DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION
Waghai Village

Dang District

PREPARED BY

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SRI SATSANGI SAKETDHAM RAM ASHRAM GROUP OF INSTITUTION VADASMA

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COLLEGE LOGO

YEAR:2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda,Ahmedabad– 382424 Gujarat

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ON

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Gujarat Technological University,

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CERTIFICATE

This is to certif y that the following students of Degree/Diploma Engineering successful ysubmitted

DetailProjectReportfor,

VILLAGE: WAGHAI

DISTRICT: DANG

Under

VishwakarmaYojana:Phase-VIII

In partial fulfillment of the project offered by

GUJARATTECHNOLOGICALUNIVERSITY,CHANDKHEDA

Duringtheacademicyear2020-21.

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

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College Name:	**Sri SatsangiSaketdham Ram Ahsram Group Of Institution**
College Stamp:	

ABSTRACT

Vishwakarma Yojana is one such initiative towards Rurbanization of villages by Government of Gujarat that hinders such migrations. This Yojana aims at developing the village by providing all the urban facilities that a city may have, yet maintaining the Rural soul. This can be achieved by considering various aspects such as Physical, Social, and Renewable infrastructural facilities. The concept of Rurbanization at regeneration and revitalization of both the physical as well as social environment in villages through a judicious and economic consumption of resources is the thought for betterment or the villages. It is designed to reduce and remove the rural-urban divide and to lead to process of rural transformation that is not exploitative. Vishwakarma Yojana is an approach towards Rurbanization, it has been proposed to provide the benefit of real world experience to engineering students and apply their technical knowledge in the planning, development and management of rural infrastructure facilities. Rurbanization means urban facilities and amenities in rural area, developing village with help of rural soul and urban amenities. In this village on one hand some essential infrastructural facilities like Water Supply, Road Network and electricity, primary school, secondary and higher secondary school etc. have been good and sufficient on the other hand lacking of infrastructural facilities like drainage, public toilet, and public garden.

The population of waghai village about 10000 peoples. The waghai Census town has population of 6,715 of which 3403 are males while 3,312 are females as for report released by census india 2011. In 2011, literacy rate of Waghai village was 84.12 % higher than state compared to 78.03 % of Gujarat. In Waghai Male literacy stands at 90.43 % while female literacy rate was 77.60 %.The main aspects for development of this village are sewage, public toilets, community hall, etc. Some of the physical infrastructure like dairy, panchayat building, primary school, and well exist in the village and are properly maintained and utilized. More over Water tank is present but in bad condition.

On the basis of survey data we have observed that there are some physical infrastructures like water tank, dairy, primary school, etc. but among them some are not in usable condition which creates problems for villagers. The work of Sarpanch and Talati is good as per the feedback given by villagers. Clinic facility is also not available.

Key Words :Rurbanization, Infrastructure facilities, Socioeconomic development, Sustainability, Rural Development.

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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.

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ABBREVIATIONS

SHORT NAME / SYMBOL	FULL NAME
VY	VishwakarmaYojana
PHC	PrimaryHealthCenter
CHC	CommunityHealthCenter
RCC	Reinforced ConcreteStructure
WBM	WaterBoundMacadam
BM	BrickMasonry
D	Door
V	Ventilator
W	Window
WC	WaterCloset
O	Opening
BARC	BhabhaAtomicResearchCentre
URDPFI	Urban And Regional Development Plans Formulation AndImplementationGuidelines
GDP	GrossDomesticProduct
SAGY	SansadAdarshGramYojana
NH	NationalHighway
SH	StateHighway
ODR	OtherDistrictRoads
MDR	MajorDistrictRoad
SBA	SwachhBharatAbhiyan
SC	ScheduleCast
ST	Scheduletribe
SOU	Statue of Unity

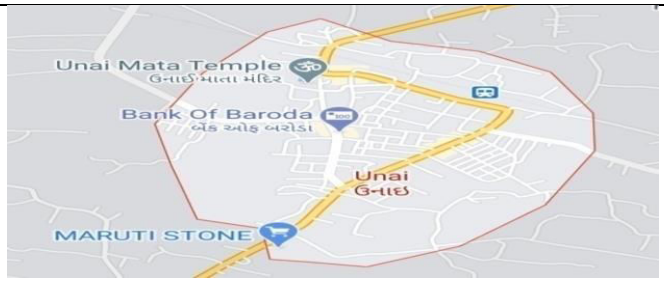
Chapter 1
Ideal Village Visit From District Of Gujarat State (Civil & Electrical Concept)

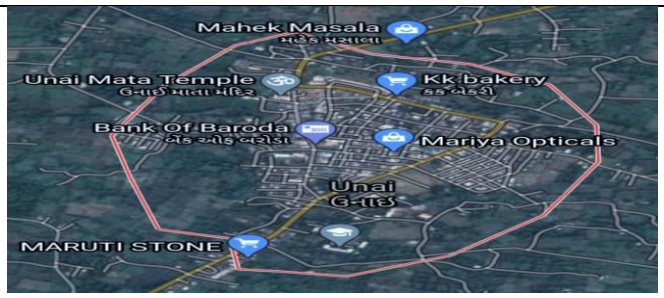
1.1.Background& Study Area Location

We visited Unai village, Navsari, Gujarat to understand how the village has been transformed in all these years. The main aim behind the visit was also to get an insightof how the Gram Sarpanch, Bipinbhai has transformed and revamped it since 2016 and what are the next developments he is looking for his village in near future. Unai is a village in the Navsari district in the Indian State of Gujarat, India. Unai is connected with Waghai, Chikhli, Saputara,Nasik, Vapi, Dharampur, Shamlaji by statehighway. This village situated onBillimora–Waghai narrow gauge railway route. The nearest railway station forbroad gauge trains isBilimoraJunction.Unai is famous for Unai Mata Temple. Unai Mata is Hindu a deviUshna Amba mata temple with hot water springs kund. Visitors can bathe in the hot spring attached to this famous temple of considerable historical significance.Bartad, Chadhav, Khambhaliya, Palgabhan , Sindhai , Bhinar, Kelkutch, Dharampuri,Kureliya, Nani Valzar, Pathakvadi are villages nearby Unai.

Unai is a village in the Navsari district in the state of Gujarat,India. Unai is connected with Waghi,Chikhli,Saputara,Nasik,Dharampur, by state highway.

Study Area Location:





Map details
Locality Name: Unai (ઉનાઈ)
Taluka Name :Vansda
District : Navsari
State : Gujarat
Elevation : 96 m Above Sea
Pin code : 396590

Fig-1.1 A Unai Village Location

1.2 Concept: Ideal Village, Normal Village

An ideal Indian village will be constructed in such a manner that it will be able to lend itself perfect sanitation. It shall have cottages with sufficient light and ventilation built of material that

can be obtained within a radius of five miles of it. The cottages shall have courtyards enabling householders to plant vegetables for domestic use and to house their cattle. The village lanes and streets will be free of all kind of avoidable dust. It shall have wells as per the need and demand. It will have houses of worship for all, also a common meeting place, a village common for grazing its cattle, a co-operative dairy, primary and secondary schools in which industrial education will be the central fact, and it will have Panchayats for settling disputes. It will produce its own grains, vegetables and fruit. It shall also have a gram panchayat as the governing body which may help in solving necessary disputes.

1.2.1. Objectives

A model village project has the following important objectives:

- Make the model village a "hub" that could attract resources for the development of other villages in its vicinity.
- Provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such villages
- Contribute towards social empowerment by engaging all sections of the community in the task of village development.

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

Unai village, Navsari, Gujarat to understand how the village has been transformed in all these years. The main aim behind the visit was also to get an insightof how the Gram Sarpanch, Bipinbhai has transformed and revamped it since 2016 and what are the next developments he is looking for his village in near future. Unai Village Total population is 6104 and number of houses are 1187. Female Population is 49.7%. Village literacy rate is 77.1% and the female literacy rate is 35.6%.

T-1.1 A- Unai Village Population Data

Particulars	Total	Male	Female
Total No. Of Houses	1187	-	-
Population	6104	3069	3035
Child (0-6)	587	297	290
Scheduled Caste	60	32	28
Scheduled Tribe	3760	1811	1949
Literacy	85.20%	91.31%	79.20%
Total workers	2151	1,680	471
Main workers	1,908	-	-
Marginal workers	243	172	71

Fig-1.2 A- Unai Village High School

Fig-1.2 B- Unai Mata Temple

1.2.3 The Idea of Model Village / Smart Village

About 68.9% of our population lives in rural areas (Census 2011). Though number is expected to fall in the coming years, it is still estimated that more than half of our population would be rural even in 2050. Despite there being several past initiatives by governments at all levels – Central, State and Local – in the past, the level of improvement has not kept pace with the rising aspirations among Indians. On most development parameters, there is still a significant gap between rural and urban India, as the table below illustrates

T-1.2.A- Population Details Of India Base In Poverty Line

Sector	Parameter	Urban	Rural
Expenditure poverty	% people below poverty line (2011-12) (Tendulkar estimates)	14%	26%
	% people below poverty line (2011-12) (Rangarajan estimates)	27.2%	31.3%
Education	Literacy Rate - 2011#	85%	68.9%
	Average years of school education of working population*	8.42	4.72
Health	Infant Mortality Rate (IMR) – 2011##	28	46
	Life Expectancy at birth - 2002-06 **	68.8	62.1

One reason for the failure of rural development schemes has been the lack of a holistic focus on the village as a unit. Separate flagship schemes targeting different sectors such as health (NRHM), education (SSA) and livelihood (NREGA, NRLM) have been launched in the past, but met with limited success. The "Model Village" concept could address these challengescomprehensively. It can address resource deficits in each of these sectors, with adequate focus on the special needs of every village.

The idea of an "Adarsh Gram" or model village has been explored earlier as well, most notably through the Pradhanmantri Adarsh Gram Yojana, launched by the Central Government in 2009-10. The scheme was implemented in pilot mode in 1000 villages of Assam, Bihar, Himachal

Pradesh, Rajasthan and Tamil Nadu, with an allocation of Rs 10 lakh per village. This limit was later raised to Rs 20 lakh per village. The target villages under the scheme were those with more than 50% of the population belonging to Scheduled Castes (SCs). Additionally, State governments have also taken steps in this direction. Himachal Pradesh launched a Mukhya Mantri Adarsh Gram Yojana along similar lines in 2011, with the allocation of Rs 10 lakh per village.

The proposed "Sansad Adarsh Gram Yojana" of the Central Government aims to involve MPs more directly in the development of model villages. By adopting a village(s) under this initiative, an MP has the opportunity to directly benefit all sections of a village community in an integrated, efficient and participatory fashion. The following sections in this brief highlight the important objectives that a model village could achieve, and covers the core features of a model village in India. Section 6 covers the important guidelines under the new "Sansad Adarsh Gram Yojana".

Model Village Punsari

Punsari model village definitely has an excellent record in terms of fewer people living below poverty line, availability of schools, water facilities, free Wi-Fi facility, roads, proper solid waste management etc. The village has proved itself on important development indicators like health, education, social services, women empowerment, which have already been discussed in the previous section. However, during the field wok the author observed that mere physical indicators of development are at times misleading. A model village is not necessarily an ideal village. An ideal village in author's opinion is the one that has been able to transcend social inequalities, reduce subordination of women, develop true community spirit, and work tirelessly to respect and recognize constitutional values. Villages in India are notorious for the caste divide, communal tensions, social injustices, and, at times, instances of violence. Punsari has performed exceptionally well in providing basic amenities, reducing inequalities among different social groups, and improving some major social indicators of development. However, it has yet to accomplish its goal of becoming an ideal village where every citizen hailing from different socio-economic background has a voice and choice. This was observed by the author while interacting with the current Punsari village headwoman.. Ms. Patel did not have any experience in governance and was never involved in any political activity, yet she was fully supported and backed by Himanshu Patel (former village headman) so that she could be successfully instituted as the Sarpanch of Punsari Village. At the time of rural local body election in 2016, the post of village headperson was reserved for a female candidate (according to the provisions of the 73rd Constitutional Amendment Act). The author asked this new puppet-like female Sarpanch about her future plans – what strategies she would adopt to implement her plans, etc. The answers were imprecise and inefficient. In fact, within few minutes after the interview began, her husband joined her in the office and made sure that Ms. Patel answered as per a pre-determined design. She was blowing the trumpet of development achieved by Himanshu Patel and could not say anything concrete about her plans and programs. This interview has reinforced the fact that (in most cases barring few exceptions) a woman merely plays a role of a rubber stamp and real governance is in the hands of dominant village men. It also exposes the way rural democratic institutions are actually working in India (cf. Kumar, 2006).

Gram Sabha is an integral part of the Gandhian concept of village Swaraj (rural self-government). The objective of Gram Sabha is to enable each and every voter in a village to

participate in decision-making at the local level. It is a constitutional body consisting of all persons registered in the electoral rolls of the village Panchayat. It provides a political forum to people in the village where they can meet and discuss their common problems, and consequently, understand the needs and aspirations of the communityIt also exposes the way rural democratic institutions are actually working in India (cf. Kumar, 2006). Another important fault line found in this village is that the Gram Sabha (village assembly) meetings are not conducted on regular basis. Article 243(b) defines the Gram Sabha as "a body consisting of persons registered in the electoral rolls relating to a village comprised within the area of the Panchayat at the village level".

Fig -1.2 C Punsari entrance gate

Fig-1.2 D Punsari primary school

F-1.2 E Punsari PHC

Fig-1.2 F Punsari Gram panchayat

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

A village is a clustered human settlement or community, larger than a hamlet but smaller than a town (although the word is often used to describe both hamlets and smaller towns), with a population typically ranging from a few hundred to a few thousand. Though villages are often located in ruralareas, the term urban village is also applied to certain urban neighborhoods. Villages are normally permanent, with fixed dwellings; however, transient villages can occur. Further, the dwellings of a village are fairly close to one another, not scattered broadly over the landscape, as a dispersedsettlement. In the past, villages were a usual form of community for societies that practice subsistenceagriculture, and also for some non-agricultural societies. In Great Britain, a hamlet earned the right to be called a village when it built a church.

India:

The soul of India lives in its villages," declared M. K. Gandhi at the beginning of 20th century. According to the 2011 census of India, 68.84% of Indians (around 833.1 million people) live in 640,867 different villages. The size of these villages varies considerably. 236,004 Indian villages have a population of fewer than 500, while 3,976 villages have a population of 10,000+. Most of the villages have their own temple, mosque, or church, depending on the local religious following.

Rural Development:

Rural development is the process of improving the quality of life and economic well-being of people living in rural areas, often relatively isolated and sparsely populated areas. Rural development has traditionally centered on the exploitation of land-intensive natural resources such as agriculture and forestry. However, changes in global production networks and increased urbanization have changed the character of rural areas. Increasingly tourism, niche manufacturers, and recreation have replaced resource extraction and agriculture as dominant economic drivers. For this reason there are a large variety of rural development approaches used globally. Rural development is a comprehensive term. It essentially focuses on action for the development of areas outside the mainstream urban economic system. We should think of what type of rural development is needed because modernization of village leads to urbanization and village environment disappears.

1.3 Detail study (Socio economic, physical, demographic and infrastructure details) of Ideal village Unai with photograph:

Physical, Socio economic and Demographical Details

Unai Census Town has total administration over 1187 houses to which it supplies basic amenities like water and sewerage. It is also authorize to build roads within Census Town limits and impose taxes on properties coming under its jurisdiction.

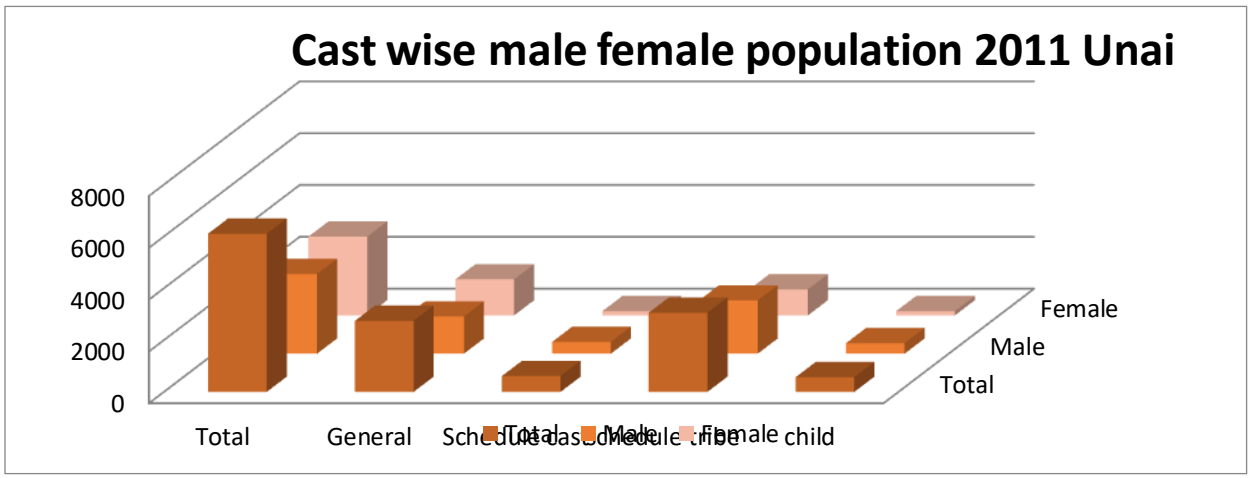
Unai is a Census Town city in district of dang, Gujarat. The Unai Census Town has a total population of 6104 of which 3,069 are males while,3045 are females as per the report released by Census India 2011.

Population of Children with age of 0-6 is 587 which is 12.03 % of total population of Unai (CT). In Unai Census Town, Female Sex Ratio is of 989gainst state average of 919. And Moreover Child Sex Ratio in Unai is around 835 compared to Gujarat state average of 890. Literacy rate of Unai city is 91.31 % higher than state average of 78.03 %. In Unai, Male literacy is around 91.52 % while female literacy rate is 79.85%.Out of total population, 2,151 were engaged in work or business activity. Of this1908 were males while 745 were females. In census survey, worker is defined as person who does business, job, service and cultivator and labor activity.

Unai Work Profile:

Out of total population, 2,151 were engaged in work or business activity. Of this1908 were males while 745 were females. In census survey, worker is defined as person who does business, job, service and cultivator and labor activity. Of total 2151 working population, 92.15 % were engaged in Main Work while 7.85 % of total workers were engaged in Marginal Work. Unai has 39% (2245) population engaged in either main or marginal works. 59% male and 18% female population are working population. 55% of total male population are main (full time) workers and 4% are marginal (part time) workers. For women 15% of total female population are main and 2% are marginal workers.

T-1.3- A Caste wise unai village population



T- 1.3 Unai Religion Data 2011

Particular	Details
Town	Unai
Population	**6104**
Hindu	**92.03**
Muslim	**7.82**
Christian	**0.06%**
Sikh	**0.00%**
Budhist	**0.01%**
Jain	**0.01%**
Other	**0.00%**
Not stated	**0.07%**

Unai Literacy :

Unai Local Language is Gujarati. Unai Village Total population is 6104 and number of houses are 1187. Female Population is 49.7%. Village literacy rate is 77.1% and the Female Literacy rate is 35.6%.Population of Children with age of 0-6 is 587 which is 12.03 % of total population of Unai (CT). In Unai Census Town, Female Sex Ratio is of 989gainst state average of 919.

T- 1.3 B Unai Village Infrastructure Facilities

Infrastructure facilities	Details
1. PHC	1
2. Government Hospital	1
3. Private Hospital/ clinic	7
4. CHC	1
5. Government dispensary	2
6. Anganwadi	3
7. Primary school (Eng. &Guj.)	6
8. Sec and high. Sec. school	3
9. ITI college	1
10. Private Tuitions	Available
11. Community hall	1
12. Library	1
13. Public garden	Closed Condition
14. Village pond	2
15. Handpump	Closed condition
16. Overhead tank	6
17. Assembly polling station	12
18. Post office	1
19. Panchayat building	2
20. U/G Sump	4
21. Polling Stations	4
22. Mahilamandal	8
23. Dairy	1
24. Nursing Home	1

25. Police station and jail	**1**
26. veterinary hospital	**1**
27. Small scale industries	**Near By 22**
28. Recreational Centre	**Chowk, temples and Play ground**
29. Bus station	**2**
30. Telephone exchange office	**No**
31. Electricity	**24/7**
32. Road network	**CC,RCC and Paver Blocks**
33. waste collection	**Daily**
34. Shops Approximately	**200**
35. Bank	**Co. Op. 1 and Gov. 2**
36. ATM	**3**
37. Local Transportation	**Available**
38. Gov. grocery shop	**5**

Fig-1.3 A Unai Village High School

Fig-1.3 B Unai Village Super Market

Fig- 1.3 C Bank of Baroda

Fig- 1.3 D Unai PHC

1.4 SWOT analysis of Ideal village / Smart Village

SWOT analysis (or SWOT matrix) is a strategic planning technique used to help a person or organization identify strengths, weaknesses, opportunities, and threats related to business

competition or project planning. This technique, which operates by 'peeling back layers of the company' is designed for use in the preliminary stages of decision-making processes and can be used as a tool for evaluation of the strategic position of organizations of many kinds (for-profit enterprises, local and national governments, NGOs, etc.). It is intended to specify the objectives of the business venture or project and identify the internal and external factors that are favorable and unfavorable to achieving those objectives. Users of a SWOT analysis often ask and answer questions to generate meaningful information for each category to make the tool useful and identify their competitive advantage.

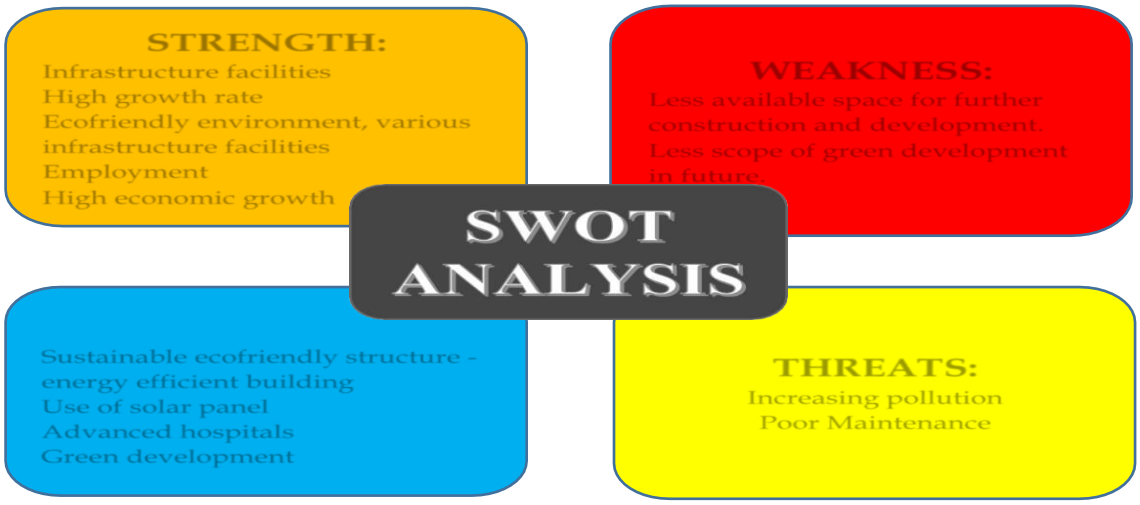


Fig-1.4 A SWOT Analysis

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

We have done an interaction with villagers and they have suggested some possible future prospects of development of the Unai village.We personally observed that things & those suggestions are as follows,

- Gas Pipelines
- Biogas Plant
- Cold Storage Area
- Rain Water Harvesting
- Solar Street Lights
- Working NGOs
- Public WiFi Facility

1.6 BenefitsofthevisitsofIdealvillage/SmartVillage

Almost all the civil benefits such as, Water supply network, Pucca roads, LED Street lights, Drainage network, Waste disposal, Water storage tanks, waste collection system were observed in the village. Apart from this, infrastructure facilities such as, schools, colleges, roads, post-office, banks, clinics, Public health center, bus stop, Public toilets, anganwadi, police station, community hall, places of recreational interest etc. are also present

- By visiting the village, we got an insight about:
  - The culture of a village.
  - Lifestyle of village
  - Socioeconomic conditions of village
  - Working of village governing bodies
  - Importance of infrastructure facilities
  - functioning of a village
  - amenities that are need by the village.

1.7 Civilaspectsrequiredin Idealvillage

We have observed the balance of commercial, residential and recreational land use in the Unai village but as per the feedback which were given by villagers some facilities are lacking in the village from civil aspects and these are, Gas Pipelines, Biogas Plant, Cold Storage Area, Rain Water Harvesting, Solar Street Lights, PublicWiFi Connection, Fire Station , etc.

