DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION
Nardipur Village

Kalol District

PREPARED BY

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COLLEGE NAME

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NODAL OFFICERS NAME

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COLLEGE LOGO

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Institute of Infrastructure

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 Engineering successfully submitted

Detail Project Report for,

VILLAGE Nardipur

DISTRICT Kalol

Under

Vishwakarma Yojana: Phase-VIII

In partial fulfilment of the project offered by

GUJARAT TECHNOLOGICAL UNIVERSITY, CHANDKHEDA

During the academic year 2020-21.

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

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College Name:	Adani Institute of Infrastructure Engineering
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ABSTRACT

Gujarat Technological University is allotted important and prestigious project of Vishwakarma Yojana by the Government of Gujarat for the year 2020-21. The first phase of project is aimed to study the present status and techno-economic survey of villages in District of the state in terms of basic and public amenities, essential commodities, and other infrastructural facilities for the need of people and to prepare report on adequacy of the available resource with reference to population of the village and growth of the area.

Nardipur is the village which selected by us. It is a village in Kalol Taluka in Gandhinagar District of Gujarat State, India. Nardipur is 13 km distance from Sub District Headquarter Kalol and it is 20 km distance from District Headquarter Gandhinagar. Around 70% population of the village engaged with the agricultural activities. As per Census 2011, Nardipur Total area is 1500.81 hectares, Non-Agricultural area is 4.89 hectares and Total irrigated area is 1100.81 hectares.

In village, there are school available to educate the younger generation, business and well educated farmers are available to make the village financially strong. But here we noticed the lacking of awareness for sanitation and so old government building that need reparation. So by redesign them and by implementation of sanitation method village can make a role model for surrounding village.

Here we are going to represent the some of our suggestion for already existing problem in the village. Solid waste management, sanitation and redevelopment of library is our main concern for Vishwakarma Yojana. By providing a good ideas and by doing quality work with our engineering and technical skills, we here are have suggested some of our ideas in it.

Based on the survey we tried to give design of required basic facilities to fulfil their needs. By providing these basic facilities to villagers migration rate will be decreased. This is ultimate aim of the Vishwakarma Yojana.

Key Words:

Solid Waste Management, Public Toilet Development, Eco-friendly Energy-source, Development of Social Infrastructure, Awareness of Health

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 **Dr. V.M. Patel, Principal**, faculties of our colleges for their encouragement and support to complete this project work. An act of gratitude is expressed to our internal guide / Evaluator / Nodal Officer, **Prof. Uzair Shaikh & Dr. Subhanarayan Sahoo from college Adani Institute of Infrastructure Engineering** 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.

Above all we would like to thank our Parents, family members and Friends for their encouragement and support rendered in completion of the present this work.

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1.1 Background & Study Area Location

During our visit to Punsari Village, we got information about the whole village that Punsari Gram Panchayat was established in 1955. However, it is mostly in last ten years that the Panchayat's work received significant achievement and praise. Punsari's Panchayat has planned and implemented multiple projects for the complete change of the village. Effective functioning of these projects co-operatively has made Punsari a success story and an example for others to follow. The village administration has been imparted with several awards in recognition of its ideal achievements.

The village is situated about 82 kilometres north-east of Ahmedabad, the major city of Gujarat, a state in the western region of India. Punsari comes under Sabarkantha district. The bordering railway station is 10 kilometres away. Name of the village is pronounced as "Poonsri" by its people. According to last census of India (2011), it has increased to 5500. About 98% of the population is involved in agriculture or dairy activities. The local language here is Gujarati.

1.2 Concept: Ideal Village

1.2.1 Objectives

- Prevention of transients from provincial territories to metropolitan regions is a typical sensation in India's towns because of nonappearance of chances and conveniences that affirmation a nice norm of existing.
- To make an ideal town, a "centre" that conceivably will draw in assets for the development of close by towns.
- To give faster, simpler and practical admittance to metropolitan business sectors for horticultural items and other sought after provisions made in towns.
- To contribute toward social strengthening by methods for connecting all units of the local area in the charge of town development.
- To assemble and withstand a culture of kind living for wide and speedy turn of events.

1.2.2 Live Case study of an ideal village of Gujarat

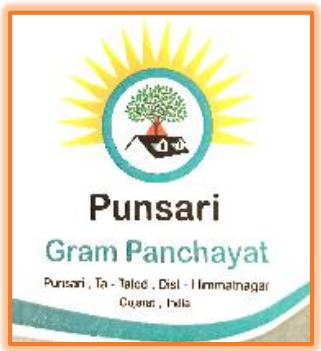


Figure 1 Logo of Punsari Village

"India's No 1 Village" A national television channel refer to Punsari in one of its special news reports telecast in May 2015. In last few years, this village in Gujarat has paying attention from multiple sources, both domestic and international. It was referred as "A model Indian village" in November 2014. An additional report claimed: "Gujarat's dream village Punsari to be Indian role model".

As Government of India has expressed its willingness in developing "Rurban" infrastructure, Punsari has positively achieved a distinction to be one of the role models for the same, noted observers. On 13th May 2015, India's Prime Minister Mr. Narendra Modi acclaimed the village administration of Punsari for its support to social security schemes. Punsari village has

achieved a rare honour and distinction of a "smart village" in the middle of more than 6 lakhs villages in India.

1.2.3 The Idea of a model Village

Figure 2 Awaerd Winner Sarpanch

Punsari is an ideal village today. On 20th October, 2006, Mr. Himanshu Patel was picked out as village Sarpanch of Gram Panchayat with a margin of 300 votes. Since he appointed, Mr. Patel worked relentlessly on effective application of a host of welfare schemes authorised by state and central government, coupled with judicious management of available resources. Continued efforts by the Sarpanch started showing results in the village. In 2011, Mr. Patel was re-elected with a higher margin of 1100 votes. In his second term, he continued his determinations to fulfil his vision of "Rurban" village. He described his vision as: "*a village with a rural soul and amenities of a city".*

1.2.4 Ancient History Civil / Electrical concept about Indian Village

Punsari was not always a model village. Like many villages in India, it did not have proper roads. Shortage of safe drinking water was an acute problem. Electricity was available only occasionally. Street lights were non-existent. The sewage disposal system was ineffective. Sanitation was poor. To make matters worse, the gram panchayat did not have sufficient funds to bring in significant changes. The transformation from just another underdeveloped village to the role model village of the country was gradual. A serious exploration of this exceptional achievement brings out the positive role of rural leadership in this transformation.

1.2.5 Countries Perspective about village and its new Development

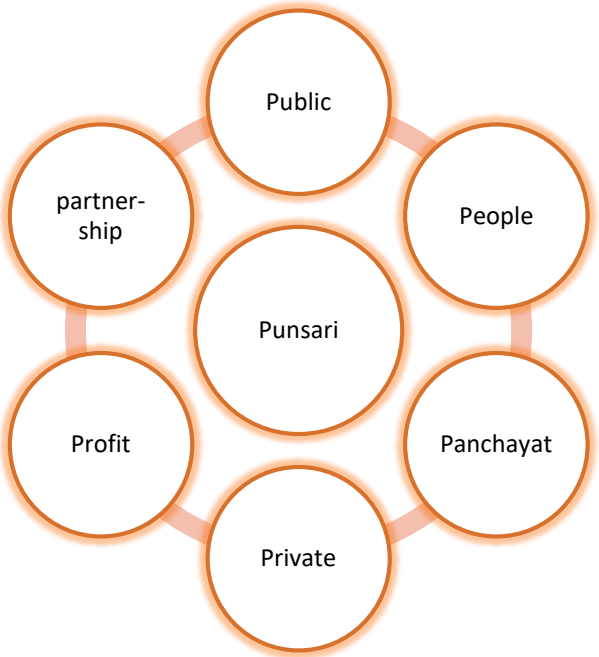


Figure 3 Punsari's 7P Model

An ideal Indian town will be so developed on fit amazing disinfection. It'll have houses with satisfactory light and ventilation amassed of a material accessible inside a scope of ten kilometres from it. Every one of the houses will have yards encouraging householders to create vegetables for local utilization and to house their animals. The town roads and paths are coordinated to be liberated from all preventable earth. There will have strict spots for every one of the, an average medium, a co-usable dairy, essential and optional schools all through modern instruction will be the prevailing component, and furthermore it will have Panchayat for settle down conflicts. This is genuinely precise thought of an ideal village.

In the current situations, houses will remain as it is with slight enhancements. Under correct conditions and intellectual supervision, villagers can twice the village earnings as distinguished from separate earnings. In our villages boundless resources are not for profit-making purposes in each occasion but surely for native purposes in more or less each occasion. The most important problem of the village that can be resolved is its sanitation, which is the topmost ignored problem. Gandhiji says "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 ought to perform daily functions and speak to them on the worth of sanitation and therefore the great injury caused by its neglect".

1.3 Detail study of Ideal village

Figure 4 Entrance of punsari village

Different points of the village are now connected through clean and well-maintained concrete roads. Streetlights are operational through solar power. Insufficiency of electricity has become a thing of the past as Punsari has 24-hours power supply through a 66 KV power sub-station located in the village itself. This was developed through funds from Jyotigram Yojana.

The village now has a proper sanitation and underground drainage system. Every house in the village has its own lavatory, which is remarkable compared to most other villages of India. The village community is prosperous and aspirational. Cars, motorcycles, LED TVs, Split A/Cs, refrigerators, smart phones are a common sight in the village.

"Atal Express", a bus service for villagers was funded through central government scheme Swarnimjayanti Gram Swarojgar Yojana. This service has been especially useful for women carrying milk to the collection centre at Sabarkantha. The bus service has become one of the most used modes of transport within the village. Students are entitled to free transport as part of this facility.

Figure 5 66 KV power sub-station, Punsari

1.3.1 Physical & Demographical Growth

Punsari is an enormous town situated in Talod Taluka of Sabarkantha region, Gujarat with all out 1109 families dwelling. The Punsari town has populace of 5100 of which 2653 are guys while 2447 are females according to Populace Statistics 2011. [2]

In Punsari town populace of kids with age 0-6 is 578 which makes up 11.33 % of absolute populace of town. Normal Sex Proportion of Punsari town is 922 which is higher than Gujarat state normal of 919. Youngster Sex Proportion for the Punsari according to statistics is 914, higher than Gujarat normal of 890. [2]

Punsari town has higher proficiency rate contrasted with Gujarat. In 2011, proficiency pace of Punsari town was 79.43 % contrasted with 78.03 % of Gujarat. In Punsari Male education remains at 89.62 % while female proficiency rate was 68.40 %. [2]

Table 1 Census 2011 data of populationof Punsari

Particulars	Total	Male	Female
Total No. of Houses	1,109	-	-
Population	5,100	2,653	2,447
Child (0-6)	578	302	276
Schedule Caste	410	214	196
Schedule Tribe	5	2	3
Literacy	79.43 %	89.62 %	68.40 %
Total Workers	2,880	1,647	1,233
Main Worker	1,650	-	-
Marginal Worker	1,230	343	887

1.3.2 Economic profile

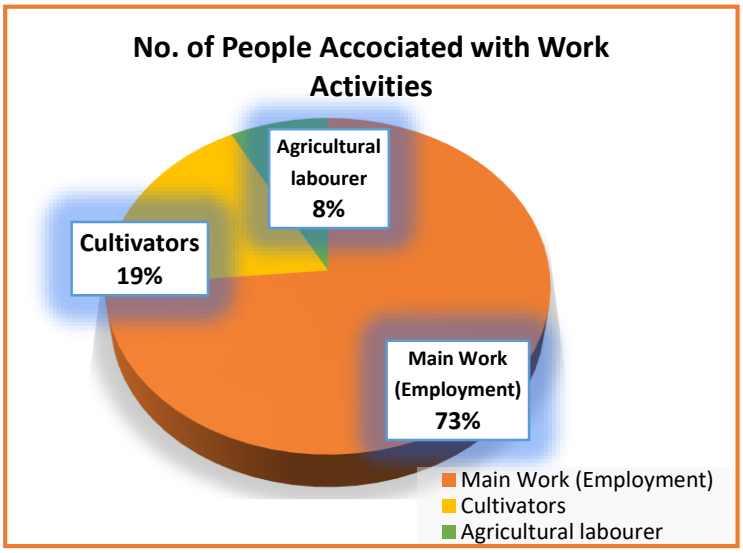


Figure 6 No. of People Accociated with Work Activities

In Punsari town out of absolute populace, 2880 were occupied with work exercises. 57.29 % of labourers depict their work as Principle Work (Business or Procuring over A half year) while 42.71 % were associated with Negligible movement giving occupation to under a half year. In town 2880 specialists occupied with Principle Work, 730 were cultivators (proprietor or co-proprietor) while 306 were rural worker. [2]

1.3.3 Healthcare

A primary healthcare centre (PHC) is functioning on 24/7 basis in Punsari. Throughout two experienced consultants are there on duty. A distinct maternity ward is also there in PHC. ASHA workers are enthusiastically involved in the whole village. Over the years the ratio of institutional delivery and vaccination of new-born babies have gone up to 100%. Villagers are protected under a group insurance system for lifespan and health insurance.

Every single villager between the ages of 18 to 60 years is insured for an accidental cover of ₹100,000 and a mediclaim cover of ₹25,000. The farmers are insured for several accident under a policy by Rashtriya Swasthya Bima Yojana (RSBY). They get an insurance of ₹1.2 to 2 lakh in particular hospitals for treatment in case of an accident. The Below Poverty Line (BPL) population of Punsari is also helped under the Mukhyamantri Amrutam Yojana launched in the year 2012.

Punsari have 8 well-furnished anganwadi centres. All the centres have well-kept infrastructure. Inhabitants of Punsari make finest use of the centres. The amenities delivered through the centres have minimalized cases of malnourishment and disease among children to just about zero level.

Figure 8 Healthcare center, Punsari

Figure 7 primary healthcare centre(before lockdown), Punsari

Figure 9 Aanganwadi, Punsari In Frame – Anuj Shyara

1.3.4 Drinking Water

Figure 10 Drinking water bottles, Punsari

Punsari has worked towards advancement in provision of clean drinking water in the village through five bore wells, four hand pumps and house to house piped connections to distribute chlorinated water. Since 2010, the panchayat set up their own RO plant manufacturing mineral water to make sure the supply of fresh drinking water to the villagers. This plant has been set up under PPP (public-private partnership) business model. The water is delivered to all the families at minimal duties of ₹ 4 per 20 litters of water. BPL card holders can take it free also.

Figure 11 Water treatment plant, Punsari

The private partner also supplies this mineral water to other villages. For the period of marriage ceremony and other rituals, water transporters are also arranged. Drinking water taps are existing for all the people all over the village.

1.3.5 Sanitation and Waste Management

Figure 13 Dustbin, Near Anganvadi, Punsari

Figure 12 Drainage system, Punsari

Figure 14 Tractor Trolley to Collect waste Door to Door, Punsari

Walking throughout the Punsari village, it's difficult to find out garbage lying nearby. All the way through the village, they have enclosed drains beside the roadsides. The village have implemented a sanitation drive in which people are encouraged in the direction of sanitation. Every single house has a toilet leading to cleaner environments. Waste bin have been donated to each household.

A tractor trolley bought in the year 2009 to collect the waste from each household twice in a day. Every household is charged ₹ 30 per year for waste management and ₹2 per person per month for sanitation drive. These supports to create income for the payments of driver, five domestic workers, tractor fuel and maintenance. There is a distinct landfill place for solid waste management (SWM). There is pay & use toilet for visitors close to bus station. The setting up of CCTV cameras have also facilitated in maintaining the sanitation in the village.

1.3.6 Wi-Fi Connectivity

Punsari was entirely connected to Wi-Fi in the year 2006. It is easily reached all over the village through Reliance's data usage plans, so every single user have a unique username and password that permits access to the mobile library, complaint registrations, CCTV recordings, etc. This Wi-Fi connection is maintained by electrical engineers and unpaid assistant. Internet connectivity is delivered to the inhabitants at an extremely subsidized rate of ₹50 per month for limitless usage. This has rehabilitated the village organisation entirely.

1.3.7 Skill Development and Employability

Figure 15 Beauty culture and hair dressing , Punsari

Figure 17 Kaushalya vardhan kendra, Punsari

Figure 16 Garment sector , Punsari

Punsari's ambitions is to develop as self-sustained village and by means of this aim in the mind, raising employment among the village youth is a leading concern. Sarpanch is leading the village youth by setting an example. He is involved in several entrepreneurial events and also guides the youth. The village has skill development centre which includes courses in running a beauty parlour, tailoring and basic computing. Additional employment oriented skill development options are most likely to start in nearby future. Several young people taught here have ongoing some entrepreneurial schemes in the village. This is separate from employment generation that have taken place under various government organisations.

1.3.8 Women's Empowerment

Women's empowerment bring up the economical ability for woman to appreciate their value and right to control from the assets, income, resources and their individual time, along with the capability to manage risk and develop their economic relief and status.

Village administration of Punsari inspires and backing woman's Self Help Groups (SHGs). SHG's Number has increased from 2 to 111 in the last 8 years. These SHGs with a co-operative membership of 1200 women are titled as "Sakhi Mandals". Their mainly work is in the direction of empowerment of the rural women with growth of numerous employable services like stitching and sewing, etc. The village has "Suvidha Shopping Centre" with 8 shops handled by SHGs at present in action. There is a scheme for establishing of a driving school for women in nearby future.

1.3.9 Education

Table 2 List of schools and number of students of Punsari

Name of School	Punsari Bit Kendra Primary School	Punsari Navanagar Primary School	Amarpura Primary School	Ajmelpura Primary School	Bharadiya Primary School
No. of Students	197	233	180	131	83

There are 5 primary schools (up to standard 5) in Punsari and 1 secondary school (up to standard 8). Schools have well equipped libraries and computer labs. Student have lockers which set up in tutorial room. Therefore, students do not have to come to school and go back home with heavy bags. Moreover, buses are as long as to means of transport the students to and from school.

Figure 15 Smart Primary school, Punsari, In Frame – Anuj Shyara

The gram panchayat furthermore afford a scholarship arrangement for students from economically weak families. Once a year, cost of schooling of 5 boys and 6 girls is allowed through this scholarship. All the 5 schools have all the basic facilities like suitable toilet facilities and drinking water. Hygiene is continuous strictly in the school campus. The Mid-Day Meal plan is being handled competently with the intention of 'No child is left hungry any day'. The organisation is run by the state government by hiring a manager, a cook, and a peon for running it. By means of this organisation, students are provided a feast or special meal on selected occasions every single month.

Figure 16 Learning with fun at playground at punsari, In Frame – Ajaysinh Bhati

One of the schools in the Punsari has been established as an exemplary school. It has computers and projectors for teaching. The attention of all the schools is on activity-based education. Villages' schools strictly follow the model 30:1 (student: teacher) proportion as instructed by the Ministry of HRM- Human Resource Development (Department of Higher Education), India. Punsari announced a joint venture with Navneet Publications in the year 2009 to advance an audio visual teaching module named as "E-SENSE". This was intended as a unique approach of attracting students to school. Then and there, it was first of its kind inventiveness for a rural school. Navneet has replicated it through the country now.
CCTV cameras are positioned in the classes to allow parents check their child's routine. This has enhanced the education ethics at the school. This school will have ACs installed in a little while in the classrooms. All these amenities have reduced the school dropout rate to 0% in Punsari. Number of students has doubled from 300 in the year 2006 to 600 in the year 2014.

Figure 17 Mobile library, Punsari

The village schools are maintained under Sarva Shiksha Abhiyaan Outlines. The village was evaluated "B+" in Gunotsav 2011 and "A" for the duration of successive 3 years. Education and Literacy of adults is the part of Panchayat's initiatives. Two female educators are allotted to run this literacy task under the "Shaksharta Mission" of the state government. The literacy rate is very high with only one hundred illiterate people in the whole village.
Sarpanch applied for Backward Regions Grant Fund (BRGF) for developing a mobile library and it is in use today. This is a transportable van with books and space to sit and read. This library travels across the village. People can borrow books and read.

1.4 SWOT analysis of Ideal Village

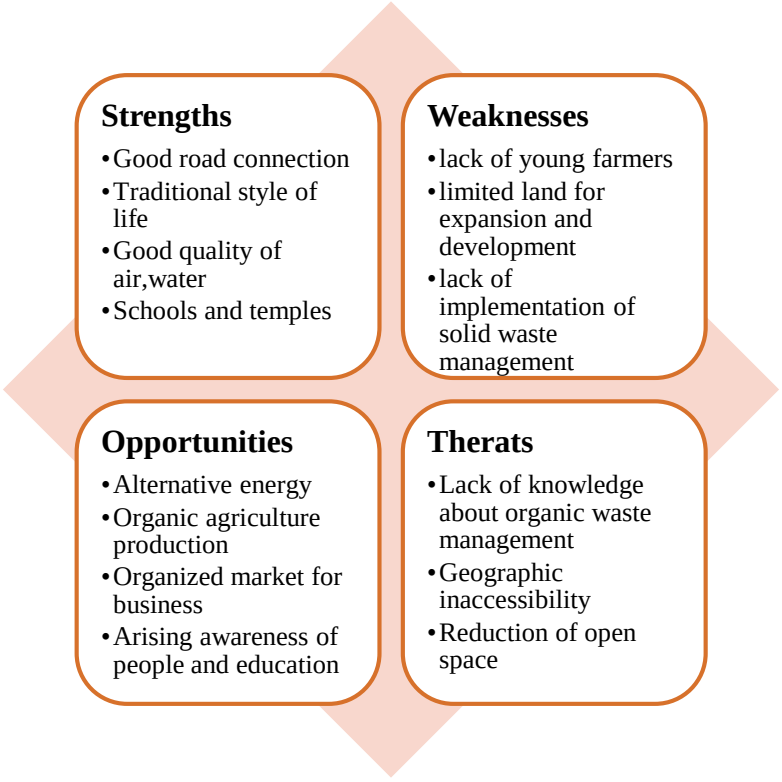


Figure 18 SWOT analysis of Ideal village Village

1.5 Future prospects of Development of the Ideal village

The sarpanch is concerned about sustainability of the growth in future. He senses that consistent employment generation and surviving by good fund management structures is the only key to sustainability. He has started a series of innovative projects to be executed during his tenure. He has a vision to empower the women of Punsari by introducing a Women Federation for creating consistent employment.

As a village, Punsari has without doubt reached a stage where it stands apart from most other villages in India. It has earned its achievements but it doesn't want to break on them. The villagers now believe even more to gram panchayat and look ahead to promote growth. Farmers in the village are intense on learning more about risk defensive to their crop. There are also some worries among some fragments of people about conservation of "rural culture" in vision of the industrial development.

1.6 Benefits of the visits of Ideal village

Rural transformation is not inadequate to growth of basic infrastructure and amenities. It has a measurement of human growth which can affect the sustainability of any alteration. The rapid growth in the urban community is generating conditions of massive vulnerabilities in the rural areas. On the other hand this varying scenario is also creating chances for growth and development. The key contributor in the direction of sustainable revolution is organization and mobilization of public participation in development events. This convergence of demands of rural public and transformation can be carried out by rural headship.

1.7 Electrical / Civil aspects required in Ideal village

Traditionally, rural development looked as a top bottom process. This view was further reinforced through centrally funded poverty alleviation and rural development programmes. In 2006, a young man, Himanshu Patel, was elected as village headman of Punsari. He hails from Chaudhary Patel Community. There was no model in front of him at the time of his election. He began with performing mundane and routine functions of the gram Panchayat. While doing his work, he realised that the village required urgent attention and a plethora of existing government schemes that were available could be a useful source of finance for development projects. He was clear that he would not beg for funds from corporate entities under their corporate social responsibility schemes or funds from non-resident Indians (NRI). He knew that the revenue generated by the Panchayat was not the only source of finance. It was also not adequate for such programmes. Hence, it was necessary to rely on the funds coming from the state and federal governments.

The only challenge for him was how to establish a link between gram Panchayat and various existing government schemes. Currently some eighty-two different schemes for rural development are in operation in India. Himanshu Patel thought of joining the village system with these existing schemes and benefit from them. For example, under the Sarva Shiksha Abhiyan (Scheme for Education for All) central government gives funds to construct rooms, toilets, and buy educational material in primary schools. The task of the leader at the local level and the gram Panchayat is to mobilise the gram Panchayat members and village folks, to prepare a proposal, and apply for such schemes so that the money is granted to the village and that it can be used for the purpose of development in the field of education. Similarly, he consistently thought of identifying such schemes and ministries and departments which were already offering financial assistance in a variety of programmes for rural rejuvenation, and he declined to exhaust money generated by Panchayat through taxes.

In the past ten years, more than seventeen crore of rupees have been transferred in the form of financial assistance under various government schemes and programmes to this single village. Generally, criticism is levelled against our three-tier federal model in which government units at the grass roots have the biggest problem of financial crunch but this village stands out as an exemplar. The village head disproved the myth that money does not come from the state and central governments. He rather made a point that local level committed leadership, activism, and vision for rural development were required. Self-governance begins with first owning your work and responsibilities.

Finance is just one aspect of rural reconstruction. The bigger challenge is to take the team of elected representatives at the grass-roots level together and generate consensus amidst difference of opinions and actions. Himanshu Patel has successfully handled this situation as he sees village headman not merely as an elected representative but visualises him as a Chief Executive Officer of a particular village. He believes that a village headman should be available to his people 24/7. The rural transformation is not merely a process of changing the village physically but also changing the way village headman has to function. His model focused on a change in the people's beliefs and attitudes.

A model village first needs to have a model Sarpanch (village headperson) who regularly comes on time to the gram Panchayat office and spends considerable quality time at work.

Sarpanch role is to ensure that the citizens' charter is taken seriously by the Panchayat and that people's issues are resolved on priority basis. Maximum communication with villagers, officials of the village level bureaucracy, and other interested parties guarantees minimum frictions and disagreements. This is the most striking feature of the village which garnered stupendous public support for most of the work done by the Panchayat. For Patel, it was essential to reinforce connections with people and that was the biggest advantage for smooth operation and execution of various functions and tasks.

The village headman of Punsari talked, discussed, and tried to resolve the issues of at least a hundred people on a daily basis. In fact, he believed that if a hundred people did not come to visit Panchayat office every day, Sarpanch, i.e. the leader, actually failed to garner their confidence and consequently failed to represent them as a village headman. People may come with small and petty issues but headman's involvement in resolving these issues actually helps to strength people's confidence in the

Panchayat system. In most of the villages in India, the village headperson almost disappears in the post-election period. After winning the election these headpersons fail to own responsibility and build a connection with their village folks, which is the main reason behind increasing disconnection and distrust between people and headpersons. Himanshu Patel was able to overcome the differences and criticisms levelled against him because of a strong connection that he had established by constantly being in touch with people. He did not hold grudges and biases against people who did not agree with him but rather tried to accommodate them and absolve their differences.

Himanshu Patel has set an example to other villages that committed leadership and community support are key elements that make rural development possible. He has many more plans like GIS mapping of people, resources in the village, generating sources of livelihood within the boundaries of the village, change people's mind-set in order to transform this model village in to an ideal village. For him, the development of infrastructure and use of sophisticated technology is not the only sign of development. This leader believes that it should include communal harmony, social justice, improvement in some essential social indicators of development like zero maternal/infant mortality rate, hundred per cent institutional deliveries, zero dropout rate, hundred per cent immunisation etc. A holistic development model is the attractive feature of this village.

The village Panchayat has established a skill development centre which focuses on enhancement of skills that are required for locally available livelihood opportunities. Village headman of Punsari repeatedly indicated that it was essential to link rural development process with local culture, available resources, and local needs. Punsari comes quite close to what Ash (1994) recognises in his work as a double movement of globalization on the one hand and devolution, decentralization, and localization on the other, which has been called globalization. The concept centres around the development of global villages that preserve and nurture the essence of rural community life without compromising on facilities perceived to be essentially urban in nature, thus creating altered 'Rurban' forms. Gujarat government has already rolled out a scheme for the purpose of Rurbanization under which selected villages shall be transformed to provide them with urban amenities and yet preserve their rural soul. The Government of India launched a similar scheme titled Provision of Urban amenities in Rural Areas (PURA) in 2010.

2. PUNSARI VILLAGE Literature Review

2.1 Introduction: Urban & Rural village concept

2.1.1 Urban:

A metropolitan zone is the segment encompass a city. Most extreme populaces of metropolitan zones have non-agrarian callings. Metropolitan zones are mechanically exceptional, which means there's a centralization of human constructions like houses, business building, street, extension, and railroad.

The term 'metropolitan' is said to community or urban areas. Differentiating in country zones here lion's share (generally) of the working inhabitants are include in non-horticultural exercises. Metropolitan zones could likewise be characterize by cross country governments dependent on their individual standards for instance size, populace thickness, control of people groups and sort of government.

The multidimensional character of metropolitan zones introduced inconvenience in giving an obvious definition for them. The list of India until 1951 described a metropolitan settlement reliant on areas and besides the quantity of occupants in zone. The 1961 enumeration acknowledged a severe definition which is amended in 1971 evaluation to treat all spots fulfilling the resulting conditions as village:

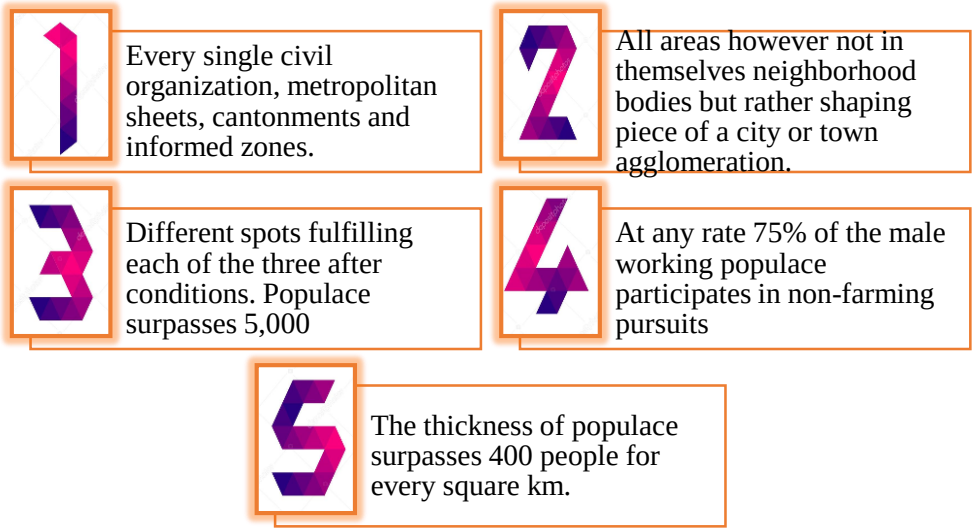


Figure 19 conditions as towns

From a neighbourhood government perspective, metropolitan improvement addresses various city-life components: new and prior property, building, street, collective space, transportation, financial turn of events, foundations, and furthermore the air, among other. We have generally portrayed these perspectives into various hypothetical zones underneath. These regions are generally addressed as sorts of metropolitan arranging, yet it's important to realize that they're not similarly elite for a metropolitan intend to be strong, it ought to contain numerous or the entirety of the beneath zones.

In 1981 evaluation some minor changes were consolidated whereby animals, ranger service, fishing of amphibian life, chasing of natural life, ranches, plantation etcetera. These were treated as horticultural action and spaces having separate metropolitan highlights and actual offices like modern zone, uncommon undertaking zone, huge lodging settlements, spots of

traveller premium, rail line state, and so forth It very well may be considered as urban areas at the choice of the Overseer of Statistics tasks in meeting with the concerned state governments. All towns and metropolitan gatherings, so recognize, are gathering into following six class offering to populace size:

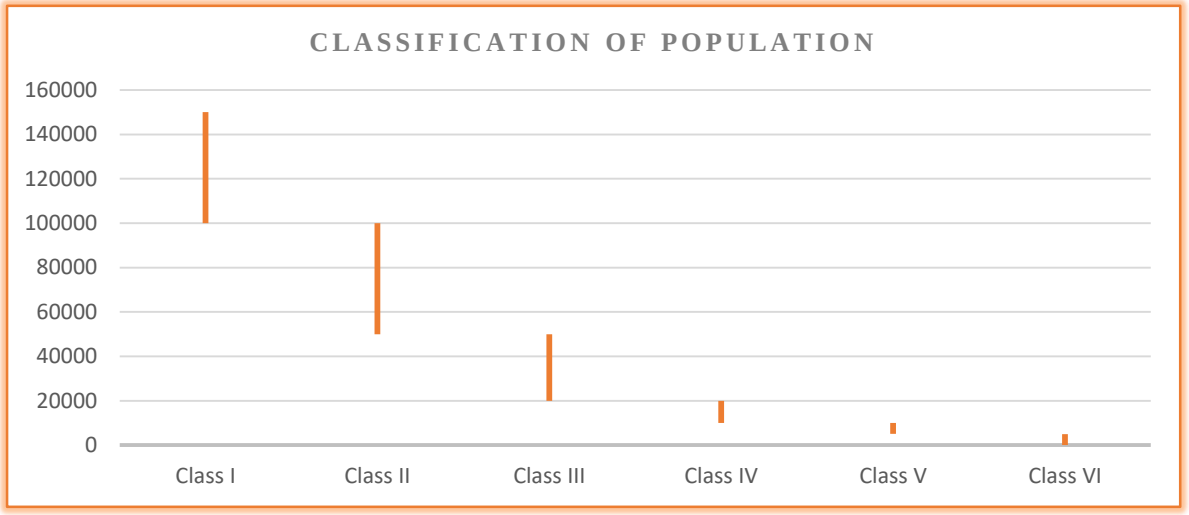


Figure 20 conditions as towns

2.1.2 Rural

Provincial zones are likewise perceived as the 'rustic territory' or a 'town' or an 'open country' in popular government of India. It has a low populace thickness. In provincial regions, horticulture is the main wellspring of job alongside fishing, cabins ventures, and ceramics and so forth.

The pursuit to decide the genuine rustic India actually stays in incredible sincere. Generally every financial organization this days have a clarification of country India.

ANNOTATIONS

- As per the Arranging Commission, a town with a most extreme populace of 15,000 is viewed as rustic in nature. In these regions the panchayat settles on every one of the choices. There are five people in the panchayat.
- The Public Example Review Association (NSSO) characterizes country as follows: A zone with a populace thickness of up to 400 for each square kilometer, Towns with clear overviewed limits however no city board, at least 75% of male working populace associated with farming and unified exercises.
- RBI characterizes rustic territories as those regions with a populace of under 49,000 (level - 3 to level 6 urban communities).

It is by and large said that the rustic zones house up to 70perceent of India's populace. Provincial India contributes a huge part to India's Gross domestic product (GDP) by technique for agribusiness, independent work, administration, structure etcetera. According to an exacting apportion utilized by the Public Example Review in its 6r1st round, named month to month per capita spending, country spending represents 55percent of absolute public month to month spending. The rustic populace at current records for 1/third of the all-out Indian deals.

2.2 Importance of the Rural Development

Provincial advancement is significant not just for an over whelming lion's share of the populace existing in towns however the advancement of rustic exercises is fundamental to animate the speed of by and large monetary improvement of the republic India. Provincial advancement have assumed more prominent significance in India this day then in the past period in the movement of the improvement of the country.

It is a methodology bundle searching for accomplish improved rustic assembling and efficiency, bigger financial unbiasedness, and objective, balance in friendly and monetary turn of events. The main errand is to ease the yearning of around 70 % of the country populace, giving agreeable and good food. At that point follow a palatable conveyance of attire and foot-wear, a slick house in a flawless climate, clinical consideration, sporting conveniences, schooling, transport and correspondence.

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

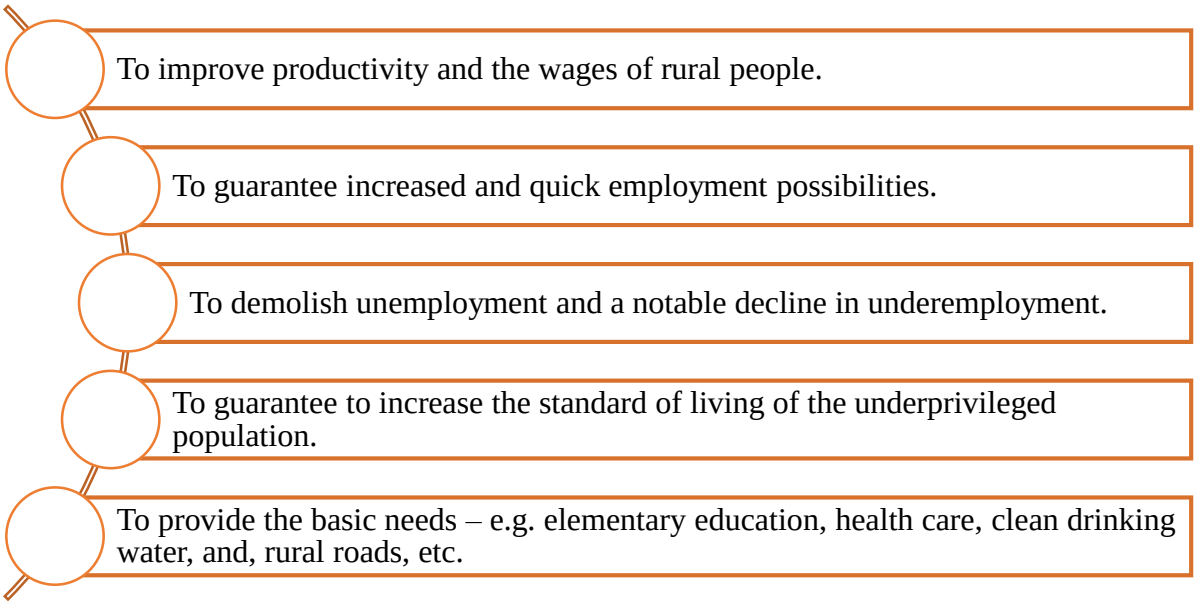


Figure 21 The sixth five-year plan for rural development

2.3 Ancient Villages of Rural Urban Villages

We characterize the term country as a section situated on the boundaries. It means to a minor settlement, which is outside the lines of a town, business or mechanical space. It might cover, rustic zone zones, towns or provincial local area, where there are regular plants and not developed spaces. There is a low convergence of populace in zone. The superb wellspring of income of the occupants is cultivating and creature farming. House Enterprises likewise structure a highest kind of revenue here.

In India, a city whose population is lower than fifteen thousand is measured as rural, as per the planning instruction. Gram Panchayat is in authority for looking after such zones. Further, there is no government board, within the villages and maximum % of the male population are engaged in cultivation and associated activities.

2.3.1 India:

The census of India considers those areas as rural where the population is below 5000 and the density of population less than 400 per (Kilometre)^2. It further provides that in such areas at least 75percent of the males of the working population are engaged in agricultural pursuits.

2.3.2 United Kingdom:

In Britain, "rural" is well-defined by the government Department for Environment, Food and Rural Affairs (DEFRA), using population information from the newest census, such as the United Kingdom Census 2001. These definitions have numerous grades, however the upper point is any local government area with less than 26% of its population living in a market town ("market town" being defined as any settlement which has permission to hold a street market).

2.4 Scenario: Rural / Urban village of Gujarat as per Census 2011

2.4.1 Gujarat Total Population 2011:

As per details from Census 2011, Gujarat has population of 6.04 Crores, an increase from figure of 5.07 Crores in 2001 census. Total population of Gujarat as per 2011 census is 60,439,692 of which male and female are 31,491,260 and 28,948,432 respectively. In 2001, total population was 50,671,017 in which males were 26,385,577 while females were 24,285,440. The total population growth in this decade was 19.28 percent while in previous decade it was 22.48 percent. The population of Gujarat forms 4.99 percent of India in 2011. In 2001, the figure was 4.93 percent. Recently as per Gujarat census data, 83.92% houses are owned while 13.54% were rented. In all, 65.95% couples in Gujarat lived in single family. [2]

Table 3 Census data comparison of 2001 and 2011

Description	2011	2001
Approximate Population	6.04 Crores	5.07 Crores
Actual Population	60,439,692	50,671,017
Male	31,491,260	26,385,577
Female	28,948,432	24,285,440
Population Growth	19.28%	22.48%
Percentage of total Population	4.99%	4.93%
Sex Ratio	919	920
Child Sex Ratio	890	883
Density/km^2	308	258
Density/mi^2	798	669
Area(Km^2)	196,244	196,024
Area mi^2	75,770	75,685
Total Child Population (0-6 Age)	7,777,262	7,532,404
Male Population (0-6 Age)	4,115,384	4,000,148
Female Population (0-6 Age)	3,661,878	3,532,256
Literacy	78.03 %	69.14 %
Male Literacy	85.75 %	79.66 %
Female Literacy	69.68 %	57.80 %
Total Literate	41,093,358	29,827,750
Male Literate	23,474,873	17,833,273
Female Literate	17,618,485	11,994,477

2.4.2 Gujarat Urban Population as Per Census 2011:

Out of total population of Gujarat, 42.60% people live in urban regions. The total figure of population living in urban areas is 25,745,083 of which 13,692,101 are males and while remaining 12,052,982 are females. The urban population in the last 10 years has increased by 42.60 percent. [2]

Sex Ratio in urban regions of Gujarat was 880 females per 1000 males. For child (0-6) sex ratio the figure for urban region stood at 852 girls per 1000 boys. Total children (0-6 age) living in urban areas of Gujarat were 2,952,359. Of total population in urban region, 11.47 % were children. [2]

Average Literacy rate in Gujarat for Urban regions was 86.31 percent in which males were 90.98% literate while female literacy stood at 70.26%. Total literates in urban region of Gujarat were 19,672,516. [2]

2.4.3 Gujarat Rural Population as Per Census 2011:

Of the total population of Gujarat state, around 57.40 percent live in the villages of rural areas. In actual numbers, males and females were 17,799,159 and 16,895,450 respectively. Total population of rural areas of Gujarat state was 34,694,609. The population growth rate recorded for this decade (2001-2011) was 57.40%. [2]

In rural regions of Gujarat state, female sex ratio per 1000 males was 949 while same for the child (0-6 age) was 914 girls per 1000 boys. In Gujarat, 4,824,903 children (0-6) live in rural areas. Child population forms 13.91 percent of total rural population. [2]

In rural areas of Gujarat, literacy rate for males and female stood at 81.61 % and 57.78 %. Average literacy rate in Gujarat for rural areas was 71.71 percent. Total literates in rural areas were 21,420,842. [2]

2.4.4 Gujarat Rural v/s Urban Population 2011Comperission

Table 4 Census data comparison of Gujarat rural vs. Urban area

Description	Rural	Urban
Population (%)	57.40 %	42.60 %
Total Population	34,694,609	25,745,083
Male Population	17,799,159	13,692,101
Female Population	16,895,450	12,052,982
Sex Ratio	949	880
Child Sex Ratio (0-6)	914	852
Child Population (0-6)	4,824,903	2,952,359
Child Percentage (0-6)	13.91 %	11.47 %
Literates	21,420,842	19,672,516
Average Literacy	71.71 %	86.31 %
Male Literacy	81.61 %	90.98 %
Female Literacy	57.78 %	70.26 %

2.5 Rural Development Issues - Concerns - Measures

People related

- Traditional way of thinking.
- Poor understanding.
- Low level of education to understand developmental efforts and new technology.
- Deprived psychology and scientific orientation.
- Existence of unfelt needs &Personal ego.

Agricultural related problems

- Lack of expected awareness, knowledge, skill and attitude.
- Unavailability of inputs.
- Poor marketing facility.
- Insufficient extension staff and services.
- Division of land.
- Unwillingness to work and stay in rural areas.

Infrastructure related problems

- Poor infrastructure facilities like water, electricity, transport, educational institutions, Communication, health, storage facility etc.

Economic problems

- Unfavorable economic condition to adopt high cost technology.
- High cost of inputs.
- Underprivileged rural industries.

Social and Cultural problems

- Cultural norms and traditions.
- Conflict within and between groups, castes, religions, regions, languages.

Leadership related problems

- Leadership among the hands of inactive and incompetent people.
- Mollified interest of leaders.
- Biased political.

Administrative problems

- Earlier, majority of the programmers were planning based on top to bottom approach and were target oriented.
- Political interference.
- Lack of motivation and interest.
- Unwillingness to work in rural area.
- Improper utilization of budget.

2.5.1 Various measures (Rural Development Programmes & Rural Development Efforts / Programmes after Independence)

2.5.1.1 Rural Development Programmes

Table 5 List of Rural Development Programmes

Sr. No.	Name of the Programme	Started by	Year
Pre independence			
1	Sriniketan Project	Shri Rabindra Nath Tagore	1914
2	Marthandam Project	Dr. Spencer Hatch	1921
3	Gurgaon Experiment	F. L. Brayne	1928
4	Sarvoday Programme	Shri Vinoba Bhave	1948-49
Post early independence (1947-53)			
1	Firka Development	Madras Government	1948
2	Etawah Pilot Project	Albert Mayor	1948
3	Nilokheri Experiment	S.K.Dey	1948
4	Community Development Programme (CDP)	Government of India	1952
5	National Extension Service (NES)	Government of India	1953

2.5.1.2 Rural Development Efforts / Programmes after Independence

Table 6 List of Rural Development Efforts after independence

No.	Year	Name of the Programme after independence	
		Known As	Full Form
1	1948	GMFC	Grow More Food Campaign
2	1950	JMPC	Japanese Method of Paddy Cultivation
3	1952	CDP	Community Development Programme
4	1953	NES	National Extension Service
5	1961	IADP	Intensive Agriculture District Programme
6	1963	ANP	Applied Nutrition Programme
7	1964-65	IAAP	Integrated Agricultural Area Programme
8	1964	ICDP	Integrated Cattle Development Programme
9	1965	NDP	National Demonstration Project
10	1966	ODP	Oilseed Development Programme
11	1966-67	HYVP	High Yielding Varieties Programme
12	1966	FTEP	Farmers Training and Education Programme
13	1966	FTC	Farmers Training Centre
14	1966	MCP	Multiple Crop Programme
15	1970	DPAP	Draught Prone Area Programme
16	1970	DFAP	Dry Farming Area Programme
17	1971	ICDP	Integrated Cotton Development Programme
18	1971	WVDP	Whole Village Development Programme
19	1971	SFDA	Small Farmers Development Agency
20	1971	MFAL	Marginal Farmers and Agricultural Labour Agency
21	1971-72	TADP	Tribal Area Development Programme

22	1973	HADP	Hill Area Development Programme
23	1974	T&V	Training and Visit System
24	1974	KVK	KrushiVigyan Kendra
25	1974	TDB	Tribal Development Block
26	1975	CADP	Command Area Development Programme
27	1976	IRDP	Intergraded Rural Development Programme
28	1976	ORP	Operational Research Project
29	1976	SF	Social Forestry
30	1977	DDP	Desert Development Programme
31	1978	LLP	Lab-to-Land Programme
32	1978	NARP	National Agricultural Research Project
33	1979	TRYSEM	Training of Rural Youth for Self-Employment
34	1980	NREP	National Rural Employment Programme
35	1980	DRDA	District Rural Development Agency
36	1980-81	TUP	Tribal Upliftment Project
37	1981	RLEGP	Rural Landless Employment Guarantee Programme
38	1982	DWCRA	Development of Women and Children in Rural Areas
39	1984-85	NAEP	National Agricultural Extension Project
40	1986-87	NWDP	National Watershed Development Project
41	1989	JRY	Jawahar Rojgar Yojana
42	1990-91	NWDPRA	National Water Development Project for Rain fed Areas
43	1998	NATP	National Agricultural Technology Project
44	1998	ATMA	Agricultural Technology Management Agency
45	2005	NAIP	National Agricultural Innovation Project

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

UDPFI norms:

- **Secondary School:** According to URDPFI norms per 7500 population, one secondary school is required and in chansad village 2775 population (from census 2011) is there, so we recommended providing one secondary school.
- **PHC or Health Centre:** According to URDPFI norms, per village one PHC or Health centre is required, so the provision of one PHC should be there.
- **U/G Sump:** According to URDPFI norms, in chansad village there are two U/G sumps of 12000L and 10000L capacity tanks.
- **Public Toilet Block:** We recommended providing public toilet in village. According to URDPFI norms there should be one public toilet per 50 families.
- **Community Hall:** According to URDPFI norms, one Community hall is required per village, so the provision of one PHC should be there.

2.7 Ancient / Existing Electrical concept study as a Literature Review for village development

2.7.1 Energy Audit

2.7.1.1 What is an Energy Audit?

Effective energy management program designed to improve the energy efficiency and reduce the energy operating costs of a facility.
Detailed examination of

- How a facility uses energy?
- What the facility pays for that energy?

It is a recommended program for changes in operating practices or energy consuming equipment that will cost effectively save money on energy bills. Collection of data about a facility's operation and about its past record of utility bills. Analysed Data to find out the facility uses, wastes energy, reduce energy costs.

2.7.2 Energy Audit and its importance

2.7.2.1 Walk-Through Audit (WTA)

Includes:
Walk-through inspection of a facility to identify maintenance, operational or deficient equipment issues and also to identify areas that need further evaluation.
Results of a Walk-Through Audit include,

- An identification of energy saving opportunities
- A qualitative analysis of the implementation of energy saving measures an estimation of its potential energy saving.

2.7.2.2 Energy Diagnosis: Includes

- Performing economic calculations.
- Devices to identify actual energy consumption and Losses using some metering devices.

The results of an Energy Diagnosis include,

- An energy balance (energy uses breakdown)
- List of energy efficiency measures derived from performance or building facility.
- Financial analysis for each of the identified measures.

2.7.2.3 Investment Grade Audit (IGA): Includes

Detailed account of energy use,
Quantitative study of the implementation with detailed investments and operational and maintenance costs**.** An analysis of the investment model. The results of an Investment Grade Audit include the real energy demand and an energy balance. Audit suggests a number of energy saving measures, including the Calculation of energy savings and the investment needed to carry them out. This audit proposes bundled measures, with a financing plan as well as implementation and savings verification plans.

2.7.3 Performing Energy Audit in different Public building of villages

Table 7 Performing Energy Audit in different Public building of villages

Sr. No	Reason	Yes	No
1	Reduce Energy Cost	Yes	-
2	Reduce Production Cost	-	No
3	Reduce Energy Consumption	Yes	-
4	Reduce Green House Gas Emission	Yes	-
5	Reduce Other Emission (SOX, NOX)	-	No
6	Improve Overall Environmental Performance	-	No
7	Improve Product Quality	-	No
8	Improve Reputation/ Recognition	Yes	-

2.7.4 Different Techniques to save energy in rural areas:

- Sealing and insulating windows, doors and cracks is a big step.
- Checking air filters, unblocking A/C vents.
- Replacing incandescent light bulbs with CFLs.
- Upgrading to Energy Star appliances, and turning everything off when it's not in use.
- Use renewable energy sources likes solar energy, wind energy, hydro energy, biomass energy etc.

2.7.4.1 Cooking

- When cooking Using electric equipment use pots and pans that are properly sized to “fit” the burners. Using a small pan on a large burner wastes energy and can be a safety hazard. Always cook with lids on your pans, as this keeps the heat inside and speeds up cooking time.
- A microwave oven is an energy efficient alternative to a conventional oven. It cooks food more quickly and uses 70-80% less electricity than a conventional oven.
- Use a toaster oven, electric skillet, popcorn popper or slow cooker for specialized jobs, rather than the electric range top, since these small appliances use less energy.

2.7.4.2 Home Cooling

- Whole-house fans can be installed in the attic or ceiling to pull fresh air through the house – usually at night when it’s cooler. It can minimize air conditioning use.
- The location of an air conditioner has a lot to do with how efficient it will be. If you have a choice, locate your unit on the north, east or the best-shaded side of your home. If the unit is exposed to direct sunlight, it has to work much harder and use more energy to cool your home.

2.7.4.3 Home Heating

- Keep draperies and shades on south-facing windows open during the heating season to allow sunlight to enter your home. Close them at night to reduce the chill you may feel from cold windows.
- Keep fireplace dampers closed when they aren’t needed will rise up the chimney and escape when the fireplace is not being used.
- Fireplaces with glass doors are most efficient.

2.7.4.4 Lighting

- Lights add a lot of heat to the room 99% of a light's energy use is converted to heat, 1% to light. Use only as much light as you need.
- Take advantage of reflected light by placing portable fixtures near light colour walls or other surfaces.
- Replace incandescent light bulbs in high use areas with compact fluorescent light bulbs.
- Compact fluorescent bulbs are more expensive, but use up to 70% less energy and last up to 10 times longer.

2.7.5 Various best practices with respect to energy management in rural areas

- Switch off the unnecessary streetlight.
- Switch off the unnecessary lights and other electric equipment in home.
- Use star rated (energy saver) gadgets.
- Use certify cable so transmission loss will be reduces.
- Use LED lights for lighting purpose because it is more energy efficient.
- Rating of motors and generator is not more than requirement so load consumption is reduce so it will help to save energy.

2.8 Other Projects / Schemes of Gujarat / Indian Government

Pradhan Mantri Adarsh Gram Sadak Yojana (PMAGSY):	It focuses on integrated development of 100 villages with a 50 per cent population of SCs.
Bharat Nirman Yojana	It was launched in 2005 for building infrastructure and basic amenities in rural areas. It comprises of six components rural housing, irrigation, drinking water, rural roads, electrification and rural telephony.
Indira Awas Yojana	It is one of the six components of Bharat Nirman Yojana. It was introduced in 1985-86. It aims to help built or upgrade the households of people living under BPL.
Jawaharlal Nehru National Urban Renewal Mission (JNNURM)	It was launched on 3rd December, 2005. The main objective of this scheme was fast track development of cities across the country. It was focused especially on developing efficient urban infrastructure service delivery mechanism, community participation and accountability of urban local bodies towards citizen.
Rajiv Awas Yojana (RAY)	This programme was announced in June 2009 with an objective to make the country slum-free.

3. Smart Village Concept Idea and its Visit

3.1 Introduction: Concepts, Definitions and Practices

A generally acknowledged meaning of a keen town isn't accessible. To various individuals, it implies various things. In this way, Keen Town conceptualization varies from one country to another, contingent upon the level of development, the capacity to change and change, the assets and desire of the inhabitants of the town.

In quest for better positions and better lives, there was a fast relocation of provincial individuals to the urban areas. Hence, Savvy Town will have every one of the offices accessible in the urban communities and furthermore help country individuals' expectations for everyday comforts. A brilliant town has certain objectives that are set up by the public authority. In the view of "Keen Town" the improvement of the town ought to be founded on the five ways Retrofitting, Redevelopment, Green fields, E-Dish, Work.

The "Ideal town with innovation" is a keen town. Ideal town is worried about the sufficient accessibility of administration to people regardless of their methods, while in keen town conceptualization it is essential to appropriately characterize the part of innovation for economical advancement for the diverse accomplishment of town improvement objectives.

Figure 22Aaspects in terms of S.M.A.R.T. village

Figure above shows different angles as far as S.M.A.R.T. town ought to continue in its arranging and conveying of administration.

3.2 Vision-Goals, Standards and Performance Measurement Indicators

3.2.1 Transport

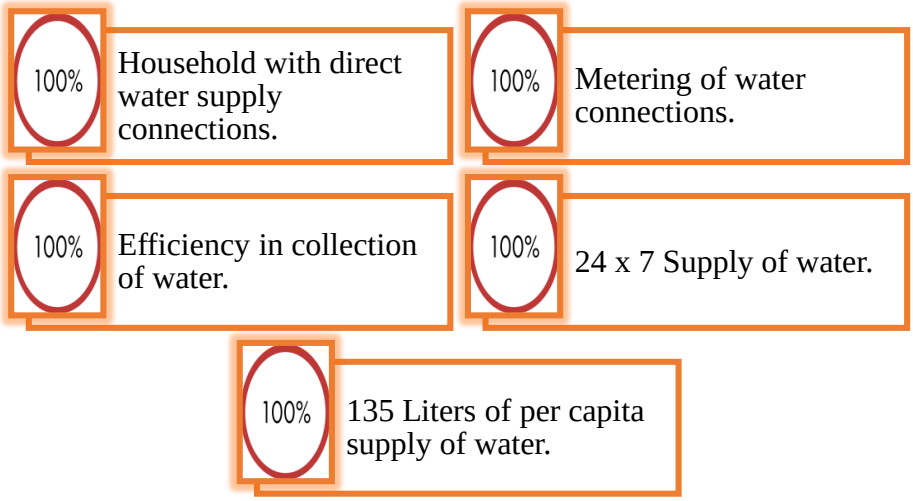
- Maximum venture season of 30 minutes in little and medium-size urban communities and 45 minutes in urbanite zones.
- Continuous, unhindered trail, 2 m wide on one or the other side of the relative multitude of roads, with column 12 meter more extensive.
- Dedicated and actually isolated bike follows a width of 2 m or more, one toward every path, ought to be given on all streets with a carriageway more prominent than 10 m.

- High quality and high recurrence mass travels inside 800m (10 to 15minute meandering aimlessly distance) of all homes in regions more than 175 people for each hector of fabricated zone.

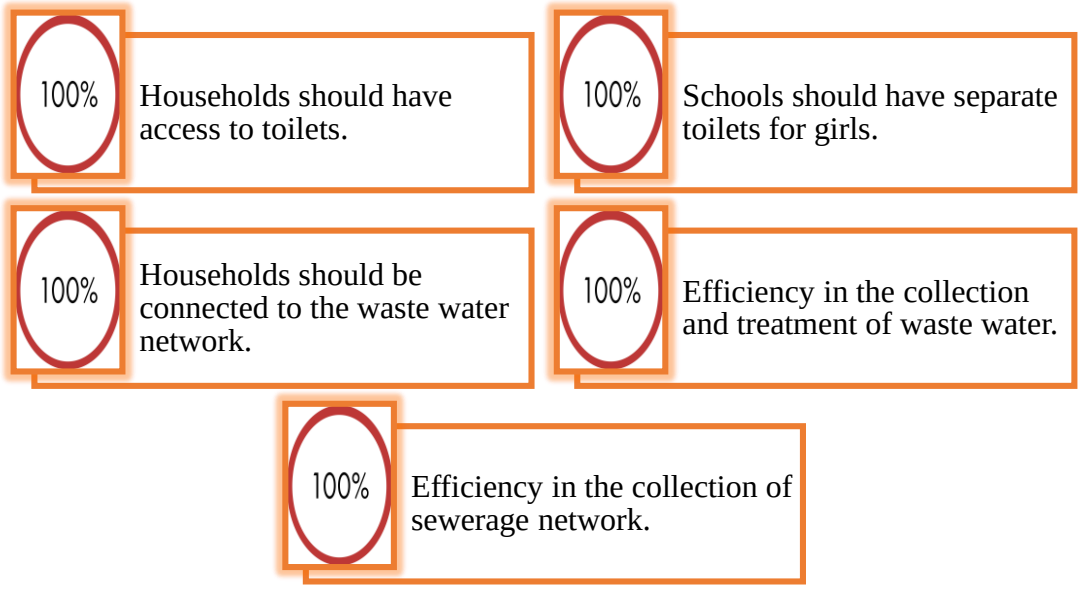
3.2.2 Spatial Planning

- 175 people groups per hector along transportation halls 95 % of homes ought to have ordinary necessities retail, parks, elementary schools and sporting facilities etcetera available inside 400 meter strolling distance.
- 95% family ought to approach business, public and institutional vehicle or bike or strolling. In any event 20percent of all private parts to be involved by monetarily weedier segments in every transportation Situated Improvement Zone 800m from transport Stations.
- At least 30% private and 30 business/institutional in each TOD Zone with in 800 m of Travel Stations.

3.2.3 Water Supply

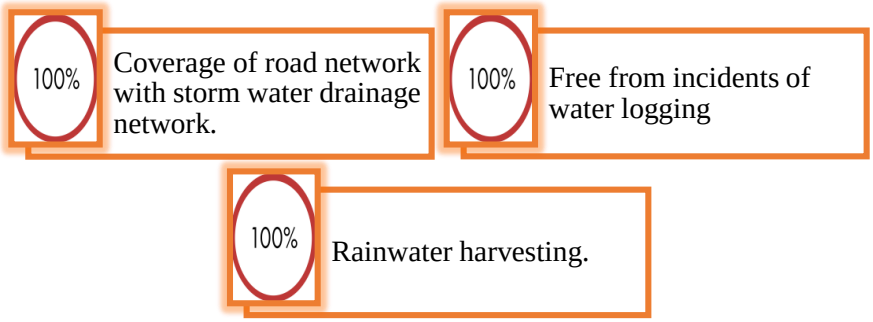


3.2.4 Sewerage &Sanitation



3.2.5 Solid management

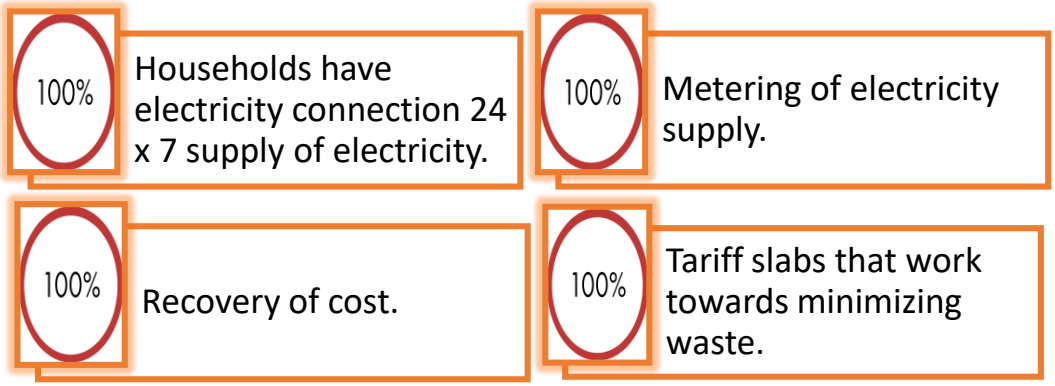
3.2.6 Storm storage



3.2.7 Health care facilities

- Accessibility of telemedicine amenities to100% residents.
- 30 minutes emergency reply time.
- 1 dispensary for each 15000 residents.
- Nursing home, child, welfare and maternity, centre - 25 to 30 beds per lakh population.
- Intermediate Hospital (Category B) - 80 beds/lakh population.
- Intermediate Hospital (Category A) – 200 beds/lakh population.
- Multi-Specialty Hospital - 200 beds/lakh population.
- Specialty Hospital - 200 beds/lakh population.
- General Hospital - 500 beds/lakh population.
- 1020 Family Welfare Centre for every 50, 000 residents.

3.2.8 Electricity



3.3 Technological Options

3.3.1 Smart Agriculture

Figure 23 Drip Irrigation, Punsari

For any village, its horticultural eco framework is one of the best key personalities that straightforwardly identifies with its public, ecological and money related material. Profitability and effectiveness in agribusiness is identified with the farming practices embraced by the social orders. Fortunately, the crossing point of innovation and agribusiness has opened up a ton of chances for the rancher, client and workers for hire. It is 'crossing point' presently called as Exactness Farming.

3.3.2 Smart Education

Shrewd towns reason to rise the time available for understudies to contemplate and will address predominant elements that destructively upset the capacity of understudies to get the information and abilities important to achieve financial objectives and grow work profitability.

Figure 24 Smart educational Classroom, Punsari

3.3.3 Smart Infrastructure

Figure 25 Speakers and CCTV at punasari

To extravagance life of locals in each plausible manner, a town must be all around supported with framework to improve profitability of occupants and helpfulness of contributions from the residents. The framework contains streets, foundation structures, climate station contraption, medical clinic device, and phone towers etcetera. The greater part of these frameworks can be perceived with very much proposed town occupants and the administrative establishments through converging of assets, capacity and functionary. Brilliant segment should be engaged with each phase of foundation development.

Figure 26 Portable library, Punsari

3.3.4 Smart Energy

Giving of clean and viable, energy is vital to practically any remaining elements of rustic development. Energy security is the achievement mysterious, which permits development in cultivating, medical services, instruction and skilling of country networks. With an enormous variety of sun based, wind, biomass and biogas innovations now available at reasonable expenses, we are at the purpose of seeing life disturbance and delivering a bountiful enthusiasm economy.

The term Keen Energy or Brilliant Energy Frameworks is defined and use to convey the scientific base for a model move away from single-area scholarly into an intelligent and brought

together comprehension of how to plan and characterize the most conceivable and reasonable techniques to instrument sound future viable energy frameworks. Savvy energy is the method of utilizing gadgets for energy-productivity. Its endeavours on amazing, practical sustainable power sources that advance better eco-amicability despite the fact that driving down costs.

3.4 Road Map and Safe Guards

Figure 27 Road map for sustainable development

[Source of Image: group.skanska.com]

With right around 80% of the world's current helpless living in rustic zones, towns should end up being a vital consideration for meddling to meet the SDGs through computerized change. Be that as it may, most country towns, primarily in least created nations, are tested with low, restricted, non-existent basic establishments regarding:

- Access to broadband Web;
- Access to power;
- Digital education and abilities.

A shrewd town can zero in on computerized change in the accompanying areas for instance:

Wellbeing: the arrangement of telemedicine and advanced wellbeing offices will permit patients to have distant conversations and medical care workers to bring efficient administrations.

Banking: arrangement induction to advanced monetary and adventure administrations for occupants and organizations.

Training: the admission to open and distance learning events will empower limit working for educators and schooling supervisors just as giving sensible admittance to quality information, deep rooted acquiring and abilities programs for kids grown-ups and youth and grown-ups.

Quest for new employment: benefits that can contribute jobless individuals to secure positions and to improve their utilize abilities.

Agribusiness: computerized cultivating administrations can uphold successful and inventive cultivating capacities among ranchers.

Wrongdoing avoidance: applications and administrations for inhabitant law execution to interconnect and share constant data to keep networks peaceful.

3.5 Issues & Challenges

3.5.1 Budget Constraints

There is a vast question of budget limitations, which basically has inadequate innovative thinking and created difficulties for many other creativities. The budget limitations have created many difficulties for a lot of smart initiatives that if appropriately encouraged could be more cost- effective and effectual.

3.5.2 Lack of Knowledge

The other challenges associated to smart village initiatives in Punsari is the deficiency of knowledge of the society using modern technology. The citizens' understanding of this smart technology inventiveness has mostly not been good for numerous reasons, one of which is due to the scarcity of knowledge of the communal people as to how to use recent digital technologies, Internet and other recent technology, and also the fact that there are very few people, specifically in rural zones of India, as with other parts of the emerging world, who know how to professionally use and apply recent digital technologies, such as "smart meters".

3.5.3 Ensuring Sustainability

One of the key challenges in emerging Smart Villages is guaranteeing their sustainability. This can only be addressed if we build our Smart Village strategies with entrepreneurship at its essential. India has one of the most vibrant entrepreneurial ecosystems that is working towards addressing rural development challenges using pioneering technologies and business models.

3.6 Smart Infrastructure

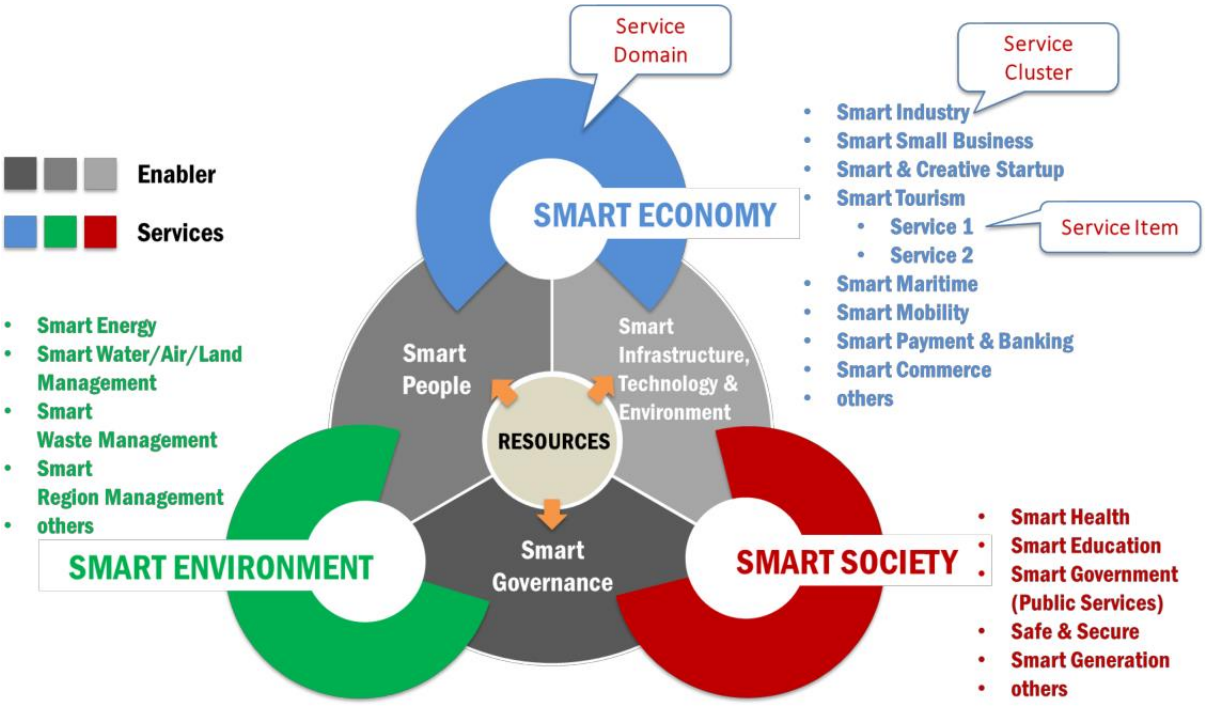


Figure 28 Flow path for smart village

[Source of Image: www.semanticscholar.org]

The main features obtained by upgrading the nation towards smarts leads to:

- Adequate and certain Electricity supply
- Digitalized Education
- Advanced Health Technologies
- Essential Water Supply
- Robust IT Connectivity and Digitalization
- Constant and Green Environment

3.7 Cyber Security

- Smart Infrastructures comprise several operators from different domains of activity, such as energy, public transport, and public safety. They deploy and operate cyber-physical systems that are data-controlled equipment which interact with the physical world. They collaborate and exchange data under several schemes, depending on their level of maturity.
- The usage of cyber-physical devices (software-controlled devices that interact with the physical world) bring new risks: on the economy and on the safety of citizens. Recent trends see Critical Infrastructures migrating toward Smart Infrastructures by deploying IoT. They invest on remote management and big data to improve the quality of service.
- It 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 is intellectual property, financial data, personal information, or other types of data for which unauthorized access or exposure could have negative consequences.

3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling

- There still is not much of a consensus on how to define the term ―smart city‖. Most explanations of the term, however, describe using information technology, most notably the quality of life for residents.
- The Smart Cities Council, a for-profit industry-led organization, states that a smart city harnesses information and communications technology to improve liveability, workability and sustainability. In essence, a smart city uses connected sensors and information technology to improve the quality of life of residents.
- In retrofitting, an area consisting of more than 500 acres will be identified by the city in consultation with citizens. Redevelopment will effect a replacement of the existing built-up environment and enable co-creation of a new layout with enhanced infrastructure using mixed land use and increased density.
- Over 10% of global electricity consumption today is used for cooling, and demand for cooling continues to increase. District cooling (centralized cooling) is a modern approach that uses increased efficiency, local sources and multi-generation to deliver more cooling capacity.

- **Steps to develop a smart city…**

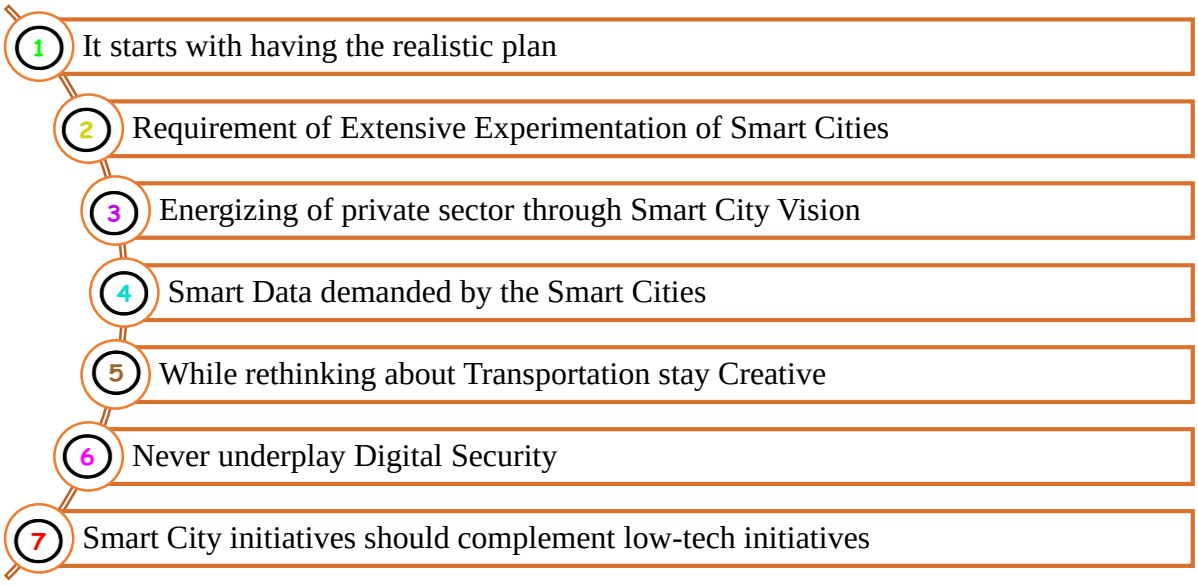


Figure 29 Steps to develop a smart city

3.9 Strategic Options for Fast Development

India has gained ground in providing water to everybody and furthermore gives disinfection offices. This everything was conceivable because of the endeavours made by the abhorrence levels of government and the networks at improving inclusion.

The degree of interest in water and sterilization has been expanded in size during 2000. As an example, there was 1% of assessment in 1980 for the rustic sterilization inclusion which came to 95% in 2018. Additionally, just two urban communities of India were having nonstop water supply and the gauge which was done in 2018 shows that 8% of Indians actually need admittance to ad limbed sterilization offices.

