DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION
KHOJA BERAJA VILLAGE
JAMNAGAR DISTRICT

PREPARED BY

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PROF. K. J. SAVALIYA

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad – 382424 Gujarat

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Gujarat Technological University,
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CERTIFICATE

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

Detail Project Report for,

VILLAGE: KHOJA BERAJA

DISTRICT: JAMNAGAR

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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College Stamp:	

ABSTRACT

Vishwakarma yojna is providing the benefits of site work experience to engineering students and simultaneously apply their technical knowledge in the development of infrastructure in rural development with sustainable development.

Under this project, the villages are surveyed and this project was identified and selected for implementation. Rurbanisation is tobring peace of mind to the villagers by providing them the basic amenities and still keeping the village soul. This project gives one idea for development of rural villages. Also gives procedure how they fulfill basic requirements of the villages.

Khoja beraja is a village in Jamnagar taluka in Jamnagar district of Gujarat state. It is located 19KM towards south from district head quarters Jamnagat. 340 KM from state capital Gandhinagar.

Elevation is **16 meter** above the sea level.

Pipli (3 km), Vav beraja (4km), Chandragadh (5km), Lonthiya (5 km), Jivapar (5km) are the nearby villages to khoja beraja. Khoja beraja is surrounded by Jamnagar taluka towards East, Khambhalia Taluka towards west, Jamjodhpur Taluka towards South, Kalavad Taluka towards East.

Khoja beraja local language is Gujarati. Total population of village is 791 and number of houses are 165. Female population is 47.9%. Village literacy rate is 63.1% and the female literacy rate is 27.2%.

The village has a power supply with 24 hour power supply in summer and 24 hour power supply in winter. Govt primary school is available in the village. Treated tap water supply all round the year and in summer also available. No drainage system available in this village. Drain water is discharged into sewer plant. Public bus service available in this village.

Key words:
Rurbanisation
Sustainble Development
Infastructure facilities
Smart development

ACKNOWLEDGEMENT

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

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 center
PPP	Public private partnership
NGO	Non government organization
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
WBM	Water bound macadam
R.C.C	Reinforcement concrete cement
P.C.C	Plain Concrete cement
S.W.M	Solid waste Management
PMGSY	Pradhan Mantri Gram Sadak Yojana
VF	Vertical Farming

Chapter: 1
Kuvadava village visit from your District of Gujarat State

Introduction:

Ideal village concept adopted by national , state and local governments of India , as an focused on holistic rural development , derived from Mahatma Gandhi‘s vision of Adarsh Gram(ideal village) .The 'gaon' with the green fields, clean air and clear blue sky always gives a nostalgic charm to any individuals. But, it is very unfortunate that villages which have so many things to offer are still very backward. Poverty, lack of education and lack of even the basic needs are washing away the charm, of the villages. But, beating the odd there are some Indian villages which have set a different level of milestone altogether.

1.1 Background and study area location:

Vishwakarma project is provide the benefits of real work experience to engineering students and simultaneously apply their technical knowledge in the development of infrastructure-Health in rural development. Under this scheme, the villages are surveyed and this project was identified and selected for implementation. Rurbanisation is to bring peace of mind to the villagers by providing them the basic amenities required and still keeping the village soul. This project gives one new idea for Development of rural villages. Also gives procedure how they fulfill needs of the villages. As a measure to strengthen the Panchayat Raj Institutions in terms of functions, powers and finance. GramSabha, NGOs, Self-Help Groups and PRIs have been accorded adequate role to make participatory democracy meaningful and effective. By this Vishwakarma yojna project government want technical solution of the problem of villages at the engineering point of view.

Study area location:

According to Census 2011 information the location code of Kuvadva village is 512944. Kuvadva village is located in Rajkot Tehsil of Rajkot district in Gujarat, India. It is located 17km away from Rajkot, which is both district & sub-district headquarter of Kuvadva village. Kuvadva village has gram panchayat.

1.2 Concept of ideal village:

A model village has good system of sanitation and drainage. Because filth and rubbish of the village should be regularly removed away into the compost pits. An ideal village has very good drainage system so that the dirty water of the village is properly drained away.

House: The residence/house in an ideal village are very neat and clean. The owners of these houses look to the house sanitation and house-drainage. The houses have sufficient windows to let in air and light.

Agriculture: People of an ideal village are good farmers and good in nature. They grow food crops and seasonal crops etc. Now they improved method of farming for more production of crops.

Educational facilities: There are Primary schools and High schools in an ideal village. Primary education is free and compulsory.

Medical facilities: In an ideal village, there are clinical facilities for villagers and animals. Hence, there are lots of dispensaries

Other facilities: We can find post-office, public library, playground, garden, Skill Development Centre etc…

People: People of an ideal village are very neat and clean. They have a sense of discipline and collaboration. They have a spirit of service and let go.

1.2.1 Objectives of smart village:

- Homes with access to toilet safe drinking water and regular power.
- A smart village knows all information about its citizen, available resources, applicable services and schemes.
- Every household has diversified livelihood opportunities and micro enterprise.
- Microenterprise a business operating on a very small scale, esp. with one with a sole proprietor and fewer than six employess.
- Maintain its identify, culture and heritage.
- It works towards revenue generation.
- End all preventable materanal depths and infant deaths
- Plans for development based on people assets

1.2.2 live case study of ideal village in Gujarat, India.

Based on Census 2011 information the location code is 512944. Kuvadva village is located in Rajkot Tehsil of Rajkot district in Gujarat, India. It is situated 17km away from Rajkot.

Map of Village

Gram Panchayat	Kuvadava
Block / Tehsil :	Rajkot
District	Rajkot
State	Gujarat
Pin code	360023
Area	2015.48 hectare
Population	8214
Household	1552
Nearest town	Rajkot

Fig-1 Map of village

1.2.3 The idea of model/smart village:

The idea of smart village in present day context seems more reasonable as there is a limit of growth of cities which is leading to creation of urban jungles, where the population ratio per km of land is way above the desired norms. A smart village is one which will automatically link local production with local procurement and local distribution. A smart village will also have power, knowledge, healthcare technology, entrepreneurship and internet connectivity.

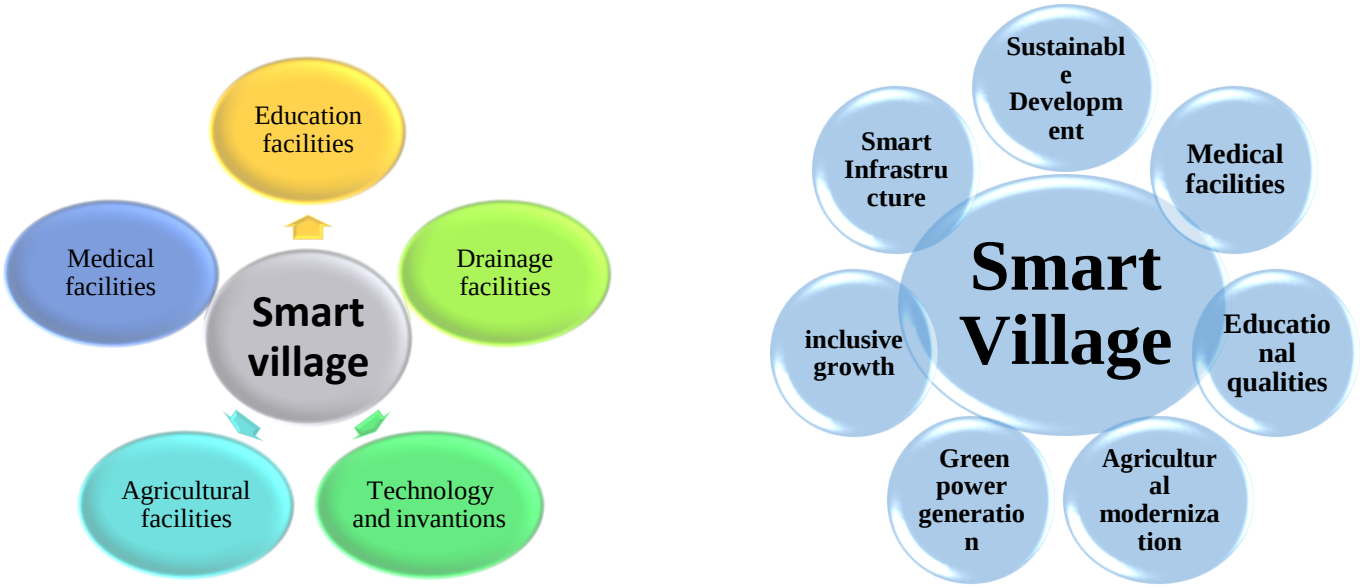


Figure 2, 3. New Factors of Ideal Model

1.2.4 Ancient history of civil:

The earliest practice of civil engineering may have commenced between 4000 and 2000 BC in ancient egypt the Indus valley civilization and Mesopotamia when humans started to abandon a nomadic existence creating a need for the construction of shelter.

1.3 Detail study (Socio economic, physical, demographic and infrastructure details):

Physical &demographical growth:

According to Census 2011 information the location code of Kuvadva village is 512944. Kuvadva village is located in Rajkot Tehsil of Rajkot district in Gujarat, India. It is located 17km away from Rajkot, which is both district & sub-district headquarter of Kuvadva village.The geographical area of village is 2015.48 hectares. Kuvadva has a total population of 8,214 peoples. There are about 1,552 houses in Kuvadva village. Rajkot is nearest town to Kuvadva which is approximately 17km away.

Vishwakarma project is provide the benefits of real work experience to engineering students and simultaneously apply their technical knowledge in the development of infrastructure in rural development. Under this scheme, the villages are surveyed and this project was identified and selected for implementation. Rurbanisation is to bring peace of mind to the villagers by providing them the basic amenities required and still keeping the village soul. This project gives one new idea for Development of rural villages. Also gives procedure how they fulfill needs of the villages. As a measure to strengthen the Panchayat Raj Institutions in terms of functions, powers and finance. GramSabha, NGOs, Self-Help Groups and PRIs have been accorded adequate role to make participatory democracy meaningful and effective. By this Vishwakarma yojna project government want technical solution of the problem of villages at the engineering point of view. village concept adopted by national , state and local governments of India , as an focused on holistic rural development , derived from Mahatma Gandhi‘s vision of Adarsh Gram(ideal village)

.The 'gaon' with the green fields, clean air and clear blue sky always gives a nostalgic charm to any individuals. But, it is very unfortunate that villages which have so many things to offer are still very backward. Poverty, lack of education and lack of even the basic needs are washing away the charm, of the villages. But, beating the odd there are some Indian villages which have set a different level of milestone altogether.

Sr no	Census	Population	Male	Female
1	2001	6959	4774	2185
2	2011	8214	4240	3974

People of an ideal village are good farmers and good in nature. They grow food crops and seasonal crops etc. Now they improved method of farming for more production of crops.

Table 1 population of kuvadava

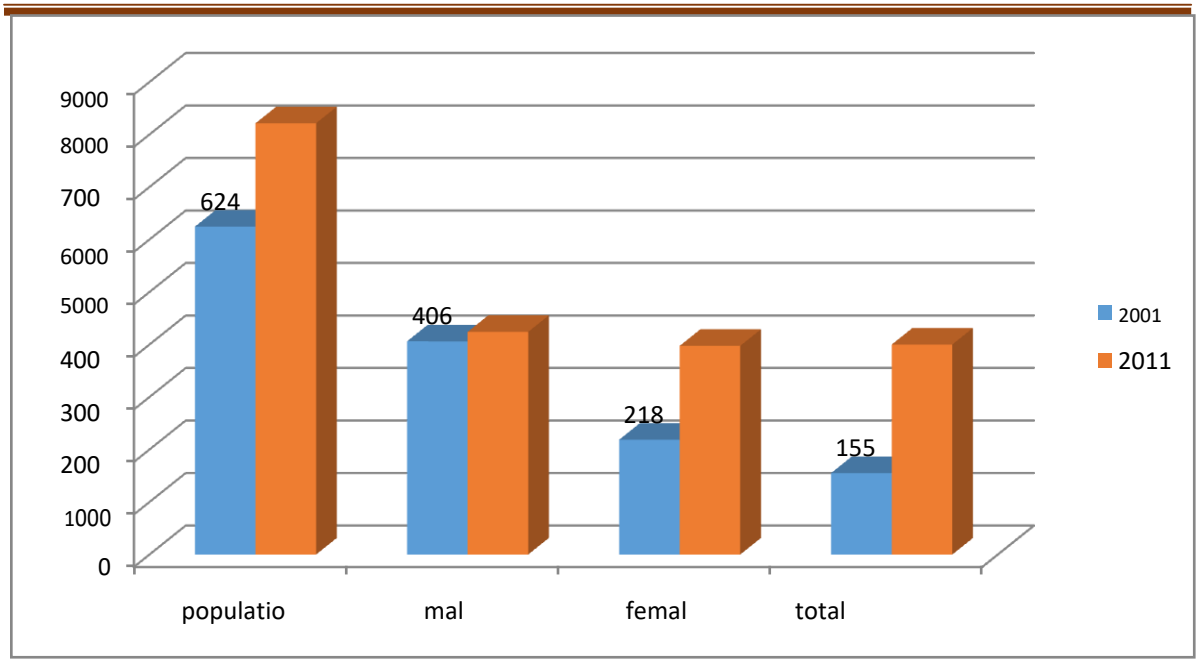


Figure: 4 Population of kuvadava

Economic Profile:

Table 2 Economic profile

Name of three major occupation groups in village	Farming	70%
	Production of food items	20%
	Jobs in Rajkot	10%

Occupation details: Farming, Business, Dairy, Production of food item

Social scenario: We have that found that all villagers of this village are much connect with today technology environment and working area and production of paindas ,etc

Infrastructure Facilities:

Fig-5 School

Fig-6 Community Hall

Figure- 7 Police station

Fig-8 CHC

Fig- 9. Bank

R.C.C. roads:

Fig- 10. R.C.C Roads

Fig-11. Agricultural co-operative bank

1.4 Swot analysis of ideal village: (Table 3)

Strength: Proper drainage facilities, Transportation facilities , Sanitation facilities
Weaknesses: Unproper disposal of waste, Unproper layout of village, No facilities for higher secondary education
Opportunities: Improving in waste management, Woman empowerment, Educational awareness
Threats: Lack of Awareness of villagers about cleaning, education, agriculture field

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

For future prospect, the village kuvadava can use more advanced technologies for agricultural prospect and for other requirements also. They can make the village Wi-Fi zone and can improve the computer labs in the schools. They can also provide biogas plant in the village.

1.6 Benefits of visits:

We visited kuvadva village, Rajkot,By the visit of the village kuvadava, we got an idea about anideal village. We had seen much kind of new technologies which can be used in village that are being used in the urban area. By this visit of this village, it has improved our communication skills and we knew how to interact with the different peoples.

- To improvement allocated village
- To understand allocated village condition

1.7civil aspects required in ideal village:

We visited kuvadva village, Rajkot,By the visit of the village kuvadava, we got an idea about an ideal village. By visiting kuvadva village we observed different type of infrastructure required. But some facilities are lacking in the kuvadva village.

Infrastructure like swimmimg pool, garden are required for recreational facilities. Library are also required for study purpose. Ponds are also required for water requirement in summer season.

Chapter: 2

Khoja beraja Literature Review

2.1 Urban:

Urban is that area where the population density is more and new facilities are provided to the people. Urban areas are the region surrounding a city. Most of inhabitants of urban areas have non-agricultural jobs. Urban areas have municipality, corporation, cantonment board or notified town area committee etc. According to census 2011, there are 7,935 towns, 4,041 statutory town and 3,894 census towns.

Rural:

All the areas which are not characterised as urban area is called rural area. In which the population is very low compared to urban areas. Mainly they depend on agricultural activities. According to census 2011, there are 6, 40,867 villages in India. The area where more than 75% of male population is associated with agricultural activity is known as rural area.

2.2 Importance of the rural development:

Rural development has assumed greater importance in India today than in the earlier period in the process of the development of the country. It is a strategy package seeking to achieve enhanced rural production and productivity, greater socio-economic equity, and aspiration, balance in social and economic development.

2.3 Ancient village / different definitions of rural areas village:

Rural areas have low population density and large amount of undeveloped land. Agricultural activities are more in rural areas.

Rural areas are large and isolated areas of and open country with low population density.
United states census(2000 census) defines rural areas as comprising open country and settlements with fewer than 2500 residents areas designated as rural can have population densities as high as 999 per square mile as 1 person per square mile.
United states development of agriculture (2002 form bill) defines rural areas as any area other than a city or town that has a population of greater than 50,000 inhabitants and the urbanized areas contiguous and adjacent to such town or a city.
National geographic society defines A rural area is an open swath of land that has few homes or other buildings and not very many people.

2.4 Scenario: rural / urban villages of India population growth:

Agenda of census of India is to release of provisional population totals-Rural urban distribution.
Population of Rural and Urban area (in crore)

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

Table-4 Population of Rural and Urban areas as per census 2001 and 2011

For the first in since independence, the absolute increase in population is more in urban areas that in rural areas.

Rural-Urban Distribution: 68.84% & 31.16

Level of urbanisation increased from 27.81% in 2001 census to 31.16% in 2011. Literacy rates (in %)

	2001	2011	Difference
India	64.8	74.0	+9.2
Rural	58.7	68.9	+10.2
Urban	79.9	85.0	+5.1

Table:5 Literacy Rates in Rural and Urban areas as per Census 2001 and 2011

The improvement in literacy rate in rural area is two times that in urban areas.
The rural urban literacy gap which was 21.2% points in 2001, has come down to 16.1% points in 2011
Literacy Rates (in %)

	2001	2011	Difference
Male			
India	75.3	82.1	+6.8
Rural	70.7	78.6	+7.9
Urban	86.3	89.7	+3.4
Female			
India	53.7	65.5	+11.8
Rural	46.1	58.8	+12.7
Urban	72.9	79.9	+7.0

Table:6 Literacy Rates in Rural and Urban area as per the males and female

2.5 Scenario : rural / urban villages gujarat as per census 2011

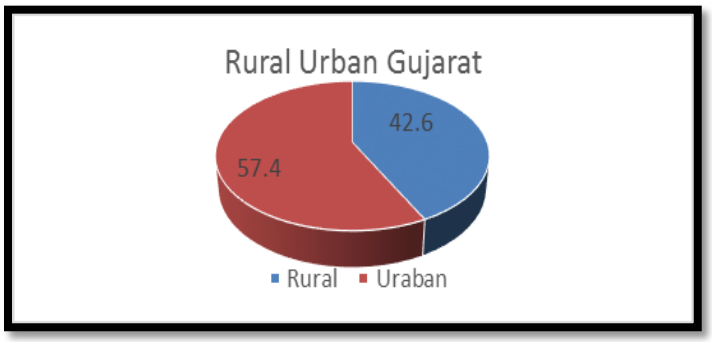


Fig- 12 population of Gujarat in %

Population	2001	2011
Male	26,385,577	31,491,260
Female	24,285,440	28,498,432
Total	50,671,017	60,439,692

Table:7 Population of Gujarat as per census 2001 & 2011

2.6 Rural development issues – concerns – measures

Following issues are concern with rural areas:

1) People are directly or indirectly dependent on agriculture and a large number of landowners have small and medium-sized landholding.
2) Economy of the people living in rural areas is low.
3) The price the farmers get for their produces less than in relation to the work they put in
4) People have to migrate to the urban areas due to unavailability of education.
5) The other rural problems are due to the fact that since the rural people do not live in concentrated masses, the availability of specialized service to them is minimum.
6) Very less people are employed in the rural areas
7) Lack of physical facilities in rural areas
8) Lack of recreational facilities Farmers are not having market area for selling their goods directly to the market.
9) Lower living standards
10) No transportation facility
11) Less awareness
12) Less income opportunity

Various measures:

Rural development is the national necessity and it has following measures:

1. To develop rural area as whole in terms of culture, society, economy, technology and health.
2. To develop living slandered of rural mass.
3. To develop rural youths, children and women.
4. To develop and empower human resource of rural area in terms of their psychology, skill, knowledge, attitude and other abilities.
5. To develop infrastructure facility of rural area.
6. To provide minimum facility to rural mass in terms of drinking water, education, transport, electricity and communication.
7. To develop rural institutions like Panchayat, cooperatives, post, banking and credit.
8. To provide financial assist to develop the artisans in the rural areas, farmers and agrarian unskilled labor, small and big rural entrepreneurs to improve their economy.
9. To develop rural industries through the development of handicrafts, small scaled industries, village industries, rural crafts, cottage industries and other related economic operations in the rural sector.

10. To develop agriculture, animal husbandry and other agricultural related areas.
11. To restore uncultivated land, provide irrigation facilities and motivate farmers to adopt improved seed, fertilizers, package of practices of crop cultivation and soil conservation methods.

2.7 Various infrastructure guidelines with the norms for villages for the provisions of different infrastructure facilities:

Physical Facilities:

Road Facilities: An ideal village must have good road facilities that the people can easily move from one place to other. The roads linking with the other nearby village or town or city must be provided.

Dwelling Houses: The dwelling-house in an ideal village are very neat and clean. The dwellers of these houses look to the house sanitation and house-drainage. The houses havesufficient windows to let in light and air. All the houses are roofed by good tiles at least.

Electricity: The electricity should be supplied 24 hours. The village should have good facilities of electricity because most of the work now days depend on electricity

Social Facilities:

Sanitation and Drainage: An ideal village has good system of sanitation and drainage. Because filth and rubbish of the village should be regularly removed away into thecompost pits. An ideal village has very good drains so that the dirty water of the village is properly drained away.

Food and fooder: The villagers grow food for themselves and fodder for their cattle. They eat fresh and healthy food. They grow good grass for fodder and also leave sufficient land for pasture

Drinking Water: An ideal village should have good supply of drinking water. There are enough tube-wells in an ideal village. There are separate ponds for men and cattle.

Agriculture and Industry: People of an ideal village are good farmers and good artisans. They grow food crops, commercial crops and oil-seeds. They take up improved method of farming. They do all kinds of home-industry including spinning and weaving.

Educational Facilities: There are Primary schools, High schools and craft schools in an ideal village. Primary education is free and compulsory.

Clinical Facilities: In an ideal village, there are clinical facilities for men and the domestic animals. Hence, there are dispensaries and veterinary dispensaries.

Socio-Cultural Facilities:

These include facilities like playgrounds, library, gardens, Lake Etc.

Sustainable Facilities:

An ideal village should have facilities like biogas plant, solar systems, use of rain water harvesting system etc.

2.8 Other projects\ schemes:

In other projects for the development of the rural area is the Public Private Partnership (PPP).

Public-Private-Partnership - The Concept:

Public-Private-Partnership or PPP is a mode of implementing government programmes/schemes in partnership with the private sector. The term private in PPP encompasses all non-government agencies such as the corporate sector, voluntary organizations, self-help groups, partnership firms, individuals and community based organizations, PPP, moreover, subsumes all the

objectives of the service being provided earlier by the government, and is not intended to compromise on them. Essentially, the shift in emphasis is from delivering services directly, to service management and coordination. The roles and responsibilities of the partners may vary from sector to sector. While in some schemes/projects, the private provider may have significant involvement in regard to all aspects of implementation; in others s/he may have only minor role.

The potential benefits expected from PPP could be mentioned as below:

- Cost-effectiveness- since selection of the developer/ service provider depends on competition or some bench marking, the project is generally more cost effective than before.

- Higher Productivity-by linking payments to performance, productivity gains may be expected within the programme/project.
- Accelerated Delivery– since the contracts generally have incentive and penalty clauses is implementation of capital projects/programmes this leads to accelerated delivery of projects. Clear Customer Focus- the shift in focus from service inputs to outputs create the scope for innovation in service delivery and enhance customer satisfaction.
- Enhanced Social Service- social services to the mentally ill, disabled children and delinquents etc. require a great deal of commitment than sheer professionalism. In such cases, it is Community/Voluntary Organizations (VOs) with dedicated volunteers who alone can provide the requisite relief.

Chapter: 3
Smart Cities/ Village Concept as per your Idea and its Visit

3.1 Concept:

In Smart Villages access to sustainable energy services acts as a catalyst for Development – enabling the provision of good education and healthcare, access to Clean water, sanitation and nutrition, the growth of productive enterprises to boost Incomes, and enhanced security, gender equality and democratic engagement.

Smart Village refers to a concept developed in rural area that provides solutions to problems occurred and improves the quality of life. The main problems faced by rural areas are cover poverty, low level of education, and limited access to technology. Smart village concept emerged due to some different characteristics between rural and urban areas. Banyuwangi Regency is one of regions that created smart concept starting from rural area, called smart kampung. So far, smart kampung only focused on public services, which included only a small part of smart city concept. Hence, this research was intended to propose the model of smart village examined through initial interview in village sample of Banyuwangi, literature reviews related to smart city, smart village, and smart rural. Then, the results were confirmed and adjusted to support local regulations. This research created a smart village model that was capable to be a guide for each village to develop towards better future. The proposed smart village model was categorized into 6 dimensions including 1) Governance, (2) Technology,(3) Resources, (4) Village Service, (5) Living, and (6) Tourism. This research is expected to be applied to villages in other Regencies by adjusting the characteristics of each region**.**

Introduction:

We have selected the smart village as pithad (Jodiya) It is located in Jamnagar district.

Pithad is a large village located in Jodiya Taluka of Jamnagar district, Gujarat with total 776 families residing. The Pithad village has population of 3940 of which 1989 are males while 1951 are females as per Population Census 2011.

In Pithad village population of children with age 0-6 is 437 which makes up 11.09 % of total population of village. Average Sex Ratio of Pithad village is 981 which is higher than Gujarat state average of 919. Child Sex Ratio for the Pithad as per census is 1033, higher than Gujarat average of 890.

Pithad village has lower literacy rate compared to Gujarat. In 2011, literacy rate of Pithad village was 73.42 % compared to 78.03 % of Gujarat. In Pithad Male literacy stands at 81.74 % while female literacy rate was 64.89 %.

As per constitution of India and Panchyati Raaj Act, Pithad village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Pithad village.

Particular	Total	Male	Female
Total no of houses	776	-	-
Population	3940	1989	1951
Child (0-6)	437	215	222
Schedule caste	496	251	245
Schedule tribe	0	0	0
Literacy	73.42%	81.74%	64.89%
Total workers	1436	1198	238
Main workers	1216	-	-
Marginal workers	220	37	183

Table -8 Data of Pithad village

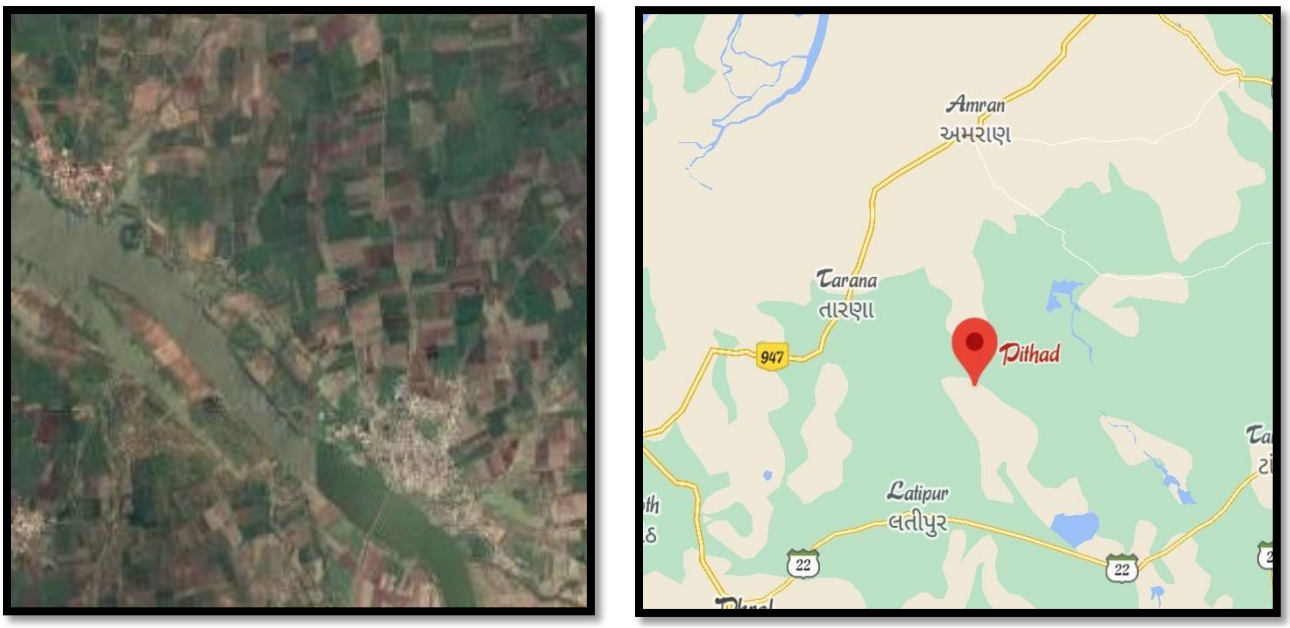


Fig-13 Location of pithad

Definition

Smart village means all the necessaries facilities is developed in the village and no need to moves in city for any kind of requirement.

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

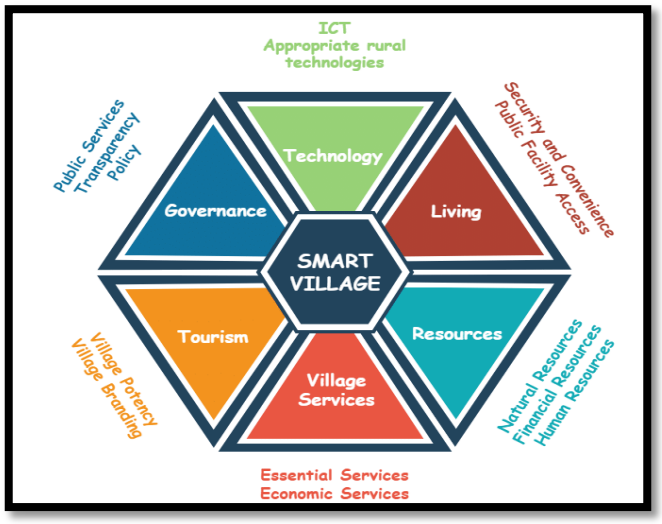


Fig – 14 Smart village Model

3.2 Vision – Goals, standards and performance measurement indicators:

Transport :

- Maximum travel time of 30 minutes in small & medium size cities and 45 minutes in metropolitan areas.
- Continuous unobstructed footpath for 2 m wide on either side of all street with Row 12 m more
- Dedicated and physically segregated bicycle tracks with width of 2 m or more, one in each direction, should be provided on all streets with carriage way larger than 10 m
- High quality and high frequency mass transport within 800 m (10-15-minute walking distance) of all residences in areas over 175 persons/ ha of built area.

Spatial Planning:

- 175 persons per Ha along transit corridors.
- 95% of residences should have daily needs retail, parks, primary schools and recreational areas accessible within 400m walking distance.
- 95% residences should have access to employment and public and institutional transport or bicycle or walk
- At least 20% of all residential units to be occupied by economically weaker sections in each Transit Oriented Development Zone 800m from Transit Stations
- At least 30% residential and 30 commercial/institutional in every TOD Zone within800m of Transit Stations

Water Supply:

- 24 x 7 supply of water
- 100% household with direct water supply connections
- 135 liters of per capita supply of water
- 100% metering of water connections
- 100% efficiency in collection of water related charges.

Sewerage & Sanitation:

- 100% households should have access to toilets
- 100% schools should have separate toilets for girls
- 100% households should be connected to the waste water network
- 100% efficiency in the collection and treatment of waste water
- 100% efficiency in the collection of sewerage network

Solid management:

- 100% households are covered by daily door-step Collection system.
- 100% collection of municipal solid waste
- 100% segregation of waste at source, i.e. bio-degradable and non- degradable waste
- 100% recycling of solid waste

Storm storage:

- 100% coverage of road network with storm water drainage network
- Aggregate number of incidents of water logging reported in a Year = 0
- 100 % rainwater harvesting

Electricity:

- 100% households have electricity connection 24 x 7 supply of electricity
- 100% metering of electricity supply
- 100% recovery of cost
- Tariff slabs that work towards minimizing waste

Health care facilities:

- Availability of telemedicine facilities to 100% residents
- 30 minutes‘ emergency response time
- 1 dispensary for every 15,000 residents
- Nursing home, child, welfare and maternity.enter - 25 to 30 beds per lakh population.

3.3 Technological Options for Smart Cities:

Smart energy, Smart mobility, Smart infrastructure, Smart public services, Smart care. Following various techniques can be promoted improving the life of people in villages and for actual development of smart villages.

➢ Enhanced Use of Smart Phones and Optical Fiber Technology for Internet Techniques

➢ Online Library and E- Education

➢ Smart Agriculture

➢ Smart and Efficient Public Transport System

➢ Smart Sewage Management System and Sanitation

➢ Renewable Energy Sources and Solar Energy

➢ Latest and Affordable Medical Facilities.

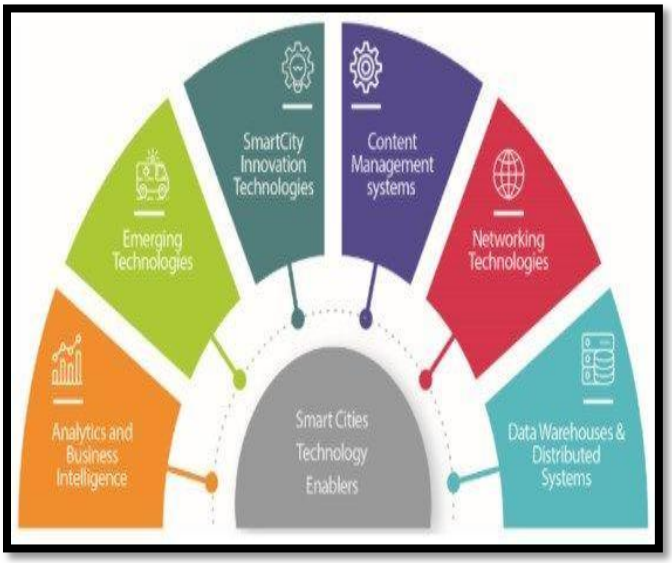


Fig – 15 Smart village technologies

3.4 Road Map and Safe Guards:

The visual perception of Indian villages has not changed much though certain corrective policy measures and infrastructural reforms have taken place.
➢ Governments need to transform our villages into smart habitats by generating lucrative economic opportunities and addressing the basic challenges rural areas are facing for decades.
➢ A combination of factors like agriculture becoming less remunerative, poor civic services, defunct infrastructure, and unavailability of good career opportunities has accelerated the migration from rural areas to cities.

3.5 Smart Cities: Issues & Challenges:

This is the first time, a MoUD programme is using the _Challenge‘ or competition method to select cities for funding and using a policy of area-based development. This captures the spirit of **viable and helpful federalism‘.**

States and ULBs will show a key helpful role in the growth of Smart Cities. Smart management and vision at this level and ability to act conclusively will be important factors determining the success of the Mission.

Understanding the concepts of retrofitting, redevelopment and Greenfield development by the policy makers, implementers and other stakeholders at different levels will require capacity assistance.

Major investments in time and resources must be made during the planning phase prior to contribution in the Challenge. This is different from the conventional DPR-driven approach.

The Smart Cities Mission requires smart people who actively contribute in governance and improvements. Citizen contribution is much more than a official participation in governance. Smart people involve themselves in the definition of the Smart City, decisions on organizing Smart Solutions, implementing reforms, doing more with less and mistake during applying and designing post-project structures to make the Smart City developments sustainable. The participation of smart people will be enabled by the SPV through increasing use of ICT, especially mobile-based tools.

3.6 Smart infrastructure:

Smart infrastructure’ responds intelligently to changes in its environment, including user demands and other infrastructure, to achieve an improved performance.
A smart system uses a feedback loop of data, which provides evidence for informed decision-making. The system can monitor, measure, analyze, communicate and act, based on information captured from sensors. Different levels of smart systems exist.
A system may: collect usage and performance data to help future designers to produce the next, more efficient version; collect data, process them and present information to

help a human operator to take decisions (for example, traffic systems that detect congestion and inform drivers); Use collected data to take action without human intervention

- Smart building
- Smart mobility
- Smart energy
- Smart waste management
- Smart health
- Smart parking
- Smart traffic management

Fig-16 Smart Infrastructure

3.7 Cyber security:

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

As several critical services become interconnected, the need for cyber security surges to protect data exchanges, privacy as well as the health and safety of citizens. However, there is currently no harmonized guideline or standard to model these data exchanges. This leads IPT operators, municipalities, policy makers as well as manufacturers, solution providers and vendors to adopt specific solutions with low scalability and disparate requirements.

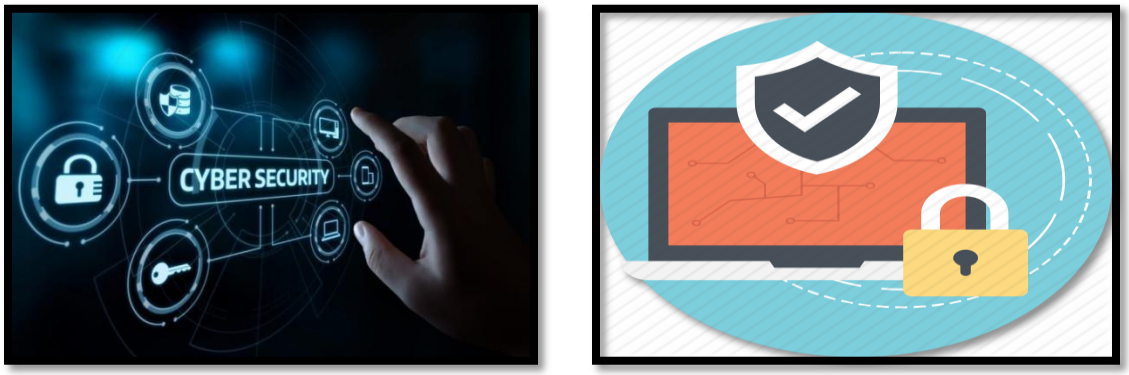


Fig-17 Cyber security

3.8 District cooling and heating:

Air condition from Hammond services

In the Southeast, air conditioners are almost crucial pieces of equipment for home comfort. However, it can be difficult to find the right air conditioner for your home, one that will provide enough cool air in the summer to cool your home without driving your energy costs

through the roof. We can help! At Hammond Services, we can help you choose the perfect air conditioner for your home, install it professionally, and even maintain/repair it in the years ahead.

Energy Efficient and Affordable Air Conditioners

When it comes down to selecting a new air conditioner for your home, there are a few things you should consider. First of all is efficiency. By choosing an energy efficient model, you can be sure your money is being well spent and isn‘t being thrown away with inefficiencies. Get the most bang for your buck with an air conditioner that won‘t cost a fortune to run. Reliability You Can Count On As a Carrier Factory Authorized Dealer, our commitment to quality products you can count on is clear. We‘re confident when we say that with the proper maintenance, you can count on our air conditioners to operate efficiently for years to come. If you‘re having trouble choosing an air conditioner for your home, contact us today – we can help you weigh your options!

3.9 Strategic options for fast smart city development:

Sometimes the smartest tech is low-tech: When exploring ways to extract value from open sensor data, don‘t overlook the invaluable role inexpensive, low-tech options can play in advancing Smart City goals.

Go small before you go big: The use of pilot projects and open sensor data can play a pivotal role in ensuring high returns for Smart City initiatives.

Collaborate, collaborate, collaborated: Open data sharing and collaboration with residents, civic tech communities and ecosystem partners is essential for driving Smart City innovation.

Treat sensor data like a valuable asset: it is Cities are discovering the importance of having full access to their own Smart City data, and can share it with others.

Attend to the tech must haves: Some technologies that are promoted as essential are really just nice-to-haves, but there are two technologies for succeeding with open sensor data that are undeniably must- haves.

3.10 India’s urban water and sanitation challenges and role of indigenous technologies:

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

To achieve the target of cleanliness, the technologies to treat the waste material should also be developed along with creating awareness. There are many technologies that are used to treat waste material.. At the same time, indigenous technologies are low cost capital and easy to

use and they can also be used by different size units. In India, they are particularly suitable for the small and medium units. In this regard, a National workshop on Indigenous water, Wastewater and Solid Waste Treatment Technologies was organized by the Department of Atomic Energy(DAE) in January 2015 at Gujarat Technological University (GTU) in Ahmadabad. The objective of the workshop was to disseminate indigenous technologies of water, wastewater and solid waste treatment developed by the Bhabha Atomic Research Centre (BARC) under ‒Swachh Bharat Abhiyan‖ and to bridge gap between the research at the research centers and the practical application of the technologies.

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

Indigenous water purification technologies:

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

Environment friendly Plasma technologies:

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

Unique Multi Stage Biological Treatment Solution:

Multi Stage Biological Treatment Solution (MSBT) can be implemented on existing STP which is not able to process Sewage to optimum efficiency. MSBT can be implemented as a modular or container on the banks of rivers on Drains/Nalas which discharge waste water to the river. It can also be implanted in small urban societies and housing complex for better water management.

Benefits of MSBT are: No Surplus of Organic Sludge, No Odour problem, Drastic reduction of electrical Power usage which minimizes operating costs, No need for return sludge pumping (minimizing electromechanical component which ultimately reduces operating cost).

Role of environmental isotope techniques in the water resources development and management:

There are two type of isotopes, stable isotopes and radioactive isotopes. Isotope techniques are used to find out the type of contamination in surface water and ground water, the sources and

origin of contamination, pollutant dispersion in surface water bodies, to assess the groundwater salinity, to assess the changes due to long-term exploitation of groundwater, for hydro-chemical investigation and to carry out geochemical evolution of groundwater.

3.11 Initiatives in village development by local self-government:

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 gover-ents and development authorities and State governments that would avoid overlaps and facilitate coordinated programming. Improved personnel incentives 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.

B. 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.

C. 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 (eg, 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 in village development by local self governmemt:

Sansadadarsh gram yojana gram panchayat:

- It is a rural development programme broadly focusing upon the development in the villages which includes social development, cultural development and spread motivation among the people on social mobilization of the village community.
- The programme was launched by the Prime minister of India, NarendraModi on the birth

anniversary of Jay Prakash Narayan.

- The distinct feature of this yojana is that it is

a)Demand driven

b) Inspired by society

c)Based on peoples participation

OBJECTIVES:

- The development of model villages is called adarsh grams, through the implementation of existing schemes, and certain new intiatives to be designed for the local context , which may vary from village to village.
- Creating models of local development which can be replicated in other villages.

3.13Any projects contributed working by government/ NGO/ other digital country project:

Following are the projects/schemes by Govt. Sector:

1. PM Fasal Bima Yojana
2. Unified Package Insurance Scheme
3. Pradhan Mantri Krishi Sinchayee Yojana
4. Paramparagat Krishi Vikas Yojana
5. National Mission on Sustainable Agriculture
6. National Agricultural Market (NAM)
7. Mission for Integrated Development of Horticulture
8. Rashtriya Krishi Vikas Yojana – RAFTAAR (RKVY-RAFTAAR)
9. Bringing Green Revolution to Eastern India (BGREI)
10. Soil Health Card Scheme
11. National Food Security Mission
12. Kisan Credit Card (KCC)
13. National Mission on Agricultural Extension and Technology
14. Strengthening & Modernization of Pest Management Approach in India (SMPMA)
15. National Mission on Bovine Productivity
16. National Program for Bovine Breeding and Dairy Development (NPBBDD)
17. National Dairy Plan-I
18. Dairy Entrepreneurship Development Scheme (DEDS)
19. Blue Revolution: Integrated Development and Management of Fisheries
20. Pandit Deen Dayal Upadhyay Unnat Krishi Shiksha Yojana
21. National Innovations on Climate Resilient Agriculture (NICRA)
22. Interest Subvention Scheme
23. Arya Project
24. Krishi Vigyan Kendras (KVK)
25. Agri Udaan
26. Mera Gaon-Mera Gaurav

27. Integrated Scheme for Agricultural Marketing
28. Krishi Kalyan Abhiyaan
29. Pradhan Mantri Annadata Aay Sanrakshan Abhiyan (PM-AASHA)
30. National Agricultural Higher Education Project (NAHEP)
31. Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)
32. Other Initiatives

3.14 How to implement other countries,smart villages, projects in Indian village context (Regarding environment, Employement)

INTRODUCTION

- In India there are 6,00,000 villages out of them 1,25,000 villages are backward so there is a need for designing and building the village as a smart village.
- With modernization and urbanization people migrate from one place to anotherplace for different facilities such as education, employment and affinity o f people towards the locality or city.
- Village is main criteria for development of nation. So, develop the village in such away that which is self dependant in providing the services, employment and well connected to the rest of the world i.e. smart village.
- The smart village corrects the social oversight by providing accommodations for sustainable family relationships without disturbing the lifestyle of different generations .Vishwakarma Yojana Jodiya Village, Jamnagar District 2019 – 20 Gujarat technical university .
- The vision of smart village is that modern energy access can act as catalyst fordevelopment in education , health , productive enterprise , clean water , sanitation ,environmental sustainability and participatory democracy which helps to support further improvement in access to energy .

Chapter: 4
About Khoja Beraja

4.1 Introduction:

4.1.1 Introduction about khoja beraja village:

GTU allocated one village to us of Gujarat for surveying which is the Khoja beraja near Jamnagar district. This is our study area to find problem related to structure and general amenities. Khoja beraja is 19 km away from Jamnagar.

4.1.2 Justification:

To development of village compare to the city area in the basic facility to needed for people and their amenities and to study whole village. For development the basic needed and their requirement. It should development gram-panchayat, anganvadi, road, drainage, Library, smart school, hospital, etc...

- To reduce migration from rural to urban areas.
- To provide basic and sustainable facilities to rural area to reduce the pressure on urban areas.
- To Give urban touch to the rural soul
- To uplift the living standard of rural people by providing facilities and better infrastructure.
- For making the village source of income for other nearby villages.

4.1.3 Study area:

GTU allocated one village to us of Gujarat for surveying which is the Khoja beraja near Jamnagar district. This is our study area to find problem related to structure and general amenities. Khoja beraja is 19 km away from Jamnagar.

4.1.4 Objective of the study:

1. To analyze the existing conditions.
2. To find out the problems of Khoja beraja village.
3 To analyses existing social and physical amenities, public buildings as well as infrastructure.
4. To collect socio-economic data through techno-economic survey.
5. To propose the comprehensive planning suited for ideal village.

Creation of Infrastructure:

To provide connectivity, civic and social infrastructure with provision of alternative Economy generation is the key pillars that the concept.

Basic Physical Infrastructure:

To provide Library, Water Supply, Transport, Sewerage and Solid Waste Management should be the priority on it. To provide internal roads within village , Efficient Transportation systems to improve connectivity between urban and rural areas, Public transportation facilities that need to be developed like bus stops, transport depot etc.

Basic Social Infrastructure:

To provide Health and Education facilities should be provided and ensure proper delivery of facilities to village houses. Promote development of rural areas with provision of quality housing, better connectivity, employment opportunities and supporting physical and social infrastructure. To Reduce migration from rural to urban areas due to lack of basic services.

4.1.5 Scope of study:

1. Sustainability: Clean drinking water, Sanitation, primary& secondary education, Drainage, Electricity Solid waste management, utilizing renewable source, Housing& livelihood, PHC

2. Technology: Irrigation facilities, Delivery of government services, Telecommunication & internet facilities, ATM Machines.

3. Connectivity: Physical connectivity to towns and other places through roads, Easy and cheap means of transportation, Financial connectivity.

4.Community Involvement: Planning for village development, Stable panchayti raj, Influencing personal and community behavior.

4.1.6. Methodology frame work for development of your village:

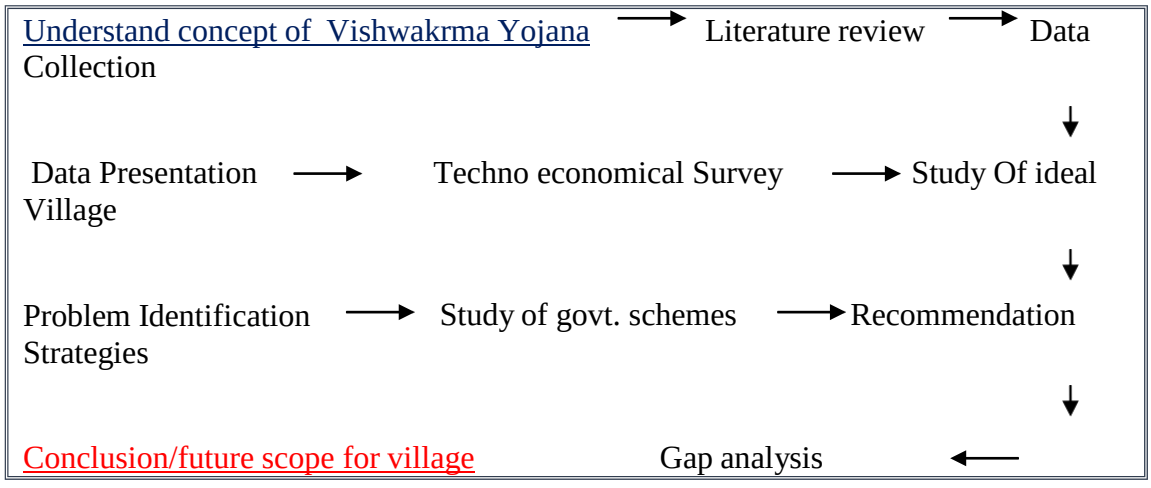


Fig- 18 Methodology framework

4.1.7 Available methodology for development of related to civil:

- Design objectives
- Project management structure
- Technical approach
- Proposed sustainability features

Objects which were available in khoja beraja village were water tank, underground sump, pucca road, primary school, anganwadi, village temple etc.

4.2 Study area location :

Khoja beraja village is located in Jamnagar district in Gujarat, India. It is situated 19 km away from Jamnagar, which both district and sub district head quarter of Khoja Beraja village.

4.2.1 Study area location with brief history land use detail:

GTU allocated one village to us of Gujarat for surveying which is the Khoja baraja near jamnagar district. This is our study area to find problem related to structure and general amenities. Khoja beraja is 19 km away from Jamnagar.

Table -9 Khoja Beraja

Village Name	Khoja Beraja
Taluka Name	Jamnagar
District	Jamnagar
State	Gujarat
Language	Gujarati,
Time zone	IST (UTC+5:30)

Brief history:

Kothariya is 19 km away from the Jamnagar.Pipli, Vav beraja, Chandragadh , Lonthiya, Jivapar are the close to Localities to Khoja beraja. Jamnagar, Khambhalia, Salaya, Kalavad are the near Cities to Khoja beraja. Khoja bearaja is a Locality in Jamnagar City in Gujarat State, India. Jamnagar Rail Way Station is major railway station 19 KM far to Khoja beraja. Khoja beraja is 16 m above sea level.

Land use detail:

Table -10 Land use data

1.	Area of village	1710.75 hectares.
2.	Irrigated area	895.06 hectares

4.2.2 Village Base Location map, Land Map, Gram Tal Map:

Fig -19 Location Map

4.2.3 Physical&demographical growth:

Sr.no	Census	Population	Male	Female	Total house hold
1	2011	791	412	379	165

Table-11 Physical &demographical growth

4.2.4 Economic generation profile / Banks:

The main economic activity of this area is farming. The People who are workers or the officers in the Jamnagar is preferable for living. No ATM in less than 10 km. Nearest Commercial Bank is available in this village. No cooperative bank in less than 10 km.

Name of three major occupation groups in village	Cultivation	74%
	Agricultural labourer	68%
	Marginal Activities	4.17%

4.2.5 Actual problem faced by villagers and smart soultion:

Sanitation

Damaged roads

Solid waste management

No children playing area

Not available collages in proper village

4.2.6 Social scenario: (Table: 12)

Sr. No.	Details	Population
Total Population		
1	Male	791
2	Female	412
Total numbers of family		
3	Total Family	165
Village Literacy rate		
1	Male literacy rate	75.53%
2	Female literacy rate	63.42%
3	Total literacy rate	69.79%

4.2.7 Migration reasons/trends:

Migration reason as include,

- Lack of services, Poverty, Flooding, For better employement, Better education.

4.3 Data collection khoja beraja village:

Data collection related to village is the most important first step for development of any village. Without data we cannot identify what is the future requirement for development of village. The following data was collected by various means like: Office record of concerned office department like- R&B Department, Talati office etc. Interaction with Sarpanch, Upsarpanch, villagers etc. Visit to different parts of village.

4.3.1 Describe methods for data collection:

Method for Collection:

- House hold for population, Occupational survey, Transportation survey, Educational survey, Techno economic survey.

4.3.2 Primary details survey:

The Primary survey was conducted to identify the various general problems of the villagers by interacting with them and enquiring about the problems faced by them in daily life. They were asked to suggest the possible and desirable solutions for these problems as well as other infrastructural facilities they would like to have in their village. Following questions were asked to the different age group and status of village people:

- Do you have enough water supplies?
- Which type of irrigation facility you are using?
- Is it enough?
- Are you comfortable with your Road network facility?

- What is your Sources of economy?
- Which type of medical facility is available?
- What is your primary need?
- Which type of facility you want first?
- Where you dispose your waste?
- Are comfortable with available medical facility?