Moreover, by providing skill development centers for the youth, panchayat should also focus on enabling the youth to setup the self-employment units. Water harvesting, Ground water recharge and improvement of village tanks/lakes are also projects to be pursued.

Chapter 2.
Waghai Village Literature Review – (Civil Concept)

2.1 Introduction: Urban & Rural village concept:

2.1.1 Urban village concept:

The urban village is an area occupied by the urban community that lives and resides in the urban environment as a group or in certain group which was formed or naturally due to urbanization. The formation of the urban village concept is based on two circumstances, which is due to the effects of urbanization and the result of the urban village formation concept brought about by the planning and strategy of re-developing the urban area. Hence, the urban village formation concept must take into consideration the basic characteristics of the urban village environment, which consist of its geography, background of the village, type of village, the position or status of the village, traditional practices and culture, local organizations, certified status of the land title and the land, distance from the city cent government reserve land were not included in the definition of the urban village concept because this type of settlement does not have certified characteristics of a land title. The operational definition is important as it determines the scope and study sample that can be used in future.

According to census of India 2011 the definition of urban area is :

- A place having minimum population of 5000.
- Population density of 400 persons per sq kilometer or higher.
- 75% plus of the male working population involved in non -agricultural employment activity.

2.1.2 Rural Village Concept:

Rural areas are also known as the 'countryside' or a 'village' in India. It has a very low population density. In rural areas, agriculture is the chief source of livelihood along with fishing, cottageindustries, pottery etc. The quest to discover the real rural India still continues in great earnest. Almost every economic agency today has a definition of rural India. Here are a few definitions: According to the Planning Commission, a town with amaximum population of 15,000 is considered rural in nature. In these areas the panchayat makes all the decisions. There are five people in the panchayat. The National Sample Survey Organization (NSSO) defines ‘rural’ as follows:

- An area with a population density of up to 400 per square kilometer,
- Villages with clear surveyed boundaries but no municipal board,
- A minimum of 75% of male working population involved in agriculture and allied activities.

2.2 Importance Of The Rural Development :

2.2.1 Importance of the Rural development

Rural development is the process of improving the quality of life and economic well-being of people living in rural areas, often relatively isolated and sparsely populated areas.

Rural development has traditionally centered on the exploitation of land-intensive naturalresources such as agriculture and forestry. However, changes in global production networks and increased urbanization have changed the character of rural areas. Increasingly tourism, niche manufacturers, and recreation have replaced resource extraction and agriculture as dominant economic drivers. The need for rural communities to approach development from a wider perspective has created more focus on a broad range of development goals rather than merely creating incentive for agricultural or resource based businesses. Education, entrepreneurship, physical infrastructure, and social infrastructure all play an important role in developing rural regions. Rural development is also characterized by its emphasis on locally produced economic development strategies. In contrast to urban regions, which have many similarities, rural areas are highly distinctive from one another. For this reason there are a large variety of rural development approaches used globally.

2.2.2 Need for Rural Development in India :

The rural economy is an example of an agrarian economy. Although farming and agriculture are one of the most important primary activities, the problem lies in the fact that they share in the GDP of the agriculture sector is on a constant decline. At the same time, about two-thirds of India's population depends on agriculture. As a result, the productivity is not up to the mark, with conditions only getting worse.

Moreover, public investment declined since 1991 coupled with a lack of adequate infrastructure, credit, transport, employment, etc. Henceforth the agricultural output has grown at only 3.2% during 2007- 2011. All these factors have been denting the process of development. Therefore, there is a need to focus on rural development and not just urban development.

2.3 Ancient Villages / Different Definition of Rural Urban Villages:

Rural area :

A rural area is a land outside the densely populated urban areas in a city or town. They have low population density, large open areas, lower standard of facilities etc. The primary industry in such area is agriculture**.**

Characteristics of rural area are:

- Lower literacy rate.
- Lack of educational facilities.
- Lack of good health infrastructure.

- Less population density.
- Migration in search of opportunities.

Village definition

- Village is a clustered human settlement or a community, larger than a hamlet but smaller than a town, with a population ranging from a few hundred to a few thousand.
- Villages are normally permanent with fixed dwellings.

Characteristics of a village:

- Village have population between 500 and 10000.
- The villagers managed their own affairs through the traditional institution of Panchayat. The central government had neither inclination nor the means for interfering with the self- government of villages.
- Village has the atmosphere of simplicity, calmness and peace. There is no noise and little sophistication.
- The poverty and illiteracy of the village people.

2.4 Scenario:Rural/UrbanvillageofIndiapopulationGrowth

The urban population of India has seen a rise from 17.1 per cent to 29.2 per cent between 1950 and 2015. Meanwhile, the rural population declined from 82.9 per cent (in 1915) to 2015's 67.2 per cent. The speculation for the year 2050 suggests that the urban-rural segregation will be 52.8 and 47.2 with a difference of 5.6 per cent. The population growth rates in both urban and rural areas suggest a similar story. The urban rate has consistently overpowered the total population growth rate over the last seventy years. This trend is set to continue for the next 30 years.

T-2.4A Population Of India As Per Census 2011

POPULATION	Total	1,210,854,977
	Males	623,724,568
	Females	586,469,294
LITERACY	Total	74% Males Females
	Males	82.10%
	Females	65.46%
DENSITY PIPULATION	Per Km2	382
SEX RATIO	Per 1000males	940 females
CHILD SEX RATIO	Per 1000males	914 females

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

The population of waghai village about 10000 peoples. The waghai Census town has population of 6,715 of which 3403 are males while 3,312 are females as for report released by census india 2011.population of children with age of 0-6 is 752. Waghai is a large village located in The Dangs Taluka of The Dangs district, Gujarat with total 1,308 families residing. The Waghai village has population of 6,715 of which 3,403 are males while 3,312 are females as per Population Census 2011.

In 2011,literacy rate of Waghai village was 84.12% higher than state compared to 78.03 % of Gujarat. In Waghai Male literacy stands at 90.43 % while female literacy rate was 77.60 %.

T-2.5A population details of Gujarat as per census 2011

DESCRIPTION 2011 2001		
Approximate Population	**6.04 Crores**	**5.07 Crore**
Actual Population	**60,439,692**	**50,671,017**
Male	**31,491,260**	**26,385,577**
Female	**28,948,432**	**24,285,440**
Population Growth	**19.28%**	**22.48%**
Percentage of total Population	**4.99%**	**4.93%**
Sex Ratio	**919**	**920**
Child Sex Ratio	**890**	**883**
Density/km2	**308**	**258**
Density/km2	**798**	**669**
Area(Km2)	**196,244**	**196,024**
Area mi2	**75,770**	**75,685**
Total Child Population (0-6 Age)	**7,777,262**	**7,532,404**
Male Population (0-6 Age) Female	**4,115,384**	**4,000,148**
Population (0-6 Age)	**3,661,878**	**3,532,256**

T-2.6 A Population Details OfWaghai Village

Particulars	Total	Male	Female
Total No.Houses	1308	_	_
Population	6,715	3,403	3,312
Child(0-6)	752	373	379
Schedule caste	111	49	62
Schedule tribe	3,842	1,947	1,895
Literacy	84.12%	90.43%	77.60%
Total worker	2,178	1,680	498
Main worker	1,768	1,480	288
Marginal worker	410	200	210

2.6 Rural Development Issues - Concerns – Measures :

The population of waghai village about 10000 peoples. The waghai Census town has population of 6,715 of which 3403 are males while 3,312 are females as for report released by census india 2011.population of children with age of 0-6 is 752. Waghai is a large village located in The Dangs Taluka of The Dangs district, Gujarat with total 1,308 families residing. The Waghai village has population of 6,715 of which 3,403 are males while 3,312 are females as per Population Census 2011.

In Waghai village population of children with age 0-6 is 752 which is up 11.20 % of total population of village.Average Sex Ratio of Waghai village is 973 which is higher than Gujarat state average of 919.

2.6.1Crime Free / Dispute Free

- The types of crime that commonly occur in Indian villages include dacoity, robbery, agricultural funds , disputes over : land , irrigation , cattle, election rivalries. Further crimes such as un-touch ability offences, insurgency, domestic violence etc. also prevail in the villages.
- Therefor it may be suggested that to tackle the problem of village crimes and disputes, a separate rural wing of police can be established. The rural police should be provided training which is needed for welfare activities.

2.6.2 Literacy

- Literacy is traditionally understood as the ability to write, read and use arithmetic. Literacy is the key to human progress in development.

- The Literacy rate of Waghai village is 71.80% which is lower than Gujarat which has a literacy rate of 78.03%.

2.6.3 Resources

- Various natural resources like wind, water from lakes, ponds and rivers are available in Waghai village.
- Generally all the villages have easy access to crops and food items used in daily life. But some resources are not available easily in waghai village. For this village needs to dependent on other villages or cities which are sometimes not easily accessible . monetary factor plays an important role in this.
- Previous studies have found that resource dependence strongly decreases with income. Efforts to improve the village natural resource base would help the poorest of the poor.

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

The importance of infrastructure for economic growth and development in rural area can hardly be overemphasized in a developing economy like India. With poor rural infrastructure, even a marginal improvement in its quantity and quality could significantly improve economic development and human well-being. Improving basic infrastructure, such as roads, transport, electricity, telecommunications, housing, health, water and sanitation, is essential for development and well-being of the rural population. The development of rural infrastructure could promote economic growth, improve the standard of living of the population and reduce the incidence of poverty by generating both farm and non-farm employment and earning opportunities, increasing productivity, providing access to basic goods and services and improving the health and physical condition of people. Empirical studies also report a strong relationship between infrastructure, economic growth, rural development and poverty reduction. In spite of the crucial importance of infrastructure, significant deficiencies have persisted in rural infrastructure across Indian states. The quantity and quality of infrastructure facilities are substantially lower in rural areas than in urban areas. A relatively low density of population, low household incomes and the absence of scale economies are considered to be challenges to the expansion of basic infrastructure facilities in rural areas**.**

Scope for development of rural infrastructure in India :

As per the road statistics published by central government for the year 2012-13, rural roads span 60.39 km of every 100 km. The sad part is that most of these rural roads in the country are in bad shape i.e., they are of poor quality, potholed and unable to withstand the loads of heavy farm equipment, thereby, affecting the rural population's quality of life and ability of the farmers to transport their produce to the market. Further, the rural surfaced road is just 33 per cent of the total rural road network in India and remaining are kutcha roads which are highly vulnerable and

inaccessible particularly during the rainy season. Thus, there is increasing need for surfaced rural roads in the country.

Living conditions of people in rural areas has still not improved much and there are majority who live in kutcha houses which are highly vulnerable to rainfall, wind blow, fire and other environmental hazards. Hence, good rural housing infrastructure is needed in the country

As per the Census 2011, still 45 per cent of the rural households are not connected with electricity and depend on kerosene and other means for lighting. Hence, rural electrification infrastructure is needed to make the lives of rural people better.

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

Smart Home Activities: A Literature Review

The increasing interest in smart home technologies has created a need for a comprehensive literature survey. This article reviews the goals of a smart home energy management system, along with related definitions, applications, and information about the manufacturing of its components. The challenges associated with smart home energy management systems and possible solutions are examined, and the energy factors that contribute to a customer's electricity bill are discussed. A number of price schemes and the load models needed for solving related scheduling optimization problems are also presented, including a review of the literature related to energy management system scheduling with respect to its control, automation, and communication.

Introduction

A smart home incorporates sensors, actuators, middleware, and a network [1] and has two major interacting components: a smart network and a smart load [2]. The primary objectives of a smart home are to increase home automation, facilitate energy management, and reduce environmental emissions. Home automation can be improved through an improved communication network that involves a twisted pair power lines, radio signals, or fiber optics in a bus-based network or an internet protocol as standards.

Home Automation

Although smart devices have been available in the past, their use has been restricted because they lack intercommunication. One suggested solution is to connect all smart devices using hard wiring. Smart home network technology has been deployed in different systems, such as powerline and radio frequency systems [4]. These developments enable the deployment of a network in smart devices but only with a high associated cost that has itself become a new challenge.

Energy Management

The primary factors in smart home energy management include efficient home appliance design, improved customer awareness, participation in DSM programs, and the use of an EMS.With

respect to appliance design, in the authors observed that the average energy efficiency of appliances is below best practice levels because of delays in replacing older, less-efficient electronics with new efficient electronics and because customers fail to remember energy consumption when purchasing an appliance.

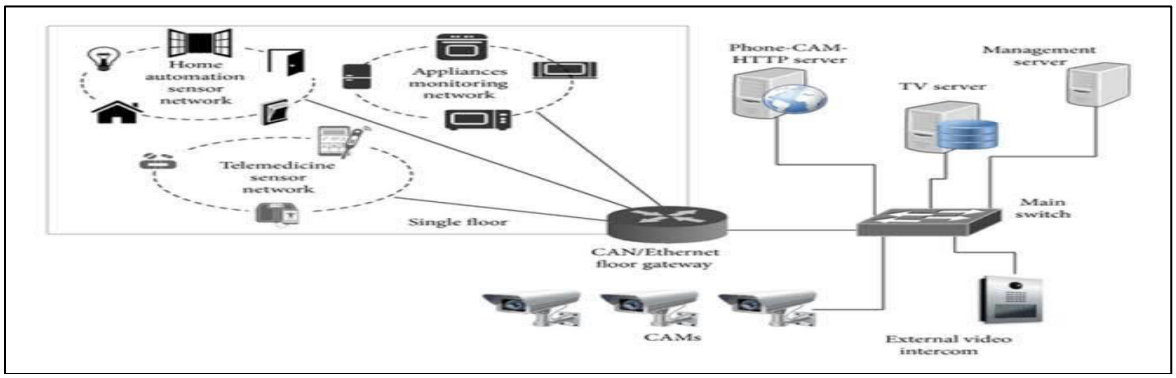


Fig-2.8 A Smart Home System

Smart meters are thus essential, and they are now employed in most Canadian houses for measuring hourly consumption; however, customers may not be aware of how much energy a watt represents. Clarifying this concept for the customer requires that the cost be provided in equivalent dollars, but even with the $/KWh value posted on the electricity provider's website, not all customers regularly track their actual consumption.

Environmental Emissions Reduction

.

Emissions are the major cause of global warming; since electricity generation produces 40% of carbon dioxide (CO2) emissions dependency on fossil fuels should be reduced, which is achievable with the use of renewable energy (solar and wind) and with a reduction in electricity use through the monitoring and controlling of customer consumption and the conversion of older home appliances to smart, energy-efficient versions.

2.9 Other Projects / Schemes of Gujarat / Indian Government :

Rural development is a process of improving quality of life and economic status of people living in villages. Education, entrepreneurship, physical infrastructure and social infrastructure also play a role in developing the rural regions.

- Pradhan Mantri Gram Sadak Yojana.
- Swarnjayanti Gram Swarozgar Yojana (SGSY)
- Prime Minister Rural Development Fellows Scheme.

Rural development implies both the economic betterment of people as well as greater social transformation. In order to provide the rural people with better prospects for economic development.

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

3.1 Introduction: Concepts, Definitions and Practices :

We have selected the smart village as punsari . It is located in Sabarkatha. We have visited the Punsari Village.

Punsari is located approximately 80 kilometers away from the state capital of Gandhinagar in Gujarat. It has had phenomenal success in the past decade under the leadership of a visionary and missionary Sarpanch (village headman) Mr. Himanshu Patel (who served as the Sarpanch from 2006 to 2016). The village has received several awards from the state as well as national government for its outstanding achievements and has become extremely popular across the country. This was the most important reason that motivated the author to visit and study this model village personally, to understand and explore how this transformation was made possible. The village has 23 communities with a population of 6000, including only 350 people living below the poverty line. Most of the people in the village are dependent on agriculture and milk production for livelihood. The major crops cultivated in the village are cotton, wheat, and potato. The trajectory of development can be broadly divided into five headings. Infrastructure Development. A public address system with 120 waterproof speakers for announcing information and spreading messages has been another striking feature of this village. There are also plans to do GIS mapping for the better implementation of many government schemes. Some of the popular national banks and their ATM centers are now available as well. Education.

Civil Practices:

Procurement The procurement practice involves:

- Selecting Appropriate Method for Construction Management
- Selection of Best team for the design
- Selection of best team to deliver

Partnering

- When compared to the traditional approach of working, the partnering is an different working style. This takes a collaborative approach in working. It has been proved through great projects that working through partnering helps in achieving

  - Greater value of money
  - Higher Profits for the company
  - Quality Improvement

Risk Management:

- Risk in projected are always expected and it is necessary to maintain a "risk register". This will help to enter all the risk faced from the starting of the project to its end. Along the risk encountered, the method used to manage is also recorded. This helps to be applied in other projects. Risk assessing and analyzing will help to assign appropriate actions to different project team. The risk assessment is an activity that have to be performed in a regular basis and in no case be ignored.

Value Management

- This key practice takesinto account time, cost and risk constraints, in order to meet the client's business needs. The method of value management will involve complete collaboration with the team. The team is in charge of design and delivery of the project. This team will also include the end-users and the stake holders. Value management is a systematic approach.

Benchmarking

- This method is practiced by comparing with other completed projects. The performance of different projects are compared each other. The lessons from each project is used to make best performances for new projects. Benchmarking is a method that improves the performance of the project in a logical and systematic way.

Whole Life Costing

- Here, the cost of ownership is measured of a building. This will take into consideration the sum of: Initial Capital Cost for making the buildingCost of maintenance of the buildingCost of servicing the building The cost of maintenance of the building is practically more when compared to the initial capital cost. This make the whole life costing an essential practice in construction.

3.2 Vision-Goals, Standards and Performance Measurement Indicators:

Smart city development vision- Goals - activities:

- India is a rural dominated country and villages are said to be the heart of this nation. According to 2011 Census, the population of rural areas comprised of 68.84 per cent. Migration of the people from rural areas to urban areas causes some burden on the urban areas. If the vision of the founders of this nation is to be respected and implemented, then we all need to have the responsibility to make our villages smart, which means self-sufficient, efficient, healthy and educated villagers. To make the villages smart means to make the country self-reliant, stronger and secured. India lives in its villages. Villages are the food basket of the nation. Village Panchayats are the centers of grass root democracy. However, the holistic development of rural India is still under tremendous pressure owing

to the declining farm output, increasing trend of distressed migration, absence of basic amenities and emerging problems of environmental pollution and conflicts.

- Identify the transportation challenges and needs of the citizen and business community and demonstrate how advanced technologies can be used to address issues in safety, mobility, and climate change, now and into the future.
- Examine the technical, policy, and institutional mechanisms needed for realizing the potential of these strategies and applications – including identifying technical and policy gaps and issues – and work with partners to address them.
- Assess reproducibility and qualify successful smart city systems and services for technology and knowledge transfer to other cities facing similar challenges.

3.3 Technological Options:

- Human society is developing with rapid momentum and achieved various successes for making its livelihood better. The civilization is witness for various changes related to its development through different catalysts like industrial development, green revaluation, science and technology, etc. India has more than 72% of its population living in villages. Near about seven decade had been passed since India got freedom, but the scenario in villages in our country is still unchanged. On one side India has recently selected 100 cities for Smart City project and ready to adapt all the advanced technologies for these smart cities and on other hand villages in our country are still struggling for getting basic amenities like 24 x 7 electricity. On one hand 4G internet technology is being utilized all over the urban areas but on other hand villages in our country are still searching for genuine mobile networks. Thus new concept of smart villages can be introduced to make heaven in the heart of our India, because real Bharat is recognized by the villages in our country.

- **Various technologies for developing smart villages :**

  Following various techniques can be promoted improving the life of people in villages and for actual development of smart villages.

  - Enhanced Use of Smart Phones and Optical Fiber Technology for Internet Techniques
  - Online Library and E- Education
  - Smart Agriculture
  - Smart and Efficient Public Transport System
  - Smart Sewage Management System and Sanitation
  - Renewable Energy Sources and Solar Energy

3.4 Road Map and Safe Guards:

- Mahatma Gandhi said, "the future of India lies in its villages". Despite government's focus on villages for many decades, villages remain poorly serviced and governed. India has been an agricultural economy yet the sector is still not a well-paying livelihood option. Generating new avenues of employment in villages, reviving agriculture and improving services in rural areas are some of the components that need to be included right away in rural development policies. The visual perception of Indian villages has not changed much though certain corrective policy measures and infrastructural reforms have taken place. Governments need to transform our villages into smart habitats by generating lucrative economic opportunities and addressing the basic challenges rural areas are facing for decades. Delhi and Mumbai add almost 200 migrants every day. A combination of factors like agriculture becoming less remunerative, poor civic services, defunct infrastructure, and unavailability of good career opportunities has accelerated the migration from rural areas to cities. Globally the concept of 'Smart City' is a significant initiative that seeks to improve the quality of life of urban citizens. In India to the new central government's stated priority of building 'Smart Cities' has found a relatively modest budgetary allocation of Rs. 7,060 crore for FY 2014-15, though its significance for the long term can be much larger. Be it the push of the 'Smart City' concept from solution providers, real estate developers or the government itself, the concept finds wide appeal..

3.5 ISSUES & CHALLENGES

3.5.1 Key issues in development of human being

1. Misuse of resources - We have been misusing resources because we do not know why it matters and what it does in the long run. It does not even comes to mind as we have been doing all our lives. This includes money.
2. Technological evolution - It has taken a dangerous turn and will come to bite us in the ass. The process has already started, things we used to see in movies are becoming bitter truth of the society. We want comfort, ease and we are getting it at the cost of our civilization. Simple examples - Social Media and Mobile Phones.
3. Religion and belief system - If only our ancestors were wise and had a long vision, they would not have dared to write holy books. Mostly, we believe what our society believes without thinking or reasoning. It has taken away our freedom and turned us against each other.

3.5.2 Education / Job opportunities development

1. Lack of funds: The lack of sufficient funds is the main problem in the development of education. Outlay for education in Five Year Plans has been decreasing. Due to insufficient funds most educational institutions lack infrastructure, science equipment and libraries etc. Due to this reason, desired results cannot be achieved.

2. Expensive higher education: University, professional and technical education has become costly in India. Fee structure of technical and professional institutes like IIM's is quite high IIM's charge Rs. 2 lakh per semester for MBA classes. It is beyond the reach of common man. Privatization of higher education has led to the growth of profit hungry entrepreneurs. Now a day's higher education is much costly affair.
3. Neglect of Indian languages: The medium of instruction particularly in science subjects is English. So rural students who are not well versed in English, cannot study science properly in English. They suffer a lot; Indian languages are still under developed. Standard publications are not available in Indian language.
4. Problem of Brain drain: When intelligent, talented and deserving candidates do not get suitable jobs in the country, they prefer to go abroad for seeking jobs. So our country is deprived of good talent. This phenomenon is called 'Brain drain'.

3.5.3 Urban water and sanitation challenges

- For urban India, the situation is critical. In 2015, about 377 million Indians lived in urban areas and by 2030, the urban population is expected to rise to 590 million. Already, according to the National Sample Survey, only 47% of urban households have individual water connections and about 40% to 50% of water is reportedly lost in distribution system due to various reasons. Further, as per the 2011 census, only 32.7% of urban Indian households are connected to a piped sewerage system. When distribution becomes challenging, the workaround is to tap ground water. According to a study by the Centre for Science and Environment, 48% of urban water supply in India comes from ground water. Ground water exploitation for commercial and domestic use in most cities is leading to reduction in ground water level.

3.6 Smart Infrastructure - Intelligent Traffic Management :

- Intelligent Traffic Management System for Smart Cities: In present-day times, the number of vehicles has increased drastically, but in contrast, the capabilities of our roads and transportation systems still remain underdeveloped and as a result, fail to cope with this upsurge in the number of vehicles. As a consequence, traffic jamming, road accidents, increase in pollution levels are some of the common traits that can be observed in our new age cities. With the emergence of the Internet of Things and its applicability in Smart Cities, creates a perfect platform for addressing traffic-related issues, thus leading to the establishment of Intelligent Traffic Management Systems (ITMS).
- **Smart Infrastructure**:
    - Social Health Indices: The number of businesses per ten lakh population can form a city's level of economic activity and economic performance. It provides a single indication of the business climate in a jurisdiction, and attitudes towards entrepreneurship. The unemployment rate is measured by taking the unutilized labor supply and then tracks business cycles. It is measured in terms of working-age city residents who during the survey period were not considered in paid employment or

self-employment and were searching for work divided by the number of total labor force.

- Electricity: All the electrical lines will be present underground by not disturbing aesthetics of a place or making any kind of nuisance. The power generated will be available from renewable sources like wind energy farm, hydroelectric plant or natural gases will also be used for not exhausting natural resources.
- Transportation: An entire intermodal transport available to all at affordable rate with minimum time delay and maximum possible comfort. It has an elaborated recommendation to keep track of transport facilities such as high capacity public transport and light passenger transport The results will be expressed in annual number of public transport trips per capita and ridership of public transport.