3.9.1 Urban Water

- As of 2010, only two cities in India — Thiruvananthapuram and Kota — get continuous water supply. In 2005 none of the 35 Indian cities with a population of more than one million distributed water for more than a few hours per day, despite generally sufficient infrastructure.
- Owing to inadequate pressure people struggle to collect water even when it is available. According to the World Bank, none have performance indicators that compare with average international standards.
- A 2007 study by the Asian Development Bank showed that in 20 cities the average duration of supply was only 4.3 hours per day. None of the 20 cities had continuous supply. The longest duration of supply was 12 hours per day in Chandigarh, and the lowest was 0.3 hours per day in Rajkot.
- In Delhi residents receive water only a few hours per day because of inadequate management of the distribution system. This results in contaminated water and forces households to complement a deficient public water service at prohibitive 'coping' costs; the poor suffer most from this situation. For example, according to a 1996 survey

households in Delhi spent an average of 2,182 per year in time and money to cope with poor service levels. This is more than two times as much as the 2001 water bill of about US$18 per year of a Delhi household that uses 20 cubic meters per month. [12]

3.9.2 Sanitation

- The dependency of rural people for sanitation is on-site sanitation as in khaad-kuvva or pit latrines. In rural areas, Government have promoted Total Sanitation Campaign which has some success rates.
- In urban areas, a good practice example is the Slum Sanitation Program in Mumbai that has provided access to sanitation for a quarter million slum dwellers. The sewerage network has lacked in maintenance in Delhi over the years and the problem of overflow in raw sewerage is common in open drains, due to the blockage settlements and inadequate pumping capacities.
- A specific Indian problem is also the (officially prohibited) "manual scavenging" which is connected to the officially banned caste system, and relates to unsafe and undignified emptying of toilets and pits, as well as handling of raw, untreated human excreta. [12]

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

Remarkable local self-government Law from the year 1992 spotted well within the villages of India which adopted the principles of Mahatma Gandhi as well. Since 1992, local governance in India takes place in two very distinct forms. Urban localities covered in the 74th amendment to the constitution, have nagar palika but derive their powers from the individual state governments, while the power of rural localities have been formalized under the panchayati raj system, under 73rd amendment to the constitution for the history of traditional local government in India and south Asia. [7]

3.11 Initiatives in village development by local self-government

The Government of India has planned various initiatives to provide and improve the infrastructure in rural areas which can have a multiplier effect in increasing movements of goods, services and thereby improve earnings potential of rural areas subsequently improving consumption.

The Government of India has approved the proposal to construct 10 million houses for the rural population, which will require an investment outlay of Rs 81,975 Crores (US$ 12.7 billion) for the period from 2016-17 to 2018-19.

- Rs 187,223 crore (US$ 28.08 billion) has been allocated towards rural, agriculture and allied sectors.
- The Allocation for Pradhan Mantri Aawas Yojana-Gramin has been increased from Rs 15,000 crore (US$ 2.25 billion) to Rs 23,000 crore (US$ 3.45 billion) in the year 2017-18 with a target to complete 10 million houses for the houseless by the year 2019.
- The pace of roads construction under Pradhan Mantri Gram Sadak Yojana (PMGSY) has been accelerated to 133 kms per day as against an average of 73 kms per day during the years 2011-14.

- The allocation to the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) has been Rs 48,000 crore (US$ 7.2 billion) in the year 2017-18, which is the highest ever allocated amount. [6]

3.12 Smart Initiatives by Gandhinagar Municipal Corporation

The Government of India launched the Smart Cities Mission on 25th June, 2015 with an objective to promote sustainable and inclusive cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions. Gandhinagar secured 9th rank among 30 new cities announced on 23rd June, 2017 by Ministry of Urban Development (MoUD) for development as smart cities under the Smart City Mission. The implementation of the Mission at the City level is being done by a Special Purpose Vehicle (SPV) created for the purpose. The SPV plans, appraises, approves, releases funds, implements, manages, operates, monitors and evaluates the Smart City development projects. A Special Purpose Vehicle (SPV), Gandhinagar Smart City Development Limited (GSCDL), is formed for Gandhinagar city to incorporate Smart Solutions.

Gandhinagar Smart City proposal consisted of two components – (i) Area Based Development & (ii) Pan City Solution. As a part of Area based development projects, major ABD projects include storm water drainage in sectors of Gandhinagar, community toilet, underpass at G-4 & GH-4, Smart road, Four Laning, revamping of Anganwadi centres, amusement parks, open spaces, skill development center, etc. The pan city solution includes intelligent traffic integrated transport management, smart water and waste management, real-time environment monitoring, CCTV surveillance, Wi-Fi services across city and online service delivery to improve public service delivery and digital inclusion.

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

- The Government of India is looking to install Wi-Fi hotspots at more than 1,000 gram panchayats across India, under its ambitious project called Digital Village, in order to provide internet connectivity for mass use, as well as to enable delivery of services like health and education in far-flung areas.
- In the Union Budget 2017-18, the Government of India mentioned that it is on course to achieve 100 per cent village electrification by May 1, 2018.
- The Government of India has sought Parliament's approval for an additional expenditure of Rs 59,978.29 crore (US$ 8.9 billion), which will be used to support the government's rural jobs scheme, building rural infrastructure, urban development and farm insurance. [5]

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

- The so-called smart development of infrastructure is hardly strictly divided into two polarized sets of frameworks, rural and urban.

- Indian smart development, it is necessary to consider both spaces simultaneously, their mutual interconnections and take into account that significant changes in one will affect the other and another way around.
- Seen in the worldwide context, there are several initiatives promoting or using the concept of the Smart Villages.
- Smart Village initiative: new thinking for off-grid communities worldwide and IEEE
- Smart Village: Empowering off-grid communities are both worldwide active and striving to meet the SDG 2030, especially goal 7, Affordable and Clean Energy.
- The first one promotes accessto sustainable energy as a main catalyst for the development of good education and healthcare systems, access to clean water, sanitation, economic growth, enhanced security, gender equality, etc.
- The activities of the Initiative are taking place in six large regions, namely East Africa, West Africa, South Asia, South-East Asia, South America, and Central America, Caribbean, Mexico—the so-called developing world with limited possibilities to access (educational, electrical, economic and other) infrastructure.
- Smart development solutions were therefore mainly addressing the ways to create opportunities for local employment and alleviate the living conditions.

3.15 Electrical concept (Design Ideal and Prototype model)

Elective wellsprings of energy are being sought after on the planet today, as the availability of petroleum products and other non-inexhaustible assets are declining. Sunlight based energy offers a promising answer for this hunt as it is a less dirtying energy asset and can without much of a stretch be changed over into power through the use of photovoltaic frameworks. It is a spotless, contamination free and sustainable power source. Model methodologies for an environmentally friendly power supply have been created and shown to meet the energy prerequisites of rustic individuals, while raising monetary efficiency adding to a practical improvement in everyday environments in country regions.

These likewise give contributions to additional provincial energy intercessions and they decrease fossil fuel by-products by zeroing in on advances not founded on petroleum derivatives. Giving admittance to power in rustic regions of India is a significant test. The fuel is by and large of small quality, and energy is utilized wastefully; the force supply is questionable and admittance to it restricted, with around 500 million individuals in rustic regions still unfit to profit by present day energy administrations.

This not just adversely affects monetary profitability; all the more critically, it likewise influences individuals' personal satisfaction and is firmly affecting the climate. The impractical utilization of privately sourced biomass and an expanding reliance on petroleum derivatives are causing natural debasement at neighbourhood (land corruption), territorial (air, water and soil contamination) and worldwide levels (ozone harming substance – GHG discharges adding to environment change).

At a similar time, privately based estimates that utilization sustainable power sources to get the rustic force supply are opening up new freedoms for financial efficiency while likewise decreasing GHG outflows and nearby contamination.

4. ABOUT NARDIPUR VILLAGE

4.1 Introduction

4.1.1 Introduction about Nardipur Village Details

Figure 30 Entrance of nardipur

As per the guidelines provided by VY-Phase VIII, we have selected Nardipur Village for our final year project. Nardipur is 13 kilometres away from Sub District Headquarter Kalol and it is 20 kilometres away from District Headquarter Gandhinagar. It have adjacent town as Kalol. Nardipur have 1500.81 hectares as total land, 4.89 hectares as Non-Agricultural land and 1100.81 hectares as Total irrigated land. The entire topographical land of village is 1703.25 hectares. Nardipur have total population of 7,757 inhabits. There were around 1,643 houses in the village. As per 2019 data, these village arises under Gandhinagar North assembly & Gandhinagar parliamentary constituency.

4.1.2 Justification of the study

- In current scenario, population is increasing very fast so necessity of development like schooling services, growing living standards and employments are given that only in towns or in urban zone. However in this case, it is near to the Gandhinagar city so migration is fewer on the other hand deficiency of facilities and hygiene leads to several unwanted dieses. So to avoid this kind of things to occur we must have to take some steps towards it. Starting by sanitation and reconstruct the old toilets up to decent condition. So we have to reflect about all infrastructural amenities that required.
- In present setup, the condition of toilet is so bad that one cannot use it and it smells so filthy also because publics started throwing their left-over close to toilet, publics are spitting in the toilet. So to avoid this kind of behaviour public awareness is must and it can only be done by educate people.
- While we are on the topic of awareness the most efficient way to aware them is make the younger generation educate and we can do that by providing them good atmosphere, good equipment good place like library.
- Therefore, the main thing is to study primary and secondary survey, determine gap analysis of village, and then go to detail survey report on it.

4.1.3 Study Area (Broadly define)

Sanitation:

Open crap is as yet drilled in rustic territories, bringing about genuine wellbeing, monetary and social issues. Human waste left in the open space helps in childhood and spread of microbes which send sickness and contamination. Human waste contain distinctive scope of microorganisms, and more than fifty kinds of various diseases are moved through aberrant or direct ways from such waste. In the towns individuals likewise poo close to the wellspring of

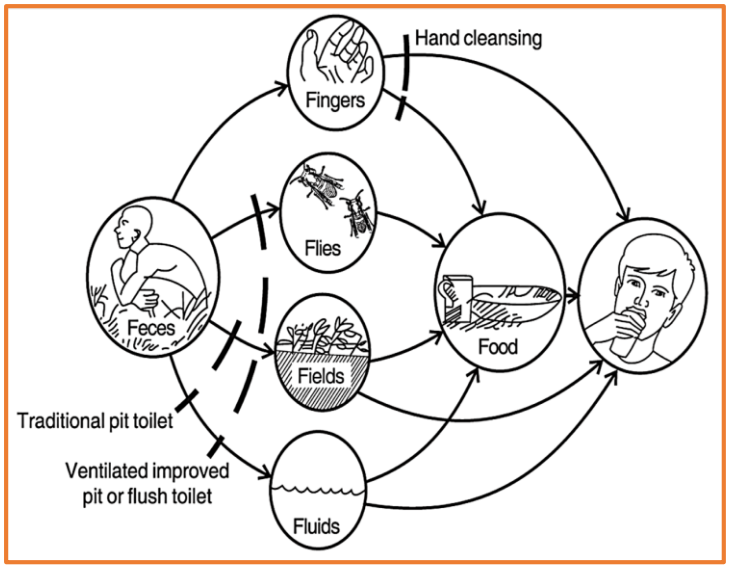


Figure 31 Chart of spreading of bacteria

***[Source:** Participatory Hygiene and Sanitation Transformation Manual (PHAST) 1998, after Wagner and Lanoix 1958.Wood S., Sawyer R. and Simpson-Hubert M., 1998. PHAST Step-by-Step Guide: A Participatory Approach for the Control of Diarrheal Disease. Geneva: World Health Organization.]*

water for the most part, which contaminates water bodies coming about in even innumerable disease through use of that dirtied water for various purposes like washing, washing, cooking, drinking. The wellbeing expenses of such exercises are without a doubt noticeable among occupants as rehashed and high instances of illness, explicitly diarrhoeal diseases, which lead to loss of working days influencing the acquiring capability of the influenced being and along these lines the monetary effectiveness of the provincial local area moreover. Figure 31 exhibits distinctive method of transmission of defilements from open crap.

Library:

Significance of the rural libraries in our country is essential for the Upliftment of the villagers and to be similarly treated with that of urban public. The adult literacy program and free schooling to the kids up to age of 14 years. With the formation of the rural libraries there is growth in understanding which have improved the employment potentials through opportunities in different occupations. It is help out to raise earnings and the socioeconomic relations. With the operation of libraries in rural areas the education level and the living standard have been also raised. This will keep up equality in the urban and rural publics. With education and knowledge they are able to do all kinds of work in every field. Nobody can make them fool or take advantage of them. It is evident that rural libraries had made the life of inhabitants. It can be examined that the libraries are the best resource to teach the residents, which helps in rural development.

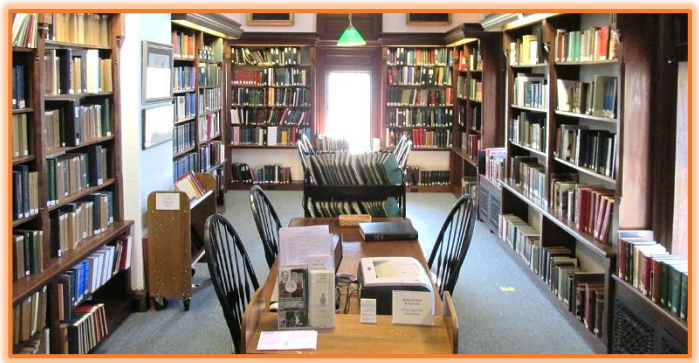


Figure 32 Our vision for nardipur's library

4.1.4 Objectives of the study

- Our main objective is to provide a healthy, safe and, satisfactory life and by doing so we need to provide a good education, good sanitation, good facilities.
- Development of sanitation by developing the toilet condition by the means of repair and rehabilitation.

- Generating more renewable energy sources.
- Electricity connections like street lighting that is energy efficient and eco-friendly.

4.1.5 Scope of the Study

- In Nardipur by taking detail of village scope of study In VY project, the main scope is in two fields are as under.

4.1.5.1 Scope for Civil engineering:

- Planning and Designing.
- Techno-Economic Survey.
- Preparation of map for Village.
- Redesigning and Imagination.
- Repair and maintenance of structure.
- Infrastructure planning & development.
- Quantity, estimation and surveying, Rurbanization.

4.1.5.2 Scope of Electrical Engineering:

- Design, develop and provide more efficient and sustainable electricity in rural area.
- Providing better connection of electricity in rural areas Telecommunication.

4.1.5.3 Scope for Villagers by VY Project:

- Utilizing each resources maximum.
- Developing and Using Sustainable and Economical Planning and Designing.
- Earn money for villagers by receiving Tax and giving facilities.

4.1.6 Methodology Frame Work for development of our village

Ideal village Survey at Punsari Village

- Meeting with Villagers, Sarpanch, Talati
- Techno-Economic Survey
- Gap analysis for facilities available as per ideal village norms &requirement
- SWOT analysis

Nardipur Village allocated by Vishwakarma Yojana

- Techno-economic survey
- Gap analysis for facilities available as per ideal village norms &requirement
- SWOT analysis
- Consulting with all related to village and analyse problem faced by Nardipur village

Rurbanization Process

- Finding solution for problems
- Planing of best economical & sustainable designs
- Giving proposal design
- Detail progress report and detail design done in final project report

4.1.7 Available Methodology for development of related to Civil/Electrical

- We can do some special efforts to increase production of pulses and root vegetable.
- By implementing agricultural land ceiling, allocate left-over area and complete assembling of land records by eliminating all administrative and legal difficulties.
- Also by Increase irrigation development, potential equipment and contributions for dry land cultivation.
- We can supply mineral drinking water to all the village at minimal monthly cost.
- By strengthening and expanding the handling of rural development and national rural employment programmes.
- Allot house locations to rural families who are starved of them and develop packages for building support also.
- Basic Necessities in Life – food, shelter, clothes, basic literacy, primary health care and security of life and property
- Also by pursuing enthusiastically programmes of social, afforestation, to implement of bio-gas plant, farm forestry and other substitute energy sources.

4.2 NARDIPUR VILLAGE Study Area Profile

4.2.1 Study Area Location with brief History land use details

Table 8 Brief introduction about nardipur village

Sr. No.	Description	Information
1.	Name of place	Nardipur
2.	Taluka Name	Kalol
3.	District Name	Gandhinagar
4.	Latitude:	23.3346° N
5.	Longitude:	72.5589° E
6.	Feature description:	Village
7.	Population:	7757
8.	State & Country	Gujarat, India.
9.	Area of Village (Approx.) (In Hector)	1500.81 hector
10.	Non-Agricultural area	4.89hectares
11.	Total irrigated area	1100.81 hectares

- According to Census 2011 information the location code or village code of Nardipur village is 511142. Nardipur village is located in Kalol Tehsil of Gandhinagar district in Gujarat, India. It is situated 13km away from sub-district headquarter Kalol and 20km away from district headquarter Gandhinagar. As per 2009 stats, Nardipur village is also a gram panchayat. [2]
- The total geographical area of village is 1703.25 hectares. Nardipur has a total population of 7,757 peoples. There are about 1,643 houses in Nardipur village. As per 2019 stats, Nardipur villages comes under Gandhinagar North assembly & Gandhinagar parliamentary constituency. Kalol is nearest town to Nardipur which is approximately 13km away. [2]

4.2.2 Base Location map, Land Map, Gram Tal Map

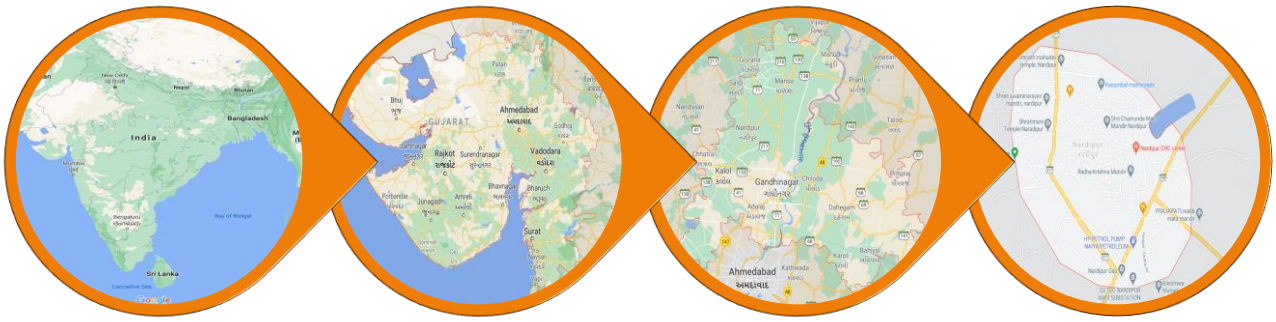


Figure 35 Location Map of Nardipur: India - Gujarat - Gandhinagar - Nardipur

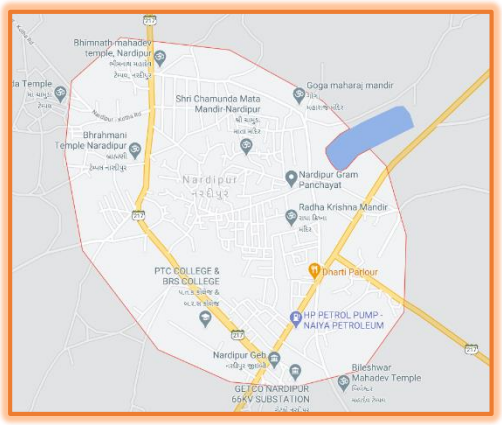


Figure 34 Satellite map of nardipur

Figure 33 Satellite 3D view of nardipur

4.2.3 Physical & Demographical Growth

Table 9 Nardipur's population in 2001 & 2011

Sr. No.	Census	Population	Male	Female	Total house holds
1.	2001	6543	3458	2804	1115
2.	2011	7757	3985	3772	1643

Nardipur is a large village located in Kalol Taluka of Gandhinagar district, Gujarat with total 1643 families residing. The Nardipur village has population of 7757 of which 3985 are males while 3772 are females as per Population Census 2011.

In Nardipur village population of children with age 0-6 is 843 which makes up 10.87 % of total population of village. Average Sex Ratio of Nardipur village is 947 which is higher than Gujarat state average of 919. Child Sex Ratio for the Nardipur as per census is 837, lower than Gujarat average of 890.

Nardipur village has higher literacy rate compared to Gujarat. In 2011, literacy rate of Nardipur village was 82.50 % compared to 78.03 % of Gujarat. In Nardipur Male literacy stands at 90.78 % while female literacy rate was 73.88 %. [2]

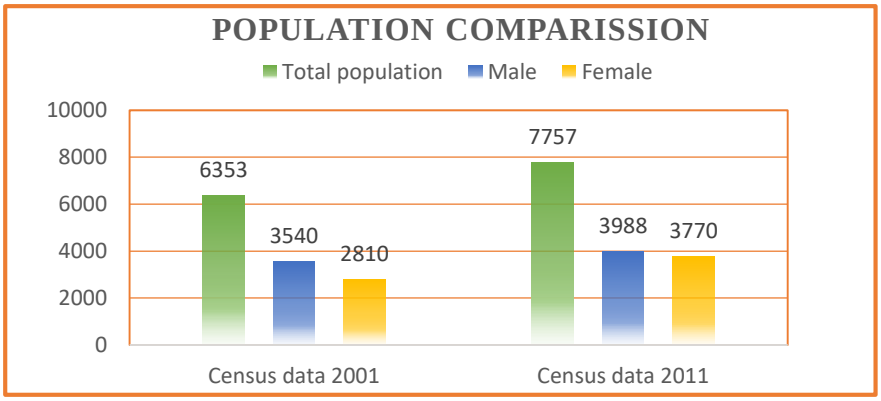


Figure 36 Population Comparision by Graph

As per constitution of Republic of India and Panchayati Raaj Act, 2019 Nardipur village is administrated by the Honourable Sarpanch Mrs. Chandrikaben R. Patel (Head of Village) who is elected as representative of the village.

4.2.4 Economic generation profile

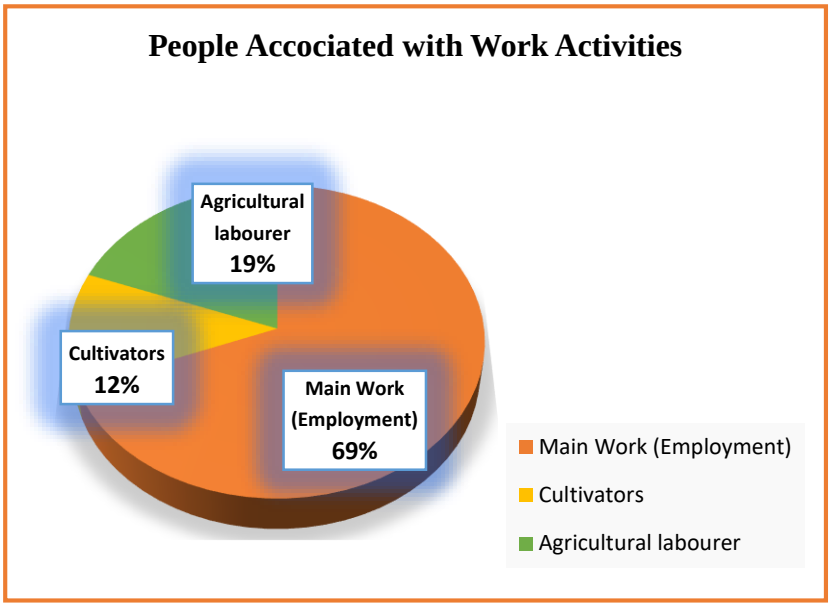


Figure 37 People Accociated with Work Activities in Nardipur

In Nardipur village out of total population, 2901 were engaged in work activities. 88.21 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 11.79 % were involved in Marginal activity providing livelihood for less than 6 months. Of 2901 workers engaged in Main Work, 494 were cultivators (owner or co-owner) while 807 were Agricultural labourer. [2]

4.2.5 Actual Problem faced by Villagers and smart solution

Figure 38 Modern problem requires modern solution

- During this pandemic time there are many problems that were facing by the villagers like some bad influence try to gather around in the public place without any precaution (Like near the shop) and chit chatting around the village so panchayat has come up with the smart solution to turn the benches upside down.

Figure 39 Not following the rules during pandemic

- Potholes cause drivers to lessen speed to limit pothole sway or to help dodge potholes out and out. This moving and speed decrease brings about a not as much as eco-friendly method of transport. Drivers need to

consume more gas and produce more carbon contamination to go a similar distance.

Figure 40 Potholes in Roads to approach Nardipur - 2

- There are three most important places of village are situated closely A Bhrhmani Temple, Bus station, & Main Market. But the public toilet available at that place was in very bad condition, people are throwing the garbage all around this place and made it worst. But as this is a very crowded area, a good quality toilet is must. The problem is most serious for young girls, children, and women. The Youngsters explicitly maturing under five, are generally helpless to looseness of the bowels which can some of the time demonstrate destructive. The consequence of a youngster becoming sick in early life is obvious future as deficient mental and actual development. Loss of school days is another issue in the midst of contamination.

Figure 41 Potholes in road to approach Nardipur - 1

Figure 42 Public toilet in poor condition

- India is open to very poor functioning and living situations. One of the disadvantages of their quality of life is unhealthy and imperfect sanitation, and open defecation remains as problem. Because of this migrant labours are at risk of being prone to dangerous illnesses and health problems. When migrant workers comes to village during Agricultural season ending they have to face problems for Sanitary Toilet and Bathroom so our vision is to provide them a better sanitation.
- During festival season, these place become so crowded that there are not enough Toilets available, so people have to go for open area near lake, to avoid this kind of situation we need to construct more toilets nearby this place.

Figure 43 Washing area for migrant near temple

Figure 44 Washing area for migrant, nardipur

- Requirement of reparation and rehabilitation of Poor and Dilapidated Government buildings. A building is called as dilapidated when it has suffered severe destruction because of decay of different members or parts, mostly the structural members which is affecting severe disproportion in load transfer arrangement. Because of decay of the exterior look of the building also converts severely affected giving an unpleasant appearance. A building should be declared

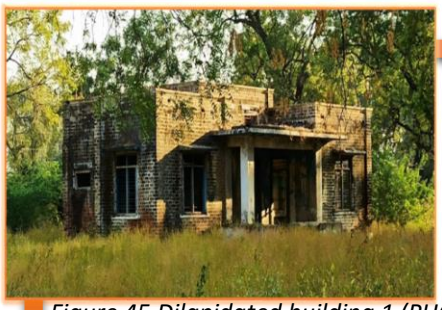


Figure 45 Dilapidated building 1 (PHC Building), nardipur

Figure 49 Dilapidated building 2 (Old Godown), nardipur

Figure 46 Old school(without maintenance), nardipur

Figure 48 Dilapidated building 4(Doctor House), nardipur

Figure 47 Dilapidated building 3 (Old Quaters), nardipur

dilapidated after detailed inspection of its different parts, specifically the structural members and load bearing walls regarding their safety from collapse.

- The home-grown waste created in rustic families is continuously really getting a matter of genuine concern. Impolite littering are the explanation behind poor natural disinfection which produce unfortunate nature of living thus home-grown waste ought to be dealt with accurately. With the point of oversee left-over in a necessary methodology, there ought to be a very much planned waste administration framework set up. Without a productive waste assortment and removal framework at the Panchayat level it is irrational to consider singular families dependable, or reprimand them for carelessness.

Figure 45 School Backyard turn into garbage area, nardipur

- Most unfavourable impact of water logging is events of different defilements. Still water rises the diseases as it

converts to sully from various perspectives. In ineffectively depleted zones, provincial spill over blends in with sewage from flooding toilets and sewers, causing contamination and a wide scope of issues related with waterborne sicknesses.

Figure 46 Inadequate drainage system

Figure 47 Poor condition of playground, nardipur

- The condition of the Playground is very poor, People are using the place for personal use and the whole ground is uneven due to poor maintenance. Equipment for games are rusting and proper care is not being taken.

- The number of animal (cows, goat, and buffalos) are comparatively larger and on the other hand spacing provided for the storage for animal food is less. Hence required more space for Storage yard.

Figure 48 Storageyard of animal Food

4.2.6 Social scenario -Preservation of traditions, Festivals, Cuisine

Gujarat is a developing state with cultural variety. It is shiny with its authentic colours of cultural traditions and wealthy heritage. Dating from historical past with the Harappan civilization the Gujarat becomes a convergence of many religions like Hinduism, Jainism, Buddhism and Islam. The Gujarat Culture and tradition is a mixture of arts, traditions, beliefs, customs, inventions, language, science and values.

The culture in Gujarat is impacted with socialization that is a Gujarat India Culture and tradition shared with individuals of the community and passed on from one generation to next generations. Socialization has unified humans with customary sense experience and impact that result in mastery and appreciation of lifestyles and cultural traditions. The facet of becoming a member of hands to greet comes via age influences as offering admiration.

Initially referred to as Gurjars, the Gujaratis are impacted by the old generations that inherit values of traditions, arts and culture of Gujarat. Gujarat has a powerful cultural impact of social, political and economic history. As Gujarat is the Mahatma Gandhi's birthplace it has a specified significance in Indian Political history. For example the main affect to the people of Gujarat together with Mahatma Gandhi's approach of non-violence moment. The Arts and Crafts, Festivals and foods, music, Folks dances form a fundamental cultural history of the Gujarati people. The traditions and beliefs make the Gujarat culture more homely and truly unique.

The regional language of Gujarat is Gujarati which is the mother tongue of Gujarati people and is broadly spoken everywhere in the world at any place where Gujarati people live.

A couple of Gujarat Costumes are worn by the Gujarati people according to the lifestyle in rural or urban regions. Most likely, mens wear T-shirts or shirts and trousers and most youthful ladies wear common western clothes like skirts and jeans, dress and many more. Aged ladies normally wear salwar and kamiz, saris. In rural areas, people are seen wearing bandis, dhotis and kurtas. The traditional clothes like chania choli are worn by ladies and kedia dress is worn by gents in rural regions or in the course of cultural fairs.

Most of the Gujarat People are Vegetarian. A conventional Gujarati Thali includes rice, dal, roti, vegetables, farsan, salads, and sweet dish and also chaas for digestion becomes the afternoon lunch. Dinner includes bhakri or khichdi. Normally Gujarat Food Culture contains pulses, cereals, green leafy vegetables, milk, butter-milk, fruits, ghee etc. Gujarati people also have papad, yoghurt, pickles, and chutney in their diet.

The Urban lifestyle in Gujarat State is a worldly experience. Well-furnished, air-conditioned, marbled or tiled flooring houses and flats are built in Gujarat. Ultra-modern living with panorama gardening and fountains is the brand new trend home stay in the major cities of the state. Rural lifestyle is growing with development. The traditional hut and traditional wooden Houses in Gujarat are also present which gives an ethnic living and royal heritage feel.

Most of the Gujarati people are born industrialist and businessman. Gujarat is a main Industrial State in India that ranks its textile center and commercial capital Ahmedabad city as 7th in India. The state has highest number of Airports and all the cities of Gujarat are well connected globally.

As Gujarat is the multicultural state, multicultural religious faith is seen in Gujarat. The major religions seen in Gujarat are Hinduism, Buddhism, and Jainism.

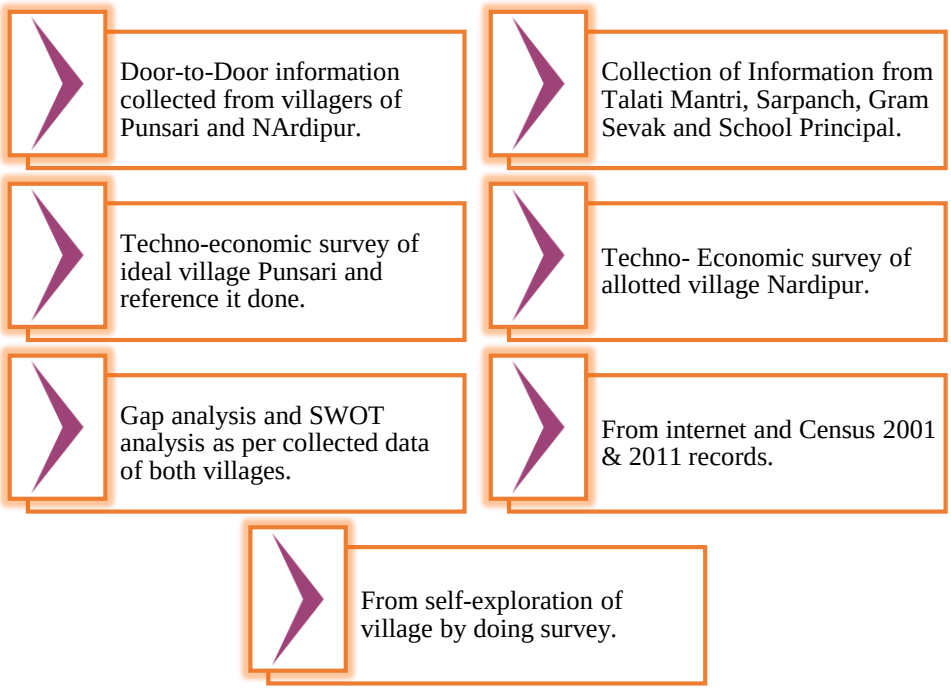
4.2.7 Migration Reasons / Trends

- Migration of work happens for various reasons, for various spans and with various terms of business.
- Social migration - moving somewhere for a better quality of life or to be closer to family or friends.
- Political migration - moving to escape political persecution or war.
- Environmental causes of migration include natural disasters such as flooding. The environment has always been a driver of migration, as people flee natural disasters, such as floods, hurricanes and earthquakes. However, climate change is expected to exacerbate extreme weather events, meaning more people could be on the move.
- We centres on inside movement of work that is occasional, transitory and is from provincial to metropolitan territories.
- It is seen that country to metropolitan relocation has expanded fundamentally in the nations in the current many years. It is likewise unsurprising to rise more in closer future.
- It is critical to investigation of this relocation in the condition of its relations with the technique of progress.
- Another reason of this rustic to metropolitan relocation has elevated or is probably going to advance improvement of transient labourers and their families just as of the locales of their source and objective.

4.3 Data Collection NARDIPUR VILLAGE

4.3.1 Describe Methods for data collection

- We are collecting data of firstly in ideal village survey at Punsari near himmatnagar and then allotted Nardipur village near Kalol, dist. Gandhinagar by following methods…



4.3.2 Primary details of survey details

Nardipur is a Village in Kalol Taluka in Gandhinagar District of Gujarat State, India. It is located 18 KM towards North from District headquarters Gandhinagar. 13 KM from. 17 KM from State capital Gandhinagar. Nardipur Local Language is Gujarati. Nardipur Village Total population is 7757 and number of houses are 1643. Female Population is 48.6%. Village literacy rate is 73.5% and the Female Literacy rate is 32.3%. [2]

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

The average size of house is where a family of 4 to 5 members can live not luxurious but a comfortable life. The Nardipur village has population of 7757 of which 3985 are males while 3772 are females as per Population Census 2011.And has 1643 number of houses. [2]

4.3.4 No of Human being in One House

In village generally each family consist average 4 to 5 member. There are about 1186 children in village.

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

For the house, they used mainly R.C.C., Steel, bricks, sands and wood. There is milk chilling centre and milk production association, basically all the commodities needed for villagers are available in the village itself and if some of are not then imported from nearby city Kalol.

4.3.6 Geographical Detail

Table 10 Geographical information of nardipur

Sr. No.	Description	Information/Detail
1	Area of Village (Approx.) (In Hector)	1500 HECTOR
2	Forest Area (In Hect.)	14.67 Hector
3	Agricultural Land Area (In hect.)	1100.81 Hector
4	Residential Area (In hect.)	2.97Hector
5	Other Area (In hect.)	0
6	Distance to the nearest railway station with distance	25 km
7	Nearest Town with Distance:	Kalol 23km
8	Distance to the nearest bus station	In village it self
9	Whether village is connected to all roads for the any facility or town or village?	Yes

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

Nardipur is a large village located in Kalol Taluka of Gandhinagar district, Gujarat with total 1643 families residing. The Nardipur village has population of 7757 of which 3985 are males while 3772 are females as per Population Census 2011.Schedule Caste (SC) constitutes 3.39 % while Schedule Tribe (ST) were 0.31 % of total population in Nardipur village. In Nardipur village population of children with age 0-6 is 843 which makes up 10.87 % of total population of village. Average Sex Ratio of Nardipur village is 947 which is higher than Gujarat state average of 919. Child Sex Ratio for the Nardipur as per census is 837, lower than Gujarat average of 890. PAN Card, AADHAR Card, ELECTION Card, mostly all kind of card are used by villagers. [2]

Table 11 Demographical information about nardipur

Particulars	Total	Male	Female
Child (0-6)	843	459	384
Schedule Caste	263	134	129
Schedule Tribe	24	10	14
Literacy	82.50 %	90.78 %	73.88 %
Total Workers	2,901	2,183	718
Main Worker	2,559	-	-
Marginal Worker	342	94	248

4.3.8 Occupational Detail - Occupation wise Details / Majority business

Name of three major three occupation groups in village,

1. Farming
2. Dairy products
3. Government Jobs
4. Business
5. Artistic Job
6. Homemade Snakes

Nardipur has 41% (3180) population engaged in either main or marginal works. 53% male and 23% female population are working population. 47% of total male populations are main (full time) workers and 7% are part time (marginal) workers. For women 17% of total female population is main and 2% are marginal workers. [2]

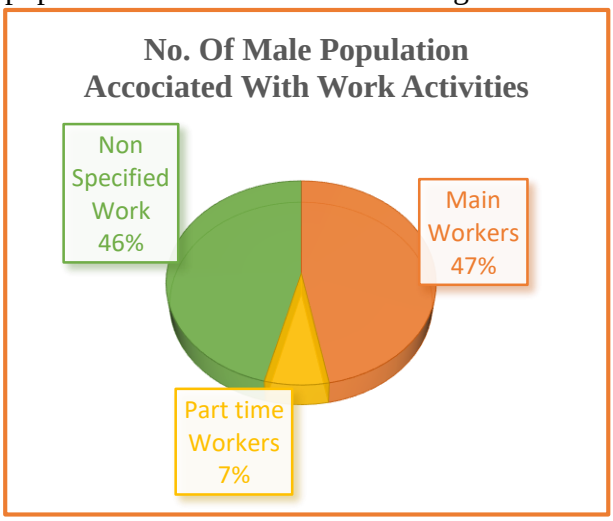


Figure 49 No. of male Population Accociated with Work Activities In Nardipur

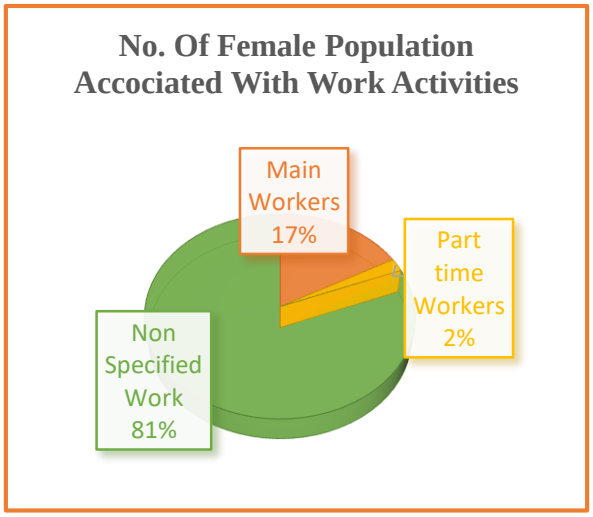


Figure 50 No. of Female Population Accociated with Work Activities In Nardipur

4.3.9 Agricultural Details / Organic Farming / Fishery

Major crops grown in the village are

1. Wheat
2. Bajra
3. Castor

4.3.10 Physical Infrastructure Facilities

- 1 Community Health care centre, 2 Primary Health Sub-Centres, 1 Maternity And Child Welfare centre, 1 TB Clinic, 1 Veterinary Hospital, 1 Family Welfare centre, 3 Medical Shops are available in this village.
- ATM, **Commercial Bank,** Cooperative Bank are available in this village.
- Agricultural Credit Society and Agricultural Marketing Society are available in this village.
- **Post Office,** Landline, Mobile Coverage, **Internet Centre** are available in this village.
- Other than this some of the facilities available in the village are
    1. Source of drinking water
    2. Water tank Facility
    3. Drainage Facility
    4. Road network
    5. Transport facilities
    6. Electricity Distribution
    7. Sanitation facility
    8. Source of irrigation facility

4.3.11 Tourism development available in the village for attracting the tourist

- There is no tourism cluster in village

4.4 Infrastructure Details (With Exiting Village Photograph)

4.4.1 Drinking Water / Water Management Facilities

- There is more than enough water available for village for all season and this water is stored in major 3 overhead tanks and distributed by the help pumps and pipes.

Table 12 Drinking Water / Water Management Facilities

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
Main Source of Drinking water				
1	Piped Water/ Piped into Dwelling/ Piped To Yard/ Public Tap/ Stand pipe/ Tube Well/ Bore Well	Piped To Yard/ Bore Well	Yes	-
2	Dug Well/ Protected Well/ Unprotected Well	-	-	-
3	Water From Spring/ Protected Spring/ Unprotected Spring/ Rainwater/ Tanker Truck	Protected Spring Rainwater Tanker Truck	Yes	-
4	Surface Water (River/ Dam/ Lake/ Pond/ Stream/ Canal/ Irrigation Channel/ Bottled Water/ Hand Pump	Pond Bottled water	-	-
5	Other(Specify) Lake/ Pond	Pond Lake	-	Yes
Water tank Facility				
Overhead Tank		3 Nos – 20,000 litter	Yes	-
Underground Tank		-	-	-

Figure 51 Overhead watertank, nardipur

Figure 52 Lake of nardipur

4.4.2 Drainage Network / Sanitation Facilities

- There is well designed closed drainage system available in the village and directly go to the gutter lines.

Table 13 Drainage Network / Sanitation Facilities

Descriptions	Information/ Detail	Adequate	Inadequate
Drainage Facility			
Available (Yes/ No)	Yes	Yes	-
Type of Drainage			
Closed/Open	Closed	Yes	-
If open than Pucca / Kutcha	-	-	-
Whether drain water is discharged directly into	Yes	-	Yes

4.4.3 Transportation & Road Network

Figure 53 Bus station, nardipur

As per the transportation purpose village is well connected with the other city though it has not available railway station, but because of bus station it is not hard to travel anywhere.

Also the railway station is nearby the village. Apart from government vehicle private vehicles are also there to transportation.

Table 14 Transportation & Road Network

Descriptions	Information/ Detail	Adequate	Inadequate
Road Network (All weather road/ Kutcha(Gravel)/Black Topped Pucca/WBM			
Village approach road	Bitumen	Yes	-
Main road	Bitumen	Yes	-
Internal streets	PCC/WBM	-	Yes
(NH/SH/MDR/ODR) Distance in kms: 10 kms	SH 138	-	-
Transport Facility			
Railway Station (Y/N) (If No than Nearest Railway Station:	No <25 km	-	-
Bus station (If No than Nearest Bus Station's Kms)	Available in village	Yes	-
Local Transportation	Auto, Privet Vehicle & Van	Yes	-

4.4.4 Housing condition

The condition of the village houses fairly good most of the houses are Pucca Makan but 10-20% Kutcha Makan is also there. The houses in the rural areas lack protection to the residents against wind, rain and cold. II. They lack proper arrangement for light and fresh air. People with mental health and substance use problems face particular issues among the homeless population when trying to obtain stable housing.

Table 15 Housing condition

Descriptions	Information/ Detail	Adequate	Inadequate
Housing condition			
Kutcha/Pucca	30 % Kutcha 70 % Pucca	yes	-

Figure 54 Kucca-Pucca Mkan of Nardipur

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

4.4.5.1 Health Facilities:

Social Infrastructure is a subdivision of the infrastructure segment and characteristically consist of assets that accommodate social services. Social infrastructure like primary health centre, private clinic is also available and giving adequate service. There were many multispecialty hospitals nearby cities, like Gandhinagar and Kalol.

Figure 55 Public health care center, nardipur

Table 16 Health Facilities

Descriptions	Information/ Detail	Adequate	Inadequate
Health Facilities			
ICDS (Anganwadi) Sub-Centre/ PHC/ BLOCK PHC/ CHC/ RH/ District/ Govt. Hospital/ Govt. Dispensary/ Private Clinic/ Private Hospital/ Nursing Home/ AYUSH Health Facility/ sonography/ ultrasound facility	ICDS (Anganwadi) Sub-Centre PHC CHC/RH Private Clinic	Yes	-
Distance from Village: Other facility Kalol - 24 kms.			

Figure 57 Emergency room, nardipur

Figure 56 Medical Counter at PHC

4.4.5.2 Education Facilities:

- For education basic facilities are available in the village like kanya shala, Kumar shala, bal-mandir, primary and secondary school.

Table 17 Education Facilities

Descriptions	Information/ Detail	Adequate	Inadequate
Education Facilities			
Anganwadi/ Play group	1	Yes	-
Primary School	1	Yes	-
Secondary school	1	Yes	-
Higher sec. School	No	-	-
ITI college/vocational training centre	No	-	-
Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	No	-	-

Figure 65 Bal mandir, nardipur

Figure 63 Prathmik kanya shala, nardipur

Figure 64 Prathmik Kumar shala,nardipur

4.4.5.3 Community Hall:

- Community hall is not available in the village but requirement of community hall is there in the village.

4.4.5.4 Public Library:

Library is available in the village but its condition is not so good. It is 113 years' old, managed by gram panchayat & villagers itself.

Figure 60 Cracks at beam column joint library, nardipur

Figure 59 Inside view of Librery - In frame Anuj Shayara

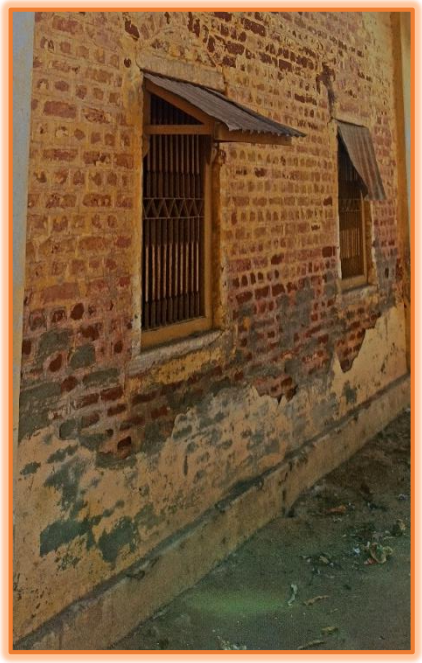


Figure 58 Broken Lintel of Library, Nardipur

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

- Some public buildings like gram panchayat, post office, milk co-operative society, village pond is available in this village, having very adequate strength & appearance.

Figure 62 Discussion with talati and Gram Panchayat Member, nardipur, In Frame – Ajay with Talati & Staff member of Gram Panchayat of Nardipur

Figure 61 Discussion with talati, nardipur, In Frame – Ajay & Anuj with Talati of Nardipur

Table 18 Public buildings and Infrastructure

Descriptions	Information/ Detail	Adequate	Inadequate
Panchayat Building	Yes	Yes	-
Post-office	Yes	Yes	-
Milk Co-operative Soc.	Yes	-	Yes
Village Pond	Yes	-	Yes

4.4.7 Technology Mobile/ WIFI / Internet Usage Details

- Wi-Fi facility is not available and also mobile network is irregular at some places.

4.4.8 Sports Activity as Gram Panchayat

Table 19 Sports activities

Descriptions	Information/ Detail	Adequate	Inadequate
Sports Activity as Gram Panchayat	Yes	Yes	-
Require to Sport ground in school.			

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

- Public garden is not available in the village as per the lack of land problem

Table 20 Socio-Cultural Facilities

Descriptions	Information/ Detail	Adequate	Inadequate
Public Garden	No	-	-

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

- Other facility like recreation centre, cinema hall, also not there but birth and death registration office is there in village

Table 21 Other facilities

Descriptions	Information/ Detail	Adequate	Inadequate
Recreation Centre	No	-	-
Cinema/ Video Hall	No	-	-
Assembly Polling Station	Yes	Yes	-
Birth & Death Registration Office	Yes	Yes	-
Assembly Polling station available in government school & anganwadi. Birth & death registration office available in panchayat building.			

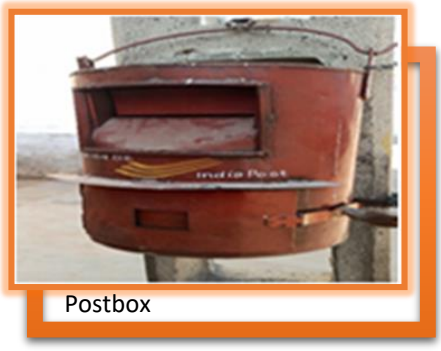
4.4.11 Any Other Details

Nardipur have numerous different offices Like Mail centre, General Market, Shops (Public Circulation Framework), Panchayat Building, Drug store/Clinical Shop, Bank and ATM Post Office and so on in awesome and sufficient condition.

In opposite side Telecom Organization/sexually transmitted disease corner, Farming Co-employable Society, Milk Co-usable Society, Limited scope Businesses, Web Bistros/Normal Assistance Community/Wi Fi, Youth Club, Mahila Mandal, and so forth sort of offices are not there in the town.

4.4.12 Other pictures from Nardipur Village Visit

Post office



Postbox

Bank

ATM

Milk co-operative society

General Godown

Wall clock at the center

General market

Figure 63 Other Notable Anenities of Nardipur Village - 1

Police station


Photograph with police officer


Police quarter


Lake


Library


Old age home


Farming


Marriage hall

Figure 64 Other Notable Anenities of Nardipur Village - 2

4.5 Electrical Concept

4.5.1 Renewable energy source planning particularly for villages

Table 22 Renewable energy source

Descriptions	Information/ Detail	Adequate	Inadequate
Adoption of Non-Conventional Energy Sources/Renewable Energy Sources	No	-	-

4.5.2 Irrigation Facilities

Table 23 Irrigation Facilities

Sr. No.	Information/ Detail	Adequate	Inadequate
Electricity Distribution			
Govt./ Private (Y/N)	24 Hrs.	Yes	-
Power supply for domestic use	24 Hrs.	Yes	-
Power supply for agricultural use	8-10 Hrs.	Yes	-
Power supply for commercial use	24 Hrs.	Yes	-
Road/street lights	No	-	-
Electrification in Government Buildings/ Schools/ Hospitals	24 Hrs.	-	-
Renewable energy source (Y/N)		No	
LED Facilities	No	-	-

4.6 Existing Institution like - Village Administration – Detail Profile

As we can show in the table bachat mandali, mahila forum plantation for aeration, rain water harvesting, adoption of non-conventional energy by renewable energy sources like modern technique is not applied here right now. There is no mahila forum available in the village not only that but rain water harvesting has not been done by the village. This same goes for bachat mandali. But at the same time Dudh mandali and agricultural development centre is there in the village. Here the facilities given by the government to the villagers by Dudh mandali is adequate but not good enough for agricultural department. This table gives the information about the village's existing institution.

Table 24 Existing Institution

Descriptions	Information/ Detail	Adequate	Inadequate
Bachat Mandali	No	-	-
Dudh Mandali	Yes	Yes	-
Mahila forum	No	-	-
Plantation for the Air Pollution	No	-	-
Rain Water Harvesting	No	-	-
Agricultural Development	Yes	-	Yes
Adoption of Non-Conventional Energy Sources/Renewable Energy Sources	No	-	-

5. Technical Options with Case Studies

5.1 Concept (Civil)

5.1.1 Advance Sustainable construction techniques

Here we have tracked down the main 10 legitimate structure moves toward by and by being used or under progress.

5.1.1.1 IoT Integrated Automated Building Systems

The Internet of Things (IoT) gives office heads' admittance to the information that they didn't prior approaches of consent to. These little connected sensors can incorporate with programmed constructing designs to propel the supportability of methods. For a model, IoT sensors can with dynamism direct the necessary lighting and ventilation levels inside building established on climate, temperature and carbon dioxide examinations. The office chief doesn't have to truly keep steady over this adjustments or information from multi bits of mechanical assembly.

5.1.1.2 Synthetic Roof Underlayment

Figure 65 Sustainable construction method

The underlayment on roofs is typically dark top based, which breakdowns moderately rapidly. Changing this layer is indispensable for keep wetness out of the designs inside. Made housetop underlayment proposed another that considers less and holds up to the mileage of an outer air. This material uses polymer that begins from reused tussle materials. It is like manner takes out Precarious Common Compound from the underlayment.

5.1.1.3. Green Roofs

Elective progression for the rooftop of appealing properties comes from green rooftops. Grass, blooms, plants, greeneries and extra greenery breeds on the planning material. Whirlwind liquid is locked in into the dirt and accomplished more adequately than with an uncovered housetop. Cooling and warming charges are diminished, and the idea of air is redesigned.

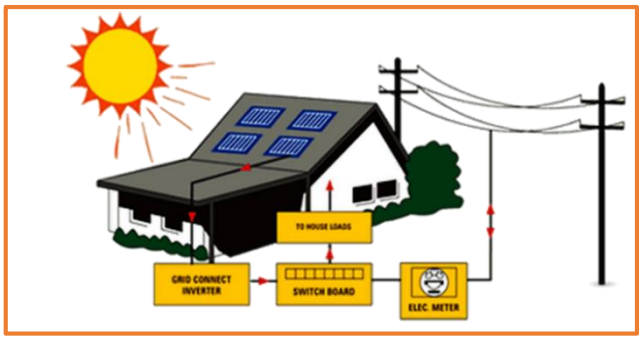


Figure 66 Grid hybrid system

5.1.1.4. Grid Hybrid System

Harmless to the ecosystem power sources pass on a bearable way for relationship to affect their sensible properties, yet a critical number of grid structures need accumulating to control workplaces through events of less daylight based accessibility. A crossbreed structure stores

spare energy and licenses the boundless source to work at evening time, all through shady days and in other environment conditions that are not ideal.

Figure 67 Roof solar panels

5.1.1.5. Passive Solar

Elective approach to control a maintainable sunlight based fuel source is to fabricate the development dependent on the reflexive sun based idea. The office's position and proposed configuration capitalize on sun based energy for warming through winter, in spite of the fact that decreasing its impact during warmer months.

5.1.1.6. Grey water Plumbing Systems

Grey water structures decrease the workplace's need for new water, as the whole thing excepting for toilet streams can be administered for reuse. The most well-known utilizations for this water contain water framework and outfitting toilets with water.

5.1.1.7. Electro chromic Glass

Electro chromic glass can move from clear to dim reliant on external lifts, for instance, an electrical stream or UV radiates. It discards the necessity for covers and other window meds, while changing in accordance with current conditions inactively. Additional benefits join ruining by a wide margin the majority of UV radiates.

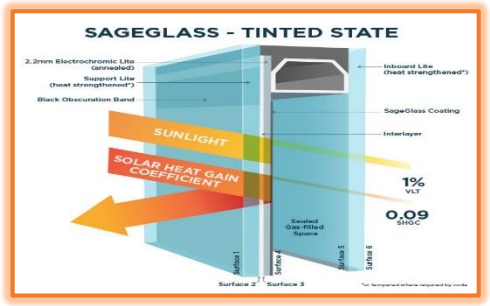


Figure 68 Electrochomic glass

5.1.1.8. Solar Thermal Cladding

Sun fuelled warm cladding is a pleasing daylight based design system proposed explicitly to understand heat through the wintertime. The sun's energy is kept inside this material and went through the design for heat holding reason.

5.1.1.9. Structural 3D Printing

Making and moving improvement materials to the work site can has considerable climatically costs. As advancement 3D printing starts pushing forward, it ends up being more less difficult to diminish down on transport costs or decrease the mass of parts.

5.1.1.10. Self-healing Concrete

Figure 69 Self healing concrete

This material is in its untimely stages, yet once it is industrially attainable it opens numerous viable chances. 0The entire part from streets to trails can profit by solid that revamps itself. Street staffs would not, at this point expected to close down the tiring roads and roadway paths to address despondencies and breaks.

5.1.2 Soil Liquefaction

Liquefaction is a peculiarity where the strength and sturdiness of a dirt diminished by earth shuddering, shaking of land or other speedy stacking. Liquefaction and related exhibitions have

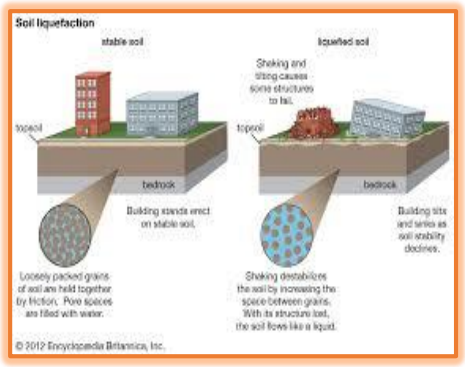


Figure 70 Liquification of soil

been responsible for extraordinary measures of damage in past seismic tremors around the globe.

Soil liquefaction occurs when the effective stress of soil is reduced to essentially zero. This may be initiated by either monotonic loading or cyclic loading. In both cases a soil in a saturated loose state, and one which may generate significant pore water pressure on a change in load are the most likely to liquefy. This is because loose soil has the tendency to compress when sheared, generating large excess pore water pressure as load is transferred from the soil skeleton to adjacent pore water during untrained loading. As pore water pressure rises, a progressive loss of strength of the soil occurs as effective stress is reduced. Liquefaction is more likely to occur in sandy or non-plastic silty soils, but may in rare cases occur in gravels and clays.

Figure 71 Example of liquification if soil

Liquefaction occurs in overflowed soils, that is, soils in which the hole among unmistakable particles is absolutely jam-loaded with water. This water applies a tension on soil molecules that impacts how strongly the actual particles are compelled together. Past to a seismic tremor, the water pressure is generally less. By and by, seismic tremor shaking can reason the water strain to upsurge to where the dirt particles can enthusiastically move regarding each other's.

There are two kinds of soil liquefaction.

1. **Flow liquefaction**

Flow liquefaction is a phenomenon in which the static equilibrium is destroyed by static or dynamic loads in a soil deposit with low residual strength. Residual strength is the strength of a liquefied soil. Static loading, for example, can be applied by new buildings on a slope that exert additional forces on the soil beneath the foundations. Earthquakes, blasting, and pile driving are all example of dynamic loads that could trigger flow liquefaction. Once triggered, the strength of a soil susceptible to flow liquefaction is no longer sufficient to withstand the static stresses that were acting on the soil before the disturbance.

Flow failures, can involve the flow of considerable volumes of material, which undergoes very large movements that are actually driven by static stresses. As described in the state criteria section, the disturbance needed to trigger flow liquefaction can, in some instances, be very small.

2. **Cyclic liquefaction**

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

Structure protection measures in case of liquefaction:

Prevention of consequences of liquefaction on existing structures can be executed in several ways:

- avoiding the construction of structures on the soil susceptible to liquefaction process
- adjusting the structure foundations to the type of soil susceptible to liquefaction
- improving or replacing the soil susceptible to liquefaction before construction of the structure

The most common way of preventing the occurrence of liquefaction are foundation soil improvement methods. One type of improvement is to replace the susceptible soil with the appropriate amount of gravel.

A more favourable form of the granulometric soil curve in a narrower location is obtained in this way. Since saturation with water is one of the main factors affecting the occurrence of liquefaction, vertical gravel drains are often used for faster water drainage due to their permeability. Stone columns are one of the best methods of reducing the liquefaction potential. Because they are performed by vibration, they increase the compactness of the foundation soil on one side, and because of their water permeability, they also allow faster water drainage. Also, there are chemical soil stabilization methods using cement, but they are not used as much because they are not as profitable.

5.1.3 Sustainable Sanitation

Supportable disinfection is a tidiness framework planned to satisfy persuaded guidelines and to function admirably over the long haul. Manageable sterilization arrangements consider the total "disinfection esteem chain", from the comprehension of the administrator, and sewer water assortment frameworks, transport or transportation of waste, dealing(maintaining), and recover or removal.

Defanations: Sustainable Sanitation

- Frameworks should be monetarily and socially worthy, in fact and institutionally fitting and ensure the climate and characteristic assets.
- The reason for practical disinfection is equivalent to sterilization as a rule: to defend human prosperity. However, "practical disinfection" goes to all methods of the characterization: This contains frameworks of assortment, treating, shipping and the removal of waste.

The Public authority of India (GoI) similarly as many State governments are finding up to Gram Panchayats to think about a working intend to accomplish solid waste in natural zones. We ought to surrender the way that 'a couple' Gram Panchayats have been beneficial in managing solid waste, while 'various others' have had a short stretch and vanished.

5.1.3.1 Case study of Mudichur Gram Panchayat

Mudichur Town Panchayat in Kancheepuram district, Tamil Nadu realizes a SWM model. It is reasonable for more than seven years now. What makes Mudichur click, while in various Panchayats, such models vanish after a short stretch? Likewise, what practices Mudichur can give for steadfastness in various bits of the country? Mudichur being close to Chennai, the effect of city culture of keeping one's home clean, and remaining unconcerned of the indecency in the city in front was ordinary. Litter wherever foolishly and censure the neighbours for their

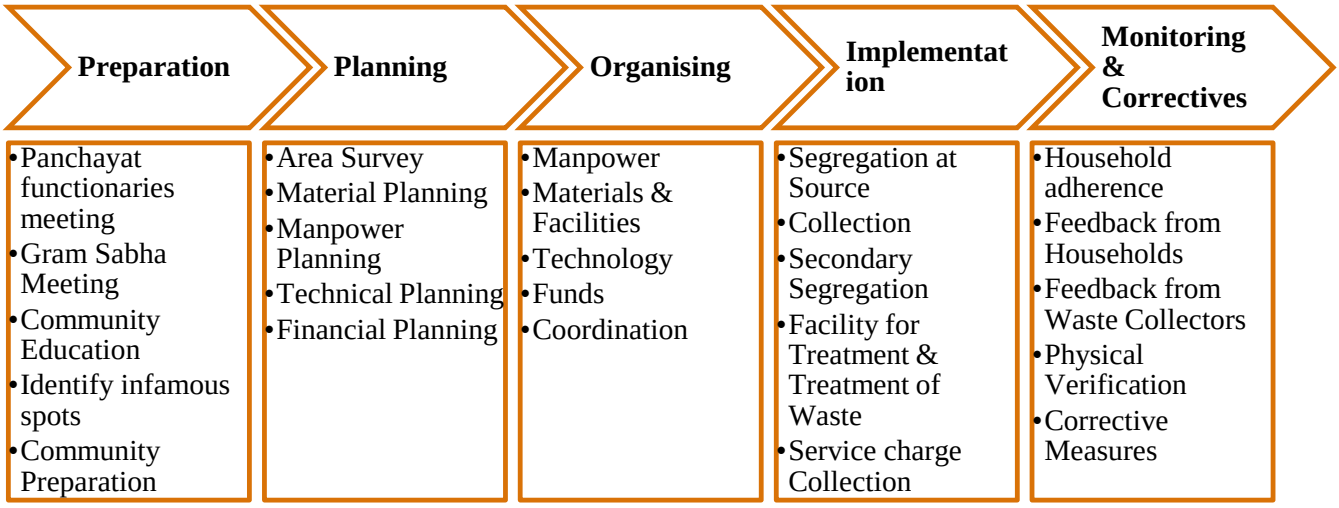
trickiness was the lifestyle. A movement of immense missions run by the State government to stop open crap, made the Panchayat functionaries to pursue making the Panchayat open poo free (ODF). To achieve the circumstance with clean town, the GP president stepped up to the plate and set up SWM plan.

The activity from Mudichur on SWM is that there is no deficiency of advances. What is required is a utilitarian organization structure (model), which in Mudichur they have made one. Mudichur Panchayat took Inseparable and the DRDA into association to make a solid waste organization structure. They are executing it critically that it has gotten ordinary, making us choice it 'a system'. The Panchayat President, Mudichur with the help of a gathering of youth (and chose Green Friends) is managing nuclear family waste decently. Emphatically, the piece of Indistinguishably (NGO) in making this structure helpful has the privilege to be esteemed as well. Mudichur model has a couple of contemplations and security measures for any Panchayat that requirements to reproduce.

In replication, the following points deserve;

- Systemic Thinking
- System Sustainability
- Social Enterprise Model
- Community Preparation

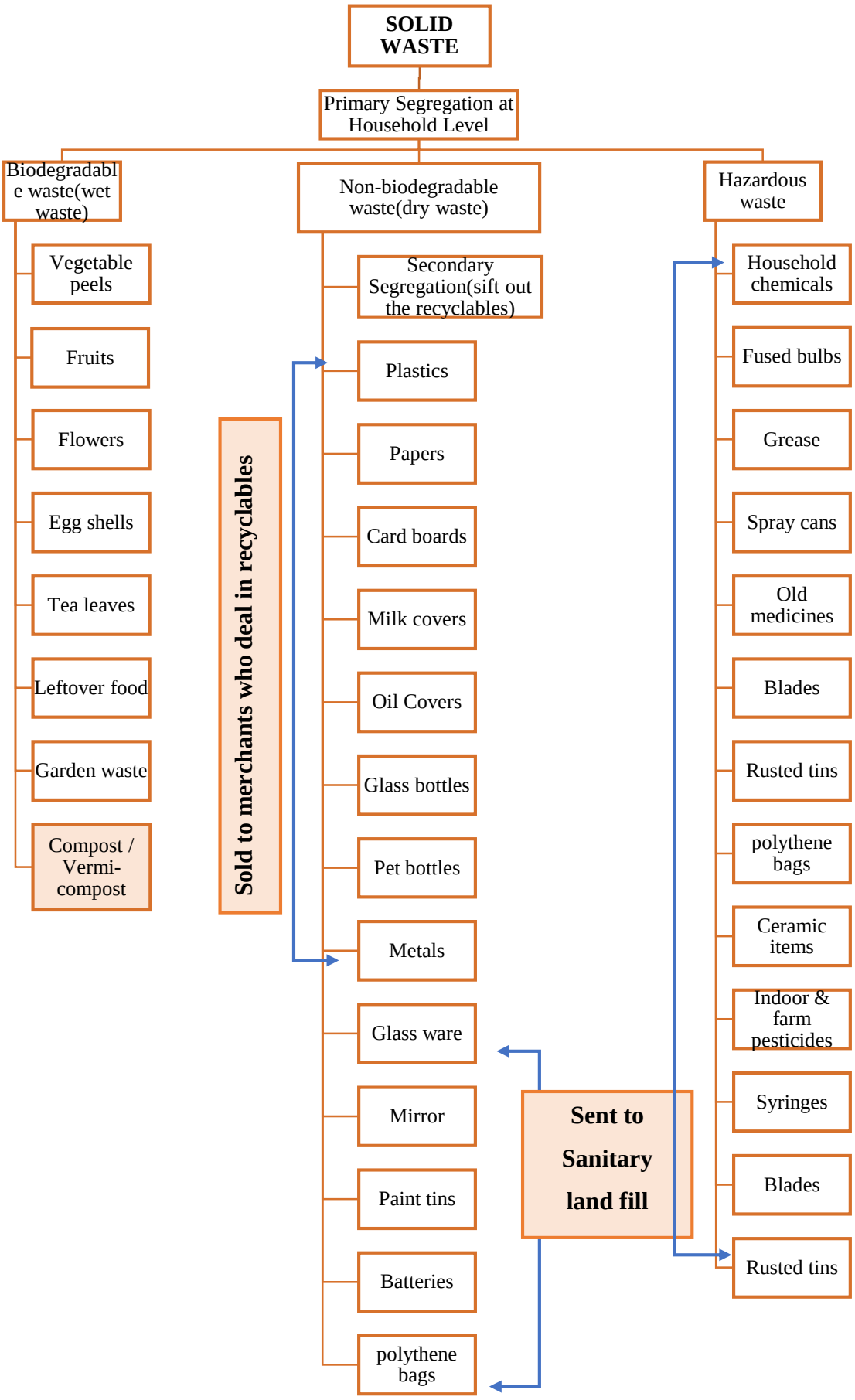
5.1.3.2 The Steps in Solid Waste Management



5.1.3.3 Community Preparation through IEC (Information-Education-Communication)

- Waste Bins Distribution with handbills
- Students Orientation
- Cultural Evening
- IPC (Interpersonal Communication)
- SMS Alert
- Educative Information
- *Rangoli* Competition
- Clean the Commons Campaign
- Announcing Prizes & Gifts

5.1.3.4 Solid Waste Management Model



5.1.3.5 Sanitary Landfill

A typical daydream is public show a spot being utilized as waste yard, and they call it landfill region. Leeway is neither specialized nor clean. Landfill should be deliberately managed without disturbing the groundwater and the air. There are certain kinds of no biodegradable squanders that can't be utilized. They might be guided to clean landfills. The primary consideration while groundwork for a clean land fill is stoppage of destructive impacts on human wellbeing and environment. A lowing site a long way from human settlement is chosen. A rock bed is done in order to evade spillage, assuming any, not to contaminate the dirt or water, adjoining. After each filling or in periodical recesses a sand top or earth top is place on that, which stops gases like methane, carbon dioxide from delivering air contamination. On the off chance that we can diminish what winds up in the landfill to 10 to 15% through decrease, reuse, reuse methodology, it tends to be estimated as a decent administration practice. 45% may go to gasification plant, treating the soil; and 40 percent may become recyclables. [14]

5.1.3.6 A Tentative Budget of Income and Expenditure for a month

Table 25 A Tentative Budget of a month

(Assume: 900 Households / 3600 population)			
Expenditure items	**Rs.**	**Income Sources**	**Rs.**
Sanitation workers salary (Rs.6000 x 6 workers cover 450 HH in the morning & 450 in the evening)	36,000.00	Service charge (900 HH x Rs.40)	36,000.00
Supervisor's salary (1 person)	6,000.00	Shops, restaurants, marriage halls etc.	6000.00
Consumables (bleaching powder etc.)	200.00	Sale of compost	2000.00
Repair & maintenance of vehicles	1000.00	Sale of Recyclables	2000.00
TOTAL	**43,200.00**	**TOTAL**	**46,000.00**

5.1.3.7 Payment for Services

The costs set for the SWM offices as for various overseers are suggested under. Coming up next is an interesting cost for various controller classes [14]

1. The assistance charge for 'SWM' will be payable to the sanitization specialist (or disinfection chief) at the way steps of game plan regulators before the multi day of each timetable month, with the exception of if regardless decided. This is more straightforward to assemble and less difficult to pay. A receipt for the aggregate paid will be requested by the inhabitants who pay.
2. Alternatively, the organizations charges may be paid at GP Office before the fifth of reliably month ahead.
3. Payment for SWM organization under the terms and conditions put down in the standing principle if not paid by individuals by inside the time determined will be recoverable likewise as house charge.
4. Waste holders given for SWM reason won't be put to some other use, making SWM persevere. In such an occasion the whole spent on the bushels will be recovered at twofold the expense

5. Household not wanting to remember themselves for fundamental seclusion can do accordingly, on the off chance that they are set up to pay Rs.80 reliably, instead of the standard Rs.30.

Table 26 Payment for Services

Sr.	User Category	Service Charge (monthly)	Remarks
1	Households	Rs.30 /Rs.80	Payable monthly
2	Tea stalls	Rs.40	Payable monthly
3	Village restaurants and eateries	Rs.60	Payable monthly
4	Marriage halls	Rs.500	Payable after every marriage
5	Vegetable markets	Rs.30	Payable monthly
6	Grocery shops	Rs.40	Payable monthly
7	Schools and offices, if any	Rs.80	Payable monthly
8	Temples, churches, mosques etc. (unless they have their own waste disposal arrangement)	Rs.80	Collected from the community along with the collection made for temple festivals / local festivals.

Penalty:

1. Anyone will completely or carelessly toss waste on the road will be considered to have abused and will be punished with a fine of Rs.500 on account of families and shops; and Rs.2000 on account of marriage corridor or as chosen by the GP.
2. The GP may likewise choose differential punishments on account of one time infringement, and rehashed rebelliousness/carelessness. [14]

5.1.4 Transport Infrastructure / system

Transport Infrastructure to continue as a key focus area for new Government with massive capital outlay of up to ₹30 trillion expected over next five years. Construction companies are likely to be the major beneficiaries and will witness strong order inflows estimated between ₹15-18 trillion.

Figure 72 Transportation infrastructure

The transport infrastructure is set to continue as key focus area for the new Government with a massive capital outlay of up to ₹30 trillion expected over the next five years. The Government is likely to maintain the continuity on the major programmes launched during its last tenure viz. Bharatmala Pariyojana (Highways), Sagarmala (Ports), railway station redevelopment programme, inland waterways development, Namami Gange, Swachh Bharat Mission, UDAN (Airports), AMRUT and Smart Cities (Urban Infra). The last five-year period (FY2014-FY2019) had witnessed huge spending by the Government on segments like roads (increased by ~353% between FY2015 to FY2019), railways (increased by ~146% times between FY2015 to FY2019), metro rail, etc, which is likely to increase further over the next five years.

As per the current government manifesto, the next five years will see massive infrastructure build-up in India. The capital investment in the infra sector has been proposed at ₹100 trillion over the next five years - which is a huge increase from the current level of capital investment

in the sector. Amongst the key segments, transport infrastructure is expected to see a major jump with an estimated ₹25-30 trillion of capital outlay over the next five years. Such an investment will provide tremendous long-term benefits for the Indian economy.

In the road sector, the manifesto mentions constructing 60,000 km of National Highways over the next five years – at an average rate of 12,000 km per year. Given that the highway construction pace had grown significantly over the last four to five years (pace of highway construction increased from 4,410 km in FY2015, to 9,829 km in FY2018, and ~10,855 km in FY2019), and sizeable number of under-implementation projects, the target seems achievable.

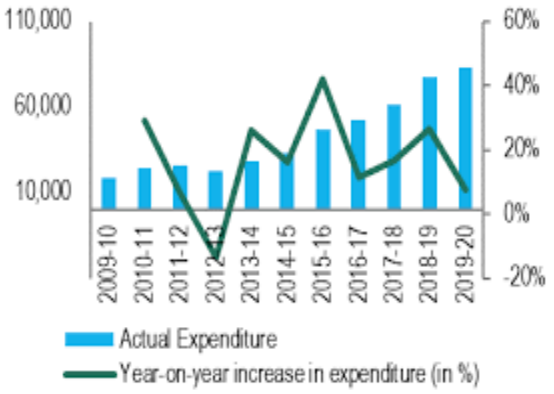


Table 27 Highway Budget

Transport substructure plays a vital part in the evolution from a middle to high income economy. Theoretic and experiential studies have highlighted the positive association between high quality infrastructure and economy wide efficiency (IMF, 2016). This association is reinforced by a number of financial mechanisms triggered by enhancements in transportation infrastructure, together with the following:

- High quality framework is a prerequisite for the foundation of compelling vehicle administration territory for both product and voyager developments, which thusly bolsters focal financial activities and wipes out geographic bars to rivalry.
- Well-functioning logistics systems facilitate occupation through dropping entrée costs to intercontinental markets and by enlightening the competitiveness of native firms.
- Explorer transport network improves the profitable limit of the economy by unearthing work marketplaces and through agglomeration gains, encouraging mechanical specialization and allowing vis-à-vis correspondences among ventures and concentrated labourers in high worth assistance areas of the economy (Graham, 2014).
- Infrastructure can be a viable arrangement instrument to report cultural and provincial contrasts by associating rustic and far off zones to more noteworthy focuses of creation and utilization, setting out extra financial open doors for inhabitants and diminishing out-relocation.

