DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION
Nani Naroli Village

Surat District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
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BHAGWAN MAHAVEER COLLEGE OF ENGENEERING & TECHNOLOGY, SURAT.

NODAL OFFICERS NAME
ASST. PROF. DIXIT CHAUHAN

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad – 382424 Gujarat

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CERTIFICATE

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

Detail Project Report for,

VILLAGE: NANI NAROLI

DISTRICT: SURAT

Under

Vishwakarma Yojana: Phase-VIII

In partial fulfillment of the project offered by

GUJARAT TECHNOLOGICAL UNIVERSITY, CHANDKHEDA

During the academic year 2020-21.

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

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
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Internal(Evaluator) Guide Name and Signature:	**ASST. PROF. Dixit Chauhan**
College Name:	**Bhagwan Mahaveer College Of Engineering & Technology.**
College Stamp:	

ABSTRACT

Vishwakarma Yojana project is an initiative taken by Gujarat Technological University that aims at providing the village with basic amenities that are easily available in the urban areas to the rural ones. This provision helps the rural public to achieve a better living standard and curbs the wish of many to migrate in to urban areas. This helps in solving one of the major concern of the modern world – Over-loading of the urban areas. Migration of people causes many problems that includes crowded urban areas, increase in pollution, and increase in unemployment rate and so on. People having moved to urban areas with hope of better future suffers as they are not able to cope up their living with low wages.

The main purpose of our project is to develop the village with a 'rural soul' but with all urban amenities that a city may have, so that the villagers are able to enjoy the benefits of urban area. For this purpose only various infrastructure facilities are designed as per the village needs and URDPFI guidelines. For the similar purpose, case study on an ideal village is carried out, and then Gap Analysis of the village is performed. SWOT Analysis of the village is also carried out to ascertain the strength of the village which can be utilized to its full potential, weakness to be considered, opportunities that are waiting to be explored, and threat that we are needed to be beware of. Then the design process is carried out as mentioned above.

For this project, we have selected Nani Naroli village located in Mangrol taluka of Surat district. Our selected village is located at about 5 kilometer away from Tadkeshwar. Nani Naroli Gram Panchayat is located near the entrance of the village itself. The Panchayat works for two villages. One is the village- Nani Naroli itself, and the other is Surali village. Surali is connected to Nani Naroli by a 4 kilometer kachcha road. It is situated in a remote area and the village is a cluster with a meagre population of 521.

The village has 5 Anganwadis, 2 primary schools, 1 secondary school and 1 higher secondary school. It also has 2 overhead tanks and 3 underground sumps as well in main Nani Naroli village. The village has 1 lake whose water is used by the villagers to bathe cattle, wash clothes, etc. piped drinking water is supplied to the villagers. Overall village has underground drainage system. However, drainage system is not provided in Monghani Faliya in the village. Most of the village roads are bituminous roads. Few streets in the internal parts are unpaved. The main occupation of the villagers is agriculture and animal husbandry.

Both the villages Nani Naroli and Surali utilize underground water for domestic and irrigation purpose. To raise awareness regarding the depleting underground water level, we decided to propose rain water harvesting system. Keeping the cleanliness in mind, we proposed the design of public toilet. We even proposed village gate for all three entrances of the village. As per URDPFI guidelines, a community hall is to be provided over 10000 population. The current population of Nani Naroli exceeds 10000, hence we propose the design of community hall.

In the next phase of this project, we are planning to provide designs of biogas plant, library and other such structures.

Key words: Sustainable development, Village gate, Rural 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.

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

We express our sincere thanks to **Commissionerate of Technical Education, Gujarat State** for appreciating and acknowledging our work.

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

We are also thankful to our Principal **Dr. Vineet Goel** and faculties of our colleges for their encouragement and support to complete this project work.

An act of gratitude is expressed to our internal guide / Evaluator / Nodal Officer, **Mr. Dixit Chauhan from college Bhagwan Mahaveer College of Engineering & Technology** for their invaluable guidance, constant inspiration and active involvement in our project work.

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

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

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ABBREVIATIONS

SHORT NAME / SYMBOL	FULL NAME
NRHM	National Rural Health Mission
SSA	Sarva Shiksha Abhiyan
NREGA	National Rural Employment Guarantee Scheme
NRLM	National Rural Livelihoods Mission
MoRD	Ministry of Rural Development
MPLAD	Members of Parliament Local Area Development Division
RKVY	Rashtriya Krishi Vikas Yojana
CSS	Centrally Sponsored *Scheme*
PMAY	Pradhan Mantri Awas *Yojna*
SWOT	Strength Weakness Opportunities Threat
DGVCL	Dakshin Gujarat Vij Company Limited
LEDs	Light-Emitting Diode
SAGY	Saansad Adarsh Gram Yojana
JGSY	Jawahar Gram SamridhiYojana
NOAPS	National Old Age Pension Scheme
NFBS	National Family Benefit Scheme
HRIDAY	Heritage Development and Augmentation Yojna
ICT	Information and Communication Technology
MaaS	Mobility as a Service
HPEC	High-Power Expert Committee
IPNM	Integrated Plant Nutrient Management
NVBDCP	National Vector Borne Disease Control Programme
NLEP	National Leprosy Eradication Programme
RNTCP	Revised National Tuberculosis Control Programme
DOTS	Direct Observed Treatment Short course
NCD	Non-communicable Disease
ANM	Auxiliary Nurse Midwife
LHV	Lady Health Visitor

Chapter 1 Ideal village visit from District of Gujarat State

1.1 Background & Study Area Location

Despite accelerating advances in science and technology, inequities across and at intervals societies globally stay at unbearably high levels. Over seventieth of the world's poorest people sleep in rural areas wherever basic human desires are unmet. Massive populations still live while not access to electrical power (1.2 billion people), clean water (more than 700 million people), sanitation (2 billion people), basic healthcare, and education.

The Ideal Village program may be a holistic, integrated and cooperative technology plat for designed to introduce alternate energy, education/vocational coaching, healthcare, property agriculture, water/waste management systems, and rural entrepreneurship to form self-sustainable, economically viable and healthy village communities.

We visited Baben village near Bardoli for ideal village visit. Baben is a village in a Bardoli Taluka of Surat District. It is situated 1 km away from Bardoli. It has population of 15610 as per census of 2011. Baben has received Best Gram Panchayat award. The Baben village marked by swanky roads, high literacy, internet connectivity, all types of basic as well as modern amenities. Baben has surely come a long way to redefine what villages in the country can be. Besides having achieved development on economic parameters, it has also developed socio economically.Falguniben Patel is the Sarpanch of the Baben village and Bhaveshbhai Patel is Deputy Sarpanch.

Figure 1 Basemap of Baben Village

Table 1 Baben Population Data

Population	**15,610**
Male	8,642
Female	6,968

Children population	2,122
No. of households	3,146
Sex-Ratio	806
Literacy	75.70 %
Male Literacy	82.55 %
Female Literacy	67.18 %
Schedule Tribe (ST)	14.48 %
Schedule Caste (SC)	12.12 %

1.2 Concept: Ideal Village

1.2.1 Objectives

➢ **Villagers or Inhabitants:** A village is formed, governed and maintained by its villagers.

❖ **Basic Infra-structures:**

- Good Connectivity
- Houses
- Sufficient sources of potable water
- Proper sanitation and drainage facilities
- Cottage Industries
- Pasture land for cattle
- Wholesale market within the village
- Healthcare Centres and hospitals
- Educational facilities

1.2.2 Example / Live Case studies of ideal village of India/Gujarat Punsari (Gujarat)

Punsari is located approximately 80 kilometres away from the state cap-ital of Gandhinagar in Gujarat. It has had phenomenal success in the past decade under the leadership of a visionary and missionary Sarpanch (village headman) Mr. Himanshu Patel (who served as the Sarpanch from 2006 to 2016). The village has received several awards from the state as well as national government for its outstanding achievements and has be-come extremely popular across the country. The village has 23 communities with a population of 6000, including only 350 people living below the poverty line. Most of the people in the village are dependent on agriculture and milk production for livelihood. The major crops cultivated in the village are cotton, wheat, and potato.

This village offers Wi-Fi connectivity, air-conditioned primary schools equipped with CCTV cameras and cooks preparing midday meals. All the streets in the village have concrete roads, people get chilled mineral water for drinking and there is an independent public transport system.

The village is now readying for a high-profile visit of the additional secretary of the Union government to study this model so that it can be replicated across 640 districts in India. Punsari has won national as well as state awards for Best Gram Panchayat in 2011.

Punsari makes a perfect case study as the village has not benefitted from NRIs and has instead relied solely on funds from central and state-sponsored developmental schemes in the past eight years. The village panchayat pays an annual premium of Rs 25 lakh against insurance for each of the 6,000 villagers who have a cover of Rs 1 lakh and a mediclaim policy of Rs 25,000. The schools have zero dropout rates since 2006 and a reverse osmosis plant supplies 20-litre cans to houses for a token amount of Rs 4.

The village panchayat had a capital of Rs 25,000 seven years ago. Today, the deposits have soared to Rs 45 lakh. “The model can be easily replicated in India. It only takes smart planning, dedicated people participation and a non-corrupt system,” says Patel.

1.2.3 The Idea of a model/Smart Village

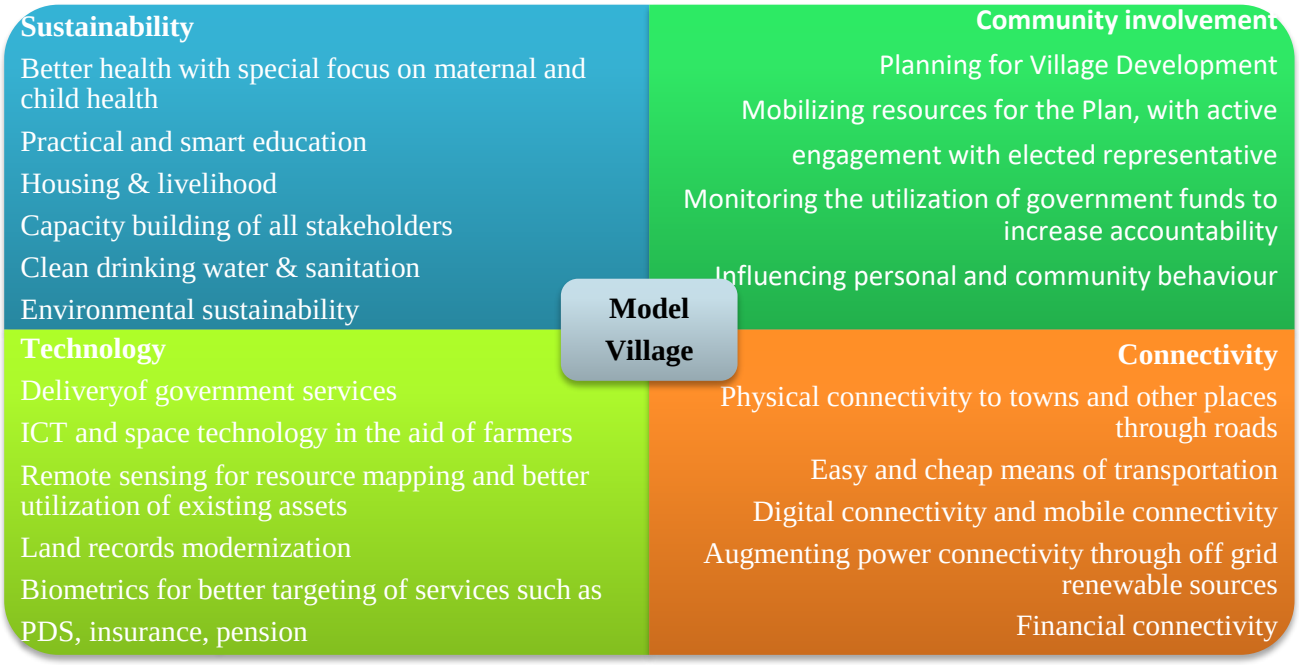


Figure 2 Key elements of ideal village

A progress of one of Key elements of ideal village Key elements of ideal village these areas could have an effect across other areas as well. For example, technology could be used to improve the quality and delivery of other services such as health, education and farming, which in turn contributes to sustainable development. Similarly, the use of renewable energy, apart from meeting energy needs, also contributes towards environmental sustainability. Village tree plantation drives could encourage community participation, benefit the environment, prevent soil erosion and benefit agriculture, conserve water, and finally contribute to the aesthetics of the village. A number of these initiatives have already been taken in different parts of the country, but most of them have been attempted in isolation. The urgent need is to bring about a convergence of all such initiatives, for which 2 things would be essential,

a) Grass roots level planning; and b) mobilization of resources.

Resources available in Ideal Village

1. **Funds under existing schemes** across various sectors such as health, education, skill development, livelihood etc. could be utilized, and based on the specific demands of the village; resources could be channelized into the development of the village. Some important Centrally Sponsored Schemes (CSS) which could be utilized are NRLM, NHM, SSA, NREGA, BRGF, RKVY and Mid-Day Meal Scheme.
2. **MPLAD** funds (Rs 5 crore per year) could be utilized for the construction of high quality, sustainable assets such as school buildings, hospitals, Anganwadi Centers and school kitchens for Mid-Day meals. Funds could also be channelized into road construction, and the construction of toilets in schools and homes, particularly for girls.
3. **CSR** funds, of which a much larger corpus is available after the latest amendment to the Companies Act, could also be used for the purpose of infrastructure development in the constituency.
4. **Self-help groups**, who are eligible for subsidized loans under various Central and State government initiatives

5. **Gram Panchayats** could also raise loans, if legally permitted to do so under the State Panchayati Raj Acts like in the case of Kerala.

1.2.4 Ancient History Civil / Electrical concept about Indian Village / Foreign Countries Perspective and its Development

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

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

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

The development of Village India, for Gandhi, was the development of India. Illiteracy, ignorance, and poverty characterized the vast population of rural India.

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

The village in India, where life was once portrayed as 'unchanging' and 'idyllic', has in recent decades seen profound changes. The twin shackles that once decided matters for India's villagers, caste and agriculture, no longer exercise their vigorous hold. While a break in caste rigidities has fostered greater fluidity in occupational choices, agricultural stagnation has ensured the constant march, in increasing numbers, of employable people in the villages towards urban areas. At the same time, vote bank politics means that parties and politicians continue to pay lip-service to the cause of villages, chiefly the poor farmer. It is in the light of these changes that the 'culture' surrounding agriculture and the village needs to be understood. While this culture is not altogether a stable one, its state of pronounced flux does hold out certain portents, whether these are understood by policy-makers and the vast majority of Indians, remains open to question.

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

❖ Physical & Demographical Growth

Baben village has a population of 15610 in 2011 which was 8377 in 2001.There are 8642 Males and 6968 Females. Total households are more than 4107. Physical growth of village is due to real estate developers, who come to develop land and houses in the village and use that money to develop basic amenities for the residents of the village. The panchayat of village collected Rs 3 crore in the past five years from real estate developers and used that money on roads, street lights, lake, public toilets, drainage and water system for the 15,000 people of Baben. The village also has a degree and diploma engineering college, a school and a restaurant.

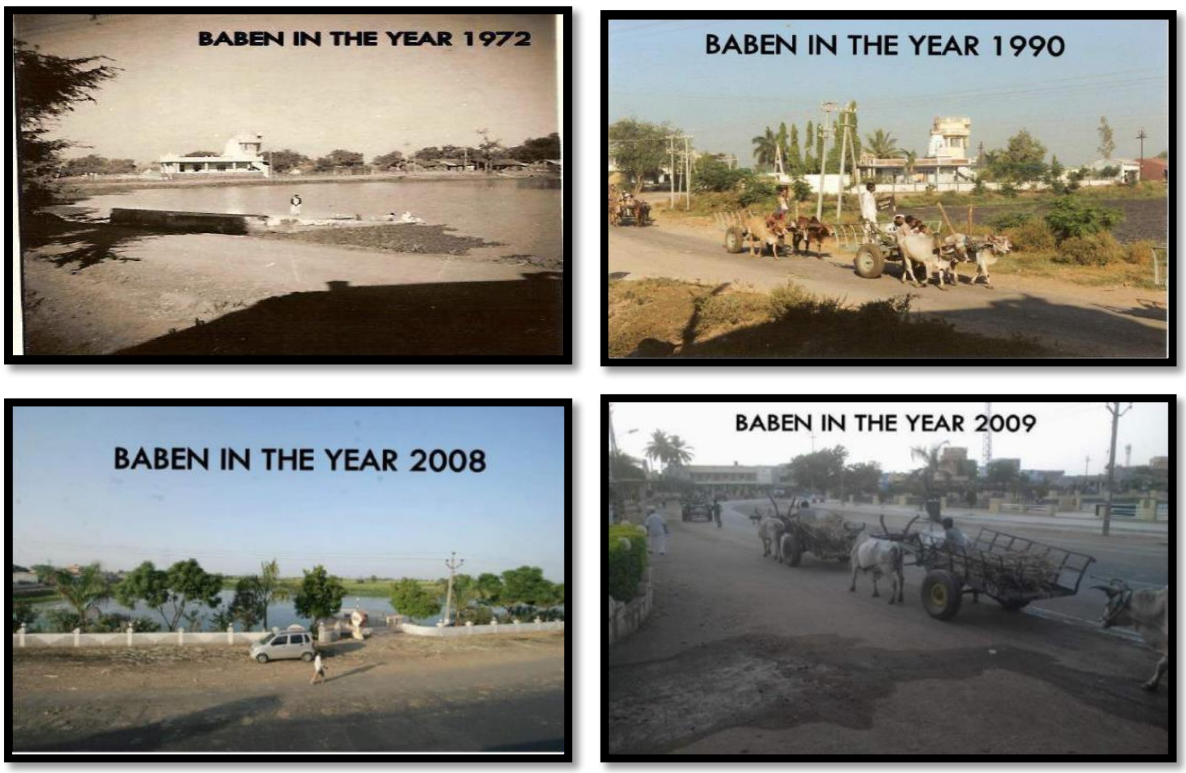


Figure 3 Physical Growth of Baben (From 1972 to 2009)

Figure 4 Baben in year 2020

❖ Economic profile

The main economic activity of the village is agriculture. A big sugar factory & higher educational facilities are available for better employment. Due to self-reliance, new development of residential area is taking place. Sufficient employment is available for LIG and EWS people who are engaged in the maintenance and cleaning of gram panchayat.

❖ Social scenario /profile

The Baben town has population of 15,610 of which 8,642 are males while 6,968 are females as per report released by Census India 2011. Population of Children with age of 0-6 is 2121 which is 13.59 % of total population of Baben (CT). Female Sex Ratio is of 806 against state average of 919. Moreover, Child Sex Ratio in Baben is around 822 compared to Gujarat state

average of 890. Literacy rate of Baben city is 75.70 % lower than state average of 78.03 %. Male literacy is around 82.55 % while female literacy rate is 67.18 %.Baben has total administration over 3,146 houses to which it supplies basic amenities like water and sewerage. It is also authorize to build roads within Census Town limits and impose taxes on properties coming under its jurisdiction. Out of total population, 6,628 were engaged in work or business activity. Of this 5,152 were males while 1,476 were females. In census survey, worker is defined as person who does business, job, service, and cultivator and Labour activity. Of total 6628 working population, 89.85% were engaged in Main Work while 10.15 % of total workers were engaged in Marginal Work.

❖ Infrastructures facilities (All Types)

- **Drinking water facilities:**

Ground water is the main source of drinking water in Baben. RO plants and Chlorination process are used to treat the water. To lift the water from ground water resources, tube wells and wells are used. This water is supplied to nine overhead water tanks after treatment. Water is provided in households for 6 hours daily. All the houses have taps through which they utilize water.

- **Drainage Facility:**

For the disposal of waste water there is a drainage system in the village. Waste water is disposed by closed conduit network. These conduits dispose water into Septic tanks. Each Faliya of village has separate Septic tank. After treatment of the water in septic tank it is disposed in Khadi.

- **Transport Facilities:**

There are many public transportation facilities available nearby village. Like Railway station is situated at 0.5 km away from village (Bardoli Railway Station). Bus station is also 1.5 km away. All the roads are RCC roads. And all the Faliya roads are of CC blocks. For local transportation there is facility of Auto rickshaws and taxi cabs. All of this makes transportation in village easy and painless.

- **Sanitation facilities:**

All the houses of village have private toilet blocks. Waste water from toilets is collected in Septic tank and disposed in Khadi. There are eight public toilets provided in the village. These public sanitation blocks also consist of bathrooms. All the blocks are in good condition. It can be seen from this that the village put heavy emphasis on swachhta of village.

- **Electricity Distribution:**

There is 24x7 electric power supply provided in village by DGVCL (Dakshin Gujarat Vij Company Limited). For agricultural use 8-hour power supply is provided. Village have street lights on each and every major and minor road, some of the street lights have LEDs and remaining will be changed by LEDs soon.

- **Irrigation facilities:**

Main source of irrigation in village is ground water. Farmers use tube wells to lift the water from ground.

❖ Social Infrastructural facilities:

Social Infrastructure facilities like Health, Education etc. are available in village.

- **Education Facilities:**

Village has very good education facility. There is one Government primary school and four private primary schools, three secondary schools, two higher secondary schools with 6 play grounds. For higher education there is Diploma College, Engineering College, Medical College, and Polytechnic College. The village youth can get necessary education in the village itself and there is no need to migrate to city for good quality education.
The infrastructure and buildings for these facilities are in very good condition as well and it can be seen how much emphasis was put on the education of village children.

Figure 5 Primary School of Baben Village

- **Health Facility:**

Village has 2 sub centers, Government Hospital, Maternity Homes Also there are private hospitals within 1 km in Bardoli. So the villagers can get benefit of all high technology in medical field and get treatment for even serious illnesses. Which makes sure that everyone can get timely medical help if need ever arises.

❖ Socio-cultural Facilities:

There are four community halls (without TV), One Public Library, Two Gardens, Village pond, Recreation center, Post Office, General, Market, Panchayat Building, Medical shop, Bank & ATM Facility, Agricultural cooperative Society, Internet Café are also available in village.
All above things are in Proper working condition and Regularly Repair and Maintenance was also carried out.

1.4 SWOT analysis of ideal village

Figure 6 SWOT Analysis

1.5 Future prospects of Development of the Ideal Village

- Village has very good agriculture and irrigation facilities which is going to increase its crop production and due to which revenue of people increases which leads to prosperity of village
- Sugar factory is also playing important role in growth of village which attracts revenue from other villages
- Use of renewable energy sources is required to attain sustainability
- Village has very excellent scope of global partnerships
- Drainage system has been improving in a regular bases

1.6 Benefits of the visits of Ideal village / Smart Village

- By this village visit we got the idea about how a village can be developed
- How to utilize resources in proper manner for the prosperity of village
- We also learned what is necessary in a village to make it ideal
- By the discussion with sarpanch, we got knowledge regarding different government Schemes
- We interacted with the people of village and discussed about their comfort and needs

- By this village study we can implement ideas and innovations for the development of Village which we have taken
- Bhaveshbhai Patel who is Deputy Sarpanch of village and played a lead role in the development of village, he set an example how an undeveloped village can become the ideal village and he explained us in detail about village.

Figure 7 Visit of Deputy sarpanch and Talati of Baben

Figure 8 Lake of Baben Village

1.7 Civil aspects required in Ideal village / Smart Village

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

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

for domestic use and to house their cattle. The village lanes and streets will be free of all avoidable dust. It will have wells according to its needs and accessible to all. It will have houses of worship for all, also a common meeting place, a village common for grazing its cattle, a co-operative dairy, primary and secondary schools in which industrial education will be the central fact, and it will have Panchayats for settling disputes. It will produce its own grains, vegetables and fruit, and its own Khadi. This is roughly my idea of a model village. In the present circumstances its cottages will remain what they are with slight improvements. Given a good zamindar, where there is one, or co-operation among the people, almost the whole of the programme other than model cottages can be worked out at expenditure within means of the villagers including the zamindar or zilladar, without Government assistance. With that assistance there is no limit to the possibility of village reconstruction. But my task just now is to discover what the villagers can do to help themselves if they have mutual co-operation and contribute voluntary Labour for the common good.

I am convinced that they can, under intelligent guidance, double the village income as distinguished from individual income. There are in our village's inexhaustible resources not for commercial purposes in every case but certainly for local purposes in almost every case. The greatest tragedy is the hopeless unwillingness of the villagers to better their lot.

The very first problem the village worker will solve is its sanitation. It is the most neglected of all the problems that baffle workers and that undermine physical well-being and breed disease. If the worker became a voluntary Bhangi, he would begin by collecting night-soil and turning it into manure and sweeping village streets. He will tell people how and where they should perform daily functions and speak to them on the value of sanitation and the great injury caused by its neglect. The worker will continue to do the work whether the villagers listen to him or no.

" India Lives In Its Village"stated by Gandhiji himself tell us that if you want to develop the nation , you must start from village level development in which major agriculture part of India contributes to main concern for us is agricultural land , education , employment and technology and research.

Chapter 2 Nani Naroli Literature Review – (Civil Concept)

2.1 Introduction: Urban & Rural village concept

Urban

- All places with a municipality, corporation, cantonment board or notified town area committee, etc. (known as Statutory Town)
- All other places which satisfied the following criteria (known as Census Town):
- A minimum population of 5,000;
- At least 75 per cent of the male main workers engaged in non-agricultural pursuits
- A density of population of at least 400 per sq. km.

Rural

In general, a rural area or countryside is a geographic area that is located outside towns and cities. The Health Resources and Services Administration of the U.S. Department of Health and Human Services defines the word rural as encompassing "...all population, housing, and territory not included within an urban area. Whatever is not urban is considered rural.
Typical rural areas have a low population density and small settlements. Agricultural areas are commonly rural, as are other types of areas such as forest. Different countries have varying definitions of rural for statistical and administrative purposes.

Table 2 Criteria of Rural Area

Criteria	Main features
Urban structure	lower building density, agricultural settlement, extensive public spaces, low ratio of built-up areas
Architectural features	Low-rise buildings, integration of residential and other functions, absence of rental housing, individual buildings
Social features	Conservatism, traditionalism, neighbour relations, participation, cooperation, sharing common history.
Economic features	Commuting to work, agricultural employment, higher ratio of subsistence, DIY
Public administration	Designation of the municipality, position of the municipalities in the public administration structure
Size features	Number of inhabitants, population density, area, ratio of built-up-space

2.2 Importance of the Rural development

The urban areas are mostly affiliated with all the infrastructure facilities. It is the rural area which still lacks even the most basic infrastructure amenities like primary school, public toilet block, drainage network, road network and many more. Some of the amenities are evident in the rural areas while some are not. Therefore, rural areas should be more focused upon while

allocating infrastructure designs and care should be taken that the norms are implemented strictly.

2.3 Ancient Villages / Different Definition of: Rural Urban Villages

United States Census (2000 census) defines rural areas as comprising open country and settlements with fewer than 2,500 residents (population/administrative-based); areas designated as rural can have population densities as high as 999 per square mile or as low as 1 person per square mile (population/land use-based). A village is a clustered human settlement or community, larger than a hamlet but smaller than a town, with a population ranging from a few hundred to a few thousand. Though often located in rural areas, the term urban village is also applied to certain urban neighbourhoods. Villages are normally permanent, with fixed dwellings; however, transient villages can occur. Further, the dwellings of a village are close to one another, not scattered broadly over the landscape, as a dispersed settlement. In most parts of the world, villages are settlements of people clustered around a central point. A central point is most often a church, marketplace, or public space. A public space can be an open space (sometimes called a village green), or developed square (sometimes called a plaza or piazza). This type of village organization is called a nucleated settlement. Some villages are linear settlements. They are not clustered around a central public space, but around a line. This line can be natural, such as a river bank or seashore. (Fishing villages are often linear settlements.) Linear settlements can also develop around a transportation route, such as a railroad line.

2.4 Scenario: Rural / Urban village of India population Growth

Table 3 Census of 2001 and 2011

	2001	2011
India	102.9	121.0
Rural	74.3	83.3
Urban	28.6	37.7

- For the first time since Independence, the absolute increase in population is more in urban areas that in rural areas
- Rural – Urban distribution: 68.84% & 31.16%
- Level of urbanization increased from 27.81% in 2001 Census to 31.16% in 2011 Census
- The proportion of rural population declined from 72.19% to 68.84%
- The slowing down of the overall growth rate of population is due to the sharp decline in the growth rate in rural areas, while the growth rate in urban areas remains almost the same
- Literacy rate is increased to 74% in 2011 from 64.8% in 2001. The improvement in literacy rate in rural area is two times that in urban areas
- The rural urban literacy gap which was 21.2 percentage points in 2001, has come down to 16.1 percentage points in 2011
- Improvement in female literacy is more than males in both rural and urban areas
- The gender gap in literacy has come down from 24.6 in 2001 to 19.8 in 2011 in rural areas and from 13.4 in 2001 to 9.8 in 2011 in urban areas.

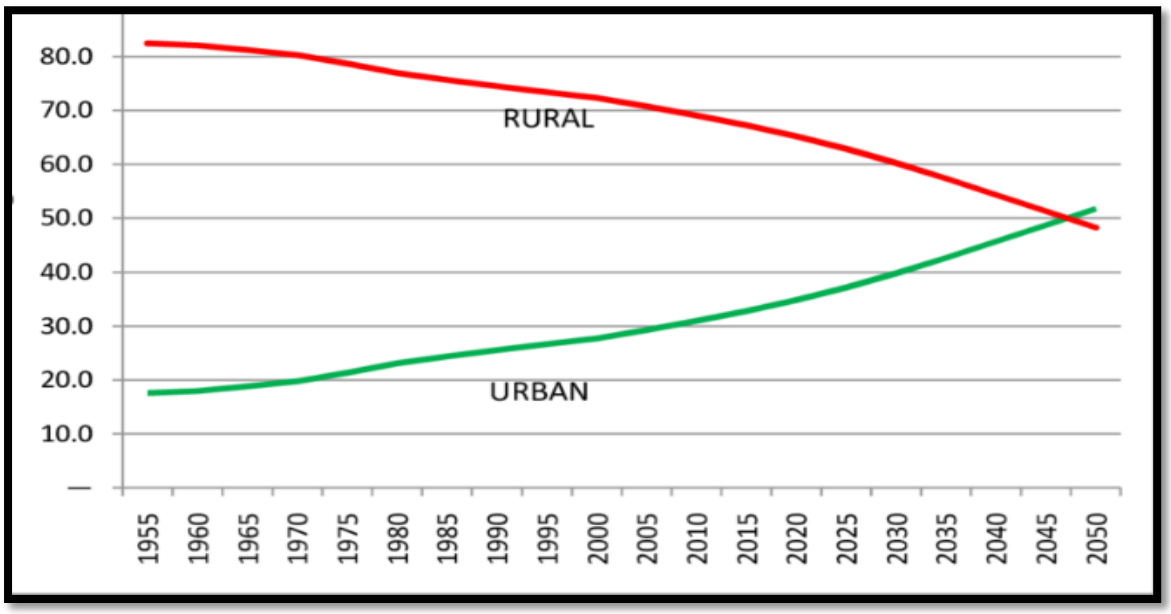


Figure 9 Urban and Rural populations in India (%):1950 to 2050

Urban Unit (or Town):

Table 4 Comparison of census

	2001	2011	Increase
Towns	5161	7935	2774
Statutory Towns	3799	4041	242
Census Towns	1362	3894	2532

Rural area (Village)

Areas which are not categorized as urban area are considered as Rural Area.

Number of Rural Units (or Villages) in India:

Table 5 Rural area of India

	2001	2011	Increase
Villages	6,38,588	6,40,867	2,279

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

Table 6 Census of Gujarat

	2001	2011	% Increase
Gujarat	50,671,017	60,439,692	19.28
Rural	31,740,767	34,694,609	9.30
Urban	18,930,250	25,745,083	36

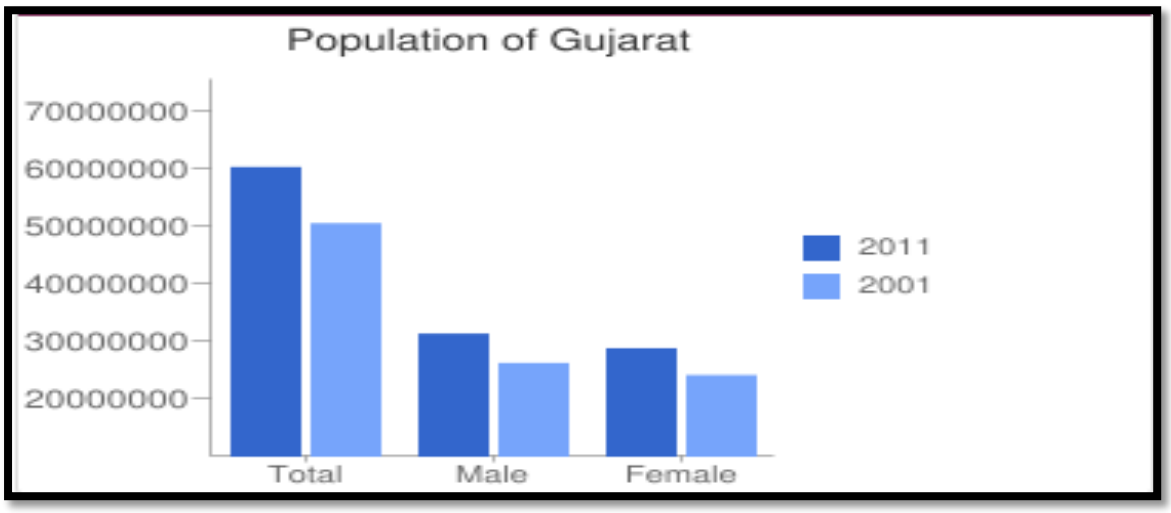


Figure 10 Gender vise Population

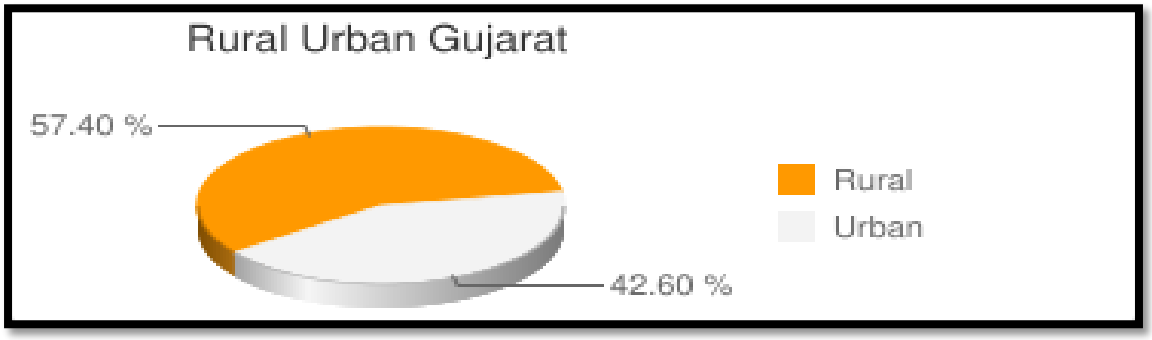


Figure 11 Rural & Urban Population

- Rural – Urban distribution: 57.40% &42.60%
- Level of urbanization increased from 37.36% in 2001 Census to 42.60% in 2011 Census.
- The proportion of rural population declined from 62.64% to 57.40%
- The slowing down of the overall growth rate of population is due to the sharp decline in the growth rate in rural areas, while the growth rate in urban areas remains almost the same.
- Literacy rate is increased to 78.03% in 2011 from 58.86% in 2001.

2.6 Rural Development Issues - Concerns – Measures

- poverty
- unemployment
- Lack of Education
- Lack of health facility
- Unavailability of public transport
- Inequality among people
- Lack of awareness about government schemes

❖ **Crime Free / Dispute free**

Mahatma Gandhi Dispute-Free Village Mission

The project has been able to evolve the necessary conditions of leadership and people's participation which has contributed in creating an environment for collaboration to sustain peace and harmony in the villages. The initiative has been successful in creating a forum for the police to engage with citizens and be partners in the change process. The project has the ability to replicate especially for the States where the law and order is a matter of concern with respect to the limited resources of managing the ground conditions. The initiative focuses on formation of a committee at the village level with 45 members which includes around 30-35% women. The village level committee should have representation from all communities and sects in the village. The chairperson and member secretary of the committee are selected by the gram panchayat. For the purpose of implementation, there are committees set up at State, district, tehsil and village level which review the progress. There is a district and village level committee which enforces the programme. The villages performing well on resolving disputes and maintaining peace and harmony are rewarded by the State government.

Some Crime Free and Dispute Free Gram Panchayats of India Sihoda gram panchayat

No sort of crime has been reported since the year 2015 in any police station, in Gram Panchayat of Jabalpur district. Alcohol prohibition is fully implemented in Panchayat and nobody consumes liquor. This is Sihoda gram panchayat of Jabalpur district and Meerabai Parshuram Patel is its sarpanch. Special Gram Sabha was held in Sihoda Gram Panchayat under 'Gramoday Se Bharat Uday' campaign. Additional Chief Secretary Deepak Khandekar and collector, Jabalpur, Maheshchandra Chaudhary participated in gram sabha. Sarpanch informed that two villages of Gram panchayat are crime-free, addiction-free and open defecation free. Gram panchayat has social harmony and there is no practice like untouchability prevailing there.

Chetar Village

The village named Chetar (Ramgadh district, Jharkhand) sets an amazing example for the rest of the country. Since Independence not a single police case has been filed from this village in any of the police stations around. This tiny village having population of around 1000 people has around 35 teachers. Any local issues that crop up in the village are resolved in the village Panchayat.

All the villagers respectfully abide to the Panchayat decisions which are always taken with general agreement of all the people. For the fine collected from those found guilty is kept in a joint account and used for the public affairs of the village or helping the less fortunate ones (like bearing the cost of marrying daughters of the poor).

The village is now coming forward as an ideal role model with techniques to be adopted at other places. This is creating general interest in academicians as well. Recently a team of students from Saint Zavier's College of Ranchi and one of the institutions in London visited the village to study their model. Though it is little bit off from Ramgadh district headquarters, the roads are developed enough for a four wheeler to pass through with ease. There are no pot holes anywhere and the drainage system of the village runs completely underground. The youth of the village take turns to keep the surroundings cleaned and tidy.

The village is alcohol free. No villager ever drinks alcohol, be it a festive occasion or something stressful happening in their lives. The villagers belonging to wide range of castes, including Mahato, Munda, Bediya, Karmali, Muslims, Thakur, Kumbhar; stay together as a family. The people of this village even actively participated in freedom movement against the Britishers, said 80 year old Tularam Mehato. Even the Police officer Ranjit Kumar Prasad has high regards for the people of Chetar village. He is full of appreciation for them as all the issues are solved

in the Panchayat amicably and the village has done a commendable job of not having any crime record against them post- Independence.

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

Norms for provision of different infrastructure facilities for Villages are as written below:
Facilities to be provided are decided based upon Planning Commission/UDPFI Norms given as below,

- **Social infrastructure Facilities** that are to be provided in village based on village population are, Anganwadi per 2500 population, Primary school per 2500 population, Secondary school Per 7500 population, Higher secondary school per 15000 population.
- **Medical Facility** that are to be provided in village based on village population are, Govt. /Panchayat Dispensary or Sub PHC or Health centre per Each Village, PHC & CHC per 20,000 population, Child welfare& Maternity home per 10,000 population, Hospital per 100,000 population.
- **Public latrines** are to be provided 1 for 50 families (if toilet is not there in home, especially for slum pockets & kutcha house)
- **Physical Infrastructure Facilities** that are to be provided in village based on village population are, each village should be Pucca village.
- **Approach road** of village should have Bus/Auto Stand provision, all villages should be connected by PT (ST Bus or Auto).
- **Drinking water** of Minimum 70 Ipcd should be provided, where water from Overhead tank should be 1/3 of total demand and from U/G pump should be of 2/3 of total demand.
- **Socio-Cultural Infrastructural Facilities** that are to be provided in village based on village population are, Community Hall per 10000 population, Community hall cum Public Library per 15000 population, Cremation ground per 20000 population, Post Office per 10000 population, Gram Panchayat Building per Each individual/group panchayat, APMC per 100000 population, Fire Station per 100000 population, Police post per 40000 population.

2.8 Ancient / Existing Civil concept Literature Review for village Payvihir, Maharastra

An obscure village in the foothills of Melghat region of Amravati district in Maharashtra, payvihir, has set an example for the country by communities and NGOs can work together to conserve the environment and ensure sustainable livelihood for people. In 2014, Payvihir bagged the Biodiversity Award from the United Nation's Development Programme (UNDP) for turning a barren, 182-hectare land under community forest right act. In 2015, the village was honoured with the Maharshtra Wildlife Service Award of its invaluable contribution to environmental conversation in the state.
Some of important features of working communities together for better livelihood:

- In 2012, Payvihir was awarded 182 hectares of degraded land to exercise its community forest right under the Forest Rights Act (FRA) 2006. The gram panchayat of payvihir decided to devote its energies to regenerate and revive the forest bio-diversity of the area,

- Villagers undertook soil and water conservation works, plantation, and protection from fires and grazing. They also ensured a mix of natural regeneration and afforestation,
- Problem like unemployment and migration were tackled by providing village development jobs to the locals under MNREGA,
- Along with money, the village used funds from the tribal welfare department to set up a biogas plant that supplies biogas for three hours a day. The village sell cow dung to that plant at the rate of 75 paise per kg and also buy gas from the plant by paying rs.200 per month,
- To increase tree diversity, the villagers have stated organic plantations of Bamboo, Sitaphal, Hirda, Behada, Mahua, Mango, Neem, Custard apple, Amla, Jamun, Teak and Arjuna trees – it's all for the income for the villagers.

As for its administrative earnings, the gram sabha of payvihir has decided to utilize it for the development of health, education and sanitation facilities of the village. It has already ensured zero-waste generation in the village and sustainable employment opportunities for the village youth!

2.9 Other Projects / Schemes of Gujarat / Indian Government

Sardar Patel Awas Yojana

Sardar Patel AwasYojana for land less agricultural laburers and village artisan living Below Poverty line in rural areas of the State. Sardar AwasVasahat, Rampura, dist. Vadodara Govt. has made strategic planning for solution of houses in the village. The poor has right to live new life and to turn to new culture as colony of poor population.

Panchvati Yojana

It aims at welfare of rural people of the State (Gujarat), to develop parks and gardens in the village with necessary facilities and implements of joy and amusement are easily available People may spend their time leisurely in the late evening and the women can spend their time peacefully with their children. It aims to build such places where senior citizens of the village may sit peacefully and may ponder over the matters.

Gram Sabha Abhiyan

Gram Sabhas have started effective work in Gujarat since the birth date of Shri Jay Prakash Narayan i.e. 11-10-2001 under the guidance of Hon. Chief Minister Gram Sabhas have been undertaken as movement of people empowerment and people participation. Objectives of it are

- People empowerment
- Platform providing training in healthy democracy
- Opportunities for poor and women to represent
- People participation
- Direct social audit by the people on working of Government/Panchayat.

E-Gram Yojana

- To make the various tasks of the panchayat modern, simple, organized, time-bound, rapid error free, transparent through the implementation of Information Technology.
- To provide E-Services to rural folk which are comparable to those availed by urban people
- To simplify property tax assessment and collection
- To make the organization, scrutiny and implementation of panchayat rule more effectively.

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

3.1 Introduction: Concepts, Definitions and Practices

❖ Concepts

Smart city may be a city which has been provided with all types of facilities such as Educational facilities, Health facilities, Infrastructure, communication, internet services, Transportation facilities, sanitation facilities with improved method of disposal (waste management), etc. Smart city is an urban area that uses different types of electronics data collection sensor to supply information used to manage assets and resources efficiently. The smart city concept integrates information and communication technology and various physical devices connected to networks to optimize efficiency of operation and services.

A Smart city uses different types of electronic Internet of Things (IoT) sensors to collect data and then use these data to manage assets and resources efficiently. This includes data collected from citizens, devices, and assets that is processed and analysed to monitor and manage traffic and transportation systems, power plants, water supply networks, waste management, crime detection, information systems, schools, libraries, hospitals, and other community services. The Smart city concept integrates information and communication technology (ICT), and various physical devices connected to the IoT network to optimize the efficiency of city operations and services and connect to citizens. Smart city technology allows city officials to interact directly with both community and city infrastructure and to monitor what is happening in the city and how the city is evolving. ICT is used to enhance quality, performance and interactivity of urban services, to reduce costs and resource consumption and to increase contact between citizens and government. Smart city applications are developed to manage urban flows and allow for real-time responses. A Smart city may therefore be more prepared to respond to challenges than one with a simple "transactional" relationship with its citizens. Yet, the term itself remains unclear to its specifics and therefore, open to many interpretations.

Concept of Smart Village

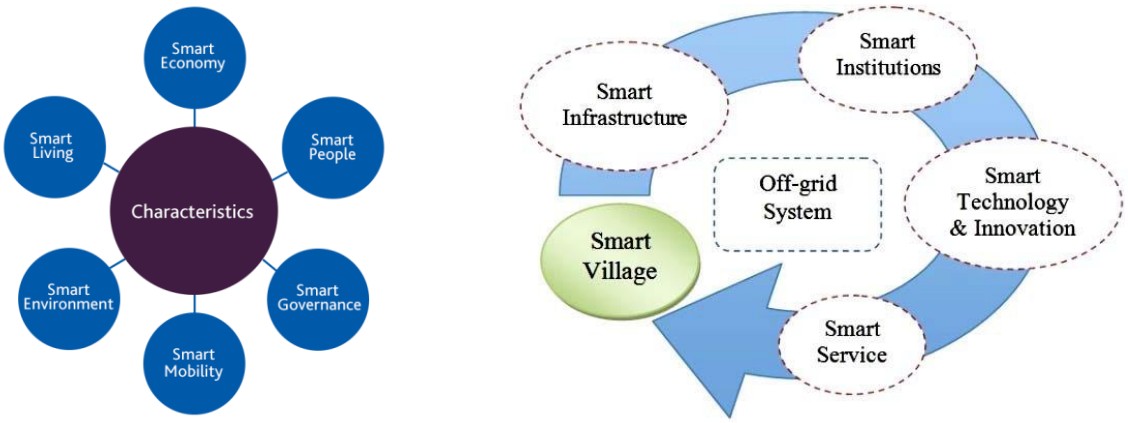


Figure 12 Concept of Smart village

❖ Definitions

The smart city may also be defined as the application of electronics and digital technologies to communities and cities. It also includes make more efficient use of physical infrastructure (roads, environment) through artificial intelligence and data analytics to support a strong and healthy economic, social, cultural development.

3.2 Vision-Goals, Standards and Performance Measurement Indicators

❖ Smart city Benchmark

Smart city Benchmark for different Parameters are,

A. Transport

- Maximum travel time of 30 minutes in small & medium size cities and 45 minutes in metropolitan areas
- Continuous unobstructed footpath of minimum 2m wide on either side of all street with Row 12m or more
- Dedicated and physically segregated bicycle tracks with a width of 2m or more, one in each direction, should be provided on all streets with carriageway larger than 10m (not ROW)
- High quality and high frequency mass transport within 800m (10-15 minute walking distance) of all residences in areas over 175 persons / ha of built area
- Access to para-transit within 300m walking distance.

B. 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 services by public 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

C. 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

D. Sewerage and sanitation

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

E. Solid waste 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. biodegradable and non-degradable waste
- 100% recycling of solid waste

F. Storm water drainage

- 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

G. 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

H. Telephone connections

- 100% households have a telephone connection including mobile

I. Wi-Fi Connectivity

- 100% of the city has Wi-Fi connectivity

J. Health care facility

- Availability of telemedicine facilities to 100% residents
- 30 minutes emergency response time
- 1 dispensary for every 15,000 residents
- Intermediate Hospital (Category B) - 80 beds per lakh population
- 1 Dispensary for pet for every 1 lakh residents
- 1 Diagnostic center for every 50,000 residents
- 1 Veterinary Hospital for every 5 lakh residents

K. Education

1. Primary to secondary education

- 1 Pre-Primary/ Nursery School for every 2,500 residents
- 1 Primary School (class I to V) for every 5,000 residents
- 1 Senior Secondary School (Cass VI to XII) for every 7,500 residents
- 1 school for mentally challenged for 10 lakh population
- 1 school for physically challenged for every 45,000 residents
- 1 integrated school (Class I to XII) per lakh of population

2. Higher education

- 1 college per 1.25 lakh population
- 1 university
- 1 technical education center per 10 lakh population
- 1 engineering college per 10 lakh population

- 1 paramedical institute per 10 lakh population
- 1 medical college per 10 lakh population
- 1 veterinary institute

L. Fire fighting

- 1 other professional college per 10 lakh population
- 1 fire station per 2 lakh population / 5-7km radium
- 1 sub – fire station with 3-4 km radius

Sustainable Development Goals

The 17 Sustainable Development Goals of the 2030 Agenda for Sustainable Development are recalled below:

- **Goal 1.** End poverty in all its forms everywhere
- **Goal 2.** End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- **Goal 3.** Ensure healthy lives and promote well-being for all at all ages
- **Goal 4.** Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- **Goal 5.** Achieve gender equality and empower all women and girls
- **Goal 6.** Ensure availability and sustainable management of water and sanitation for all
- **Goal 7.** Ensure access to affordable, reliable, sustainable and modern energy for all
- **Goal 8.** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all Sustainable Development Goals and Smart Cities Development Engineering Opportunities in the Mauritian Context 5
- **Goal 9.** Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- **Goal 10.** Reduce inequality within and among countries
- **Goal 11.** Make cities and human settlements inclusive, safe, resilient and sustainable
- **Goal 12.** Ensure sustainable consumption and production pattern
- **Goal 13.** Take urgent action to combat climate change and its impacts
- **Goal 14.** Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- **Goal 15.** Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- **Goal 16.** Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- **Goal 17.** Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development Acknowledging that the UNFCCC is the primary international, intergovernmental forum for negotiating the global response to climate change.