3.7 Cyber Security:

- Securing smart cities is a not-for-profit global initiative which aims at solving the existing and future cyber security problems of smart cities through collaboration between companies, government, media outlets and individuals across the world. Over the past few years, Technology has begun to play an important role in our daily lives. Internet enabled gadgets have changed the way in which we work or do our daily chores. Digitization has an impact on personal lives, education, health, government and national security. Due to increase in complexity of smart city systems and globally connected social, economic, political systems, etc. has increased vulnerability of security of a city. The cyber threats have amplified due to infinite supply of data. Smart surveillance technology or analytics to manage the crowd, traffic, cyber security, data privacy, building codes to manage natural/man-made disasters, etc. are some parameters that would make a city safe.
- Standards are evolved for all these potentially connected systems. This will lead to improve in quality in life. Smart Transportation will also provide an access to a web of connected data from GPS location. Integrated systems and cyber security will aid public safety. We examine two important challenges: Security and Privacy.

3.8 Initiatives in village development by local self-government:

- The institutions of Local Government have flourished in India since time immemorial. The Panchayats or Village Governments, as they were called, were ancient institutions and were themselves small republics. They exercised power in various spheres such as industrial, commercial, administrative, and social including civic education and religious functions. It was also suggested to cover all the Towns and Cities having a population of over one lakh under the scheme of planning in an organic way. The maintenance of the Accounts of the Municipalities and other audit shall be done in accordance with the provisions of the State law. There shall be constituted in every State at the District level a District Planning Committee to consolidate the plans prepared by the Panchayats and the Municipalities in the District and to prepare a Draft Development Plan for the District.

3.9 Smart Initiatives by District Municipal Corporation :

- Talking about the smart city initiative by Vadodara district the goal of the initiative is " Smart utilization of Vadodara city's potential for enhancing quality of life for the citizens of providing equal access to best quality physical infrastructure , social infrastructure and mobility through leveraging state of the art and technology : thus making Vadodara a futuristic Global city with focus on enhancing economy , protecting the ecology and preserving the identity and culture of the city".
- The initiatives taken by Vadodara Municipal Corporation are :
    - Solar roof Panels
    - Green Vadodara campaign
    - Integrated command and control center.
    - Installation of CCTV Cameras
    - Installation of smart toilets
    - Installation of public wi-fi
    - Parking encroachment drive

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

- Digital India Initiative : The initiative comprises of several projects which will focus on better governance, knowledge and universal phone connectivity across the country.
    - Digital Locker
    - MyGov.in
    - E-Sign Framework
    - Swatchh Bharat Mission mobile app
    - National Scholarship Portal
    - E-Hospital
    - Digitize India Platform
    - Bharat Net
    - Wi-fi Hotspots
    - Next Generation Network
    - Electronics Development Fund
    - Centre of Excellence on Internet of Things (IoT)

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

- Smart Environment Smart villages can be stewards of the environment aided by technologies to monitor key environmental indicators such as forest health, water quality, soil conditions and changes to the landscape. They can also reduce pressure on deforestation using efficient cook stoves to decrease the need for traditional biomass energy sources such as charcoal and wood a key driver of unsustainable forest use. Smart villages can host community-run recycling facilities ranging from those equipped to recycle wastewater and organic waste from agro -processing, to next-generation facilities for the recycling of e-waste, including energy-storage and generation technologies such as batteries and solar panels. Depending on geographical endowments, some smart villages will be able to operate as regional ecotourism hubs, an activity that can improve the welfare and connectivity of rural and urban communities. There formentioned Villages have all emerged as Smart Villages but only in a particular domain. It's not holistic in nature. However, the pressing need of hour is to have a Smart Village with all sorts of comprehensiveness in it.Smart villages can host community-run recycling facilities ranging from those equipped to recycle wastewater and organic waste from agro -processing, to next-generation facilities for the recycling of e-waste, including energy-storage and generation technologies such as batteries and solar panels.

Smart cities revolution to boost employment in India

- Government of India's 'smart cities mission', a flagship initiative, is aimed at developing 100 sustainable and citizen friendly cities across the country. Each of these smart cities will be a key driver of economic growth boosting the GDP of the country and creating multiple new-age employment opportunities. With increased urbanization, urban areas are expected to house 40 per cent of India's population and contribute to over 75 per cent of India's GDP by 2030. This calls for large scale infrastructural development which is not just physical and institutional but also social and economic infrastructure. Only then would these cities will attract investments leading to continuous growth and development.

Chapter 4.
WAGHAI VILLAGE

4.1 INTRODUCTION

4.1.1 Introduction About Waghai Village Details

- The population of Waghai village about 10000 peoples. The waghai Census town has population of 6,715 of which 3403 are males while 3,312 are females as for report released by census india 2011.population of children with age of 0-6 is 752.
- Waghai is a large village located in The Dangs Taluka of The Dangs district, Gujarat with total 1,308 families residing.

T-4.1 A Basic Details Of Waghai Village

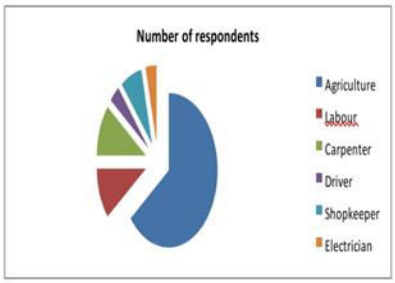
WAGHAI VILLAGE	OVERVIEW
State	Gujarat
District	Dang
Government type	Taluka Panchayat
Population	10,000 (Approx)
Languages	Gujarati, Hindi
Time Zone	Utc+5:30(Ist)
Pin	394730
Vehicle Registration	Gj
Nearest City	Navsari
Legislative Constituency	173-Dang
Parliamentary Constituency	Valsad

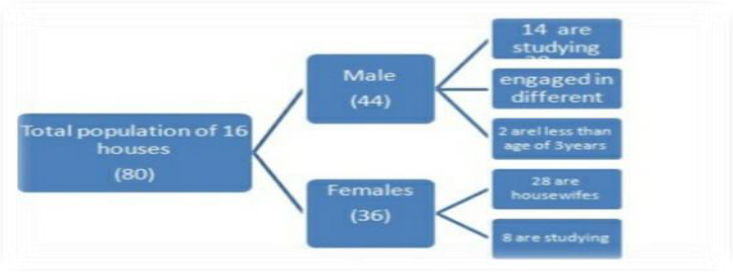
4.1.2 Working Population as per Census 2011

- As per constitution of India and PanchayatRaj Act, Waghai village is administrated by Sarpanch (Head of Village) who is elected representative of village. In Waghai village out of total population, 2178 were engaged in work activities. Total workers of town are 2178 Of which 1680 are male workers and 498 are female authorities.

T-4.1 B Waghai Village Population Details

WAGHAI VILLAGE POPUALATION DATA			
PARTICULARS	TOTAL	MALE	FEMALE
TOTAL NO OF HOUSES	1,308	-	-
POPULATION	6,715	3,403	3,312
CHILD(0-6)	752	373	379
SCHEDULED CASTE	111	49	62
SCHEDULED TRIBE	3,842	1,947	1,895
LITERACY	84.12%	90.43%	77.60%
TOTAL WORKER	2,178	1,680	498
MAIN WORKER	1,768	1,480	288
MARGIONAL WORKER	410	200	210





4.1.3 Justification/ need of the study:

- Almost 69% of our population lives in villages and the need to be provided with the best of facilities and lifestyle to take India forward as a country. Being future civil engineers it is our duty to observe even the smallest issue and work towards its improvement. Even if a small amount of people migrate from villages to cities the pressure on the city increases, be it : overcrowding, pollution, traffic etc., this affects the whole nation Migration occurs mainly due to job opportunities and better facilities like hospitals, educational facilities etc. provided in urban area. To increase liveliness of village by providing good sanitation facilities, good infrastructure, basic requirements like pucca houses or awaas, water supply etc. are required considering the environmental and need of people.

4.1.4 Study Area (Broadly define) :

- Waghai is a large village located in The Dangs Taluka of The Dangs district, Gujarat with total 1,308 families residing. The Waghai village has population of 6,715 of which 3,403 are males while 3,312 are females as per Population Census 2011.
- In Waghai village population of children with age 0-6 is 752 which is up 11.20 % of total population of village. Average Sex Ratio of Waghai village is 973 which is higher than Gujarat state average of 919

- As per constitution of India and PanchayatRaj Act, Waghai village is administrated by Sarpanch (Head of Village) who is elected representative of village. In Waghai village out of total population, 2178 were engaged in work activities. Total workers of town are 2178 Of which 1680 are male workers and 498 are female authorities.

4.1.5 Objectives of the Study :

- Basic Social infrastructure Health and Education facilities should be provided and ensure proper delivery of facilities to village dwellers.
- Promote integrated development of rural areas with provision of quality housing, better connectivity, employment opportunities and supporting physical and social infrastructure.
- Reduce migration from rural to urban areas due to lack of basic services and sufficient economic activities in rural areas.
- Internal roads within village settlement, Efficient Mass Transportation systems to improve connectivity between urban and rural areas, Public transportation facilities that need to be developed like bus stops, transport depot etc.
- Electricity connections like street lighting that is energy efficient and eco-friendly
- To provide sanitation for all Economy generation is the key pillars that the concept hinges on which should be introduced to village.

4.1.6 Scope of the Study:

- Reduce migration and decrease poverty in to village due to improvement given below content by using and following village development plan:
  - Micro, Small and Medium Scale Industries
  - Irrigation Development
  - Domestic Water Resource Development
  - Power and Energy Utilization
  - Educational Programs and Services
- India is agriculture country, about sixty percent of total population lives in village; they migrate to city for job and urban facility. This is useful to find the Actual requirement of village.
- The study will focus the development trend, intensity of growth of the village, and find out the problems related to the Socio- Cultural or physical development of the area, social infrastructure services, and the administrative systems of the village.

4.1.7 Methodology Frame Work for development of your village

- Method for development of village
  - Literature Review

- Visit of Ideal Village of Respective District
- Data Collection- Techno economic survey
- Data Presentation
- Sustainable Design Planning Proposals (Rain water harvesting, Biogas plant, waste to energy models, eco sanitation, Renewable Energy sources Application & Other)
- Repair & Maintenance of Existing Infrastructure Facilities Suggestions and Recommendation
- Gap Analysis (Guidelines, Regulation and Literature will be given for comparison)
- Physical Infrastructure Facilities

4.1.8 Available Methodology for development of related to Civil :

➢ Methodology:

- Design objectives
- Technical approach
- Proposed sustainability features
- Identify customer needs
- Identify local/state/federal engineering and construction specifications
- Project management structure

➢ Objects which were available in the Waghai village were, Panchayat Building, Water Tank, Underground Sump, Post Office, Approach and Internal Road, Public Library, RO Water Plant, Dairy, Primary School, Anganwadi, Dharmshala, Government Grocery Shop, Village Temples, etc.

4.1 C Waghai Village Census Details

CENSUS PARAMETER	CENSUS DATA
Total Population	6,715
Total No of Houses	1308
Female Population	3403
Total Literacy rate %	84.12%
Female Literacy rate	77.60%
Scheduled Tribes Population %	3,842
Scheduled Caste Population %	111
Working Population %	2,178
Child(0 -6) Population by 2011	752
Girl Child(0 -6) Population % by 2011	379

4.2 Waghai Village Study Area Profile

4.2.1 Study Area Location With Brief History And Land Use Details

- Waghai is a town in the Dang District of the southern part of Gujarat state in India. And also Taluka of dang district. Waghai is about 32 km west of the district headquarters of Ahwa, and about 52 km north-west of the hill station of Saputara. Vansda, Chikhli and Bilimora are located westerly. It is linked by state highway to the town of Chikhli (where the road meets National highway 8), and by a narrow gauge to the town of Bilimora

T-4.2 A connectivity of Waghai village

CONNECTIVITY OF WAGHAI	
TYPE	**STATUS**
Public Bus Service	Available within village
Private Bus Service	Available within 10+ km distance
Railway Station	Available within village

T- 4.2 B Waghai Village Land Use Details

Particulars	Total	Male	Female
Total No. of Houses	1,308	-	-
Population	6,715	3,403	3,312
Child (0-6)	752	373	379
Schedule Caste	111	49	62
Schedule Tribe	3,842	1,947	1,895
Literacy	84.12%	90.43%	77.60%
Total Workers	2,178	1,680	498
Main Worker	1,768	1,480	288
Marginal Worker	410	200	210

- Waghai is a large village located in The Dangs Taluka of The Dangs district, Gujarat with total 1,308 families residing. The Waghai village has population of 6,715 of which 3,403 are males while 3,312 are females as per Population Census 2011.

- Waghai is a town in the Dang District of the southern part of Gujarat state in India. And also Taluka of dang district. Waghai is about 32 km west of the district headquarters of Ahwa, and about 52 km north-west of the hill station of Saputara. Vansda, Chikhli and Bilimora are located westerly.

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

- According to Census 2011 information the location code or village code of Waghai village is 522842. Waghai village is located in The Dangs Tehsil of The Dangs district in Gujarat, India. The Dangs is nearest town to Waghai village.

Map detail

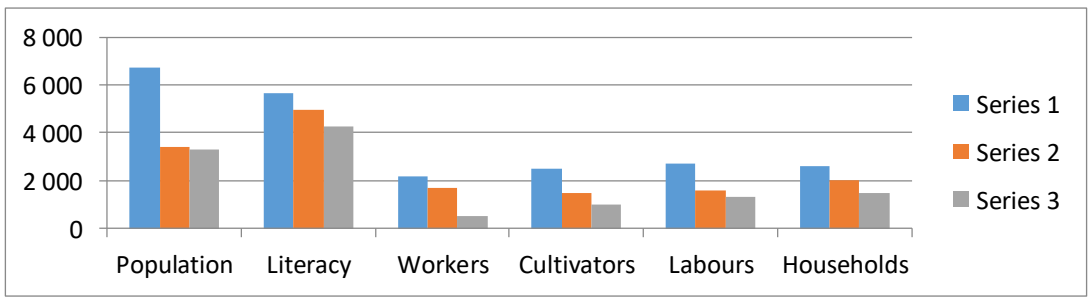
- Village Name -: Waghai
- Taluka Name -: Waghai
- District -: Dang
- State -: Gujarat
- Pin code -: 394730

Fig-4.2 A- Waghai Village Location Map

4.2.3 Physical & Demographical Growth

- The population of waghai village about 10000 peoples. The waghai Census town has population of 6,715 of which 3403 are males while 3,312 are females as for report released by census india 2011.population of children with age of 0-6 is 752. Waghai is a large village located in The Dangs Taluka of The Dangs district, Gujarat with total 1,308 families residing.
- The Waghai village has population of 6,715 of which 3,403 are males while 3,312 are females as per Population Census 2011.In Waghai village population of children with age 0-6 is 752 which is up 11.20 % of total population of village. Average Sex Ratio of Waghai village is 973 which is higher than Gujarat state average of 919

T -4.2 C- Waghai Village Population Chart



4.2.4Economic generation profile / Banks:

- The major sources of income are:
  - Farming
  - Animal Husbandry
  - As Shopkeepers
- Post Office: There is one Post Office in Waghai village.
- Banks: There are two banks currently present in Waghai village.

4.2.5Actual Problem faced by Villagers and smart solution

- During an interaction with people of Waghai village we understood their problems and issues like**:**
  - Water Supply System
  - Drainage System
  - Common Public Sanitation Facilities
  - Street lighting
  - Sewage Disposal Space
- Smart solutions:
  - Solid waste management
  - Skill development center
  - Solar street lights and dustbins
  - Water Management System

4.2.6 Social scenario -Preservation of traditions, Festivals, Cuisine:

- **Gujarat Social Scenario**

- CULTURE : The Gujarati's are known for their diverse cultural heritage and rich traditions. It is a vibrant mix of Hinduism, Islam, Jainism and Buddhism and also a blend of different cultures of the Gujarat's like arts, beliefs, customs, traditions, institutions, inventions, language, technology and values. The culture of the people does not stop with one particular generation but instead the elders of the community see to that the future generations also practice it which automatically leads to the wisdom and appreciation of cultural traditions and lifestylesThere is not much of culture shock seen in the people of Gujarat and so it makes people bold and courageous with lot of energy to face different challenges raised by the global scenario.

- CUSTOMS AND TRADITIONS : Though modern and sophisticated houses have come in Gujarat, still there are places which have their traditional homes and wooden houses. Most of these traditionallybuilt houses have beautiful and intricately designed interiors but as a customary practice each house has a special "Chabutara" built for bird feeding. Pachchikam jewelry is one of the traditional jewelry of the people of Gujarat where instead of gold, the metal used in making of this ornament is silver. The Gujarati women as a part of their tradition carry a bunch of keys on their waist and the ring holder is usually made of silver.
- CUISINE : Mostly Gujarati food is vegetarian because the state is dominated by Jains and the Vaishnavas. Most of their staple food includes wheat and millet varieties like jowar and bajri. No meal of Gujarati will miss roti along with a variety of vegetable curries and dishes. The food is generally served on a metal tray which is called as thali and 4-5 small bowls placed on it.
- OCCUPATION : The major occupation of the people of Gujarat is agriculture for at least one-half of the total land area is cultivable. Other area of economy and job sector includes dairy farming, primarily concerned with milk production. There are lot of industries which are involved in the production of fertilizers and petrochemicals.

4.2.7 Migration Reasons / Trends :

- Waghaivillage Migration Reasons as per the data available in Village Profile & Taluka Planning are
- Number of families who have migrated from village to village/city to get higher education are around 170.
- Number of families who have migrated from village to other place in the country are around 40.
- Number of families who have migrated from village to out of the country are around 15.

T-4.2C -Migration data India

Reason for migrations	Number of Migrants		
	Persons	Males	Females
Total migrants	98,301,342	32,896,986	65,404,356
Work / Employment	14,446,224	12,373,333	2,072,891
Business	1,136,372	950,245	186,127
Education	2,915,189	2,038,675	876,514
Marriage	43,100,911	679,852	42,421,059
Moved after birth	6,577,380	3,428,673	3,148,707
Moved with households	20,608,105	8,262,143	12,345,962
Other	9,517,161	5,164,065	4,353,096

4.2 Data Collection Waghai village (Photograph/Graphs/Charts/Table) :

4.3.1 Describe Methods for data collection :

The main methods for data collection are :

1) Individual interviews.:

- Interviews can be conducted in person or over telephone.
- Interviews can be done formally or informally.
- Questions should be focused , clear , and encourage open ended responses.

2) Focus groups :

- A facilitated group interview with individual that has something in common.
- Gathers information about combined opinions.
- Responses are often coded in categories and analyze

4.3.2 Primary details of survey

Waghai is a large village located in The Dangs Taluka of The Dangs district, Gujarat with total 1,308 families residing. The Waghai village has population of 6,715 of which 3,403 are males while 3,312 are females as per Population Census 2011.

In 2011, literacy rate of Waghai village was 84.12 % higher than state compared to 78.03 % of Gujarat. In Waghai Male literacy stands at 90.43 % while female literacy rate was 77.60 %.Waghai is a town in the Dang District of the southern part of Gujarat state in India. And alsoTaluka of dang district. Waghai is about 32 km west of the district headquarters of Ahwa, and about 52 km north-west of the hill station of Saputara. Vansda, Chikhli and Bilimora are located westerly.

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

Size: 10* 12 m2 .Geo-Tagging: The process of tagging infrastructure with geographical information like Latitude, Longitude, Distance, place name, etc. It is connected to GPS which are monitored through computer internet networks. It can be used to locate important places like labs, dispensaries, milk center, etc. Geo Tagging is not implemented in Waghai village

4.3.4 No of Human being in One House

Total number of population in waghai is 6715 as per 2011 census. There are different number of people in each house as there are nuclear families as well as joint families, but the average no of human beings in one house is 6.

4.3.5Material available locally in the village and Material Out Sourced by the villagers :

The materials like milk, other grocery materials, wheat, dangar , cotton and other agricultural cereals are used locally as they are locally easily available.

4.3.6 Geographical Detail:

The total geographical area of village is 1010.94 hectares, total residential area is 481 hectares and total irrigated land area is 343 hectares.

Elevation above MSL : 107meters

Latitude : 73.2824331

Longitude : 22.4192638

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

Total No. of houses : 1328 ,

Population : 6715(Male : 3403 ; Female : 3312)

SC &ST : 111 & 3842 , Literacy : 84.12%

Total Workers : 2178

4.3.8 Occupational Detail - Occupation Wise Details / Majority Business :

Major occupations are, Shop keepers , government and private services , Service , Labor , etc. Waghai has approx. 410 population engaged in either main or marginal works. Out which 200 male are working and 210 female are working.

4.3.9 Agricultural Details / Organic Farming / Fishery :

Majority of the population of Waghai village are occupied in shopkeepers . The main crops grown in the village are: wheat, cotton, rice, etc. There are no any farmer or villager using organic farming or fishery.

4.3.10 Physical Infrastructure Facilities - Manufacturing HUB / Ware Houses :

Government Transportation facilities like bus service and railway transportation facilities are available . Local transportations are jip , private vehicles are available in Waghai village. ; The village approach roads are made of WBM and internal roads are of concrete roads it is available in all streets in village. One overhead tank is available. Apart from this primary school,

anganwadi, dairy, RO water plant, U/G sump, etc. are also present in the waghai village. ; There are no any ware houses or manufacturing hub activities active in the Waghai village.

4.3.11 Tourism development available in the village for attracting the tourist :

In Waghai village there are also tourism activities available for attracting the tourist. In waghai village botanical garden and giradodhwaghai are two famous places foe tourists. Waghai botanical garden is very famous for its unique production.

4.4 Infrastructure Details (With Exiting Village Photograph) :

4.4.1 Infrastructure Facilities

Infrastructure is very important for development of village. The main thing of rural development is to provide all basic amenities to all people. In waghai village there is lacking of amenities like is water supply system, sanitation and Drainage system .Inwaghai village some facilities like health and sanitation , education, transport facilities by government and publically are available in good condition.

T- 4.4 A Infrastructurer facilities

TYPE OF INFRASTRUCTURE	FACILITIES
Physical infrastructure	1. Water supply 2. Transportation 3. Drainage 4. Rain water harvesting structure 5. Sewerage
Social infrastructure	1. Health and education facilities 2. Electricity connection 3. Repairs and maintenance of existing building like school building, library building Gram panchayat, public toilet 4. Devlopement of existing structure
Economics	1. public transportation facilities 2. Employment opportunity
Sustainable infrastructure facilities	1. Street lighting 2. Solar panel 3. Rain water harvesting.

4.4.2 Drinking Water:

- Drinking water is sourced from open wells and bore wells and is electrically pumped through pipes to an elevated storage tank or an open well, treated with chlorine for disinfection and then distributed to households through taps around the village under gravitational pressure.
- The gram panchayat and the sarpanch are responsible for the management of water supply, treatment and day-to-day maintenance. The actual implementation is done by the "waterman", who is from the same village and is paid by the gram panchayat. The waterman has received training to do his duties, including chlorination practices, from the health department at the block level. The health department is in charge of taking monthly water samples and monitoring the water quality.

Fig-4.4 B- Various Facilities Available For Drinking Water

T-4.4 B Water distribution waghai village

DESCRIPTION	DETAIL	REMARK/SUGGESTION
Tape Water	Yes	Water Distribution
Well Water	Yes	There Are Only Two Well Water InWaghai Village
Hand Pump	Yes	It Is One Of The Main Source Of Drinking Water
Tube Well/Borehole	Yes	It Also One Of The Source For Drinking Water
River/Lake /Spring	Yes	A Big River Passing Near The Village

4.4.3 Drainage Network

- This work had as main purpose the design of a separative drainage network of wastewaters in the Waghai village. For this project topographic data of this region were provided a priori. However a collection of updated information about the population was needed .A number of INE publications were consulted and a recognition of the city and surrounding region was made. The implementation and design of the network were made

based on current regulations, and always having into account the costs of the adopted solution . Because of this the exposure of the structure to aggressive agents was considered, the toxicity level of WW in the lifting ducts was analyzed, and armored materials and coatings were suitable to the surrounding environment.

- There is good drainage network in waghai village . But some people dispose waste on their open land. In this village About 80% people have their own sanitation facilities and pay and use facilities also provided and sanitation facilities for other public also provided.