4.3.3 Average size of the house-Geo-tagging of house:

Khoja Beraja village is located in Jamnagar taluka in Jamnagar district of Gujarat state. It is located 19 KM towards west from district headquarter Jamnagar. 340 KM from state capital Gandhinagar.

4.3.4 Number of human being in one house:

As per the surpanch and our survey there are average 4 persons per household in village .

4.3.5 Material available locally in the village and material outscored by the villagers:

Major economic option of the village is farming so there are no more locally material available like standard bricks, aggregates, concrete and reinforcements. So, this material is brought from nearest city for construction of the houses.

4.3.6 Geographical detail :

It is situated 19 km away from Jamnagar, which is both district and subdistrict headquater of khoja beraja village. As per 2009 stats khoja beraja village is also a gram panchayat. The total geographical area of khoja beraja is 1710.75 hecters.

4.3.7 Demographical details :

Table-13 Demographical details(2011)

Particular	Total	Male	Female
No of houses	165	-	-
Population	791	412	379
Child(0-6)	123	36	40
Schedule of cast	123	75	48
Schedule tribe	00.0	00.0	00.0
Literacy	69.79%	75.53%	63.42%
Total worker	264	249	15

4.3.8 Occupational details:

In Khoja Beraja village out of total population, 264 were engaged in work activities. 95.83 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 4.17 % were involved in Marginal activity providing livelihood for less than 6 months. Of 264 workers engaged in Main Work, 74 were cultivators (owner or co-owner) while 68 were Agricultural labourer.

Occupation wise Details:

Name of three major occupation groups in village	Cultivations	74%
	Agricultural labourer	68%
	Marginal activities	4.17%

4.3.9 Agriculture Detail:

Ground Nut, Cotton and wheat are agriculture commodities grow in this village. 8 hours agricultural power supply in summer and 8 hours agricultural power supply in winter is available in this village. Total irrigated area in this village is 1060 hectares from Boreholes/Tube wells 1060 hectares are the Sources of irrigation.

4.3.10 Physical infrastructure facilities-Manufacturing hub/ware houses:

Groundnut, cotton, wheat and milk are the main manufacturing product of this village.

4.3.11 Tourist development available in the village for attracting to tourist:

No tourism in this village

4.4 Infrastructure details:

4.4.1 Drinking water/water managements facilities:

Treated tap water supply all round the year and in summer also available. Uncovered well, Hand pump and tube wells are other drinking water sources.

Fig – 20 Water Tank

4.4.2 Drainage network and sanitation facilities:

Underground drainage facilities are available in all areas of the village. No treatment is given to the waste water, it is directly disposed to the outflow of lake and Drainage Strom water facility is not available in village; due to that clogging of rain water on road is problem in monsoon.

Sanitation facility:

No Drainage System Available in this Village. There is no system to Collect garbage on street. Drain water is discharged directly into sewer plants.

4.4.3 Transportation & Road network:

Public Bus service available in this village. There is no railway station in less than 10 km . No nearest National highways in less than 10 km. No nearest state highway in less than10 km. District road passes through this village. Pucca road and foot path are other roads and transportation within the village.

Fig-21 Road Network

4.4.4 Housing Condition:

There are households in the village. 40% households are kutcha and 60% are pucca.

Fig-22 House

4.4.5 Social infrastructure facilities, Health, Education, community hall, library Social infrastructure Facility:

Primary School, Panchayat Bhavan, Anganwadi, private clinic, Water tank

Health facilities:

No Primary Health Sub-Centre available in this village.

Education facilities:

Govt. Primary School is available in this Village. Nearest Govt disabled school, private primary school, govt secondary schoolm Govt arts and science degree collage, Govt engineering collage, Govt medical collage and private MBA collage,

Govt polytechnic collage and Govt ITA collage are in Jamnagar.

Fig-23 Primary School

4.4.6 Existing condition of public building and maintaince of existing public infrastructure:

In Kohoja beraja public building like gram panchyat, school, post office etc are good in condition. But Panchayat condition is not well so maintenance is required.

4.4.7 Technology mobile/wifi/internet usage detail:

Khoja beraja village is not a Wi-Fi village. Approximately only 50-60 % people use technology or mobile or internet.

4.4.8 Sports Activity as Gram Panchayat:

There is no Any Sport Activity as Gram Panchayat or in school.

4.4.9 Sociocultural facility/public garden/park/play ground/pond/Other recreation facilities:

Public garden/park/playground

There is playground in school, but no park and public garden in the village.

Village pond:

No pond is available in this village.

Other Recreation Facilities:

In the village, none recreational facilities available like there is no cinema hall or theatre.

4.4.10 Others facilities:

Other facility like post office, panchayat building, banks (sahakari mandali), temples etc are exists. This Village has a Power supply with 24 hour power supply in summer and 24 hour power supply in winter, Anganwadi centre, ASHA, Birth & Death registration office, Daily News Paper and Polling station are the other amenities in the village.

4.4.11 Any others details :

Not required.

4.5 Existing institution like-village administration-detail profile:

4.5.1 Bachat Mandali

There is no bachat mandli in the village.

4.5.2 Dudh Mandali

There is no dudh mandali in the village. It is a required infrastructure in the village as there are many people in the village working in animal husbandry.

4.5.3 Mahila forum

There is no mahila forum in the village.

4.5.4 Plantation for the Air Pollution

Yes this is available in the village**.**

4.5.5 Rain Water Harvesting

There is no infrastructure for rain water harvesting in the village

Chapter:5
Technical option with case studies

5.1 Concept:

5.1.1 Advance sustainable construction techniques/Practices and Quantity Surveying:

The term _advanced construction technology‘ covers a wide range of modern techniques and practices that encompassthe latest developments in materials technology, design procedures, quantity surveying, facilities management, services, structural analysis and design, and management studies.

Incorporating advanced construction technology into practice can increase levels of quality, efficiency, safety, sustainability and value for money. However, there is often a conflict between traditional industry methods and innovative new practices, and this is often blamed for the relatively slow rate of technology transfer within the industry.

The adoption of advanced construction technology requires an appropriate design, commitment from the whole project team, suitable procurement strategies, good quality control, appropriate training and careful commissioning.

Advanced construction technologies are commonly described as including (amongst many others) advanced forms of:

- Materials.
- Rain water harvesting
- Solar power plant
- Green house
- Building information modeling (BIM).
- Cladding systems.
- Computer aided design and computer aided manufacturing (CAD/CAM).
- Construction plant.
- Modern methods of construction.
- Prefabrication and preassembly.
- Water engineering.
- Temporary works.
- Smart technology.
- Robotics.
- GPS controlled equipment.

Rain Water Harvesting :

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

domestic heating. The harvested water can also be committed to longer-term storage or groundwater recharge.

Advantages:

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

A rainwater harvesting system that could be easily installed and maintained by local people.

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

Limitations:

Rainwater harvesting is a widely used method of storing rainwater in the countries presenting with drought characteristics. Several pieces of research have derived and developed different criteria and techniques to select suitable sites for harvesting rainwater. Some research was identified and selected suitable sites for the potential erection of dams, as well as derived a model builder in ArcMap. The model combined several parameters, such as slope, runoff potential, land cover/use, stream order, soil quality, and hydrology to determine the suitability of the site for harvesting rainwater.

Harvested water from RWH systems can be minimal during below-average precipitation in arid urban regions such as the Mideast. RWH is useful for developing areas as it collects water for irrigation and domestic purposes. However, the gathered water should be adequately filtered to ensure safe drinking.

Fig-24 Rain water harvesting

1.	Pipe	10
2.	Tank	4500
3.	Fitting cost	600

5.1.2 Soil Liquification:

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

Causes of soil Liquification:

Poorly drained fine-grained soils such as sandy, silty, and gravelly soils are the most susceptible to liquefaction. Road cracking from soil liquefaction near Moss Landing, California, resulting from the Loma Prieta earthquake in 1989. Granular soils are made up of a mix of soil and pore spaces.

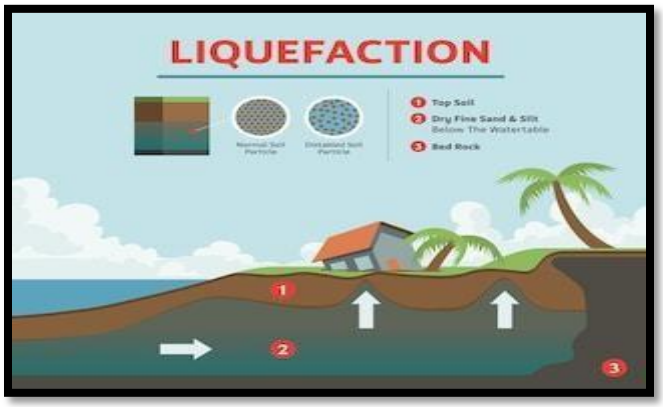


Fig-25 Soil Liquification

Soil liquefaction occurs when a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress such as shaking during an earthquake or other sudden change in stress condition, in which material that is ordinarily a solid behaves like a liquid. In soil mechanics, the term "liquefied" was first used by Allen Hazen in reference to the 1918 failure of the Calaveras Dam in California. He described the mechanism of flow liquefaction of the embankment dam as:

If the pressure of the water in the pores is great enough to carry all the load, it will have the effect of holding the particles apart and of producing a condition that is practically equivalent to that of quicksand… the initial movement of some part of the material might result in accumulating pressure, first on one point, and then on another, successively, as the early points of concentration were liquefied.

The phenomenon is most often observed in saturated, loose (low density or uncompacted), sandy soils. This is because a loose sand has a tendency to compress when a load is applied. Dense sands, by contrast, tend to expand in volume or 'dilate'. If the soil is saturated by water, a condition that often exists when the soil is below the water table or sea level, then water fills the gaps between soil grains ('pore spaces'). In response to soil compressing, the pore water pressure increases and the water attempts to flow out from the soil to zones of low pressure (usually upward towards the ground surface). However, if the loading is rapidly applied and large enough, or is repeated many times (e.g. earthquake shaking, storm wave loading) such that the water does not flow out before the next cycle of load is applied, the water pressures may build to the extent that it exceeds the force (contact stresses) between the grains of soil that keep them in contact. These contacts between grains are the means by which the weight from buildings and overlying soil layers is transferred from the ground surface to layers of soil or rock at greater depths. This loss of soil structure causes it to lose its strength (the ability to transfer shear stress), and it may be observed to flow like a liquid (hence 'liquefaction').

Although the effects of soil liquefaction have been long understood, engineers took more notice after the 1964 Niigata earthquake and 1964 Alaska earthquake. It was a major factor in the

destruction in San Francisco's Marina District during the 1989 Loma Prieta earthquake, and in Port of Kobe during the 1995 Great Hanshin earthquake. More recently soil liquefaction was largely responsible for extensive damage to residential properties in the eastern suburbs and satellite townships of Christchurch, New Zealand during the 2010 Canterbury earthquake and more extensively again following the Christchurch earthquakes that followed in early and mid-2011 On 28 September 2018, an earthquake of 7.5 magnitude hit the Central Sulawesi province of Indonesia. Resulting soil liquefaction buried the suburb of Balaroa and Petobo village in 3 meters deep mud. The government of Indonesia is considering designating the two neighborhoods of Balaroa and Petobo, that have been totally buried under mud, as mass graves.

The building codes in many countries require engineers to consider the effects of soil liquefaction in the design of new buildings and infrastructure such as bridges, embankment dams and retaining structures.

Technical Defination:

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

A 'flow failure' may initiate if the strength of the soil is reduced below the stresses required to maintain the equilibrium of a slope or footing of a structure. This can occur due to monotonic loading or cyclic loading, and can be sudden and catastrophic. A historical example is the Aberfan disaster. Casagrande referred to this type of phenomena as 'flow liquefaction' although a state of zero effective stress is not required for this to occur.

'Cyclic liquefaction' is the state of soil when large shear strains have accumulated in response to cyclic loading. A typical reference strain for the approximate occurrence of zero effective stress is 5% double amplitude shear strain. This is a soil test-based definition, usually performed via cyclic triaxial, cyclic direct simple shear, or cyclic torsional shear type apparatus. These tests are performed to determine a soil's resistance to liquefaction by observing the number of cycles of loading at a particular shear stress amplitude required to induce 'fails'. Failure here is defined by the aforementioned shear strain criteria.

The term 'cyclic mobility' refers to the mechanism of progressive reduction of effective stress due to cyclic loading. This may occur in all soil types including dense soils. However, on reaching a state of zero effective stress such soils immediately dilate and regain strength. Thus, shear strains are significantly less than a true state of soil liquefaction.

5.1.3 Sustainable sanitation:

The purpose of sustainable sanitation is the same as sanitation in general: to protect human health. However, "sustainable sanitation" attends to all processes of the system. This includes methods of collecting, transporting, treating and the disposal (or reuse) of waste.

The definition of ecosan has varied in the past. In 2012, a widely accepted definition of ecosan was formulated by Swedish experts: "Ecological sanitation systems are systems which allow for the safe recycling of nutrients to crop production in such a way that the use of non-renewable resources is minimized. These systems have a strong potential to be sustainable sanitation systems if technical, institutional, social and economic aspects are managed appropriately."

Prior to 2012, ecosan has often been associated with urine diversion and in particular with urine-diverting dry toilets (UDDTs), a type of dry toilet. For this reason, the term "ecosan toilet" is widely used when people mean a UDDT. However, the ecosan concept should not be limited to one particular type of toilet. Also, UDDTs can be used without having any reuse activities in which case they are not in line with the ecosan concept (an example being the 80,000 UDDTs implemented by eThekwini Municipality near Durban, South Africa).

Eco sanitation :

Ecological sanitation (Ecosan) is a concept that treats various types of waste generated by us as a resource which can be safely collected, treated and reused to prevent pollution of water bodies and the environment. Currently, various types of Ecosan practices such as promotion of Ecosan toilets, compost pits, bio-gas plants, reed-beds for treatment of waste water, etc., are being taken up to treat waste generated by us in a ecologically sound manner.

Excreta collected in the chamber (in most cases two separate chambers are constructed for alternative use) constructed below the toilet seat are allowed to decompose for a period of 6-9 months after a chamber gets filled up. After very use, ash and mud is sprayed into the chamber to prevent contact of flies/insects with excreta and also to facilitate decomposition process. A vent pipe is also attached to the chambers to release foul smell and also to facilitate faster decomposition. The compost harvested from the chamber is used as manure in the agricultural fields. Urine collected in a covered pot kept outside the toilet can be applied to crops as fertilizer after storing it for certain period to inactivate the disease causing organisms normally present inurine. The wash water is diverted to a plant bed, preferably planted with cannas plants for effective absorption, near the toilet block.

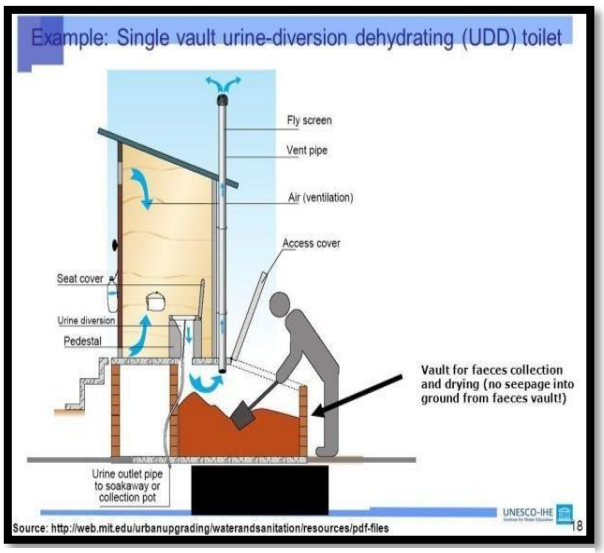


Fig-26 Ecosan

Merits of Ecosan:

- Treats human excreta and urine as a useful resource rather as waste.
- Environmental friendly and prevents pollution caused by conventional sanitation systems.
- No water is needed for flushing (an individual saves 6-8 liters per day)
- No additional treatment process/infrastructure is needed to treat the waste collected.

5.1.4 Transport infrastructure system :

There are a range of different types of transport available to us; the type we choose to use will depend on the purpose for travelling, length of the journey and anyone you may be travelling with. Increasingly cost is becoming a deciding factor in the types of transport we use, especially due to the increase in fuel costs we all wish to avoid.

Car

The most popular type of transport, most people use cars daily for short and long journeys. Cars have many advantages such as their ease of use and convenience, getting you exactly where you want to be without additional buses, trains or walking needed to get to your final destination. To save money you can carpool with friends or work colleagues when possible.

Bicycles

Numbers of cyclists are fast increasing as it is a cheap and environmentally friendly method of transport. There are now incentive schemes which businesses can run, making bikes cheaper for their employees who are going to use them to travel to work. The main disadvantage is being exposed to the elements on wet days!

Buses

Buses are available in all cities, towns and most villages. They are ideal for those short journeys from one part of a town to another. Short journeys may take longer than expected on a bus due to the frequent stops and routes which cover a lot of the area to accommodate everyone. Buses are however a cheap method of transport, if you use the buses a lot there are a range of travel cards, passes and long-term tickets to help you save more money!

Fig-27 Transport Infrastructure

Trains

Rail transport is used for both goods and people and is a popular method of public transport. Many towns have a train station but there are still a lot more than don‘t which would make travelling by train difficult to get to some destinations and will require further transportation by bus, car or taxi.

5.1.5 Vertical Farming:

Vertical farming is the practice of growing crops in vertically stacked layers. It often incorporates controlled-environment agriculture, which aims to optimize plant growth, and soilless farming techniques such as hydroponics, aquaponics, and aeroponics.

Recently, the application of Vertical Farming into cities has increased. Vertical farming is a cultivating vegetable vertically by new agricultural methods, which combines the design of building and farms all together in a high-rise building inside the cities. This technology needs to be manifest both in the agricultural technique and architectural technology together, however, little has been published on the technology of Vertical Farming.

The integration of food production into the urban areas have been seen as a connection to the city and its residents. It simultaneously helps to reduce poverty, adds to food safety, and increases contextual sustainability and human well-being.

Introduction

“We live vertically, so why can’t we farm vertically?”

Due to the limited access to land for farming, there is a need for sustaining farming tasks so as to pave the way for adding to food needs. Many aspects press on food industry and processing such as: growth of population and its growing needs accordingly, reduction of natural sources due to growing cities, earth erosion, different forms of contamination, advent of biofuels, restrictions imposed on food production techniques affected by customers and rule providers which requires better quality, less use of chemicals and many useful environmental attempts ‘from farm to fork’. Recently, environmental obsessions have been mixed with rising obsession with health as architecture design is concerned. Therefore, it has led to more interest in providing healthy food and incorporating it in the sustainable development project.

The answer to these issues is Vertical Farming (VF). VF has grown as a project which combines the design of building and farms all together in a high-rise building. VF is a system of growing crops in skyscrapers, to maximize the use of land by having a vertical design whereby plants, animals, fungi and other life forms are cultivated for food, fuel, fiber… by artificially stacking them vertically above each other.Vertical farms are now used in a lot of countries. At present, these farms are largely grown and produce different types of crops inside cities.

OBJECTIVE

Vertical farming is the urban farming of fruits, vegetables, and grains, inside a building in a city or urban centre, in which floors are designed to accommodate certain crops. The objective of this dissertation was to investigate the feasibility and plausibility of the vertical farming concept in three specific and interrelated research domains.

- The first research question was to investigate whether enough energy can be generated onsite to meet the needs of the building.

- The second research question was to investigate the carbon footprint of produce grown vertically and compare that to produce grown conventionally (greenhouse and outdoors).
- The final research question was to investigate how relevant stakeholders perceive the concept of vertical farming and what they believe are current barriers and opportunities towards uptake of the technology.
- The purpose of this investigation was to determine ways to supply food to cities in an energy efficient and sustainable manner from both a quantitative and qualitative approach.

Methodology

- Litreture reviews to examine the current agricultural practices were exhausting our natural resources and wheaher it was sensible to explore other farming options.
- Knowing the history and overview of urban agriculture. The history of urban agriculture was provided because it offered a sense of the history and development of the concept, it applications inthepast and today and the advantages and disadvantages associated.
- To quality the energy flows in the building. Also to study how much energy can be generated on site and how much energy will be used on site. The energy generation source was from photovolitates, and the energy was used to pump the water, light the building and ventilate the building.
- Conduct the carbon foot print analysis for horizontal conventional and vertical farming methods.
- Conduct life cycle analysis of leafy veggies grown vertically.
- Conduct semi structured interview to explore the concept.
- Conduct the experiments and study to find out the crop growing condition at different levels of atmosphere.
- Detailed case study on vertical farming and bio climatic sky scrappers to know the design process and approach.
- Comparative studies of crop cultivation and yielding in a conventional method and vertical farming.
- Finding out solutions for the correct implementation of techniques and materials for the same .

Creating a model of new form of tomato for multi tiered narrow rack hydroponics:

	Small-fruited variety		Medium-fruited variety	
	Feature	Value	Feature	Value
1	*Dwarfism - plant height*	*30-35 cm*	*Dwarf - superdet – plant height*	*45-50 cm*
2	Productivity	450-500 g / plant	Productivity	850-1,000 g / plant
3	Maturation term (shoots - ripe fruit)	78-82 days	Maturation term (shoots - ripe fruit)	78-82 days
4	Brush	Difficult compact	Brush	Simple elongated, intermediate
5	Laying brush	After the second true leaf	Laying brush	After the second and th true leaf
6	Stem	Thick, dense	Stem	Thick, dense, popping

How its design?

Multistoried buildings growing different crops at each floor-

- Irrigated assembly line including – seed sorting facilities, distribution.
- Continous planting system including monitoring growth and harvesting
- All creating a miniature eco system that acts to enable the urban population to manufacture and produce food locally.

Making of vertical farm

Aim: to make a vertical farm.

Equipment's used: angles, iron pipe, PVC pipes, wall, plastic tubs, soil, manure, rotating tyers, paint.

Tools used: hammer, chipping hammer, tong, welding machine, drilling machine, grinding machine, file

Procedure:

1. At first we design the structure for the vertical farm.
2. Then drill holes in tub.
3. Mix manure and soil.
4. Fill tubs with mixture of manure and soil.
5. Then we divide this mixture into 3 rows.
6. Then we sprinkle seeds into soil 1 inch deep, it takes almost 2 weeks to grown up.
7. Plumbing work.
8. Then we test it with water.

Precautions:

1. Proper sunlight, air and water.
2. Care from birds (they eat seeds)
3. Handle tubs with care

.

Fig-28 Vertical Farming at real

The implications of vertical farming in an urban ecology

This dissertation will conclude by examining how vertical farming can encourage a more resilient, cyclical resource metabolism to emerge in the microcosm of human society, the city.

Large scale urban farming, in the shape of vertical farms, can thoroughly affect the way we provide for our daily necessities. Its potential is enormous, positively affecting transportation, food quality, the economy of cities, skyline and the sociological landscape of urban areas. However, it depends on its level of implementation how influential it can be.

Also as a long vision future is urban totally. And here the vertical farming concepts can really act as an emerging trend for resource (oil, land, water etc.) management. The impact of urban agriculture, vertical or not, could range from large to small. The range spans from a nice and functional addition to the agricultural services providing some places with a percentage of their food contribution in highly developed countries, to revolutionary development in food production that shifts the balance from rural to urban and empowers developing countries in economic, political and social ways as not seen before.

In the case of architecture it really helps the city to shape its skyline and sociological landscape of urban areas .As architects it is necessary to continue to push for experimentation and exploration of this realm. The challenge of architects for this vertical farm is to maximize sunlight penetration and provide facilities for the public and commercial sectors. The crops areas should place on top and envisaged to the south, to take advantage of the southern sun. Scaffold framed structures and meshes can be used to keep farm area light. The technologies are known, but they've hardly been used in such a way before. Also, the economical characteristics are not entirely known. Without test sites and further research into the implementation of vertical farms into the fabric of the city it will remain guess work.

What is certain is that vertical farms provide an enormous potential for changing the 49conomic nal operations of cities the world over, and that whoever manages to harness them in an 49conomic ally and ecologically sound way has a bright future ahead of them. Internat ional cooperation to achieve the first few plants would be a good start, and a number of experimental vertical farms the next step. No matter how it will be done, large scale urban farming is a viable opportunity in architecture that can play a very important role in the next century, if executed correctly.

To effectively explain vertical farming's impact on urban resource metabolism it is important to address the underlying systematic behavior of cities in relation to that of their sustaining natural ecosystems. Like ecosystems, cities are classified a ―complex adaptive systems‖; complex in that they are diverse and composed of multiple interconnected agents, and adaptive in their capacity to evolve in response to stimulus. Both can be described as emergent phenomena wherein their overall form and behavior are determined not by the sum of their constituent parts, but rather the patterns that emerge from the interactions of their constituent parts. Both are also strongly influenced by their contextual forces: the hydrological and thermodynamic signature of a region for ecosystems and the regional economic, demographic, and environmental forces for cities. Urban systems will expand or contract, evolve or become stagnant over time, just like ecological communities.

The evident behavioral distinctions between cities and ecosystems can be explained primarily by the differing levels of diversity among their respective constituent agents. It is widely understood that ecosystems exhibit a complex cyclical metabolism. This is enabled by the heterogeneous array of organisms that compose ecosystems, where the waste material discharged by one organism can become the nourishment for another. This metabolic structure is astonishingly self-reliant, requiring few inputs beyond sunlight and externalizing no material output waste.

5.1.6 Corrosion mechanism prevention and repair measures of rcc structure:

Cracks can occur due to chemical reactions in construction materials, changes in temperature and climate, foundation movements and settling of buildings, environmental stresses like nearby trains, earth quakes etc. Faulty design, bad quality materials, wrong method of construction, weather effects and lots of wear and tear can create cracks in walls, floors and ceilings. Here are given various reasons of cracks and their prevention techniques.

- **Alkali aggregate reaction Elastic Deformation**: When the walls are unevenly loaded, due to variation in stresses in different parts of wall the cracks are formed in walls. When two materials having wide different elastic properties are built together under the effect of load, different shear stresses in these materials create cracks at the junction. Dead and live loads cause elastic deformation in structural components of a building.
- **Prevention:** Create slip joints under the support of RCC slab on walls. Masonry work on RCC slabs and beams should not be started before drying RCC slab and beam. Provide horizontal movement joints between the top of brick panel and RCC beam/slab.

Thermal Movement:

All materials expand on heat and contract on cool. Thermal movement in components of structure creates cracks due to tensile of shear stresses. It is one of the most potent causes of cracking in buildings and needs attention.

Prevention:

Construct joints such as construction joints, expansion joints, control joints and slip joints. The joints should be planned at the time of design and be constructed carefully.

Chemical Reaction:

Chemical reactions in building materials increase their volume and internal stress causes cracks. The components of structure also weaken due to chemical reactions. Some common instances of chemical reactions are following.

Sulphate attack on cement products
Carbonation in cement

Prevention

Use dense and good quality concrete i.e. richer mix of cement concrete 1:1.5:3 to prevent cracks. Repair corrosive cement concrete surface by _guniting‘/ injecting technique after removing all loose and damaged concrete and cleaning reinforcement from all rust also.

Shrinkage:

Most building materials expend when they absorb moisture from atmosphere and shrink when they are dry. Cement made materials shrink due to drying up of the moisture used in their construction. The factors causing shrinkage in cement concrete and cement mortar and their preventions are following.

Excessive Water:

The quantity of water used in the mortar mix can cause shrinkage. Vibrated concrete has less quantity of water and lesser shrinkage than manually compacted concrete.

Un-gradedAggregate:

Aggregate can cause shrinkage also. If un-graded and fine material/aggregate is used in cement concrete and cement mortar which requires more water and can cause greater shrinkage.

Prevention

Use largest possible aggregate and ensure good grading of materials. The use of water according to required workability has less shrinkage because of reduction in the porosity of hardened concrete.

Curing

After laying cement concrete mix, the hardening of cement takes place, causes reduction in moisture and creates shrinkage. This causes cracks in concrete work.

Prevention

Proper curing should be started as soon as initial setting has taken place and be continued for at least seven to ten days. When hardening of concrete takes place under moist environment, the shrinkage due to drying is comparatively less.

Excessive Fine materials

Fine materials take more surface area and require more water for mix. The use of excessive fine materials i.e. silts; clay and dust in aggregate create more shrinkage.

Prevention

Do not use fine materials containing silt, clay and dust. Use coarse sand/fine aggregate in cement concrete and cement mortar mix which has silt and clay less than 4%. Use coarse aggregate and fine aggregate after washing to reduce silt contents.

Foundation Movement and Settlement of Soil

Shear cracks occur in buildings when there is large differential settlement of foundation due to any of following causes.

- Unequal bearing pressure under different parts of the structure
- Bearing pressure being in excess of safe bearing strength of the soil
- Low factor of safety in the design of foundations
- Local variation in the nature of supporting soil

Prevention

The design of foundation must be based on sound engineering principles and good practice.

Earth Quake

Crack may occur due to sudden shift in lower layer of the earth. The voids in the earth might have suddenly collapsed and be filled with soil from the above. Many geological events can trigger earth movements but is continuous movement. This results in cracks.

Prevention

Construct the foundation of buildings on firm ground while doing construction. Tie up the building with connecting beams at foundation level, door level and roof level.

.5.1.7 Sewage treatmemt plant:

Sewage treatment is the process of removing contaminants from municipal wastewater, containing mainly household sewage plus some industrial wastewater. Physical, chemical, and biological processes are used to remove contaminants and produce treated wastewater that is safe enough for release into the environment.

Primary Treatment:

During primary treatment, wastewater is temporarily held in a settling tank where heavier solids sink to the bottom while lighter solids float to the surface.

Once settled, these materials are held back while the remaining liquid is discharged or moved through to the more rigorous secondary phase of wastewater treatment.

These large tanks are also often equipped with mechanical scrapers that continually drive collected sludge in the base of the tank to a hopper which pumps it to sludge treatment facilities.

Secondary Treatment:

Secondary treatment of wastewater works on a deeper level than primary and is designed to substantially degrade the biological content of the waste through aerobic biological processes. It is done in one of three ways:

Biofiltration

Biofiltration uses sand filters, contact filters or trickling filters to ensure that any additional sediment is removed from the wastewater.

Aeration

Aeration is a lengthy process which increases oxygen saturation by introducing air to wastewater. Typically, the aeration process can last for up to 30 hours, but it is very effective.

Oxidation ponds

Typically used in warmer climates, this method utilises natural bodies of water such as lagoons, allowing wastewater to pass through for a set period before being retained for two to three weeks.

Completing secondary wastewater treatment allows for safer release into the local environment, reducing common biodegradable contaminants down to safe levels.

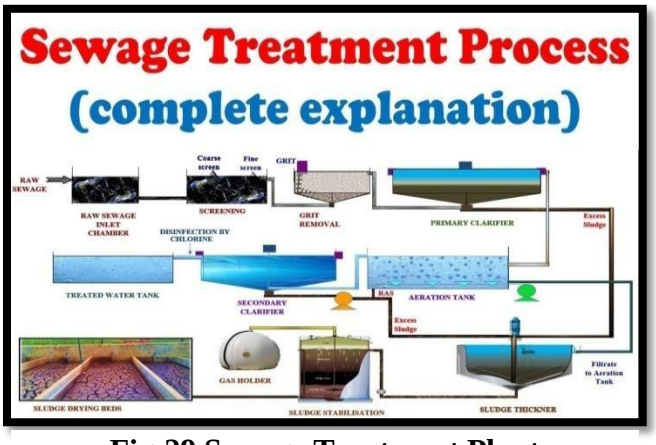


Fig-29 Sewage Treatment Plant

Teritary treatment:

The aim of tertiary wastewater treatment is to raise the quality of the water to domestic and industrial standards, or to meet specific requirements around the safe discharge of water. In the case of water treated by municipalities, tertiary treatment also involves the removal of pathogens, which ensures that water is safe for drinking purposes.

5.1.8 Technical Case Study On Rajkot Bus Port:

We have selected a recently constructed structure named Rajkot Bus Port as a technical case study. It is located on the Dhebar road , karanpara in the city of Rajkot in Gujarat .

Rajkot: Gujarat Chief Minister Vijay Rupani inaugurated a new bus port in Rajkot for Gujarat State Road Transport Corporation (GSRTC) construction in public private partnership (PPP) mode.
This new bus port replaces the old Central bus station in 11,589 square meter space. It has been constructed at a cost of Rs. 45.23 crore.

The Chief Minister speaking on this occasion announced two new bus station in Rajkot on Bhavnagar road and Jamangar road.

A new bus port will take time to function. According to GSRTC official, the new bus port will take at least one and half month time to start operations. Till then, bus operations will continue tot ake place at old Shastri ground based bus station.

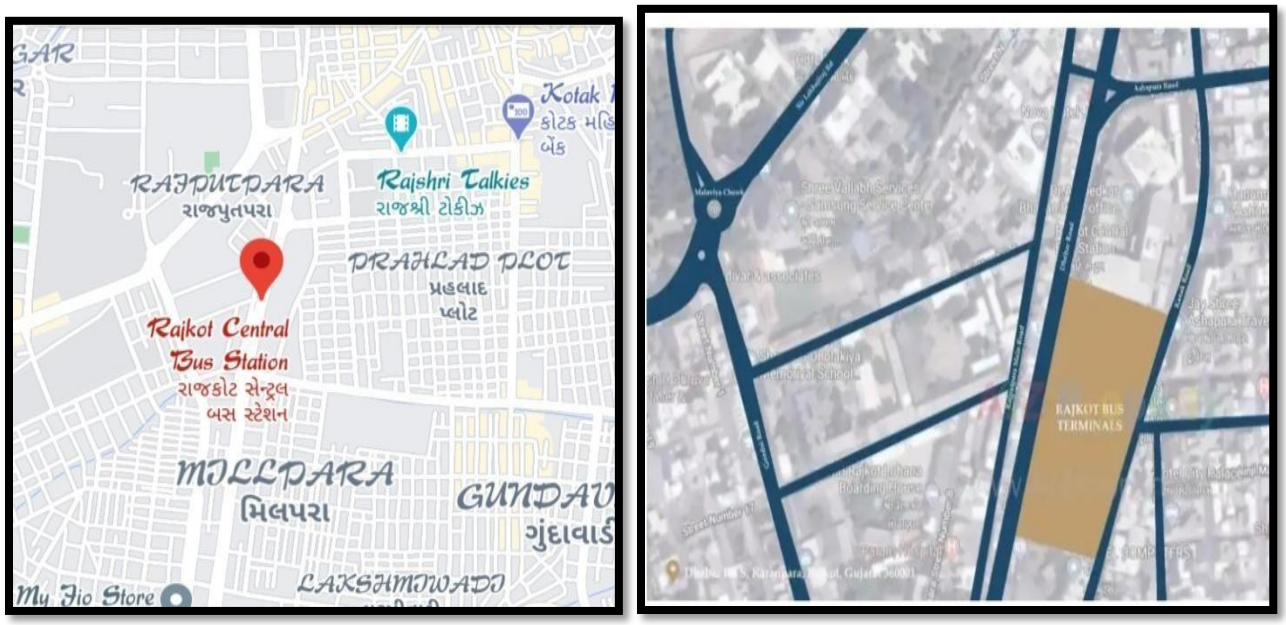


Fig-30 Location and key map of Rajkot Bus Port

Fig-31 RAJKOT BUS PORT

History :

Gujarat State Road Transport Corporation (GSRTC) is all set to build a swanky interstate bus stop in Rajkot at the cost of whopping Rs 154 crore. Gujarat Chief Minister Vijay Rupani laid the foundation stone for the new bus stand in Rajkot. These pictures are an artist's impression of the lavish Rajkot Bus Station and have taken the internet by storm. The facilities of new Rajkot bus stop will be same as that of international airports.
Rajkot New Bus Stand building will be of eight floors, with 20 buses to be parked together on the ground floor apart from the underground parking.

The State Government is adding CCTV surveillance cameras and GPS for the security and safety checks. The new bus port will also be lined with TV sets for the entertainment of the waiting passengers. Airport style sign boards and other public amenities will be present.

Rajkot Bus station will be built over 11,000 square meter area. The first floor of the new bus stop will have facilities for the commuters while other seven floors will have around 100 shops, offices, hotels, restaurant, theatre and more. Gujarat state government is renovating bus stands for the modern ones in a total of 10 cities.
Ten new and modern district level bus terminals to be built at Amreli, Bhuj, Junagadh, Rajkot, Nadiad, Navsari, Modasa, Patan and Palanpur at the cost of Rs.913.30-crore with facilities for commercial activities.

BASIC INFORMATION:

Sr. No.	Item	Details
1	Name of the project/s	RAJKOT BUS TERMINAL
2	Proposed capacity/area/length/tonnage to be handled/command area/lease area/number of wells to be drilled	RAJKOT BUS TERMINAL Total Built up Area: 50115.52 Sq. m. Total FSI: 23579.56 Sq. m
3	New/Expansion/Modernization	New
4	Existing Capacity/Area etc.	12499.31 Sq. m

5	Location	
	Plot/Survey/Khasra No.	City Survey No. 81, Dhebar Road, Rajkot.
	Village	-
	Tehsil	Rajkot
	District	Rajkot
	State	Gujarat
6	Nearest railway station / air port along with distance in kms.	Railway Station: Bhaktinagar – 1.5 km Airport : Rajkot – 3.9 km
7	Nearest Town, city, District Headquarters along with distance in kms	Rajkot – The proposed project is within the limit of the Rajkot Municipal Corporation (RMC)
8	Village Panchayats, Zilla Parishad, Municipal Corporation, Local body (complete postal addresses with telephone nos. to be given)	Rajkot Municipal Corporation (RMC), Dhebar Road, Rajkot. Ph: 0281-2239973 Email: mc_rmc@rmc.gov.in
9	Name of applicant	Gujarat State Road Transport Corporation
10	Registered Address	City Survey No. 81, Dhebar Road, Rajkot.

Fig -32 Photographs during construction

DESIGN :

Construction, operation or decommissioning of project involving action, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

Sr. No.	Information /checklist confirmation	YES/NO	Details thereof (with approximate quantities/rate, wherever possible) with source of information data
1	Permanent or temporary change in land use, land cover or topography including increase in intensity of local land use plan)	No	The proposed project is developed at Rajkot city under Rajkot Municipal Corporation, (RMC) with construction of Rajkot Bus Terminal The construction will be done is conformity with the requirement of GDCR Norms.
2	Clearance of existing land, vegetation and buildings?	No	-
3	Creation of new land use?	No	-
4	Pre-construction investigation e.g. bore house, soil testing?	Yes	The soil analysis report has been carried out before construction.
5	Construction work	Yes	Old Rajkot Bus Terminal is existing at present which to be demolished. Total built up area to be demolished is 2000 m^2.
6	Demolition works?	No	-
7	Temporary sites used for construction works or housing of construction works?	No	-
8	Above ground building, structures or earth works including liner structures, cut and ill or excavations	Yes	Total Built Up Area for the proposed building is 50115.52 Sq. m These building are High rise building as per GDCR Norms.
9	Underground works including mining or tunneling?	No	-
10	Reclamation works?	No	-
11	Dredging?	No	-

12	Offshore structures?	No	-
13	Production and manufacturing processes?	No	It is a construction and building project.
14	Facilities for storage of goods or materials?	Yes	Construction materials like steel, cement, sand, bricks etc will be procured from local market and will be temporarily stored at site.
15	Facility for treatment or disposal of solid waste or liquid effluent?	Yes	Wastewater Project proponent will install STP of 1000 KLD with dual pumping system and treated water will be used for flushing and gardening. Please refer Annexure II
			Solid waste: The total solid waste generated during the operation phase will be collected, Segregated & treated onsite by waste to compost machine.
16	Facility for long term housing of operational workers?	No	-
17	New road, rail or sea traffic during construction or operation?	Yes	Road traffic will increase due to the various construction activities and also in the operation phase because of increased population due to proposed project.
18	New road rail. Air waterborne or other transport infrastructure including new or altered routes and station, ports airport etc.	No	-
19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	-
20	New or diverted transmission Lines pipelines?	No	-

21	Impoundment, damming. Culver ting. Realignment or other changes to the hydrology of watercourses or aquifers?	Yes	RMC water supply line and onsite treated water is the source of water during operation phase.
22	Stream crossing?	No	-
23	Abstraction or transfer of water from ground or surface waters?	No	During operation phase the whole water requirement will be met through RMC water supply and treated water. 5 Nos. of percolation well will be constructed for the ground water recharging as per the GDCR Norms.
24	Changes in water bodies or the land Surface affecting drainage or run-off?	Yes	The project involves construction of paved areas and hence the quantity of runoff will increase due to infiltration. This runoff will be collected through a well – designed surface water drain and will be used for recharging aquifers.
25	Transport of personnel or material for construction, operation or Decommissioning?	Yes	Transportation of construction material will be by truck.

Use of Natural resources for construction or operation of the project (such as land, water material or energy any resources which are non-renewable or in short supply):

Sr. No.	Information/checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
1	Land especially undeveloped or agricultural land (ha)	No	The project will be constructed in within plot area of 12499.31 sqm in which old bus terminal of built up area 2000 m2 is present that is to be demolished.
2	Water (expected source & competing users)	Yes	During operation phase the whole water requirement will be met through RMC water supply line and onsite treated water.

3	Minerals	No	-
4	Construction material-stone, aggregates, and/soil (expected source-MT)	No	-
5	Forests and timber (sources MT)	No	Wood will be used for the furniture.
6	Energy including electricity and fuels (source, competing users) Units. Fuel (MT) energy (MW)	Yes	The project would required about 1250 KVA electric power during operation phase which is sourced from PGVCL
7	Any other natural resources (appropriate standards units)	No	-

AREA STATEMENT

Plot Area	12499.31 Sq. m
Built up Area	50115.52 Sq. m
Built up Area, FSI	23579.56 Sq. m
Nos. of Blocks	1 buildings
Nos. of Flats	422 shops/office, 1 Dormitory, Rest Room, 2 Food court, 1 Restaurant Zone, 1 Game Zone.

Advantages of Rajkot Bus Port:

- The Rajkot bus port is the biggest bus port. It will help to reduce the congestion.
- Due to unique design and size of bus port it will attract tourists.
- Due to massive size of construction laboureres and engineers were around 2 employed around 2 year during construction of the bus port. Thus it generated employment from the massive construction.
- In the Rajkot bus port 422 shops and offices available.
- In the Rajkot bus port rest room food court facility is also available.
- 1 game zone and 1 restaurant zone also available in Rajkot bus port.

Disadvantages of Rajkot Bus Port:

- A big amount of government money is being used after the construction of the Rajkot bus port.
- The total amount spent is Rs. 154 crores. This money could have been used for developing villages .
- The operation and maintenance cost of Rajkot bus port is expensive.

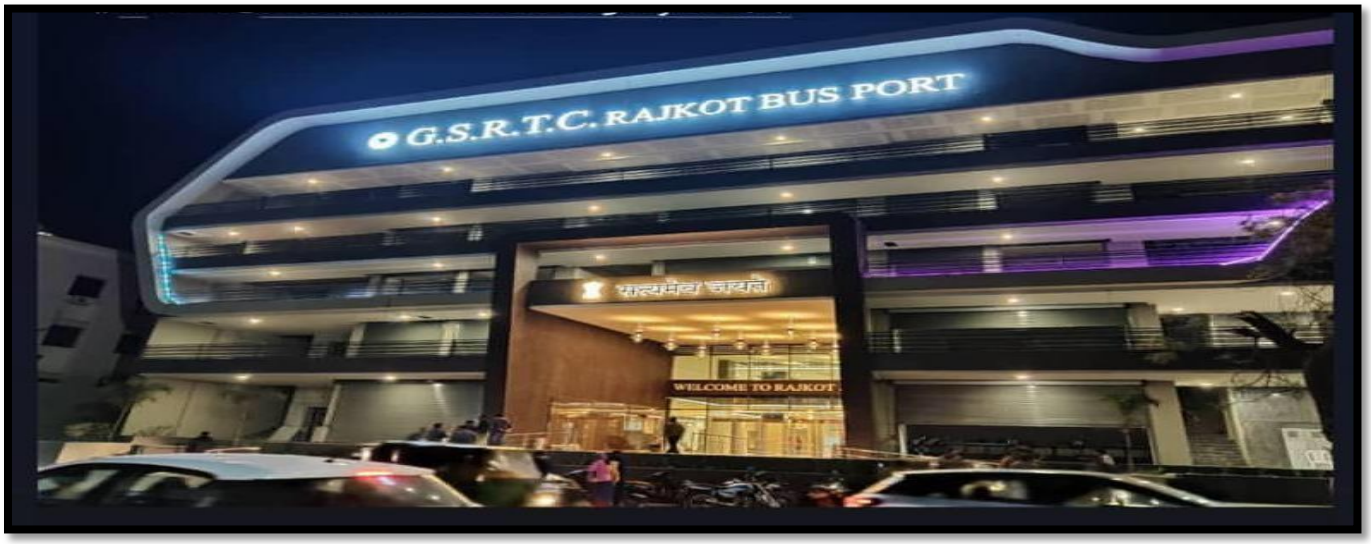


Fig- 33 G.S.R.T.C. RAJKOT BUS PORT

Chapter:6
Swatchh Bharat Abhiyan

SWATCHH BHARAT ABIYAN campaign, launched on 2 October 2014 2019 on birth anniversary of Mahatma Gandhi, aimwd to eradicate open defecation by 2 October 2019 the 150 th anniversary of the birth of Mahatma Gandhi, by constructing 90 million toilets in rural india at a projected cost of 1.96 lakh crore .
Swachh Bharat Mission (SBM), Swachh Bharat Abhiyan (SBA), or Clean India Mission is acountry-wide campaign initiated by the Government of India in 2014 to eliminate open defecation and improve solid waste management (SWM). Phase 1 of the mission lasted till October 2019. Phase 2 will be implemented between 2020–21 and 2024-25.
The core objectives of the first phase of the mission were to reduce open defecation and improve management of municipal solid waste in both urban and rural areas.[citation needed] Elimination of open defecation was to be achieved through construction of individual household level toilets (often twin pit pour flush pit latrines), toilets and public toilets. For improving solid waste management, cities were encouraged to prepare detailed project reports that are bankable and have a financial model.
The second phase on the other hand focuses on sustaining gains of the first phase and improving management of the solid and liquid wastes.

IMPACTS
According to the dashboards maintained by respective ministries, more than 100 million individual household level toilets have been constructed in rural areas, and 6 million household toilets in urban areas. In addition, nearly 6 million community and public toilets have also been constructed in the urban areas. Consequently, 4,234 cities and more than 600,000 villages across the country have declared themselves open defecation free (ODF).

Further, more than 81.5 thousand wards in urban areas now have100% door to door collection of solid waste and nearly 65 thousand wards practice 100% segregation of waste at source. Of the nearly 150 thousand metric tonnes of solid waste generated in urban areas, 65% is being processed

6.1 swatchhta needed in allocated village-existing :

ENSURE	Identification of households without toilets for corrective action
	Toilet use and maintenance
	Facilities for solid and liquid waste management
	Water use efficiency by rationalizing water use
	Compliance with environmental safeguard for all GPDP activities
PRAMOTE	Hygiene education
	Toilets for all households and institutions
	Modern agricultural and water use technologies to conserve water.

	Water use rationalization by selecting appropriate cropping Patterns
ESTABLISH	Local environmental safeguard measures
	Surveillance of water bodies
	Safeguard for water bodies
PLAN AND IMPLEMENT	Environmental management framework
	Water supply schemes
FACILITATE	Appropriate irrigation methods
	Regulations of water extraction based on demand yields match
	Participation of local communities in improving water and sanitation management.

6.2 Guidelines –Implementation in allocated village with photograph:

Elimination of open defecation

- Eradication of Manual Scavenging
- Modern and Scientific Municipal Solid Waste Management
- Generate awareness about sanitation and its linkage with public health
- Capacity Augmentation for ULBs to create an enabling environment for private sector participation in Capex (capital expenditure) and Opex (operation and maintenance) Mission Strategy

The estimated cost of implementation of SBM (Urban) based on unit and per capita costs for its various components is Rs. 62,009 Crore.
The Government of India share as per approved funding pattern amounts to Rs. 14,623 Crore. In addition, a minimum additional amount equivalent to 25% of GoI funding, amounting to Rs. 4,874 Crore shall be contributed by the States as State/ ULB share.

The balance funds are proposed to be generated through various other sources of fund which are, but not limited to:

A. Private Sector Participation

B. Additional Resources from State Government/ ULB
C. Beneficiary Share
D. User Charges
E. Land Leveraging
F. Innovative revenue streams
G. Swachh Bharat Kosh
H. Corporate Social Responsibility
I. Market Borrowing
J. External Assistance

Fig-34 clean road

Mission Components

Household toilets, including conversion of insanitary latrines into Community toilets.
• Public toilets and urinals

- Solid waste management
- IEC & Public Awareness
- Capacity building and Administrative & Office Expenses (A&OE)

6.3 Activites done by students for allocated village:

Easy and effective tips which will help us in keeping our Village clean

Don‘t litter : Please don‘t litter in your society and/or roads. Set a good example. Use dustbins, it will help in keeping the society clean. If society is plagued by litter then consult with your society members, president and other authorities in order to organize an awareness camp. Work with them and volunteers to clean the litters.

Be the change that you want to see in others: We always complain about the things and processes that have not been taken care of… Most of the time we ourselves don‘t follow them. The first thing that is needed to be done is to change ourselves into the person we want others to be. Why wait for other to do the right things, take initiative and lead the way.

Don‘t dispose garbage in open areas : Use dustbin or other means for dumping the waste material. People even in urban areas are seen throwing the waste on road or around open park areas. By organizing awareness camp you can help them in understanding the importance of using dustbin.

Plant trees/Adopt trees : You should plant trees in your society or you can also adapt any tree and take care of that. Trees will help in controlling the pollution atleast a little bit. Having lots of trees in your society will help you have fresh air for you and your kids, balanced rainfall, and with a beautiful green society you will inspire others to follow the track and save the city and environment.

Proper storage of water : Water is the most important part of life. Excess or deficit, both, of water not only makes us cry, but can lead to severe damages as well. Proper storage of water can help us combat many problems. We should try to store rain waters; with proper arrangements and help of society members we can utilize them for future usage. Water logging around the society if not managed leads to mosquito breeding which can cause various disease like Dengue, malaria, chickengunia etc.

Be real eco-friendly : Don‘t just talk about eco-friendly concepts and principles, abide by them. Use herbals colors in Holi; avoid using crackers on Diwali;do not dump e- waste (worn out electrical equipments, gadgets, etc.) or plastic waste; avoid using vehicles for short distances, instead walk or use a bicycle; do not overcharge your mobile batteries, charge only when the battery drains out.

Fig-35 Clean India

Chapter:7

Village condition due to Covid-19

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

In all gram panchayats in the state, the use of Social Media whatsapp group has been used to create awareness among the masses in the villages. Information at the grassroots level is being given to the people by putting posters everywhere. Regular cleaning operations are being carried out and sodium hypochlorite is being sprayed on the roads . Face masks are being distributed to the citizens by Gram Panchayat members and social organizations and citizens are also being told not to touch their eyes, nose, and mouth, wash hands with soap frequently and maintain personal distance. Along with ration distribution to villagers, fodder for abandoned cattle is also being provided by a social service organization.

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

Due to the lockdown there were no jobs in the cities, therefore lots of people who resided in the cities came back to the village which increased the risk of coronavirus in the village.Therefore, quarantine center was established in the school premises for the people coming from cities outside of the village. The people were quarantined for 14 days in the quarantine facility before they can go to their homes in the village Their daily needs were satisfied by the gram panchayat in collaboration with the district authorities and state government.

7.2 Activities Done by Students for allocated village with Photograph:

- Activity done by students yet for making Khoja Beraja village for covid 19.
- Orientation is being provided to villagers and migrants on social distancing .

- Awareness is also being provided on social distancing and hand washing to agricultural labour workers.

Fig-36 Activities in village

7.3 Any other steps taken by the students / villagers:

Sanitization is being done in the Khoja beraja Gram Panchayat. Villagers are maintaining social distancing while receiving ration and essentials from the Gram Panchayat in khoja beraja Gram Panchayat. Vegetables are being distributed by vehicles among the vulnerable communities .

Fig-37 Social Distancing

Chapter-8
Sustainable design planning proposal (Prototype Design)

8.1 Design Proposal:
8.1.1 Sustainable Design (civil)

Sustainable design – Bio Gas Plant

Bio-Gas:

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

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

Bio gas is primarily methane(CH4) and carbon dioxide(CO2) and may have small amounts of hydrogen sulfide(H2S) moisture and siloxanes. The gases methane, hydrogen, and carbon monoxide (CO) can be combusted or oxidized with oxygen. This energy release allows biogas to be used as a fuel; it can be used for any heating purpose, such as cooking. It can also be used in a gas engine to convert the energy in the gas into electricity and heat.

Biogas can be compressed after removal of Carbon dioxide, the same way as natural gas is compressed to CNG, and used to power motor vehicles. In the United Kingdom, for example, biogas is estimated to have the potential to replace around 17% of vehicle fuel.[4] It qualifies for renewable energy subsidies in some parts of the world. Biogas can be cleaned and upgraded to natural gas standards, when it becomes bio-methane. Biogas is considered to be a renewable resource because its production-and-use cycle is continuous, and it generates no net carbon dioxide. As the organic material grows, it is converted and used. It then regrows in a continually repeating cycle. From a carbon perspective, as much carbon dioxide is absorbed from the atmosphere in the growth of the primary bio-resource as is released, when the material is ultimately converted to energy.