❖ **Smart Cities Standards**

Figure 13 Smart city standards

Smart Cities Performance Measurement Indicators

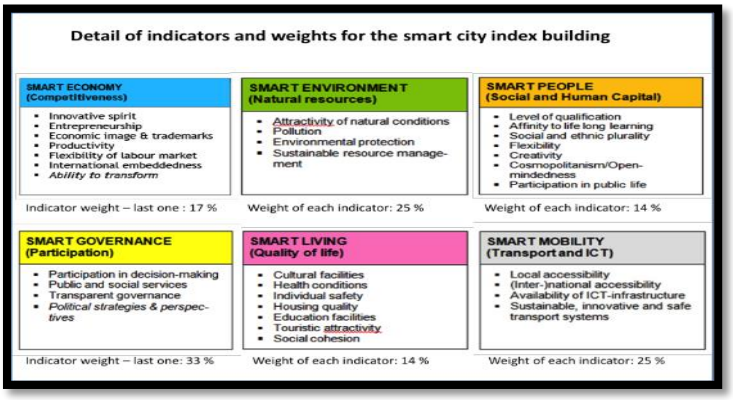


Figure 14 Indicator and weight of smart city

3.3 Technological Options

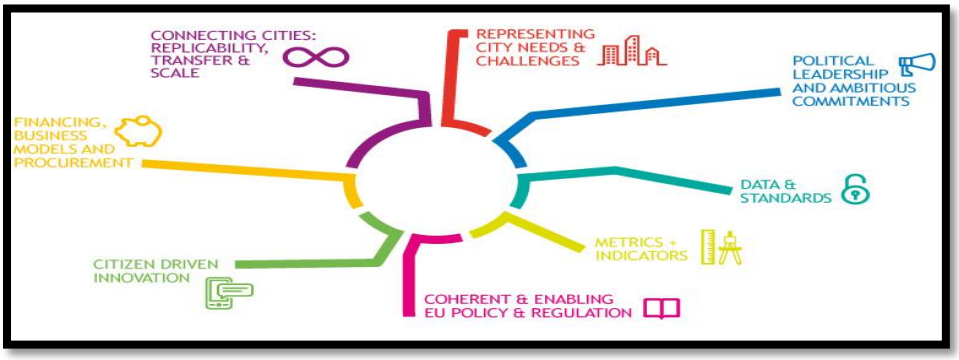


Figure 15 Smart City Options

In the construction industry, 3D printing can be used to create construction components or to 'print' entire buildings. Construction is well-suited to 3D printing as much of the information necessary to create an item will exist as a result of the design process, and the industry is already experienced in computer aided manufacturing. The recent emergence of building information modelling (BIM) in particular may facilitate greater use of 3D printing.
Construction 3D printing may allow, faster and more accurate construction of complex or bespoke items as well as lowering labour costs and producing less waste. It might also enable construction to be undertaken in harsh or dangerous environments not suitable for a human workforce such as in space.

Figure 16 3D Printing technology

3.4 Road Map and Safe Guards

Smart Maps capture a broad range of detailed data, such as roads (with details including lanes, speed limits, and turn restrictions), shops, offices, points of interest (types, user ratings), and other information (bike and transit routes, building shapes, etc.).
Cities are a useful lens through which to analyse the value of improvements in maps. Cities have a high volume of internet users – at least 140 million of India's 240 million estimated internet users are urban.12 Cities have greater and more complex density of physical infrastructure (roads, shops, restaurants, addresses, etc.), which better maps can help people navigate. Additionally, cities are experiencing change at unprecedented rates as urbanization skyrockets, making accurate, up-to-date geospatial information even more critical. And finally, cities are today, more than ever before, engines of economic and social development in India. The same characteristics that define a Smart Map can be applied to a Smart City. A map is only as good as the benefits it provides its users; a city is smart only if its citizens are at the heart of its design.

3.5 Issues & Challenges

❖ Urban Water and Sanitation Challenges

Water and sanitation are two of the greatest challenges in India today. A quick glance at some of the statistics is sufficient to give you a gist of the situation:

- A staggering half of India's 1.1 billion population lives without toilets
- Over 75 million people in rural India do not have access to proper sanitation of the 1.1 million people in the world who defecate outdoors, more than half are in India
- Each year, India logs the highest number of diarrhea-related deaths worldwide; more than 30 percent of all deaths among Indian children under the age of five are diarrhea-related
- Currently 30% of the rural population lack access to drinking water, and of the 35 states in India, only 7 have full availability of drinking water for rural inhabitants
- Water quality problems include Fluoride (66 million people across 17 states are estimated to be at risk), excess Arsenic in ground water (nearly 13.8 million people in 75 blocks are reported at risk), varying iron levels, presence of nitrates and heavy metals, bacteriological contamination and salinity.
- Of the total wastewater generated in the metropolitan cities, barely 30 per cent is treated before disposal. Water supply is not continuous in any of India's metros.

The statistics go on and on, and the situation seems dire, even hopeless. But articles such as this two-part blog post by Michael and Susan Dell Foundation's Urvashi Prasad and Semonti Basu make one more hopeful that innovative new approaches are being thought of and tried out, which can help counter these large challenges, or wicked problems. They propose what they call a 'Networked Approach to Change," involving multiple stakeholders in the process.

Proposed strategy for urban water management

The urban area is classified in 6x4 matrix which would need to be implemented in a location specific manner within each urban settlement. These include:

- Sustainable groundwater management
- Focus on recycling and reuse of waste water
- Reducing industrial water footprint
- Protect and priorities local water bodies
- Shift focus to management and distribution
- Use of eco-restorative, low-cost technologies
- Capacity building of urban local bodies
- Sector Overview and Challenges

Key Issues in development of Human Being

Access to water

Access to clean potable water and to basic sanitation is a key indicator for human development. According to United Nations (UN) standards, the proportion of the population measures access to safe water with access to an adequate amount of safe drinking water located within a convenient distance from the user's dwelling.

Poverty

Chronic poverty is usually induced by long-term exposure to threats such as drought, famine and conflict. These combined multiple factors are often referred to as the cycle of poverty:

numerous factors, such as malnutrition, illness and poor living conditions, that when combined, make it difficult for people to break out of the conditions of poverty to improve their level of well-being and create a more positive livelihood. Poverty and health are inextricably connected issues that form a feedback loop. Due to an inability or reduced capacity to work, sickness, disability and poor health increase poverty. Poverty, in turn, through reduced quality of life, exposes individuals and communities to health risks, as these groups are often marginalized to poor quality land with no facilities. Informal housing has little or no sanitation resulting in greatly increased health risks.

Food security

Food security is defined as "when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. Household food security is the application of this concept to the family level, with individuals within households as the focus of concern." The World Health Organization recommends a minimum dietary consumption of 2 100 kilocalories per day, including daily protein intake of 56 g and 48 g for the average adult man and woman respectively. The Food and Agriculture Organization (FAO) defines undernourishment as food consumption of less than about 1 900 kilocalories per day (FAO 1996). Undernourishment may lead to malnutrition, which reduces human well-being by impairing physical functioning, the ability to work and learn, and processes such as growth, pregnancy, lactation and resistance to disease (SAfMA 2004). Malnutrition is defined by the World Health Organization as "the cellular imbalance between supply of nutrients and energy and the body's demand for them to ensure growth, maintenance, and specific functions".

Health situation

The health situation in a country is a key factor for human development. People, who are ill or have to look after ill relatives, are kept away from productively contributing to their family's and country's economic wellbeing. Instead, a lot of money is needed for treatment and medication.

As a consequence, many other key factors for human development (like food security and access to education) are affected; the development of the country is slowed down. It is in the highest interest of any country/government to invest into good healthcare for its citizens– as investment here will produce multiple benefits.

Access to education

Education is central to development. It empowers people and strengthens nations. It is a powerful "equalizer", opening doors to all to lift themselves out of poverty.

Benefits of Education

Investment in education benefits the individual, society, and the world as a whole. Broad-based education of good quality is among the most powerful instruments known to reduce poverty and inequality. With proven benefits for personal health, it also strengthens nations' economic health by laying the foundation for sustained economic growth. For individuals and nations, it is key to creating, applying, and spreading knowledge—and thus to the development of dynamic, globally competitive economies. And it is fundamental for the construction of democratic societies.

Access to livelihood

The term Livelihood is used to identify a fundamental relationship between the people and the biophysical resources. Livelihood is defined as a primary activity that individuals engage in to obtain the income, food, water, shelter, clothing and other materials needed to satisfy and

sustain the well-being of families and other members of a social group. In the face of decades of attempts to promote development, developing countries are turning to a new model to reduce and alleviate poverty without compromising the natural assets of the country. These new methods are collectively termed Sustainable Livelihoods. A livelihood includes the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks while maintaining or enhancing its capabilities and assets and not undermining the natural resource base.

Education / Job Opportunity Development

Slogging your way through your schoolwork is not always fun, and if you're racking up mountains of student debt, you might find yourself wondering whether the work is worth it. But education plays a key role in both finding and keeping a job and can open doors to higher-paying, more stimulating and rewarding careers.

Jobs and Education

There is a direct correlation between the level of education you achieve and your likelihood of finding a job. The U.S. Bureau of Labor Statistics reported in 2013 that, at each higher level of education, the unemployment level drops. For example, people whose highest level of education was graduating high school had an unemployment rate of 8.3 percent, while the unemployment rate of college graduates was 4.5 percent.

Educational Requirements

Many jobs have minimum educational requirements, and without meeting these requirements, you won't get an interview. The Georgetown Public Policy Institute emphasizes that employers are increasingly requiring a college degree and estimates that by 2018, 60 percent of jobs will require a bachelor's degree. Even if you already meet the minimum educational requirements for a job you want, exceeding requirements -- particularly with advanced studies in a subject area related to your field -- can make you a more attractive job candidate, increasing your likelihood of finding a job.

Improved Job Skills

Education isn't just a piece of paper. Time spent in high school, college or graduate school helps you master both basic and advanced skills. The longer you spend in academia, the better your writing, reading, comprehension and communication skills will become. Writing, research and classes can also improve your computer skills, which are key in a competitive job market. You'll also become accustomed to interacting with a wide variety of people. These social skills can serve you well in the job search even if the job you want doesn't require a specific degree.

Opportunities for Advancement

After you've found a job, the benefits of education continue. Higher education may be a requirement for promotions or for managerial positions, and if you continue your education, you'll be eligible for these higher-paying, more prestigious jobs. If a job in your company opens up that's specific to your college major, you'll probably be the most competitive candidate even if your previous job had little to do with your major.

Governmental Issues

Retrofitting existing legacy city infrastructure to make it smart:

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

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

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

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

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

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

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

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

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

3.6 Smart Infrastructure - Intelligent Traffic Management

- In a world where infrastructure is truly smart, sensing technologies are embedded in infrastructure and the equipment it interacts with. These sensors are connected to a communication backbone which allows real-time data acquisition and analysis. The information gathered is analysed, interpreted and delivered as reliable, robust and meaningful information to infrastructure providers, who can then make better informed decisions about the structural health and maintenance of their assets.
- In a sensing environment, infrastructure is able to respond in real time to users' needs. Self-aware infrastructure assets direct their own maintenance, leading to condition- based maintenance, reduced down time and greater operational efficiency of the infrastructure overall.
- Better information leads to an enhanced understanding of the behaviour of infrastructure. The impact of this will lead to transformations in the approaches to design and construction as well as step changes in improved health and productivity, greater efficiency in design and performance, a low-carbon society and sustainable urban planning and management.

3.7 Cyber Security

Cyber security is important because government, military, corporate, financial, and medical organizations collect, process, and store unprecedented amounts of data on computers and other devices. A significant portion of that data can be sensitive information, whether that be intellectual property, financial data, personal information, or other types of data for which unauthorized access or exposure could have negative consequences. Organizations transmit sensitive data across networks and to other devices in the course of doing businesses, and cyber security describes the discipline dedicated to protecting that information and the systems used to process or store it. As the volume and sophistication of cyber-attacks grow, companies and organizations, especially those that are tasked with safeguarding information relating to national security, health, or financial records, need to take steps to protect their sensitive business and personnel information. As early as March 2013, the nation's top intelligence officials cautioned that cyber-attacks and digital spying are the top threat to national security, eclipsing even terrorism.

Elements of cyber security

- Network security
- Application security
- Endpoint security
- Identity management
- Database and infrastructure security
- Cloud security
- Mobile security
- Disaster recovery/business continuity planning
- End-user education

3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling

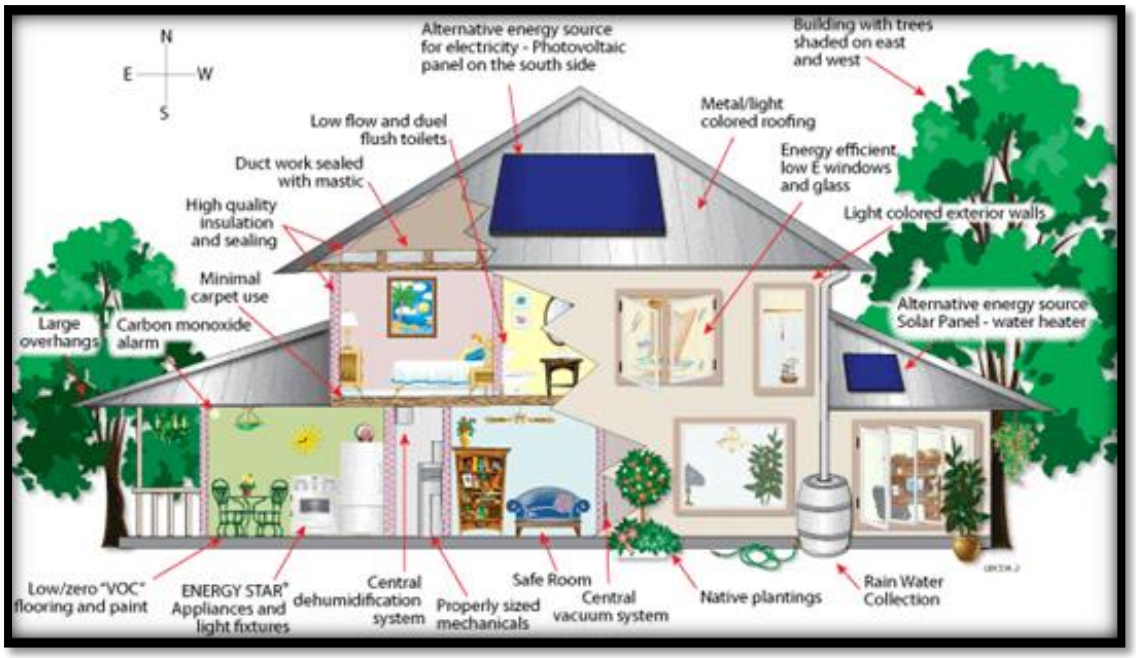


Figure 17 Green Building

Green buildings are designed to reduce the overall impact of the built environment on human health and natural environment by:

- Efficiently using energy, water and other resources.
- Protecting occupant's health and improving employee productivity.
- Reducing waste, pollution and environment degradation.
- Following examples can be considered for green buildings:

Green buildings may incorporate sustainable materials in their construction (e.g., reused, recycled content, or made from renewable resources).
Create healthy indoor environments with minimal pollutants (e.g., reduced product emissions). And feature landscaping that reduce water usage (e.g., by using native plants that survive without extra watering).
A green building is a structure that is environmentally responsible and resource-efficient throughout its life-cycle. These objectives expand and complement the classical building design concerns of economy, utility. Durability and comfort.
What are Green Features of a Green Building?

- Minimal disturbance to landscapes and site condition
- Use of non-toxic and recycled / recyclable material
- Efficient use of water and water recycling
- Use of energy efficient and eco-friendly equipment
- Use of renewable energy
- Quality of indoor air quality for human safety and comfort
- Effective controls and building management systems

❖ District Cooling and Heating

A heating network generates and distributes heat in the form of hot water and superheated steam using one or more generating units. They generally uses a range of different primary energy sources for heat generation, including natural gas, locally-generated energy and renewable in the form of household waste incineration, biomass (wood, etc.), biogas, solar, geothermal and heat recovered from wastewater.

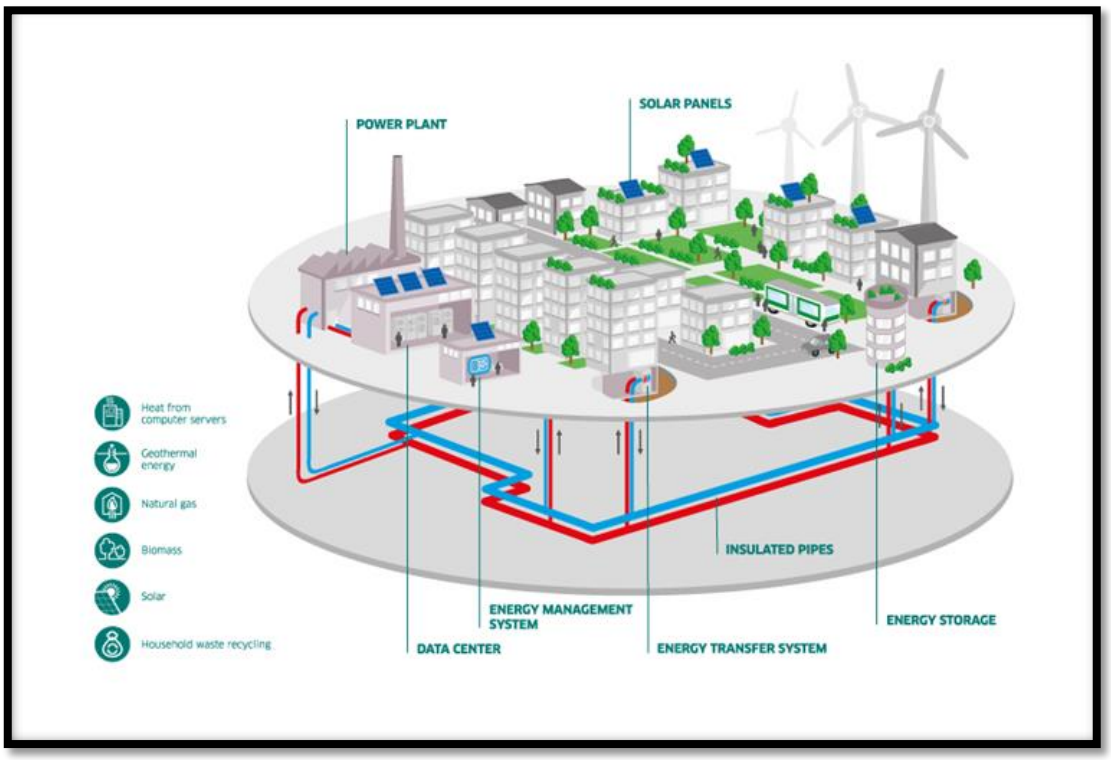


Figure 18 District cooling and heating

- A heating network has four main component parts:
- One or more heat generating units,
- A primary pipeline network that transfers the heat to the delivery points,
- Heat exchanger substations installed in connected buildings,
- Secondary pipeline network that distributes the heat in the form of hot water from the delivery points (substation) to the radiant sources in individual homes or offices.

3.9 Strategic Options for Fast Development

Mobility as a Service (Maas)

Moovel, an innovative Maas platform combines and facilitates the use of multimode transport and shared mobility services and enables payments via a single interface. This smart urban mobility solution offers a multimodal capability which bundles transport options such as public transport, on-demand services, vehicle sharing, bike sharing and ride hailing. With access to the Moovel app, customers can book and pay for mobility services through an integrated account.

Sustainable Travel Behavior

Innovactory is committed to making the travel behavior of its users more sustainable through development of TimesUpp, a smart travel assistant. Used by more than 150,000 people,

TimesUpp "transforms a user's calendar into the perfect travel assistant, advising on the best time and method of transport to get to their destination, with real-time updates on traffic jams and other unexpected delays."
In 2017, Innovactory introduced TimesUpp incentive programs with the goal of reducing transport-induced emissions and "prevented more than 250,000 car trips from being executed. This resulted in a CO2 saving of almost 650 tons." In 2018, TimesUpp launched the Smart Traveling! Campaign — an initiative of SmartwayZ.NL with stakeholders from public and private sectors — to reward commuters when they reduce usage of their car by switching to cycling, public transport or working from home.

Intelligent Traffic Management Solution (ITS)

PSI Roads is an intelligent traffic management solution that provides decision support enabled by artificial intelligence. This smart city mobility solution offers intelligent traffic management services such as change of traffic light phases, road user information,and dynamic changes in traffic capacity. This mobility solution is designed to help transport authorities meet strategic goals by minimizing vehicle emission levels and reducing traffic congestion in residential areas.

Traffic Congestion Service

An estimated 30% of traffic congestion in urban areas is caused by drivers looking for a parking space. Parquery — a cloud-based smart parking solution implemented in more than 15 cities worldwide — provides parking managers with accurate data on parking space usage and "also supports adaptive street light management, intelligent traffic management, and retail services for easy navigation in a smart city."

Micro mobility Management

Micro mobility — including systems and fleets of shared bikes and electric scooters — "is the hottest tech in transportation," according to City Lab. "The appeal of cycling and scooters to cities and startups alike is obvious: Micro mobility systems complement each other while stealing trips from other modes." Read more about e-scooter sharing and e-scooter solution providers in our special market insight report E-Scooters: A Passing Fad or Smart Mobility?
eCooltra is a European innovator in scooter sharing with a fleet of more than 3,000 electric scooters deployed in five cities. By using the eCooltra app, customers can book and unlock a free-floating scooter and pay only for minutes of usage. This e-mobility solution aims to improve the customer's quality of life, contribute to urban sustainability, and reduce CO2 emissions.

Public Transport Innovation

In Poland, an innovative passenger information system was designed and implemented in the City of Lublin. This project included modernization of urban transport infrastructure and the city's fleet of bus vehicles. The project involved installation of GSM and GPRS equipment in the vehicles; electronic displays at bus stops; dispatch center software; and a website offering dynamic information to passengers. For its innovation in traffic management and transport solutions, Lublin was named "Smart City of the Year" among cities with population between 100,000 and 350,000". By modernizing transport infrastructure and improving

communications with passengers, Lublin shows that mid-size cities can achieve far-reaching upgrades in the user experience and quality of urban mobility.

Transport Poverty Reduction

- The HiReach project, a research and innovation action funded under Europe's Horizon 2020 program, has the mission of finding solutions to improve accessibility, inclusion and equity of mobility by:
- Exploring viable business models for affordable, modular and replicable mobility services (community transport, ridesharing, minibus)
- Generating and testing mobility solutions created by startups and entrepreneurs
- Enabling the viability and scaling-up of new mobility business models

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

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.

Radiation Hygienization of Municipal Sewage Sludge:

The Sewage is the waste water generated from domestic premises and consists mainly of human waste. It typically contains 99.9% water and about 0.1% solid. The solid waste in sewage is typically organic in nature and is broken down in the sewage treatment plants resulting in sewage sludge as a by-product. In Radiation Hygienization process dry sludge generated at STP's is hygienized using radiation technology using standard Gamma facility at a Dose of 10 kg. Such radiation plants are operating in India for sterilizing medical products.

Refuse Derived Fuel: An Emerging Processing Technology in MSWM:

Refuse Derived Fuel (RDF) is a processed form of Municipal Solid Waste (MSW) and it can be a substitute to coal energy. The process of conversion of garbage into fuel pellets involves primarily Drying, Separation of incombustible, Size reduction and Palletisation.

3.11 Initiatives in village development by local self-government

The local government has all the responsibilities for the development of village. Local development partly via local institutions was supposedly a scheme to better understand rural communities, and be more responsive to the perceived aspirations and constraints of the rural folk. Local Governments were considered to be more successful in promoting local participation and empowerment, democracy and cost effectiveness within the framework of the One-Party System. So local government should initiate the village development by using all these factors.

3.12 Smart Initiatives by District Municipal Corporation

Objectives for an innovative & modern Solid Waste Management

- To devise a system of storage of waste and segregation of recyclable waste at source.
- To improve system of primary collection of waste.
- To devise more efficient system of day to day cleaning, conventionally and mechanically.
- To devise system to eliminate practices of throwing garbage on the road causing nuisance& health threat.
- To modernize the system of community waste storage & synchronize the system of primary collection as well as transportation of waste.
- To eliminate manual handling of waste and open transportation vehicles.
- To improve the system of transportation of waste by ensuring "handling waste only once".
- To construct four more semi close body transfer station to strengthen the existing primary collection-transportation and secondary transportation system.
- To reduce quantity of waste going to landfill site by adopting suitable technology.
- Land to be acquired for other landfill disposal site.
- To derive income from the processing of waste.
- To ensure safe disposal of waste including bio-medical wastes.
- To do institutional strengthening.
- To have public participation.

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

The Role of Citizens in "Smart City"

The "smart city" is an umbrella for cities that use information technology to improve services and provide better quality of life to its citizens. Citizen participation is often highlighted as an important part of the smart city concept. Citizens are an important aspect of smart cities. A city cannot be built smart until and unless citizens do not participate in the transformation. So, know the role of citizens in building smart city. The Success of Smart city is defined only when it is accepted by its citizens as the core aim of the smart city is to build a city which is solely for its people. When we talk about the concept of smart cities then they primarily are cities which is smart enough to provide sustainable, environment friendly urban infrastructure to its citizens where it has all smart facilities popular as smart solutions, which can ease their life. If a smart city is not as per the needs of its citizens then it is completely not a successful smart city. Citizens' acceptance should be the main focus while transforming a city into a smart city.

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

First of all, we need to study the smart village project in minute detail. Then, we need to compare the climate, soil condition, available resources, existing infrastructure, etc. The manpower is also an important aspect. Required skills for its implementation is also mandatory. And not to forget, the funds! If we are adapting a technology from a developed country, it is necessary that we also keep check if sufficient funds are available or not. A feasibility report should be prepared to check whether its implementation is beneficial or not.

Chapter 4 About Nani Naroli

4.1 Introduction

4.1.1 Introduction about Nani Naroli Village details

Nani Naroli village is located in Mangrol Tehsil of Surat district in Gujarat, India. It is situated 8km away from sub-district headquarter Mangrol and 40km away from district headquarter Surat.

As per 2009 stats, Nani Naroli village is a gram panchayat. The Panchayat works for two villages. One is the village- Nani Naroli itself, and the other is Surali village. Surali is connected to Nani Naroli by a 4 kilometer kachcha road. It is situated in a remote area and the village is a cluster with a meagre population of 521. It is situated 5km away from sub-district headquarter Mangrol and 47km away from district headquarter Surat.

Gandhinagar is the state capital for Nani Naroli village. It is located around 218.8 kilometer away from Nani Naroli.

Table 7 co- ordinates of Nani Naroli

latitude	**21.3803499**
longitude	73.0966019
Elevation / Altitude	435 m above Sea level

Dharampor (4 KM) , Borsad (5 KM) , Jhankharda (7 KM) , Limbada (7 KM) , Rosvad (7 KM) are the nearby Villages to Nani Naroli. Nani Naroli is surrounded by Kamrej Taluka towards South, Mandvi Taluka towards East, Bardoli Taluka towards South, and Valia Taluka towards North.

Ankleshwar, Surat, Bharuch, Vyara are the nearby Cities to Nani Naroli.

This Place is in the border of the Surat District and Bharuch District. Bharuch District Valia is north towards this place.

4.1.2 Justification/ need of the study

Village studies have their own importance. These have enriched the knowledge of the Indian Society in general and rural India. These have given great encouragement to the growth of rural society. After independence, planners in India realised that unless Indian villages were properly studied, no real progress could be made. Scholars now began to pay more and more attention to village studies.

To develop the village for making it an ideal village, it is necessary to first understand its location, resources, etc. so we can come to know its advantages owing to various factors like location, water bodies available, and proximity to sea and so on. Not only that we can also take care of the threats posed owing to the same and take care of it to reduce the dangers and impacts on the village.

4.1.3 Study Area (Broadly define)

It is the study of political or geographical area including its history, geography, language, and general culture. As our project is related to development of a village, our study area is the history of development of village, infrastructure facilities in village, and existing condition of village.

4.1.4 Objectives of the study

The objective of village study is to give idea about its layout, its design, the facilities available in village, requirement of people, things required to develop village. It helps in planning rural reconstruction, useful information related construction, requirements. It helps to getting information about needs of people, social reality.

4.1.5 Scope of the Study

The scope of the study is

- Analysis of study
- Problem identification
- Solution of the problem
- Designing new facilities

4.1.6 Methodology Frame Work for development of your village

- Survey of the village
- Grouping existing infrastructure facilities
- SWOT analysis of the village
- Deducing the requirements of the village
- Provision of infrastructure facilities as per URDPFI norms

4.1.7 Available Methodology for development of related to Civil

- Availability of drinking water
- Adequate drainage system
- Pukka road network
- Adequate health facilities
- Educational facilities
- Skill development facilities

4.2 Nani Naroli Study Area Profile

4.2.1 Study Area Location with brief History and land use details

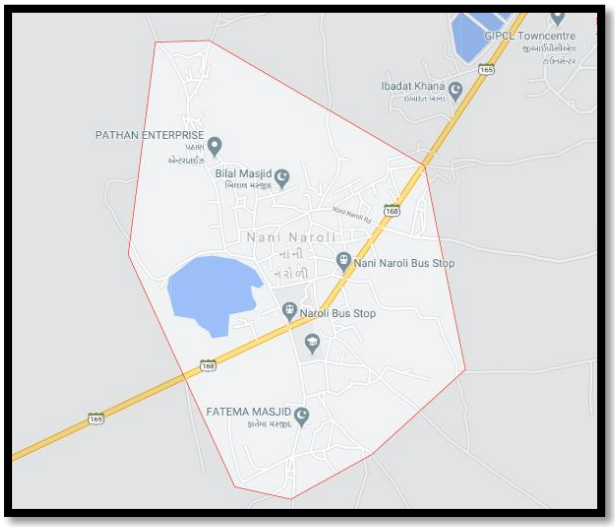
Nani Naroli is a village in Surat district, State of Gujarat India. Located 15 kilometers (15,000 m) away from the Kim Char Rasta highway, the village currently has a population of up to 10,000 people. It occupies a land area of 1783 hectares.

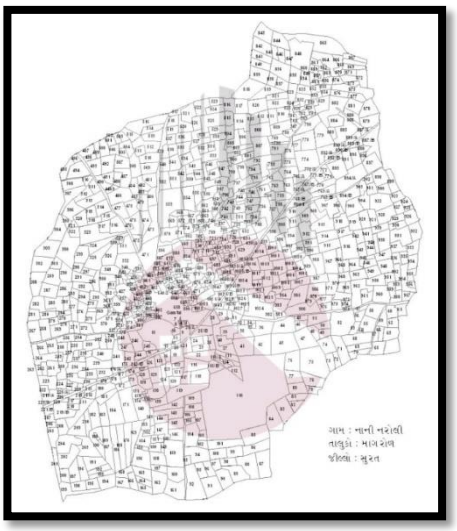
In the early 1960s, the village primarily consisted of mud-built homes without electricity. Water was brought into residence in 1963. The village was primarily agricultural in the 1980s and early 1990s, cultivating cotton, rice, wheat, lentil, sesame, mung lentil, gram lentil and many more vegetables with the aid of farm animals such as horses, buffaloes, and bulls.

Table 8 Land use Details

Sr. No.	Description	Area in hectare
1	Area of village	1783
2	Forest Area	0
3	Agricultural Land Area	1502
4	Residential Area	115.43
5	Other Area (Non agriculture)	54.86

4.2.2 Base Location map, Land Map, Gram Tal Map





4.2.3 Physical & Demographical Growth

Growth of village is mainly due to agriculture. Few of the villagers are also involved in animal husbandry. The population of village was 7463 according to census 2011, currently it has risen up to 10000 and still growing.

4.2.4 Economic generation profile / Banks

The village has 1 bank – State Bank of India. It has ATM facility as well for use of villagers. The main income source in village is agriculture work and private jobs. The economic conditions of overall villagers is stable sans people from monghani faliya, which is economically backward area.

4.2.5 Actual Problem faced by Villagers and smart solution

The main problem face by villagers include:

- Water logging on road is one of the problem troubling population in surali.
- This problem can be solved by providing pukka road with suitable camber.
- The health issues may emerge due to water clogging around the kachcha houses from daily use in monghani faliya.
- This can be solved by provision of public or community toilet with bathing facility.
- Drinking water is not provided in surali to comfort of their home, people can get water from communal tap provided at some certain interval on the street.
- Provision of water supply system can solve that.

4.2.6 Social scenario -Preservation of traditions, Festivals, Cuisine

The villagers celebrate all the festivals of Indian culture. This includes Eid, Moharram, Navaratri, Diwali, etc. The primary diet of villagers comprises of rice, roti, dal, green vegetables, pulses, eggs, chicken, and meat.

4.2.7 Migration Reasons / Trends

The village is located at remote area far from highways and major cities. It lacks higher education and employment opportunities. The village also lacks few basic amenities and facilities usually always available in towns and cities.

4.3 Data Collection Nani Naroli (Photograph/Graphs/Charts/Table)

4.3.1 Describe Methods for data collection

We visited Nani Naroli village of Mangrol taluka in Surat district for the purpose. Data collection is carried out by interacting with people like Sarpanch, Talati, Farmer, Teacher, etc. of the respective village.

Data collected from teacher includes number of students, number of classes available for study, availability of library, computer lab, other activities carried out in school and their needs related their activities. Data related to farming such as: which type of technique use for farming like drip irrigation or any other, availability of water, source of water for irrigation works, availability of rains, etc. collected from interacting with farmers. Basic data such as population, sex ratio, area of village, all other details as geographic details, demographical details, educational, institutional details, physical infrastructure facilities, etc. are collected from sarpanch office.

However, for collection of above mentioned data, we took upon a systematic approach by following Simplified Planning Techniques:

- **Identifying Data Needs and Data Collection List**

The basic presumption of simplified information gathering methodologies is that there is always a certain amount of uncertainty attached to any set of data, and that the available data may or may not be complete as compared to what is required for ensuring perfectness in decision making. This presumption implies that decision-making most often involves an element of imperfect data and good decision maker makes good use of extrapolation of the collected data though the application of simplified survey techniques.

The methods of rapid information collection institutionalise existing good practices and even common sense. They rely mostly on direct observation, seek several views of any one "fact" (cross checking) and make use of checklists and semi-structured dialogues instead of lengthy and often costly questionnaire-based surveys. Due to difficulties of measuring much of socio-economic information directly, rapid survey techniques make liberal use of proxy indicators to trace ranking, trends and shifts. These rapid methods must not be considered as substitutes to specialist investigations and should be used for quick access to information for rapid decision- making.

Data Checklist

The data collection checklist is a precise and exhaustive listing of topics/issues and sub-topics/issues related to the information need. The process begins with the preparation of an initial checklist. The next stage is to define the method of acquiring information about each sub-topic in the list. The checklist is flexible and allows the surveyor to adapt and improvise in the field. The steps involved in the preparation of the checklist are as follow:

- **Data Collection Techniques**

Information or data can be divided into two types. I.e. Primary data and Secondary data. Primary data is collected first hand by investigator, thus through primary survey. Secondary data is second hand data, initially collected by some other investigator for other purpose but later on used by an investigator for his own purpose.

Primary Data Collection Techniques

Primary data are those which are collected for the first time and are always given in the form of raw material and original in character. Before beginning the primary data collection process, the technique of data collection, the questionnaire thereof and the survey sample selection technique is to be finalized. To process, analysis and interpret primary data, suitable statistical methods are needed.

Visual surveys / Reconnaissance survey

Visual surveys are direct inspection surveys, which are performed by survey teams moving in a vehicle or walking. This type of survey can be used in the initial stages of the investigation, often after preparing initial checklist.

Inspection

Direct Inspection: The direct inspection of conditions or activities is employed in many kinds of surveys where human communication is not required to elicit the information.
Indirect Inspection: The findings of the initial survey can be substantiated with the help of key indicator survey, which are specific to the objectives of the analysis.

Personal Interview/Dialogue

A number of types of surveys are undertaken face to face or by telephonic conversation. In case of quantitative survey, the structured dialogue is one way where précised questioning takes place.

Focussed Group Discussion (FGD)

Focussed group discussion is a qualitative data collection and research technique. Questions about opinions, perceptions, beliefs, attitude of people towards planning aims, services are probed in this discussions.

Secondary Data Collection techniques

Secondary data are those, which have already been collected by someone other than the investigator himself.

Published Sources

Mostly secondary data is collected from published sources, which makes it reliable.

Unpublished Sources

Statistical and non-statistical data can also be collected from various unpublished sources.

- **Type of Surveys**

Socio-Economic Survey

Demographic survey is concerned with collection of socio-economic data regarding characteristics of human populations, such as size, growth, density, distribution, and vital statistics. This survey forms base for not only understanding current socio demographic characteristics of specific area but also projections of future population and related infrastructure. However this survey is to be done in rare cases only as Census of India provides detailed information of demography.

Density Surveys

Density surveys are done to understand the relationship between built-up area and population density. It is taken up for assessment of infrastructure requirements, to reduce congestion, appropriate availability of land for specific activities and services required by residents for good quality of life.

Residential Density

Residential density surveys are undertaken with the objective to understand the accommodation density, built-up area density (built-up area per land area) and the residing population density. Based on the analysis from this survey, the decisions on the control and promotional measures can be taken. There are two separate aspects of this objective, first is less congestion within dwelling unit and second is low- high density in a neighbourhood or the study area. Another reason for such surveys is to control number of people residing in an area so as to provide appropriate/sustainable or decentralised services and utilities for the area.

Residential density is normally expressed in terms of:

- ✓ Houses per unit land (dwelling units/hectare),
- ✓ Habitable rooms per unit land (rooms/hectare) (Accommodation density) and
- ✓ Persons per unit land (persons/hectare) (Population Density).

For comparison at later stages and analysis of the residential areas, the study area can be further divided into zones/sub-divisions of similar housing types/conditions and tentative observation of density or based on similar pattern for survey within the study area.

As accommodation density and population density are calculated for same unit of area, these can be compared to reach at number of persons (occupancy rate) per habitable room. Thus it is used to determine whether particular area is underutilized or over-utilised. This information can be used in future planning to decide which areas are to be decongested and in which areas density can be increased.

Infrastructure Surveys

Infrastructure survey includes the survey of existing infrastructure within and surrounding the study area in terms of its population. The result of infrastructure survey is compared to benchmarks and parameters provided by National/Government authorities. Such survey includes physical as well social Infrastructure. This survey is commonly integrated with the land use survey to cohesively understand the use of land and to save on time and manpower.

- ✓ Physical infrastructure indicators: transportation, water supply, wastewater, sewerage, and solid waste management infrastructure.
- ✓ Social infrastructure indicators: educational, civic and utilities, health care, recreation infrastructure etcetera.

4.3.2 Primary details of survey details

The results of primary survey carried out in the village are described below:
Nani Naroli village is located in Mangrol Tehsil of Surat district in Gujarat, India. It is situated 8km away from sub-district headquarter Mangrol and 40km away from district headquarter Surat.
As per 2009 stats, Nani Naroli village is a gram panchayat. The Panchayat works for two villages. One is the village- Nani Naroli itself, and the other is Surali village. Surali is connected to Nani Naroli by a 4 kilometer kachcha road. It is situated in a remote area and the village is a cluster with a meagre population of 521. It is situated 5km away from sub-district headquarter Mangrol and 47km away from district headquarter Surat.

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

The houses in the village depends upon the financial condition of the family. The middle class and wealthy households have pucca houses of various sizws and most of houses are one storey or two storey pucca houses in the village.
The house size on an average for the dwellers is 12' * 25'.
Geo-tagging of any houses is not done yet.

4.3.4 No of Human being in One House

Average number of members varies between one to as much as twelve in the village. However, on an average, there are 6 person living per household.

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

No construction material such as cement, aggregate, sand, timber, etc. is available in the village and all is brought from outside the village from surrounding villages or towns.
Though the many kachcha houses of village are built with clay and cow dung from village. They also use corrugated cement sheets as roofing material for kachcha houses.

4.3.6 Geographical Detail

The geographic details of the Nani Naroli village is as follows:

Table 9 Geographical Details of Nani Naroli

Sr. No.	Description	Area in hectare
1	Area of village	1783
2	Forest Area	0
3	Agricultural Land Area	1502
4	Residential Area	115.43
5	Other Area (Non agriculture)	54.86

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

Table 10 Cast wise Population detail based on census 2011

Based On 2011 Census	
Cast	Population
S.C.	222

O.B.C.	512
S.T.	2225
OPEN	4505

4.3.8 Occupational Detail - Occupation wise Details / Majority business

The major occupation of the village as being described later on, are

- Agriculture
- Animal husbandry

Around 3% of the people residing in the village is engaged in animal husbandry and many in remaining population have their own livestock.
Almost 30% of the population has their own farms.
The remaining population either work as labourer or provide service at outside.

4.3.9 Agricultural Details / Organic Farming / Fishery

The following are the major crops grown in the village

- Sugarcane
- Telibiya
- Pulse

4.3.10 Physical Infrastructure Facilities - Manufacturing HUB / Ware Houses

There are no manufacturing hubs/warehouses present in the village.

4.3.11 Tourism development available in the village for attracting the tourist

The village does not have any tourist spot that can attract the outside traffic to the village and boost its economy.

4.4 Infrastructure Details

4.4.1 Drinking Water / Water Management Facilities

For drinking purpose, water is supplied from via
The main source of drinking water are:

- Piped water supply and
- Underground water

❖ Piped water- From Water Tanks

Drinking water supply to all the houses by the O/H & U/G water tank.
The village has two overhead tanks and one underground tank and one tank resting on ground.
The quality of drinking water is satisfactory.

Overhead Tank:

There are two overhead tanks in the village. One is 80000 and second is 60000 litre capacity.
Both are in working condition. Quality of water is also satisfactory.
Both of the tank is located in Tarki Faliyu of which exterior paint is tarnished by rain water.

Figure 19 O/H tank near panchayat building Tarki Faliyu

Figure 20 O/H tank in Tarki Faliyu

Underground sump: There are four underground sumps located in the village with capacity of 50000 litre in 3 number of tank and 70000 in one of them. One sump with 70000 capacity is situated in Moghlani Faliyu while the other two are present in road Faliyu and remaining one is Tarki faliyu.

Figure 21 U/G Water tanks in moghlani Faliyu and Tarki faliyu

Table 11 List of Water tanks

SR.	Type	No.	Capacity	Faliya
1	O/H	1	60000	Tarki Faliyu
2	O/H	1	80000	Tarki Faliyu
3	U/G	1	70000	Moghlani Faliyu
4	U/G	1	50000	Tarki Faliyu
5	U/G	2	50000	Road faliyu

Surface Water

Lake:

There is one lake in the village. Cattle bathing, washing of clothes and such other activities are carried out in this lake.

Figure 22 Lake in Nani Naroli

Hand Pump:
At Some Locations in the village, Hand Pumps are installed.

Figure 23 Hand Pump installed in village

4.4.2 Drainage Network / Sanitation Facilities

Drainage Network:
All of the village has closed Drainage Network, except harigan vas.

Figure 24 Manhole for underground drainage network

House Drainage: All Houses Have connection to the closed drainage system except small gathering of kuchha houses in harigan vas.

*Figure **25** Open drainage in Harigan vas*

Strom Water Drainage: There is no Strom water Drainage throughout the village. The water might collect by the road or in low laying areas and deteriorate the road surface and soil surface and cause problem of water logging.

Figure 26 Water gathered on road

Sanitation Facilities:

All houses connected to closed drainage facilities, except to few kuchha houses.

Public Toilet Block: Public toilet is not present in this village.

4.4.3 Transportation & Road Network

Approach road: The approach road of the village is pukka road.

Figure 27 Village Approach road

Internal roads: Most of the internal roads of village are well maintained. The WBM roads of some of the streets are well-maintained while the remaining either require maintenance or are disrupted by rains.

Figure 28 Internal Street of village

Local Transport – Bus stand: The village has well maintained two bus stands.

Figure 29 Nani naroli Bus stand

The internal transport facilities like auto, taxi, etc. are not available in the village. All the houses have private vehicles like bike, bicycles. Very few houses have car.

Electricity

All the houses in the village are given electricity power supply. The power distribution and transmission lines and cables are overhead.

Power Outage: This has almost reduced to nil.

Electricity distribution in the village takes place for the following purposes:

- Domestic use
- Government buildings/school
- Street light

Figure 30 Electricity pole

4.4.4 Housing condition

Most of the houses in the village are puckka houses. While some of the kuchcha houses still exist in the village, their proportion is less.

Table 12 Housing Condition in Nani Naroli village

Housing condition	Numbers
Puckka House (naliya)	293
Puckka House(terrace)	918
Kuchha House	438
Mud House	134

Figure 31 Housing condition in Nani Naroli

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

Infrastructure assets such as rural roads, tracks, bridges, irrigation schemes, water supplies, schools, health centers and markets are needed in rural areas for the local population to fulfill their basic needs and live a social and economic productive life.

Health Facilities

Sub-centre: There is sub-centre in village but it is closed and not in use. There is PHC available which is in working condition.

There is one doctor and two nurses available to diagnose and treat villagers for most common diseases. There is Laboratory with technician and a malaria ward. There are three bed for male and female ward each. There are two peon working in PHC. There is ambulance with driver available for emergency as well. The daily average patient count is 30.

Figure 32 closed Sub centre in Nani Naroli

Figure 33 PHC available in Nani Naroli

Education Facilities

Anganwadi: Nani Naroli village has five Anganwadis.

Figure 34 Angawadi in village

Primary School: Two primary schools are located in the village. Both are government schools. Each school has one male and one female teacher along with Principal & clerk & maid staff.

Figure 35 Primary School in village

Mid-day Meal Scheme is currently enforced in both the primary schools. It is a scheme by Government of India to provide free meals at noon to the school children keeping in mind the nutrition value to prevent malnutrition.

Secondary and Higher Secondary School: Secondary and Higher Secondary School is available in village.

Figure 36 Secondary and Higher Secondary School in village

Community Hall

The village does have community hall constructed by GIPCL trust in village but it is in need of severe maintenance. It's better to build a new bigger community hall with various facilities for the village people, which can serve for any functions of celebrations held in the village.

Figure 37 Community hall in village

Public Library

Public library is not present in the village.

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

The public buildings are in good enough conditions though it might need slight maintenance to keep good appearance and working condition.
The panchayat building might need repair and maintenance in the shed portion as there are broken parts in corrugated sheets of shed.

4.4.7 Technology Mobile/ WIFI / Internet Usage Details

Most of the people of the village use mobile smart phones. The mobile signal strength is excellent in the village for almost all networks.
There is no public WI-FI spot located in the village. However, cellular data works quite well, without buffering.

4.4.8 Sports Activity as Gram Panchayat

Gram Panchayat does not hold any sports activity in the village. However, the kids and youth of the village play various games like gully cricket and other street games. A community playground in village can benefit the villages and village children to wind down from the hectic work days and raise their living standard.

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

The definition of socio-cultural is something that involves the social and cultural aspects.
"Sociocultural Infrastructures" are basic physical and organizational structures needed for the operation of a society or enterprise, or the services and facilities necessary for an economy to function. It is an important term for judging a country or region's development.

Public Garden /Park/Playground:

There are no public parks or playground available in the village. The villagers have to go to another bigger village or the kim city nearby to enjoy such facilities. Which not all can afford either for lack of time or money.

Village Pond/Lake:

There is big lake in village but it is not maintained and no recreational activity can be done there right now.
People bathe the animals inside these ponds. Not only this, they still come to wash clothes besides the pond.
Though the pond has been covered in the weeds and wild lotus plants and does not give very aesthetic appearance. It has potential to devlop.

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

None facilities as above mentioned in example exists in the village. The smart toilets and self-cleansing public buildings can benefit village greatly.
The village roads doesn’t have well developed footpaths alongside. The pedestrian can only walk along the road sides. The well-developed footpaths with beautiful plants at certain distance will greatly benefit the appearance and aesthetics of the village.

4.5 Existing Institution like - Village Administration – Detail Profile

4.5.1 Bachat Mandali

No bachat mandli exists in the village.

4.5.2 Dudh Mandali

A milk co-operative society exists in the village. Mostly buffaloes are raised and milk is sold to this mandali. This is one of their major occupation.

Figure 38 Dudh mandali in village

4.5.3 Mahila forum

No Mahila forum exist in the village. Having a mahila forum in the village to support the village women will be beneficial for further growth and development of the village.

4.5.4 Plantation for the Air Pollution

There are no conscious plantations being done in the village for air pollution though the village itself has wild vegetation growing around. Which is still helping reduce the air pollution in the surrounding. Having large area the village has great potential for being a developed green village.

4.5.5 Rain Water Harvesting - Waste Water Recycling

There are no rain water Harvesting or Waste Water recycling being done in the village. Though having a rain water harvesting system will greatly help village as they don't have adequate water supply based on the current population of village.

4.5.6 Agricultural Development

There are no advance agriculture instruments or techniques are being used in the village.

Chapter 5 Technical Options with Case Studies of the Existing Village

5.1 Concept (Civil)

5.1.1 Advance Sustainable construction techniques / Practices and Quantity Surveying

The advance sustainable techniques used in today's times are listed below and 3D printing is described,

- 3D printing.
- Building information modelling (BIM).
- Cladding systems.
- Computer aided design and computer aided manufacturing (CAD/CAM).
- Computer numerical control.
- Construction Innovation Hub.

Construction 3D Printing (c3Dp) or 3D Construction Printing (3DCP) refers to various technologies that use 3D printing as a core method to fabricate buildings or construction components.

There are a variety of 3D printing methods used at construction scale, these include the following main methods: extrusion (concrete/cement, wax, foam, and polymers), powder bonding (polymer bond, reactive bond, sintering) and additive welding. 3D printing at a construction scale will have a wide variety of applications within the private, commercial, industrial and public sectors. Potential advantages of these technologies include faster construction, lower labour costs, and increased complexity.

Figure 39 3D printing in construction

By adding more intelligent designs and an optimised use of materials to the mix, 3D construction printing can also pave the way for a built environment with greater sustainability.

A 3D construction printer can be used to create concrete structures in a quick and cost-effective manner, and with a significant degree of design flexibility - without the need for formwork. This makes the procedure an ideal alternative to brick construction.

5.1.2 Soil Liquefaction

Soil liquefaction is one of the primary geotechnical failures that occur as a result of a seismic event.