4.4.4 Transportation And Road Network

- Road network is vital to the economic development, trade and social integration of the country. It facilitates smooth conveyance of both people and goods. Size of the road net work, its quality and access has a bearing on various parameters of the economy like travel time, transport costs, cost of input, cost of finished products etc. There must be matching growth between roads, traffic, vehicle population and population.
- Based on the findings of rural travel survey (Kumar et al 1997) it was observed that nearly 50% of the population in rural area is static i.e. they do not make any trip. The highest number of trips in rural areas was for education (42%).

T- 4.4 CVarious roads in waghai village

TYPE OF ROADS	AVAILABILITIES	REMARKS
Village Approach r	Yes	Black tapped pucca road good condition
Main road	Yes GJ state highway no.14	Black tapped pucca road good condition
Internal streets	Yes	Kuchaa road poor condition
Nearest NH/SH/MDR/ODR	NH350 Passes through waghai block	Black type pucca road good condition

Fig-4.4 B - Various road facilities available in waghai village

4.4.5 Electricity

- Electricity is distributed into village by government sector of DGVCL(Dakshin Gujarat vij co. ltd.) for 24 hours. Power is supplied to community for domestic use, commercial use, government buildings, schools and hospitals and road street light by DGVCL for 24 hours.

Fig-4.4 C- Electric Pole

Fig-4.4 D- DGVCL Sub Department

T- 4.4 D Electrical Facilities

ELECTRICAL FACILITIES		
DISTRIBUTION OF ELECTRICITY	**AVAILABLITY**	**REMARK**
Govt./Private(Y/N)	Yes govt.	24hours
Power supply for Domestic use	Yes govt.	24hours
Power supply for irrigation	Yes govt.	8hours
Power supply for commercial use	Yes govt.	24hours
Street lighting	Yes	Need improvement
Electrification	Yes	More than 12 hours
Renewable energy source	No	Applicable for solar
LED facilities	Yes	Only 10% intrest in ujala

4.4.6 Sanitation Facilities

- The things to attend to in the villages are cleaning tanks and wells and keeping them clean, getting rid of dung-heaps. If the workers will begin the work themselves, working like paid Bhangis from day to day and always letting the villagers know that they are expected to join them so as ultimately to do the whole work themselves, they may be sure that they will find that the villagers will soonea or later co-operate.Lanes and streets have to be cleansed of all the rubbish, which should be classified. There are portions which can be turned into manure, portions which have simply to be buried and portions which can

be directly turned into wealth. Every bone picked up is valuable raw material from which useful articles can be made or which can be crushed into rich manure. Rags and waste-paper can be turned into paper, and excreta picked up are golden manure for the village fields.

- Prime minister Narendra Modi launched Swachh Bharat Mission on Oct. 02, 2014, by wielding a broom on the streets of Delhi. The programme, which has Mahatma Gandhi's iconic spectacles as its logo, is one of the most hyped schemes of the Modi government.
- In waghai village sanitation are provide house to house but they do not use this sanitation due to lacking of water.

4.4.7 Housing Condition

- The poor housing conditions in the Waghai village of Dang have been identified as one of the greatest problems faced by the village residents. Fifty-five per cent of the village population is dalits (untouchables) and these and other poor households live in small thatched huts made of wooden sticks, mud and palm leaves, with inadequate lighting and ventilation. The smoke produced by cooking creates a health hazard and high winds or fires frequently destroy the huts. Social inequality within the villages is increased by the stigma associated with living in huts.

Fig-4.4 E Housing Condition Of Waghai Village

4.4.8 Social Infrastructure Facilities(Health , Education , Community Hall)

- **Health Facilities**
  - In waghai there are number of CHC and PHC and hospitals are available for primary treatment . For any serious condition big and with best quality hospitals are available in vansda about 10 km distance from waghai.
  - **Hospitals in Waghai, Dang**
    - Government Hospital Waghai; Gujarat 394730
    - PHC WaghaiWaghai; Gujarat 394730
    - CHC Waghai ; Gujarat 394730
    - Rukmani clinicWaghai Gujarat ;394730

- Hebzi care clinic ,Waghai Gujarat ;394730
- Ashirwad Sewa Trust Clinic ,Waghai Gujarat ;394730
- Gaurang Hospital, Waghai Gujarat ;394730

T- 4.4 E Health Facilities Available In Waghai Village

Particulars	Availability	Numbers	Remarks
Hospitals	Yes	2	Good condition
PHC	Yes	1	Waghai PHC
CHC	Yes	1	Good condition
Dispensaries	Yes	2	Not good condition.
Clinic	Yes	2	good condition

Fig-4.4 F- Hospitals In Waghai Village

➢ **Education**

- The schools in rural India have really poor infrastructure. There is a huge lack of teachers, especially well-trained ones which disturbs the student-teacher ratio extensively. This leads to very poor quality of education being imparted, hardly fulfilling the need of education.
- In waghai village very good educational facilities are available. In waghai village the facility of primary, secondary, and graduation level education facilities are available and good infrastructure facilities are available.
- The way of teaching also differs in urban schools. While the teaching methodology in rural schools is still primitive, the urban schools are keen on adopting modern ways of teaching like concept learning and focus on development of each student.

T 4.4 F Education Facilities In Waghai Village

Type of facility	Availability	Remark
Anganvadi /play ground	Yes	In Good condition
Primary school	Yes	In Good condition
Secondary school	Yes	In Good condition
High secondary school	Yes	Good condition
Collage	Yes	In Good condition

- **School in waghai**
  - Taluka shalawaghai ,Waghai , Dang, Gujarat,394730
  - Sardar primary school waghai ,Waghai,Dang, Gujarat,394730
  - Adarsh primary school waghai, Waghai , Dang, Gujarat,394730
  - Waghai Primary School ,Waghai , Dang, Gujarat,394730
  - SarkariKhetiwadi School, ,Waghai , Dang, Gujarat,394730

Fig-4.4 G -Education Facilities InWaghai Village

- **Community hall**

- Community centres or community halls are public locations where members of a community tend to gather for group activities, social support, public information, and other purposes.
  - As a place where community members meet each other socially.
  - As a place housing local clubs and volunteer activities.

- As a place that community members (and sometimes others), can rent cheaply when a private family function or party is too big for their own home. For instance the non-religious parts of weddings, funerals, etc.

➢ **Library**

o However, the libraries in rural areas, as observed from earlier studies, are traditional in nature and not well equipped to effectively cater to the information needs of the rural people. Lack of adequate resources, financial and human, is identified as the major reason for the present status of rural libraries.

Fig-4.4 H- Taluka panchayat

Fig-4.4 I - Public library

4.4.9 Socio- cultural facilities , public garden/park/playground/other recreation facilities

o A cultural facility is a space that is "open to the public that provides cultural services and facilities including, but not limited to, museums, cultural centers, historical societies, and libraries operated by a public, private, or nonprofit organization.

T-4.4 G Socio Cultural Facilities Available InWaghai Village

PARTICULARS	AVAILIBILITY	REMARK
Community hall	NO	-
Public library	Yes	Good condition
Garden/park/playground	Yes	Good condition Very famous garden is located near waghai village
Village pond/lake	Yes	Good condition It is one of the most favorite tourism palace of tourists
Temple	Yes	Good condition Tourism place
Railway station	Yes	It is only one railway station in Dang district

- **Bus Stop**

  - A bus stop is a designated place where buses stop for passengers to get on and off the bus. The construction of bus stops tends to reflect the level of usage, where stops at busy locations may have shelters, seating, and possibly electronic passenger information systems; less busy stops may use a simple pole and flag to mark the location. Bus stops are, in some locations, clustered together into transport hubs allowing interchange between routes from nearby stops and with other public transport modes to maximise convenience. In waghai village there is one bus stop and it is in very good condition , proper infrastructure , proper maintenance is also provided.

- **Waghai Railway Station**

  - Waghai Railway station is in Dang district making it an important railway station in the Indian state of Gujarat. The station code name of Waghai is 'WGI'. As part of one of the busiest and populated Indian states, Gujarat, the Waghai railway station is known amongst the top hundred train ticket booking and train traveling stations of the Indian Railway. The total number of trains that pass through Waghai (WGI) junction is 4.

Fig-4.4 J- Waghai Village Bus Stop

Fig-4.4 K - Waghai Railway Station

Fig-4.4 L - Waghai post office

Fig-4.4 M -Forest rest House

4.5 Electrical facilities

4.5.1 Renewable energy source planning particularly for villages

India is one of the largest countries in the world, where the people's occupation is predominantly agriculture and most of the population lives in villages. Many of these villages are remotely located and their connectivity with the grid is very difficult resulting in their being not electrified at all or lack of continuous supply. For the development of the region, there is every need to

utilize energy efficient techniques and potential of available renewable energy resources. An economic solution can be achieved by proper energy management making the village self sustained in its energy requirement. Based on a survey conducted in an Indian village named "Bacharam" situated near Hyderabad in India, this paper attempts to identify the available resources like agro-waste, animal dung, and solar energy. The regular resource usage pattern has been studied and an effective solution has been proposed for proper usage to meet the daily energy requirements.

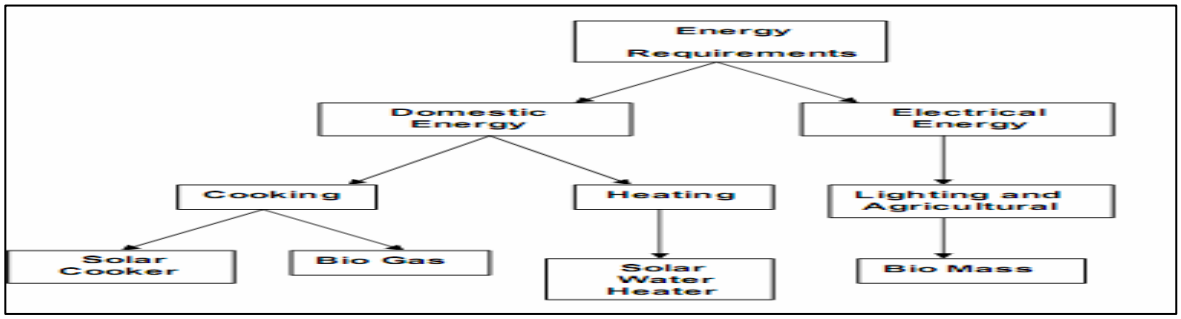
The concept of an energy plan for a rural community by making use of locally available resources to meet electrical and other energy needs has been revisited over theyears. A lot of this may owe to the slow but continuously arising awareness among national and international states, about the fast depleting conventional energy sources and the urgent need to find and implement technology for alternative energy sources.Rural electrification is still incomplete due to technical constraints and practical difficulty in electrical power transfer to remote rural areas through grid connectivity which are usually from conventional sources. Rural electrification can be achieved predominantly if one harnesses the locally available renewable sources, namely, bio-mass, biogas and solar power.

Current Resource Use Scenario:

The work presented in the paper is fully based on the survey conducted, which provided the authors with enough particulars of the village like population, main occupation, literacy, land in acres, both cultivated and uncultivated, major crops, types of crop residues, livestock, electricity demand for agriculture, domestic and street lightning etc. It also revealed all the practices followed by people in order to meet their daily energy requirements. The conventional practices did indicate an unhealthy way of living with no utilization of the available renewable resources.

Proposed Solution :By changingthe above practices of resource managementtocleanandeco-friendlytechniques,thedependability onconventional energy would be reduced while overcoming theenergy shortage andassuringmore continuity insupply. Inthefollowingsections,costeffective,reliable,eco-friendlyandeasilyadaptablemethodsofenergyconversionarepresented.

T-4.5 A Classification of Energy Requirement



The plan, as depicted in fig. 1, proposes separate enhanced and cost effective way so futilizing these resources,for different requirements like:

i. Agro waste is collected and used for power generation with the help of a biomass

based community plant which serves the purpose of electricity demand from households ,street lighting and agriculture.

ii. Animal waste is used forthe productionof bio-gas whichservesascookinggas.

iii. The proposed usage of solar energy is for waterheatingandcooking.

4.5.2 Irrigation Facilities

Agriculture is the backbone of the majority of developing and emerging countries. Therefore, access to reliable and affordable irrigation water for agriculture is a crucial factor for the economic development of the country.

Around 93% of human water consumption is utilized for irrigation. Most of this water needs to be moved, often from below the ground. Yet, water distribution is often inefficient and requires significant amounts of energy, mostly supplied through diesel generators.

The ability to move water is critical for irrigated agriculture in most areas of the world. Both surface and underground water resources are commonly tapped for irrigation. Around 57% of current irrigation water demand is covered by the former, the remaining 43% by the latter source of water (World Bank, 2010).

In particular irrigation from underground sources requires an energy input. In off-grid areas of the world, this is currently covered to a large part through diesel generators. The disadvantages of this fossil energy supply are known. High operating costs and frequent maintenance, environmental damage through ground water soiling with fuels and lubricants or CO2 emissions are the most significant drawbacks of the status quo. Using renewable energy (RE) sources is an attractive alternative as they feature several economic, managerial and ecological advantages.
Motor-driven water abstraction and conveyance requires a reliable energy source – or a reliable combination of energy sources. The vast majority of water pumping for irrigation purposes is to date done by diesel or petrol motors as well as by electric motors that fed from the grid or are run by diesel generators. The utilization of renewable energy sources is steadily increasing but still on the minority side.

Irrigation in Waghai includes a network of major rivers, groundwater well based systems, tanks, and other rainwater harvesting projects for agricultural activities.Ofthesegroundwater system is the largest. In 2013-14, only about 36.7% of total agricultural land in waghai was reliably irrigated, and remaining 2/3rd cultivated land in waghai is dependent on monsoons. 65% of the irrigation in village is from groundwater.Currently about 51% of the agricultural area cultivating food grains is covered by irrigation. The rest of the area is dependent on rainfall which is most of the times unreliable and unpredictable.

4.5.3 Electricity Facilities with Area

In waghai village the electicity supply is managed by DGVCL department. In waghai village by dgvcl department electricity supplied for 24 hours and there is also one electrical station located near the dgvcl which provide electricity in waghai village.

4.6 Existing Institution like - Village Administration – Detail Profile

4.6.1 BachatMandali :

In the Waghai village there is no any BachatMandali existing

4.6.2 DudhMandali :

There is one DudhMandali existing in the Waghai village in Dairy

4.5.3 Mahilaforum :

A mahila forum is active in the village anganwadi. There is one any mahilamandal existing in theWaghai village. As per the interaction with villagers there is a system of asking before any kind ofdecision implementation in the village and that is a good thing in Waghai village so that mahilas havethe decision making authority.

4.6.4 Plantation for the Air Pollution :

There is no such activity done of tree plantation for the air pollution in the Waghai village. But thatkind of activities are done in the primary school by the students of the Waghai village.

4.6.5 Rain Water Harvesting - Waste Water Recycling :

In the Waghai village no one is using thesystem of rain water harvesting and there is no any kind of waste water recycling process done.According to Talati there is rain water harvesting in the village primary school.

4.6.6 Agricultural Development :

There is one agricultural co-operative office building in the Waghaivillage so all the village agriculture related decisions are being operated from this office. The farmers have agricultural tools and equipment. All the agri-materials are available from Unai village which is 3 km away from the Waghai village.

4.6.7 Any Other :

There are many other kind of institutions existing in the Waghai village apart from panchayat building,dharmshala, dairy, primary school, public library, government grocery shop, temples, agricultural cooperative office building, anganwadi, etc.

Chapter 5.
Technical Options with Case Studies: (FOR ANY ONE TOPIC, Take a new concept design, prototype model with actual costing)

5.1 Concept (Civil)

5.1.1 Advance Sustainable construction techniques / Practices and Quantity Surveying:

India's construction sector is assessed at Rs.4000 billion or $100 billion. As a result of government spending, private investments as well as foreign direct investment, has made India number one of the top ten spending nations on construction in the world. We manufacture more than 250 million tons of cement and are second only to China. A recent report "Global Construction 2020", estimates that India will be the third largest global construction market after China and USA. In order to improve the standard of living of her population, one of the key hurdles that faces today's India is to overcome the challenge of infrastructure bottlenecks. Consequently the federal government has announced our 11th five years plan which allocates 9% of the GDP to infrastructure projects. The National Planning commission - an apex federal body has estimated an allocation of $515 billion which is equivalent to Rs.23 trillion to infrastructure sectors over the next five years

5.1.2 Soil Liquefaction:

Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Liquefaction and related phenomena have been responsible for tremendous amounts of damage in historical earthquakes around the world. Liquefaction occurs in saturated soils, that is, soils in which the space between individual particles is completely filled with water. This water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together.

Fig-5.1 A- Soil Liquefaction

Earthquake shaking often triggers this increase in water pressure, but construction related activities such as blasting can also cause an increase in water pressure. Liquefied soil also exerts higher pressure on retaining walls,which can cause them to tilt or slide. This movement can cause settlement of the retained soil and destruction of structures on the ground surface .

5.1.3 Sustainable Sanitation

In 2016, the experts of the World Economic Forum ranked water crises, from drought in the world's most productive farmlands, to the hundreds of millions of people without access to safe drinking water, as the top global risk to industry and society over the next decade (Source: Global Risks Perception Survey 2015, World Economic Forum). Even though in 2010, the United Nations (UN) General Assembly recognised safe drinking water and sanitation as a human right, the contamination of water supplies and the lack of sanitation is still a major and unsolved problem in many parts of the world; especially in low and middle income countries. According to UN-Water, in 2015, every 20 seconds a child died as a result of poor sanitation management and about 80% of diseases in developing countries are caused by unsafe water and poor sanitation.The required improvement of wastewater management and governance must be adapted to local environmental specificities and to human needs and activities (e.g. water uses and pollution), but also considered at the basin-scale in order to protect surface and groundwater resources (i.e. rivers, aquifers and lakes) and ecosystems (services) and human livelihoods.

Fig-5.1 B- Sustainable Sanitation

5.1.4 Transport Infrastructure / system :

Road network planning is important in road constitute the whole range of rural roads for all practical purposes in India. However, from network planning point of view rural road is an all weather road that connects a village with any other village, to the market centers, or to the primary and secondary road systems. This constitutes the Other District Roads and Village Roads as per the definition of Road Development Plan (1981-2001) of the country. The aim here is to develop the network planning methodology for this category of village roads using GIS database.

Fig-5.1 C Road network planning

5.1.5 Vertical Farming

- By 2050, the world's population is expected to grow to 9.7 billion people, and feeding it will be a huge challenge.1 Due to industrial development and urbanization, we are losing arable lands every day. In 2015, scientists reported that the Earth had lost a third of its arable lands over the previous 40 years
- Vertical farming is the practice of producing food on vertically inclined surfaces. Instead of farming vegetables and other foods on a single level, such as in a field or a greenhouse, this method produces foods .
- Advantages
    - It offers a plan to handle future food demands
    - It allows crops to grow year-round
    - It uses significantly less water
    - Weather doesn't affect the crops

Fig-5.1 D-Vertical Farming

5.1.6 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure :

Mechanism

Corrosion mechanisms require the right combination of condensed or adsorbed molecular layers, galvanic behavior, conductive ionic or chemical contamination, and/or other conditions.Corrosion mechanism in aqueous solution has been amply demonstrated. In atmospheric corrosion which also exemplifies uniform corrosion, a very thin layer of electrolyte is present. It is probably best demonstrated by putting a small drop of seawater on a piece of steel

Prevention

- Alternative reinforcement and slab design method includes materials that electrically isolate the steel from the concrete and create a barrier for chloride ions, materials that protect steel galvanic-ally, and materials that have significantly higher corrosion thresholds than conventional reinforcing steel. Concrete slabs have been designed without any internal reinforcement.

- Barrier methods protect reinforced concrete from corrosion damage by preventing water, oxygen, and chloride ions from reaching the reinforcement and initiating corrosion.
- Corrosion inhibitors offer protection by raising the threshold chloride concentration level, by reducing the permeability of the concrete, or by doing both.

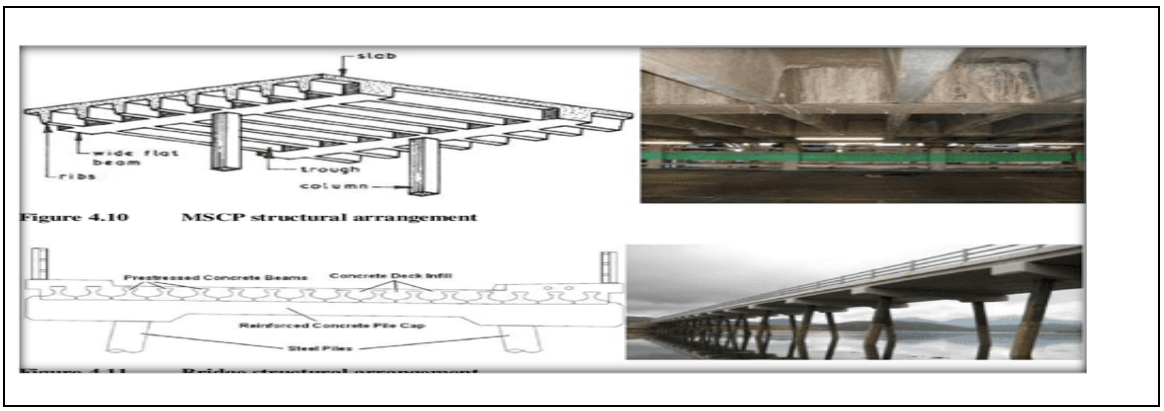


Fig-5.1 E- Corrosion Mechanism

5.1.7 Sewage treatment plant

From a public health perspective, treatment of the wastewater produced by the population and industries in a given urban area is critical to ensure stable growth. Wastewater must also be treated to an extent that it does not affect the environment into which it is discharged, the goal being to ensure that urban growth is sustainable.In order for wastewater treatment to be sustainable, an innovation project must be implemented to develop a new biological wastewater treatment process with low energy consumption and a low environmental impact.

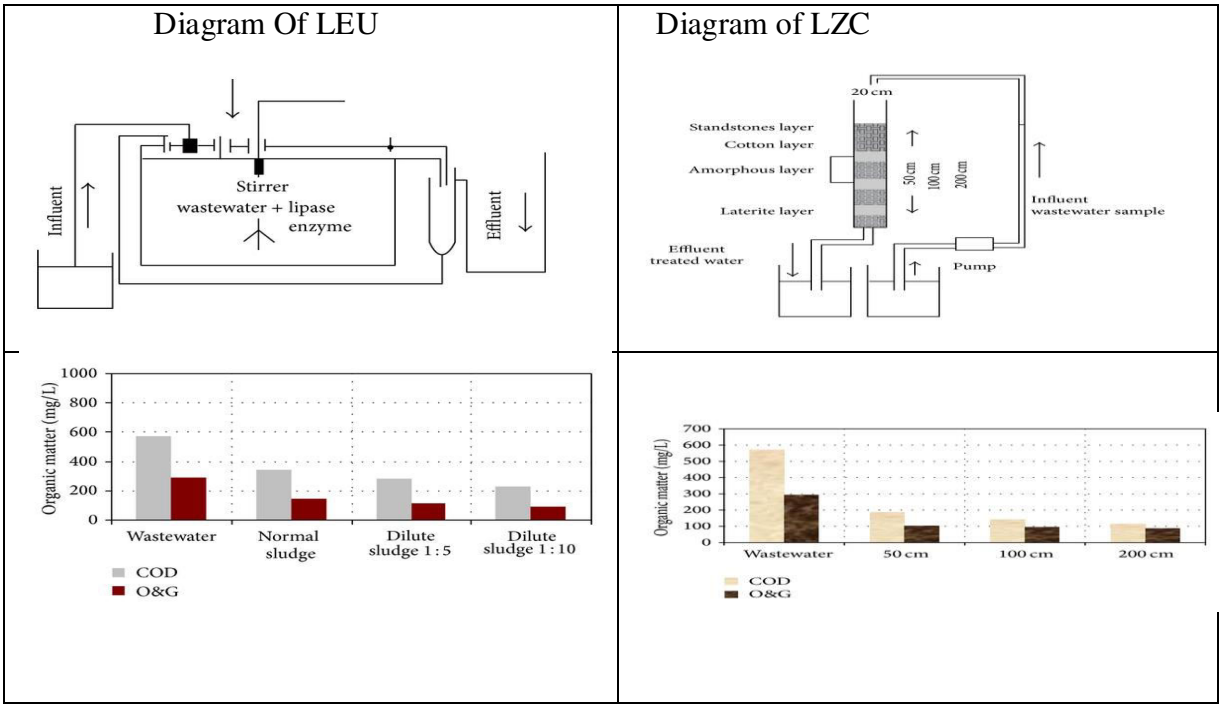


Fig- 5.1 F Sewage Treatment Plant Chart

5.2 Concept (Electrical)

5.2.1 Programmable Load Shedding

Electricity is one of the most important requirements of modern civilization. Without which various Indispensable applications will bind to bring to a standstill. As we know that demand of electricity is increasing now days. So electric utilities prefer load shedding when the demand exceeds the supply. Thus in a distribution system it needs to be precisely measured for specific period of time. Programmable load shedding time management system is a reliable & effective load shedding technique that takes over the manual task of switch ON/OFF the electrical supply with respect to time .