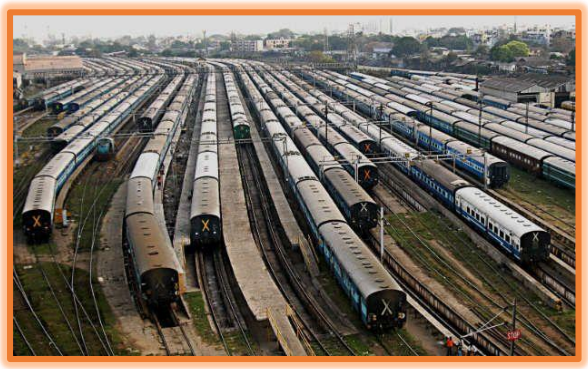


Table 28 Railway Infrastructure

For the railways, the manifesto has proposed a conversion of all viable rail tracks to broad gauge, electrification of all railway tracks, and completion of the two dedicated freight corridor projects (EDFC, and WDFC) by 2022. Further, a large investment is also envisaged towards railway station modernisation across the country.

Significant investment is also expected in metros, airports, ports and inland waterways. The metro rail infrastructure is aimed to be brought to 50 cities from around 20 cities where

the metro rail project has been approved so far. As regards to airport infrastructure, the target is to double the number of functional airports from around 101, currently. Similarly, port capacity is aimed to be doubled over the next five years and the Sagarmala project is to be fast-tracked. Development of inland waterways is another potential area.

India's Eleventh Five Year Plan identifies various deficits in transport sector which include inadequate roads/highways, old technology, saturated routes and slow speed on railways, inadequate berths and rail/road connectivity at ports and inadequate runways, aircraft handling capacity, parking space and terminal building at airports. Government aims to modernize, expand, and integrate the country's transport services. It also seeks to mobilize resources for this purpose and to gradually shift the role of government from that of a producer to an enabler. In recent years, the Government has made substantial efforts to tackle the sector's shortcomings and to reform its transport institutions. These include:

- Increasing public funding for transportation in its Five Year Plans.
- Launching the ambitious National Highway Development Program which has seven phases and is expected to be completed by 2012. It includes improved connectivity between Delhi, Mumbai, Chennai and Kolkata, popularly called the Golden Quadrilateral, in the first phase, North- South and East- West corridors in phase two, four laning of more than 12,000 km in phase three, two laning of 20,000km and six laning of 6,500 km respectively in phase four and five, development of 1,000km of expressway in phase six and other important highway projects in phase seven. Total expected investment is INR 2.2 trillion.
- Accelerated Road Development Program for the North East Region to provide road connectivity to all State capitals and district headquarters in the North East region.
- Financing the development and maintenance of roads by creating a Central Road Fund (CRF) through an earmarked tax on diesel and petrol.
- Operationalizing the National Highway Authority of India (NHAI) to act as an infrastructure procurer and not just provider.
- Improving rural access by launching the Pradhan Mantri Gram Sadak Yojana (Prime Minister's Rural Roads Program).
- Reducing the congestion on rail corridors along the highly trafficked Golden Quadrilateral and improving port connectivity by launching the National Rail Vikas Yojana (National Railway Development Program).
- The development of two Dedicated Freight Corridors from Mumbai to Delhi and Ludhiana to Dankuni.
- Improving urban transport under Jawaharlal Nehru National Urban Renewal Mission (JNNURM).
- Upgrading infrastructure and connectivity in the country's twelve major ports by initiating the National Maritime Development Program (NMDP).
- Privatization and expansion of the Mumbai and New Delhi Airports and development of new international airports at Hyderabad and Bangalore.
- Enhancing sector capacity and improving efficiencies through clear policy directive for greater private sector participation. Large parts of the NHDP and NMDP are to be executed through public private partnerships (PPP).

5.1.5 Vertical Farming

Figure 73 Vertical farming

Vertical cultivating is the activity of manufacturing sustenance on vertically slanted outsides. As an option of farming vegetables and different nourishments on one phase, for example, in a field or a hot house, this method harvests food sources in vertically skewed layers regularly incorporated into different constructions like a steel trailer, high rise or repurposed stockroom.

Utilizing Controlled Climate Agribusiness (CEA) innovation, this contemporary thought utilizes encased cultivating techniques. The non-characteristic control of temperature, light, moistness, and gases makes making nutriments and medication encased conceivable. From various perspectives, vertical cultivating is corresponding to nurseries were metallic reverberators and non-regular light enlarge customary light. The significant objective of vertical cultivating is utilize crops yield in a confined space.

There are four critical areas in understanding how vertical farming works:

1. Physical layout,
2. Lighting,
3. Growing medium,
4. Sustainability features.

Firstly, the primary goal of vertical farming is producing more foods per square meter. To accomplish this goal, crops are cultivated in stacked layers in a tower life structure. Secondly, a perfect combination of natural and artificial lights is used to maintain the perfect light level in the room. Technologies such as rotating beds are used to improve lighting efficiency. Thirdly, instead of soil, aeroponic, aquaponic or hydroponic growing mediums are used. Peat moss or coconut husks and similar non-soil mediums are very common in vertical farming. Finally, the vertical farming method uses various sustainability features to offset the energy cost of farming. In fact, vertical farming uses 95% less water.

Advantages

~ It offers an arrangement to deal with future food requests

~ It permits harvests to develop all year

~ It utilizes essentially less water

~ Climate doesn't influence the harvests

~ More natural harvests can be developed

~ There is less openness to synthetic substances and sickness

Disadvantages

~ It very well may be exorbitant to construct and monetary attainability considers haven't yet been finished

~ Fertilization would be exceptionally troublesome and expensive

~ It would include higher work costs

~ It depends a lot innovation and one day o force misfortune would be wrecking.

Types of Vertical Farming:

1. **Building-based vertical farms:**

Abandoned buildings are often reused for vertical farming, such as a farm at Chicago called "The Plant," which was transformed from an old meatpacking plant. However, new builds are sometimes also constructed to house vertical farming systems.

Figure 74 Building-based vertical farms

2. **Shipping-container vertical farms:**

Figure 75 Shipping-container vertical farms

Recycled shipping containers are an increasingly popular option for housing vertical farming systems. The shipping containers serve as standardized, modular chambers for growing a variety of plants, and are often equipped with LED lighting, vertically stacked hydroponics, smart climate controls, and monitoring sensors. Moreover, by stacking the shipping containers, farms can save space even further and achieve higher yield per square foot.

3. **Deep farms:**

A "deep farm" is a vertical farm built from refurbished underground tunnels or abandoned mine shafts. As temperature and humidity underground are generally temperate and constant, deep farms require less energy for heating. Deep farms can also use nearby groundwater to reduce the cost of water supply. Despite low costs, a deep farm can produce 7 to 9 times more food than a conventional farm above ground on the same area of land, according to Saffa Riffat, chair in Sustainable Energy at the University of Nottingham. Coupled with automated harvesting systems, these underground farms can be fully self-sufficient.

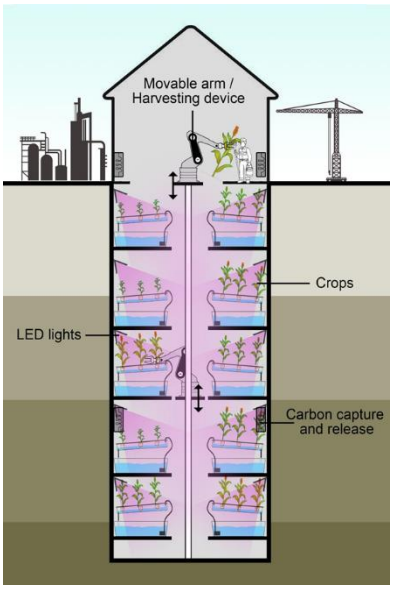


Figure 76 Deep Farm

Vertical farming technologies face economic challenges with large start-up costs compared to traditional farms. In Victoria, Australia, a "hypothetical 10 level vertical farm" would cost over 850 times more per square meter of arable land than a traditional farm in rural Victoria, Vertical farms also face large energy demands due to the use of supplementary light like LEDs. Moreover, if non-renewable energy is used to meet these energy demands, vertical farms could produce more pollution than traditional farms or greenhouses.

Vertical farming technologies are still relatively new. Companies are yet to successfully produce crops at scale and make it economically feasible to meet the growing food demand. The performance of farms like Aero Farms will determine how important a role vertical farming will play in the future to face the challenge of growing food demand.

It is worth noting, however, that technologies developed for vertical farms are also being adopted by other segments of the indoor farming sector, such as greenhouses, which can utilize natural sunlight, albeit requiring much more real estate and longer routes to market.

5.1.6 Sewage treatment plant

Treating wastewater has the aim to produce an effluent that will do as little harm as possible when discharged to the surrounding environment, thereby preventing pollution compared to releasing untreated wastewater into the environment.

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

Sewage treatment generally involves three stages, called primary, secondary and tertiary treatment.

- **Primary treatment** consists of temporarily holding the sewage in a quiescent basin where heavy solids can settle to the bottom while oil, grease and lighter solids float to the surface. The settled and floating materials are removed and the remaining liquid may be discharged or subjected to secondary treatment. Some sewage treatment plants that are connected to a combined sewer system have a bypass arrangement after the primary treatment unit. This means that during very heavy rainfall events, the secondary and tertiary treatment systems can be bypassed to protect them from hydraulic overloading, and the mixture of sewage and storm water only receives primary treatment.

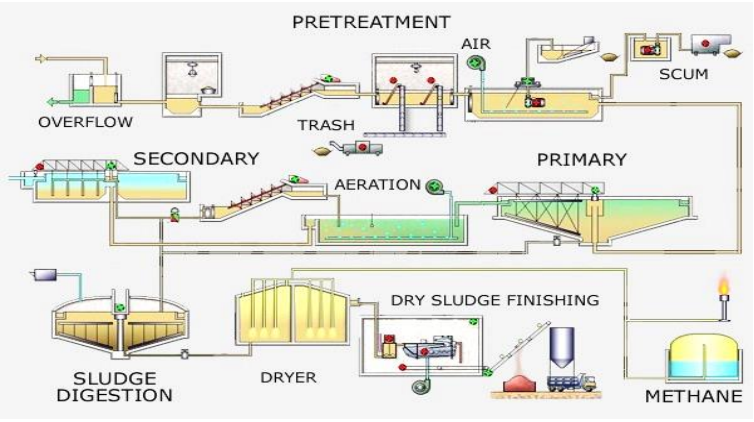


Figure 77 Sewage Treatment Plant process

- **Secondary treatment** removes dissolved and suspended biological matter. Secondary treatment is typically performed by indigenous, water-borne micro-organisms in a managed habitat. Secondary treatment may require a separation process to remove the micro-organisms from the treated water prior to discharge or tertiary treatment. Secondary treatment of wastewater works on a deeper level than primary and is designed to substantially degrade the biological content of the waste through aerobic biological processes. It is done in one of three ways:
  - **Bio filtration** uses sand filters, contact filters or trickling filters to ensure that any additional sediment is removed from the wastewater.
  - **Aeration** is a lengthy process which increases oxygen saturation by introducing air to wastewater. Typically, the aeration process can last for up to 30 hours, but it is very effective.

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

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

- **Tertiary treatment** is sometimes defined as anything more than primary and secondary treatment in order to allow ejection into a highly sensitive or fragile ecosystem (estuaries, low-flow Rivers, coral reefs...). Treated water is sometimes disinfected chemically or physically (for example, by lagoons and microfiltration) prior to discharge into a stream, river, bay, lagoon or wetland, or it can be used for the irrigation of a golf course, greenway or park. If it is sufficiently clean, it can also be used for groundwater recharge or agricultural purposes.

Figure 78 Sewage Treatment Plant

The highlights of sewer water dealing with frameworks are fearless by:

1. The nature of the municipal and mechanical squanders that are moved to them by the sewers.
2. The amount of treatment needed to keep the greatness of the getting streams and waterways.

To make wastewater satisfactory for reprocess or for repeating to the climate, the grouping of contaminations should be concentrated to a protected level, for the most part a normal set by the Climate Organization.

- It comprises of physical and natural and now and again compound interaction to dispose of debasements. Its motivation is to deliver a naturally innocuous fertilizer water, likewise called profluent and a strong waste additionally called slime or bio solids, appropriate for removal or reuse. Reuse is all the more frequently for rural purposes, however more of late, ooze is being utilized as a fuel source.
- Water from the mains, utilized by modern, agrarian, family units (latrines, showers, showers, kitchens, sinks), facilities, business and mechanical areas, is decreased in quality because of the presentation of tainting components. Natural squanders, suspended solids, microbes, nitrates, and phosphates are toxins that should be taken out.

Reuse:

- With suitable technology, it is possible to reuse sewage effluent for drinking water, although this is usually only done in places with limited water supplies, such as Windhoek and Singapore.
- In arid countries, treated wastewater is often used in agriculture. For example, in Israel, about 50 percent of agricultural water use (total use was one billion cubic metres (3.5×1010 cu ft) in 2008) is provided through reclaimed sewer water. Future plans call for increased use of treated sewer water as well as more desalination plants as part of water supply and sanitation in Israel.

- Constructed wetlands fed by wastewater provide both treatment and habitats for flora and fauna. Another example for reuse combined with treatment of sewage are the East Kolkata Wetlands in India. These wetlands are used to treat Kolkata's sewage, and the nutrients contained in the wastewater sustain fish farms and agriculture.

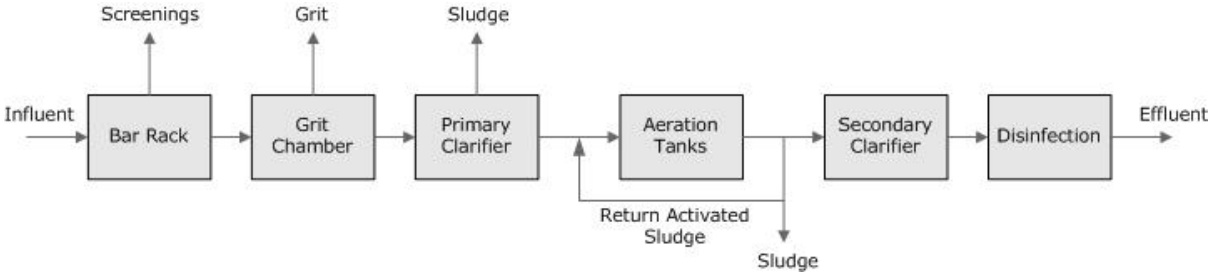


Figure 79 Flow Chart of Sewagw treatment plant

5.2 Concept (Electrical)

5.2.1 Programmable Load Shedding

The task is a programmed load activity framework that controls load activity, various quantities of times as indicated by customized guidance. The undertaking takes out the manual ON/OFF exchanging of burden. A continuous clock (RTC) is utilized to follow the time and naturally switch ON/OFF the heap. This undertaking is needed for load shedding time the board which is utilized when the power request surpasses the stockpile and there comes a requirement for physically turning ON/OFF the electrical gadgets on schedule. Consequently this framework wipes out the manual activity via naturally turning the heap ON/OFF. A network keypad is interfaced with the microcontroller from where the predefined time is contribution to the microcontroller. At the point when this information time equivalents to the continuous, in view of the orders the microcontroller starts that specific hand-off to turn ON/OFF the heap. The time is shown on a seven portion show.

5.2.2 Moisture Monitoring System

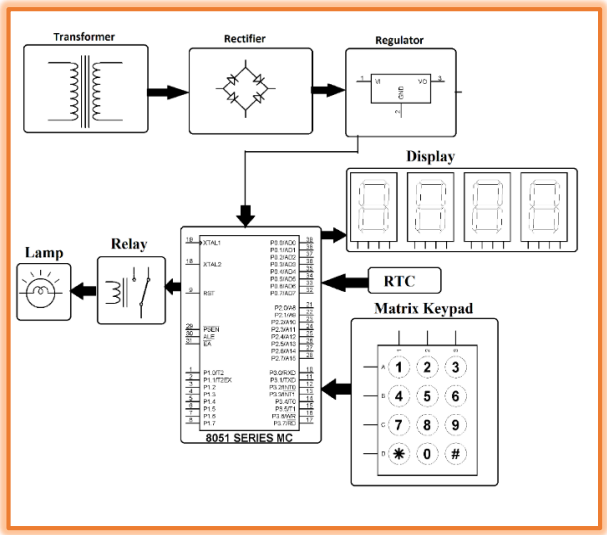


Figure 80 Programmable load shedding

The centre of this dampness screen circuit is worked around a 14-stage swell convey paired counter and a couple of usually accessible parts.

To improve the usage pace of farming water system water, a dirt dampness observing framework dependent on ZigBee innovation is intended to improve the intricacy and significant expense of the conventional wired organization. The proposed framework has the attributes of low utilization, huge limit, high security and simple mix with brushing the benefits of ZigBee and WIFI.

Objectives: Soil dampness data assumes a significant part in ecological checking - rural creation and hydrological contemplates.

Especially, horticultural yield relies upon a few developing boundaries like temperature, mugginess, soil dampness and pH of the dirt, and so forth.

5.2.3 SOLAR POWERED SMART IRRIGATION SYSTEM

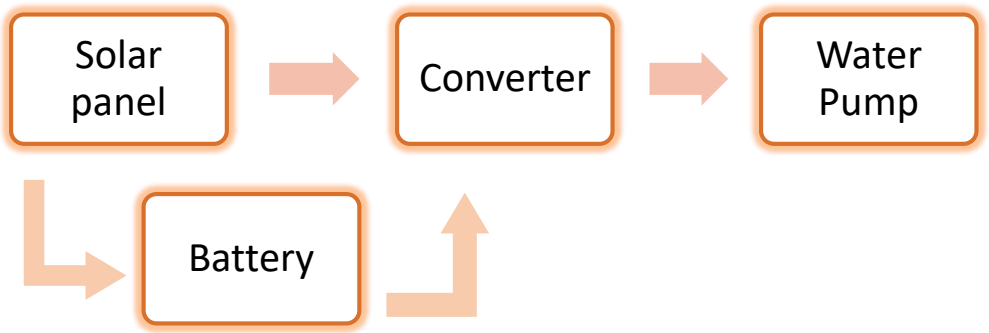
5.2.3.1 Literature Survey and Background Study

As demonstrated by the survey drove by the Division of Electrical Energy in India in 2011 there are around 18 million green siphon sets and around 0.5 million new affiliations every year is presented with ordinary breaking point 5HP. Supreme yearly usage in agribusiness territory is 131.96 billion KWh (19% of full scale power use). Sun arranged controlled smart water framework technique is the future for the farmers and a response for energy crisis. Sine PWM system has been used for inverter movement for least music which further extends the capability of the structure. The rating of the system was resolved contrasting with the siphon subtleties.

5.2.3.2 The Proposed Solution

In this proposed structure we utilize the sun based energy from sun fuelled sheets to thus siphon water from drill well clearly into a ground level accumulating tank dependent upon the power of sunshine. While standard techniques join directing of water from drill well into a well and from this well onto field using another siphon, our system uses simply a singular stage energy use wherein the water is guided into a ground level tank from which a clear valve instrument controls the movement of water into the field. This recuperations critical proportion of energy and viable use of harmless to the ecosystem power. A valve is controlled using shrewd count in which it coordinates the movement of water into the field dependent upon the sogginess need of the land. In this system we use a soil moistness sensor that recognizes the proportion of clamminess present in the earth and depending on the need of level of suddenness content required for the gather the water stream is overseen in like manner, checking the water by keeping an essential separation from over flooding of yields.

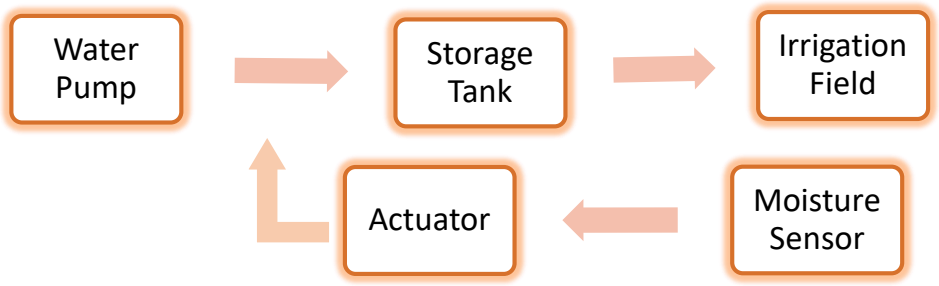
Proposed water framework structure for the most part includes two modules; Sun based siphoning module and customized water framework module. In sun controlled siphoning module a sun situated leading body of required assurance is mounted near the siphon set.



5.2.3.3 Block diagram of solar pumping module

By then using a control circuit it is used to charge a battery. From the battery using a converter circuit it gi2ves ability to the water siphon which is brought down inside the well. By then the water is guided into an overhead tank for taking care of water momentarily preceding

conveying the water into the field. In modified water framework module the water outlet valve of the tank is electronically compelled by a soil suddenness identifying circuit. The sensor is set in the field where the collect is being created. The sensor changes over the suddenness content in the earth into indistinguishable voltage. This is given to a distinguishing circuit which has a reference voltage that can be changed by the farmer for setting unmistakable sogginess levels for different yields. The proportion of water needed for soil is comparative with the qualification of these two voltages. A control signal was given to a stepper motor whose rotational point is comparative with the differentiation in voltage. The stepper motor in turns controls the cross-sectional zone of the valve to be opened controlling movement of water. Likewise the proportion of water streaming is comparative with the moistness qualification.



[Block diagram of automatic irrigation module]

5.2.3.4 Design of converter and battery specification

An inverter is arranged with a DC commitment of 230V D.C which is made from 12V D.C using a lift converter. Sine PWM technique is applied to make 230V A.C. The inverter circuit produced is showed up in Fig. 4. Everything considered we are using a battery with 12V, 100Ah cutoff as for a 2HP siphon.

5.2.3.5 Moisture sensor module

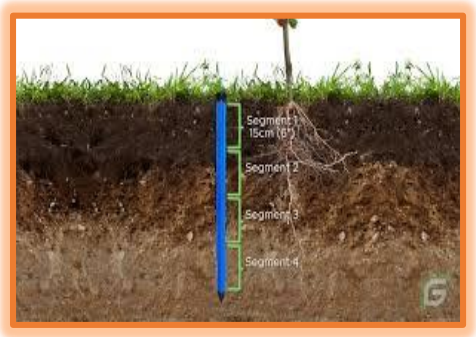


Figure 81 Soil Moisture Sensor

A clamminess sensor is used to distinguish the level of soddenness content present in the water framework field. It has a level area module wherein we can set a reference regard. This circuit can be used with basic tests that produce a voltage relating to soil clamminess, for instance, VG400 test showed up in Fig. 75. The clamminess substance of the soil is found by using the earth moistness sensor, for instance, VG400 which makes an indistinguishable yield voltage comparative with the conductivity between the two tests.

5.2.3.6 Automatic valve regulation

For a modified valve control we are using a stepper motor as an actuator control of the valve which is related with the force source valve of the tank. With the help of sogginess sensor signal and a controller, a control beats is given to the driver circuit that invigorates the stepper motor. So this way the force source valve is progressively opened or closed dependent upon

the proportion of suddenness present in the soil of the field. Right when the earth clamminess content shows up at the important worth, the valve is totally closed and ability to driver circuit is killed and controller is set into rest mode for low power use. Right when the moistness in soil is dried and show up at any rate cut-off regard, the controller rises out of rest mode and stream of water is coordinated. This way the whole system works therefore.

Figure 82 Automatic valve regulation circuit.

5.2.3.7 Cost Analysis

Within excess of 900,000 chamber wells being a used in every area of India, around Rs.18 Million of energy is used for siphoning water for water framework. This proportion of money used for influence can be saved with the help of daylight based water siphon. Yearly the cost of right around 5,000,000 kilo watt hour of energy can be saved. That is around Rs.27 Million for every annum can be recuperated which comes around 40% of the total amount of hypothesis. Regardless of the way that the hidden hypothesis is high, it will in general be gained back in 2 and a huge part of years' time. If we acknowledge the cost of power is Rs. 1.5 Million for each kilo watt hour, Rs.18 Million is used for siphoning water alone in a year. By using the sun based water siphon, we can put to the side to 4.8 million KWh of energy consistently which saves a lot of energy. The excess energy can in like manner be given to the grid with little changes and interests in the circuit, which can add to the pay of the farmer.

Table 29 Cost Analysis

Component	Unit Cost	Quantity	Total Cost
Solar Panel	24000	4	Rs.96000
Converter Circuit	400	1	Rs.400
Battery 24V,100Ah	8250	1	Rs.8250
		Overall Cost	Rs.104650

5.2.3.8 Conclusion

By realizing the proposed structure there are various benefits for the public position and the farmers. For the public position a response for energy crisis is proposed. By using the modified water framework structure it smoothest out the utilization of water by diminishing wastage and lessen the human intervention for farmers. The bounty energy made using daylight based loads up can similarly be given to the system with little changes in the structure circuit, which can be a wellspring of the pay of the farmer, thusly engaging developing in India and same time furnishing a response for energy crisis. Proposed structure isn't hard to execute and environment pleasant response for flooding fields. The structure was found to be successful when completed for drill openings as they guide over the whole day. Sun controlled siphons also offer clean courses of action with no danger of borehole corrupting. This structure shows the common sense and use of using daylight based PV to offer energy to the siphoning necessities for sprinkler water framework. Regardless of the way that there is a high capital endeavour required for this structure to be executed, the overall benefits are high and in since a long time prior run this system is moderate.

6. Swachh Bharat Abhiyan (Clean India)

6.1 Swachhta needed in allocated village -Existing Situation with photograph

So many places are in very bad condition, For an example the panchayat building is so clean but on the other hand the old school near the panchayat building was in very condition people used to throw their garbage in its ground.

Per se the village has proper drainage system available but some places it get damaged and reparation was never happened and with time it get more and more dirty.

Public toilet were there but the people of the village do not use it in proper manner and maintenance was so poor of the public toilet.

In Nardipur as well as in many rural parts of India, cows roam the streets looking for food. The Village's waste management system is extremely lacking, which means many streets and alleys are littered with garbage.

6.2 Guidelines - Implementation in allocated village with Photograph

- The solid waste management contains many processes to conduct in reducing the waste from the surroundings. It consists of waste collection, transporting, processing, recycling or dumping of wastes.

Figure 83 swachh Bharat Abhiyan

- Reduction in junks can be achieved by performing this management task strictly. It all should start from household level, due to this further there will be automatic reduction in waste production on community level.
- Public awareness is must as long as people are unaware about the importance of sanitation and cleanliness all the effort of the government does not matter, after some time it will back to zero.

Following measures should be kept in mind while executing management program:

- Biodegradable and non-biodegradable wastes should be separated at household level.
- Polymerized materials such as plastic bags, bottles, containers, etc. should be reused till their life period.
- Segregated waste should be collected at household and community level, and taken to the community level for further segregation or treatment.
- Non decomposing materials should be further sold out or to be reused.

6.3 Activities Done by Students for allocated village with Photograph

About Swachh Bharat Abhiyan, we aware the people of Nardipur village by personal interaction, how they should keep their houses and surroundings clean. Also, knowledge of cleanliness was distributed among them, by conducting lectures on the importance, benefits, necessities, requirements, etc. Here are some of the activities done by us in the Village…

6.3.1 Importance of Primary Segregations with handbills

Figure 84 Sharing Knowledge about importance of segrigation at primary level, In Frame – Ajaysinh Bhati

The Gram Panchayat already arrange to supply three different colour bins to all the residents. But villagers do not cooperate with the system. As we personally interact with villagers and asked them, *"Why they do not use the waste bins properly?"* And the most common answer was, they do not know segregation system or use of waste bins.

So we distributed pamphlet explaining the purpose of three different colour bins with the help of Miss Aanalben Prajapati, Talati and Mr. Lalaji Jeshanji Thakor, Gram panchayat Patawala, to motivate them with our reasons: *why is this important in a village?*

Figure 85 Pamphlet Distributed to Villagers

6.3.2 IPC (Interpersonal Communication)

Relational Correspondence causes us in an eye to eye circumstance to show to the occupants that, what are bio-degradable squanders (wet)? Also, what are non-biodegradable (dry) squanders? What are recyclables? What unsafe squanders are? What is implied by essential isolation that the family units should do? How this goes further into making gas, vermi-manure and so forth we utilize our insight, innovativeness and advancement to spread mindfulness by making Diagrams, Drawings, leaflets and so on.

Figure 86 Personal Interection with villagers of Nardipur, In frame- Ajaysinh Bhati & Anuj Shyara

6.3.3 Students Orientation

The inhabitant school youngsters are a brilliant wellspring of energetic human asset, the force of which can be named for this reason and they imperative a short direction on SWM likewise that what is this SWM plan attempting to achieve inside a gram panchayat. To lead directions for them in independent gatherings, and plan with them how they can include themselves in this IEC exercise and Create thoughts too, we are intending to lead meetings of understudy direction on SWM, when government return the schools.

6.3.4 Educative Inspection

The Disinfection Reviewer goes for checking crafted by the sterilization labourers, mentions direct observable fact of how occupants react to the call. We disclose to disinfection Investigator Mr. Mohanbhai Thakor that, he can likewise utilize that chance to educate the occupants who are reluctant to invest energy on isolating.

Figure 87 Sanitation Inspector doing his Job

6.3.5 Clean the Commons Campaign

Cleaning up the schools, Roads, Chowk, Chauaraha, all Government Buildings and nearby blank space or many infamous spots where people usually chuck their waste. These areas can be cleaned up through a special campaign. After introducing 'Clean the Commons Campaign' to Talati and Gram panchayat, they had decided to take action on it. With the title suggested

Figure 88 Figure 83 Cleaning of all the common places of Village

by us 'Clean the Commons Campaign' they decided to clean all the common places and as a result these work was done in very good manner. (Here we show some of the images from the campaign taken by Mr. Lalaji Jeshanji Thakor, Gram panchayat Patawala.)

6.3.6 Lack of awareness about troubles created by unhygienic place

Figure 90 Small Talk about playing safe by Ajaysinh Bhati and Anuj Shyara

Walking through the street of village we saw that people throw the garbage of their houses on an open area which is causing odour nuisance and can be harmful for health of people living nearby. While doing survey work in the village, we found that children are playing in some very unhygienic place, which was surrounded by cows' and buffalo's dung and flies-mosquitoes are in huge amount. Which causes too much troubles regarding health for children. So we explain them and their parents also, not to play nearby such kind of places.

Figure 89 Children playing nearby unhygenic place

7. Village condition due to Covid-19

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

Taking all things together gram panchayats in the express, the utilization of Online Media whatsapp bunch has been utilized to make mindfulness among the majority in the towns. Data at the grassroots level is being given to individuals by putting banners all over. Face veils are being circulated to the residents by Gram Panchayat individuals and social associations and residents are likewise being advised not to contact their eyes, nose, and mouth, wash hands with cleanser regularly and keep up close to home distance. Alongside apportion appropriation to locals, grain for deserted steers is likewise being given by a social help association.

Figure 91 Notice Board at Temple, Nardipur

Government of India in close collaboration with State Governments has taken various initiatives. Close consultation and guidance of the State as well as District authorities is being maintained to ensure that lock down conditions are not violated and norms of social distancing are scrupulously followed to contain the spread of the disease.

Gram panchayat is continuing to request that residents quarantine for 10 days if the following criteria are met:

- Any inhabitant with the accompanying signs and manifestations: fever or chills, hack, windedness or trouble breathing, weariness, muscle or body throbs, migraine, sore throat, runny nose or blockage, sickness or spewing, looseness of the bowels or new loss of taste or smell.
- Any occupant that has gotten back from an emergency clinic or recovery office.

Figure 92 Shopkeeper giving information, Nardipur

7.2 Any other steps taken by the students / villagers

- People of the village are so helpful to us and at the same time they were so strict about the social distancing.
- Villagers are avoiding to go in public places without any necessary.
- Social distancing was maintained by the villagers at the shop and public places.
- Hand sanitizers were distributed to the villagers for the safety purpose and to fight against the Covid situation.
- villagers were been warned to wear mask at all cost in public places and one who does not follow will have to pay the fine decided by government.

8. Sustainable Design Planning Proposal (Prototype Design)

8.1 Design Proposals

8.1.1 Sustainable Design Proposals : Public Toilet

Scenario:
Open defecation is still practiced in Nardipur, resulting in serious social, health and economic problems. Human waste left in the open helps in breeding and transmission of pathogens which carry disease and infection. Human waste contain a spectrum of pathogens, and over 50 types of different infections are transmitted through direct or indirect routes from such waste.

Existing Condition in Nardipur:
In Nardipur, sometimes people defecate near the source of water, which contaminates water bodies resulting in even greater infection through use of that water for various purposes such as drinking, cooking, bathing, washing. The health consequences of such actions are clearly visible amongst villagers in the form of high and repeated cases of illness, especially diarrhoeal diseases, which lead to loss of working days affecting the earning potential of the affected person and thus the economic productivity of the village as a whole.

Sustainability of the design:
For some households, affording a low-cost toilet option may be a problem, even with external incentives/subsidies available for construction and usage. Or, in other instances, availability of the required space may be a problem; in some cases, there may be issues related to ownership of land (for example, with migrant labour). In all these instances, the provision of a community toilet may be the only option.

Design Utilized by:
A public toilet is a facility which is built for the use of inhabitant and the floating population such as migrant workers, visitors, and tourists, etc., who visit the village area frequently because of its commercial, religious or tourist attraction. Illiterate/ Semi-literate users; Underserved; Unbanked; People living in remote area; etc.

Design brief:
This is a Public lavatory designs for Men and Women both attached with Handicap lavatory having all kind of lavatory facilities and amenities.

Organisation and Maintenance of the Lavatory:
O&M is most crucial to ensure that the actual goal of the project is being achieved. If the toilet falls into a state of disrepair and is not cleaned regularly for users, the asset will deteriorate and the interest of people in using the facility lost over a period of time. Thus, a formal O&M arrangements have to be made in which the interest of the people is sustained.

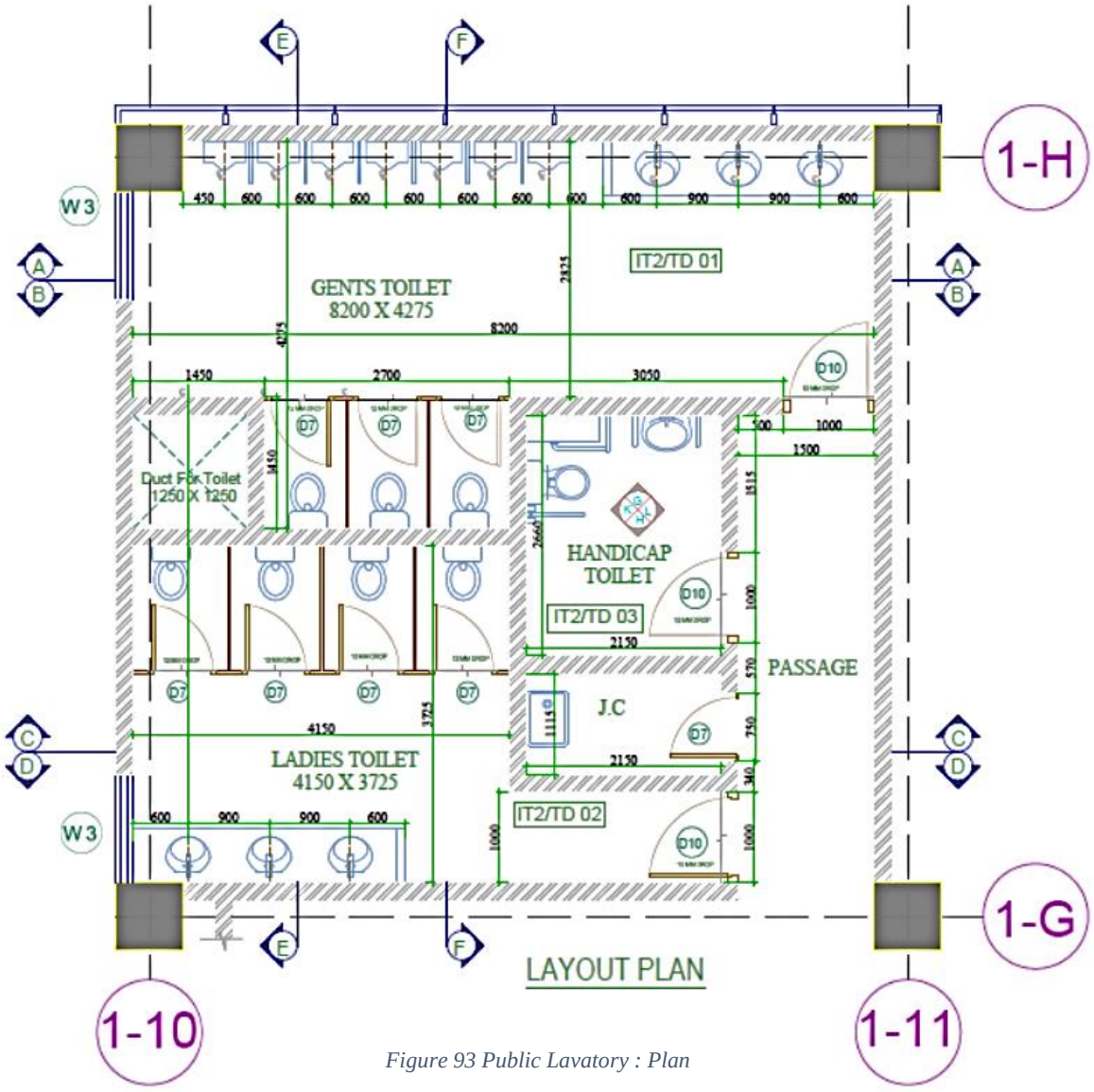


Figure 93 Public Lavatory : Plan

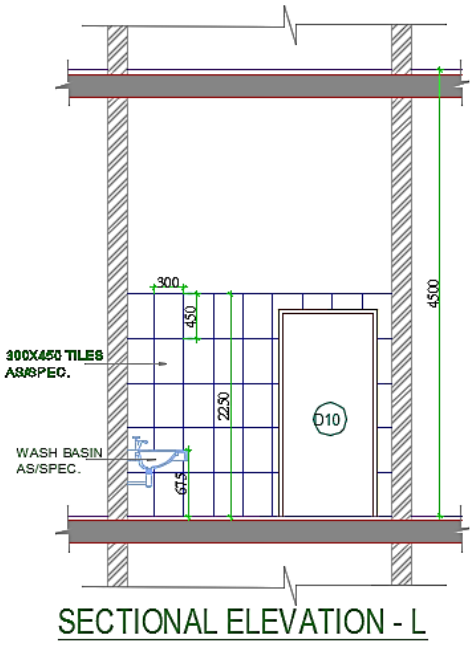


Figure 94 Public Lavatory : Elevation

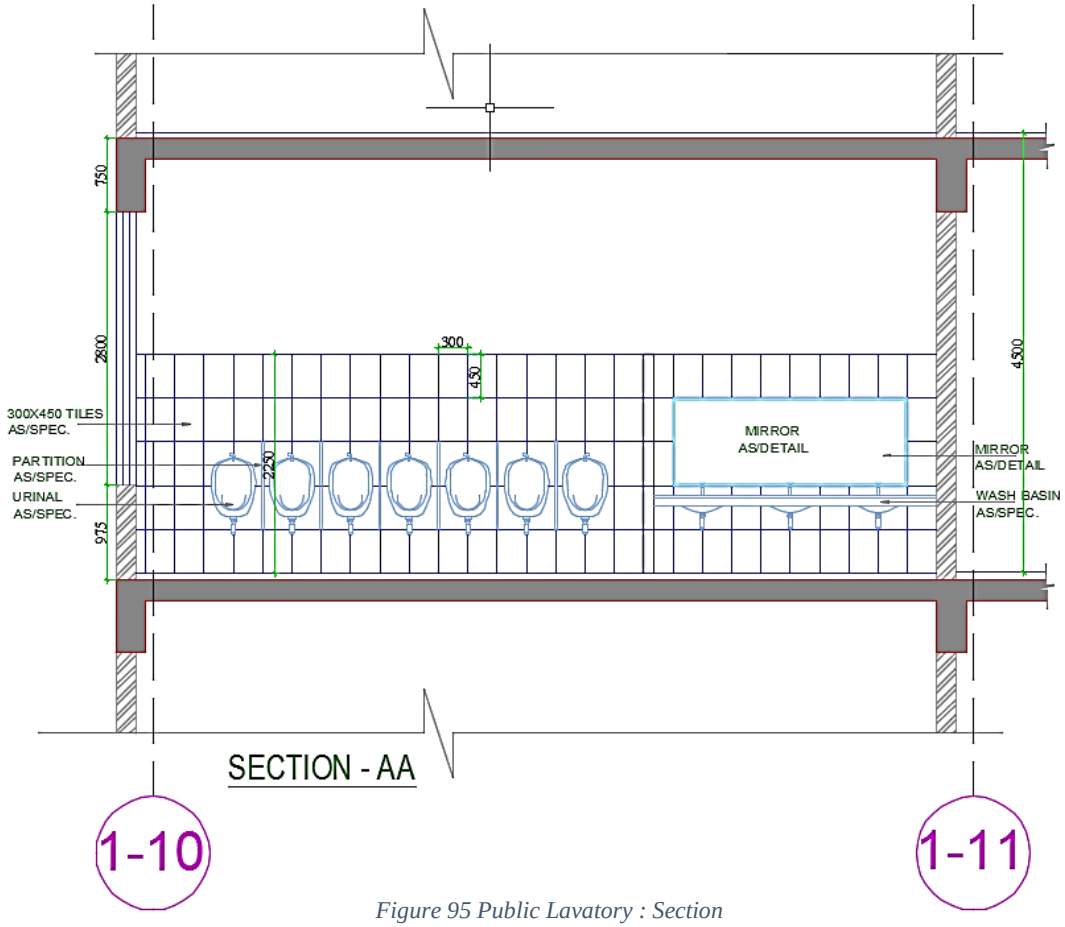


Figure 95 Public Lavatory : Section

Abstract Sheet:

Table 30 Public Lavatory : Abstract Sheet

Sr. No	Item Description	No.	Length	Width	Height	Quantity	Total Quantity	Rate	Per	Total Amount
1.	**Excavation**						33.426	350	m^3	11699
	Main Walls	4	7.650	0.9	0.9	24.786				
	Columns	4	1.2	1.2	1.5	8.64				
2.	**PCC In Foundation**						5.283	3400	m^3	17962
	Main Walls	4	7.650	0.9	0.15	4.131				
	Columns	4	1.2	1.2	0.20	1.152				
3.	**Brickwork In Foundation**						19.503	3200	m^3	62410
	Main Walls	4	7.650	0.6	0.75	13.77				
	Columns	4	1.05	1.05	1.3	5.733				
4.	**Brickwork In Superstructure**	1	51	0.2	4.5	45.9	45.9	3600	m^3	165240
5.	**Plaster**	2	51	-	4.5	459	459	170	m^2	78030
6.	**125 Mm THK Rcc Slab**	1	9.150	9.150	0.125	10.465	10.465	4600	m^3	48140
Total										**3,83,481**
Add 6% Enhancement										**23,008.86**
Total Rs.										**4,06,489.86**
Say Rs.										**4,07,000**

8.1.2 Physical Design Proposals: Water Tank

Scenario:

Given that an individual consumes eight litres of water a day, an average village requires almost 3.8 Ml water a year for drinking and cooking. This means an average village would require 0.17 ha to catch this rainfall even if half the average rainfall was captured.

Existing Condition in Nardipur:

There are already two overhead water tanks are available in the village but it is not sufficient for whole village so we are here presenting the underground water tank design.

Design Utilized by:

Farmers for farming, villagers for day to day life and to make sure that enough water is available in hard situation.

Design brief:

Under suitable circumstances, ground level storage tanks may be used to deliver water to users by gravity flow. Storage tanks are a very important part of a water system because they ensure that adequate quantities of water are available to meet demand.

Operation Points of the Water Tank:

- Monitor min and max water level
- Monitor time to fill and empty tank
- Monitor occurrence of overflows
- Monitor occurrence of alarms
- Monitor for ice formation in tank
- Monitor chlorine residuals in tank
- Monitor distribution system water demand and pressure

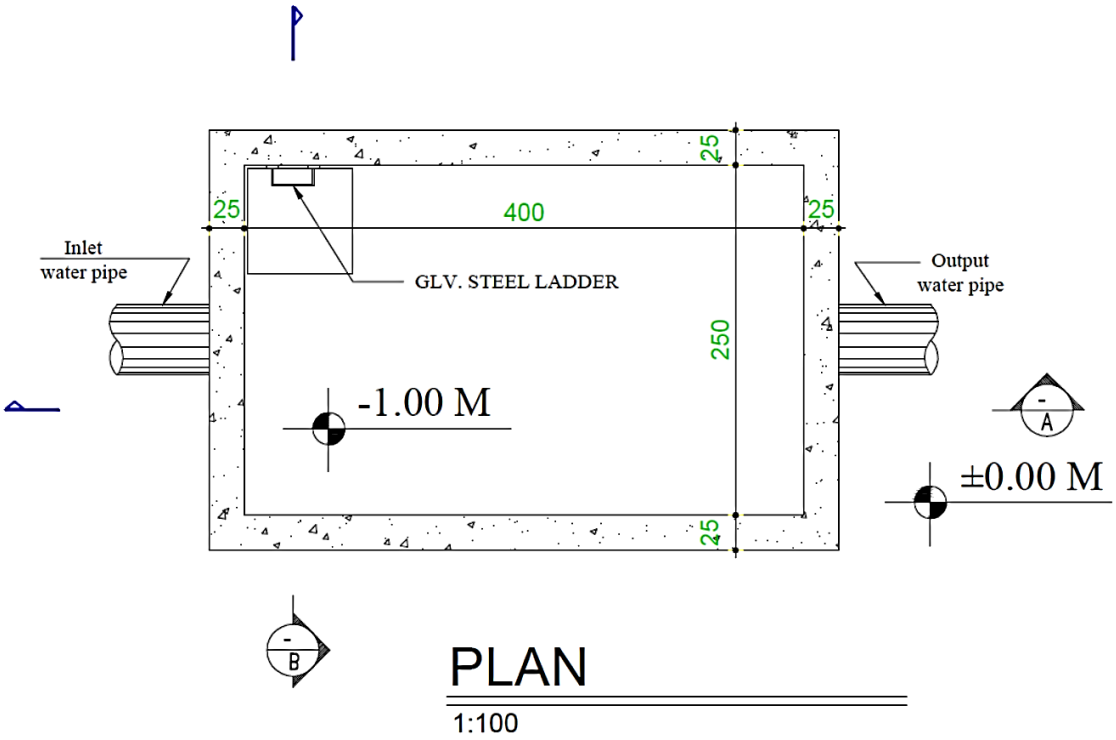


Figure 96 Water Tank : Plan

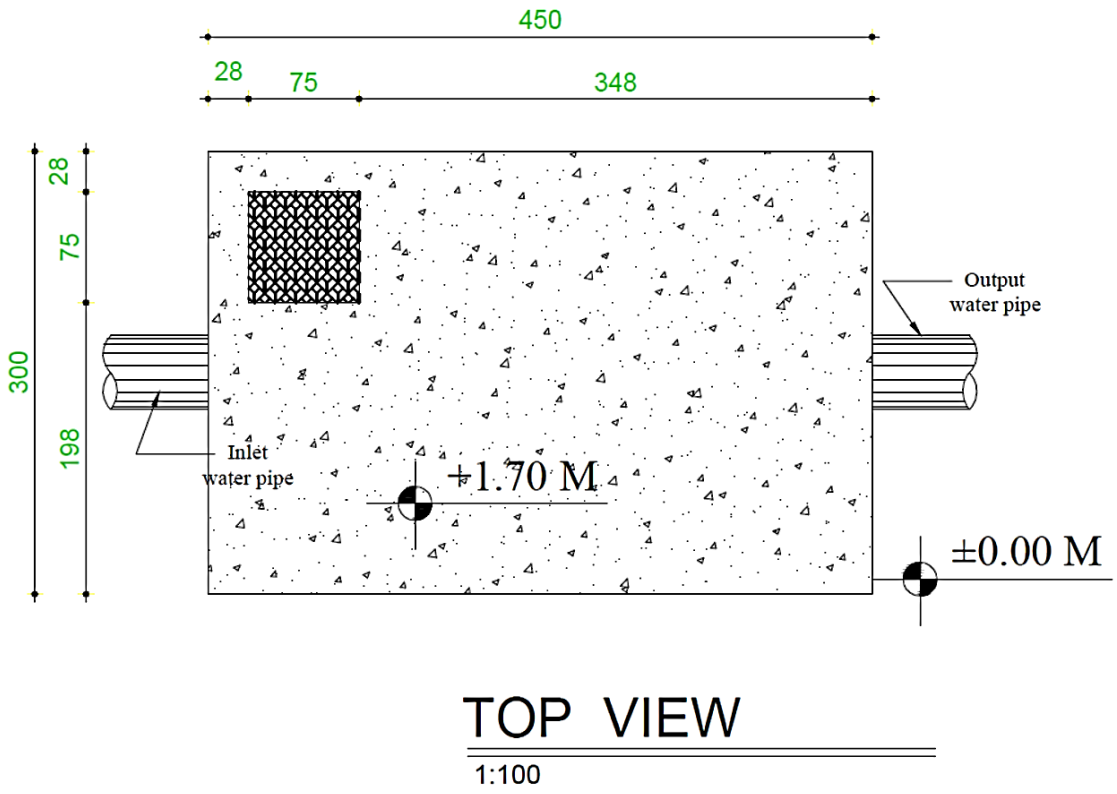


Figure 97 Water Tank : Top View

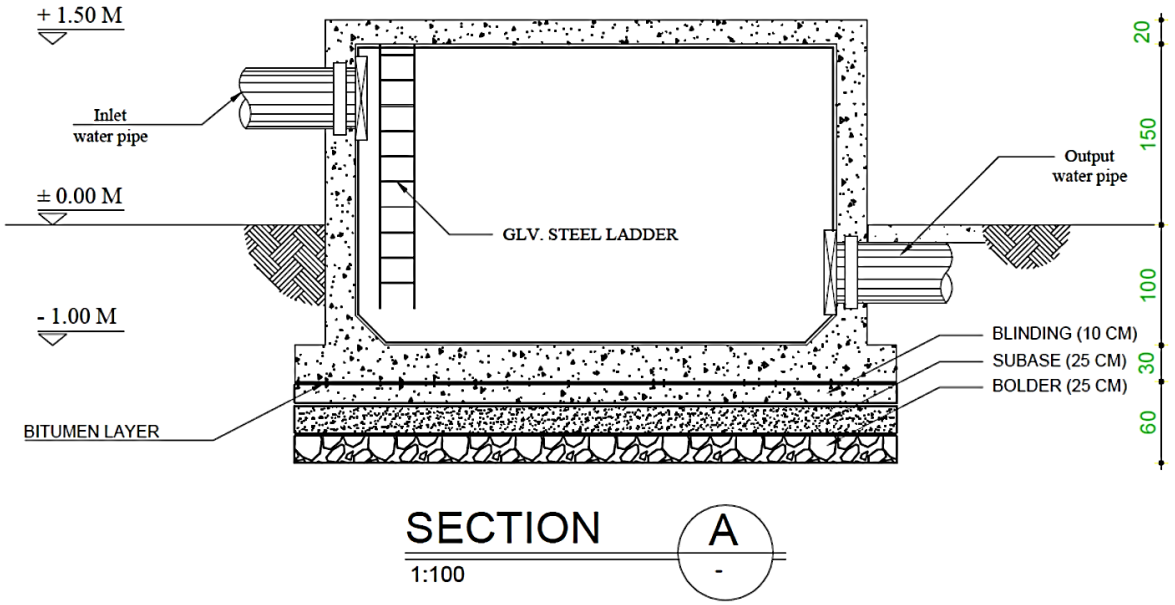


Figure 98 Water Tank : Longitudinal Section

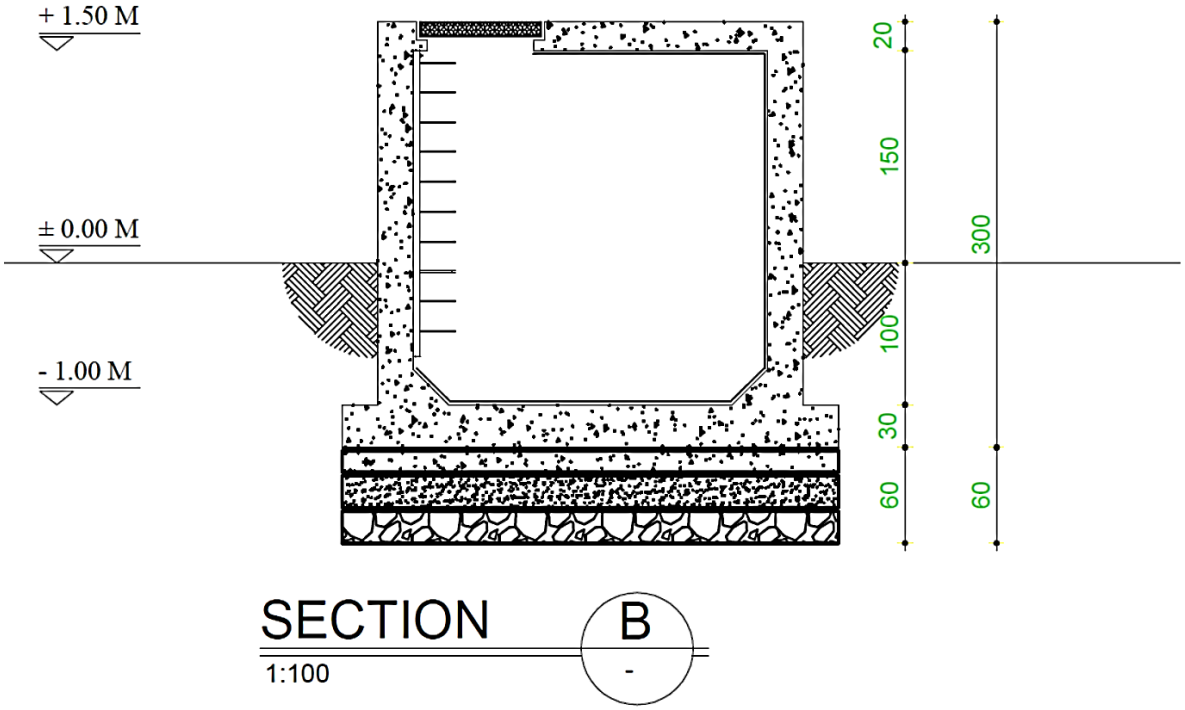


Figure 99 Water Tank : Lateral Section

Abstract Sheet:

Table 31 Water Tank : Abstract Sheet

Sr. No	Item Description	No.	Length	Width	Height	Quantity	Total Quantity	Rate	Per	Total Amount
1.	**Excavation**	1	5.5	4	2	44	44	350	m^3	15400
2.	**Foundation Courses**									
	Compacted layer of soil	1	5.5	4	0.1	2.2	2.2	150	m^3	330
	Bolder	1	5.5	4	0.25	5.5	5.5	450	m^3	2475
	Sub base	1	5.5	4	0.25	5.5	5.5	580	m^3	3190
	Blinding	1	5.5	4	0.1	2.2	2.2	3200	m^3	7040
3.	**Body of Tank**									
	Bottom wall	1	5.5	4	0.3	6.6	18.025	3600	m^3	64890
	Long Side wall	2	4.5	0.25	2.5	5.6				
	Short Side wall	2	2.5	0.25	2.5	3.125				
	Top wall	1	4.5	3	0.2	2.7				
Total										**64,890**
Add 6% Enhancement										**3,893**
Total Rs.										**68,783**
Say Rs.										**69,000**

8.1.3 Social Design Proposals: Bus Stop

Scenario:

Public transport by bus is an essential need in almost all areas of the country. However, public transport can be difficult to organise in rural areas because of the dispersed nature of populations and the potential trade-off between maintaining accessibility and achieving competitive journey time in designing services. Accordingly, it is important that the location of a particular bus stop considers the issues set out in the following sections.

Existing Condition in Nardipur:

An effective public transport system needs stopping locations that are convenient for passengers, both in terms of journey origins and journey destinations. The selection of bus stop locations that reduce walking times from origins and to final destinations should improve the attractiveness of public transport and contribute to the achievement of national, regional and local transport policy objectives

Sustainability of the design:

Ideal arrangements are rarely available when considering the location of bus stops in rural area, and instead, an informed judgment has to be made on the suitability of a location based on a number of factors. This judgement has to take into account the positive benefits of the availability of a bus stop location at a convenient location for intending passengers, but also consider the suitability of introducing or retaining a vehicle stopping location into the road environment at that location

Design Utilized by:

A Bus Stop is a facility which is built for the use of inhabitant and the floating population such as migrant workers, visitors, and tourists, etc., who visit the village area frequently because of its commercial, religious or tourist attraction. Illiterate/ Semi-literate users; Underserved; Unbanked; People living in remote area; etc.

Design Location:

The location of the particular bus stop has to be accessible to intending passengers, and as convenient as possible.

In general, bus stops should not be located at some distance along roads bound with fences or blank walls these locations are inconvenient to all passengers residing away from the main road.

The preferable location of a bus stop is on the exit side from a junction, for the following reasons:

The junction itself and any crossing/turning movements will remain clear to approaching traffic, and will not be obstructed by a stopped bus; and Drivers will be expecting to slow on approach to a junction, and this offers the most forgiving (slower) speed regime for traffic approaching buses that are stopped on the far side of the junction.

Passenger Need from the Bus Stop:

For instance, if the bus stop on a main road is intended to serve the residents of a particular town land, estate or conclave of houses, it is important that the bus stop should be located close to where these residents access the main road.

In effect, it should be expected that bus stops would be located proximate to junctions, as opposed to being positioned at a significant remove.

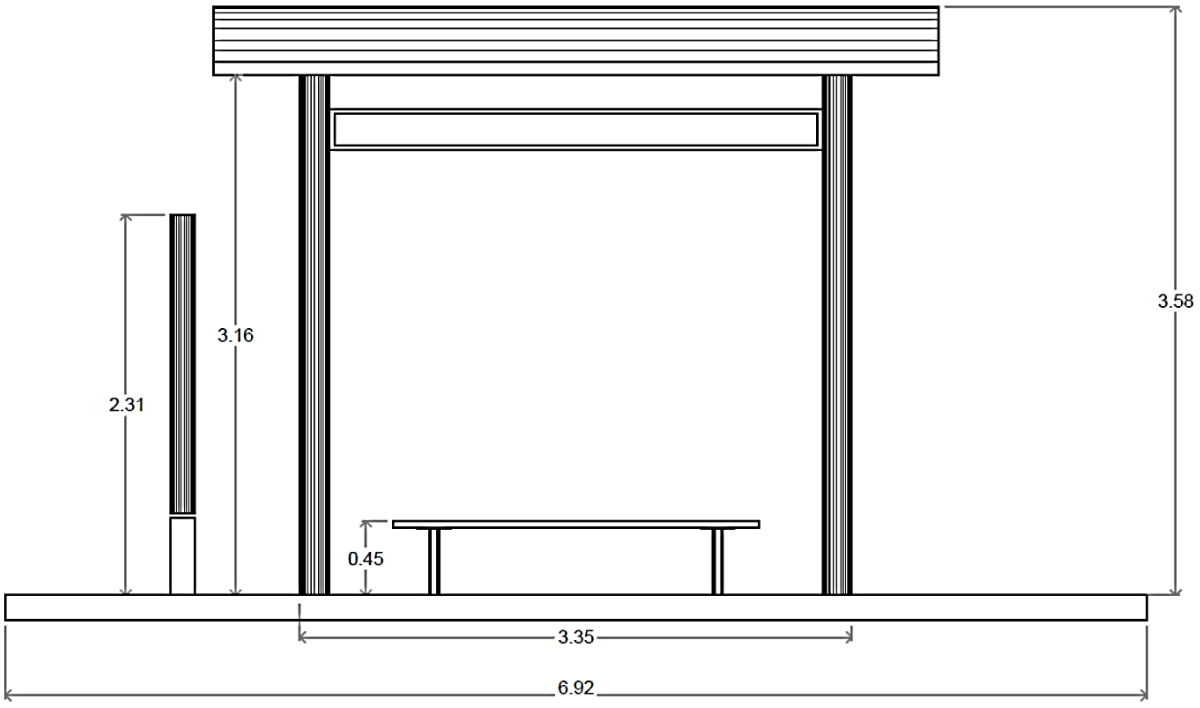


Figure 101 Bus Stop : Elevation

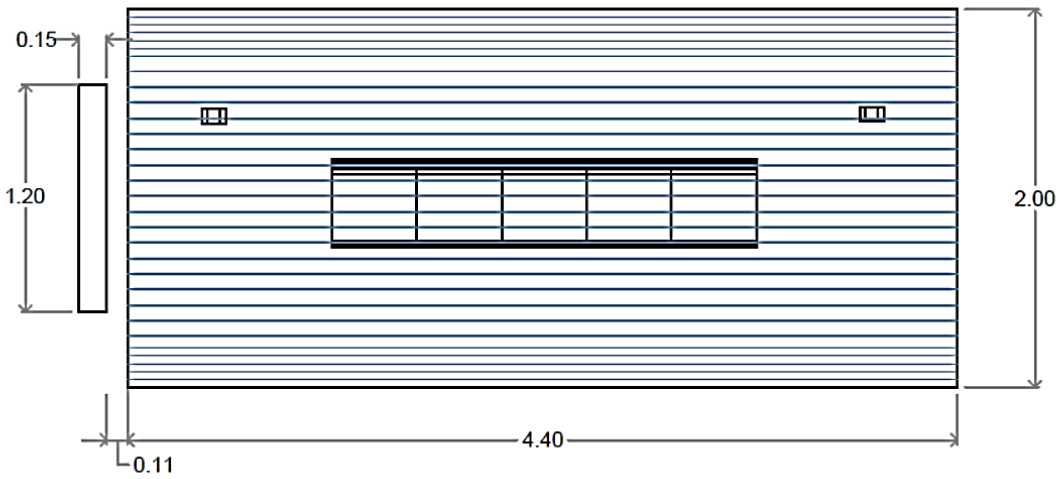


Figure 100 Bus Stop : Top View

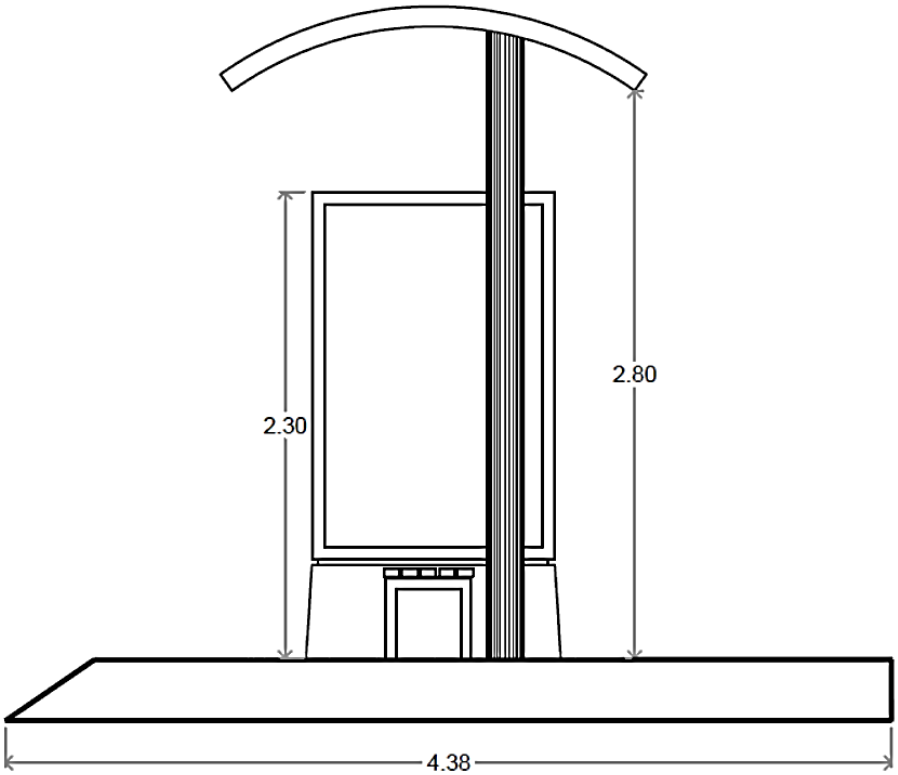


Figure 102 Bus Stop : Sectional View

Abstract Sheet:

Table 32 Bus Stop : Abstract Sheet

Sr. No	Item Description	No.	Length	Width	Height	Total Quantity	Rate	Per	Total Amount
1.	**Earth work in excavation in foundation, trenches etc.**	1	7.25	5	0.5	18.125	350	m^3	6343
2.	**PCC foundation with crushed stone aggregate 40 mm nominal size**	1	6.92	4.38	0.65	19.70	3400	m^3	66980
3.	**Precast and installation charges**								
	SS Grade 304 Column					211312	piece		211310
	SS Grade 304 Rafter								
	SS Grade 304 Purlin								
	Roof sheet - Polycarbonate Sheet								
	SS Grade 304 Frame for Advertisement Board								
	SS Sheet for Advertisement Board								
	Acrylic Sheet for Route Board								
	SS Grade 304 Connectors for Advertisement Board								
Total									**2,84,633**
Add 6% Miscellaneous									**17,078**
Total Rs.									**3,01,711**
Say Rs.									**3,05,000**

8.1.4 Socio-Cultural Design Proposals: Youth Club

Scenario:

In India, persons in the age group of 13-35 years are considered as youth. It is acknowledged that since all the persons within this age group are unlikely to be one homogeneous group, but a conglomeration of sub groups with differing social roles and requirements; the age group may, therefore be divided into two broad sub-groups i.e. 13-19 years and 20-35 years (National Youth Policy 2003).

Purpose of Youth Club:

Youth Club is an association of youth who are striving towards the achievement of common goals and objectives. It is formed, managed and run by youth themselves for the growth and development of youth in particular and the community in general. The members of Youth Club constitute both male and female youth. Whereas, if a particular Youth Club has only female members it may be called a Yuva Mahila Mandal also. The Youth Clubs and Yuva Mahila Mandals enjoy the same status for all practical purposes.

Youth Clubs empower the youth:

- To identify the needs and problems of the community and provide solutions by mobilizing the required resources
- To bring a positive change among the youth and the society by inculcating the national, social, cultural and civic values
- To inculcate dignity of labour, the spirit of volunteerism, sense of responsibility,self-relianceandqualityofgoodcitizenshipamongtheyouth
- To develop leadership qualities, sportsman spirit, communication skills with proficiency in computers and life skills along with survival skills
- Develop cultural and scientific temperament among youth
- Provide a platform to explore talents of youth in various fields
- Develop communal and social harmony, friendship, fraternity and peace in the community, and
- Fight social evils.

Suggested activities for Youth Club:

1. Education, Literacy and Library
2. Employment Generation including skill up-gradation
3. Environmental sustainability
4. Promotion of Art & Culture
5. Promotion of Sports & Games
6. Youth Health
7. Adolescent/Teens Club
8. Women's Wing
9. Social welfare

Management of the Youth Club:

In order to manage the Youth Club effectively, it needs to have a Memorandum of Association, Byelaw, properly elected General Body, Executive Committee and other Subcommittees. The election of office bearers should be done in a democratic manner.

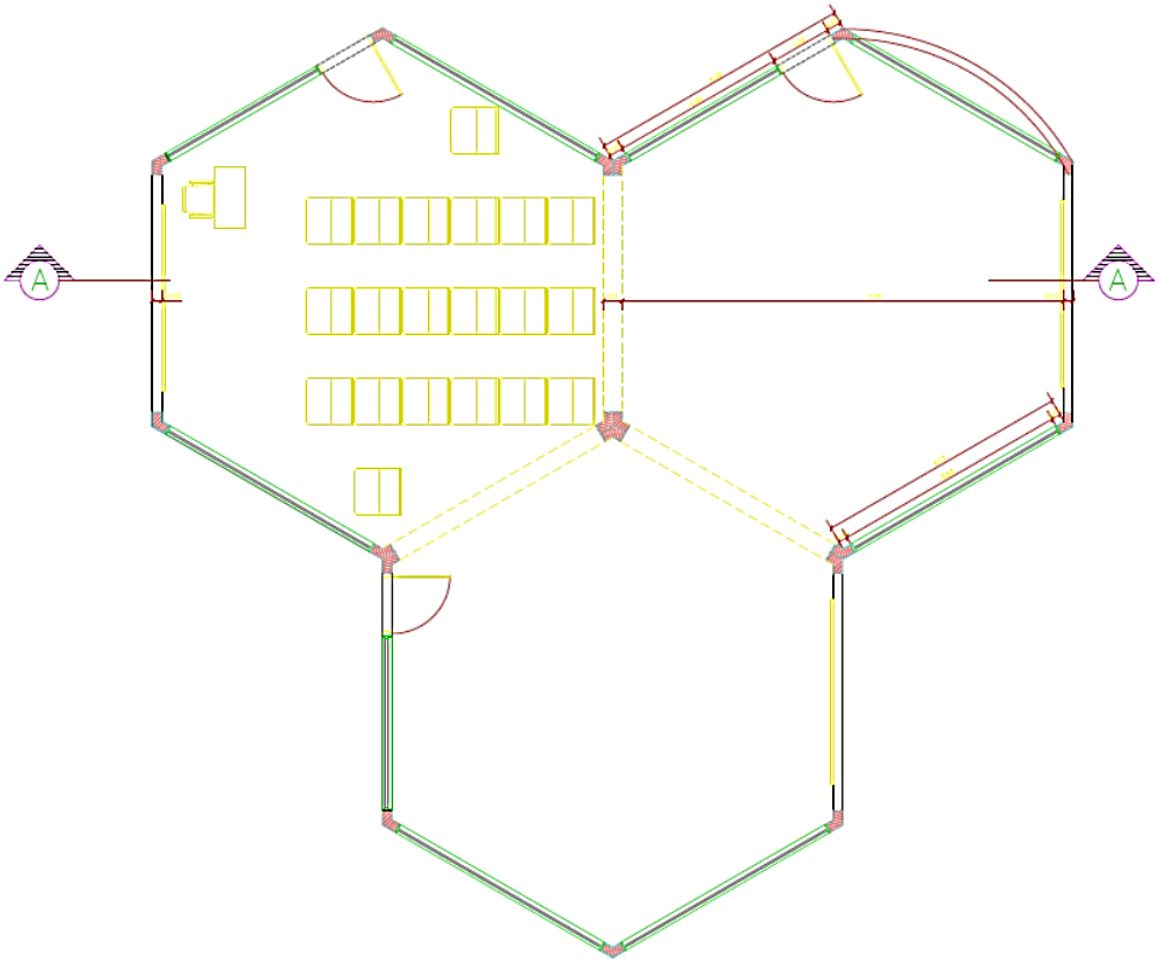


Figure 103 Youth Club : Plan

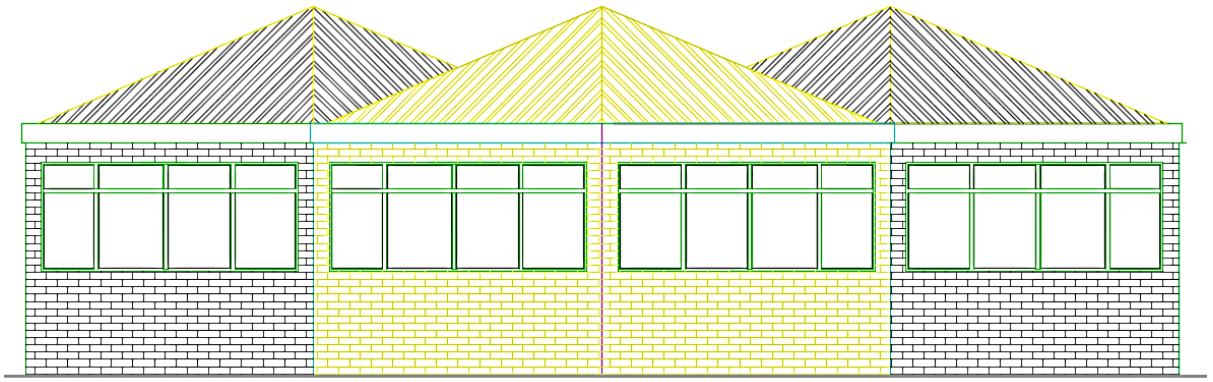


Figure 104 Youth Club : Elevation

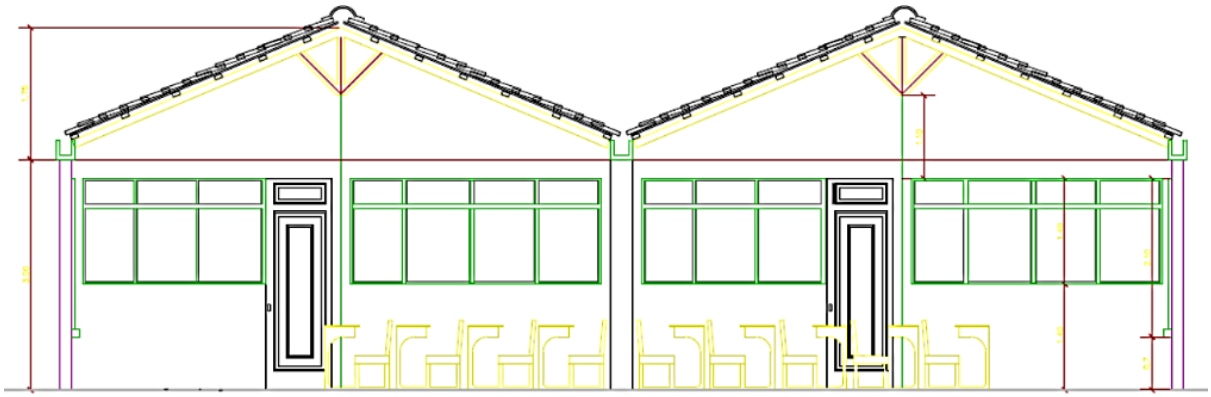


Figure 105 Youth Club : Section

Abstract Sheet:

Table 33 Youth Club : Abstract Sheet

Sr. No	Item Description	No.	Length	Width	Height	Quantity	Total Quantity	Rate	Per	Total Amount
1.	**Excavation**						19.8	350	m^3	6953
	Outer Wall	12	4.6	0.45	0.6	14.9				
	Inner Wall	3	4.6	0.6	0.6	4.97				
2.	**PCC In Foundation**						1.74	3200	m^3	5568
	Outer Wall	12	4.3	0.15	0.15	1.16				
	Inner Wall	3	4.3	0.3	0.15	0.58				
3.	**Brickwork In Foundation**						5.22	3400	m^3	17748
	Outer Wall	12	4.3	0.15	0.45	3.48				
	Inner Wall	3	4.3	0.3	0.45	1.74				
4.	**Brickwork In Superstructure**						35.41	3600	m^3	127476
	Outer Wall	12	4.3	0.15	3.05	23.61				
	Inner Wall	3	4.3	0.3	3.05	11.8				
5.	**Clay Roofing Tiles**						160	1076	m^2	172223
Total										**3,29,968**
Add 12% Enhancement										**39,596**
Total Rs.										**3,69,564**
Say Rs.										**3,70,000**

8.1.5 Smart Village Design Proposals: Aanganwadi

The meaning of the word ‘Anganwadi’ in the English language is "courtyard shelter". The word Anganwadi is derived from the Hindi word “Angan”, it refers to the courtyard of a house. Angan is a rural Indian term for “a place where people get together to discuss, greet, and socialize their matters”. The Angan is also used occasionally to cook food or for household members to sleep in an open air. This part of the house is seen as the heart of the house and is considered a sacred place. Therefore, the significance of this part of the house comes across in the way a worker works in an Angan and visits other Angans to perform the indispensable duty of helping with health care issues. After all, they are the most important link between the rural poor and good healthcare.