Effect of soil Liquefaction

- The effects of soil liquefaction on the built environment can be extremely damaging. Buildings whose foundations bear directly on sand which liquefies will experience a sudden loss of support, which will result in drastic and irregular settlement of the building causing structural damage, including cracking of foundations and damage to the building structure, or leaving the structure unserviceable, even without structural damage. Where a thin crust of non-liquefied soil exists between building foundation and liquefied soil, a 'punching shear' type foundation failure may occur. Irregular settlement may break underground utility lines. The upward pressure applied by the movement of liquefied soil through the crust layer can crack weak foundation slabs and enter buildings through service ducts, and may allow water to damage building contents and electrical services.
- Bridges and large buildings constructed on pile foundations may lose support from the adjacent soil and buckle, or come to rest at a tilt.
- Sloping ground and ground next to rivers and lakes may slide on a liquefied soil layer (termed 'lateral spreading'), opening large ground fissures, and can cause significant damage to buildings, bridges, roads and services such as water, natural gas, sewerage, power and telecommunications installed in the affected ground.
- Buried tanks and manholes may float in the liquefied soil due to buoyancy.
- Earth embankments such as flood levees and earth dams may lose stability or collapse if the material comprising the embankment or its foundation liquefies.

Electro osmosis method for prevention of soil Liquefaction

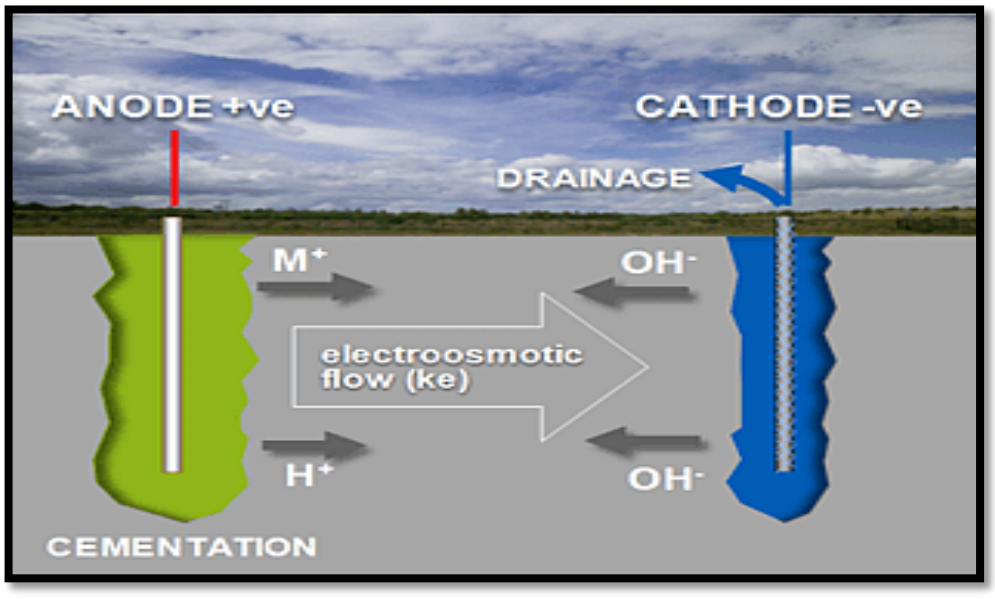


Figure 40 Electro Osmosis Process for Soil Liquefaction.

Electro-osmosis technology involves placing electrodes beneath an existing structure to prevent soil liquefaction in certain soils by reducing the pore pressure rise during the earthquake event.
Electro-osmosis is the movement of liquid in response to an applied electric field across a conduit such as a membrane, capillary tube, micro channel, or porous material. In electro-osmosis, the bulk fluid moves relative to a charged surface due to an external electric field.

5.1.3 Sustainable Sanitation

Sustainable sanitation aims at overcoming these drawbacks. It is not a certain technology, but an approach with certain underlying principles. There are a number of technologies that can be used to make sanitation and wastewater management more sustainable. The term "sustainable sanitation" in principle denominates the same as ecological sanitation, though the latter has a stronger focus on source separation.

- **Needs of sustainable sanitation**

The overall purposes of sanitation are to provide a healthy living environment for everyone, to protect the natural resources (such as surface water, groundwater, soil), and to provide safety, security and dignity for people when they defecate or urinate.

- **Sustainability criteria for sanitation**

Health

Poorly handled faecal sludge poses high health risks (much spillage and no personal protective equipment for the workers)
Health aspects include the risk of exposure to pathogens and hazardous substances that could affect public health at all points of the sanitation system from the toilet via the collection and treatment system to the point of reuse or disposal. The topic also covers aspects such as hygiene, nutrition and the improvement of livelihood achieved by the application of a certain sanitation system, as well as downstream effects.

Environment and natural resources

Environment and natural resources aspects involve the required energy, water and other natural resources for construction, operation and maintenance of the system, as well as the potential emissions to the environment resulting from use. It also includes the degree of recycling and reuse of excreta practiced and the effects of these, for example reusing the wastewater, returning nutrients and organic material to agriculture, and the protecting of other non-renewable resources, for example through the production of renewable energy (e.g. biogas or fuel wood).

Technology and operation

Technology and operation aspects incorporate the functionality and the ease with which the system can be constructed, operated and monitored using the available human resources (e.g. the local community, technical team of the local utility etc.). It also concerns the suitability to achieve an efficient substance flow management from a technical point of view. Furthermore, it evaluates the robustness of the system, its vulnerability towards disasters, and the flexibility and adaptability of its technical elements to the existing infrastructure, to demographic and socio-economic developments and climate change.

Finance and economics

Financial and economic issues relate to the capacity of households and communities to pay for sanitation, including the construction, maintenance and depreciation of the system. Besides the evaluation of investment, operation and maintenance costs, the topic also takes into account the economic benefits that can be obtained in "productive" sanitation systems, including

benefits from the production of the recyclables (soil conditioner, fertiliser, energy and reclaimed water), employment creation, increased productivity through improved health and the reduction of environmental and public health costs.

Socio-cultural and institutional aspects

Socio-cultural and institutional aspects take into account the socio-cultural acceptance and appropriateness of the system, convenience, system perceptions, gender issues and impacts on human dignity, the contribution to subsistence economies and food security, and legal and institutional aspects.

5.1.4 Transport Infrastructure / system

- **Types of Roads Based on Materials**

I. Earthen Roads

Figure 41 Earthern Roads

Earthen roads are laid with soil. They are cheaper of all types of roads. This type of road is provided for less traffic areas and or for countryside areas. Good drainage system should be required which reflects good performance for longer period.

II. WBM Roads

Figure 42 WBM Road

Water Bound Macadam (WBM) roads contain crushed stone aggregate in its base course. The aggregates are spread on the surface and these are rolled after sprinkling water.
WBM roads provides better performance compared to earthen, gravel, murrum and kankar roads.
WBM roads are laid as layers about 10cm thickness of each layer. They are very rough and may disintegrate immediately under traffic.

III. Bituminous Roads

Figure 43 Bituminous road

Bituminous roads are very popular roads around the world. They are most used roads in the world. They are low in cost and good for driving conditions. They are flexible and thickness of bituminous roads depends upon the subgrade soil conditions.

Types of Roads Based on Location and Function

National Highways

National highways are main roads of a particular country. They connects all major cities to the capital of the country. They run throughout the length and breadth of the country. Minimum two lane road is provided for national highways.

State Highways

State highways are second main roads which connect major parts of state with in it. State highway ultimately connects to the national highways.

District Roads

District roads are provided with in the cities and connects markets and production places to state and national highways. Two types of district roads are there namely,

Major district roads & Minor district roads

Major district roads connect headquarters of neighboring district with main parts of district while minor district roads are laid with in the district.

Rural Roads or Village Roads

Village roads connects the nearby villages with each other. They lead to nearby town or district roads. Usually low quality roads are provided as village roads because of low traffic.

5.1.5 Vertical Farming

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

Figure 44 Vertical Farming

The main advantage of utilizing vertical farming technologies is the increased crop yield that comes with a smaller unit area of land requirement. The increased ability to cultivate a larger variety of crops at once because crops do not share the same plots of land while growing is another sought-after advantage. Additionally, crops are resistant to weather disruptions because of their placement indoors, meaning less crops lost to extreme or unexpected weather occurrences. Lastly, because of its limited land usage, vertical farming is less disruptive to the native plants and animals, leading to further conservation of the local flora and fauna.

5.1.6 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure

What is corrosion?

Corrosion is when a refined metal is naturally converted to a more stable form such as its oxide, hydroxide or sulphide state this leads to deterioration of the material.

Corrosion Mechanism

Steel in concrete is normally protected from corrosion by a passive film of iron oxides on the steel surface resulting from the natural alkaline environment of the concrete. The passive film is chemically stable in the absence of carbonation and chloride ions. The ingress of chloride ions (Cl-) to the level of the steel reinforcing bars destroys the passive film and initiates corrosion. This makes reinforced concrete structures in coastal areas and/or marine environments vulnerable to damage by corrosion of steel reinforcement. Reinforced concrete infrastructures located in cold environments are also susceptible to corrosion damage due to the use of deicing salts. Carbonation penetrates concrete cover and destroys the passive film

by the neutralizing alkalinity of concrete. Once corrosion is initiated, electrochemical reactions occur, leading to the formation of expansive corrosion products that create tensile stresses in the concrete surrounding the corroding steel reinforcing bar. This results in concrete cracking and spalling, which aggravates the progressive damage, thus affecting the durability of the structure.

Prevention & Repair Measures of RCC Structure

Epoxy-coated reinforcing steel —Epoxy-coated reinforcing bars have been widely used in aggressive environments since about 1973 and have generally met with success in delaying corrosion due to the ingress of chlorides. ASTM A 775 and AASHTO standard specifications were developed that outlined coating application and testing.

Galvanized steel —Galvanized steel has been used in concrete for the last 50 years, and is particularly appropriate for protecting concrete subjected to carbonation because zinc remains passivated to much lower levels of pH than does black steel. Unfortunately, zinc dissolves in a high pH solution with the evolution of hydrogen (H2) as the cathodic reaction the performance of galvanized bars significantly decreases if there is carbonation in the concrete surrounding these bars.

Stainless steel —Stainless steel is under investigation as a reinforcing material for structures in, particularly aggressive environments. While ASTM A 304 stainless steel can tolerate higher amounts of chlorides, it is necessary to use a more expensive ASTM A 316L grade to gain significantly improved properties, particularly in bar mats of welded reinforcing steel

Cement and pozzolans — the components of the concrete that determine the pH of the pore solution, the total porosity, and the pore-size distribution are of importance for the corrosion process. In general, mineral admixtures such as fly ash, slag, and silica fume reduce and refine the porosity. Concretes containing these minerals exhibit considerably enhanced resistance to penetration of chlorides from the environment. The binding capacity of cement for chloride ions has been considered to be directly related to the C3A content of the cement. This is because the chloride ions can react to form insoluble chloro aluminates. The chloride ions, however, cannot be totally removed from solution by chemical binding. An equilibrium is always established between the bound and the free chloride ions, so that even with high C3A contents, there will always be some free chloride ions in solution.

Water-cementitious materials ratio —the porosity and the rate of penetration of deleterious species are directly related to the water-cementitious materials ratio (w/cm). For high-performance concretes, the ratio is generally less than 0.40 and can be as low as 0.30 with the use of suitable water-reducing admixtures.

Aggregate — unless it is porous, contaminated by chlorides, or both, the aggregate generally has little influence on the corrosion of reinforcing steel in concrete.

Curing conditions —the longer concrete is allowed to cure before being exposed to aggressive media, the better it resists penetration by chlorides or CO2. At an early age, fly ash concrete

usually exhibits lower resistance to penetration of chlorides than an ordinary port land cement concrete, whereas, at greater maturity, the fly ash concrete may have superior properties.

5.1.7 Sewage treatment plant

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

The sewage treatment plant is the system consisting of various treatment units that does the process of sewage treatment.

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

Sewage treatment plant processes fall into two basic types:

Anaerobic Sewage Treatment

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

Aerobic Sewage Treatment

In this process, aerobic bacteria digest the pollutants. To establish an aerobic bacterial colony you must provide air for the bacteria to breathe. In a sewage treatment plant, air is continuously supplied to the Bio zone either by direct Surface Aeration using Impellers propelled by pumps which whisk the surface of the liquid with air, or by Submerged Diffused Aeration using blowers for air supply through bubble diffusers at the bottom of the tank. (The most modern aerobic sewage systems use natural air currents and do not require electricity, though these are only used for small scale sewage systems at the moment. Once again, the general public leads the way!) Aerobic conditions lead to an aerobic bacterial colony being established. These achieve almost complete oxidation and digestion of organic matter and organic pollutants to Carbon Dioxide, Water and Nitrogen, thus eliminating the odour and pollution problem above. The effluent produced by this process is non-polluting and can be discharged to a watercourse.

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

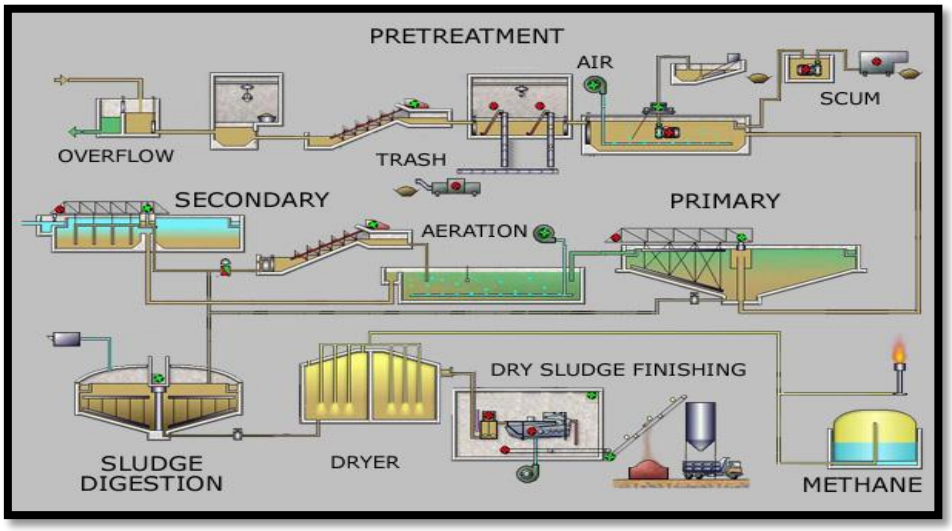


Figure 45 Sewage Treatment Plant Process

Primary Treatment

This is usually Anerobic. First, the solids are separated from the sewage. They settle out at the base of a primary settlement tank. The sludge is continuously being reduced in volume by the anerobic process, resulting in a vastly reduced total mass when compared to the original volume entering the system.

The primary settlement tank has the sludge removed when it is about 30% of the tank volume.

Secondary Treatment

This is Aerobic. The liquid from the Primary treatment contains dissolved and particulate biological matter. This is progressively converted into clean water by using indigenous, water-borne aerobic micro-organisms and bacteria which digest the pollutants. In most cases, this effluent is clean enough for discharge directly to rivers.

Tertiary Treatment

In some cases, the effluent resulting from secondary treatment is not clean enough for discharge. This may be because the stream it is being discharged into is very sensitive, has rare plants and animals or is already polluted by someone's septic tank. The Environment Agency may then require a very high standard of treatment with a view to the new discharge being CLEANER than the water in the stream and to, in effect, 'Clean it up a bit'. It is usually either Phosphorous or Ammoniacal Nitrogen or both that the E.A. want reduced. Tertiary treatment involves this process. If Phosphorous is the culprit, then a continuous dosing system to remove it is the tertiary treatment. If Ammoniacal Nitrogen is the problem, then the sewage treatment plant process must involve a nitrifying and then de-nitrification stage to convert the ammoniacal nitrogen to Nitrogen gas that harmlessly enters the atmosphere.

Chapter 6 Swatchh Bharat Abhiyan (Clean India)

6.1 Swatchhta needed in allocated village -Existing Situation with photograph

Garbage Littering: there is absence of garbage disposal system. The waste generated from each home is collected by the garbage van and it is disposed in area surrounding the road. Since, the incineration is still being utilized in the village, all the drawbacks of the method of disposal comes into picture as well. One of the main side effect is air pollution. Along with it, land pollution also arises. Since, agriculture is still practiced and that too as a major occupation, taking care of the fertile land is not only voluntary out of concern; but it becomes a necessity too.

To overcome these issues and threats a capable garbage disposal system is needed in any community. Awareness about harmful effects of garbage littering on village beauty and overall health of village should be spread so to not hinder the development and growth of the village.

Figure 46 The Garbage Disposed by road side and incinerated

- **Compost:**

Compost is made by decomposing organic materials into simpler organic and inorganic compounds in a process called composting. This process recycles various organic materials otherwise regarded as waste products. A good compost is rich in plant nutrients and beneficial organisms.

Once again, the dung cakes are prepared individually outside each home in the open space. This reduces effective land which can be utilized for other purposes too, and also, spoils the beauty. Hence, a separate piece of land can be allocated to the villagers for the composting.

Also, the villagers do not adopt any scientific method for composting. They just allow the cow dung to degenerate on its own. Lack of scientific knowledge reduces the productivity and efficiency. Hence, a systematic design should be adopted.

The other biodegradable waste can also be incorporated along with this. It will also solve the issue of waste disposal.

The example of composting methods that can be used on local level are biogas plant, vermi compost, compost pits in farms etc.

6.2 Guidelines - Implementation in allocated village with Photograph

- Dust bins should be allocated to each and every house.

- ❖ Also at every certain distance on road sides a common garbage bins should be placed to reduce the street garbage littering.
- ❖ The awareness regarding cleanliness and hygiene should be developed.
- ❖ A campaign on how to divide garbage in to wet, organic, or dry garbage etc. should be done so as to make it easier for waste management of the community.
- ❖ Seminars can be conducted regarding environment friendliness.
- ❖ An awareness seminar should be done on topic of recycling of garbage which could be recycled.
- ❖ For that purpose a common recycle bin should be provided in each and every area to discard those recyclable items.
- ❖ Of course, for this, waste collection system should be implemented.
- ❖ Any barren land can be utilised for the incineration process to burn the waste collectively.
- ❖ This piece of land may be infertile waste lands.
- ❖ The location of the site of disposal should be enough far away from the community settlement so as to not disturb them.
- ❖ The villagers should be made acquainted with the scientific composting method.

Figure 47 waste land away from community settlement for waste disposal

6.3 Activities Done by Students for allocated village with Photograph

Following are the activities done by us for the allocated village:

- In this phase, we spread awareness by visiting and discussing with them importance of hygiene with village people.
- We also propagated the importance of waste collection and its disposal to the village authority.

Chapter 7 Village condition due to Covid-19

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

What is COVID-19? The unexpected Pandemic Disaster!

A coronavirus is a kind of common virus that causes an infection in your nose, sinuses, or upper throat. Most coronaviruses aren't dangerous.

When it started

In early 2020, after a December 2019 outbreak in China, the World Health Organization identified SARS-CoV-2 as a new type of coronavirus. The outbreak quickly spread around the world.COVID-19 is a disease caused by SARS-CoV-2 that can trigger what doctors call a respiratory tract infection. It can affect your upper respiratory tract (sinuses, nose, and throat) or lower respiratory tract (windpipe and lungs).

It spreads the same way other coronaviruses do, mainly through person-to-person contact. Infections range from mild to deadly.

When it reached India

The first case of COVID-19 in India, which originated from China, was reported on 30 January 2020. India currently has the largest number of confirmed cases in Asia, and has the second-highest number of confirmed cases in the world after the United States with more than 10.3 million reported cases of COVID-19 infection and more than 154,000 deaths as of February 2, 2021.

Symptoms of COVID-19:

The main symptoms to look for are:

- Fever
- Coughing
- Shortness of breath
- Trouble breathing
- Fatigue
- Chills, sometimes with shaking
- Body aches
- Headache
- Sore throat
- Congestion/runny nose
- Loss of smell or taste
- Nausea
- Diarrhea

Nani Naroli in midst of COVID-19 Pandemic

When we visited the village the total number of case was 8 and all the cases were treated with care. The people who contracted COVID-19 disease were all quarantined. The close family and people in contact with them were also quarantined for required period of time.

The villagers obeyed curfew and rules of wearing mask and social distancing.

As the existing situation prevailed at this time because of the pandemic spread all over the world due to COVID-19 and novel coronavirus, we have to abide by the rules and regulations while surveying the village.
We all wore mask to prevent the infection spreading more. We also kept social distance while taking village data and sanitized our hands thoroughly to prevent any infection.

7.2 Activities Done by Students for allocated village Clean with Photograph

We are habiting in Surat- which was heavily affected by the novel coronavirus. The number of COVID cases were maximum here amongst all the cities of Gujarat, next only to Ahmedabad. At this point, we were quarantined in our homes. We were not able to even visit the markets for daily necessities freely.
Hence, we were not able to travel the 60 kilometre distance to Nani Naroli at that point. We could not even get their condition at that time.
However, when the situation got easened up, we paid a visit to the village and got acquainted with the situation. The situation was not so pessimistic at that point. The local authorities took great measures and controlled the situation.

7.3 Any other steps taken by the students / villagers

For further prevention of the coronavirus, we took following measures from our end:

- We wore masks during our complete visit.
- We also maintained safe distance of 1 metre during our complete visit so as to not spread the virus.

Figure 48 Visiting our Village

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

8.1 Design Proposals

After thoroughly discussing, we decided to give the following design proposals as per the current need of the village:

1. Biogas Plant
2. High School
3. Public Toilet with soakage pit
4. Community Hall
5. Bank
6. Village gate

8.1.1 Sustainable Design (Civil)

❖ Biogas Plant

Introduction

Biogas is a mixture of different gases produced by the breakdown of organic matter in the absence of oxygen. Biogas can be produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage green waste or food waste.

As our village Nani Naroli has Animal husbandry as one of main occupation of people, it is wiser to use the manure produced by those animals to turn it in to another energy option. The kitchen waste and night soil waste also could be used in biogas plant. This will also reduce organic waste from the village as well as turn it in to something useful.

Advantages of Biogas Plant

- Biogas is Eco-Friendly
- Biogas Generation Reduces Soil and Water Pollution
- Biogas Generation Produces Organic Fertilizer
- It's A Simple and Low-Cost Technology That Encourages a Circular Economy
- Healthy Cooking Alternative for Developing Areas

Design specifications:

- The biogas plant is made of F.R.P. Material which is resistant to water, sunlight and electricity, if it is take care of well, can be used for up to 25 years.
- Everyday 10 kg cow dung along with 15 liters of water is put in the mixing tank.
- The cow dung is brought from cowsheds from nearby areas, where owners want to dispose it anyway.
- The mixture is fermented inside the fermentation tank by the anaerobic bacteria.
- The mixture is then converted into slurry through which methane gas and co2 gas are released.

- They also put kitchen waste into the tank for producing biogas which used for cooking.
- The amount of biogas produced can be used for feeding 4-5 members of the family and 10- 15kg manure is released from the plant everyday which is utilized in their backyard.
- The initial cost for setting up a biogas plant is somewhere between Rs.25000 and one can recover the cost by saving one.
- Government gives subsidy for biogas, For general category = 9,000
- For scheduled cast/category = 11,000 Rs
- The biogas production is best way to use natural recourses which is non-polluting and also use for making organic manure because of that we can use it in agriculture to reduce the harmful effects of chemical and pesticides.
- The biogas is used not only or cooking but also used as electrical purpose by converting the gas into electricity in invertors. It is a cheaper technology, helps to reduce the greenhouse gases and also helps to reduce waste generated.

Site selection for biogas plant:

- The area available should be adequate to accommodate all the units of the plant.
- Care should be taken that the site receives full sunlight without any obstruction from other surrounding structures or vegetation.
- Do not select low lying areas for the plant as water logging will create problems. Check the water table in the existing wells close to the plant location before site selection. If the water table is above the bottom level of the plant should be located at least 20 m away from the water sources such as wells, springs, tube wells etc. to avoid possible contamination of water sources.
- The site selected should be away from trees or tree stumps to mitigate the root hazard in the pre/post construction phase. To make plant operation easy and to avoid wastage of raw materials specially the waste substrate, the plant must be as close as possible to the waste source (cattle-shed, poultry waste collection chamber, kitchen waste, night soil pipe).
- The nearest water source should not be at a distance of more than 20 minute walk. Otherwise more time in fetching water from the source to the plant will bring unnecessary burden to the owner during the operation of the plant.

Lay out of plant and digester:

- Calculate the tentative length and breadth of the plant required as per the available
- Drawing. Level the ground before a plant lay out could be started.
- Mark with white powder on the centre line for inlet, digester, outlet and compost pits on the ground so that all are accommodated in the same plane.
- Fix 2 wooden pegs 2 m away from the end points of the plant as reference points during the construction.
- Fix a small wooden peg in the ground which will act as the centre for the digester.
- One end of a cord is attached to this peg with the length equal to the internal radius of the digester including plaster thickness, wall thickness and the footing offset.
- The other end of the cord is held tight without disturbing the position of the wooden peg and moved along a circular path. This circular mark made on the ground is covered with white powder (lime).

Design Calculation:

Component	Plant Size					
	2 m^3	4 m^3	6 m^3	10 m^3	15 m^3	20 m^3
A	70	140	150	180	248	264
B	60	120	120	125	125	176
C	67.5	135	151	183	205	233
D	25	50	60	68	84	86
E	77	154	155	168	180	203
F	51	102	122	154	175	199
G	97.5	195	211	243	265	293
H	43	86	92	94	115	115
I	56	112	116	124	132	137
J	75.5	151	160	171	193	203

Here, we design the bio-gas plant of 2 m³ capacity which is shown in drawing 2 and its dimensions are as per table

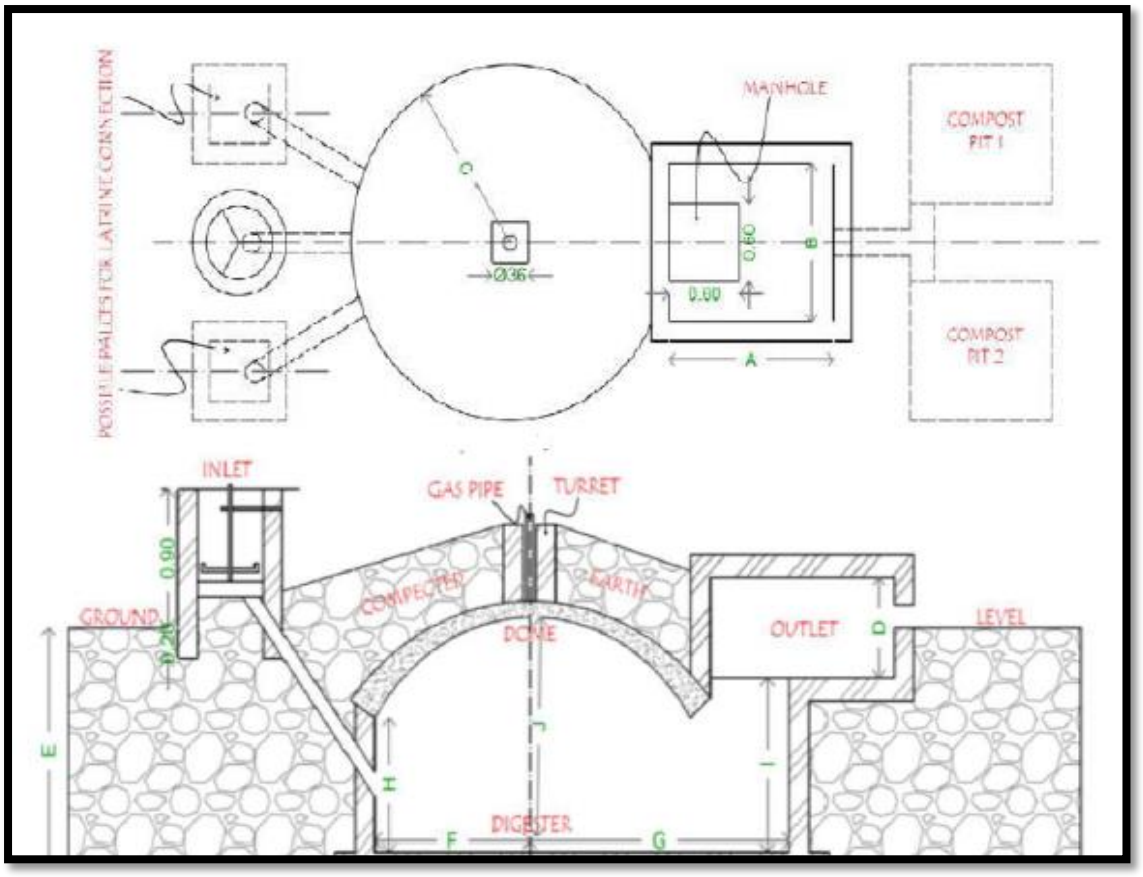


Figure 49 Biogas Plant Drawing

Estimation and costing for $2m^3$ bio-gas plants

Table 13 Estimation and costing for $2m^3$ bio-gas plants

No.	Item Description	No.	L(m)	B(m)	H(m)	Quantity
1	excavation for foundation up to full depth including sorting out and stacking of useful material up to 30 m. lead in loose per soft soil depth = 0.675m height = 0.77 m V1 = π/4 * d_2* h = .275 excavation for foundation of man hole V2 = L*H*D* =.06*0.6*.56 =0.201		0.6 0.6	0.675 0.6	0.77 0.56	0.275m3 0.201m3
2	Providing and laying C.C. (1:4:8) for foundation block For dome πr2h For man hole		 0.6	R= 0.675 0.60	 0.15 0.15	 0.201m3 0.214m3
3	**2nd class brick work using black brick** V = π/4 * d_2* h - inside hollow wall = π/4*0.67$7_2$ * 0.43 - π/4*0.67$5_2$ * 0.43 Masonry for man hole Length of long wall = 0.60+0.230 = 0.830 Length of short wall=same as long wall **1nd class brick work for outlet Chamber** Length of long wall = 0.702 Length of short wall = 0.602 Inlet tank cylindrical wall brick D1 = 0.623m D2= 0.37m V = π/4 * d_2* h - inside hollow wall	 2 1 2 2	 1.06 0.6 0.932 0.372	 0.23 0.23 0.23 0.23	 0.43 0.43 0.4 0.4	0.236m3 0.20m3 0.05m3 0.171m3 0.068m3 0.117m3
4	**R.C.C domical roof slab**					0.0747m3

	V= πh (c_2/8 +h_2//6) C=0.675 h= 0.321					
5	Providing 20 mm thick cement plastering in CM (1:3) on inner face of wall = πdh	2	-	D=1.35	0.43	3.64m2
	Providing 20 mm thick cement plastering in CM (1:3) on manhole Providing 20 mm thick cement plastering Inlet tank	3	0.6	D=1.35	-	2.43m2
						3.57m2

Abstract sheet of Biogas Plant

Table 14 Abstract sheet of Biogas Plant

Sr. No.	Item Description	Quantity	Rate	per	Amount
1	Excavation for foundation	0.476	85	Cu. m.	40.46
2	Providing and laying c.c. (1:4:8)	415	7800	Cu. m.	3237
3	2nd class Brick Masonry	0.902	3500	Cu. m.	3157
4	R.C.C. Domical roof slab	0.747	7800	Cu. m.	582
5	20mm thick plastering	9.64	100	Sq. m.	964.48
Total material cost					7980.46
Add 1.5% water charges					119.7
Sanitary fittings					3000
Labour charge					2300
TOTAL COST					14,000

Without a doubt, a biogas plant is one of the most ecological electricity generation processes that exist today. The use of biogas plants is the most efficient “control of the organic decomposition process” that exists to date.
Having a Biogas Plant in any village or countryside will benefit people greatly.

8.1.2 Physical design (Civil)

❖ High School

For good education of children and youth a proper school till the 12th standard is a necessity in any settlement. There is a gap of one high school in the village based on village population which is still growing rapidly. So we provided a high school for that purpose only.
Which will also cancel the need of commuting to other big towns or city for high school education.

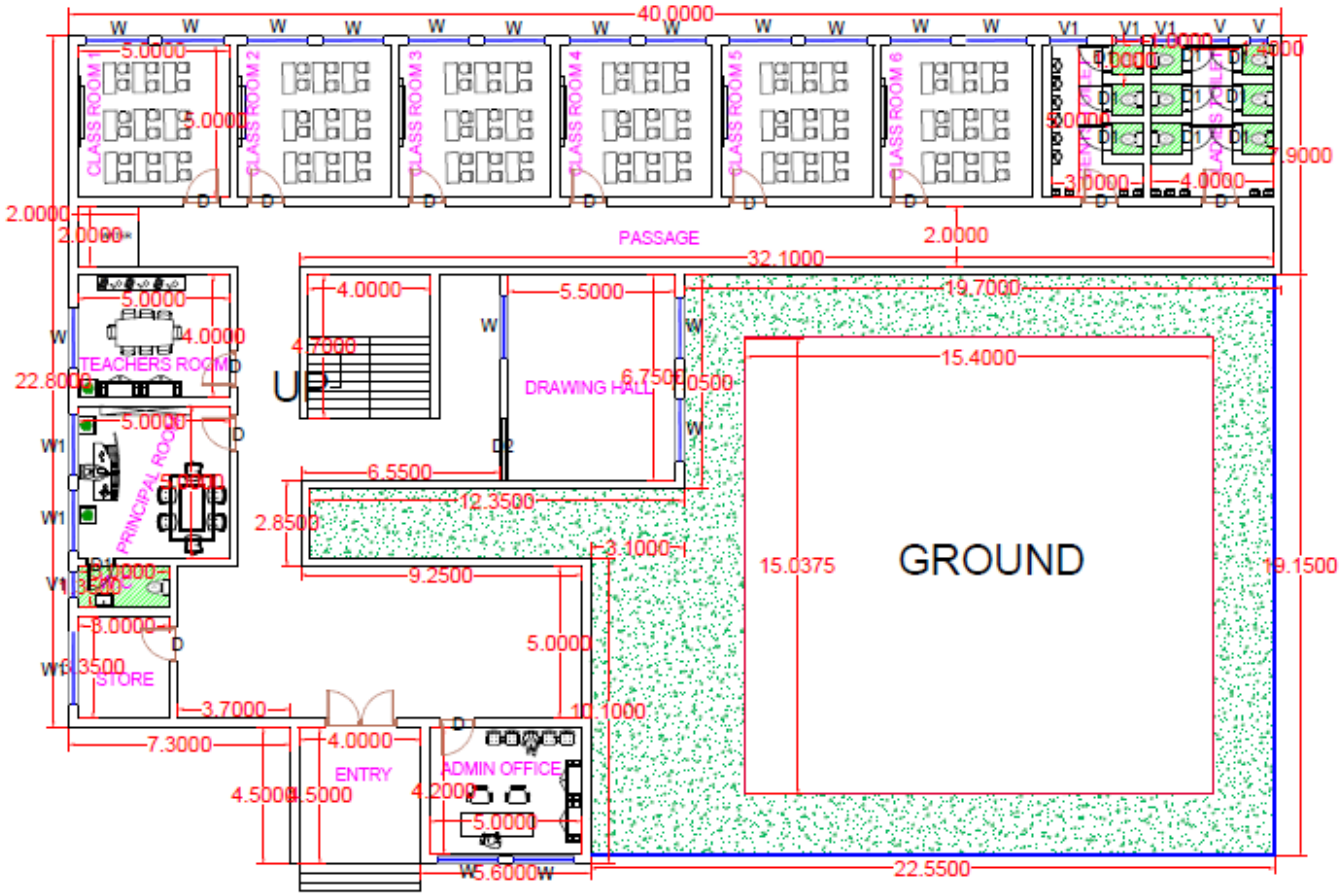


Figure 50 Ground Floor of High School

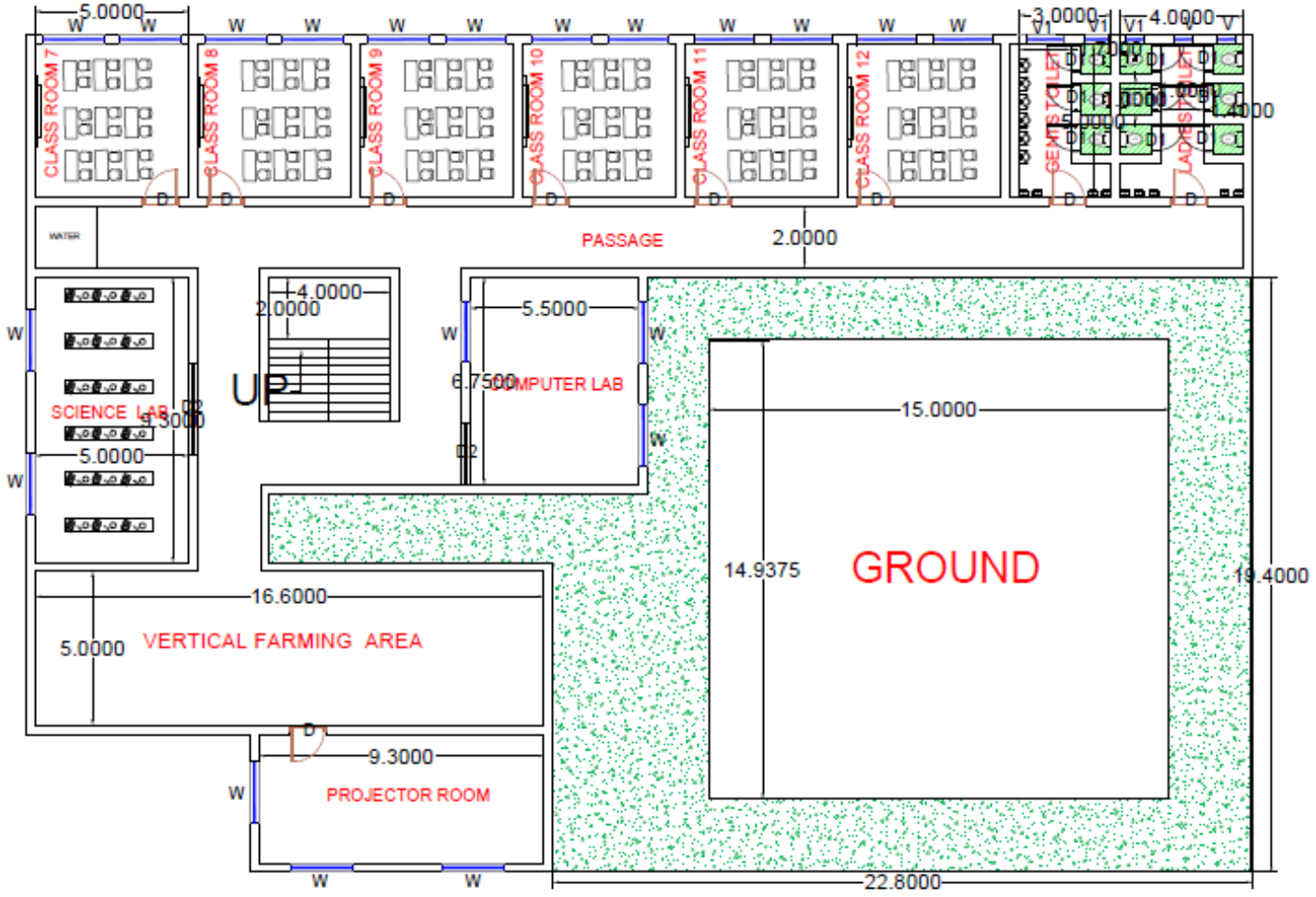
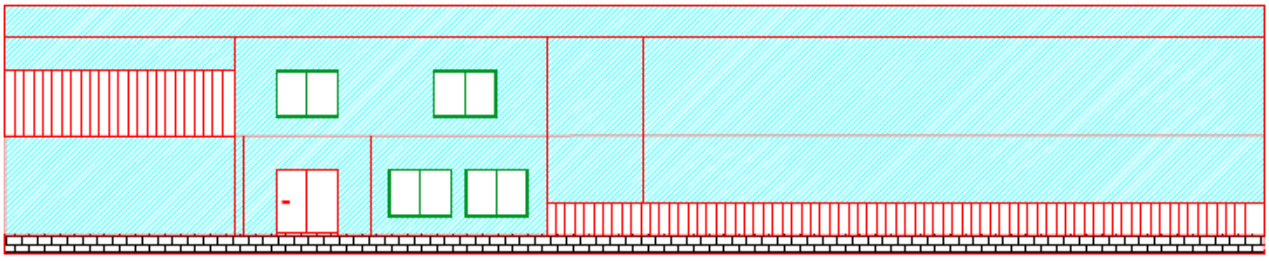
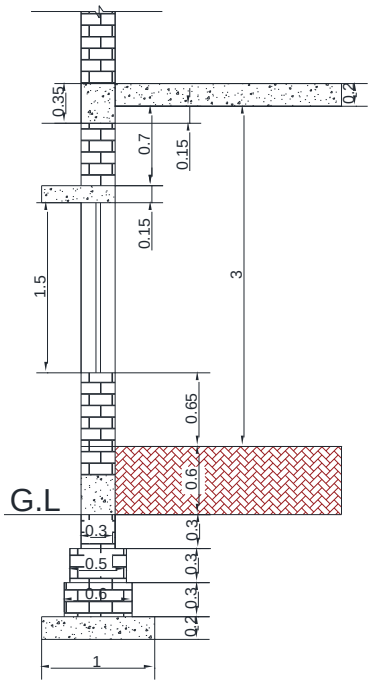


Figure 51 First Floor of High School



ELEVATION

Figure 52 Elevation of High School



SECTION

Figure 53 Section of wall of High School

Measurement Sheet of High School

Table 15 Measurement Sheet of High School

Sr. No.	Description	No.	Length	Width	Height	Quantity
1	Excavation in foundation					
	G.F. wall	1	313.9	1	1.1	345.29 m^3
					Total	345.29 m^3
2	P.C.C. in foundation					
	G.F. wall	1	313.9	1	0.2	62.78m^3
					Total	62.78m^3
3	Brickwork in foundation					
	G.F. wall					
	First step	1	325.5	0.6	0.3	58.05m^3
	Second step	1	324.65	0.5	0.3	48.697 m^3
	Third step	1	328.95	0.3	0.3	29.61m^3
						136.357 m^3
	Steps:					

	First	1	4	0.9	0.15	0.18 m^3
	Second	1	4	0.6	0.15	0.36 m^3
	Third	1	4	0.3	0.15	0.54m^3
						1.08 m^3
					Total	137.437m^3
	Plinth	1	328.95	0.3	0.6	59.21 m^3
					Total	196.64m^3
	Backfill(345.29-196.64)	1				148.64m^3
4	Brickwork in superstructure					
	G.F. wall	1	328.95	0.3	3	296.05m^3
	F.F. wall	1	316	0.3	3	284.4 m^3
						580.45m^3
	Deduction for door/window					
	D	21	1.2	0.3	2.1	15.876 m^3
	D1	19	0.9	0.3	1.5	7.695 m^3
	D2	3	3	0.3	1.2	3.24 m^3
	W	35	2	0.3	1.5	31.5m^3
	W1	6	2.5	0.3	1.5	6.75 m^3
	V	8	0.6	0.3	0.6	0.864 m^3
	V1	3	0.8	0.3	0.6	0.432 m^3
						(-)66.357m^3
					Total	514.093 m^3
5	R.C.C. work					
	Slab(637.84m^2)	2			0.15	191.352m^3
	Beam	1	328.95	0.3	0.3	29.6 m^3
		1	316	0.3	0.3	28.44 m^3
	Lintel	1	328.95	0.3	0.15	14.8 m^3
		1	316	0.3	0.15	14.22m^3
	Stair					20 m^3
					Total	298.412 m^3
6	2 cm thick marble flooring Deduction	1 1 1	1275.68 328.95 316	 0.3 0.3		1082.21m^2
7	Smooth plaster inside walls and ceiling					
	All inside of the wall(GF+FF)					2716.1m^2
	All outside of the wall(GF)		149.1		3.75	559.125m^2
	(FF)		153.1		4.15	635.365m^2
	Ceiling					1082.21m^2

	Deduction for Door/Window					
	D	21	1.2		2.1	52.92m^2
	D1	19	0.9		1.5	25.65m^2
	D2	3	3		1.2	10.8m^2
	W	35	2		1.5	105m^2
	W1	6	2.5		1.5	22.5m^2
	V	8	0.6		0.6	2.88m^2
	V1	3	0.8		0.6	1.44m^2
						(-)221.19m^2
					Total	3576.82m^2
8	Parapet wall	1	158.2	.2	1	31.64 m^3

Abstract Sheet of Public toilet

Table 16 Abstract Sheet of High School

Sr. No.	Particulars	Quantity	Unit	Rate	Per	Amount
1	Excavation in foundation	345.29	m^3	85	m^3	29349.65
2	Plain cement concrete (P.C.C) in Foundation (1:4:8)	62.78	m^3	3000	m^3	188340
3	Brickwork in Foundation up to Plinth level	196.64	m^3	3200	m^3	629248
4	Brickwork in superstructure	514.093	m^3	3500	m^3	1799325.5
5	R.C.C. work	298.412	m^3	8800	m^3	2626025.6
6	2 cm thick marble flooring	1082.21	m^2	500	m^2	541105
7	Smooth plaster inside walls and ceiling	3576.82	m^2	150	m^2	536523
8	Earth filling in excavation	148.64	m^3	50	m^3	7432
Total						Rs.6357348.75
Add 5% contingencies						Rs.317867.44
Grand Total						Rs.6675216.188
say						**Rs.6675216**

Total floor area = 1275.68 m^2
5232.67 Rs. per m^2

8.1.3 Social design (Civil)

❖ Public Toilet with soakage pit

There are no public toilet existing in whole Nani Naroli village as of right now so we decided to provide one as per required based on Gap Analysis.