The project is an automatic load operation system that controls load operation, multiple numbers of times according to programmed instruction. The project eliminates the manual ON/OFF switching of load. A real time clock (RTC) is used to track the time and automatically switch ON/OFF the load. This project is required for load shedding time management which is used when the electricity demand exceeds the supply and there comes a need for manually switching ON/OFF the electrical devices in time. Hence this system eliminates the manual operation by automatically switching the load ON/OFF.

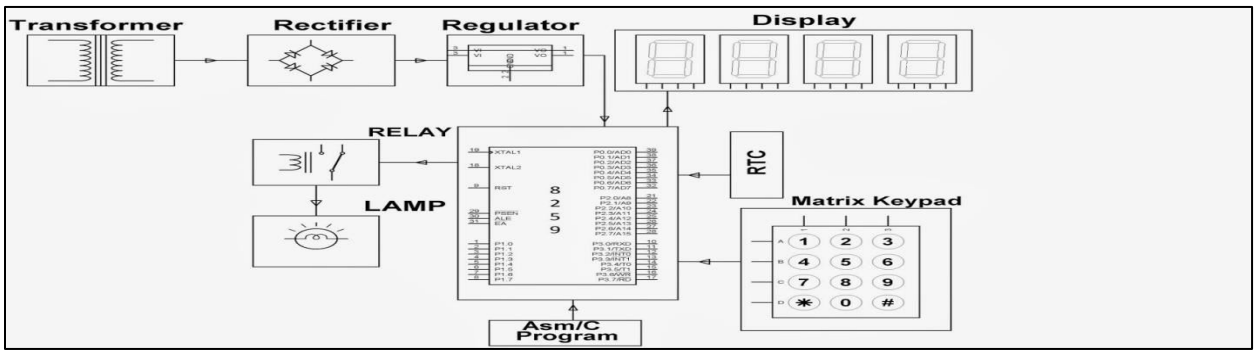


Fig- 5.2 A Block Diagram of Programmable Load Shedding

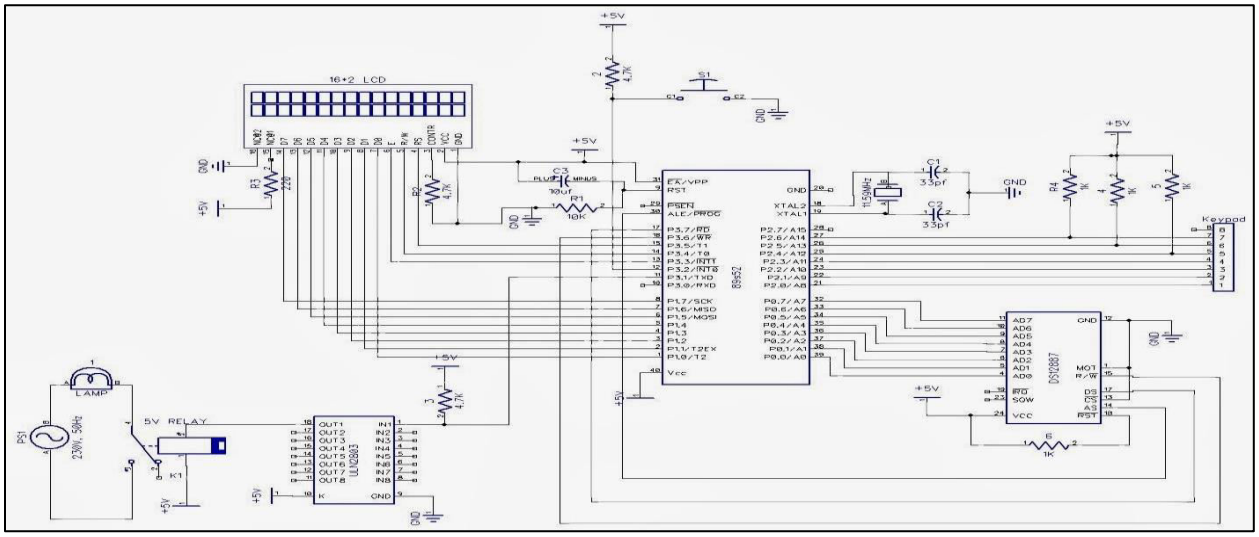


Fig-5.2 B Circuit Diagram For Programmable Load Shedding

5.2.2 Railway Security System Using IOT

Due to the continuous development of the highspeed railway lines and the growth of automatic systems, it is becoming more and more necessary to install safety elements to prevent accidents. For that purpose, this project proposes the design of a multisensory system, which consist of infrared (IR) and ultrasonic (US) sensors, which are placed at opposing sides of the railway tracks, respectively, in order to establish optical and acoustic links between them. When the train arrives at the particular location then the details about that train will be given from the database. Now, check the train details, if match then and only then, the parameters will be measured and the speed of train regarding to that parameters will be sent to the loco pilots display. In the parameters, this project measures the rainfall in mm, temperature, fog, humidity and route vibrations.

Railway has been playing a important role of public transportation from 19'th century, in this a steam locomotive began to be run. From that moment, the railway was regarded as a core method to transport population moving along the determinant paths within and between metropolitan cities. The basic technology of the railway has been so far progressed and enables a high-speed railway system which satisfies the public demand on traveling a long distance.

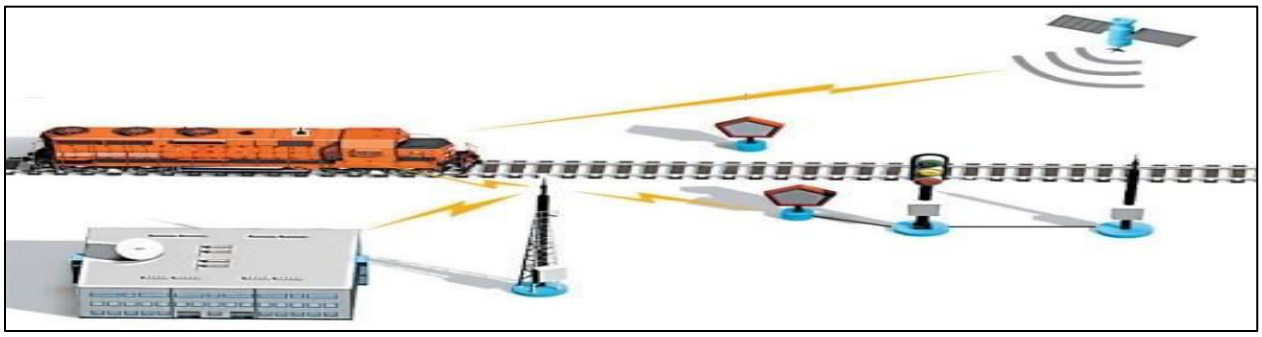


Fig- 5.2 C Railway Security System Using IOT

5.2.3 Management through Energy Harvesting Concept

With the rise of the Internet of Things (IoT), the interest of wireless sensor networks (WSN) consisting of low-power devices has increased. These kinds of networks are utilized in various fields such as healthcare, military and transportation, performing tasks like gathering data, monitoring processes and controlling autonomous activities. Wireless sensors used in wireless sensor networks are often powered by batteries, limiting their life-time and performance.

Objective

Themainobjectivesofthisthesisprojectarelistedasfollows:

- Do a pre-study on energy harvesting techniques, wireless communication standards and energy harvesting wireless sensor network systems to find a suitable solution guaranteeing a desired level of performance.
- Build a network consisting of a client sensor node and server sensor node and establish a communication link between them.

- Addan energyharvesting mechanism tothe clientnode.
- Evaluate the energy consumption and harvesting for the chosen hard-waret creation energy budget.
- Evaluatethesolutionfordifferentweatherconditions.

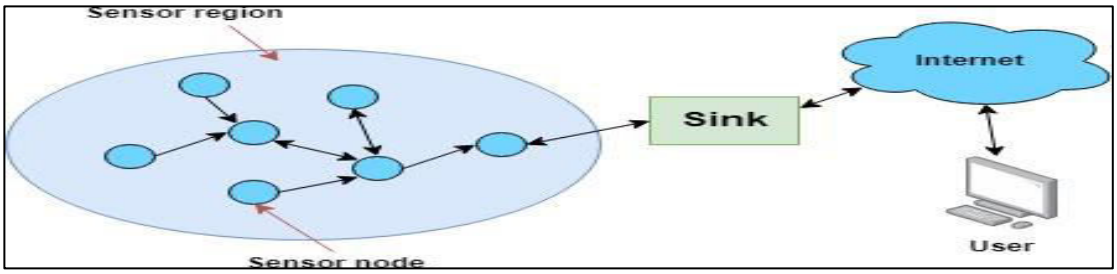


Fig-5.2DIllustrationofawirelesssensornetwork

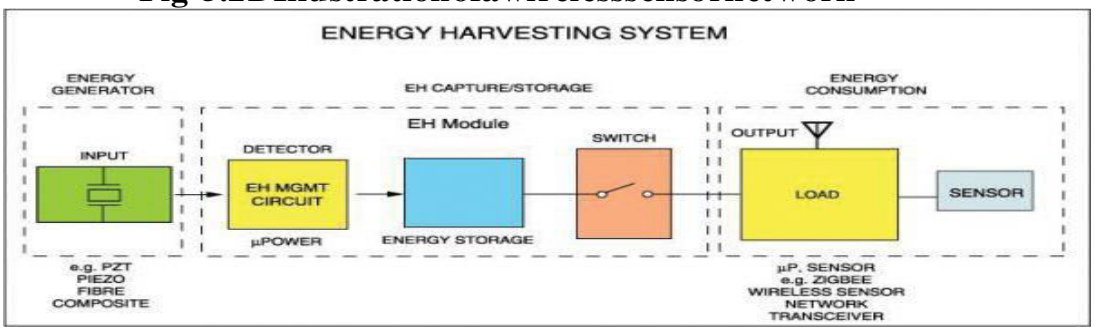


Fig-5.2 E Energy Harvesting System

5.2.4 Moisture Monitoring System

Soil moisture has been linked to many pressing enviromental issues, but due to the large natural variability in soil texture, there is no efficient way to observe the spatial (hortizontal and vertical) and temporal dynamics on a large scale. This study will focus on using radio-frequency identification (RFID), technology in an effort to expand the scale on which soil moisture can be measured. Application of RFID sensors allows for a cheap, wireless, powerless system that could be deployed across large area.The first method which does the best job at recording all the necessary information at a fast rate is the use of wireless sensors. These are sensors planted in the ground at different depths to transmit the necessary information to a central location. With enough sensors, this allows for effective management zone data collection.

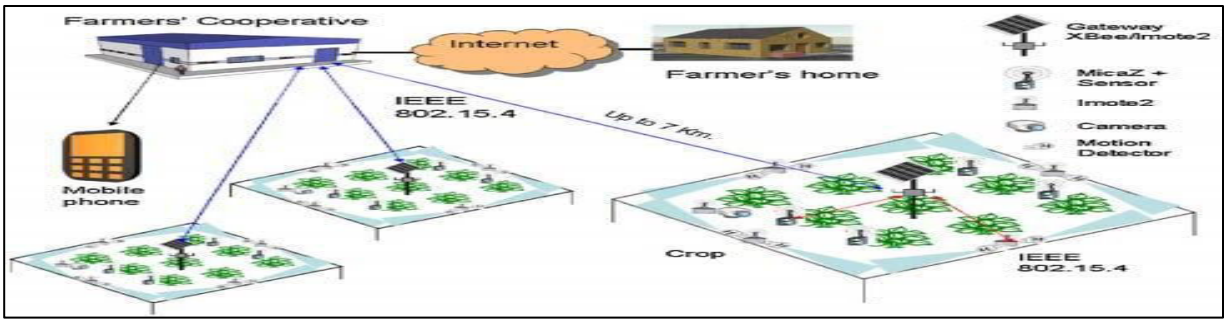


Fig-5.2 F System ArchitectureOf Soil

5.2.5 Home Automation using IOT / Any other methodology

Home automation is providing home safety for dwellers. It automatically turn lights on in closets, stairways, and other dark places. Thus accidentally tripping or running into thing is decreased. Everywhere environmental issues are raised before introducing any technology. In this regard home automation provides a better solution. Devices included in home automation consume less power. Besides, it saves energy. Thus home automation technology is so far environmentally suitable.In home automation system internet access is used to control from far away. For years, internet is used only for surfing pages, searching information and downloading software and other things. Advancement of technology is forcing to make interaction internet with machineries and devices. In home automation system comfort and security of houses have been enhanced. Besides, people are concerning over costs.

EXISTINGSYSTEM

Temperature control using PIC16F877

The system is composed of a 300W heater resistance, a temperature sensor, a measurement amplifier, a controller, a digital/analog converter, a pulse width modulator, a TRIAC triggering circuit and a 220V AC fan.

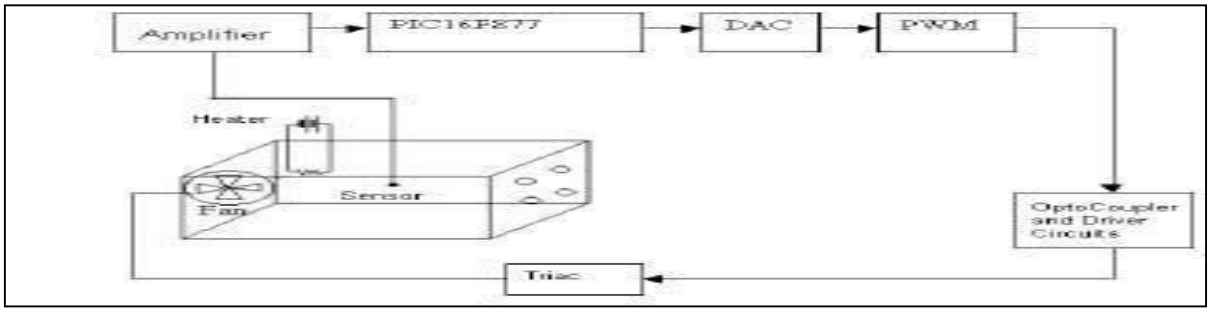


Fig-5.2 G TemperatureControl OfTheExistingSystem

Gas leakage system

The gas leakage alarm circuit is shown in figure 2. It operates on a 9V PP3 battery. Zener diode ZD1 is used to convert 9V into 5V DC to drive the gas sensor module. A preset in the module is used to set the threshold.

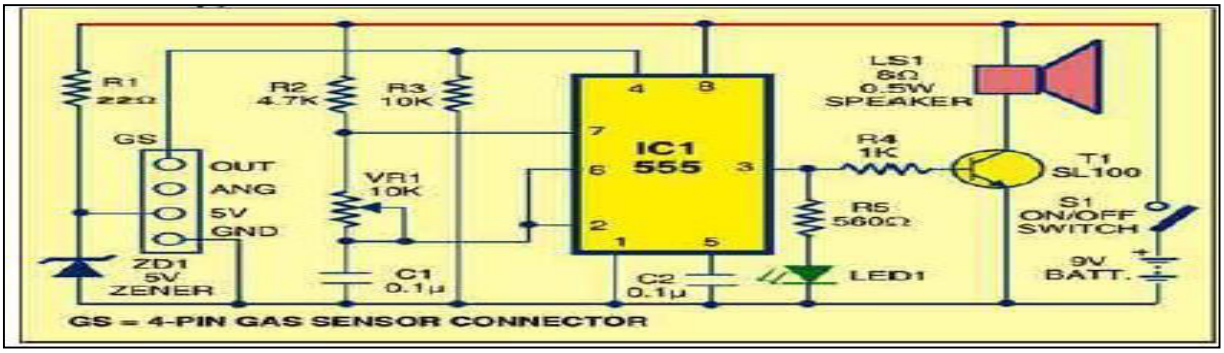


Figure 5.2 H Gas leakage system

PROPOSED SYSTEM

The aim of the proposed system is full security with automation of home also controlling the appliances using WIFI. Temperature and humidity of the each room is monitored. Water level controller also implemented by the use of Ultrasonic sensor. By using PIR and Vibration Sensor Motion detection and thief identification also recorded by HD Spy camera. Room temperature is maintained by using exhaust fan.

Description of the system and Hardware Model

A block diagram is a diagram of a system in which the principal parts or functions are represented by blocks connected by lines that show the relationships of the blocks. They are heavily used in engineering in hardware design, electronic design, software design, and process flow diagrams.A diagram showing in schematic form the general arrangement of the parts or components of a complex system or process, such as an industrial apparatus or an electronic circuit.

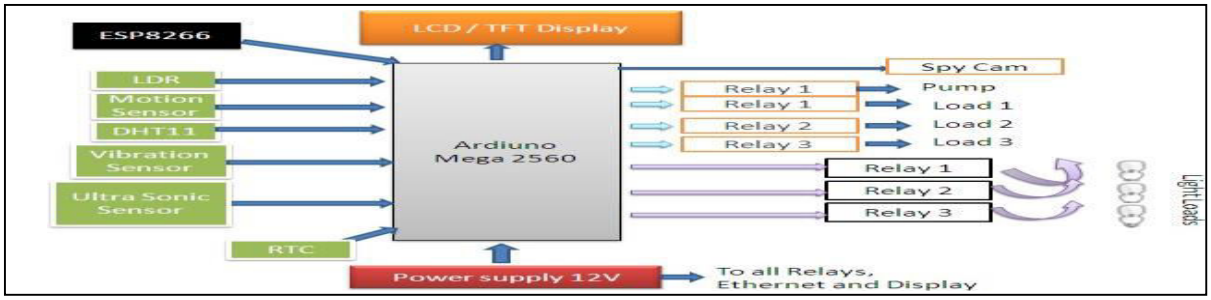


Fig- 5.2 IBlockdiagramofHome automation system

5.2.6 PC Based Electrical Load Control

The control and management of power consumption under running conditions is a key point in order to respect contract agreements and prevent the payment of fees in case of over-absorption.To reduce energy consumption, few actions are needed to get relevant benefits.One of them is peak shaving, common technique to reduce the energy consumption in a selected period by controlling load and generators.

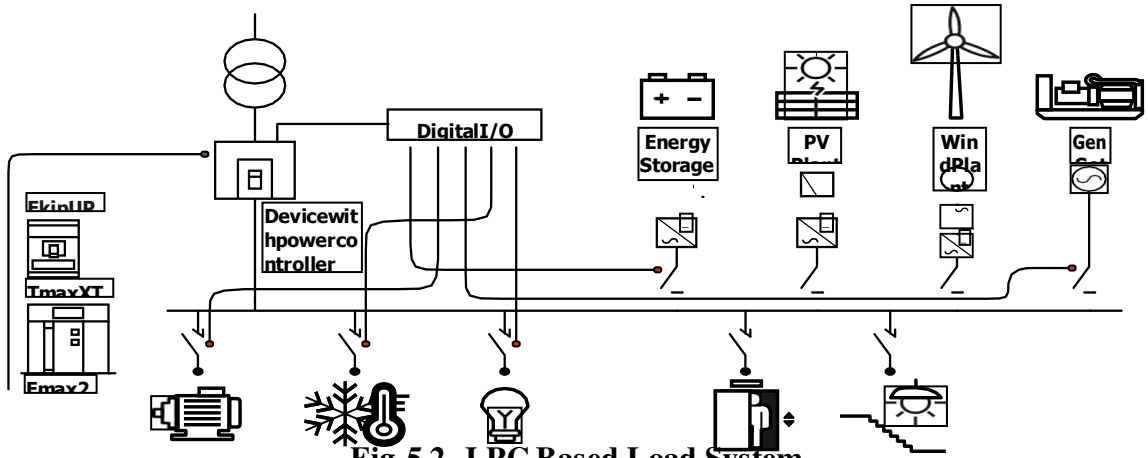


Fig-5.2 J PC Based Load System

The algorithm is based on a forecast average power absorption over determined time interval and set by the user. Whenever this value exceeds the fixed power, the Power Controller function intervenes to bring it back within the limits. This system can be realized with a single Ekip UP Control or Ekip UP Control+ standard equipped with this function and installed as the low-voltage plant controller.

5.2.7 Electrical Parameters Measurements

Electricity makes our lives easier, but it can seem like a mysterious force. Measuring electricity is confusing because we cannot see it. We are familiar with terms such as watt, volt, and amp, but we do not have a clear understanding of these terms. We buy a 100-watt light bulb, a tool that requires 120 volts, or an appliance that uses 8.8 amps, but we don't think about what those units mean.

Voltage

The pressure that pushes electrons in a circuit is called voltage. Using the water analogy, if a tank of water were suspended one meter above the ground with a 1-centimeter pipe coming out of the bottom, the water pressure would be similar to the force of a shower. If the same water tank were suspended 10 meters above the ground, the force of the water would be much greater, possibly enough to hurt you.

Current

The flow of electrons can be compared to the flow of water. The water current is the number of molecules of water flowing past a fixed point; electric current is the number of electrons flowing past a fixed point.

Electric current (I) is defined as electrons flowing between two points having a difference in voltage. Current is measured in amperes or amps (A). One ampere is 6.25 x 1018 electrons per second passing through a circuit.

Resistance

Resistance (R) is a property that slows the flow of electrons. Using the water analogy, resistance is anything that slows water flow, such as a smaller pipe or fins on the inside of a pipe.In electrical terms, the resistance of a conducting wire depends on the properties of the metal used to make the wire and the wire's diameter. Copper, aluminum, and silver—metals used in conducting wires—have different resistance.

Ohm's Law

George Ohm, a German physicist, discovered that in many materials, especially metals, the current that flows through a material is proportional to the voltage. He found that if he doubled the voltage, the current also doubled. If he reduced the voltage by half, the current dropped by half. **Voltage = Current X Resistance**

$$\mathbf{V = I \times R} \qquad \textbf{or} \qquad \mathbf{V = A \times \Omega}$$

Electric Power

Power (P) is a measure of the rate of doing work, or the rate at which energy is converted. Electric power is the rate at which electricity is produced or consumed. Using the water analogy, electric power is the combination of the water pressure (voltage) and the rate of flow (current) that results in the ability to do work.

Power = Voltage X Current

P = V x I or W = V x A

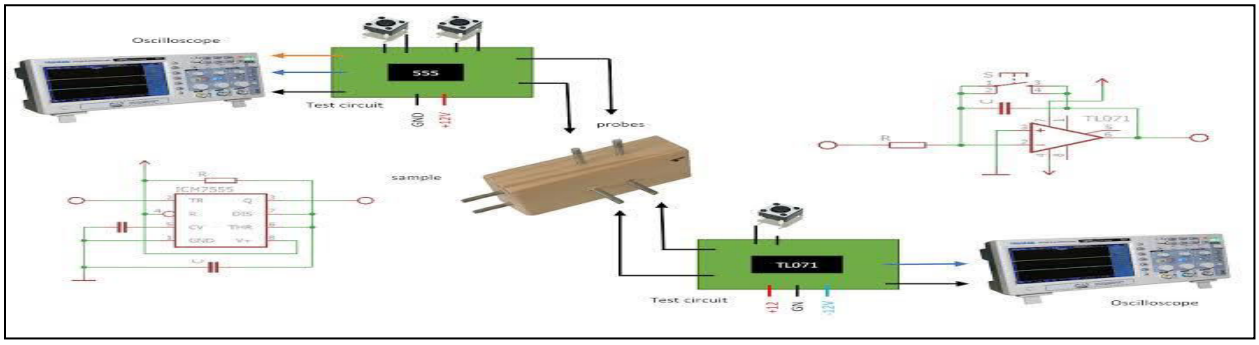


Fig-5.2 K Electrical Parameters Diagram

Electrical Energy

Electrical energy introduces the concept of time to electric power. In the water analogy, it would be the amount of water falling through the pipe over a period of time, such as an hour. When we talk about using power over time, we are talking about using energy. Using our water example, we could look at how much work could be done by the water in the time that it takes for the tank to empty.

5.3 Technical Case Study On "The Statue Of Unity" :

We have selected an already constructed structure site named The Statue Of Unity as a technical case study. It is located on the Narmada River in the Kevadiya colony, facing the Sardar Sarovar Dam 100 kilometers (62 mi) southeast of the city of Vadodara and 150 kilo meters (93 mi) from Surat.

Introduction :

The Statue of Unity is the world's tallest statue with a height of 182 meters (597 feet). It is located on the Narmada River in the Kevadiya colony, facing the Sardar Sarovar Dam 100 kilometers (62 mi) southeast of the city of Vadodara and 150 kilometers (93 mi) from Surat. The project was first announced in 2010 and the construction of the statue started in October 2013 by Larsen & Toubro, with a total construction cost of ₹2,989 crore (₹29.89 billion; US$437 million) It was designed by Indian sculptor Ram V. Sutar, and was inaugurated by Indian Prime Minister Narendra Modi on 31 October 2018, the 143rd anniversary of Sardar Patel's birth.