Aim of Anganwadi:

The aim is to provide a learning environment for children under the age group of 3-6 years, and early care and stimulation for children under the age of three. PSE is provided through the medium of “play” to promote the social, emotional, cognitive, physical and aesthetic development of the child as well as to prepare him/her for primary schooling.

Purpose:

- To improve the nutritional and health status of children below the age of six years.
- To lay the foundation for the proper psychological, physical and social development of the child.
- To reduce the incidence of mortality, morbidity, malnutrition and school dropouts.
- To achieve effective coordination of policy and implementation among various departments to promote child development.
- To enhance the capability of the mother to look after the normal health, nutritional and developmental needs of the child through proper community education.

Importance of the design:

The Anganwadi is passing through many ups and downs. It does not mean that it is a worthless program; but on the other hand, it helped many rural children by providing them with an early education. Therefore, for making this program successful, it is our collective duty to cooperate with each other in this pious social work.

Design Utilized by:

The basic services provided under ICDS are mentioned under three headings like nutrition, health and pre-school education. Nutrition services include supplementary feeding, growth monitoring, and nutrition and health counselling. Health services include immunization, basic health care, and referral services. Pre-school education involves various stimulation and learning activities at the Anganwadi.

Operation and Management of the Aanganwadi:

Integrated Child Development Services (ICDS) is the only major national program that addresses the needs of children under the age of six years. It seeks to provide young children with an integrated package of services such as supplementary nutrition, health care and pre-school education. Because the health and nutrition needs of a child cannot be addressed in isolation from those of his or her mother. The program also extends to adolescent girls, pregnant women and nursing mothers.

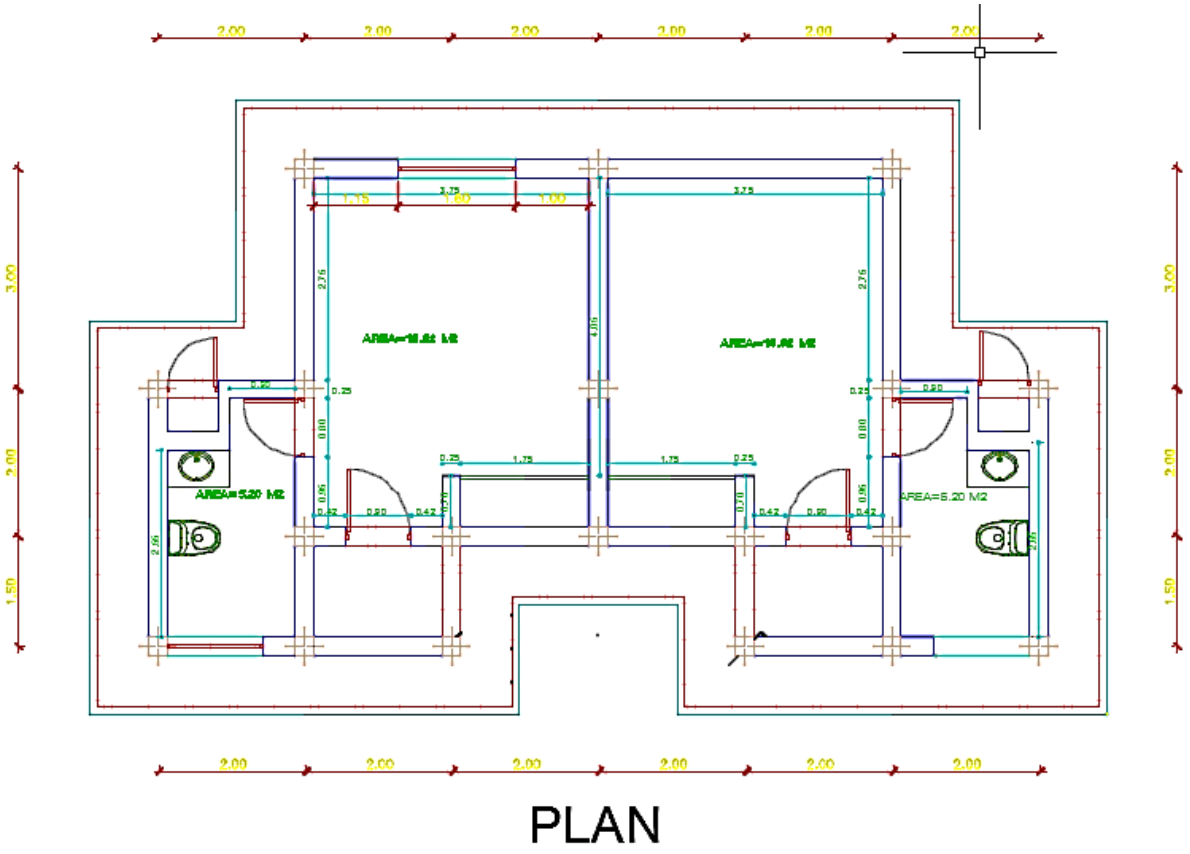


Figure 106 Aanganwadi : Plan

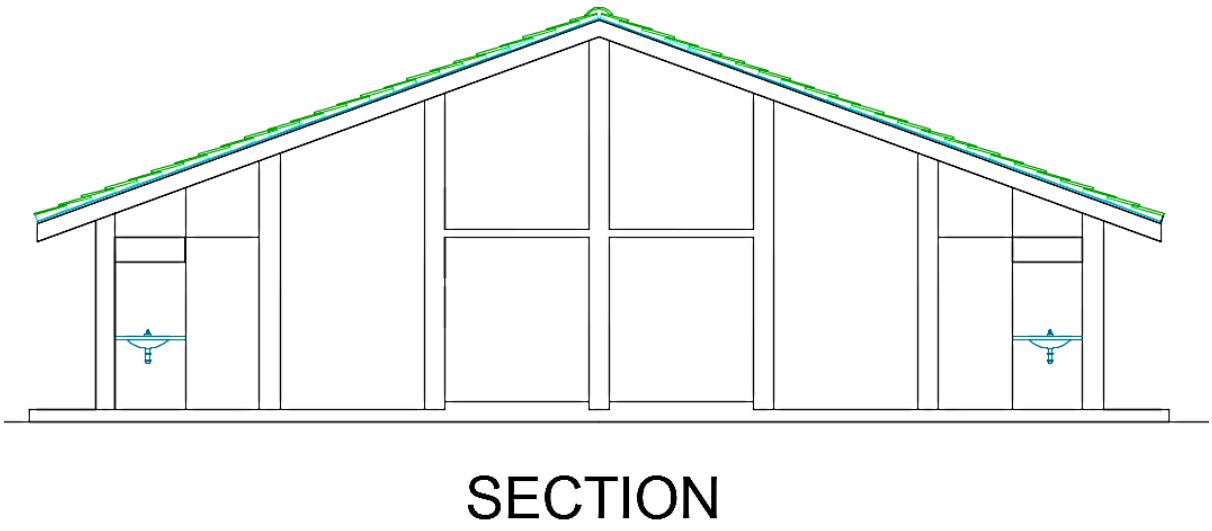


Figure 107 Aanganwadi : Section

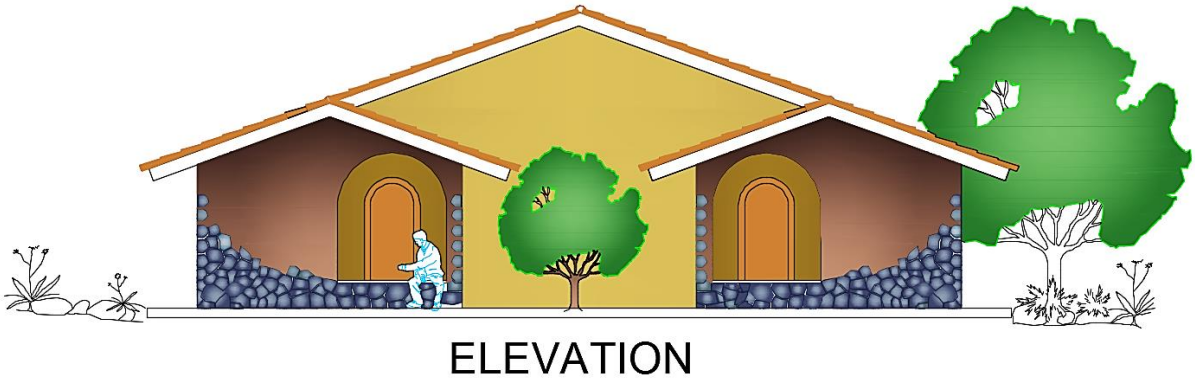


Figure 108 Aanganwadi : Elevation

Abstract Sheet:

Table 34 Aanganwadi : Abstract Sheet

Sr. No	Item Description	No.	Length	Width	Height	Quantity	Total Quantity	Rate	Per	Total Amount
1.	**Excavation**						37.333	350	m^3	13066
	Main Walls	1	80.9	0.6	0.6	29.124				
	Columns	19	0.6	0.6	1.2	8.208				
2.	**PCC In Foundation**						4.285	3200	m^3	13712
	Main Walls	1	80.9	0.25	0.2	4.045				
	Columns	19	0.25	0.25	0.2	0.24				
3.	**Brickwork In Foundation**						9.28	3400	m^3	31600
	Main Walls	1	80.9	0.25	0.4	8.09				
	Columns	19	0.25	0.25	1	1.19				
4.	**Brickwork In Superstructure**						96.225	3600	m^3	346410
	Main Walls	1	80.9	0.25	4.5	91.1				
	Columns	4	0.25	0.25	3	0.75				
		8	0.25	0.25	4	2				
		4	0.25	0.25	5	1.25				
		3	0.25	0.25	6	1.125				
	White putti on both side of walls						769	45	m^2	34605
5.	**Main Walls**	2	80.9	-	4.5	728				
	Columns	8	0.25	-	3	6				
		16	0.25	-	4	16				
		8	0.25	-	5	10				
		6	0.25	-	6	9				
6.	**RCC precast slab**						95.72	1950	m^2	186654
Total										**6,26,047**
Add 6% Enhancement										**37,562**
Total Rs.										**6,63,609**
Say Rs.										**6,65,000**

8.1.6 Heritage Village Design Proposals: Assembly Point - Chowk

Chowk can be used as gathering place for village. Meetings can be arranged in this place where enough place is available with seating arrangements. In Village villagers and farmers can sit heat for take rest after doing the hard work. Workers can use this public place to take rest and to eat with peace.

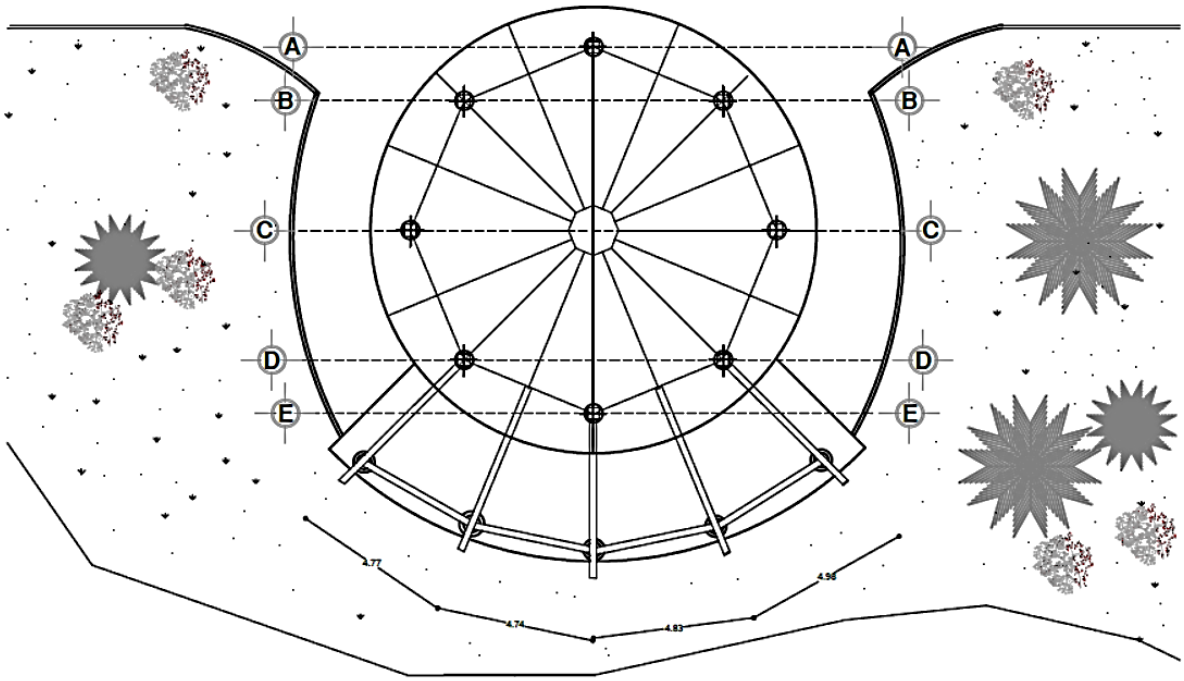


Figure 109 Chowk : Plan

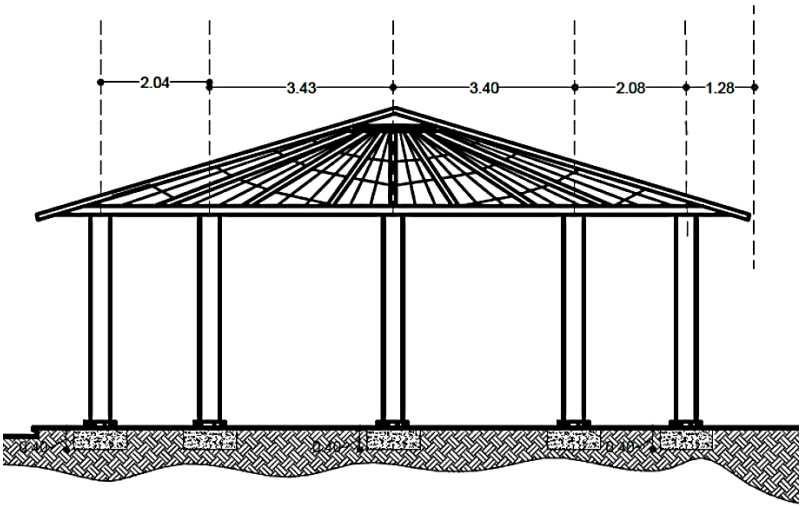


Figure 110 Chowk : Section

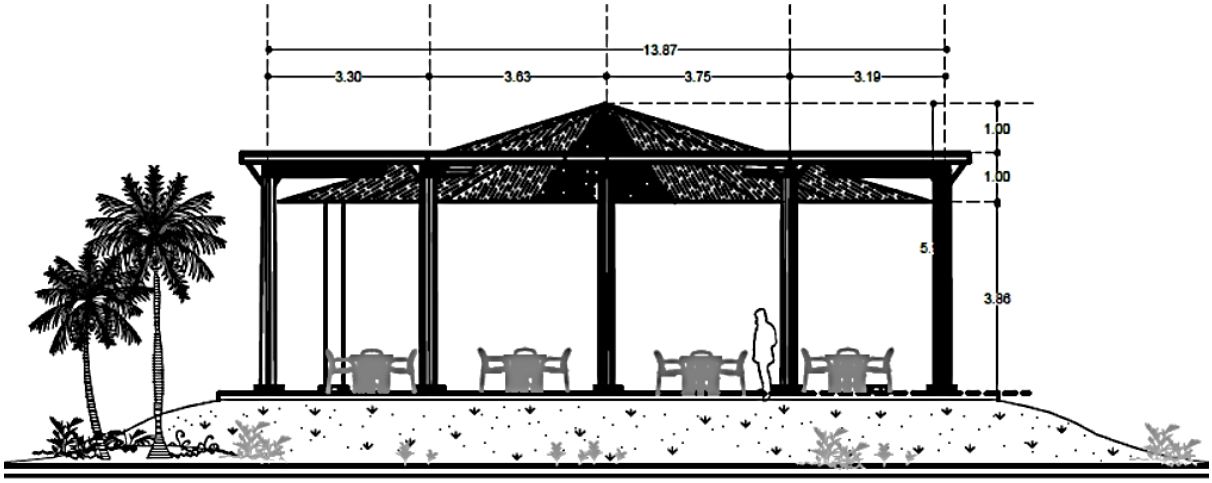


Figure 111 Chowk : Elevation

Abstract Sheet:

Table 35 Chowk : Abstract Sheet

Sr. No	Item Description	No.	Length	Width	Height	Total Quantity	Rate	Per	Total Amount
1.	**Earth work in excavation in foundation**	8	1.3	1.3	0.4	5.408	350	m^3	1892
2.	**PCC foundation**	8	1	1	0.4	3.2	3400	m^3	10880
3.	**Column**	8	0.375	0.375	4	4.5	3600	m^3	16200
4.	**Roof sheet - Polycarbonate Sheet**					83.2	320	m^2	26624
Total									**55,596**
Add 12% Miscellaneous									**6,671**
Total Rs.									**62,267**
Say Rs.									**65,000**

8.1.7 Power theft identification and location detection using gsm:

Power theft is at the centre of focus all over the world but power theft in India has a significant effect on the Indian economy.

WAYS OF POWER THEFT:

- The normal practice for power theft is to short the input and output terminals.
- To place a magnet on the wheel in case of old meters.
- Bogus seals and tampering of seals.
- Disturbing electronic common reference point of measurement.

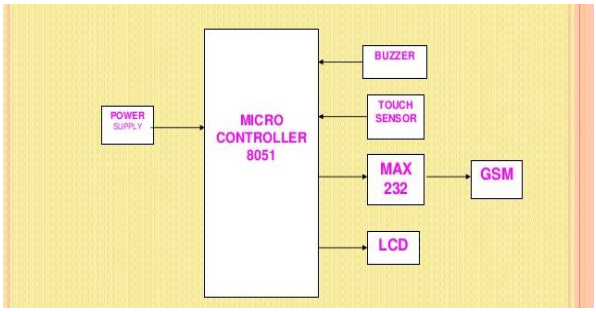


Figure 112 Micro Controller

COMPONENTS:

- GSM (Global System for Mobile communications)
- Microcontroller
- MAX232
- Touch sensor
- Liquid crystal display (LCD)
- Power supply
- Capacitors
- Resistors
- Voltage regulator
- Buzzer

GSM:

- GSM (Global System for Mobile communications) is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity.
- GSM networks operate in four different frequency ranges. Most GSM networks operate in the 900 MHz or 1800 MHz bands.
- Some countries in the Americas use the 850 MHz and 1900 MHz bands because the 900 and 1800 MHz frequency bands were already allocated.

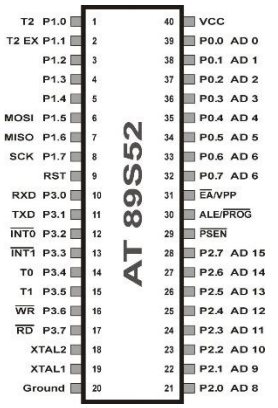


Figure 113 AT 89s52

MICROCONTROLLER:

- A microcontroller is a computer on a chip. It is an integrated chip that is usually a part of an embedded system. It is a self-contained,
- Independent and yet function as a tiny, dedicated computer.

MAX 232:

- A MAX232 chip has long been using in many microcontrollers boards. It is a dual RS232 receiver / transmitter that meets all RS232 specifications while using only +5V power supply

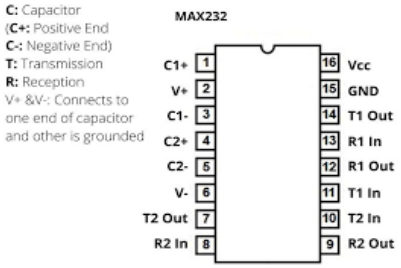


Figure 114 MAX 232

Touch sensor:

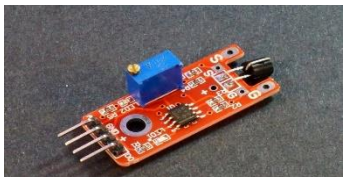


Figure 115 Touch sensor

Touch Sensor Technologies designs and manufactures patented digital switches for use in touch-sensitive User Interface Panels. Much more durable than mechanical and membrane switches, Touch Sensor keypads have become the new standard for solid-state switching.

LCD: A liquid crystal display (LCD) is a thin, flat display device made up of any number of colour or monochrome pixels arrayed in front of a light source or reflector.

Figure 116 LCD

POWER SUPPLY: Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit.

Figure 117 Capacitors

CAPACITORS: A capacitor or condenser is a passive electronic component consisting of a pair of conductors separated by a dielectric.

RESISTORS: A resistor is a two-terminal electronic component that produces a voltage across its terminals that is proportional to the electric current through it in accordance with Ohm's law: V = IR.

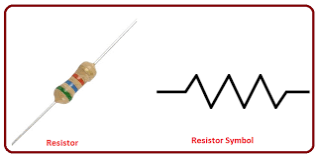


Figure 118 Resistor

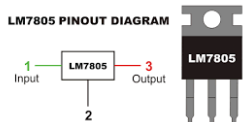


Figure 119 LM7805

VOLTAGE REGULATOR:

Voltage regulator is an electrical regulator designed to automatically maintain a constant voltage level.

It may use an electromechanical mechanism, or passive or active electronic components.

Figure 120 Buzzer

Buzzer: A *buzzer* or *beeper* is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short).

Costing:

Table 36 Costing of of Power theft identification

Component	Unit cost Rs.	Quantity	Total costR s.
GSM Module	825	1	825
Microcontroller(AT89s52)	72	1	72
MX232	500	1	500
Touch Sensors	400	2	800
Capacitor	12	6	72
Resistor	16	6	96
Voltage Regulator LM7805	9	1	9
Buzzer(6v)	8	1	8
Battery	8250	1	8250
LCD	330	1	330
Overall Cost			**10,962**

ADVANTAGES:

- The proposed system provides the solution for some of the main problems faced by the existing Indian grid system, such as wastage of energy, power theft, manual billing system, and transmission line fault.
- This method will reduce the energy wastage and save a lot of energy for future use.
- We can detect the location from where the power is being stolen which was not possible before.
- Optimized use of energy.
- Automatic user identification.

LIMITATIONS:

- Wide range of frequencies is required to facilitate large number of users. To overcome this, carrier levels can be changed from region to region.

- Presently, it requires a power supply (230 V) for the operation, but a small battery with automatic charging facility can be provided in real time.
- Cannot determine who is stealing, but even no other existing system is capable of doing this.
- If implemented on a large scale it may take lot of time and manual input.

APPLICATIONS:

- The system can be incorporated for almost all types of users.
- The concept is well suited especially for villages and interior areas.
- We by this design like to conclude that the power theft can be effectively curbed by detecting where the power theft occurs inform the authorities.

CONCLUSION:

- The project of ours is aimed at reducing the heavy power and revenue loss that occur due to power theft by the consumers.
- The proposed system will be hidden in such meters and as soon as an attempt is made for the theft, it will send a sms using GSM modem, by displaying the respective consumer meter number to control unit of electricity board
- Thus by the above mentioned design we can successfully and effectively address the problems related to power theft.

8.1.8 Automatic water level controller & indicator:

The drinking water crisis in Asia is reaching alarming proportions. It might very soon attain the nature of global crisis. Hence, it is of utmost importance to preserve water for human beings. In many houses there is unnecessary wastage of water due to overflow in overhead tanks. Automatic Water Level Indicator and Controller can provide a solution to this problem. The operation of water level controller works upon the fact that water conducts electricity due to the presence of minerals within it. So water can be used to open or close a circuit. About 95% of the Earth's water is in the oceans, which is unfit for human consumption. About 4% is locked in the polar ice caps, and the rest 1% constitutes all fresh water found in rivers, streams and lakes which is suitable for our consumption. A study estimated that a person in India consumes on an average of 140 litres per day. This consumption would rise by 40% by the year 2025. This signifies the need to preserve our fresh water resources.

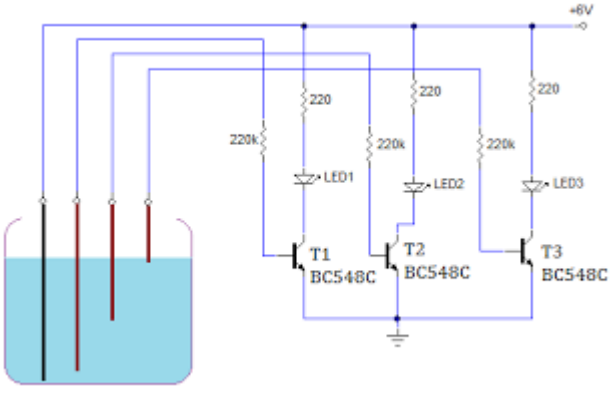


Figure 121 Water Level Indicator

This circuit consists of 4 sensing probes which are dipped in water to sense the level of water. The probe A is connected as com-mon to other three, which should be at the bottom most part of the water tank, also it act as a reference level. The probes B, C and D are set as minimum, middle and maximum level respectively. A short length three, 18 SWG copper wires can be used as sensing probes and for common sensor Probe A, a bare copper wire can be used. When water in the tank touches the probe A and B both, a small current flows from A to B through water and

to the base of transistor T1 via a 220KΩ resistor. As a result the transistor conducts causing the LED1 to glow and immediately the pump will start functioning and the buzzer starts sounding. Similarly, when water touches sensor C, LED2 glow and indicates that the tank is half- filled and still the pump works and it gives the information about the level of water in the tank.

Equipment Used

Input Voltage: 6 volt power supply is required.

Transistor:

BC548C is general purpose silicon, NPN, bipolar junction transistor. It is used for amplification and switching purposes. The current gain may vary between 110 and 800. The maximum DC current gain is 800.

Water Sensors:

18 SWG copper wires can be used as sensing probes that can be placed in the water tank. As the current required passing through the wire is in Nano amps. But if needed then carbon rods at the end of wires can be used. These carbon rods should be thoroughly washed.

LM7805:

This is the 5v regulator used to power up the whole circuit.

Buzzer:

Any 6 V buzzer will work here.

Automatic water level controller will automatically START the pump set as soon as the water level falls below the predetermined level and shall SWITCH OFF the pump set as soon as tank is full. It can be used to predict flood Liquid level indicator in the huge containers in the companies.

- Low costs
- Low power consumer.
- Fuel level indicator in vehicles.

Costing:

Table 37 Costing of Automatic water level controller & indicator

Component	Unit Cost	Quantity	Total Cost(Rs.)
Transistor (BC548c)	10	7	70
Water Sensors	39	4	156
Copper wires(18SWG)	22.5 / meter	3 m	67.5
Buzzer(6V)	8	1	8
LM7805	1	130	130
Battery 24V,100Ah	8250	1	8250
LED	12	1	12
		Overall Cost	RS. 8693

Automatic Water level Controller can be used in Hotels, Factories, Homes Apartments, Commercial Complexes, Drainage, etc.

8.1.9 Dual Tone Multi Frequency (DTMF) based Load Control System using 8051

DTMF based Load Control System using 8051 Microcontroller is a simple project that helps is controlling different loads (electrical appliances) with the help of DTMF Technology. DTMF

or Dual Tone Multi Frequency is a signalling technique that is often used in the field of telecommunication (telephones to be specific).

In the DTMF based Load Control System using 8051 project, we are using different communication technologies like DTMF and GSM for controlling our home appliances using a cell phone (mobile phone).

Principle of DTMF based Load Control System using 8051:

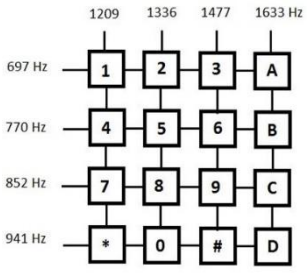


Figure 122 Dial Box

- The principle of operation of the DTMF based Load Control System using 8051 Microcontroller is based on the DTMF Technology.
- DTMF Technology is used in telephones (mobile phones or fixed lines), where when a key or button is pressed on the phone, a corresponding and unique tone will be generated. This tone is a combination of two different frequencies.
- Every key is associated with two frequencies and up on pressing the key a tone, which is an overlap of those two signals, is generated. In a typical telephone keypad, there are 12 keys i.e. 0 to 9 numeric keys and two symbol keys (# and *).
- These 12 keys are placed in 4 rows and 3 columns. Additionally, a fourth column consisting of letters A, B, C and D is also included in DTMF Technology.

Circuit Diagram of DTMF based Load Control System using 8051:

Components Required:

- 8051 based Microcontroller (AT89C51)
- 11.0592 MHz Quartz Crystal
- Push Button
- 2 x 33pF Capacitor
- 2 x 10 KΩ Resistors (1/4 Watt)
- 10µF Capacitor
- 1 KΩ x 8 Pull-up Resistor Pack
- 16 x 2 LCD Display
- 10 KΩ POT
- IC MT8870DE DTMF Decoder IC
- 3.579545 MHz Crystal
- 2 x 20pF Capacitor
- 2 x 100 KΩ Resistors (1/4 Watt)
- 0.1µF Capacitor (100nF)
- 300 KΩ Resistor (1/4 Watt)
- 5V or 12V Relay
- BC547 NPN Transistor
- 1N4007 PN Junction Diode
- 1 KΩ Resistor (1/4 Watt)
- Two mobile phones (one at the circuit and one for calling).

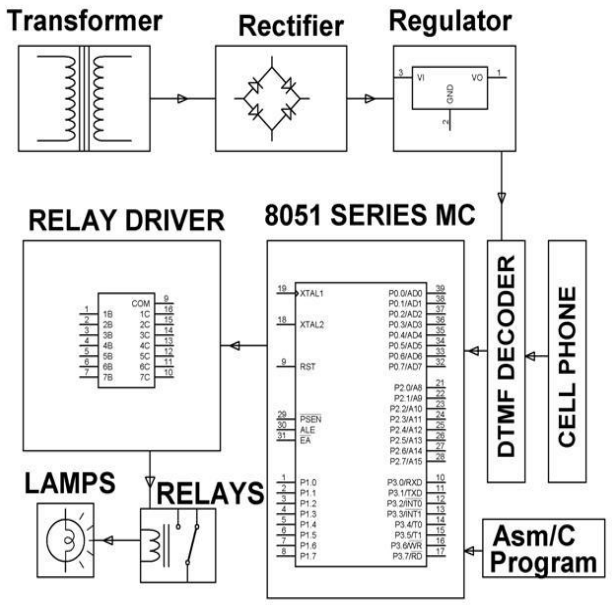


Figure 123 Circuit Diagram of DTMF based Load Control System

8051 based Microcontroller (AT89C51):

The AT89C51 is an age old 8-bit microcontroller from the Atmel family. It is a 40 pin IC package with 4Kb flash memory. It has four ports and all together provide 32 Programmable GPIO pins.

DTMF Decoder:

- This circuit detects the dial tone from a telephone line and decodes the keypad pressed on the remote telephone.
- Two distinct frequency tones make up the DTMF (dual tome multiple frequency), and hence the name.
- The dialler and the telephone exchange communicate one way through the DTMF communication.
- The tone generator and the tone decoder consist of a complete communication setup.
- In this project, IC MT8870DE is used to decode the input dial tone to the dialled numbers.
- These digital bits are interfaced to a microcontroller for any application.
- Pulse/ dial tone method is used in the modern telephone communication.
- A decoder circuit is present on the receiver side, which decodes the tone to a digital code.

RELAY:

- A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts.

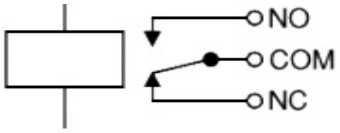


Figure 124 Relay

- The coil current can be on or off so relays have two switch positions and have double throw (changeover) switch contacts as shown in the diagram.
- Relays allow one circuit to switch a second circuit which can be completely separate from the first.
- For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit.
- There is no electrical connection inside the relay between the two circuits, the link is magnetic and mechanical.
- To drive relay through MC ULN2003 relay driver IC is used.

RELAY DRIVER ULN2003:

- ULN is Relay driver application
- The ULN2003 is a monolithic high voltage and high current Darlington transistor arrays.
- The collector-current rating of a single Darlington pair is 500mA.
- The Darlington pairs may be paralleled for higher current capability.
- The ULN functions as an inverter.

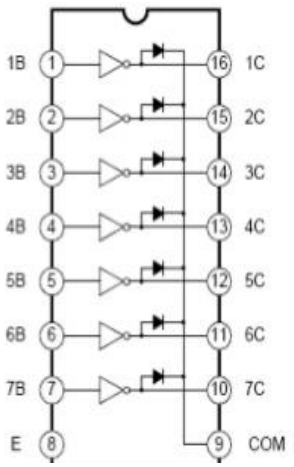


Figure 125 RELAY DRIVER ULN2003

1N4007 PN Junction Diode:

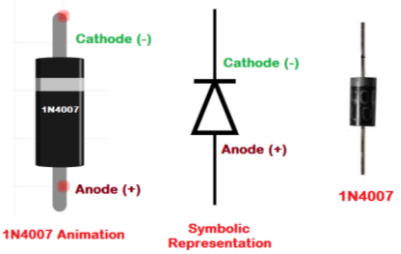


Figure 126 1N4007 PN Junction Diode

1N4007 is a PN junction rectifier diode. These types of diodes allow only the flow of electrical current in one direction only. So, it can be used for the conversion of AC power to DC. 1N 4007 is electrically compatible with other rectifier diodes and can be used instead of any of the diode belonging to 1N400X series.

How to Operate the DTMF based Load Control Circuit?

- First, connect headphone to the 3.5MM Jack on the phone. The wires of the headphones are connected to the DTMF I/P of the circuit.
- Power ON the circuit and all the loads are OFF by default.
- For testing the circuit, open the dialler in the phone connected to the circuit and press digit 1.
- As per the program, when tone for 1 is decoded by the DTMF Decoder IC, microcontroller will turn ON the Load 1.
- When you press the key 1 once again, the microcontroller will turn OFF the Load 1.
- Now, in the phone connected to the circuit, set the option to automatically answer a call, when headphone is connected.
- Hence, the microcontroller will turn ON load 1.
- Similarly, you can control other loads as well.

Costing:

Component	Unit Cost Rs.	Quantity	Total Cost RS.
8051 Microcontroller AT89c51	65	1	65
Crystal oscillator(11.0592 MHz)	322	1	322
Crystal oscillator(3.579545MHz)	2474	1	2474
Capacitor(33pF)	3	2	6
Capacitor(20pF)	1.5	2	3
Capacitor(10µF)	12	1	12
Resistors(1KΩ)	1	35	35
Resistors(10 KΩ)	2	59	118
Resistors(100 KΩ)	1	200	200
Resistors(300 KΩ)	1	548	548
IC MT8870DE DTMF Decoder IC	1	107	107
Relay 230v	566	1	566
Relay Driver (UNL2003)	1	350	350
LCD	330	1	330
BC547 NPN Transistor	75	1	75
1N4007 PN junction DIODE	100	1	100
Mobile Phone	1000	2	2000
Overall Cost Rs.			**7,311**

Advantages:

- You can use the DTMF based Load Control System using 8051 Microcontroller to remotely control any loads using GSM and DTMF technologies.
- We can turn ON or OFF the appliances from anywhere and at any time.
- We need not worry if forgot to switch OFF any appliance while we are going out as we can turn them OFF at our convenience.

Applications:

- This project is used to control the loads in,
    - Agriculture
    - Home
    - Industries.

8.2 Reason for Students Recommending this Design

Public Lavatory: As the present scenario the village is well developed but still many villagers are used to do the latrine on open area which causes dieses and our goal is to make the village as ideal village in terms of sanitary.

Underground water tank: The village itself is well equipped with two overhead water tanks which holds enough water to provide the whole village during the monsoon and winter season but in summer it's not enough so we will propose a underground tank which will helpful to villagers.

Bus stop: There is already one bus stop available in the village but it is in very poor condition so our plan is to create a small bus stop which is enough for this village.

Youth club: In Nardipur village there are no any special club available for people where they can spend their free time with learning new things (i.e. female can learn sewing works for support their family financially and others). Hence, we will provide Youth club as opportunity to the villagers.

Anganwadi: Anganwadi is a very important infrastructure which helps to educate the younger generation of village. As it's playing very important role to the society a good environment will help kids to born interest in study. So here we are proposing an anganwadi.

Chowk: It is a gathering place where panchayat can arrange meetings, it is more of a relaxation place for farmers and workers whose houses are not nearby but wanted to sit in peace for while after working hard, so here we are proposing a Chowk design.

8.3 Benefits of the Villagers from this designs

- Public lavatory will be useful to the villagers as well as visitors and workers who come here in search of employment.
- It adds infrastructure value to the village.
- Place in which some local non-government activities are organized.
- It's a place for volunteer activities and housing local clubs.
- Public meetings of the peoples on various issues can be organized here.
- Water tank can come in handy during summer season when there is most demand of water in village.

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

For future development of the Nardipur village we are proposing the designs for Part II design in which following points should be considered,

1. Sustainable design: Rain water harvesting

An additional source of water will be available which could be used at the time of emergency or water shortage by implementing the Rain Water Harvesting system in the village households.

2. Physical design: Solid Waste Management

Currently the villagers are dumping their solid waste at outer part of the village and burn it at a specific location. By that air pollution will increase and waste collection is not done regularly so that solid waste management system should be there in the village for cleanliness and safe environment.

3. Social design: Library

In the Nardipur village there is one library available but in a very poor condition. So we are proposing A Library which will use as reading purpose of students and villagers can easily do their education related works and for easy access of it.

4. Socio-Cultural design: Skill Development Centre

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

5. Smart village design: Cyber cafe

For the smart development of the Nardipur village we have proposed the smart concepts as the Cyber cafe because village have low connectivity and data connections issues. So to overcome these problem we are proposing a design of cyber cafe.

6. Heritage village design: Public Garden

In the Nardipur village there is no any recreational area existing. So that for the better living standard and entertainment purpose we have proposed one design of public garden as recreational area in the village.

These are the proposed designs for the future development of Nardipur village for Vishwakarma Yojana phase VIII, Part 2 design.

Task for 2nd part:

- Proper detail design along with the cost estimation, labour charges and material quantity will provided in 2nd part.
- 2D plans with technical detail will be provided with the help of AutoCAD.
- Detailed information of which type of solar panels are best suitable for rooftop according to average energy consumed. What is approximate cost of suitable panels and also give information about subsidiaries given by government for the same.

10. Conclusion of the Entire Village Activities of the Project

As we visit the Nardipur village assigned to us, our group came to know a lot about the village's infrastructure and what can we do as a civil engineer to fulfil the needs of the village. We get the closer perspective of the infrastructure that is available and needed in the villages of India when we visited the ideal village such as Punsari village as we were able to define some requirements for our allocated village. By the help of various surveys provided by Vishwakarma Yojana we were able to get some basic requirements that are needed in the Nardipur village.

We have surveyed of an ideal village at Punsari near Himmatnagar, have to determine that what is basic need & facilities to have in a village and how to providing this facilities as economical and sustainably for superior purposes in our Nardipur village.

We also determine that what is the process needs to be done such all this work and what is role of villagers, Sarpanch, Local authorities, Talati, TDO, DDO for development of village and also basic and main thing is supporting to all will make sustaining design and facilities for village develops as an ideal village.

We discussed with the village authorities and village dwellers after that we filled the different type of survey and analysis form. In the Techno-Economic Survey conclude about Introduction of village, Geographical details, Demo-graphical details, Occupational detail and different types of Infrastructure facilities.

Smart Village Survey concludes about % Value of Education: % Health and % Cleanliness of village and we find about which smart facilities can be subjected as per requirement of village dweller and village authorities. This all amenities may stop migration from the village towards the urban area. By performing this project we are able to reduce the pressure on the urban area. As well as this amenities are very much helpful for overall development of the village.

The existing structures and infrastructures have been studied and reviewed in detail. Suggestions have been proposed for the repair and renovation of existing structures and design proposals for its development. Socio Economic Survey has been done for the study area in detail. All the types of the needs, facilities has been studied in detail. Gap analysis have been done and interviews of the local peoples has been done in detail. The preliminary survey and socio-economic study shows that the village has insufficient infrastructure requirement. If the planning and proposals will be proposed based on the requirement of the people the life of the people can be made prosperous.

Following design has been carried out under Vishwakarma Yojana: Public lavatory, under water ground tank, bus stop, Youth club, Chowk, Anganwadi

The intention of Vishwakarma Yojana is to raise the way of life of the country zones to its specific degree up to the level of an ideal town circumstance. It is a viable government plan to build up the country zones under efficient expense with great functionality and effectiveness during its utilization. The task will in general improve the physical, social just as socio-social parts of the town by actualizing and adding lobbing different foundations concerning lesser or least obstruction to its provincial genuineness. The principle point is to create town with a "country soul" however with all metropolitan conveniences that a city may have. This project provides "DESIGN TO DELIVERY" solutions for development of villages in "RURBAN" areas.

11. References refereed for this project

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  6. https://www.ibef.org
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- Ministry of housing and urban affairs, government of India : https://www.mohua.gov.in
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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:	~~Himmatnagar~~ Punsari
Name of Taluka:	Talod
Name of District:	Himmatnagar
Name of Institute:	Adani Insti of Infra. Eng.
Nodal Officer Name & Contact Detail:	Mr. Uzair Shaikh Dr. Shubhanarayan sahoo
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Ashish chaudhary. Talati cum Mantri
Date of Survey:	10-Dec-2020

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	4681	2438	2241	1017
ii)	2011	5100	2657	2447	1109

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	1041.08 hector
	Forest Area (In hect.)	-
	Agricultural Land Area (In hect.)	700 hector
	Residential Area (In hect.)	2.5 hector
	Other Area (In hect.)	0.42 hector (Non Agriculture)
	Water bodies	-
	Nearest Town with Distance:	<10 Km

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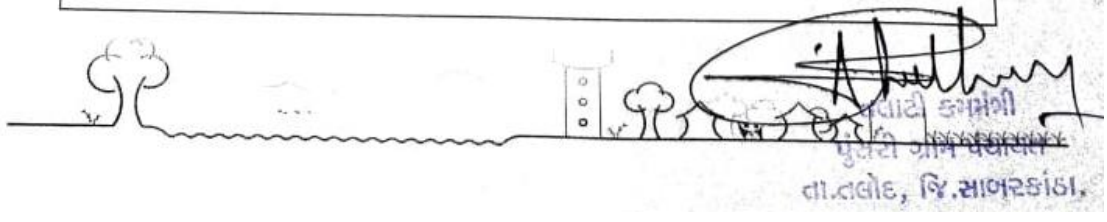
Techno Economic Survey

3. Occupational Details:

Name of Three Major Occupation groups in Village	1. farming
	2. milk production
	3. Jobs / loussiness

4. Physical Infrastructure Facilities:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated)	~~Yes~~ treated	✓	–	–
	• RO Water	Yes	✓	–	–
	• Well (Covered/ Uncovered)	Covered	✓		
	• Hand pumps	No	–	–	–
	• Tube well/ Borehole	tubewell	✓		
	• River/ Canal/ Spring/ Lake/ Pond	Canal/ rivers	✓		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity: 35000 lit	✓	–	–
	Underground Sump	Capacity:			
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	Yes	✓	–	–
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	~~Open~~ Close	✓	–	–
	If Open than Pucca / Kutchcha				
	Whether drain water is discharged directly in to Water bodies/ Sewer plants				
Suggestions if any:					



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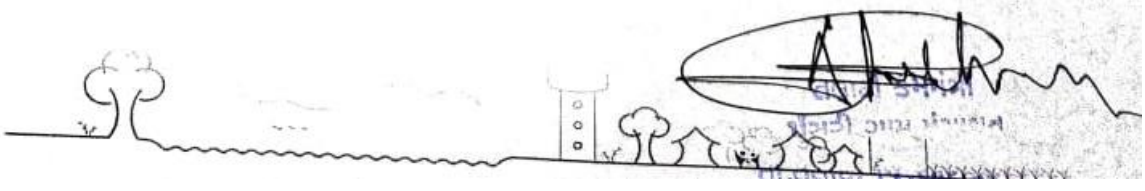
Techno Economic Survey

E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Bitumen	✓	–	–
	Main road	Bitumen	✓	–	–
	Internal streets	Pcc	✓	–	–
	Nearest NH/SH/MDR/ODR Dist. in kms.	ODR <7km	✓	–	–
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No <10km	–	–	–
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes	✓	–	–
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Yes	✓	–	–
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes 24hrs	✓	–	–
	Power supply for Domestic Use	Yes	✓	–	–
	Power supply for Agricultural Use	Yes	✓	–	–
	Power supply for Commercial Use	Yes	✓	–	–
	Road/ Street Lights	Yes	✓	–	–



	Electrification in Government Buildings/ Schools/ Hospitals	Yes	✓		
	Renewable Energy Source Facilities (Y/ N)	Yes	✓	-	-
	LED Facilities	Yes	✓	-	-
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes	✓	-	-
	Location Condition	Good			
	Community Toilet (With bath/ without bath facilities)	Yes without bath	✓	-	-
	Solid & liquid waste Disposal system available	Yes	✓	-	-
	Any facility for Waste collection from road	Yes	✓	-	-
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	tube well	✓	-	-
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	10:90%			

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

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Techno Economic Survey

	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	Yes Average	✓		
	Public Garden Location: Condition:	No	-	-	-
	Village Pond Location: Condition:	Yes Not good	-	✓	-
	Recreation Center Location: Condition:	No	-	-	-
	Cinema/ Video Hall Location: Condition:	No	-	-	-
	Assembly Polling Station Location: Condition:	Yes Good	✓	-	-
	Birth & Death Registration Office Location: Condition:	Yes in panchayat good	✓	-	-
If any of the above Facility is not available in village than approx. distance from village: .....kms.					
Suggestions if any:					

N.	Other Facilities				
	Post-office	Yes	✓	-	-
	Telecommunication Network/ STD booth	Yes	✓	-	-

K.	Health Facilities:				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:				
	Private Clinic/Private Hospital/ Nursing Home				
	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	~~Yes~~ 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: ..5...kms.				
Suggestions if any:					

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

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

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

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

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	

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

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		

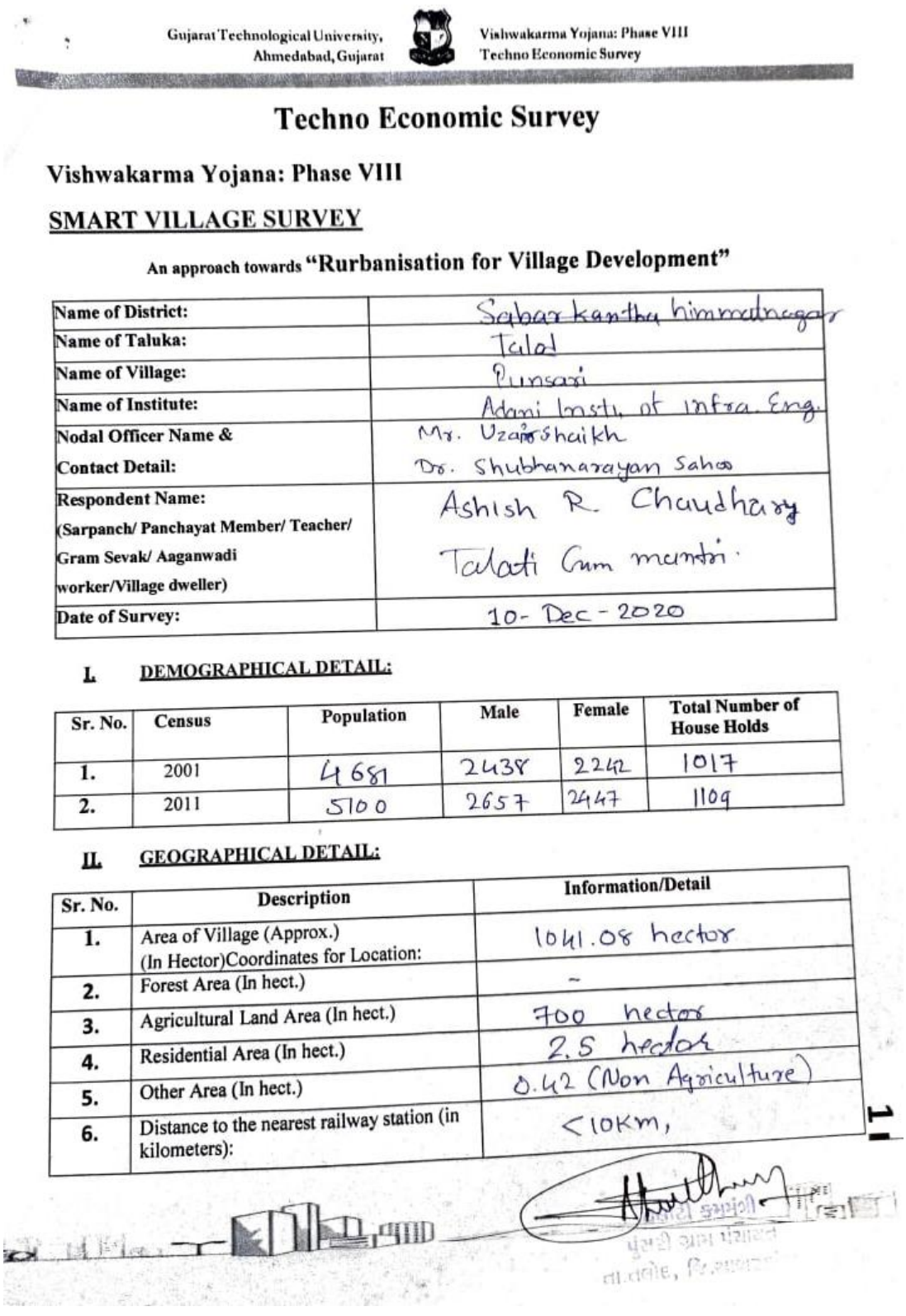
9. Smart Village Proposal Design

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Is there any thing for the village Enhancement possible	Beautification of pond	

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

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

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



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Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

Name of District:	Sabarkantha Himmatnagar
Name of Taluka:	Talod
Name of Village:	Punsari
Name of Institute:	Adani Instt. of Infra. Eng.
Nodal Officer Name & Contact Detail:	Mr. Uzair Shaikh Dr. Shubhanarayan Saha
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Ashish R. Chaudhary Talati Cum mantri.
Date of Survey:	10-Dec-2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	4681	2438	2242	1017
2.	2011	5100	2657	2447	1109

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1041.08 hector
2.	Forest Area (In hect.)	-
3.	Agricultural Land Area (In hect.)	700 hector
4.	Residential Area (In hect.)	2.5 hector
5.	Other Area (In hect.)	0.42 (Non Agriculture)
6.	Distance to the nearest railway station (in kilometers):	<10Km,

7.	Name of Nearest Town with Distance:	24 km, taluk
8.	Distance to the nearest bus station (in kilometers):	Village itself has.
9.	Whether village is connected to all road for the any facility or town or City?	Yes

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1.	Farming
	2.	mill production
	3.	Jobs / bussiness

Major crops grown in the village:	1.	Bajra
	2.	wheat
	3.	Groundnut

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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

D/d. In School

પુંસરી ગ્રામ પંચાયત
તા.વલોદ, જિ.

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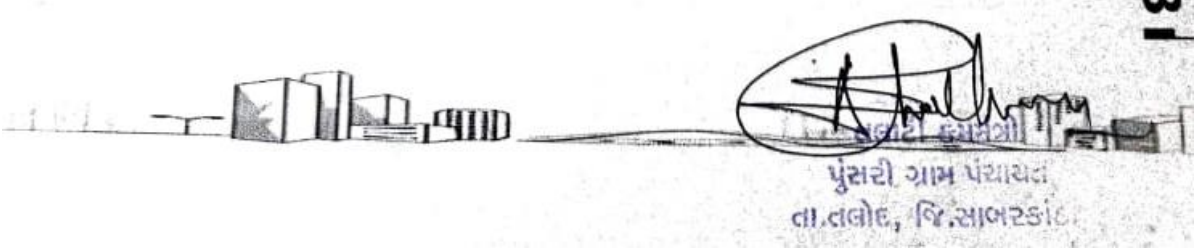
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity: 5 Lakh.			
	Underground Sump	Capacity:			
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	✓			
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	~~PCC~~ Bitumen	✓		
	Main road	Bitumene	✓		
	Internal streets	PCC	✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.	~~NH~~ ODR 7 km	✓		
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No <10 KM	-	-	-
	Bus station (Y/N) Condition: (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 hrs	✓		

31



	Power supply for Domestic Use	✓	✓		
	Power supply for Agricultural Use	✓	✓		
	Power supply for Commercial Use	✓	✓		
	Road/ Street Lights	✓	✓		
	Electrification in Government Buildings/ Schools/ Hospitals	✓	✓		
	Renewable Energy Source Facilities (Y/ N)	✓	✓		
	LED Facilities	✓	✓		
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Y (~~86~~)			
	Location Condition	Good			
	Community Toilet (With bath/ without bath facilities)				
	Solid & liquid waste Disposal system available	Yes	✓		
	Any facility for Waste collection from road	Yes	✓		
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL ✓ TUBE WELL ✓ OTHER (SPECIFY)				
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	10 : 90			

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

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

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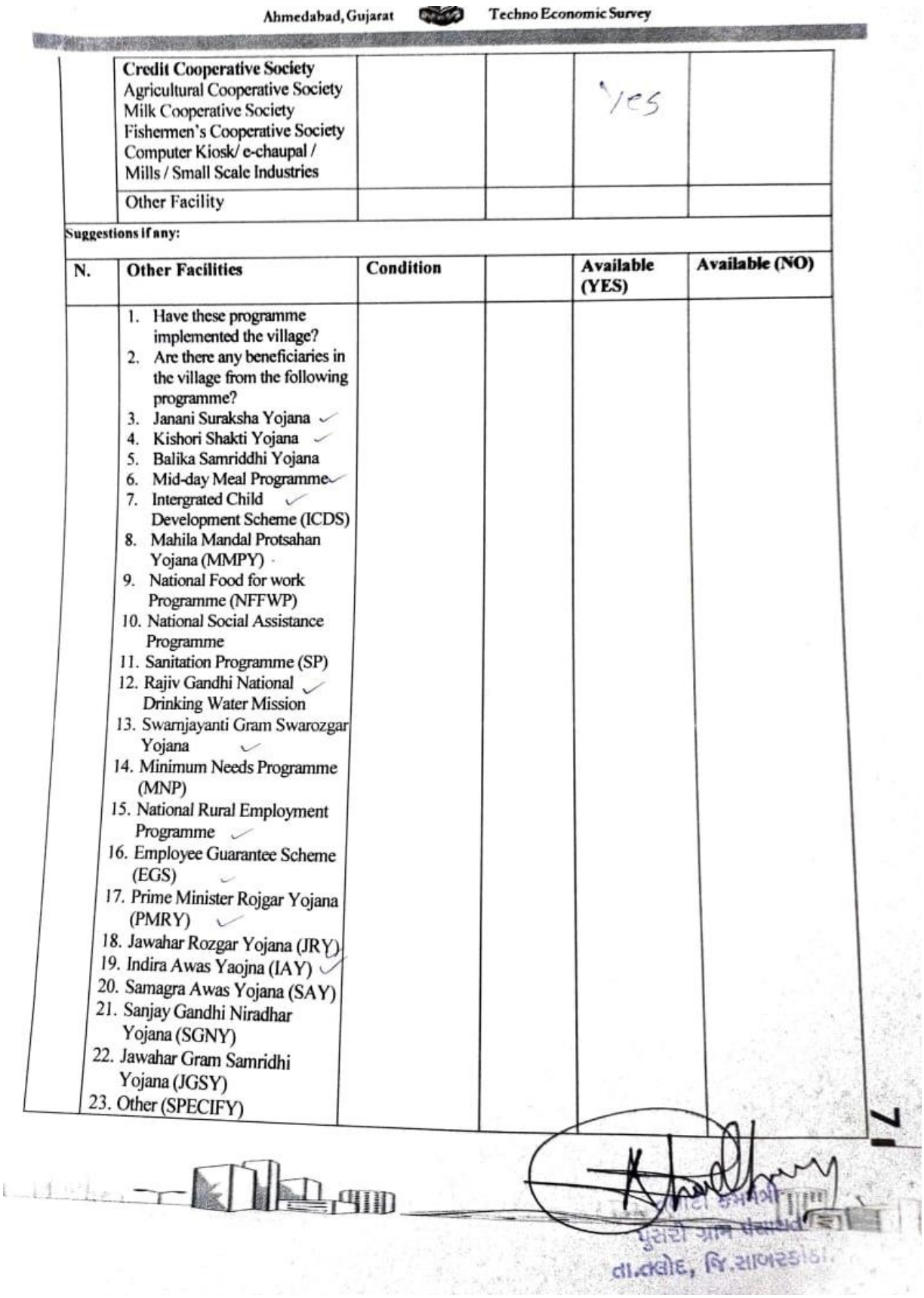
Suggestions if any:

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

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

Suggestions if any:

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



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

Suggestions if any:

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

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

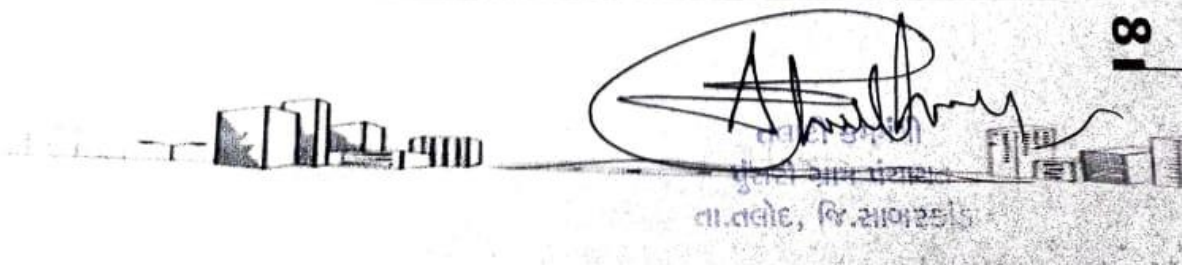
Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	Solar Panels	✓		
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System				
3.	Any Other				

VII. DATA COLLECTION FROM VILLAGE

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

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks



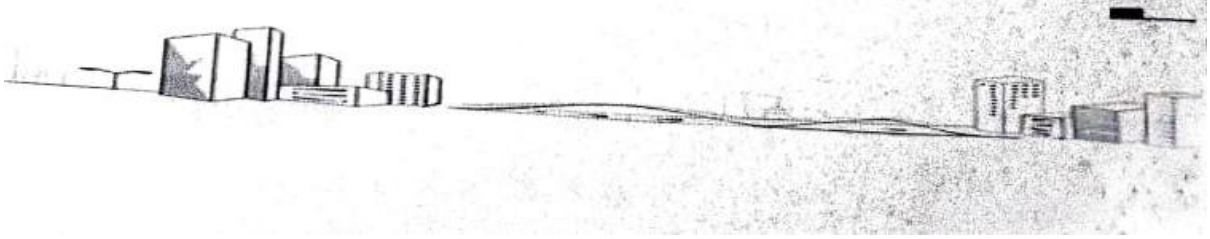
1.	**Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other**		
2.	**Additional Information/ Requirement**		
3.	**During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?**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

IX. Smart Village / Heritage Details

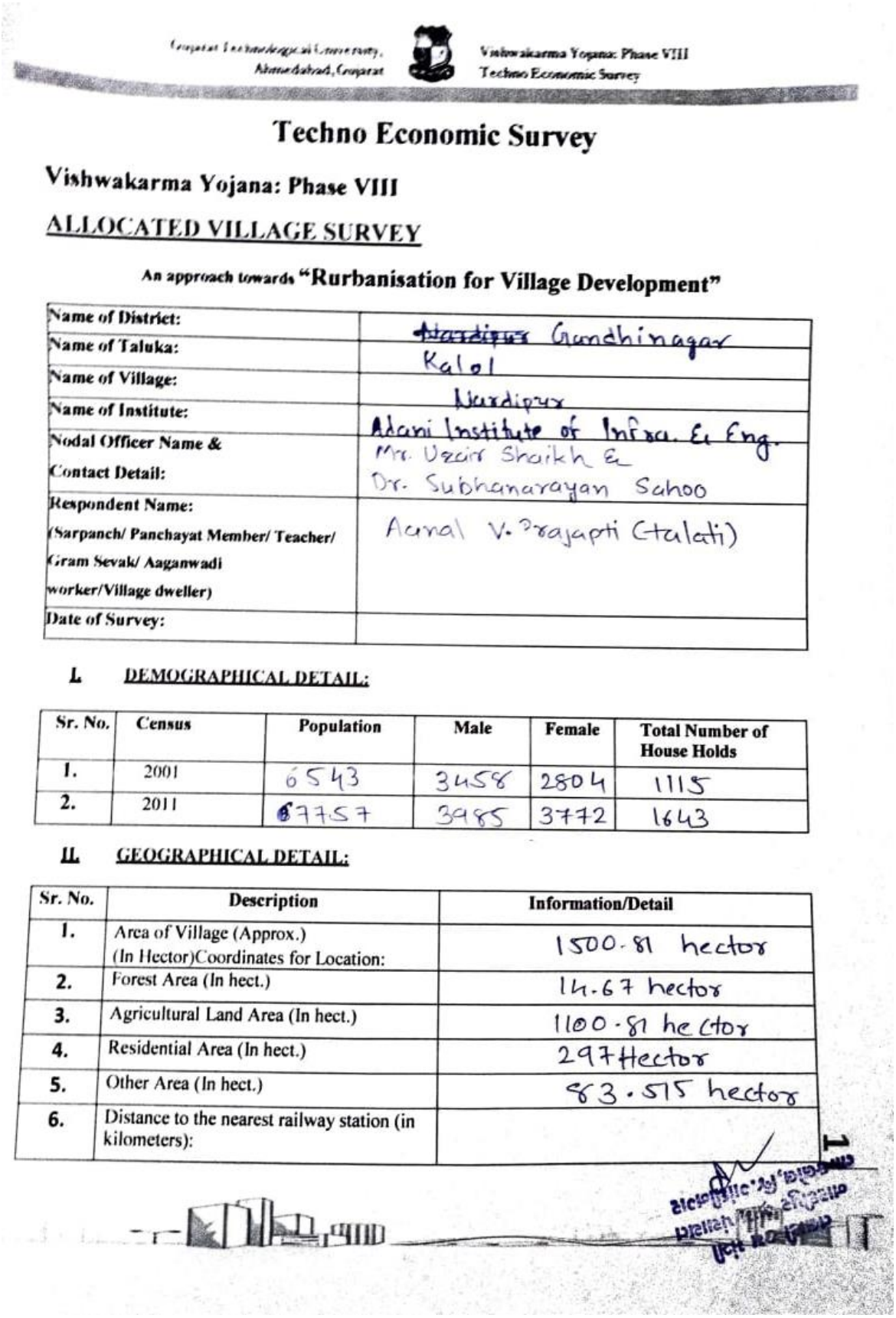
Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	Beautification of Pond.	

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

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



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



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Techno Economic Survey

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Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

Name of District:	~~Nardipur~~ Gandhinagar
Name of Taluka:	Kalol
Name of Village:	Nardipur
Name of Institute:	Adani Institute of Infra. & Eng.
Nodal Officer Name & Contact Detail:	Mr. Uzair Shaikh & Dr. Subhanarayan Sahoo
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Amal V. Prajapti (talati)
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	6543	3458	2804	1115
2.	2011	87757	3985	3772	1643

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1500.81 hector
2.	Forest Area (In hect.)	14.67 hector
3.	Agricultural Land Area (In hect.)	1100.81 hector
4.	Residential Area (In hect.)	297 Hector
5.	Other Area (In hect.)	83.515 hector
6.	Distance to the nearest railway station (in kilometers):	

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7.	Name of Nearest Town with Distance:	Kalol 13 Km
8.	Distance to the nearest bus station (in kilometers):	No
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.	Agricultur work
	2.	Business
	3.	JOB

Major crops grown in the village:	1.	Wheat
	2.	Bajra
	3.	Castor

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	Pipe to yard/Plot, Bore well	✓	–	–
2.	**DUG WELL** Protected Well Un Protected Well	–	–	–	–
3.	**WATER FROM SPRING** Protected Spring Unprotected Spring	Protected Spring,	✓	–	–
	Rainwater Tanker Truck Cart With Small Tank	rain water, tanker -truck			
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/** Irrigation Channel Bottled Water Hand Pump	~~Dami~~ Pond	–	✓	–

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	Other(Specify)Lake/ Pond	Lake, Pond	-	✓	-

Suggestions if any:

B.	Water Tank Facility				
	Overhead Tank 3 No	Capacity:	20,000 Lit	Adequate	
	Underground Sump	Capacity:			

Suggestions if any:

C.	The Type of Drainage Facility				
	A UNDERGROUND DRAINAGE	YES	YES		

Suggestions if any:

D.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road	Bitumen	✓	-	-
	Main road	Bitumen	✓	-	-
	Internal streets	PCC / WBM	-	✓	-
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH138	-	-	-

Suggestions if any:

E.	Transport Facility				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO	-	-	-
	Bus station (Y/N) Condition: (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 hrs	✓	-	-

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	Power supply for Domestic Use	24 hrs	✓	-	-
	Power supply for Agricultural Use	6-8 hrs	✓		
	Power supply for Commercial Use	24 hrs	✓	-	-
	Road/ Street Lights	Yes	✓	-	-
	Electrification in Government Buildings/ Schools/ Hospitals	Yes		✓	
	Renewable Energy Source Facilities (Y/ N)	No	-	-	-
	LED Facilities	No	-	-	-
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes		✓	-
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	No	-	-	-
	Solid & liquid waste Disposal system available	No	-	-	-
	Any facility for Waste collection from road	No	-	-	-
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL OTHER (SPECIFY)	Pond tubewell Canal	✓	-	-
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	50% 50%	-	✓	-

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi) Sub-Centre PHC BLOCK PHC CHC/RH District/ Govt. Hospital Govt. Dispensary Private Clinic Private Hospital/ Nursing Home AYUSH Health Facility sonography /ultrasound facility	ICDS Private Clinic PHC CHC/RH	-	✓	-
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	1	✓	-	-
	Primary School	1+1	✓	-	-
	Secondary school	1+1	✓	-	-
	Higher sec. School	1	✓	-	-
	ITI college/ vocational Training Center	0	-	-	-
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	0	-	-	-

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

Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)				No
	Public Library (With daily newspaper supply: Y/N) No	Not good	-	Yes	
	Public Garden				No
	Village Pond	Not good.	-	Yes	~~No~~
	Recreation Center				No
	Cinema/ Video Hall				No
	Assembly Polling Station	Yes good	-		~~No~~
	Birth & Death Registration Office	good		Yes	

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

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	good	-	~~Good~~ Yes	-
	Telecommunication Network/ STD booth	-	-	-	No
	General Market	Average	-	Yes	-
	Shops (Public Distribution System)	good	-	Yes	-
	Panchayat Building	good	-	Yes	-
	Pharmacy/Medical Shop	Average	-	Yes	-
	Bank & ATM Facility	good	-	Yes	-
	Agriculture Co-operative Society	-	-	-	No
	Milk Co-operative Soc.	Not 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				
	Other Facility				

Suggestions if any:

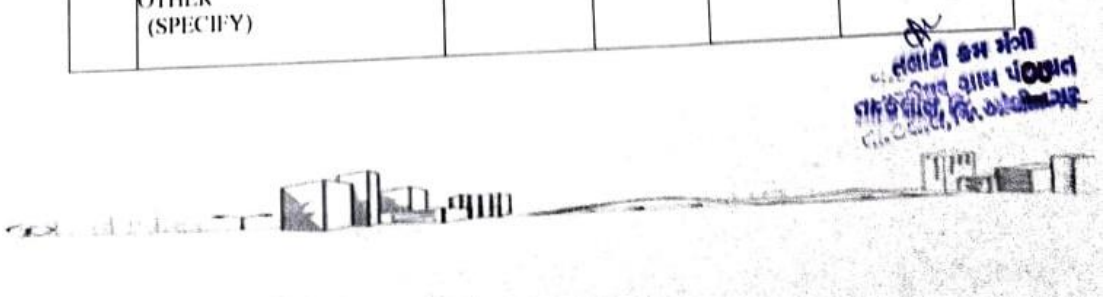
N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village? 2. Are there any beneficiaries in the village from the following programme? 3. Janani Suraksha Yojana 4. Kishori Shakti Yojana 5. Balika Samriddhi Yojana 6. Mid-day Meal Programme 7. Intergrated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

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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



VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

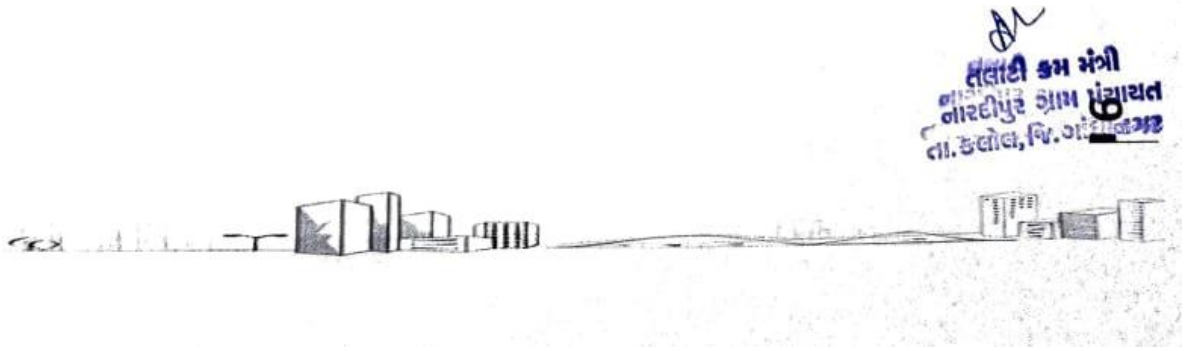
Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities,		
	School Building	Yes	
	Health Center	Yes	
	Panchayat Building	Yes	
	Public Toilets & any other	Yes	
2.	Additional Information/ Requirement	No	-
3.	During the last six months how many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

IX. Smart Village / Heritage Details

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

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

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



12.4 Gap Analysis of the Allocated Village

VILLAGE GAP Analysis

Village Name: Nardipur

Population: 7757

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	1	0	6	1
Primary School	Each Per 2500 population	2	0	0	2
Secondary School	Per 7,500 population	1+1	0	0	2
Higher Secondary School	Per 15,000 Population	0	●1	0	-1
College	Per 125,000 Population	0	0	0	0
Tech Training Institute	Per 100000 Population	0	1	1	-1
Agriculture Research Centre	Per 100000 Population	0	1	1	-1
Skill Development Center	Per 100000 Population	0	1	1	-1
Health Facility					
Govt/Panchyat Dispensary or Sub PHC or Health Centre	Each Village	●1	0	1	1
Primary Health & Child Health Center	Per 20,000 population	1	0	0	●1
Child Welfare and Maternity Home	Per 10,000 population	1	0	1	0
Multispeciality Hospital	Per 100000 Population	0	1	0	-1
Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & kutcha house)	0	4	3	-4
Physical Infrastructure Facilities					
Transportation		Adequate / ~~Inadequate~~	inadequate		
Pucca Village Approach Road	Each village	✓	-	-	-
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	✓	-	-	-
Drinking Water (Minimum 70 lpcd)		Adequate / ~~Inadequate~~	inadequate		-
Over Head Tank	1/3 of Total Demand	✓	-	-	-
U/G Sump	2/3 of Total Demand	✓	-	-	-
Drainage Network - Open		Adequate / ~~Inadequate~~	inadequate		-
Drainage Network - Cover		✓			-
Waste Management System		Adequate / Inadequate			-
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	●0	1	0	-1
community hall and Public Library	Per 15000 Population	1	1	0	0
Cremation Ground	Per 20,000 population	0	1	0	-1
Post Office	Per 10,000 population	1	0	0	1
Gram Panchayat Building	Each individual/group panchayat	1	0	0	1
APMC	Per 100000 Population	0	1	1	-1
Fire Station	Per 100000 Population	0	1	1	-1
Public Garden	Per village	0	1	1	-1
Police post	Per 40,000Population	1	1	0	0
Shopping Mall					
Electrical Design					
Electricity Network		Adequate / ~~Inadequate~~ ✓	inadequate		
Any Smart Village Facility					
Technology					
		ESR cap	0		
		Sump cap	0		
		Lat	0		

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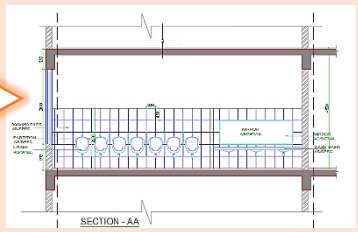
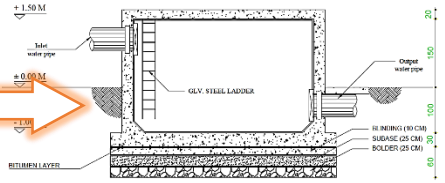
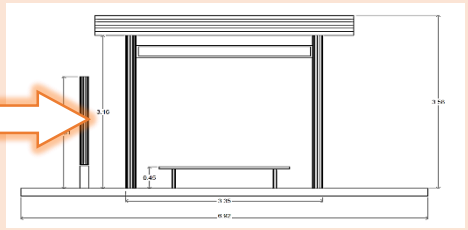
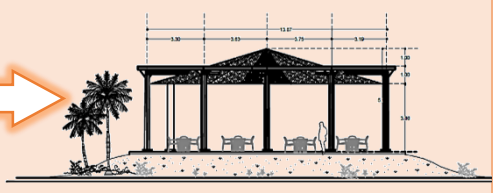
જિ.ગાંધીનગર

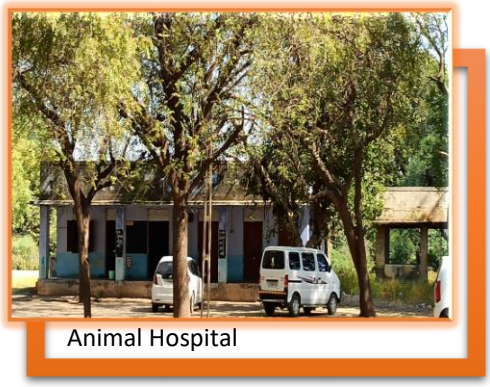
12.5 Summary Details of All the Villages Designs in Table form as Part-I

Table 38 All the Villages Designs

Name of Design	Current Condition Of Existing Building	Our Vision Of Design That Building
Public Lavoraty		
Water Tank	Not Available	
Bus Stop		
Youth Club	Not Available	
Chowk		

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


Old age home visit


Animal Hospital


Children playing around the village


Vintage building

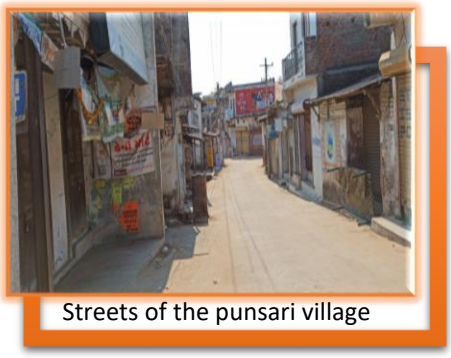

UnderGround Sump


Schools

Figure 127 Unforgettable Pictures of Nardipur Village

Gram panchayat punsari

Play ground



Streets of the punsari village

Bullock cart

General market

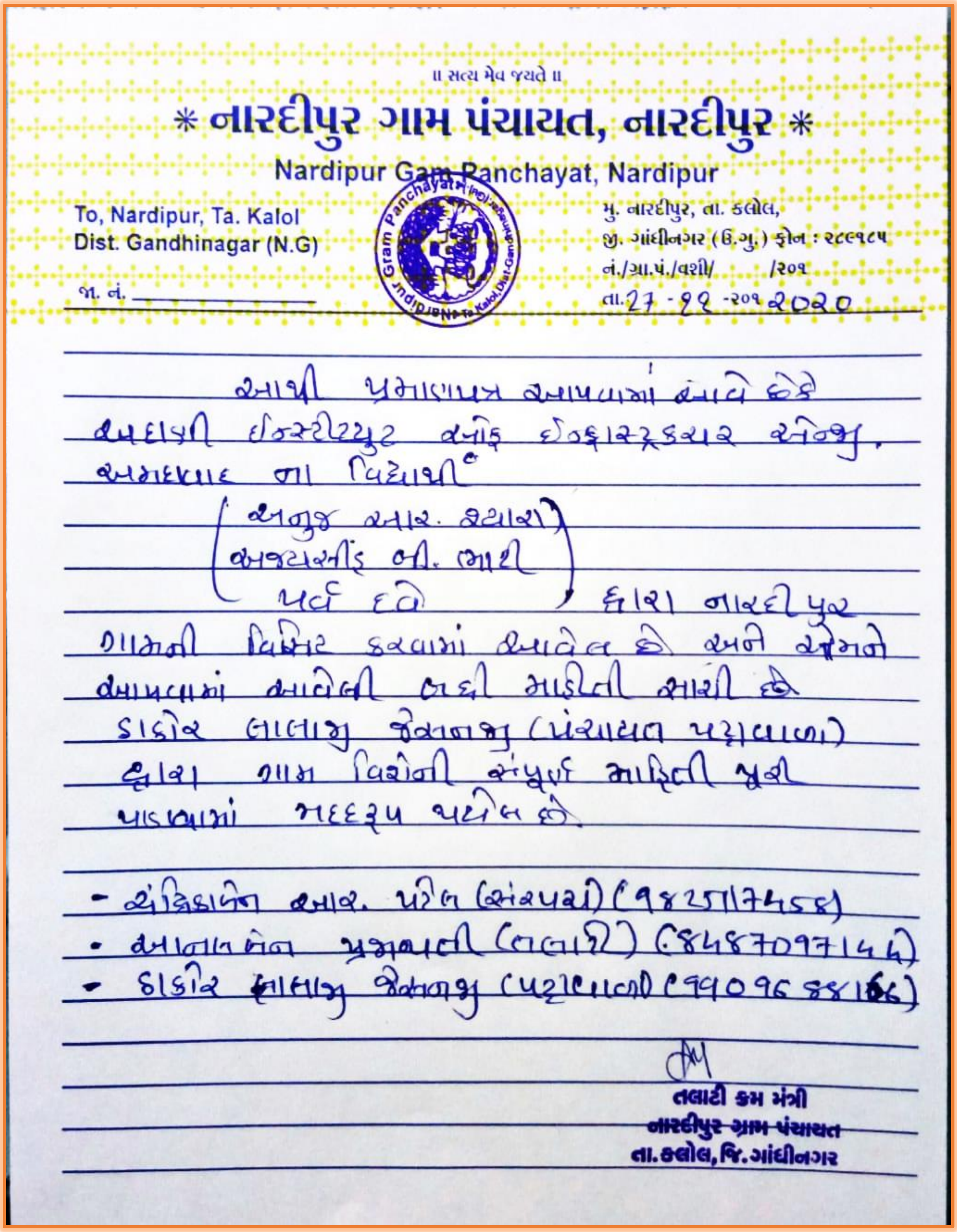
Bank

Water treatment plant

Swachh Bharat Abhiyan

Figure 128 Unforgettable Pictures of Punsari Village

12.7 Village Interaction (Survey) with sarpanch /Talati Report with the photograph


॥ સત્ય મેવ જયતે ॥

* નારદીપુર ગ્રામ પંચાયત, નારદીપુર *

Nardipur Gam Panchayat, Nardipur

To, Nardipur, Ta. Kalol
Dist. Gandhinagar (N.G)
જા. નં. ____

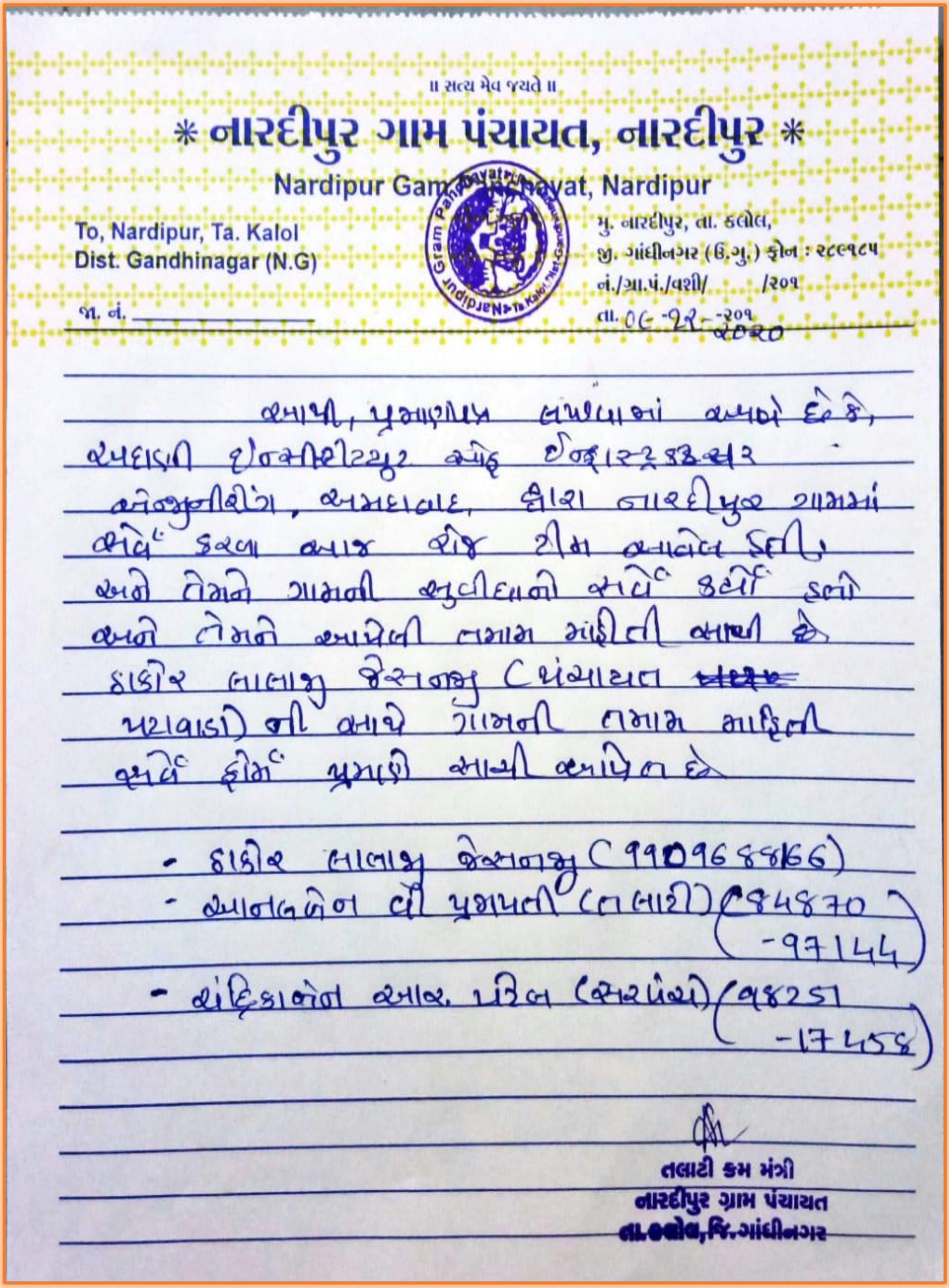
મુ. નારદીપુર, તા. કલોલ,
જી. ગાંધીનગર (ઉ.ગુ.) ફોન : ૨૮૯૧૮૫
નં./ગ્રા.પં./વશી/ /૨૦૧
તા. 27-11-૨૦૧ 2020

આથી પ્રમાણપત્ર આપવામાં આવે છે કે ઇન્ડીયન ઇન્સ્ટીટ્યુટ ઓફ ઇન્ફ્રાસ્ટ્રક્ચર ટેકનો, અમદાવાદ ના વિદ્યાર્થી (અનુજ આર. કથારા, અજયસિંહ બી. ગોરી, પર્વ દવે) દ્વારા નારદીપુર ગામની વિઝીટ કરવામાં આવેલ છે અને તેમને આપવામાં આવેલી બધી માહિતી સાચી છે. ઠાકોર લાલાજી જેવાનજી (પંચાયત પટાવાળા) દ્વારા ગામ વિશેની સંપૂર્ણ માહિતી પૂરી પાડવામાં મદદરૂપ થયેલ છે.