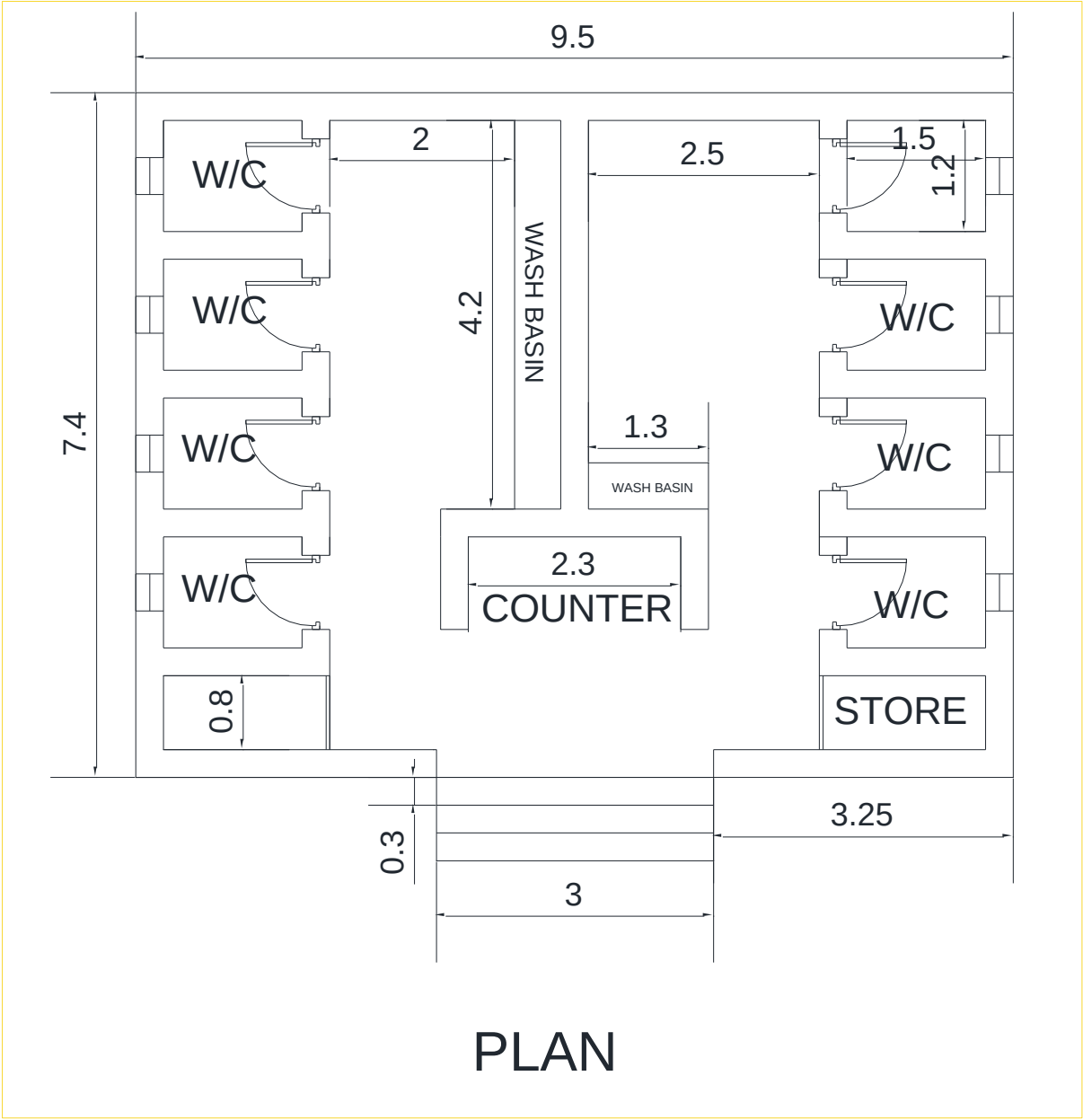


Figure 54 plan of public toilet

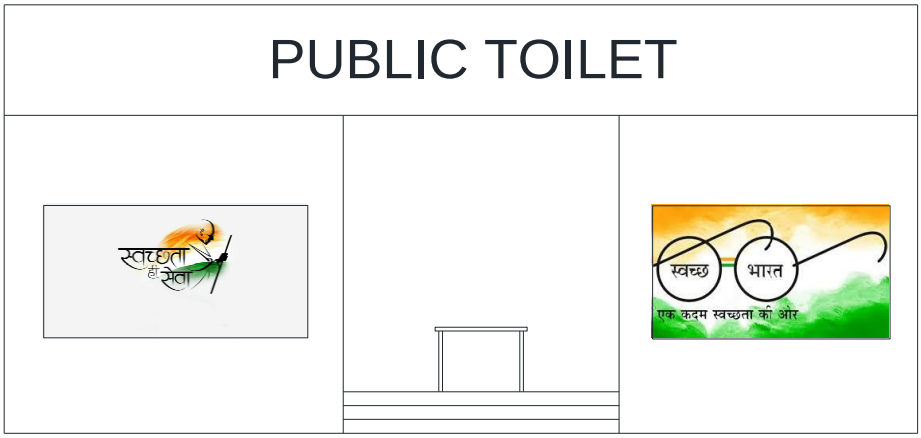


Figure 55 Elevation of Public Toilet

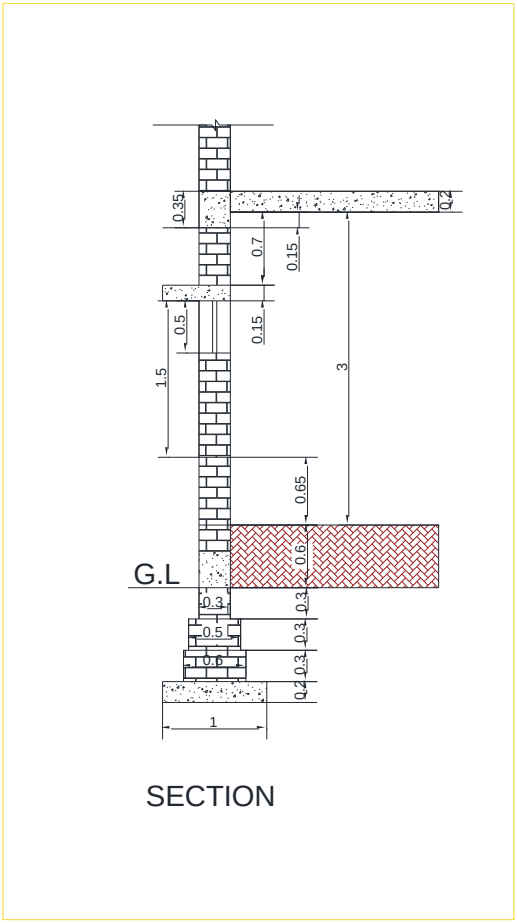


Figure 56 Section of wall of public toilet

Measurement Sheet of Public toilet

Table 17 Measurement Sheet of Public toilet

Sr. No.	Description	No.		Width	Height	Quantity
1	Excavation in foundation					
	Internal wall	1	67.3	1	1.1	74.03 m^3
					Total	74.03 m^3
2	P.C.C. in foundation					
	Internal wall	1	67.3	1	0.2	13.46 m^3
					Total	13.46m^3
3	Brickwork in foundation					
	Internal wall					
	First step	1	67.3	0.6	0.3	12.12 m^3
	Second step	1	67.3	0.5	0.3	10.1 m^3
	Third step	1	67.3	0.3	0.9	18.17 m^3
						40.39 m^3
	Steps:					
	First	1	3	0.9	0.15	0.405 m^3
	Second	1	3	0.6	0.15	0.27 m^3
	Third	1	3	0.3	0.15	0.135 m^3
						0.81 m^3
					Total	41.2 m^3
4	Brickwork in superstructure					
	wall	1	67.3	0.3	3	60.57 m^3
	Deduction for door/ventilation					
	D1	8	0.8	0.3	2.1	4.032m^3
	V	8	0.5	0.3	0.5	0.6 m^3
						(-)4.632 m^3
					Total	55.938m^3
5	R.C.C. work					
	Slab	1	9.5	7.4	0.2	14.06 m^3
		1	9.5	7.4	0.1	7.03 m^3
	Beam	2	9.5	0.3	0.15	.855 m^3
		5	7.4	0.3	0.15	1.665 m^3
	Lintel					2 m^3
					Total	25.61 m^3
6	2 cm thick marble flooring Deduction	1 1	9.5 67.3	7.4 0.3		50.11m^2

7	Smooth plaster inside walls and ceiling					
	All inside of the wall					302.4m^2
	All outside of the wall		33.8		4.8	162.24m^2
	Ceiling Deduction		9.5	7.4		50.11m^2
	Deduction for Door/ventilation					
	D1	8	0.8		2.1	13.44 m^2
	V	8	0.5		0.5	2 m^2
						(-)15.44m^2
					Total	499.31 m^2
8	Earth filling in excavation					
	Total excavation for walls+plinth filling					74.03 m^3 +30.066
	Brickwork up to G.L.					(-)40.39 m^3
	P.C.C.					(-)13.46m^3
	Total					50.25m^3
9	Parapet wall	1	33.8	.2	1	6.76 m^3

Abstract Sheet of Public toilet

Table 18 Abstract Sheet of Public toilet

Sr. No.	Particulars	Quantity	Unit	Rate	Per	Amount
1	Excavation in foundation	74.03	m^3	85	m^3	6292.55
2	Plain cement concrete (P.C.C) in Foundation (1:4:8)	13.46	m^3	3000	m^3	40380
3	Brickwork in Foundation up to Plinth level	41.2	m^3	3200	m^3	131840
4	Brickwork in superstructure	55.938	m^3	3500	m^3	195783
5	R.C.C. work	25.61	m^3	8800	m^3	225368
6	2 cm thick marble flooring	50.11	m^2	500	m^2	25055
7	Smooth plaster inside walls and ceiling	499.31	m^2	150	m^2	74896.5
8	Earth filling in excavation	50.25	m^3	50	m^3	2512.5
Total						Rs.702127.55
Add 5% contingencies						Rs.35106.378
Grand Total						Rs.737233.93
say						**Rs.737234**

Total floor area = 70.3 m^2

10487 Rs. per m^2

To Dispose the Waste water coming from the individual toilets the soak pit or soak aways can additionally be installed.

- **Soak pit or Soak away**

The soak pit which is also called soak away or soakage pit is a closed rectangular or circular, covered up construction with porous or perforated walls, which is connected to the primary treatment unit or directly connected to the washroom and even some specific types of toilet.
It allows water to slowly penetrate into the ground. Soak pit, which is lined with porous materials that provide foundational support to prevent the collapse of the underground chamber, may also be used for separate treatment of greywater (water from domestic sanitation, like showering and from kitchen areas).

Design Considerations
Design conditions that should be considered for the design of a soak-pit are as following;

1. Generally, the soak pit should consist of a chamber of approximately 1 m^3 and the depth of it should be kept between 1.5 m and 4 m deep.
2. The bottom of the soak pit should never be less than 2 m above the groundwater table.
3. The soak pit can either be lined with a porous material to provide additional support and prevent the collapse of walls if it is to be left empty. Or it can be left unlined and filled with gravel and sand to prevent the walls from collapsing, which will still provide adequate space for wastewater.
4. Though in both the above-mentioned cases, a layer of sand and fine gravel is to be spread across the bottom of the soak pit to help disperse the flow.
5. A removable lid (preferably concrete) should be provided to seal the pit until it needs to be maintained to allow for easy future access.
6. The soak pit should be constructed at a safe distance of at least 30 m away from local drinking water sources as it can possess the threat of contamination of groundwater.
7. The soak pit should also be kept well away from high-traffic areas so that the soil above and around it is not compacted.
8. It should be made sure that the site does not gather water from surface runoff, as too much mud filtered in the pit will clog the gravel and sand layer which will block the seepage and water will stagnant.

Construction procedure of Soak Pit

- Excavate a pit in the ground that's 3 feet to a side. Dig the hole away from the low, wet area and where there is little access to people. The pit size may vary according to the available room and the type of soil you are working in.

- Excavate a 1-foot-deep and six-inch-wide trench from the area with waste water (i.e. bathroom and washing area) to the soak pit. The trench should slope 1/4 inch for every 10 feet in length to ensure the water drains toward the pit. The trench should end where the soak pit begins.

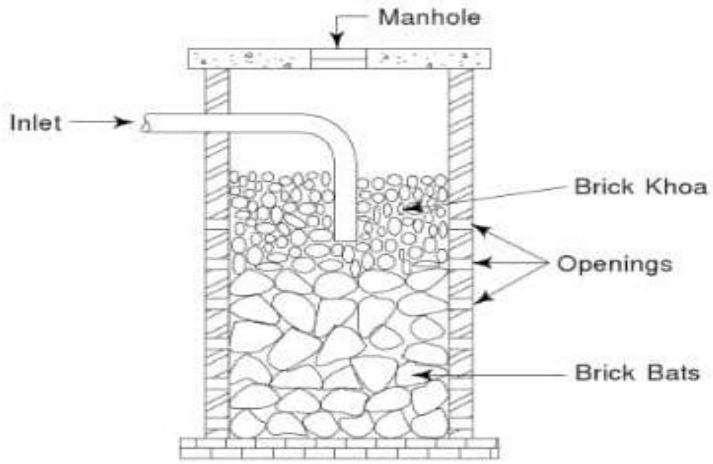


Figure 57 Soak pit

- Cover the walls of the excavation so that the dirt does not fill inward to the pit. Options include using construction blocks, bricks or a cement crepe.
- Stack the blocks on top of one another around the excavated area, making a four-sided chamber. You don't have to mortar together the blocks. Leave enough room between two of the blocks to allow access by the drain pipe.
- Lay 6 inches of sand or gravel on the bottom of the pit. Precise measurements or leveling is not required.
- Fill the soak pit with rocks of various sizes, taking care to not damage walls. Do not tightly pack the pit, which prevents water flow downward. The rocks should be of sufficient amount to keep the walls from pushing inward. The tops of the rocks should be just below where the drain pipe enters.
- Fill the drainage trench with 2 inches of gravel, taking care that the downward sloping is protected.
- Set a PVC drain pipe on the gravel, perforated side down. The pipe should extend into the center of the pit. Fill the trench with soil and level it off slightly higher than the existing soil. The soil will settle downward.
- Place a large, flat rock under the end of the pipe in the pit. This disburses the flow of water and prevents erosion of the rocks below.
- Lastly, cover the top of the pit with removable lid and make sure it is secured as to no child accidently open the pit.

Cost

For construction of soak pit government usually give fund of 2111/- Rs.

8.1.4 Socio-Cultural design (Civil)

- **Community Hall**

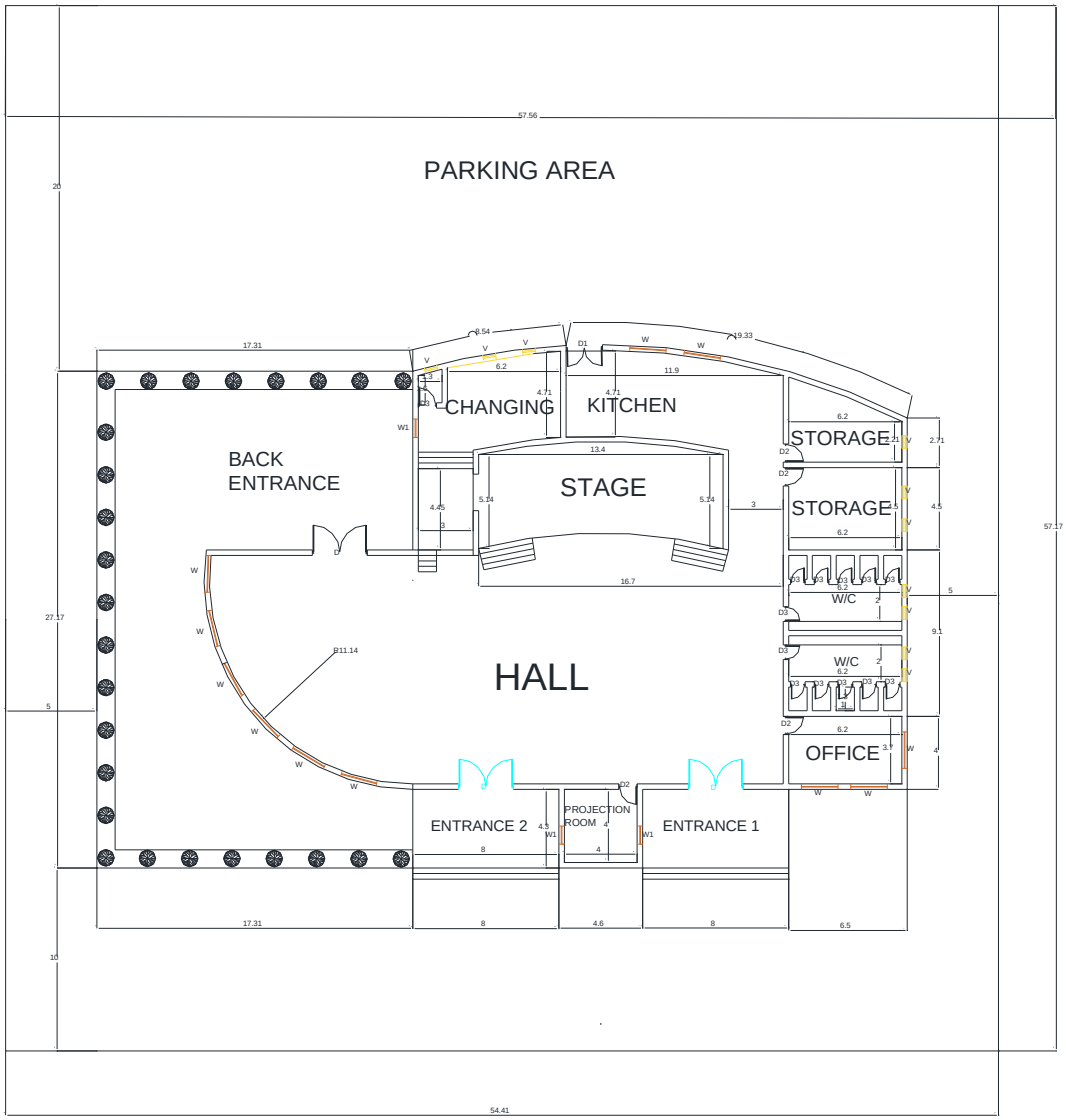


Figure 58 Plan of community Hall

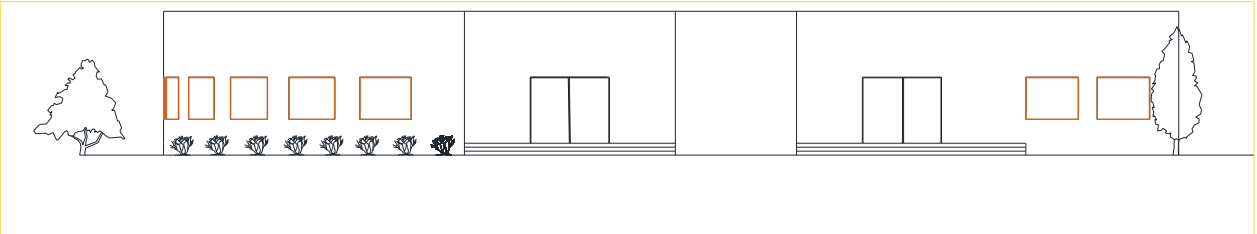


Figure 59 Elevation of community Hall

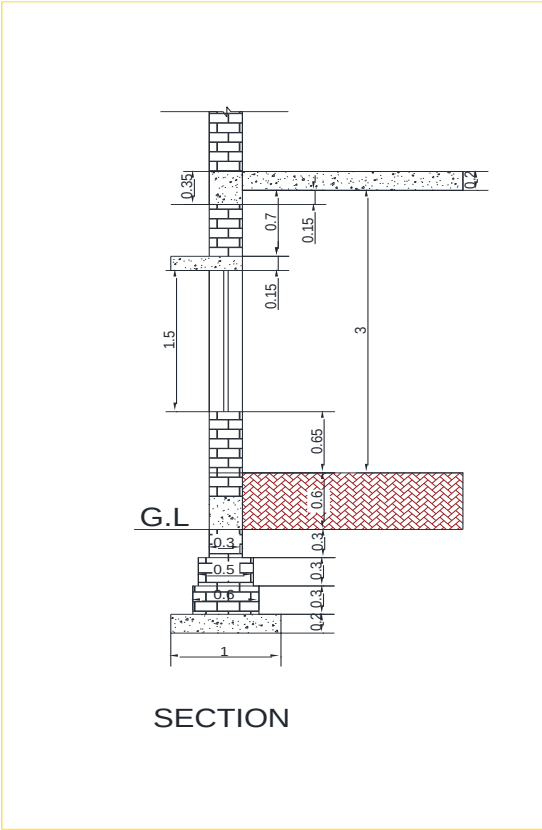


Figure 60 Section of wall of Community Hall

Measurement Sheet of Community Hall

Table 19 Measurement Sheet of Community Hall

Sr. No.	Description	No.	Length	Width	Height	Quantity
1	Excavation in foundation					
	Internal wall	1	212	1	1.1	233.2 m^3
					Total	233.2 m^3
2	P.C.C. in foundation					
	Internal wall	1	212	1	0.2	42.4 m^3
					Total	42.4 m^3

3	Brickwork in foundation					
	Internal wall					
	First step	1	212	0.6	0.3	38.16 m^3
	Second step	1	212	0.5	0.3	31.8 m^3
	Third step	1	212	0.3	0.9	57.24 m^3
	Steps:					
	First	2	8	4.9	0.15	11.76 m^3
	Second	2	8	4.6	0.15	11.04 m^3
	Third	2	8	4.3	0.15	10.32 m^3
					Total	160.32 m^3
4	Brickwork in superstructure					
	wall	1	212	0.3	3	190.8 m^3
	Deduction for door/window					
	D	3	3	0.3	2.1	5.67 m^3
	D1	1	2	0.3	2.1	1.26 m^3
	D2	3	1	0.3	2.1	1.89 m^3
	D3	13	0.8	0.3	2.1	6.55 m^3
	W	11	2	0.3	1.5	9.9 m^3
	W1	3	1	0.3	1.2	1.08 m^3
	V	10	0.7	0.3	0.5	1.05 m^3
						(-)27.4 m^3
					Total	163.4 m^3
5	R.C.C. work					
	Slab1 (Area=565.76)	1	-	-	0.2	113.15 m^3
	Slab2 (Area=98)	1	-	-	0.2	19.6 m^3
	Beam	1	70	0.3	0.15	3.15 m^3
		1	28	0.3	0.15	1.26
		1	27.1	0.3	0.15	1.22
		1	10	0.3	0.15	0.45
		1	20.31	0.3	0.15	0.91
		4	6.2	0.3	0.15	1.12
		1	32.21	0.3	0.15	1.45
		1	24	0.3	0.15	1.08
		2	5.14	0.3	0.15	0.23
		1	24.54	0.3	0.15	1.10
	Lintel					8 m^3
					Total	152.72 m^3
6	2 cm thick marble flooring Deduction	- 1	- 212	- 0.3	-	600.16m^2
7	Smooth plaster inside walls and ceiling					
	All inside of the wall					831.57m^2
	All outside of the wall					636m^2
	Ceiling					600.16m^2

	Deduction for Door/Window					
	D	3	3		2.1	
	D1	1	2		2.1	
	D2	3	1		2.1	
	D3	13	0.8		2.1	
	W	11	2		1.5	
	W1	3	1		1.2	
	V	10	0.7		0.5	
						-(91.34) m^2
					Total	862.7 m^2
8	Earth filling in excavation					
	Total excavation for walls+plinth filling					233.2 m^3 +360
	Brickwork up to G.L.					(-)127.2 m^3
	P.C.C.					(-)42.2 m^3
	Total					423.9 m^3
9	Parapet wall	1	212	.2	1	42.4 m^3

Abstract Sheet of Community Hall

Table 20 Abstract Sheet of Community Hall

Sr. No.	Particulars	Quantity	Unit	Rate	Per	Amount
1	Excavation in foundation	233.2	m^3	85	m^3	19822
2	Plain cement concrete (P.C.C) in Foundation (1:4:8)	42.2	m^3	3000	m^3	126600
3	Brickwork in Foundation up to Plinth level	127.2	m^3	3200	m^3	407040
4	Brickwork in superstructure	163.4	m^3	3500	m^3	571900
5	R.C.C. work	152.72	m^3	8800	m^3	1343936
6	2 cm thick marble flooring	600.16	m^2	500	m^2	300080
7	Smooth plaster inside walls and ceiling	862.7	m^2	150	m^2	129405
8	Earth filling in excavation	423.5	m^3	50	m^3	21175
Total						Rs.2919958
Add 5% contingencies						Rs.145998
Grand Total						**Rs.3065956**

Total floor area = 665 m^2

4610.5 Rs. per m^2

8.1.5 Smart Village Design (Civil)

❖ Bank

Having a Bank in the village itself is more convenient for villagers so that people can save their money in banks with highest security and they will feel free and they will get subsidy direct into their account whenever crop will be fail.

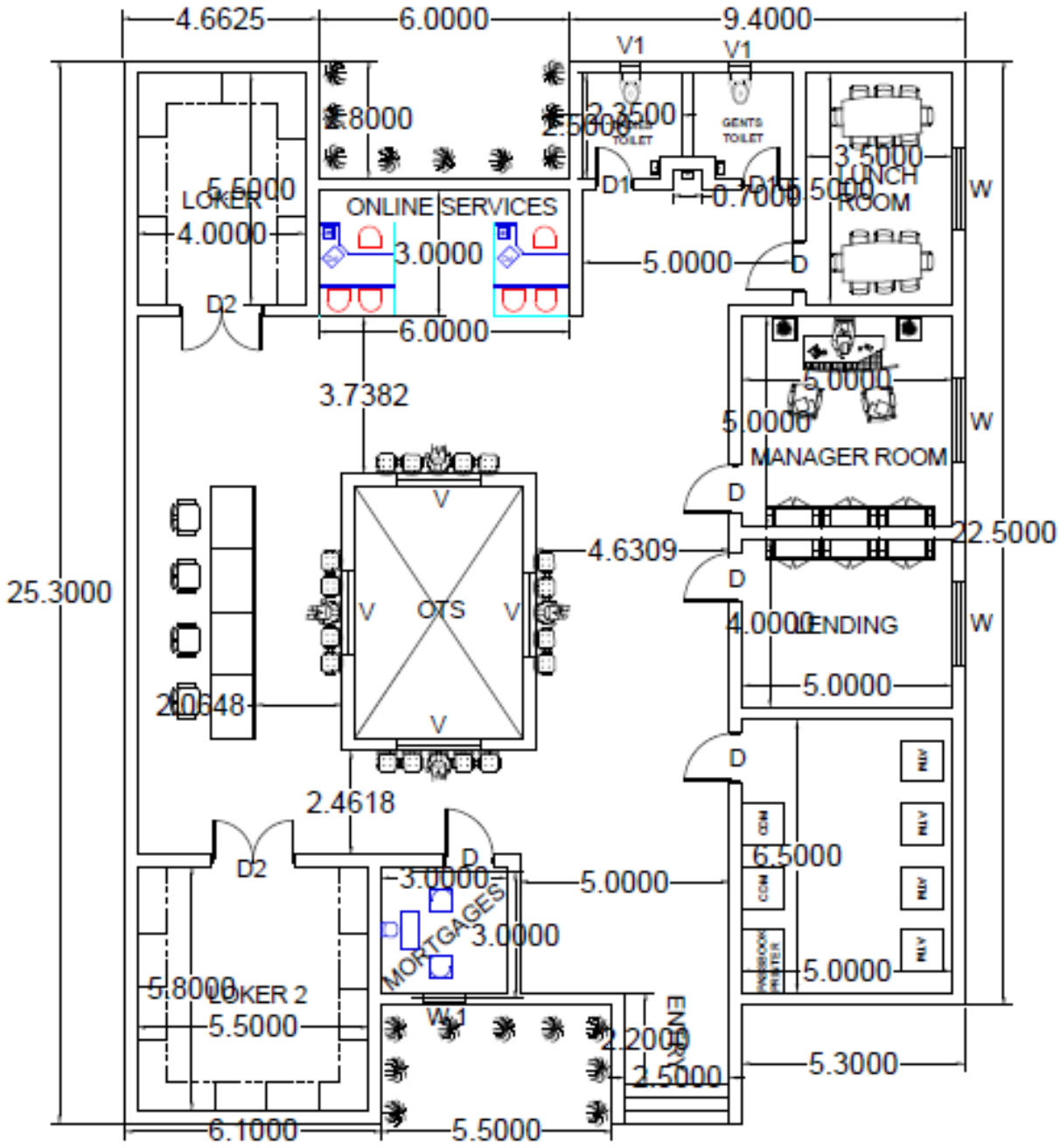


Figure 61 Plan of Bank

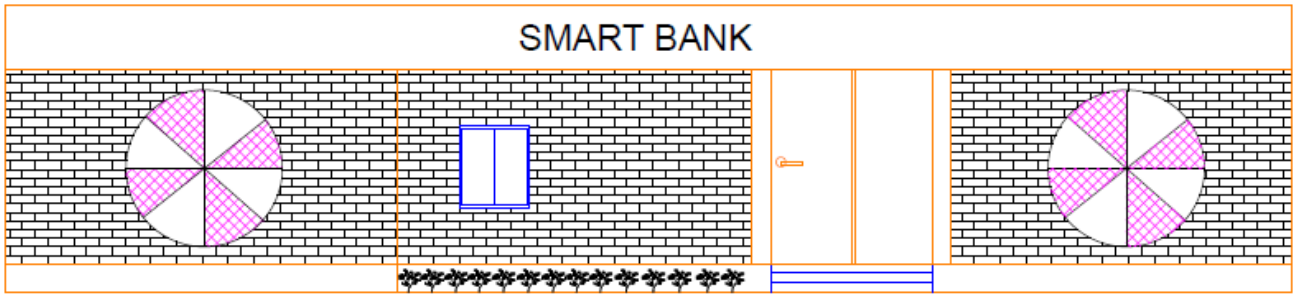


Figure 62 Elevation of Bank

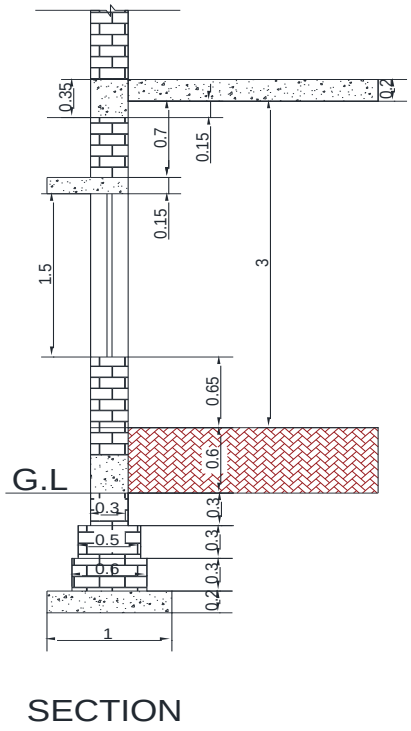


Figure 63 Section of wall of Bank

Measurement Sheet of Bank

Table 21 Measurement Sheet of Bank

Sr. No.	Description	No.	Length	Width	Height	Quantity
1	Excavation in foundation					

	Internal wall	1	186.74	1	1.1	205.41 m^3
					Total	205.41 m^3
2	P.C.C. in foundation					
	Internal wall	1	186.74	1	0.2	37.35 m^3
					Total	37.35m^3
3	Brickwork in foundation					
	Internal wall					
	First step	1	189.94	0.6	0.3	34.19m^3
	Second step	1	190.74	0.5	0.3	28.61m^3
	Third step	1	192.34	0.3	0.3	17.31m^3
						80.11 m^3
	Steps:					
	First	1	2.5	0.9	0.15	0.1125 m^3
	Second	1	2.5	0.6	0.15	0.225m^3
	Third	1	2.5	0.3	0.15	0.337 m^3
						0.674 m^3
					Total	80.78 m^3
	Plinth	1	192.34	0.3	0.6	34.62 m^3
					Total	115.40 m^3
	Backfill(205.41-152.75)	1			Total	52.65m^3
4	Brickwork in superstructure					
	G.F. wall	1	192.34	0.3	3	173.11 m^3
						288.51 m^3
	Deduction for door/window					
	D1	5	1.2	0.3	2.1	3.78 m^3
	D2	2	2	0.3	2.1	2.52 m^3
	D3	2	0.9	0.3	2.1	1.134 m^3
	W	3	2	0.3	1.5	2.7 m^3
	W1	1	1	0.3	1.5	.45 m^3
	V	4	2	0.3	0.5	1.2 m^3
	V1	2	0.5	0.5	0.3	0.15 m^3
						(-)11.934m^3
					Total	276.576 m^3
5	R.C.C. work					
	Slab(Area=458.96)	1			0.15	68.84m^3
	Beam					
		1	192.34	0.3	0.3	17.31m^3
	Lintel	1	192.34	0.3	0.15	8.655m^3
	Stair					10 m^3
					Total	78.645 m^3
6	2 cm thick marble flooring Deduction	1 1	458.96			401.58m^2

			192.34	0.3		
7	Smooth plaster inside walls and ceiling					
	All inside of the wall(GF)					638.2m^2
	All outside of the wall		119.36		4.75	566.97m^2
	Ceiling					401.58m^2
	Deduction for Door/Window					
	D1	5	1.2		2.1	12.6m^2
	D2	2	2		2.1	8.4m^2
	D3	2	0.9		2.1	3.78m^2
	W	3	2		1.5	9m^2
	W1	1	1		1.5	1.5m^2
	V	4	2		0.5	4m^2
	V1	2	0.5		0.5	0.5m^2
						(-39.78)m^2
					Total	1566.97m^2
8	Parapet wall	1	95.3	0.2	1	19.06 m^3

Abstract Sheet of Community Hall

Table 22 Abstract Sheet of Community Hall

Sr. No.	Particulars	Quantity	Unit	Rate	Per	Amount
1	Excavation in foundation	205.41	m^3	85	m^3	17459.85
2	Plain cement concrete (P.C.C) in Foundation (1:4:8)	37.35	m^3	3000	m^3	112050
3	Brickwork in Foundation up to Plinth level	115.40	m^3	3200	m^3	369280
4	Brickwork in superstructure	173.11	m^3	3500	m^3	605885
5	R.C.C. work	104.81	m^3	8800	m^3	922328
6	2 cm thick marble flooring	458.96	m^2	500	m^2	229480
7	Smooth plaster inside walls and ceiling	1000	m^2	150	m^2	150000
8	Earth filling in excavation	52.65	m^3	50	m^3	2632.5
Total						Rs.2409115.35
Add 5% contingencies						Rs.120455.77
Grand Total						Rs2529571.12
say						**Rs.2529571**

Total floor area = 458.96 m^2

5511.53 Rs. per m^2

8.1.6 Heritage Village Design (Civil)

❖ **Village gate:-**

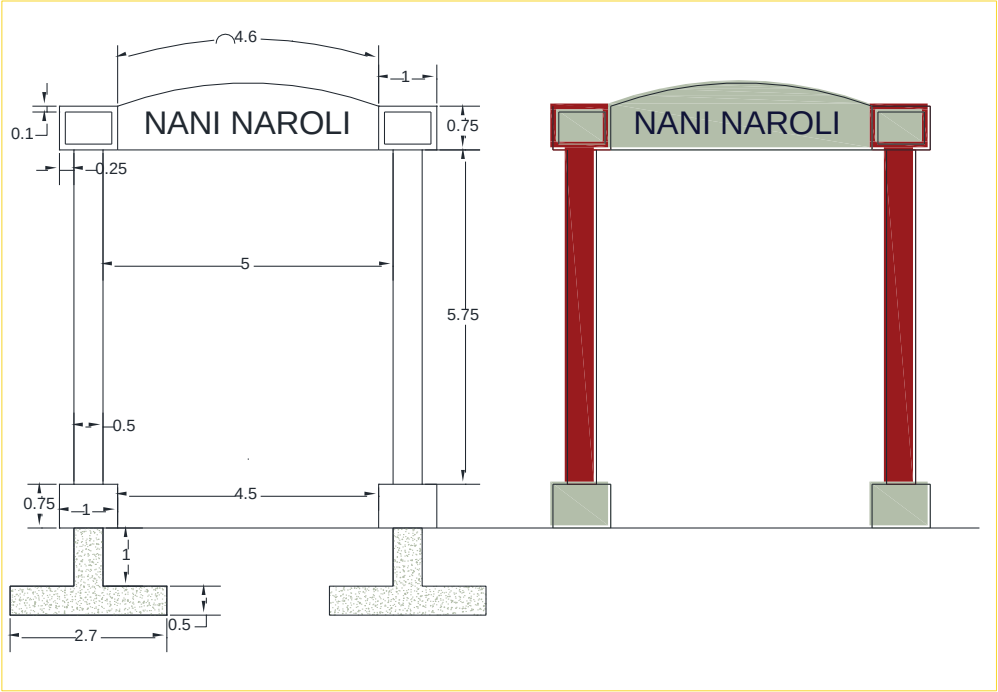


Figure 64 Village gate design

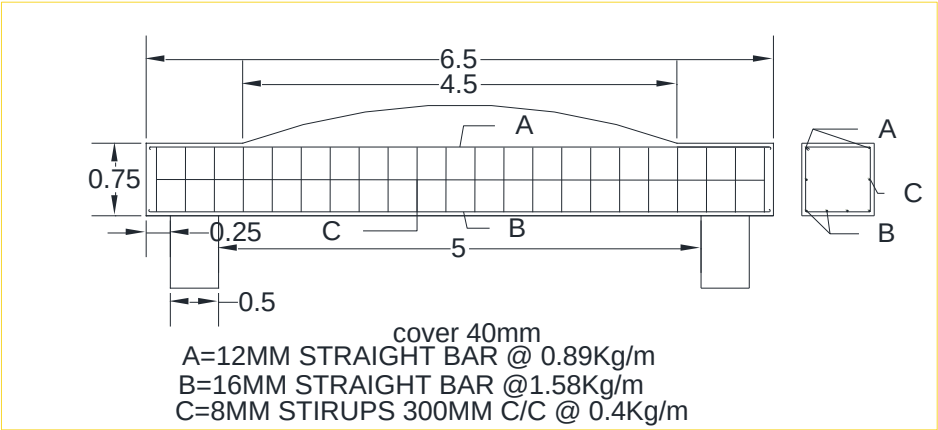


Figure 65 Beam design

Estimate of a beam of gate (span=6.5m):

Table 23 Estimate of a beam of gate (span=6.5m):

Item No.	Description of Item	No.	L(m)	B(m)	H(m)	Quantity
(1)	Quantity of concrete: L=6.5m B=0.75m H=0.75m Arc=0.45*0.5*4.5	 1	 6.5	 0.75	 0.75	 3.66m^3 1.01m^3
					Total	4.67 m^3
(2)	Formwork: Bottom Sides Arc=4.5*0.75+4.5*0.45*0.5	 1 2 2	 5 6.5 0.75	 0.75 - -	 - 0.75 0.75	 3.75m^2 4.875m^2 0.562 m^2 4.387 m^2
					Total	13.6m^2
(3)	Weight of steel in kg: A type: L=6.5-(2*0.05)+(2*9*0.012) =6.616m No. of bars=4 B type: L=6.5-(2*0.05)+(2*9*0.016) =6.688m No. of bars=4 C type: Width=0.75-(2*0.04)-(2*0.008) =0.654m L=4(Width)+24D =4(0.654)+24(0.008) =2.808m Nos.=(6.5÷0.3)+1=22.67 Say 23	 4 4 23	 6.616 6.688 2.808		 @0.89kg/m @1.58kg/m @0.4kg/m	 23.55kg 42.27kg 25.83kg
					Total	91.7kg

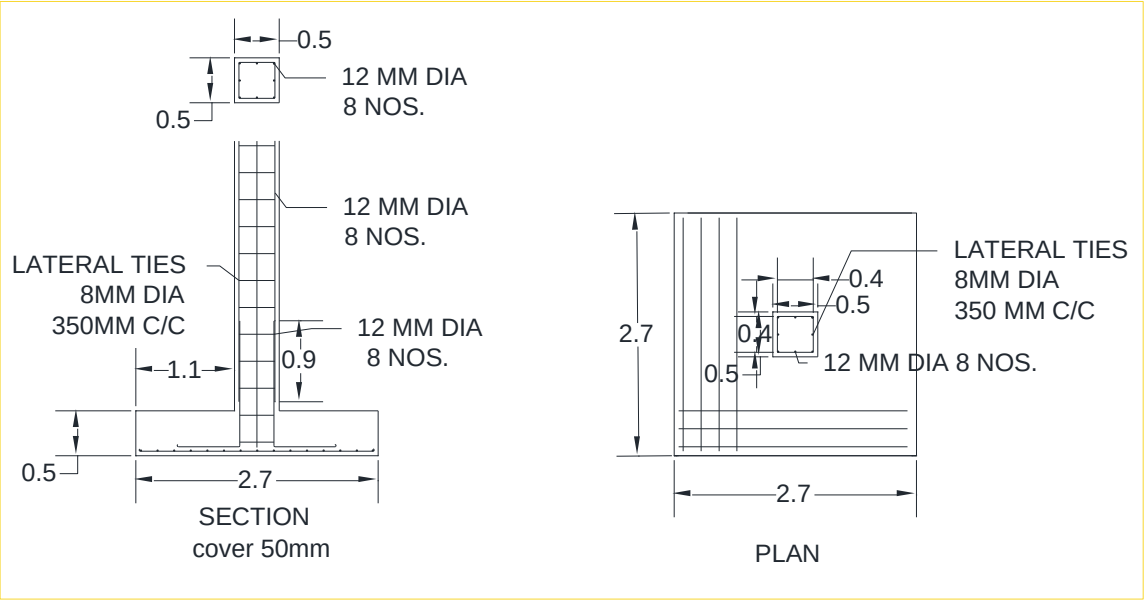


Figure 66 Footing design

Estimate of column + footing of gate:

Table 24 Estimate of column + footing of gate:

Sr. No.	Description of Item	No.	L(m)	B(m)	H(m)	Quantity
(1)	Excavation for foundation: H=1.0+0.5=1.5m	1	2.7	2.7	1.5	10.935m^3
(2)	R.C.C.(1:2:4): Footing Column	 1 1	 2.7 0.5	 2.7 0.5	 0.5 7.5	 3.645m^3 1.88m^3
					Total	5.52 m^3
(3)	Filling of foundation trench: =10.935-5.52=5.42m^3					5.42m^3
(4)	Steel for column and footing: Vertical bars of column: L=7.5+(9×0.012)=7.61m Dowel bars: L=0.9+0.15+0.5+0.5+(9×0.012)-0.05-(2×0.016) =2.08m Lateral ties for column: A=0.5-(2×0.04)-(2×0.008) =0.412m	 8 8	 7.61 2.08		 @0.89kg/m @0.89kg/m	 54.183kg 14.81kg

	B=0.5-(2×0.04)-(2×0.008) =0.412m L=2(A+B)+24D =2(0.412+0.412)+0.192 =1.84m No. of ties=(7.5-0.05-(2×0.016))÷0.35 =21.19 Say 22 Footing bars: L=2.7-(2×0.05)+(2×9×0.016) =2.888m No.=(2.7-(2×0.05))÷0.17 =15.29 Say 16	22 32	1.84 2.888		@0.4kg/m @1.58kg/m	16.2kg 146kg
					Total	231.19kg
(5)	Formwork for column and footing: Column: Footing:	4 4	0.5 2.7	- -	7.5 0.5	$15m^2$ $5.4m^2$
					Total	$20.4m^2$

Abstract sheet

Table 25 Abstract sheet of Village Gate

Sr. No.	Description of Item	Quantity	Rate Rs.	Per	Amount Rs.
1	Cement	101	350	Bag	35350
2	Brick	375	5	brick	1875
3	Sand	$6.74m^3$	600	m^3	4044
4	Aggregate	$13.47m^3$	650	m^3	8755.5
5	Placing of concrete	$15.71m^3$	125	m^3	1963.75
6	Centering, Shuttering	$54.4m^2$	100	m^2	5440
7	16mm dia bar	188.3kg	50	kg	9414
8	12mm dia bar	92.613kg	50	kg	4631
9	8mm dia bar	42.03kg	50	kg	2102
10	Charges for cutting ,bending, placing	322.94kg	113.76	kg	36738
11	Excavation for foundation	$21.87m^3$	700	m^3	15309
12	Filling of foundation trench	$14.08m^3$	250	m^3	3520
				Total	Rs 129142.25
Add 5% contingencies **Contractor profit (10%)** **Total**					Rs 6457.113 Rs 12914.225 **Rs 148514**

8.2 Reason for Students Recommending this Design

1. Biogas Plant

The village is rich in animal resources, animal husbandry being one of the major occupation here. Therefore, large amounts of cattle dung are produced and the villagers just let the dung dry out in the courtyard, which reduces the efficiency and increases the duration of the organic waste converting into compost.

The kitchen waste and night soil waste also could be used in biogas plant. This will also reduce organic waste from the village as well as turn it in to something useful.

2. High School

For good education of children and youth a proper school till the 12^{th} standard is a necessity in any settlement. The village has gap of one high school according to the population of the village which is ever growing. The high school building is provided for that purpose only. Which will also cancel the need of commuting to other big towns or city for high school education.

3. Community Hall

A place for gathering is a must in any village. So that the villagers can come together and enjoy themselves or celebrate some festivals together. This diminishes the differences between them and unites them in a much better way.

So, we have given the provision of a community hall for the village.

4. Public Toilet with soak pit

As the village does not have even one public toilet provided for use of villagers and visitors, with the current emphasis on cleanliness and swatchhta abhiyan also going on, we decided to provide the design of public toilet. We have provided soak pit with public bathroom to dispose the waste generated from it.

Soak pit is a porous chamber, which filters out the grey water and allows it to penetrate in the soil. Grey water is the water coming from bathrooms, kitchen sinks, and such other sources except for that coming from WC.

Small particles are filtered out by soil matrix and organic matter is digested by the micro-organisms. It is quite suitable with the soil type of the village- clayey sand.

5. Bank

Having a Bank in the village itself is more convenient for villagers so that people can save their money in banks with highest security and they will feel free and they will get subsidy direct into their account whenever crop will be fail.

6. Village Gate

The village is devoid of the entrance gate. A village entrance gate is a cultural heritage for a village and a symbol of pride. However, besides displaying the glory, it also marks the boundary of the village, from where the village commences. It gives a clear idea to the visitors about the existence of the village.

8.3 About designs Suggestions / Benefit of the villagers

1. Biogas Plant

- The biogas production is best way to use natural recourses which is nonpolluting and also use for making organic manure because of that we can use it in agriculture to reduce the harmful effects of chemical and pesticides.
- The biogas is used not only or cooking but also used as electrical purpose by converting the gas into electricity in invertors.

2. High School

- Having high school in village itself will cancel out need to commute for students.
- The village children can have education till 12th in the village itself.
- It will increase job opportunities as various staff vacancy will open up in the high school.

3. Community Hall

- It provides the place for gatherings where villager can come together and celebrate.
- Awareness program can be held there.
- Meetings for betterment of village or any other purpose can be held there.

4. Public Toilet with soak pit

- By providing a proper public space, public defecation can be stopped and cleanliness can be maintained in the village.
- As particular place is provided, the issue of open defecation is resolved which helps in keeping the nuisance of flies away.
- It is quite helpful to the visitors of the village.
- It helps in fulfilling the mission initiated by our honourable Prime Minister Mr. Narendra Modi- “Swachha Bharat Abhiyan”,
- The public toilet can have a safe way to dispose grey water with a soak pit attached to it.
- Soak pit can be built and repaired with locally available materials.
- Technique simple to apply for all users.
- Small land area is required; Low capital cost; low operating cost.

5. Bank

- To provide finance facilities to farmers
- To provide banking facilities to villagers
- For the economic development of village
- To guide villagers about new monetary policies and governmental schemes

6. Village Gate

- It marks the entrance of the village.
- It serves as a cultural heritage for the village.
- It becomes one of the identification marks for the village.

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

For part II design, we are planning to design the following:

1. Tank design for water harvesting
As per the current population of the village the water supply provided is bit unadaquate. To provide the adequate amount of water sustainably to the village people a tank to store rain water during rainy season can be provided.
It will not only benefit the village but will also lead the village in the direction of sustainability as well as green development.

2. Road Section
Most of the village roads and streets are paved in Nani Naroli village but few internal streets of the nani naroli village specifically in Monghani faliyu and poorer area of village although paved is not very smooth. It has pits and lumps in the road which cause the water logging in the area. Providing a road design might help with that.

3. Child welfare and maternity home
The village lack Child welfare and maternity home According to Gap analysis done baed ob village population of current time. Having a Child welfare and maternity home will largely help reduce any chances of causalities in labour and child delivery as well as child health.

4. Public garden
The village lack any type of recreational infrastructure which may lead to monotonous life for the villagers. Having no place to lift up the mood and just unwind might cause them to be more fatigues and tired in general. For the mental and physical benefit of the village population design proposal of a public garden with play area can be good.

5. Common Service Centre
CSC aims to provide access to information, backed with relevant infrastructure and end-to-end services that would allow rural population, the opportunities to enhance their quality of life.
Having a Common Service Centre in the village will propel it to the path of development and becoming a smart village.

6. Chabutro
Chabutro has been a staple feature in our old city and villages. Having a Chabutro in the village will elevate the aesthetics of the village, it will also provide shelter and food to the surrounding birds as well as migrating birds.

Chapter 10 Conclusion of the Entire Village Activities of the Project

The project started with inauguration ceremony by GTU where we were introduced to the project concept and process. We learnt about rural development, ideal village, its infrastructure facilities, and concept of rurbnization.

After that we selected a village to work on its development. Later when we took visit of the selected village Nani Naroli, we came to know that the village is mainly agricultural, has adequate water supply, electricity supply, road network, and closed drainage network for most part of village.

We also noticed few weak points of the village such as still many kachha houses without drainage facilities, lack of public toilets, no recreational facilities present in village, etc.

We tried to remove these weaknesses of the village before they manifest themselves into threats.

For that purpose only, we provided design proposal and designs of Biogas plant, public toilet, community hall, Bank, soakage pit, etc.

Also under the mission of swatchh bharat abhiyan which focuses on cleanliness of our county, we gave design proposal of soakage pit with the public toilet and are planning to provide biogas plant for the same.

Which also propels the development of our village towards the goal of sustainability.

For the purpose of higher education of village youth we proposed the design of high school building in the village.

To help village people to develop, improve and manage individual financial situation we provided a bank in the village. Which will help collectively to improve village finance.

Now, water conservation is evidently a necessity prevailing at almost all of the places.

Hence, we also gave design proposal of Tank for water harvesting system for next semester.

For the next semester, we will be working on physical infrastructure, recreational facilities and maintenance, etc.