Standing at 182 meters, which is twice the height of the Statue of Liberty, the Statue of Unity in Gujarat rises on India's western shore as the pride of the nation built on a budget of Rs. 2,989 Crore (USD 450 Million), it is a tribute to Sardar Vallabhbhai Patel, a freedom fighter and

India's first Deputy Prime Minister. Constructed by Larsen and Toubro (L&T), the Statue of Unity is located on Sadhu Hill on the banks of the Narmada in Gujarat. The statue towers over another engineering marvel, the Sardar Sarovar Dam, and has already become a draw for tourists from across the country. The project was the winner of PMI India's Project of the Year in the large category in 2019.

History :

Narendra Modi first announced the project to commemorate Vallabhbhai Patel on 7 October 2013 at a press conference to mark the beginning of his 10th year as The Chief Minister of Gujarat. At the time, the project was dubbed, "Gujarat's tribute to the nation". A separate Society named Sardar Vallabhbhai Patel Rashtriya Ekta Trust (SVPRET) was formed under the chairmanship of the Chief minister, Government of Gujarat, to execute the project. An outreach drive named the Statue of Unity Movement was started to support the construction of the statue. It helped collect the iron needed for the statue by asking farmers to donate their used farming instruments. By 2016, a total of 135 metric tonnes of scrap iron had been collected and about 109 tonnes of it was used to make the foundation of the statue after processing. A marathon titled Run For Unity was held on 15 December 2013 in Surat and Vadodara in support of the project.

Project Scope

The Statue of Unity is the tallest statue in the world and is dedicated to the life and work of Sardar Vallabhbhai Patel. The scope of the project also included a hotel, convention centre, memorial garden, visitor centre building and a 3.5 km (2.2 mile) highway connecting the statue site to the town of Kevadia in the state of Gujarat. The project envisages that the iconic statue will become a catalyst for accelerated development in the project area benefitting a large number of the local tribal population. It was anticipated that development will be based on several stimuli such as tourism infrastructure, entertainment and educational infrastructure, research activity in facets of bio-technology, clean energy, water resources, environmental management and tribal development. The overall area surrounding the project site was expected to grow and support all of the above activities and more.

The statue depicts Vallabhbhai Patel, one of the most prominent leaders of the Indian independence movement, the first home minister as well as the first Deputy Prime Minister of independent India, and responsible for the integration of hundreds of princely states into the modern Republic of India. The Statue of Unity is an enlarged version of this statue in the Ahmedabad International Airport. After studying statues of Patel across the country, a team of historians, artists, and academics chose a design submitted by the Indian sculptor Ram V. Sutar. The Statue of Unity is a much larger replica of a statue of the leader installed at Ahmedabad International Airport. Commenting on the design, Ram Sutar's son, Anil Sutar explains that, "the expression, posture and pose justify the dignity, confidence, iron will as well as kindness that his personality exudes. The head is up, a shawl flung from shoulders and hands are on the side as if he is set to walk". Three models of the design measuring 3 feet (0.91 m), 18 feet (5.5 m), and 30 feet (9.1 m) were initially created. Once the design of the largest model was approved, a detailed

3D-scan was produced which formed the basis for the bronze cladding cast in a foundry in China.

Project Features :

T-5.3 A Project Site And Its Features

PROJECT SITE AND ITS FEATURES	
Height of the Statue	182 meters
Project Cost	Rs. 2,989 Core (USD 450 Million)
Project Duration	33 months
Employment Generation	4500 direct and 3500 indirect
Project management Effort	1, 058 (person-month)
Amount of reinforced Steel Used	18,500 Mt. Tons
Amount of Structured Steel Used	6.500 Mt. Ton
Amount of Bronze Used	1,700 Mt. Ton + 1,800 Mt. Ton for cladding

T-5.3 B Timeline And Task

TIMELINE AND TASK	
21stAugust2012	ProjectsigningwithPMCTurnerProjectManagement&JV
28thDecember 2013	Beganthe‘LohaCampaign’
1stNovember 2013	SadhuBethillocklandinvestigation
28thMay2013	PotentialBiddersmeet
28thOctober2013	WebsiteLaunchbyGovernorofGujarat
31stOctober 2013	GroundBreaking
27thOctober2014	IssuanceofworkordertoL&T
31stOctober 2014	GroundBreakingceremonyofShresthaBharatBhavan
27thDecember 2014	Consultationonstatue features
5thJanuary2015	Showcasingthe statueatvibrantGujaratSummit
2nd May2015	ConsultationWorkshopatbardoli
26thMay2015	ConsultationworkshopatAhmedabad
21stJuly2015	ConsultationworkshopatNoida
31stOctober 2015	ReplicaofthestatueinstalledatSwarnimPark,Gandhinagar
17thJune2016	ReviewoftheprojectbyHon’blePrimeMinister
29thSeptember2016	GroundbreakingofMemorial & VisitationCentre
31stOctober 2016	OathofUnityatSwarnimPark
4thJanuary2017	LaunchofArchivalBook
Jan-17	ShowcasingthestatueatVibrant
May-17	Launchof CoffeeTableBook
17thSeptember2017	VisitofHon’blePrimeMinister
31stOctober2018	ConstructionCompleted

Construction:

Statue of Unity Height Standing at 597 feet or 182 meters above ground level, the Statue of Unity is twice the size of the Statue of Liberty in the United States, and 40% taller than China's Spring Temple Buddha. The statue also hosts a viewing gallery at a height of 193 meters from sea level, which can accommodate 200 visitors at a time, offering a spectacular view of the Sardar Sarovar Dam, its reservoir, and the Satpura and Vindhya mountain ranges.

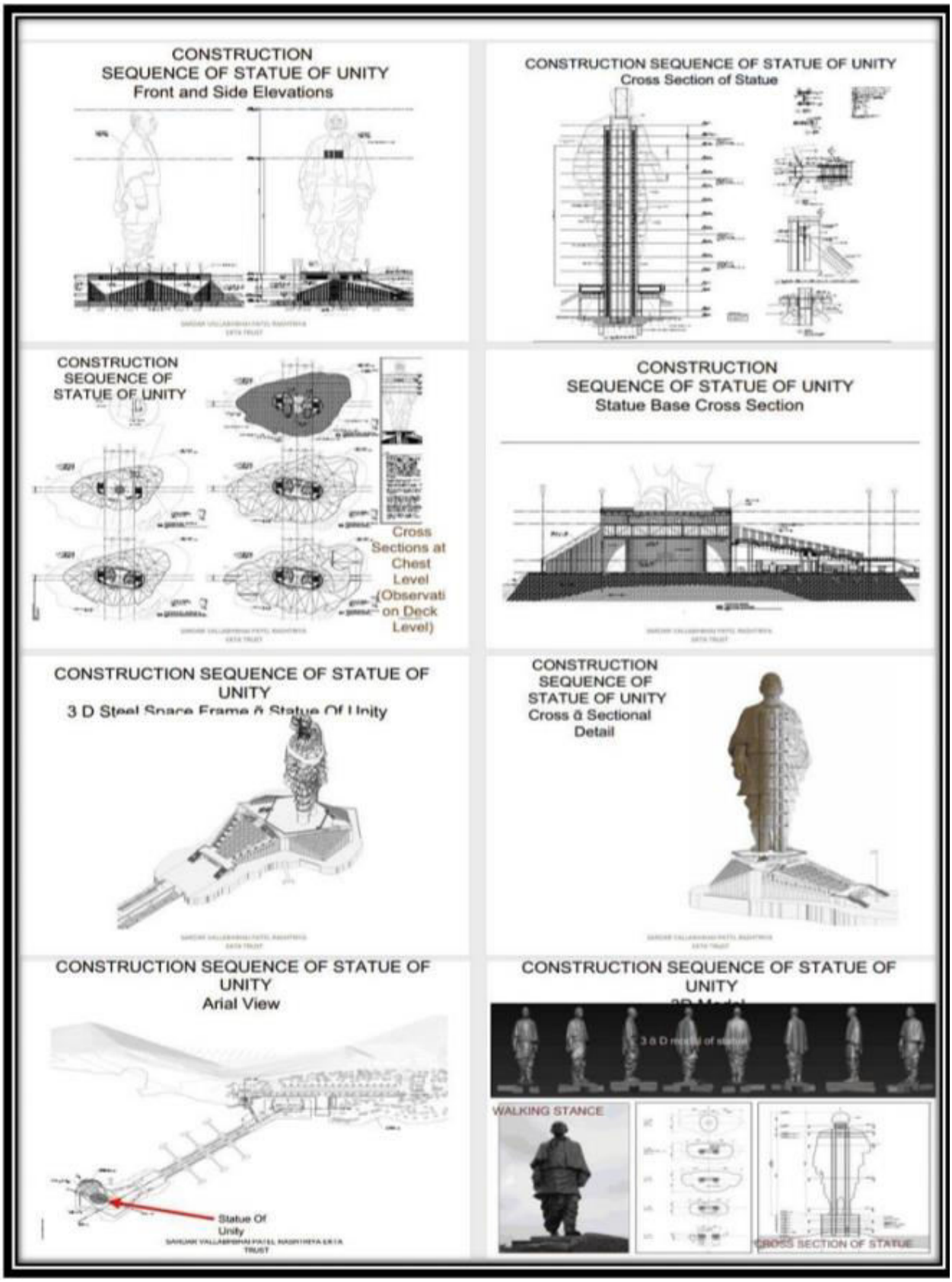
Statue of Unity Cost Costing nearly ₹3,000 crores / USD $40-45 Million / Euro €35-40 Million – work on the 182-meter tall Statue of Unity began in 2013 and completed in 2018.

Built by over 250 engineers and 3,400 workers using 70,000 tonnes of cement, 18,500 tonnes of reinforcement steel bars, 6,000 tonnes of structural steel, and 1,700 metric tonnes of bronze – the Statue of Unity in Gujarat stands twice as tall as the Statue of Liberty in the United States. Larsen and Toubro and state-run Sardar Sarovar Narmada Nigam Ltd built the statue, with intricate bronze cladding work done by a Chinese foundry, the Jiangxi ToqineCompany.The height of the statue was fixed as '182' meters to match the total democratic assembly constituencies in the state of Gujarat.The base of the statue is constructed with over 129 tonnes of scrap iron, donated by nearly 100 million farmers from across India. The statue is built to withstand wind velocity up to 60 meters per second and earthquakes measuring below 6.5 on the Richter scale.

Statue of Unity Architect The Statue of Unity is designed by Padma Bhushan-winning sculptor Ram V Sutar, who has designed over 50 monuments in his 40-year career. Depicting Sardar Patel wearing a traditional dhoti and shawl, towering over the mighty Narmada river, looking out towards the world as a commanding yet humble, unfazed, and unafraid leader. A consortium comprising Turner Construction, Michael Graves and Associates and the Meinhardt Group supervised the project. The project took 57 months to complete – 15 months for planning, 40 months for construction and 2 months for handing over by the consortium. The total cost of the project was estimated to be about ₹2,063 crore (equivalent to ₹27 billion or US$370 million in 2019) by the government. The tender bids for the first phase were invited in October 2013 and were closed in November 2013. Narendra Modi, then serving as the Chief Minister of Gujarat, laid the statue's foundation stone on 31 October 2013, the 138th anniversary of Patel's birth.

Natural factors such as earthquakes and wind posed stiff challenges in the construction ofthe statue of unity. Since the statue of unity was located right in the middle of the river Narmada,it was exposed to the tunnel effect of winds blowing down the river. After analysing the windpattern data over the years, researchers identified that the wind speeds of 130 kilometres per hour(roughlytranslatedinto39meterspersecond)couldtopplethestatueinaworst-casescenario.To address this, issue the Statue of Unity has been engineered to withstand the wind speeds ofaround180 kilometres per hour.

The challenge in the construction of unity was not just about the wind blowing against the statuebut also about the succession effect created at the back of the statue. This aspect was alsoconsidered in the structural design of the statue of unity. The Statue of Unity could easily surviveanearthquakemeasuringaround6.5ontheRichterscalewithinaradiusof12kilometresandatad epth of 10 kilometers.


CONSTRUCTION
SEQUENCE OF STATUE OF UNITY
Front and Side Elevations
CONSTRUCTION SEQUENCE OF STATUE OF UNITY
Cross Section of Statue
CONSTRUCTION
SEQUENCE OF
STATUE OF UNITY
Cross
Sections at
Chest
Level
(Observati
on Deck
Level)
CONSTRUCTION
SEQUENCE OF STATUE OF UNITY
Statue Base Cross Section
CONSTRUCTION SEQUENCE OF STATUE OF
UNITY
3 D Steel Space Frame & Statue Of Unity
CONSTRUCTION
SEQUENCE OF
STATUE OF UNITY
Cross & Sectional
Detail
CONSTRUCTION SEQUENCE OF STATUE OF
UNITY
Arial View
Statue Of
Unity
CONSTRUCTION SEQUENCE OF STATUE OF
UNITY
WALKING STANCE
CROSS SECTION OF STATUE

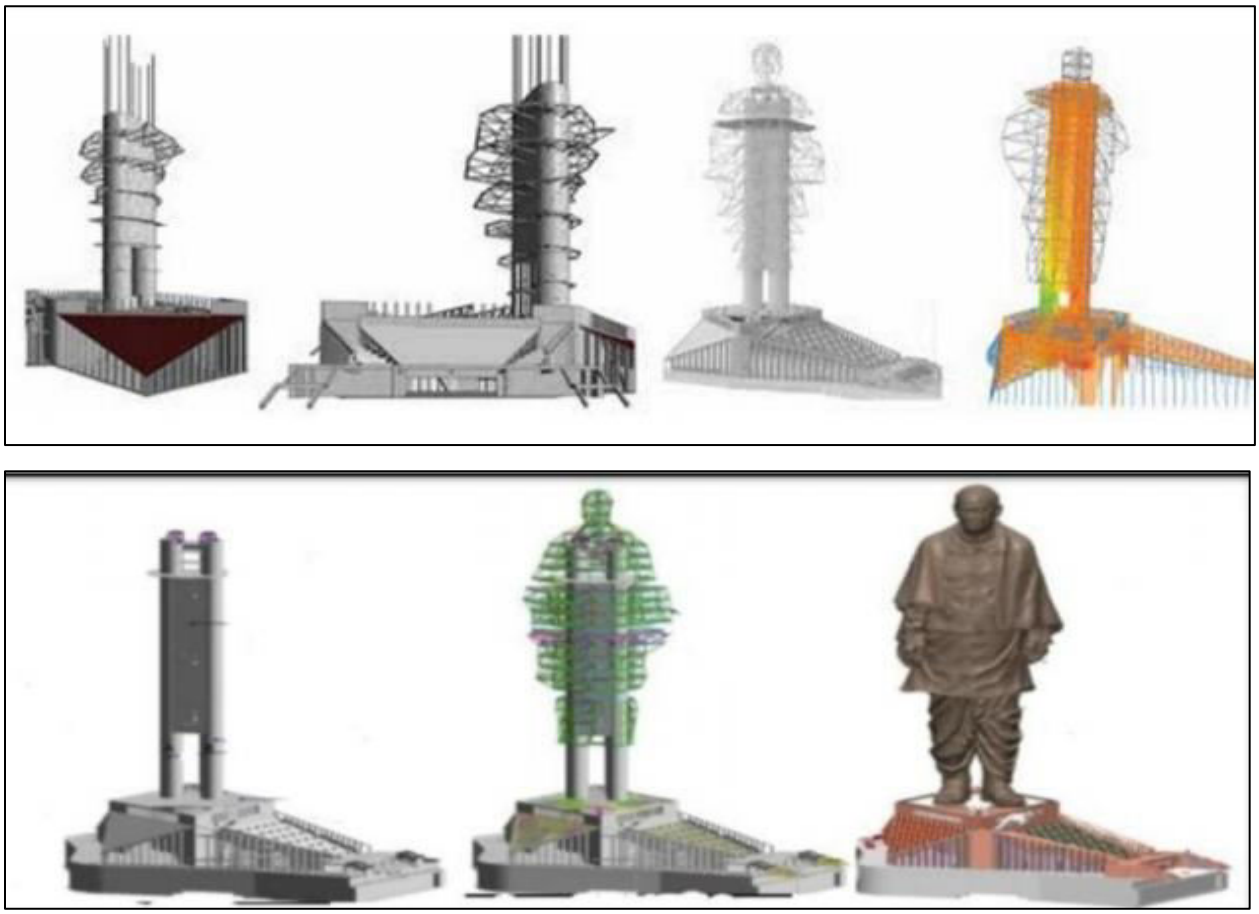


Fig-5.3 A Design and construction of Statue of unity

Recent News on Statue of Unity:

- The day before yesterday, PM Modi urges people to visit Sardar Sarovar Dam and its nearby the Statue Of Unity in his home state Gujarat that has touched historic 134-meter water levels.
- After setting a number of records, the Statue of Unity in Gujarat has found a place in the Time's list of 100 greatest places in the world.
- It is a matter of pride that the Statue of Unity is emerging as a popular tourist destination and at the same time, a record 34,000 people visited the site in a single day.
- On 18th August 2019, Gujarat Chief Minister Vijay Rupani inaugurated a river rafting sports facility at Khalvani near the Statue of Unity.
- This statue is known as the Pride of the Nation, but the mass of people think that spending Rs. 2900 crores on it have been completely wastage of public money. Several questions have been asked In the recent govt exams

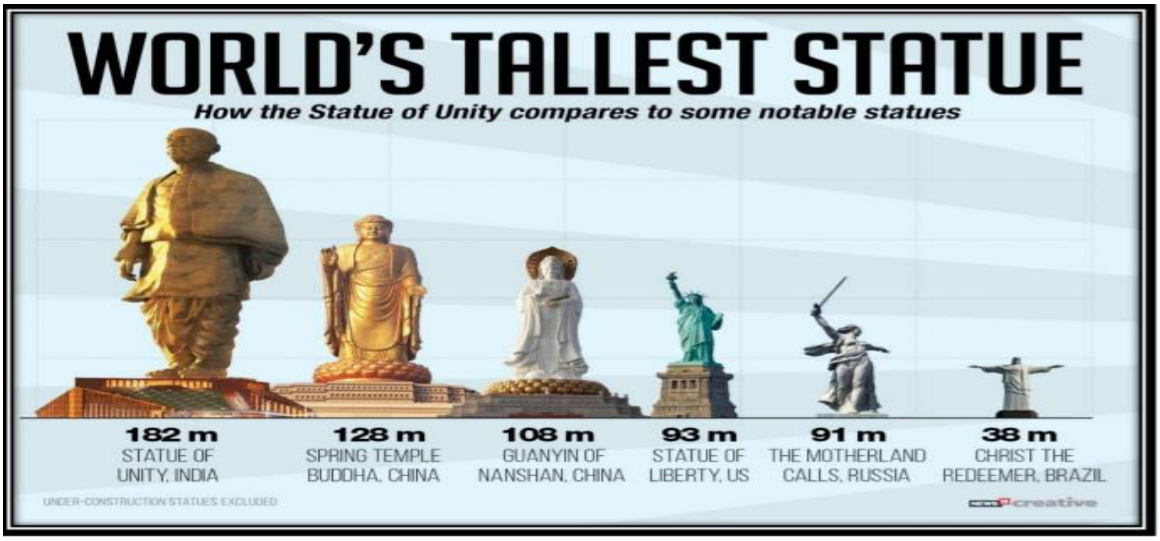
Advantages of Statue of Unity

- It is the world's tallest statue which has recently been awarded in Time's list of 100 greatest places in the world, is located in India and considered to be 'Pride of Nation'.
- It will boost income from tourism and generate a large number of hotels, transports and other services. • Increase in the transport, restaurants, accommodation, service sectors.

- It is estimated that this statue will remain as it is for 1000 years which implies that it will contribute to the national income of India through tourism for centuries.
- Local people getting employment.
- The local business has seen lots of progress.

Disadvantages of Statue of Unity

- The government has spent a huge amount of money on this project over other priorities like women's safety, education and agriculture schemes.
- There are plenty of sectors in India, like health, safety, employment and education where the money could have been utilized.
- Many political parties allege that this was a place of religious significance, so it should not be built on the land.



Tourism:

- Over 128,000 tourists visited the statue in the 11 days after its opening to the public on 1 November 2018. The daily average tourist footfall at Statue of Unity during November 2019 reached 15,036, outpacing the Statue of Liberty (which attracts around 10,000 daily visitors on average).

Chapter 6.
Swatch Bharat Abhiyan (Clean India)

Swatch Bharat Mission (SBM)

Swatch Bharat Abhiyan is one of the most significant and popular missions to have taken place in India. Swatch Bharat Abhiyan translates to Clean India Mission. This drive was formulated to cover all the cities and towns of India to make them clean. This campaign was administered by the Indian government and was introduced by the Prime Minister, Narendra Modi. It was launched on 2nd October in order to honor Mahatma Gandhi's vision of a Clean India. The cleanliness campaign of Swatch Bharat Abhiyan was run on a national level and encompassed all the towns, rural and urban. It served as a great initiative in making people aware of the importance of cleanliness.

The objectives of the first phase of the mission also included eradication of manual scavenging, generating awareness and bringing about a behavior change regarding sanitation practices, and augmentation of capacity at the local level. The second phase of the mission aims to sustain the open defecation free status and improve the management of solid and liquid waste.

The mission is aimed at progressing towards target6.2 of the Sustainable Development Goals Number 6 established by the United Nations in 2015.The campaign's official name is in Hindi. In English, it translates to "Clean India Mission". The campaign was officially launched on 2 October 2014 at Rajghat, New Delhi by Prime Minister Narendra Modi. It is India's largest cleanliness drive to date with three million government employees and students from all parts of India participating in 4,043 cities, towns, and rural communities. At a rally in Champaran, the Prime minister called the campaign Satyagrah se Swatchagrah in reference to Gandhi's Champaran Satyagraha launched on 10 April 1916. The mission was split into two: rural and urban. In rural areas "SBM - Gramin" was financed and monitored through the Ministry of Drinking Water and Sanitation; whereas "SBM - urban" was overseen by the Ministry of Housing and Urban Affairs.As part of the campaign, volunteers, known as Swachhagrahis, or "Ambassadors of cleanliness", promoted indoor plumbing and community approaches to sanitation (CAS) at the village level. Other activities included national real-time monitoring and updates from non-governmental organizations (NGOs) such as The Ugly Indian, Waste Warriors, and swatch Pune (Solid Waste Collection and Handling).The government provided subsidy for construction of nearly 110 million toilets between 2014 and 2019, although many Indians especially in rural areas choose to not use them. The campaign was criticized for using coercive approaches to force people to use toilets.

6.1 Swachhta needed in Waghai village -Existing Situation with photograph:

We have done one survey on existing condition of village regarding swachhta. The people are maintaining cleanliness of the village but in some streets there is no swachhata because there are

animal and their waste , mud, etc. The village pond has to need a proper maintenance. Other than these there are clean streets, main road and approach road.

Fig-6.1 A Waghai Internal streets

Fig-6.1 B Main roadwaghai

6.2 Guidelines - Implementation in Waghaivillage :

According to Talati, Sarpansh and villagers, the people are cleaning their nearby area regularly and collect that waste and dispose it to out of the village and burn it. No daily basis waste collection is there in the Waghai village.

6.3 Activities Done by Students for Waghai village:

We took a permission from village Talati and Sarpanch for doing one Swachhta awareness camp and then we have done one activity of swachhta awareness in the village and we have done an interaction with villagers and aware them about the importance of swachhta in our life and told them to keep the village and infrastructure clean and safe.We have also done a cleaning of village street. We have suggested them for not dumping the waste in village streets and dispose it at right place. So that we have also proposed one design of Solid Waste Management as part 2 design in the Waghai village.

Fig-6.3- A- Activities Done by Students for Waghai village

Chapter 7.
Village Condition due to Covid-19

The nation-wide lockdown imposed in India from March 25 to May 31, 2020 following the breakout of the Covid-19 pandemic affected rural India in diverse ways. This was only to be expected given the great variation in production systems and socio-economic conditions in villages across agro-ecological zones.Most rural communities rely on untrained health workers. Over two-thirds of these rural health providers have no formal medical training, but remain the only option of medical support for most of the rural population.This situation is worsened by the stigma and misinformation that surrounds COVID-19 in India. Fear of the virus has led to widespread mistrust of trained healthcare professionals. Indian doctors have reported being evicted from rented accommodation and others have been violently targeted in some slum communities. The misconception is that health professionals are sources of infection and that they will force people to be removed from their families into quarantine centres.