BIOGAS PLANT:

A *biogas plant* is the name often given to an anaerobic digester that treats farm wastes or energy crops. It can be produced using anaerobic digesters (air-tight tanks with different configurations). These plants can be fed with energy crops such as maize silage or biodegradable wastes including sewage sludge and food waste. During the process, the micro-organisms transform biomass waste into biogas (mainly methane and carbon dioxide) and digestate. Higher quantities of biogas can be produced when the wastewater is co-digested with other residuals from the dairy industry, sugar industry, or brewery industry. For example, while mixing 90% of wastewater from beer factory with 10% cow whey, the production of biogas was increased by 2.5 times compared to the biogas produced by wastewater from the brewery only

COW DUNG IS GENRATED IN THE VILLAGE.

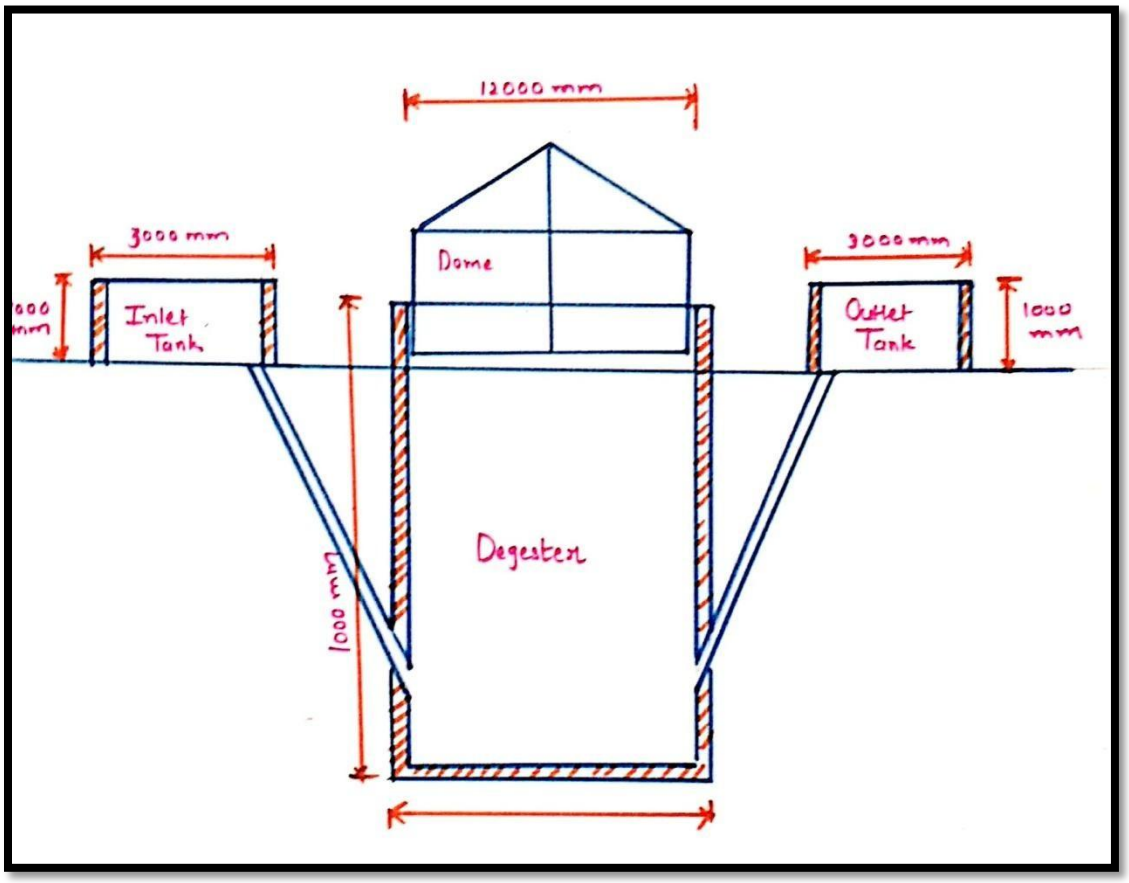


Fig-38 Bio Gas Plant

DESCRIPTION OF BIO GAS PLANT

- Bio gas plant is one of the plants for renewable energy sources. It transforms rural village in to clean village and provide gas as energy source and gives fertilizer at end.
- Day to day operation.
- Daily 5000 - 5500 kg cow dung is fed into the plant. The amount of cow dung fed varies with number of cattle present (500/animal/day). Poultry waste and kitchen waste can also be added if it is available.
- Equal amount of water is added in the inlet tank, mixed (manually), and let in the digester. Water is procured manually from nearby wells (Maximum 50 feetaway).
- The availability of water is not a problem as normally every household that hascattle has that much amount of water available. Entire operation of biogas plant is done by the woman in the household which calls upon extra efforts to be put in byher.
- The gas collected in the dome after digestion is used as and when required. The usability of gas depends on its pressure inside the dome.

- The output slurry is dried and used as manure in beneficiary's own farms. Initial cost of the plant.

BASICTHINGS:

- Total numbers of animals in village =500
- As per standard data assume per day dung of animal=10.5Kg.
- So total per day dung = 500 * 10.5 =5250 Kg./day

DESIGN OFDIGESTER

- Assume retention period (RT) = 70days.
- Assume mixing proportion of solid and water is1:2.
- Now total amount of slurry per day (Sd) = Total per day dung + Wateramount
  = 5250 + (2*5250)
  = 15750 Kg. / day
  = 15.75 m3 / day
- Digester volume (Vd) = Sd *RT
  = 15.75 * 70
  =1102.5 m^3
- Assume cylinder shaped biogasplant.
- Provide total one numbers of units in differentareas,
- So, digester volume becomes for one unit =1102.5/1= 1102.5 m3
- So, provide = 1100m3
- Total digester volume (Vd) = πr2h
- 1100 = πr210 (assume h=10m) So dimensions of digester are H = 10m
- R = 6m

DESIGN OF GASHOLDER

- Assume digester temperature= 26-28˚C
- Now from following fig find Gd by taking RT=70 days' Specific gas production Gd =37 Lit. / Kg. /day
- Daily gas production G = Gd X Feed volume
  = 37 X 5250
  = 194250 Lit.
  = 194.25 m3
- Now assume gas holder capacity =60
- Gas holder volume = Daily gas production X Capacity ofholder= 194.25 X 0.6= 116.55 m^3

- So, take Gas holder volume = 120m^3
- Now for 1 unit provide volume of holder of each unit = 120 /1 = 120 m^3
- Take It = 120 m3Provide cylinder shaped holder; so…
- Volume =$\pi r^2 h$
- 120 = 3.14 X rX1 (assume h=1m) R = 6m
- So, dimensions of Gas holder are: H= 1 m

DESIGN OF INLET AND OUTLET

- Total volume of slurry mix per unit = 15.75 /1= 15.75 m^3 / day
- Assume two-time filling operation inplant.
- So, take total volume of slurry = 15.75 ÷2 = 7.87 3/ day
- Take it = 8 m3/ day Provide rectangulartank…
- Total volume for one time mixing of slurry= L X B XH
- 8 = L X B X 1 (assume H=1m)
- Dimension of inlet are L = 3m, B = 3m&H = 1 m
- Here 8 m3 / day required < 9 m3 / dayprovided.
  Hence ok
- Provide same size for outlet tankalso.

Table -14 Cost of Biogas Plant

SR NO.	COMPONENTS	CAPITAL COST IN RS.
1.	Gas Holder and Frame	8000
2.	Piping and Stove	5000
3.	Civil engineering Construction	20,000
	TOTAL	**32,000**

8.1.2 Physcical Design(civil):

Among various physical designs, Play ground is not available in Khoja Beraja village and so it is designed below.

CHILDREN'S PLAY GROUND:

Garden are resources for recreation as well as education and research opportunities. An outdoor area provided for children to play in, especially at a school or public park.

A piece of land used for and usually equipped with facilities for recreation especially by children. An area known or suited for activity of a specified sort a vacation playground.

Here are some adjectives for playground: great promising, large covered, new, profitable, vast, fleshy, magical and everlasting, the slightly dangerous, dirty but seemingly safe, seedy and faintly

dangerous, perfect sinful, agreeable and extensive, gaudy rural, ample and open, ample and well-equipped, ideal open-air, ...

Playgrounds provide a place for children to work off energy, have fun, and interact with peers. It also gives them a safe learning environment to develop physical, social, emotional, and cognitive skills.

DESIGN OVERVIEW:

The design of garden is square type. There ae trees on the boundary of the garden. There are benches for people to sit in the ground.

TOTAL CENTER LINE LENGTH: =2*10.4+2* 10.4 =41.6m

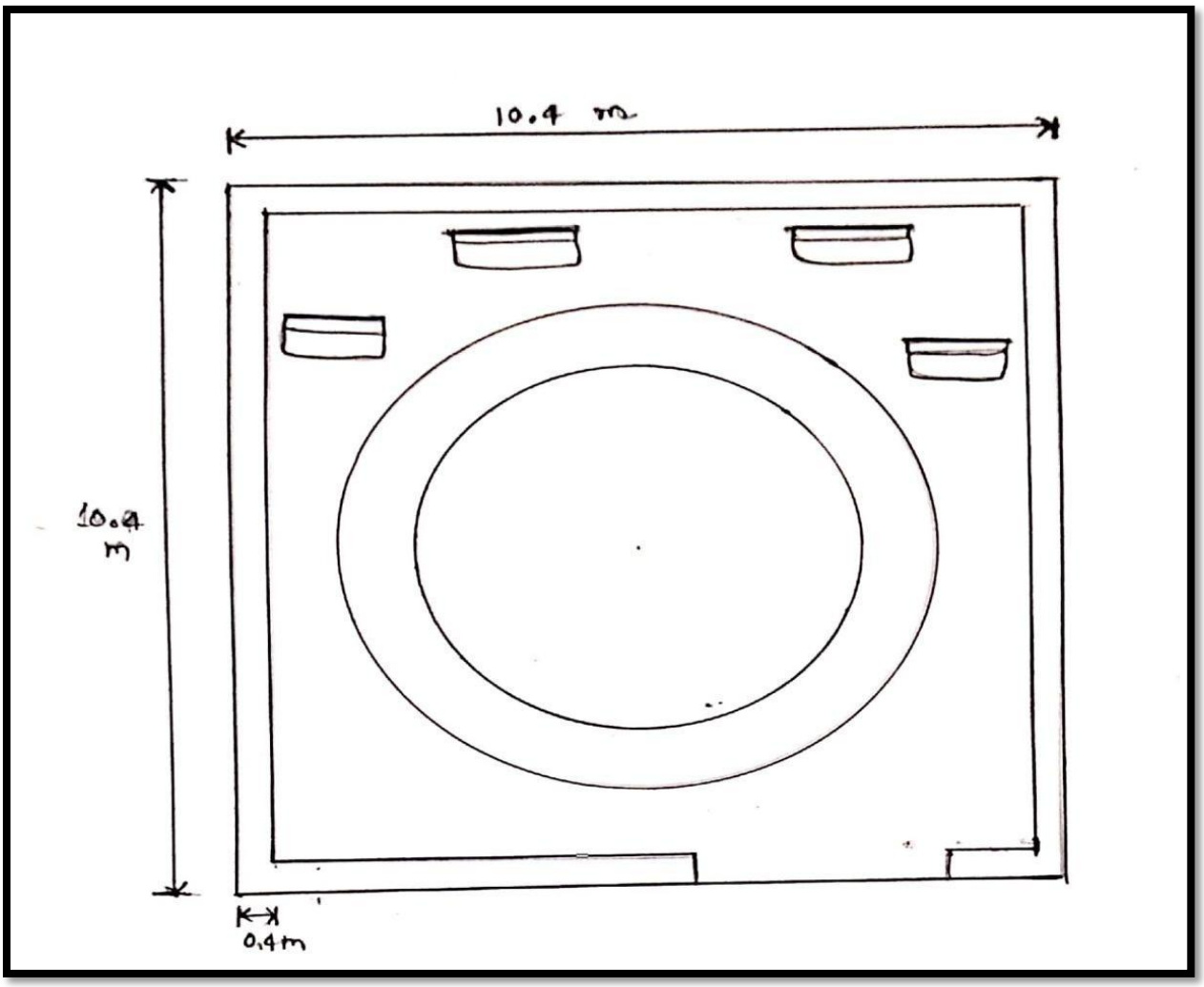


Fig-39 Plan of Children play ground

Fig –40 3D VIEW OF CHILDREN PLAYGROUND

CALCULATION FOR CHILDREN PLAYGROUND(FOR WALL)

Item No.	Item description	No.	Length	Breadth	Height	Quantity
1	Excavation	1	41.6	0.7	0.3	8.736m^3
2	PCC	1	41.6	0.7	0.1	2.912 m^3
3	First step	1	41.6	0.5	0.2	4.16 m^3
4	Wall	1	41.6	0.4	0.9	14.976 m^3
Deduction:	Gate	1	1	0.4	0.9	(-)0.36 m^3
						=18.77 m^3

Table - 15 Calculation of children playground

ABSTRACT

Item description	Qty	Rate	Per	Amount(Rs.)
Material:				
Brick:	9385	4	m^3	37540
Sand:	5.31	800	m3	4248
Cement:	25 bags	280	bag	7000

Labour:				
Male coolie:	2	350	Day	700
Female coolie:	2	300	Day	600
Bhistie:	1	350	Day	350
				Cost: Rs.50438

Table- 16 Abstract of children playground

Water charges = 0.015 x 50438 =Rs. 756.57

Contractor profit = 0.1x50438=Rs. 5043.8

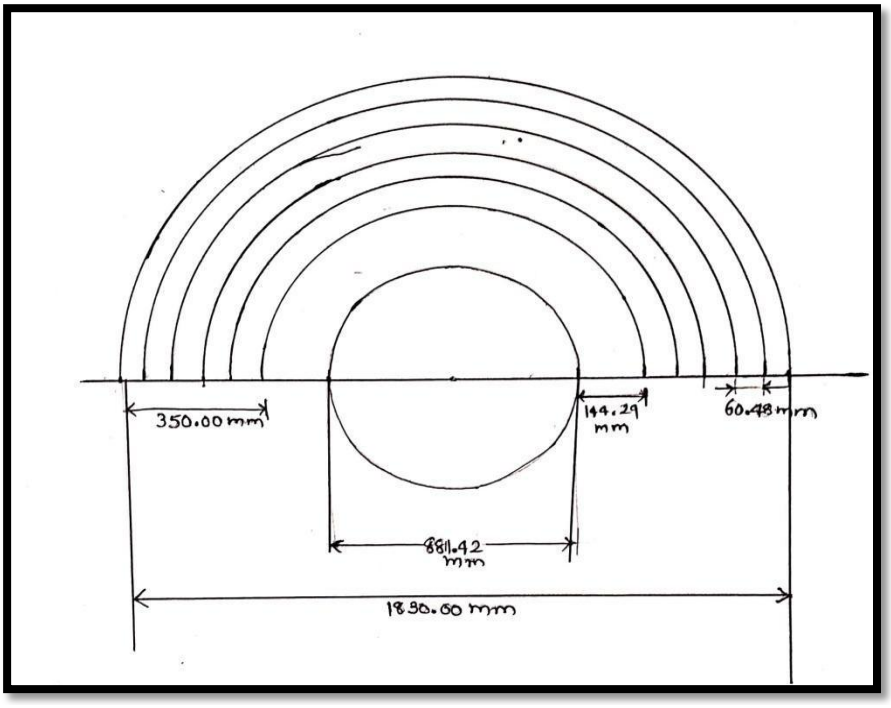
Add lump sump=Rs.1000

Total cost = Rs. **57238**

8.1.3 Social Design (Civil):

Panchayat Meeting place - Step auditorium:

A community which is planned and designed to accommodate all of its citizens celebrates potential, quality of life, and diversity of ability. Such a community also reaps social and financial benefits when citizens can enter businesses, cross streets, attend games and concerts, or participate in outdoor recreation.A village has no facilities for social event for different programmes .so we give proposal for open-step auditorium. It gives entertainment facilities.



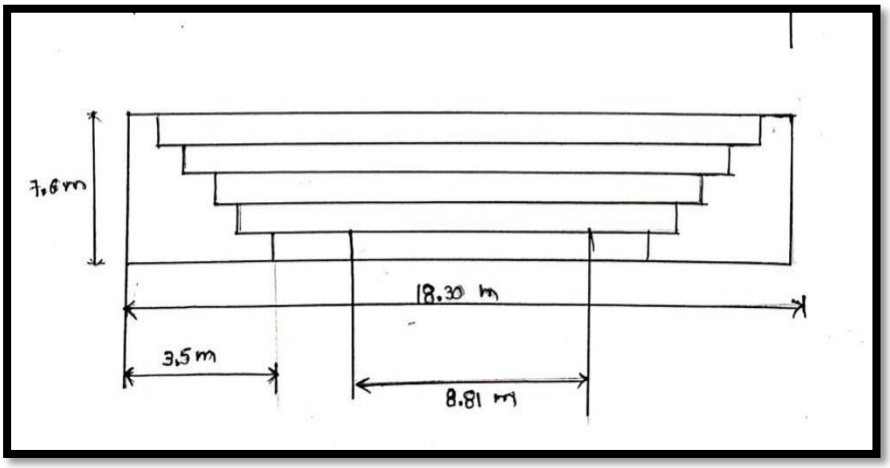


Fig – 41 Plan and Elevation of Step Auditorium

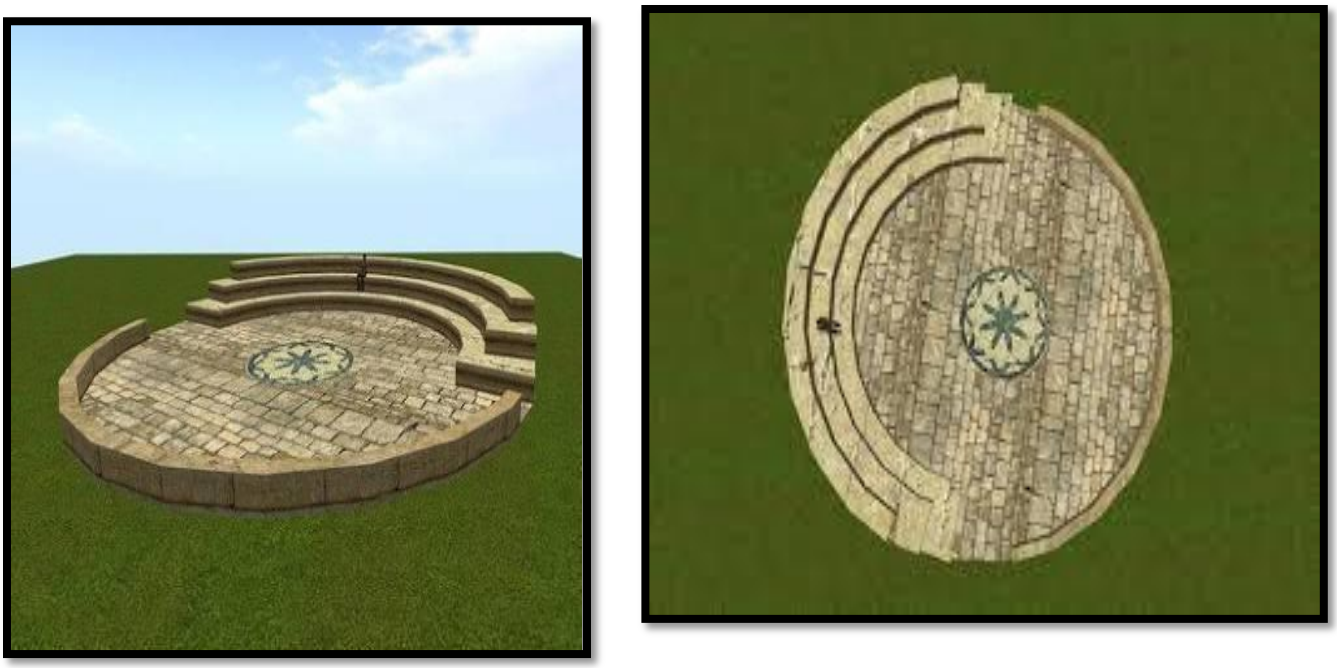


Fig-42 3D VIEW

Rate analysis:

Sr no.	Particular	Quantity or Number	Rate Rs.	Per	Amount Rs.
1	P.C.C	74.078	3000	M^3	2,22,234

Table – 17 Rate Analysis of Panchayat Meeting Place-Step Auditirioum

8.1.4 Socio-Cultural Design (civil)

Socio-Cultural Design – Swimming pool:

A pool suitable for swimming especially : a tank (as of concrete or plastic) made for swimming.

By now, you probably know that there are three types of inground pools: fiberglass, vinyl liner, and concrete (also called gunite).

A popular choice is a gunite swimming pool because it is highly durable and it can be created in just about any shape. Gunite pools use a rebar framework that is sprayed over with a **concrete** and sand mixture. Gunite is exceedingly durable, so swimming pools made of this substance are built to last.

Here are some adjectives for pool: rectangular turquoise, utterly stagnant, decent genetic, tiered hexagonal, fascinating genetic, smaller, cooler, deeper, fresher, unseen hot, sticky, shallow, nearer blue, acceptably full and foamy, acceptably full, mineral-rich thermal, blue cool, nearest frigid, inaccessible

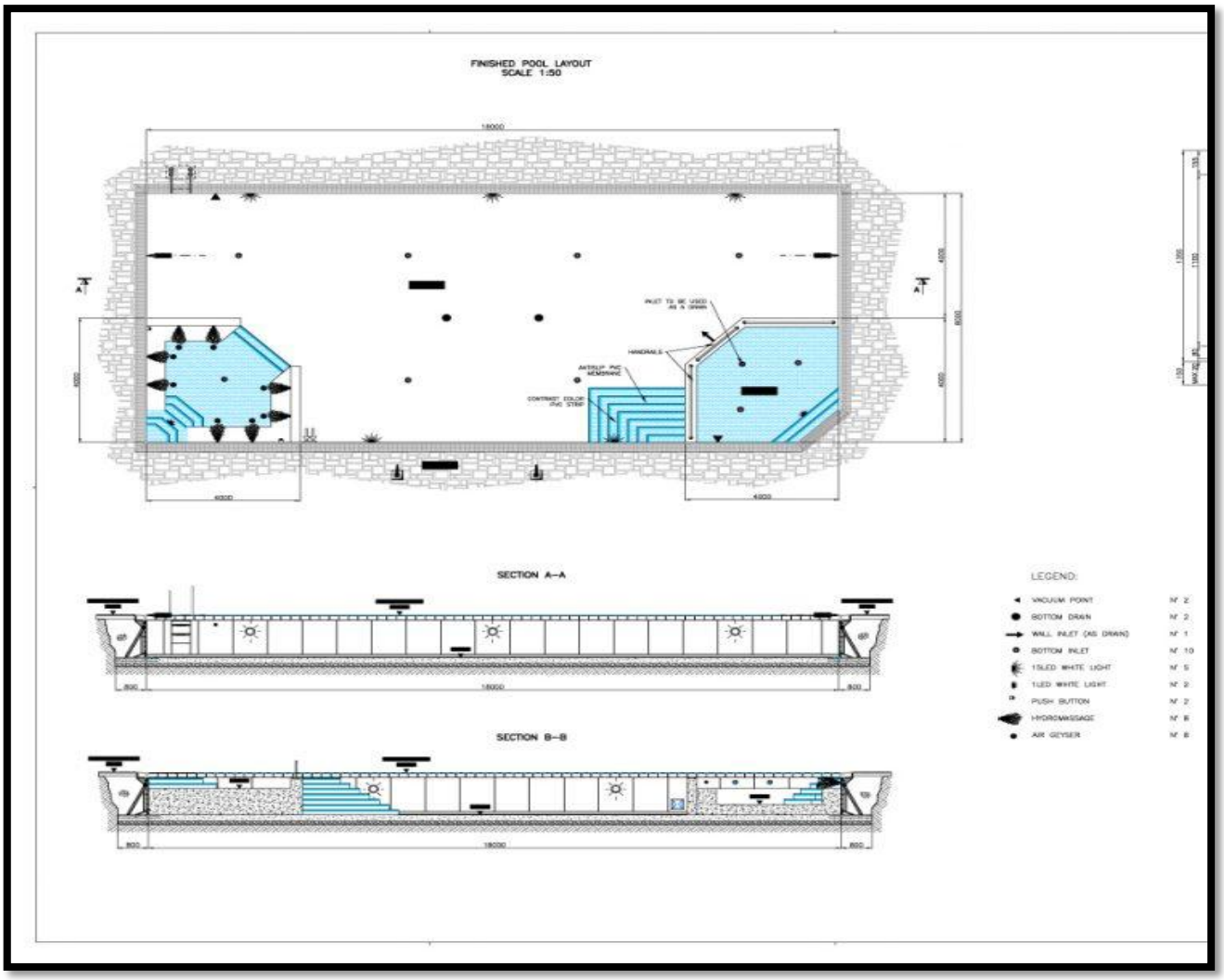


Fig-43 Plan and section of Swimming Pool

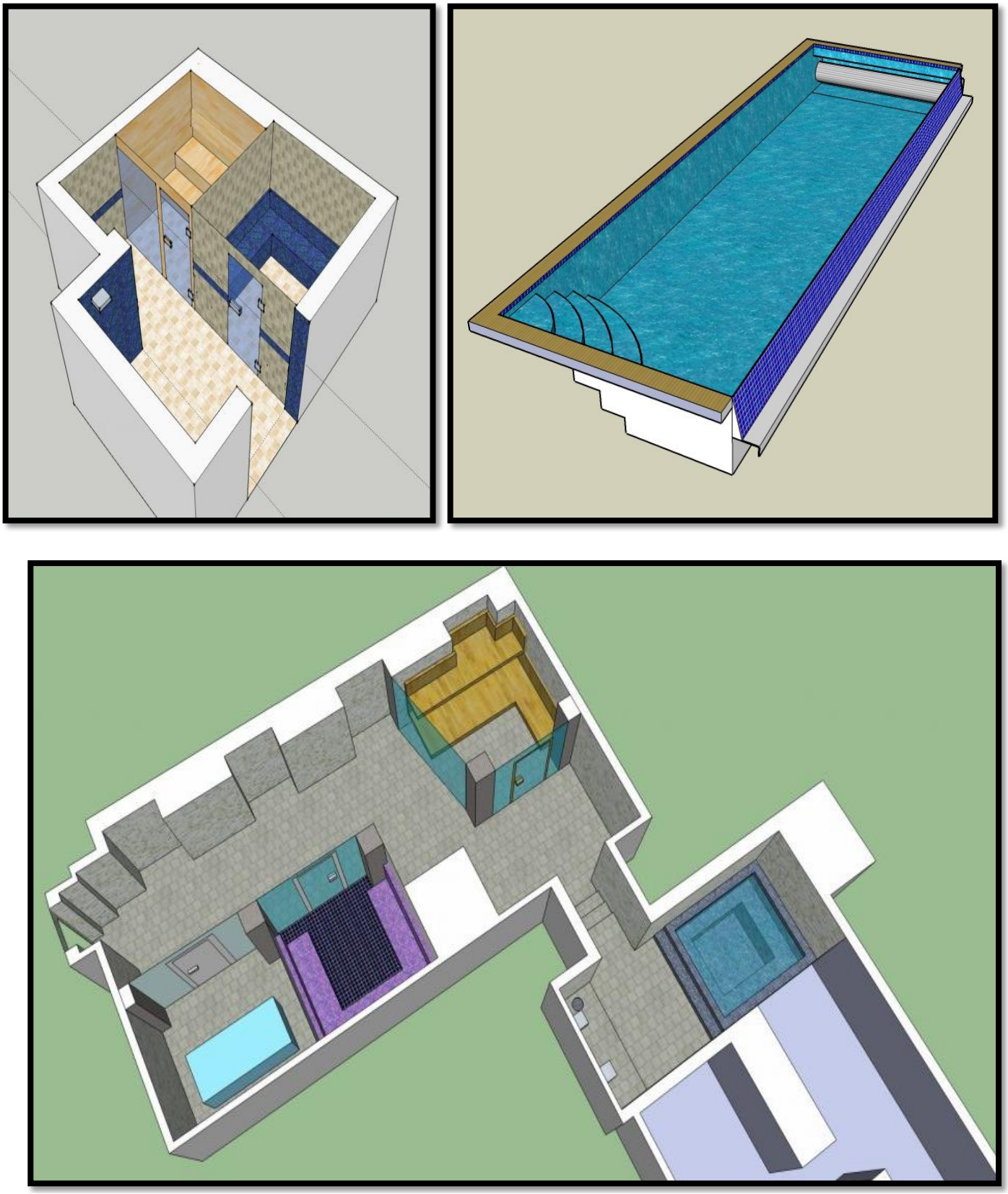


FIG-44 3D VIEW OF SWIMMING POOL CHANGING ROOM AND BATHROOM

MEASURMENT SHEET

Sr no.	Item Description	No.	Length	Width	Height	Quantity
1.	Excavation in foundation	1	7.6	3.6	1.8	51.984
2.	P.C.C.	1	7.6	3.6	0.1	2.736
3.	Brick work	1	21.2	0.3	1.8	11.448
	Bottom	1	7	0.3	0.3	6.3
					TOTAL	17.748
4.	Plaster					
	Side	2	7	1.5		21
	Side	2	3	1.5		9
	Bottom	1	7	3		21
					TOTAL	51

Table – 18 Measurement sheet of swimming pool

ABSTRACT

Nos.	Particulars	Quantity	Rate	Per	Amount
1.	Material				
	Excavation	51.948	90	m3	4675.32
	Pcc	2736	2200	m3	601.2
	Cement	7	280	Bag	1960
	Sand	10.944	800	m3	8755.2
	Aggregate	201.88	1000	m3	2188
	Tiles	180	105	Nos.	18900
	Sundries				100
				TOTAL	42597.72
2.	Labour				
	Mistry	2	400	Day	800
	Mason	3	300	Day	900
	Male coolie	5	200	Day	1000
	Female coolie	6	180	Day	1080
	Bhistie	1.5	200	Day	300
	Sundries				100
				TOTAL	4180

TOTAL COST RS. = 50957.721

1.5% Water Charges 764.36 rs.

10% contractors profit 5095.772 rs.

Total cost of swimming pool= 56820 rs.

Table- 19 Abstract sheet of swimming pool

Total cost rs. = 50957.72 1.5 % water charges 764.36 rs. 10% contractors profit 5095.772 rs. Total cost of swimming pool = 56820 rs.

Calculation :

(1) P.c.c. (1:4:8) = 13

Cement = 1/13*2.736=0.21/0.035=6.013 bags say 7 bags

Sand=4*2.736=10.944 m3

Agg. = 8*2.736 = 21.88 m3

(2) Brickwork

For 1 m3 = 500 nos.

17.748 = 8874 nos.

(3) Tiles

Assume size of tiles = 0.6*0.6=0.36 m2

Total area of swimming pool=51 m2

Number of tiles=51/0.36=141.66say 150 nos.

Add 20% waste = 150+20% =180 nos.

(4) Plaster (1:4)

1:4=5

Volume = 51*0.20=11.02

Add 20 % wastages 1.02+20% = 1.224

Cement=1/5*1.224=0.2448m2=6.99bags say 7 bags

Sand =4*0.2448=0.979 say 1m

8.1.5 Smart Village Design(civil):

– Rain Water Harvesting:

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

Advantages:

- Rainwater harvesting provides the independent water supply during regional water restrictions, and in developed countries, it is often used to supplement the main supply.
- A rainwater harvesting system that could be easily installed and maintained by local people
- A large body of work has focused on the development of life cycle assessment and its costing methodologies to assess the level of environmental impacts and money that can be saved by implementing rainwater harvesting systems.

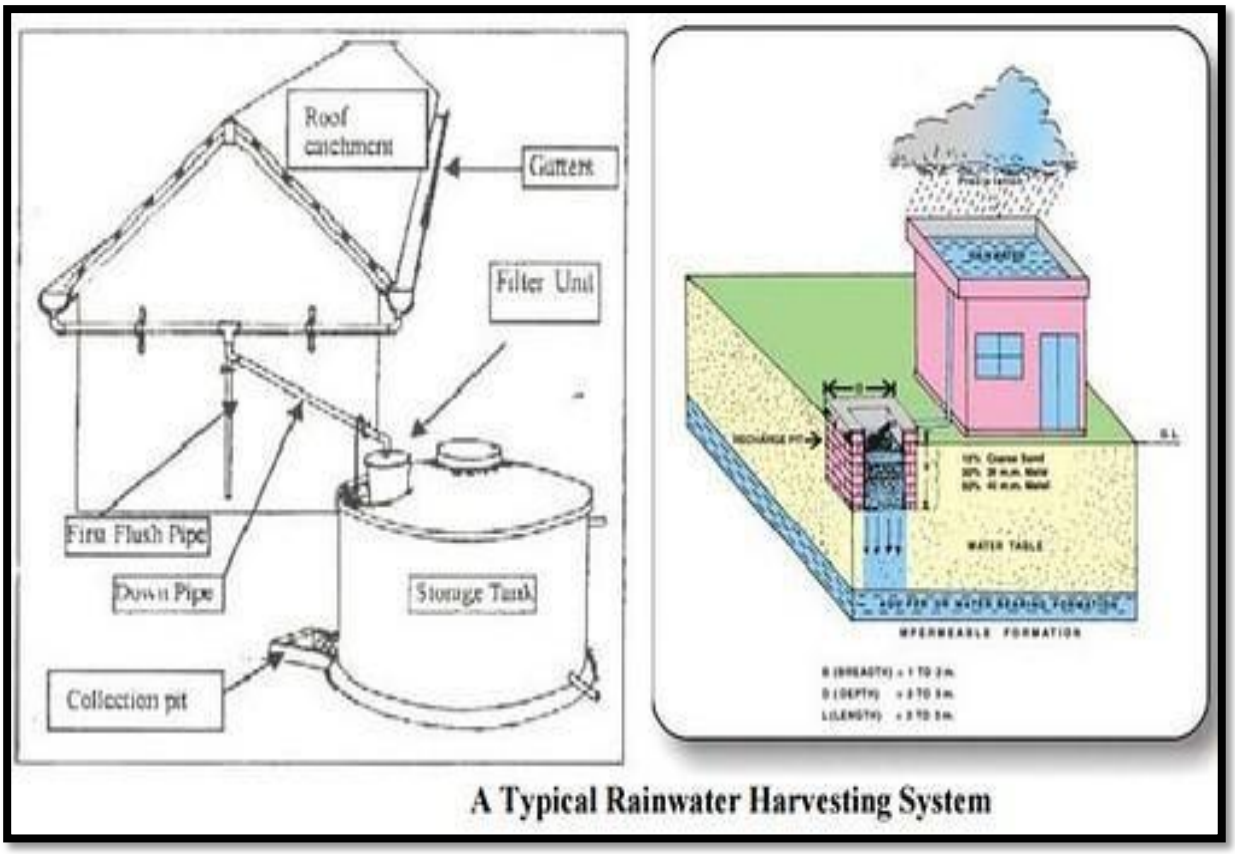


Fig-45 Rainwater harvesting system

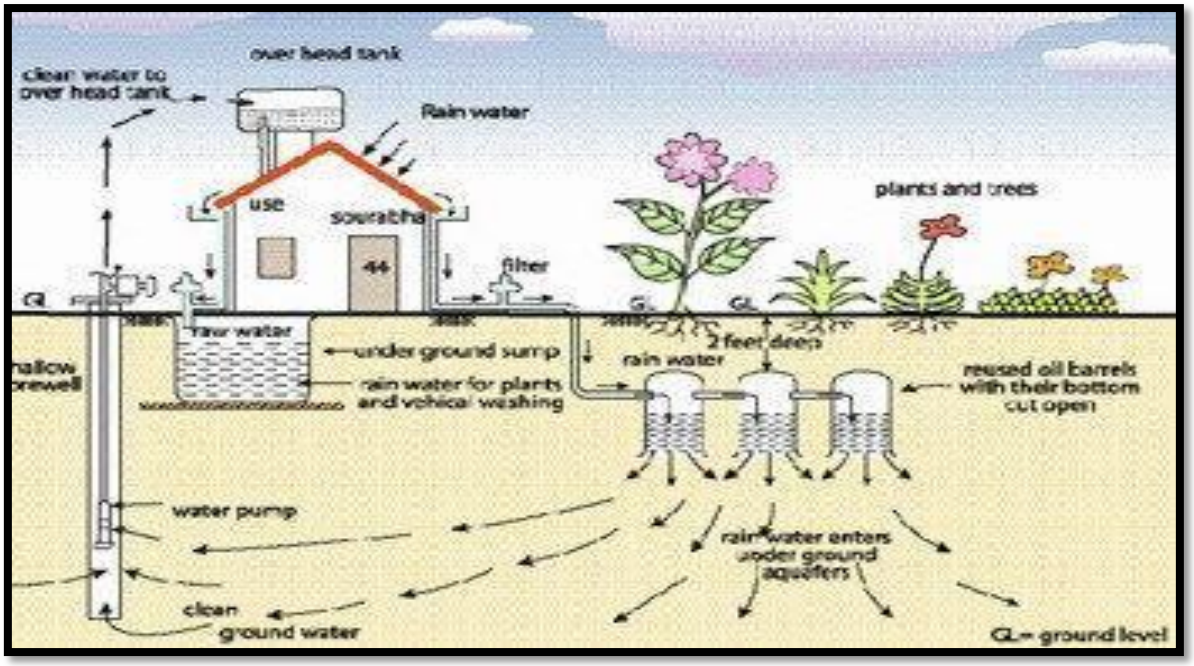


Fig-46 Layout of Rain Water Harvesting

Types Of Tanks:

Generally, two types of tank can be used for storing rainwater discharge from the roof.

LINED STORAGE TANK
UNLINED NATURAL STORAGE TANK

In lined storage tank, earth work excavation is done and underground RCC water storage tank is constructed which is completely covered from the top. The land above the tank can be used for serving as playground or parking slot, etc.

In unlined natural storage tank, earth excavation is done and all the water being allowed to fall directly in that pit and store it.

The rooftop area Calculated of a residential building at **Khoja Beraja** for which rain water harvesting system is to be designed is around 50 m^2

Harvesting potential or Volume of water Received (m^3)

= Area of Catchment (m^2) X Amount of rainfall (m) X Runoff coefficient

Average rainfall of above last five years

= 630 mm Now,

Volume of water Received (m3)

= Area of Catchment X Amount of Rainfall X Runoff Co-efficient

Taking Runoff Co-efficient for the proposed roof-top = 1.0

Hence, Total volume of surface runoff water suppose to be collected

= 50 x 0.63 x 1 = 32 m^3/year

Design For Optimum Dimensions Of The Tank:

Size of the tank

= total quantity of water collected in one year + take 20% of that extra for future variations in storage

= 32+ (0.2 x 32)

= 38.4 m^3

Taking height of tank = 1.8 m

So, Area of base =38.4/1.8 = 21.33 m^2

Let‘s take square base having each of that side = _B m

(Or rectangular base may also be considered as per land availability). Hence, size of each side of the base = $(21.33)^{1/2}$ = 4.61m ≈ say 5m.

So our tank will have dimensions as 1.8 m x 5 m x 5 m (taking square tank) **.**

Measurement Sheet:

Sr. No.	Particulars	Nos.	Length (m)	Breadth (m)	Height/ depth(m)	Quantity
1	Earth work in excavation	1	6.2	6.2	2.0	76.88m^3
2	Plain Cement concrete of 1:3:6 in foundation	1	6.2	6.2	0.2	7.68m^3
3	Ist class brick work in 1:4 cement mortar For walls	4	6.2	1.8	0.3	13.39m^3
4	R.C.C work for slab cover	1	5	5	0.20	5m^3
5	12 mm plastering inside with 1:2 cement mortar For walls	4	5	5	-	100m^2
6	110 mm dia. PVC pipe	1	600	-	-	600m

Table -20 MEASURMENT SHEET FOR RAIN WATER HARVESTING

Abstract:

Sr. No.	Particulars	Quantity	Rate (as per market rate)	Cost (in Rs)
1	Earthwork in excavation	76.88m^3	90Rs/m^3	6919.2
2	Plain Cement concrete 1:3:6 in foundation with brick ballast	7.68m^3	2400Rs/m^3	18432.00
3	I class brickwork 1:3 cement Mortar	13.39m^3	3000Rs/m^3	40170.00
4	R.C.C work for slab cover	5m^3	6900Rs/m^3	34500.00
5	12mm plastering with 1:2 cement mortar	100m^2	2400Rs/m^2	240000.00
6	110 mm dia. PVC pipe	600 m	270Rs/m	162000.00
Total				**502021.00**
7	Add 20 % extra for other minor items like soak pit, pipe fittings etc.			100404.2
8	Add Contingency + work charges establishment (3% + 2 % = 5 %)			25101.00
9	Add 10% Engineering profit			50202.12
Total				**677728.32**
Say Total				**680000**

Table-21 ABSTRACT SHEET FOR RAIN WATER HARVESTING

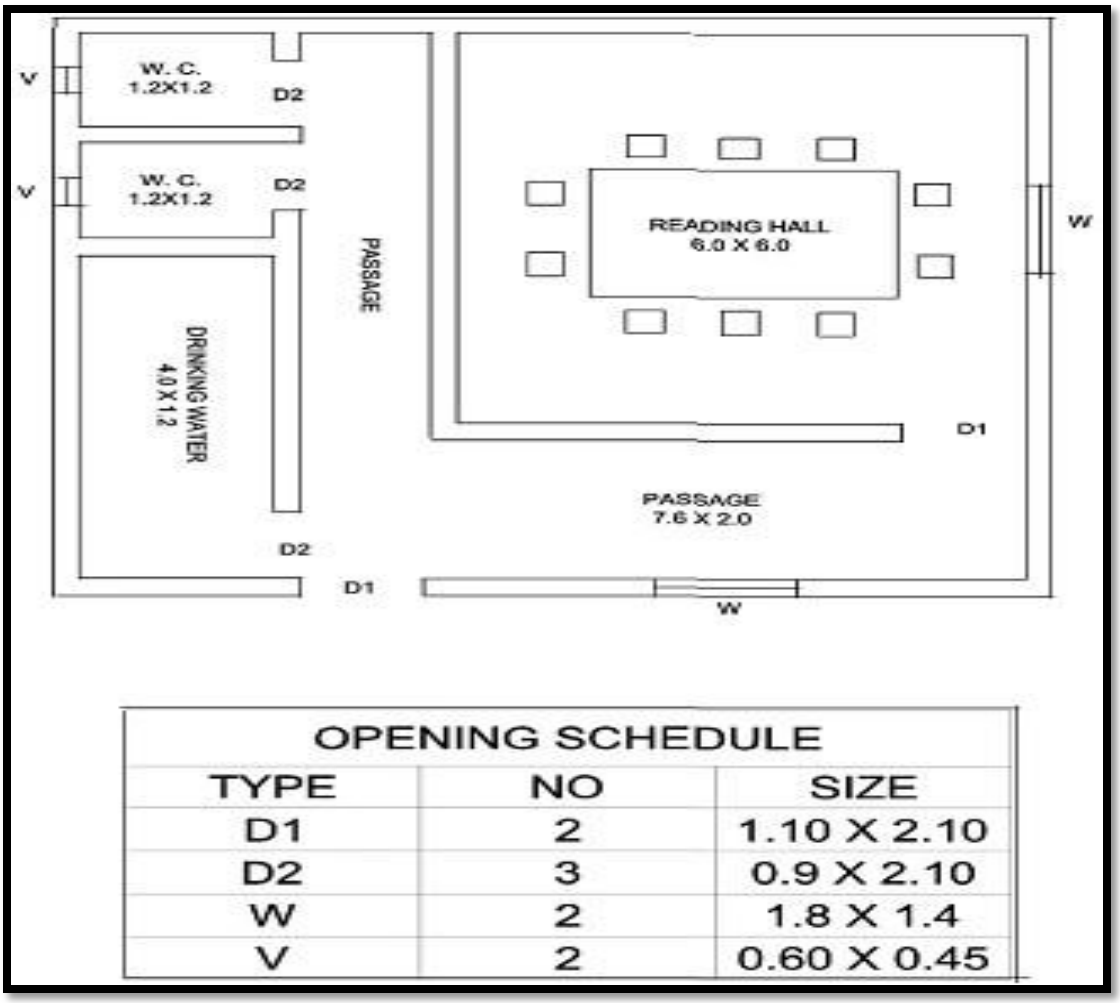
8.1.6 Heritage Village Design(Civil) :

Khoja Beraja village is a mini-hub of Education as it has many schools and colleges in it. So, by providing the facilities like Public library and Play ground, it can be proved very useful to the students living in the village. Also these facilities can be useful for other villagers. The Senior citizens living in the village can also use public library and Small children can use public play ground.

A public library is a library that is accessible by the general public and is usually funded from public sources, such as taxes. It is operated by librarians and library paraprofessionals, who are also civil servants.

Public library is a welfare centre which provides useful services to the community by fostering education, promoting culture, providing scope for healthy recreation and disseminates information to all section of the society.

Public Library:



OPENING SCHEDULE		
TYPE	NO	SIZE
D1	2	1.10 X 2.10
D2	3	0.9 X 2.10
W	2	1.8 X 1.4
V	2	0.60 X 0.45

Fig -47 2D Plan of Public Library

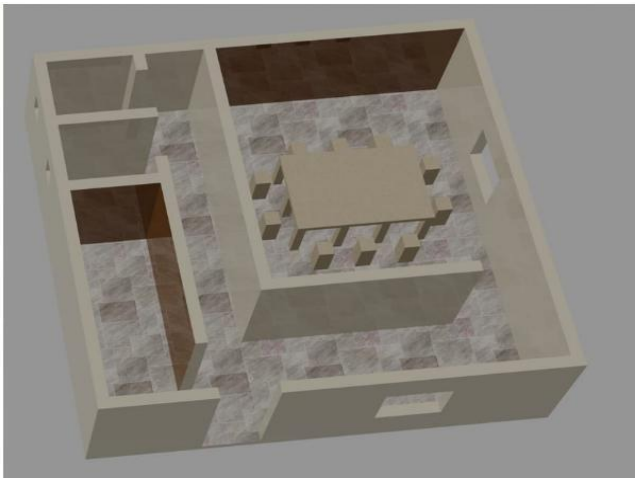


Fig-48 3D PLAN OF PUBLIC LIBRARY

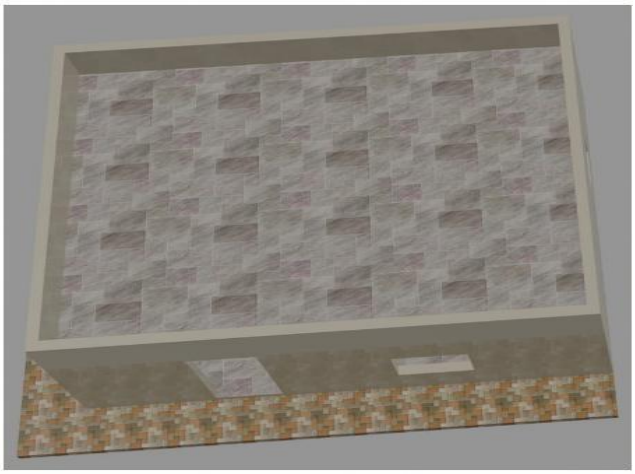


Fig-49 3D TOP VIEW OF PUBLIC LIBRARY

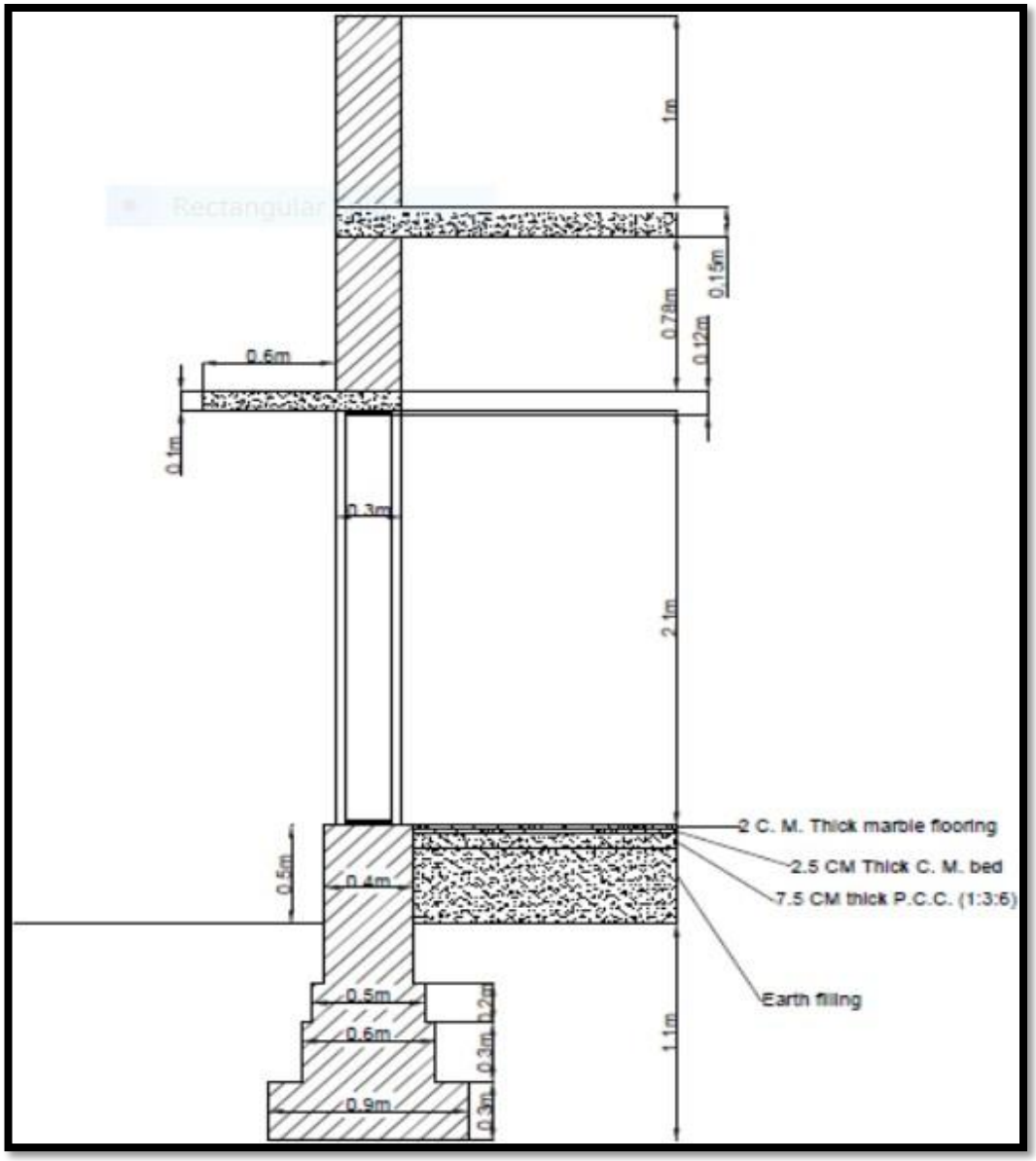


Fig-50 Wall section of Public Library

MEASUREMENT SHEET:

Sr	Description of Work	No	Length	Width	Depth/ Height	Quantity	
#	**TOTAL CENTRE LINE**		**54.7**				
1	**Excavation for Foundation**	1	5 9	0.9	1.1	58.41	m3
2	**P.C.C.**	1	5 9	0.9	0.2	10.62	m3

3	**BRICK MASONARY UP TO PLINTH**						
i	First step	1	60.2	0.6	0.3	10.836	m3
ii	Second step	1	60.6	0.5	0.2	6.06	m3
iii	Third step	1	61	0.4	0.8	19.52	m3
		TOTAL				36.416	m3
4	**BRICK WORK UP TO SUPER STRUCTURE**						
		1	61.4	0.3	3	55.26	m3
A	**Deduction Door/Window**						
i	D1	2	1.1	0.3	2.1	1.386	m3
ii	D2	3	0.8	0.3	2.1	1.512	m3
iii	W	2	1.8	0.3	1.4	1.512	m3
iv	V	2	0.6	0.3	0.45	0.162	m3
		TOTAL				4.572	m3
B	**15 Cm brick deduction for lintel**						
I	D1	2	1.4	0.3	0.15	0.126	m3
ii	D2	3	1.2	0.3	0.15	0.162	m3
iii	W	2	2.1	0.3	0.15	0.189	m3
iv	V	2	0.8	0.3	0.15	0.072	m3
		TOTAL				0.549	m3
5	**Silling Plaster**						
I	W.C.	1	1.7	1.7	1	2.89	m3
ii	BATH	1	1.7	1.7	1	2.89	m3
iii	Drinking water	1	1.7	6	1	10.2	m3
iv	Passage	1	2	9.4	1	18.8	m3
v	Reading Hall	1	8.5	7.9	1	67.15	m3
vi	Passage	1	8.8	1.2	1	10.56	m3
		TOTAL				112.49	m3

A	**DEDUCTION**						
I	D1	1	1.1		2.1	2.31	m3
II	D2	1.5	0.9		2.1	2.835	m3
III	W	1	1.8		1.4	2.52	m3
		TOTAL				7.665	m3
6	2CM THICK MARBLE FLOORING					112.49	m3
						1.47	m3
			total			113.96	m3
B	**DOOR SILL**						
I	D1	2	1.1	0.3		0.66	m3
II	D2	3	0.9	0.3		0.81	m3
		TOTAL				1.47	m3
6	**WALL PLASTER**						
i	WC.	4	1.7		3	20.4	m3
ii	BATH	4	1.7		3	20.4	m3
iii	(I)DRINKING WATER	2	6		3	36	m3
	(I)DRINKING WATER	2	1.7		3	10.2	m3
IV	(i)PASSAGE	2	9.4		3	56.4	m3
	(II)PASSAGE	2	2		3	12	m3
V	READING HALL	2	7.9		3	47.4	m3
	READING HALL	2	8.5		3	51	m3
VI	PASSAGE	2	1.2		3	7.2	m3
	PASSAGE	2	8.8		3	52.8	m3
		TOTAL				313.8	m3
7	EARTH FILLING IN PLINTH						
i	WC.	1	1.2	1.2	0.38	0.5472	m3
ii	BATH	1	1.2	1.2	0.38	0.5472	m3
iii	DRINKING WATER	1	4	1.2	0.38	1.824	m3
iv	PASSAGE	1	2	7.6	0.38	5.776	m3
v	READING HALL	1	6	6	0.38	13.68	m3
vi	PASSAGE	1	8.3	1.3	0.38	4.1002	m3
		TOTAL				26.4746	m3

8	R.C.C. SLAB WORK	1	10.1	7.6	0.15	11.85	m3
	W	2	1.8	0.6	0.1	0.216	m3
						12.066	m3

Table – 22 Measurement sheet of public Library

ABSTARCT

ITEM NO.	PARTICULERS OF ITEM	QUNTITY	PER	RATE	AMOUNT
1	EXCAVATION IN FOUNDATION	58.41	m3	90	5256.9
2	PCC IN FOUNDATION (1:3:6)	10.62	m3	3500	37170
3	BRICK WORK UPTO PLINTH LEVEL	60.6	m3	3300	199980
4	BRICK WORK UPTO SUPER STRUCTURE	55.26	m3	3500	193410
5	PLASTERING WORK (INNER WALL AND SILLING)	418.63	m2	300	125589
6	RCC WORK IN SLAB, CHAJJA AND LINTEL	10.22	m3	9000	91980
7	MARBLE FLOORING	112.49	m2	750	731185
8	EARTH FILLING	44.3	m3	70	3101
9	DOORS,WINDOW				6000
			TOTAL		1393671.9

TOTAL= 1393671.9
RS. ADD 1.5% WATER CHARGE = 20905
rs. ADD 10% CONTRACTOR PROFIT=139367 rs.
TOTAL COST = 1553944 rs.