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- https://study4sure.com/general-info/villages/gujarat/surat/village-list.php?village=Admor
- https://www.google.com/maps?ll=21.339919,72.755297&z=18&t=h&hl=en-IN&gl=US&mapclient=embed&q=Olpad+Gujarat+394540
- https://www.google.com/maps/place/Admor,+Gujarat+395005,+India/@21.3093641,72.6478404,14z/data=!3m1!4b1!4m5!3m4!1s0x3be1b5782aa9eea3:0x4667b1c93184455e!8m2!3d21.306482!4d72.6653771?hl=en-IN
- https://www.census2011.co.in/data/village/523770-admor-gujarat.html
- https://www.realmaps.co.in/gis-mapping-infrastructure-industry.html?gclid=Cj0KCQjwi7DtBRCLARIsAGCJWBoLj65VaOKFQVEpxyFmDXMoWi9exfvklWODNf9r3sq5_wkv55wjo6caAjYLEALw_wcB
- http://www.ijste.org/articles/IJSTEV4I3023.pdf
- https://eos.com/blog/top-5-newest-technologies-in-agriculture/

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

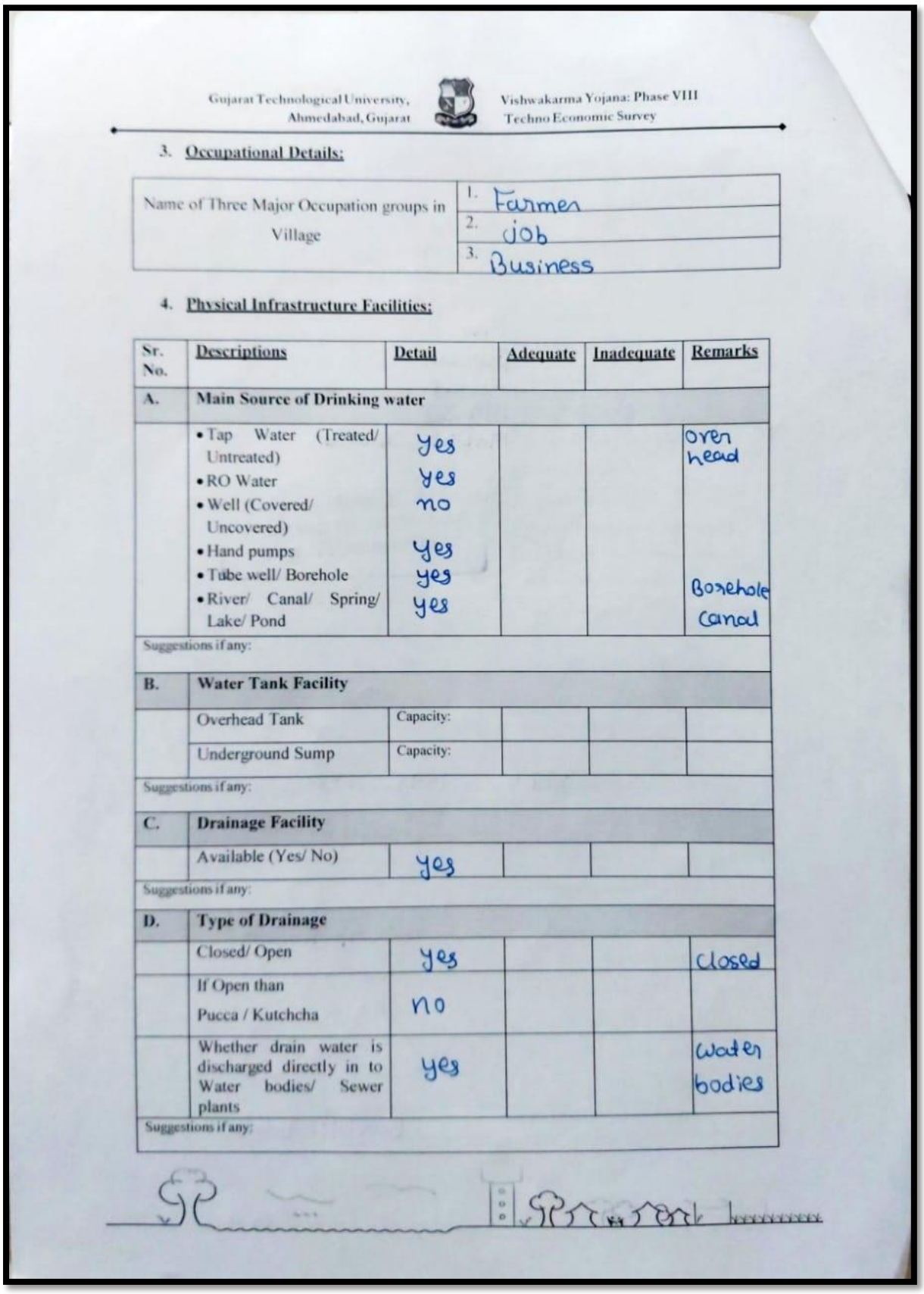
Name of Village:	Ena
Name of Taluka:	Bardoli
Name of District:	Surat
Name of Institute:	BMCET
Nodal Officer Name & Contact Detail:	Mr. Dixit Chauhan
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	[illegible] એના-ગો[illegible]ીયા ગૃપ ગ્રામ પંચાયત તા: પલસાણા, જિ. સુરત
Date of Survey:	

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001				
ii)	2011	3771	1895	1882	888

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	621.93 hector
	Forest Area (In hect.)	
	Agricultural Land Area (In hect.)	
	Residential Area (In hect.)	
	Other Area (In hect.)	
	Water bodies	
	Nearest Town with Distance:	Bardoli (9km)



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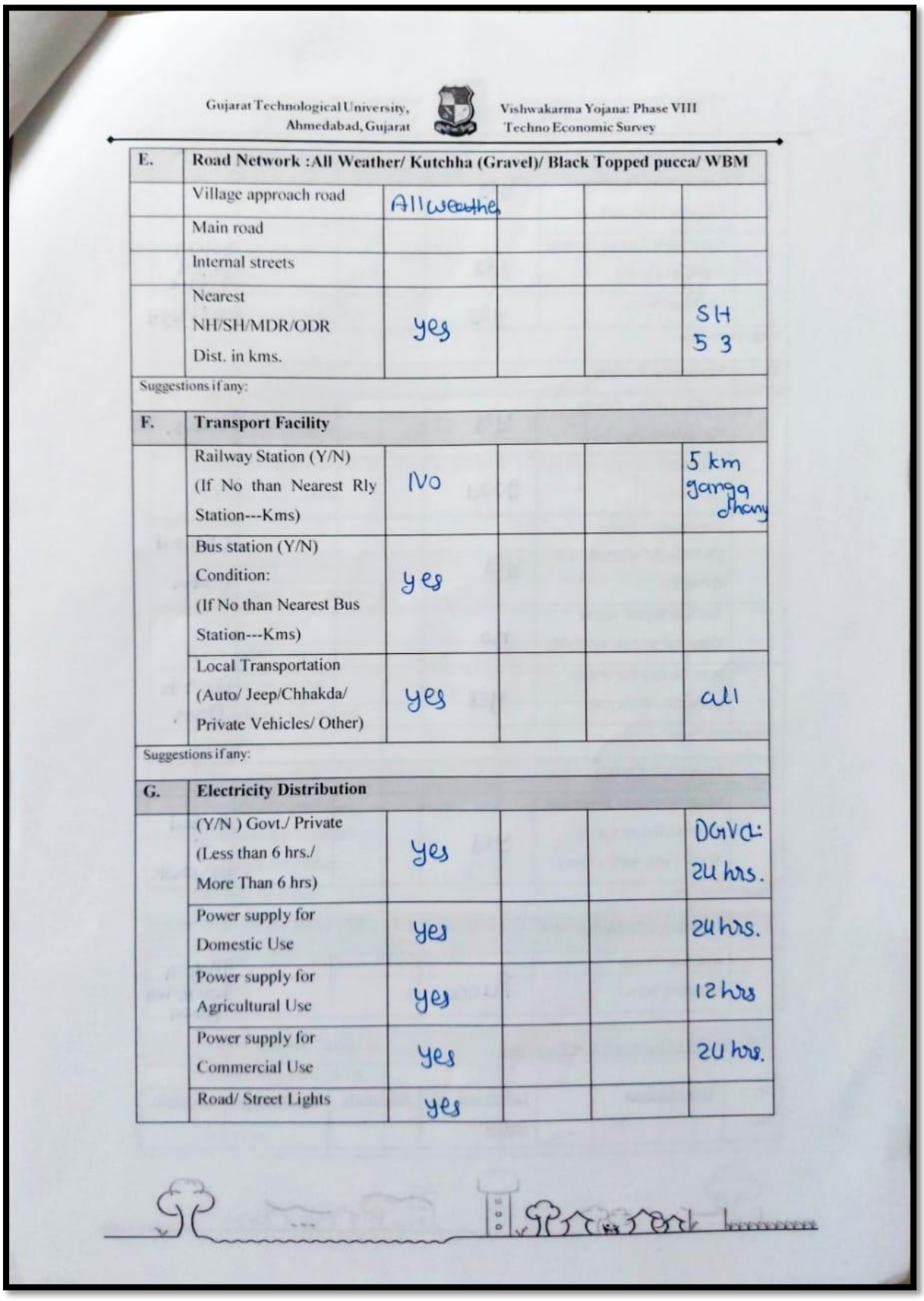
3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1. Farmer 2. Job 3. Business

4. **Physical Infrastructure Facilities:**

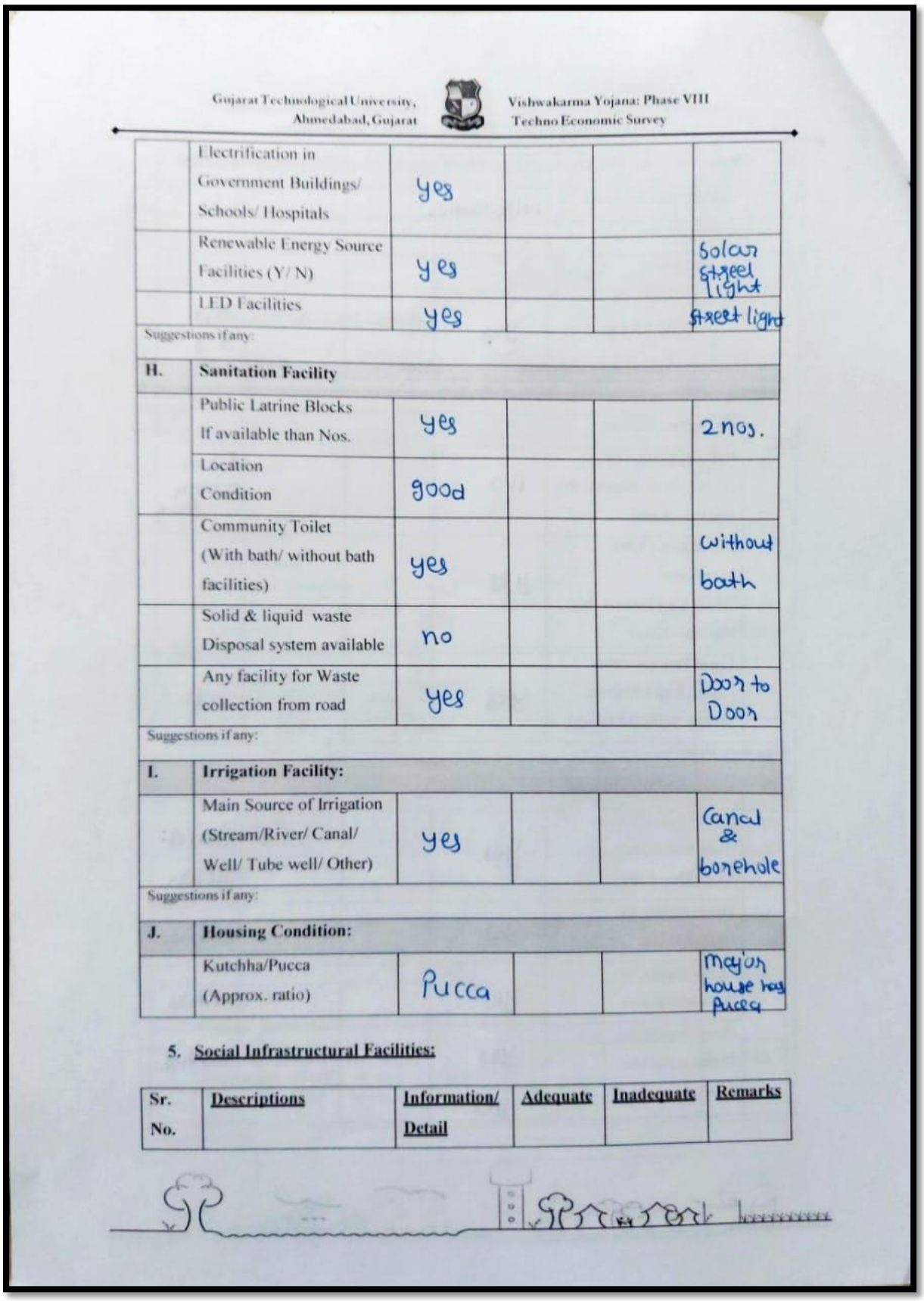
Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated) • RO Water • Well (Covered/ Uncovered) • Hand pumps • Tube well/ Borehole • River/ Canal/ Spring/ Lake/ Pond	yes yes no yes yes yes			over head Borehole Canal
Suggestions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



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	All weather			
	Main road				
	Internal streets				
	Nearest NH/SH/MDR/ODR Dist. in kms.	yes			SH 5 3
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No			5 km ganga dham
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	yes			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	yes			all
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	yes			DGVCL 24 hrs.
	Power supply for Domestic Use	yes			24 hrs.
	Power supply for Agricultural Use	yes			12 hrs
	Power supply for Commercial Use	yes			24 hrs.
	Road/ Street Lights	yes			



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	Electrification in Government Buildings/ Schools/ Hospitals	yes			
	Renewable Energy Source Facilities (Y/ N)	yes			Solar street light
	LED Facilities	yes			street light
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	yes			2 nos.
	Location Condition	good			
	Community Toilet (With bath/ without bath facilities)	yes			without bath
	Solid & liquid waste Disposal system available	no			
	Any facility for Waste collection from road	yes			Door to Door
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	yes			Canal & borehole
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Pucca			Major house has Pucca

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

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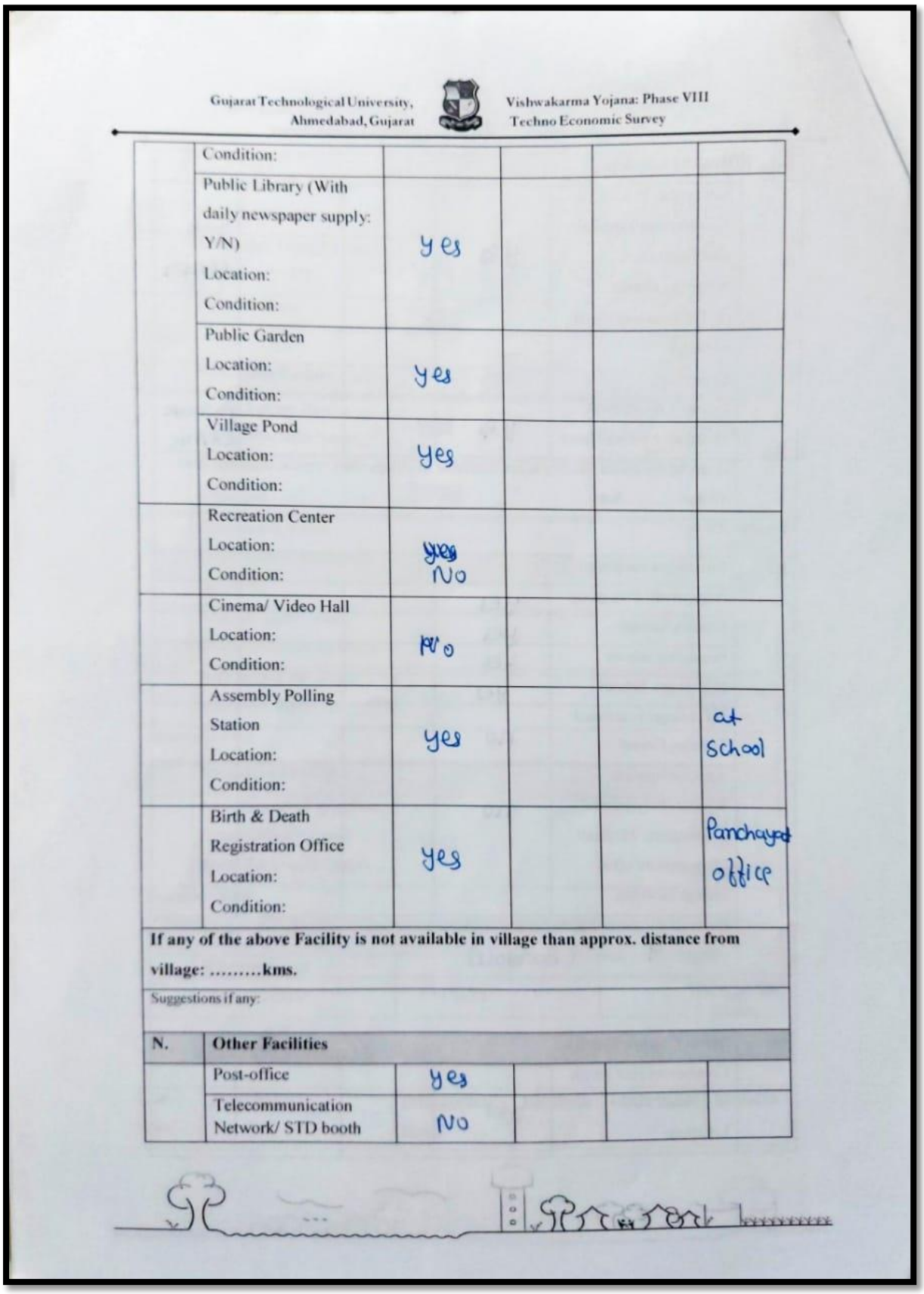
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

K.	**Health Facilities:**				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	yes			Sub center
	Private Clinic/Private Hospital/ Nursing Home	yes			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	yes			
	Primary School	yes			
	Secondary school	yes			
	Higher sec. School	yes			
	ITI college/ vocational Training Center	no			
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	no			
	If any of the above Facility is not available in village than approx. distance from village: ....9....kms. (Bardoli)				
Suggestions if any:					
M.	**Socio- Culture Facilities**				
	Community Hall (With or without TV) Location:	yes			



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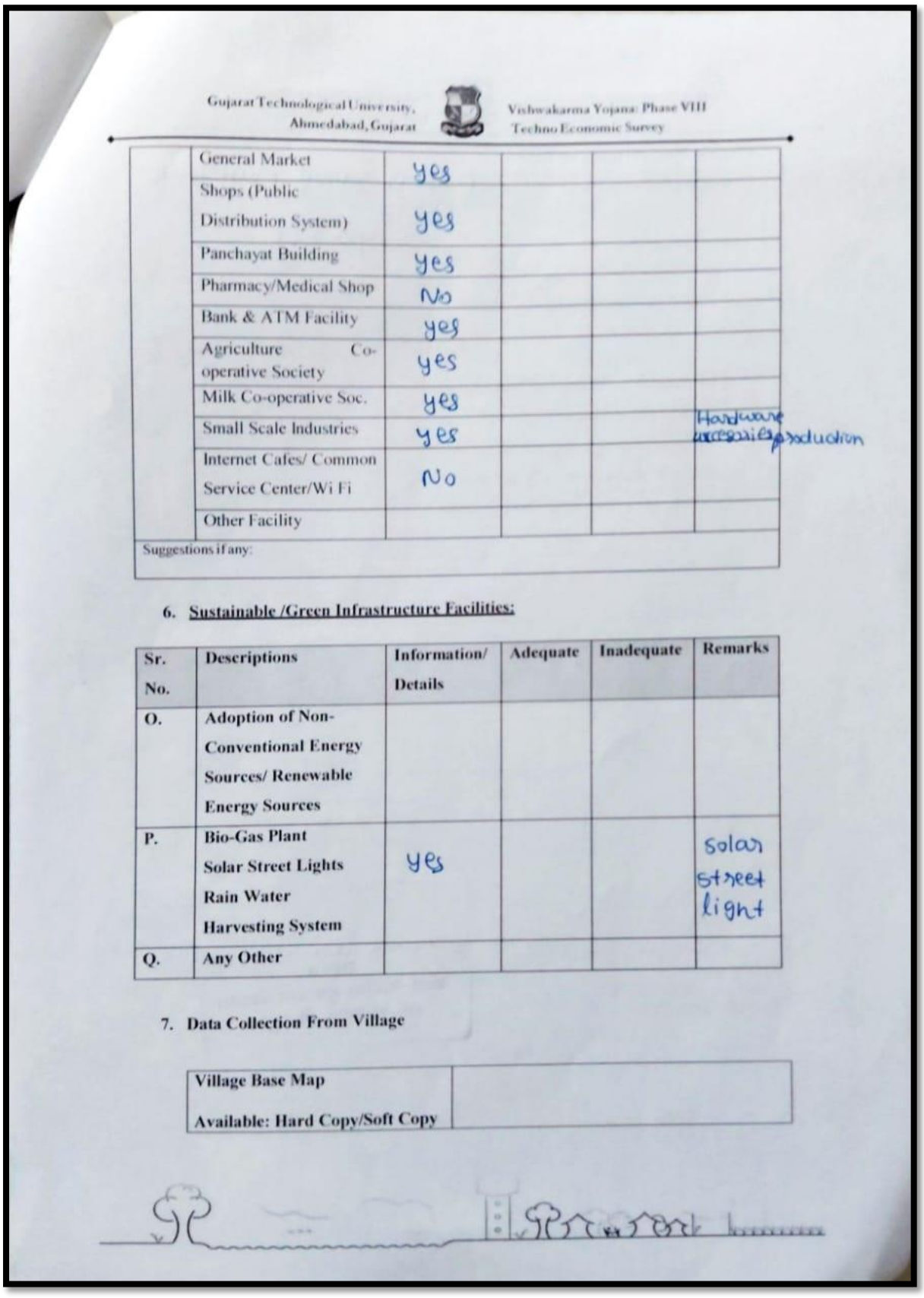
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	yes			
	Public Garden Location: Condition:	yes			
	Village Pond Location: Condition:	yes			
	Recreation Center Location: Condition:	~~yes~~ No			
	Cinema/ Video Hall Location: Condition:	No			
	Assembly Polling Station Location: Condition:	yes			at School
	Birth & Death Registration Office Location: Condition:	yes			Panchayat office
If any of the above Facility is not available in village than approx. distance from village: .....kms.					
Suggestions if any:					
N.	**Other Facilities**				
	Post-office	yes			
	Telecommunication Network/ STD booth	No			



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	General Market	yes			
	Shops (Public Distribution System)	yes			
	Panchayat Building	yes			
	Pharmacy/Medical Shop	No			
	Bank & ATM Facility	yes			
	Agriculture Co-operative Society	yes			
	Milk Co-operative Soc.	yes			
	Small Scale Industries	yes			Hardware accessories production
	Internet Cafes/ Common Service Center/Wi Fi	No			
	Other Facility				
Suggestions if any:					

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

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

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	

Recent Projects going on for Development of Village	Patidar samaj trust Hall
Any NGO working for village development	yes (1)

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)		
2.	Additional Information/ Requirement		

9. **Smart Village Proposal Design**

Sr. No.	Descriptions	Information/ Detail	Remarks
1.			

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

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

જયનાબેન પરેશભાઈ ચાહિર
સરપંચ
એના-ગોટીયા ગ્રુપ ગ્રામ પંચાયત
તા. પલસાણા, જિ. સુરત

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

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

Name of District:	Surat
Name of Taluka:	Bardoli
Name of Village:	Baben
Name of Institute:	BMCET
Nodal Officer Name & Contact Detail:	Mr. Dixit Chauhan
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Bhavesh patel (deputy sarpanch) Bhavin Maisuriya (Talati)
Date of Survey:	12/10/2020

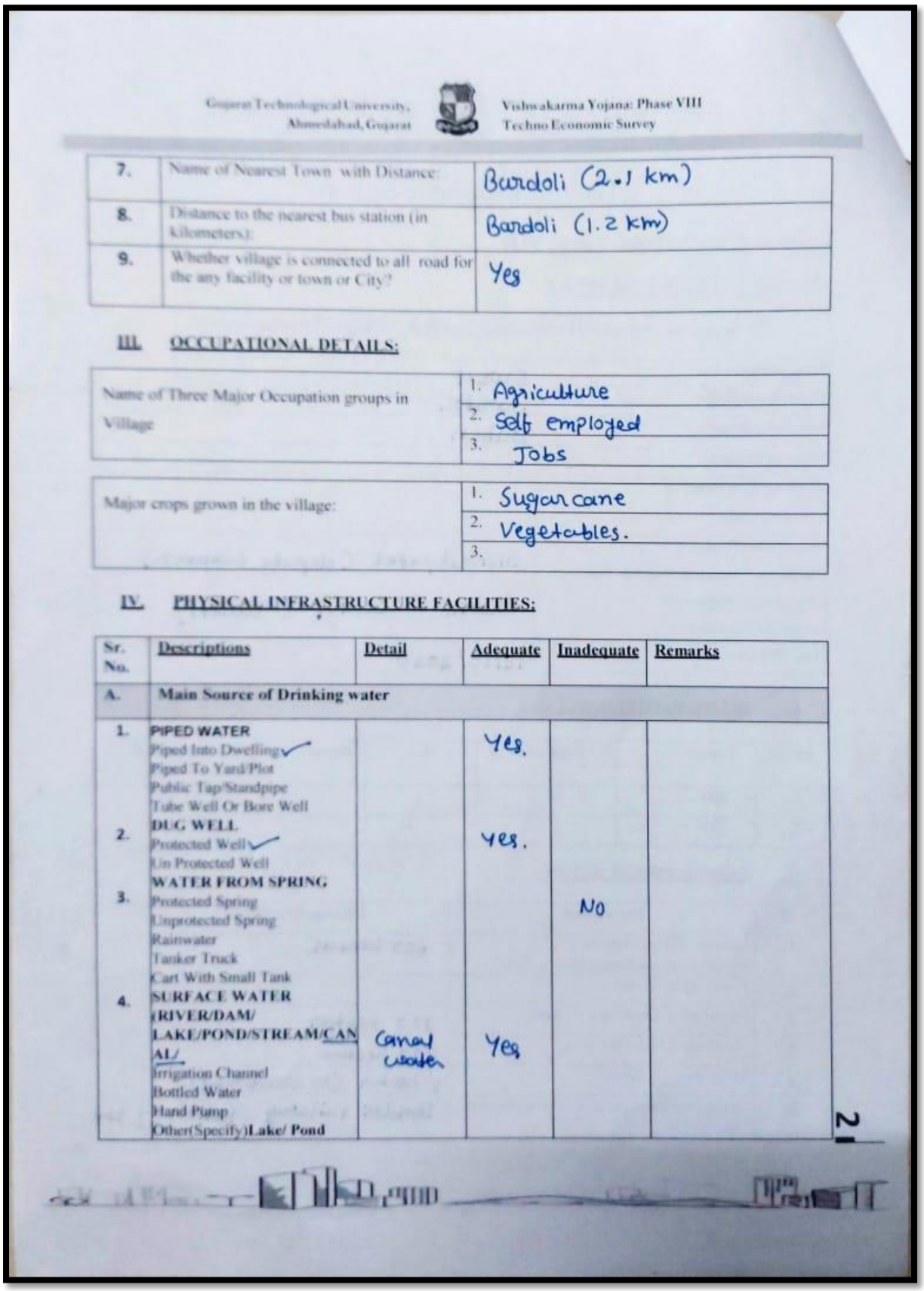
FB Patel
સરપંચ
ગ્રામ પંચાયત બાબેન
તા. બારડોલી, જી. સુરત.

I. DEMOGRAPHICAL DETAIL:

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

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	600 heetar.
2.	Forest Area (In hect.)	
3.	Agricultural Land Area (In hect.)	300 heetar
4.	Residential Area (In hect.)	200 heetar
5.	Other Area (In hect.)	5 hectar (Recreational)
6.	Distance to the nearest railway station (in kilometers):	Bardoli Railway station (1 km)



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

7.	Name of Nearest Town with Distance:	Bardoli (2.1 km)
8.	Distance to the nearest bus station (in kilometers):	Bardoli (1.2 km)
9.	Whether village is connected to all road for the any facility or town or City?	Yes

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1.	Agriculture
	2.	Self employed
	3.	Jobs
Major crops grown in the village:	1.	Sugarcane
	2.	Vegetables.
	3.	

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

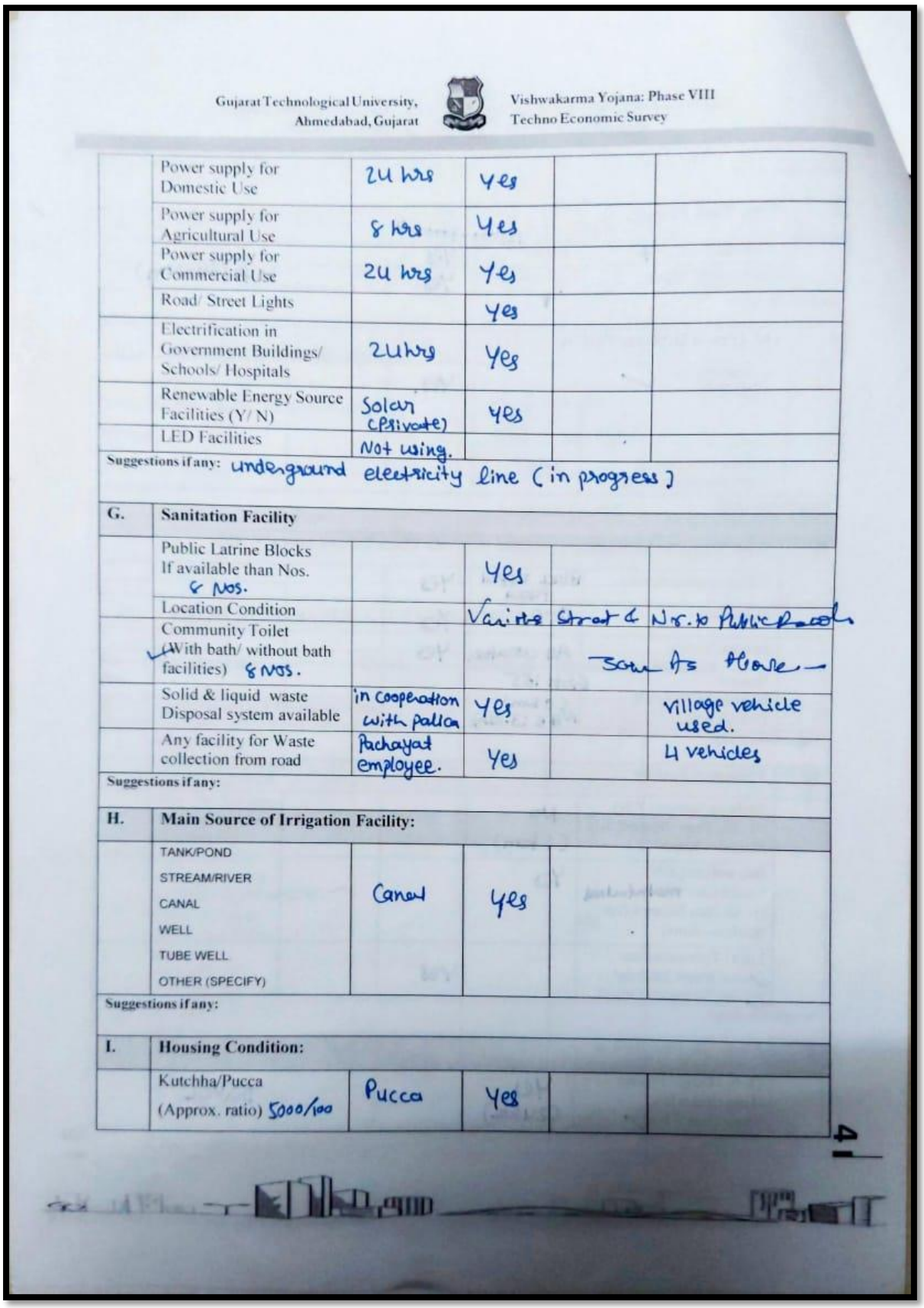
Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER** Piped Into Dwelling ✓ Piped To Yard/Plot Public Tap/Standpipe Tube Well Or Bore Well		Yes.		
2.	**DUG WELL** Protected Well ✓ Un Protected Well		Yes.		
3.	**WATER FROM SPRING** Protected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

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank 7	Capacity: 125000-30000 lt	Yes		
	Underground Sump	Capacity:	Yes		80 ft (drinking)
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE ✓ 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET		Yes.		
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Black Topped Pucca	Yes		
	Main road	BTP	Yes		
	Internal streets	All weather	Yes		
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH 165 (0 km) NH 6 (3.2km)			
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No (1 km)			
	Bus station (Y/N) Condition: maintained (If No than Nearest Bus Station---Kms)	Yes			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other) ✓		Yes		
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs) ✓	Yes (24 hr.)			DGVCL

3



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Power supply for Domestic Use	24 hrs	Yes		
	Power supply for Agricultural Use	8 hrs	Yes		
	Power supply for Commercial Use	24 hrs	Yes		
	Road/ Street Lights		Yes		
	Electrification in Government Buildings/ Schools/ Hospitals	24 hrs	Yes		
	Renewable Energy Source Facilities (Y/ N)	Solar (Private)	Yes		
	LED Facilities	Not using.			

Suggestions if any: Underground electricity line (in progress)

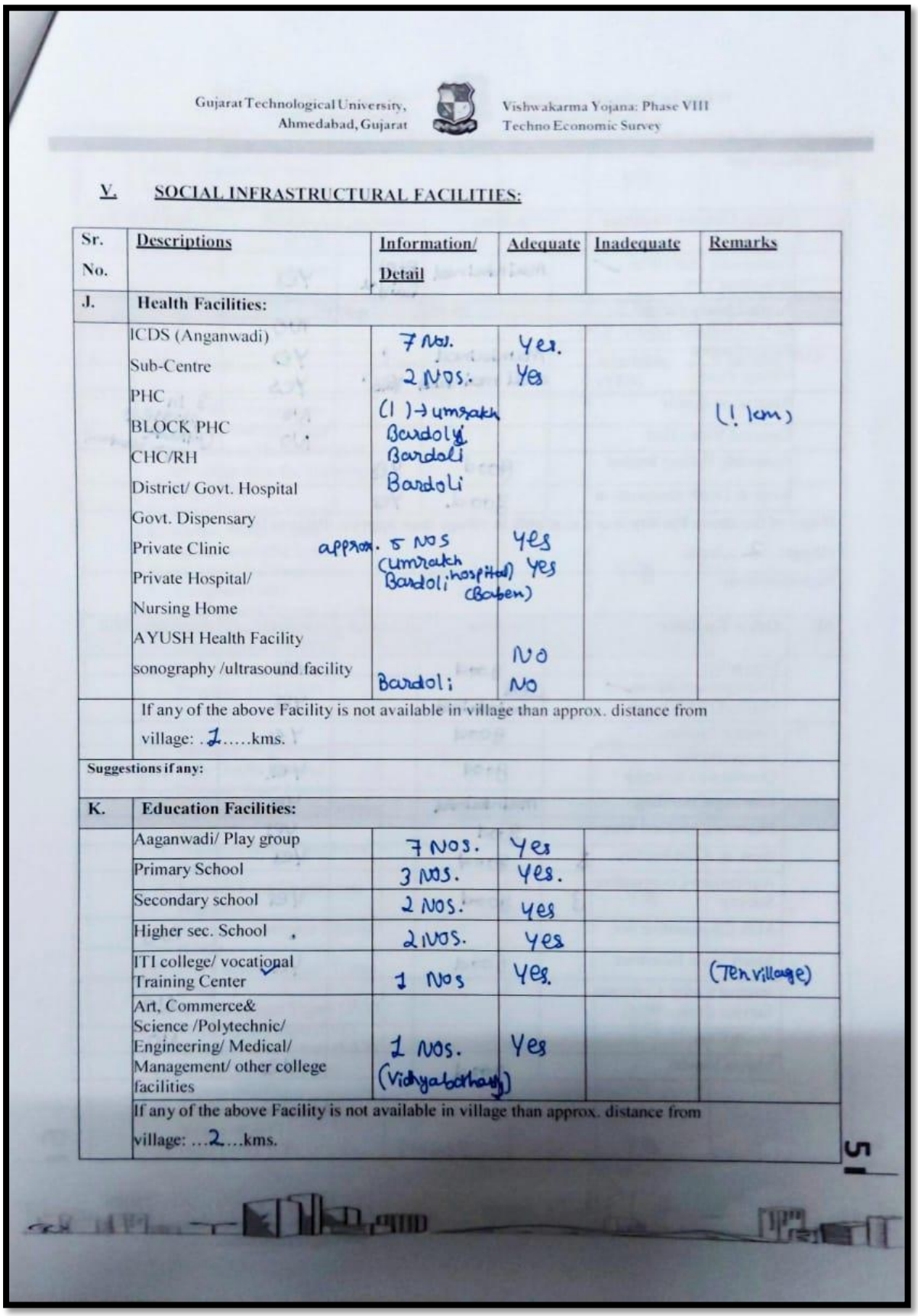
G.	Sanitation Facility				
	Public Latrine Blocks If available than Nos. 6 Nos.		Yes		
	Location Condition		Various Street & Nr. to Public Roads		
	Community Toilet (With bath/ without bath facilities) 8 Nos.			Same As Above	
	Solid & liquid waste Disposal system available	in cooperation with Pallan	Yes		Village vehicle used.
	Any facility for Waste collection from road	Pachayat employee.	Yes		4 vehicles

Suggestions if any:

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

Suggestions if any:

I.	Housing Condition:				
	Kutchha/Pucca (Approx. ratio) 5000/100	Pucca	Yes		



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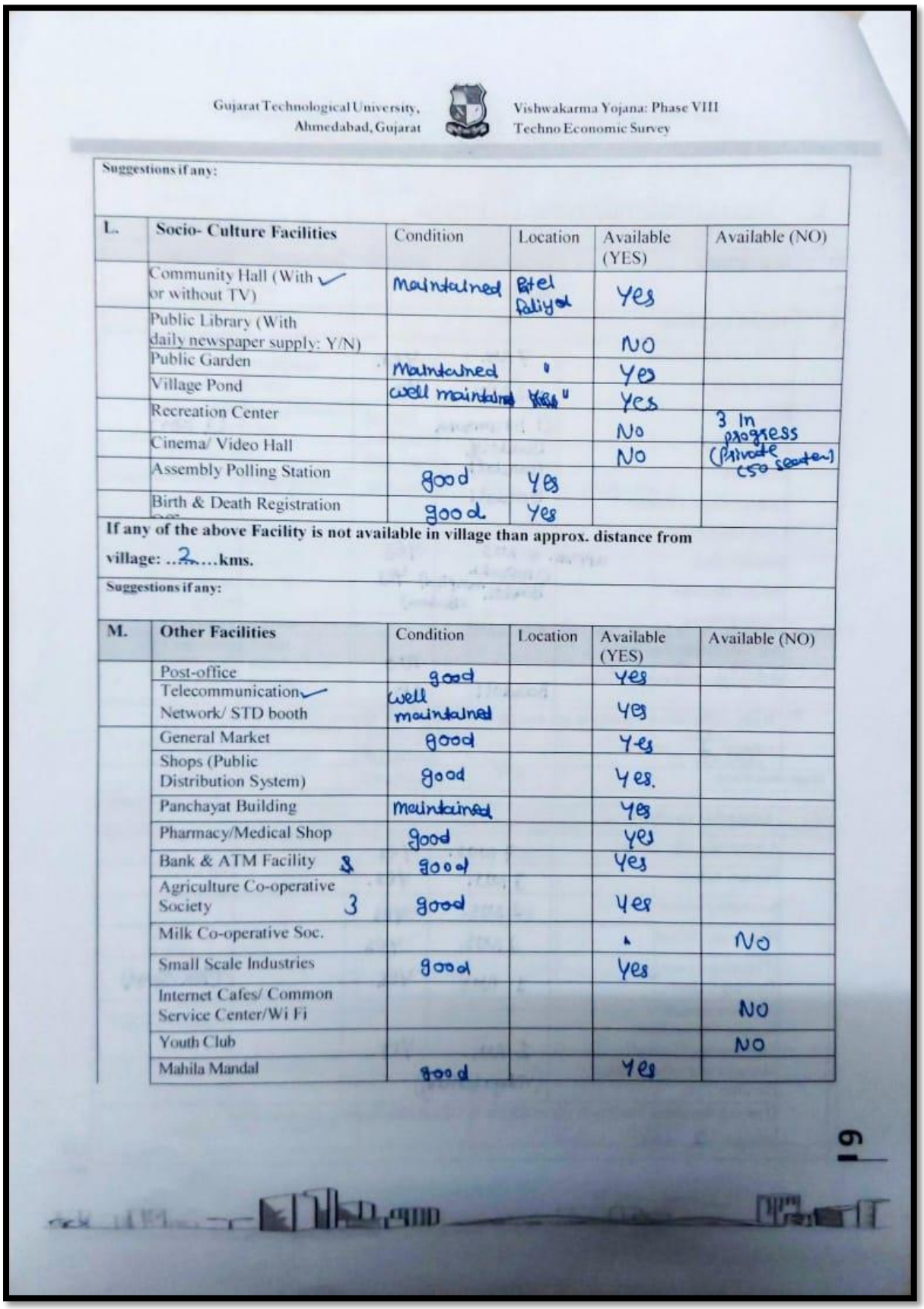
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	7 Nos.	Yes.		
	Sub-Centre	2 NOS.	Yes		
	PHC	(1) → Umrakh			(1 km)
	BLOCK PHC	Bardoli			
	CHC/RH	Bardoli			
	District/ Govt. Hospital	Bardoli			
	Govt. Dispensary				
	Private Clinic	approx. 5 NOS (Umrakh Bardoli hospital)	Yes		
	Private Hospital/ Nursing Home	(Baben)	Yes		
	AYUSH Health Facility				
	sonography /ultrasound facility	Bardoli;	NO NO		
	If any of the above Facility is not available in village than approx. distance from village: .1.....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	7 NOS.	Yes		
	Primary School	3 NOS.	Yes.		
	Secondary school	2 NOS.	Yes		
	Higher sec. School	2 NOS.	Yes		
	ITI college/ vocational Training Center	1 Nos	Yes.		(Ten village)
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	1 NOS. (Vidyabarhay)	Yes		
	If any of the above Facility is not available in village than approx. distance from village: ...2...kms.				

5



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With ✓ or without TV)	Maintained	Patel faliyā	Yes	
	Public Library (With daily newspaper supply: Y/N)			NO	
	Public Garden	Maintained	"	Yes	
	Village Pond	well maintained	"	Yes	
	Recreation Center			No	3 In progress (Private CSC centers)
	Cinema/ Video Hall			No	
	Assembly Polling Station	good	Yes		
	Birth & Death Registration	good	Yes		

If any of the above Facility is not available in village than approx. distance from village: ..2....kms.

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	good		Yes	
	Telecommunication ✓ Network/ STD booth	well maintained		Yes	
	General Market	good		Yes	
	Shops (Public Distribution System)	good		Yes.	
	Panchayat Building	maintained		Yes	
	Pharmacy/Medical Shop	good		Yes	
	Bank & ATM Facility 8	good		Yes	
	Agriculture Co-operative Society 3	good		Yes	
	Milk Co-operative Soc.			"	NO
	Small Scale Industries	good		Yes	
	Internet Cafes/ Common Service Center/Wi Fi				NO
	Youth Club				NO
	Mahila Mandal	good		Yes	

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Ahmedabad, Gujarat

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

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	good		Yes	
	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			Yes	
	13. Swarnjayanti Gram Swarozgar Yojana				
	14. Minimum Needs Programme (MNP)				
	15. National Rural Employment Programme			Yes	
	16. Employee Guarantee Scheme (EGS)				
	17. Prime Minister Rojgar Yojana (PMRY)				
	18. Jawahar Rozgar Yojana (JRY)				
	19. Indira Awas Yaojna (IAY)			Yes	
	20. Samagra Awas Yojana (SAY)				
	21. Sanjay Gandhi Niradhar Yojana (SGNY)				
	22. Jawahar Gram Samridhi Yojana (JGSY)				
	23. Other (SPECIFY)	PMGSY		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	Solar (Private)	Yes		
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System				
3.	Any Other				

VII. DATA COLLECTION FROM VILLAGE

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

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	yes.	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ....Daily..... 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

FB Patel
સરપંચ
ગ્રામ પંચાયત બાબેન
તા. બારડોલી, જી. સુરત.

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Covid-19 situation :

→ Street vendors → ground available (sugar factory ground) during pandamic.
to abide by covid guidelines.

→ during quarantine → helping hand was provided to covid positive people.

→ 70 cases till now. (Sanetization was done properly to all places)

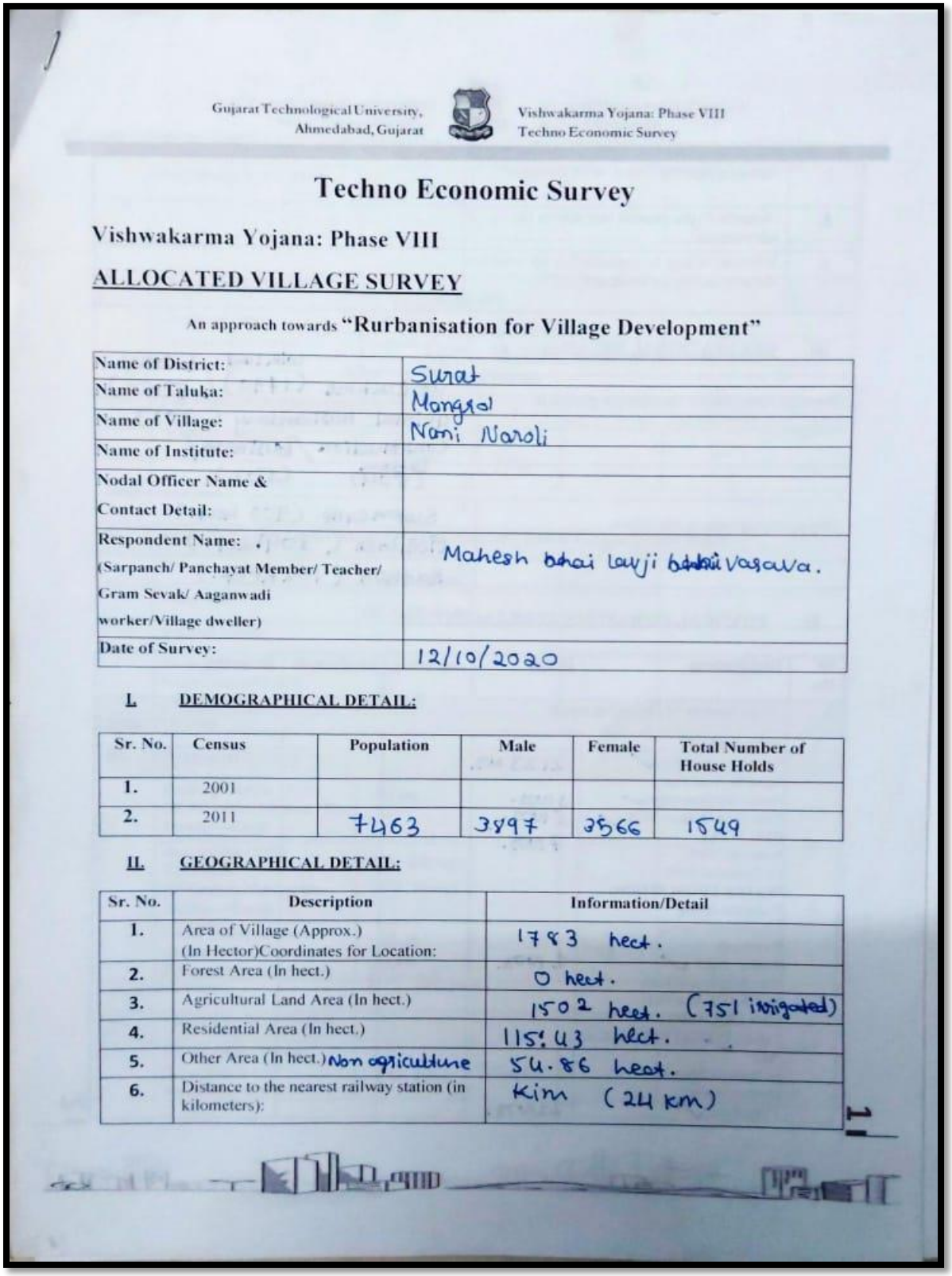
→ kit provided from depuly sarpanch with co-operation with sugar factory. (to unemployeed)

* Kaushalya vandhak centre, baben
→ plumbing, suthari work, papad making, etc.

Suggetions :

→ The village doesn't lack anything in respect to facilities & employeement opportunities, if the person doesn't lack the will to grow, they will definately prosper in this village on their own.

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



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

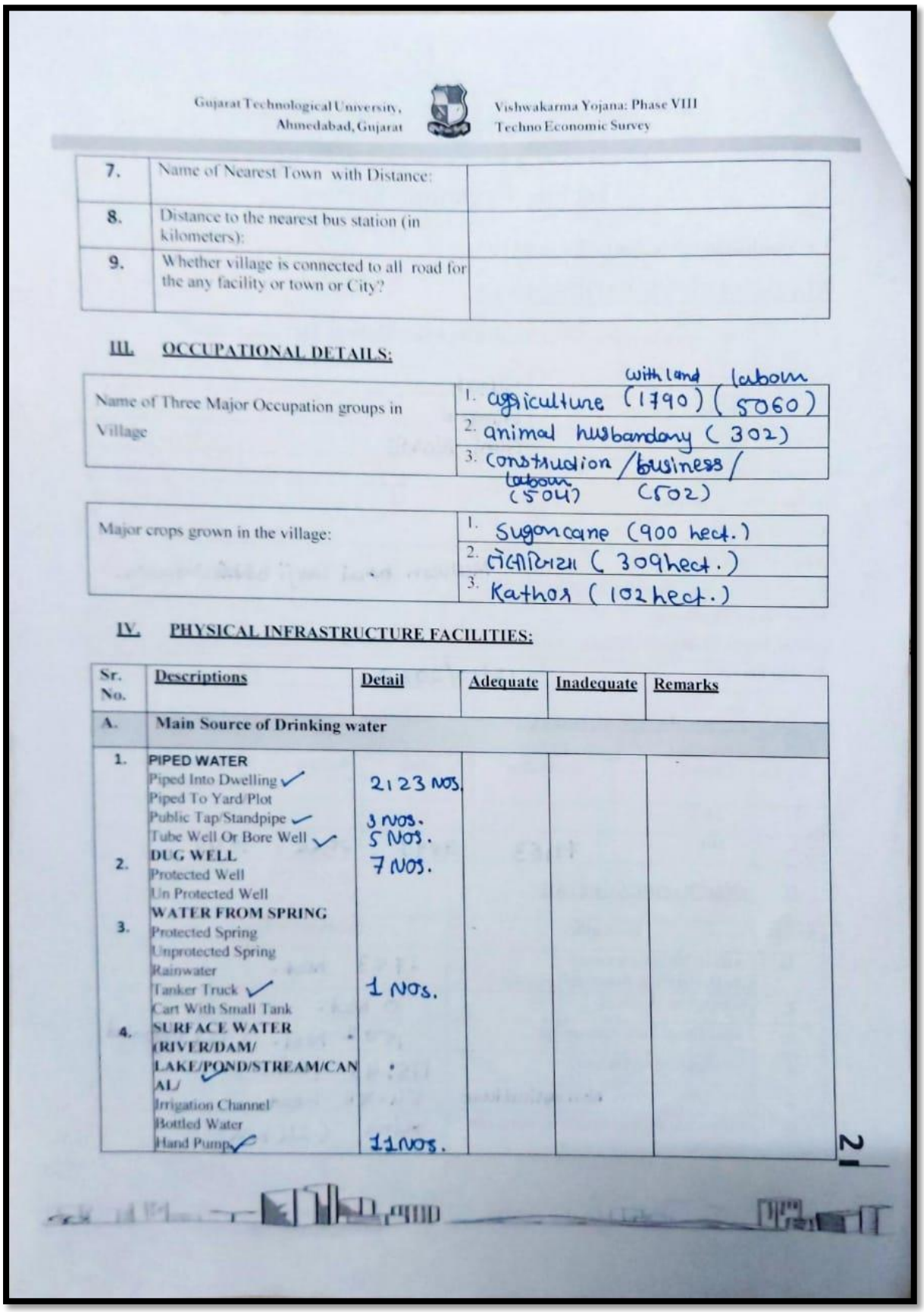
Name of District:	Surat
Name of Taluka:	Mangrol
Name of Village:	Nani Naroli
Name of Institute:	
Nodal Officer Name & Contact Detail:	
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Mahesh bhai Lavji [illegible] Vasava.
Date of Survey:	12/10/2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	7463	3897	3566	1549

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1783 hect.
2.	Forest Area (In hect.)	0 hect.
3.	Agricultural Land Area (In hect.)	1502 hect. (751 irrigated)
4.	Residential Area (In hect.)	115.43 hect.
5.	Other Area (In hect.) Non agriculture	54.86 hect.
6.	Distance to the nearest railway station (in kilometers):	Kim (24 km)



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7.	Name of Nearest Town with Distance:	
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 with land (1790) labour (5060)
	2. animal husbandary (302)
	3. construction labour (504) / business (502)

Major crops grown in the village:	1. Sugarcane (900 hect.)
	2. [illegible] (309 hect.)
	3. Kathol (102 hect.)

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER**				
	Piped Into Dwelling ✓	2123 NOS.			
	Piped To Yard/Plot				
	Public Tap/Standpipe ✓	3 NOS.			
	Tube Well Or Bore Well ✓	5 NOS.			
2.	**DUG WELL**	7 NOS.			
	Protected Well				
	Un Protected Well				
3.	**WATER FROM SPRING**				
	Protected Spring				
	Unprotected Spring				
	Rainwater				
	Tanker Truck ✓	1 NOS.			
	Cart With Small Tank				
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/**				
	Irrigation Channel				
	Bottled Water				
	Hand Pumps ✓	11 NOS.			