7.1 Taken steps in Waghai village related to existing situation:

During interaction with the Sarpanch, he told us that in waghai there is not any case of covid in waghai village but they are prepared to fight for covid andinwaghai village large government hospital is available which can be after conveted into quarantine center Sarpanch and villagers in the WAGHAI village the sanitization process was done during the lockdown period when first case of covid 19 came in the village.

7.2 Activities Done by Students for Waghai village with Photograph:

We have taken a permission from Talati and Sarpanch for doing one awareness regarding covid 19 in the WAGHAI village and then we did awareness camp regarding covid 19. In that awareness camp we have distributed some face masks to the villagers for the protection against covid 19 and aware them about covid 19 situation in India and told them to take precautionary measures like wear a mask perfectly, wash hands.



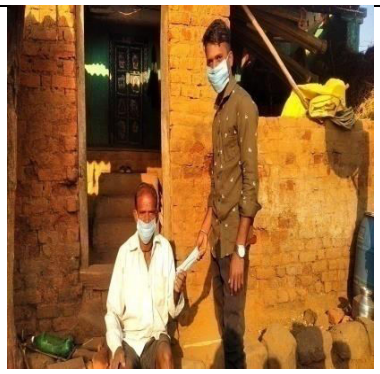


Fig- 7.2 A Activities Done by Students for Waghai village

Chapter 8.
Sustainable Design Planning Proposal (Prototype Design) - Part- I (Scenario / Existing Situation / Proposed Design in Auto cad / Recapitulation Sheet / Measurement Sheet / Abstract Sheet)

8.1 Design Proposals : Observation and brief write up about Each design

1.Public sanitary complexes

A sanitary toilet complex is an infrastructure for the use of the community and/or floating population. A sanitary toilet complex takes care of safe disposal/reuse of human waste in addition to the objective of providing a toilet facility that enhances privacy and dignity.

2.Sewage treatment plant

From a public health perspective, treatment of the wastewater produced by the population and industries in a given urban area is critical to ensure stable growth.

3.Community hall

Community hall is a public location where members of a community gather for group activities, events, festivals and social purpose.

4.Cybercafe

Cyber café is the facility where computers are provided for accessing the internet, playing games, chatting with friends or doing other computer related tasks and access of these is charged based on time**.**

5. Pharmacy Store

In the Waghai village there is one PHC or dispensary or private clinic or pharmacy store, but according to the feedback given by the villagers, dispensary is not in good condition it requires some new formations of facilities and design .

6. Tourist Service Center

Tourist information center, providing visitors to a location with information on the area's attractions, lodgings, maps, and other items relevant to tourism .

Electrical Design

1. Solar Street Light

For the smart development of the Waghai village we have proposed the smart concepts as the solar street lights. Solar Street lights are very helpful while traveling in night it reduces accidents and provide better safety facilities.

2. Roof Top Solar

Energy plays a pivotal role in our daily activities. The degree of development and civilization of a country is measured by the amount of utilization of energy by human beings. Energy demand is increasing day by day due to increase in population, urbanization and industrialization.

3. Solar Water Pumping System

In waghai village people don't have very much knowledge about solar power system. People use only electricity supplied by the government for irrigation and other purposes.

8.1.1.Sustainable design : Public sanitary complexes

Introduction

A public toilet is a facility which is built for the use of 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. Public toilets may be owned by the Gram Panchayats, private trusts, Non-governmental Organisations (NGOs), Community Based Organisations (CBOs), Self Help Groups (SHGs), youth clubs, or even private entrepreneurs, who ensure proper O&M of the system.

Existing Situation

In waghai village there is not any facilities of sanitation for visitors and tourists. So it is very important to design public sanitary complexes to increa se attractions of tourist s and to provide better facilities for visitors and tourists.

Problems and Prospects of Implementing Sanitary Toilet Complexes in Rural Villages

Sometimes, a sanitary toilet complex is a useful way to completely end the practice of open defecation in the village. While community toilets act as a medium to help families who cannot otherwise have an IHHL, public toilets address the needs of the floating population. Overall, sanitary toilet complexes help in ensuring social dignity and privacy.

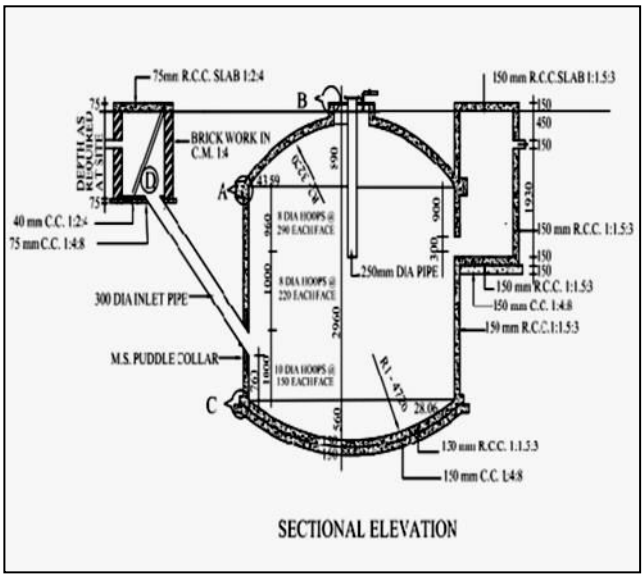
The immediate benefits of improved sanitation in rural areas include:

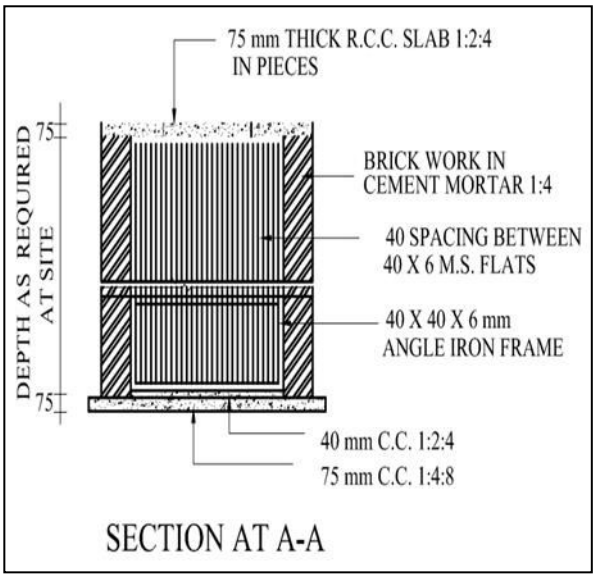
- Dignity and social status
- Privacy and safety;
- Convenience and comfort;
- For women and girls, avoidance of sexual harassment and assault; and
- Less embarrassment with visitors in homes.

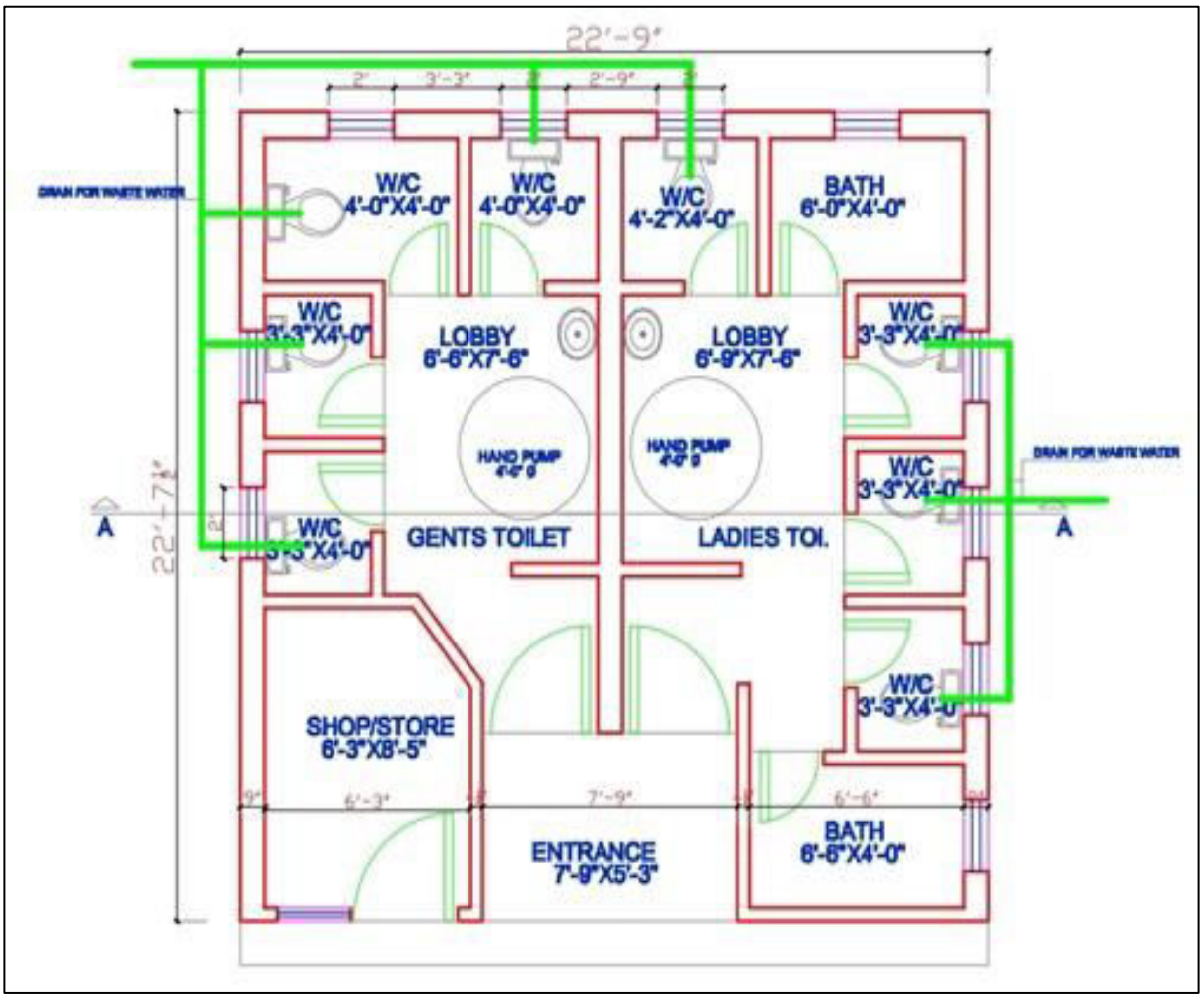
Design Utilized by :

- Migrant Workers, Visitors, And Tourists, Floating Population
- Size : 9 cubic metre (m3) capacity (around 300 users of toilets per day)

PROPOSED DESIGN IN AUTO CAD; REVIT AND SKECHUP







PLAN

Fig –8.1.1 APlan and Section Of Public Sanitary Complexes

Fig-8.1.1 B- Public Sanitary Complex 3D Model

T- 8.1.1A Estimation And Costing Of Public Community Toilet

Sr. No	ITEM	Unit	Qty.	Rate(Rs.)	Amount(Rs)
1	Earth work in excavation over areas (exceeding 30 cm in depth, 1.50 m in width as well as 10 sq m on plan) including disposal of excavated earth lead up to 50 m and lift up to 1.5 m, disposed earth to be 88itumin and neatly dressed soft/loose soil.				
	a) From 0.00 m to 1.50 m below ground	47.02	m3	103.40	4,861.87
	b) From 1.50 m to 3.0 m below ground	42.14	m3	122.30	5,153.72
	c) From 3.00 m to 4.50 below ground	29.11	m3	141.20 4	110.33
	d) From 4.50 m to 6.0 m below ground	5.63	m3	160.10	901.36
2.	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering all work up to plinth level 1:4:8 (1 cement: 4 coarse sand:8 graded stone aggregate 40 mm nominal size)	6.46	m3	2,449.00	15,820.54
3	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering all work up to plinth level 1:4:8 (1 cement: 4 coarse sand:8 graded stone aggregate 40 mm nominal size)	6.46	m3	2,449.00	15,820.54
A	RCC work in arches, archribs, domes and vaults up to floor two level excluding cost of centering, shuttering and reinforcement with 1:1.5:3 (1 cement:1.5 coarse sand:3 graded stone aggregate 20 mm nominal size)	5.75	m3	4,092.35	23,531.01
B	RCC work in lintels, beams, plinth beams and bressumers up to floor two level excluding cost of centering, shuttering & reinforcement 1:1.5:3 (1 cement:1.5 coarse sand:3 graded stone aggregate 20 mm nominal size)	1.98	m3	4,092.35	8,102.85
C	RCC work in walls (any thickness) including attached pilasters, fillets etc. up to floor two level excluding cost of centering, shuttering & reinforcement 1:1.5:3 (1 cement:1.5 coarse sand:3 graded stone aggregate 20 mm nominal size)	9.21	m3	4,092.35	37,690.54
D	RCC work up to plinth level excluding cost of centering, shuttering and reinforcement with 1:1.5:3 (1 cement:1.5 coarse sand:3 graded stone aggregate 20 mm nominal size)	1.26	m3	4,092.35	5,156.36

E	RCC work in suspended floors, roofs, landings and balconies up to floor two level excluding the cost of centering, shuttering, finishing and reinforcement 1:2:4 (1 cement:2 coarse sand:4 graded stone aggregate 20 mm nominal size)	1.41	m3	4,092.35	5,770.21
F	Providing, hoisting and fixing up to floor five level precast RCC in string courses, bands, copings, bed plates, anchor blocks, plain in window sills and the like including the cost of centering, shuttering, finishing but excluding the cost of reinforcement with 1:2:4 (1 cement:2 coarse sand:4 graded stone aggregate 20 mm nominal size)	0.18	0.18 m3	4,092.35	736.62
5	Reinforcement for RCC work including bending, binding and placing in position complete cold twisted bars	21.85	kg	2,580.00	56,373.00
6	Brick work with bricks of class designation 75 in foundation and plinth in 1:4 cement work	1.43	m3	2,529.05	3,616.54
7	12 mm cement plaster 1:3 (1 cement:3 coarse sand) providing and mixing water proofing material in proportion recommended by the manufacturers, finished with a float coat of neat cement	7.84	m2	112.80	884.35
8	Providing and laying S&S centrifugally cast (spun) iron pipes (class LA) 300 mm diameter	3.8	m	2,800.00	10,640.00
9	Cement concrete flooring 1:2:4 (1 cement:2 coarse sand:4 stone aggregate) finished with a floating coat of neat cement including cement slurry, rounding off edges and strips, etc., but excluding the cost of nosing of steps, etc., complete, 40 mm thick	1.2	m2	192.95	231.54
10	Providing & fixing PVC pipe 3.0 m long 250 mm diameter with flange and 0.50 m long 50 mm ID steel tube complete	1	Set	15,000.00	15,000.00
11	Steel work in bolted section for mild steel plates including cutting, hoisting, fixing in position and applying a priming coat of approved primer	125.89	kg	46.35	5,835.00
12	Providing and fixing 10/12 mm thick rubber ring seal gasket under MS plate	1.33	m2	2,000.00	2,660.00
13	Providing & fixing bolts and nuts up to 300 mm in length including nuts and washer plates 10 mm diameter				
	20 mm diameter	7	kg	62.75	439.25

14	Providing & fixing 50 mm diameter GI pipes complete with GI fittings including trenching and refilling (external work)	10	m	280.10	2,801.00
15	Providing and fixing safety valve of 50 mm diameter	1	Each	3,500.00	3,500.00
16	Providing & fixing brass stop cock of approved quality for gas outlet	1	Each	578.20	578.20
17	Steel work welded in built up sections, trusses and framed work including cutting, hoisting, fixing in position & applying a priming coat of approved steel primer in tees, angles, flats and channels	75	kg	61.50	4,612.50
18	Disposal of surplus earth by mechanical transport including loading, unloading up to 3 km	106.18	m3	63.32	6,723.32
19	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations, etc., in layers not exceeding 20 cm in earth consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.50 m	17.72	m3	45.70	809.80
20	Supplying & applying 90ituminous solution primer on roofs and/or wall surface at 0.24 litre per sq m	117.12	m2	14.65	1,715.81
21	Installation of well point equipment for lowering sub-soil water to required level by pumping during construction including removal of slips and mud, etc., and removal of equipment after completion	Job	LS		5,000.00
22	Sheet piling work	Job	LS		5,000.00
23	Epoxy painting on concrete work on the inner, surface of the digester & displacement chamber	117.12	m2	77.75 9	106.08
	Site clearance before and after completion	Job	LS		5,000.00
				Total	288,087.11
	Add 26% enhancement excluding items 10,12,15,24				599,11.04
				Total	347,998.04
				Say Rs	348,000.00

The rates of their respective works provided in the abstract sheet along with quantities are inclusive of water charges, contractor's profit, contingencies, utilities and labor charges.

Total cost = 3,48,000.00

8.1.2 Design Of Sewage Treatment Plant

Introduction

Wastewater must also be treated to an extent that it does not affect the environment into which it is discharged, the goal being to ensure that urban growth is sustainable.In order for wastewater treatment to be sustainable, an innovation project must be implemented to develop a new biological wastewater treatment process with low energy consumption and a low environmental impact.

Design Detail of Sewage Treatment Plant with Sequential Batch Reactor Principle

The sequential batch reactor (SBR) process is a cyclic activated sludge treatment process. Multiple reactors are provided to treat the wastewater in batches. Sequencing batch reactors will be operated to oxidize carbonaceous BOD, nitrify the ammonia and denitrify to reduce total nitrogen to a level that meets the permit limits.

Water demand calculation:

Water demand is calculated based on the guidelines of NBC. Total quantity of water requirement for the population of approx 10000 is estimated as 122.09 KLD during the operation phase.

Total water requirement = 122.09 m3 / day

Assuming Diversity Factor of 0.85 = 103.77 m3

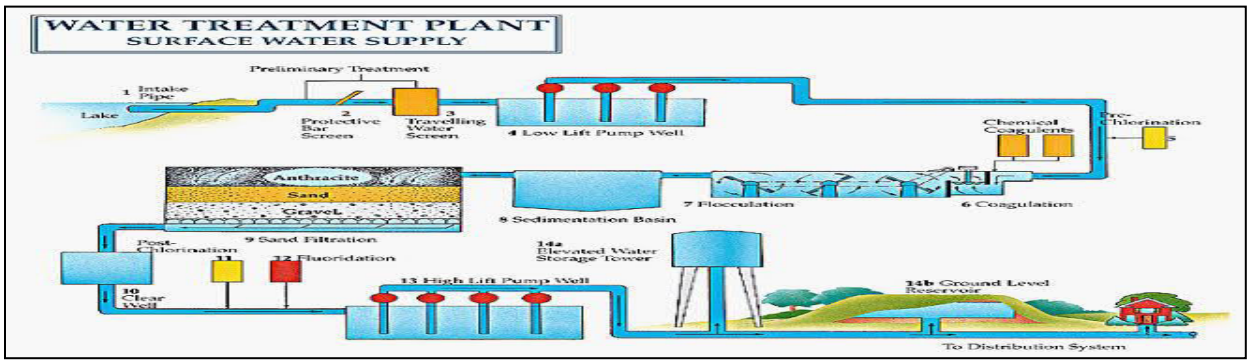
General characteristics:

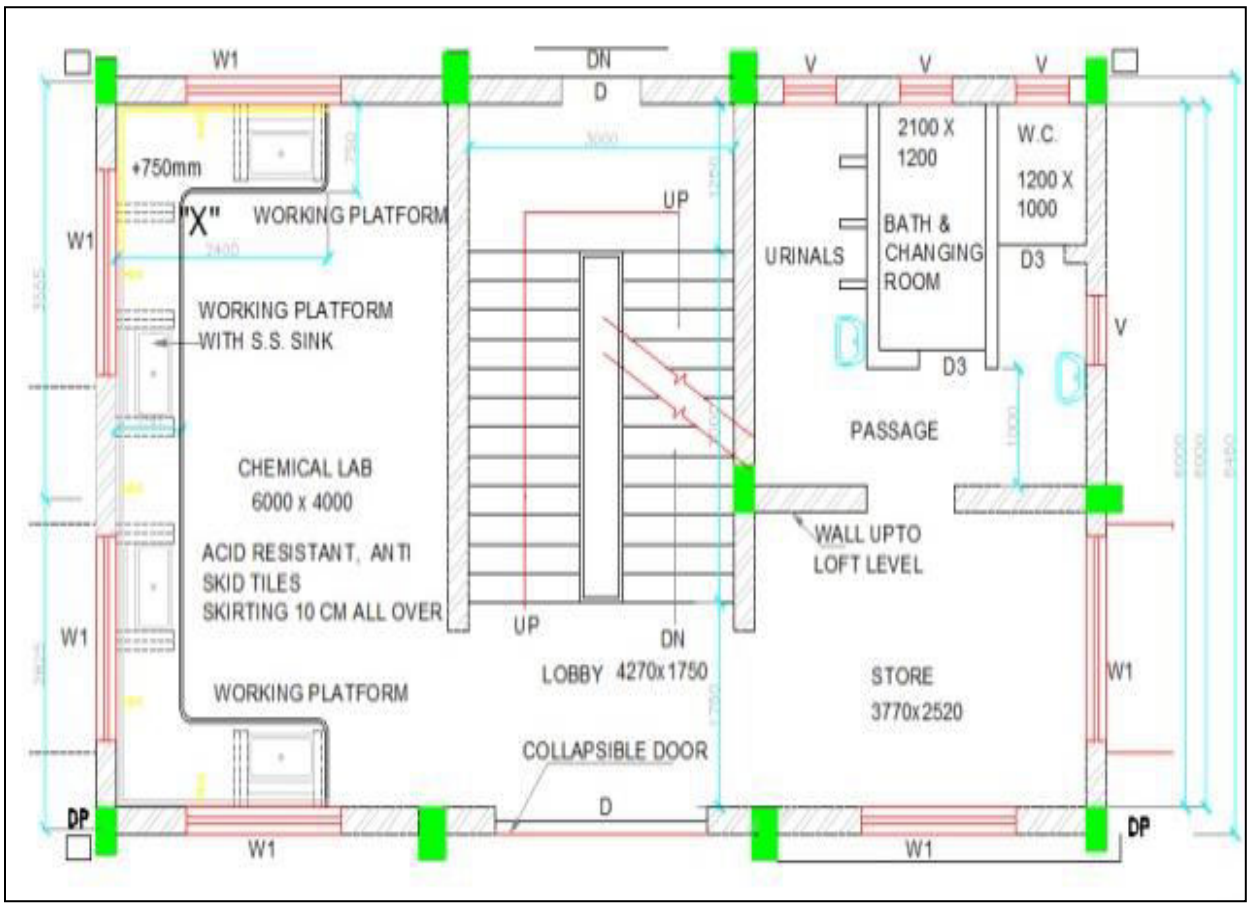
It is proposed to install STP of capacity 1,15,000 litres/day, Following is the scheme for treating 1,15,000Liters/day capacity sewage. The treated water can be utilized for Toilet Flushing & gardening. Various treatment units which have been envisaged in this sewage treatment plant are explained below.

T-8.2 A Characteristics Of Waste Water

CHARACTERISTICS OF WASTE WATER	
BOD..	300 to 350 Mg / Ltr
COD	350 to 450 Mg / Ltr
TSS	350 to 450 Mg / Ltr
PH	7 to 8
Oil & Grease	100 to 150 mg / Ltr.
CHARACTERISTICS OF TREATED EFFLUENT	
BOD5	< 10 Mg / Ltr
COD	< 100 Mg / Ltr

TSS	< 20 Mg / Ltr
PH	< 6.5 to 7.5.
Oil & Grease	< 10 Mg / Ltr
Turbidity	1 mg/l
E – Coli	Nil





8.1.2 A Sewage Treatment Plant Flow Diagram And Plan

Design :

1. Bar Screen Chamber:

Max Flow = 115 KLD

Detention Time = 6.0 min

Bar Screen Chamber Volume = 0.25 m3

Let Side water depth (SWD) be 1.0 m BSC Size = 2.0 m x 1.25m x 1.0

Screen is made out of MS Flat of Size 10mm x 50mm (10mm facing the flow)

Clear spacing between bars = 20mm

2. Equalization Tank:

Design average flow = 115 KLD

Detention Time = 12 Hr

Volume of Equalization tank = 140.0 m3

Equalization tank dimension = 4.5m x 4.5m x 3.0m

3. Bio Reactor :

No. of. Tanks = 1 No.