- ચંદ્રિકાબેન આર. પટેલ (સરપંચ) (9825174558)
- અલ્પાબેન પ્રજાપતિ (તલાટી) (8487097146)
- ઠાકોર લાલાજી જેવાનજી (પટાવાળા) (9909688166)

તલાટી કમ મંત્રી
નારદીપુર ગ્રામ પંચાયત
તા. કલોલ, જિ. ગાંધીનગર

Figure 129 Letter of Talati for confirmation of Details Date : 27/11/20



॥ સત્ય મેવ જયતે ॥

*** નારદીપુર ગ્રામ પંચાયત, નારદીપુર ***

Nardipur Gram Panchayat, Nardipur

To, Nardipur, Ta. Kalol
Dist. Gandhinagar (N.G)

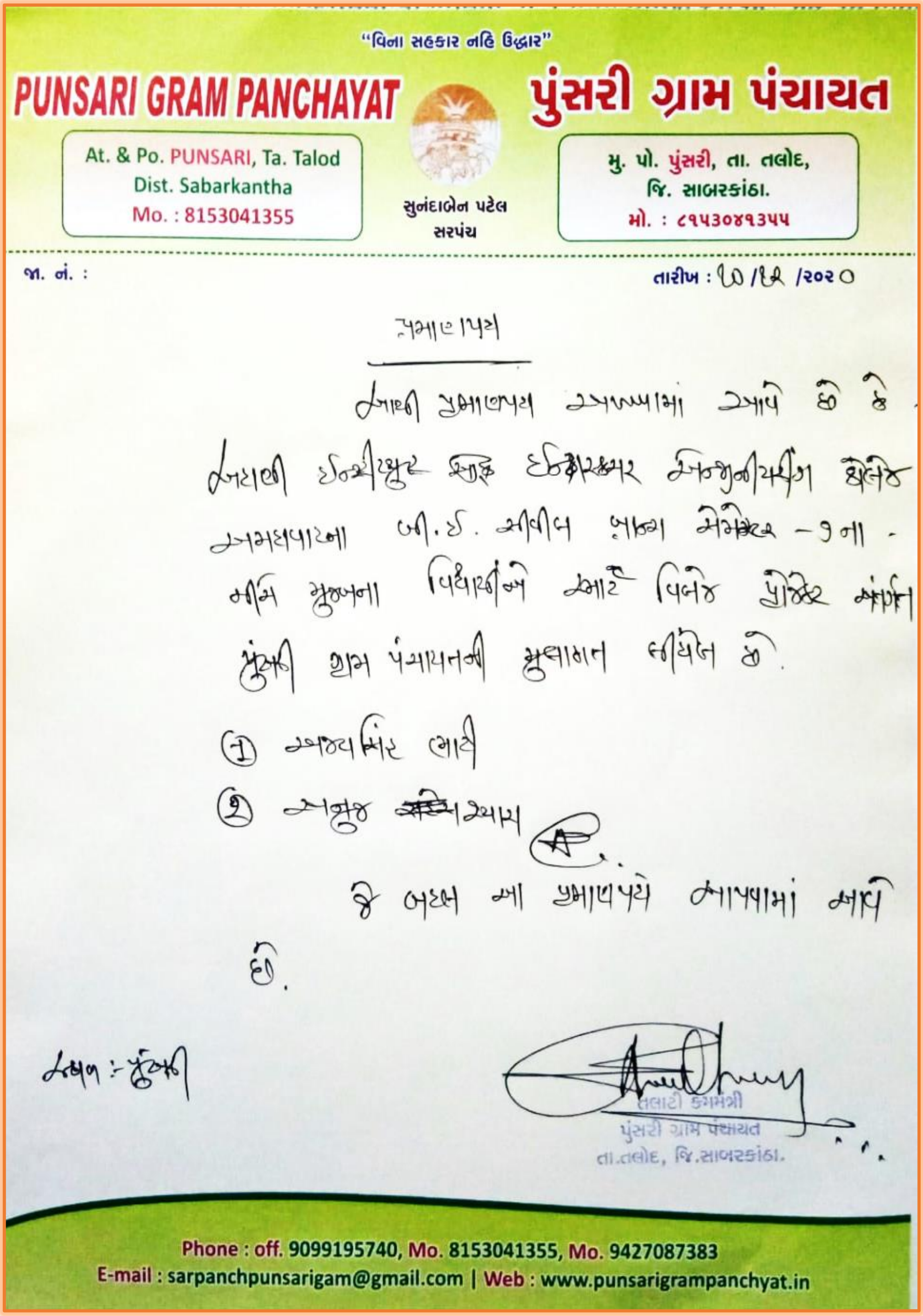
મુ. નારદીપુર, તા. કલોલ,
જી. ગાંધીનગર (ઉ.ગુ.) ફોન : ૨૮૯૧૮૫
નં./ગ્રા.પં./વશી/ /૨૦૧
જા. નં. ______ તા. 06-12-2020

આથી, પ્રમાણપત્ર લખવામાં આવે છે કે, [illegible] ઇન્સ્ટીટ્યુટ ઓફ ઇન્ફ્રાસ્ટ્રકચર એન્જીનીરીંગ, અમદાવાદ, દ્વારા નારદીપુર ગામમાં સર્વે કરવા માટે ટીમ આવેલ હતી, અને તેમને ગામની સુવીધાનો સર્વે કર્યો હતો અને તેમને આપેલી તમામ માહીતી સાચી છે ઠાકોર લાલાજી જેસંગજી (પંચાયત પટાવાળા) ની સાથે ગામની તમામ માહિતી સર્વે ફોર્મ પ્રમાણે સાચી આપેલ છે

- ઠાકોર લાલાજી જેસંગજી (9909688166)
- આનંદબેન વી. પ્રજાપતી (તલાટી) (84870-97144)
- ચંદ્રિકાબેન આર. પટેલ (સરપંચ) (98251-17458)

તલાટી કમ મંત્રી
નારદીપુર ગ્રામ પંચાયત
તા.કલોલ, જિ.ગાંધીનગર

Figure 130 Letter of Talati for confirmation of Details Date : 09/12/20



"વિના સહકાર નહિ ઉદ્ધાર"

PUNSARI GRAM PANCHAYAT પુંસરી ગ્રામ પંચાયત

At. & Po. PUNSARI, Ta. Talod
Dist. Sabarkantha
Mo. : 8153041355

સુનંદાબેન પટેલ
સરપંચ

મુ. પો. પુંસરી, તા. તલોદ,
જિ. સાબરકાંઠા.
મો. : ૮૧૫૩૦૪૧૩૫૫

જા. નં. :

તારીખ : ૧૦/૧૨/૨૦૨૦

પ્રમાણપત્ર

આથી પ્રમાણપત્ર આપવામાં આવે છે કે ... ઇન્સ્ટીટ્યુટ ઓફ ઇન્ફોર્મેશન એન્જીનીયરીંગ કોલેજ અમદાવાદના બી.ઈ. સીવીલ શાખા સેમેસ્ટર -૭ ના ... વિદ્યાર્થીઓએ આજે વિશ્વ પ્રોજેક્ટ અંતર્ગત પુંસરી ગ્રામ પંચાયતની મુલાકાત લીધેલ છે.

(1) ...

(2) ...

જે બદલ આ પ્રમાણપત્ર આપવામાં આવે છે.

સ્થળ : પુંસરી

તલાટી કમ મંત્રી
પુંસરી ગ્રામ પંચાયત
તા.તલોદ, જિ.સાબરકાંઠા.

Phone : off. 9099195740, Mo. 8153041355, Mo. 9427087383
E-mail : sarpanchpunsarigam@gmail.com | Web : www.punsarigrampanchyat.in

Figure 131 Letter of Talati for confirmation of Details Date : 10/12/20

Figure 132 Picture With Talati Cum Mantri of Nardipur
Date : 09/12/20

Figure 133 Picture With Talati Cum Mantri of Punsari Date : 10/12/20

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

13.1 Design Proposals

13.1.1 Social Design Proposals: Community Health Center

Scenario:

People in rural areas generally have less access to healthcare than their urban counterparts. Fewer medical practitioners, mental health programs, and healthcare facilities in these areas often mean less preventative care and longer response times in emergencies.

The lack of healthcare workers has resulted in unconventional ways of delivering healthcare to rural dwellers, including medical consultations by phone or internet as well as mobile preventative care and treatment programs. There have been increased efforts to attract health professionals to isolated locations, such as increasing the number of medical students from rural areas and improving financial incentives for rural practices.

Existing Condition in Nardipur:

In some case village has adequate facilities but villagers are unaware of this and sometimes they are afraid to show their medical condition in front of everyone because of society.

Sustainability of the design:

A comprehensive revised National Health Policy addressing the existing inequalities, and Work towards promoting a long-term perspective plan exclusively for rural health is the current need.

Design Utilized by:

A Health center is a facility which is built for the use of inhabitant and the floating population such as migrant workers, visitors, and tourists, etc., who visit the village area frequently because of its commercial, religious or tourist attraction. Illiterate/ Semi-literate users; Underserved; Unbanked; People living in remote area; etc.

Design Location:

This Infrastructure should be situated where people can access this facility easily and because this is community health center surrounded atmosphere must be calm and noise pollution should be minimum. And also the connectivity of this community health center must have well connection with road transportation system.

Design Brief:

This design have male ward and female ward for different gender's patients having capacity of 5 beds each. And in emergency situation it can be increase up to certain level beds also. It is also equipped with two well-developed labs and also sanitary measures have been considered like sanitary toilets, wash basins, etc.

Figure 134 Community Health Center : Plan

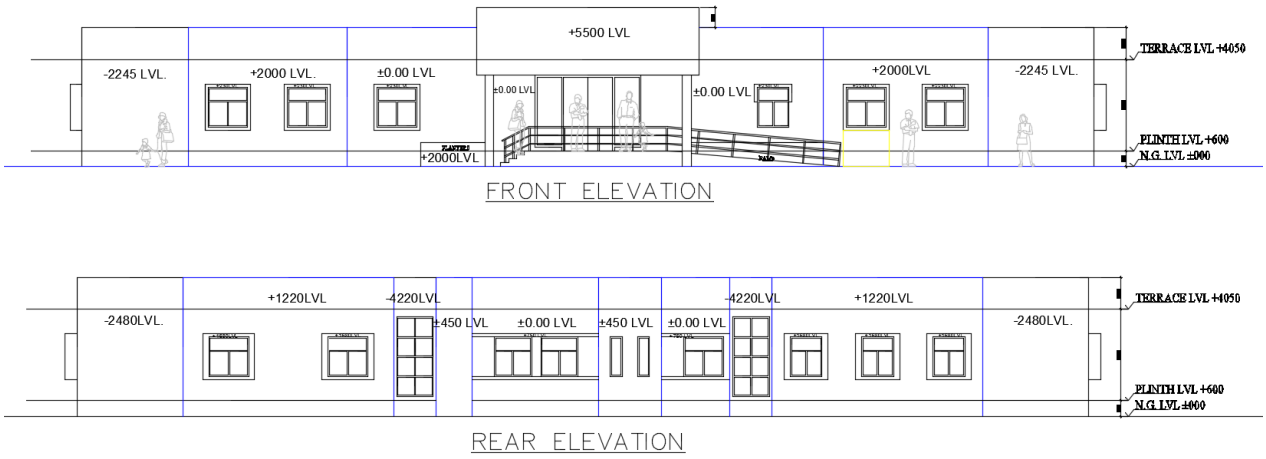


Figure 136 Community Health Center : Elevation

Figure 135 Community Health Center : Section

Table 39 Community Health Center: Abstract Sheet

Sr. No	Item Description	No.	Length	Width	Height	Quantity	Total Quantity	Rate	Per	Total Amount
1.	**Overall Excavation**						250	350	m^3	87500
2.	**Overall PCC**						31.25	3200	m^3	100000
3.	**RCC In Foundation**						6.624	3400	m^3	22521.6
	Foundation	46	0.6	0.6	0.4	6.624				
4.	**Superstructure**						150.213	3600	m^3	540766.8
	Main Walls	8	5.8	0.2	3.45	32.016				
		4	3.8	0.2	3.45	10.488				
		6	4	0.2	3.45	16.56				
		1	9.8	0.2	3.45	6.762				
		4	7.55	0.2	3.45	20.838				
		4	5.3	0.2	3.45	14.628				
		2	2.5	0.2	3.45	3.45				
		6	3.5	0.2	3.45	14.49				
		6	3.75	0.2	3.45	15.525				
		4	2.9	0.2	3.45	8.004				
	RCC Columns	46	0.2	0.2	4.05	7.452				
	White putti on both side of walls						1427.61	45	m^2	64242
5.	**Main Walls**	16	5.8		3.45	320.16				
		8	3.8		3.45	104.88				
		12	4		3.45	165.6				
		2	9.8		3.45	67.62				
		8	7.55		3.45	208.38				
		8	5.3		3.45	146.28				
		4	2.5		3.45	34.5				
		12	3.5		3.45	144.9				
		12	3.75		3.45	155.25				
		8	2.9		3.45	80.04				
6.	**RCC slab**						225	1950	m^2	438750
Total										1253780
Add 6% Enhancement										75226
Total Rs.										1329006
Say Rs.										**13,30,000/-**

13.1.2 Socio-cultural Design Proposals: Garba Chowk

Scenario:

Village enjoys a thriving cultural tradition, being the centre of Gujarati cultural activities and diverse traditions of different ethnic and religious communities. Popular celebrations and observances include Uttarayan an annual kite-flying day on 14 and 15 January. The nine nights of Navratri are celebrated with people performing Garba the folk dance of Gujarat at venues across the city. The festival of lights Deepavali is celebrated with the lighting of lamps in every house, the decorating the floors with the rangoli and the bursting of firecrackers. Other festivals such as Holi and Ganesh Chaturthi are celebrated with enthusiasm. The annual Rath Yatra procession on the Ashadh-sud-bij date of the Hindu calendar.

Importance of Chowk:

As navaratri is one of the most celebrated and spiritual festival that has been celebrated in Gujarat and by gujarati peoples. During navartri people come together and celebrate it for 9 days. 'Navratri' literally translates to nine nights for which the festival is observed. During these 9 days/nights, nine forms or incarnations of Goddess Durga are worshipped. The festival honours and celebrates Goddess Durga for defeating the demon Mahishasura in a battle.

Sustainability of the design:

We have some unique concept for socio-cultural so we are going to design Step Auditorium cum Garba Chowk in this structure. If Sarpanch want to organize any funcation or any detailed announcement so he can organize at this auditorium & also suitable for village meeting. Any Cultural programs can be organized at this auditorium like in Navaratri festival Garba, Holi etc.

Idea of the Chowk:

Place is as hub for playing Garba across the village, Nine nights of Navaratri are celebrated with people performing Garba, the most popular folk dance of Gujarat. In the village there is a ritual to perform garba from the day of Bestu Varas to the day of Dev Diwali. Villagers perform Garba, start to emerge around 8:00 in the evening and continue till late night.

Design Location:

Figure 137 Garba Chowk: Location

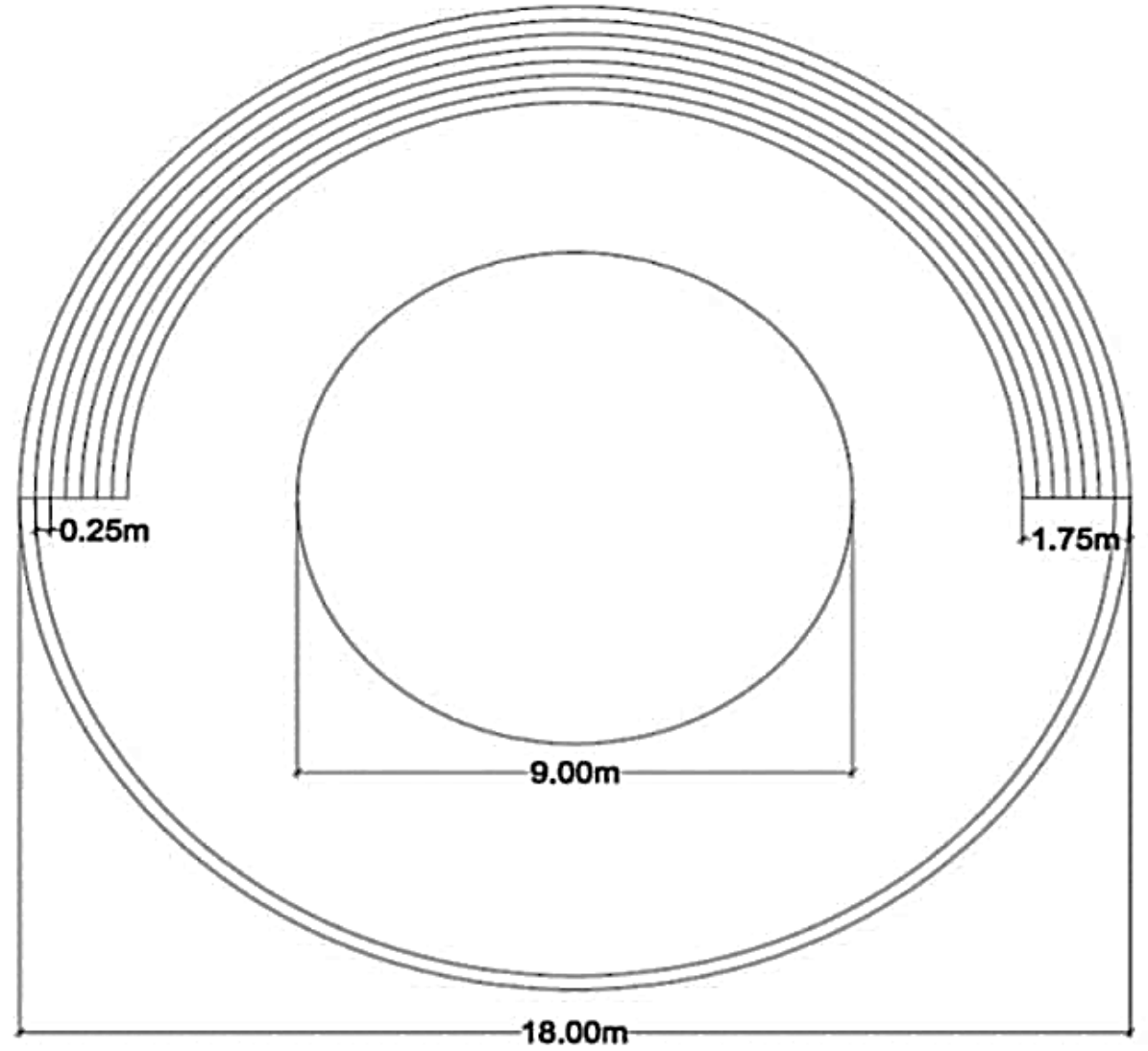


Figure 138 Garba Chowk : Plan

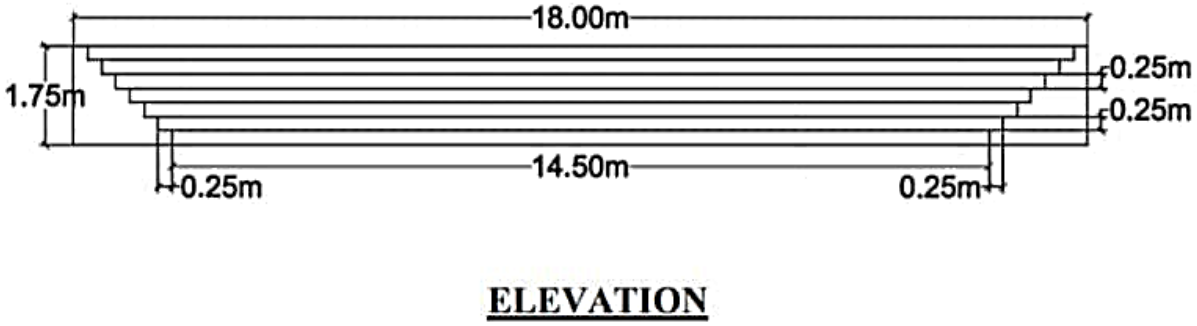


Figure 139 Garba Chowk : Elevation

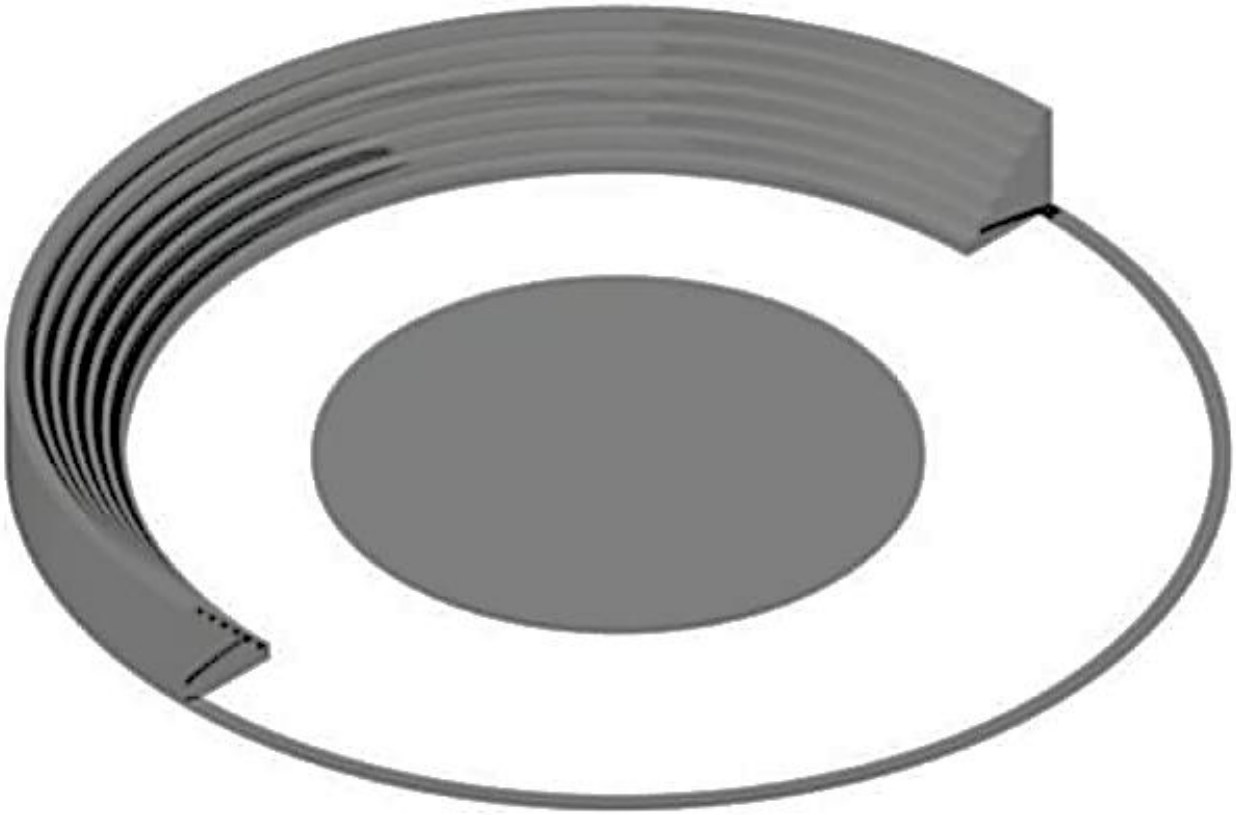


Figure 140 Garba Chowk : 3D view

Table 40 Garba Chowk: Abstract Sheet

Sr. No	Item Description	No.	Radius	Area	Height	Quantity	Rate	Per	Total Amount
1	Earthwork in excavation in foundation	1	9.5	283.385	0.6	170.031	350	m^3	59510
2	Sand filling in foundation	1	9.5	283.385	0.45	127.52	250	m^3	31880
3	PCC in foundation	1	9.5	283.385	0.15	42.50	1800	m^3	76500
4	Mid circle	1	4.5	63.585	0.15	9.54	2400	m^3	22896
5	Calculation for Steps								
	Step 1	1	9	127.23	0.25	11.1675	2400	m^3	26802
			7.25	82.56					

		Total Area		**44.67**					
	Step 2	1	9	127.23	0.25	9.72	2400	m^3	23328
			7.5	88.35					
		Total Area		**38.88**					
	Step 3	1	9	127.23	0.25	8.9725	2400	m^3	21534
			7.75	94.34					
		Total Area		**35.89**					
	Step 4	1	9	127.23	0.25	6.675	2400	m^3	16020
			8	100.53					
		Total Area		**26.7**					
	Step 5	1	9	127.23	0.25	5.08	2400	m^3	12192
			8.25	106.91					
		Total Area		**20.32**					
	Step 6	1	9	127.23	0.25	3.4375	2400	m^3	8250
			8.5	113.49					
		Total Area		**13.74**					
	Step 7	1	9	127.23	0.25	1.7425	2400	m^3	4182
			8.75	120.26					
		Total Area		**6.97**					
6	Semi-circle	1	9	127.23	0.1	0.697	2400	m^3	1672.8
			8.75	120.26					
		Total Area		**6.97**					
Total									304766.8
Add 6% Enhancement									18286
Total Rs.									323052
Say Rs.									**3,25,000/-**

13.1.3 Physical Design Proposals: Boundary wall with Gate

Existing Condition in Nardipur:

The ground near the village is unprotected as there are no boundary walls are available many times vehicles came into the ground in night times and cause damages and several times street animals comes too in the ground and make it dirtier and create unsafe environment for children.

Sustainability of the design:

Boundary wall with Gate improves the aesthetic look and provides safety and security to the Ground.

Design Utilized by:

After construction of boundary wall children can play without any worries of street animals or vehicles trespassing. They can play safely in the Ground.

Design Brief:

We have decided to create boundary wall around the ground which is 800 meter long and have height of 2.7 meter providing with 6 meter long gate.

Design Location:

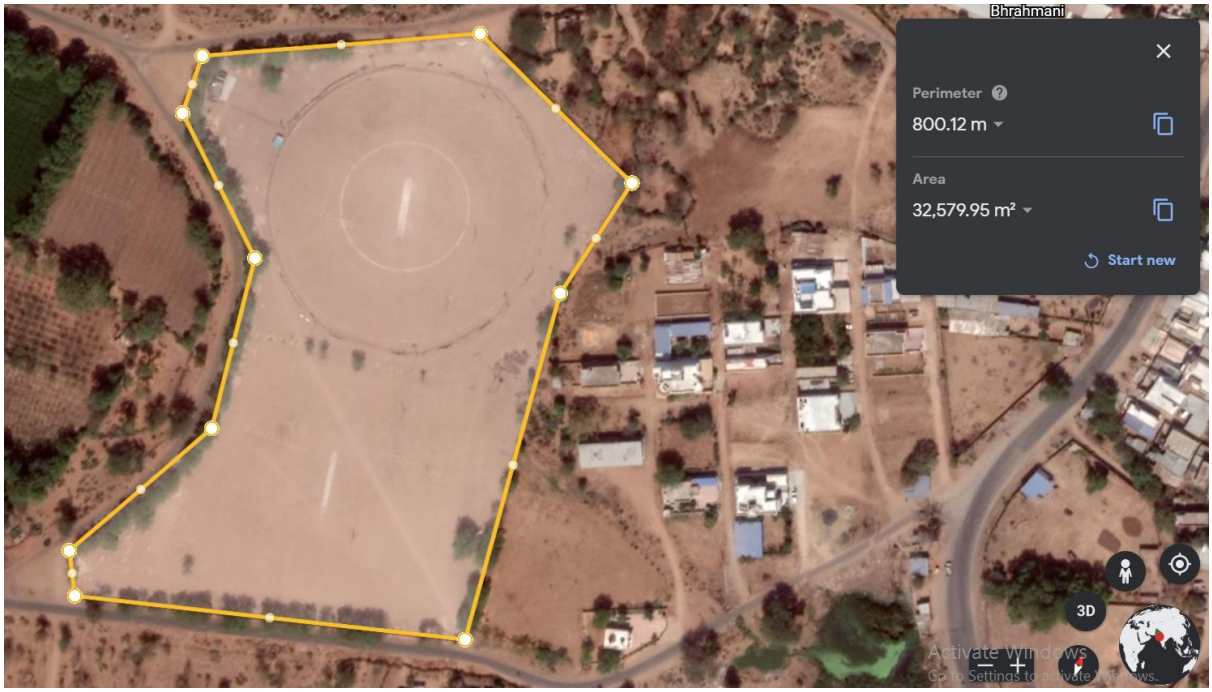


Figure 141 Boundary wall with Gate: Location

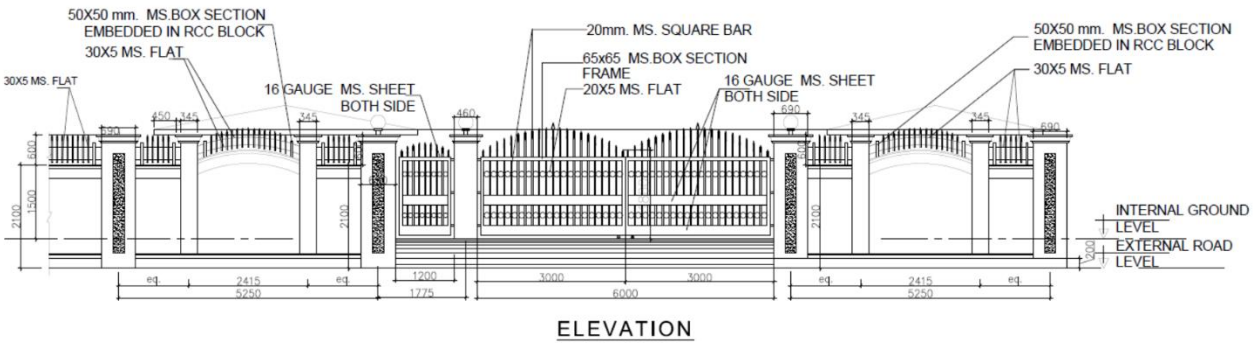


Figure 142 Boundary wall with Gate: Elevation

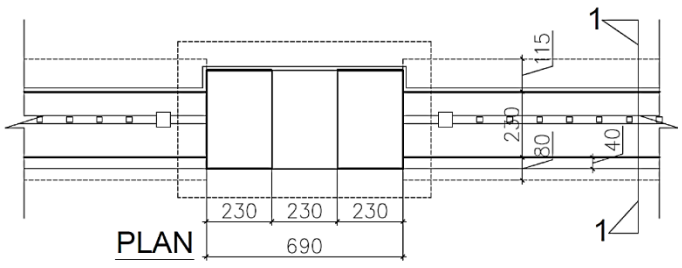


Figure 143 Boundary wall with Gate: Plan of Wall

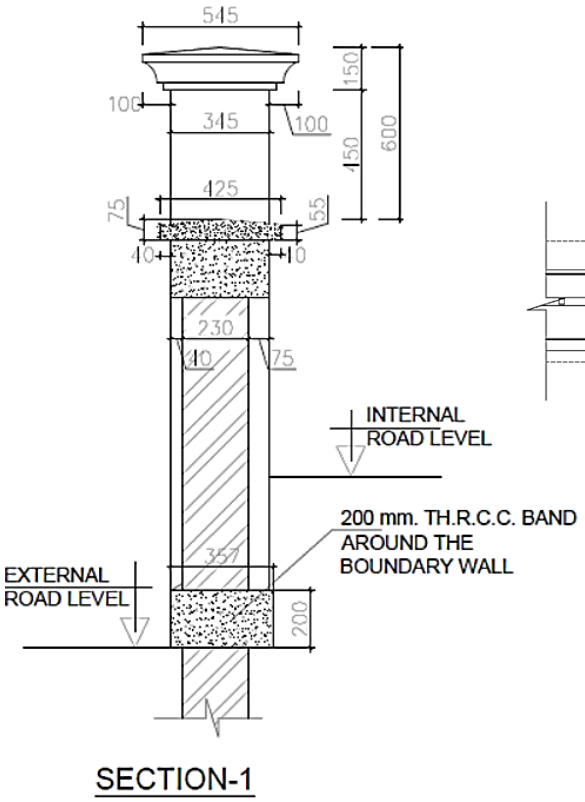


Figure 144 Boundary wall with Gate: Section-1

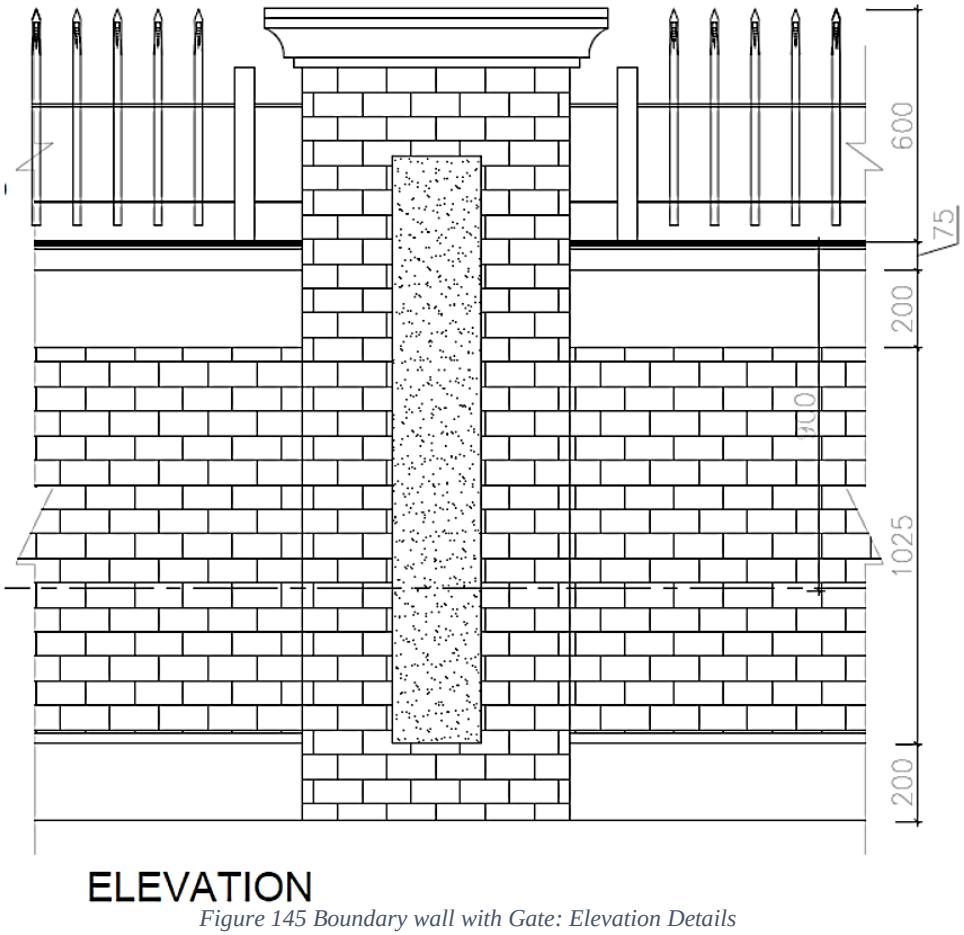


Figure 145 Boundary wall with Gate: Elevation Details

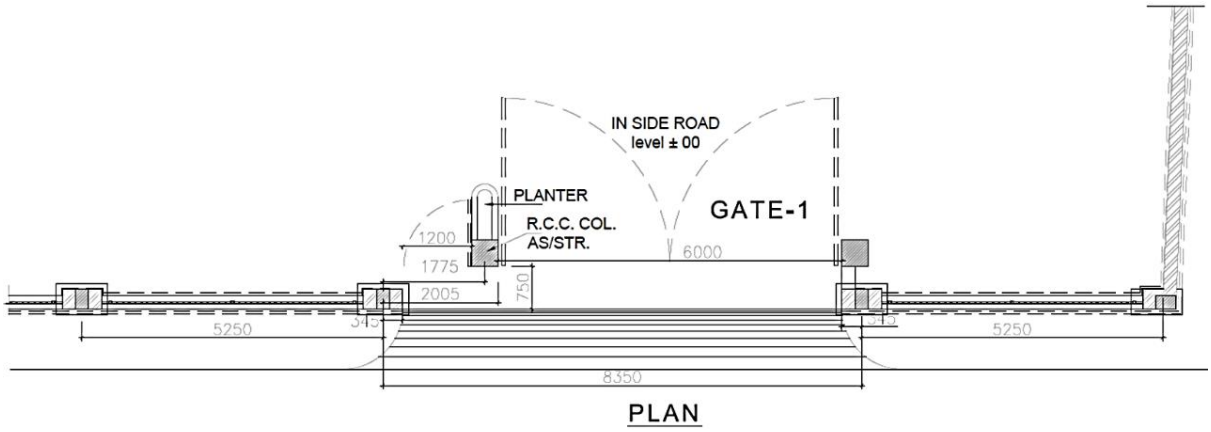


Figure 146 Boundary wall with Gate: Plan of Gate

Table 41 Boundary wall with Gate: Abstract Sheet

Sr. No	Item Description	No.	Length	Width	Height	Quantity	Total Quantity	Rate	Per	Total Amount
1.	**Excavation**						307.14	350	m^3	107497
	Main Wall	151	5.25	0.645	0.6	306.8				
	Gate column	2	0.53	0.53	0.6	0.34				
2.	**PCC In Foundation**						42.23	1800	m^3	76014
	Main Wall	151	5.25	0.495	0.1	39.24				
	Gate column	2	0.38	0.38	0.1	0.028				
	Ramp	1	7.66	1.5	0.6	6.894				
3.	**Brickwork In Foundation**						136.79	2400	m^3	328296
	Main Wall	151	5.25	0.345	0.5	136.74				
	Gate column	2	0.23	0.23	0.5	0.0529				
4.	**Brickwork In Superstructure**						343.16	2600	m^3	892216
	Wall column	151	0.69	0.345	2.7	97.052				
		302	0.345	0.345	2.7	97.052				
	Main wall	151	3.87	0.23	1.1	147.84				
	Gate column	2	0.23	0.23	2.7	0.28				
5.	**RCC band around the wall**						96.78	3200	m^3	309706
	Upper side	151	3.87	0.345	0.2	40.32				
		151	3.87	0.425	0.065	16.14				
	Lower side	151	3.87	0.345	0.2	40.32				
6.	**Steel work**						11630	85	kg	988550
	Wall	151	50x50 MS box s/c, 30x5 MS flat (70 kg)			10570				
	Gate	1	20mm MS Sq. bar, 65X65 MS box s/c frame			1060				
Total										2702279
Add 6% Enhancement										162136
Total Rs.										2864415
Say Rs.										**28,70,000/-**

13.1.4 Heritage Design Proposals: Fountain

History:

Fountain is a Latin word representing "fons" or "fontis" whose English meaning is water from a source or spring that pours water into a basin or sprinkles into the air to supply drinking water or for a decorative purpose. In the early time usually fountains were connected to springs or aqueducts and were used to provide drinking and potable water for the residents of cities, towns and villages.

Most of the fountains were gravity driven, and needed a source of water at higher RL than the fountain as for example a reservoir or aqueduct to make the water flow or thrown into the air by the action of gravity. In addition to those uses fountains were also used for decoration purposes. Romans were the initiators of those fountains who decorate them with bronze or stone giving the shape of animals or their local heroes. Romans were also great lovers of fountains. By the end of the 19th century urban fountains became purely decorative. Mechanical pumps were used to pump water into the fountains with high pressure with a provision to recycle.

In today's time fountains are specially constructed for decorative purposes. In further development, musical fountains are massively used in different countries to attract tourists. Drinking fountains are also used to provide clean drinking water in public buildings, parks and public spaces. Garden fountains with light and sound prevails in almost all the countries. The sparkle and gurgle of flowing water is soothing tonic for frazzled nerves, and it also attracts a variety of birds and other wildlife to the inspired oasis.

Design Location:

We are suggesting this design to implement in front of the gram panchayat building to increase the appearances of the village.

Fountains Design Brief:

Jet height of a fountain is usually designed to pump water half the radial distance of the fountain but to make more appealing multiple jet points are installed which extends the height equal or more than the radius of the fountain. Height can be added by using statuary or sculptures or if the area is free from wind velocity.

Design Considerations:

The most common factors that influence water are light, temperature, wind, slope, shapes and surfaces. These all can play a role in considering the final design concept of the fountain.

Two Tier Pool Fountain:

Various architectural views of fountains were referred for consideration. With the consultation of management, beautification committee, the faculty members of civil dept. as well as project team members, the two tier pool fountain structure was selected. A two tier pool fountain (showupdesign.com) consist of 2 bowls; one at the top and the other at the middle which pours water from one bowl to another and finally to the basal pool. The upper bowl is smaller in size in comparison to the lower one. A two tier fountain is more elegant than the normal jet fountain or other fountain and used mainly for decorative purpose in gardens or other infrastructures. The location was selected as per the consultation of management, beautification committee and team members the selected location was very much accessible to water supply as well as electricity supply; thus economical to our cause.

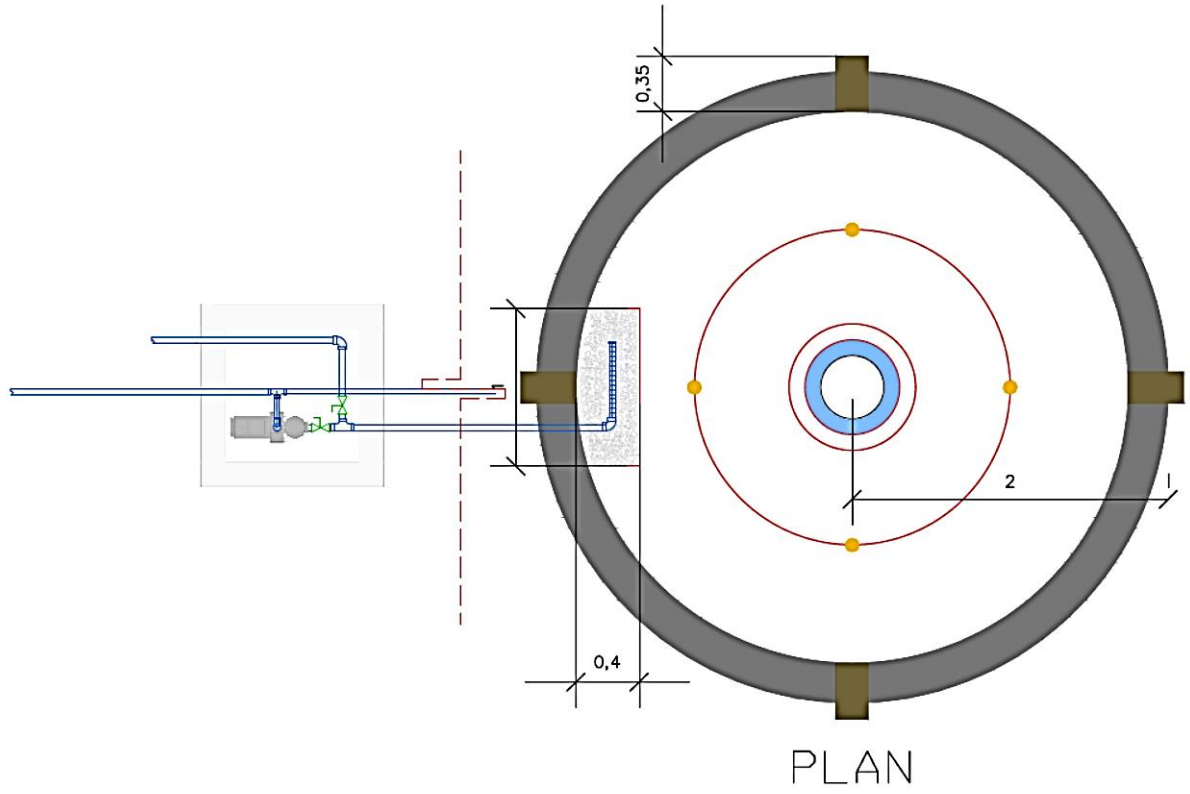


Figure 148 Fountain: Plan

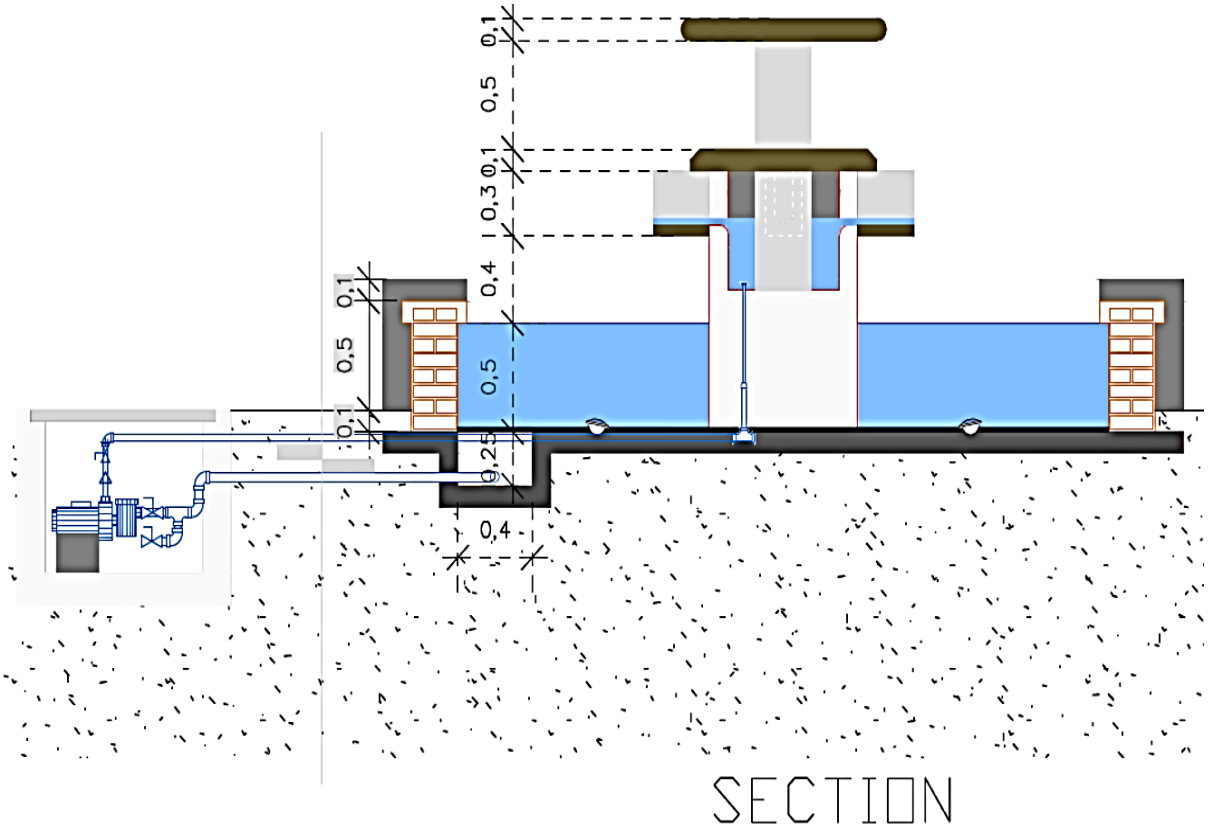


Figure 147 Fountain: Section

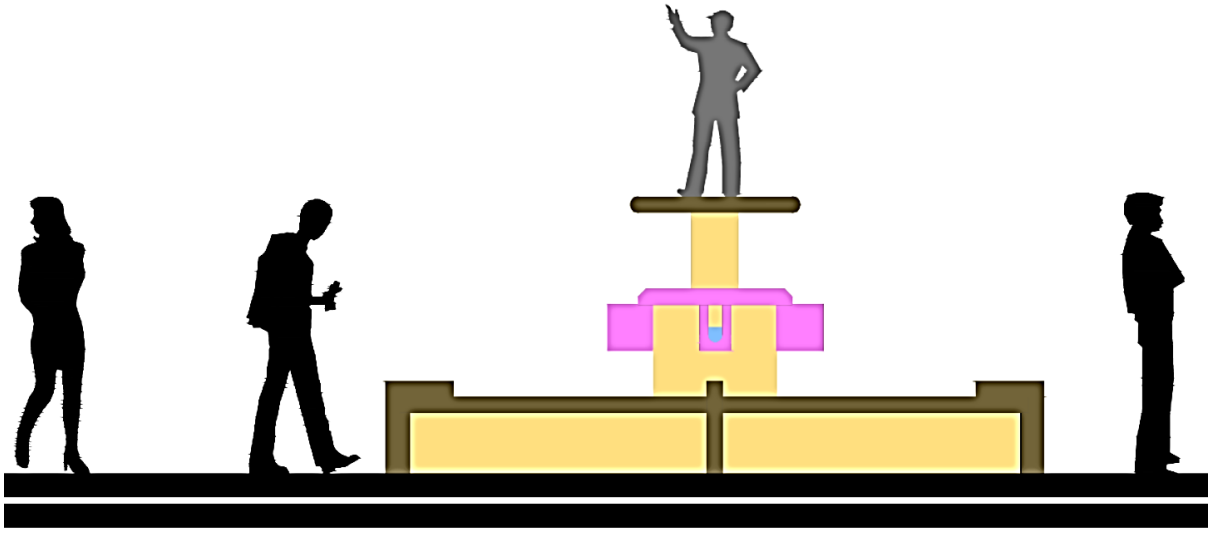


Figure 149 Fountain: Elevation

Table 42 Fountain: Abstract Sheet

Sr. No	Item Description	No.	Length	Width	Height	Quantity	Rate	Per	Total Amount
1	Earthwork in excavation in foundation	1	5.15	5.15	1.5	37.1315	350	m^3	12996.03
2	Sand filling in foundation	1	5.15	5.15	0.2	5.3045	250	m^3	1326.125
3	PCC in foundation	1	5.15	5.15	0.15	3.9783	3400	m^3	13526.22
4	RCC work in foundation	1	5.15	5.15	0.45	11.9351	4200	m^3	50127.42
5	RCC Work in super structure					1.0568	4400	m^3	4649.92
6	Brick Corner Portion	4	1.1	0.25	0.85	0.9350	3600	m^3	13464
7	Arch Portion	4	2.85	0.25	0.85	2.4225	4000	m3	38760
8	Nozzle + Lighting Cost:								50000
9	Water pump, pipeline & plumbing work								18000
Total									202849.7
Add 6% Enhancement									12170
Total Rs.									215019
Say Rs.									**2,20,000/-**

13.1.5 Smart Design Proposals: Animal Shelter House

Scenario:

The shelter industry has terminology for their unique field of work, and though there are no exact standards for consistent definitions, many words have meanings based on their usage Animal control has the municipal function of picking up stray dogs and cats, and investigating reports of animal abuse, dog bites or animal attacks. It may also be called animal care and control, and earlier was called the dog catcher or rabies control. Stray, lost or abandoned pets picked up off the streets are usually transported to the local animal shelter, or pound. Uncomplicated stray cases are usually kept for a period of time, called stray hold. After the holding period, an animal is considered forfeited by its owner, and may become available for adoption. Animals involved in attacks or bites are placed in quarantine and are not available for adoption until investigations or legal cases are resolved. Animal control's interest is mainly public safety and rabies control.

Aims of the design:

- To provide a home for rescued animals
- To provide and essential treatment and care.
- To provide essential Training:
- Training for Animal Assisted Therapy (AAT).
- To interact with other animals in the facility (considering limitations). To interact with human companion.
- To promote human-animal interaction.
- Work to rescue and rehabilitate sick and needy animals. Set up and run shelters, ambulance services, sterilization programs, treatment camps and disaster rescue missions for animals
- Conduct education programs in schools, fight cases in court and lobby on animal issues in parliament.

Objective of the design:

- To understand the meaning of animal welfare and its principles.
- To understand animal behaviour in shelters
- To study human-animal interaction and its benefits and limitations
- To understand space design for animals to maintain psychological equilibrium.

Need For Animal Shelter House:

Need for animal welfare is based on awareness that animals are sentient and constitute a major part of the ecosystem and that consideration should be given to their well-being especially when they are used for food, in animal testing, as pets or in any other way. (Animal Welfare, Outfield & Brown). Over the years animal habitat is occupied by urban settlement resulting in "pet overpopulation". Pet overpopulation encompasses two primary factors: (1) allowing cats and dogs to reproduce with little chance of finding homes for offspring (2) being relinquished by owners who can no longer keep their animal. Every year millions of cats and dogs are euthanized in animal shelters because there are more pets than there are responsible homes. In order to control overpopulation animals are spayed or neutered in rescue centers or veterinary clinic.

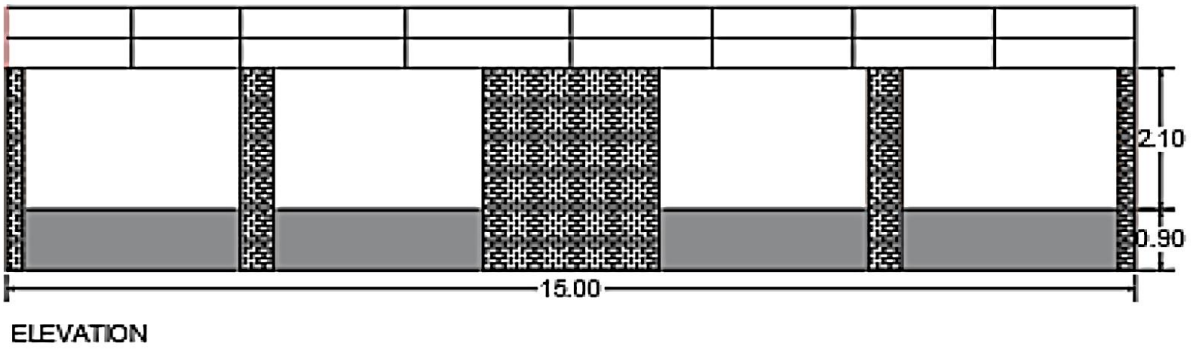


Figure 152 Animal Shelter House: Elevation

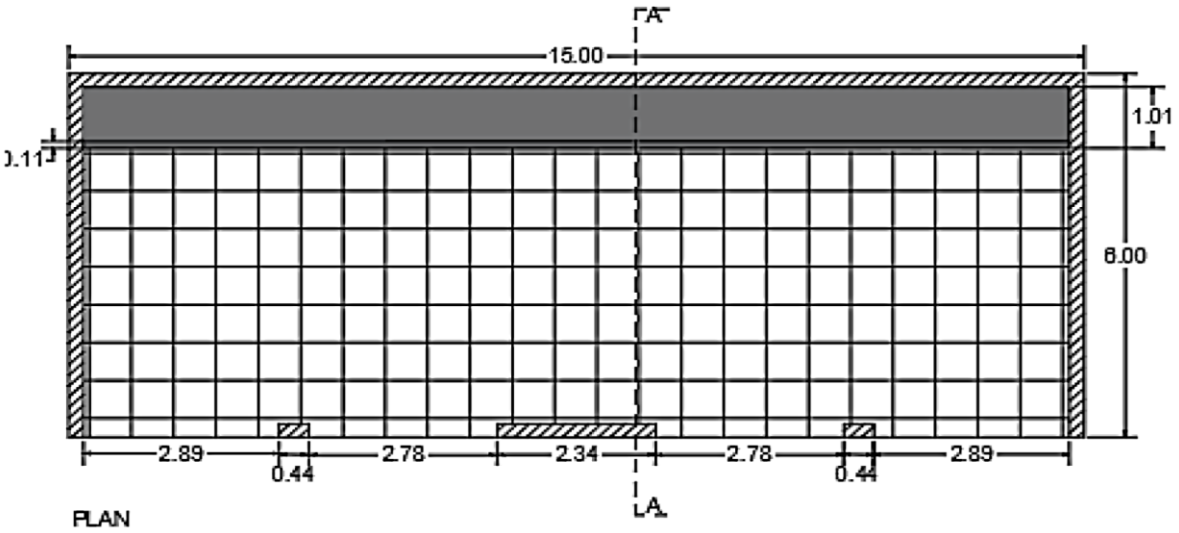


Figure 151 Animal Shelter House: Plan

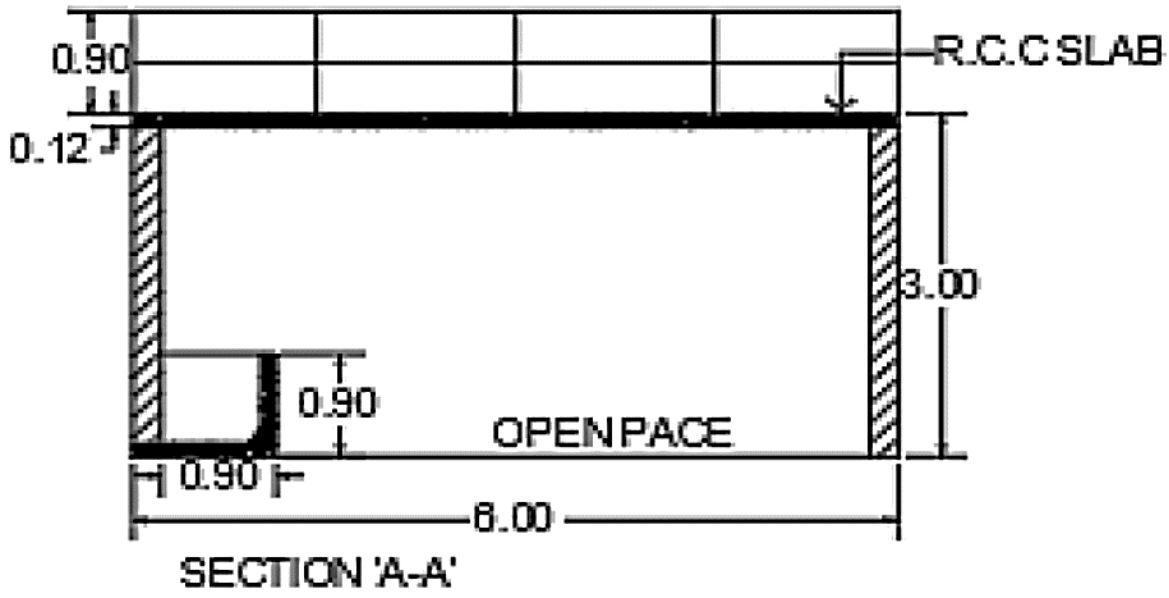


Figure 150 Animal Shelter House: Section

Table 43 Animal Shelter House: Abstract Sheet

Sr. No	Item Description	No.	Length	Width	Height	Quantity	Total Quantity	Rate	Per	Total Amount
1.	**Excavation**						29.358	350	m^3	10275
	Main Walls	2	6.4	0.6	1.5	11.52				
		1	15.4	0.6	1.5	13.86				
	Columns	2	0.84	0.6	1.5	1.512				
		1	2.74	0.6	1.5	2.466				
2.	**PCC In Foundation**						2.9358	3400	m^3	9981
	Main Walls	2	6.4	0.6	0.15	1.152				
		1	15.4	0.6	0.15	1.386				
	Columns	2	0.84	0.6	0.15	0.1512				
		1	2.74	0.6	0.15	0.2466				
3.	**Brickwork In Foundation**						11.3112	3200	m^3	36195
	Main Walls	2	6.2	0.4	0.9	4.464				
		1	15.2	0.4	0.9	5.472				
	Columns	2	0.64	0.4	0.9	0.4608				
		1	2.54	0.4	0.9	0.9144				
4.	**Brickwork In Super structure**						18.132	3600	m^3	65275
	Main Walls	2	6	0.2	3	7.2				
		1	15	0.2	3	9				
	Columns	2	0.44	0.2	3	0.528				
		1	2.34	0.2	3	1.404				
5.	**Floorfinish**	1	15	6	0.15	13.5	13.5	4600	m^3	62100
6.	**125 Mm THK Rcc Slab**	1	15	6	0.12	10.8	10.8	4600	m^3	49680
7.	**Parapet wall**	2	15	0.1	0.9	2.7	3.78	3600	m^3	13608
		2	6	0.1	0.9	1.08				
8.	**Water Tank**	2	15	0.1	0.9	2.7	2.7	3600	m^3	9720
Total										256834
Add 6% Enhancement										15410
Total Rs.										272244
Say Rs.										**2,75,000/-**

13.1.6 Sustainable Design Proposals: Library

Importance of Library:

It is evident that rural libraries had made the life of villagers. Going through the literature, schemes and projects through various organizations, it can be analysed that the libraries are the best resource to educate the villagers which helps in rural development. Villages are the backbone of the country because the farmers are born there who cultivates land which helps in the economic development of the country. It is suggested that the books which are old and used by the students of urban areas should be donated to the rural areas. They should not sell the books. It is the duty of the citizens of the urban areas that they should step forward for the development of the libraries in rural areas. If they are unable to reach there, they can fund the organizations working in this field. It will again make the India a Golden Bird as it was known during Independence.

Talking about the importance of village, Gandhiji wrote in 1936, "I would say if the village perishes, India will perish too. It will be no more India. His one mission in the world will get lost." Harijan. 29.08.36.

Existing Condition in Nardipur:

- The current library is very dilapidated, but because of renovation work it is still in usable condition only for storage of some old papers.
- Roof of the library have many holes so water comes through it in rainy season.
- There were no proper seating arrangement for reading.
- All the walls of the building have some kind of defects so structure of the building is not proper.

Vision of Library:

The library acts as a resource centre and a clearinghouse of information on rural development in India. It has developed a computerized database of the resources in its collection. The computerized database consists of nearly two lakh references. The library has also fully automated its day-to-day operations.

Design Location:

Figure 153 Current Location and scenario

Impact on Rural Development:

With the establishment and implementation of the public libraries there is a positive effect on the villagers. It had changed their standard of living by raising education and knowledge level. The Information revolution had entered in the rural areas which is a good sign for rural development. The different projects and schemes undertaken by the Government and Nongovernmental Organizations for the Upliftment of rural communities living in villages are running with a good cause. It has raised better communication, education, knowledge through books, and mobile library all by advancement in the Information Technology. It is the impact of public library services in the villages which had built up the confidence level of the villagers. It had spread and enlightened the seed of knowledge through establishment of libraries. Now the villagers are active in running computer, mobile and to do work in all areas like agriculture, economic, finance, marketing etc which is good for the economic condition of the country. The rural development is the dream of the Gandhian Thought. Rural reconstruction puts an end to exploitation, diseases, illiteracy, gambling, drinking, corruption or class struggle. It seeks to establish a socialistic system in the country and thereby brings about the social and economic development of the rural areas. The concept of E-learning had made easy for receiving education and knowledge.