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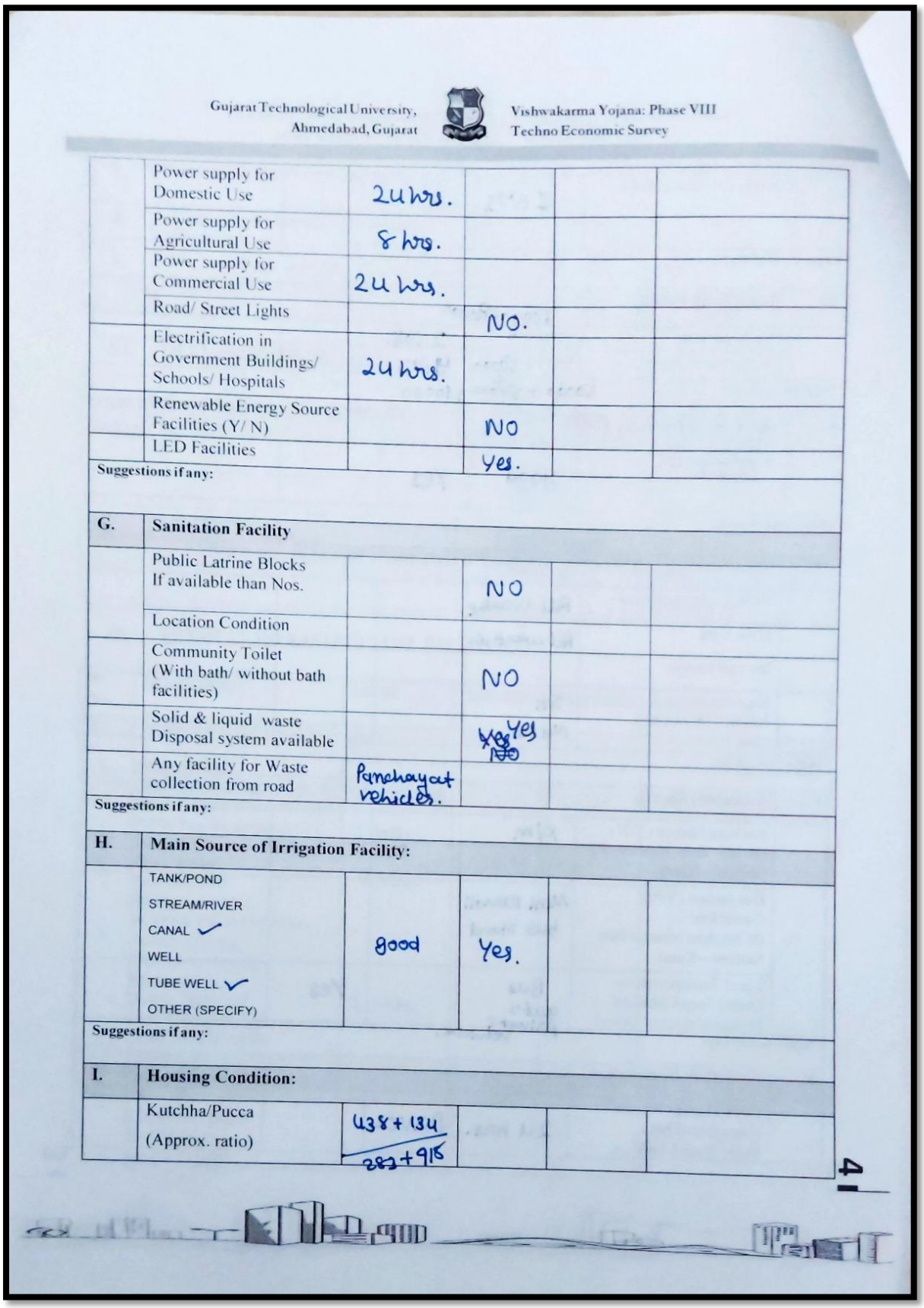
	Other(Specify)Lake/ Pond	1 Nos.			
Suggestions if any:					
B.	**Water Tank Facility**	50000+80000			
	Overhead Tank	Capacity:	2 Nos.		
	Underground Sump	Capacity: 50000	4 Nos.		
Suggestions if any:		50000 + 50000 + 700000			
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1	good	Yes		
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	All weathe			
	Main road	All weather			
	Internal streets				
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH NH 48			
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	4 km			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Nani Naroli bus stand			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Bus auto Private vehicle.		Yes	
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	24 hrs.	DGVCL		



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	Power supply for Domestic Use	24 hrs.			
	Power supply for Agricultural Use	8 hrs.			
	Power supply for Commercial Use	24 hrs.			
	Road/ Street Lights		NO.		
	Electrification in Government Buildings/ Schools/ Hospitals	24 hrs.			
	Renewable Energy Source Facilities (Y/ N)		NO		
	LED Facilities		Yes.		

Suggestions if any:

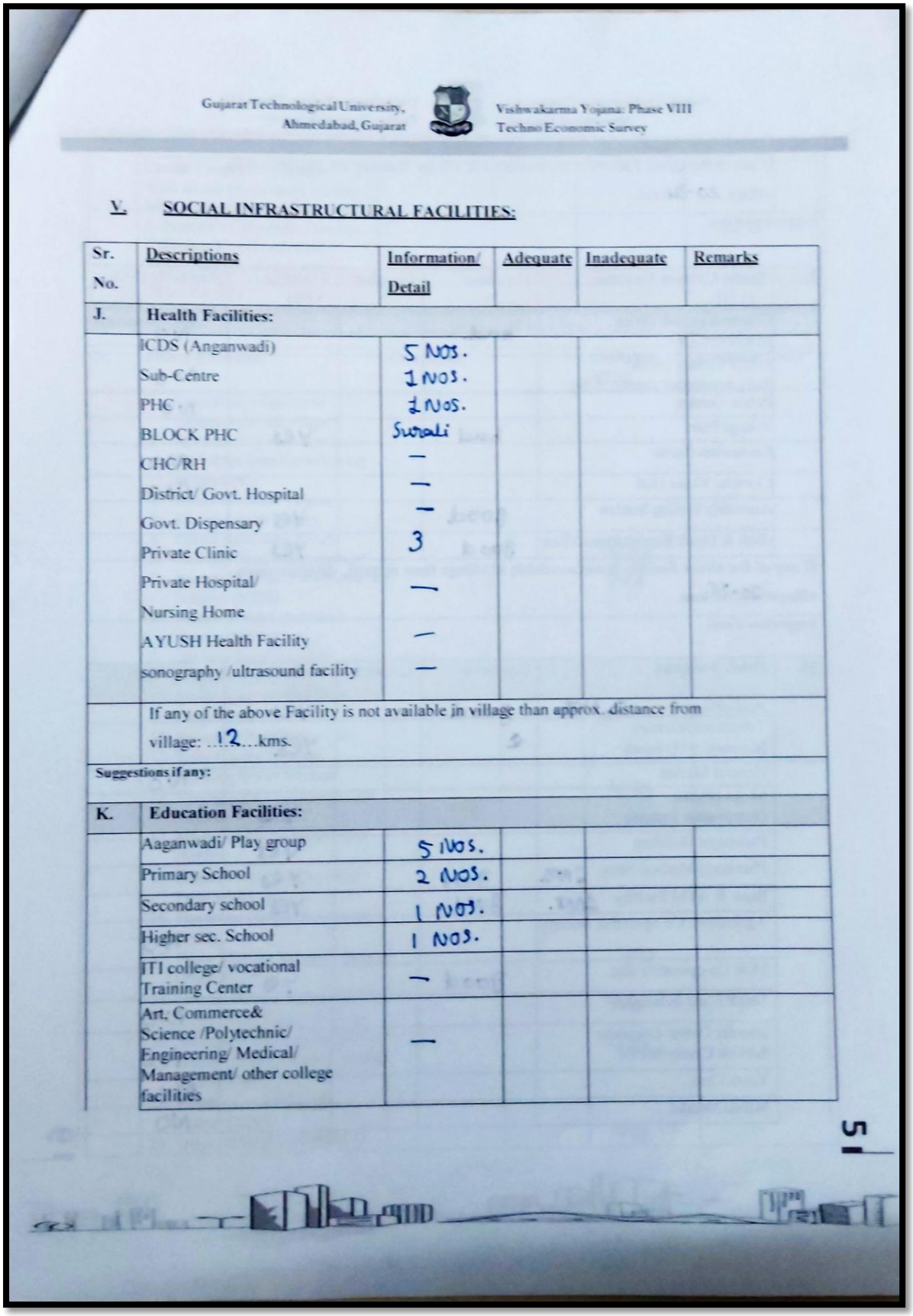
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.		NO		
	Location Condition				
	Community Toilet (With bath/ without bath facilities)		NO		
	Solid & liquid waste Disposal system available		~~Yes~~ Yes NO		
	Any facility for Waste collection from road	Panchayat vehicles.			

Suggestions if any:

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

Suggestions if any:

I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	438 + 134 / 283 + 918			



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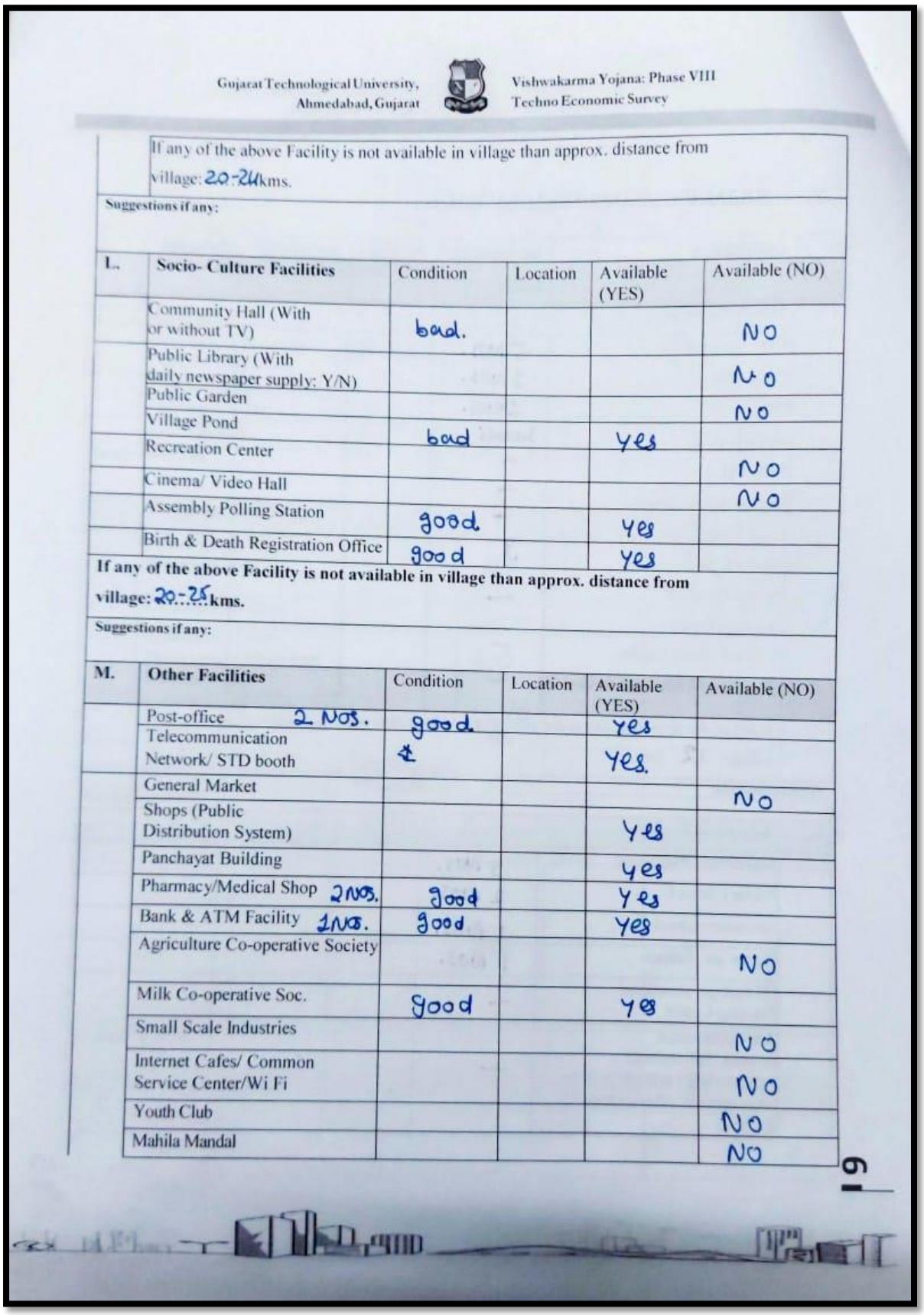
V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	5 NOS.			
	Sub-Centre	1 NOS.			
	PHC	1 NOS.			
	BLOCK PHC	Surali			
	CHC/RH	—			
	District/ Govt. Hospital	—			
	Govt. Dispensary	—			
	Private Clinic	3			
	Private Hospital/ Nursing Home	—			
	AYUSH Health Facility	—			
	sonography /ultrasound facility	—			
	If any of the above Facility is not available in village than approx. distance from village: ..12...kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	5 NOS.			
	Primary School	2 NOS.			
	Secondary school	1 NOS.			
	Higher sec. School	1 NOS.			
	ITI college/ vocational Training Center	—			
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	—			



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If any of the above Facility is not available in village than approx. distance from village: 20-24 kms.

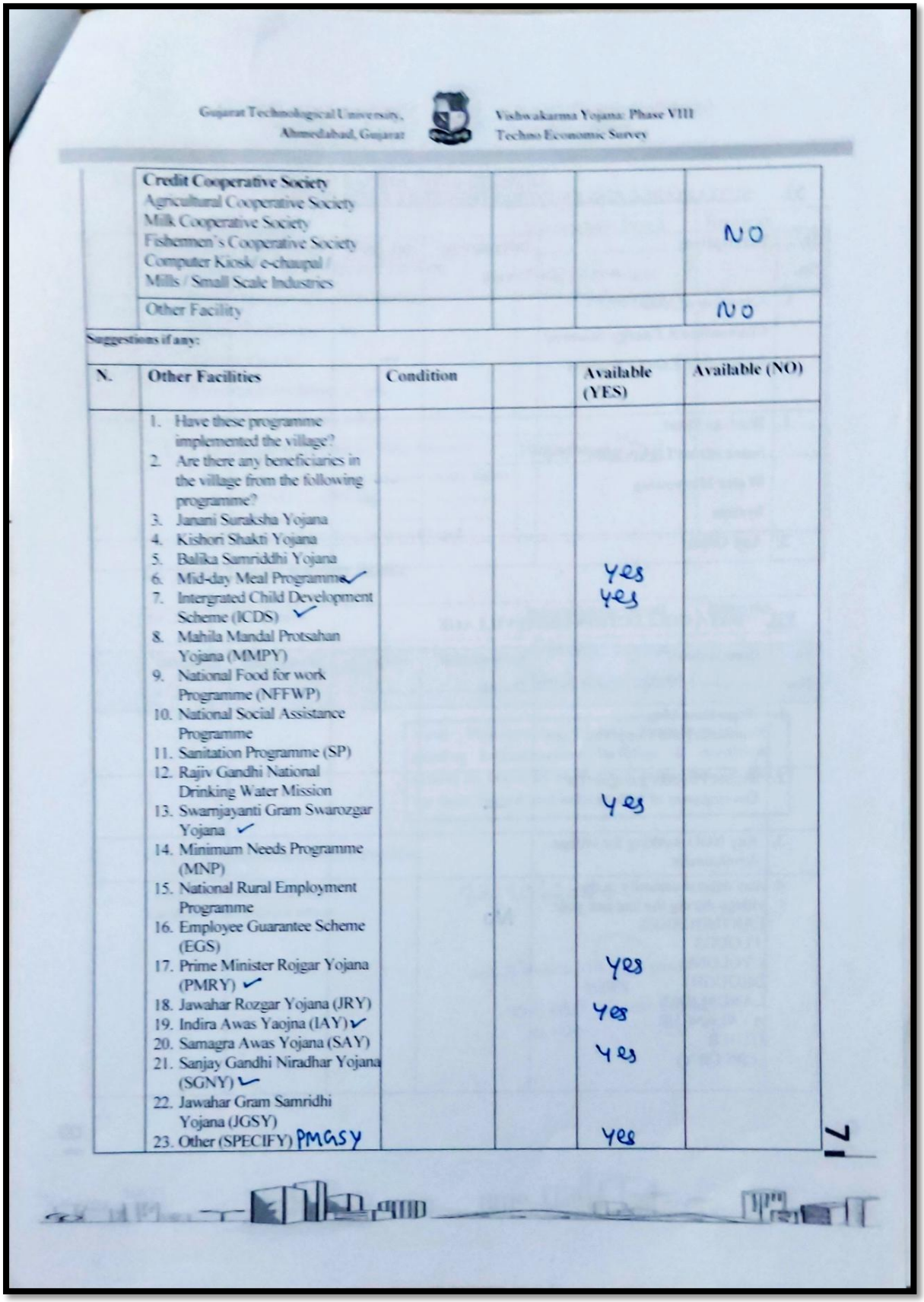
Suggestions if any:

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

If any of the above Facility is not available in village than approx. distance from village: 20-25 kms.

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office 2 NOS.	good.		Yes	
	Telecommunication Network/ STD booth	₹		Yes.	
	General Market				NO
	Shops (Public Distribution System)			Yes	
	Panchayat Building			Yes	
	Pharmacy/Medical Shop 2 NOS.	good		Yes	
	Bank & ATM Facility 1 NO.	good		Yes	
	Agriculture Co-operative Society				NO
	Milk Co-operative Soc.	good		Yes	
	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				NO
	Other Facility				NO

Suggestions if any:

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village?				
	2. Are there any beneficiaries in the village from the following programme?				
	3. Janani Suraksha Yojana				
	4. Kishori Shakti Yojana				
	5. Balika Samriddhi Yojana				
	6. Mid-day Meal Programme ✓			Yes	
	7. Intergrated Child Development Scheme (ICDS) ✓			Yes	
	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 ✓			Yes	
	14. Minimum Needs Programme (MNP)				
	15. National Rural Employment Programme				
	16. Employee Guarantee Scheme (EGS)				
	17. Prime Minister Rojgar Yojana (PMRY) ✓			Yes	
	18. Jawahar Rozgar Yojana (JRY)			Yes	
	19. Indira Awas Yaojna (IAY) ✓				
	20. Samagra Awas Yojana (SAY)			Yes	
	21. Sanjay Gandhi Niradhar Yojana (SGNY) ✓				
	22. Jawahar Gram Samridhi Yojana (JGSY)				
	23. Other (SPECIFY) PMGSY			Yes	

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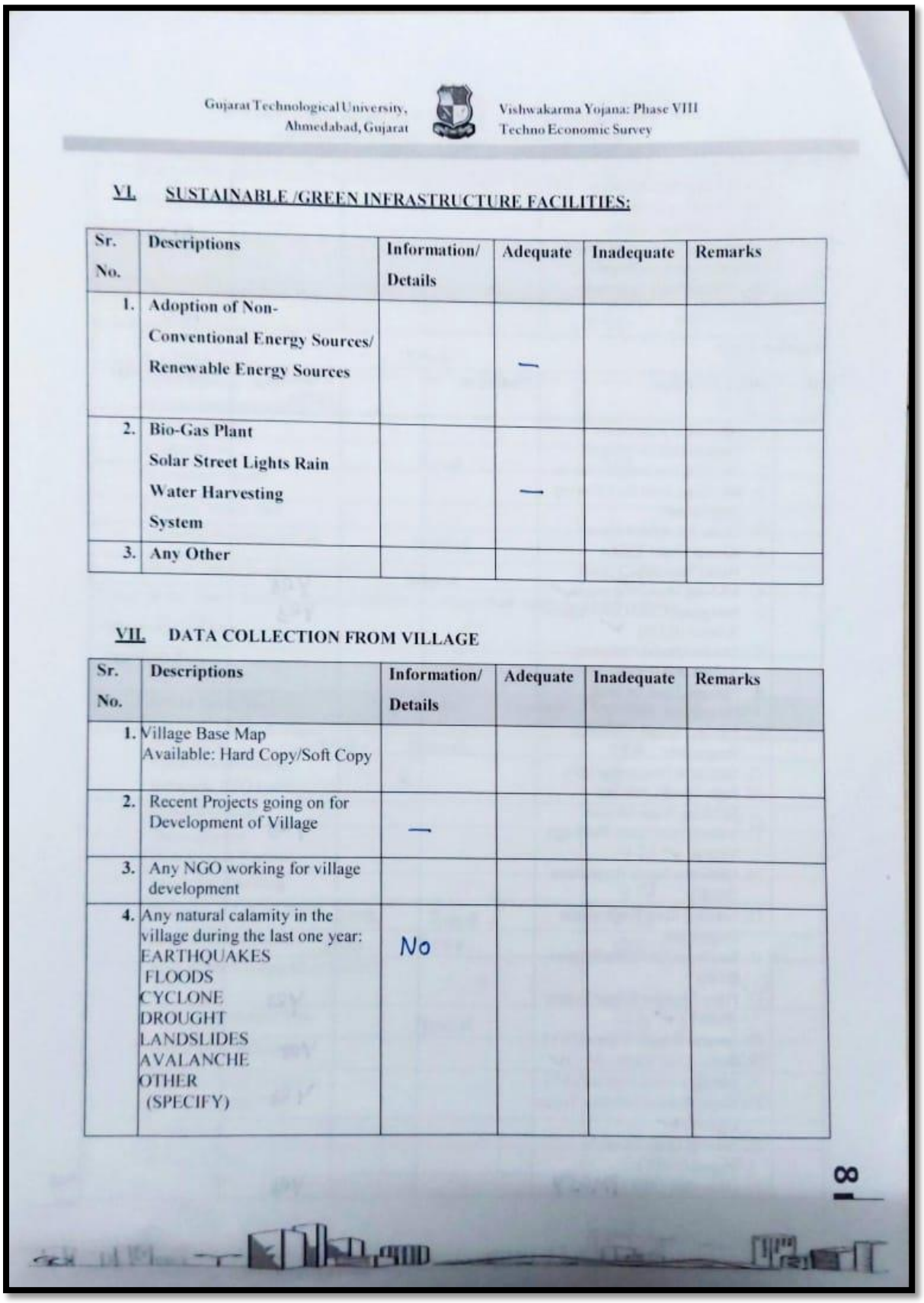

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

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VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building ✓ M Health Center Panchayat Building ✓ M Public Toilets & any other	Maintenance Needed.	
2.	Additional Information/ Requirement	Anganwadi (Main..)	
3.	During the last six months how many times CLEANING ....daily..... 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 ?	Street light Pond development	

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

22/10/2020

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નાની નરોલી ગામ પંચાયત

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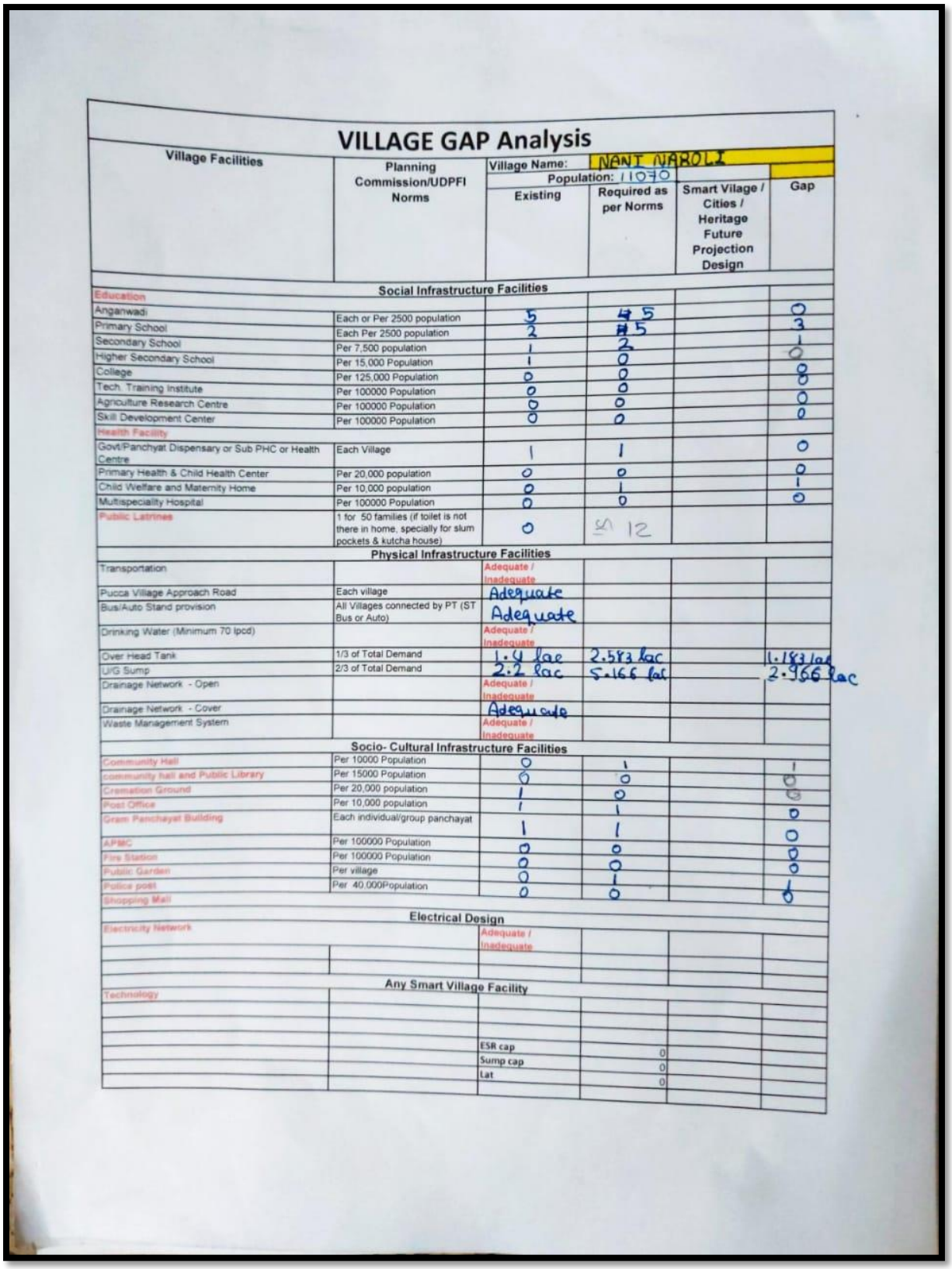
12.4 Gap Analysis of the Allocated Village



VILLAGE GAP Analysis

Village Name: NANI NAROLI

Population: 11070

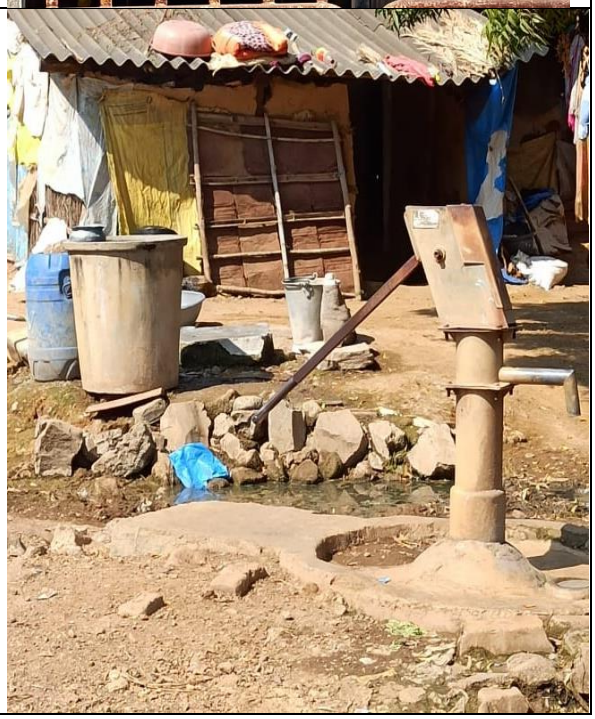
Village Facilities	Planning Commission/UDPFI Norms	Existing	Required as per Norms	Smart Vilage / Cities / Heritage Future Projection Design	Gap
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 population	5	4 5		0
Primary School	Each Per 2500 population	2	5		3
Secondary School	Per 7,500 population	1	2		1
Higher Secondary School	Per 15,000 Population	1	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	1	1		0
Primary Health & Child Health Center	Per 20,000 population	0	0		0
Child Welfare and Maternity Home	Per 10,000 population	0	1		1
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	50 12		
Physical Infrastructure 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 / Inadequate			
Over Head Tank	1/3 of Total Demand	1.4 lac	2.583 lac		1.183 lac
U/G Sump	2/3 of Total Demand	2.2 lac	5.166 lac		2.966 lac
Drainage Network - Open		Adequate / Inadequate			
Drainage Network - Cover		Adequate			
Waste Management System		Adequate / Inadequate			
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	0	1		1
community hall and Public Library	Per 15000 Population	0	0		0
Cremation Ground	Per 20,000 population	1	0		0
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	0		0
Shopping Mall					
Electrical Design					
Electricity Network		Adequate / Inadequate			
Any Smart Village Facility					
Technology					
		ESR cap	0		
		Sump cap	0		
		Lat	0		

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

Sr. No.	Village	Diciplin	Part - I	Part - II
1.	Nani Naroli, Mangrol	Civil	Biogas plant	Tank design for water harvesting
			High School	Road Section
			Public toilet	Child welfare and maternity home
			Community Hall	Public garden
			Bank	Common Service Centre
			Village Gate	Chabutro
2.	Palod, Mangrol	Civil	Bio-gas plant	Post office
			Rain water harvesting	Garden
			Library	Overhead Water Tank
			Community Hall	Low Cost House
			Skill development center	Primary health center
			Village Gate	Chabutra
3.	Vav, Kamrej	Civil	Post office	Bio-gas plant
			Public garden	Maintenance of PHC
			Water harvesting system	Sewage treatment plant
			Community Hall	Library
			Skill development center	Road (internal road)
4.	Ten, Bardoli	Civil	Bio-gas plant	Internal street road
			Primary health center	Primary School
			Post office	Public Toilet
			Public library	Community Hall
			Agriculture Research Center	Maintenance of Overhead water tank
			Village Gate	Maintenance of Village pond
5.	Kharach	Civil	Milk collecting and Distributing Unit	Development of lake
			Library	Primary School
			Clinic	Video Hall
			Overhead water tank	Medical Store
			Road	Youth club
			Mahila Mandal	Public garden
6.	Ilav	Civil	Anganwadi	Public garden
			Girl's primary school	Community Hall
			Agro storage unit	Public library
			Milk dairy unit	Post office
			Animal shelter	Aro-water plant
			Public toilet	Mahila Mandal

7.	Madhi	Civil	Library	Maintenance of police station
			Hospital	Public garden
			Riverfront	Waste water treatment
			Fire station	Solid waste treatment
			Village Gate	Medical shop
			Community hall	Pucca vegetable market
8.	Vankaner	Civil	Library	Lake Garden
			Skill development center	Science-Department
			Community hall	Cyber-café
			Anganwadi	Child-welfare & Maternity Home
			Public toilet	Overhead tank
			Entrance Gate	Super Market

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




નાનીનરોલી બસ સ્ટેન્ડ GIPCL
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અલ્ટ્રાટેક
દેશની
નં.1સિમેન્ટ
દેશની
નં.1સિમેન્ટ


પ્રાથમિક શાળા વૂંઢાલી


GUJARAT INDUSTRIES POWER CO LTD
URAT LIGNITE POWER PLANT

12.7 Village Interaction with sarpanch Report with the photograph

Village Interaction Report
Nani Naroli Village, Taluka: Mangrol, District: Surat

To know or to understand the actual necessities of village it's required to visit village and interact with Sarpanch, Talati and Other village dwellers.

Techno economic survey forms give much information about village by interacting with Sarpanch and Upsarpanch. But interaction with village dwellers and observation of village condition is required.

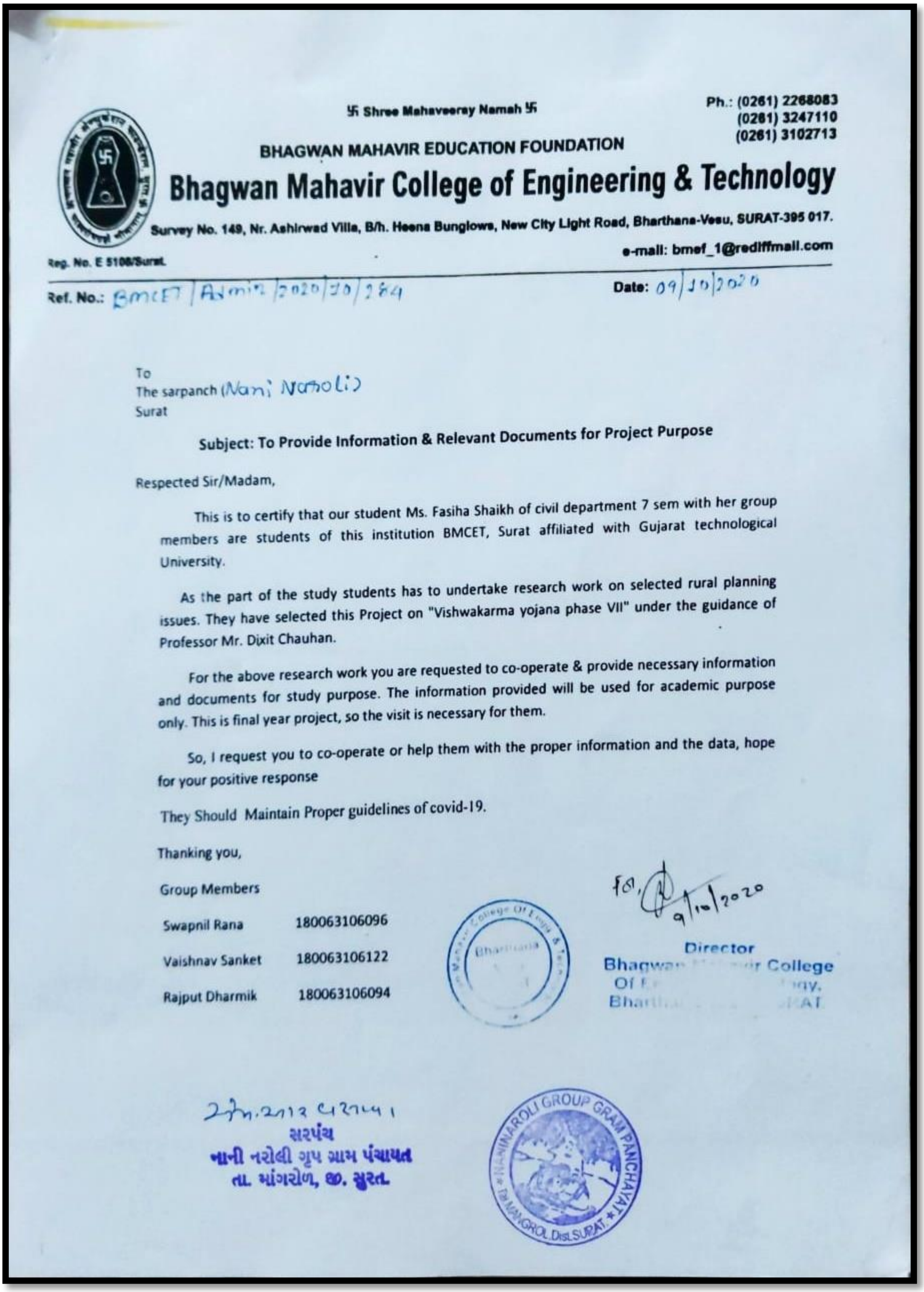
We visited allocated village Nani Naroli and also visited ideal village Baben.

- We met to Sarpanch Mrs. Minaben Rupsingbhai Vasava and Upsarpanch Mr. Hasimbhai Sulemanbhai Limbada of Nani Naroli village. They both are very dynamic person and gave us the detailed information and data whenever we required.
- We visited all the internal part of the village and interacted with villagers directly and ask them about the present situation of village. We conducted a Technoeconomic survey of Nani Naroli village.
- After all, we analyzed the gap analysis and provided the necessary facilities to village. We saw that as per UDPFI norms there are some non-adequate facilities.
- We provide Village gate, Public Toilet, community hall, Biogas Plant and soak pit at primary basis. Then in second stage we will provide Public Garden, tank for water Harvrsting, Common Service Centre, maternity centre, and maintenance of existing structure.
- We also send our design proposal to Gram Panchayat of Nani Naroli Village.

In this way we approach to various problems faced by villagers and various criteria given by GTU (VY section).

Figure 67 Interaction with sarpanch and upsarpanch

12.8 Sarpanch Letter giving information about the village development



卐 Shree Mahaveeray Namah 卐

BHAGWAN MAHAVIR EDUCATION FOUNDATION

Bhagwan Mahavir College of Engineering & Technology

Survey No. 149, Nr. Ashirwad Villa, B/h. Heena Bunglows, New City Light Road, Bharthana-Vesu, SURAT-395 017.

Ph.: (0261) 2268083
(0261) 3247110
(0261) 3102713

e-mail: bmef_1@rediffmail.com

Reg. No. E 5108/Surat

Ref. No.: BMCET / Admin /2020/10/284 | Date: 09/10/2020

To
The sarpanch (Nani Naroli)
Surat

Subject: To Provide Information & Relevant Documents for Project Purpose

Respected Sir/Madam,

This is to certify that our student Ms. Fasiha Shaikh of civil department 7 sem with her group members are students of this institution BMCET, Surat affiliated with Gujarat technological University.

As the part of the study students has to undertake research work on selected rural planning issues. They have selected this Project on "Vishwakarma yojana phase VII" under the guidance of Professor Mr. Dixit Chauhan.

For the above research work you are requested to co-operate & provide necessary information and documents for study purpose. The information provided will be used for academic purpose only. This is final year project, so the visit is necessary for them.

So, I request you to co-operate or help them with the proper information and the data, hope for your positive response

They Should Maintain Proper guidelines of covid-19.

Thanking you,

Group Members

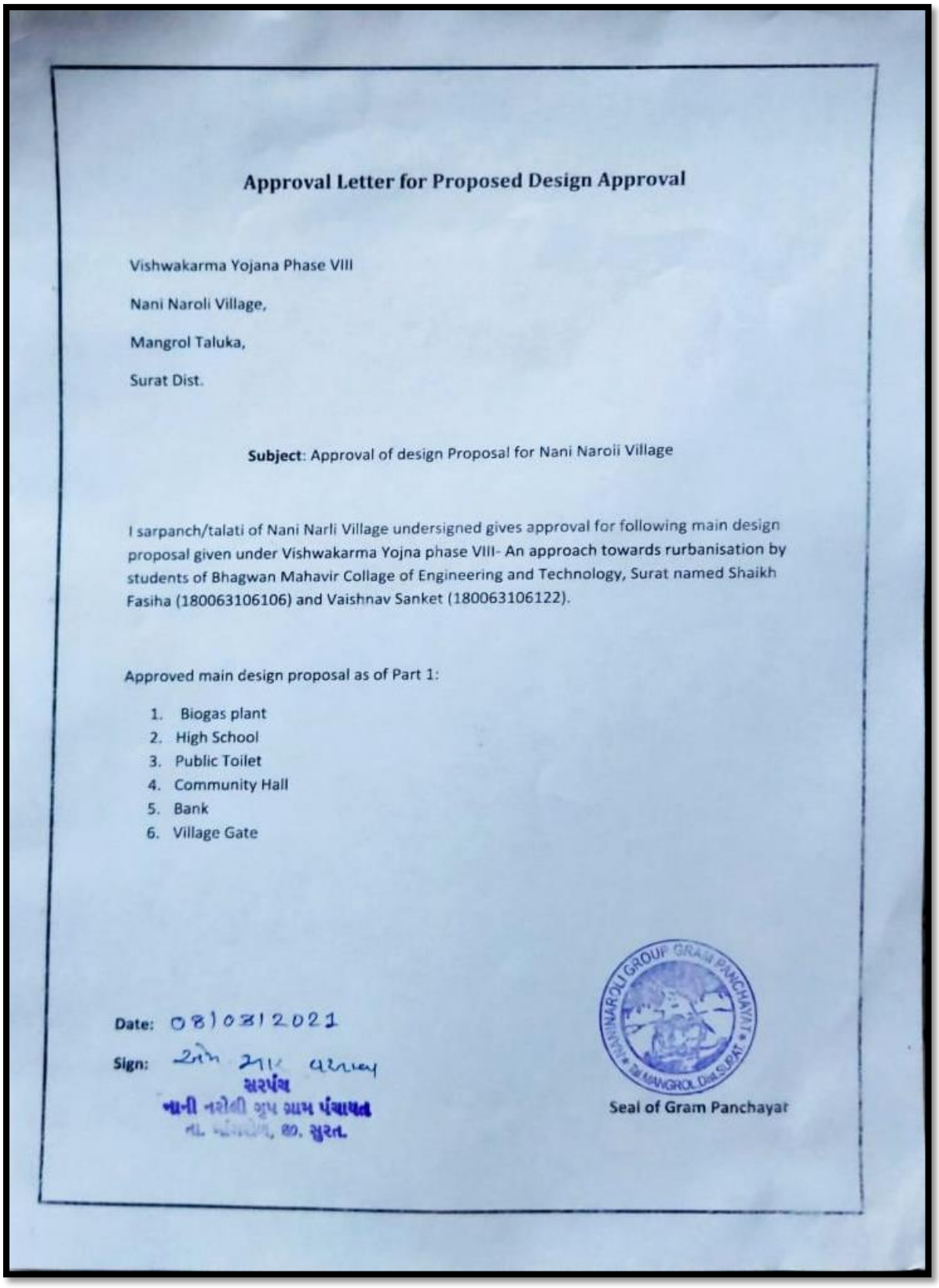
Swapnil Rana	180063106096
Vaishnav Sanket	180063106122
Rajput Dharmik	180063106094

9/10/2020
Director
Bhagwan Mahavir College
Of Engg. & Tech.
Bharthana, SURAT

સરપંચ
નાની નરોલી ગ્રૂપ ગ્રામ પંચાયત
તા. માંગરોળ, જી. સુરત.

NANINAROLI GROUP GRAM PANCHAYAT
TA. MANGROL DIST. SURAT

❖ Approval Letter for Proposed Design Approval



Approval Letter for Proposed Design Approval

Vishwakarma Yojana Phase VIII

Nani Naroli Village,

Mangrol Taluka,

Surat Dist.

Subject: Approval of design Proposal for Nani Naroli Village

I sarpanch/talati of Nani Narli Village undersigned gives approval for following main design proposal given under Vishwakarma Yojna phase VIII- An approach towards rurbanisation by students of Bhagwan Mahavir Collage of Engineering and Technology, Surat named Shaikh Fasiha (180063106106) and Vaishnav Sanket (180063106122).

Approved main design proposal as of Part 1:

1. Biogas plant
2. High School
3. Public Toilet
4. Community Hall
5. Bank
6. Village Gate

Date: 08/03/2021

Sign:

સરપંચ
નાની નરોલી ગ્રુપ ગ્રામ પંચાયત
તા. માંગરોળ, જી. સુરત.

NANINAROLI GROUP GRAM PANCHAYAT
TA MANGROL Dist.SURAT

Seal of Gram Panchayat

12.9 Comprehensive report preparation as per format

12.9.1 Introduction

The **Comprehensive Report** is an informative, in-depth evaluation on a particular topic. A comprehensive report format is a systematic arrangement of information gathered on one particular topic. By definition, a comprehensive report is intended to explore a topic or an idea in great detail.

The first section you start writing in your report is always a summary or introduction. This should stretch across just one or two pages to give your reader a brief glimpse into what your results or findings are.

12.9.2 Purpose of writing comprehensive report

Reports communicate information which has been compiled as a result of research and analysis of data and of issues. Reports can cover a wide range of topics, but usually focus on transmitting information with a clear purpose, to a specific audience. Good reports are documents that are accurate, objective and complete. They should also be well-written, clearly structured and expressed in a way that holds the reader's attention and meets their expectations.

12.9.3 How to write comprehensive report

A summary of the entire detail project report is written in the comprehensive report. Thus, comprehensive report in includes a synopsized content of the detailed project report prepared during the entire term.
A comprehensive report gives a brief idea about the work done during the tenure of the project. As listed below the significant topics explained in the detailed project report are written in concise form.
For instance, a brief conclusion compiling an overview of the conclusion of the project is included in this comprehensive report. Likewise, other topics included in the comprehensive report are enlisted in the next subtopic.

12.9.4 Topics to be included in comprehensive repost\

We are going to include following topics in our comprehensive report.

- Introduction
- Aim of the Project
- Significance of the Project
- Topics Included in this DPR
- Ideal Village Concept
- Data Collection
- Conclusion
- Design Proposals

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

After thoroughly discussing, we decided to give the following design proposals as per the current need of the village:

1. Tank design for water harvesting
2. Road Section
3. Child welfare and maternity home
4. Public garden
5. Common Service Centre
6. Chabutro

13.1.1 Civil Design 1

❖ Tank design for water harvesting

A tank or water storage tank collects water and stores it for later use and timely access.
The purpose of tank here is to store water from rainwater harvesting system.
Rainwater Harvesting is a technique of collection and storage of rainwater into natural reservoirs and tanks, or the infiltration of surface water into subsurface aquifers. The rainwater harvesting is of different types such as,

1. Directly from roof tops and stored in tanks,
2. Monsoon runoff and water in swollen streams during the monsoon and storing it in underground tanks,
3. Water from flooded rivers can be stored in small ponds,
4. Collection and transfer of rainwater into percolation tanks. So as to facilitate discharge into ground.

Advantages:

- Rainwater harvesting provides a good supplement to other water sources .Thus relieving pressure on other water sources.
- It can be as a buffer and can be used in times of emergency or breakdown of public water supply systems.
- Helps to reduce the storm drainage load and flooding in the cities.
- It is a flexible technology and can be built to require meets of any range .Also the construction, operation and maintenance is not very labour intensive in most systems.
- Prevents water wastage by arresting soil erosion and mitigates flood.

- Sustains and safeguards existing water table through recharge.
- Arrests sea water intrusion and prevents salination of ground water.