Table - 23 Abstract of Public Library

8.2 Reasons for students Recommending this Design:

• Recreational facilities can be provided like public garden, playground etc. for the recreational purpose because there are no such provisions made in the village.

• Renewable energy sources can be used for energy conservation and to reduce load on conventional energy sources.

• Swimming pool is a recreation facility and develop s skill.

• Vertical farming are very useful for maximum crops in minimum land reqirement.

• Biogas Plant can be provided.

8.3 About design Suggestions/ Benefit of villagers:

- Bio gas plant
- Playground for children to play
- Outdoor step auditorium for some function
- Swimming pool
- Vertical farming
- Public Library

Chapter: 9

Proposing Designs For Future Devlopement Of The Village For The Part-2 Design

- After completion of visit & data collection of the Khoja Beraja village, we have given some of the designs which were to be provided under this project.

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

- Some of the designs which are left like Community hall, Solid Waste Management, Septic Tank, Bus Stand , bank etc. will be provided in the next part.

- Solid waste management: currently the villagers are dumping their solid waste at outer part of the village and burn it a specific location. By that air pollution will increase and waste collection is done regularly so that solid waste management system should be there in the village for cleanliness and safe environment.

- Skill development centre: There is no any child development or maternity home or skill development centre in the village but for the better development of students and children there should one skill development centre in the village.

- Vertical farming: for the smart development for the khoja beraja village we have proposed the smart concepts as the vertical farming.

Chapter:10

Conclusion Of The Entire Village Activities Of the Project

The motive of Vishwakarma Yojana phase - VIII is to uplift the lifestyle 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. 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. Main Smart Aim: Developing village with a _rural soul‘ but with all Smart urban amenities that a city may have‖. This will help in developing Smart villages in sustainable manner, reduce migration from villages and prevent the cities from the urban pressure. This should lead to some rethinking about the meaning of efficiency beyond the usual conceptions of economic or technical efficiency.

Indeed, employment expansion is at least as important as growth in productivity. In a sense, both represent the utilization of labor as a resource. Why, then, does thinking about efficiency focus on one and neglect the other It is important to reflect on this question.

The answer, which calls for change in both economics and politics, could make a real difference. With Gap Analysis, we conclude that some of different Smart Village facilities are required as basic or primary level which still lack in village.

So, according to Gap Analysis of Khoja Beraja village, we observed condition of existing infrastructure facilities in village such as- Primary school, Anganvadi etc. Smart Village can solve their problem itself can become a smart village example to another village too. According to UDPFI norms, lacking in basic amenities And Smart Amenities can be suggested as;

Bio-gas plant

Children Playground

Step Auditorium

Swimming Pool

Rain Water Harvesting

Public Library

This 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.

Chapter:11

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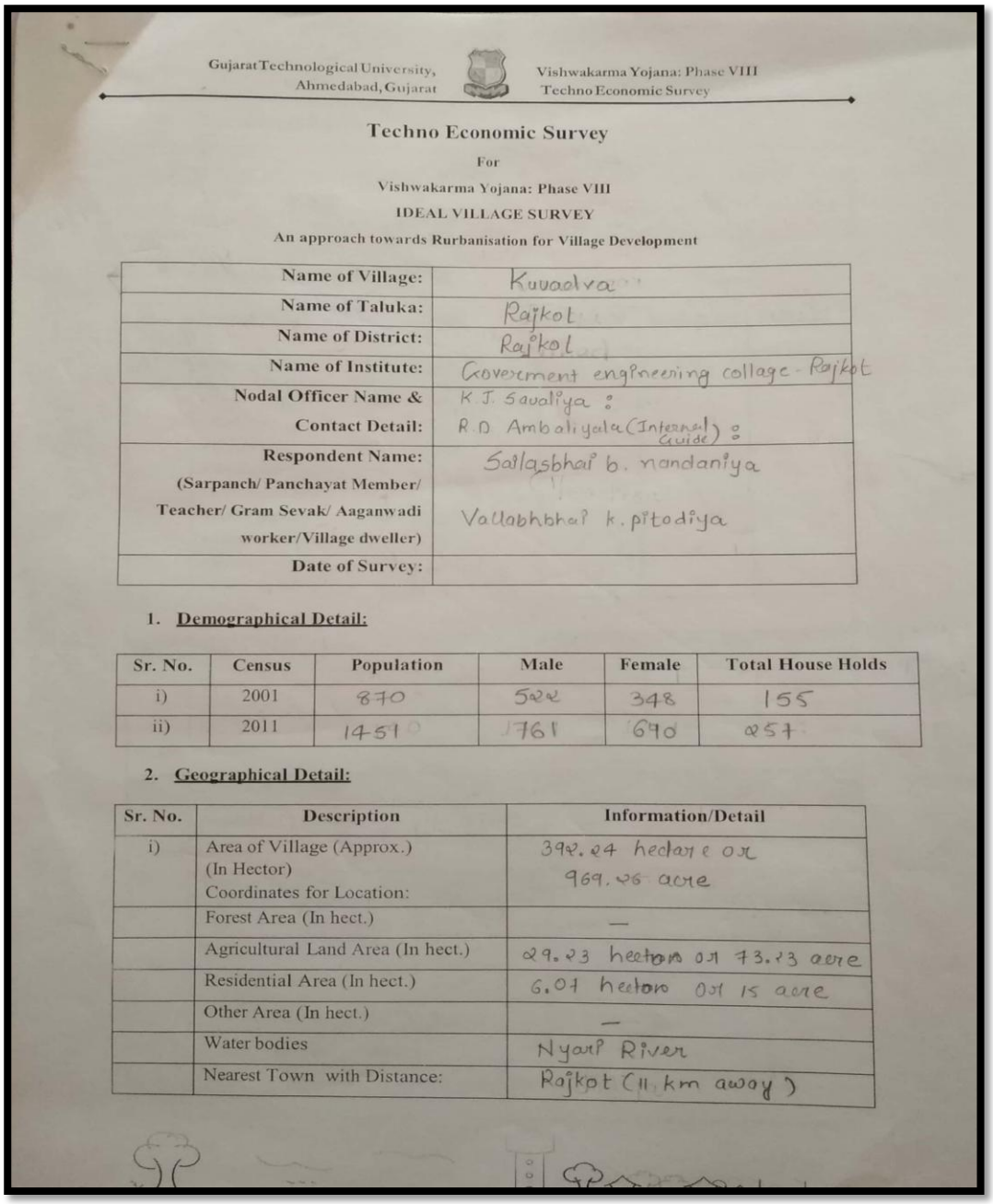
Chapter :12

Annexure Attachment

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



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

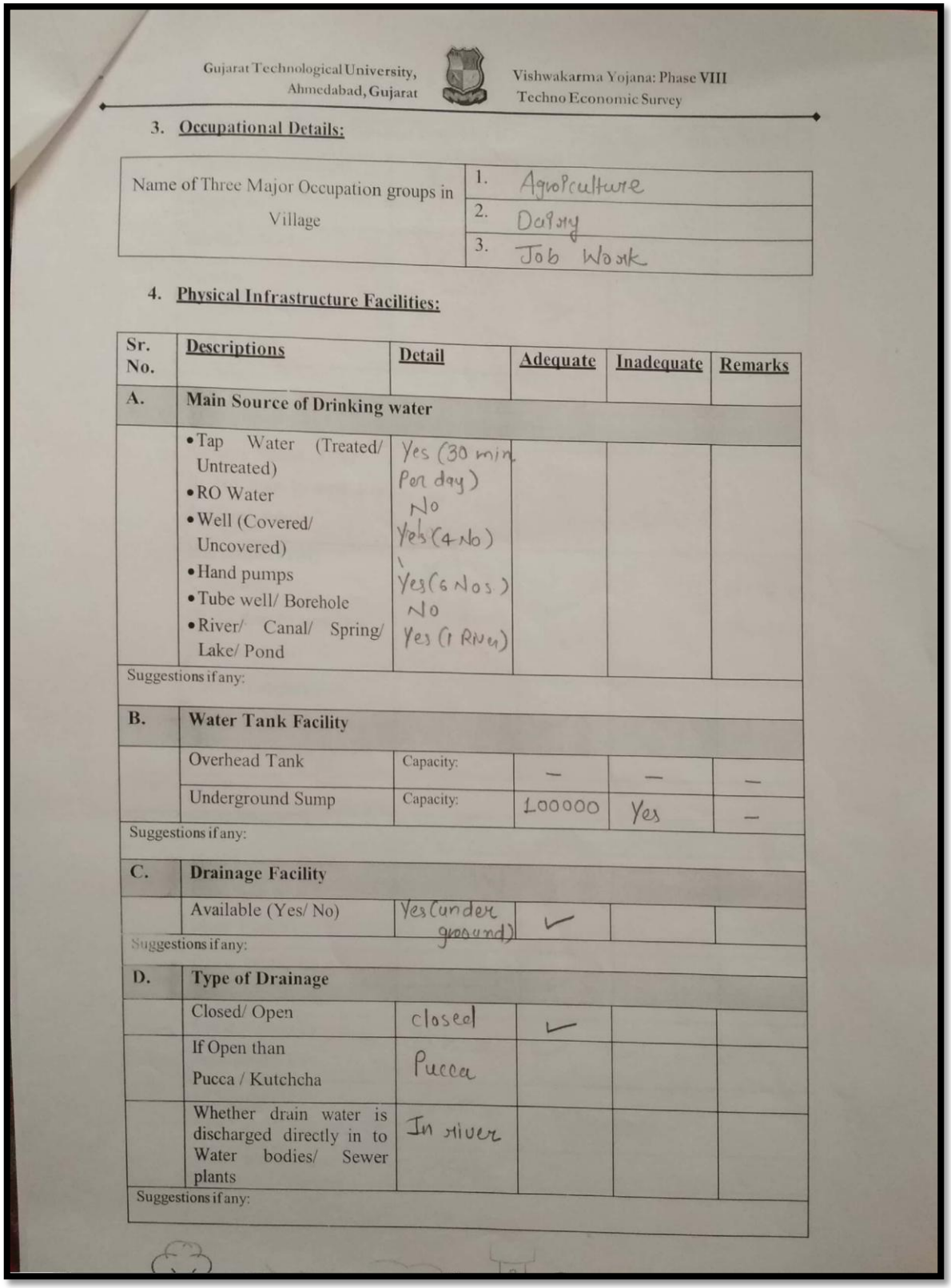
Name of Village:	Kuvadva
Name of Taluka:	Rajkot
Name of District:	Rajkot
Name of Institute:	Goverement engineering collage - Rajkot
Nodal Officer Name & Contact Detail:	K. J. Savaliya : R. D. Ambaliyala (Internal Guide) :
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sailasbhai b. nandaniya Vallabhbhai k. pitodiya
Date of Survey:	

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	870	522	348	155
ii)	2011	1451	761	690	257

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	392.24 hectare or 969.26 acre
	Forest Area (In hect.)	—
	Agricultural Land Area (In hect.)	29.23 hectare or 73.23 acre
	Residential Area (In hect.)	6.07 hectare or 15 acre
	Other Area (In hect.)	—
	Water bodies	Nyari River
	Nearest Town with Distance:	Rajkot (11 km away)



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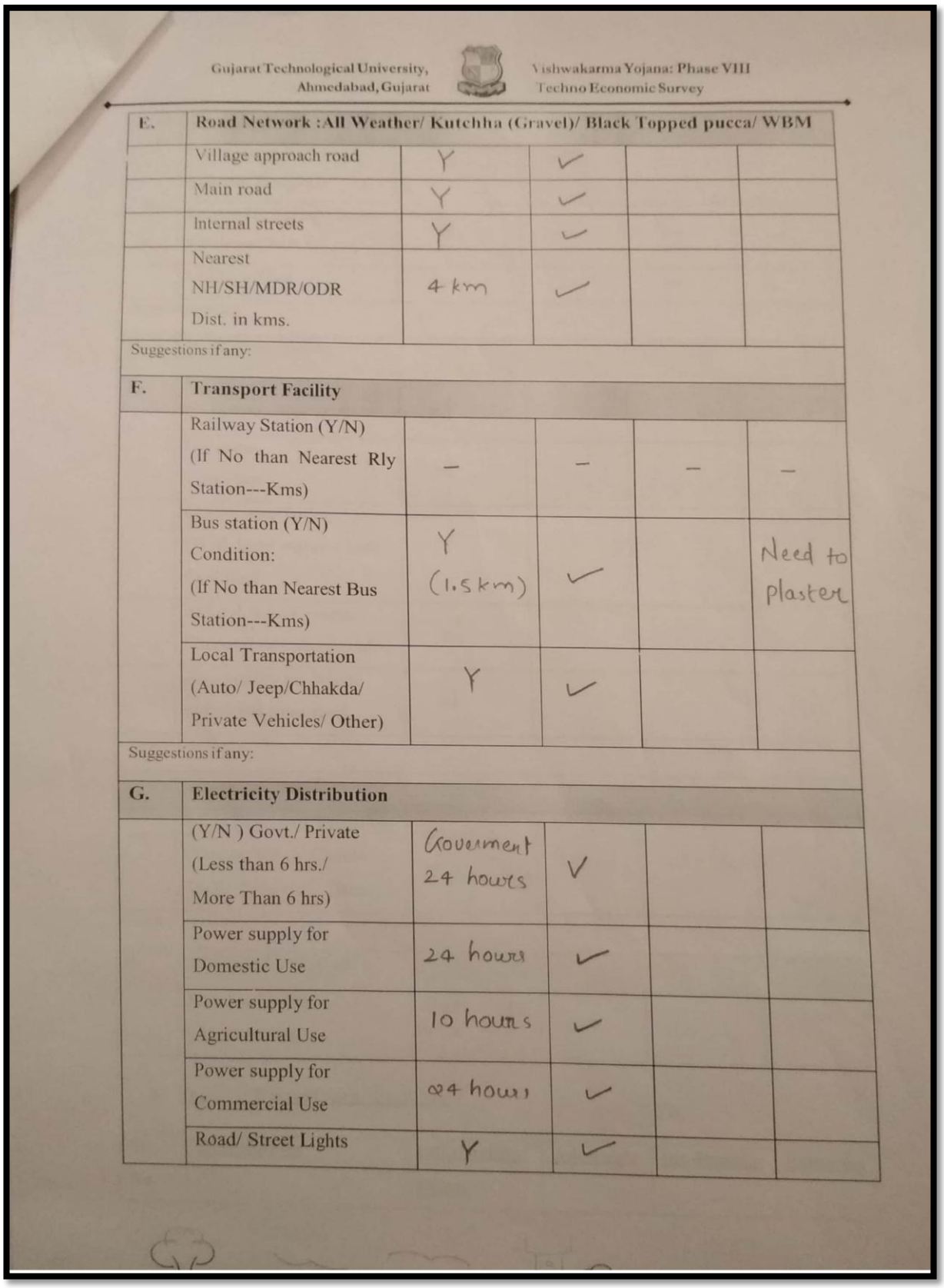
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1. Agriculture 2. Dairy 3. Job Work

4. **Physical Infrastructure Facilities:**

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated) • RO Water • Well (Covered/ Uncovered) • Hand pumps • Tube well/ Borehole • River/ Canal/ Spring/ Lake/ Pond	Yes (30 min Per day) No Yes (4 No) Yes (6 Nos) No Yes (1 River)			
	Suggestions if any:				
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	–	–	–
	Underground Sump	Capacity:	100000	Yes	–
	Suggestions if any:				
C.	**Drainage Facility**				
	Available (Yes/ No)	Yes (under ground)	✓		
	Suggestions if any:				
D.	**Type of Drainage**				
	Closed/ Open	closed	✓		
	If Open than Pucca / Kutchcha	Pucca			
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	In river			
	Suggestions if any:				



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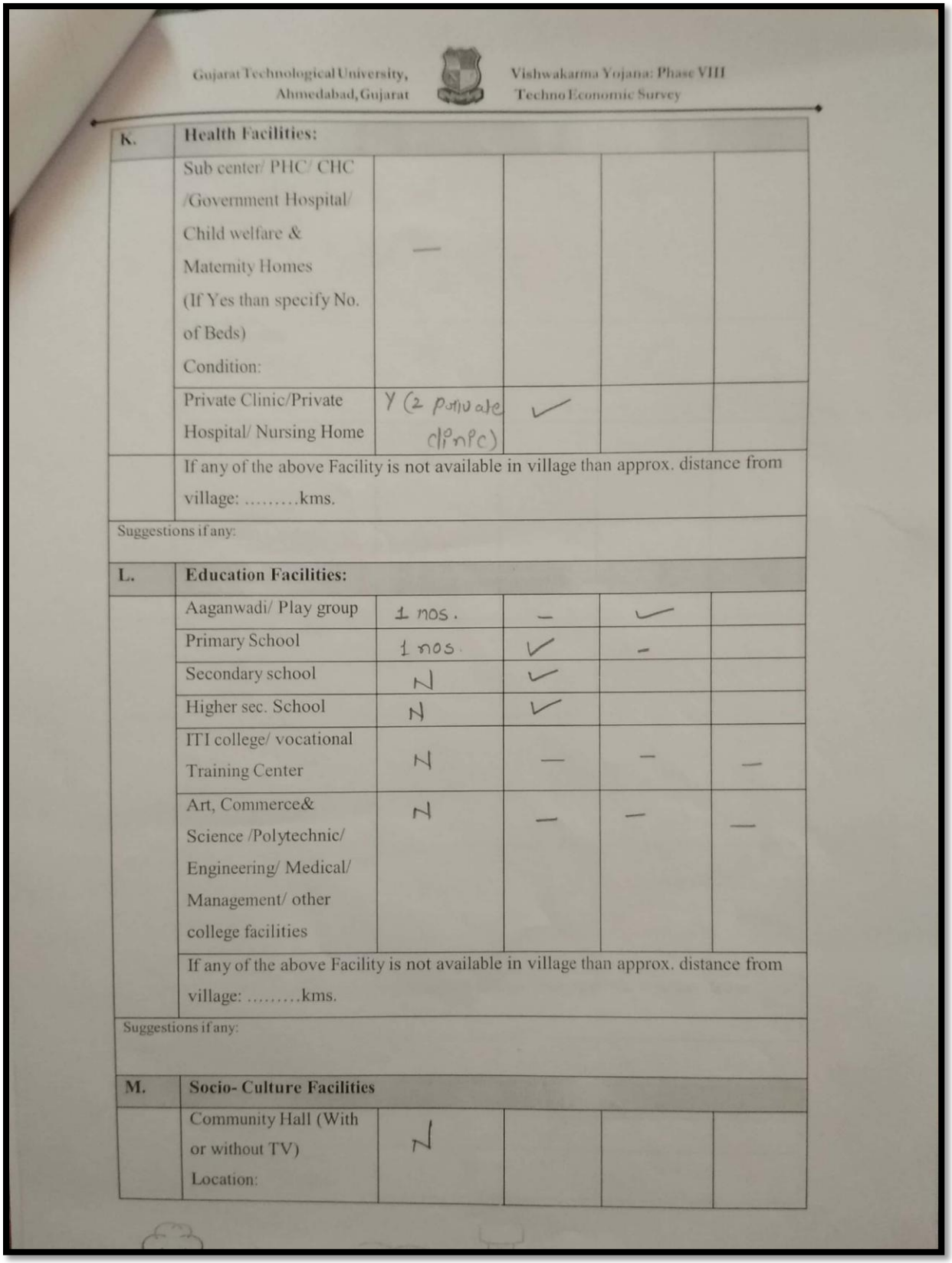
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

E.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road	Y	✓		
	Main road	Y	✓		
	Internal streets	Y	✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.	4 km	✓		
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	–	–	–	–
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Y (1.5 km)	✓		Need to plaster
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Y	✓		
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Goverment 24 hours	✓		
	Power supply for Domestic Use	24 hours	✓		
	Power supply for Agricultural Use	10 hours	✓		
	Power supply for Commercial Use	24 hours	✓		
	Road/ Street Lights	Y	✓		

	Electrification in Government Buildings/ Schools/ Hospitals	24 hours	✓		
	Renewable Energy Source Facilities (Y/ N)	–	–	–	–
	LED Facilities	–	–	–	–
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	N			
	Location Condition	N			
	Community Toilet (With bath/ without bath facilities)	N			
	Solid & liquid waste Disposal system available	N			
	Any facility for Waste collection from road	N			
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	Well & Tube Well	✓		
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Both (70% Pucca, 30% kutchha)	✓		

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks



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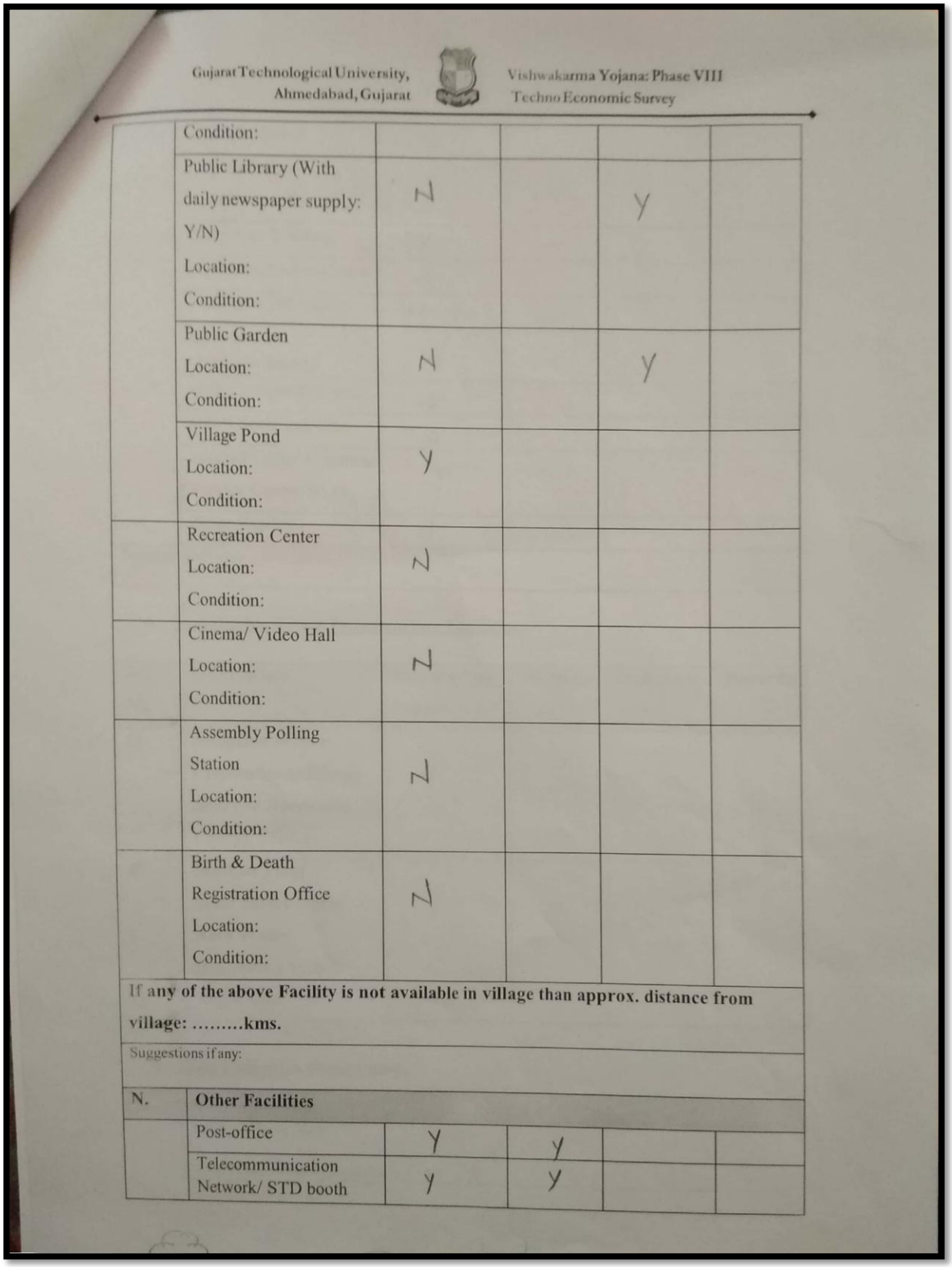
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

K.	Health Facilities:				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	—			
	Private Clinic/Private Hospital/ Nursing Home	Y (2 private clinic)	✓		
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					

L.	Education Facilities:				
	Aaganwadi/ Play group	1 nos.	–	✓	
	Primary School	1 nos.	✓	–	
	Secondary school	N	✓		
	Higher sec. School	N	✓		
	ITI college/ vocational Training Center	N	—	–	–
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	N	–	–	–
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					

M.	Socio- Culture Facilities				
	Community Hall (With or without TV) Location:	N			



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	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	N		Y	
	Public Garden Location: Condition:	N		Y	
	Village Pond Location: Condition:	Y			
	Recreation Center Location: Condition:	N			
	Cinema/ Video Hall Location: Condition:	N			
	Assembly Polling Station Location: Condition:	N			
	Birth & Death Registration Office Location: Condition:	N			

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

Suggestions if any:

N.	**Other Facilities**				
	Post-office	Y	Y		
	Telecommunication Network/ STD booth	Y	Y		

	General Market	N			
	Shops (Public Distribution System)	Y	✓		
	Panchayat Building	Y	✓		
	Pharmacy/Medical Shop	N			
	Bank & ATM Facility	Y (1 Nos)	✓		
	Agriculture Co-operative Society	N			
	Milk Co-operative Soc.	N			
	Small Scale Industries	N			
	Internet Cafes/ Common Service Center/Wi Fi	N			
	Other Facility	N			
Suggestions if any:					

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

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

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	Y

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Techno Economic Survey

Recent Projects going on for Development of Village	N
Any NGO working for village development	N

8. Additional Information/ Requirement:

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

9. Smart Village Proposal Design

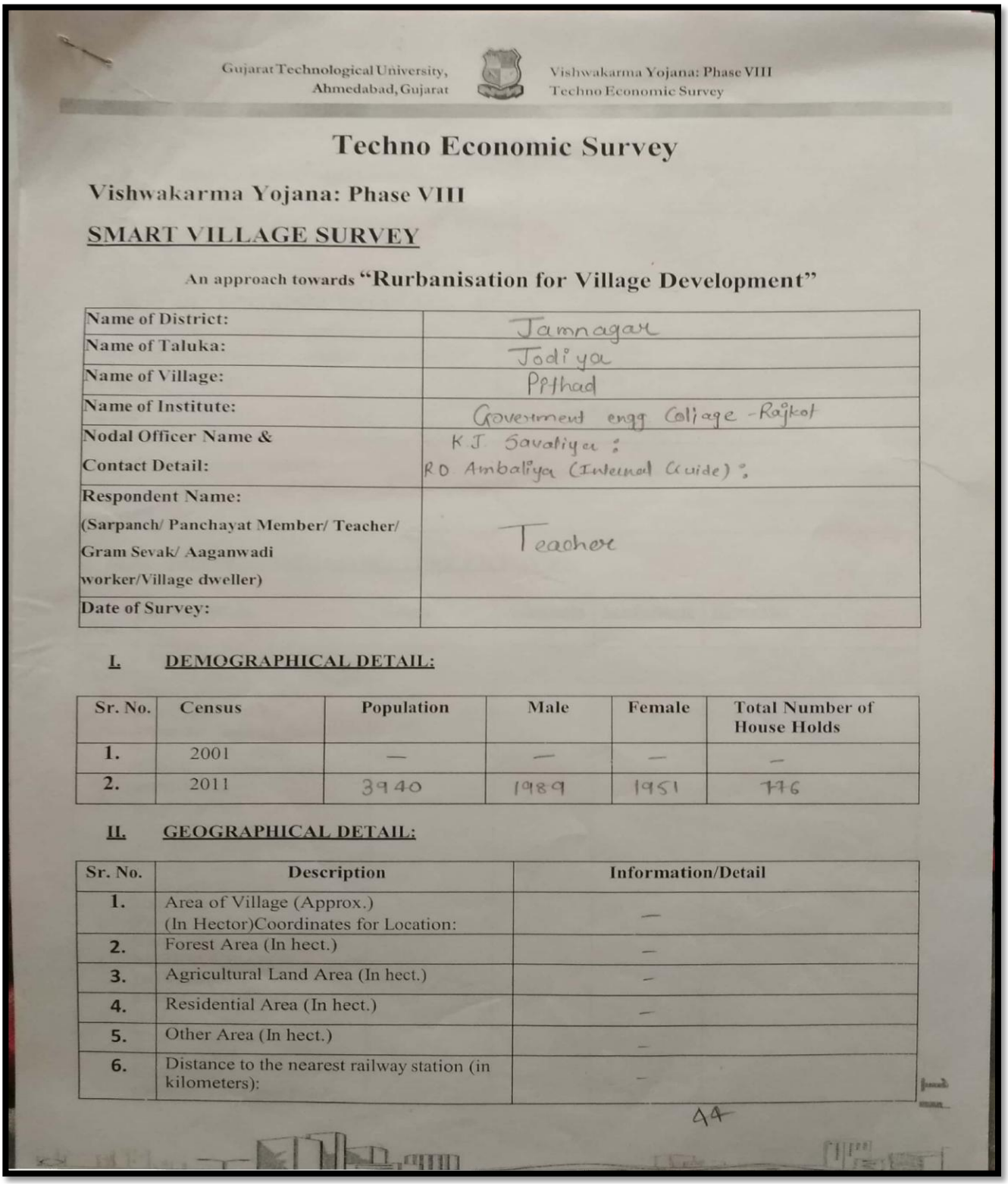
Sr. No.	Descriptions	Information/ Detail	Remarks
1.			

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

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

કુવાડવા ગ્રામ પંચાયત
તા. રાજકોટ. તા.....

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



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

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

Name of District:	Jamnagar
Name of Taluka:	Jodiya
Name of Village:	Pithad
Name of Institute:	Government engg College -Rajkot
Nodal Officer Name & Contact Detail:	K J Savaliya : RD Ambaliya (Internal Guide) :
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Teacher
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	—	—	—	—
2.	2011	3940	1989	1951	776

II. GEOGRAPHICAL DETAIL:

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

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

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1.	Agriculture
	2.	Dairy
	3.	Jobs
Major crops grown in the village:	1.	
	2.	
	3.	

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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

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Vishwakarma Yojana: Phase VIII
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Suggestions if any:						
B.	**Water Tank Facility**					
	Overhead Tank	Capacity:	10000	y		
	Underground Sump	Capacity:	100000	y		
Suggestions if any:						
C.	**The Type of Drainage Facility**					
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	y	y			
Suggestions if any:						
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**					
	Village approach road	y				
	Main road	y				
	Internal streets	y				
	Nearest NH/SH/MDR/ODR Dist. in kms.	y (4km)				
Suggestions if any:						
E.	**Transport Facility**					
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	N				
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	y				
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	y				
Suggestions if any:						
F.	**Electricity Distribution**					
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes Gov 24 hour				

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	Power supply for Domestic Use	24 Hour			
	Power supply for Agricultural Use	8 Hour			
	Power supply for Commercial Use	24 Hour			
	Road/ Street Lights	Y			
	Electrification in Government Buildings/ Schools/ Hospitals	Y			
	Renewable Energy Source Facilities (Y/ N)	Y			
	LED Facilities	Y			

Suggestions if any:

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

Suggestions if any:

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

Suggestions if any:

I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	20-80			

V. SOCIAL INFRASTRUCTURAL FACILITIES:

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

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Suggestions if any:

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

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

Suggestions if any:

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

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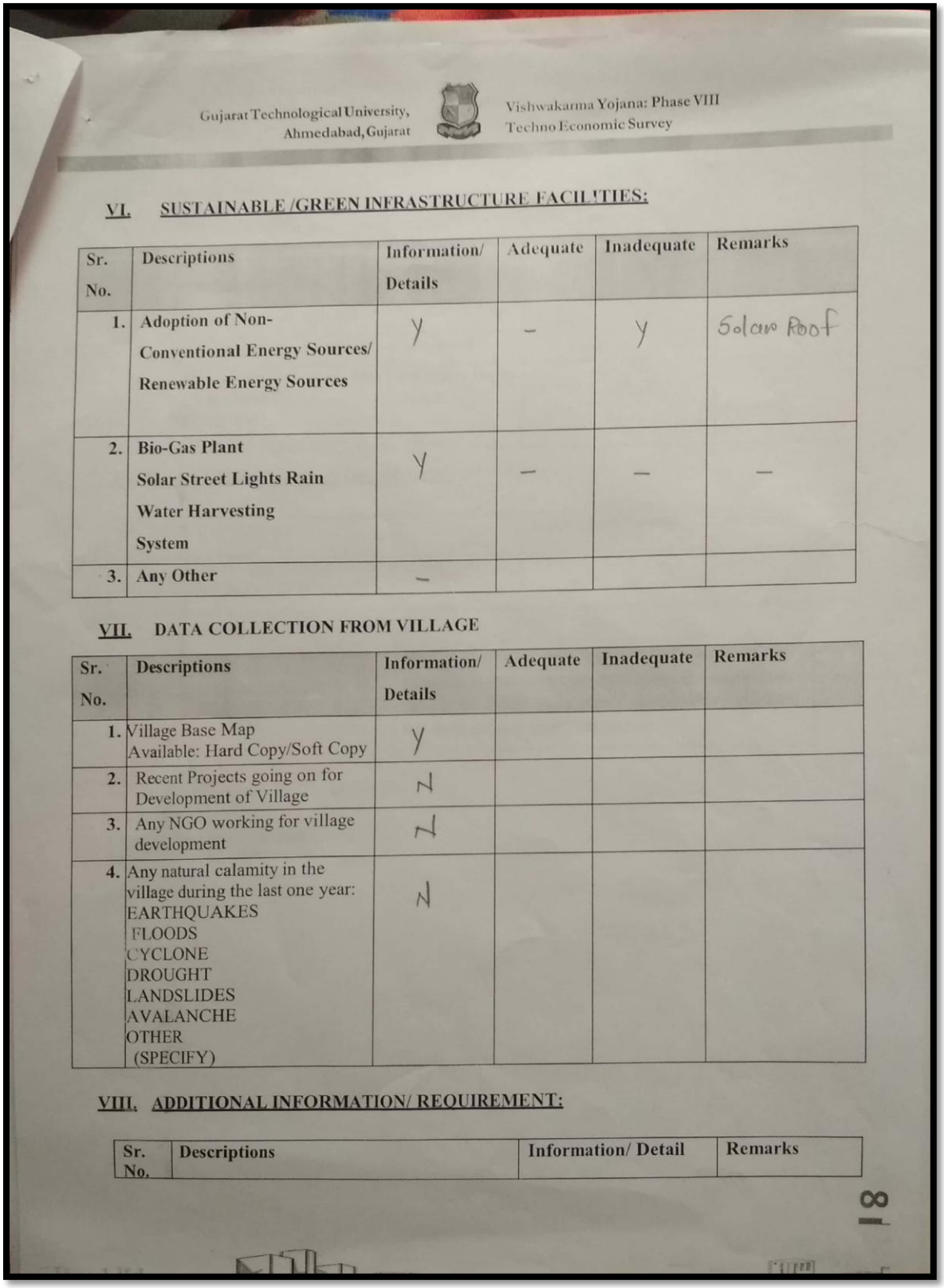
Techno Economic Survey

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

Suggestions if any:

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



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

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

IX. Smart Village / Heritage Details

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

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

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

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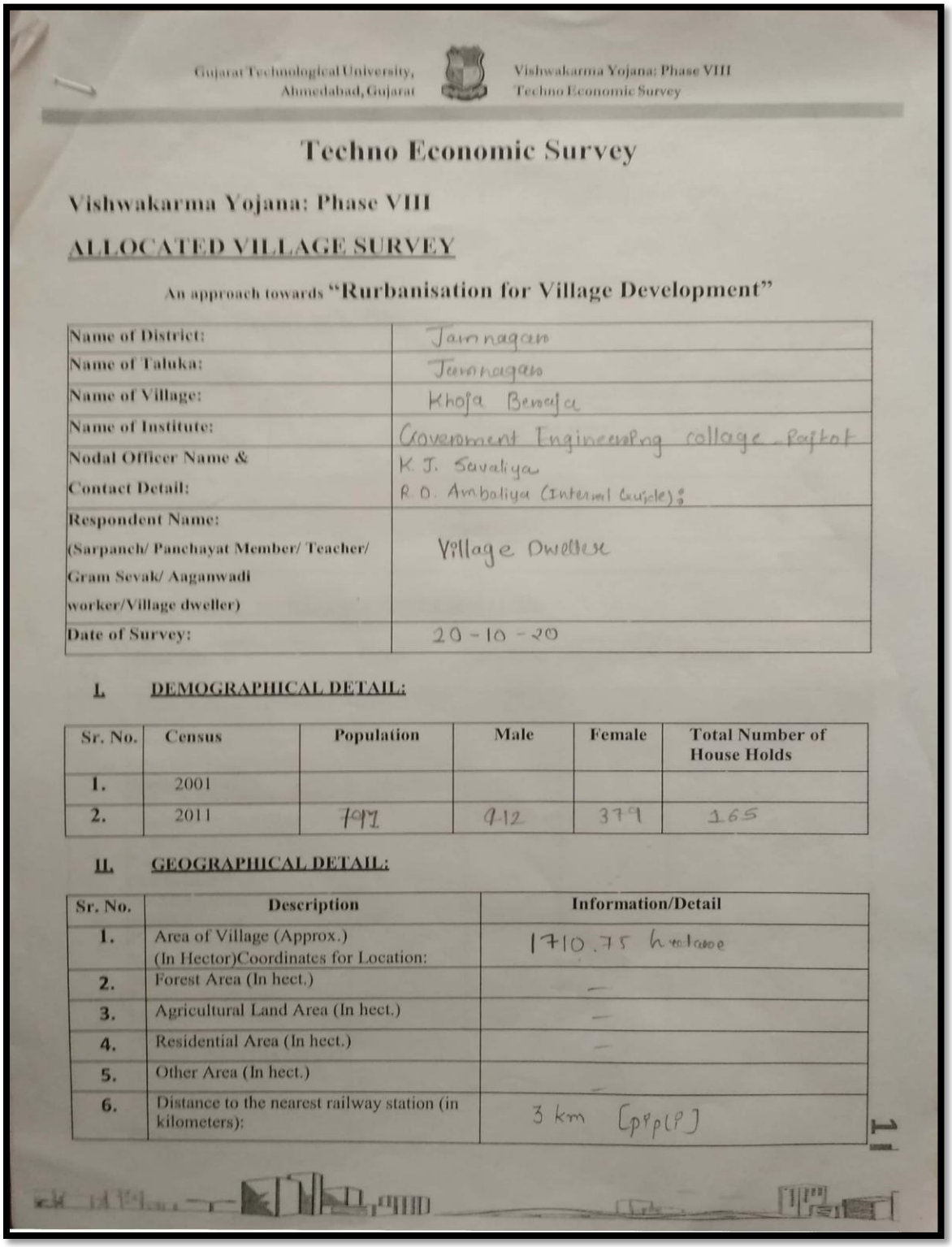
12.3 Survey form of Allocated Village Scanned copy attachment in the report for Part-I:



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

Name of District:	Jamnagar
Name of Taluka:	Jamnagar
Name of Village:	Khoja Beraja
Name of Institute:	Government Engineering college, Rajkot
Nodal Officer Name & Contact Detail:	K. J. Savaliya R. D. Ambaliya (Internal Guide) :
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Village Dweller
Date of Survey:	20-10-20

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	791	412	379	165

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1710.75 hectare
2.	Forest Area (In hect.)	—
3.	Agricultural Land Area (In hect.)	—
4.	Residential Area (In hect.)	—
5.	Other Area (In hect.)	—
6.	Distance to the nearest railway station (in kilometers):	3 km [approx]

19 km 340 km

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7.	Name of Nearest Town with Distance:	Jamnagar
8.	Distance to the nearest bus station (in kilometers):	Chandragadh (4.5km)
9.	Whether village is connected to all road for the any facility or town or City?	

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1. Cultivation 2. Agricultural Labourers 3. Marginal Activities

Major crops grown in the village:	1. 2. 3.

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER** Piped Into Dwelling Piped To Yard/Plot Public Tap/Standpipe Tube Well Or Bore Well	Yes	Yes		
2.	**DUG WELL** Protected Well Un Protected Well	Yes	Yes		
3.	**WATER FROM SPRING** Protected Spring Unprotected Spring	Yes	Yes		
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/** Irrigation Channel Bottled Water Hand Pump	Yes	Yes		

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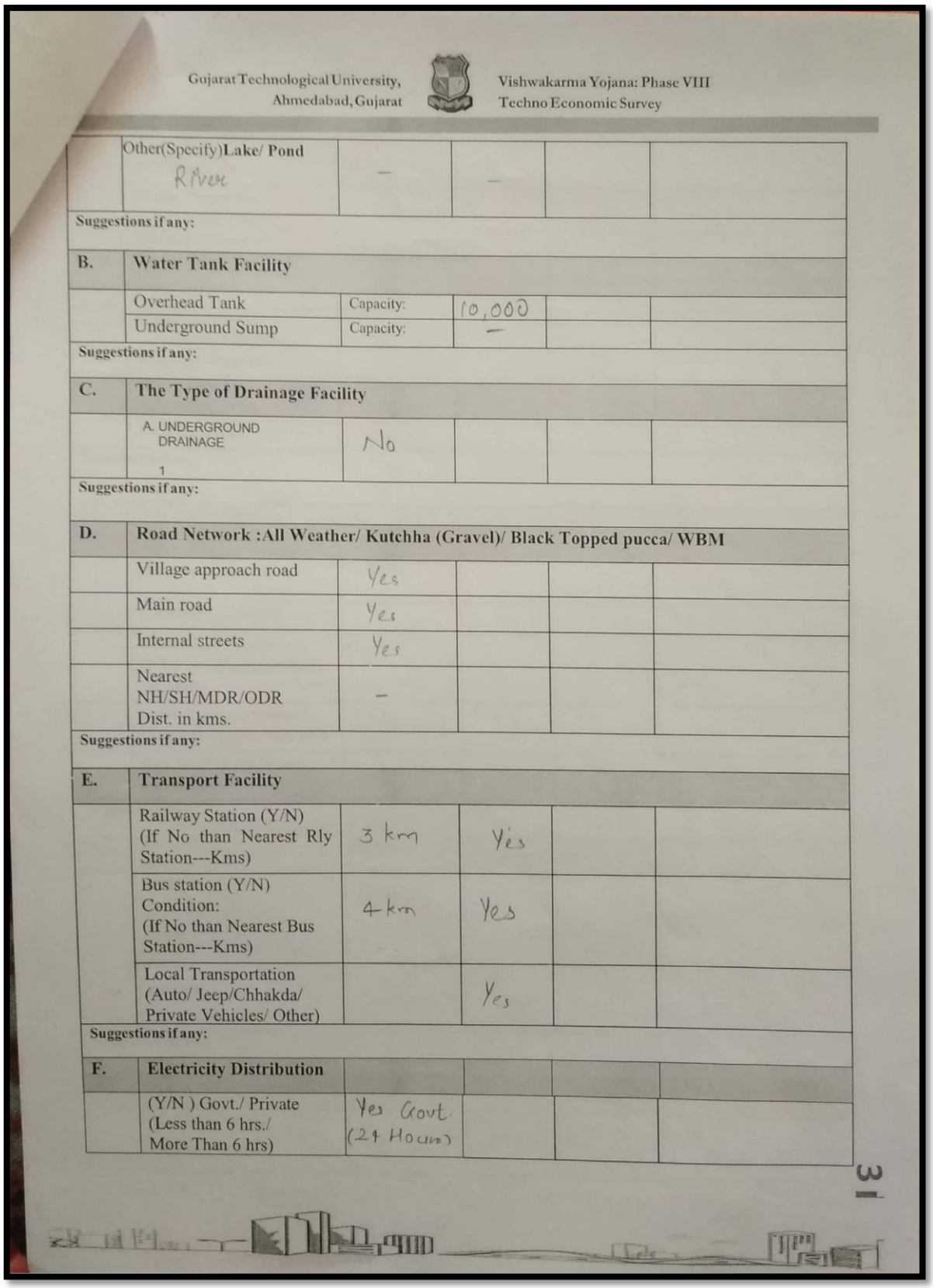

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Other(Specify)Lake/ Pond River	–	–		

Suggestions if any:

B.	Water Tank Facility				
	Overhead Tank	Capacity:	10,000		
	Underground Sump	Capacity:	–		

Suggestions if any:

C.	The Type of Drainage Facility				
	A. UNDERGROUND DRAINAGE 1	No			

Suggestions if any:

D.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road	Yes			
	Main road	Yes			
	Internal streets	Yes			
	Nearest NH/SH/MDR/ODR Dist. in kms.	–			

Suggestions if any:

E.	Transport Facility				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	3 km	Yes		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	4 km	Yes		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)		Yes		

Suggestions if any:

F.	Electricity Distribution				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes Govt. (24 Hours)			

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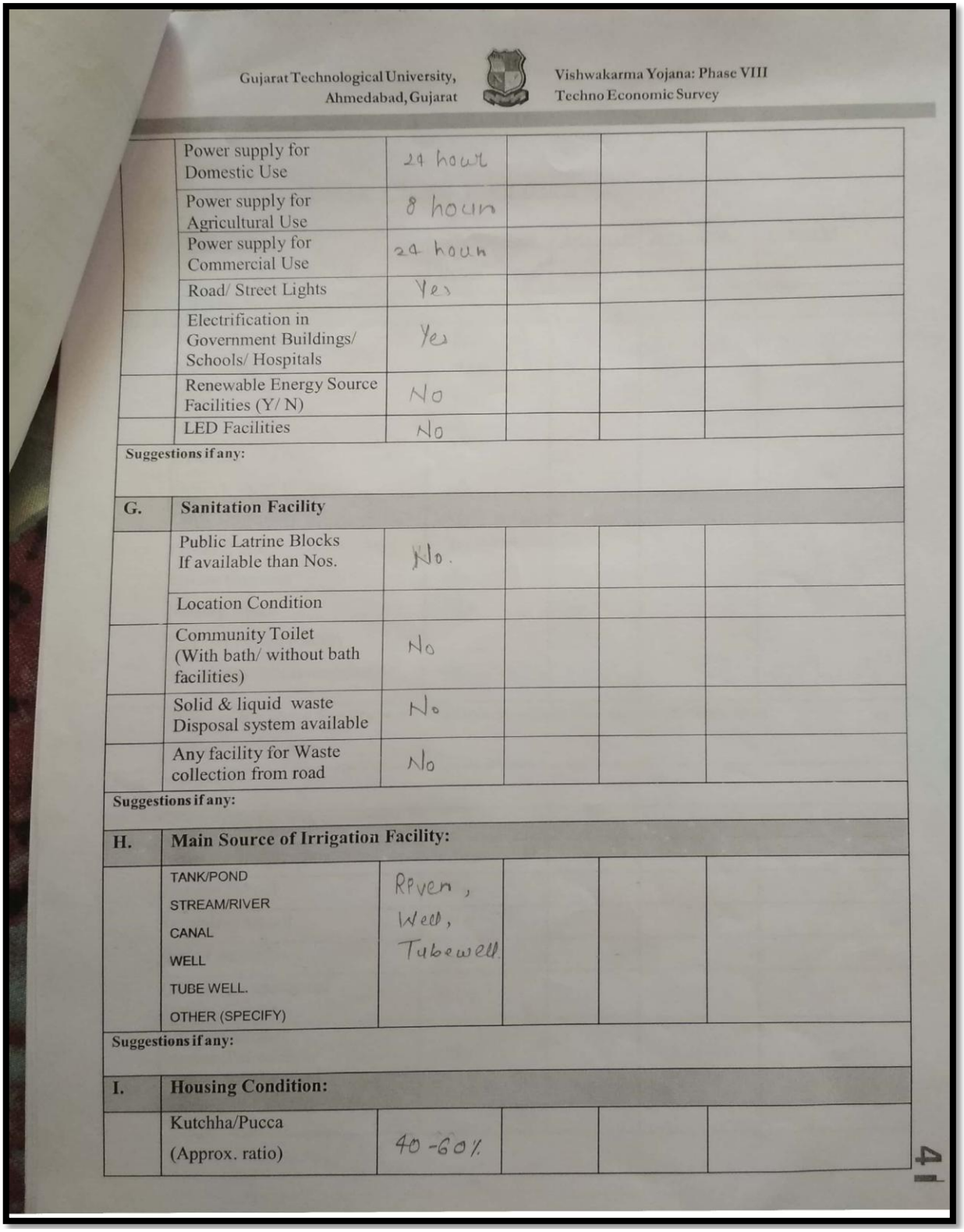

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Vishwakarma Yojana: Phase VIII
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	Power supply for Domestic Use	24 hour			
	Power supply for Agricultural Use	8 hour			
	Power supply for Commercial Use	24 hour			
	Road/ Street Lights	Yes			
	Electrification in Government Buildings/ Schools/ Hospitals	Yes			
	Renewable Energy Source Facilities (Y/ N)	No			
	LED Facilities	No			

Suggestions if any:

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

Suggestions if any:

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

Suggestions if any:

I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	40-60%			

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

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

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

Suggestions if any:

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

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

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	Good		Yes	
	Telecommunication Network/ STD booth	Good		Yes	
	General Market				No
	Shops (Public Distribution System)			Yes	
	Panchayat Building	Not good		Yes	
	Pharmacy/Medical Shop				
	Bank & ATM Facility			Yes	
	Agriculture Co-operative Society				
	Milk Co-operative Soc.				
	Small Scale Industries				No
	Internet Cafes/ Common Service Center/Wi Fi				No
	Youth Club				No
	Mahila Mandal				No

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

Suggestions if any:

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

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	Underground drainage, CC Road, street lighting	
2.	Additional Information/ Requirement	—	
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?		