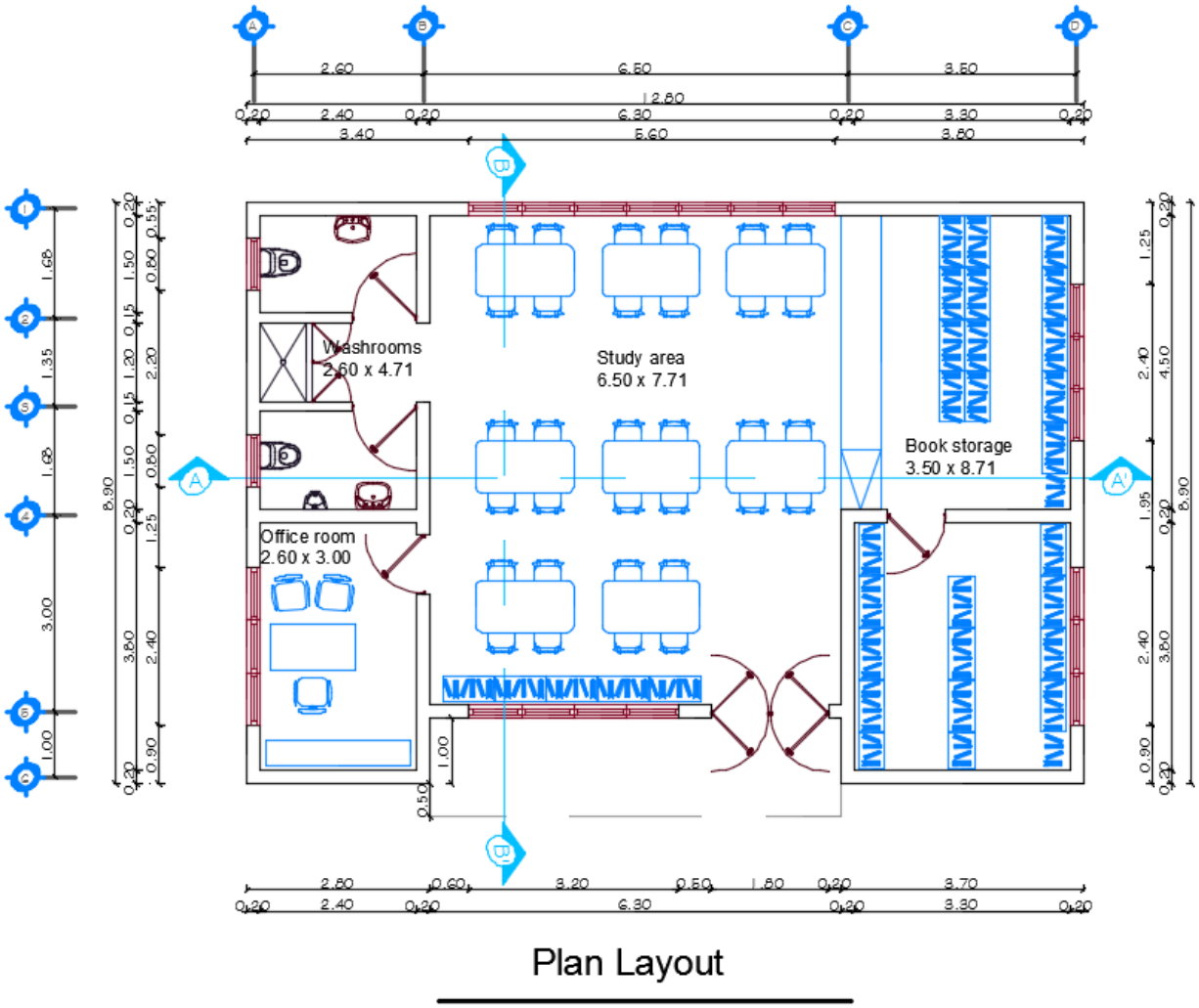


Figure 154 Librery : Plan

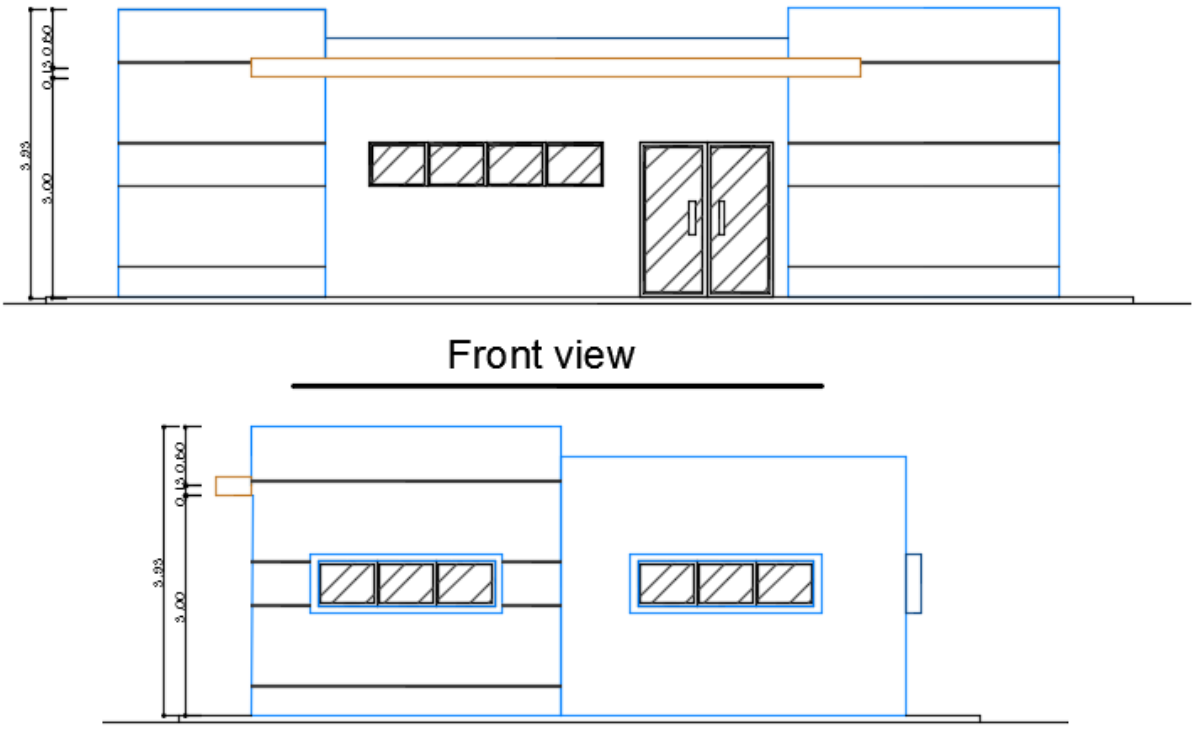


Figure 155 Librery : Front and Side view

Table 44 Librery : Abstract Sheet

Sr. No	Item Description	No.	Length	Width	Height	Quantity	Total Quantity	Rate	Per	Total Amount
1.	**Excavation**						21.746	350	m^3	7610
	Outer Wall	2	15.8	0.6	0.6	11.376				
		2	11.9	0.6	0.6	8.568				
	Inner Wall	1	15	0.2	0.6	1.8				
2.	**PCC In Foundation**						1.752	3200	m^3	5606
	Outer Wall	2	12.8	0.2	0.15	0.768				
		2	8.9	0.2	0.15	0.534				
	Inner Wall	1	15	0.2	0.15	0.45				
3.	**Brickwork In Foundation**						5.258	3400	m^3	17877
	Outer Wall	2	12.8	0.2	0.45	2.307				
		2	8.9	0.2	0.45	1.601				
	Inner Wall	1	15	0.2	0.45	1.35				
4.	**Brickwork In Superstructure**						34.81	3600	m^3	125316
	Outer Wall	2	12.8	0.2	3.93	20.12				
		2	8.9	0.2	3.93	13.999				
	Inner Wall	1	15	0.2	3.93	11.700				
5.	**125 Mm THK Rcc Slab**						14.63	4600	m^3	67315
6.	**Furniture**						Lumbsum			95000
Total										318724
Add 12% Enhancement										38246
Total Rs.										356970
Say Rs.										**3,60,000/-**

13.1.7 Electrical Design Proposals 1: LPG Gas Leakage Detection & Control System

INTRODUCTION:

The objective of this project is to detect any leakage of LPG/CNG based cars, small scale factories or in home appliances also. It will detect the leakage and will close the knob of the system to stop the supply of the gas. Stepper motor is there that could be attached with the knob and will close the supply by rotating it. For assistance and LCD of 16x2 is also there. An alarm is there also the stop the alert the user as soon as leakage is found. Gas sensors are employed in a wide range of applications in the fields of safety, health, instrumentation etc.

Common examples are domestic/commercial alarms for explosive or toxic gases, or in automotive application as gas leakage detectors for LPG powered cars and exhausts detectors inside any fuel powered truck/car. Such sensors, nowadays, are found also in applications involving air quality control systems and pollution monitoring.

Today's sensors, while featuring a high sensitivity to a wide gases variety, are very compact in size and have significantly reduced their power consumption to better adapt to portable solutions. Building a system with a gas sensor is not as easy as it could appear. Despite the sensor could be treated, basically, as a variable resistor (which value depends on gas concentration in air) the practical implementation in a project should be done considering some design rules, especially if the final circuit is a device to be used in a field where reliability is strongly required (e.g. safety).

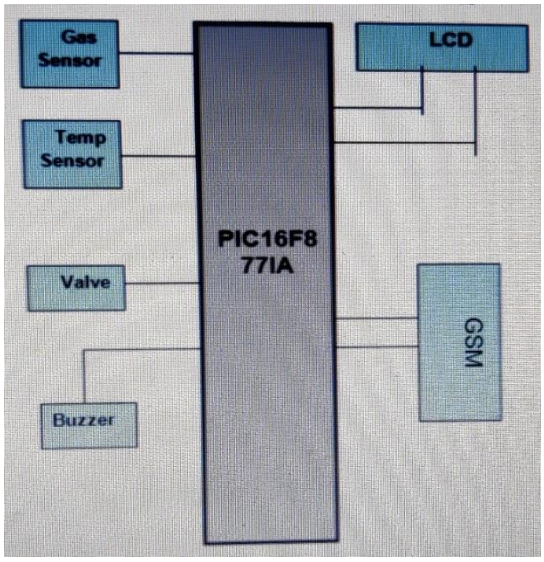


Figure 156 Block diagram of gas leakage system

As an example the internal elements of a sensor (heater and gas sensitive resistors) have to be constantly kept under control to avoid failures leading to a wrong alarm indication; furthermore, if the application needs to achieve a good measurement accuracy, factors like environment temperature, sensor life etc. have to be taken into account.

All those features and controls require introducing in the project a certain amount of external circuitry (including components like comparators, temperature sensor, spare logic etc. This project aims to show how a microcontroller can be employed to replace a lot of external components while adding extra functionalities at a cost comparable as a simple integrated comparator. In the prototype that we are going to present, the hardware and microprocessor firmware have been optimized to implement a smart LPG gas alarm (LPG stands for Liquefied Petroleum Gas) for cars running on LPG/CNG so that it can raise alarm before any fatal incident happens.

Working:

The block diagram of the hardware implementation of the entire system is as shown in the Figure. In this circuit we used MQ-6 sensor for gas leakage detection. MQ-6 sensor composed by micro AL2O3 ceramic tube, Tin Dioxide (SnO2) sensitive layer, measuring electrode and

heater are fixed into a crust made by plastic and stainless steel net. The heater provides necessary work conditions for work of sensitive components. The enveloped MQ-6 has 6 pin, 4 of them are used to fetch signals, and other 2 are used for providing heating current. Here MQ-6 sensor works on basics of combustion process, and output is given in variable voltage form, so, when LPG gas is leakage voltage at the output pin of MQ-6 is increased and we use IC2 (Op-amp LM324) as a comparator for compare the LPG leakage with respect to normal condition. Output of comparator is fed to IC1 microcontroller (ATMEL 89S8253) and corresponding coding LCD is display gas leakage and give another instruction to stepper motor via ULN2803 to turn 90o to turn off the regulator of gas tank. Temperature sensor DS18B20 is continuously communicated with Microcontroller and display temperature at LCD. If temperature is more than 50o then fire alarm is activated and display fire on LCD. PIC16F877A devices are available only in 40-pin packages. All devices in the PIC16F7X family share common architecture, with the following differences.

The main components of the system are-

1. PIC microcontroller
2. Gas sensor
3. GSM module
4. LCD
5. Power supply

1. PIC (MICROCONTROLLER)

The PIC (founded by Microchip) 16F877A is a CMOS-FLASH based High-performance 8-bit RISC Microcontroller. This powerful (200 nanosecond instruction execution) yet easy-to-program (only 35 single word instructions) microcontroller packs Microchip's powerful PIC® architecture into a 40 pin package. The PIC16F877A features 256 bytes of EEPROM data memory, self-programming, an ICD, 2 Comparators, 8 channels of 10-bit Analog-to-Digital converter, 2 capture/compare/PWM functions, the synchronous serial port can be configured as either 3-wire Serial Peripheral Interface (SPITM) or the 2-wire Inter-Integrated Circuit (I2CTM) bus and a Universal Asynchronous Receiver Transmitter (USART). All of these features make it ideal for more advanced level A/D applications in automotive, industrial, appliances and consumer applications. Alternating current differ from DC in the direction of electron flow , first in one direction for a short time , then reverse direction and flow again in opposite direction for short time . The flow of electrons in one direction and then in another direction is called a cycle of AC. The number of cycles occur in one second of time is called “Cycles/Second”. In our country the standard power line frequency is 50 Hz.

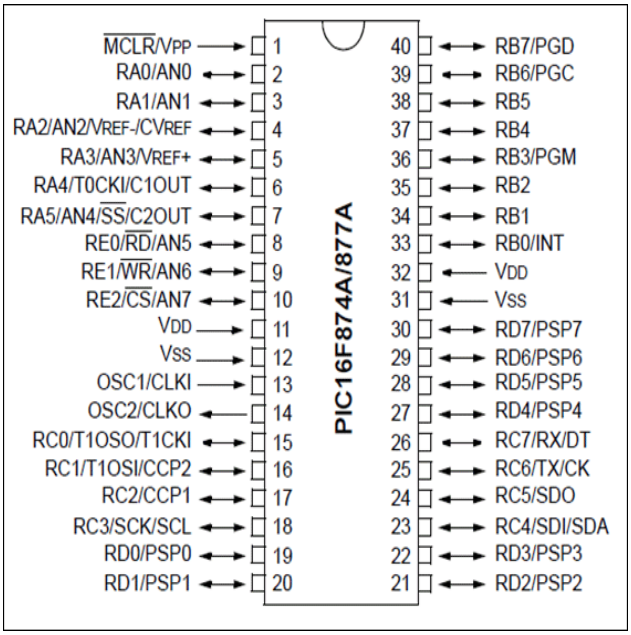


Figure 157 PIC (MICROCONTROLLER)

2. MQ6 SENSOR

They are used in gas leakage detecting equipment in family and industry, are suitable for detecting of LPG, iso-butane, propane, LNG, avoid the noise of alcohol and cooking fumes and cigarette smoke.

Structure and configuration of MQ-6 gas sensor is (Configuration A or B), sensor composed by micro AL2O3 ceramic tube, Tin Dioxide (SnO2) sensitive layer, measuring electrode and heater are fixed into a crust made by plastic and stainless steel net. The heater provides necessary work conditions for work of sensitive components. The enveloped MQ-6 has 6 pin, 4 of them are used to fetch signals, and other 2 are used for providing heating current.

Figure 158 MQ6 SENSOR

3. LCD

Figure 159 LCD

A liquid crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals (LCs). LCs do not emit light directly. They are used in a wide range of applications, including computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones. LCDs have replaced cathode ray tube (CRT) displays in most applications. They are available in a wider range of screen sizes than CRT and plasma displays, and since they do not use phosphors, they cannot suffer image burn-in. LCDs are, however, susceptible\to image persistence. LCDs are more energy efficient and offer safer disposal than CRTs. Its low electrical power consumption enables it to be used in battery-powered electronic equipment. It is an electronically modulated optical device made up of any number of segments filled with liquid crystals and arrayed in front of a light source (backlight) or reflector to produce images in color or monochrome. The most flexible ones use an array of small pixels.

4. GSM MODEM

It is a wireless MODEM-just like dial-up MODEM works with GSM wireless network. The difference between dial-up MODEM and wireless MODEM is wireless MODEM sends and receives data through radio waves whereas dial-up MODEM send and receive data through a fixed telephone line.

Figure 160 GSM MODEM

5. POWER SUPPLY

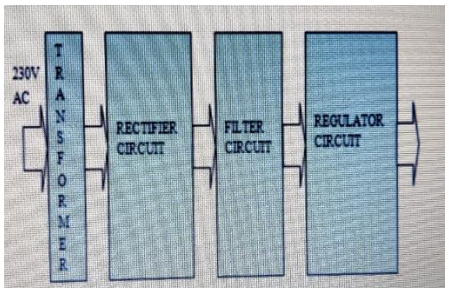


Figure 161 +5v DC power supply for microcontroller

Power supply unit consists of the following units:

a. Step down transformer
b. Rectifier unit
c. Filter unit
d. Regulator unit
e. Output filter

STEP DOWN TRANSFORMER: The instrument transformer for power supply in this project is to convert AC from 230V to required low level such as 5V AC. This transformer apart from stepping down AC voltage gives isolation between power source and power supply circuitries.

RECTIFIER UNIT: In a power supply unit, rectification is normally achieved by a solid state diode. Diode contains two electrodes called the anode and the cathode. A diode has the property that will let electron flow easily in one direction. As a result when AC is applied to a diode, electrons only flow when the anode is positive and cathode is negative. Reversing the polarity of voltage applied to a diode will not permit electron flow. The various method of rectifying AC to DC or half wave, full wave and bridge rectifications. This project employs a full wave bridge rectifier which is most commonly used in industries. A bridge structure of four diodes is commonly used in power supply units to achieve full wave rectification. When AC voltage is applied to the primary winding of power transformer. It is stepped down to 5V AC across the secondary winding of the transformer. Normally one alteration of the input voltage will cause the polarities to reverse. Opposite end of the transformer will therefore, always be 180 degrees out of phase with each other. For positive cycle, two diodes connected to the top winding gets positive voltage and only one diode conducts for that cycle due to forward bias. At the same time one out of the other two diodes conducts, for the negative voltage being applied from the bottom winding due to forward bias for that diode DC of frequency 100Hz. In the next alteration the two diodes conducted from top winding and bottom winding as they are forward biased in this cycle. It is to be noted that the current flow through the load is always in one direction for each alteration of the applied AC input. This is of course, means that AC is rectified into DC. This DC output, in this case, has a ripple frequency of 100Hz, since each alternation produces a resulting output pulse, the ripple frequency or 2*50 Hz =100Hz. The output DC is not a pure DC. It is pulsating DC voltage.

FILTER UNIT: After pulsating DC has been produced by our rectifier, it must be filtered in or for it to be usable in a power supply. Filtering involves the ripple frequency. The power supply unit employed in this project used 7805 voltage regulator (for positive output voltages) and a 7905 regulator (for negative output voltages). Resistors R1 and R2 maintain line load regulation. Capacitors C2 and C4 act as high frequency suppressors. Depending on the design, it may be used to regulate one or more AC or DC voltages. The 78xx (sometimes LM78xx) is a family of self-contained fixed linear voltage regulator integrated circuits. The 78xx family is commonly used in electronic circuits requiring a regulated power supply due to their ease-of-use and low cost. For ICs within the family, the xx is replaced with two digits, indicating the output voltage (for example, the 7805 has a 5 volt output, while the 7812 produces 12 volts). The 78xx line is positive voltage regulators: they produce a voltage that is positive relative to a common ground.

REGULATOR UNIT: Regulator regulates the o/p voltage constant depends on upon the regulator. The 78XX series of voltage regulator are intended to provide a fixed voltage for use with a variety of different circuits. They are available in a range of different voltages as shown below and, although only the positive variety is considered here, there is a complimentary range of negative regulators that are essentially identical. The voltage regulators are capable of providing currents of up to 1.5A with adequate heat-sinking and internal protection circuitry makes them almost indestructible. In other configurations and with extra components, these

regulators can be employed as variable voltage sources or constant current sources crystal, so oscillator circuits incorporating them became known as crystal oscillators, but other piezoelectric materials including polycrystalline ceramics are used in similar circuits.

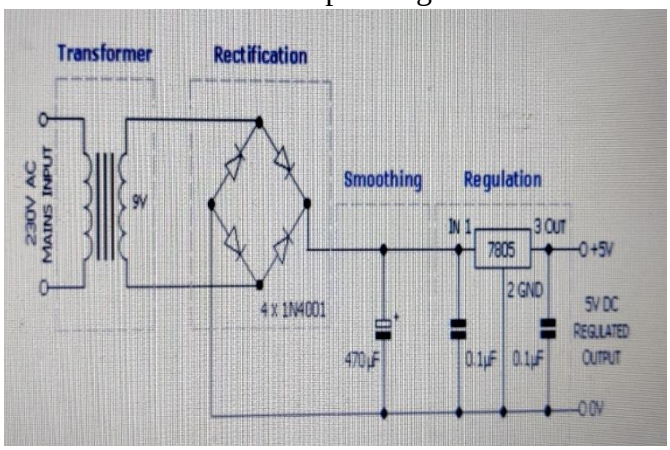


Figure 162 Power supply circuit

OUTPUT FILTER: Capacitor acts as filter. The principle of the capacitor is charging and discharging. It charges in positive half cycle of the AC voltage an it will discharge in negative half cycle. So it allow only allows AC voltage and does not allow the DC voltage. This filterer fixed after the regulator.

Costing:

Table 45 LPG Gas Leakage Detection & Control System: Costing

Component	Quantity	Unit Cost	Total cost (Rs.)
Plc microcontroller	1	260	260
Gas sensor (MQ-6)	1	160	160
GSM module	1	600	600
LCD	1	88	88
Step down transformer	1	300	300
Rectifier unit	1	15	15
LM 7805	2	9	18
9v battery	1	40	40
Buzzer	1	15	15
Voltage Regulator(LM7805)	1	9	9
Capacitors(25v)	4	10	40
Resistors	4	2	8
		Overall cost(Rs.)	**1,553**

ADVANTAGES:

- It is used in house as LPG leakage detection
- It also detects alcohol so it is used as liquor tester.
- The sensor has excellent sensitivity combined with a quick fast response time.
- The system is highly reliable, tamper-proof and secure.
- In the long run the maintenance cost is very less when Compared to the present systems.
- It is possible to get instantaneous results and with high accuracy.

APPLICATION:

- Protection from any gas leakage in cars
- For safety from gas leakage in heating gas fired appliances like boilers, domestic water heaters
- Large industries which uses gas as their production

13.1.8 Electrical Design Proposals 2: Automatic LED Emergency Light

INTRODUCTION:

Growing demand for the saving of electricity. It is based on the principle of providing light when the power is cut off. This is accomplished by the use of automatic charger which gets charged when power supply exists. When the battery is fully charged it stops charging. In case of power failure, the LED glows automatically with the supply provided by the charged battery.

This project is working on two major processes:

1. It turns on automatically when the mains power fails, so you need not search it in the dark.
2. Its battery starts charging as soon as mains resumes.

This Emergency light is used mostly in village because there is the lack of electricity which is very required. In industries and as well as in household applications an emergency light is employed where there is frequent non uniform voltage distribution occurs. Many types of emergency lights from rechargeable torches to systems like generators are available in market. All of them require a switch to operate them when frequent power failure occurs.

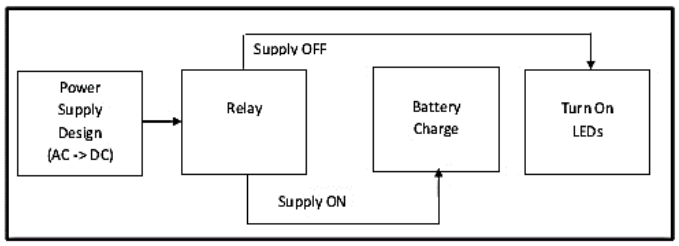


Figure 163 FUNCTIONAL BLOCK DIAGRAM

The present one deals with a model which senses the mains as well as daylight to switch on the emergency light. There is no need to search the switch in the dark as it switches on/off automatically. This present one has one on/off switch on operating which the emergency light glows. In most of the emergency light there exists a drawback. The discharge level of the battery is not being controlled to a safe level. The batteries get discharged completely and lose their life rapidly. This is a very serious aspect in order to overcome this cut-off is provided and there exists a minimum discharge level which ensures the long life of batter.

Power Supply:

For converting 230V AC to 12V AC, 12-0-12V Transformer is used. It steps down the voltage from 230V to 12V AC. Now, to convert 12V AC to 12V DC we use Bridge Circuit. There are four 1N4007 Diode is used to get 12V DC output. This is the function of Power Supply to convert AC to DC.

Relay:

Relay is working as a Switch. There are three terminal NC (Normally Close) and NO (Normally Open) and Common. Here we connect. NC terminal to the rechargeable battery and Common terminal is Connects with the LEDs. Now if Power supply is on it connects with NO terminal and charge the battery and when there is no power supply NC terminal is connected with the battery and LEDs will be ON.

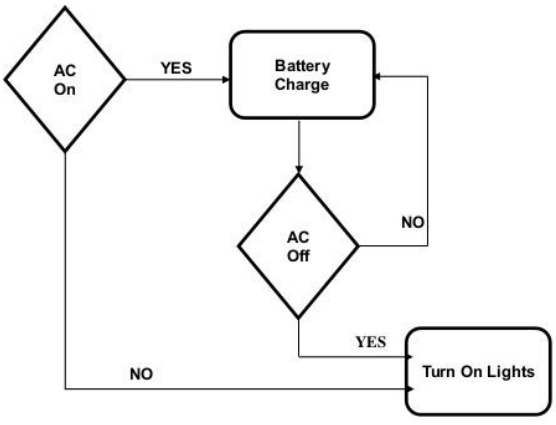


Figure 164 Flow Diagram

Rechargeable Battery:

Li-ION battery is used to give 3.7V as Output and Maximum Voltage of the battery is 4.7 voltage Zener Diode of 4.5V is used to get 4.5V as an input. So that it can be measured how much time it will take to charge battery.

LEDs:

10 LEDs are connected in parallel to get charge from rechargeable battery when power supply is cut off. It is on automatically when power supply is off.

When AC is on the flow shows that battery will be charge. When AC is off it turn on the LEDs as shown in the flow diagram.

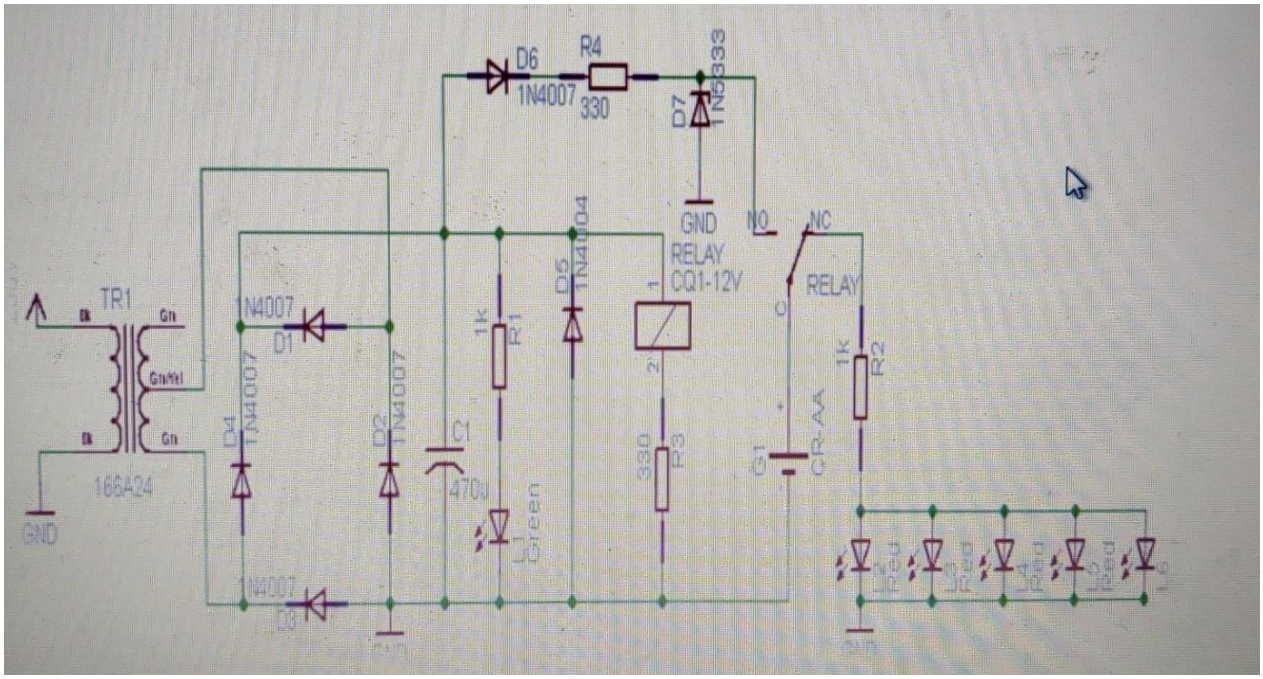


Figure 165 Circuit Diagram

Operation:

- The step down transformer and the diode bridge rectifier steps down and convert the high AC (in the range of 110V or 230V) voltage to low (12V) DC voltage.
- The diode D5 prevents the battery charge from flowing back, it acts as a freewheeling diode too.
- In the presence of electricity, the relay contact connects the NO (Normally Open) terminal to battery. Thus battery charges during this time.
- Use Green LED as the charging indicator which glows when the emergency light battery is charging.
- When supply failure occurs, relay connects the NC (Normally Closed) terminal to the battery.
- The LED arrays are connected to NC terminal, thus they glow by using the charge stored in the battery.

Transformer:

For Converting High AC voltage to Low AC voltage we used 12-0-12V Transformer.

Bridge Circuit:

To convert 12V AC to 12 V DC, we use 4 Diode 1N4007. It has High Current Capability and Low Forward Voltage Drop. The value of capacitor is 470µF. So we get rectified output.

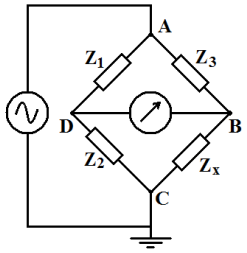


Figure 166 Bridge Circuit

Relay:

Relay is working as a Switch. To operate relay we needs 12V DC supply so that we are using 12V Transformer.

Rechargeable Battery:

For Rechargeable battery, Nominal Voltage of Li-Ion battery is 3.7 Voltage. Standard capacity is 1950mAh. Charging voltage is 4.2V.Constant current 0.2C5A.

Costing:

Table 46 Automatic LED Emergency Light

Component	Quantity	Unit Cost	Total cost(Rs.)
Relay	2	25	50
Battery	2	110	220
LEDs	10	5	50
Transformer (12V)	3	300	900
1N4007 Diode	10	4	40
		Overall cost(Rs.)	**1,260**

Advantages:

- It is easy to use, save energy more and easy to install anywhere.
- Efficiency: more light per watt than incandescent bulbs.
- Colour: can emit of an intended colour without use of colour filters.
- Size: very small.
- On/off time: light up very quickly.
- Life time: long useful life time.

Disadvantages:

- Cost: currently more expensive.
- Health hazard: cool white LEDs can cause problems to eyes.

Application:

- Used as an alternative source at the time of power failure.
- It is suitable for domestic applications.
- Used in remote residential areas.

13.1.9 Electrical Design Proposals 3: Three phase fault analysis with auto reset on temporary fault and permanent trip otherwise

Introduction:

A fault in a power system is any failures which interface with the normal flow of current. The cause of electric power system faults is insulation breakdown.

This breakdown can be due to a variety of different factors such as,

- Lightning stroke
- Spray on Insulators
- Trees coming in contact with wires
- Equipment Failure

- Human Errors

As from the studies 70% to 90% of faults are occurred in overhead transmission line which are transient. There are many transient fault, such as damages of insulation, swinging wires and little time contact with other objects.

These faults are cleared by operating the circuit breakers or can be cleared by de-energizing the line at short period for clearing the fault. The other 30% to 10% faults are occurred in overhead line which are permanent or long duration fault. Permanent or long duration fault occurred by broken wire which results one phase to ground fault or joining the two phase together which is occurred in overhead line as well as in the underground cable.

These fault cleared by finding them in line and repair which results permanent trip of line.

Types of Faults:

The faults can be classified into:

- Symmetrical faults
- Unsymmetrical faults

The Shunt faults are characterized by increase in current and fall in voltage and frequency. The Shunt faults can be classified as:

- Single Line to Ground (LG) fault
- Line to Line (LL) fault
- Double line to ground (LLG) fault
- Three Phase fault.

An unbalanced fault does not affect each of the three phase equally. Common type of unbalanced fault and there causes:

- Line-to-Line (LL) fault: A short circuit between lines, caused by ionization of air, or when lines come into physical contact, for example due to a broken insulator.
- Single line-to-ground (LG) fault: A short circuit between one line & ground, very often caused by physical contact, for example due to lightning or other damages.
- Double line-to-line ground (LLG) fault: Two lines come into contact with the ground also commonly due to storm damage.

Block Diagram:

COMPONENTS USED:

- Power transformer
- Voltage regulator
- Relays and 555 timer
- LM 358

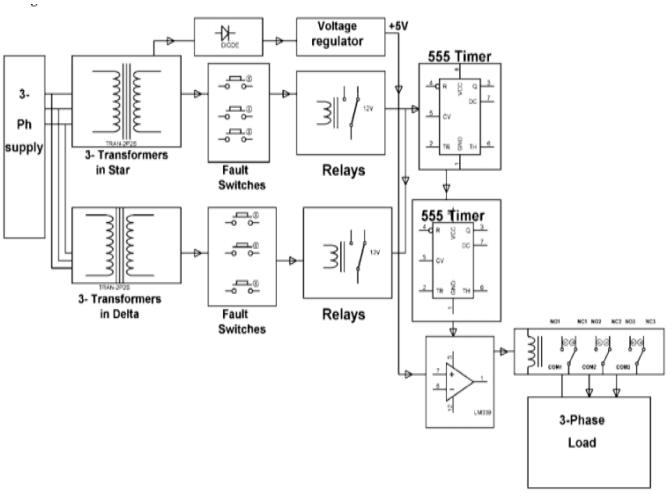


Figure 167 Block Diagram

POWER TRANSFORMER:

This is a device which is used to covert electricity from alternating current (AC) voltage to another alternating current (AC) voltage with less loss of power.

Here step down transformers are used for step down the voltage at 12volt from 220volt AC. The ratio of number of turns in the primary and secondary windings determines that a transformer is step-up or step-down.

In this project three single phase transformers which are wired in star input and star output and three transformers are connected in delta connection.

VOLTAGE REGULATOR:

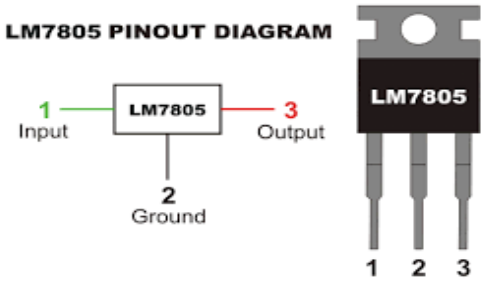


Figure 168 VOLTAGE REGULATOR

The LM78XX/LM78XXA series of three terminal positive regulators are available. Each type employs internal current limiting, thermal shut down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided they can deliver over 1A output current. These devices can be used with external component to obtain adjustable voltage and current.

RELAY:

Relay is an electrically operated switch which helps in protecting system from severe damage by detecting and isolating fault on transmission and distribution lines by opening and closing of circuit breaker.

Figure 169 Relay

555 TIMER:

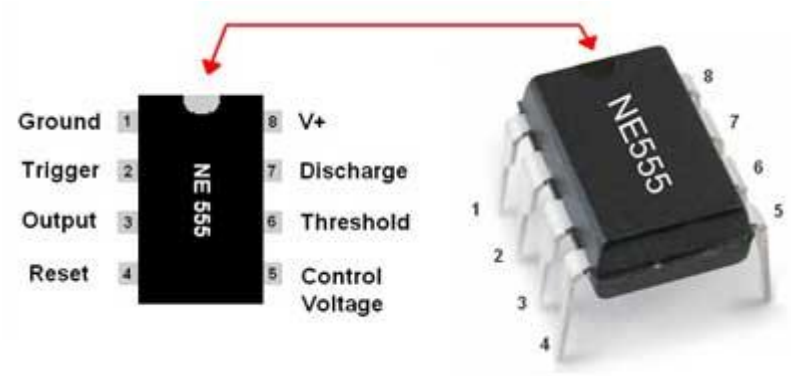


Figure 170 555 TIMER

The 555 Timer is an integrated circuit implementing a variety of timer & multi-vibrator applications. Depending on the manufacturer, the standards 555 package includes over 20 transistors, 2 diodes & 15 resistors on a silicon chip installed in an 8-pin mini dual-in-line package.

LM358:

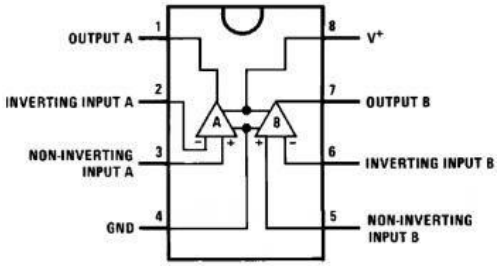


Figure 171 LM358

Op amp and comparator look very similar but a comparator gives a logic output indicating the relative potentials on its two outputs.

An op amp amplifies the differential voltage between its two inputs and is designed always to be used in closed loop applications.

SCHEMATIC DIAGRAM:

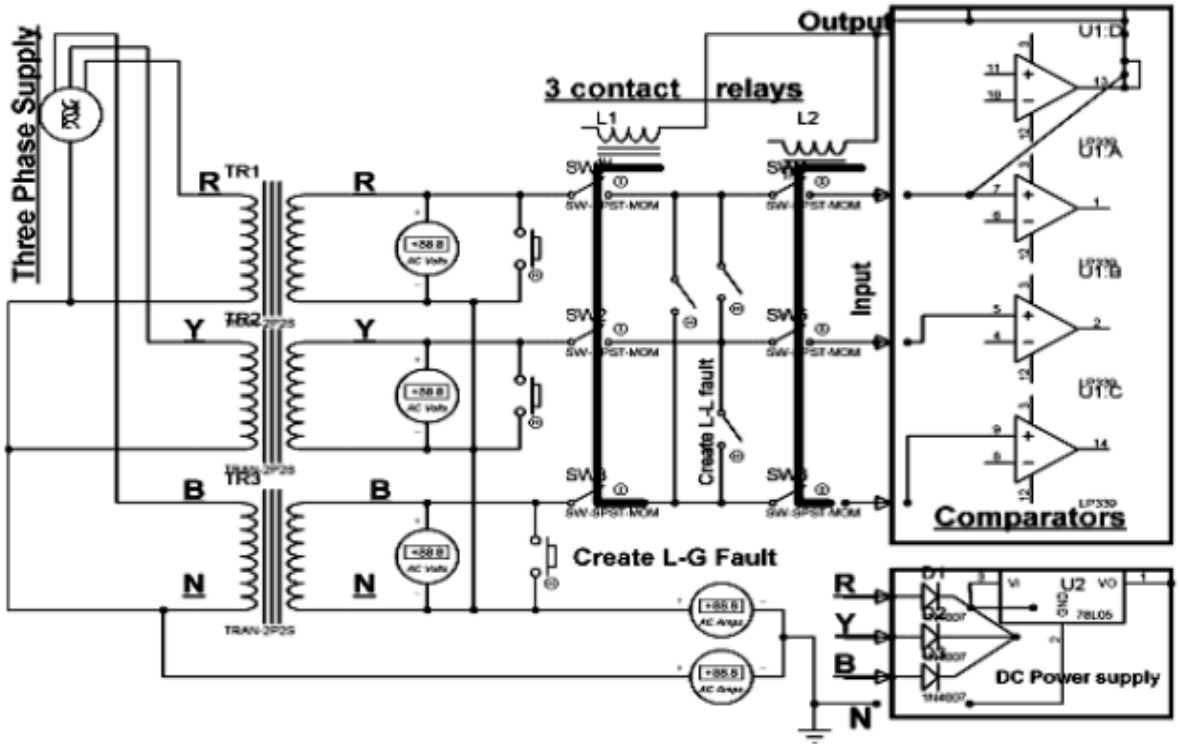


Figure 172 SCHEMATIC DIAGRAM

Working Principle:

There are six step down transformers which are connected to the board producing 12 volt to the circuit. These six transformers are divided into two groups, first one group is connected in star-star connection and later s connected in star-delta connection.

The NC contacts of all the relay are made parallel while all the common points are grounded. The parallel connected point of NC is then connected to pin2 of 555 timer through a resistor R5 i.e. wired in constable mode the output (pin3) of the same timer is connected to reset (pin4) of the other 555 timer wired in a stable mode.

LED's are connected at their output to indicate their status. The output (pin1) of 555 timer (U3) is given to op-amp LM358 through wire 11 and d12 (1N4007) to the non-inverting input (pin3) which acts as a comparator.

Costing:

Table 47 Costing: Three phase fault analysis with auto reset on temporary fault and permanent trip otherwise

Component	Quantity	Unit Cost (Rs.)	Total cost (RS.)
Stepdown Transformers	6	300	1800
Relay	2	25	50
Push Button	6	8	48
555 timer	1	225	225
Op-amp LM358	5	45	225
Resistors(1K)	10	2	20
Voltage Regulator(LM7805)	1	9	9
Diode (1N4007)	12	4	48
		Overall Cost(Rs.)	**2,425**

13.2 Reason for Students Recommending this Design

13.2.1 Social Design Proposals: Community Health Center

People in rural areas generally have less access to healthcare than the urban counterparts. Fewer medical practitioners, mental health programs, and healthcare facilities in these areas often mean less preventative care and longer response times in emergencies.

13.2.2 Socio-cultural Design Proposals: Garba Chowk

We have some unique concept for socio-cultural so we are going to design Step Auditorium cum Garba Chowk in this structure. If Sarpanch want to organize any funcation or any detailed announcement so he can organize at this auditorium & also suitable for village meeting. Any Cultural programs can be organized at this auditorium like in Navaratri festival Garba, Holi etc.

13.2.3 Physical Design Proposals: Boundary wall with Gate

The ground near the village is unprotected as there are no boundary walls available, many times vehicles came into the ground in night times and park their and several times street animals comes too in the ground and make it dirtier and create unsafe environment for children.

13.2.4 Heritage Design Proposals: Fountain

We are suggesting this design to implement in front of the gram panchayat building to increase the appearances of the village.

13.2.5 Smart Design Proposals: Animal Shelter House

Need for animal welfare is based on awareness that animals are sentient and constitute a major part of the ecosystem and that consideration should be given to their well-being especially when they are used for food, in animal testing, as pets or in any other way. Every year millions of cats and dogs are euthanized in animal shelters because there are more pets than there are responsible homes. In order to control overpopulation animals are spayed or neutered in rescue centres or veterinary clinic.

13.2.6 Sustainable Design Proposals: Library

The current library is very dilapidated, but because of renovation work it is still in usable condition only for storage of some old papers. Roof of the library have many holes so water comes through it in rainy season. There were no proper seating arrangement for reading. All the walls of the building have some kind of defects so structure of the building is not proper.

13.3 About designs Suggestions / Benefit of the villagers

- In the village as if CHC's physical condition are best so all village people and also nearby villages will easily get much better health facilities.
- Garba Chowk will be helpful to bring people close to each other.
- Boundary wall will provide safety to their children who are playing in the ground and Children can play more freely without any fear of trespassing of vehicle.
- By implementing the fountain in front of the gram panchayat building it will increase the presences of the village.
- A shelter for animal and Library for youth will be great initiatives for village Growth.

14. Technical Options with Case Studies

14.1 Civil Engineering

14.1.1 Advanced Earthquake Resistant

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

Earthquake Resistant Design Techniques for Buildings and Structures

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

- Base Isolation
- Energy Dissipation Devices

Base Isolation Method

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

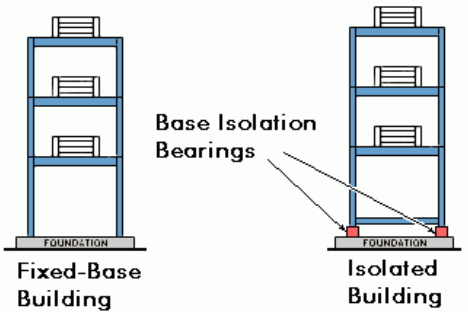


Figure 173 Base-Isolated and Fixed-Base Buildings 1

Earthquake Generated Forces

To get a basic idea of how base isolation works, examine Figure 2. This shows an earthquake acting on both a base-isolated building and a conventional, fixed-base, and building. As a result of an earthquake, the ground beneath each building begins to move. In Figure 2, it is shown moving to the left. Each building responds with movement which tends toward the right. The building undergoes displacement towards the right. The building's displacement in the direction opposite the ground motion is actually due to inertia. The inertial forces acting on a building are the most important of all those generated during an earthquake.

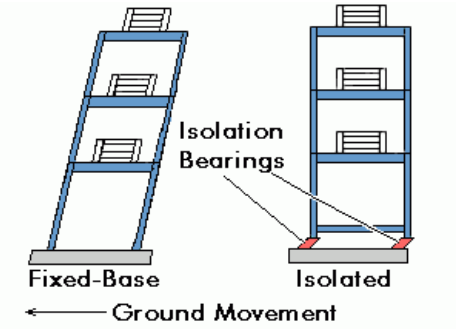


Figure 174 Base-Isolated, Fixed-Base Buildings 2

Response of Base Isolated Building

By contrast, even though it too is displacing, the base-isolated building retains its original, rectangular shape. It is the lead-rubber bearings supporting the building that are deformed. The base-isolated building itself escapes the deformation and damage, which implies that the inertial forces acting on the base-isolated building have been reduced. Experiments and observations of base-isolated buildings in earthquakes have been shown to reduce building accelerations to as little as 1/4 of the acceleration of comparable fixed-base buildings, which

each building undergoes as a percentage of gravity. As we noted above, inertial forces increase, and decrease, proportionally as acceleration increases or decreases. Acceleration is decreased because the base isolation system lengthens a building's period of vibration, the time it takes for the building to rock back and forth and then back again. And in general, structures with longer periods of vibration tend to reduce acceleration, while those with shorter periods tend to increase or amplify acceleration. Finally, since they are highly elastic, the rubber isolation bearings don't suffer any damage. But the lead plug in the middle of our example bearing experiences the same deformation as the rubber. However, it generates heat. In other words, the lead plug reduces, or dissipates, the energy of motion, i.e., kinetic energy--by converting that energy into heat. And by reducing the energy entering the building, it helps to slow and eventually stop the building's vibrations sooner than would otherwise be the case, in other words, it damps the building's vibrations.

Energy Dissipation Devices

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

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

Fluid Viscous Dampers

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

Damping Devices and Bracing Systems

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

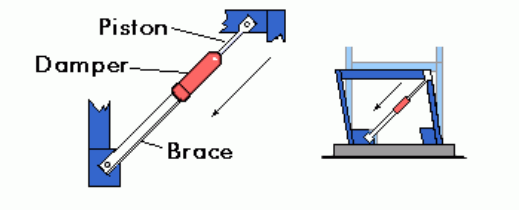


Figure 175 Damping Devices and Bracing Systems

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

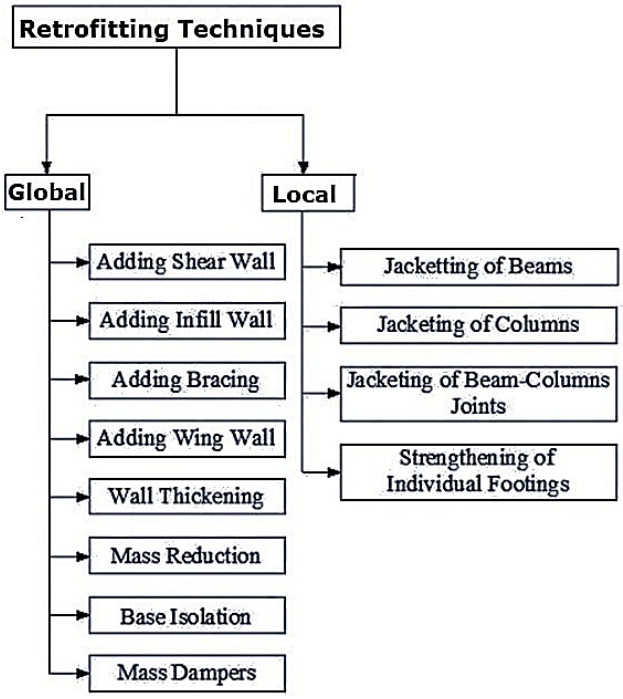


Figure 176 retrofitting Techniques

Need for Seismic Retrofitting:

- To ensure the safety and security of a building, employees, structure functionality, machinery and inventory
- Essential to reduce hazard and losses from non-structural elements.
- Predominantly concerned with structural improvement to reduce seismic hazard.
- Important buildings must be strengthened whose services are assumed to be essential just after an earthquake like hospitals.

Basic Concept of Retrofitting:

The aim is at:

- Up gradation of lateral strength of the structure
- Increase in the ductility of the structure
- Increase in strength and ductility

Adding New Shear Walls:

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

Figure 177 New Shear Walls

Adding Steel Bracings

- An effective solution when large openings are required.

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

Jacketing (Local Retrofitting Technique):

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

Types of Jacketing:

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

Purpose for jacketing:

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

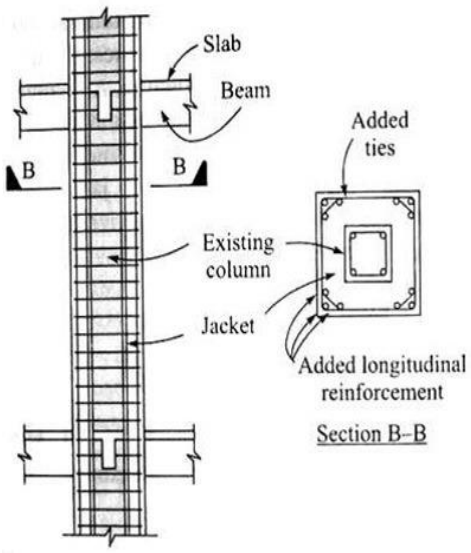


Figure 178 Jacketing

Base Isolation (or Seismic Isolation):

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

Advantages of Base Isolation

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

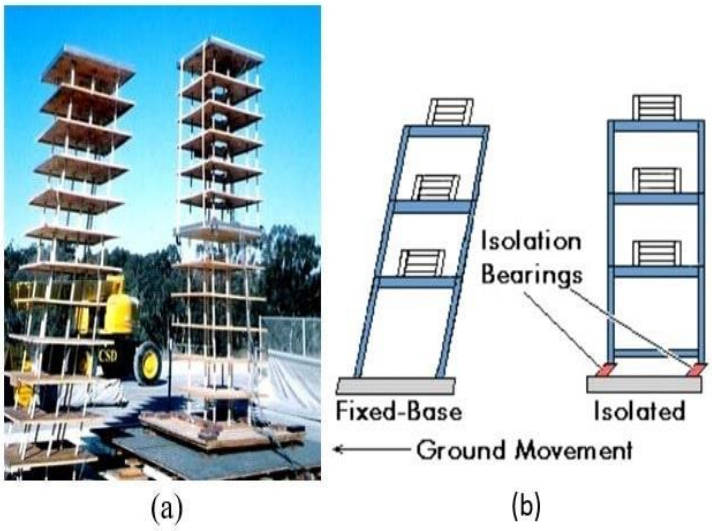


Figure 179 Base Isolated Structures (a)Model Under Test, (b) Diagrammatical Representation

Disadvantages of Base Isolation

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

Wall Thickening Technique of Retrofitting:

The existing walls of a building are added to certain thickness by adding bricks, concrete and steel aligned at certain places as reinforcement, such that the weight of wall increases and it can bear more vertical and horizontal loads, and also it's

designed under special conditions that the transverse loads does not cause sudden failure of the wall.

Conclusion – Seismic Retrofitting Techniques for concrete structures:

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

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

Building construction methods have experienced significant facelift in recent times with innovative technologies being harnessed optimally for improving the qualitative index of buildings.

This has spelled considerable advantages for end users like us who can remain immune from recurrent expenses on repairs and other incidental building-related jobs. Construction lead time has also been reduced and building costs have been rationalized.

This post takes you through 8 techniques that have given the much-needed fillip to the most primitive human pursuit that still exists i.e. construction.

1) 3D Volumetric Construction

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

Figure 180 3D Volumetric Construction

Figure 181 Precast Flat Panel Modules

2) Precast Flat Panel Modules

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

3) 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.

Figure 182 Tunnel Formwork System

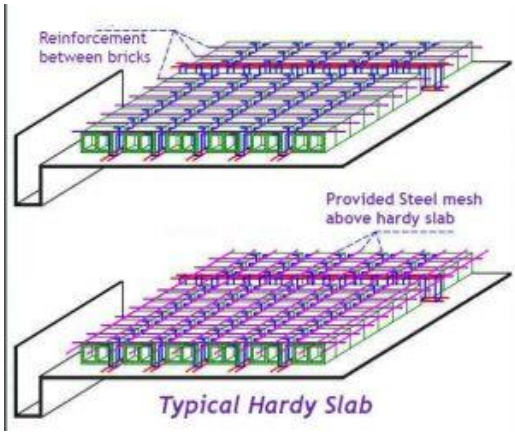


Figure 183 Flat Slabbing Technology

4) Flat Slabbing Technology

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

5) Pre-cast Foundation Technique

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

Figure 184 Pre-cast Foundation Technique

Figure 185 Hybrid Concrete Building Technique

6) Hybrid Concrete Building Technique

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

7) Thin Joint Masonry Technique

Utilization of this technique leads to the reduction of the quantum of mortar applied by slashing it depth from 10mm to lesser than 3mm. Consequently, mortar can be laid swiftly with enhanced productivity on the longer wall panels. With large sized concrete blocks, higher construction efficiency along with significant cost reduction can be achieved. Within a single day, the number of mortar courses laid is higher as

Figure 186 Thin Joint Masonry Technique

curing of mortar takes place quickly without compromising on bonding strength resulting in the elimination of floating problem.

Figure 187 Insulating Concrete Formwork (ICF) Technique

8) Insulating Concrete Formwork (ICF) Technique

ICF technique employs polystyrene blocks that feature twin walls and can be rapidly put together for creating building wall formwork. The formwork is then pumped in with high quality, ready mixed, factory-made concrete. The building construction process becomes fool-proof and the resultant structure has a high level of sound and thermal insulation.

Advanced Construction: Material Innovations and New Technologies

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

1. **Durable Concrete**

Concrete Design and Construction Practices today are strength driven. Concrete grades up to M80 are now being used for highrise buildings in India. However, due to escalation in the repair and replacement costs, more attention is now being paid to durability issues. There are compelling reasons why the concrete construction practice during the next decades should be driven by durability in addition to strength.

2. **High Performance Concrete**

In the United States, in response to widespread cracking of concrete bridge decks, the construction process moved towards the use of High Performance Concrete (HPC) mixes. Four types of HPC were developed1:

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

3. **Self–compacting Concrete (SCC)**

SCC was developed by the Japanese initially as a Quality Assurance measure, but now is being widely used for concrete structures worldwide. In India, one of the earliest uses of SCC was for some components of structures at Kaiga Atomic Power Project.

Figure 188 Palais Royale–The Tallest Building in India under construction with M-80 Concrete Columns in Self–compacting Concrete

The diverted slag is quenched and forms small nodules. These nodules are crushed and granulated into very fine product, with particle size smaller than that of cement. The product is marketed in 50 kg bags and available economically in the regions around steel mills with blast furnaces. In other regions, additional transport cost of this bulk material is involved but its use is justified because of contribution to durability of concrete. For the concrete components of the structure for Bandra and Worli sewage outfalls in Mumbai, the German prime contractor insisted on compulsory use of GGBFS for the M40 concrete in order to improve the durability of concrete.

Durability Enhancing Products

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

Hydrophobic Concrete Waterproofing System

Figure 189 Hydrophobic Concrete

A typical patented product uses three materials to achieve a water-tight concrete structure, a super-plasticizer which reduces batching water requirements, thus limiting the volume of the capillary pour network in the concrete; a reactive hydrophobic pour blocking concrete admixture and product specific water stop protection at construction dams.

Other accessory products include an operation retardant, curing compound, water stops and polypropylene fiber reinforcement. The patented product is typically added while concrete mix is being prepared to assist waterproofing. One product is applied at the rate of 5 liter per of concrete. Typically the manufacturer provides a warranty period of 10 years. The performance warranty provides for repairing water leakage through industry accepted and approved means for a period of 10 years. The product however has some negative impact on the rate of gain of strength of concrete. As a rough indication, the specified characteristic 28-day strength of concrete will not be achieved at 28 days but at 56 days or more.

Reinforcement

Figure 190 Reinforcement

The revised BIS Code 1786 provides for four grades of reinforcement characterized by the yield strength – Fe 415, Fe 500, Fe 550 and Fe 600. Each of the first three grades is also available with superior ductile properties and a nomenclature is Fe 415D, Fe500D and Fe550D. Fe 500 bars are now used for a number of highrise buildings, bridges and flyovers in India. Lapping of bars results in congestion of steel creates difficulties in proper placement and compaction of concrete and of course more expensive for large diameter bars. Couplers are now preferred instead of lapping. With widespread use, the cost of couplers has come down. The coupler design and manufacture permits the joints in the same plane without the need for staggering as in the case of lapping Fig. 1 shows typical use of couplers for columns of a multi-storied building in Mumbai.

Figure 191 Ternary Blended Cements

Ternary Blended Cements

Ternary blended cements containing the combination of fly ash–slag, fly ash–silica fume or slag–silica fume are commonly used for concrete in many parts of the world. The European Standard EN 197 for cement lists 27 different combinations for cement. Usually mineral admixture used may present a complimentary effect on cement hydration. Limestone filler addition produces favorable effects on cement test. In particular, the physical effects caused by limestone filler enhance the strength due to hydration acceleration of Portland clinker gains at very early age and the improvement of particle packing of the cementitious system.

Photo-catalytic Cement

This is a patented Portland cement developed by Italcementi Group. The photo-catalytic components use the energy from ultra-violet rays to oxidize most organic and some inorganic compounds. Air pollutants that would normally result in discoloration of exposed surfaces are removed from the atmosphere by the components, and the residues are washed off by rain. This cement can be used to produce concrete and plaster products that save on maintenance cost while they ensure a cleaner environment.

Insulated Concrete Form (ICF)

ICF structural elements allow maximum clear spans. The ICF elements are used for large commercial buildings, residential buildings etc.

Exterior Self–leveling Concrete Topping

This is a Portland cement based product for fast track resurfacing and smoothing of concrete. It produces a smooth flat hard surface and dries quickly without shrinking, cracking or spalling. Pourable or pumpable when mixed with water, it installs 6 to 20 mm thick in one application and up to 50 mm thick with the addition of aggregate. It is pourable or pumpable when mixed with water. It can be used on, above or below grade and it makes spalled or damaged concrete look like new. Once sealed it creates an excellent wearing surface.

Figure 192 Corrosion Inhibiters for Reinforced Concrete

Corrosion Inhibiters for Reinforced Concrete

Calcium nitrate has been proven to inhibit reinforcement corrosion. About 3–4% calcium nitrate of cement by weight is sufficient to protect the reinforcement steel against corrosion. Typically a corrosion inhibiter should raise the level of chlorides necessary to initiate corrosion or decrease the rate of corrosion after it has started or both. Since it does not necessarily prevent corrosion from happening altogether, it is more appropriate to call the product as corrosion retarders. The performance warranty provides for repairing water leakage through industry accepted and approved means for a period of 10 years. The product however has some negative impact on the rate of gain of strength of concrete

14.1.4 Engineering Aspects of Soil mechanics - Environmental Impact Assessment

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

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

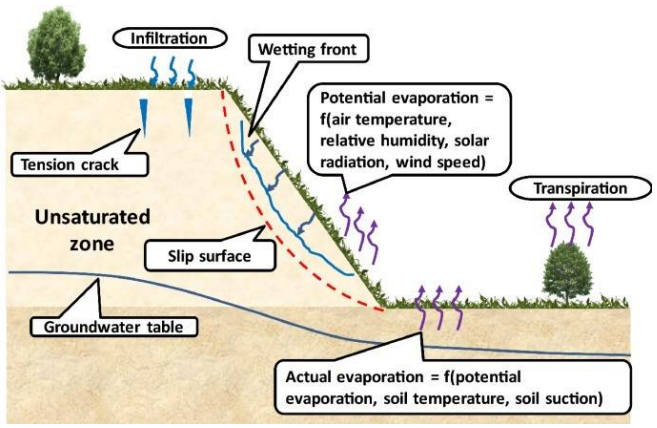


Figure 193 Water cycle

There is historical precedent for the now mandatory Environmental Impact Assessments (EIA). Past efforts by governments have resulted in bans on activities that caused noxious odors, garbage dumps were positioned at places far away from habitation, and commercial activities were restricted to town centers.

Objectives of Environmental Impact Assessment

The objective of an EIA is to predict the environmental impact project would have on all aspects of the environment. Once this is done, a study has to be made to see if the impacts can be reduced in any way. The project has then to be modified to suit the local environment and

Figure 194 Objectives of Environmental Impact Assessment

all predictions and likely options presented to decision makers for final decisions.

You can gain a better understanding of EIA by understanding how any typical project can affect the environment of a particular area. Take for example the building of a new road in a city. The alignment of the road may require that certain lands have to be leveled or new embankments created. Cutting of the land and the new embankments would affect the

geography of the area and probably upset its drainage pattern. This would require re-planning existing methods of treating the run-off and could cause existing watercourses to be modified. The new road may require the removal of existing green cover and this could affect the living conditions in that area. The traffic going through that area can cause pollution problems from vehicles which also includes an increase in sound pollution. The emissions from the vehicles can affect already existing atmospheric pollutants which in turn could affect human health, animal health and affect greenery in the area. The road may affect existing structures in the area which may have to be removed and can cause changes in the economic wellbeing of the persons who are using those structures.

A positive impact of the new road may mean a reduction in traffic congestion, its positive effect on pollution, and the economic advantage of these two aspects.

For any environmental impact assessment, complete data on all these aspects as they are at present has to be made so that any changes can be reasonably judged to existing standards required for good living. The deterioration or increase in these living standards has then to be highlighted by the EIA before any final decision on the project can be undertaken.

Environmental assessment process

The main objective of the Environmental Impact Assessment (EIA) is to evaluate the Project likely impacts on the environment as described in section 4 of this ESIA. One of the key objectives of the ESIA is to assist in ensuring environmentally and socially sound management of the Project during its entire lifecycle. The description of the existing conditions of the local environment provides a comprehensive data collection and analysis of the baseline conditions at the Project site. The baseline data permits the identification of the main socio-environmental factors that might be associated with the Project activities.

The interaction between the Project activities and the environmental and social baseline conditions of the ecosystem at the Project site is at the core of the ESIA. The ESIA is designed to forecast the positive and negative effects that may occur to the receiving environment. The early identification of impacts that may occur in the area leads to a reduction of the risk of future adverse environmental effects, and permits the proposal of mitigation guidelines/measures to avoid, reduce or remediate significant adverse effects.

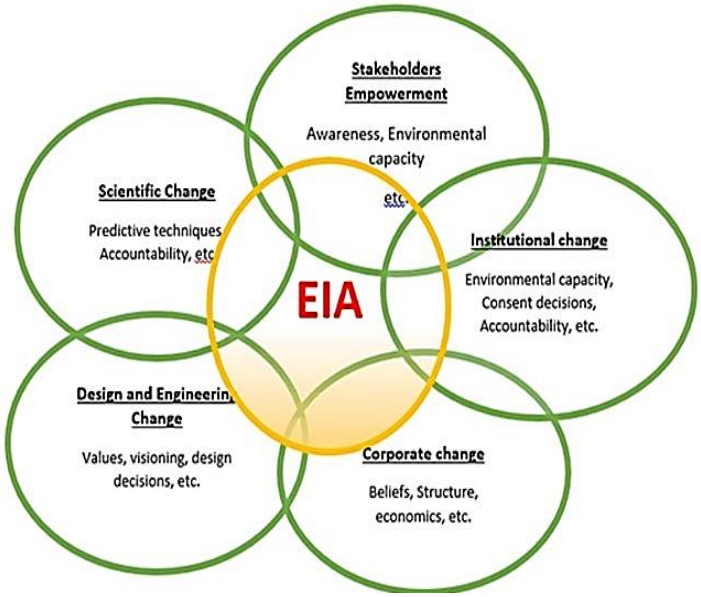


Figure 195 Environmental Impact assessment

The ESIA also acknowledges potential socio-economic impacts, and predicts the effect on people and communities occurring as a result of the Project. In this section, key biological, physical, and human receptors are selected from the baseline data. The impacts of the Project activities on each of these "Valued ecosystem Components" are evaluated using a significance ranking process.

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

Wastewater is any water that has been adversely affected in quality by anthropogenic influence and comprises liquid waste discharged by domestic residences, commercial properties, industry, and/or agriculture and can encompass a wide range of potential contaminants and concentrations.

Sewage is the part of wastewater that is contaminated with feces or urine, but is often used to mean any wastewater. When this is done sewage refers to wastewater from sources including domestic, municipal, or industrial liquid waste products disposed of, usually via a pipe or sewer system. Untreated sewage may contain water; nutrients; solids; pathogens; helminthic ; oils and greases; runoff from streets, parking lots and roofs; heavy metals and many toxic chemicals including PCBs, PAHs, dioxins, furans, pesticides, phenols and chlorinated organics.

Sanitation is the hygienic means of preventing human contact from the hazards of wastes to promote health. Examples of waste that can cause health problems are feces, solid wastes, domestic wastewater and industrial wastes. Hygienic means of prevention can be by using septic tanks sewage systems or simply by personal hygiene practices like hand washing with soap. The Joint Monitoring Program for water and sanitation of WHO and UNICEF defines improved sanitation as; connection to a public sewer; connection to a septic system; pour-flush latrine; simple pit latrine; ventilated improved pit latrine. Not improved sanitation is; public or shared latrine; open pit latrine; bucket latrines.

Effects

Sewage released into the rivers and oceans can cause a threat to both human health and the environment.

Human health

Figure 196 Humans riskind their lives

According to GESAMP (2001), contamination of the coastal marine environment by sewage leads to significant numbers of infectious diseases linked to bathing and swimming in marine waters and to the consumption of seafood. Human exposures to toxins associated with algae blooms also impose significant risks.

Most illnesses are caused by pathogens, which are biological/infectious agents that cause diseases or illnesses. They cause a wide variety of acute illnesses including diarrhoea, cholera, dysentery, typhoid, and hepatitis A. Pathogenic bacteria can survive in the sea from a few days to several weeks; viruses can survive in water, fish or shellfish for several months while the hepatitis virus can remain viable in the sea for over a year (GESAMP 2001).

The Environment

Nutrients are essential chemical elements that organisms need to survive and reproduce (Smith & Smith 1998). Macronutrients, needed in large quantities, include carbon, hydrogen, oxygen, nitrogen, phosphorus, potassium, sulphur, magnesium, and calcium, while micronutrients like iron, copper and zinc are needed in lesser quantities (Smith & Smith 1998).Excess nutrients

are discharged to the marine environment through sewage, fertilizers from agriculture and by nitrogen oxides from burning fossil fuels.

According to GESAMP (2001) sewage tends to be the main source of nutrients near cities, while agriculture predominates in rural areas. Increased nutrients may lead to eutrophication which is an excessive growth of marine plant life and decay. Plants such as algae often experience a population increase (called an algal bloom) which limit the sunlight available and cause lack of oxygen in water.

Figure 197 Environment in Danger

Global Studies on Sanitation and Sewage

According to a report published by UNICEF and the World Health Organization (2008) the world is not on track to meet the Millennium Development Goal (MDG) on sanitation and 2.5 billion people still lack access to improved sanitation facilities. According to the same study 1.2 billion people worldwide live without any sanitation facilities. Without an immediate acceleration the world will not even achieve the half of the MDG for sanitation by 2015. Based on the current trends there will still be 2.4 billion people worldwide without improved sanitation in 2015.

Improved sanitation facilities are defined as, facilities that ensure hygienic separation of human excreta from human contact; connection to a public sewer; connection to a septic system; pour-flush latrine; simple pit latrine; ventilated improved pit latrine. Not improved sanitation is; public or shared latrine; open pit latrine; bucket latrines (JMP Joint Monitoring Programme for Water supply & Sanitation).

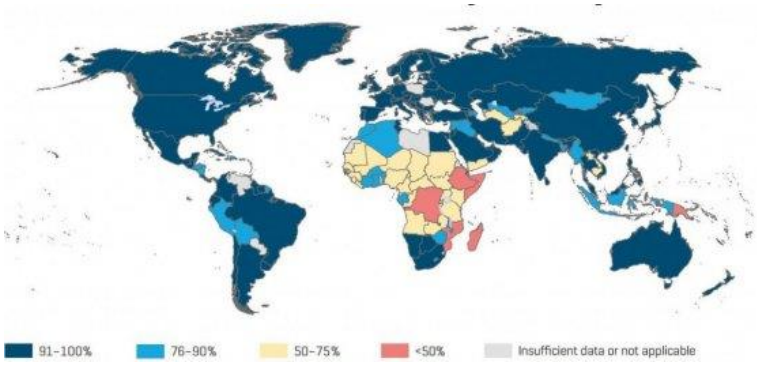


Figure 198 Global Studies on Sanitation and Sewage

A global study by the World Health Organization (WHO) estimates that bathing in polluted seas causes some 250 million cases of gastroenteritis and upper respiratory disease every year. Many studies show that respiratory and intestinal diseases and infections among bathers rise as a direct consequence of increasing amounts of sewage pollution in the water GESAMP (2001).

According to Shuval 2003, the estimated economic loss globally, caused by pathogenic microorganisms is about $12 billion per year. Seafood contaminated by harmful algal blooms causes significant health problems and a study done by the European Environment Agency (EEA 2005) showed that the socio-economic impact in Greece, Italy and Spain is around 329 million annually.

The number of ‘dead zones’, which are areas of anaerobic conditions at the sea bottom, due to increased amounts of nutrients, has doubled since 1990 (GPA/UNEP 2006). A “dead zone” appears off Louisiana in the Gulf of Mexico each summer caused by excessive amounts of nitrogen flushed down the Mississippi River.

This study shows that the pollution by sewage in this sub- region has caused

- Fish mortality;
- eutrophication;
- threats to corals, swamp ecosystems and seagrass beds;
- biological diversity loss;
- red tides which have killed marine organisms;
- threats to human health due to elevated numbers of pathogenic microorganisms (e.g. viruses, bacteria) and toxins created by algal bloom;
- Threats to tourism.

Laws, Regulations and Policy Response on Sewage

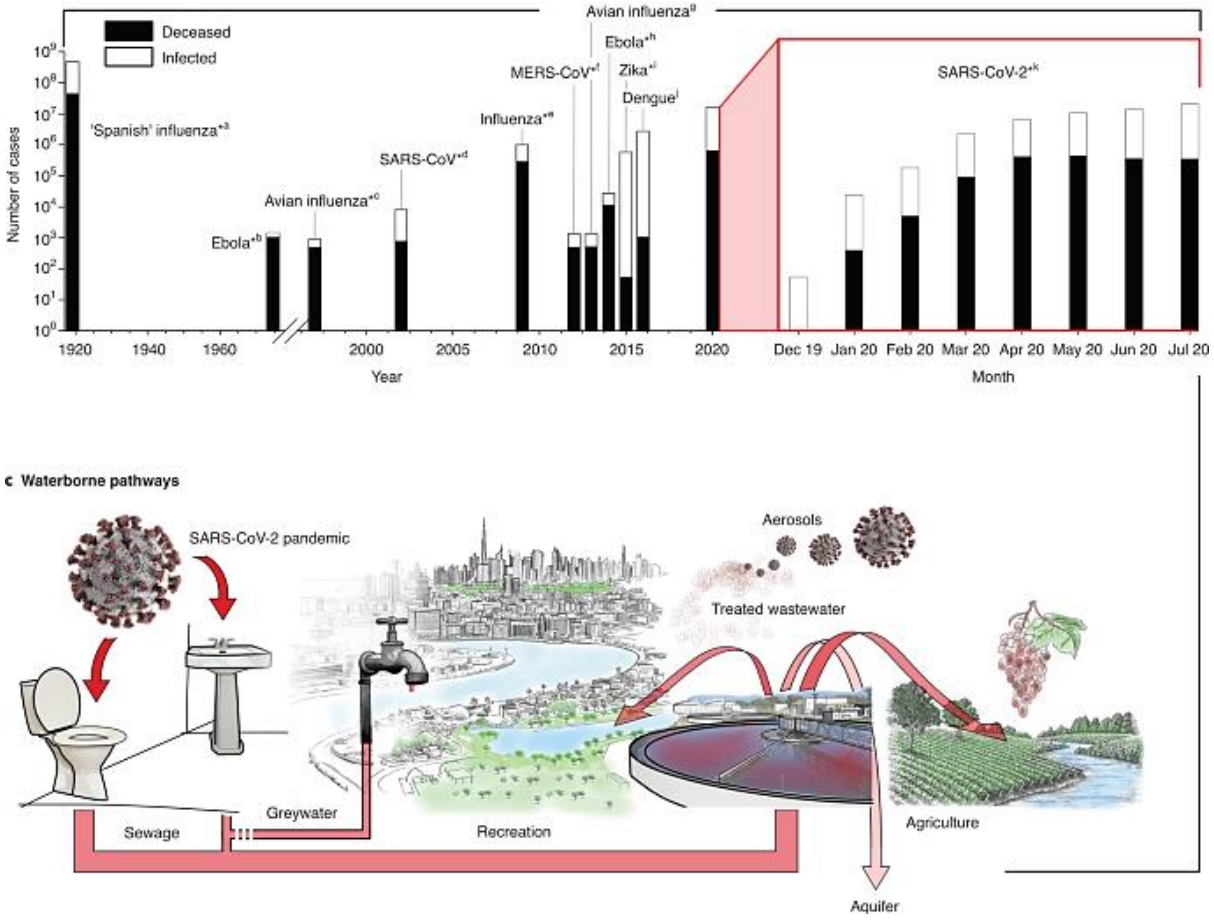


Figure 199 Laws, Regulations and Policy Response on Sewage

Land and ocean-based sewage pollution is regulated in many different frameworks ranging from regional legislation, international non-binding and binding agreements, action plans and national legislation and regulations (UNEP 2005).

The most important regional legal framework is the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention). The Convention entered into force in 1986 and is a legally binding, regional multilateral environmental agreement for the protection and development of the WCR. The Protocol Concerning Pollution from Land-Based Sources and Activities (**LBS Protocol**) of the Cartagena Convention sets forward general obligations and a legal framework for regional co-operation, provides a list of priority source categories, activities and associated pollutants of concern and promotes the establishment of pollution standards and schedules for

implementation. Annex III relates directly to domestic wastewater and establishes specific regional effluent limitations, as well as a time table for the implementation of wastewater treatment.

For the purpose of the Annex, effluent limits are divided in two classes, depending on the water in which they are discharged. Class 1 waters are particularly sensitive to impacts from pollution while Class 2 waters are less sensitive. The effluent limits for domestic wastewater in the LBS Protocol are set to:

Parameter	Class 1 Waters	Class 2 Waters
Total Suspended Solids *	30 mg/l	150 mg/l
Biochemical Oxygen Demand (BOD_5)	30 mg/l	150 mg/l
pH	5-10 pH units	5-10 pH units
Fats, Oil and Grease	15 mg/l	50 mg/l
Faecal Coliform or *E. coli*.or entrerococci	Faecal coliform: 200 mpn/100ml E. coli: 126 organisms/100ml Entrerococci: 35 org./100ml	Not applicable
Floatables	Not visible	Not visible

Figure 200 Water Parameters

Facilities and communities in each country must comply with the provisions of the Protocol on a phased basis after the Protocol enters into force for that country. The following will apply related to treatment facilities:

Years after entry into force	Effluent Sources required to comply with standards
0	All new domestic wastewater systems – public and private
10	Existing domestic wastewater systems other than community wastewater systems
10	Communities with 10,000 – 50,000 inhabitants
15	Communities with more than 50,000 inhabitants already possessing wastewater collection systems
20	Communities with more than 50,000 inhabitants not possessing wastewater collection systems
20	All communities except those relying exclusively on household (e.g. septic tanks) systems

Figure 201 Tratment facilities throught years

On the International level, Annex IV of the International Convention for the Prevention of Pollution from Ships **MARPOL73/78** is one of the most important Conventions on the regulation on sewage discharges from the shipping sector**.** The Annex is optional, entered into force on 27 September 2003, and a revised Annex entered into force 1 August 2005. The 30th of November 2006, 113 countries representing over 75% of the world's tonnage had become party to this Annex. Cruise ships flagged under countries that are signatories to MARPOL are subject to its requirements, regardless of where they sail, and member nations are responsible for vessels registered under their respective nationalities.