Design of tank

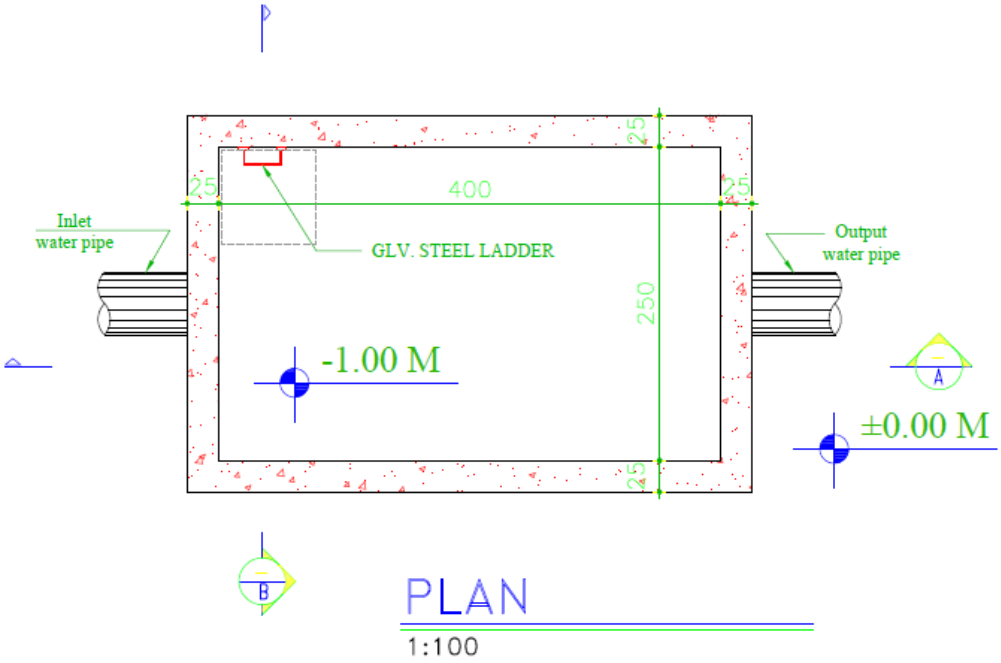


Figure 68 Plan of Tank

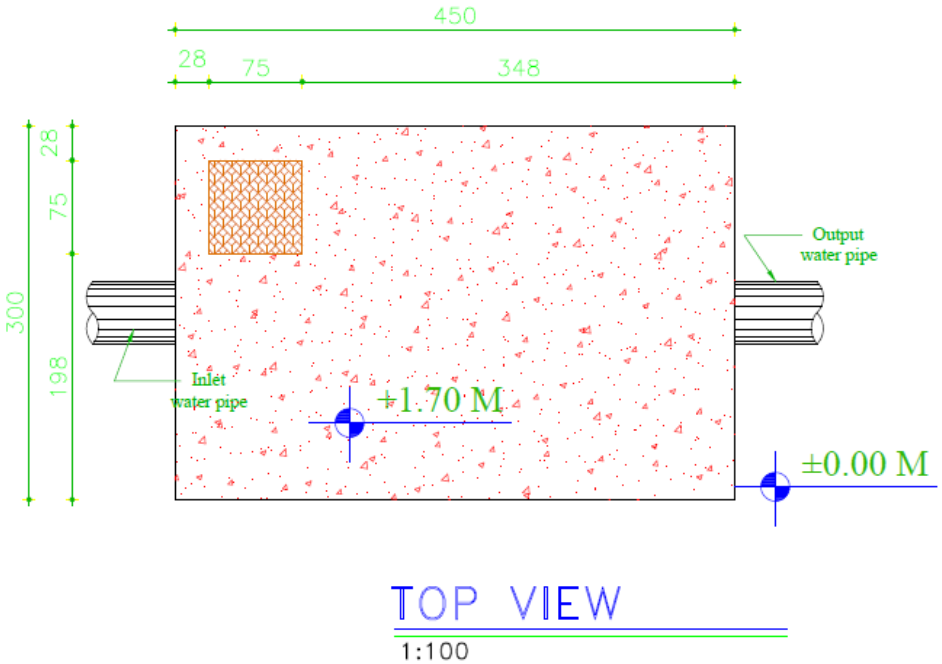


Figure 69 Top view of Tank

WATER TANK:-

Capacity of water tank =L*B*H

=4.5*3*3.6

=48.6*1000 =48600lit

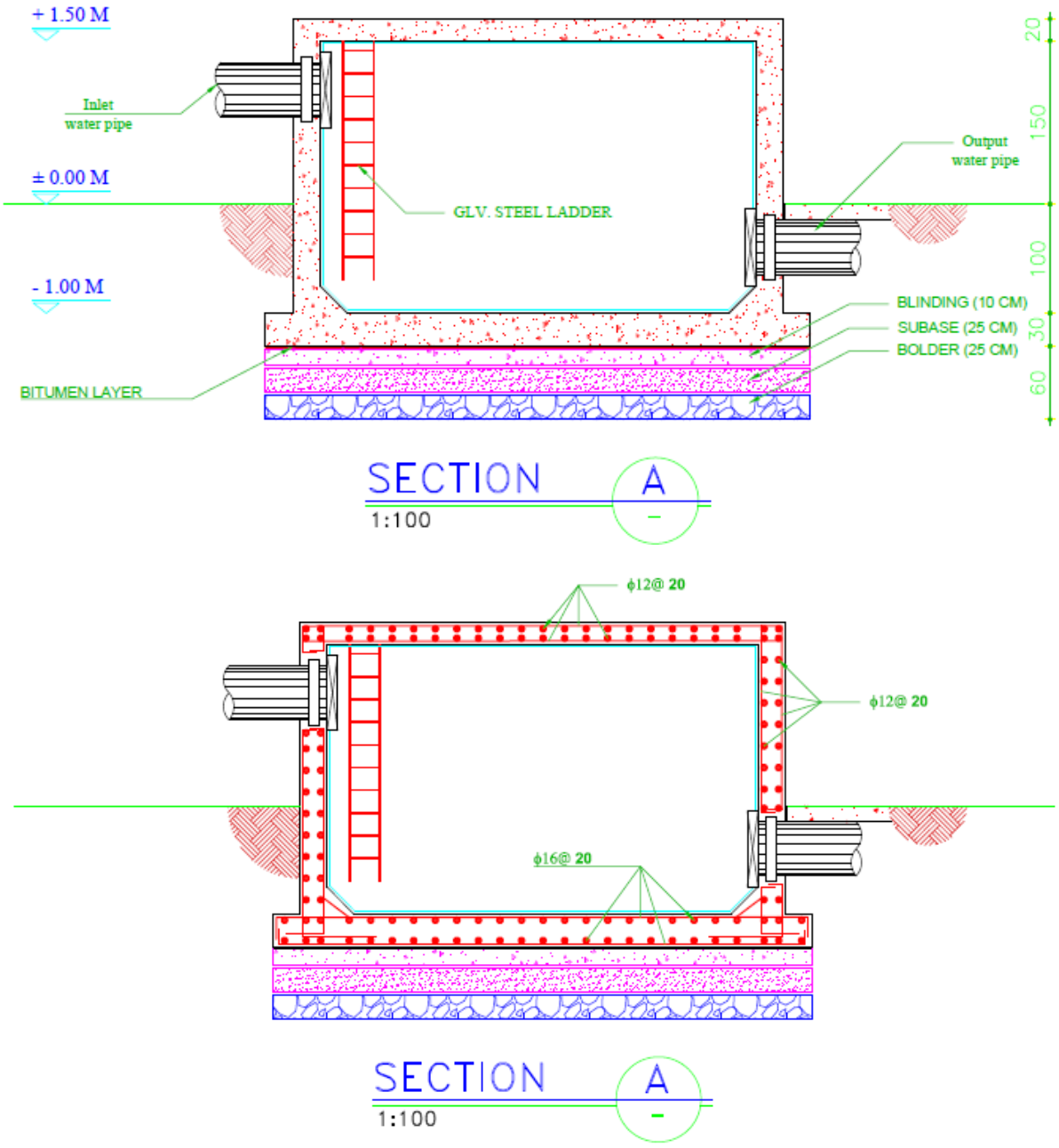


Figure 70 Section A of Tank

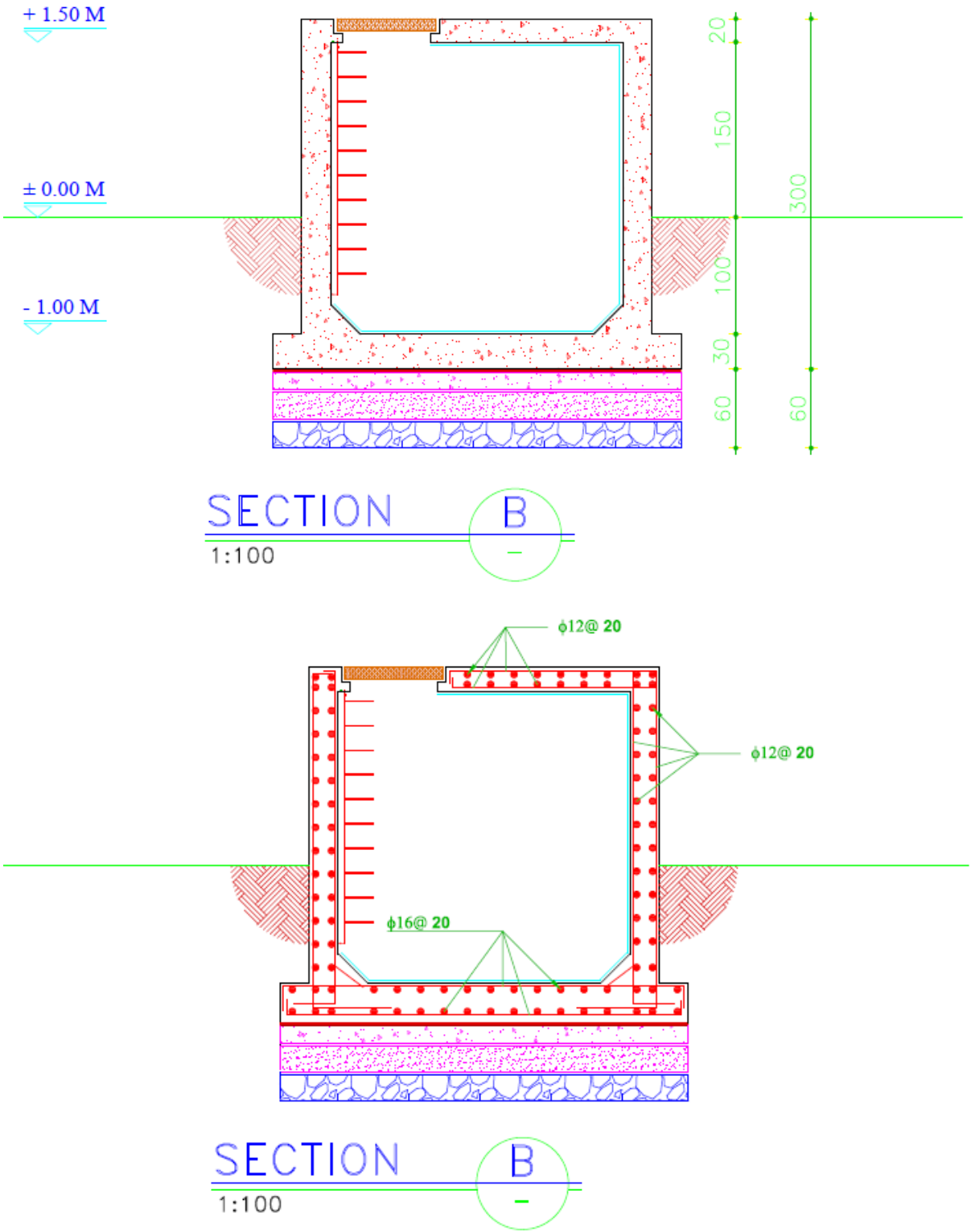


Figure 71 Section B of Tank

Measurement Sheet of Tank

Table 26 Measurement Sheet of Tank

Sr. No.	Description	No.	Length	Width	Height	Quantity
1	Excavation in foundation					
	Internal wall	1	6.875	4.5	3.6	111.375 m^3
					Total	111.375 m^3
2	R.C.C. work					
	Internal wall	1	6.875	.25	3.6	6.187 m^3
					Total	6.187 m^3
3	At top slab	1	4.5	3	0.2	2.7 m^3
	At base slab	1	5	3.5	0.3	5.25 m^3
	Deduction					
	Pipe(area=0.125 m2)	2			0.25	-0.063 m^3
	Cover	1	0.75	0.75	0.2	-0.1125 m^3
						13.96 m^3

Abstract Sheet of Tank

Table 27 Abstract Sheet of Tank

Sr. No.	Particulars	Quantity	Unit	Rate	Per	Amount
1	Excavation in foundation	111.375	m^3	85	m^3	9466.875
5	R.C.C. work	13.96	m^3	8800	m^3	122848
Total						Rs.132314.875
Add 5% contingencies						Rs.6615.74
Grand Total						Rs.138930.615
say						**Rs138931**

13.1.2 Civil Design 2

❖ Road Section

A road is a wide way leading from one place to another, especially one with a specially prepared surface which vehicles can use.

The condition of the village roads of few backward areas in the Nani Naroli village is not so good. There are many streets that are yet not paved.
Therefore, we have come up with the design of road section for the Nani Naroli village.

Slope of the Road is 1:400

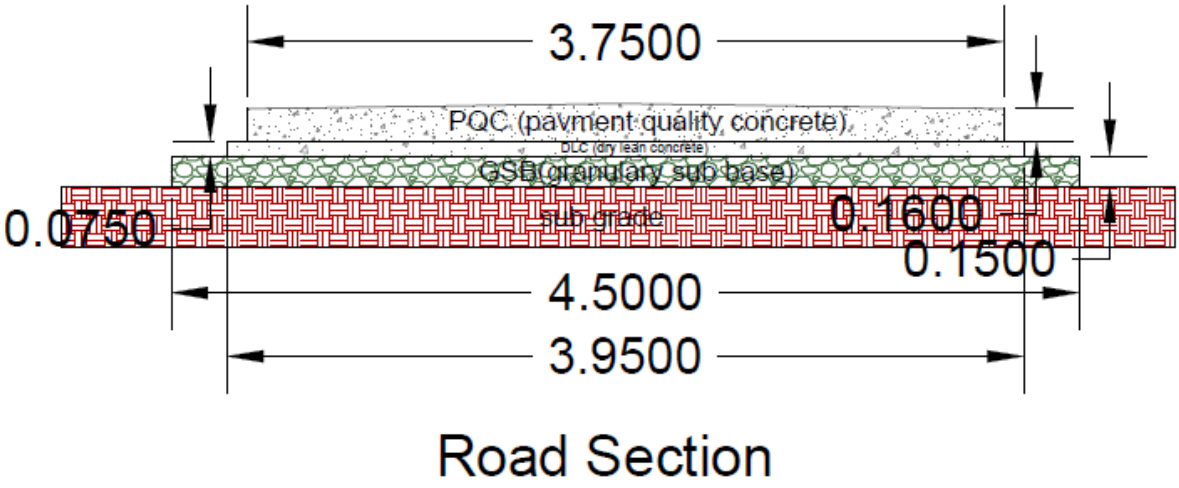


Figure 72 Road Section

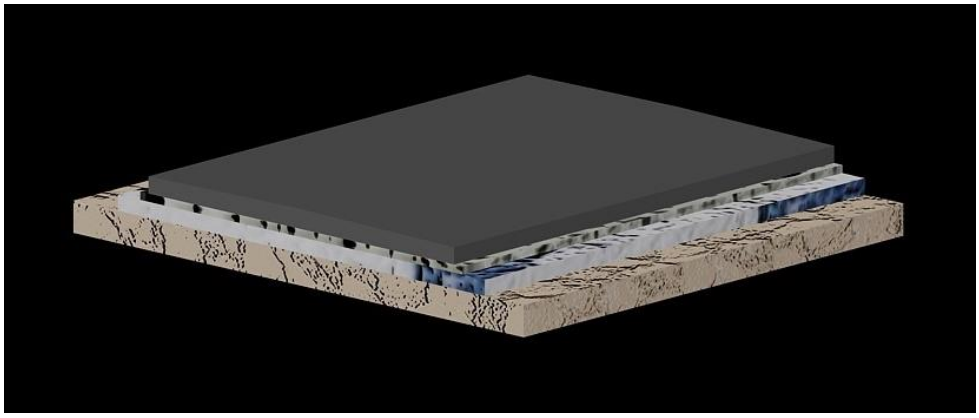


Figure 73 3D of Road Section

Measurement Sheet of Road Section

Table 28 Measurement Sheet of Road Section

Sr. No.	Description	No.	Length	Width	Height	Quantity
1	Excavation for road work					
		1	1000	3.75	0.39	1462.5 m^3
					Total	1462.5 m^3
2	Laying of granularly sub base material					
		1	1000	3.75	0.150	562.5 m^3
	Density=2				Total	1125ton(compacted)
3	Laying of dry lean concrete(M10)					
		1	1000	3.75	0.075	281.25 m^3

4	Laying of pavement quality concrete(M35)	1	1000	3.5	0.160	560 m^3

Abstract Sheet of Road Section

Table 29 Abstract Sheet of Road Section

Sr. No.	Particulars	Quantity	Unit	Rate	Per	Amount
1	Excavation in foundation	1462.5	m^3	85	m^3	124312.5
2	Laying of granularly sub base material(GSB)	1125	Ton	650	m^3	731250
3	Laying of dry lean concrete(D.L.C)	281.25	m^3	3600	m^3	1012500
4	Laying of pavement quality concrete(PQC) (M35)	560	m^3	5500	m^3	3080000
Total						**Rs.4948062.5**
Add 5% contingencies						**Rs.247403.125**
Grand Total						**Rs.5195465.25**
say						**Rs5195466**

Therefore, the cost of road is Rs.51,95,466 per Km.

13.1.3 Civil Design 3

❖ Child welfare and maternity home

Child welfare and maternity home focus on health issues concerning women, children and families, such as access to recommended prenatal and well-child care, infant and maternal mortality prevention, maternal and child mental health, newborn screening, child immunizations, child nutrition and services for children with special health care needs. Investment in healthy children and families is needed to strengthen communities and avoid unnecessary health care costs.

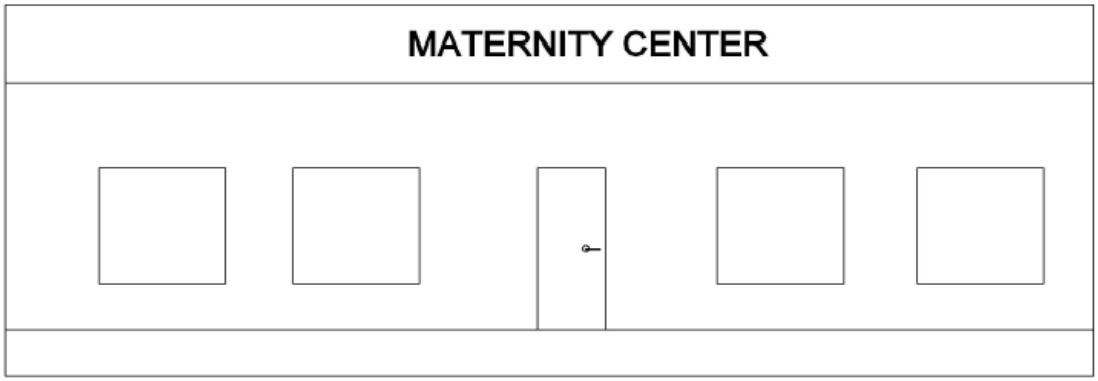


Figure 74 Elevation of Child welfare and Maternity Center

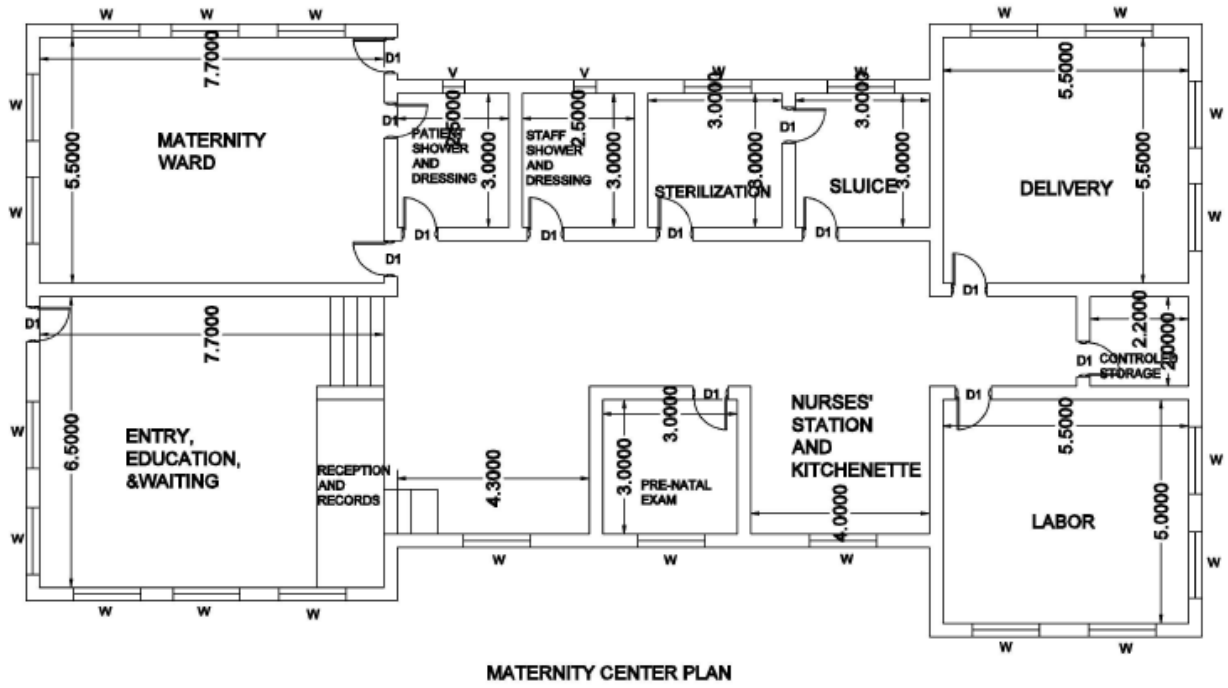
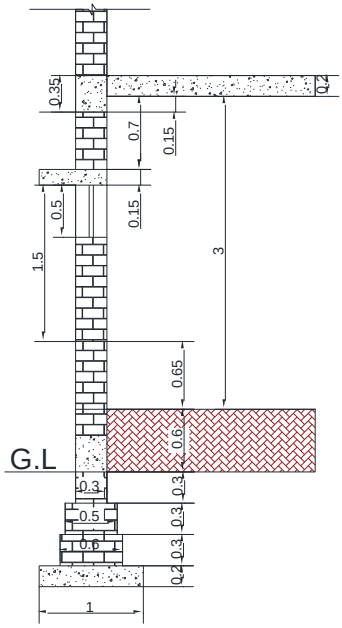


Figure 75 Plan of Child welfare and Maternity Center

Figure 76 3D of Child welfare and Maternity Center



SECTION

Figure 77 Section of Child welfare and Maternity Center

Measurement Sheet of Child welfare and Maternity Center

Table 30 Measurement Sheet of Child welfare and Maternity Center

Sr. No.	Description	No.	Length	Width	Height	Quantity
1	Excavation in foundation					
	Internal wall	1	141.4	1	1.1	155.54 m^3
					Total	155.54 m^3
2	P.C.C. in foundation					
	Internal wall	1	141.4	1	0.2	28.28 m^3
					Total	28.28 m^3
3	Brickwork in foundation					
	Internal wall					
	First step	1	145.6	0.6	0.3	26.208 m^3
	Second step	1	146.4	0.5	0.3	21.96 m^3
	Third step	1	148.4	0.3	0.9	40.068 m^3
						88.236 m^3
	Steps:					
	First	1	1	0.9	0.15	0.135 m^3
	Second	1	1	0.6	0.15	0.09 m^3
	Third	1	1	0.3	0.15	0.045 m^3
						0.27 m^3
	First	1	2	0.9	0.15	0.27 m^3

	Second	1	2	0.6	0.15	0.18 m^3
	Third	1	2	0.3	0.15	0.09 m^3
					Total	89.046 m^3
4	Brickwork in superstructure					
	G.F. wall	1	143.1	0.3	3	128.79 m^3
						128.79 m^3
	Deduction for door/window					
	D1	12	1	0.3	2.1	7.56 m^3
	W	21	1.5	0.3	1.5	14.175 m^3
	V	2	0.5	0.3	0.5	0.15 m^3
						(-)21.885 m^3
					Total	106.905 m^3
5	R.C.C. work					
	Slab=360.31 m^2					
		1	26.3	13.7	0.2	72.062 m^3
	Beam	1	148.4	0.3	0.35	15.582 m^3
	Lintel					2 m^3
	Stair					10 m^3
					Total	99.644 m^3
6	2 cm thick marble flooring Deduction	1 1	360.31 m^2 148.4	0.3		315.79m^2
7	Smooth plaster inside walls and ceiling					
	All inside of the wall(GF)		207.7		3	623.1m^2
	All outside of the wall		67.5		4.6	310.5m^2
	Ceiling					315.79m^2
	Deduction for Door/Window					
	D1	12	1		2.1	25.2m^2
	W	21	1.5		1.5	47.25m^2
	V	2	0.5		0.5	0.5m^2
						(-)72.95m^2
					Total	1176.44 m^2
8	Earth filling in excavation					
	Total excavation for walls+plinth filling					155.54m^3+ 216.86 m^3
	Brickwork up to plinth					(-)89.046 m^3
	P.C.C.					(-)28.28 m^3
	Total					255.074 m^3
9	Parapet wall	1	67.5	.3	1	20.25 m^3

Abstract Sheet of Child welfare and Maternity Center

Table 31 Abstract Sheet of Child welfare and Maternity Center

Sr. No.	Particulars	Quantity	Unit	Rate	Per	Amount
1	Excavation in foundation	155.54	m^3	85	m^3	13220.9
2	Plain cement concrete (P.C.C) in Foundation (1:4:8)	28.28	m^3	3000	m^3	84840
3	Brickwork in Foundation up to Plinth level	89.046	m^3	3200	m^3	284947.2
4	Brickwork in superstructure	128.79	m^3	3500	m^3	450765
5	R.C.C. work	99.644	m^3	8800	m^3	876867.2
6	2 cm thick marble flooring	315.79	m^2	500	m^2	157895
7	Smooth plaster inside and outside walls and ceiling	1176.44	m^2	150	m^2	176466
8	Earth filling in excavation	255.074	m^3	50	m^3	12753.7
Total						Rs.2057755
Add 5% contingencies						Rs.102887.75
Grand Total						Rs.2160642.75
say						**Rs2160643**

Total floor area = 360.31 m^2

5996.62 Rs. per m^2

13.1.4 Civil Design 4

❖ Public garden

Public garden plays a significant role in the development of any village by providing a recreational facility. The people can meet and enjoy in the garden promoting their togetherness. It also helps in building social relations and serves as a sociocultural infrastructure for the village.

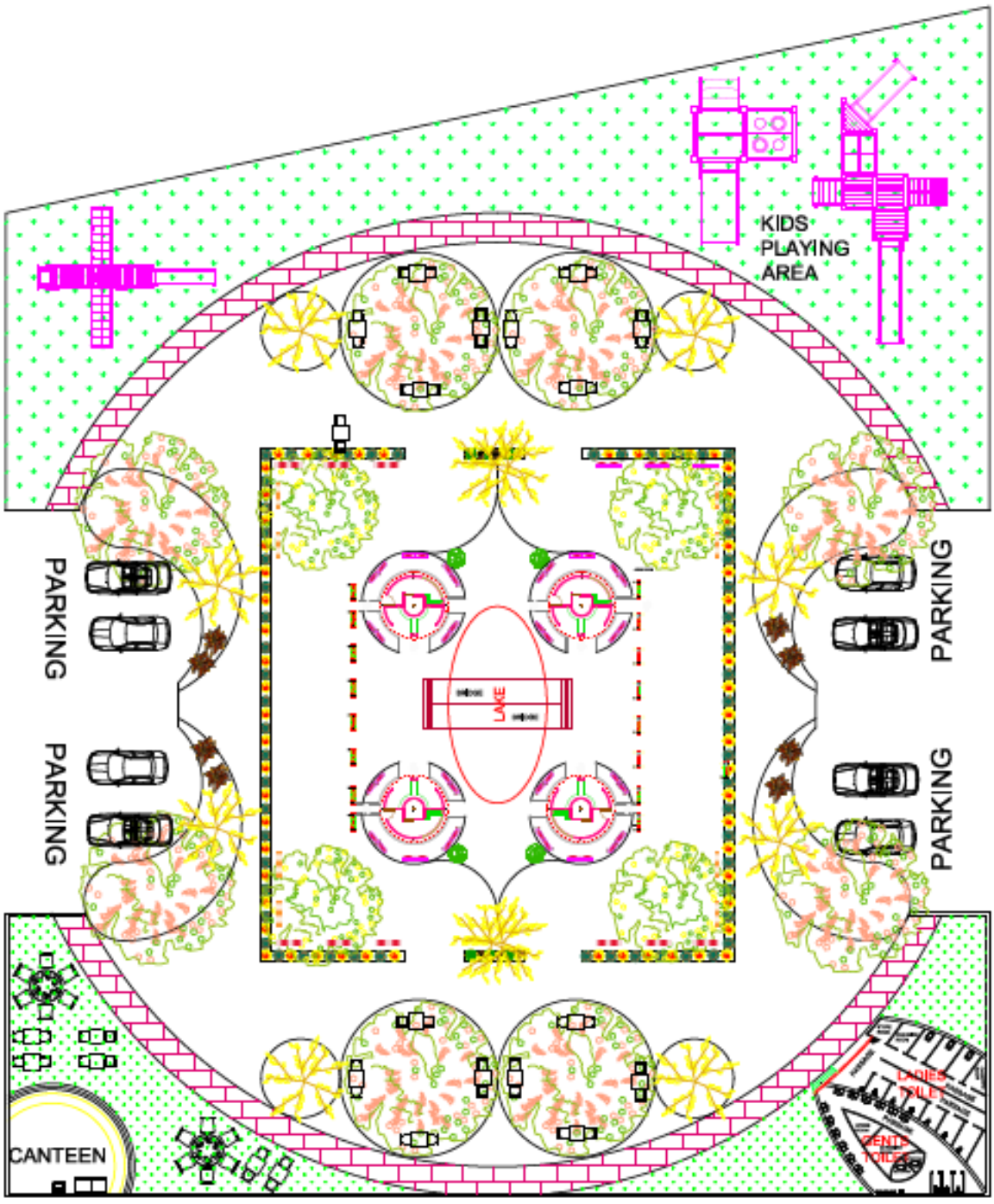


Figure 78 Plan of Public Garden

Figure 79 Elevation of Public Garden

Measurement Sheet of Public Garden

Table 32 Measurement Sheet of Public Garden

Sr. No.	Description	No.	Length	Width	Height	Quantity
1	Excavation in foundation					
		1	176	0.9	1.1	174.24m3
					Total	174.24m3
2	P.C.C. in foundation					
	Internal wall	1	176	0.9	0.2	31.68m3
					Total	31.68m3
3	Brickwork in foundation Upto plinth					
	First step	1	176	0.6	0.3	31.68m3
	Second step	1	176	0.5	0.3	26.4m3
	Third step	1	176	0.3	0.3	15.84 m3
						73.92 m3
4	Brickwork in superstructure(1:6)					
	Main wall	1	176	0.3	1	52.8 m3
	Internal wall	1	277.5	0.2	1	55.5 m3
					Total	108.3 m3

Abstract Sheet of Public Garden

Table 33Abstract Sheet of Public Garden

Sr. No.	Particulars	Quantity	Unit	Rate	Per	Amount
1	Excavation in foundation	174.24	m^3	85	m^3	14810.4
2	Plain cement concrete (P.C.C) in Foundation (1:4:8)	31.68	m^3	3000	m^3	95040
3	Brickwork in Foundation up to	73.92	m^3	3200	m^3	236544

	Plinth level					
4	Brickwork in superstructure	108.3	m^3	3500	m^3	379050
Total						Rs.725444.4
Add 5% contingencies						Rs.36272.22
Grand Total						Rs.761716.62
say						**Rs761717**

The cost of Public Garden is Rs.7,61,717.

13.1.5 Civil Design 5

❖ Common Service Centre

A CSC is an IT enable front-end delivery points for Government, private and social sector services to rural citizens of India in an integrated and seamless manner. A CSC is managed by Local unemployed, educated youth providing opportunities for direct and indirect employment.. CSC aims to provide access to information, backed with relevant infrastructure and end-to-end services that would allow rural population, the opportunities to enhance their quality of life.

Benefits of Common Service Center (CSC)

- Transparent and timely delivery of government and other e-Services at affordable cost.
- Reducing citizens' efforts and resources in availing services within their localities by eliminating their visit to Government offices for the same.
- Acting as last mile distribution units for various governments' direct benefits to marginalised/backward communities.
- Encouraging more and more participation of women to become VLEs and increasing their contribution in the social and economic development.

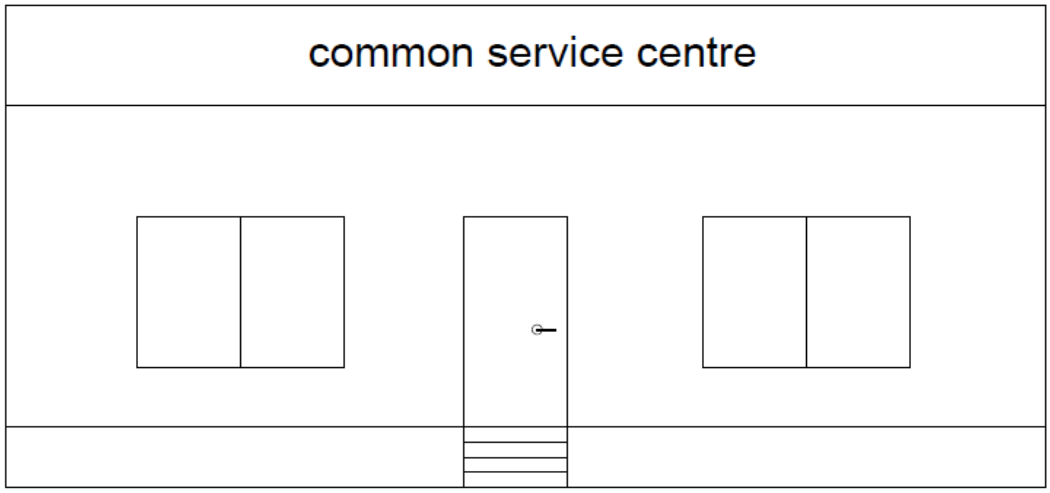


Figure 80 Elevation of Common Service Centre

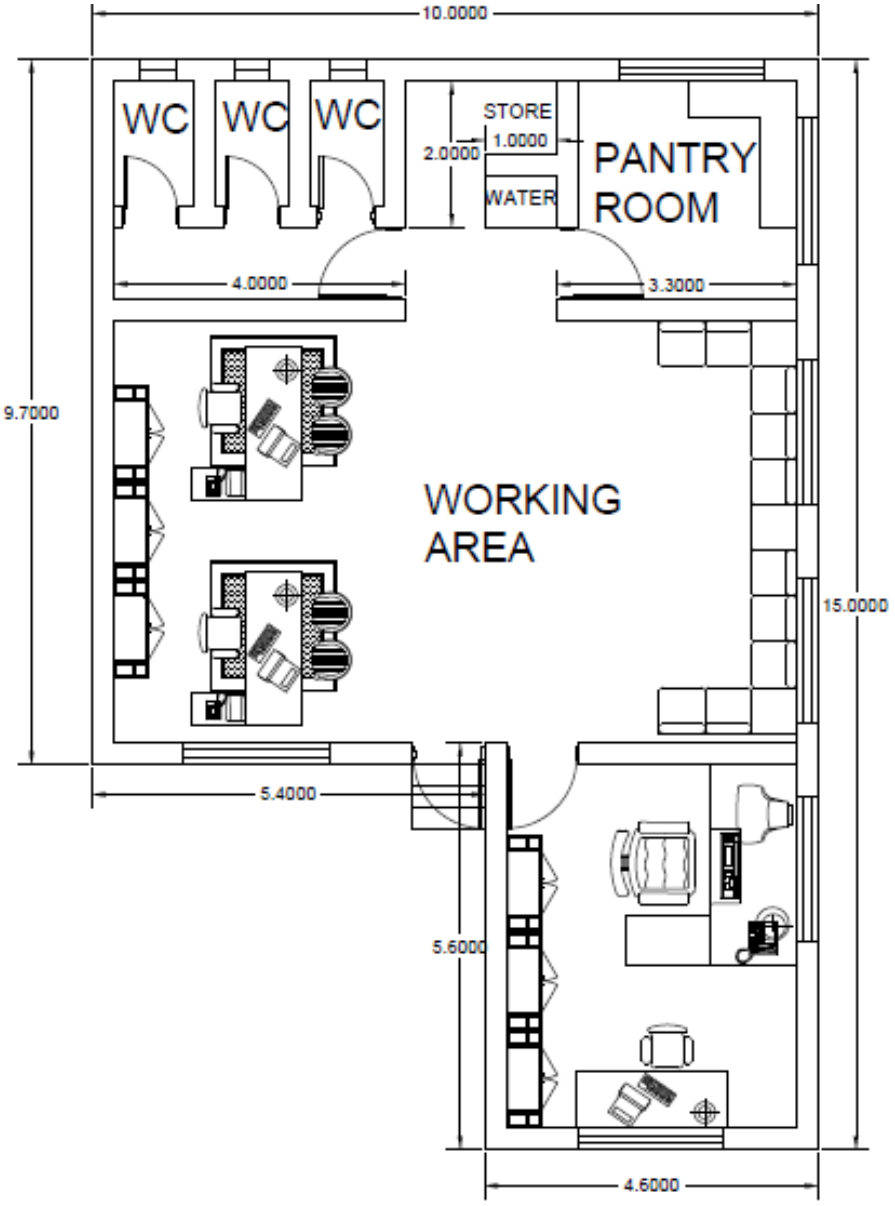
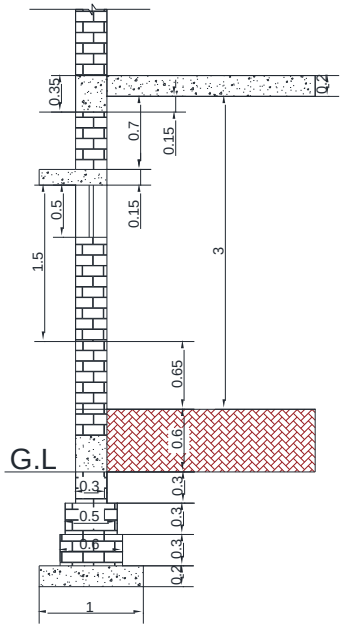


Figure 81 Plan of Common Service Centre

Figure 82 3D of Common Service Centre



SECTION

Figure 83 Section of Common Service Centre

Measurement Sheet of Common Service Centre

Table 34 Measurement Sheet of Common Service Centre

Sr. No.	Description	No.	Length	Width	Height	Quantity
1	Excavation in foundation					
	Internal wall	1	69	1	1.1	75.9 m^3
					Total	75.9 m^3
2	P.C.C. in foundation					
	Internal wall	1	69	1	0.2	13.8 m^3
					Total	13.8m^3
3	Brickwork in foundation					
	Internal wall					
	First step	1	71.4	0.6	0.3	12.852m^3
	Second step	1	72	0.5	0.3	10.8 m^3
	Third step	1	73.8	0.3	0.9	19.926 m^3
						43.578 m^3
	Steps:					
	First	1	1	0.9	0.15	0.135 m^3
	Second	1	1	0.6	0.15	0.09 m^3
	Third	1	1	0.3	0.15	0.045 m^3
						0.27 m^3
					Total	43.848m^3

4	Brickwork in superstructure					
	G.F. wall	1	73.8	0.3	3	66.42 m^3
						66.42 m^3
	Deduction for door/window					
	D1	4	1	0.3	2.1	2.52 m^3
	D2	3	.9	0.3	2.1	1.701 m^3
	W	7	2	0.3	1.5	6.3 m^3
	V	3	0.5	0.3	0.5	0.225 m^3
						(-)19.962 m^3
					Total	55.674m^3
5	R.C.C. work					
	Slab=113.97 m^2					
		1	113.97		0.2	22.794 m^3
	Beam	1	73.8	0.3	0.35	7.749 m^3
	Lintel					2 m^3
	Stair					10 m^3
					Total	42.543m^3
6	2 cm thick marble flooring Deduction	1 1	113.97 m^2 73.8	0.3		91.83m^2
7	Smooth plaster inside walls and ceiling					
	All inside of the wall(GF)		89.7		3	269.1m^2
	All outside of the wall		50.3		4.6	231.38m^2
	Ceiling					91.83m^2
	Deduction for Door/Window					
	D1	4	1		2.1	8.4m^2
	D2	3	.9		2.1	5.67 m^2
	W	7	2		1.5	21m^2
	V	3	0.5		0.5	0.75m^2
						(-)35.82m^2
					Total	464.66 m^2
8	Earth filling in excavation					
	Total excavation for walls+plinth filling					75.9 m^3+90 m^3
	Brickwork up to plinth					(-)43.848 m^3
	P.C.C.					(-)13.8 m^3
	Total					108.252m^3
9	Parapet wall	1	48.8	.3	1	14.64 m^3

Abstract Sheet of Common Service Centre

Table 35 Abstract Sheet of Common Service Centre

Sr. No.	Particulars	Quantity	Unit	Rate	Per	Amount
1	Excavation in foundation	75.9	m^3	85	m^3	6451.5
2	Plain cement concrete (P.C.C) in Foundation (1:4:8)	13.8	m^3	3000	m^3	41400
3	Brickwork in Foundation up to Plinth level	43.848	m^3	3200	m^3	140313.6
4	Brickwork in superstructure	66.42	m^3	3500	m^3	232470
5	R.C.C. work	42.543	m^3	8800	m^3	374378.4
6	2 cm thick marble flooring	91.83	m^2	500	m^2	45915
7	Smooth plaster inside and outside walls and ceiling	556.49	m^2	150	m^2	83473.5
8	Earth filling in excavation	108.252	m^3	50	m^3	5412.6
Total						Rs.929814.6
Add 5% contingencies						Rs.46490.73
Grand Total						Rs.976305.33
say						**Rs.976306**

Total floor area = 119.76 m^2

8152.19 Rs. per m^2

13.1.6 Civil Design 6

❖ Chabutro

Chabutro or Chabutaro or Chabutra is a structure mostly found in India. They are usually a tower-like structure with octagonal or pentagonal shaped enclosures at the top, where the upper enclosure has several holes, wherein birds can make their nests. But they can also be built as raised platforms to throw feeding on for the birds.
Mostly such monuments are found in village centers or at village entrances.

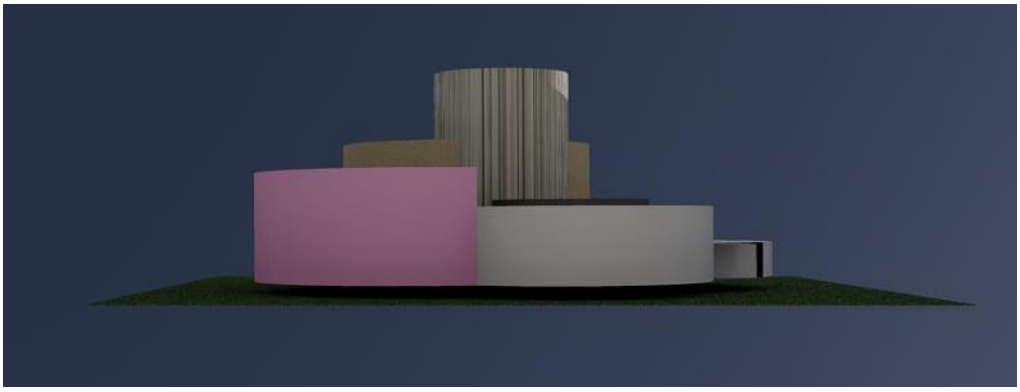


Figure 84 Elevation of Chabutro

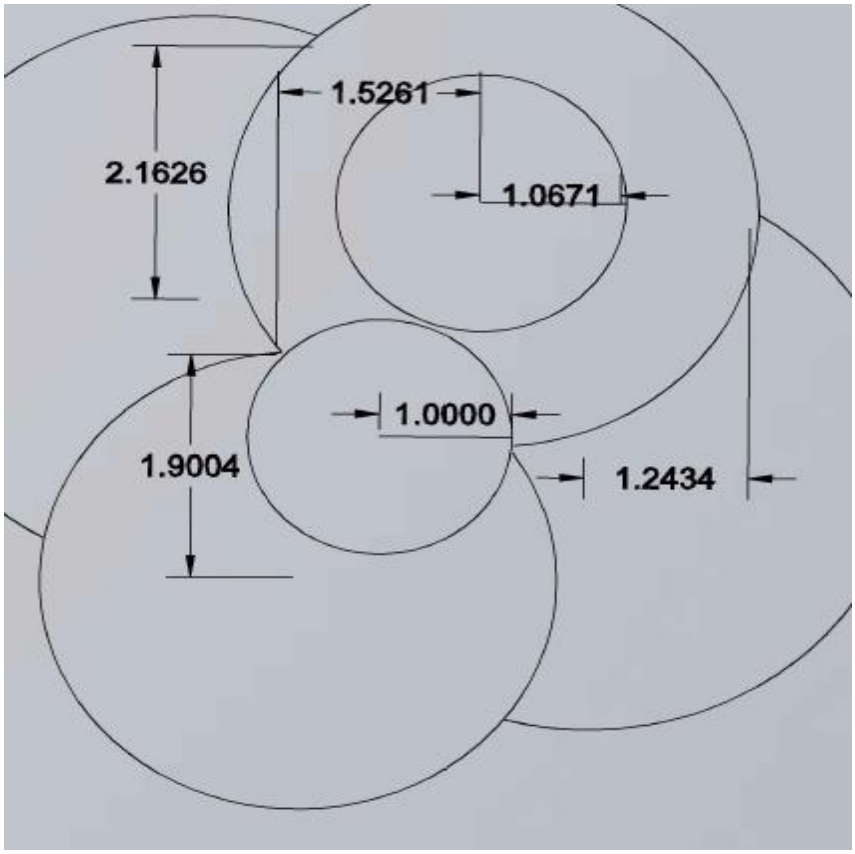


Figure 85 Plan of Chabutro

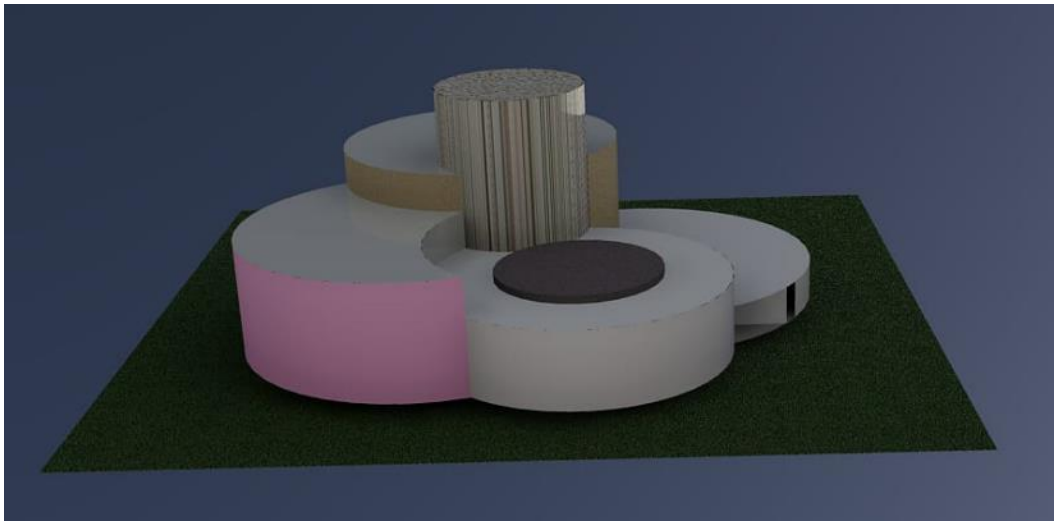


Figure 86 3D of Chabutro

Measurement Sheet of Chabutro

Table 36 Measurement Sheet of Chabutro

Sr. No.	Description	No.	Radius	Area	Height	Quantity
1	P.C.C. work					
	Middle pole	1	1	3.14	2	6.28 m^3

	Side 1	1	2.16	7.33	0.5	3.66 m^3
	Side 2	1	1.53	7.26	1	7.26 m^3
	Side 3	1	1.24	2.43	1.5	3.64 m^3
	Side 4	1	1.9	11.34	2	22.68 m^3
						43.52 m^3

Abstract Sheet of Chabutro

Table 37 Abstract Sheet of Chabutro

Sr. No.	Particulars	Quantity	Unit	Rate	Per	Amount
2	Plain cement concrete (P.C.C) in Foundation (1:4:8)	43.52	m^3	3000	m^3	130560
Total						Rs.130560
Add 5% contingencies						Rs.6528
Grand Total						Rs.137088
say						**Rs137088**

13.2 Reason for Students Recommending this Design

1. Tank design for water harvesting

Rainwater harvesting will improve water supply, food production, and ultimately food security.

Water insecure household or individuals in rural areas will benefit the most from rainwater harvesting system.

2. Road Section

Main Road in Nani Naroli village is in good conditions but when we are talking about the whole development of village, it's not enough only main road is in good conditions but road of street in all areas is also very important, so that overall development of village can be done and it will also convert into smart city.

3. Child welfare and maternity home

Antenatal care: Early registration of all pregnancies preferably within first trimester with registration even in later stages and appropriate care.

Associated services like general examination: height, weight, B.P.,anaemia, abdominal examination, breast examination, Folic Acid Supplementation in first trimaster, Iron & Folic.

Counselling on diet & rest, pre-birth preparedness and complication readiness danger signs, infant & young child feeding, initiation of breast feeding, exclusive breast feeding for 6 months, demand feeding, supplementary feeding at 6 months, contraception, post natal care & hygiene, nutrition, care of new born and registration of birth.

new born care, exclusive breast feeding for 6 months, vaccination programme, prevention of childhood deficiencies like malnutrition, infections, diarrhoea, fever, etc

Family Planning and Contraception: Education and counselling for appropriate methods, provision of contraceptives, etc

Counselling and appropriate referral for safe abortion services for those in need.

4. Public garden
There is no availability of any garden or recreational design in village. So, we provide design of garden for the future scope of Nani Naroli village.

5. Common Service Centre
Having a Bank in the village itself is more convenient for villagers so that people can save their money in banks with highest security and they will feel free and they will get subsidy direct into their account whenever crop will be fail.

6. Chabutro
Chabutro can act as a breeding place for birds like pigeons. It also provides a sitting platform where people can gather together.
Chabutro even acts as a heritage for the village dwellers.

13.3 About designs Suggestions / Benefit of the villagers

1. Tank design for water harvesting

- Rainwater harvesting provides a good supplement to other water sources .Thus relieving pressure on other water sources.
- It can be as a buffer and can be used in times of emergency or breakdown of public water supply systems.
- Helps to reduce the storm drainage load and flooding in the cities.
- Prevents water wastage by arresting soil erosion and mitigates flood.
- Sustains and safeguards existing water table through recharge.

2. Road Section

- It will improve the transportation.
- People from backward area will benefit from it.

3. Child welfare and maternity home
Maternal and Child Health:

- Antenatal care: Early registration of all pregnancies preferably within first trimester with registration even in later stages and appropriate care.
- Associated services like general examination: height, weight, B.P.,anaemia, abdominal examination, breast examination, Folic Acid Supplementation in first trimaster, Iron & Folic.
- Counselling on diet & rest, pre-birth preparedness and complication readiness danger signs, infant & young child feeding, initiation of breast feeding, exclusive breast feeding for 6 months, demand feeding, supplementary feeding at 6 months, contraception, post natal care & hygiene, nutrition, care of new born and registration of birth.

Child Health:

- New born care, exclusive breast feeding for 6 months, vaccination programme, prevention of childhood deficiencies like malnutrition, infections, diarrhoea, fever, etc
- Family Planning and Contraception: Education and counselling for appropriate methods, provision of contraceptives, etc
- Counselling and appropriate referral for safe abortion services for those in need.

4. Public garden

- It will provide aesthetic view to village.
- It will provide recreational space to villagers.
- It creates pleasant environment in village.
- Provide playing area for children.
- Provide sitting area for old age people.

5. Common Service Centre

- Transparent and timely delivery of government and other e-Services at affordable cost.
- Reducing citizens' efforts and resources in availing services within their localities by eliminating their visit to Government offices for the same.
- Acting as last mile distribution units for various governments' direct benefits to marginalised/backward communities.
- Encouraging more and more participation of women to become VLEs and increasing their contribution in the social and economic development.

6. Chabutro

- Chabutro is used for feeding as well as breeding of birds, especially pigeons. These structures prove to be of great importance especially in this era of declining bird population.
- It also provides a sitting platform where the villagers can gather and enjoy themselves. This helps in increasing bonding and preserves our culture which promotes *ekta*.

Chapter 14 Technical Options with Case Studies

14.1 Civil Engineering

14.1.1 Advanced 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.

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

1. Base Isolation
2. Energy Dissipation Devices

Where Energy Dissipation Devices is discussed below;

Energy Dissipation Devices

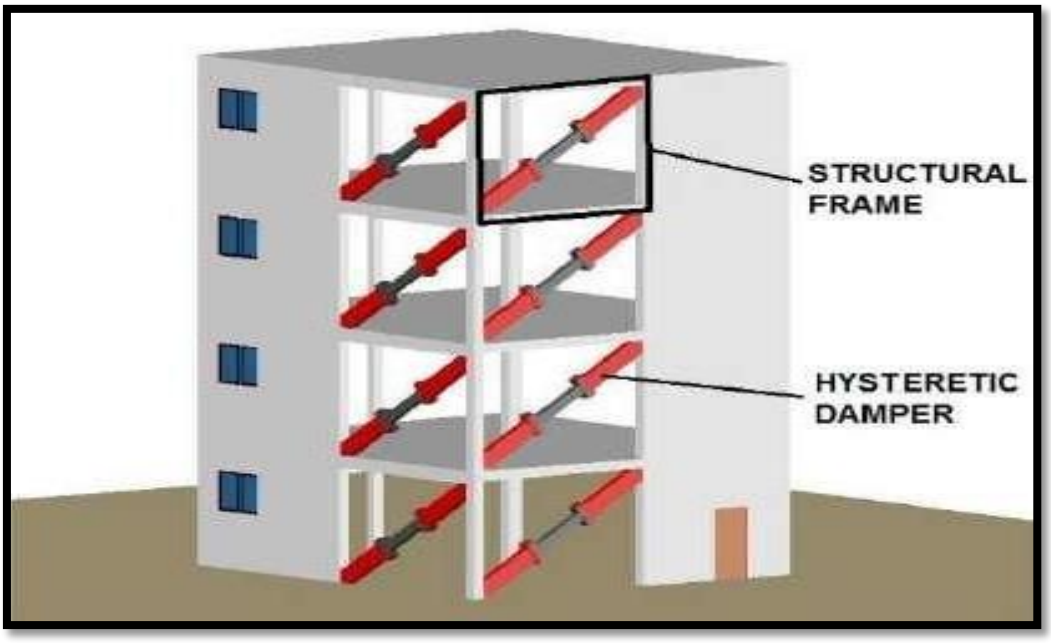


*Figure **87** Energy Dissipation Device*

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 of fluids within the dampers.