IX. Smart Village / Heritage Details

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

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

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

R.H.T of ઉમાદેવ માલાભાઈ

સરપંચ
ખોજાબેરાજા ગ્રામ પંચાયત

12.4 Gap Analysis Of Allocated Village:

VILLAGE GAP Analysis				
Village Facilities	**Planning Commission/UDPFI Norms**	**Village Name:**	KHOJA BERAJA	
		Population:		
		Existing	**Required as per Norms**	**Gap**
Social Infrastructure Facilities				
Education				
Anganwadi	Each or Per 2500 population	1	2	-1
Primary School	Each Per 2500 population	1	2	-1
Secondary School	Per 7,500 population	0	0	0
Higher Secondary School	Per 15,000 Population	0	0	0
College	Per 125,000 Population	0	0	0
Tech. Training Institute	Per 100000 Population	0	0	0
Agriculture Research Centre	Per 100000 Population	0	0	0
Skill Development Center	Per 100000 Population	0	0	0
Health Facility				
Govt/Panchyat Dispensary or Sub PHC or Health Centre	Each Village	0	0	0
Primary Health & Child Health Center	Per 20,000 population	1	0	0
Child Welfare and Maternity Home	Per 10,000 population	0	0	0
Multispeciality Hospital	Per 100000 Population	0	0	0
Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & kutcha house)	0	2	-2

Physical Intrastructure Facilities				
Transportation		**Adequate / Inadequate**		
Pucca Village Approach Road	Each village	Adequate		
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	Adequate		
Drinking Water (Minimum 70 lpcd)		Adequate		
Over Head Tank	1/3 of Total Demand	Adequate		
U/G Sump	2/3 of Total Demand	Adequate		
Drainage Network - Open		Adequate		
Drainage Network - Cover		Inadequate		
Waste Management System		Adequate		
Social Infrastructure Facilities				
Community Hall	Per 10000 Population	1	1	0
community hall and Public Library	Per 15000 Population	0	1	-1
Cremation Ground	Per 20,000 population	0	1	-1
Post Office	Per 10,000 population	1	1	0
Gram Panchayat Building	Each individual/group panchayat	1	1	0
APMC	Per 100000 Population	0	0	0
Fire Station	Per 100000 Population	0	0	0
Public Garden	Per village	0	1	-1
Police post	Per 40,000Population	0	1	-1
Shopping Mall				
Electrical Design				
Electricity Network		**Adequate / Inadequate**		
For domestic use	24 hour per day			
Agriculture use	8 hour per day			
Commercial use	24 hour per day			
Any Smart Village Facility				
Technology	-			
		ESR cap	10000	
		Sump cap	50000	
		Lat	0	

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

Sr no.	Village	Discipline	Part-I	Part-2
1	Khoja Beraja	Civil	Children Playground	Bus stand
			Step Auditorium	ATM machine
			Swimming Pool	Artificial pond
			Rain Water Harvesting	Public health centre
			Bio gas Plant	Public toilet
			Public Library	Open party plot
2	Agatri	Civil	Play ground	Agriculture storage yard
			Public library	Skill development centre
			Septic Tank	Milk cooperative society
			Community Hall	Bus stop
			Dry Composite Toilet	Farmer help centre
3	Rangpar(Bela)	Civil	Children park	Green house
			Dry compost toilet	Septic tank
			Community hall	Bank
			Bio gas plant	Post office
			Clock tower	Library
			Rain water harvesting	Auditorium

12.6 Summary of Good Photographs :

FIG – 51 SUMMARY OF GOOD PHOTOGRAPH

12.7 Village Interaction with sarpanch Report with the photograph:

Date:31/08/2020

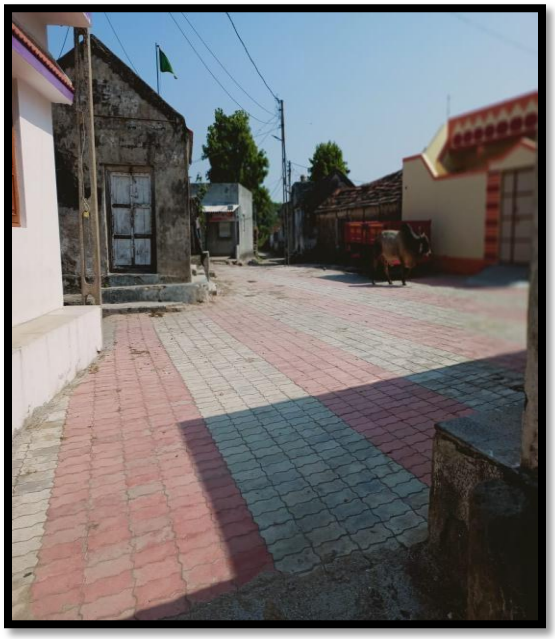
Subject: Village developing plan and future development

As per the circular of GTU guidelines, GTU had informed all the team members of Vishwakarma Yojana to present their work in the allocated village for the successful and effective implementation of Vishwakarma Yojana Phase-VIII . Under their guidelines the members of the team of Khoja Beraja village presented the plan for the development of the village at Khoja Beraja Gram panchayat office.

Sarpanch, Talati, and all the other member of the panchayt, village dwellers were present were present to know how the development of the village can be done. Some of them also gave their own ideas and the facilities which are required in the village.

We presented our work under the guidelines of VY Phase-VIII. We also made them understand about the main objective of the project, its benefits for the development of village and other issues and concerns prevailing in the village.

We explained them about the various designs we are going to proposed in the village for its development. The designs which we are going to proposed were designated as Physical infrastructure, Social infrastructure, Social and Cultural facilities, Repair and Maintenance of Existing structures and the most important facility of Sustainable/ Renewable Energy Source of planning.



12.8 Sarpanch Letter giving information about the village development:

VISHWAKARMA YOJNA PHASE- VIII

KHOJA BERAJA VILLAGE, JAMNAGAR DISTRICT

Sub : Approval Of Design Proposal Of Khoja Beraja Village

I am Sarpanch of khoja Beraja village underdesign to give approval of following main designs if Vishwakarma Yojna Project phase- VIII. An approach towards rurbanization by the students of GOVERNMENT ENGINEERING COLLAGE-RAJKOT named as Pitroda Janvi and Hemani Afsin.

Approval of main designs proposal are as follow:

Bio gas plant

Children Playground

Step Auditorium

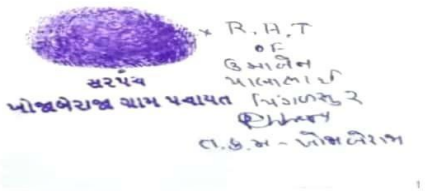
Swimming Pool

Rain Water Harvesting

Public Library

Date:

Sign Of Sarpanch:



Chapter -13

From the Chapter- 9 future designs of the aspects (Feasibility, Construction, Operation and maintenance of various design options in Rural Areas along with cost with AutoCAD designs / planning with any software:

13.1 Design Proposals:

13.1.1 Civil Design –Physical Design:

Bus stand:

A bus stand also called a bus bay or bus stance, is a designated parking location where a bus or coach waits out of service between scheduled public transport services….In the simplest case a bus turnout type of bus stop is extended and buses can lay over away from the stop if necessary.

A bus stand are seen at different busy spots. Like school or college gates, markets, medical centres and the crossing point of two or more roads. A bus stand is usually employed to allow a bus to lay over at a bus terminus, without giving the appearance of being in service, or blocking the stop from use by other buses that are in service. Bus stands also allow short-term parking for driver changes or driver breaks.

In the simplest case, a bus turnout type of bus stop is extended, and buses can lay over away from the stop if necessary. In locations where buses cannot remain stationary for long, nearby but separate bus stands may be provided where other bus parking is not conveniently located.

Due to their public transport use, bus stands will often be specifically covered by local legislation. Parking of non-public service vehicles (PSVs) in bus stands may be prohibited. For pollution and fuel saving concerns, drivers may be required to switch their engines off if in a bus stand, as opposed to when stopped in a bus stop.

In public bus and coach stations, buses will often be marshalled into specific parking slots, which act as stands where buses queue for an available slot at a departure point, such as in Victoria Coach Station in London. At the appropriate time, the bus can be moved the short distance to the stop, to begin boarding.

Bus stops enhance passenger safety in a number of ways:

- Bus stops prevent passengers from trying to board or alight in hazardous situations such as at intersections or where a bus is turning and is not using the curb lane.
- A bus driver cannot be expected to continuously look for intending passengers. A bus stop means that the driver only needs to look for intending passengers at the approach to each bus stop.
- Having bus stops requires passengers to group themselves prior to boarding, which reduces time spent at boarding.
- At night, when passenger numbers are lower, restrictions are sometimes relaxed and passengers may be allowed to exit the bus anywhere within reason.
- Bus turnouts, or lay-bys, allow buses to stop without impeding the flow of traffic on the main roadway.

DESIGN:

- Bus stop infrastructure ranges from a simple pole and sign, to a rudimentary shelter, to sophisticated structures. The usual minimum is a pole mounted *flag* with suitable name/symbol. Bus stop shelters may have a full or partial roof, supported by a two, three or four sided construction. Modern stops are mere steel and glass/perspex constructions, although in other places, such as rural Britain, stops may be wooden brick or concrete built.
- The construction may include small inbuilt seats. The construction may feature advertising, from simple posters, to complex illuminated, changeable or animated displays. Some installations have also included interactive advertising. Advertising may be the primary reason for the shelter and the advertising pays for the bus shelter. Design and construction may be uniform to reflect a large corporate or local authority provider, or installations may be more personal or distinctive where a small local authority such as a parish council is responsible for the stop. The stop may include separate street furniture such as a bench, lighting and a trash receptacle.

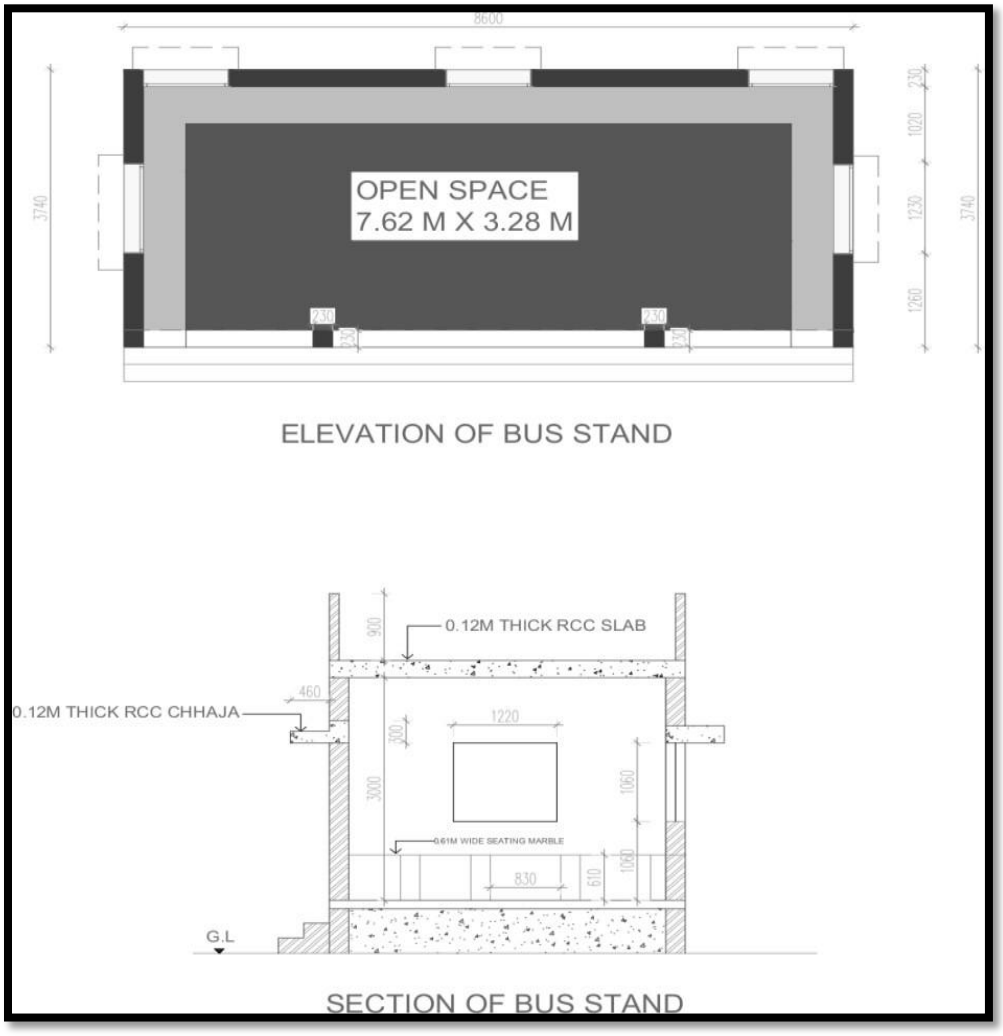


Fig- 52 Elevation and section of Bus stand

MEAUREMENT SHEET:

NO	DISCRIPTION	NO	L	B	H	QUANTITY	TOTAL QUANTITY
1	Excavation in						
	Long wall	2	8.46	0.61	0.61	6.30	
	Short wall	2	2.9	2.16	0.61	2.16	8.45 cu.m
2	PCC in foundation						
	Long wall	2	8.46	0.61	0.15	1.55	
	Short wall	2	7.93	0.61	0.15	0.53	2.08 cu.m
3	Rubble masonry in foundation up to plinth						
	Long wall						
	Step -1	2	8.16	0.30	0.46	2.25	
	Step-2	2	7.93	0.23	0.53	1.94	
	Short wall						
	Step-1	2	3.2	0.30	0.46	0.88	
	Step-2	2	3.43	0.23	0.53	0.84	
	Deduction						
	Column foundation	2	0.30	0.30	1	-(0.18)	5.72 cu.m
4	Brick masonry in foundation up to plinth						
	Long wall	1	7.93	0.23	3	5.47	
	Short wall	2	3.43	0.23	3	4.73	
	Above beam to slab	1	7.93	0.23	0.58	1.05 c	
	Deduction						
	Window	5	1.22	0.23	1.0	-1.48	
	RCC Beam	2	0.23	0.23	0.30	-0.031	
	Lintel (0.15 m bearing)	5	1.38	0.23	0.12	-0.19	9.55 cu.m
5	Brick masonry for parapet wall	1	11.13	0.15	0.90	1.50	
	Deduction for Square Hole	9	0.23	0.15	0.23	0.071	1.43 cu.m
6	Concrete work						
	RCC Slab	1	8.14	3.51	0.12	3.42	
	Lintel (0.15m bearing)	5	1.38	0.23	0.12	0.19	
	RCC Beam	1	7.93	0.23	0.30	0.54	
	RCC Chhajja	5	1.52	0.46	0.12	0.42	
	RCC Column	2	0.23	0.23	2.66	0.28	
	RCC Column	2	0.30	0.30	0.46	0.08	

	Foundation						
	PCC below the step	1	8.14	0.5	0.10	0.41	
	Elevation Chhajja	1	8.08	0.46	0.12	0.45	5.79 cu.m
7	Plinth Filling						
	Earth Filling	1	7.62	3.28	0.30	7.49	
	Sand Filling	1	7.62	3.28	0.12	3	
	PCC in Plinth	1	7.62	3.28	0.10	2.50	13.0 cu.m
8	Brick Masonry of Partition wall	14	0.61	0.15	0.61	0.87	0.87 cu.m
9	Marble for seating	1	12.49	0.61		7.89	7.89 sq.m
10	Plaster (Outside)						
	Long wall	1	8.08		4.56	36.84	
	Short wall	2	3.51		4.56	32.01	
	Plaster above elevation Chhajja	1	8.08		1.72	13.09	
	RCC chhajja						
	Top & bottom	10	1.53	0.46		7.93	
	End side face	10	0.46		0.12	0.55	
	RCC column	8	0.23		2.12	3.90	
	Elevation Chhajja						
	Top & bottom	2	8.08	0.46		7.93	
	End side face	2	0.46		0.12	0.55	
	RCC beam						
	Bottom face	1	7.62	0.23		1.75	
	Plaster (inside)						
	Ceiling	1	7.62	3.28		25	
	Long wall	1	7.62		3	22.86	
	Short wall	1	7.62		3	19.68	
	Inside parapet	1	11.13		0.90	10.01	
	Inside beam to slab	1	7.62		0.58	4.42	
	Plaster for step						
	Top of step	2	8.08	0.25		4.04	
	End of step						
	Step – 1	2	0.50		0.17	0.17	
	Step – 2	2	0.25		0.17	0.085	
	Plaster for partition Wall						
	Two side	2	0.61		0.61	0.70	
	Front side	1		0.15	0.61	0.92	
	For 14 partition wall =14 *1.66 =23.23 sq.m					23.23	215.62sq.m
	Deduction						
	Window	10	1.23		1.06	12.93	
	Square hole of parapet Wall	9	0.23		0.23	0.47	

	RCC column	2	0.23	0.23		0.11	-13.56 sq.m
	Total plaster inside and Outside						201.09 sq.m

Table -24 Measurement sheet of bus stand

ABSTRACT:

ITEM NO	DESCRIPTION	QUANTITY	RATE(RS)	PER	AMOUNT(RS)
1	Excavation for foundation up to 1.5 m depth including shorting out and stacking of useful Excavated stuff up to 50m lead (A) loose or soft soil	8.45	100	Cu.m	RS 845
2	Excavation for foundation up to 1.5 m depth including shorting out and stacking of useful Excavated stuff up to 50m lead (A) loose or soft soil	4.99	3200	Cu.m	RS 15968
3	Rubble masonry 1:6	3.13	3550	Cu.m	RS 11,111.5
4	Earth filling in 0.46 m depth	3.03	55	Cu.m	RS166.65
5	Brick masonry in super structure 1:6	12.41	3400	Cu.m	RS 42,194
6	Rcc column with centering , finishing and curing:(1:2:4)	0.36	13200	Cu.m	RS4752
7	Rcc beam with centering, finishing and curing(1:2:4)	0.54	13200	Cu.m	RS7128
8	Rcc slab with centering , finishing and curing(1:2:4)	3.42	8900	Cu.m	RS30,438
9	Chaaja with centering, finishing and curing(1:2:4)	0.87	8900	Cu.m	RS7743

10	Earth filling in plinth 0.30m depth with compaction	7.49	60	Sq.m	RS449.4
11	Sand filling in plinth 0.10m depth compaction	3	975	Sq.m	RS2925
12	Double coat 12mm thick plaster inside and outside all(1:4)	201.09	160	Sq.m	RS32174
13	0.15m thick partion Wall	0.87	450	cu.m	RS391.5
14	20mm thick marble Sheet	7.89	60	m	RS473.4
15	Double hand lime white wash	201.09	40	Sq.m	RS8043.6
Total					RS 1,67,033
Add 3% contingency charge					RS 50,109
2% work charge establishment					RS 33,406
10% contractor profit					RS 16,703
Grand total					RS 2,67,251

Table-25 Abstract sheet of Bus stand

13.1.2 Civil design-ATM MACHINE :

An **ATM**, which stands for automated teller machine, is a specialized computer that makes it convenient to manage a bank account holder's funds. It allows a person to check account balances, withdraw or deposit money, print a statement of account activities or transactions, and even purchase stamps.

ATMs enable individuals to make banking transactions without the help of an actual teller. Also, customers can avail banking services without having to visit a bank branch. Most **ATM** transactions can be availed with the use of a debit or credit card. There are some transactions that need no debit or credit card.

ATMs are convenient, allowing consumers to perform quick self-service transactions such as deposits, cash withdrawals, bill payments, and transfers between accounts. Fees are commonly charged for cash withdrawals by the bank where the account is located, by the operator of the ATM, or by both. Some or all of these fees can be avoided by using an ATM operated directly by the bank that holds the account.

ATMs are known in different parts of the world as automated bank machines (ABM) or cash machines.

ADVANTAGES OF ATM MACHINE:

- Provide convenience to customers
- Offer 24×7
- Reduce bank account from anywhere
- minimizes

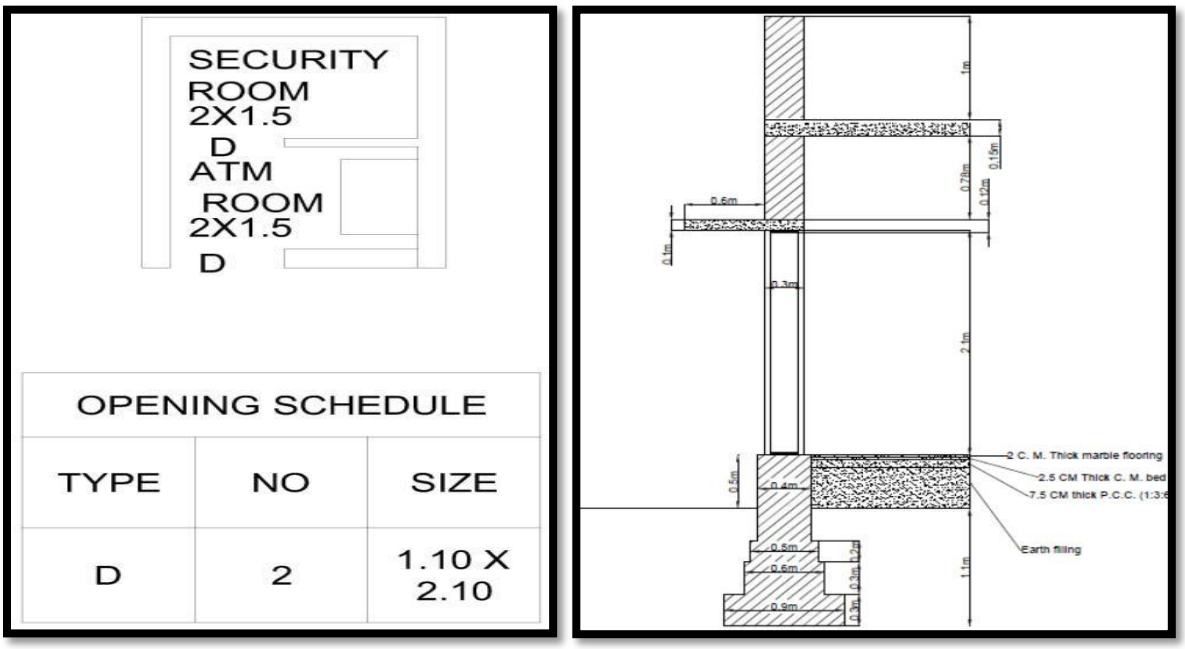


Fig-53 Plan and section of ATM Machine

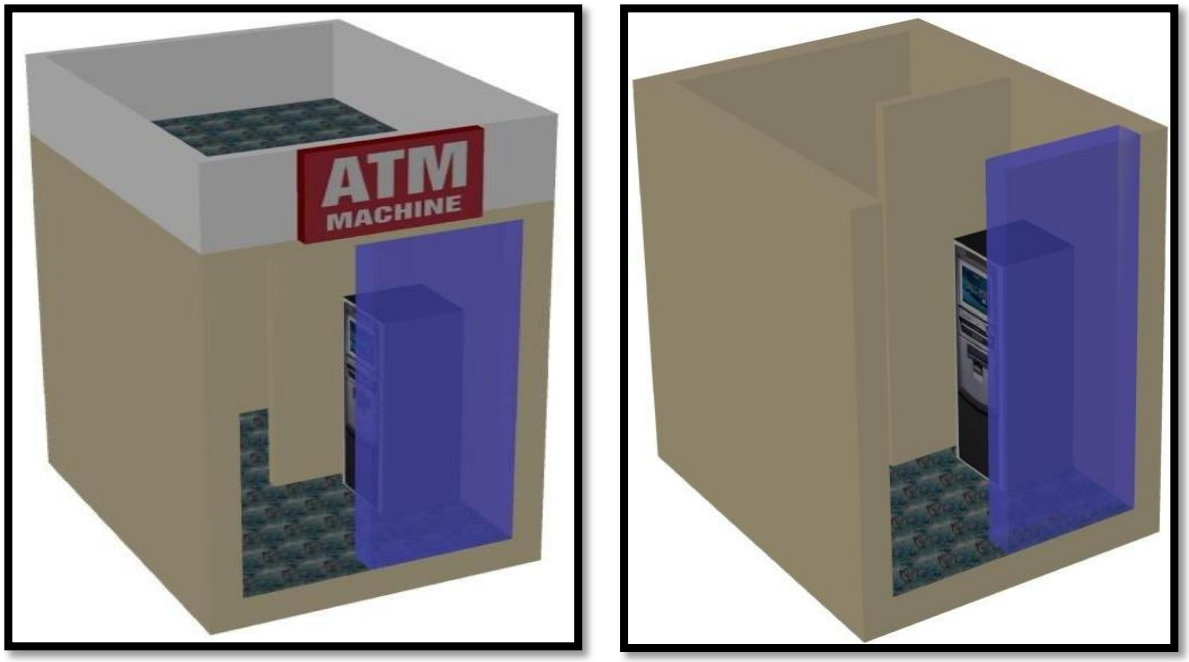


Fig-54 3D viewof ATM Machine

MEASUREMENT SHEET:

Sr no.	Description	No	Length	Width	Height	Quantity	Unit
	Total centre line & no. of junction	2	14.1				
1	Excavation for foundation	1	13.2	0.9	1.1	13.068	m3
2	P.C.C. in foundation	1	13.2	0.9	0.3	3.564	m3
3	Brick masonary upto plinth						
	Step 1	1	13.5	0.6	0.3	2.43	
	Step 2	1	13.6	0.5	0.2	1.36	
	Step 3	1	13.7	0.4	0.8	4.384	
		Total				8.174	m3
4	Brick work upto super structure						
	L=	1	13.8	0.3	3	12.42	
	Parapet wall	2	3.9	0.3	1	2.34	
	L=	2	2.3	0.3	1	1.38	
			Brick work			16.14	m3
	Deduction Doors/Window						
1	D1	2	1.1	0.3	2.1	1.386	
2						0	
3						0	
4						0	
5						0	
					Total	1.386	m3
	Deduction for lintel						
1	D1	2	1.1	0.3	2.1	1.386	
2						0	
3						0	
4						0	
5						0	
					Total	1.386	m3
		Total deduction				2.772	m3
		Total Brick Work				13.368	m3

5	Inner Wall Plaster						
a	Room 1	2	2	-	3	12	
		2	1.5	-	3	9	
b	Room 2	2	2	-	3	12	
		2	1.5	-	3	9	
c				-		0	
				-		0	
d				-		0	
				-		0	
e				-		0	
				-		0	
						42	m2
	Deduction						
a	D1	0.5	1.1		2.1	1.155	
b						0	
c						0	
d						0	
e						0	
		Total deduction				1.155	m2
		Total plastering work				40.845	m2
6	Plaster in ceiling						
a	Room 1	2	2	1.5		6	
b	Room 2	2	2	1.5		6	
c						0	
d						0	
e						0	
		Total plaster in ceiling				12	m2
7							
							m3
8	Earth filling						
	Room 1	2	2	1.5	0.38	2.28	
	Room 2	2	2	1.5	0.38	2.28	
						0	
						0	

		Total earth filling				4.56	m3
9	Marble flooring						
	Room 1	2	2	1.5		6	
	Room 2	2	2	1.5		6	
						0	
						12	
	Door sills						
	D1	2	1.1	0.3		0.66	
						0	
						0	
						0.66	
		Total marble flooring				12.66	m2

Table-26 MEASUREMENT SHEET OF ATM

ABSTRACT SHEET:

Item no.	Particulers of item	Quntity	Per	Rate	Amount
1	Excavation for foundation	13.068	m3	90	1176.12
2	PCC in foundation	3.564	m3	3300	11761.2
3	Brick work upto plinth	8.174	m3	3300	26974.2
4	Brick work upto super structure & parapet Wall	13.368	m3	3300	44114.4
5	Plastering in inner wall	40.845	m2	300	12253.5
6	Plastering in ceiling	12	m2	300	3600
7	RCC work in slab & chajja	0	m3	8500	0
8	Earth filling	4.56	m3	70	319.2

9	Marble flooring	12.66	m 2	75 0	9495
10	Doors,window &paint			90 00	9000
		To tal			118693.6 2
CONTRACTOR PROFIT & WATER CHARGE					
	ADD 1.5 % WATER CHARGE				1780.404 3
	ADD 10% CONTRACTOR PROFIT				11869.36 2
	TOTAL COST				132343.3 86

Table-27 Abstract sheet of ATM Machine

13.1.3 Civil Design – Artificial Pond

In the village no provision for storage for rain water and no small pond available so we wil give an artificial pond.

Both **ponds** have a lot in common, but there are some differences too: **Artificial ponds** rarely have a natural inlet and outlet. This means they only receive fresh water in the form of rainwater and direct action such as a partial water change.

An inland body of standing water that is smaller than a lake. Natural **ponds** form in small depressions and are usually shallow enough to support rooted vegetation across most or all of their areas. ... The **definition of a pond** is a small body of water, or is a slang term for the Atlantic Ocean.

Characteristics of pond dikes

1. Any pond dike should have following basic qualities.

(a) It should be able to resist the water pressure resulting from the pond water depth.

(b) It should be impervious, the water seepage through the dike being kept to a minimum.

(c) It should be high enough to keep the pond water from ever running over its top, which would rapidly destroy the dike.

2.Water pressure can be readily resisted by:

anchoring your dike strongly to its foundations (the soil on which you build it);

constructing your dike large enough to resist the water pressure by virtue of its weight.

3. Impermeability of the dike can be ensured by:

using good soil that contains enough clay

building a central clayey core when using pervious soil material;

building a cut-off trench when the foundation is permeable;

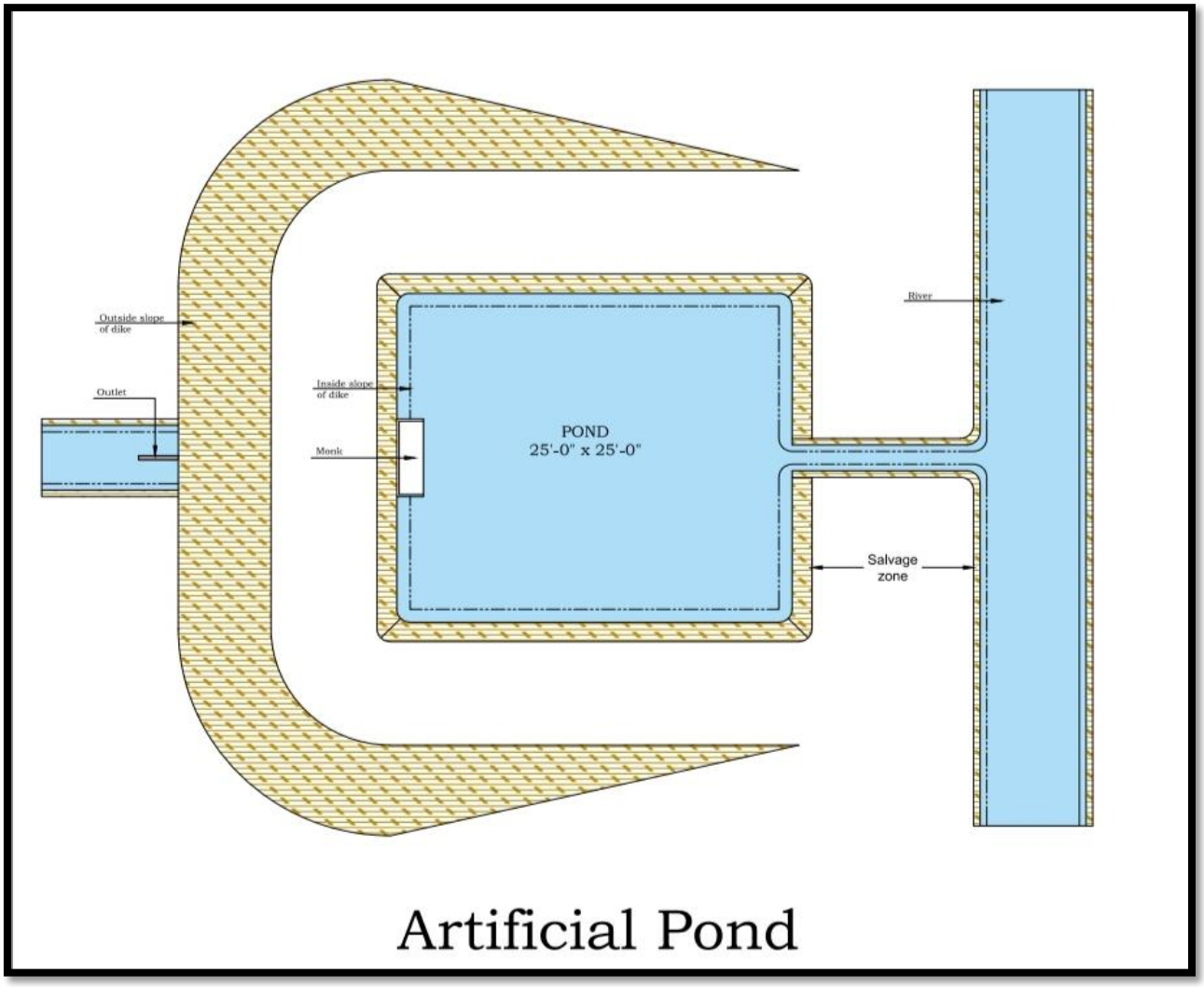


Fig-55 Plan of artificial pond

ABSTRACT SHEET:

Abstract Sheet						
Sr.No	Description of item	Quantity	Unit	Rate (Rs.)	Per	Estimated Cost (Rs.)

1	Excavation for Foundation	350	m^3	100	m^3	35000
2	Concreting in foundations	28	m^3	3000	m^3	84000
3	Masonry in foundation	175	m^3	1200	m^3	210000
4	Earth Filling	147	m^3	40	m^3	5880
5	Super structure masonry work	70	m^3	1500	m^3	105000
6	Plaster work	118	m^2	120	m^2	14160
7	Colorings	118	m^2	20	m^2	2360
8	Pavement block	120	m^2	570	m^2	68400
9	Tree plantation	28	Nos.	50	Nos.	1400
10	Light pole with light	15	Nos.	5000	Nos.	75000
11	Benches	6	Nos.	4500	Nos.	27000
12	P.C.C. in slope	12	m^3	2200	m^3	26400
13	B.B.C.C.	16	m^3	1000	m^3	16000
14	B.B.C.C. at walkway	82	m^2	1000	m^2	82000
15	Main gate	1		12000		12000
		Total materials and labours cost				654600
		1.5% Water Charges				9819
		10% Contractor profit				65460
		Total Estimation				**729879**
				Say Total		**729900 Rs.**

TABLE-28 Abstract sheet of Artificial Pond

13.1.4 Civil design – Primary Health Centre:

THE ROLE OF PRIMARY HEALTH CARE: Primary health care (PHC) is on essential part of health care and its main principles are equity, health promotion and disease prevention, community participation, appropriate health technology and multisectoral approach.

Public health system across nations is a conglomeration of all organized activities that prevent disease, prolong life and promote health and efficiency of its people. Indian healthcare system has been historically dominated by provisioning of medical care and neglected public health.

The principles of primary health care are accessibility, public participation, health promo- tion, appropriate technology and intersectoral cooperation. Accessibility means that the five types of health care are universally available to all clients regardless of geo- graphic location.

Fig-56 Plan, Elevation and Section of PHC

MEASUREMENT SHEET:

ITEM	DESCRIPTION	NO	L	B/W	H/D	QUANTIY	UNITS
1	Excavation for						
	Foundation						
	L=196	1	196	0.9	1.2	211	Cu.m.
2	C.C. work in foundation						
	L=196	1	196	0.9	0.2	35.28	Cu.m.
3	Brick masonry work in						
	Foundation (L=37.10)						
	1st step						
	L=205 –20*(0.6/2)	1	199	0.6	0.1	11.94	Cu.m
	=199						
	2nd step						
	L=205 –20*(0.5/2)	1	200	0.5	0.1	10	Cu.m
	=200						
	3rd step						
	L=205–20*(0.4/2)	1	201	0.4	0.1	8.04	Cu.m
	=201						
	4th step	1	202	0.3	0.7	42.42	Cu.m
	L=205 –20*(0.3/2)						
	=202						
	Total Brick masonry					72.4	Cu.m.
	work in foundation						
4	Brick masonry work in						
+	super structure						
	L=50.20m	1	205	0.3	4	246	Cu.m.
	Deduction for door &						
	Window						
	Door	14	1.2	0.3	2.1	10.58	Cu.m.
	Door 1	9	0.9	0.3	2.1	5.103	Cu.m.
	Ventilator – V	9	0.6	0.3	0.6	0.972	Cu.m.
	Door 2	1	4	0.3	2	2.4	Cu.m

	Deduction for lintel						
	Door	14	1.2	0.3	0.1	0.504	Cu.m.
	Door 1	9	0.9	0.3	0.1	0.243	Cu.m.
	Ventilator – V	9	1.2	0.3	0.1	0.324	Cu.m.
	Door 2	1	4	0.3	0.1	0.12	Cu.m
	Total Brick masonry						
	Work						
	= 246 –20.24					225	Cu.m.
5	Brick masonry work in step						Cu.m.
	Step: 1	1	4	0.6	0.25	0.6	Cu.m.
	Step: 2	1	4	0.3	0.25	0.3	Cu.m.
					Total	0.9	Cu.m.
6	D.P.C at plinth level						
	For 200mm thick wall	1	8	0.7	0.6	3.36	cu.m
	For 300mm thick wall	1	205	0.9	0.9	166.05	Cum
	Total					169.41	Cu.m
7	EARTH FILLING	2	4	5	0.6	24	Cu.m
		1	16	14	0.6	134.4	Cu.m
		1	16	5.30	0.6	50.88	Cu.m
		1	4	4.58	0.6	11	Cu.m
		1	4	3	0.6	7.2	Cu.m
		1	4	3.98	0.6	9.55	Cu.m
		1	4	8	0.6	19.2	Cu.m
		1	4	7	0.6	16.8	Cu.m
	TOTAL					273.03	Cu.m
	INTERNAL PLASTER	14	4			84	
		5	5			25	
		5	6			30	
		3	3		4	36	
		16	6		4	384	
		5	5		4	100	

		5	5		4	100	
	TOTAL					754	**SQ.M**
8							
WHITE WASH PER ABOVE						754	SQ.M
9	RCC WORK FOR SLAB	1	25.2	24.18	0.15	91.4	CU.M
	L=25.2						
	B=24.18						
	H=0.15						

Table-29 Measurement sheet of primary health centre

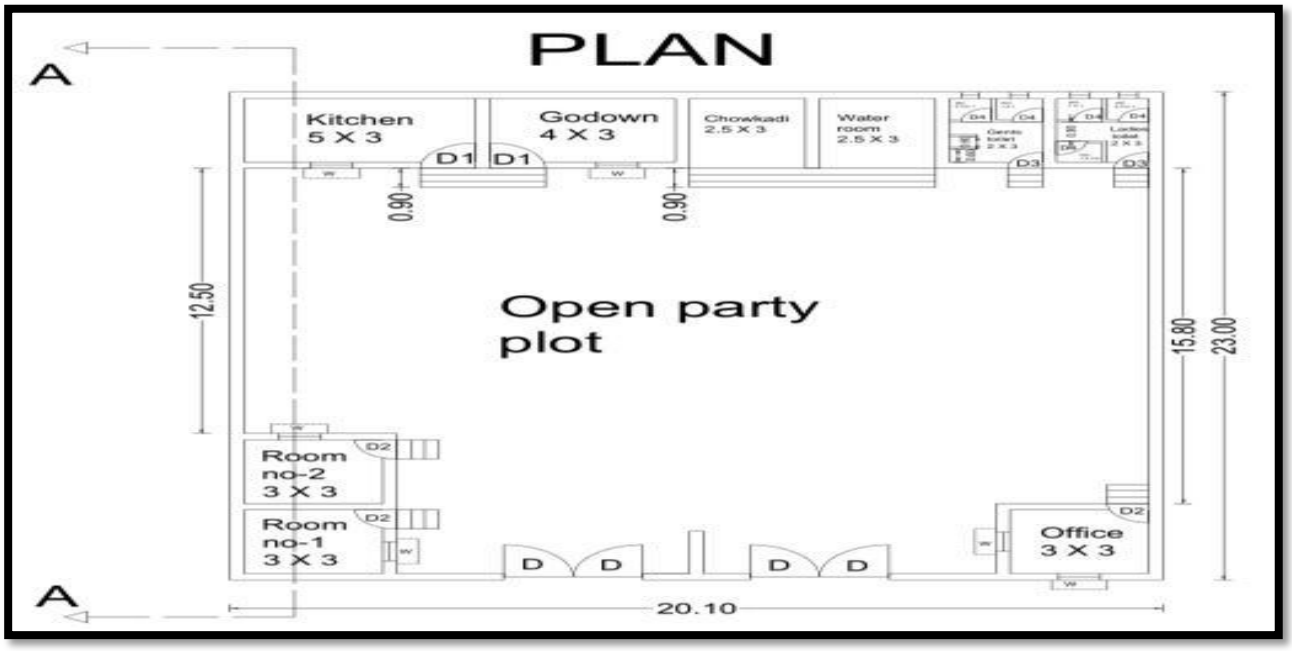
ABSTRACT SHEET:

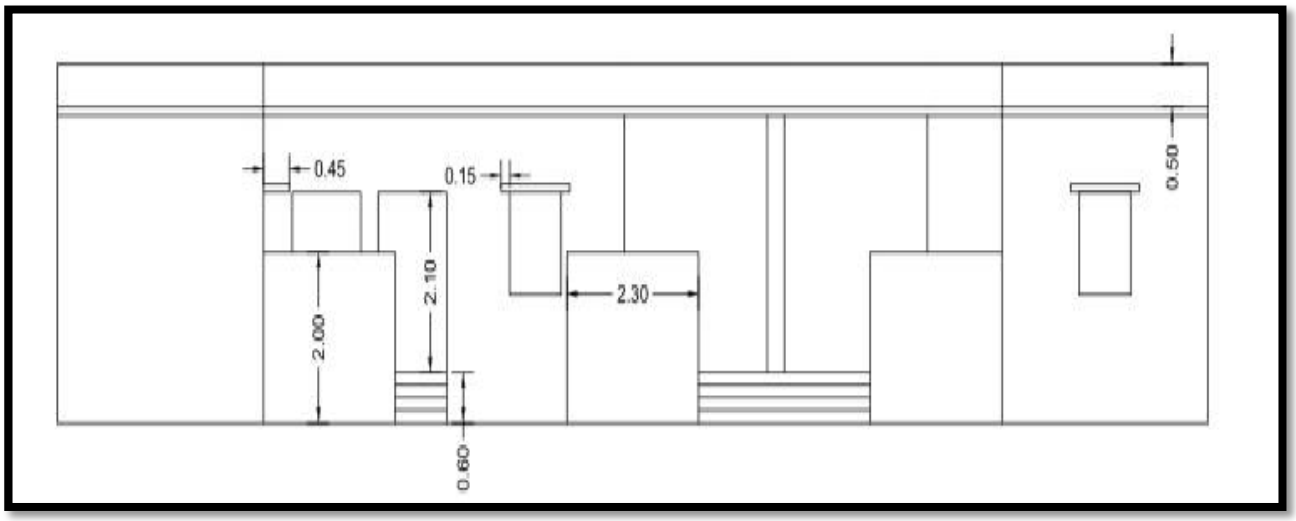
Sr.	Item description	Quantity	Rate	Per	Amount
1.	Excavation work	211	155	Cu.m.	32705
2.	P C.C	35.28	3000	Cu.m.	105840
3.	Brickwork in foundation	72.4	3200	Cu.m.	2,31,680
4.	Brickwork in superstructure	225	3500	Cu.m.	787500
5.	Plastering	754	150	Sq.m.	113100
6.	R.C.C slab	91.4	4900	Cu.m.	447860
7.	Painting	754	25	Sq.m.	18850
				Total Rupees	1737535
				Conti.....05.00% Rupees	86876
				10% contractor charges	173753
				2% water charges	34750
				Total Amount Rupees	2032914
				Say Rupees	2032000

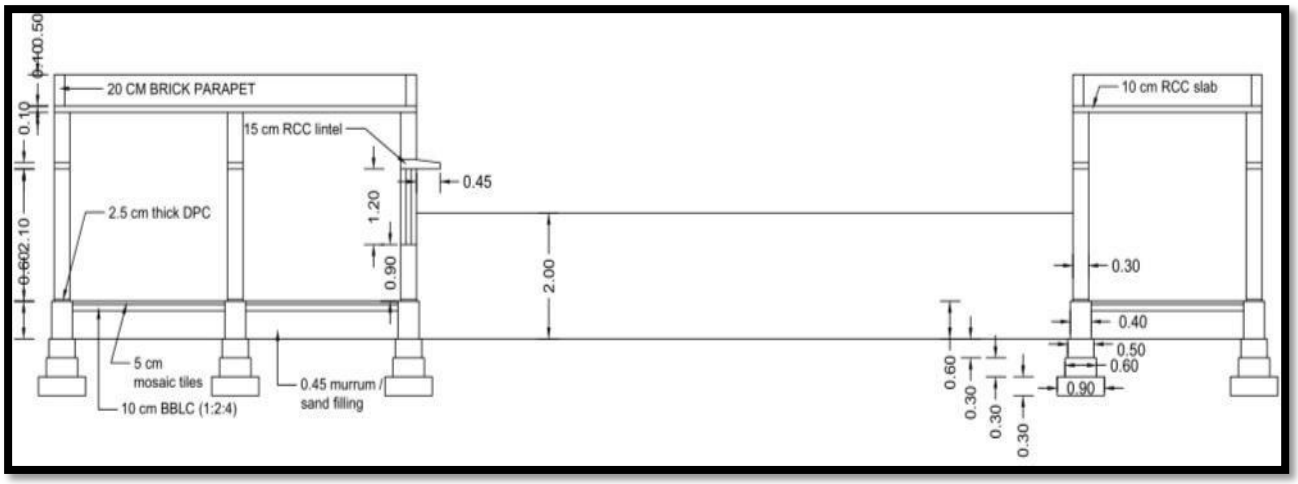
Table-30 Abstract sheet of Primary Health Centre

13.1.5 Civil Design – Open Party Plot:

Party Plot . Means a large open land often consisting of a small service building with changing rooms, toilets, storage and a hall, laid out for conducting social events like marriages, party, functions, etc.