Costing:

Table 48 Costing of Waste water treatment plant

Parameters	Eq tank	FM	CF	SDB	RGF	Dis
Cost for cement	16402	1144	76380	49118	119824	5411
Cost for sand	4001	279	18629	11980	29225	1320
Cost of coarse aggregate	10779	669	82527	34648	88031	2523
Cost of Brick	10152	214	27420	16898	21261	3849
Cost of Pipe	500	500	500	1500	1000	1000
Cost of painting	5000	2500	10000	7500	5000	2500
Mason	5600	4200	9800	7000	8400	5600
Male helper	4000	3000	7000	5000	6000	4000
Female helper	3200	2400	5600	4000	4800	3200
Estimated cost	59633	14906	237856	137644	283542	29402
Contractors profit	5963	1491	23786	13764	28354	2940
Total Estimated Cost	65597	16397	261641	151408	311896	32342
				Sum Total (Rs)		**839281**

The aim of wastewater treatment is to ensure human health and prevent ecological degradation by the safe disposal of local and modern wastewater generated during the utilization of water. In India, there was no particular treatment given to wastewater and was discharged into drains and trenches, which in the long run wound up in waterways, streams, lakes, and seas, and eventually utilized by individuals.

Bearys Institute of Technology (BIT) is 20 km from the centre of the city and 5 km from Mangalore University Campus at Konaje. The campus is having5-acrearea, consists of two academic blocks, one workshop block and two hostels with a mess and one prayer hall. The plan and the contours of the Bearys Institute of Technology campus represented in Fig. The blocks totally consist of seven water tanks of 5000 liters capacity each with 3 times loading per day, so total capacity of 105000 litersof water are pumped daily. Therefore, the total quantity of water required for the boy's hostel is 30000 litters per day. From the contour map of the campus it was observed that, South West part of the campus is of higher elevation and North East is of lower elevation where we can expect the gravity flow. So, placing the STP in North East is more convenient. The contour values were varying from 91.5 m to 92.5 m in the proposed sewage treatment plant area.

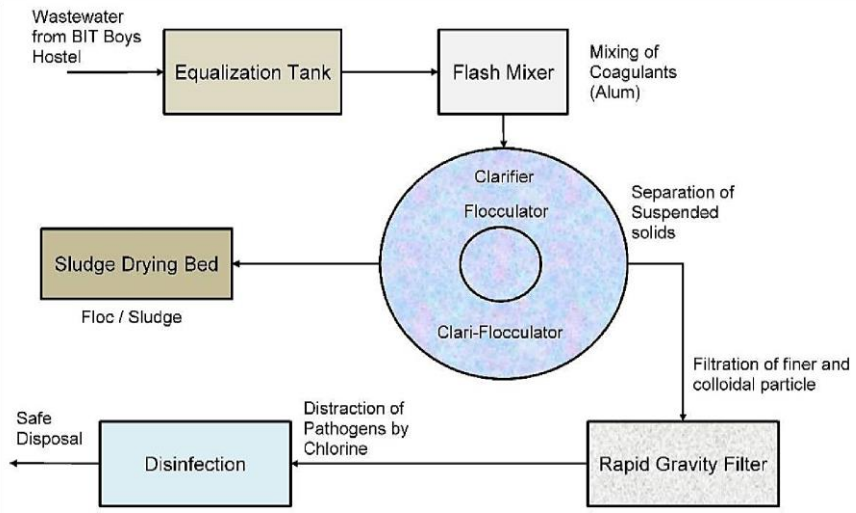


Figure 202 Parameters of Waste water treatment

Sewage treatment can be categorized as aerobic and anaerobic process. Aerobic is of primary treatment, secondary treatment, biological treatment, miscellaneous and tertiary treatment. Primary treatment consists of equalization tank and flash mixer. Secondary and biological treatment consists of sand filter and sludge drying bed. Miscellaneous consists of disinfection tank.

14.2 Electrical Engineering

14.2.1 Design of Power Electronics converter

A power electronic converter uses power electronic components such as SCRs, TRIACs, IGBTs, etc... To control and convert the electric power. The main aim of the converter is to produce conditioning power with respect to a certain application. The design of power electronics converter circuits requires design of the power and control circuits. The voltage and current harmonics that are generated by the power converters can be reduced or minimized with a proper choice of the control strategy.

Power Electronics Application:

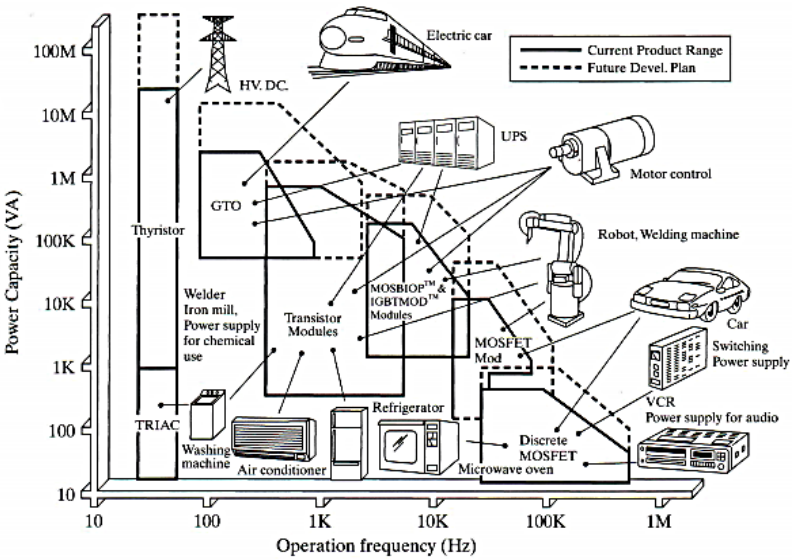


Figure 203 Power Electronic devices application

Power Electronics defined as the application of solid - state (devices) electronics for the control and conversion of electric power. Power electronics have already found an important place in modern technology and are now used in a great variety of high power product, including heat controls, light controls, electric motor control, power supplies, vehicle propulsion system and high voltage direct current (HVDC) systems.

Power electronic switching devices:

1. Uncontrolled turn on and off (Power Diode)
2. Controlled turn on uncontrolled turn off (Thyristors)
3. Controlled turn on and off characteristic (Power Transistor, BJT, MOSFET, GTO, IGBT)
4. Continuous gate signal requirement (BJT, MOSFET, IGBT)
5. Pulse gate requirement (SCR, GTO)
6. Bipolar voltage-withstanding capability (SCR, GTO)
7. Unipolar voltage-withstanding capability (BJT, MOSFET, GTO, IGBT)
8. Bidirectional current capability (TRIAC)
9. Unidirectional current capability (SCR, GTO, BJT, MOSFET, IGBT)

Static converters:

Static converter is a power electronic converter that can conversion of electric power from one to another. The static power converters perform these function of power conversion.

The Power Electronic Converter can be classified into six types:

Diode Rectifiers: A diode rectifier circuit converts AC voltage into a fixed DC voltage. The input voltage to rectifier could be either single phase or three phase.

AC to DC Converters: An AC to DC converter circuit can convert AC voltage into a DC voltage. The DC output voltage can be controlled by varying the firing angle of the thyristors. The AC input voltage could be a single phase or three phase.

AC to AC Converters: This converters can convert from a fixed ac input voltage into variable AC output voltage. The output voltage is controlled by varying firing angle of TRIAC. These type converters are known as AC voltage regulator.

DC to DC Converters: These converters can converter a fixed DC input voltage into variable DC voltage or vice versa. The DC output voltage controlled by varying of duty cycle.

Static Switch: Because the power devices can be operated as static switches or contactors, the supply to these switches could be either AC or DC and the switches are called as AC static switches or DC static switches.

Example of type of converter:

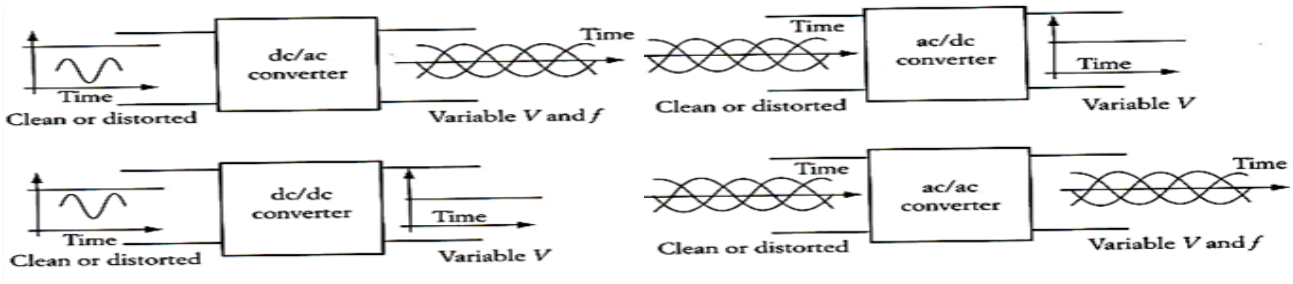


Figure 204 Example of type of converter

AC to DC Converters:

Single phase, Half wave AC to DC converter:

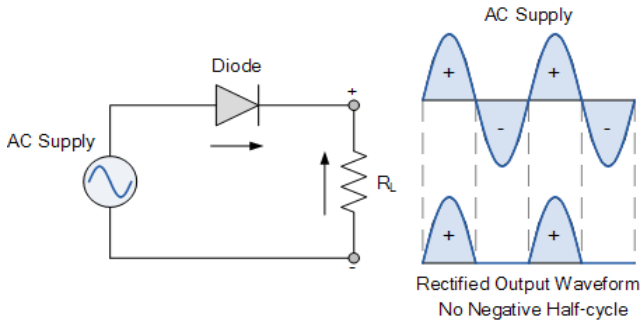


Figure 205 Single phase, Half wave AC to DC converter

Single phase, Full wave AC to DC converter:

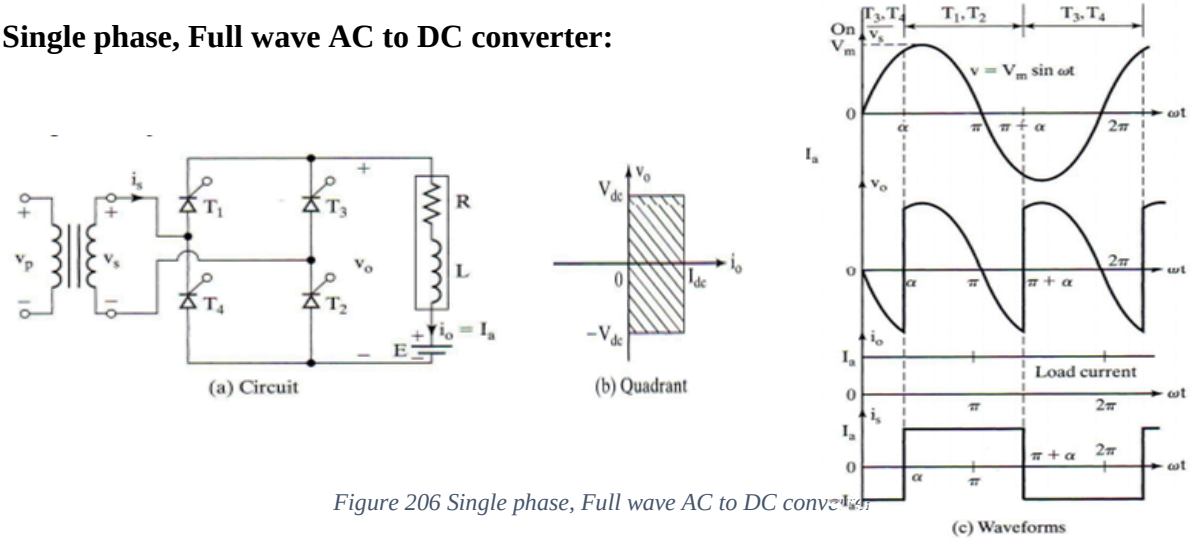


Figure 206 Single phase, Full wave AC to DC converter

Three-phase, Half wave AC to DC converter:

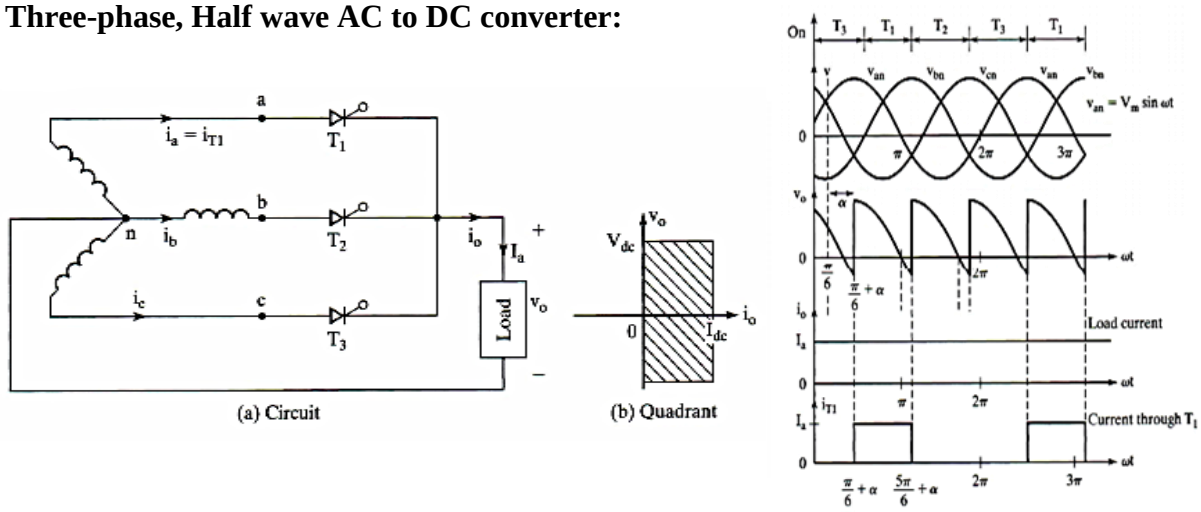


Figure 207 Three-phase, Half wave AC to DC converter

Three-phase, Full Wave AC to DC converter:

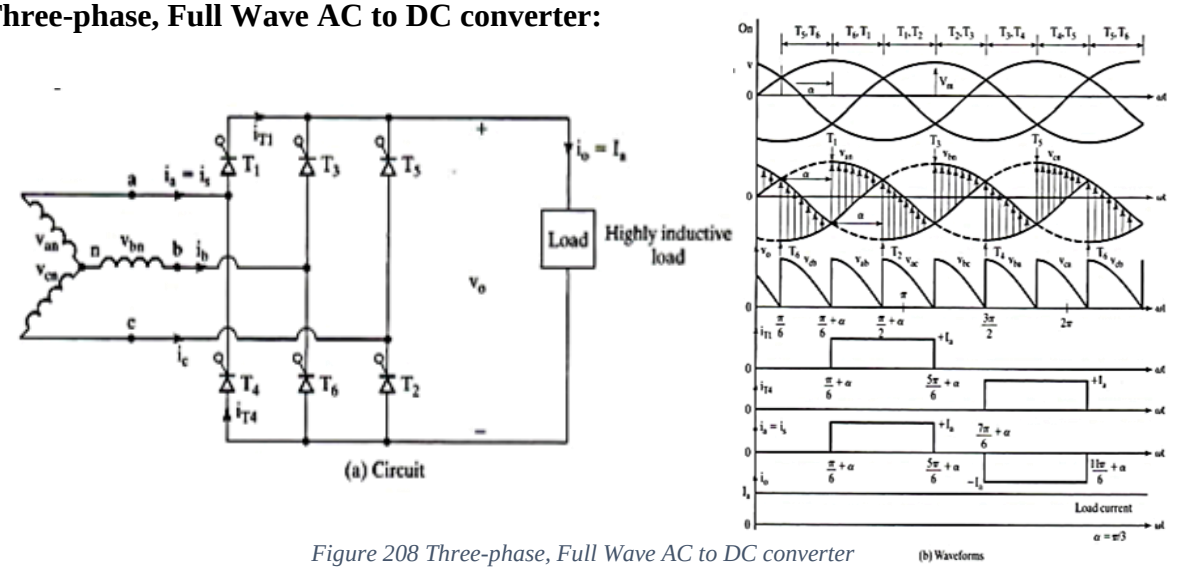


Figure 208 Three-phase, Full Wave AC to DC converter

DC-DC CONVERTER (DC Chopper):

- In many industrial application, DC-DC converter is required to convert a fixed-voltage DC source into a variable-voltage DC source.
- Like a transformer, DC-DC converter can be used to step down or step up a DC voltage source.

Advantages:

- High Efficiency
- Fast dynamic response

Application:

- Traction motor control in electric automobiles
- Trolley cars
- Marine hoists
- Forklift trucks
- Mine haulers, etc...

14.2.2 Electronic Soft Starter for 1/3 Phase Induction Motor for Agriculture

Soft starter project is used to smoothly start single phase and three phase induction motor. Soft starter is a technique which is used for the protection of induction motor.

Why we need soft starter for induction motor?

When we supply power to induction motor, initially it takes more than the rated current of induction motor. This initial current is also known as inrush current. So we need a device which can control this inrush current. Inrush current is very dangerous for induction motors. Because it can damage induction motor winding and also it is wastage of resources. So to limit the starting current of induction motor, soft starter is used. Inrush current required only at the starting of motor. After motor reaches its full speed, motor also start to draw steady state current. But the chances for the motor to get damaged during starting is very high. Therefore soft starter is used to start induction motor smoothly.

Soft starter for single phase induction motor:

As I mentioned earlier, soft starter is a device which is used to run or start induction motor smoothly. Soft starter applies controlled voltage to induction motor. By applying gradually increasing voltage from low to high. As I mentioned earlier motor draws high current at the start than its rated capacity. So the voltage applied to the induction motor increases gradually from low to high value so that motor can draw small current at the start according to applied voltage. Because at low voltage motor will draw low current and at higher voltage motor draws high current. So this gradual increase in voltage stops the motor to withdraw inrush current and helps the induction motor to start smoothly. This is also known as **smooth start of induction motor.**

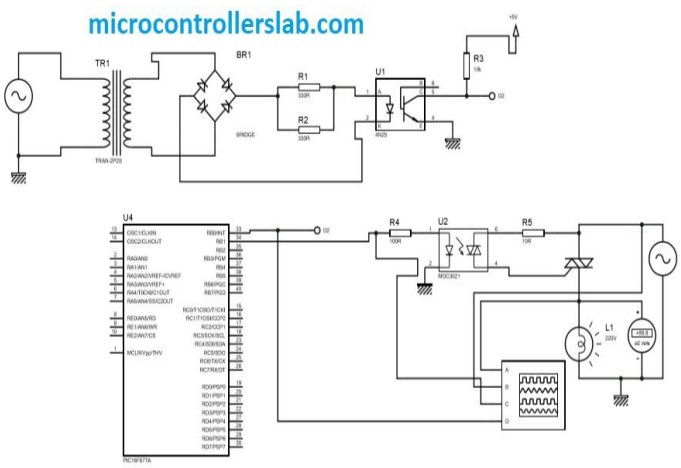


Figure 209 Circuit Diagram

Circuit Diagram:

In circuit diagram, lamp is used as load instead of induction motor. Because induction motor is not available in Proteus.

We just want to check the functionality of voltage change gradually at the start from low to high value. So AC voltmeter is also connected parallel to lamp to check change in voltage.

Oscilloscope shows the operating range of firing angle from maximum to minimum.

Block Diagram:

Soft starter for single phase induction motor consists of following main components:

- **Zero crossing detector circuit:** This circuit is used to detect zero crossing signal of ac power supply. Because firing angle which is used to control thyristor operating angle is triggered at every zero crossing.
- **PIC16F877A microcontroller:** PIC16F877A microcontroller senses zero crossing and generates triggering pulse at specified firing angle. In soft starter, firing angle will be

maximum at the start, because we want minimum voltage at the start. After that firing angle will be decreased gradually, so that voltage also increase gradually.

- **Thyristor or Two back to back Silicon controlled rectifiers:** Thyristor is used as a switch.
- **Opt isolator:** It is used to provide isolation between pic microcontroller and high side voltage operating circuit.

Soft starter for Three phase induction motor:

The soft starters used in three phase induction motor eliminates high inrush current and high mechanical torque on start up. It reduces cable and switch-gear rating in power supply network. It prevents any dip in line voltage. The soft starter has desirable features of soft, step-less acceleration & deceleration.

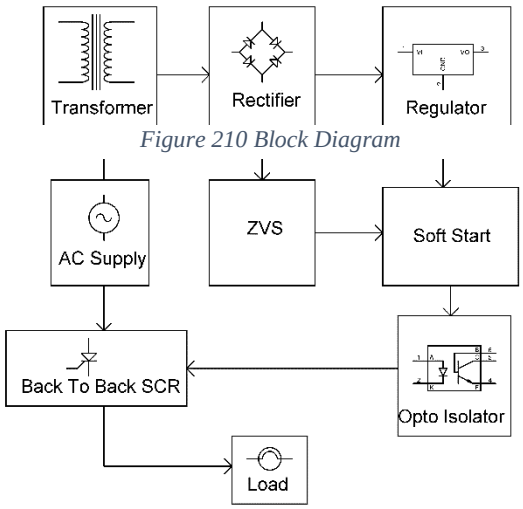


Figure 210 Block Diagram

The ac motor starters are increasingly becoming popular due to its controlled soft-starting capability. The ac motor starter provides limited starting current and hence conventional electromagnetic line starters and reduced voltage starters are replaced with ac motor starters.

Thyristor-based soft starters have many desirable properties and provide a viable solution to starting problems in three phase induction motors. These power semiconductor based starters are cheap, simple, and reliable and occupies less volume. The power density of these soft starters is also very high. A three phase induction motor produces electromagnetic torque on its shaft but initial switching instants of all three phases to the supply produces pulsations on the electromechanical torque when it is controlled by a direct- online starter.

These severe pulsations in electromagnetic torque might cause shocks to the shaft and hence to the driven equipment. These pulsations might damage mechanical system components, such as shafts, couplings and gears etc. The electromagnetic torque pulsations also causes long term effects on various mechanical system components if the strength of materials is exceeded which might lead to fatigue also.

The reduced voltage starting by soft starters eliminates stress from the electrical supply and it also reduces the possibility of voltage dip and brown out conditions. Soft and smooth starters provide smooth acceleration of rotor of three phase induction motor. Reduced voltage starting reduces high amount of starting torque applied on the shaft and therefore eliminates the shock on the driven load. An instantaneous high amount of starting torque can cause a jolt on the conveyor which can damage products, pump capitations and water hammer in pipes.

Therefore, a soft starter ramps up the voltage applied to the motor from the initial voltage to the full voltage. The voltage is initially kept low to avoid sudden jerks during the start. The voltage and torque increases gradually so that the induction motor starts to accelerate. This ramp up voltage provides sufficient torque for the load to accelerate gradually and hence mechanical and electrical shocks are minimised from the system, The voltage supplied to stator windings are adjustable and it has ramp characteristics.

Working Example of Electronic Soft Start System for 3 phase induction motor:

The system consists of the following components:

Two back to back SCRs for each phase, i.e. 6 SCRs in total. Control Logic circuitry in the form of two comparators- LM324 and LM339 to produce the level and the ramp voltage and an opt isolator to control the application of gate voltage to each SCR in each phase. A power supply circuitry to provide the required dc supply voltage.

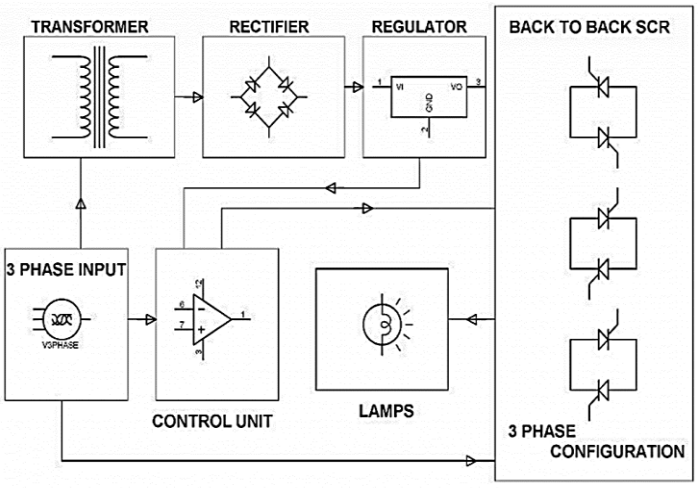


Figure 211 Block Diagram of Electronic Soft Start System for 3 phase Induction Motor

The level voltage is generated using the comparator LM324 whose inverting terminal is fed using a fixed voltage source and the no inverting terminal is fed through a capacitor connected to the collector of an NPN transistor. The charging and discharging of the capacitor cause the output of the comparator to change accordingly and the voltage level to change from high to low. This ramp voltage is produced using another comparator LM339 which compares the pulsating DC voltage applied at its inverting terminal to the pure DC voltage at its no inverting terminal and generates a zero voltage reference signal which is converted to a ramp signal by the charging and discharging of an electrolyte capacitor.

The 3rd comparator LM339 produces a High pulse width signal for every high-level voltage, which decreases gradually as the level voltage reduces. This signal is inverted and applied to the Opt isolator, which provides gate pulses to the SCRs. As voltage level falls, the pulse width of the Opt isolator increases and more the pulse width, lesser is the delay and gradually the SCR is triggered without any delay.

Thus by controlling the duration between the pulses or delay between applications of pulses, the firing angle of SCR is controlled and the application of supply current is controlled, thus controlling the motor output torque. The whole process is an open-loop control system where the time of application of gate triggering pulses to each SCR is controlled based on how earlier the ramp voltage decreases from the level voltage.

Advantages:

- **Improved Efficiency:** The efficiency of the soft starter system using solid-state switches is more owing to the low on-state voltage
- **Controlled start up:** The starting current can be controlled smoothly by easily altering the starting voltage and this ensures smooth starting of the motor without any jerks.
- **Controlled acceleration:** Motor acceleration is controlled smoothly.
- **Low Cost and size:** This is ensured with the use of solid-state switches.

Disadvantages:

The disadvantage of the soft starter technology compared to the frequency converter is that it is unable to control the speed and is unsuitable for applications requiring speed control.

Areas of Soft Starter application:

These are main applications of Soft starter:

1. Agriculture.
2. Steel industries (Rolling mills and processing lines)
3. Cement industries
4. Sugar plants
5. Rubber and plastic
6. Textile industries
7. Machine tool applications
8. Power sector
9. Water supply scheme
10. And various process control applications.

14.2.3 Advanced Wireless Power Transfer System

The Transfer of electrical power in reliable and efficient way is always challenging for the designers and engineers. Presently all electrical power from the generating stations to the distribution station is transferred by the uses of wires and underground cables. One of the major issues in these types of systems is the losses due to resistance of the material. Generally the percentage of loss of power during the transmission and distribution is 26%. In modern technology the use of portable device has increased such as mobile robots and electric vehicle. Mobility is the main concern of these equipment i.e. they are not connected to the main source of power.

Nikola Tesla was the first who introduce the concept of wireless power transfer. But this technology from the time of Tesla is underdeveloped due to lack of funding and technology. But research from past few years has always going on and recent development has been observed in the field . Wireless power transfer can be achieved by several methods. Here we discussed few methods such as induction coupling, resonating coupling, LASER technology for electrical power transfer.

Inductive coupling:

- This type of WPT is simply based on inductive coupling between two coils. This is a type of near field technique measuring with appliance near the source.
- It is generally based on the principle of mutual induction, where two coils are placed vicinity to each other and there is no physical connection between these two coils.
- The simplest example is transformer where the transfer of energy takes place due to electromagnetic coupling. Each of these coils connected without wires and it has been an important and popular technology to transfer power without wires because of its simplicity and reliability.

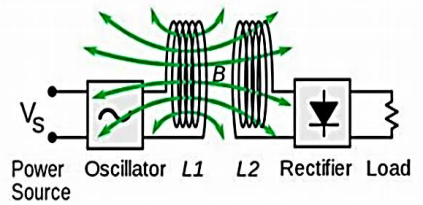


Figure 212 Inductive coupling

- Based on this technology there are various application device has been already made including electric brush and charging pad for cell phones or laptop. But this kind of method also have some limitation i.e. the range can be very less up to few cm and separation distance is very less than the coil diameter.

Magnetic resonance coupling wpt:

- This is also one of the important method for transferring power based on near field technique.
- It generally overcome the disadvantage of up to some extent which arise in non-resonant inductive coupling. This type of coupling used the concept of resonance.
- At resonance we know that natural frequency and excitation frequency are same. This leads to the maximum amplitude that means a maximum amount of energy is transferred between two coils.
- Here the receiver and transmitter coils are tuned to be at same resonant frequency. This allow us to transfer significant amount of power by increasing distance between coils.

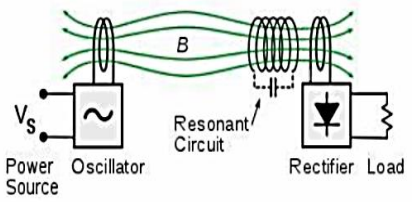


Figure 213 Magnetic resonance coupling wpt

- These type of system are used for building mid-range power transfer. Mid-range can be specified by distance up to 10 times the diameter of the transmitting coil. Magnetic resonance coupling have several advantage such as efficiency increases with decrease in the radiation and power loss and range can be increase up to some meter and it is directional.
- The mainly disadvantage is that selection of resonance frequency which tunes with the natural frequency and it cannot be used for long range application.

Microwave wpt:

This is one of the type of far-field technique of WPT which have range up to KM, with power transfer up to MW. This method uses microwave frequency ranging from 1GHZ to 1000GHZ generated from the microwave generator. First the microwave is generated by microwave generator which pass through the coax-waveguide adapter to the waveguide circulator. Then a tuner and directional coupler are used to separate wave according to their propagation direction. Then they are transmitted through antenna. At the receiver terminal, a receiver antenna receives which pass through a low pass filter to finally produce DC power. Based on microwave WPT system the present application is solar power satellite. Advantages of microwave WPT are that it is used for several KM range with transferring high amount of power. Disadvantage are generally that the radiation effect to human beings from the microwave electromagnetic radiation.

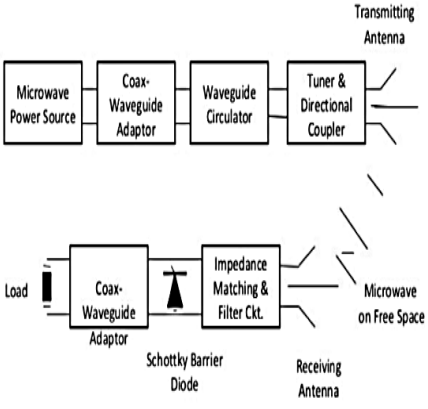


Figure 214 Functional block diagram of WPT

Laser wpt:

This is also one of the types of far- field technique, where the power is transmitted through LASER beams. For power transmission firstly the electrical energy is converted to high LASER beams and at receiving side, these LASER beams are converted to electricity by using photo voltaic cells. This type of WPT has several disadvantage i.e. why it is not used for electrical power transmission because LASER beams can easily harms human being if they cut LASER beam path. Therefore these are generally used for military weapon development and space research.

Comparison of wpt methods:

Table 49 Comparison of wpt methods

WPT METHODS	SEPERATION DISTANCE	POWER	EFFICIENCY
Inductive coupling	Few mm	Few Watts	Low
Magnetic resonance coupling	Few Meter	Few Kilo Watts	High
Microwave WPT	Up to 100KM	up to 100 MW	High
LASER	Few meter but with high intensity	up to 100 MW	Low

Advantages:

- It gives the human comfort as there is no chording or wiring problem, so mobility is easier.
- There is no problem of power failure and extensive heating.
- Cost of overall system decreases due to no uses of wires.
- Overall efficiency increases due to decrease in the power loss.
- It offers no corrosion as there is no exposure to the atmosphere which is Eco friendly.
- It offers ranges of power levels and separation distance between coils.
- It offers convenient, reliability, high efficiency, low cost at the same time.

Disadvantages:

- WPT methods uses the electromagnetic radiation for power transfer and the main effect of electromagnetic wave is its biological impact which harms human beings and animal.
- Biological impact of inductive coupling and resonance coupling is far less than compared to microwave power transmission technique.
- There is also a limitation of separation distance and power capacity.
- Interference of microwave with other communication system.
- Initial cost is very high for implementing WPT system.

Applications:

1. **Medical devices:**
   - The most important application of WPT is in medical science. As we know medical device uses very small amount of power.
   - Some medical device are LAVAD heart assist pumps, pacemaker and infusion pumps. These device one implemented in human body.
2. **Electrical vehicles:**
   - Electrical vehicles are the new technology which uses electrical energy for their operation. The main concern about the electrical vehicles is that their mobility i.e. they are not directly connected to the source of power by wires.
   - With using this technology, it enables the reliable and efficient power transmission to electrical vehicles without using of wires.
3. **Solar power satellite (SPS):**
   - The most important application of WPT system is solar power satellite that uses the microwave for energy transferring. Satellites are generally equipped with solar power transmitter and receiver antenna.
   - Solar panel converted the generated electricity into high power microwave beams and directed towards the ground station receiver antenna.
   - The major problem with this system is it biological effect of microwave radiation on human and animals, if they are distracted from their path.

14.2.4 Industrial Temperature Controller

This practical temperature controller controls the temperature of any device according to its requirement for any industrial application. It also displays the temperature on an LCD displays in the range of –55°C to +125°C. At the heart of the circuit is the microcontroller from 8051 family which controls all its functions.

The DS1621 Digital Thermometer and Thermostat provides 9-bit temperature readings, which indicate the temperature of the device. User-defined temperature settings are stored in a non-volatile memory EEPROM through 8051 series microcontroller. Maximum and minimum temperature settings are entered to the MC through a set of switches which are stored in the EEPROM -24C02.Maximum and minimum setting are meant for allowing any hysteresis necessary.

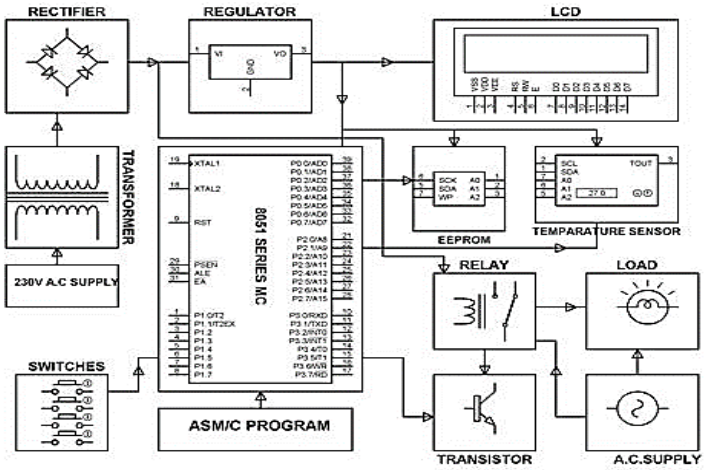


Figure 215 Block Diagram

Components Used:

- Transformer
- Voltage regulator
- Diodes
- Capacitor
- Resistors
- Microcontroller (AT89S52)
- Temperature sensor (DS1621)
- BC547
- Relay
- Lamp
- LCD (16x2)

Microcontroller (AT89S52):

- It is a smaller computer
- Has on-chip RAM, ROM, I/O

Temperature Sensors:

- Measures temperatures from -55°C to +125°C in 0.5°C increments. Fahrenheit equivalent is -67°F to 257°F in 0.9°F increments.
- Temperature is read as a 9-bit value (2-bytetransfer).
- Wide power supply range (2.7V to 5.5V).
- Converts temperature to digital word in less Than 1 second.
- Thermostatic settings are user definable and Non-volatile.
- Data is read from/written via a 2-wire serial interface (open drain 1/0 lines).
- Applications include thermostatic controls, industrial systems, consumer products, thermometers, or any thermal sensitive system.

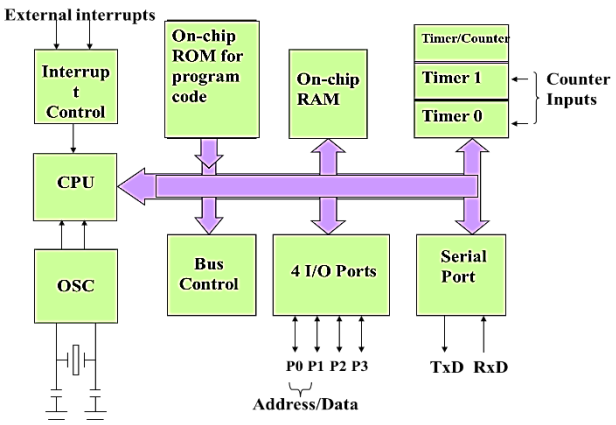


Figure 216 Internal Structure of a Micro Controller-AT89s52/51

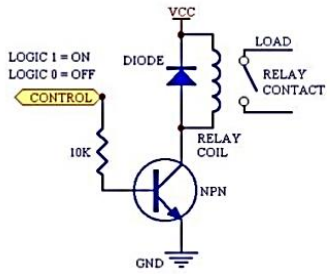


Figure 217 Relay

Relay:

- It is an electromagnetic switch
- Used to control the electrical devices
- Copper core magnetic flux plays main role here
- The relay's switch connections are usually labelled COM, NC and NO
- COM Common, always connect to this; it is the moving part of the itch.
- NC Normally Closed, COM is connected to this when the relay coil is off.
- NO Normally Open, COM is connected to this when the relay coil is on.

BC547 Transistor:

- The BC547 transistor is an NPN Epitaxial Silicon Transistor.
- The BC547 transistor is a general-purpose transistor in small plastic packages.
- It is used in general-purpose switching and amplification BC847/BC547 series 45 V, 100 mA NPN general-purpose transistors.
- Whenever base is high, then current starts flowing through base and emitter and after that only current will pass from collector to emitter

Capacitor:

- A capacitor or condenser is a passive electronic component consisting of a pair of conductors separated by a dielectric.
- When a voltage potential difference exists between the conductors, an electric field is present in the dielectric.
- This field stores energy and produces a mechanical force between the plates.
- The effect is greatest between wide, flat, parallel, narrowly separated conductors.

Figure 218 Capacitor

Figure 219 LED

LED:

- Water Clear Lens
- Forward Voltage - 1.7V
- A light-emitting diode (LED) is an electronic light source.
- LEDs are used as indicator lamps here.
- 850nm Wavelength

LCD (Liquid Crystal Display):

- A liquid crystal display (LCD) is a thin, flat display device.
- It made up of any number of colour or monochrome pixels arrayed in front of a light source or reflector.
- Each pixel consists of a column of liquid crystal molecules.

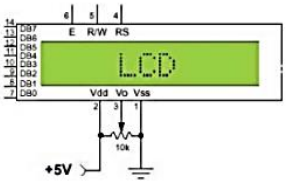


Figure 220 LCD

- It suspended between two transparent electrodes, and two polarizing filters, the axes of polarity of which are perpendicular to each other.
- Many microcontroller devices use 'smart LCD displays to output visual information.

Working:

- The project uses a digital temperature sensor DS1621 the surface which is capable of sensing the temperature & delivering digital data at its output which are connected to the controller.
- The LCD displays the present temperature, maximum temperature and minimum temperature. The maximum and minimum values are entered through switches attached to the microcontroller.
- The maximum and minimum settings are stored in the EEPROM.
- If the temperature goes below the minimum value the heater is on as indicated by a lamp connected through a relay driven by a transistor connected to the microcontroller.
- If the temperature crosses the maximum value the heater is switched off.

Why Do We Need Temperature Controllers?

- Temperature controllers are needed in any situation requiring a given temperature be kept stable.
- When an object is required to be heated, cooled or both and to remain at the target temperature (set point).
- Regardless of the changing environment around it.
- There are two fundamental types of temperature control; open loop and closed loop control.

Cost Analysis:

Table 50 Industrial Temperature Controller

No.	Component	Quantity	Unit Cost(Rs.)	Total Cost(Rs.)
1	Step down Transformer 230v to 24v	1	700	700
2	1.2 → 37 V Linear Voltage Regulator, 1.5A, 1-Channel, Adjustable 3-Pin	1	137	137
3	Max232 & At89s52 Microcontroller IC Project Kit	1	470	470
4	DS18B20 Waterproof Temperature Sensor Probe	1	105	105
5	BC547 series 45 V, 100 mA NPN general-purpose transistors.	5	7	35
6	EEPROM Memory, 250ns 8-Pin	1	245	245
7	Solid State Relay, 600 V Maximum Load	1	208	208
8	Capacitor (25v)	5	10	50
9	Three Phase Rectifier	1	1850	1850
10	850nm LED DC 1.5-1.7V	10	43	430
11	LCD (Liquid Crystal Display)	1	249	249
			Overall Cost(Rs.)	**4,479**

Applications:

- This device is extensively used in the manufacturing sector, automobile company, steel and Iron Company, food processing company and medical sector etc.
- A basic temperature controller provides control of industrial or laboratory heating and cooling processes.
- To encounter the accurate level of temperature is very crucial and it becomes very necessary in the manufacturing process.

14.2.5 Accident Alerts in Modern Traffic Signal Control System

The motor vehicle population is growing at a faster rate than the economic and population growth. Accidents and the death rate due to road accidents, especially two wheelers are also increasing at an alarming rate. Most of the accident deaths that happens are due to the lack of immediate medical assistance, on the roads like express highways. A facility for providing immediate medical assistance to the accident area can reduce the fatality to a greater extend. Thus comes the idea of an alert system that senses the accident and its seriousness to alert the nearby medical centre for providing ambulance or medical aid to the accident area. The proposed system will check whether an accident has occurred and identify the seriousness of the injury to the accident victim/driver.

Once the decision of serious accident has taken, the system will check for the nearest medical centre and notify them about the incident. The rescue team can rush to the spot immediately without any delay as the correct location will be communicated by the mobile phone of the accident victim. The system will also send message to the friends and relatives to inform them about the incident. The system is intended to capture the location of the vehicle through GPS receiver, send the location information to vehicle owner's mobile number through SMS and also to the telematics operator server through GPRS.

Architecture:

- The proposed system consist of an accident detection system and an Android smartphone. The accident detection system will constantly monitor the bike and detect whether the vehicle is in normal driving posture or has fallen down.
- When the bike fall is detected, the body condition or heartbeat rate of the driver is checked. If any abnormality is found, the Android application connected to the accident detection system, through Bluetooth, will send alert to the nearby medical centre about the accident.
- The system will inform the basic details of the person and the place of the accident using GPS coordinates from the mobile.
- The system will also inform friends and relatives of the driver, whose contact numbers are already stored in the Android application.
- The high level architecture of the proposed system is as shown in the Figure.

Accident Detection System:

The Accident Detection System consist of two main modules. The first module detects whether the vehicle has fallen down. It is mounted on the vehicle itself. This module consist of an accelerometer, MSP430 micro-controller and a Bluetooth module. Once the vehicle fall is detected the information is send to the second module. The second module consists of a Heartbeat sensor MSP430 microcontroller, Buzzer and Bluetooth module. Once the fall is detected the heartbeat of the driver is checked and if any abnormality is detected the decision that a serious accident has occurred is taken.

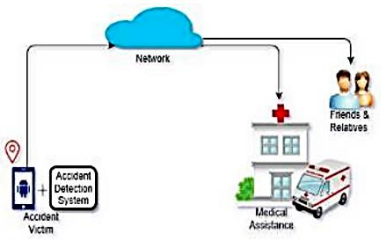


Figure 221 Accident Detection System

The Android application in the Smart phone will search for the nearest medical centre and sends message about the accident location and accident victim details.

DESIGN OF ACCIDENT DETECTION SYSTEM:

- In this project bike accidents are being monitored. In the case of bikes, in the accident, the vehicle will fall either left side or right side, if the perpendicular axis is taken as the reference. Here accelerometer is used to detect the tilt of the vehicle.
- The X-axis of accelerometer is taken for checking whether bike has fallen or not. The output voltage of the accelerometer is made low, when the angle of inclination is more than the critical value.
- Thus when a low signal output is being produced and send to the microcontroller, microcontroller will confirm an accident being occurred.
- Then an interrupt is generated and the information is send to the heartbeat sensing module to check whether the heartbeat is abnormal. If the heart beat is more than or less than the normal range then it will confirm the seriousness of the accident. Thus the decision that serious accident has being occurred is taken.

Heartbeat Sensing Module:

The Heartbeat sensing module is activated after the fall is detected. It consist of heartbeat sensor, MSP430G2452, Buzzer and Bluetooth module HC-05 as shown in the Figure. The power module is provided to power the whole circuit using 9V battery through regulator IC LM117. Heartbeat sensor detect the heartbeat and help to count the heartbeat to check whether the rate is normal or abnormal. With the idea of low cost system in mind the heartbeat sensor is designed and developed using IR LEDs and photodiode as shown in the Figure.

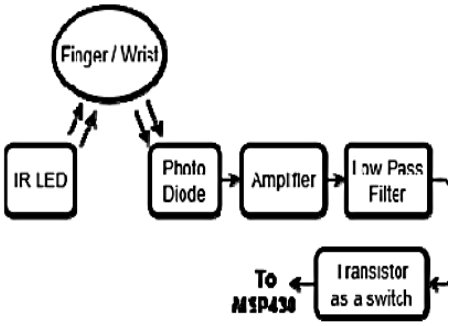


Figure 222 Heartbeat Sensing Module

The principle of Reflectance Photo Plethysmography is utilized in the design of heartbeat sensor. Light from IR LED is allowed to fall on the body part especially finger or wrist and the reflected light intensity is observed. The change in the volume of blood through the body region causes the change in the reflected light intensity. Heartbeat beat or systolic peak gives the highest amount of light reflected. The reflected light is captured by the Photodiode and corresponding electric signal is produced.

A Buzzer is also provided to alarm the nearby passengers that an accident has occurred there, in case the vehicle and the victim are thrown inside the bushes along the roadside. Thus the chances of offering the help from the fellow passengers on the road can also be explored. Buzzer is controlled by the GPIO pins of MSP430.

MSP430 microcontroller:

The MSP430 is a family of 16-bit RISC mixed-signal microcontrollers produced by Texas Instruments. Its low power consumption feature, the flexibility of its peripheral modules and the easy way to use it makes the MSP430 the suitable microcontroller for these kind of applications. The proposed system uses MSP430G2452, the series of MSP430 designed for medical signal related applications.

Bluetooth Connection with Mobile Phone:

The fall detection module and the Heartbeat sensing modules are connected to the Android mobile application through Bluetooth. So both the modules are equipped with Bluetooth

communication. Fall detection module is using HC06 Bluetooth module and the Heart beat sensing module is using HC-05 respectively. The mobile phone will work as the master controller, the Bluetooth modules of two boards are connected to the mobile phone.

When the vehicle fall is detected by the microcontroller, it sends this information to the mobile phone, which in turn activates the heartbeat sensing module. The heartbeat rate is counted and checked for any abnormality. If any abnormalities detected, then a message alert is send to the nearby medical assist centre and the emergency contact numbers of friends and family and with GPS location.

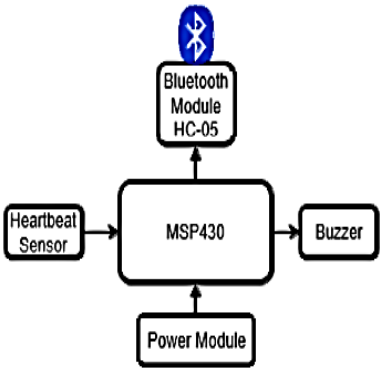


Figure 223 Bluetooth Connection with Mobile Phone

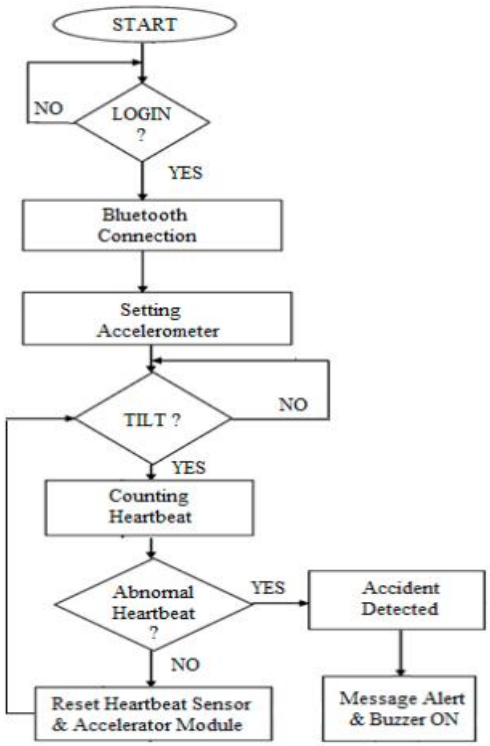


Figure 224 Flow chart of the Accident Detection and Alert

Android Application:

- An Android application is used to communicate with Bluetooth device and this Android application will search the nearest medical assist centre and send messages with the GPS location of the accident.
- MIT App Inventor is used to develop the Android application.
- MIT App Inventor for Android is an open-source web application originally provided by Google, and now maintained by the Massachusetts Institute of Technology (MIT). It uses a graphical interface which allows users to drag-and-drop visual objects to create an application that can run on Android devices.
- Screen shot of Android Application
- The Android application allows the user to set the connection with fall detection module and heartbeat sensing module with the help of the button “Bluetooth-1” and “Bluetooth-2” button respectively as shown in the Figure.
- Mobile number shown in the application screen is the emergency contact number of friends and family. Message option provides the user to add any extra information within the message alert.

Buzzer and Alarm operation:

Two types of alarms are used, one is the visible alarm and the other is audible alarm. The audible alarm is a buzzer. The buzzer will make sound when the microcontroller detects and confirms the accident. The visible alarms are the two LEDs, one LED is Red in colour and the other is Green. These LEDs are mainly used for the testing purpose of the board.

15. Smart and Sustainable features of designs and Impact on society.

Table 51 Smart and Sustainable features of designs and Impact on society

Sr. No.	Design Name	Amount Period	Expenditure (Rs.)	Benefit
1.	Public Toilet	Immediately	**4,07,000**	➢ It will improve sanitation facility ➢ It will be helpful to people who don't have toilets in their home ➢ It will promote cleanliness in village
2.	Water tank	Immediately	**72,000**	➢ To raise ground water level ➢ To store water to avoid water scarcity ➢ To achieve Sustainability
3.	CHC	Within 1 year	**2,87,858**	➢ It will provide medicines to villagers ➢ It will improve health facility. ➢ Villagers will get all the primary treatment in village.
4.	Bus stop	Immediately	**3,05,000**	➢ It will help Villagers in transportation ➢ It eases the load on the one bus stop and help to reduce noise pollution by easy control of less crowd.
5.	Youth Club Design	Within 1 year	**3,70,000**	➢ The emphasis is to skill the youths in such a way so that they get employment and also improve entrepreneurship. Provides training, support and guidance to farmers ➢ To provide skills to women so that they become self-dependent ➢ To aware villagers regarding new development schemes for their betterment ➢ To initiate start-ups in village.
6.	Aanganwadi	Within 1 year	**6,65,000**	➢ Pre-school education involves various stimulation and learning activities at the Anganwadi. ➢ To lay the foundation for the proper psychological, physical and social development of the child. ➢ To improve the nutritional and health status of children below the age of six years.

7.	Chowk Design	Immediately	**65,000**	➢ Chowk can be used as gathering place for village. Meetings can be arranged in this place where enough place is available with seating arrangements. In Village villagers and farmers can sit heat for take rest after doing the hard work. Workers can use this public place to take rest and to eat with peace.
8.	Boundary wall with gate	Immediately	**28,70,000**	➢ Boundary wall with Gate improves the aesthetic look and provides safety and security to the Ground. ➢ After construction of boundary wall children can play without any worries of street animals or vehicles trespassing. They can play safely in the Ground.
9.	Fountain	Immediately	**2,20,000**	➢ The most common factors that influence water are light, temperature, wind, slope, shapes and surfaces. ➢ These all can play a role in considering the final design concept of the fountain.
10.	Animal Shelter House	Within 1 year	**2,75,000**	➢ Animal will provide with shelter and food where they can feel safe and secure ➢ Enough watering will be provided so they don't have to roam around village for water.
11.	Garba chowk	Within 1 year	**3,25,000**	➢ Garba chowk is proposed by us so villagers of different cast can come together in the name of festival and can situated good relation with each other.
12.	Library	Long term (2-5 years)	**3,60,000**	➢ The library acts as a resource centre and a clearinghouse of information on rural development in India. ➢ It has developed a computerized database of the resources in its collection. The computerized database consists of nearly two lakh references. The library has also fully automated its day-to-day operations.

16. Survey By Interviewing With Talati And Sarpanch

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

CHAPTER- 16

Sr.	Questions	Yes/ No	Remarks
1	What are the sources of income in village?	YES	**Agriculture, Dairy products**
2	What are the chances of employment in village?	YES	**Farming, business etc.**
3	What are the special technical facilities in village?	YES	**Adequate water supply**
4	Is any debt on village dwellers?	NO	
5	Are village people getting agricultural help?	YES	**There is agriculture department**
6	Is women health awareness Program organized in village?	YES	
7	Are women having opportunity to work and income?	YES	**Proper awareness is there**
8	Child girl education is appreciated in village?	YES	
9	Facility of vaccination to child is available in village?	YES	**Anganwadi is there**
10	Are village people aware about child vaccination and done to each and every child as per norms?	YES	
11	Women help line number information is provided to village people?	YES	**Women are well educated and aware.**
12	Is water scarcity in village? How many days per year?	NO	
13	Is village under any debt?	NO	
14	Is any serious issue due to debt from bank or any person happened in village?	NO	
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	NO	
16	Is any death of patient occurred due to unavailability of medical facility in village?	NO	
17	How many disabled (physically challenged) is observed in village? Provide list with Male/female/girl/boy with age and type of disability and reason of disability.	NO	
18	Is village improvement is observed in comparative scenario from past to present?	YES	**In last few years development is very impressive**
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	NO	
20	Life Living standard of girls and women is appreciated and uplifted in village?	YES	
Nodal officer and students can add more questions. This is a sample. Having Minimum requirement.			

Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588

Figure 225 Survey By Interviewing With Talati

17. Agriculture Activities and Agro Industry, Alternate Technics and Solution

Figure 226 Agriculture Activities

In areas where rain doesn't come regularly or when growing water-hungry crops, farmers are forced to get creative. Irrigation uses groundwater, surface water, and water delivered directly to farms to hydrate thirsty plants.

Evapotranspiration and wind are issues farmers face when trying to get water to plants while avoiding waste. General access to water and a diminished supply are also struggles for farmers in many parts of the country.

While operations in western states make up the bulk of U.S. farms that irrigate, farms across the country use irrigation. Just five states – Nebraska, California, Texas, Arkansas, and Idaho house 52% of the nation's total irrigation acres.

There are multiple ways to irrigate. Research has backed numerous effective application strategies, but each farmer has their own preference and budget. On this page, you'll find an overview of techniques and how irrigation fits into the U.S. agriculture landscape.

DRIP IRRIGATION: WATER TO THE ROOTS

One approach to getting plants the moisture they need is by sending water directly to the roots with a drip irrigation system or a subsurface drip irrigation system. A drip system is made up of hoses with holes throughout that pump water directly to plant roots within the soil. While this irrigation method is more expensive, farmers see a reduction in water applied. Drip can also be beneficial to oddly shaped or sloped fields.

Today, precision mobile drip irrigation (PMDI) exists, which is essentially a hybrid of drip and center pivot irrigation. PMDI uses drip hoses on a center pivot system, rather than nozzle heads, to get water to plants without getting wheel tracks wet or investing entirely in a drip system.

Figure 227 DRIP IRRIGATION

CENTER PIVOT IRRIGATION

This method of irrigating involves long steel arms and sprinkler nozzles and pivots, usually electrically, around a center base to reach the entire field. In south-western Kansas, farmers are getting innovative with their pivots to help reduce water usage without cutting yields to help the Ogallala Aquifer.

A farm family with 57 center pivot irrigation systems across central Kansas uses remote monitoring and control to keep up with all the units. When it comes to Fertigation, the farmers manage injections themselves, but having remote control has helped the family dedicate more time to field scouting and nutrient management.

IRRIGATION TECHNOLOGY ADVANCES

New technology is regularly revealed as environmental needs change and the U.S. takes a harder look at water consumption. Farmers already control their irrigation systems with full-colour touchscreen displays, one of a number of advanced irrigation controller technology options. Apps are also available to maximize water use.

A University of Missouri smart app can advise Missouri farmers on when to irrigate. To help farmers do a better job of managing moisture, the app uses weather conditions based on field location, evapotranspiration estimates, and NRCS soil mapping and texture data.

Figure 228 TECHNOLOGY ADVANCES

REPORTING WATER USE

In the summer of 2012, Illinois struggled greatly with a lack of water. Farmers saw the direct hit as yields plummeted due to a dire need for moisture. One Illinois farmer yielded just 50 bushels per acre on one plot but harvested 190-bushel corn on a plot just 20 miles away that received .4 inches more rain. That farmer, along with many other Illinois producers, invested in an irrigation system to combat seasonal shortages after 2012.

Irrigation water application regulation has lots of room for improvement—particularly in Illinois. Only in 2015, when it became required, did Illinois farmers start reporting water use on irrigated land. The state has no water-use restrictions, no laws in place for future groundwater conflicts, and no restrictions on new system installations. Only half of the total use is actually reported, as of 2017.

REDUCING WATER USE

Figure 229 Water Supply

Drought and water shortages have farmers and consumers alike looking for ways to conserve the water supply. While some farmers are facing low aquifers and others have hard limits on what is allowed legally, water conservation is constantly being studied and implemented on United States operations.

In an effort to save water, University of Nebraska experts suggest adjusting levels based on soil type to keep the available soil water level above the 50% depletion level. When it comes to soybeans, moisture needs can differ vastly.

FERTIGATION AND CHEMIGATION

Irrigation systems are more than just water-delivery systems for plants. The advanced systems can also be a critical tool in farmers' nutrient management plans. Fertigation injects fertilizers, soil amendments, and water soluble products into an irrigation system while chemigation injects chemicals. Today, farmers can use efficient variable-rate Fertigation systems.

One Idaho farmer has been saving on fuel and avoiding driving on his crops with chemigation and Fertigation for 37 years. His crops get 15 to 18 fertilizer applications and four to six chemical applications via his pivot systems each year.

TAPPING INTO GROUNDWATER'S HIDDEN BENEFITS

Figure 230 groundwater

In many developing countries, groundwater for irrigation and drinking water has played a critical role in development. But unsustainable use and uninformed land use changes are depleting the quantity and deteriorating the quality of groundwater and associated ecosystems, upon which livelihoods are dependent.

According to a new framework by the CGIAR Research Program on Water, Land and Ecosystems, a change in perspectives is needed to view groundwater as part of a larger hydrological system associated with numerous ecosystem services, indispensable for sustainable development and livelihoods, especially irrigated agriculture for smallholder farmers.

SOLAR PUMPS – A SMARTER WAY TO IRRIGATE

In western India and other parts of the country, heavily subsidized electricity to power water pumps have driven groundwater depletion. An unreliable electric grid, bankrupted utilities and power theft have contributed to the problem. Solar irrigation pumps have been promoted as a green energy solution, but subsidizing the cost of solar pumps can result in the same overexploitation of water resources.

In Karnataka state in arid southwest India, the local electric company is required to buy back surplus solar power from farmers. The buyback policy, signed by Karnataka's governor last September, is consistent with recommendations by scientists at the International Water Management Institute (IWMI) to treat solar power as a 'cash crop.' The rationale is that if farmers can make money by selling excess power, they then will have an economic incentive to irrigate their crops efficiently, thus helping to conserve groundwater and energy use.

Figure 231 SOLAR PUMPS

SMART SCHEDULES

Smart irrigation systems vary by their levels of complexity, especially when it comes to watering customization. Some tools allow setting basic timing for a particular irrigation zone with a possibility to pause or finish the irrigation at any given moment. Other systems support complex schedules in weekly advance with planned breaks and intensity variations.

REMOTE CONTROL

Agricultural irrigation systems are typically navigated via a smartphone or laptop. A user downloads a mobile app that enters profile credentials and gets redirected to the management page. Some farms prefer to develop an additional physical device to control irrigation, seeing how smartphones can be hacked rather easily.

18. Social Activities – Any Activates Planned By Students

1. Waste Bins Distribution with handbills:

The GP shall arrange to supply three different colour bins to all the residents. This must be used as an opportunity to supply also a Handbill explaining the purpose of three different colour bins, and seek residents' cooperation. Motivate them with your reasons: why is this important in a village?

Figure 232 Waste Bins Distribution with handbills

2. Students Orientation:

Figure 233 Students Orientation

The local school children are a magnificent source of enthusiastic human resource, the power of which can be tapped for this purpose. To do this, they need a brief orientation on SWM, and what is this SWM plan trying to achieve within a GP. Conduct orientations for them in separate groups, and plan with them how they can involve themselves in this IEC exercise. Generate ideas as well. They can be alternatively used in IEC, IPC activities depending upon their availability. School children also can prepare IEC materials on a competition held for them at school. They tend to own up such materials prepared by them, and put them to effective use.

3. Cultural Evening:

Cultural evening with messages on waste management. Cultural evenings may be organised in the villages. In between the cultural programmes, we can take 15 minutes to sensitize the residents on waste segregation, waste reduction etc. The cultural programme will continue, then again for 15minutes Solid Waste Management (SWM) plan shall be put across to the residents. At the end of the programme, the GP President shall sum up asking for the cooperation of residents for proper management of wastes, and not throw wastes in street corners.

Figure 234 Cultural Evening

4. IPC (Interpersonal Communication):

Figure 235 Interpersonal Communication

This helps in a face to face situation for the school children and sanitation motivators to demonstrate to the residents what bio-degradable wastes are (wet)? and what are non-biodegradable (dry) wastes? What are recyclables; what hazardous wastes are? What is meant by primary segregation that the households are supposed to do? How this goes further into making gas, vermi-compost etc. The students can use their knowledge, creativity and innovation.

5. SMS Alert: An SMS alert may be arranged with mobile service providers (IDEA and Airtel) 'alerting residents every morning with a message on 'waste segregation'. This should go on at least for 15 days at the launch of the programme; then once in three days; and then reduced to once a week.

6. Educative Information: The sanitation workers can also politely educate the residents where they mix up waste (without segregating) especially because they are not clear as to how to segregate.

Figure 236 Educative Information

7. Educative Inspection: The Sanitation Inspector who goes for monitoring the works of the sanitation workers makes direct observation of how residents respond to the call. He can also use that opportunity to educate the residents who are unaware or are unwilling to spend time on segregating.

Figure 237 Rangoli Competition

8. Rangoli Competition: Rangoli competitions can be announced at GP level. Prizes can be given to the biggest and the best rangoli. Prizes can be announced at three levels: (i) household level, (ii) street level, and (iii) habitation level. People tend to clean up the streets in front of their houses, and their streets in their enthusiasm to bag prizes.

9. Clean the Commons Campaign: Cleaning up the schools, ICDS Centres, infamous spots where people usually chuck their waste. Such places can be cleaned up through a special campaign. Innovative ideas must be put to use so as to sustain the cleanliness of such places – by making vulnerable /infamous spots to be used as playground for kabbadi players; or plant some trees, and fence the area. If it is a bigger area, children's park can also be planned (like it has been done in Ibrahimpur GP in Telangana State).

Figure 238 Clean the Commons Campaign

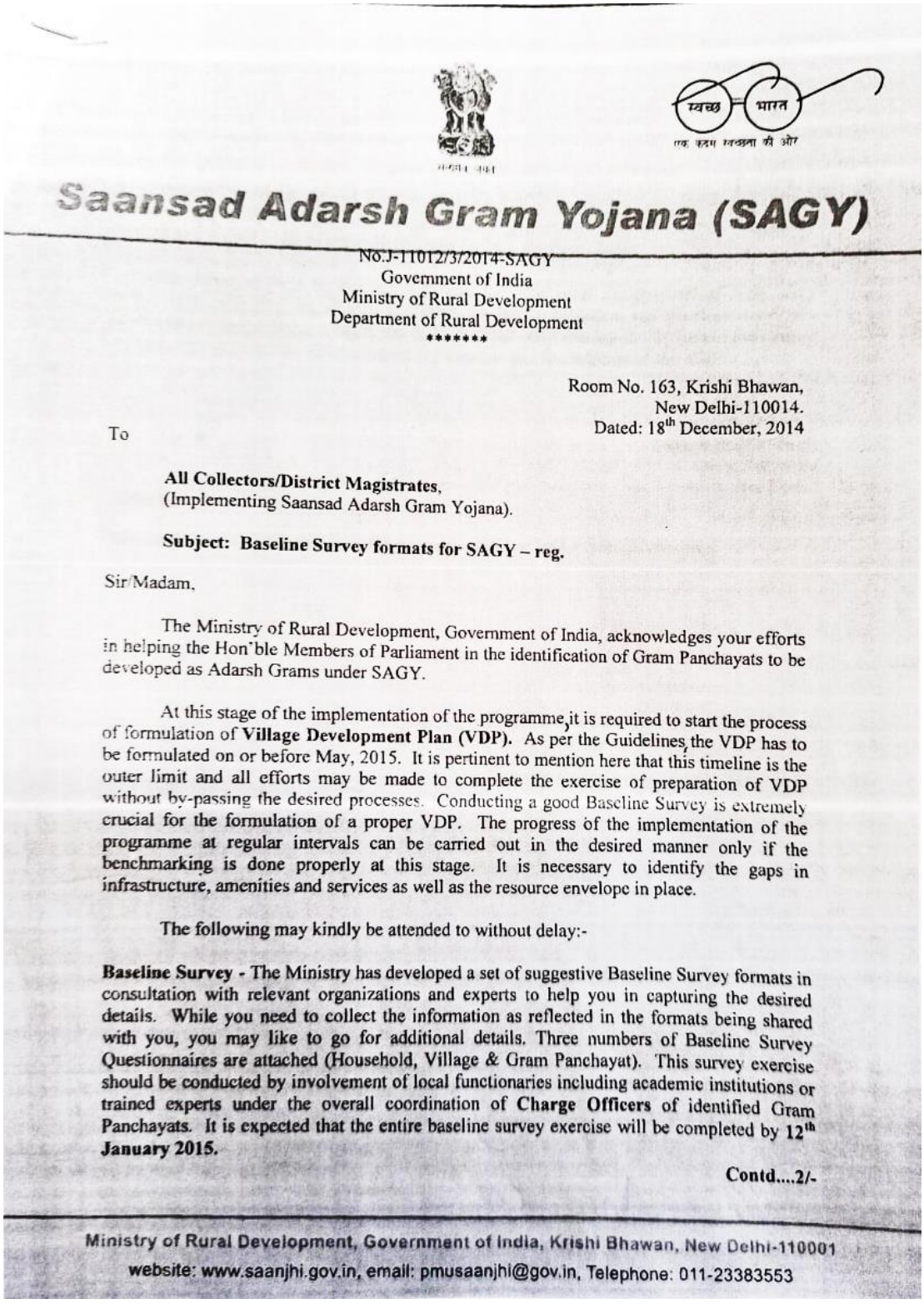
10. Announcing Prizes & Gifts: As part of local festivals institute some awards such as, 'Street of the Year Award' or 'Best Residential Locality Award'. It must be given every year so that people have some encouragement to keep clean, and tend to question those irresponsibly throw waste in street corners.

The work opportunities in the welfare institutions may be enumerated as under

1. Adoption of welfare institutions and helping the inmates and staff by arranging outings, fund collection drives, reading and writing letters for those who are unable to do so;
2. Propagation of the message of Swachchta, Digital Literacy, renewable energy etc.
3. Working for improvement of physical environment;
4. Programme of non-formal education and general literacy classes;
5. Organisation of economic development activities;
6. Establishment of hobby centres and
7. Assisting in the rehabilitation work of the disabled, destitute etc.

In addition, NSS units and welfare agencies can take up joint community development projects and other programmes of community welfare land awareness depending on the local needs.

19. NARDIPUR VILLAGE SAGY Questionnaire Survey form with the Sarpanch Signature



Saansad Adarsh Gram Yojana (SAGY)

No.J-11012/3/2014-SAGY
Government of India
Ministry of Rural Development
Department of Rural Development
****

Room No. 163, Krishi Bhawan,
New Delhi-110014.
Dated: 18th December, 2014

To

All Collectors/District Magistrates,
(Implementing Saansad Adarsh Gram Yojana).

Subject: Baseline Survey formats for SAGY – reg.

Sir/Madam,

The Ministry of Rural Development, Government of India, acknowledges your efforts in helping the Hon'ble Members of Parliament in the identification of Gram Panchayats to be developed as Adarsh Grams under SAGY.

At this stage of the implementation of the programme, it is required to start the process of formulation of **Village Development Plan (VDP).** As per the Guidelines, the VDP has to be formulated on or before May, 2015. It is pertinent to mention here that this timeline is the outer limit and all efforts may be made to complete the exercise of preparation of VDP without by-passing the desired processes. Conducting a good Baseline Survey is extremely crucial for the formulation of a proper VDP. The progress of the implementation of the programme at regular intervals can be carried out in the desired manner only if the benchmarking is done properly at this stage. It is necessary to identify the gaps in infrastructure, amenities and services as well as the resource envelope in place.

The following may kindly be attended to without delay:-

Baseline Survey - The Ministry has developed a set of suggestive Baseline Survey formats in consultation with relevant organizations and experts to help you in capturing the desired details. While you need to collect the information as reflected in the formats being shared with you, you may like to go for additional details. Three numbers of Baseline Survey Questionnaires are attached (Household, Village & Gram Panchayat). This survey exercise should be conducted by involvement of local functionaries including academic institutions or trained experts under the overall coordination of **Charge Officers** of identified Gram Panchayats. It is expected that the entire baseline survey exercise will be completed by **12th January 2015.**

Contd....2/-

Ministry of Rural Development, Government of India, Krishi Bhawan, New Delhi-110001
website: www.saanjhi.gov.in, email: pmusaanjhi@gov.in, Telephone: 011-23383553

-2-

Uploading of the data collected through Baseline Survey- After the collection of data, the same should be entered into the online portal at http://www.saanjhi.gov.in . You (District Collector/DM) being the Nodal Officer will ensure that the data is correctly compiled and uploaded on to the website latest by **20th January, 2015.**

The Ministry will be sharing with you the **structural framework of VDP** very shortly, which will give you an idea as regards the desired processes and structure of a VDP. We will be holding a dialogue with you through video conferencing facility in the near future for assessing the progress of baseline survey exercise and formulation of the VDP.

(Aparajita Sarangi)
Joint Secretary
19/12/14

Copy to:

Principal Secretaries/Secretaries (RD Department)/State Nodal Officers (SAGY)

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Nardipur Gram Panchayat: Nardipur Ward No.____

Block: Kalol District: Gandhinagar

State: Gujarat S Constituency: _____

1. Family Identity and Size

Name of Head of Household	Thakor lalaji Kisanji							Male/ Female	M
SECC Survey ID:		Family Size	5	Over 18	3	to 18	2	Under 6	-

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]		Life Insurance	1. All Adults 2. Some Adults 3. None	AABY	1. Yes 2. No	Kisan Credit Card	~~Yes~~ / No
Poverty Status Year[2]:	1. BPL 2. APL	X 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]
Thakor lalaji Kisanji	48	M	N	Y	-	Y	Y	Y
Thakor Kisan lalaji	24	M	N	N	-	Y	Y	N
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

3. Children from 6 years and up to 18 years

Name	Age	Sex M/F/O	Disability Y/N	Marital Code*	Level of Education: Code#	Going to School /College (Y/N)	Current Class	Computer Literate Y/N
Meet Vaghela	13	M	N	N	-	Y	7	Y
Zeel Patel	17	F	N	N	-	Y	11	Y

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
Shivani Pithaliya	4	F	N	N	Y	Y	Y	24
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

[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	1
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

12. Landholding (Acres)

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

13. Principal Occupations in the Household

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

14. Migration Status
Does any member of the household migrate for Work: 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
–	–	–
–	–	–
–	–	–

17. Livestock Numbers

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

18. What games do Children Play

19. Do children play musical instrument (mention)

Schedule Filled By:
Principal Respondent:
Date of Survey:

તલાટી કમ મંત્રી
નારદીપુર ગ્રામ પં...
તા.કલોલ, જિ.ગાંધીનગર

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: Nardipur

b. Block: Kalol

c. District: Gandhinagar

d. State: Gujarat

e. Lok Sabha Constituency: –

f. Number of Wards in the Gram Panchayat: _____

g. Number of Villages in the Gram Panchayat: 1

h. Names of Villages: Nardipur

Demographic Information

Number of Households 1643 Total Population 7757 Male 3985 Female 3772

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

1

તલાટી કમ મંત્રી
નારદીપુર ગ્રામ પંચાયત
તા.કલોલ,જિ.ગાંધીનગર

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	✓	
p	Nearest Agro Service Centre	X	
p	MSP based Government Procurement Centre	X	
q	Milk Cooperative /Collection Centre	✓	
r	Veterinary Care Centre	+	
s	Ayurveda Centre	✓	
t	E – Seva Kendra	✓	
u	Bus Stop	✓	
v	Railway Station	X	
w	Library	✓	
x	Common Service Centre	.	