14.1.2 Seismic Retrofitting of Buildings

Seismic Retrofitting Techniques are required for concrete constructions which are vulnerable to damage and failures by seismic forces.

Need for Seismic Retrofitting:

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

Types of seismic retrofitting techniques;

1. Crack fill method:
2. Section repair method:
3. Adding Shear Wall
4. Adding Bracing
5. Adding Wing wall/Buttress
6. Wall thickening
7. Mass Reduction
8. Base Isolation
9. Adding Infill Wall
10. Jacketing of

- Wall
- Columns
- Beam-Column Joints
- Individual Footing

One is explained below;

Addition of Shear Walls

The addition of shear walls is one of the most popular methods in retrofitting existing structures.

This method limits the global lateral drift, and thus reduces damage to buildings.

Be careful of the distribution of walls in the plan as well as elevation so as the regular building configuration is not disturbed. Irregularity in configuration reduces the capacity drastically.

The new concrete for this wall should not be thicker than that of the old frame members. Otherwise, the foundation of the new wall will need very high moment resistance.

Figure 88 Addition of Shear Wall

One of the simplest and cost-effective ways is adding infill to the base of the existing frame of the outer columns.

Drawbacks of using the addition of shear wall method-

- Addition of a shear wall increases concentrated lateral resistance at a few places.
- It increases overturning moment at the foundation causing high uplifting forces. This may require a new foundation or strengthening of the existing foundation.
- It increases the dead load of the structure.

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

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.

Advance Practices in Construction Techniques

Tunnel Formwork System

Figure 89 Tunnel Formwork System

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

Advance Practices in Construction Machines

EARTH MOVING MACHINES

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

Advantages

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

14.1.4 Engineering Aspects Of Soil mechanics - Environmental Impact Assessment

Environmental assessment (EA) is the assessment of the environmental consequences of a plan, policy, program, or actual projects prior to the decision to move forward with the proposed action. In this context, the term "environmental impact assessment" (EIA) is usually used when applied to actual projects by individuals or companies

The purpose of the assessment is to ensure that decision makers consider the environmental impacts when deciding whether or not to proceed with a project.

In an ideal EIA assessed project, potential problems are addressed before the implementation stage to prevent any degradation in the environment. Among these potential problems are the geological hazards that can potentially threaten the environment and human lives if not mitigated appropriately. Geological hazards could negatively affect the value, integrity, and accessibility of a country's assets. Several studies have been conducted that assessed areas with high susceptibility to geological hazards and evaluated the disaster resilience capacity of the communities within. By first quantifying the risk, the disaster vulnerability profile of a

site can be derived which is important in hazard mitigation. With the help of appropriate strategies, hazard susceptibility can be minimized and the natural environment will be preserved. Sometimes in the quest to maximize design performance, and minimize monetary costs, the potential adverse environmental impacts that are geologic or geotechnical in nature are not considered in the EIA process.
These geological threats include: compressible ground and shrink-swell soil, slope instability and landslides, ground dissolution, liquefaction and collapse, fluvial, coastal and groundwater flooding, aggressive ground conditions and mining hazard.

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

The uncontrolled disposal to the environment of municipal, industrial and agricultural liquid, solid, and gaseous wastes constitutes one of the most serious threats to the sustainability of human civilization by contaminating the water, land, and air and by contributing to global warming.
With increasing population and economic growth, treatment and safe disposal of wastewater is essential to preserve public health and reduce intolerable levels of environmental degradation. In addition, adequate wastewater management is also required for preventing contamination of water bodies for the purpose of preserving the sources of clean water.
The inadequate water and sanitation service is the main cause of diseases in developing countries. Considering the expected population growth and the order of priorities in the development of the water and sanitation sector in developing countries—water supply and sewerage first, and only then wastewater treatment—as well as the financial difficulties in these countries, it cannot be assumed that the current low percentage of the coverage of wastewater treatment in these countries will increase in the future, unless a new, innovative strategy is adopted and affordable wastewater treatment options are used.
Appropriate technology unit processes include (but are not limited to) the following:

- Preliminary Treatment by Rotating Micro Screens;
- Vortex Grit Chambers;
- Lagoons Treatment (Anaerobic, Facultative and Polishing), including recent developments in improving lagoons performance;
- Anaerobic Treatment processes of various types, mainly, Anaerobic Lagoons,Upflow Anaerobic Sludge Blanket (UASB) Reactors, Anaerobic Filters and Anerobic Piston Reactor (PAR);
- Physicochemical processes of various types such asChemically Enhanced Primary Treatment (CEPT); (vi) Constructed Wetlands;
- Stabilization Reservoirs for wastewater reuse and other purposes;
- Overland Flow;
- Infiltration-Percolation;
  Septic Tanks; and
- Submarine and Large Rivers Outfalls.

Now a sustainable wastewater treatment system such as lagoons and wetlands is discussed below;

Lagoons and wetlands:

Figure 90 Wetland in india

In wetland treatment, natural forces (chemical, physical, and solar) act together to purify the wastewater, thereby achieving wastewater treatment. A series of shallow ponds act as stabilization lagoons, while water hyacinth or duckweed actto accumulate heavy metals. Multiple forms of bacteria, plankton, and algae act to further purify the water. Wetland treatment technology in developing countries offers a comparative advantage over conventional, mechanized treatment systems because the level of self-sufficiency, ecological balance, and economic viability is greater. The system allows for total resource recovery (Rose, 1999). Lagoon systems may be considered a low-cost technology insufficient, non-arable land is available. However, the requirement of available land is not generally met in big cities. The demand for flat land is high for the expanding urban developments and agricultural purposes. The decision to use wetlands must consider the climate. There are disadvantages to the system that in some locations may make it unsustainable. Some mechanical problems may include clogging with sprinkler and drip irrigation systems, particularly with oxidation pond effluent. Biological growth (slime) in the sprinkler head, emitter orifice, or supply line causes plugging, as do heavy concentrations of algae and suspended solids.

- **For Minimum One Topic Explain New Concept, Design, Prototype Model With Actual Cost Estimation**

New Concept

Construction of Shear Walls in Buildings

The addition of shear walls is one of the most popular methods in retrofitting existing structures.

This method limits the global lateral drift, and thus reduces damage to buildings.

Be careful of the distribution of walls in the plan as well as elevation so as the regular building configuration is not disturbed. Irregularity in configuration reduces the capacity drastically

Building Details taken as for Case Study

- Location- Visakhapatnam city-India
- Plan area- 27m x 38m
- Zone- zone II
- Other details- Model consists of RC shear wall flat slab system.

The design loads are considered as per the building code IS 875-2015 (Part-I, II & III) and the design methodology is followed by IS 456-2000 Limit state method.
Influence of bot lateral and gravity loads are taken into consideration in the design. Performance study of model is evaluated with respect to displacement, inter storey drift and stiffness aspects.

Geometry and design considerations are as mentioned below;
Model design consideration: 18 storied RC shear wall flat slab structure with plan area 27m x 38m, cellar floor height 3.5m and rest of the floor height 3m each (Typical).

Design

- Structure type- RC Moment resistance framed structure
- Size of Building- 38mx27 m
- No Of Storey- 18 (Sub cellar+cellar+16 storey)
- Storey Height- 3m (Typical)
- Cellar height- 3.5m
- Thickness of RC slab- 0.15m
- Shear Wall Thickness- 0.15m
- Seismic Zone- II
- Soil Type- Medium coarse grained granular soils
- Importance Factor (I) - 1.0
- Response reduction Factor- 5
- Zone factor- 0.1
- Live Load- 3Kn/m
- External Wall Load- 16.2 KN/m
- Internal Wall Load- 8.1 KN/m
- Grade of concrete used- M25
- Grade of steel used- Fe415

Prototype Model

The typical floor plan and elevation of the building model-prototype in consideration for this case study are as given below;

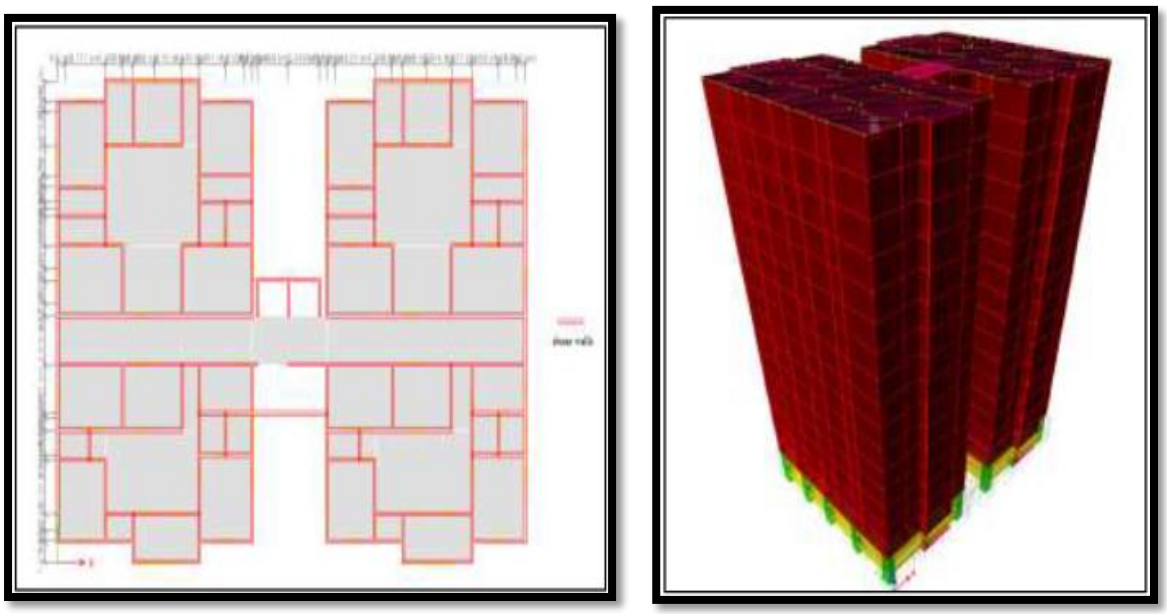


*Figure **91** typical floor plan and elevation of building*

Actual Cost Estimation

Material	Unit	Rate-Indian Rupees	Model- Shear wall flat slab	Cost of Model - (Rupees)
Concrete	M^3	8,500	6014	$511.19x10^5$
Steel	M.Ton	60,000	328	$196.80x10^5$
Form-work.& Shuttering	M^2	250	49976	$124.94x10^5$
TOTAL COST- Rs				**$832.92x10^5$**

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

Table 38 Scenario of Implementation of designs

Sr. No.	Design Name	Implementation probability	Remarks
1	Biogas plant	0%	Inadequate fund
2	High School	0%	Inadequate fund
3	Public toilet	60 %	Arises sense of cleanliness amongst the people
4	Community Hall	0%	Houses are scattered
5	Bank	100%	Management of finance
6	Village Gate	50%	It is not that much important
7	Tank design for water harvesting	100%	Some people have already worked upon it
8	Road Section	60 %	Provides connectivity
8	Child welfare and maternity home	100%	Health is very important, especially during this year
9	Public garden	50%	It is not that much important
11	Common Service Centre	50%	People are not aware of its importance
12	Chabutro	50%	It is not that much important

Table 39 Implementation Time Period

Sr. No.	Design Name	Period	Amount Expenditure	Benefit
1	Biogas plant	Long term(3-5 years)	Rs.14,000	The biogas production is best way to use natural resources which is nonpolluting and also use for making organic manure.
2	High School	Long term(3-5 years)	Rs.66,75,216	Helps in promoting literacy rate in the village
3	Public toilet	Within 1 year	Rs.7,37,234	The condition of the village roads of the Nani Naroli village is not so good. There are many streets that are yet not paved.

4	Community Hall	Long term(3-5 years)	Rs.30,65,956	Community hall also enables to organize awareness programs, seminars, discussions for village problems etc. It eliminates social injustice in a village as all the villagers gather on same place.
5	Bank	Long term(3-5 years)	Rs.25,29,571	It helps in managing finance.
6	Village Gate	Within 1 year	Rs.1,48,514	It will provide aesthetic view to village.
7	Tank design for water harvesting	Immediately	Rs.1,38,931	Helps to reduce the storm drainage load and flooding in the cities. Prevents water wastage by arresting soil erosion and mitigates flood. Sustains and safeguards existing water table through recharge.
8	Road Section	Within 1 year	Rs.51,95,466 per km	The condition of the village roads of few backward areas in Nani Naroli village is not so good. There are many streets that are yet not paved.
9	Child welfare and maternity home	Within 1 year	Rs.21,60,643	Heath is a very important factor for welfare of people.
10	Public garden	Long term(3-5 years)	Rs.7,61,717	It creates a recreational opportunity for the village people.
11	Common Service Centre	Long term(3-5 years)	Rs.9,76,306	Acting as last mile distribution units for various governments' direct benefits to marginalised/backward communities.
12	Chabutro	Within 1 year	Rs.1,37,088	It will provide aesthetic view to village.

Chapter 16 Survey By Interviewing With Talati And/Or Sarpanch

Sr.	Questions	Yes/ No	Remarks
1	What are the sources of income in village?	Yes	Nil
2	What are the chances of employment in village?	Yes	Nil
3	What are the special technical facilities in village?	No	Nil
4	Is any debt on village dwellers?	Yes	Percentage might be < 3
5	Are village people getting agricultural help?	No	Nil
6	Is women health awareness Program organized in village?	No	Nil
7	Are women having opportunity to work and income?	Yes	There might be small home businesses
8	Child girl education is appreciated in village?	Yes	
9	Facility of vaccination to child is available in village?	Yes	Vaccination is done compulsorily in the village.
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	Vaccination is done compulsorily in the village.
11	Women help line number information is provided to village people?	No	Nil
12	Is water scarcity in village? How many days per year?	No	Nil
13	Is village under any debt?	No	Nil
14	Is any serious issue due to debt from bank or any person happened in village?	No	Nil
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	No	Nil
16	Is any death of patient occurred due to unavailability of medical facility in village?	No	Nil
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.	5	Nil
18	Is village improvement is observed in comparative scenario from past to present?	Yes	Nil
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	No	Nil
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	Female education is also widespread in the village

Chapter 17 Irrigation / Agriculture Activates And Agro Industry, Alternate Techniques And Solution

In recent years, the adoption of digital technologies in precision agriculture has been adjusting the ways that farmers treat crops and manage fields. One doesn't have to be an expert to see how the technology has changed the concept of farming making it more profitable, efficient, safer, and simple. Among other technologies, farmers have picked five they deem to be the best:

- GIS software and GPS agriculture
- Satellite imagery
- Drone and other aerial imagery
- Farming software and online data
- Merging datasets

As a result, modern farms get significant benefits from the ever-evolving digital agriculture. These benefits include reduced consumption of water, nutrients, and fertilizer, reduced negative impact on the surrounding ecosystem, reduced chemical runoff into local groundwater and rivers, better efficiency, reduced prices, and many more. Thereby, business becomes cost-effective, smart, and sustainable.

One of these modern technology is discussed below;

GIS-Based Agriculture

Figure 92 GIS based harvesting

Since fields are location-based, GIS software becomes an incredibly useful tool in terms of precision farming. While using GIS software, farmers are able to map current and future changes in precipitation, temperature, crop yields, plant health, and so on. It also enables the use of GPS-based applications in-line with smart machinery to optimize fertilizer and pesticide

application; given that farmers don't have to treat the entire field, but only deal with certain areas, they are able to achieve conservation of money, effort, and time.
Another great benefit of GIS-based agriculture is the application of satellites and drones to collect valuable data on vegetation, soil conditions, weather, and terrain from a bird's-eye view. Such data significantly improves the accuracy of decision-making.

Another alternative method/ techniques for irrigation purpose is also given below;

Solar irrigation
Solar irrigation uses the sun's energy to power a pump which supplies water to boost crop's growth. The pumps are used for the transport of the water are equipped with solar cells. The solar energy, which is absorbed by the cells, is then converted into electrical energy via a generator. The generator finally feeds an electric motor driving the pump. Most of the traditional pump systems mainly work either with a diesel engine or with the local power grid. When the interior air becomes saturated with moisture, water condenses on the walls of the bottle and forms drops that fall by gravity to the ground. In the interior of this irrigation system, a small-scale water cycle is produced, providing water to the soil continuously.
This irrigation system is very simple to manufacture and is innovative in irrigation because it allows greater savings, which comes to reduce 10 times the amount of water used in conventional irrigation systems.

Irrigation system by micro-sprinkler:

Figure 93 Micro sprinkler irrigation technique

It is another form of sprinkler irrigation. It distributes smaller droplets, allowing higher rate of water savings. It has a wider application in irrigating horticultural crops, flowers, greenhouses or nurseries… etc.

Chapter 18 Social Activities – Any Activates Planned by Students e.g. Teaching Learning activities, Awareness Camp, Business Idea for SELF HELP GROUP OR ANY OTHER

Social activities are activities enhancing the social mentality of the people. We are living in a society where we need to live in harmony. To establish social connections, one also needs to upgrade his/her own skills and mentality. Social activities help improving the mental abilities of the people and develop a sense of cohabitation in people. Gathering of people and carrying out any activity promotes unity in people.

We wanted to carry out awareness activity regarding the current situation of pandemic where the whole globe is threatened. COVID-19 situation plunged the whole world into darkness of helplessness. We wanted to make the local people of the village aware of the situation who do not have much access to these information. The people who are suffering from poverty and they have most of the monetary issues. These people are not aware of the right precautions and preventive measures to deal with the suddenly-emerged situation.

There is no necessity to indulge on what COVID-19 is and what it does. We all are aware of how serious and dangerous the situation is. What we need to focus upon is what are the things that we can do to keep the situation under control. The massive infection and rapid spread of the life-threatening virus should be controlled. And there is only one way to do it- joint effort of all the people. All the people of the world have come together in the fight against this viral infection.

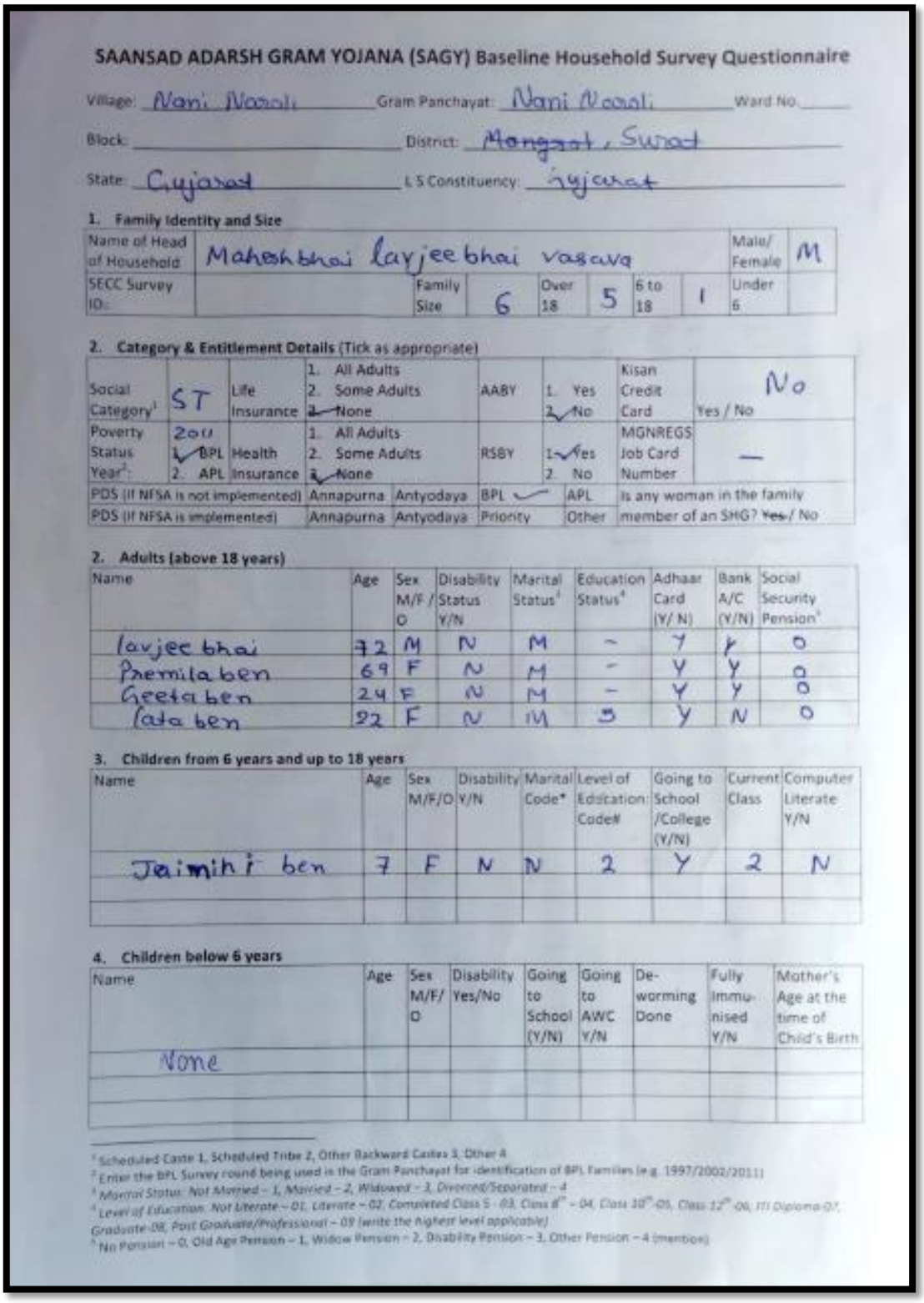
If we want to involve all the people, then it becomes necessary for us to make the people residing in backward region understand the steps that are to be followed. Therefore, we planned to arrange an activity for the slum areas of Nani Naroli. We wanted to emphasize on the importance of adorning masks. Now, we all know that wearing masks is mandatory. But, what we left out is the fact that masks are to be washed daily and they get worn out too. They have to be disposed and replaced.

If we just distribute the masks, then what about the next time? Instead of that we planned an activity where we taught the people how to make masks. We planned to take pieces of clothes and sew the masks in front of them and also made them do it so that they could learn it.

The next important thing is sanitization. The local authorities can keep the streets sanitized and distribute sanitizers to these people who cannot afford it. Besides the provision, they should also be taught how to make it a part of their daily life. It should be emphasized that even the vegetables and groceries bought from outside should be kept in sunlight.

However, we were not able to carry out any of the planned activity owing to the situation itself. We are not even able to enter the village, hence we could not execute it.

Chapter 19 Nani Naroli SAGY Questionnaire Survey form with the Sarpanch Signature



SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Nani Naroli Gram Panchayat: Nani Naroli Ward No.

Block: District: Mangrol, Surat

State: Gujarat L S Constituency: Gujarat

1. Family Identity and Size

Name of Head of Household	Mahesh bhai lavjee bhai vasava						Male/ Female	M
SECC Survey ID:		Family Size	6	Over 18	5	6 to 18	1	Under 6	

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]	ST	Life Insurance	1. All Adults 2. Some Adults 3. None	AABY	1. Yes 2. No	Kisan Credit Card	No Yes / No
Poverty Status Year[2]:	2011 1. BPL 2. APL	Health Insurance	1. All Adults 2. Some Adults 3. None	RSBY	1. Yes 2. No	MGNREGS Job Card Number	—
PDS (If NFSA is not implemented)	Annapurna	Antyodaya	BPL	APL	Is any woman in the family member of an SHG? Yes / No		
PDS (If NFSA is implemented)	Annapurna	Antyodaya	Priority	Other			

2. Adults (above 18 years)

Name	Age	Sex M/F/O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Adhaar Card (Y/N)	Bank A/C (Y/N)	Social Security Pension[5]
lavjee bhai	72	M	N	M	-	Y	Y	0
Premila ben	69	F	N	M	-	Y	Y	0
Geeta ben	24	F	N	M	-	Y	Y	0
Lata ben	22	F	N	M	5	Y	N	0

3. Children from 6 years and up to 18 years

Name	Age	Sex M/F/O	Disability Y/N	Marital Code*	Level of Education Code#	Going to School /College (Y/N)	Current Class	Computer Literate Y/N
Jaimini ben	7	F	N	N	2	Y	2	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
None								

[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: _____
Cooking: LPG/~~Biogas/Kerosene/Wood/Electricity~~
Mention if Any Other: _____
If cooking in Chullah: Normal/ Smokeless No

12. Landholding (Acres)

1. Total	—	2. Cultivable Area	1.24
3. Irrigated Area	—	4. Uncultivable Area	—

13. Principal Occupations in the Household

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

14. Migration Status

Does any member of the household migrate for Work: 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
Tuvar		100Kg
Tuver		100Kg

17. Livestock Numbers

Cows: 0	Bullocks: 0	Calves: 0
Female Buffalo: 0	Male Buffalo: 0	Buffalo Calves: 0
Goats/ Sheep: 0	Poultry/ Ducks: 0	Pigs: 0
Any other: Type _____		No. _____
Shelter for Livestock: ~~Pucca / Kutcha /~~ None		
Average Daily Production of Milk(Litres): _____		

18. What games do Children Play

—

19. Do children play musical instrument (mention)

—

Schedule Filled By: Fasiha Shaikh

Principal Respondent: Mahesh bhai Vasava

Date of Survey: 29/6/21

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

I. Basic Information

a. Gram Panchayat: Nani Naroli

b. Block: _____

c. District: Surat

d. State: Gujarat

e. Lok Sabha Constituency: _____

f. Number of Wards in the Gram Panchayat: 24

g. Number of Villages in the Gram Panchayat: 2

h. Names of Villages: Nani Naroli, Swadi

Demographic Information

Number of Households 1541 Total Population 7463 Male 3897 Female 3566

SC HHs _____ ST HHs _____ OBC HHs _____ Other HHs _____

I. Access to Infrastructure / Facilities / Services

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
a.	ANM/ Health Sub Centre	Y	
b.	Nearest Primary Health Centre (PHC)	Y	
c.	Nearest Community Health Centre (CHC)	N	12 km
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	24 km
l.	Nearest Graduate College	N	24 km
m	Nearest ITI / Polytechnic Centre	N	24 km
n	Kisan Seva Kendra	N	24 K

1

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

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

IV. Sports Facilities in the Gram Panchayat

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

b. Mini Stadium : 0 (N) Yes(Y) /No (N) *(Playground with equipment and sitting arrangement)*

V. Education, ICDS

a. Number of Angan Wadi Centres: 6

b. Number of villages without Angan Wadi Centres –

Names of such villages: _____

c. Schools (Number)

Primary Private: 2 Primary Govt.: 1

Middle Private: 2 Middle Govt.: 0

Secondary Private: 2 Secondary Govt.: 0

Higher Secondary Private: 2 Higher Secondary Govt: 0

VI. Public Distribution System

	Item	Private Contractor	Women's SHG	Gram Panchayat	Cooperative	Other (Mention) Govn.	Location in GP (mention Location)	If outside GP, Location & distance from GP HQrs)
a.	Cereal (Rice/ Wheat/ Millets)	–	–	–	–	1	Nani Naroli	–
b.	Kerosene	–	–	–	–	1	Nani Naroli	–
c.	Other (mention) sugar	–	–	–	–	1	〃	–

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

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	1502	d.	Pasture / Grazing Land	49	g.	Check Dam	0
b.	Irrigated Land	751	e.	Forests/ Plantations	0	h.	Wells/Bore Wells	5
c.	Un-irrigated Land	49	f.	Other Common Land	88.20	i	Tanks /Ponds	1

[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)	46
b)	Number of Households receiving pension (old age, widow, disability)	5
c)	Number of eligible Households who are not receiving pension	41
d)	Number of Households eligible for Ration Card	223
e)	Number of eligible HHs having ration cards	76
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	45
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	0
h)	Number of active Job Card holders under MGNREGA	56
i)	Number of Job Card holders who completed 100 days of work during 2013-14	-
j)	Number of shops selling alcohol	0
k)	Number of BPL families	228
l)	Number of landless households	223
m)	Number of IAY beneficiaries	22
n)	Number of FRA[7] beneficiaries	0
o)	Number of Community Sanitary Complexes	0
p)	Number of Households headed by single women	0
q)	Number of Households headed by physically handicapped persons	0
r)	Total number of Persons with Disability in the village	5
s)	Number of SHGs	0
t)	Number of active SHGs	0
u)	Number of SHG Federations	0
v)	Number of Youth Clubs	0
w)	Number of Bharat Nirman Volunteers	0

Name and Signature of Surveyor and Respondent[7]

Fasiha Shaikh Vaishnav Sanjeet Surveyor	PRI Respondent (Preferably Gram Panchayat Chairperson)	સરપંચ નાની નરોલી જૂથ ગ્રામ પંચાયત તા. માંગરોળ, જી. સુરત. Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	29/6/21 Date of Survey

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

4

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: NaNi Naroli

b. Ward Number: _____

c. Gram Panchayat: Nani Naroli

d. Block: _____

e. District: Surat

f. State: Gujarat

g. Lok Sabha Constituency: _____

h. Number of Habitations / Hamlets in the Gram Panchayat: 24

i. Names of Habitations / Hamlets: Tarki faliyu, Mandir faliyu, Sulo hafeji faliyu, limbada faliyu, parmar faliyu bambi falliyu, Nichat faliyu, Ashis faliyu, Talav faliyu, galla faliyu, Suthar faliyu, Monglani faliyu, Navu bas station faliyu, Chakla faliyu, etc.

Demographic Information

Number of Households 1549 Total Population 7463 Male 3897 Female 3566

SC HHs _____ ST HHs _____ OBC HHs _____ Other HHs _____

II. Access to Infrastructure/Amenities etc.

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
a.	Nearest Primary School	Y	
b.	Nearest Middle School	Y	
c.	Nearest Secondary School	Y	
d.	Kisan Seva Kendra	N	24 km
e.	Milk Cooperative /Collection Centre	Y	
g.	Health Sub Centre	Y	
h.	Bank	Y	
i.	ATM	Y	
j.	Bus Stop	Y	
k.	Railway Station	N	24 km

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

1

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
l	Library	N	–
m	Common Service Centre	N	
n	Veterinary Care Centre	N	30 Km

ii. Road Connectivity

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

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

iii. Drinking Water Facilities

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

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

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

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

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)* 1

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

v. Coverage of Habitations under Electrification

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

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

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

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

vi. Sports Facilities in the Village

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

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

vii. Education, ICDS

a. Number of Anganwadi Centres: 6

c. Schools (Number)

Primary Private: 2 Primary Govt.: 1

Middle Private: 2 Middle Govt.: 0

Secondary Private: 2 Secondary Govt.: 0

Higher Secondary Private: 2 Higher Secondary Govt: 0

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	1502	d.	Pasture / Grazing Land	49	g.	Check Dam	0
b.	Irrigated Land	751	e.	Forests/ Plnatations	0	h.	Wells/Bore Wells	5
c.	Un-irrigated Land	49	f.	Other Common Land	88.40	I	Tanks /Ponds	1

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

Name and Signature of Surveyor and Respondent

Fasina Shaikh Sanket Vaishnav 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)	29/6/'21 Date of Survey

❖ Approval Letter for Proposed Design Approval

Approval Letter for Proposed Design Approval

Vishwakarma Yojana Phase VIII

Nani Naroli Village,

Mangrol Taluka,

Surat Dist.

Subject: Approval of design Proposal for Nani Naroli Village

I sarpanch/talati of Nani Narli Village undersigned gives approval for following main design proposal given under Vishwakarma Yojna phase VIII- An approach towards rurbanisation by students of Bhagwan Mahavir Collage of Engineering and Technology, Surat named Shaikh Fasiha (180063106106) and Vaishnav Sanket (180063106122).

Approved main design proposal as of Part 2:

1. Common service centre
2. Maternity centre
3. Garden
4. Chabutro
5. Water tank
6. C.C road

Date: 30/8/2019

Sign:

Seal of Gram Panchayat

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

Design Proposals for Nani Naroli Village in Mangrol Taluka under 'Vishwakarma Yojana Phase VIII- An Aproach towards Rurbanisation' affiliated to GTU
1 message

Fasiha Shaikh <fashaikh99@gmail.com> **Tue, 20 Jul 2021 a**
To: ddo-sur@gujarat.gov.in, collector-sur@gujarat.gov.in

Respected Sir/Madam

We are the Students of Bhagwan Mahavir College of Engineering and Technology, District Surat affiliated to GUJARAT TECHNOLOGICAL UNIVERSITY(GTU). Vishwakarma Yojana has been as to GTU by the Government of Gujarat with the aim of providing the urban amenities at the rural level so that the growing population at a tremendous rate in urban areas can be controlled as th migration reduces. And the living standards of the rural population is also enhanced.

Under this project, the students are asked to carry out surveys like smart village surveys and techno-economic surveys in different villages to find Infrastructure Requirements, Issues, and the structures requiring maintenance. Keeping in mind these issues and deficient infrastructure amenities, various designs or services are proposed so that the development of the rural areas is ensured.

We selected Nani Naroli Village situated in Mangrol district for the same purpose. After the survey, we performed gap analysis and SWOT analysis of the village.

SWOT Analysis of Nani Naroli

Strength

- electricity is available 24*7
- education facility till higher secondary is available
- sufficient water available in main village
- village is located at higher elevation

Weakness

- Lack of funds in gram panchayat
- Lack of awareness towards self-development and hygiene
- Drainage absent in moughani faliya
- No recreational facilities available in village
- Even at present, lots of kachcha houses present in village

Opportunities

- massive village area
- lake in village
- power plant in vicinity
- large cultivable area

Threats

- Underdeveloped areas in village against increasing population
- Villagers not united as a whole
- Vast economic imbalance amongst the village people

As per the requirements derived from the gap analysis and discussion with the village authorities, we have provided design proposals as follows:

Village: Nani Naroli (Mangrol Taluka) Surat District		Population: 7463 (As per Population Census 2011)
Key Issue	Remark	Design Given
Health	There is no maternity health centre in the village and the villagers have to travel to the pregnant women and newborn children are thus not getting timely aids.	Child welfare and maternity home
Sanitation	There is no Public Toilet in village, as such the outsiders visiting the village does not have any facility for sanitation	Public Toilet
Community places	Gram panchayat faces difficulties in conducting gram Sabha, the village does not have any place for gatherings or for celebration.	Community Hall
Recreation	There is no Public Garden in the village where people can gather to refresh and relax their tired mind and body on special occasions.	Public Garden

Sr. No.	Design Name	Period	Amount Expenditure	Benefit
1	Biogas plant	Long term(3-5 years)	Rs.14,000	Biogas production is the best way to use natural resources whic nonpolluting and also use for making organic manure.
2	High School	Long term(3-5 years)	Rs.66,75,216	Helps in promoting literacy rate in the village
3	Public toilet	Within 1 year	Rs.7,37,234	The condition of the village roads of the Nani Naroli village is no good. There are many streets that are yet not paved.
4	Community Hall	Long term(3-5 years)	Rs.30,65,956	Community hall also enables to organize awareness programs, sem discussions for village problems etc. It eliminates social injustice in a village as all the villagers gather same place.
5	Bank	Long term(3-5 years)	Rs.25,28,571	It helps in managing finance.
6	Village Gate	Within 1 year	Rs.1,48,514	It will provide an aesthetic view to the village.
7	Tank design for water harvesting	Immediately	Rs.1,38,931	Helps to reduce the storm drainage load and flooding in the citi Prevents water wastage by arresting soil erosion and mitigates fl Sustains and safeguards existing water table through recharge
8	Road Section	Within 1 year	Rs.51,95,466 per km	The condition of the village roads of few backward areas in Nani N village is not so good. There are many streets that are yet not pa
9	Child welfare and maternity home	Within 1 year	Rs.21,65,843	Health is a very important factor for the welfare of people.
10	Public garden	Long term(3-5 years)	Rs.7,61,717	It creates a recreational opportunity for the village people.
11	Common Service Centre	Long term(3-5 years)	Rs.9,76,506	Acting as last mile distribution units for various governments' dir benefits to marginalised/backward communities.
12	Chabutro	Within 1 year	Rs.1,37,088	It will provide an aesthetic view to the village.

PS. Detailed project report including the above design proposal is attached along with this mail.
Regards,

Fasiha Shaikh,
B.E. Civil Engineering,
BMCET, Surat.

Chapter 21 Comprehensive report for the entire village

A COMPREHENSIVE REPORT ON VISHWAKARMA YOJANA PHASE VIII

A Step towards Rurbanization

TERM: 2020-2021
GUJARAT TECHNOLOGICAL UNIVERSITY
Bhagwan Mahavir College of Engineering and Technology

Team Members:	Fasiha Mohmmed Rafik Shaikh
	Sanket H. Vaishnav
Project Guide:	Asst. Prof. Dixit Chauhan

Aim of the Project

The main purpose of our project is to develop the village with a 'rural soul' but with all urban amenities that a city may have, so that the villagers are able to enjoy the benefits of urban area. For this purpose, various infrastructure facilities are designed as per the village needs and URDPFI guidelines.

Significance of the Project

Vishwakarma Yojana project is an initiative taken by Gujarat Technological University that aims at providing the village with basic amenities that are easily available in the urban areas to the rural ones. This provision helps the rural public to achieve a better living standard and curbs the wish of many to migrate in to urban areas.
This helps in solving one of the major concern of the modern world – Over-loading of the urban areas. Migration of people causes many problems that includes crowded urban areas, increase in pollution, and increase in unemployment rate and so on.
This project can raise awareness towards this issue as well as keep the rural soul of the village while still developing.

Topics Included in this DPR

Following topics are included in this DPR;

- Ideal village concept and Smart city concept
- Literature review understanding Rurbanization
- Allocation of village
- Surveys, Data collection and village visits
- Infrastructure condition in the village
- Presenting Design proposals for future development of village
- Feasibility assessment of the given designs

Ideal Village Concept

Ideal village is which deals with the proper availability of service to people to their means regardless of achieving their means.

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

"India Lives in Its Village "as stated by Gandhiji himself tell us that if you want to develop the nation, you must start from village level development, and this ideal village concept aids us in developing that integral part of our country.

Data Collection

For the purpose of collecting the data we carried out the following surveys;

- Ideal village survey form
- Ideal village survey has let us know about the key features of why that particular village has been considered as an ideal village.
- Smart village survey form
- Smart village survey has pointed out the infrastructure as well as facilities which makes the village a smart village.
- Techno- economic survey form for Nani Naroli village
- The techno-economic survey on Nani Naroli has helped us see condition of village infrastructure as well as facilities.
- Gap analysis
- Gap analysis is a good tool to figure out the infrastructure as well as facilities which are lacking in allocated village compared to an ideal or smart village. So it can be remedied and the allocated village can be closer to becoming an ideal or smart village.
- Survey by interacting with village people

Interaction with village people let us know the actual situation in the village as well as the current and future needs of the village.

Conclusion

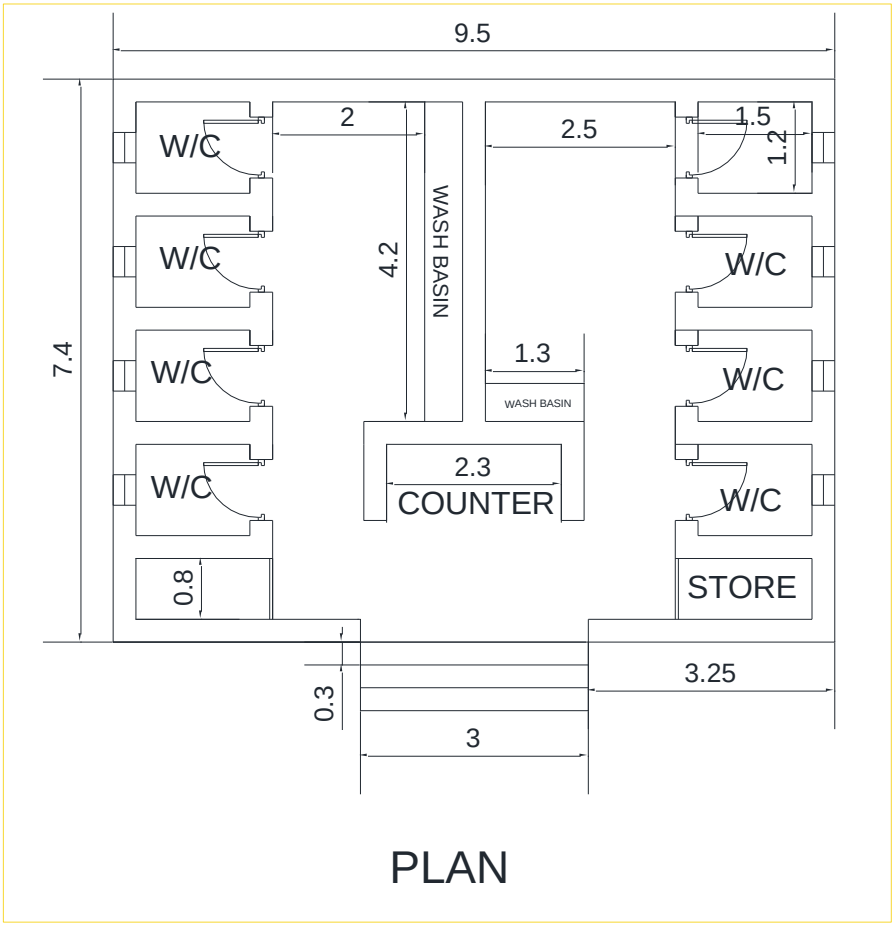
The project started with inauguration ceremony by GTU where we were introduced to the project concept and process. We learnt about rural development, ideal village, its infrastructure facilities, and concept of rurbnization.

After the project started we headed out to the village for visit as well as to fill up the survey form and interact with the villagers. As the project progressed the data was collected regarding the village and its development. The design proposals were then prepared.

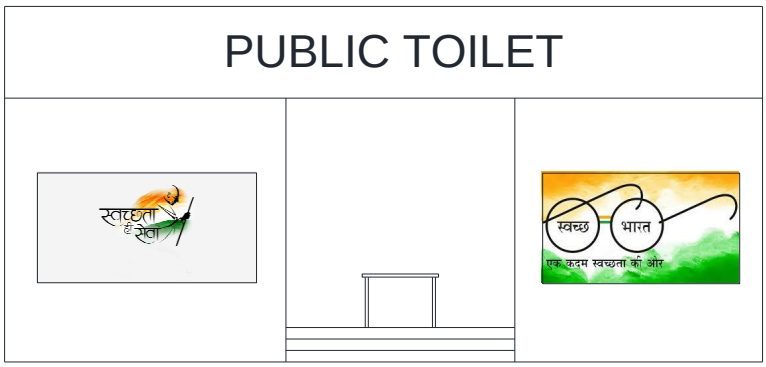
Throughout this whole process we learnt a lot of real life skills as well as gained a glimpse to real life work experience. This experience can help us in guiding our future endeavors.

Design Proposals

Public Toilet

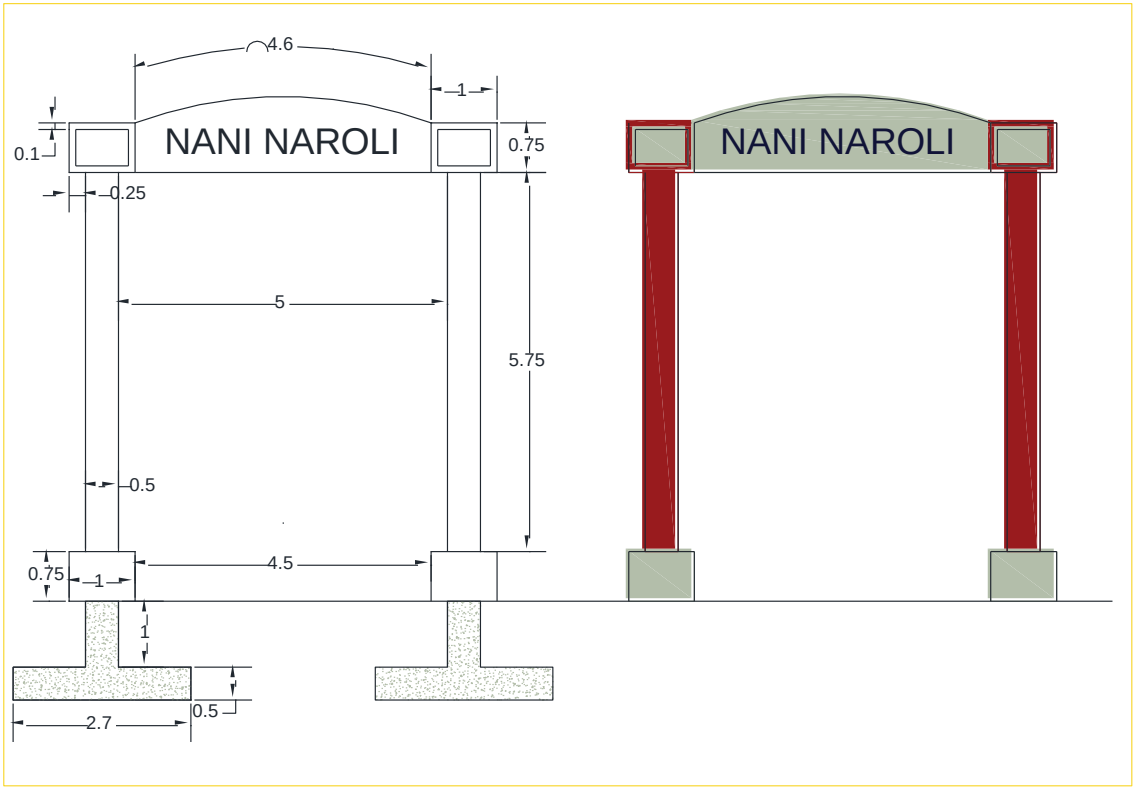


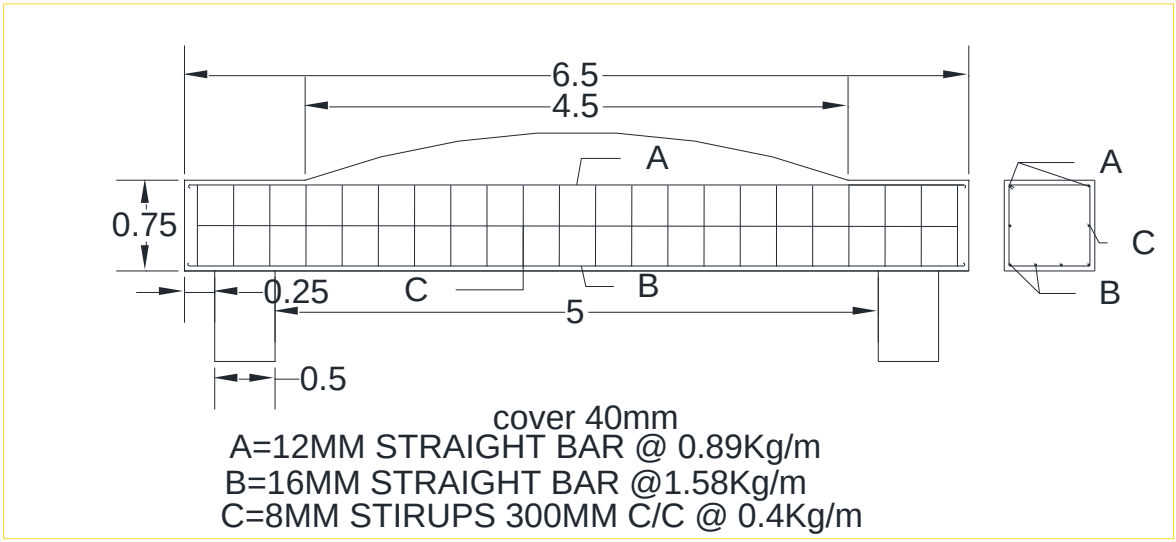
PLAN



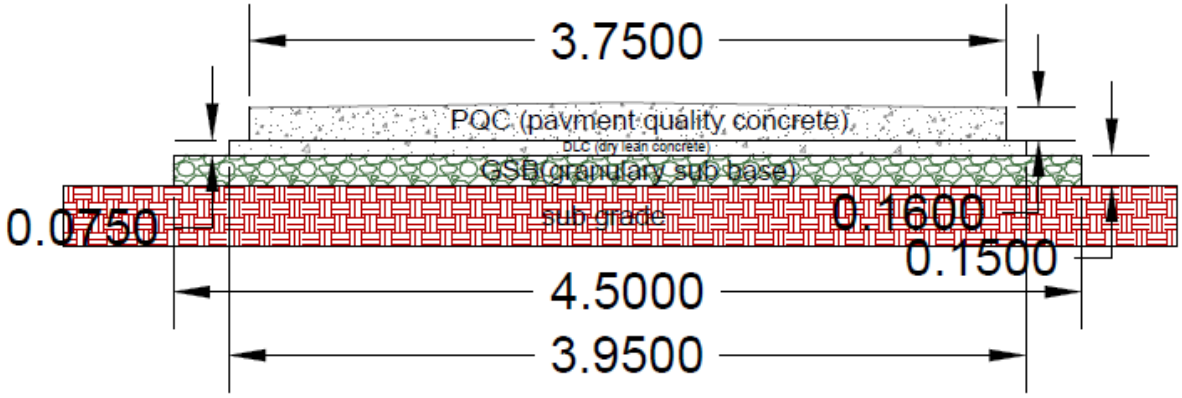
ELEVATION

Village Gate





Road Section



Road Section