PLAN
A
Kitchen
5 X 3
Godown
4 X 3
Chowkadi
2.5 X 3
Water
room
2.5 X 3
D1
D1
0.90
0.90
Open party
plot
12.50
15.80
23.00
Room
no-2
3 X 3
Room
no-1
3 X 3
D2
D2
D
D
D
D
Office
3 X 3
D2
A
20.10


0.45
0.15
0.50
2.10
2.00
2.30
0.60


20 CM BRICK PARAPET
0.10
0.50
15 cm RCC lintel
10 cm RCC slab
0.45
1.20
0.90
2.10
0.60
2.5 cm thick DPC
2.00
0.30
0.40
0.50
0.60
0.90
0.60
0.30
0.30
0.30
5 cm
mosaic tiles
10 cm BBLC (1:2:4)
0.45 murrum /
sand filling

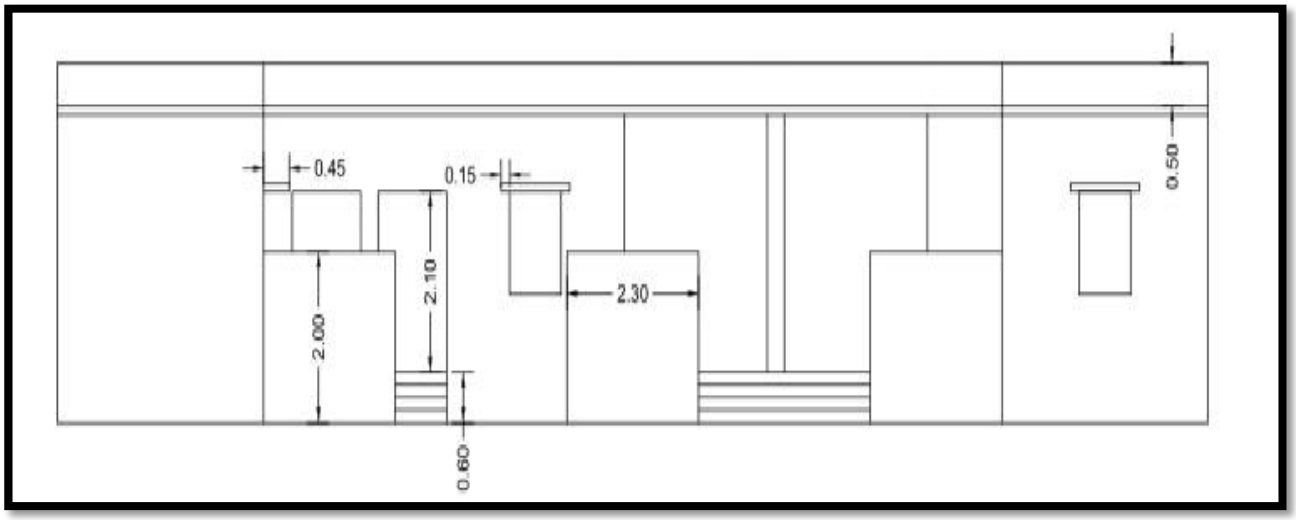


Fig-57 Plan, Elevation and Section

SCHEDULE FOR OPENINGS

NO.	DETAILS	SYMBOL	SIZE
1	DOOR	D	1.5 X 2.1
2	DOOR	D1	0.9 X 2.1
3	DOOR	D2	0.75 X 2.1
4	DOOR	D3	0.65 X 2.1
5	WINDOW	W	0.9 X 1.2
6	VENTILATION	V	0.5 X 0.5

MEASUREMENT SHEET:

SR. NO	DESCRIPTION	NO.	L	B	H	QUANTIY
	Total Centre line= 22.7x2+19.8x3+3.3x4+6.6+3.3x5=141.1m No. Of T-junction= 9					
1.	Excavation for foundation up to 1.5 depth					
	Length =141.1-(9×0.9÷2)= 137.45	1	137.45	0.9	0.9	111.33m3

	For steps:-					
	At door D_2					
	L= 0.9+0.15+0.15=1.2M	3	1.2	0.6	0.15	0.324
	At door D_1, L= 1.5M	2	1.5	0.6	0.15	0.27
	At chowkadi , water room					
	L= 6+0.3+2x0.15=6.6m	1	6.6	0.6	0.15	0.594
	At toilet, L= 0.75+2x0.15= 1.05m	2	1.05	0.6	0.15	0.189
					Total	112.70m3
2.	Providing and laying PCC(1:4:8) for foundation	1	137.45	0.9	0.3	$37.11m^3$
	Steps :					
	D_2	3	1.2	0.9	0.15	0.486
	D_1	2	1.5	0.9	0.15	0.405
	At chowakadi,water room	1	6.6	0.9	0.15	0.891
	D_3	2	1.05	0.9	0.15	0.283
					Total	39.17m3
3.	First class brick masonry C:M(1:6) for foundation					
	Step:-1(60cm) L=138.4m	1	138.4	0.6	0.3	$24.91m^3$
	Step:-2(50cm)					
	L=138.85m	1	138.85	0.5	0.3	$20.82m^3$
					Total:-	$45.73m^3$
4.	Back filling in foundation					
	$=111.33-39.17=72.16m^3$				Total:	$72.16m^3$
5.	First class brick masonary G.L to P.L					
	L= 139.3m	1	139.3	0.4	0.575	$32.0.4m^3$
	At D1					
	Step1.	2	0.9	0.3	0.15	0.081
	Step2.	2	0.9	0.3	0.30	0.162
	Step3.	2	0.9	0.3	0.45	0.243
	At D2					
	Step 1	3	1.2	0.3	0.15	0.162
	Step 2	3	1.2	0.3	0.30	0.324
	Step 3	3	1.2	0.3	0.45	0.486
	At chowkadi ,water room					
	Step 1	1	6.3	0.3	0.15	0.283
	Step 2	1	6.3	0.3	0.30	0.567
	Step 3	1	6.3	0.3	0.45	0.850
	At toilet,					
	Step 1	2	0.75	0.3	0.15	0.0675
	Step 2	2	0.75	0.3	0.30	0.135
	Step 3	2	0.75	0.3	0.45	0.202
					Total	35.26m3
6.	DPC(2.5cmthick)	1	139.3	0.4		55.72m2
	Deduction:-					
	D1	2	1.2	0.4		0.96
	D2	3	0.9	0.4		1.08

	D3	2	0.75	0.4		0.6
	D	2	1.5	0.4		1.2
					Net total	51.88m2
7.	First class brick masonary for superstructure					
	LW = 20.10m	2	20.10	0.3	3	36.18
	SW = 3m	7	3	0.3	3	18.9
	For room 1,2					
	LW = 3m	3	3	0.3	3	8.1
	SW = 6.9m	2	6.9	0.3	3	12.42
	For office,					
	LW =3m	2	3	0.3	3	5.4
	SW = 3.6m	2	3.6	0.3	3	6.48
	For boundary,					
	SW1= 15.80m	1	15.80	0.3	2	9.48
	SW2 = 12.5m	1	12.50	0.3	2	7.5
	LW = 9.9m	1	9.9	0.3	2	5.94
	Deduction					
	At chowkadi, water room					
	L = 3.3	1	3.3	0.3	3	2.97
	D	2	1.5	0.3	2	1.8
	D1	2	1.2	0.3	2.1	1.512
	D2	3	0.9	0.3	2.1	1.70
	D3	2	0.75	0.3	2.1	0.94
	W	5	0.9	0.3	1.2	1.62
	V	12	0.4	0.3	0.4	0.576
					Total	11.11
					Net total	99.28
8.	Half brick partition wall in C:M (1:6)					
	LW =0.9m	5	0.9		3	13.5
	SW= 1.1m	3	1.1		3	9.9
	Deduction					
	D4	5	0.65		2.1	6.825
					Net total	16.575m2
8a.	Brick work for parapet, 0.2m					
	LW1 =20.10m	1	20.10	0.2	0.5	2.01
	LW2 = 13.8m	1	13.8	0.2	0.5	1.38
	SW = 3m	2	3	0.2	0.5	0.6
	For room 1,2					
	LW = 3m	2	3	0.2	0.5	0.6
	SW = 6.9m	2	6.9	0.2	0.5	1.38
					Total	5.97m3
9.	Providing RCC slab, lintel, chhajja					
	Lintel					

	LW= 20.10	2	20.10	0.3	0.15	1.809
	SW = 3	7	3	0.3	0.15	0.945
	For room 1,2					
	LW = 3m	3	3	0.3	0.15	0.405
	SW = 6.9m	2	6.9	0.3	0.15	0.621
	For office, LW =3m	2	3	0.3	0.15	0.27
	SW = 3.6m	2	3.6	0.3	0.15	0.324
	Chhajja					
	W	5	1.1	0.45	0.1	0.247
	RCC slab					
	For last portion	1	20.10	3	0.1	6.03
	For room 1,2	1	6.9	3	0.1	2.07
	For office	1	3.6	3.6	0.1	1.296
					Total	14m3
10.	Providing mild steel reinforcement in RCC work					
	Quantity=1%ofvolumeofconcrete					
	=14×78.54=1099.56kg					
					Total:-	1099.56kg
11.	12cmthickplaster					
	(A)Internal plaster					
	(1)ceiling					
	Kitchen	1	5	3		15
	Godown	1	4	3		12
	Toilet M	1	2	3		6
	Toilet F	1	2	3		6
	Room 1,2 and office	3	3	3		27
	Wall					
	Kitchen	2	5		3	30
		2	3		3	18
	Godown	2	4		3	24
		2	3		3	18
	Toilet M	4	2		3	24
		4	2		3	24
	Room 1,2 and office	6	3		3	54
		6	3		3	18
					Total	276m2
12	External plaster up to parapet					
	LW =20.10m	1	20.10		4.35	87.43
	SW = 15.1m	1	15.1		4.35	65.68
	Room 1,2 LW = 6.9m	2	6.9		4.35	60.03
	SW = 3m	2	3		4.35	26.1
	Office LW = 3.6m	2	3.6		4.35	31.32
	SW =3.3m	2	3.3		4.35	28.71
	Boundary wall					
	SW1= 12.5m	2	12.5		2	50
	SW2=15.8m	2	15.8		2	63.2

	LW=12.9m	2	12.9		2	51.6
	Chhajja Face	5	1.2		0.1	0.6
	Side	10	0.45		0.1	0.45
	Top	5	0.45		0.1	0.225
	Bottom	5	0.45		0.1	0.225
					Total	465.0.7m2
	Deduction D	2	1.5		2.1	6.3
	D1	2	1.2		2.1	5.04
	D2	3	0.9		2.1	5.67
	D3	2	0.75		2.1	3.15
	W	5	0.9		1.2	5.4
	V	12	0.4		0.4	1.92
					Total	27.48m2
					Net Total	712.59m,2
13.	5cmthickmosictilesflooring					
	Kitchen	1	5	3		15
	Godown	1	4	3		12
	Toilet	2	3	3		18
	Room 1,2 and office	3	3	3		27
	Chowkadi,water room	2	2.5	3		15
					Total	87m2
14.	10cmBBLC(1:2:4)					
	Kitchen	1	4.9	2.9	0.1	1.421
	Godown	1	3.9	2.9	0.1	1.131
	Toilet	2	1.9	2.9	0.1	1.102
	Room 1,2 and office	2	2.9	2.9	0.1	1.682
	Chowkadi,water room	2	2.4	2.9	0.1	1.392
					Total	6.73m3
15.	Sand filling/murum					
	Kitchen	1	4.9	2.9	0.45	6.39
	Godown	1	3.9	2.9	0.45	5.08
	Toilet	2	1.9	2.9	0.45	4.959
	Room 1,2 and office	2	2.9	2.9	0.45	7.57
	Chowkadi,water room	2	2.4	2.9	0.45	6.26
					Total	30.25m3

Table-31 Measurement sheet of open party plot

ABSTRACT:

SR. NO	DESCRIPTION	QUANTITY	RATE	PER	AMOUNT(RS)
1.	Excavation for foundation up to 1.5 m Depth	112.70 m^3	100	m^3	11270
2.	Providing and laying PCC (1:4:8) for Foundation	39.17 m^3	1500	m^3	58755

3.	First class brick masonry CM (1:6) for Foundation	45.73 m^3	1600	m^3	73168
4.	Back filling in foundation	72.16 m^3	70	m^3	50512
5.	First class brick masonry GL to PL	35.26m^3	1600	m^3	56416
6.	DPC (2.5 cm thick)	51.88 m^2	200	m^2	10376
7.	First class brick masonry for super Structure	105.25 m^3	1500	m^3	157875
8	Half brick wall	16.575	1500	M^2	24862.5
9.	Providing and laying RCC (1:2:4)	14m^3	2500	m^3	35000
10.	Providing mild steel reinforcement for RCC work including binding and bending and placing in position	1099.56 kg	45	Kg	49480.2
11.	12 mm thick plaster	712.59 m^2	150	m^2	106888.5
12.	5 cm thick mosaic tiles flooring	87 m^2	200	m^2	17400
13.	10 cm BBLC (1:2:4)	6.73 m^3	1000	m^3	6730
14.	Sand filling / murrum	30.25m^3	60	m^3	1815
		TOTAL :-			660548.2
		3 % CONTIGENCY :-			19816.45
		2 % WORKCHARGE ESTABLISHMENT :-			13210.96
		TOTAL :-			693575.61
		10 % CONTRACTOR PROFIT :-			69357.56
		GRAND TOTAL :-			762933

Table-32 Abstract sheet of open party plot

13.1.6 Civil design- Public Toilet:

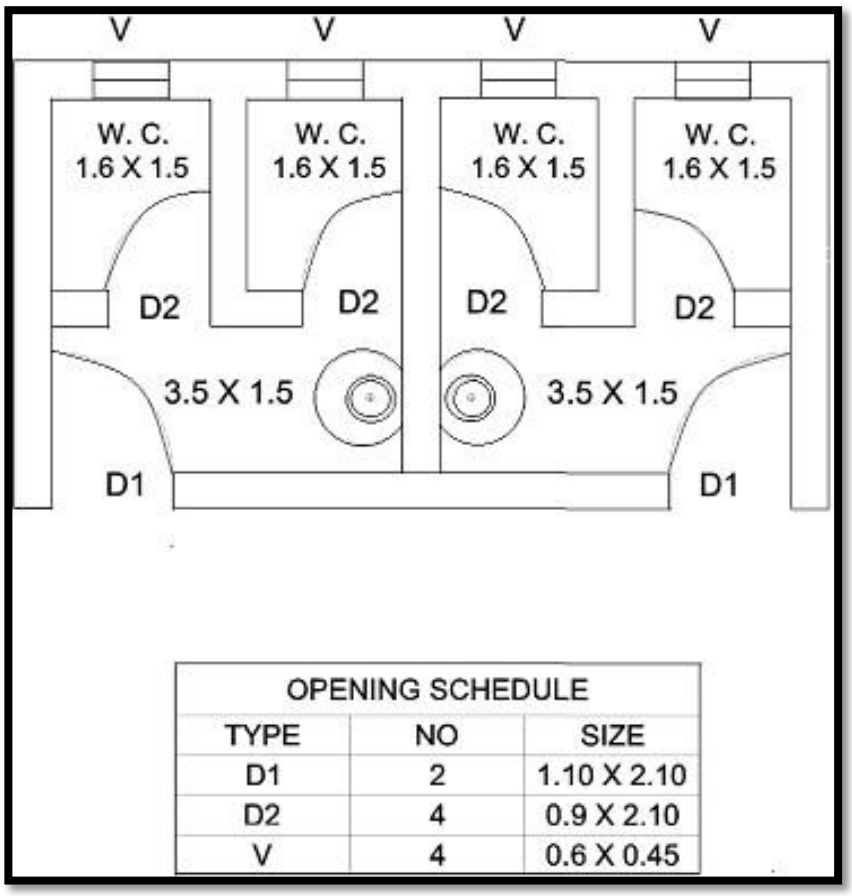
A public toilet is a room or small building with toilets (or urinals) and sinks that does not belong to a particular household. Rather, the toilet is available for use by the general public, customers, travellers, employees of a business, school pupils, prisoners etc. Public toilets are commonly separated into male and female facilities, although some are unisex, especially for small or single-occupancy public toilets. Increasingly, public toilets are accessible to people with disabilities. Public toilets are known by many other names depending on the country. Examples are: restroom, bathroom, men's room, women's room in the US, washroom in Canada, and toilets, lavatories, water closet (W.C.), ladies and gents in Europe. In some parts of the world, they are referred to as the loo.

Some public toilets are free of charge while others charge a fee. In the latter case they are also called pay toilets and sometimes have a charging turnstile.

Local authorities or commercial businesses may provide public toilet facilities. Some are unattended while others are staffed by an attendant. In many cultures, it is customary to tip the attendant, especially if they provide a specific service, such as might be the case at upscale nightclubs or restaurants.

Public toilets are typically found in many different places: inner-city locations, offices, factories, schools, universities and other places of work and study. Similarly, museums, cinemas, bars, restaurants, entertainment venues usually provide public toilets. Railway stations, filling stations, and long

distance public transport vehicles such as trains, ferries, and planes usually provide toilets for general use. Portable toilets are often available at large outdoor events.



OPENING SCHEDULE		
TYPE	NO	SIZE
D1	2	1.10 X 2.10
D2	4	0.9 X 2.10
V	4	0.6 X 0.45

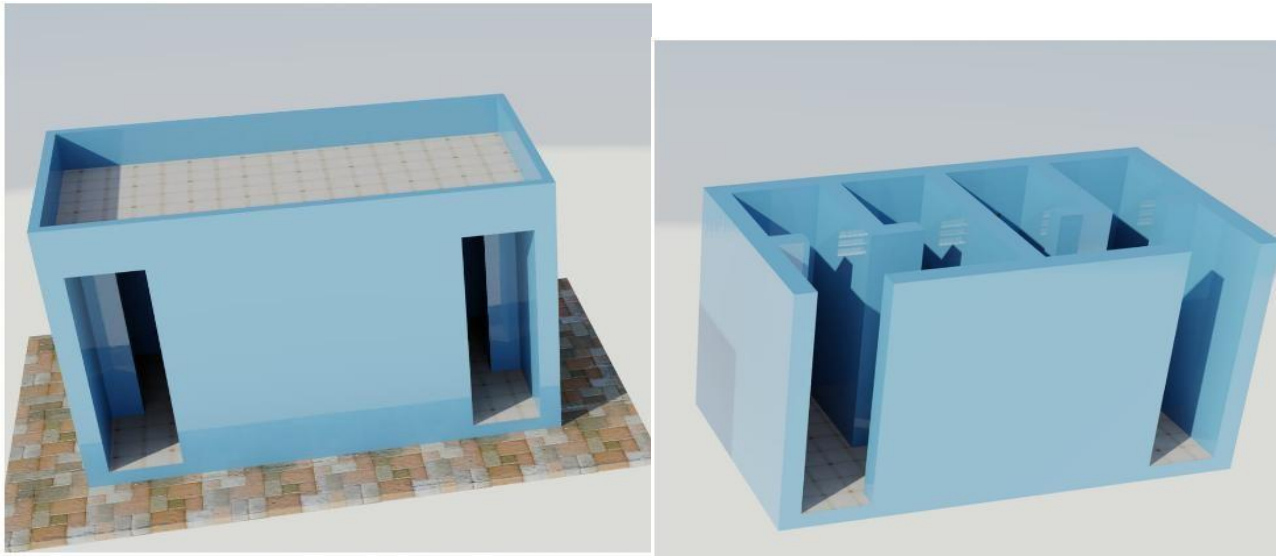


Fig-58 Plan, Elevation, Section and 3D view of Public Toilet

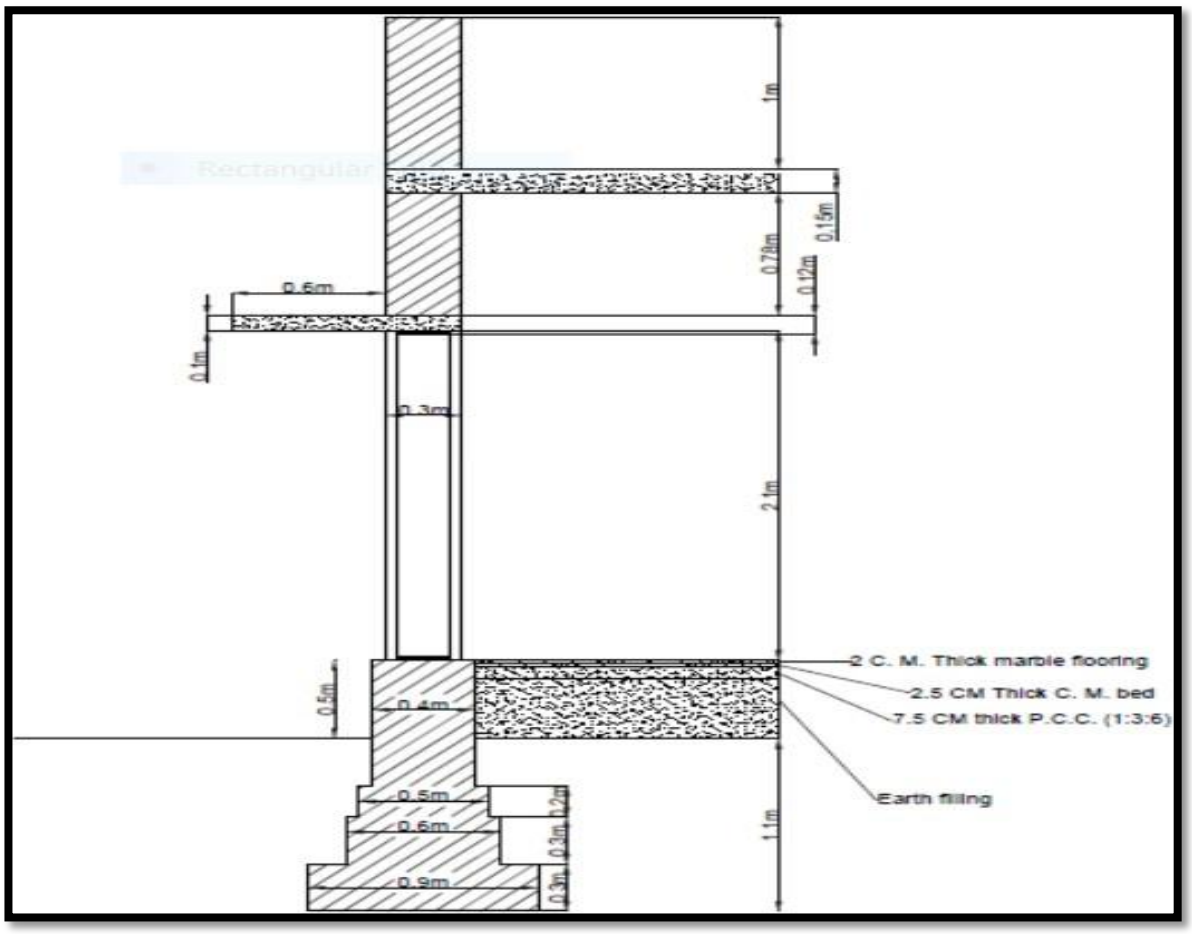


Fig -59 Section of public Toilet

MEASUREMENT SHEET:

Sr	Description of Work	No	Length	Width	Height	Quantity	
1	Excavation for Foundation						
i	Long Walls	3	8.10	0.90	1.10	24.06	m3
ii	Short Wall 1	5	1.10	0.90	1.10	5.45	m3
iii	Short Wall 2	5	1.7	0.9	1.1	8.415	m3
					TOTAL	37.92	m3
2	**P.C.C**						
i	Long Walls (Simple)	3	8.10	0.90	0.30	6.56	m3
	Short Walls 1	5	1.1	0.9	0.3	1.485	m3

	Short wall 2	3	1.70	0.90	0.30	1.38	m3
					Total	9.42	m3
3	Brick masonary up to plinth						
i	**Long wall**						
	First step	3	7.80	0.60	0.30	4.21	m3
	Second step	3	7.70	0.50	0.30	3.47	m3
	Third step	3	7.60	0.40	0.80	7.30	m3
					Total	14.97	m3
ii	Short Wall 1						
	Step 1	5	1.40	0.60	0.30	1.26	m3
	Step 2	5	1.50	0.50	0.30	1.13	m3
	Step 3	5	1.60	0.40	0.80	2.56	m3
					Total	4.95	m3
iii	Short Wall 2						
	step 1	3	2.00	0.60	0.30	1.08	m3
	Step 2	3	2.10	0.50	0.30	0.95	m3
	Step 3	3	2.20	0.40	0.80	2.112	m3
					Total	4.137	m3
4	Brick work up to super structure						
i	Long wall	3	8	0.3	3	21.6	m3
ii	Short wall 1	5	2.1	0.3	3	9.45	m3
iii	Short wall 2	3	2.7	0.3	3	7.29	m3
					Total	38.34	m3
	Deduction						
	D1	2	1.1	0.3	2.1	1.386	m3
	D2	4	0.9	0.3	2.1	2.268	m3
	D3	4	0.6	0.3	0.45	0.324	m3
					Total	3.978	m3
	Deduction for lintel	2	1.4	0.3	0.15	0.126	m3
		4	1.2	0.3	0.15	0.216	m3
		4	0.9	0.3	0.15	0.162	m3

						0.504	m3
5	Plaster						
	inner wall plaster						
i	W.C. 1	4	1.5		1.7	10.2	m3
ii	W.C. 2	4	1.5		1.7	10.2	m3
iii	W.C. 3	4	1.5		1.7	10.2	m3
iv	W.C. 4	4	1.5		1.7	10.2	m3
	Silling plaster						
	W.C.	4	1.5	1.7		10.2	m3
	Passage	2	2.5	2.9		14.5	m3
					TOTAL	65.5	m3
6	R.C.C SLAB CHAJJA AND LINTEL						
		1	4.9	6.7	0.15	4.9245	m3
7	Marble Flooring						
		4	1.5	1.7		10.2	m3
		2	2.5	2.9		14.5	m3
	Door Sill						
	D1	2	1.1	0.3		0.66	m3
	D2	4	0.9	0.3		1.08	m3
					TOTAL	26.44	m3
8	EARTH FILLING IN PLINTH						
	W.C.	4	1.5	1.7	0.38	3.876	m3
	Passage	2	2.5	2.9	0.38	5.51	m3
					TOTAL	9.386	m3

Table-33 Measurement sheet of Public Toilet

ABSTRACT SHEET:

ITEM NO.	PARTICULERS OF ITEM	QUNTITY	PER	RATE	AMOUNT
1	EXCAVATION IN FOUNDATION	37.9	m3	90	3411
2	PCC IN FOUNDATION (1:3:6)	9.41	m3	3500	32935

3	BRICK WORK UPTO PLINTH LEVEL	24.03	m3	3300	79299
4	BRICK WORK UPTO SUPER STRUCTURE	38.34	m3	3500	134190
5	PLASTERING WORK (INNER WALL AND SILLING)	88.41	m2	300	26523
6	RCC WORK IN SLAB, CHAJJA AND LINTEL	4.92	m3	9000	44280
7	MARBLE FLOORING	26.44	m2	750	19830
8	EARTH FILLING	9.38	m3	70	656.6
9	DOORS,WINDOW				6000

TOTAL= 347124.6RS .
ADD 1.5% WATER CHARGE = 36448 RS.
ADD 10% CONTRACTOR PROFIT=34712RS.
TOTAL COST = 418284 RS.

Table-34 Abstract sheet of Public Toilet

13.2 Reason for Students Recommending this Design:

- Generally in village all household have not individual toilet so for that in village area its necessary to have public toilet in village for use by large.
- Public health centre are public locations where member of a community tendtogather for group health related issue.
- In a Monsoon need to a artificial pond for collect a water.
- In a village no nearest bus stop in 10 km area so bus stand is required.
- For any function no open area provided in the village so open party plot is required for functions.
- No atm is provided in nearest 10 km so atm is provided in village.

13.3 About designs Suggestions / Benefit of the villagers:

- There is no bus stop in this village. So we give design of bus stop. now people can easily travel and also useful for people who are stand for bus or local transports.
- There is no recreational cum development facility so we give artificial pond design. People are enjoy and use it in vacationtime
- For decreases the long distance for reach atm in the village. So we give design of ATM..
- In this village public toilet are not available so we give design of public toilet.
- In the village no area provided for function so we gave design of open party plot.
- In the village no PHC is provided so we gave design of PHC.

CHAPTER-14
Technical Options with Case Studies
(EXPLAIN ALL TOPIC AND FOR MINIMUM ONE TOPIC EXPLAIN NEW CONCEPT, DESIGN, PROTOTYPE MODEL WITH ACTUAL COST ESTIMATION)

14.1.1 Advance Earthquake Resistant:

Earthquake-resistant structures are structures designed to protect buildings from earthquakes. While no structure can be entirely immune to damage from earthquakes, the goal of earthquake-resistant construction is to erect structures that fare better during seismic activity than their conventional counterparts. According to building codes, earthquake-resistant structures are intended to withstand the largest earthquake of a certain probability that is likely to occur at their location.Currently, there are several design philosophies in earthquake engineering, making use of experimental results, computer simulations and observations from past earthquakes to offer the required performance for the seismic threat at the site of interest.

These range from appropriately sizing the structure to be strong and ductile enough to survive the shaking with an acceptable damage. The conventional approach to earthquake resistant design of buildings depends upon providing the building with strength, stiffness and inelastic deformation capacity which are great enough to withstand a given level of earthquake-generated force. This is generally accomplished through the selection of an appropriate structural configuration and the careful detailing of structural members, such as beams and columns, and the connections between them. But more advanced techniques for earthquake resistance is not to strengthen the building, but to reduce the earthquake-generated forces acting upon it.

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

1.Base Isolation

2.Energy Dissipation Devices

Base Isolation Method of Earthquake Resistant Design

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

To get a basic idea of how base isolation works, examine Figure . This shows an earthquake acting on both a base isolated building and a conventional, fixed-base, building. As a result of an earthquake, the

ground beneath each building begins to move. In Figure, it is shown moving to the left. Each building responds with movement which tends toward the right. The building undergoes displacement towards the right. The building's displacement in the direction opposite the ground motion is actually due to inertia. The inertial forces acting on a building are the most important of all those generated during an earthquake. It is important to know that the inertial forces which the building undergoes are proportional to the building's acceleration during ground motion. It is also important to realize that buildings don't actually shift in only one direction. Because of the complex nature of earthquake ground motion, the building actually tends to vibrate back and forth in varying directions. By contrast, even though it too displacing, the base-isolated building retains its original, rectangular shape. It is the lead-rubber bearings supporting the building that are deformed.

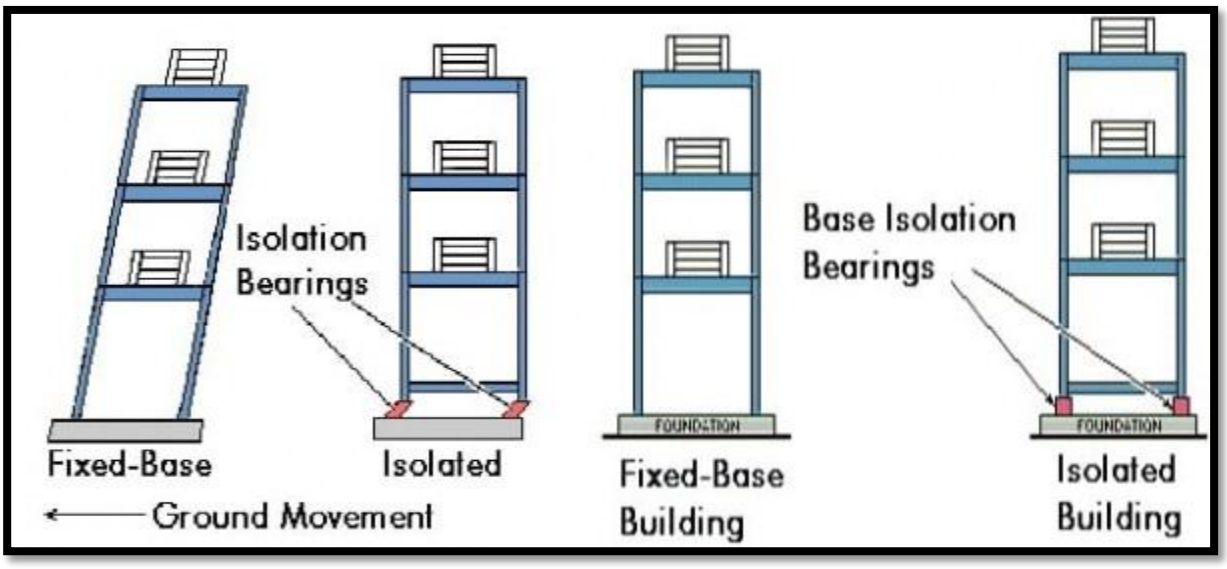


Fig-60 Base Isolation Method

The base-isolated building itself escapes the deformation and damage, which implies that the inertial forces acting on the base-isolated building have been reduced. Experiments and observations of base-isolated buildings in earthquakes have been shown to reduce building accelerations to as little as 1/4 of the acceleration of comparable fixed-base buildings, which each building undergoes as a percentage of gravity. As we noted above, inertial forces increase, and decrease, proportionally as acceleration increases or decreases. Acceleration is decreased because the base isolation system lengthens a building's period of vibration, the time it takes for the building to rock back and forth and then back again. And in general, structures with longer periods of vibration tend to reduce acceleration, while those with shorter periods tend to increase or amplify acceleration. Finally, since they are highly

elastic, the rubber isolation bearings don't suffer any damage. But the lead plug in the middle of our example bearing experiences the same deformation as the rubber. However, it generates heat.

Energy Dissipation Devices

The second of the major new techniques for improving the earthquake resistance of buildings also relies upon damping and energy dissipation, but it greatly extends the damping and energy dissipation provided by lead-rubber bearings. As we've said, a certain amount of vibration energy is transferred to the building by earthquake ground motion. Buildings themselves do possess an inherent ability to dissipate, or damp, this energy. However, the capacity of buildings to dissipate energy before they begin to suffer deformation and damage is quite limited. The building will dissipate energy either by undergoing large scale movement or sustaining increased internal strains in elements such as the building's columns and beams. Both of these eventually result in varying degrees of damage. So, by equipping a building with additional devices which have high damping capacity, we can greatly decrease the seismic energy entering the building, and thus decrease building damage. Accordingly, a wide range of energy dissipation devices have been developed and are now being installed in real buildings. Energy dissipation devices are also often called damping devices. The large number of damping devices that have been developed can be grouped into three broad categories: Friction Dampers: these utilize frictional forces to dissipate energy Metallic Dampers : utilize the deformation of metal elements within the damper Viscoelastic Dampers : utilize the controlled shearing of solids Viscous Dampers: utilized the forced movement (orificing) of fluids within the dampe

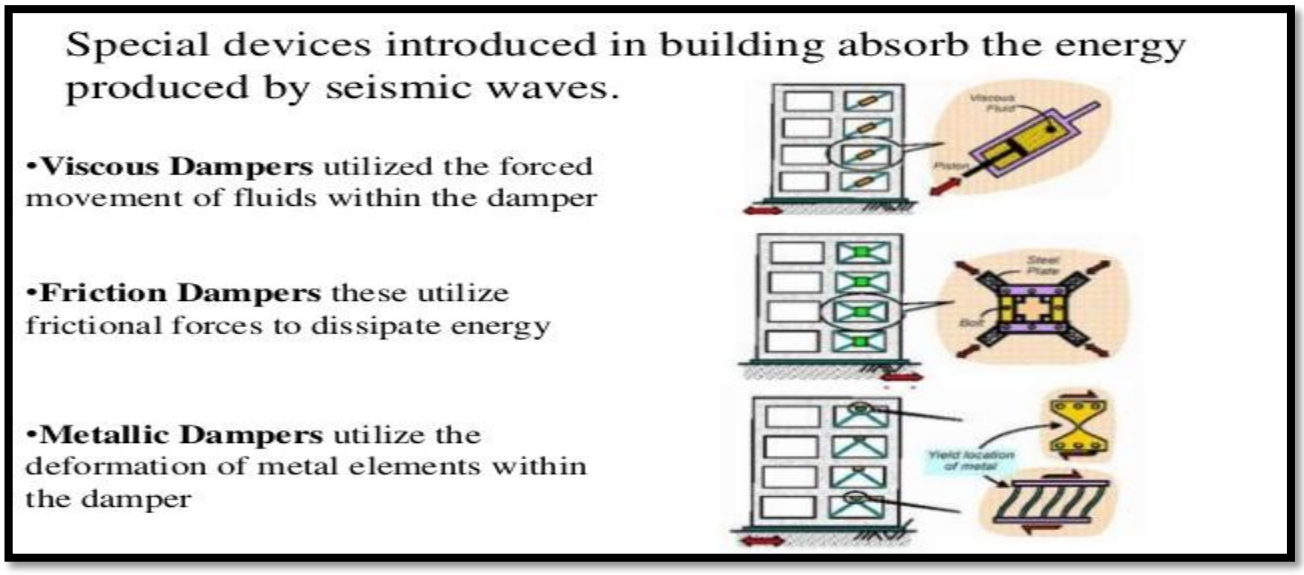


Fig-61 Energy Dissipation device for earthquake resistant

14.1.2 Seismic Retrofitting of Buildings:

Seismic retrofitting is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes. ... These codes must be regularly updated; the 1994 Northridge earthquake brought to light the brittleness of welded steel frames, for example.

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

Common seismic retrofitting techniques fall into several categories:

External post-tensioning

The use of external post-tensioning for new structural systems have been developed in the past decade. Under the PRESS (Precast Seismic Structural Systems), a large-scale U.S./Japan joint research program, unbonded post-tensioning high strength steel tendons have been used to achieve a moment-resisting system that has self-centering capacity. An extension of the same idea for seismic retrofitting has been experimentally tested for seismic retrofit of California bridges under a Caltrans research project [12] and for seismic retrofit of non-ductile reinforced concrete frames. Pre-stressing can increase the capacity of structural elements such as beam, column and beam-column joints. External pre-stressing has been used for structural upgrade for gravity/live loading since the 1970s.

Base isolators

Main article: Base isolation

Base isolation is a collection of structural elements of a building that should substantially decouple the building's structure from the shaking ground thus protecting the building's integrity and enhancing its seismic performance. This earthquake engineering technology, which is a kind of seismic vibration control, can be applied both to a newly designed building and to seismic upgrading of existing structures. Normally, excavations are made around the building and the building is separated from the foundations. Steel or reinforced concrete beams replace the connections to the foundations, while under these, the isolating pads, or base isolators, replace the material removed. While the base isolation tends to restrict transmission of the ground motion to the building, it also keeps the building positioned properly over the foundation. Careful attention to detail is required where the building interfaces with the ground, especially at entrances, stairways and ramps, to ensure sufficient relative motion of those structural elements.

Supplementary dampers

Supplementary dampers absorb the energy of motion and convert it to heat, thus damping resonant effects in structures that are rigidly attached to the ground. In addition to adding energy dissipation capacity to the structure, supplementary damping can reduce the displacement and acceleration demand within the structures. In some cases, the threat of damage does not come from the initial shock itself, but rather from the periodic resonant motion of the structure that repeated ground motion induces. In the practical sense, supplementary dampers act similarly to Shock absorbers used in automotive suspensions.

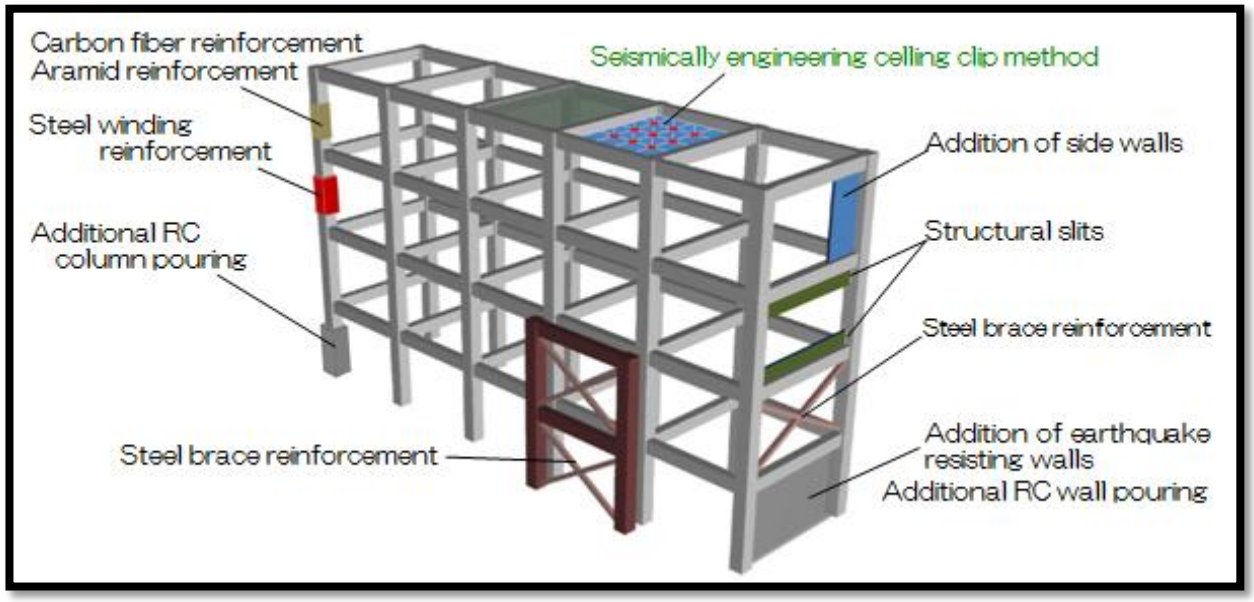


Fig-62 Sesmic Retrofitting Method

Tuned mass dampers

Tuned mass dampers (TMD) employ movable weights on some sort of springs. These are typically employed to reduce wind sway in very tall, light buildings. Similar designs may be employed to impart earthquake resistance in eight to ten story buildings that are prone to destructive earthquake induced resonances.

Slosh tank

A slosh tank is a large container of low viscosity fluid (usually water) that may be placed at locations in a structure where lateral swaying motions are significant, such as the roof, and tuned to counter the local resonant dynamic motion. During a seismic (or wind) event the fluid in the tank will slosh back and forth with the fluid motion usually directed and controlled by internal baffles – partitions that prevent the tank itself becoming resonant with the structure, *see Slosh dynamics*. The net dynamic response of the overall structure is reduced due to both the counteracting movement of mass, as well as energy dissipation or vibration damping which occurs when the fluid's kinetic energy is converted to heat by the baffles. Generally the temperature rise in the system will be minimal and is passively cooled by the surrounding air. One Rincon Hill in San Francisco is a skyscraper with a rooftop slosh tank which was designed primarily to reduce the magnitude of lateral swaying motion from wind. A slosh tank is a passive tuned mass damper. In order to be effective the mass of the liquid is usually on the order of 1% to 5% of the mass it is counteracting, and often this requires a significant volume of liquid. In some cases these systems are designed to double as emergency water cisterns for fire suppression.

Active control system

Very tall buildings ("skyscrapers"), when built using modern lightweight materials, might sway uncomfortably (but not dangerously) in certain wind conditions. A solution to this problem is to include at some upper story a large mass, constrained, but free to move within a limited range, and moving on some sort of bearing system such as an air cushion or hydraulic film. Hydraulic pistons, powered by electric pumps and accumulators, are actively driven to counter the wind forces and natural resonances. These may also, if properly designed, be effective in controlling excessive motion – with or without applied power – in an earthquake. In general, though, modern steel frame high rise buildings are not as

subject to dangerous motion as are medium rise (eight to ten story) buildings, as the resonant period of a tall and massive building is longer than the approximately one second shocks applied by an earthquake.

Adhoc addition of structural support/reinforcement

The most common form of seismic retrofit to lower buildings is adding strength to the existing structure to resist seismic forces. The strengthening may be limited to connections between existing building elements or it may involve adding primary resisting elements such as walls or frames, particularly in the lower stories. Common retrofit measures for unreinforced masonry buildings in the Western United States include the addition of steel frames, the addition of reinforced concrete walls, and in some cases, the addition of base isolation.

Connections between buildings and their expansion additions

Frequently, building additions will not be strongly connected to the existing structure, but simply placed adjacent to it, with only minor continuity in flooring, siding, and roofing. As a result, the addition may have a different resonant period than the original structure, and they may easily detach from one another. The relative motion will then cause the two parts to collide, causing severe structural damage. Seismic modification will either tie the two building components rigidly together so that they behave as a single mass or it will employ dampers to expend the energy from relative motion, with appropriate allowance for this motion, such as increased spacing and sliding bridges between sections.

Exterior concrete columns

Historic buildings, made of unreinforced masonry, may have culturally important interior detailing or murals that should not be disturbed. In this case, the solution may be to add a number of steel, reinforced concrete, or poststressed concrete columns to the exterior. Careful attention must be paid to the connections with other members such as footings, top plates, and roof trusses.

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

Advance construction Materials:

1. Stabilized, Compressed earth Blocks: are made of mud stabilized with 5% cement/lime etc. and compacted in block making machine with no burning. A good walling material as burnt bricks and is economical, stronger, energy saving and simple to manufacture. The soil to be used for the blocks should have the requisite component of clay and silt and sand etc. Soil stabilized hollow and interlocking blocks can provide better thermal insulation.

2. Stabilized Adobe: is an improvement over traditional adobe or hand moulded and sun dried mud block in which mud is mixed with a small proportion of cement or lime or broken or cut dry grass as reinforcing media to impart added strength and lower the permeability. It is appropriate in dry climates.

3. Clay Fly ash Burnt Bricks: produced from fly ash and clay, are stronger than conventional burnt clay bricks, consume less energy, provide better thermal insulation and solve the environmental problem through utilization of the fly ash, an industrial waste.

4. Fly ash/ Sand-Lime Bricks: produced from fly ash or sand with lime as binder, are strong, superior

in water absorption and crushing strength. However this needs autoclaving.

5. Fly ash-Lime-Gypsum (Fal-G) Products: manufactured by blending fly ash, lime and calcined gypsum (from byproduct of phosphogypsum or natural gypsum) for making a useful product, named Fal-G, and can be used as a cementeous material for mortar/plasters and for masonry blocks of any desired strength. It can also be used for road pavements and plain concrete in the form of Fal-G concrete.

6. Clay Red Mud Burnt Bricks: produced from alumina red mud or bauxite an industrial waste of aluminum producing plants in combination with clay. Possess all the physical properties of normal clay bricks and solves the problem of disposal of the waste product and environmental pollution. In addition, they have good architectural value as facing bricks due to their pleasing hues of colour. Red mud in addition improves the quality of bricks made from inferior soil deficient in clay content.

7. Lato Blocks: are improved bricks made from lateritic soil and cement or lime. Available in South-West India as large soft rock masses. The blocks are moulded under pressure to produce strong and good quality blocks which consume lesser energy than conventional bricks and hence cheaper. They are available in pleasing hues of colours ranging from cream to light crimson.

8. Precast Stone Blocks: of larger size than normal bricks are manufactured by using waste stone pieces of various sizes with lean cement concrete and enable a rationalized use of natural locally available materials. Shaping stones in this manner, enables speedy construction saves on cement, reduces thickness of stone walls and effects overall saving by eliminating plasters on internal/external wall surface. Appropriate architectural rendering on exterior surfaces can also be given.

9. Precast Concrete Blocks: made to similar dimension of stone blocks without large size stone pieces, but using coarse and fine graded aggregate with cement. They have excellent properties comparable to other masonry block, are cheaper and facilitate speedy construction and especially suitable where good quality clay for brick making is not available.

10. Hollow Concrete Blocks: are manufactured using lean cement concrete mixes and extruded through block making machines of egg laying or static type need lesser cement mortar and enable speedy construction as compared to brick masonry. The cavity in the blocks provides better thermal protection and also do not need external or internal plastering. These can be used for walling block or as roofing blocks along with inverted precast tee beams.

11. Fly ash Based Light Weight Aerated Concrete Walling and Roofing Blocks: are manufactured by a process involving mixing of fly ash, quick lime or cement and gypsum, foaming agents such as aluminum powder. These are considered excellent products for walling blocks and prefab floor slabs.

12. Precast Aerated/Cellular Concrete Walling Blocks and Roofing Slabs: are manufactured through aerated cellular concrete manufacturing process. When used in multistoried structures reduce weight, resulting more in economic design of structure. These components can also be worked and handled easily, have high fire resistance rating and provide better insulation.

13. Rat-Trap Bond: is an alternate brick bonding system for English and Flemish bond. This is economical, strong and aesthetic. 25% of the total number of bricks and 40% of motor the cost of the wall can be saved by using RAT -TRAP BOND. It is simple to build and has better insulation

properties.

14. Bamboo/Timber Mat Based Walls (Ekra Walling): plastered on either side by mud or cement mortar over bamboo mat placed between horizontal and vertical timber/bamboos as a frame. Are easy to construct, cost less and are popular in hilly areas due to self help. However, these are non-load bearing and need supporting structure. This upgraded traditional technology is a relevant for earthquake view point walling option.

15. Composite Ferro Cement System: simple to construct and made of ferro cement i.e. rich mortar reinforced with chicken and welded wire mesh. These reduce the wall thickness and allow larger carpet area. Precast ferro cement units in trough shape are integrated with R.C.C. columns. Ferro cement units serve as a permanent skin unit and as a diagonal strut between columns. Inside cladding can be done with mud blocks or any locally available material. Ideally suitable for seismic areas.

Advance Construction Techniques:

The construction industry is repeatedly criticised for being inefficient and slow to innovate. The basic methods of construction, techniques and technologies have changed little since Roman times. But the application of innovation in the construction industry is not straight forward.

Every construction project is different, every site is a singular prototype, construction works are located in different places, and involve the constant movement of personnel and machinery. In addition, the weather and other factors can prevent the application of previous experience effectively.

The term 'advanced construction technology' covers a wide range of modern techniques and practices that encompass the latest developments in materials technology, design procedures, quantity surveying, facilities management, services, structural analysis and design, and management studies.

Incorporating advanced construction technology into practice can increase levels of quality, efficiency, safety, sustainability and value for money. However, there is often a conflict between traditional industry methods and innovative new practices, and this is often blamed for the relatively slow rate of technology transfer within the industry.

The adoption of advanced construction technology requires an appropriate design, commitment from the whole project team, suitable procurement strategies, good quality control, appropriate training and careful commissioning.

Advanced construction technologies are commonly described as including (amongst many others) advanced forms of:

- 3D printing.
- Materials.
- Building information modeling (BIM).
- Cladding systems.
- Computer aided design and computer aided manufacturing (CAD/CAM).
- Computer numerical control.
- Construction Innovation Hub.
- Construction plant.
- Modern methods of construction.
- Modular construction.
- Offsite manufacturing.
- Prefabrication and preassembly.
- Research and development.
- Site investigations and surveying.
- Substructure works.
- Water engineering.
- Temporary works.
- Smart technology.
- Robotics.
- GPS controlled equipment

Advance construction Equipment:

1. **Earthmoving & Mining**: Construction equipment that is capable of lifting huge quantities of earth in one scoop falls in this category. While bulldozers and articulated trucks are part of this kind, they are quite versatile and are widely used in highway construction projects. Some of the other specialized equipment is:

- Surface Mining equipment, which includes electric shovels for mineral extraction, drills, mass excavators and giant draglines, which are extensively used in civil engineering.
- Underground mining equipment, while similar, needs to function under different space parameters. Advanced pieces of such machinery include scalers, scissor lifts, and continuous miners.

2. **Excavation**: Any kind of operation that requires digging, excavation, making trenches, etc. falls under this category. Many of the examples of machinery that are grouped under this require a great degree of flexibility and maneuverability, because of the limited area they might be operating under. The most popular and versatile of the lot is the backhoe loader. Apart from this, the other kinds that find widespread use are dredges (which are used in waterways to access sediments under water), excavators (in forestry, pipelines, and even mining) and trenchers for laying underground cable networks or to facilitate sewer systems.

3. **Lifting**: Since the construction industry involves a great deal of hoisting material, people and other equipment, there are numerous specialized types of machines for this purpose, although some lifting can be done using excavators etc. They are developed taking into account various factors like machine capacity at specific heights, the speed of wind, maneuver radius, etc. The most popular equipment in this category includes boom trucks, forklifts, manlifts (specially designed for greater height reach without any impediments), cranes of many specialized varieties and pipe layers.

4. **Roads**: Building a road is a project that necessitates the use of a rather wide variety of heavy machinery. Earthmoving, clearing areas, lifting work (especially when building a structure like a bridge) and paving are all activities that need different equipment. Cold planers (for milling asphalt), compactors (for ensuring a smooth, eve surface), curb machines, and crushing machines are just a few examples.

5. **Railroads**: The use of several types of highly specialized machinery is needed when constructing railroads. Many factors like high cargo levels, passenger transit, energy consumption and safety have to be taken into consideration; so the equipment needed to serve these purposes has to be just right. Some of the commonly used machinery includes ballast tampers and ballast regulators. While the former help to render the railway tracks more durable and to facilitate perfect track alignment, the latter is aimed at distributing the gravel underneath the tracks more evenly.

14.1.4 Engineering Aspects Of Soil mechanics - Environmental Impact Assessment:

- Environmental Impact Assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.
- UNEP defines Environmental Impact Assessment (EIA) as a tool used to identify the environmental, social and economic impacts of a project prior to decision-making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers.
- Environment Impact Assessment in India is statutorily backed by **the Environment Protection Act, 1986** which contains various provisions on EIA methodology and process.

The Environmental impact Assesment Process:

EIA involves the steps mentioned below. However, the EIA process is cyclical with interaction between the various steps.

- **Screening:** The project plan is screened for scale of investment, location and type of development and if the project needs statutory clearance.
- **Scoping:** The project's potential impacts, zone of impacts, mitigation possibilities and need for monitoring.
- **Collection of baseline data:** Baseline data is the environmental status of study area.
- **Impact prediction:** Positive and negative, reversible and irreversible and temporary and permanent impacts need to be predicted which presupposes a good understanding of the project by the assessment agency.

- **Mitigation measures and EIA report:** The EIA report should include the actions and steps for preventing, minimizing or by passing the impacts or else the level of compensation for probable environmental damage or loss.
- **Public hearing:** On completion of the EIA report, public and environmental groups living close to project site may be informed and consulted.
- **Decision making:** Impact Assessment Authority along with the experts consult the project-in-charge along with consultant to take the final decision, keeping in mind EIA and EMP (Environment Management Plan).

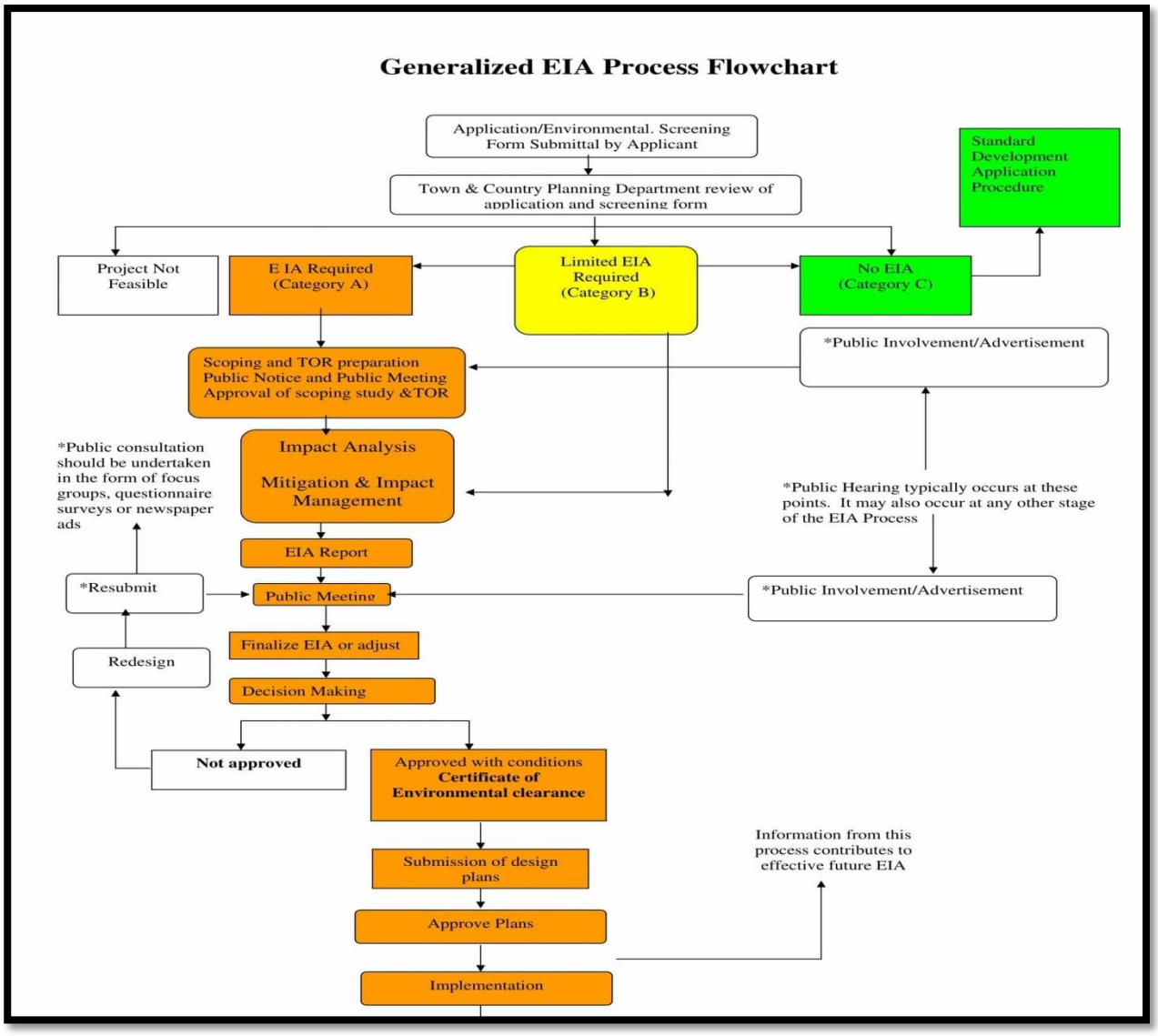


Fig – 63 Generalized Process Flow Chart

- **Monitoring and implementation of environmental management plan:** The various phases of implementation of the project are monitored.

- **Assessment of Alternatives, Delineation of Mitigation Measures and Environmental Impact Assessment Report:** For every project, possible alternatives should be identified, and environmental attributes compared. Alternatives should cover both project location and process technologies.
  Once alternatives have been reviewed, a mitigation plan should be drawn up for the selected option and is supplemented with an Environmental Management Plan (EMP) to guide the proponent towards environmental improvements.

- **Risk assessment:** Inventory analysis and hazard probability and index also form part of EIA procedures.

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

What is Sustainable Development?

All systems and societies naturally develop. However, In this day and age, development is moving at breakneck speeds, thanks to advancements in technology. The only problem is that not everyone considers the downsides that come along with unbalanced economic growth including impacts on people's well-being and environment.
It's about time people start to change their perspective on unbalanced economic development by viewing the world in a completely different way. What would help people achieve that is setting sustainable development goals.
Sustainable development is the practice of using guidelines for environmentally responsible and energy savings to create new development projects and to maintain and retrofit older projects.
It can include using green materials in new construction, designing projects that can harvest their own energy to reduce the load on a power grid, or that incorporate green space in order to counterbalance the green space removed to build the onsite facilities

Goals of Sustainable Development:
There are three primary goals of sustainable development:

1. To minimize the depletion of natural resources when creating new developments.
2. To create a development that can be maintained and sustained without causing further harm to the environment.
3. To provide methods for retrofitting existing developments to make them environmentally friendly facilities and projects.

Importance of Sustainable Development:
Sustainable development is a hard topic to nail down because it consists of a wide range of things. Due to the technicality and complexity of this topic, it's best to check out its importance holistically to be able to grasp it easily.

The population is the main factor driving up sustainable development campaigns. So, the importance of sustainable development can be viewed from this perspective:

1. Provides Essential Human Needs:

The explosion of population means people will have to scramble for the limited life essentials like food, shelter, and water. Adequate provision of these basic needs almost entirely hinges on infrastructure capable of sustaining them for a long time.

If governments insist on utilizing fossil fuel-based sources of energy instead of renewable and sustainable options, the cost and environmental effects of supplying these basic needs would become a tall order.

2. Agricultural Requirement:

A growing population means agriculture must catch up. Finding ways to feed more than 3 billion people can be staggering. If the same unsustainable cultivation, planting, irrigation, spraying, and harvesting techniques are utilized in the future, they might prove to be financially burdening considering fossil fuel resources are projected to run out.