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 3 Public 3 Private 0

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 1

b. Number of villages without Angan Wadi Centres 0

Names of such villages: _____

c. Schools (Number)

Primary Private: 0 Primary Govt.: 3

Middle Private: 2 Middle Govt.: 3

Secondary Private: 1 Secondary Govt.: 1

Higher Secondary Private: 1 Higher Secondary Govt: 0

VI. Public Distribution System

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

2

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નારદીપુર ગ્રામ પંચાયત
તા.કલોલ, જિ.ગાંધીનગર

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

VII. Coverage of Villages under different Facilities & Services

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

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	1400	d.	Pasture / Grazing Land		g.	Check Dam	0
b.	Irrigated Land	1100	e.	Forests/ Plantations		h.	Wells/Bore Wells	
c.	Un-irrigated Land	581	f.	Other Common Land		i	Tanks /Ponds	2

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

3

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તા.કલોલ,જિ.ગાંધીનગર

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

Name and Signature of Surveyor and Respondent'

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

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

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તા. કલોલ, જિ. ગાંધીનગર

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: Nardipur

b. Ward Number: _____

c. Gram Panchayat: Nardipur

d. Block: Kalol

e. District: Gandhinagar

f. State: Gujarat

g. Lok Sabha Constituency: –

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

i. Names of Habitations / Hamlets:

Demographic Information

Number of Households 1643 Total Population 7757 Male 3985 Female 3772

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	✓	
b.	Nearest Middle School	✓	
c.	Nearest Secondary School	✓	
d.	Kisan Seva Kendra	✓	
e.	Milk Cooperative /Collection Centre	✓	
g.	Health Sub Centre	✓	
h.	Bank	✓	
i.	ATM	✓	
j.	Bus Stop	✓	
k.	Railway Station	✗	

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

1

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SAANSAD ADARSH GRAM YOJANA (SAGY) 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	✓	
m	Common Service Centre	X	
n	Veterinary Care Centre	X	

ii. Road Connectivity

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

If 3 mention the name of the habitations where not available: 1

iii. Drinking Water Facilities

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

If 3 mention the name of the habitations not covered:

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

If 3 mention the name of the habitations not covered:

iv. Coverage of Habitations under Waste Management System

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

If 3 mention the name of the habitations not covered:

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

If 3 mention the name of the habitations not covered:

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

If 3 mention the name of the habitations not covered: 2

v. Coverage of Habitations under Electrification

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

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

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

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

vi. Sports Facilities in the Village

a.Number of Play Grounds in the Village (minimum size 200 square meters): 2

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

vii. Education, ICDS

a. Number of Anganwadi Centres: 1

c. Schools (Number)

Primary Private: 0 Primary Govt.: 3

Middle Private: 2 Middle Govt.: 3

Secondary Private: 1 Secondary Govt.: 1

Higher Secondary Private: 1 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	1400	d.	Pasture / Grazing Land		g.	Check Dam	0
b.	Irrigated Land	1100	e.	Forests/ Plnatations		h.	Wells/Bore Wells	
c.	Un-irrigated Land	5.81	f.	Other Common Land		I	Tanks /Ponds	2

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

Name and Signature of Surveyor and Respondent'

Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey
		તલાટી કમ મંત્રી નારદીપુર ગ્રામ પંચાયત તા.કલોલ,જિ.ગાંધીનગર	

3

તલાટી કમ મંત્રી
નારદીપુર ગ્રામ પંચાયત
તા.કલોલ,જિ.ગાંધીનગર

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

Gmail Ajaysinh Bhati <ajaysinhbhati.cie17@gmail.com>

Development scenario of Nardipur village, Gandhinagar, Gujarat.
1 message

Ajaysinh Bhati <ajaysinhbhati.cie17@gmail.com> Wed, Jun 23, 2021 at 6:14 PM
To: collector-gnr@gujarat.gov.in, tdo-gnr@gujarat.gov.in, ddo-gnr@gujarat.gov.in
Cc: Vishwakarma Yojana <rurban@gtu.edu.in>

Respected Sir/Madam,

We are students of Adani institute of Infrastructure Engineering, Ahmedabad affiliated to Gujarat Technological University-GTU. GTU has been assigned to Vishwakarma Yojanaa-VY Phase-VIII in which students survey various villages and Designs various amenities To Deliver it to them making them ideal for living better life as per requirements & village problem statements.

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

Sr. No.	Design Name	Expenditure (Rs.)	Benefit
1.	Public Toilet	4,07,000	➢ It will improve sanitation facility ➢ It will be helpful to people who don't have toilets in their home ➢ It will promote cleanliness in village
2.	Water tank	72,000	➢ To raise ground water level ➢ To store water to avoid water scarcity ➢ To achieve Sustainability
3.	Community Health Center	2,87,858	➢ It will provide medicines to villagers ➢ It will improve health facilities. ➢ Villagers will get all the primary treatment in the village.
4.	Bus stop	3,05,000	➢ It will help Villagers in transportation ➢ It cases the load on the one bus stop and helps to reduce noise pollution by easy control of less crowd.
5.	Youth Club Design	3,70,000	➢ The emphasis is to skill the youths in such a way so that they get employment and also improve entrepreneurship. Provides training, support and guidance to farmers ➢ To provide skills to women so that they become self-dependent ➢To aware villagers regarding new development schemes for their betterment ➢ To initiate start-ups in villages.
6.	Aanganwadi	6,65,000	➢ Pre-school education involves various stimulation and learning activities at the Anganwadi. ➢ To lay the foundation for the proper psychological, physical and social development of the child. ➢ To improve the nutritional and health status of children below the age of six years.
7.	Chowk Design	65,000	➢ Chowk can be used as a gathering place for a village. Meetings can be arranged in this place where enough place is available with seating arrangements. In Village villagers and farmers can sit here to take rest after doing the hard work. Workers can use this public place to take rest and to eat with peace.
8.	Boundary wall with gate	28,70,000	➢ Boundary wall with Gate improves the aesthetic look and provides safety and security to the Ground. ➢ After construction of the boundary wall children can play without any worries of street animals or vehicles trespassing. They can play safely on the Ground.
9.	Fountain	2,20,000	➢ The most common factors that influence water are light, temperature, wind, slope, shapes and surfaces. ➢ These all can play a role in considering the final design concept of the fountain.
10.	Animal Shelter House	2,75,000	➢ Animal will provide with shelter and food where they can feel safe and secure ➢ Enough watering will be provided so they don't have to roam around the village for water.
			➢ Garba Chowk is proposed by us so villagers of different castes can come

11.	**Garba Chowk**	**3,25,000**	together in the name of festival and can establish good relations with each other.
12.	**Library**	**3,60,000**	➢ The library acts as a resource centre and a clearinghouse of information on rural development in India. ➢ It has developed a computerized database of the resources in its collection. The computerized database consists of nearly two lakh references. The library has also fully automated its day-to-day operations.

Please find herewith attached,
Detailed Project Report of Nardipur Village

AIIE_VY_NARDIPUR VILLAGE-FULL REPORT.pdf

Best Regards,

Student Name	Branch Name	Enrollment No	Email ID
Ajaysinh Bhati	Civil & Infrastructure Engineering	171310140006	ajaysinhbhati.cie17@gmail.com
Anuj Shyara	Civil & Infrastructure Engineering	171310140058	anujshyara.cie17@gmail.com
Parv Dave	Electrical Engineering	181313109001	parvdave.ele18d@gmail.com

University: Gujarat Technological University, Chandkheda, Ahmedabad 382424 Gujarat.
College: Adani Institute of Infrastructure and Engineering, Shantigram, Nr. Vaishnodevi Circle, S.G. Highway, Ahmedabad, 382421.

21. Comprehensive report for the entire village

Gujarat Technological University is allotted important and prestigious project of Vishwakarma Yojana by the Government of Gujarat for the year 2020-21. The first phase of project is aimed to study the present status and techno-economic survey of villages in District of the state in terms of basic and public amenities, essential commodities, and other infrastructural facilities for the need of people and to prepare report on adequacy of the available resource with reference to population of the village and growth of the area.

The reason behind choosing the Vishwakarma Yojana Project as our final year project is to have an experience of working with Government bodies, to be helpful for people directly with our engineering knowledge and to be part of development of our nations' foundations.

Future Plan of Vishwakarma Yojana are to maximize participation from NGO, Public Private Partnership authorities and other need to be identified for development process also Involvement of stake holders from planning phase and Developing new technologies for effective development. Designing of Model Rurban Town and More Expert sessions and Technical skill enhancement of Students are also considerable.

Nardipur is the village which selected by us. It is a village in Kalol Taluka in Gandhinagar District of Gujarat State, India. Nardipur is 13 km distance from Sub District Headquarter Kalol and it is 20 km distance from District Headquarter Gandhinagar. Around 70% population of the village engaged with the agricultural activities. As per Census 2011, Nardipur Total area is 1500.81 hectares, Non-Agricultural area is 4.89 hectares and Total irrigated area is 1100.81 hectares.

In village, there are school available to educate the younger generation, business and well educated farmers are available to make the village financially strong. But here we noticed the lacking of awareness for sanitation and so old government building that need reparation. So by redesign them and by implementation of sanitation method village can make a role model for surrounding village.

To find that what else we could possibly do to improve the village, we visited the first smart village of the Gujarat state, Punsari village and there we have come to know about Punsari's 7P Model which include Punsari, Public, People, Panchayat, Private, Profit, Partner-ship. The facilities that we have observed in the Punsari village are adequate sanitation facilities like Drainage system, Solid Waste Management, Public Toilet etc, adequate Educational facilities like Nand Ghar & Aanganvadi, Smart School, Smart Educational Classroom etc, and adequate infrastructure facilities like Mobile Library, Smart Agriculture, Atal Express, Primary Health Center, Water Purification Plant, 66 KV power substation, A public address & surveillance system, Bank, Public Wi-Fi and many more facilities like this.

After visiting the Punsari village we have come to know that our allocated village Nardipur is lacking behind in terms of rural infrastructure. The key contributor towards sustainable transformation is mobilization & organization of community participation in development activities. This convergence the demand of rural community and change can be brought about by rural leadership. Infrastructure or rural development is not the only thing which makes village the smart village it is also a dimension of human development as individual which can affect the sustainability of any change.

Scope of developments that we have found out by Revisiting the Nardipur Village with a new Perspective towards the Rurbanization are in Sanitation sector, plenty of dilapidated building that may be use after renovation, repair or rehabilitation for different purposes and other things like Pot-holes in inter connected village roads, Water logging during monsoon season, No Eco-friendly Energy-sources, Poor condition of Common Play Ground, Insufficient storage space for Animal Food etc.

Our vision for development of the Nardipur village comes after detailed discussion with Talati, sarpanch and villagers. That's why we have suggested solutions of already existing problem in the village by providing some infrastructure designs like-

Table 52 Name of all the proposed designs

Proposed 12 Civil designs		Proposed 6 Electrical design
Public Lavatory	Boundary wall with Gate	Power theft identification
Water Tank	Garba Chowk	Automatic water level controller
Bus Stop	Fountain	Dual Tone Multi Frequency (DTMF)
Youth Club	Animal Shelter House	LPG Gas Leakage Detection & Control
Aanganwadi	Community Health Center	Automatic LED Emergency Light
Chowk	Library	Three phase fault analysis

By providing a good ideas and by doing quality work with our engineering and technical skills, here we have suggested some of our ideas in it. For that there were many Activities done by us in the village and for the village like techno- economic survey of ideal village, smart village and allocated village more than that gap analysis between ideal and allocated village are also done by us with SAGY survey. These survey includes Demographical detail, Geographical detail, Occupational details, Physical infrastructure facilities, Social infrastructural facilities, Sustainable infrastructure facilities, Data collection from village or any other Additional information that may have required.

Based on the survey we tried to give design of required basic facilities to fulfil their needs. By providing these basic facilities to villagers migration rate will be decreased. This is ultimate aim of the Vishwakarma Yojana.

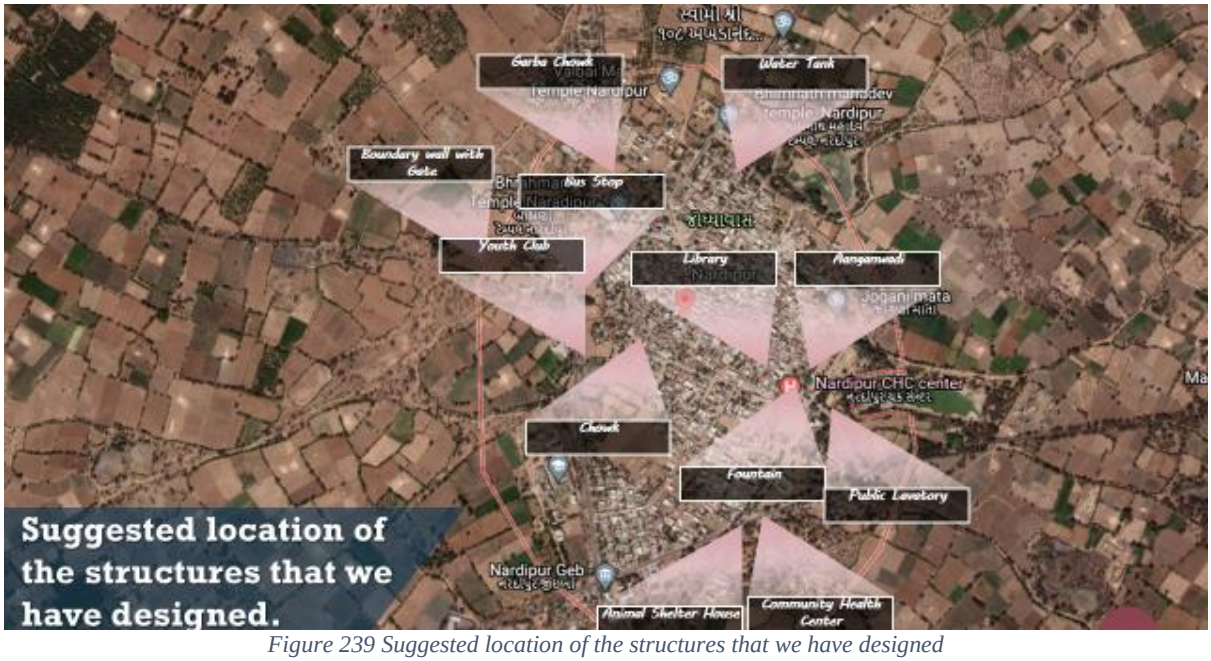

Figure 239 Suggested location of the structures that we have designed

FINAL YEAR PROJECT REPORT Sem 8 Ajay-Anuj (Plagiarism)

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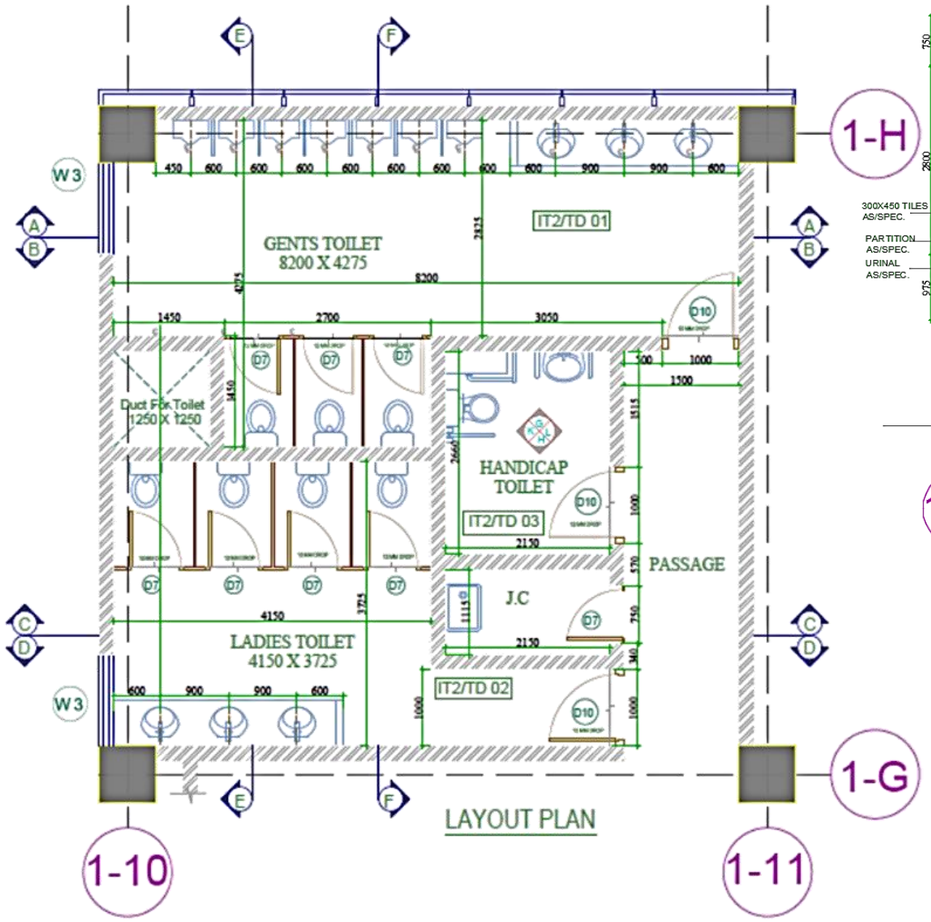

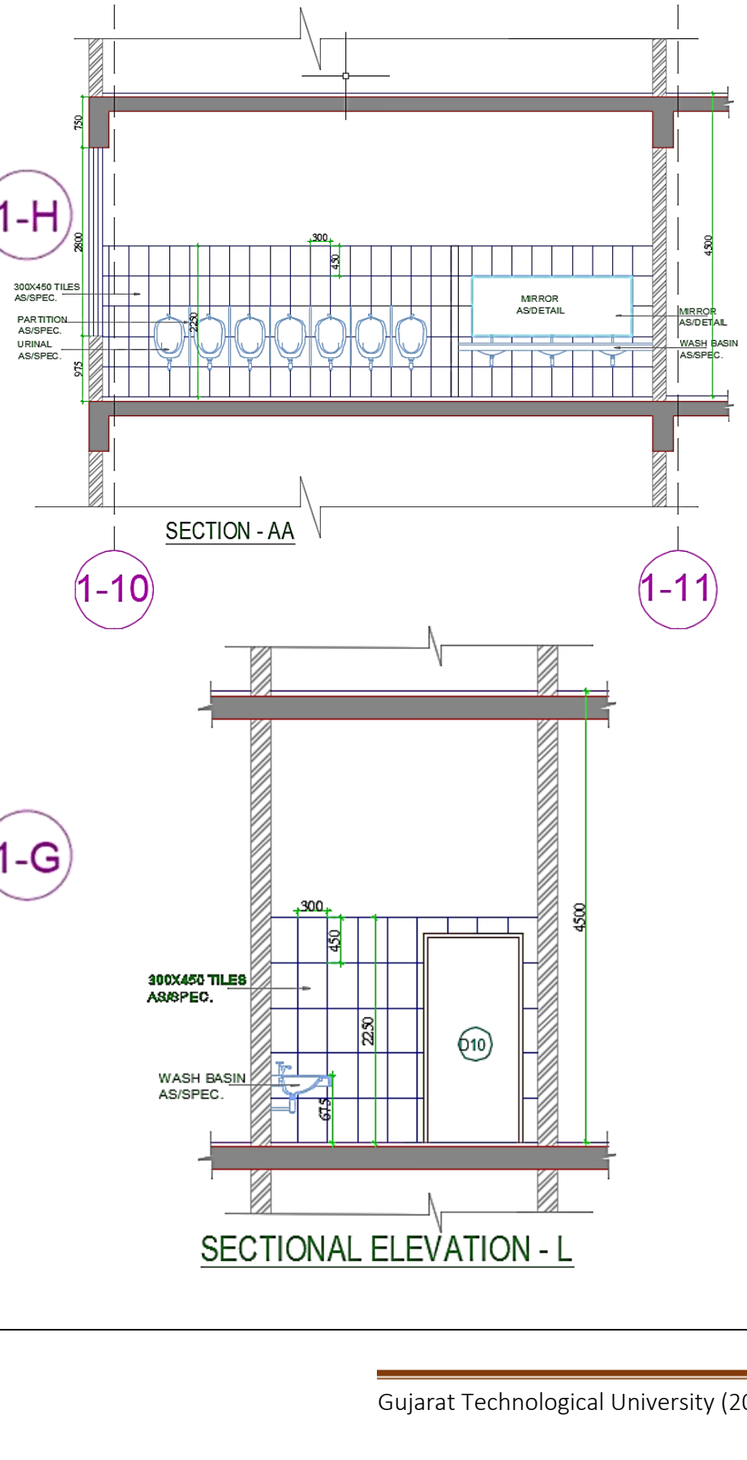

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Check first the plot dimensions.

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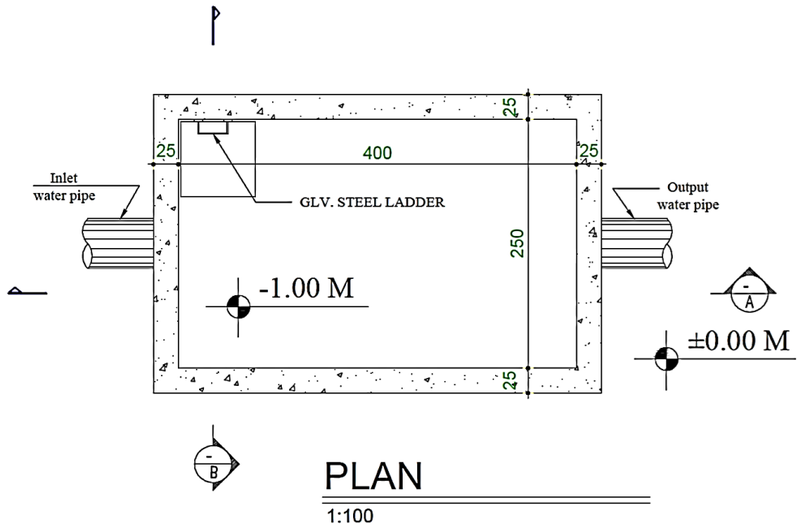
Institute of Infrastructure

Design By:	Ajaysinh Bhati Anuj Shyara

Public Lavatory

Sheet No.	001
Date:	
Guide by:	Prof. Uzair Shaikh Dr. Subhanarayan Sahoo
Vishwakarma Yojana: Phase VIII	
Scale	As indicated



PLAN
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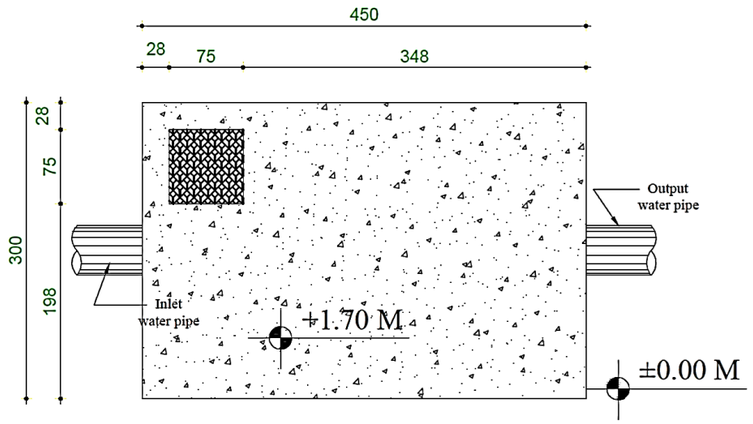

TOP VIEW
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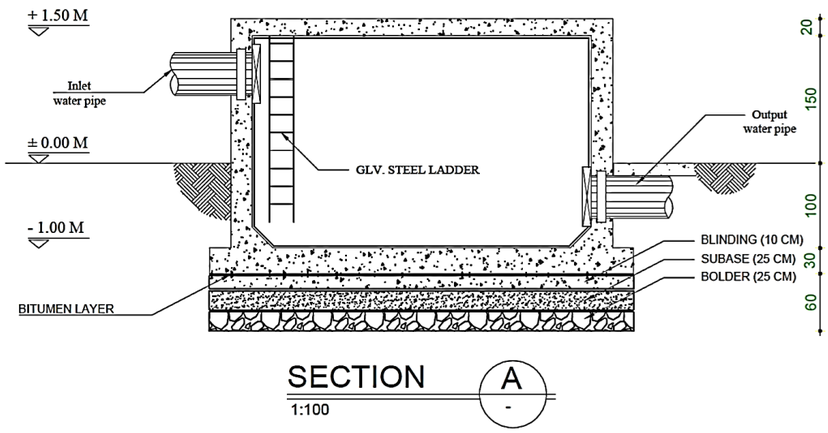

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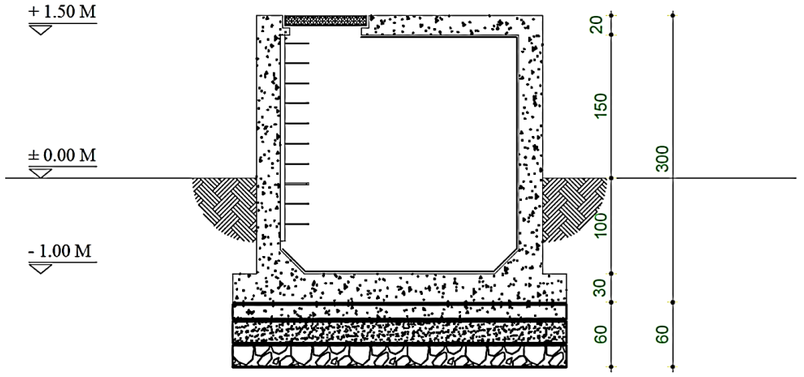

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Design By:	Ajaysinh Bhati Anuj Shyara

Water Tank

Sheet No.	002
Date:	
Guide by:	Prof. Uzair Shaikh Dr. Subhanarayan Sahoo
Vishwakarma Yojana: Phase VIII	
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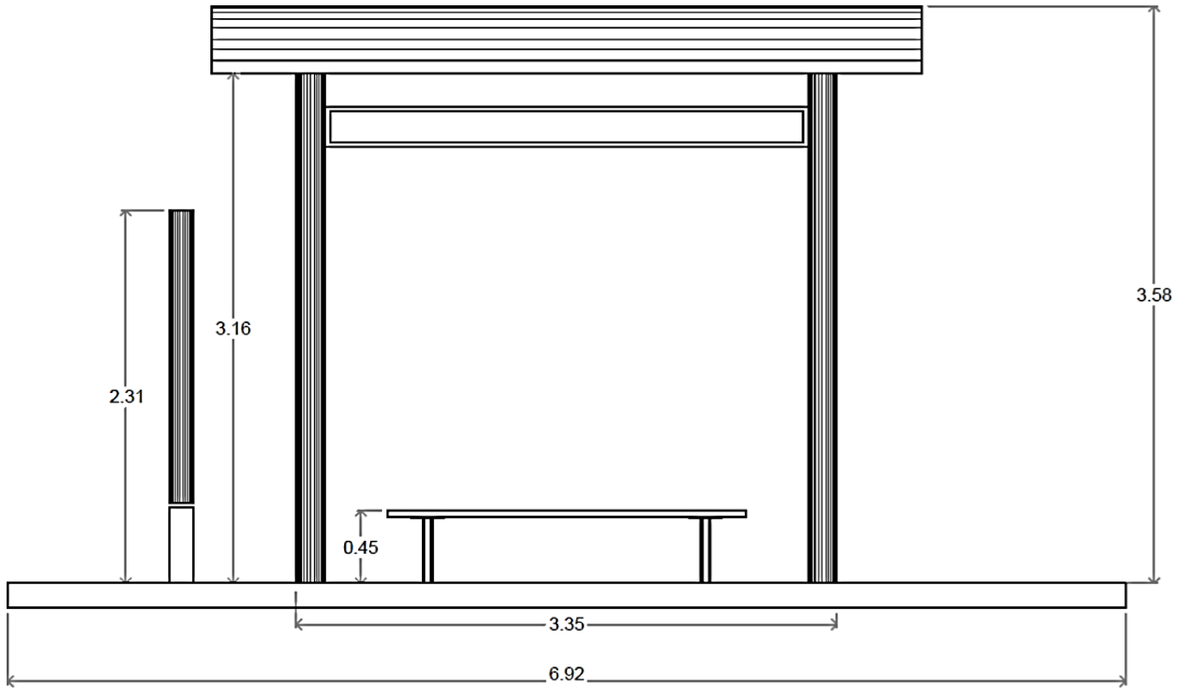
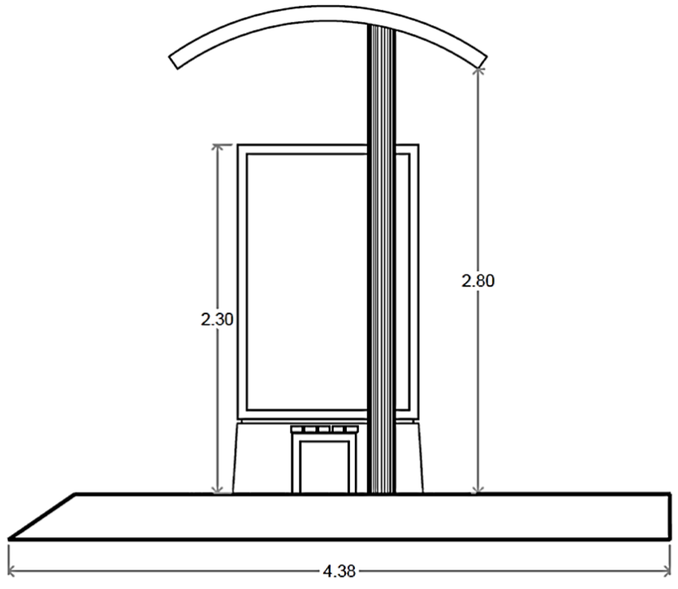
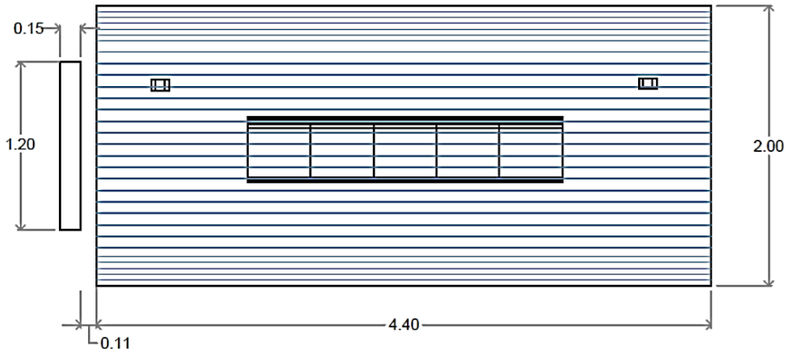


ELEVATION



SECTION



TOP VIEW

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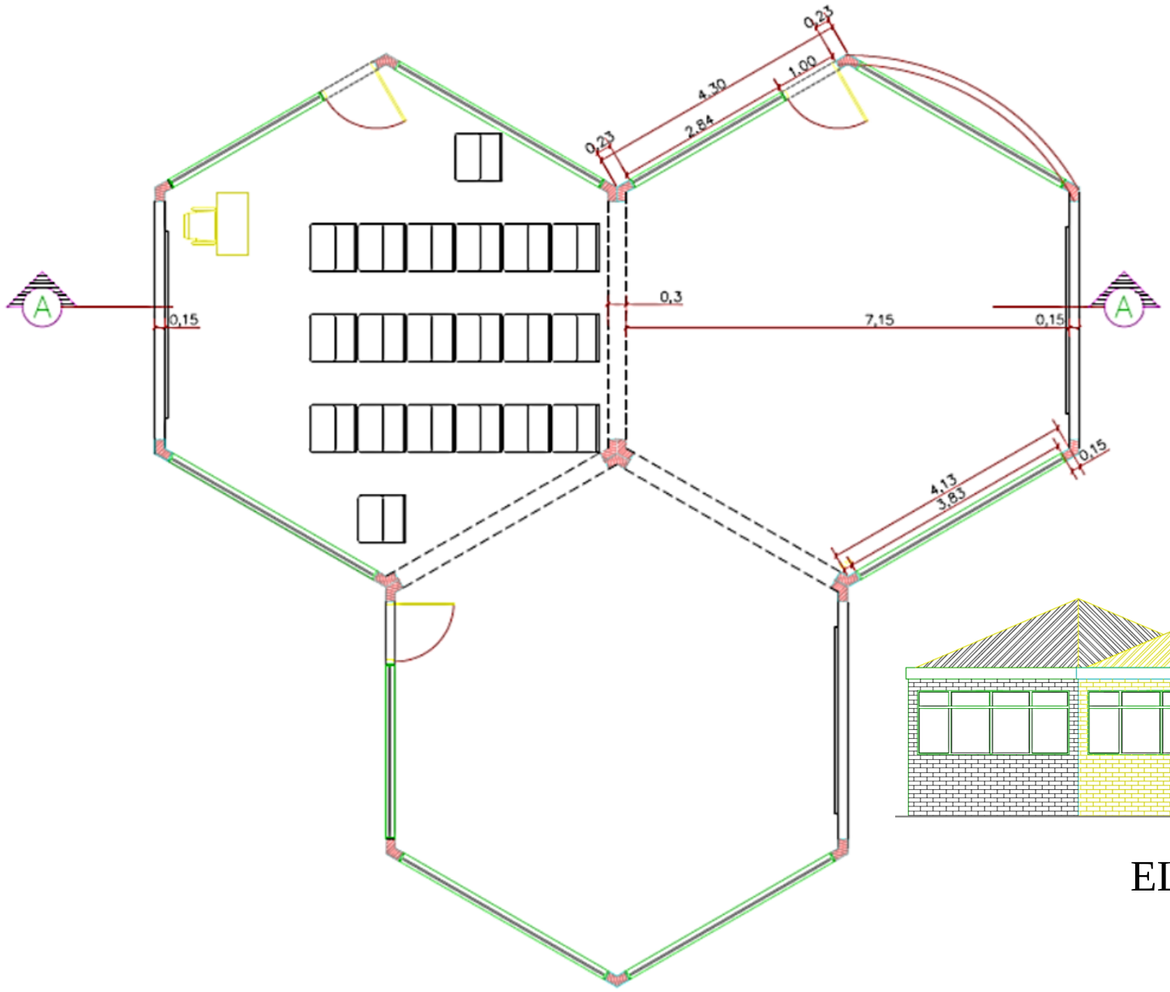
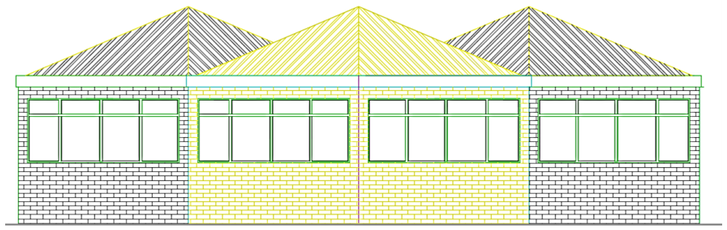
Design By:	Ajaysinh Bhati Anuj Shyara

Bus Stop

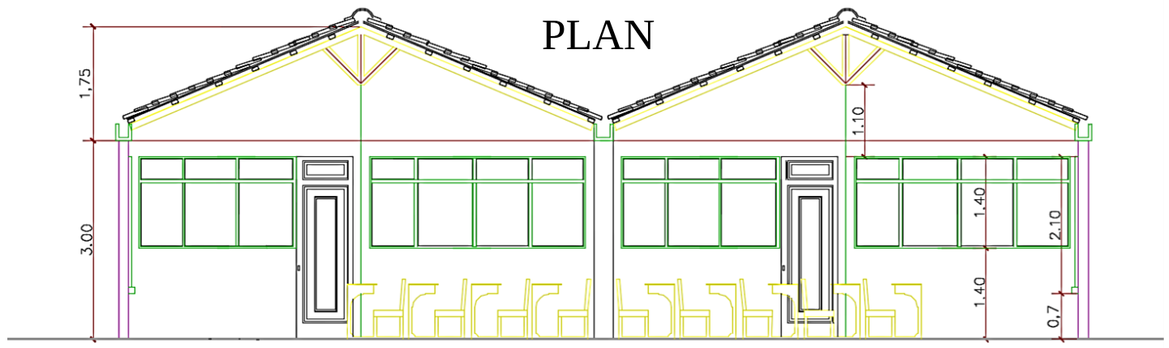
Sheet No.	003
Date:	
Guide by:	Prof. Uzair Shaikh Dr. Subhanarayan Sahoo
Vishwakarma Yojana: Phase VIII	
Scale	As indicated



PLAN



ELEVATION



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Design is not responsible for any kind of wrong data.

Minimum Grade of Concrete is M20 and all Steel grade is fe500 as per IS456:2000.

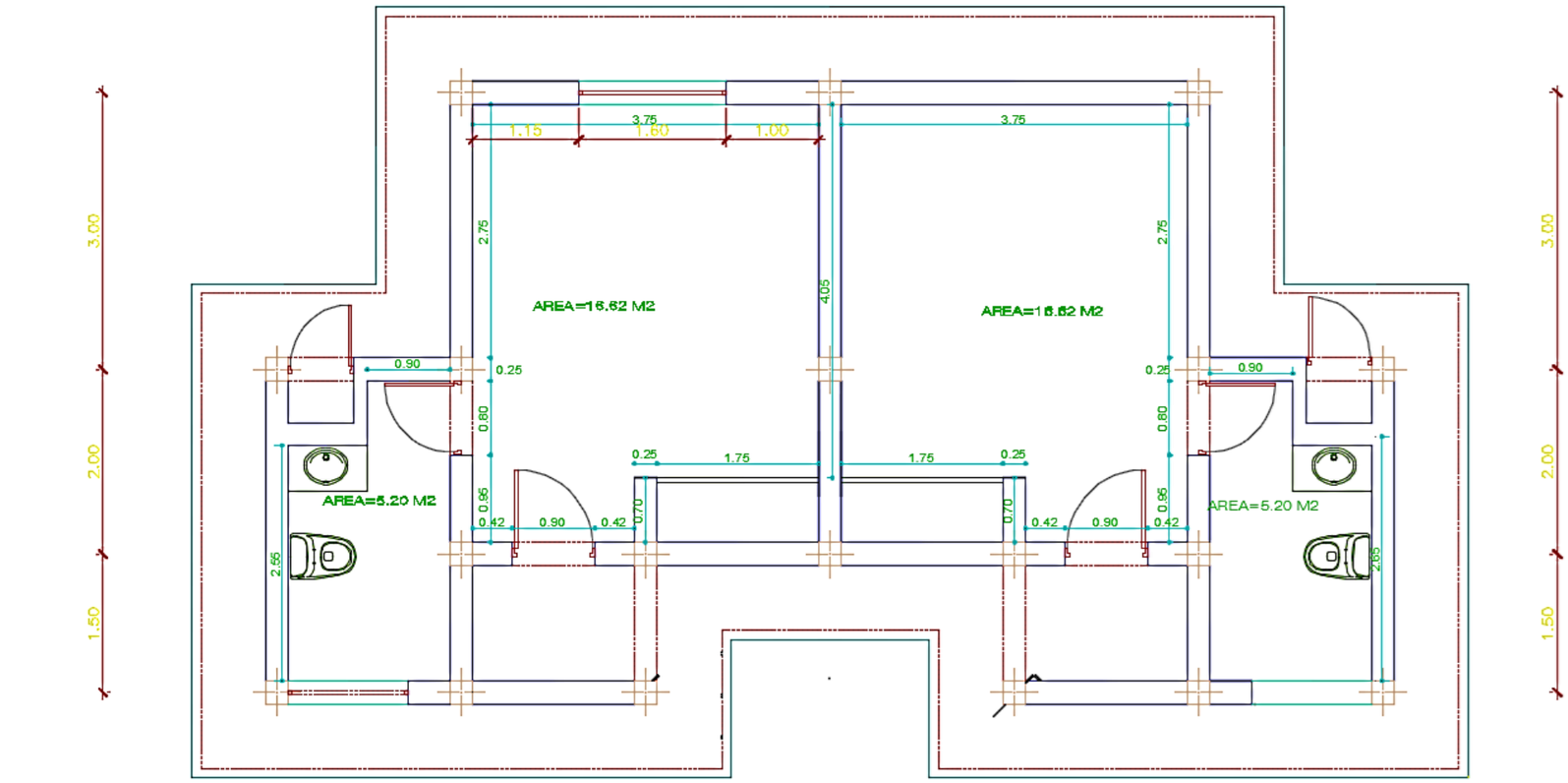
Check first the plot dimensions.

adani Institute of Infrastructure

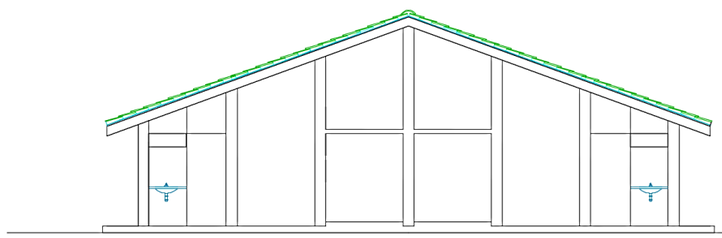
Design By:	Ajaysinh Bhati Anuj Shyara

Youth Club

Sheet No.	004
Date:	
Guide by:	Prof. Uzair Shaikh Dr. Subhanarayan Sahoo
Vishwakarma Yojana: Phase VIII	
Scale	As indicated



PLAN



SECTION

ELEVATION

Gujarat Technological University

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Check first the plot dimensions.

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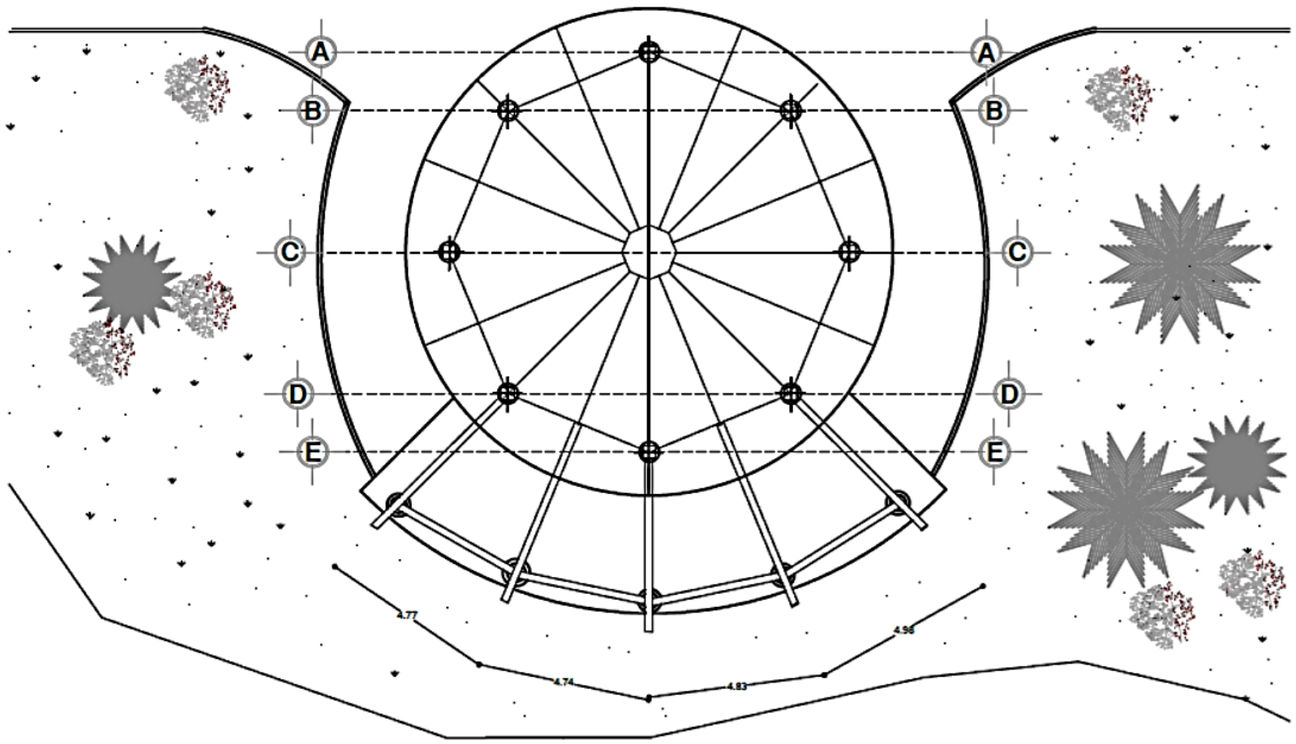
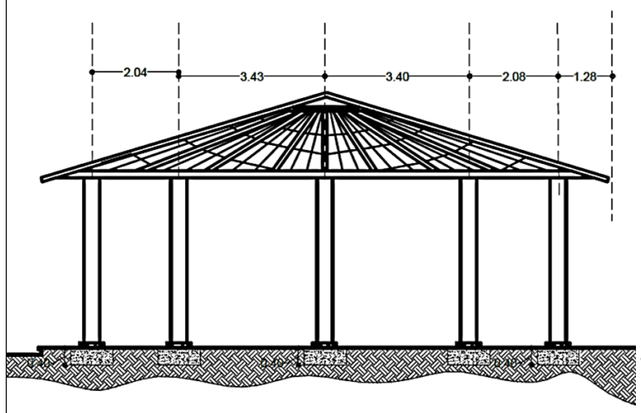
Design By:	Ajaysinh Bhati Anuj Shyara

Aanganwadi

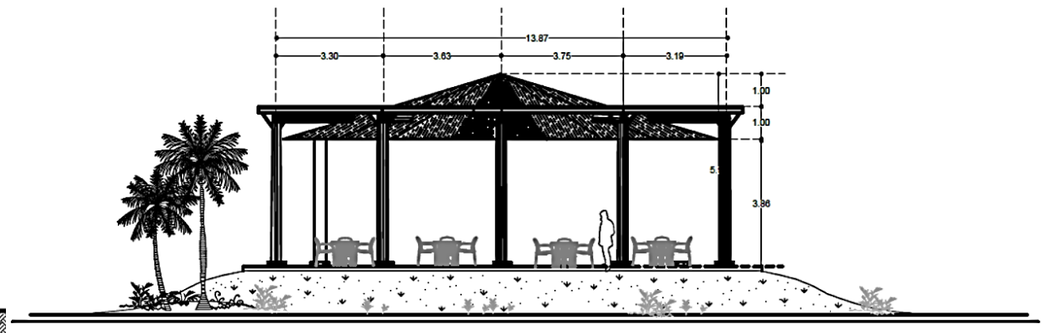
Sheet No.	005
Date:	
Guide by:	Prof. Uzair Shaikh Dr. Subhanarayan Sahoo
Vishwakarma Yojana: Phase VIII	
Scale	As indicated



PLAN



SECTION



ELEVATION

Gujarat Technological University

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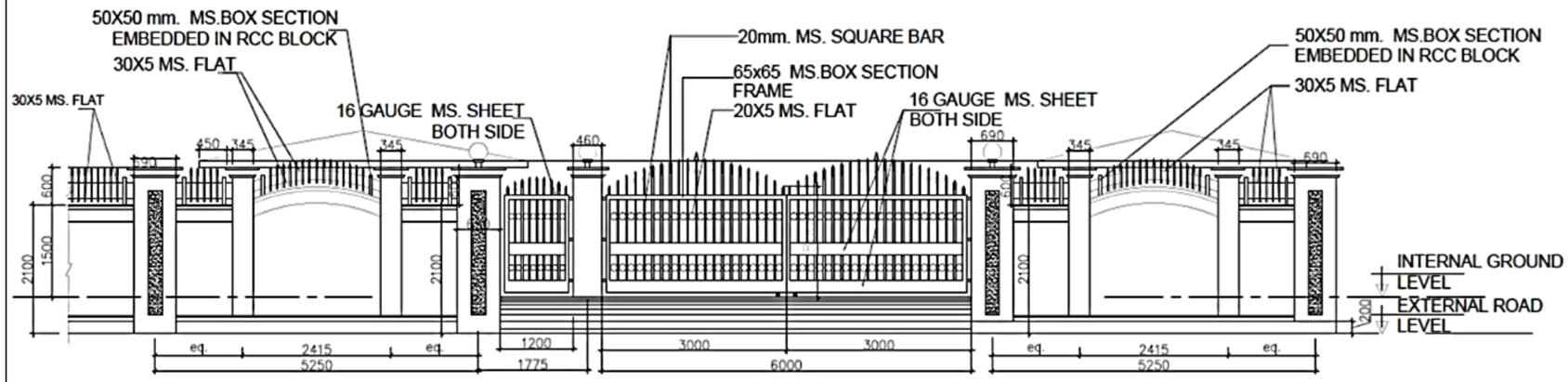
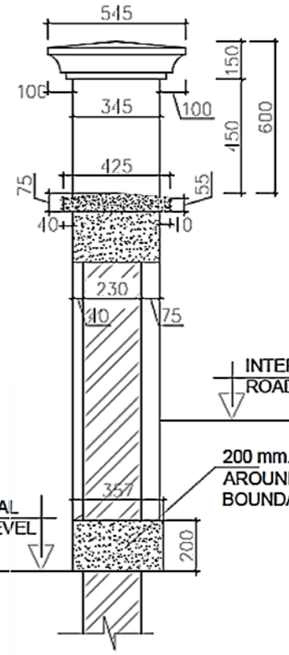
Design By:	Ajaysinh Bhati Anuj Shyara

Chowk

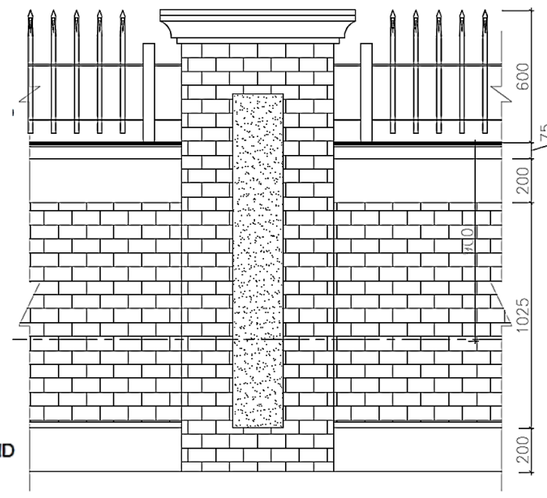
Sheet No.	006
Date:	
Guide by:	Prof. Uzair Shaikh Dr. Subhanarayan Sahoo
Vishwakarma Yojana: Phase VIII	
Scale	As indicated



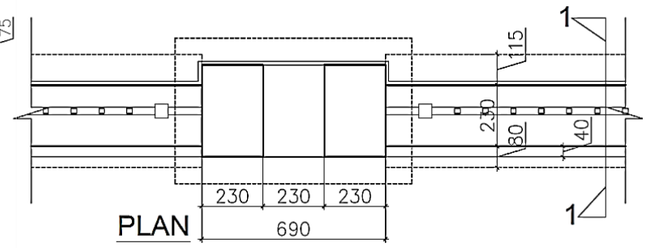
ELEVATION

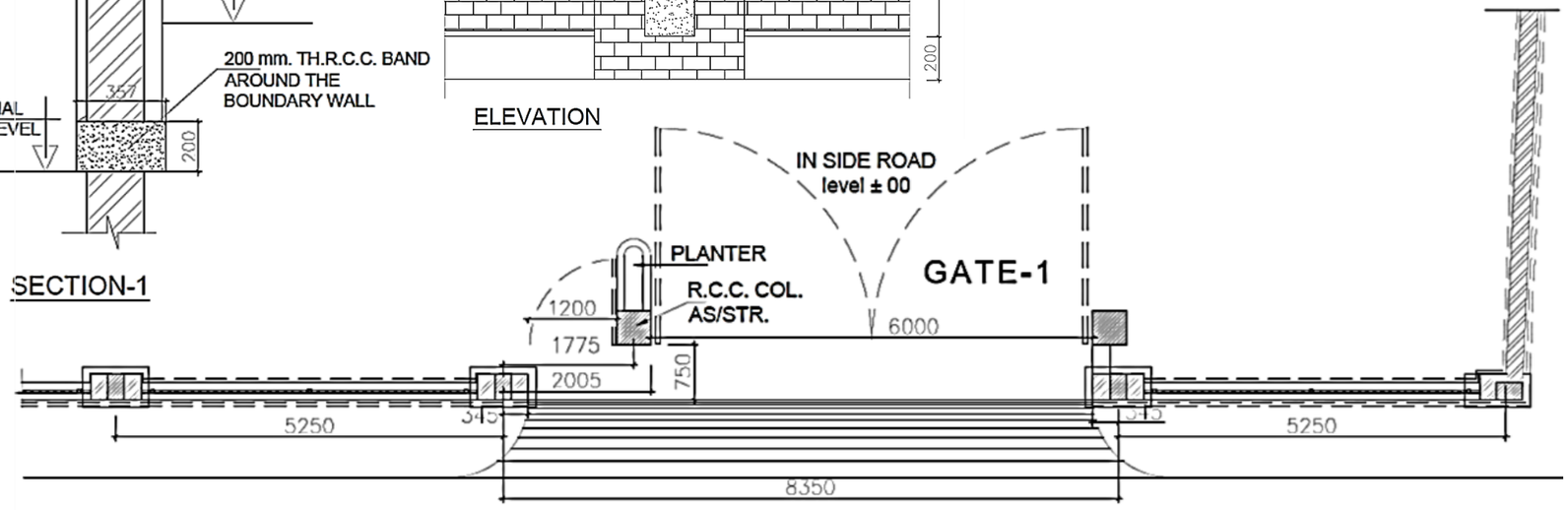


SECTION-1



ELEVATION





PLAN

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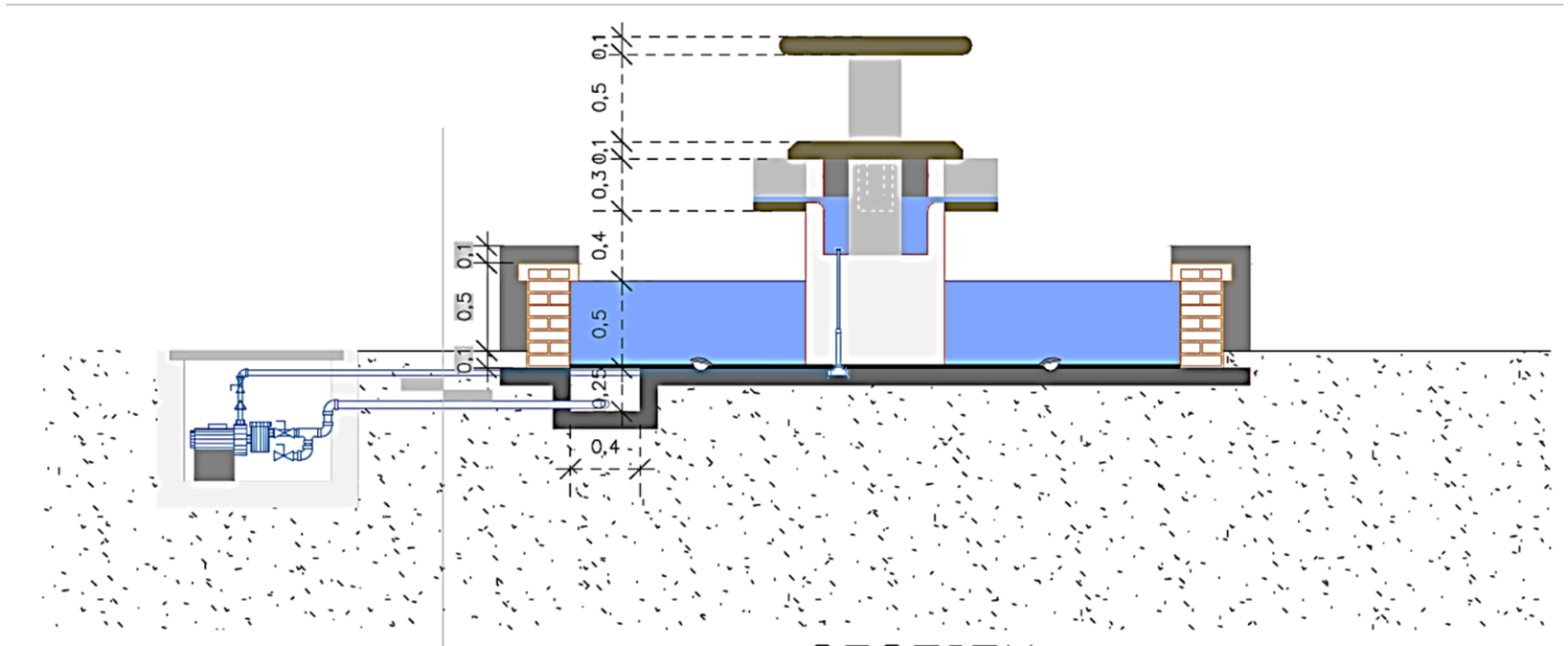
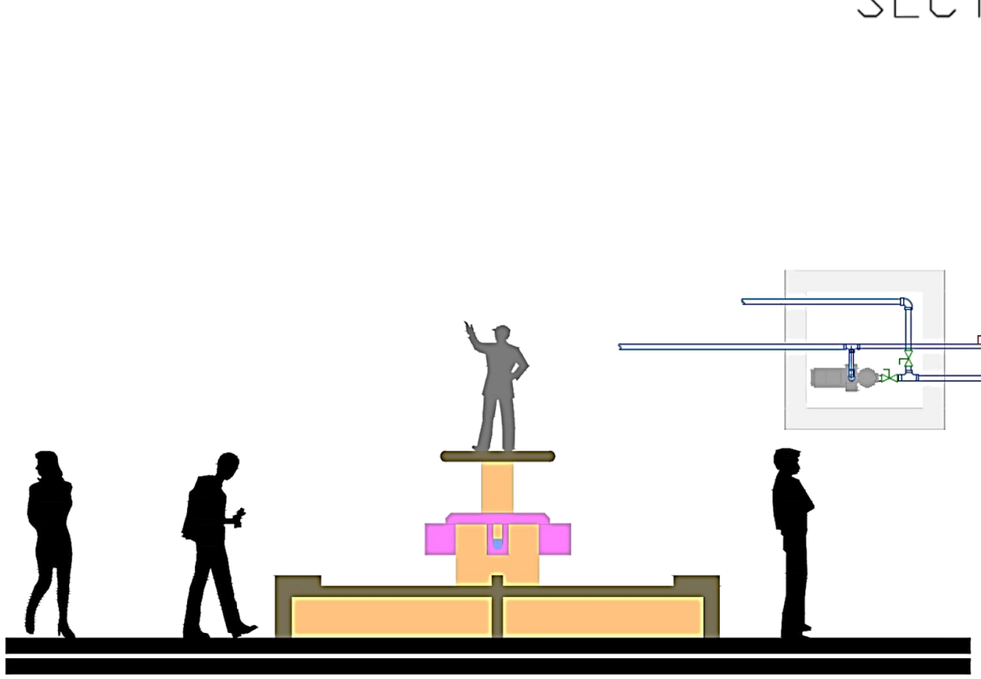
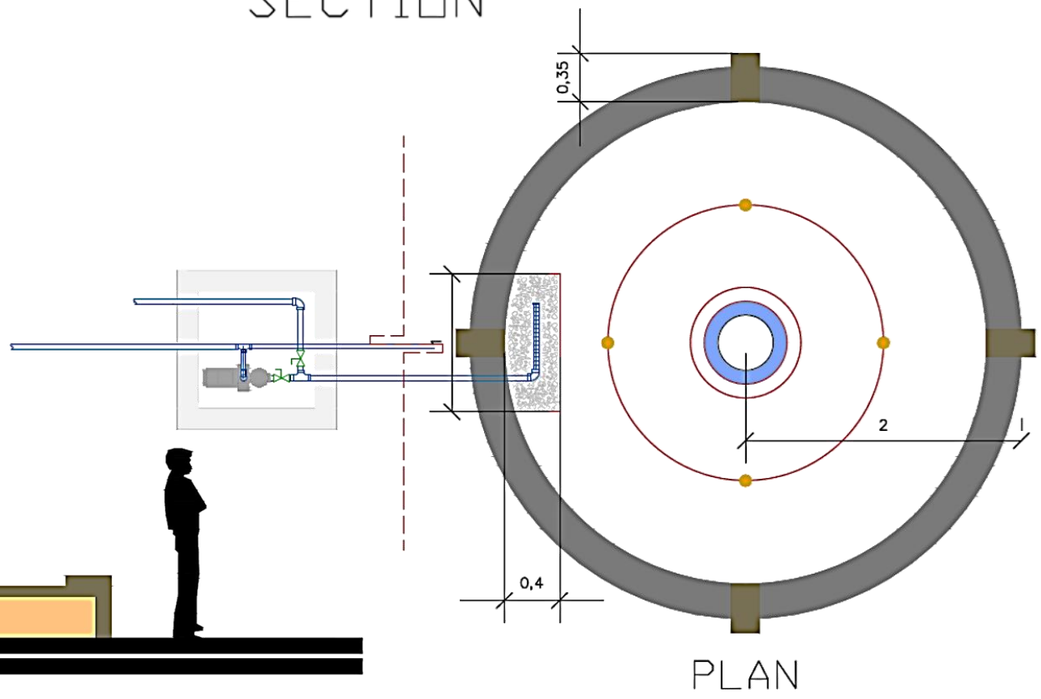
All dimensions are in centimetre until stated.	
Drawing Should be read not for scale.	
Design is prepared only for educational purpose and correction of all data must be check before use.	
Design is not responsible for any kind of wrong data.	
Minimum Grade of Concrete is M20 and all Steel grade is fe500 as per IS456:2000.	
Check first the plot dimensions.	
Design By:	Ajaysinh Bhati Anuj Shyara
Boundary wall with Gate	
Sheet No.	007
Date:	
Guide by:	Prof. Uzair Shaikh Dr. Subhanarayan Sahoo
Vishwakarma Yojana: Phase VIII	
Scale	As indicated



SECTION



ELEVATION



PLAN

Gujarat Technological University

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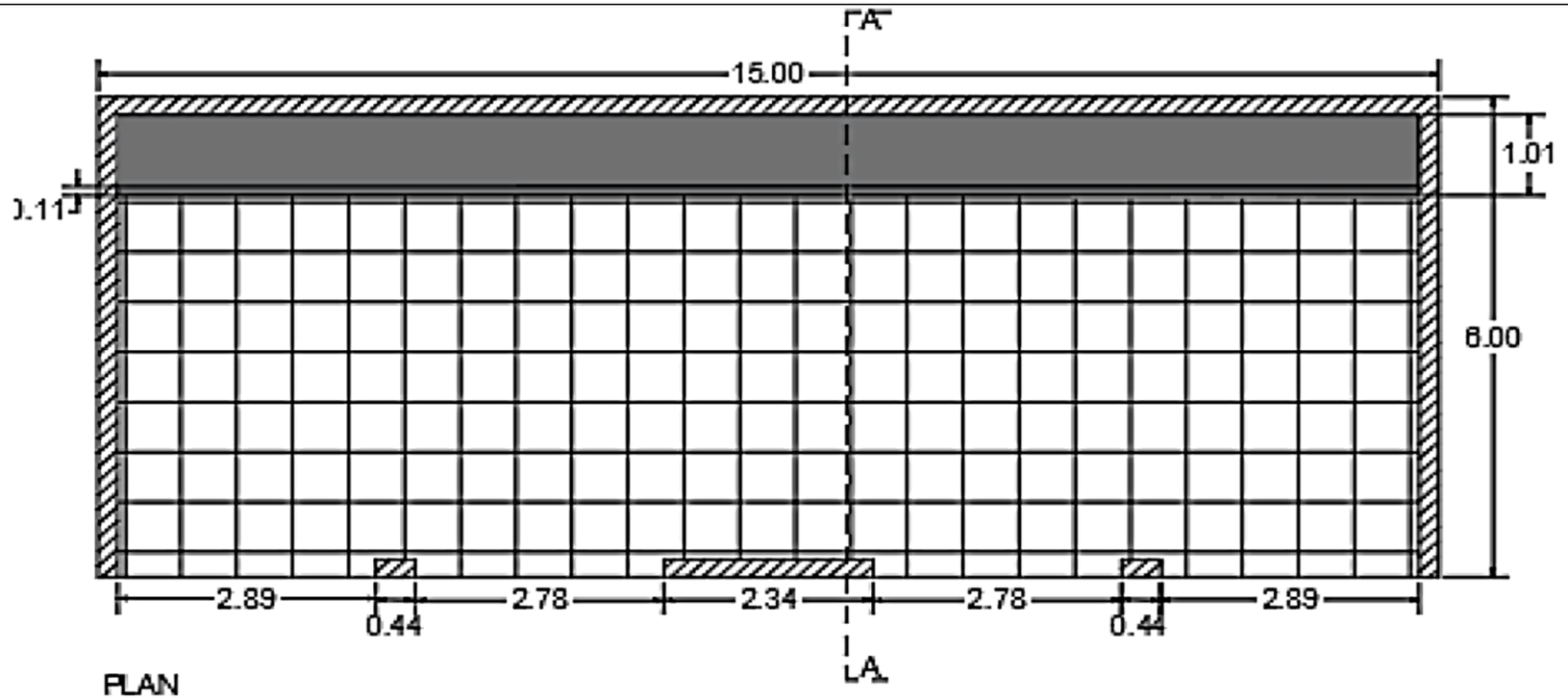
Design By:	Ajaysinh Bhati Anuj Shyara

Fountain

Sheet No.	008
Date:	
Guide by:	Prof. Uzair Shaikh Dr. Subhanarayan Sahoo
Vishwakarma Yojana: Phase VIII	
Scale	As indicated



Gujarat Technological University

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Design By:	Ajaysinh Bhati Anuj Shyara

Animal Shelter House

Sheet No.	009
Date:	
Guide by:	Prof. Uzair Shaikh Dr. Subhanarayan Sahoo
Vishwakarma Yojana: Phase VIII	
Scale	As indicated

Gujarat Technological University

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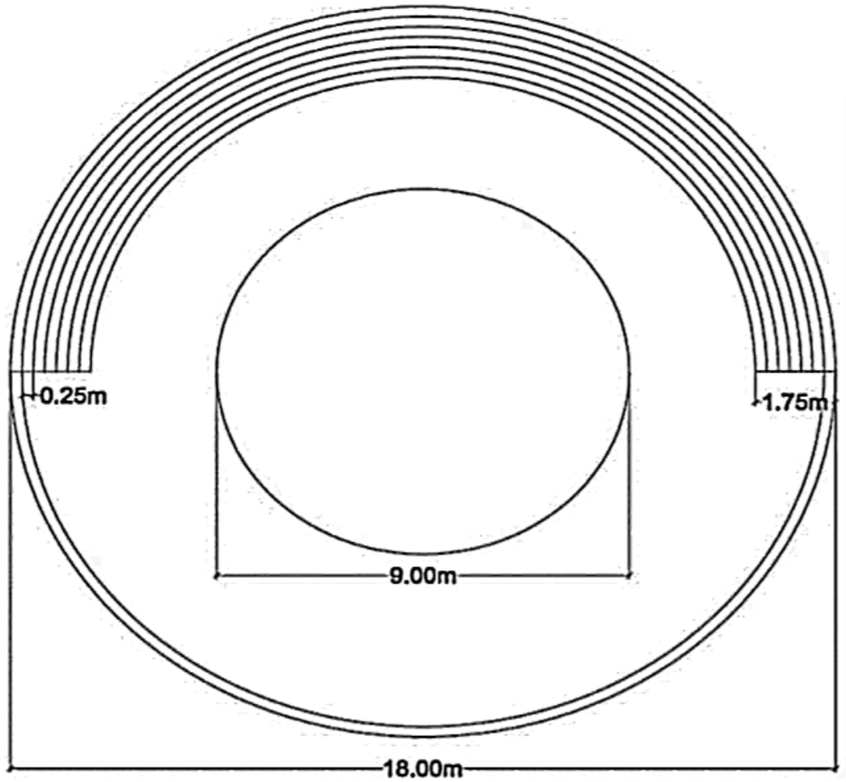
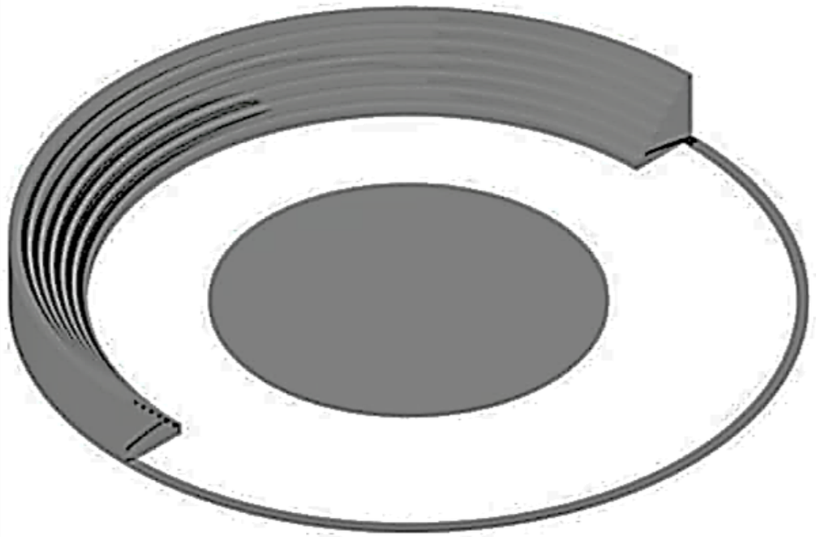
Minimum Grade of Concrete is M20 and all Steel grade is fe500 as per IS456:2000.
Check first the plot dimensions.

Institute of Infrastructure

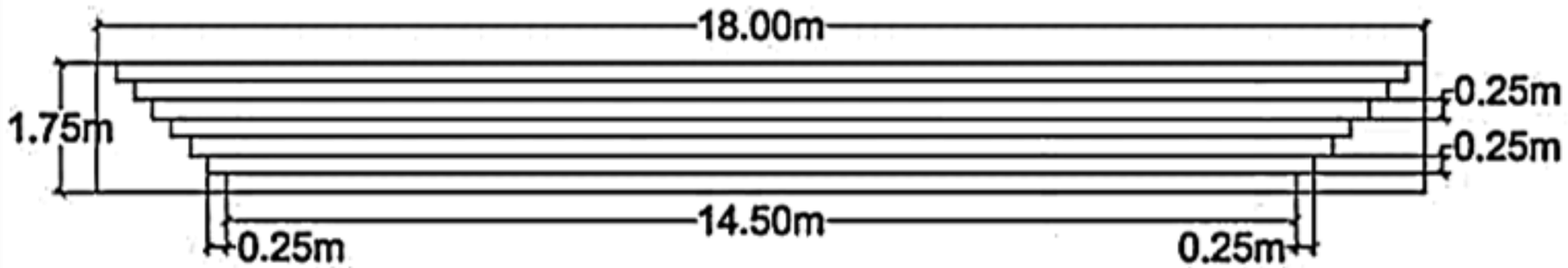
Design By:	Ajaysinh Bhati Anuj Shyara
Community Health Center	
Sheet No.	010
Date:	
Guide by:	Prof. Uzair Shaikh Dr. Subhanarayan Sahoo
Vishwakarma Yojana: Phase VIII	
Scale	As indicated



PLAN



3D VIEW



ELEVATION

Gujarat Technological University

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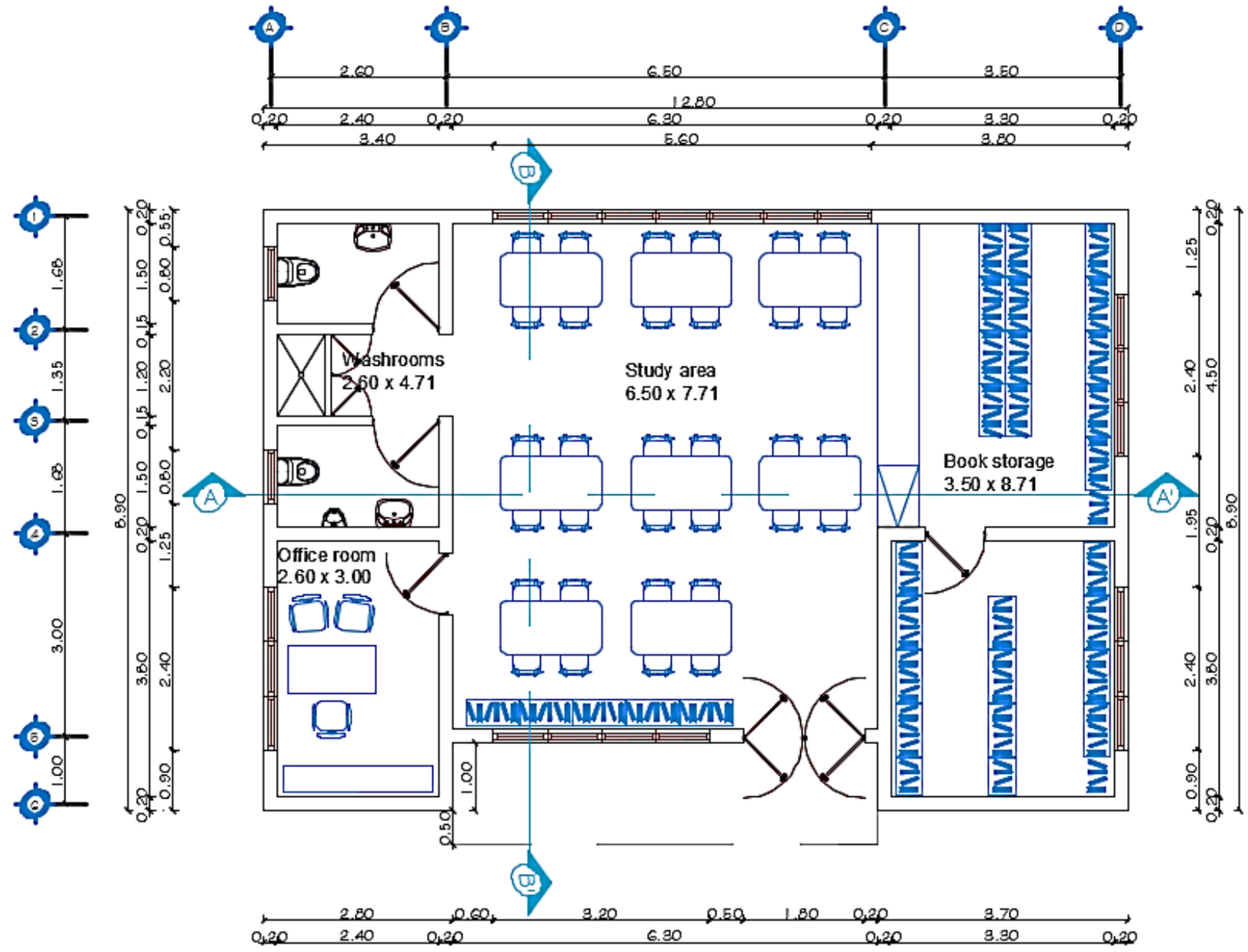
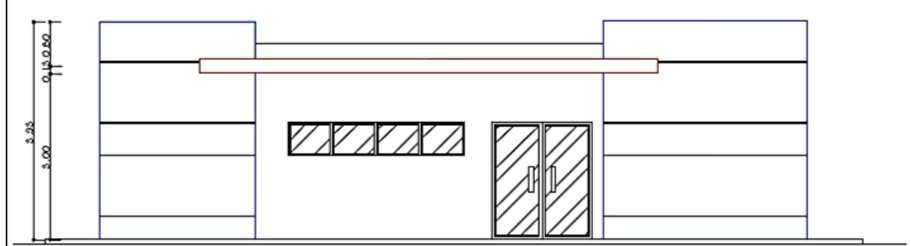
Design By:	Ajaysinh Bhati Anuj Shyara

Garba Chowk

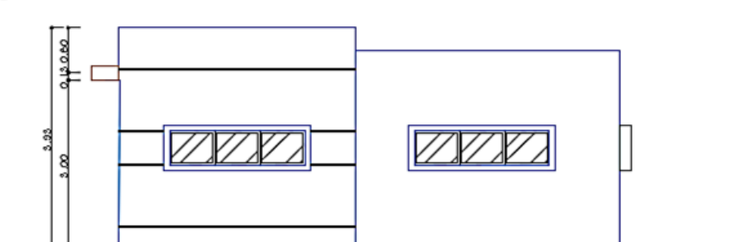
Sheet No.	011
Date:	
Guide by:	Prof. Uzair Shaikh Dr. Subhanarayan Sahoo
Vishwakarma Yojana: Phase VIII	
Scale	As indicated



Plan Layout



Front view



Side view

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Design By:	Ajaysinh Bhati Anuj Shyara
Library	
Sheet No.	012
Date:	
Guide by:	Prof. Uzair Shaikh Dr. Subhanarayan Sahoo
Vishwakarma Yojana: Phase VIII	
Scale	As indicated