Sustainable development focuses on sustainable agricultural methods such as effective seeding techniques and crop rotation to promote high yields while maintaining the integrity of the soil, which produces food for a large population.

3. Manage Climate Change:

Climate change can be mitigated by sustainable development practices. Sustainable development practices seek to reduce the use of fossil-based sources of fuel like oil, natural gas, and coal. Fossil fuel sources of energy are unsustainable since they will deplete in the future and are responsible for the emission of greenhouse gasses.

4. Financial Stability:

Sustainable development practices have the ability to create more financially sustainable economies across the globe. Developing countries that can't access fossil fuels can leverage renewable forms of energy to power their economies.

From the development of renewable energy technologies, these countries can create sustainable jobs as opposed to finite jobs based on fossil fuel technologies.

5. Sustain Biodiversity:

Unsustainable development and overconsumption practices greatly impact biodiversity. The life ecosystem is designed in such a way that species depend on one another for survival. For instance, plants produce oxygen that humans need for respiration.

Humans exhale carbon dioxide that plants need for growth and production. Unsustainable development practices like emission of greenhouse gasses in the atmosphere kill many plant species resulting in the reduction of atmospheric oxygen.

This is not good for humans. Sustainable development practices encourage the use of renewable energy resources and organic farming practices that do not emit any greenhouse gas to the atmosphere.

Examples of Sustainable Development:

Wind Energy:

Wind energy is energy harnessed from the motion of wind using wind turbines or windmills. Wind energy is renewable, which means it's never-ending and can be used to substitute energy at the grid. This makes it a good sustainable development practice.

Solar Energy:

This is energy harnessed from the sun using solar panels. It's advantageous since it's absolutely free and its supply is infinite. These factors make it beneficial to consumers and good for Mother Nature because it doesn't contribute to the emission of greenhouse gasses.

Green Space:

Green spaces are locations where plants and animals are left to flourish. Parks also fall into the category of green spaces. Green spaces provide people a remarkable opportunity to take pleasure in outdoor recreation, more so in big cities, where resting space is hard to come by.

Green spaces also help regulate climate and quality of air, insulate rivers and streams from polluted runoff and lowers energy usage by dealing with the warming impacts of paved surfaces.

Crop Rotation:

Crop rotation is the practice of planting different crops in the same farm to enhance soil fertility and assist control diseases and insects. Crop rotation is beneficial in many ways; most importantly, it's chemical-free. This means using this farming practice maintains the integrity of your soil, making it a sustainable development practice.

In the long run, there will be no debate about sustainable development. Sustainable development has proven to be cleaner, potentially more efficient, and is the only way to grow our economies without impacting human health and the environment.

Due to world governments putting more emphasis on sustainable development, more people today are moving towards renewable sources of energy like solar, wind, hydropower and geothermal.

As more people join this bandwagon, a lot more of the resources will be required, and this will mean faster depletion of resources. With time sustainable development will not be an option for individuals wanting to live a healthy life and lifestyle choices.

Understanding Regulations and Incentives:

There is a very real necessity for a change to the regulations and incentives that govern development in order to make sustainable development the better option to choose. It isn't really possible to mandate sustainable development because it could hinder projects that are necessary for the common good by making them unaffordable to create.

However, by using various tax credits and incentive programs assigned to different levels of sustainability in a development program, more of a project can meet the requirements of sustainability. This is a measure

towards creating the choice of whole sustainable development, but it also allows for the reality of the cost

of implementation while delivering options that won't impede progress.

Water Supply:

Water supply is the provision of water by public utilities, commercial organisations, community endeavors or by individuals, usually via a system of pumps and pipes. ... The institutional

responsibility for water supply is arranged differently in different countries and regions (urban versus rural).

Water supply is the provision of water by public utilities, commercial organisations, community endeavors or by individuals, usually via a system of pumps and pipes. Aspects of service quality include: Continuity of supply, water quality and water pressure. The institutional responsibility for water supply is arranged differently in different countries and regions (urban versus rural). It usually includes issues surrounding policy and regulation, service provision and standardization.

The cost of supplying water consists, to a very large extent, of fixed costs (capital costs and personnel costs) and only to a small extent of variable costs that depend on the amount of water consumed (mainly energy and chemicals). Almost all service providers in the world charge tariffs to recover part of their costs.

Water supply is a separate topic from irrigation, the practice and systems of water supply on a larger scale, for a wider variety of purposes, primarily agriculture.

Sewerage system- Waste water treatment:

A sewerage system, or wastewater collection system, is a network of pipes, pumping stations, and appurtenances that convey sewage from its points of origin to a point of treatment and disposal.
Combined systems.
Systems that carry a mixture of both domestic sewage and storm sewage are called combined sewers. Combined sewers typically consist of large-diameter pipes or tunnels, because of the large volumes of storm water that must be carried during wet-weather periods. They are very common in older cities but are no longer designed and built as part of new sewerage facilities. Because wastewater treatment plants cannot handle large volumes of storm water, sewage must bypass the treatment plants during wet weather and be discharged directly into the receiving water. These combined sewer overflows, containing untreated domestic sewage, cause recurring water pollution problems and are very troublesome sources of pollution.

Separate systems

New wastewater collection facilities are designed as separate systems, carrying either domestic sewage or storm sewage but not both. Storm sewers usually carry surface runoff to a point of disposal in a stream or river. Small detention basins may be built as part of the system, storing storm water temporarily and reducing the magnitude of the peak flow rate. Sanitary sewers, on the other hand, carry domestic wastewater to a sewage treatment plant. Pretreated industrial wastewater may be allowed into municipal sanitary sewerage systems, but storm water is excluded.

Alternative systems.

Sometimes the cost of conventional gravity sewers can be prohibitively high because of low population densities or site conditions such as a high water table or bedrock. Three alternative wastewater collection systems that may be used under these circumstances include small-diameter gravity sewers, pressure sewers, and vacuum sewers.

Wastewater treatment and disposal:

The size and capacity of wastewater treatment systems are determined by the estimated volume of sewage generated from residences, businesses, and industries connected to sewer systems as well as the anticipated inflows and infiltration (I&I). The selection of specific on-lot, clustered, or centralized treatment plant configurations depends upon factors such as the number of customers

being served, the geographical scenario, site constraints, sewer connections, average and peak flows, influent wastewater characteristics, regulatory effluent limits, technological feasibility, energy consumption, and the operations and maintenance costs involved.

The predominant method of wastewater disposal in large cities and towns is discharge into a body of surface water. Suburban and rural areas rely more on subsurface disposal. In either case, wastewater must be purified or treated to some degree in order to protect both public health and water quality. Suspended particulates and biodegradable organics must be removed to varying extents. Pathogenic bacteria must be destroyed. It may also be necessary to remove nitrates and phosphates (plant nutrients) and to neutralize or remove industrial wastes and toxic chemicals.

The degree to which wastewater must be treated varies, depending on local environmental conditions and governmental standards. Two pertinent types of standards are stream standards and effluent standards. Stream standards, designed to prevent the deterioration of existing water quality, set limits on the amounts of specific pollutants allowed in streams, rivers, and lakes. The limits depend on a classification of the "maximum beneficial use" of the water. Water quality parameters that are regulated by stream standards include dissolved oxygen, coliforms, turbidity, acidity, and toxic substances. Effluent standards, on the other hand, pertain directly to the quality of the treated wastewater discharged from a sewage treatment plant. The factors controlled under these standards usually include biochemical oxygen demand (BOD), suspended solids, acidity, and coliforms.

14.1.6 A Case Study on Waste Water Treatment Plant, CETP (Common Effluent Treatment Plant):

INTRODUCTION:

The present study aims on the process of industrialization is adversely impacting the environment globally. Pollution due to inappropriate management of industrial wastewater is one of the major environmental problems particularly in India.

To avoid such problem a Common Effluent Treatment Plants (CETPs) are considered as one of the viable solution for small to medium enterprises for effective wastewater treatment. In India, Ministry of Environment and Forest (MoEF) in 1991 initiated an innovative financial support scheme for CETPs to ensure growth of the small and medium entrepreneurs (SMEs) in an environmentally compatible manner. The provision of the scheme for fund is as follows; ¬ Central Government matching grants- 25% of the project capital cost(this has been increased to 50% since 2012). ¬ State Government subsidy- 25% of the project capital cost ¬ Loans from financial institutions- 30% of the project capital cost, and ¬ Contribution from the SMEs-20% of the project capital cost. The concept of CETP was adopted as a way to achieve end-of-pipe treatment of combined wastewater to avail the benefit of scale of operation so the CETP scheme was justified on the basis of potential benefits in terms of pollution reduction and environmental improvements.

CETP PLANT INFORMATION:

CETP in Maharashtra at solapur which have a capacity of 3 mld municipal sewage generated in the CETP, solapur heavily contaminated with various streams of industrial waste and result in to waste water solapur has a good base for Textile industries. In order to become water self sufficient and to meet increasing process water requirements, the CETP plant realizes the importance of reuse of waste water for agricultural and industrial uses.

Process	Effluent composition	Nature
Sizing	Starch, waxes, carboxymethyl cellulose (CMC), polyvinyl alcohol (PVA), wetting agents.	High in BOD, COD
Desizing	Starch, CMC, PVA, fats, waxes, pectins	High in BOD, COD, SS, dissolved solids (DS)
Bleaching	Sodium hypochlorite, Cl2, NaOH, H2O2, acids, surfactants, NaSiO3, sodium phosphate, short cotton fibre	High alkalinity, high SS
Mercerizing	Sodium hydroxide, cotton wax	High pH, low BOD, high DS
Dyeing	Dyestuffs urea, reducing agents, oxidizing agents, acetic acid, detergents, wetting agents.	Strongly colored, high BOD, DS, low SS,heavy metals
Printing	Pastes, urea, starches, gums, oils, binders, acids, Thickeners, cross-linkers, reducing agents, alkali	Highly colored, high BOD, oily appearance, SS slightly alkaline,low BOD

Table-35 Effluent Characteristics from Textile Industry

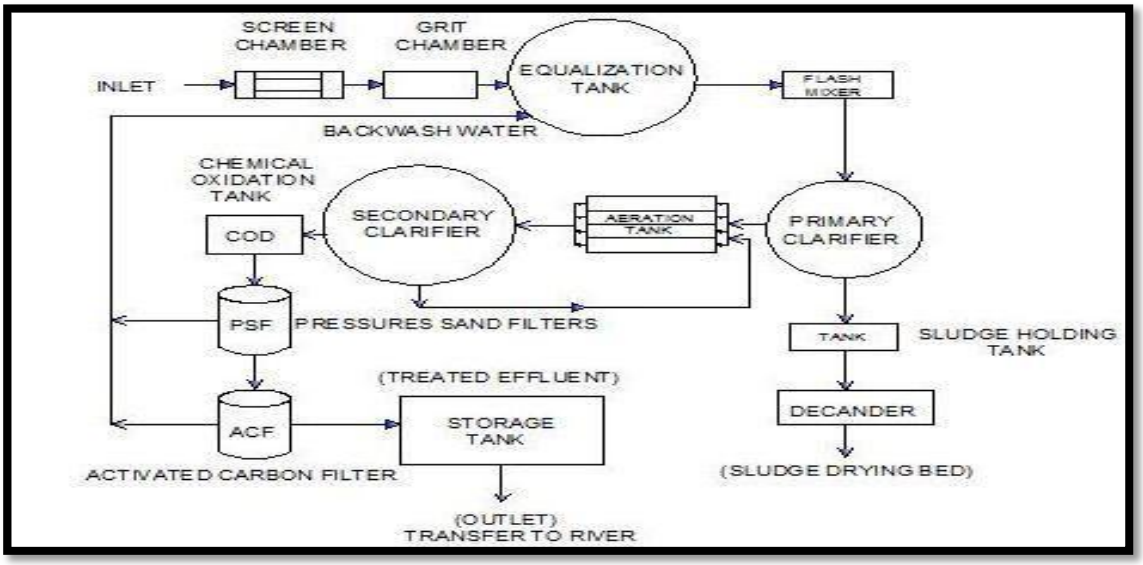


Fig-64 Flow Diagram of CETP

TECHNICAL SPECIFICATION OF CETP UNIT SOLAPUR

Units	Size	Details	Quanti ty

Screen Chamber	2.0 m x 0.5 m x 0.4 m (LD)	MOC-RCC	1
Grit Chamber	4.8 m x1.2 m x 1.0 m (LD)	MOC-RCC	1
Collection/Equlization Tank	25 m Dia. x 3.0 m (LD)	MOC-RCC	1
Flash Mixer	2.0 m x1.5 m x 1.2 m (LD)	MOC-RCC	1
Primary Clarifier	13 m Dia.x 3.0 m (SWD) + 0.3 m (FB)	MOC-RCC	1
Sludge Holding Tank	4.0 m x 4.0 m x3.0 m (LD)	MOC-RCC	1
Aeration Tank	25 m x 12 m x4.5 m (LD)+0.5 m (FB)	MOC-RCC	2
Secondary Clarifier	16 m Dia.x 3.0 m (SWD) + 0.3 m (FB)	MOC-RCC	1
Chemical Oxidation Tank	7.0 m x 7.0 m x 3.0 m (LD)	MOC-RCC	1
Pressure Sand Filter	3.2 m Dia. x 1.5 m	MS (tponly)	1
Activated Carbon Filter	3.2 m Dia. x 1.5 m	MS (tponly)	1
Treated Effluent Storage Tank	12 m x 12 m x3.0 m	MOC-RCC	1
LD-Liquid Depth	MOC-Made of Concrete	Free Board	
SWD-Side Water Depth	RCC-Reinforced Cement Concrete	MS-Mild Steel	

Table-36 Technical specification of CETP Unit

EFFLUENT TREATMENT SYSTEM

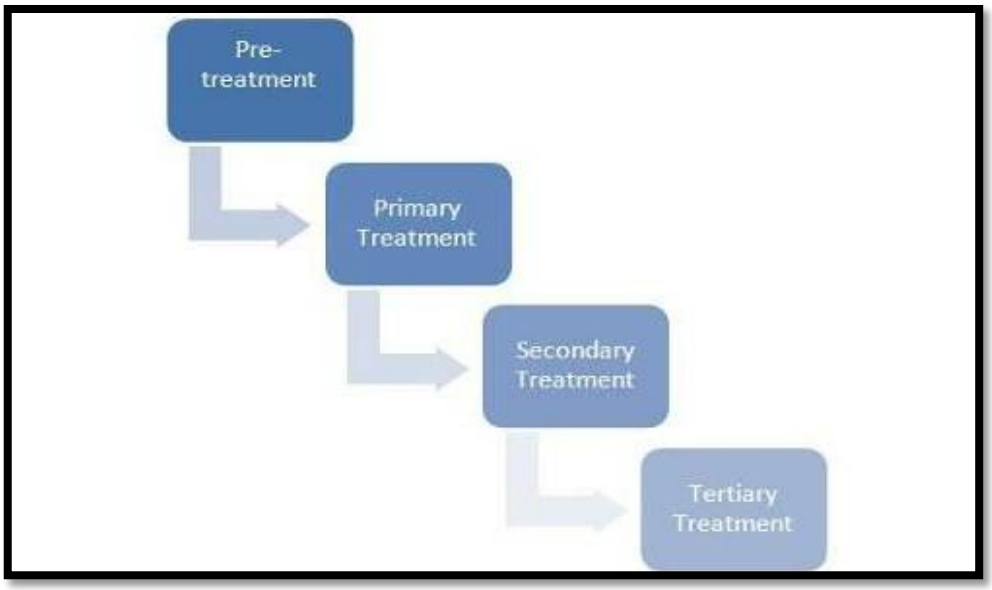


Fig-65 Waste Water Treatment

This chapter discusses in brief various treatment technologies involved in the process of wastewater treatment. In- depth knowledge of all these technologies and factors regulating the treatment mechanism is important for better management of CETPs or ETPs. Wastewater depending

on its characteristics is subjected to different treatment options. Basic wastewater treatment consists of a combination of physical, chemical, and biological processes and operations to remove solids, organic matter and, sometimes, nutrients from wastewater. General terms used to describe different degrees of treatment, in order of increasing treatment level, are preliminary, primary, secondary, and tertiary and/or advanced wastewater treatment. These are described below in brief.

Preliminary treatment:

Preliminary treatment is required to remove the coarse solids and other large materials from raw wastewater. Removal of these materials is necessary to enhance the operation and maintenance of subsequent treatment units. A number of unit operations are engaged in the preliminary treatment of wastewater to eliminate undesirable characteristics of wastewater. The operations include use of screens and grates for removal of large materials, comminutors for grinding of coarse solids, pre-aeration for odour control. Sometimes pH correction and removal of oil & grease is also done. At times, member industries do preliminary treatment in their premises, before sending the effluent to CETP for further treatment. If preliminary treatment or pre-treatment is taken up by individual member industry, it improves the performance of CETP.

Primary Treatment:

Primary wastewater treatment, at times, is the first step in the wastewater treatment process or it may be the second step after the preliminary treatment. It involves physical separation of suspended solids from the wastewater using primary clarifiers. This process is helpful in reduction of total suspended solids (TSS) and associated biochemical oxygen demand (BOD) levels and prepares the waste for the next step in the wastewater treatment process. The objective of primary treatment is to remove of settle able organic and inorganic solids by sedimentation and removal of materials that float (scum) by skimming. Approximately 25 to 50% of the incoming biochemical oxygen demand (BOD), 50 to 70% of the total suspended solids (TSS), and 65% of the oil and grease are removed during primary treatment. Some organic nitrogen, organic phosphorus, and heavy metals associated with solids are also removed during primary sedimentation but colloidal and dissolved constituents are not affected.

The effluent from primary sedimentation units is referred to as primary effluent. Primary treatment ensures satisfactory performance of subsequent treatment units. Sedimentation chambers are the main units involved but various auxiliary processes such as fine screening, flocculation and floatation may also be used. The second step may be chemical treatment (generally with lime and alum) which is sometimes preceded by flocculation. The purpose is to remove metals by precipitation but it also removes some associated colloidal BOD. The process generates chemical sludge.

Secondary Treatment:

This process involves decomposition of suspended and dissolved organic matter in waste water using microbes. The mainly used biological treatment processes are activated sludge process or the biological filtration methods.

Biological treatment processes mainly used for secondary treatment and are based on microbial action to decompose suspended and dissolved organic wastewater. Microbes use the organic compounds as both a source of carbon and as a source of energy. Biological treatment can be either aerobic where microbes require oxygen to grow or anaerobic where microbes grow in absence of oxygen or facultative where microbes can grow with or without oxygen. Micro-

organisms may be either attached to surface as in trickling filter or be unattached in a liquid suspension as in activated sludge process.

Activated sludge process:

It is a continuous flow, aerobic biological treatment process that involves suspended growth of aerobic micro- organisms to biodegrade organic contaminants. Influent is introduced in the aeration basin and is allowed to mix with the contents. A suspension of aerobic microbes is maintained in the aeration tank. A series of biochemical reactions in the basin degrade the organics and generate new bio mass. Micro-organisms oxidize the matter into carbon dioxide and water using the supplied oxygen. These organisms agglomerate colloidal and particulate solids. The mixture is passed to a settling tank or a clarifier where micro-organisms are separated from the treated water. The settled solids are recycled back to the aeration tank to maintain a desired concentration of micro-organisms in the reactor and some of the excess solids are sent to sludge handling facilities. To ensure biological stabilization of organic compounds, adequate nutrient levels of nitrogen and phosphorous must be available to the bio mass. The key variables to the effectiveness of the system include:

a) Organic loading which is described as food to micro-organism ratio (F/M) ratio or Kg of BOD applied daily to the system per Kg of biological solids in aeration tank. F/M ratio determines BOD removal, oxygen requirements and bio mass production. Systems designed and operated at lower F/M provide higher treatment efficiency.

Tertiary treatment:

Tertiary treatment may include a number of physical and chemical treatment processes that can be used after the biological treatment to meet the treatment objectives. It is the next wastewater treatment process after secondary treatment. This step removes persistent contaminants that secondary treatment is not able to remove. Tertiary treatment is the final cleaning process that improves wastewater quality before it is reused, recycled or discharged to the environment. Tertiary treatment is used for effluent polishing (BOD, TSS), nutrient removal (N, P), toxin removal (pesticides, VOCs, metals) etc.

Tertiary treatment can also be extensions of conventional secondary biological treatment to further stabilize oxygen- demanding substances in the wastewater, or to remove nitrogen and phosphorus.

Tertiary treatment can also involve physical-chemical separation techniques such as activated carbon adsorption, flocculation/precipitation, membranes filtration, ion exchange, de-chlorination and reverse osmosis. Advanced treatment processes which generally constitute of or are part of the tertiary treatment may also sometimes be used in primary or secondary treatment or used in place of secondary treatment.

Some of the common tertiary treatment processes are described below:

Granular Media Filtration:

Many processes fall under this category and the common element being the use of mineral particles as the filtration medium. It removes suspended solids mainly by physical filtration. Two common types of these granular media filers area

Sand filters are the most common type which consists of either a fixed or moving bed of media that traps and removes suspended solids from water passing through media.

b) Dual or multimedia filtration consists of two or more media and it operates with the finer, denser media at the bottom and coarser, less dense media at the top. Common arrangement is

granite base at the bottom, sand in the middle and anthracite coal at the top. Flow pattern of multimedia filters is usually from top to bottom with gravity flow. These filters require periodic back washing to maintain their efficiency.

These processes are most commonly used for supplemental removal of residual suspended solids from the effluents of chemical treatment processes.

Sludge Dewatering System:

Sludge from primary and secondary clarifiers is collected in primary sludge sump. From primary sludge sump, sludge is transferred to sludge thickener. Thickened sludge is sent to sludge drying beds for removal of water from sludge. Overflow from thickener is taken into primary clarifier. Thickener collected from sludge dewatering system is collected in Decander collection tank. That Decander is then taken into waste water collection tank for further treatment. Dried sludge from sludge drying beds is removed, packed and disposed to the Transport, Storage and Disposal Facility site for secured land filling.

Result and Discussion:

Inlet and outlet sample was analyzed for various parameters and average results obtained are mentioned in table.

Analysis for inlet and outlet sample was carried out for period of 30 days.

Parameters	Inlet	Outlet
pH	7.9	7.3
COD	900 mg/l	180 mg/l
BOD	600 mg/l	25 mg/l
OIL AND GREASE	20±5 mg/l	6±3 mg/l
TSS	245 mg/l	80 mg/l
TDS	3300 mg/l	2500 mg/l

Table-37 Average Quality parameters

Operating Parameters of CETP:

TSS:

Inlet TSS varies between 220 mg/l to 260 mg/l. Outlet COD varies between 75 mg/l to 90 mg/l

TDS:

Inlet TDS varies between 3000 mg/l to 3300 mg/l. Outlet COD varies between 2200 mg/l to 2700 mg/l.

pH:

Inlet pH value varies between 7.9 to 6.2. Outlet pH value varies between 7.5 to 7.00. Industries use alkaline base solutions for their process therefore there are variations in inlet pH. Also various chemicals like caustic soda, hypochlorite's etc. are used for processes like bleaching, scouring in textile industries that also cause variations in inlet pH.

BOD:

Inlet BOD varies between 500 mg/l to 650 mg/l. Outlet COD varies between 18 mg/l to 25mg/l.

COD:
Inlet COD varies between 800 mg/l to 1600mg/l. Outlet COD varies between 65 mg/l to 200mg/l. Variations in inletCOD is due to the chemical consumption of industries is varies according to their process requirement.

Oil and Grease:
Inlet oil and grease value varies between 26 mg/l to 18 mg/l. Outlet oil and grease value is <10 mg/l. Oil consumptionof industries is varies according to their process requirement therefore there are variations in inlet oil and grease value.

CONCLUSIONS:

The study indicates that there is efficient reduction in parameter from treatment units of CETP. Up to 20% COD reduction is obtained at biological treatment. Removal of oil and grease is also in desirable range. pH variations are there in outlet but outlet pH values are in required range. Chlorides reduction is not obtained anywhere in the treatment provided at CETP. There is need to provide treatment for chloride removal.

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

DESIGN NAME	SUSTAINABLE FEATURES	IMPACT ON SOCIETY
Bio gas plant	With cow dung produce bio gas	Bio gas is very useful
Children playground	In a free time children play in play ground	To provide recreation for children
Step Auditorium	For Panchayat meeting step auditorium is useful	To provide facilities of entertainment for villagers
Swimming Pool	For recreational facilities	Provide recreation in free or vacation time
Rain Water Harvesting	In monsoon collect the water	Collected water is very useful in summer time where water demand is more
Public Library	To read the books and peaceful place for reading	Peoples read peacefully in library and they also gave a heritage to the village
ATM machine	For Deposit and debited a money	Due to atm machine in village villagers can not travel more distance.
Bus Stand	For easily transportation	Reduce the time of villagers to reach bus stand out of village
Open Party Plot	For function	For party or function
Public Health Centre	To get a proper treatment of ill people	For get proper treatment of villagers
Public Toilet	For Cleanliness purpose	Proper clean the village
Artificial pond	To collect a water of rain	Collected water use in more water demand time

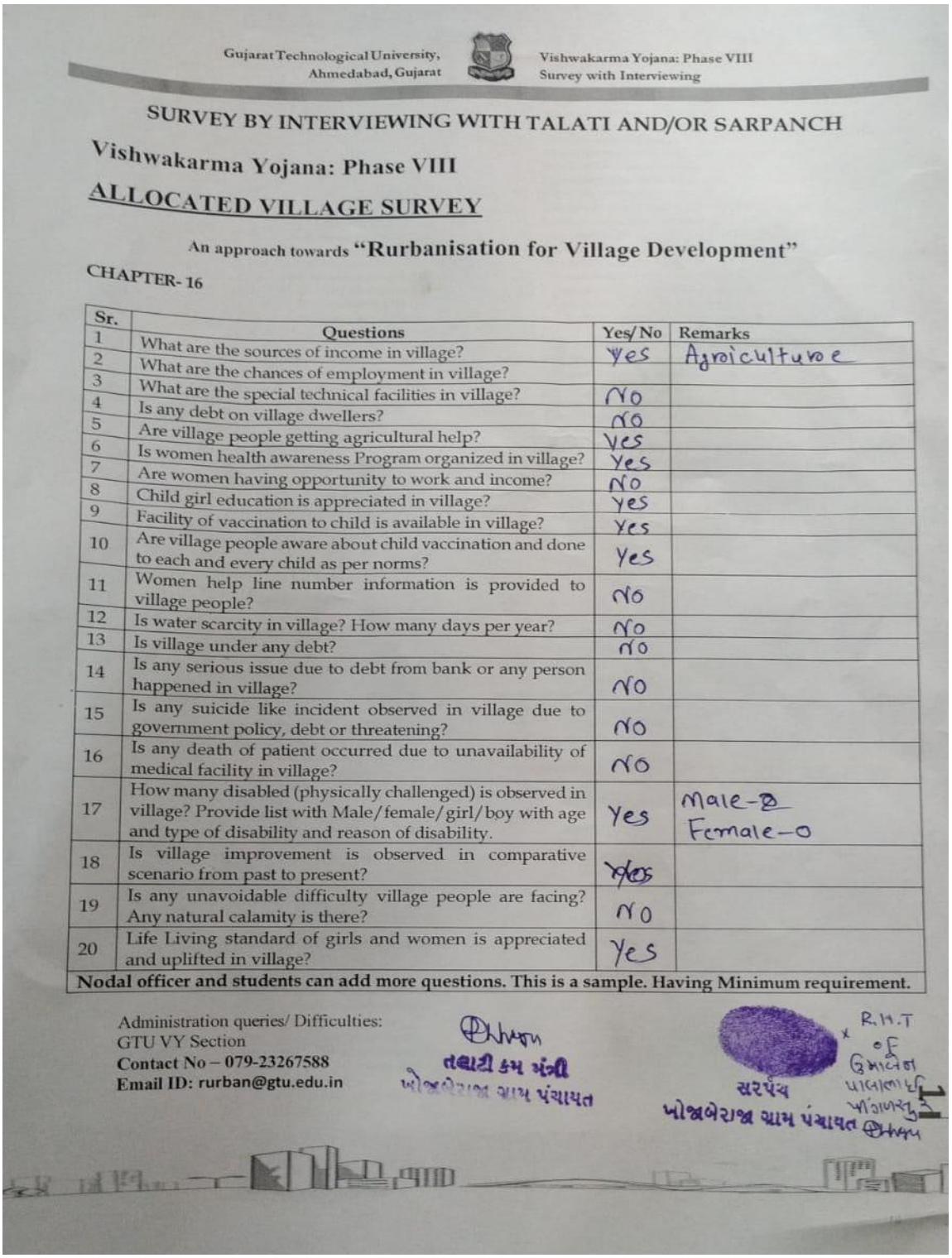
Table-38 Sustainable features and impact on society of designs

How can be improved with small changes, Period a) Immediately, b) Within 1 year and , c) Long term (3-5 years) along with cost:

Sr. No.	Design Name	Period	Amount Expenditure	Benefit
1	Bio gas plant	Within 1 year	32,000	To produce bio gas with waste product cow dung.
2	Children playground	Within one year	57,238	It used for entertainment for children and relaxationfor villagers.

3	Step Auditorium	Immediately	2,22,234	It used for entertainment and relaxation for villagers.
4	Swimming Pool	Within one year	56,820	It used for entertainment and relaxation for villagers.
5	Rain Water Harvesting	Within one year	6,80,000	It is used to store the water in ground.
6	Public Library	Long term	2,55,000	It is used for reading place and it is village heritage place and it's a very peaceful place.
7	ATM machine	Within one year	1,32,343	For money deposit and credited.
8	Bus Stand	Within one year	2,67,251	To provide facility of transportation.
9	Open Party Plot	Long Term	7,62,933	To provide a place for function.
10	Public Health Centre	Within one year	8,45,146	To get proper treatment for villagers who are ill or sick.
11	Public Toilet	Immediately	3,41,000	To get a toilet facilities.
12	Artificial pond	Within one year	30,00,000	To collect water in monsoon season.

CHAPTER-16
Survey By Interviewing With Talati And/Or Sarpanch



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Survey with Interviewing

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

CHAPTER- 16

Sr.	Questions	Yes/ No	Remarks
1	What are the sources of income in village?	Yes	Agriculture
2	What are the chances of employment in village?		
3	What are the special technical facilities in village?	No	
4	Is any debt on village dwellers?	No	
5	Are village people getting agricultural help?	Yes	
6	Is women health awareness Program organized in village?	Yes	
7	Are women having opportunity to work and income?	No	
8	Child girl education is appreciated in village?	Yes	
9	Facility of vaccination to child is available in village?	Yes	
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	
11	Women help line number information is provided to village people?	No	
12	Is water scarcity in village? How many days per year?	No	
13	Is village under any debt?	No	
14	Is any serious issue due to debt from bank or any person happened in village?	No	
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	No	
16	Is any death of patient occurred due to unavailability of medical facility in village?	No	
17	How many disabled (physically challenged) is observed in village? Provide list with Male/female/girl/boy with age and type of disability and reason of disability.	Yes	Male-0 Female-0
18	Is village improvement is observed in comparative scenario from past to present?	~~Yes~~	
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	No	
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	

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

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

તલાટી કમ મંત્રી
ખોજબેરાજા ગ્રામ પંચાયત

સરપંચ
ખોજબેરાજા ગ્રામ પંચાયત

R.M.T of ગ્રામજનો પાસેથી માંગણી કરેલ

CHAPTER-17
Irrigation / Agriculture Activites And Agro Industry, Altenate Technics And Solution

A Real – Time Irrigation Control System for Precision Agriculture Using WSN in Indian Agricultural Sectors:

India is the agriculture based country. Our ancient people completely depended on the agricultural harvesting. Agriculture is a source of livelihood of majority Indians and has great impact on the economy of the country. In dry areas or in case of inadequate rainfall, irrigation becomes difficult. So, it needs to be automated for proper yield and handled remotely for farmer safety. Increasing energy costs and decreasing water supplies point out the need for better water management. Irrigation management is a complex decision- making process to determine when and how much water to apply to a growing crop to meet specific management objectives. If the farmer is far from the agricultural land he will not be noticed of current conditions. So, efficient water management plays an important role in the irrigated agricultural cropping systems.

A low cost alternative solution for efficient water management currently in use is drip irrigation systems that consist of an automated controller to turn on & off the control values, which in-turn helps the farmers by managing the water supply to the crop fields and further maintains the moisture levels of soil that helps in better crop production within the short span of time.

By using the concept of modern irrigation system a farmer can save water up to 50%. This concept depends on two irrigation methods those are: conventional irrigation methods like overhead sprinklers, flood type feeding systems i.e. wet the lower leaves and stem of the plants.The area between the crop rows become dry as the large amount of water is consumed by the flood type methods, in which case the farmer depends only on the incidental rainfalls. The crops are been infected by the leaf mold fungi as the soil surface often stays wet and is saturated after irrigation is completed.
Overcoming these drawbacks new techniques are been adopted in the irrigation techniques, through which small amounts of water applies to the parts of root zone of a plant. The plant soil moisture stress is prevented by providing required amount of water resources frequently or often daily by which the moisture condition of the soil will retain well. The diagram below shows the entire concept of the modern irrigation system. The traditional techniques like sprinkler or surface irrigation requires / uses nearly half of water sources. Even more precise amounts of water can be supplied for plants. As far as the foliage is dry the plant damage due to disease and insects will be reduced, which further reduces the operating cost. The dry rows between plants will leads to continuous federations during the irrigation process.

Fertilizers can be applied through this type of system, and the cost required for will also reduce. The erosion of soil and wind is much reduced by the recent techniques when compared with overhead sprinkler systems.

The soil characteristics will define the form of the dripping nature in the root zone of a plant which receives moisture. As the method of dripping will reduce huge water losses it became a popular method

by reducing the labour cost and increasing the yields

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.

- Smart building
- Smart mobility
- Smart energy
- Smart waste management
- Smart health

Solar-powered LED street light:

solar-powered LED street light that can immediately report its power data. The disclosed LED Street light has a solar cell, a switch power supply unit, and a power cable data communicating unit. The mains power cable of the LED Street light connects to the switch power supply unit for providing it with DC power. The solar cell has a solar board, a battery and a charge controller. The charge controller can also provide the LED Street light with DC power. The charge controller has a power data digital output interface for connecting with the power cable data communicating unit, outputting the power data of the solar cell to the power cable data communicating unit. Through the mains power cable, the status of solar cell of each LED lamp is monitored.
A solar-powered LED street light comprising: An LED lamp mounted on a lamp post; A solar cell comprising a solar board, a charge controller and a battery, wherein the charge controller is electrically connected between the solar board and the battery and electrically connected to the LED lamp for converting power in the battery and outputting to the LED lamp, and the charge controller has a power data digital output interface;

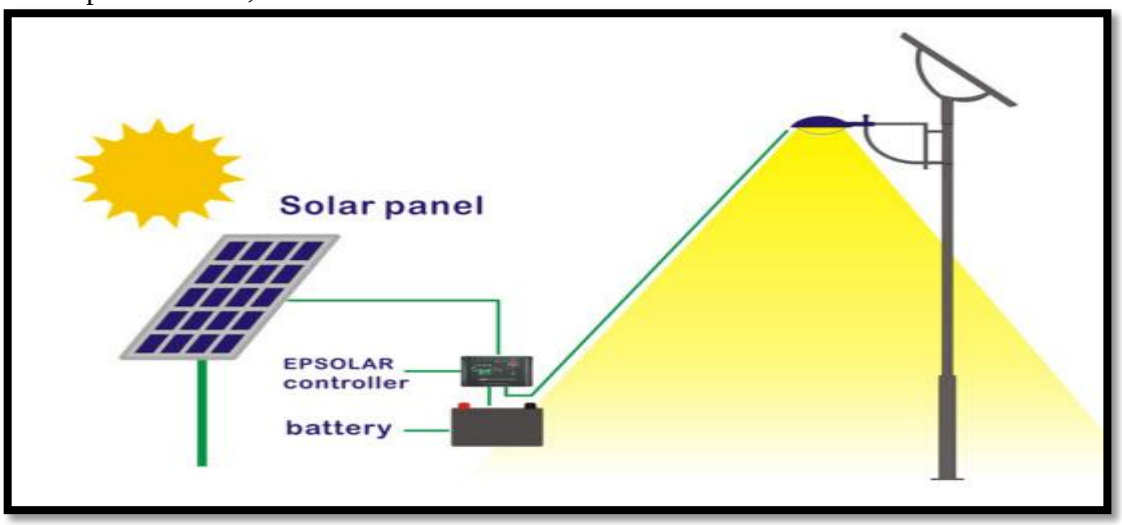


Fig-66 Solar-powered LED street light

A switch power supply unit connected to an mains power cable for converting AC power into DC power and outputting the DC power to the LED lamp; and
A power cable digital communicating unit coupled to the AC power cable and electrically connected to the power data digital output interface of the charge controller to obtain power dataof the solar cell, the power data being modulated and coupled to the mains power cable for transmission.

RO Plant for water treatment:

Using local groundwater, though of poor quality becomes the only long term solution for many areas of the country. Treatment of this local groundwater is essential since various problems of biological and chemical contamination affect these sources. The important question is what kind of water treatment would best suit the local needs and adapt to local culture, be within affordability of the users and as a technology be reasonably adept to maintenance and long-term upkeep.
Fluoride, Arsenic, Nitrate, Salinity and biological contamination are broadly the main pollutants that need to be removed by any water treatment for drinking. Add to these, individual andcultural factors such as colour, odour, taste and smell. Different water treatment technologies have emerged catering to specific purposes in the past few decades. A popular technology that gained popularity in the past 2 decades has been biofilters that can be fitted to the tap.
This technology guaranteed with-flow removal of biological contaminants without requiring any storage and at no extra time for treatment. Variants of this technology are still popular in many areas that suffer only from biological contamination. But when it comes to removing chemical contaminants, the need remained. Specific filters such as defluoridation (Activated Alumina, Resin) have been developed, and they are effective in areas where Fluoride is the only problem with water contamination. But, removal of other salts was still a question. The one technology till now that has been able to address all these problems together has been that of Reverse Osmosis (RO). The major question with RO has been that of cost and handling of effluent (reject) water, both of which present constraints to adoption and wider spread of this technology.

Fig-67 RO Plant for water treatment

Strategic options for fast smart city development:

The strategic components of area-based development in the Smart Cities Mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (Greenfield development) plus a Pan-city initiative in which Smart Solutions are applied covering larger parts of the city. Below are given the Deion‘s of the three models of Area-based smart city development:
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. Depending on the existing level of infrastructure services in the identified area and the vision of the residents, the cities will prepare a strategy to become smart. Since existing structures are largely to remain intact in this model, it is expected that more intensive infrastructure service levels and a large number of smart applications will be packed into the retrofitted smart city. This strategy may also be completed in a shorter time frame, leading to its replication in another part of the city.

Sewage and Sanitation:

- 100% households should have access to toilets
- 100% schools should have separate toilets for girls
- 100% households should be connected to the waste water network
- 100% efficiency in the collection and treatment of waste water
- 100% efficiency in the collection of sewerage network

Rooftop rainwater harvesting:

Rooftop rainwater harvesting (RTRWH) is the most common technique of rainwater harvesting (RWH) for domestic consumption. In rural areas, this is most often done at small-scale. It is a simple, low-cost technique that requires minimum specific expertise or knowledge and offers many benefits. Rainwater is collected on the roof and transported with gutters to a storage reservoir, where it provides water at the point of consumption or can be used for recharging a well or the aquifer. Rainwater harvesting can supplement water sources when they become scarce or are of low quality like brackish groundwater or polluted surface water in the rainy season. However, rainwater quality may be affected by air pollution, animal or bird droppings,insects, dirt and organic matter. Therefore regular maintenance (cleaning, repairs, etc.) as well as a treatment before water consumption (e.g. filtration or/and disinfection) are very important.

The delivery system from rural rooftop catchment usually consists of gutters hanging from the sides of the roof sloping towards a down pipe and tank. Guttering is used to transport rainwater from the roof to the storage vessel. Guttering comes in a wide variety of shapes and forms, ranging from the factory made PVC type similar as the pipes used in water distribution systems to homemade guttering using bamboo or folded metal sheet. Guttering is usually fixed to the building just below the roof and catches the water as it falls from the roof.

Debris, dirt, dust and droppings will collect on the roof of a building or other collection area. When the first rains arrive, this unwanted matter would be washed into the tank. This will cause contamination of the water and the quality will be reduced. Many RWH systems therefore incorporate a system for diverting this‗first flush‘ water so that it does not enter the tank. These systems are called first flush devices.

The simpler ideas are based on a manually operated arrangement whereby the inlet pipe is moved away from the tank inlet and then replaced again once the initial first flush has been diverted. This method has obvious drawbacks in that there has to be a person present who will remember to move the pipe. Other, more sophisticated methods provide a much more elegant means of rejecting the first flush water, training material). But practitioners often recommend that very simple, easily maintained systems be used, as these are more likely to be repaired if failure occurs.

A coarse filter, preferably made of nylon or a fine mesh, can also be used to remove dirt and debris before the water enters the tank.

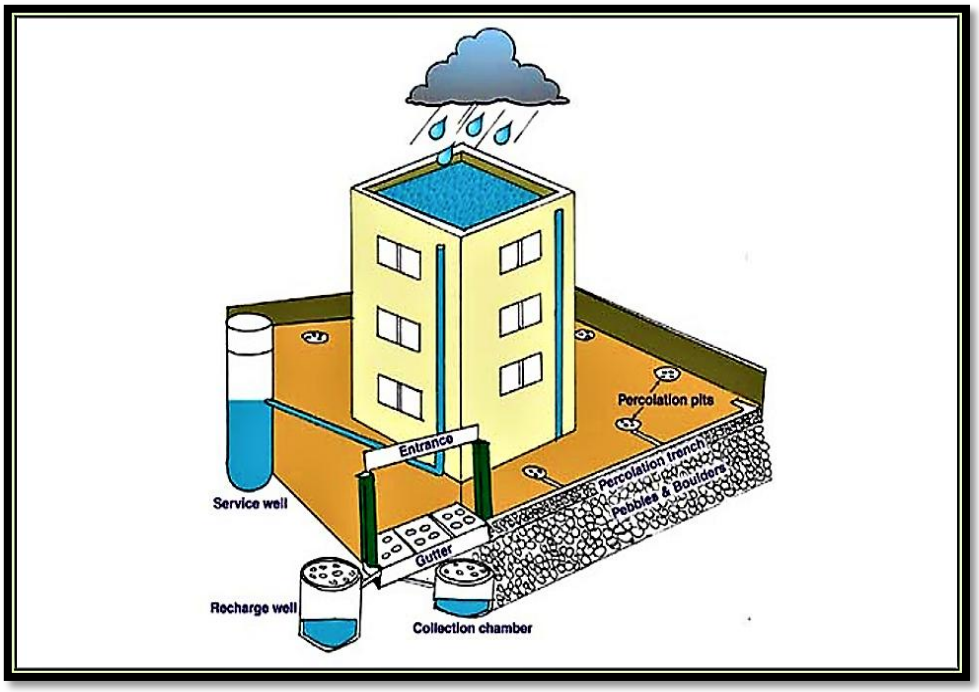


Fig-68 Rooftop rainwater harvesting system

CHAPTER-18
Social Activities – Any Activates Planned By Students

In the activity we did in the village we taught the villagers how to make compost for farming from whatever waste there is and also advised them to build platforms for the thirsty birds to drink water and sit and feed them in summer. We painted on the walls of the village to awaken the villagers and maintain cleanliness. We also trained the villagers to pay online light bills and recharge their mobiles. We taught the villagers how to make compost from waste. In which the first pit was dug and the waste was filled in and the pit was closed for a few weeks and the waste was used to make compost for farming. We also showed the villagers the measures to maintain cleanliness. Which are as follows.

1. You should grow trees must and should.

2. In your village waste thing not see in your village on soil.

3. You should clean a ghutter where water flow.

4. You should say people daily clean your home and other side of home.

5. You should help together.

6. You should use one society for clean. I hope it help.

7. firstly spread awareness about cleanliness

8. tell them the importance of cleanliness

9. if we have clean surrounding so we would not suffer from any kind of disease.

10. you can have have a team that helps to clean village.

11. you can tell them not to throw garbage out side.

12. you can even have the prize distribution that is if any person of village is seen to be clean keep his/her house clean ,surroundings clean and helping others to clean and also making other aware about cleanliness so would be awarded by the prize.

Fig-69 Social activity

1. Beti bachao beti padhavo
2. Digital India
3. Entrepreneurship
4. One day Health Awareness / Education Camp
5. Women Empowerment and her Rights

Women Empowement and her Rights:

We gave a speech on women empowerment in the village to awaken the people of the village during the village visit.

Women must be given equal opportunities in every field, irrespective of gender. Moreover, they must also be given equal pay. We can empower women by abolishing child marriage. Various programs must be held where they can be taught skills to fend for themselves in case they face financial crisis. There are various ways in how one can empower women. The individuals and government must both come together to make it happen. Education for girls must be made compulsory so that women can become illiterate to make a life for themselves.

Most importantly, the shame of divorce and abuse must be thrown out of the window. Many women stay in abusive relationships because of the fear of society. Parents must teach their daughters it is okay to come home divorced rather than in a coffin.

Fig-70 Women Empowerment

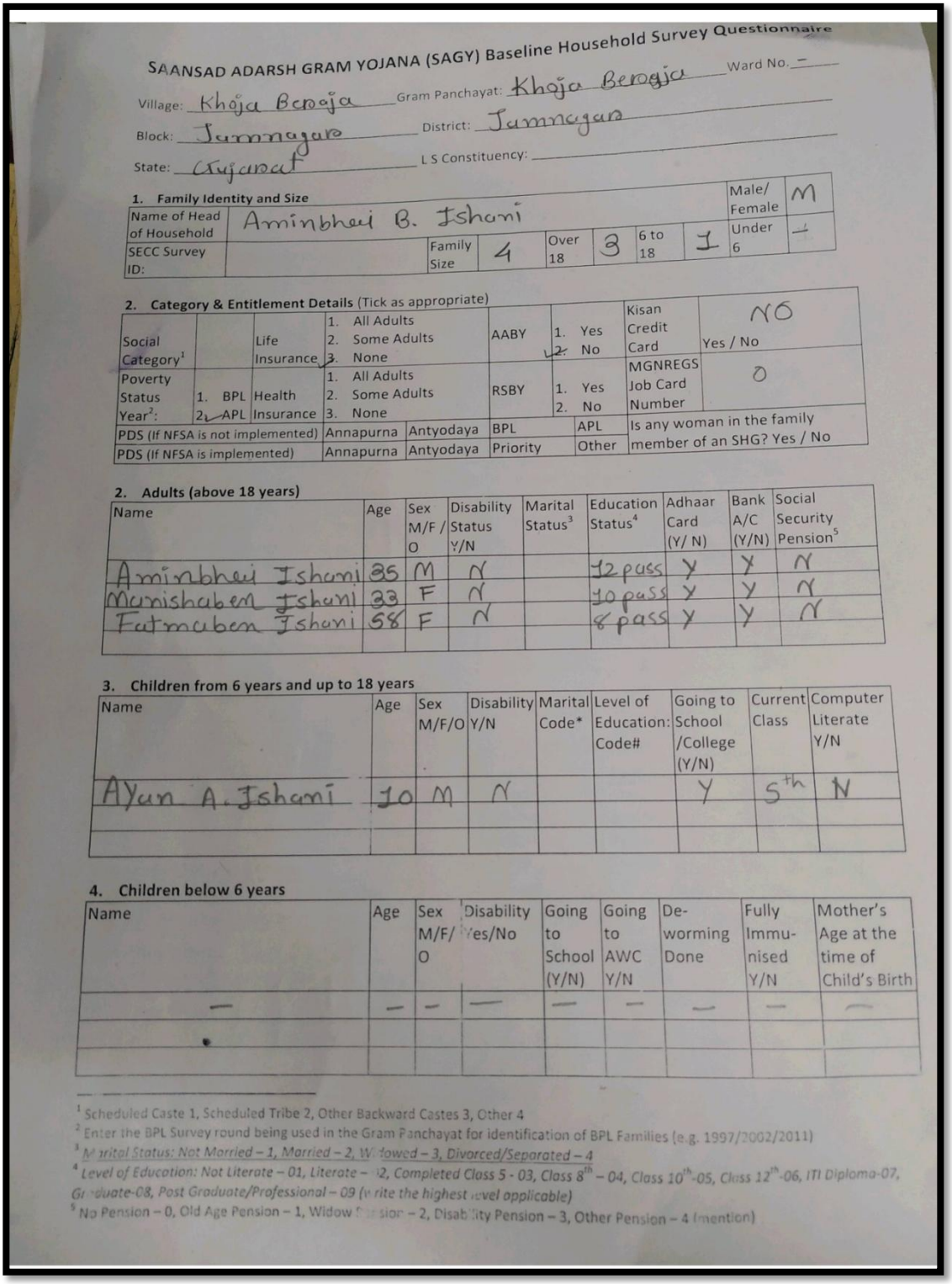
In India, women empowerment is needed more than ever. India is amongst the countries which are not safe for women. There are various reasons for this. Firstly, women in India are in danger of honor killings. Their family thinks its right to take their lives if they bring shame to the reputation of their legacy.

Almost every country, no matter how progressive has a history of ill-treating women. In other words, women from all over the world have been rebellious to reach the status they have today.

While the western countries are still making progress, third world countries like India still lack behind in Women Empowerment.

Women empowerment refers to making women powerful to make them capable of deciding for themselves. Women have suffered a lot through the years at the hands of men. In earlier centuries, they were treated as almost non-existent. As if all the rights belonged to men even something as basic as voting. As the times evolved, women realized their power. There on began the revolution for women empowerment.

CHAPTER-19
SAGY Questionnaire Survey form with the Sarpanch Signature



SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Khoja Beraja Gram Panchayat: Khoja Beraja Ward No. –

Block: Jamnagar District: Jamnagar

State: Gujarat L S Constituency:

1. Family Identity and Size

Name of Head of Household	Aminbhai B. Ishani							Male/ Female	M
SECC Survey ID:		Family Size	4	Over 18	3	6 to 18	1	Under 6	–

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]		Life Insurance	1. All Adults 2. Some Adults 3. None	AABY	1. Yes 2. No	Kisan Credit Card Yes / No	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	0
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]
Aminbhai Ishani	35	M	N		12 pass	Y	Y	N
Munishaben Ishani	33	F	N		10 pass	Y	Y	N
Fatmaben Ishani	58	F	N		8 pass	Y	Y	N

3. Children from 6 years and up to 18 years

Name	Age	Sex M/F/O	Disability Y/N	Marital Code*	Level of Education: Code#	Going to School /College (Y/N)	Current Class	Computer Literate Y/N
Ayan A. Ishani	10	M	N			Y	5th	N

4. Children below 6 years

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

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

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

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

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

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

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

5. Hand washing

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

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

7. Do members take Regular Physical Exercise

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

8. Consumption of Tobacco

	Smoking	Chewing
Adults	—	—
Children	—	—

9. House & Homestead Data

Own House: Yes / ~~No~~	No. of Rooms: 2
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~~	
Community Water Tap	Yes / ~~No~~	
Hand Pump (Public / Private)	Yes / ~~No~~	
Open Well(Public / Private)	Yes / ~~No~~	
Other (mention):		

11. Source of Lighting and Power

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

12. Landholding (Acres)

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

13. Principal Occupations in the Household

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

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
Cuheat	1	200 kg

17. Livestock Numbers

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

18. What games do Children Play
Kho-kho, kabbadi

19. Do children play musical instrument (mention)
No

Schedule Filled By:
Principal Respondent:
Date of Survey:

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

I. Basic Information

a. Gram Panchayat: Khoja Beraja
b. Block: Jamnagar
c. District: Jamnagar
d. State: Gujarat
e. Lok Sabha Constituency: Jamnagar
f. Number of Wards in the Gram Panchayat: 6
g. Number of Villages in the Gram Panchayat: 1
h. Names of Villages: khoja Beraja

Demographic Information

Number of Households 165 Total Population 1203 Male 791 Female 412

SC HHs 300 ST HHs 200 OBC HHs 115 Other HHs 825

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		
b.	Nearest Primary Health Centre (PHC)	Y	
c.	Nearest Community Health Centre (CHC)	N	15 km away
d.	Nearest Post Office	Y	
e.	Nearest Bank Branch (Any)	Y	
f.	Nearest Bank with CBS Facility	Y	
g.	Nearest ATM	Y	
h.	Nearest Primary School	Y	
i.	Nearest Middle School	Y	
j.	Nearest Secondary School	Y	
k.	Nearest Higher Secondary School / +2 College	N	20 km away
l.	Nearest Graduate College	N	22 km away
m	Nearest ITI / Polytechnic Centre	N	12 km away
n	Kisan Seva Kendra	N	10 km away

1

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
o	Agriculture Credit Cooperative Society	N	12 km away
p	Nearest Agro Service Centre	N	15 km away
p	MSP based Government Procurement Centre	N	13 km away
q	Milk Cooperative /Collection Centre	N	10 km away
r	Veterinary Care Centre	N	8 km away
s	Ayurveda Centre	N	9 km away
t	E – Seva Kendra	Y	
u	Bus Stop	N	6 km away
v	Railway Station	N	8 km away
w	Library	N	5 km away
x	Common Service Centre	N	7 km away

IV. Sports Facilities in the Gram Panchayat

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

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 5

b. Number of villages without Angan Wadi Centres 0

Names of such villages: –

c. Schools (Number)

Primary Private: 0 Primary Govt.: 1

Middle Private: – Middle Govt.: –

Secondary Private: – Secondary Govt.: –

Higher Secondary Private: – Higher Secondary Govt: –

VI. Public Distribution System

	Item	Private Contractor	Women's SHG	Gram Panchayat	Cooperative	Other (Mention)	Location in GP (mention Location)	If outside GP, Location & distance from GP HQrs)
a.	Cereal (Rice/ Wheat/ Millets)			2			Community hall	
b.	Kerosene			2			Dharam shala	
c.	Other (mention)			2				

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

VII. Coverage of Villages under different Facilities & Services

	Parameter	Villages Status[1]	Names of Villages Covered	Names of Villages not Covered
a.	Piped Water Supply Coverage to Villages	Covered ✓ / Not Covered	Khoja beraja	
b.	Hand Pump Coverage in Villages:	Covered ✓ / Not Covered	Khoja Beraja	
c.	Coverage under Covered Drains:	Covered ✓ / Not Covered	Khoja Beraja	
d.	Coverage under Open Drains:	Covered ✓ / Not Covered	Khoja Beraja	
e.	Villages with Household Electricity Connection (Numbers)	Connected ✓ / Not Connected	Khoja Beraja	

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	1676	d.	Pasture / Grazing Land	30	g.	Check Dam	1
b.	Irrigated Land	1400	e.	Forests/ Plantations	320	h.	Wells/Bore Wells	500
c.	Un-irrigated Land	276	f.	Other Common Land	20	i	Tanks /Ponds	4

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

3

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	8
b)	Number of Households receiving pension (old age, widow, disability)	8
c)	Number of eligible Households who are not receiving pension	—
d)	Number of Households eligible for Ration Card	55
e)	Number of eligible HHs having ration cards	2
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	—
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	—
h)	Number of active Job Card holders under MGNREGA	0
i)	Number of Job Card holders who completed 100 days of work during 2013-14	0
j)	Number of shops selling alcohol	0
k)	Number of BPL families	65
l)	Number of landless households	0
m)	Number of IAY beneficiaries	0
n)	Number of FRA[2] beneficiaries	0
o)	Number of Community Sanitary Complexes	3
p)	Number of Households headed by single women	—
q)	Number of Households headed by physically handicapped persons	8
r)	Total number of Persons with Disability in the village	7
s)	Number of SHGs	—
t)	Number of active SHGs	—
u)	Number of SHG Federations	—
v)	Number of Youth Clubs	—
w)	Number of Bharat Nirman Volunteers	—

Name and Signature of Surveyor and Respondent

Afsin Janvi	સરપંચ ખોજાબેરાજા ગ્રામ પંચાયત	તલાટી કમ મંત્રી ખોજાબેરાજા ગ્રામ પંચાયત	15/05/2021
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

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: Khoja Berajа
b. Ward Number: –
c. Gram Panchayat: Khoja Berajа
d. Block: Jamnagar
e. District: Jamnagar
f. State: Gujarat
g. Lok Sabha Constituency: Jamnagar
h. Number of Habitations / Hamlets in the Gram Panchayat: –

i. Names of Habitations / Hamlets:
–

Demographic Information

Number of Households 165 Total Population 1203 Male 791 Female 412

SC HHs 300 ST HHs 200 OBC HHs 115 Other HHs 425

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	
b.	Nearest Middle School	Yes	
c.	Nearest Secondary School	NO	13 km away
d.	Kisan Seva Kendra	NO	9 km away
e.	Milk Cooperative /Collection Centre	NO	8 km away
g.	Health Sub Centre	yes	
h.	Bank	yes	
i.	ATM	yes	
j.	Bus Stop	NO	7 km away
k.	Railway Station	NO	6 km away

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

1

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
l	Library	N	8 km away
m	Common Service Centre	N	9 km away
n	Veterinary Care Centre	N	9 km away

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: 1

iii. Drinking Water Facilities

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

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

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

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

iv. Coverage of Habitations under Waste Management System

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

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

b. Coverage under Open Drains: 2 *(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: 1

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: 1

vi. Sports Facilities in the Village

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

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

vii. Education, ICDS

a. Number of Anganwadi Centres: 5

c. Schools (Number)

Primary Private: – Primary Govt.: 2

Middle Private: – Middle Govt.: –

Secondary Private: – Secondary Govt.: –

Higher Secondary Private: – Higher Secondary Govt: –

2

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in Acres		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	1676	d.	Pasture / Grazing Land	30	g.	Check Dam	1
b.	Irrigated Land	1400	e.	Forests/ Plnatations	320	h.	Wells/Bore Wells	500
c.	Un-irrigated Land	276	f.	Other Common Land	20	I	Tanks /Ponds	4

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	0
2	Number of active Job Card holders who have completed 100 days of work	0
3	Number of shops selling alcohol	0
4	Number of BPL families	65
5	Number of landless households	0
6	Number of IAY beneficiaries	0
7	Number of FRA beneficiaries	0
8	Number of common sanitation complexes	3
9	Number of SHGs	—
10	Number of active SHGs	—
11	Existence of SHG Federation in the Village (Yes / No)	No
12	Number of Youth Clubs	—
13	Number of Bharat Nirman Volunteers	—

Name and Signature of Surveyor and Respondent'

Afsin Janvi	x R.H.T of ગામના પ્રતિનિધિ સરપંચ ખોજાબેરાજા ગ્રામ પંચાયત	ખોજાબેરાજા ગ્રામ પંચાયત	15/05/2021
Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

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

Gmail

Janvi Pitroda <pitrodajanvi2617@gmail.com>

Development scenario of Khoja Beraja village, jamnagar

1 message

Janvi Pitroda <pitrodajanvi2617@gmail.com> 19 May 2021 at 17:31
To: tdo-jamnagar@gujarat.gov.in, ddo-jam@gujarat.gov.in, collector-jam@gujarat.gov.in

Respected sir/Madam

We are students of government engineering college rajkot affiliated to Gujarat Technological university-GTU. GTU has been assigned to Vishwakarma yojna-VY in which students survey various village and design various amenities to deliver it to them making ideal for living better life as per requirements and village problem statements.

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

DESIGN NAME	SUSTAINABLE FEATURES	IMPACT ON SOCIETY
Bio gas plant	With cow dung produce bio gas	Bio gas is very useful
Children playground	In a free time children play in play ground	To provide recreation for children
Step Auditorium	For Panchayat meeting step auditorium is useful	To provide facilities of entertainment for villagers
Swimming Pool	For recreational facilities	Provide recreation in free or vacation time
Rain Water Harvesting	In monsoon collect the water	Collected water is very useful in summer time where water demand is more
Public Library	To read the books and peaceful place for reading	Peoples read peacefully in library and they also gave a heritage to the village
ATM machine	For Deposit and debited a money	Due to atm machine in village villagers can not travel more distance.
Bus Stand	For easily transportation	Reduce the time of villagers to reach bus stand out of village
Open Party Plot	For function	For party or function
Public Health Centre	To get a proper treatment of ill people	For get proper treatment of villagers
Public Toilet	For Cleanliness purpose	Proper clean the village
Artificial pond	To collect a water of rain	Collected water use in more water demand time

Sr. No.	Design Name	Period	Amount Expenditure	Benefit
1	Bio gas plant	Within 1 year	32,000	To produce bio gas with waste product cow dung.
2	Children playground	Within one year	57,238	It used for entertainment for children and relaxationfor villagers.
3	Step Auditorium	Immediately	2,22,234	It used for entertainment and relaxation for villagers.
4	Swimming Pool	Within one year	56,820	It used for entertainment and relaxation for villagers.
5	Rain Water Harvesting	Within one year	6,80,000	It is used to store the water in ground.
6	Public Library	Long term	2,55,000	It is used for reading place and it is village heritage place and it's a very peaceful place.

7	ATM machine	Within one year	1,32,343	For money deposit and credited.
8	Bus Stand	Within one year	2,67,251	To provide facility of transportation.
9	Open Party Plot	Long Term	7,62,933	To provide a place for function.
10	Public Health Centre	Within one year	8,45,146	To get proper treatment for villagers who are ill or sick.
11	Public Toilet	Immediately	3,41,000	To get a toilet facilities.
12	Artificial pond	Within one year	30,00,000	To collect water in monsoon season.

Please find here with detailed report of Khoja Beraja village.

KHOJA BERAJA.pdf
13957K

CHAPTER-21
Comprehensive report for the entire village

- 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.

- It is also proposed to frame "Vishwakarma Yojana" to provide the benefit of real work experience to engineering students of Gujarat Technological University and simultaneously apply their technical knowledge in the development of infrastructure in rural development. 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, 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. Under this scheme, the villages of "Rurban" area will be adopted by the engineering colleges under the Gujarat Technological University.

- First of all, when we do a primary survey then we conclude that the infrastructure facility of village is not so good. The public buildings like gram panchayat, bus stop, school, library, PHC, bank, community hall, post office, milk co-operative society Were not in good condition. And the shops of village is average maintain. There is no recreational area in the village. The rode network is in poor condition and drainage facility too. Educational building is in well condition. And the lake of village is not containing the clean water.

- We also did Sansad Adarsh Gram Yojana (SAGY) Baseline Household Survey to know the basic details of the households of people living in the Agatrai Village. After the survey we canunderstand the problems of the people and what we can do to elevate the living standard of thepeople of the village. We did a Social Survey by interviewing talati to better understand the current social scenario of the village.

As per survey We explained various designs of Infrastructure facilities such as:

- Children play ground
- Step auditorium
- Swimming pool
- Rainwater harvesting system

- Public library
- Bus stand
- Atm machine
- Artificial pond
- Priliminary health centre
- Open party plot
- Community toilet

By providing this required facilities to village and growth of village can be possible. So ultimately migration rate and urban city pressure can be reduces and livehood of village dweller will increase.

All the design which is given above are very helpful for future development of village and village people for their enhancement and prosperity. I got deep knowledge about development of village and various infrastructure facilities design of village.

CHAPTER-22 A3 SIZE DRAWING SHEETS

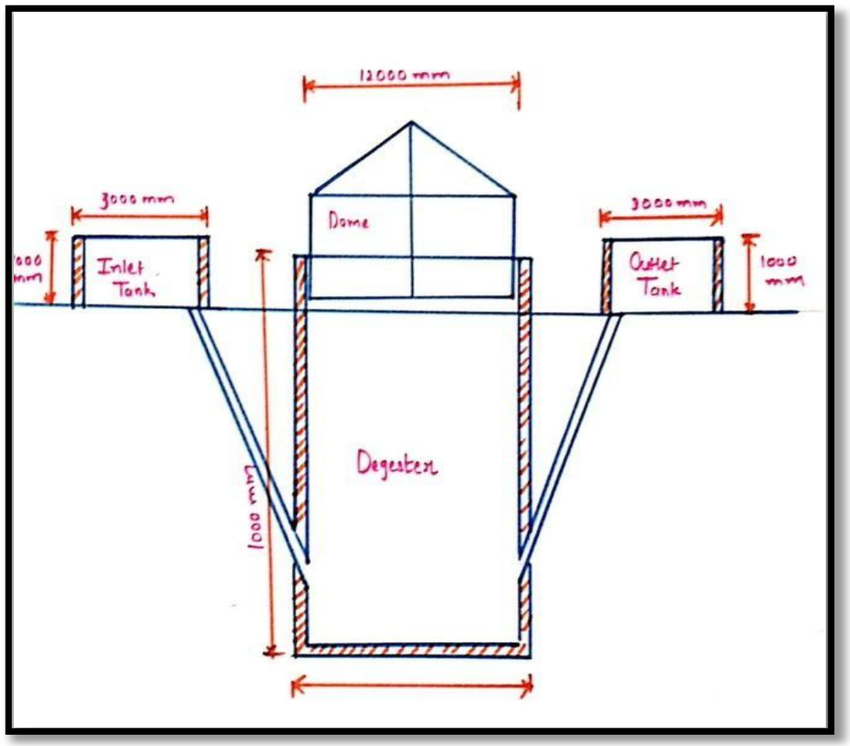
BASICTHINGS:

- Total numbers of animals in village =500
- As per standard data assume per day dung of animal=10.5Kg.
- So total per day dung = 500 * 10.5 =5250 Kg./day

BIO GAS PLANT

DESIGN OFDIGESTER

- Assume retention period (RT) = 70days.
- Assume mixing proportion of solid and water is1:2.
- Now total amount of slurry per day (Sd) = Total per day dung + Wateramount
  = 5250 + (2*5250)
  = 15750 Kg. / day
  = 15.75 m3 / day
- Digester volume (Vd) = Sd *RT
  = 15.75 * 70
  =1102.5 m^3
- Assume cylinder shaped biogasplant.
- Provide total one numbers of units in differentareas,
- So, digester volume becomes for one unit =1102.5/1
  = 1102.5 m3
- So, provide = 1100m3
- Total digester volume (Vd) = πr2h
- 1100 = πr210 (assume h=10m) So dimensions of digester are
- H = 10m R = 6m



DESIGN OF GASHOLDER

- Assume digester temperature= 26-28˚C
- Now from following fig find Gd by taking RT=70 days
  ’ Specific gas production Gd =37 Lit./ Kg. /day
- Daily gas production G = Gd X Feed volume
  = 37 X 5250
  = 194250 Lit.
  = 194.25 m3
- Now assume gas holder capacity =60
- Gas holder volume = Daily gas production X Capacity ofholder= 194.25 X 0.6= 116.55 m^3

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- **Minimum grade of concrete is M20 and all steel grade is Fe500.**
- **Drawings should not be read for scale.**

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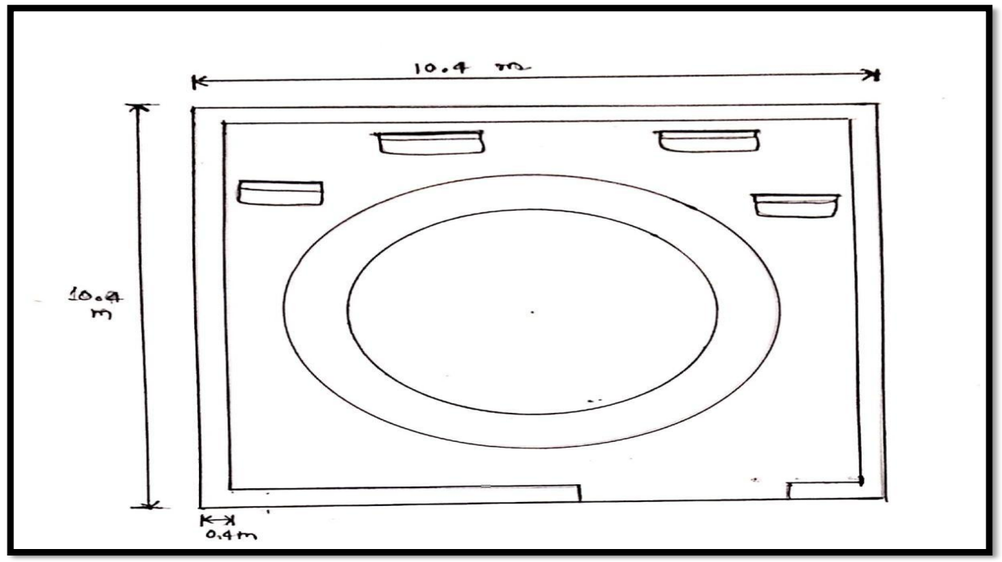

PLAN AND 3D VIEW OF CHILLDREN PLAY GROUND

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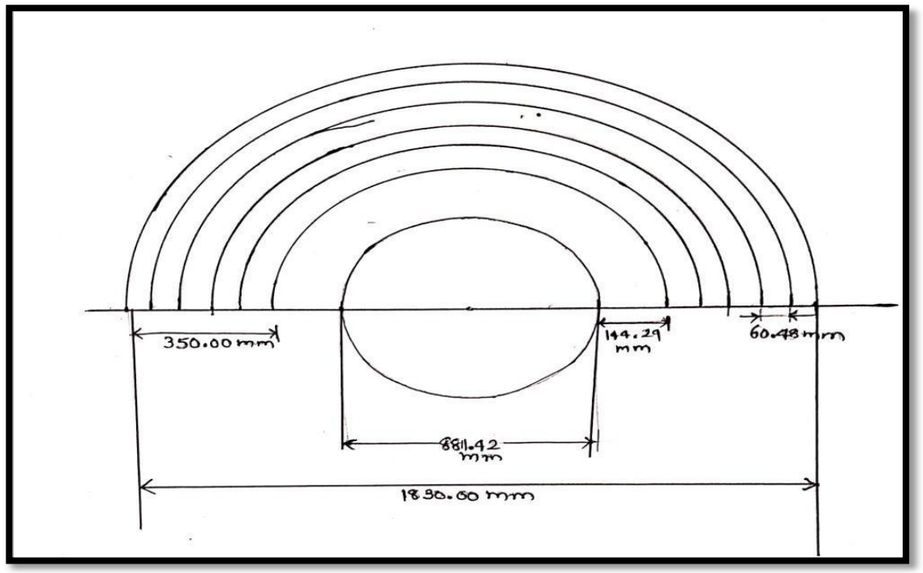

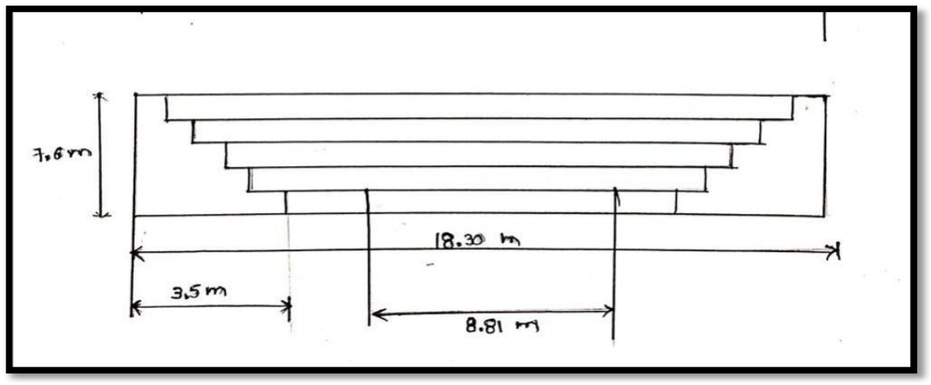

PLAN AND ELEVATION OF STEP AUDITORIUM

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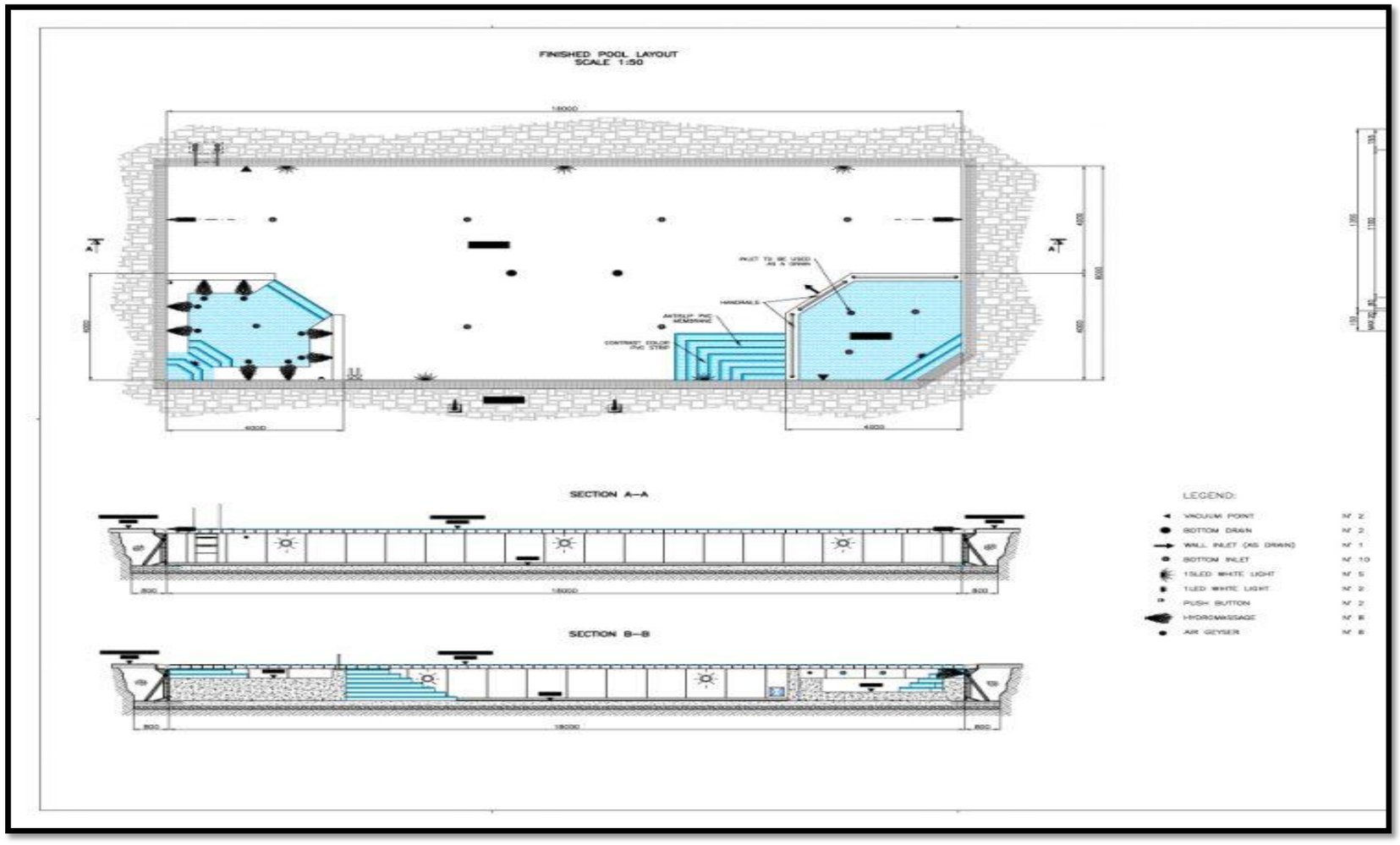

PLAN AND SECTION SWIMMING POOL

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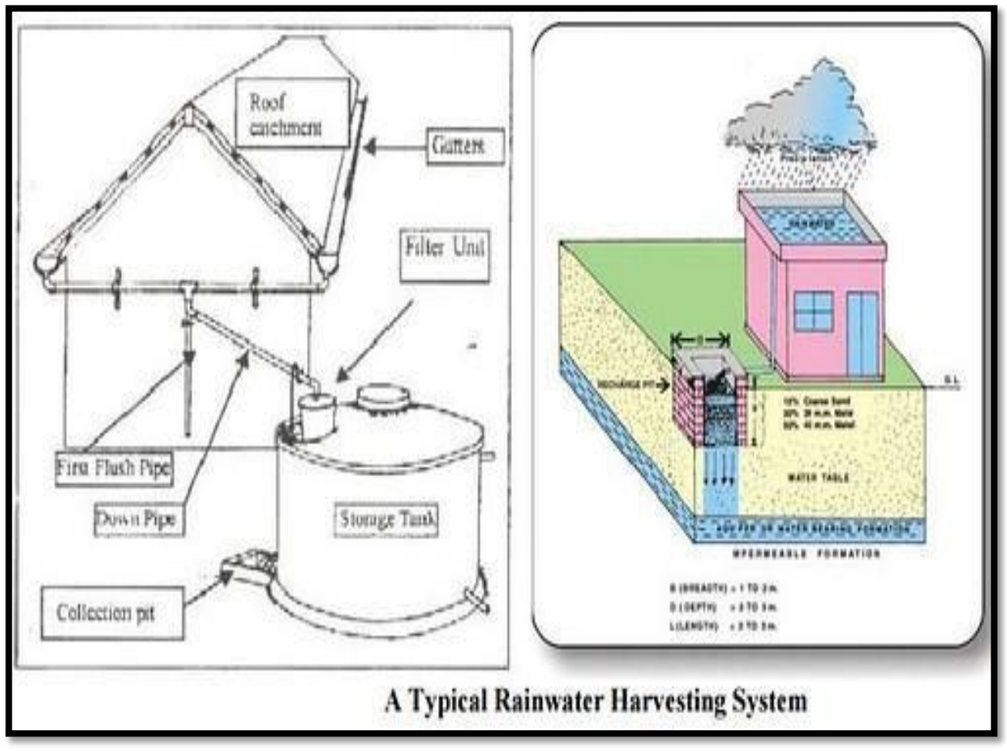
The rooftop area Calculated of a residential building at **Khoja Beraja** for which rain water harvesting system is to be designed is around 50 m^2

So our tank will have dimensions as 1.8 m x 5 m x 5 m (taking square tank) **.**



A Typical Rainwater Harvesting System

RAINWATER HARVESTING SYSTEM

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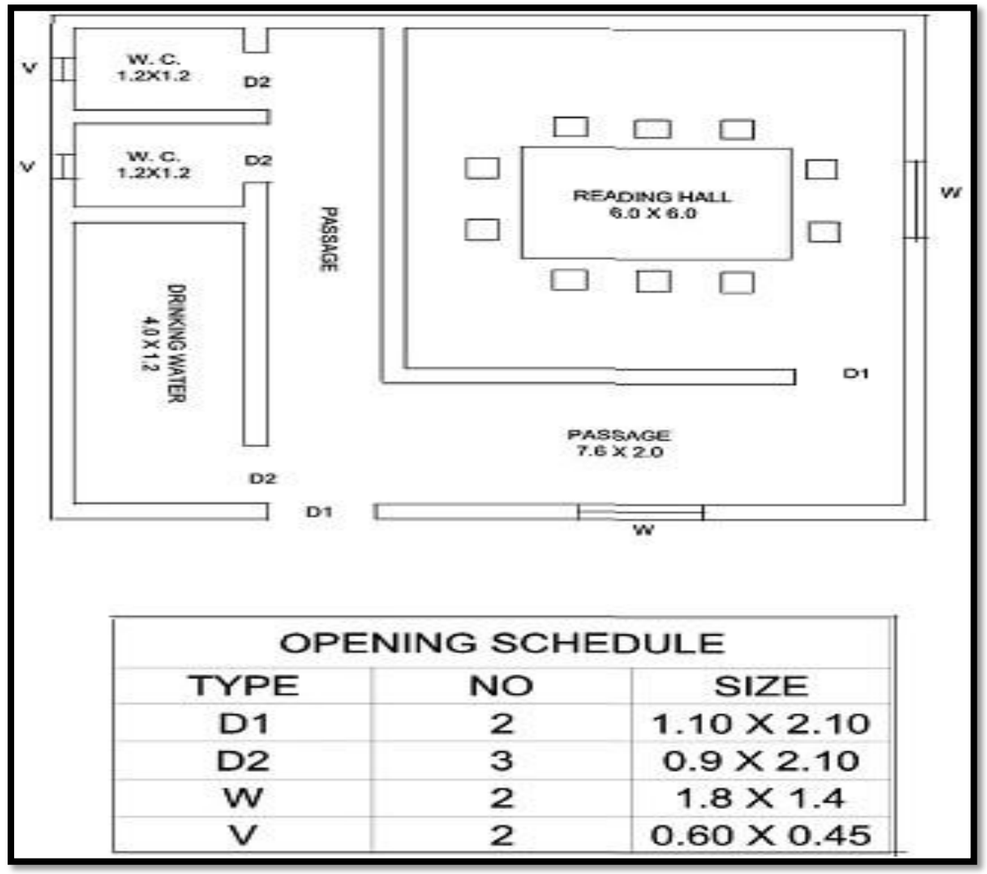

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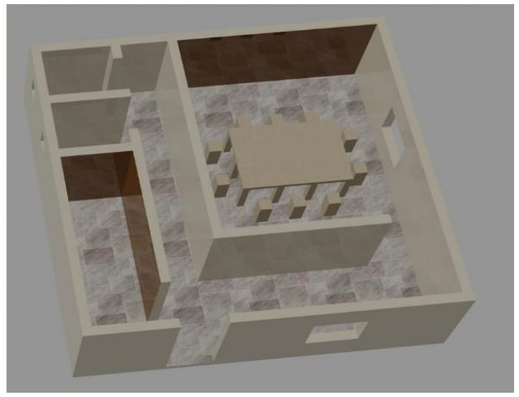
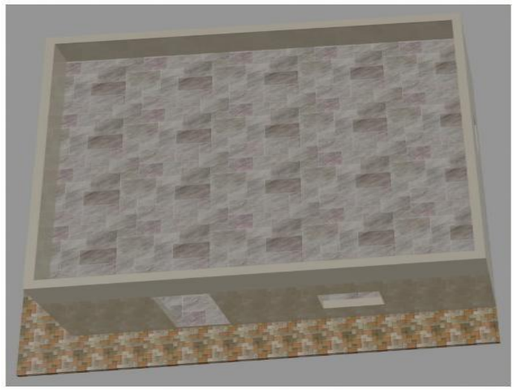
D2	3	0.9 X 2.10
W	2	1.8 X 1.4
V	2	0.60 X 0.45





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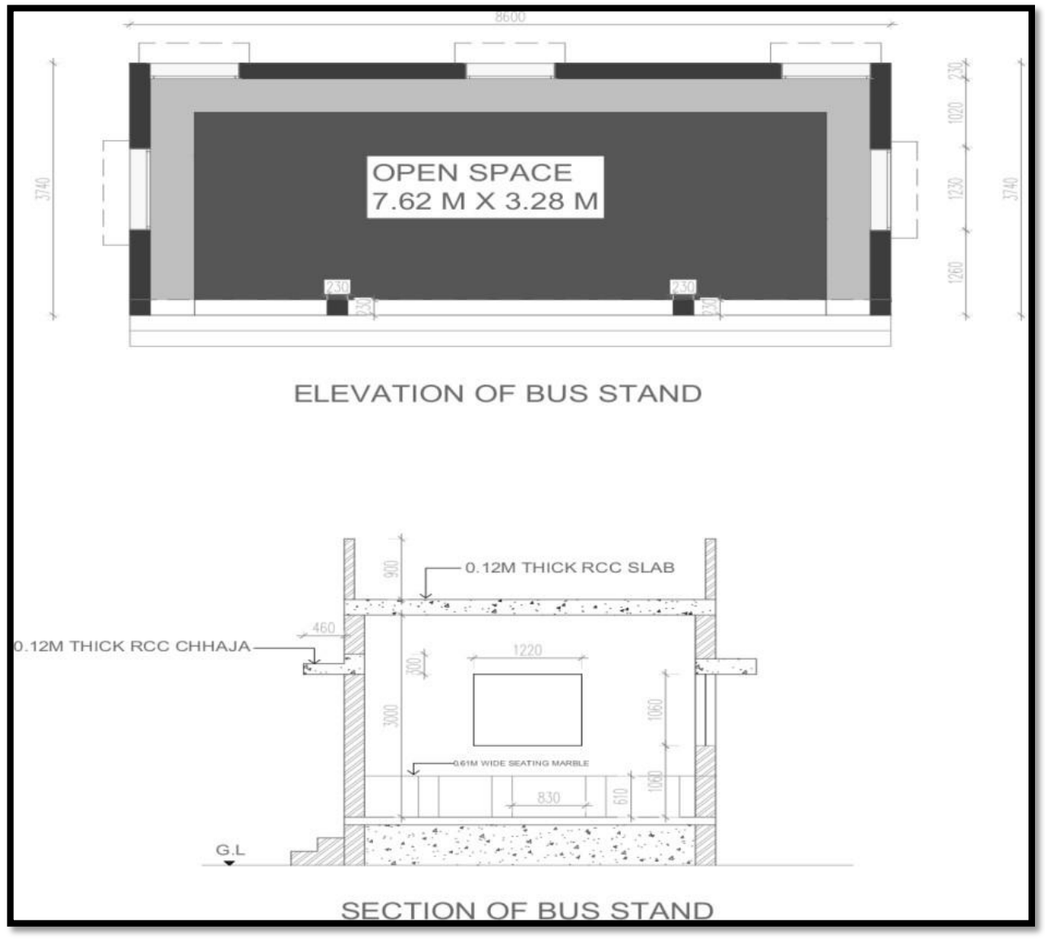
PLAN AND SECTION OF PUBLIC LIBRARY



ELEVATION AND SECTION OF BUS STAND

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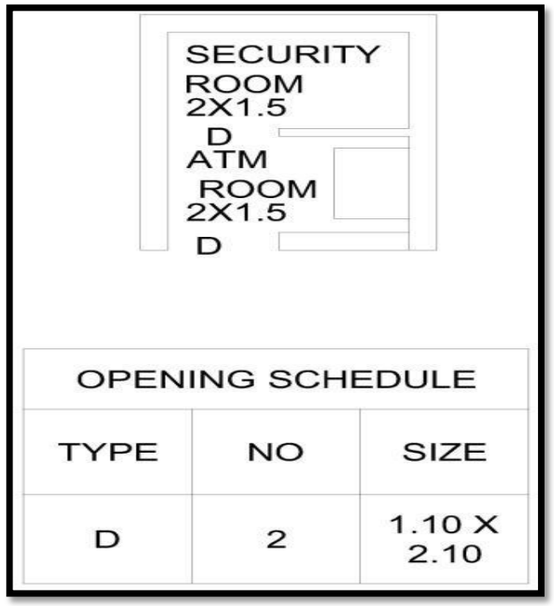

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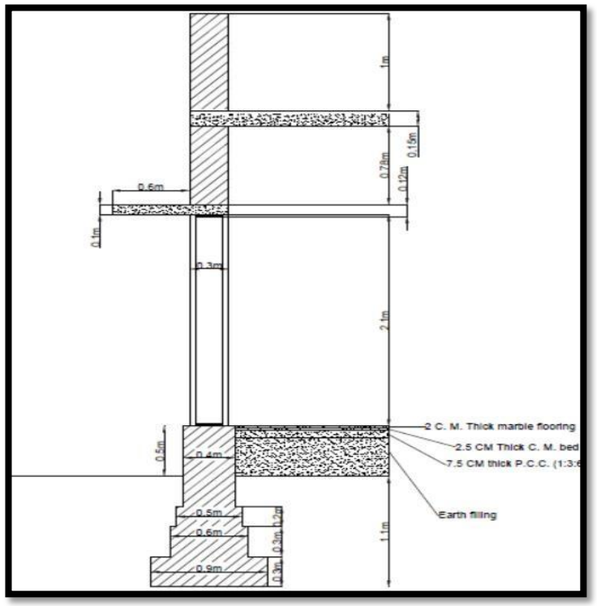

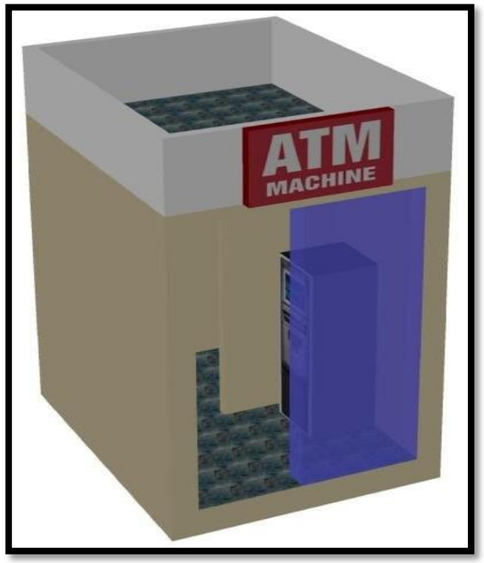

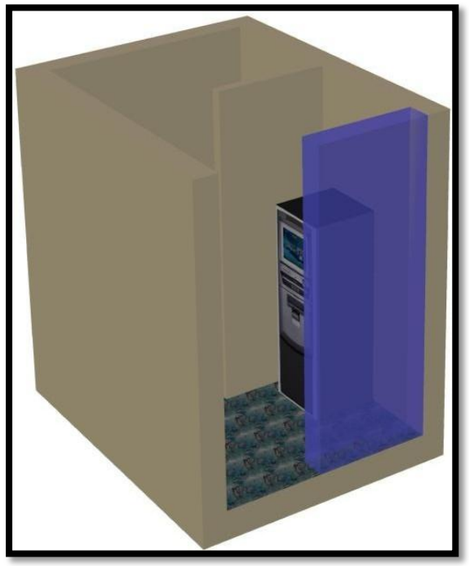

PLAN, SECTION AND 3D VIEW OF ATM MACHINE

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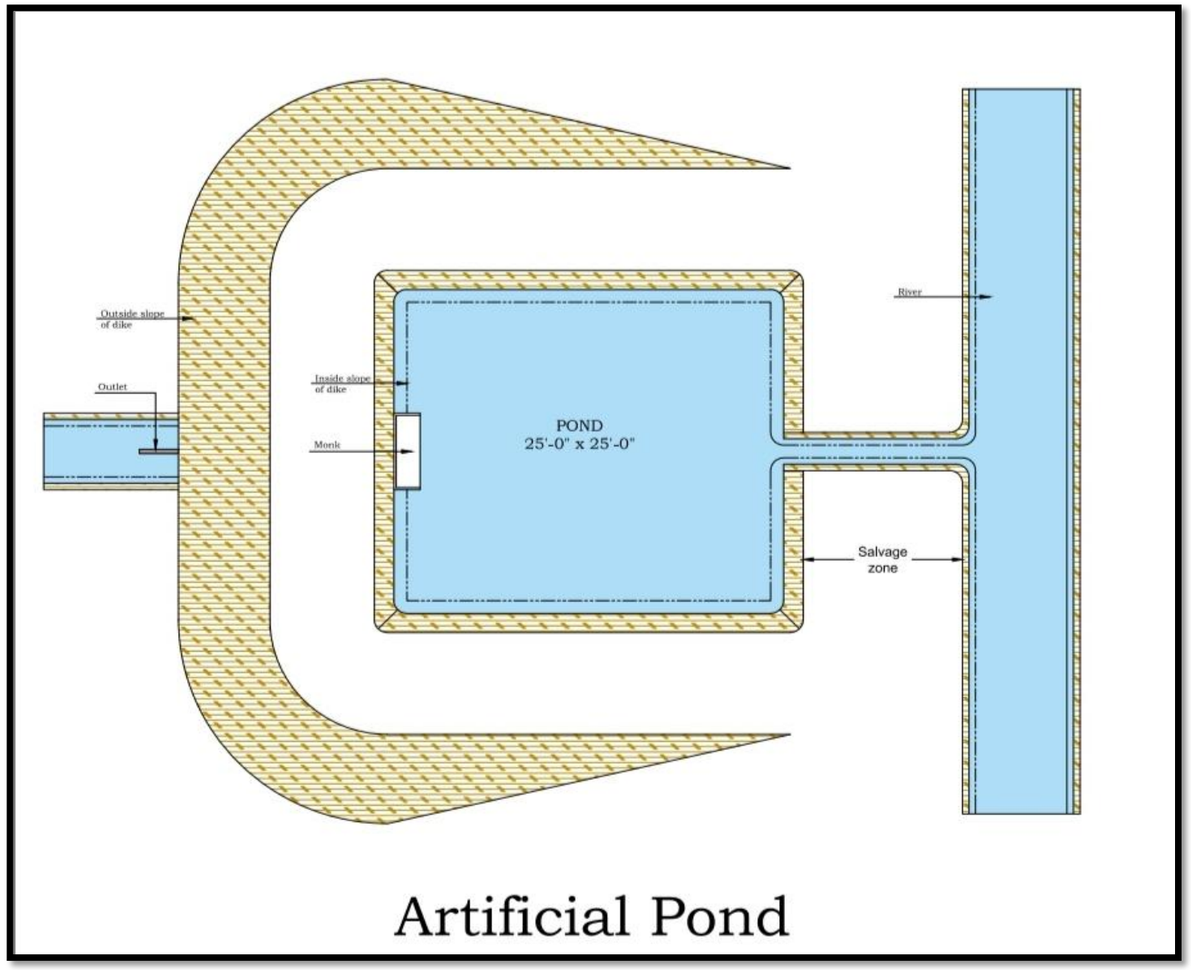

PLAN OF ARTIFICIAL POND

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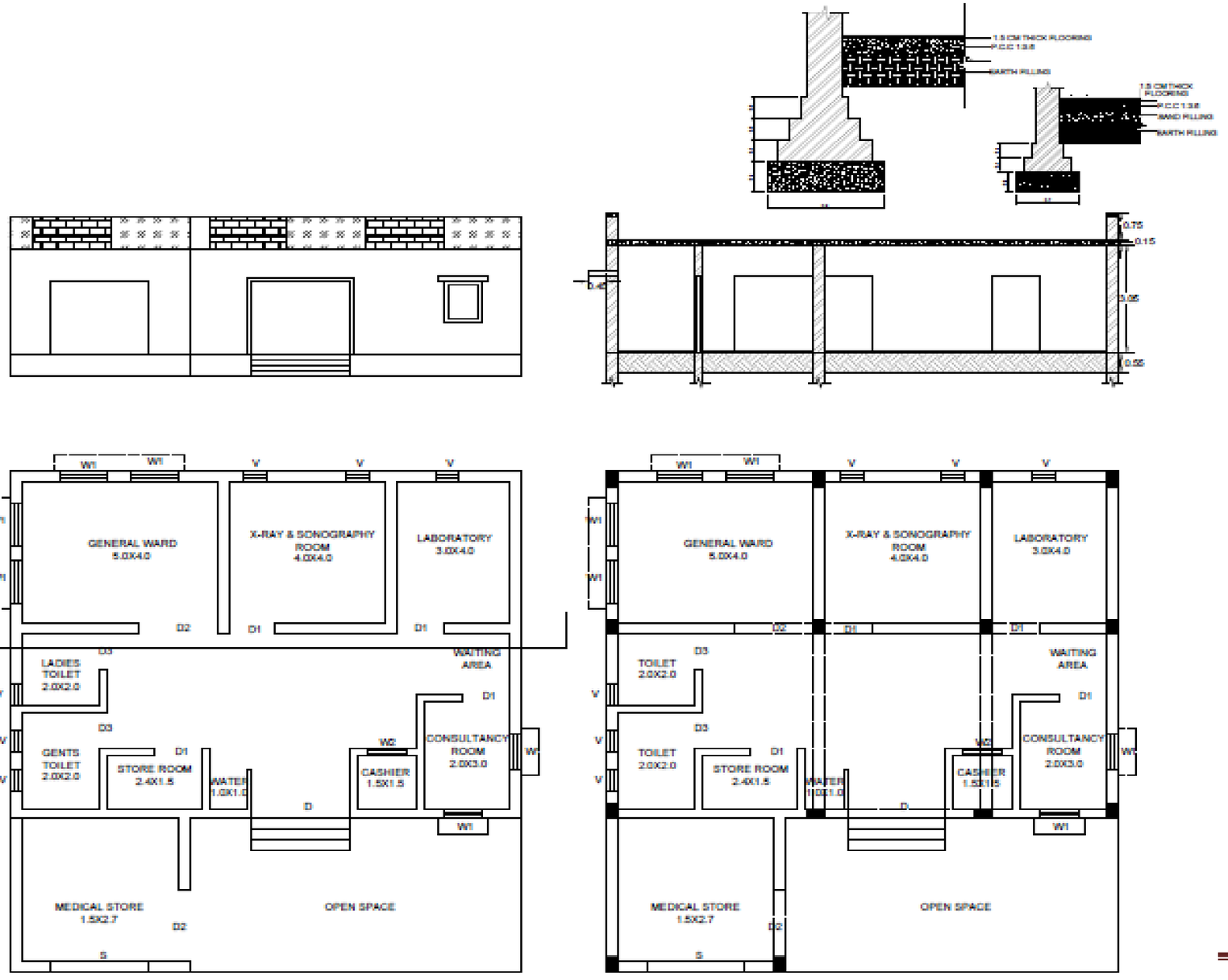

PUBLIC HEALTH CENTRE

DETAIL PLAN

PLAN, ELEVATION AND SECTION OF PRIMARY HEALTH CENTRE

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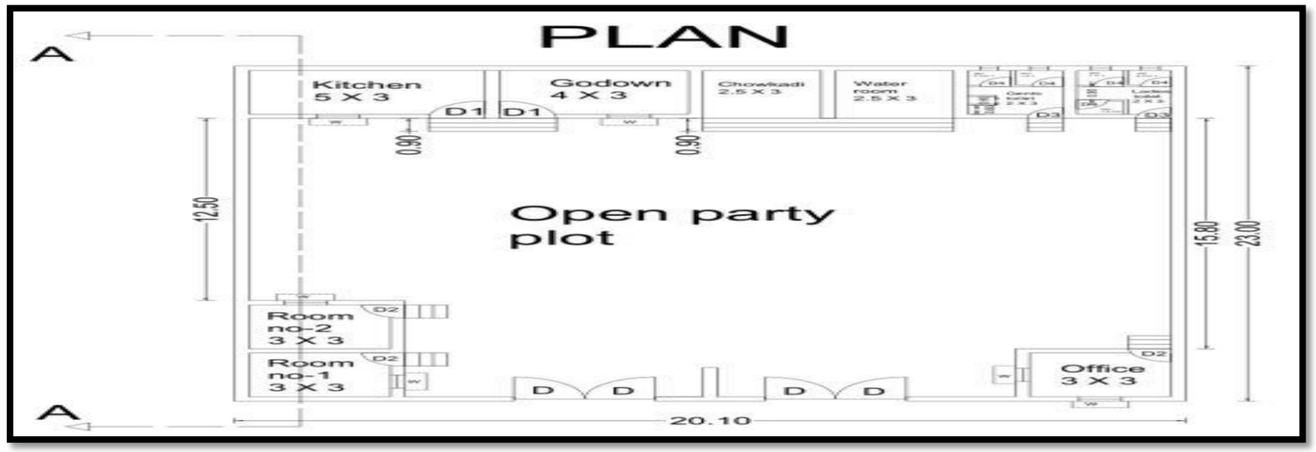

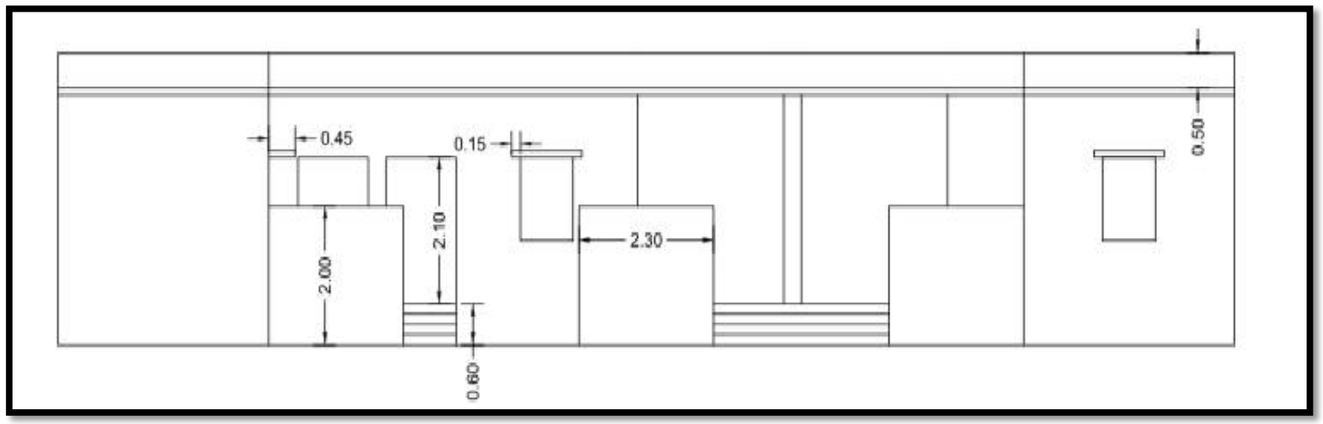

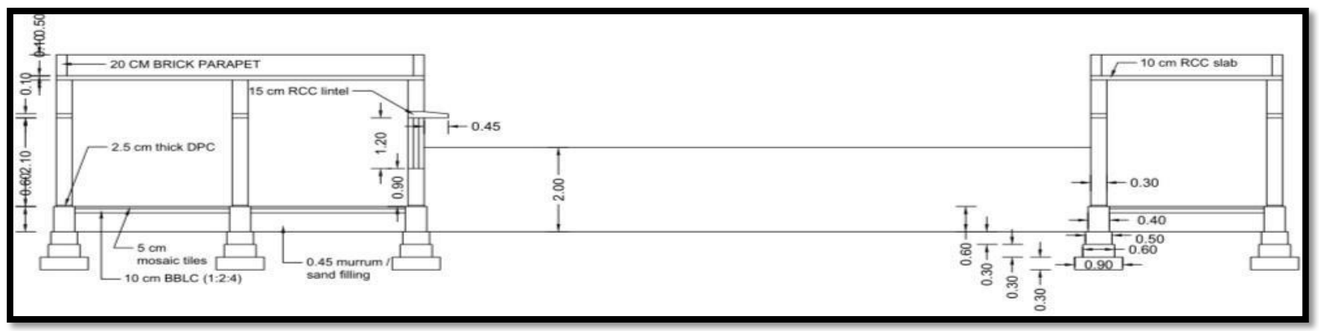

PLAN, ELEVATION AND SECTION OF OPEN PARTY PLOT

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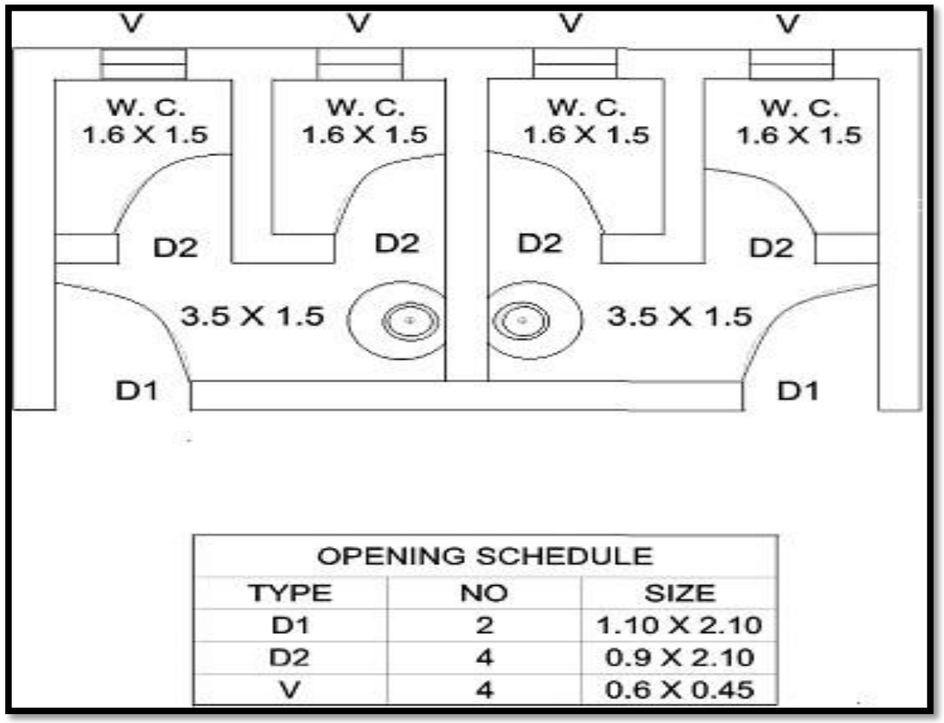

OPENING SCHEDULE		
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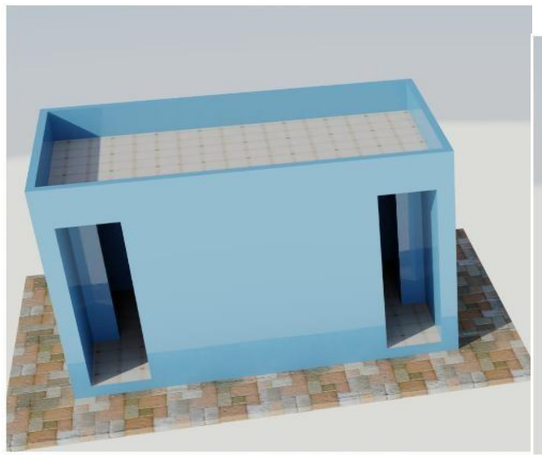
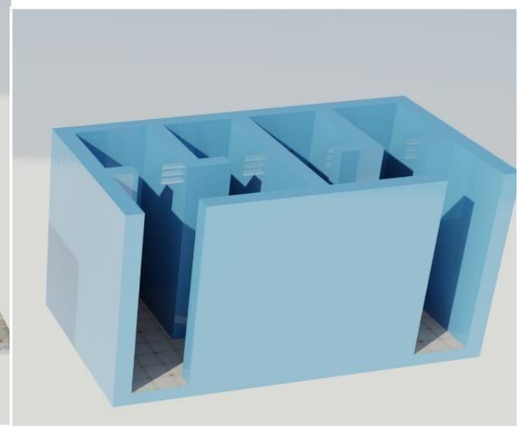
D2	4	0.9 X 2.10
V	4	0.6 X 0.45





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PLAN AND 3D VIEW OF PUBLIC TOILET