No. of. Sequential Batch = 1 Nos

Average flow to the reactor, Q = 115 KLD

Bio reactor volume, V= 105.0 m3

Each Bio reactor dimension = 5.5m x 5.5m x 3.5m

- Hydraulic Retention Time = **V= 105 m3 x 16 Hrs = 14.60 Hrs**

Q 115m3

- Influent VSS, Xt = 0.8 x 400mg/L = 320mg/L

  Θc =VX = 105 x 4000 = 11.4 days (OK since >3 days)

QXt115x 320

- BOD Loading = Q x Y0= **0.72 Kg/m3.d**

  V

4. Decant Tank :

Unlike Other treatment processes, in SBR the Clarified water tank is designed to hold decanted supernatant from each batch, i.e., 105.0 m3/batch.
Thus Clarified Water Tank dimension = **5.5m x 5.5m x 3.5m**

5. Sludge Holding Tank :

Reactor Volume = 12 m3
MLSS = 4000mg/L
Weight of solid = 12m3 x 4kg/L = 48 Kg
Sludge retention time for 9 days, SRT9 = 48 Kg = 5.33 Kg
Sludge/day 9 Wasting during Aeration phase = 25

6. Pre Aeration Tank:

Detention time = 4.0 Hrs
Volume of Final collection tank = 25.0 m3
Final Collection tank dimension = 3.0m x 3.0m x 3.5m

7. Final Collection Tank:

Detention time = 11.5 Hrs
Volume of Final collection tank = 70.0 m3
Final Collection tank dimension = 4.5m x 5.0m x 3.5m

8. Disinfection :

In order to disinfect the treated effluent various disinfection methods like chlorination, ozonation etc can be used. However chlorination is proved to be cheaper and relatively effective. Hence the same system is adopted.

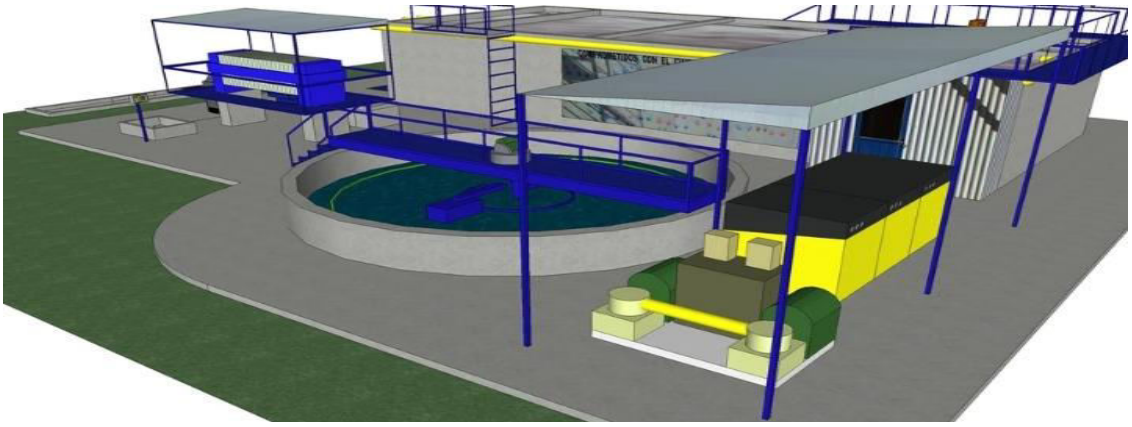


Fig- 8.1.2 B 3D Model Of Sewage Treatment Plant

9. Costing :

As per the capacity of the plant per KLD capacity of the plant the cost various from 50-200.

Toal Cost = 70000.00

Fig-8.1.2 C- Sewage Treatment Plant Costing Chart

8.1.3 Design of community hall

Introduction

All the people living in the village of even outsiders from nearby villages and relatives of the villagers can use or utilize a community hall for their different uses with the permission of Sarpanch, Talati and some authorized people of the village. The Community Hall is an important public building in a prominent location.

Existing Situation in Waghai

In the Waghai village there is no any cybercafe existing in the village. From the feedbacks which were given by the villagers we have decided to design a cybercafe as a smart village design for the main purpose of internet availability at any time for any person in the village.

Location

In waghai village the location for community hall will be suitable near the swaminarayan mandir besides the main road.

Design Utilized by

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

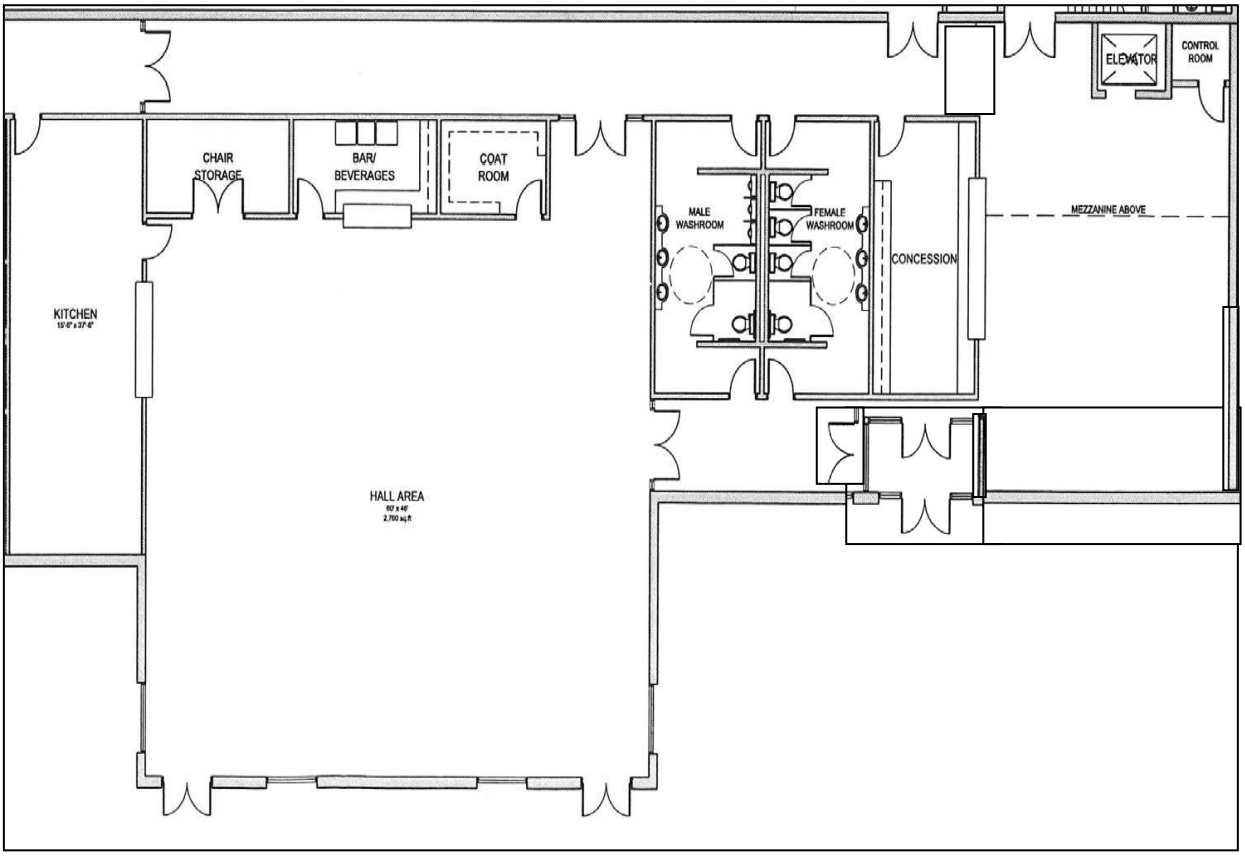
Size : Length : 11.25 ; Width : 7.12 m : Height : 5.03m Carpet area : 80.1 m2

The Community Hall is an important public building in a prominent location. Village and community halls are the smallest buildings that can accommodate a sports programme alongside the customary social and arts pursuits.

Some common repairs and maintenances are as below :

Exterior painting and plastering ; Landscaping and gardening ; Paving repairs ; Carpeting and flooring; Plumbing; Repairing cracking or leaning walls etc. For most effective maintenance , it should be organized through a programme of cyclical maintenance.

Proposed Design in Auto cad: Revit and Sketchup



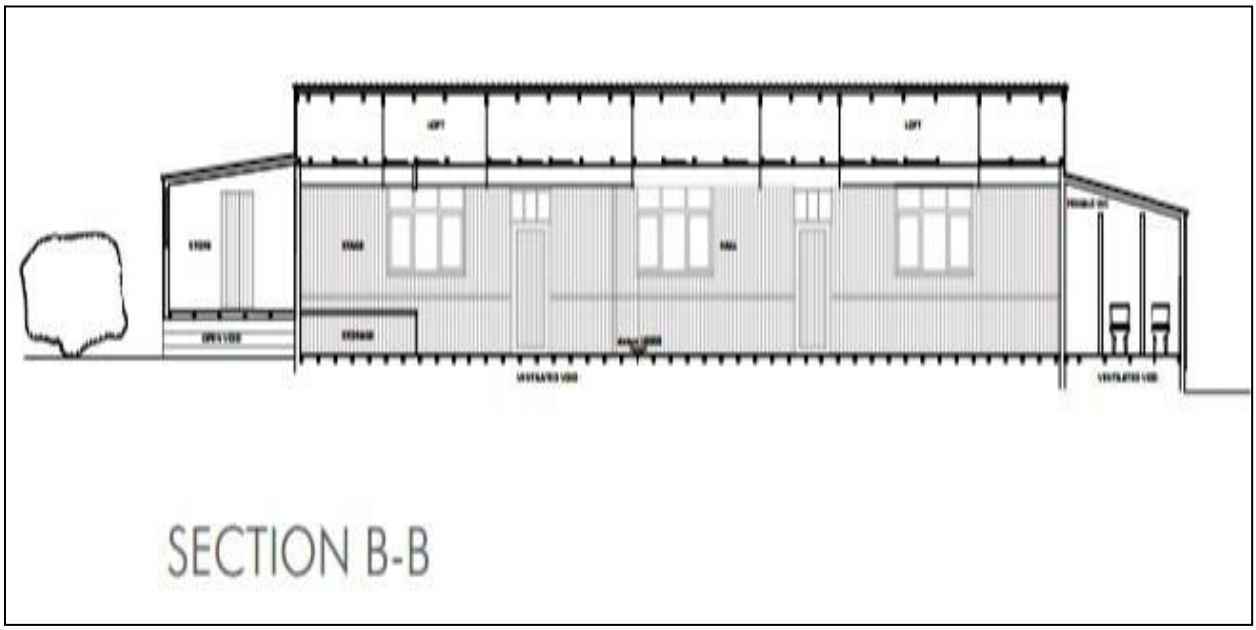


Fig-8.1.3 A Floor plan and section of community hall

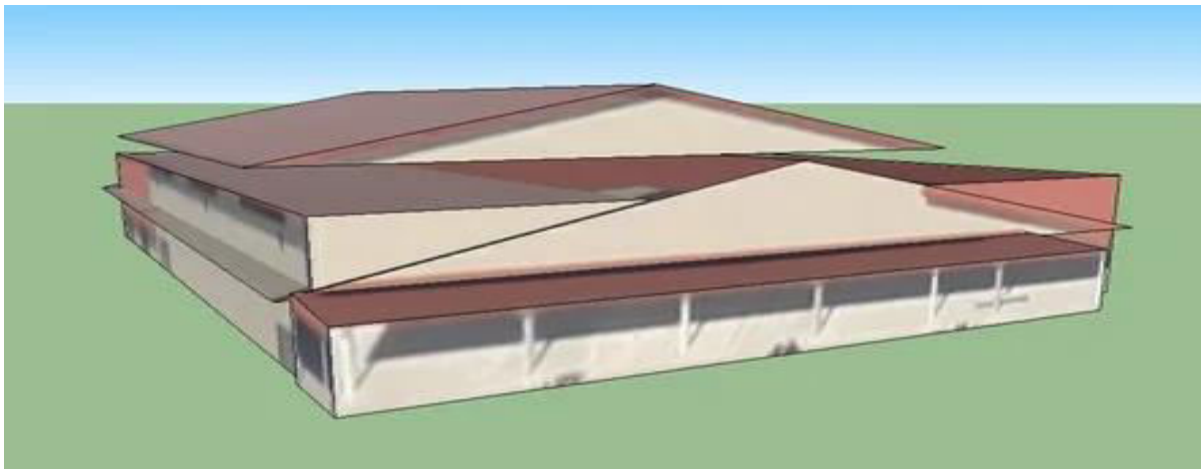


Fig- 8.1.3 B- 3D model of community hall

T- 8.1.3 A Community Hall : Measurement Sheet

Sr. No.	Description	Length (M)	Width (M)	Height (M)	Count	Total Quantity (M3)
1	BASIC WALL: 9": 4	35.052	0.438	3	1	25.09
2	BASIC WALL: 9" PL: 4	35.052	0.438	3	1	3.67
3	BASIC WALL: GENERIC - 6": 5	10.907	0.255	0.76	1	3.030
4	BASIC WALL: GENERIC - 6" 2: 4	35.052	0.255	-	1	3.44
5	WINDOWCASEMENTDOUBLE: 48" X 60"	1.2192	-	2.55	4	-
6	WINDOWLOUVERS: 16" X 24": 2	0.502	--	0.65	2	-
7	BASIC ROOF: GENERIC -6"	-	-	0.255	1	-
8	FLOOR: GENERIC - 10"	-	-	1'-0'	1	21.42
9	DOOR-INTERIORDOUBLE-SLIDING2_PANEL-WOOD: 72" X 84	-	-	2.133	1	-
10	SINGLE-FLUSH: 30" X 80" 2	0.777		2.032	2	
11	PCC	35.152	1.03	0.5	1	10.0
12	BASIC WALL: 00.30	35.152	1.03	0.5	1	4.255
13	BASIC WALL: 0.40	35.152	1.25	0.5	1	5.44
14	BASIC WALL: GENERIC - 0.50	35.152	1.25	0.5	1	6.55

T- 8.1.3 B Community Hall : Abstract Sheet

SR NO.	Description	Quantity (m3)	rate	per	Amount
1	BASIC WALL: 9": 4	25.06	130	Ft2	147290
2	BASIC WALL: 9" PL: 4	3.49	90	Ft2	135500
3	BASIC WALL: GENERIC - 6": 5	3.70	90	Ft2	225010
4	BASIC WALL: GENERIC - 6" 2: 4	2.35	90	Ft2	14825
5	WINDOWCASEMENTDOUBLE: 48" X 60": 6	17ft2	220	-	25300
6	WINDOW-LOUVERS: 16" X 24": 2	384 inch 2	75	-	2700
7	BASIC ROOF: GENERIC -6"	12.09	3500	M3	38881
8	FLOOR: GENERIC - 10"	-	3500	M3	72235
9	DOOR-INTERIORDOUBLE-SLIDING2_PANEL-WOOD: 72" X 84"	-			6300
10	SINGLE-FLUSH: 30" X 80" 2	1,255*5			4300
11	EXCAVATION	10.32	350	M3	1801
12	PCC	5.05	3500	M3	32500
13	BASIC WALL: 00.30	5.45	90	Ft2	13356
14	BASIC WALL: 0.40	6.79	90	Ft2	13356
15	BASIC WALL: GENERIC - 0.50	6.65	90	Ft2	13356
				Grand Total	433560

Costing :

From abstract sheet total cost of community hall is

Grand Total Cost = 433560

8.1.4 Design of cyber café

Introduction:

A cybercafe is a type of business where computers are provided for accessing the internet, playing games, chatting with friends or doing other computer-related tasks. In most cases, access to the computer and internet is charged based on time.

Existing Situation in Waghai :

In the Waghai village there is no any cybercafe existing in the village. From the feedbacks which were given by the villagers we have decided to design a cybercafe as a smart village design for the main purpose of internet availability at any time for any person in the village.

Location :
The location of cybercafé is suitable infront of taluka panchayat and besides of ambika store.

Design Utilized by

People living in the village, Students ,Outsiders of the village , employe, workers to acces various facilities cyber café will be used.

Design brief :

A cybercafe alternatively referred to as an Internet cafe, PC bangs, or Net cafe. Cybercafe is a place to use computers to access the Internet, play games, create documents, chat with friends using voice and video, and other computer-related tasks. At most Internet cafes the computer and Internet access is provided for an hourly or daily fee. Vishwakarma Yojana: Phase VIII Village: Waghai District: Vadodara Gujarat Technological University 2020-2021 Page 123 The cybercafe first came into existence in July 1991 in San Francisco, when Wayne Gregori started up the net Coffeehouse Network. He built and set up 25 coin operated computer stations in multiple coffeehouses in San Francisco. The Binary Cafe was the first cybercafe in Canada, started up in June 1994. Today, there are thousands of cybercafes all over the world, providing the computer and Internet access that people need to go about their daily lives.

Some common repairs and maintenances are as below ;

Exterior painting and plastering ; Landscaping and gardening ; Paving repairs ; Carpeting and flooring; Plumbing; Repairing cracking or leaning walls etc. For most effective maintenance , it should be organized through a programme of cyclical maintenance. . The Binary Cafe was the first cybercafe in Canada, started up in June 1994. Today, there are thousands of cybercafes all over the world, providing the computer and Internet access that people need to go about their daily lives.

Proposed Design in Auto cad; Revit and Skechup

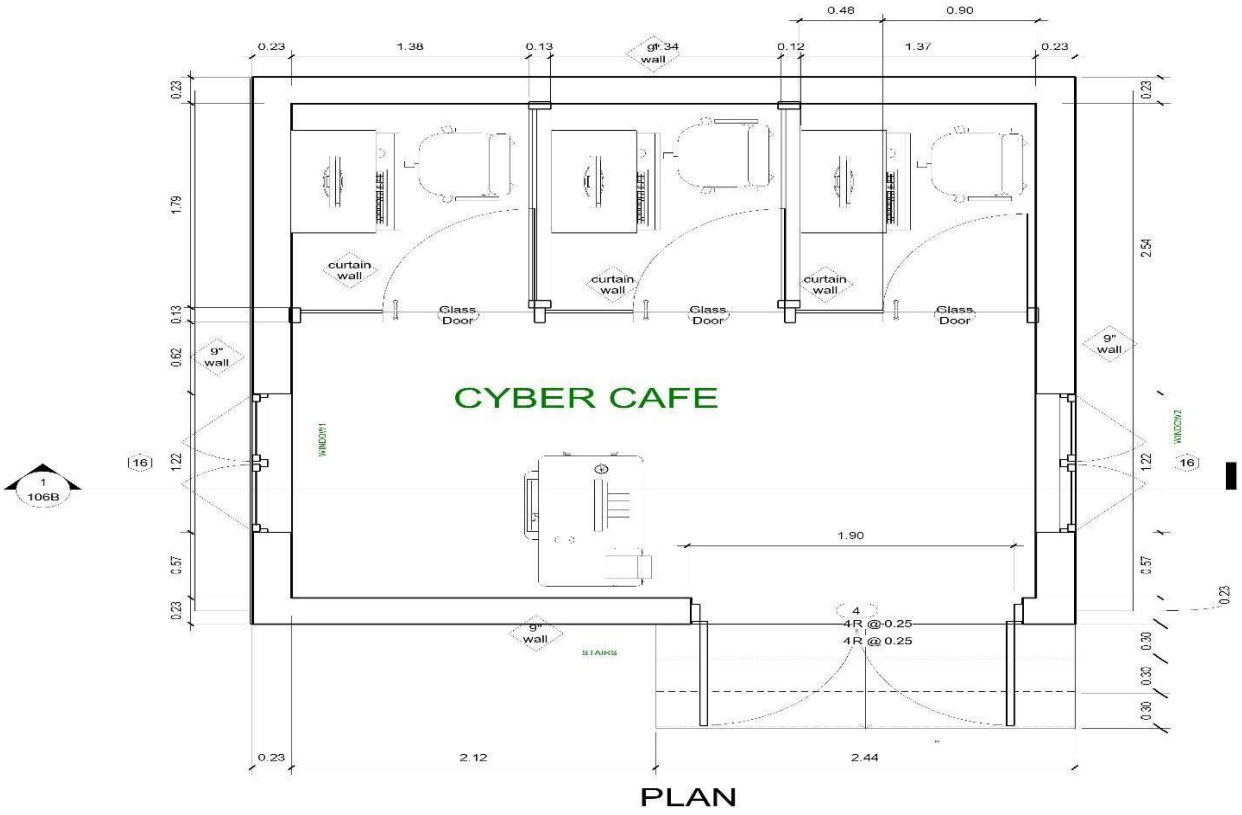


Fig- 8.1.4 A Plan Of Cyber Café

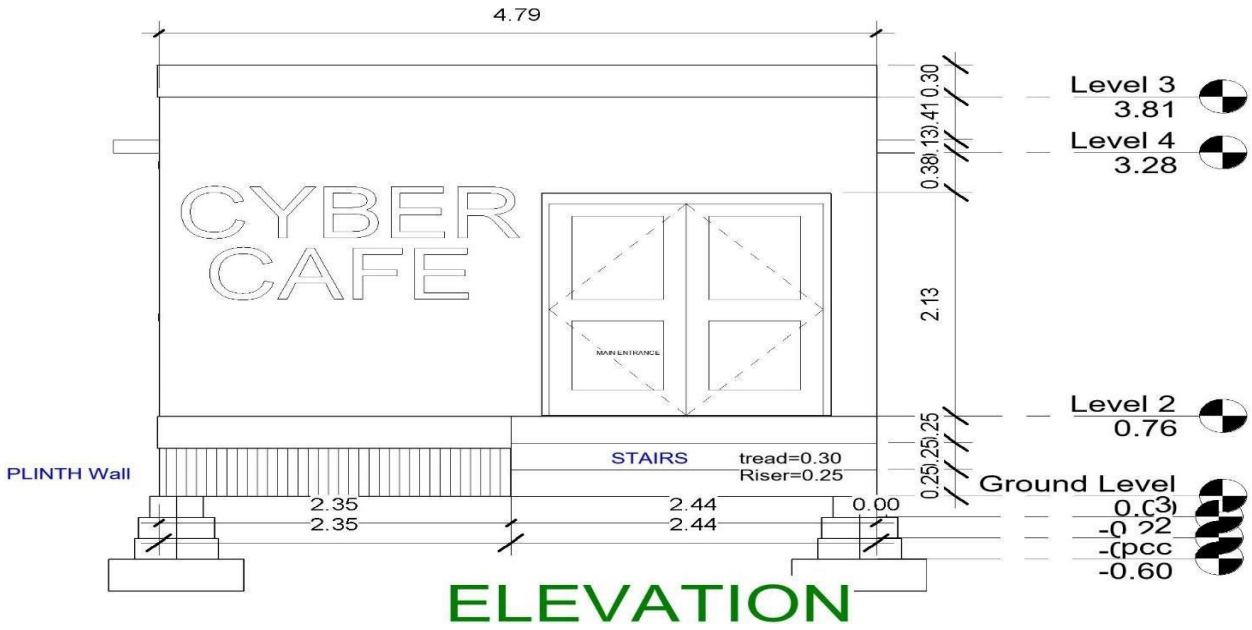


Fig-8.1.4 B- Cyber café interior design

Fig-8.1.4 C- Cyber café 3D model

T- 8.1.4 ACybercafe : Measurement Sheet

SR. NO)	Description	Length (m	Width (m)	Height (m)	Count (Nos.)	Total Quantity
1	BASIC WALL: GENERIC - 9" 2	4.455	0.2256	3	1	11.92
2	BASIC WALL: GENERIC - 9" 2	4.455	0.2256	0.763	1	11.92
3	CURTAIN WALL: CURTAIN WALL 1	2.023	0.0145	3.012	1	-
4	DOOR-EXTERIORDOUBLE-TWO LITE: 72" X 80	1.795	0.0324	2.023	1	-
5	1452181752750- CURTAIN WALL DOOR: AUS SGL GLASS FRAMED W D-PULL	0.923	0.023	2.112	3	-
6	WINDOWCASEMENTDOUBLE: 49" X 60"	1.235	0.123	1.453	3	-
7	BASIC ROOF: GENERIC – 1	4.455	0.2256	0.232	1	7.65
8	FLOOR: GENERIC – 1	4.455	0.33	1.754	1	7.01
9	PCC	4,222	0.78	0.38	1	5.04
10	BASIC WALL: 00.30	17.5	1.2	0.40.4	1	2.3
11	BASIC WALL: 0.40	17.5	1.5	0.4	1	2.34
13	EXCAVATION	22	1.2	1.5	4	3.6

T- 8.1.4 B Cyber cafe : Abstract Sheet

SR NO.	Description	Quantity m3	rate	per	Amount
1	BASIC WALL: GENERIC - 9" 2	10.92	130	Ft2	67002.3
2	BASIC WALL: GENERIC - 9" 2	1.91	90	Ft2	7902.3
3	DOOR-EXTERIORDOUBLE-TWO LITE: 72" X 80				4000
4	1452181752750- CURTAIN WALL DOOR: AUS SGL GLASS FRAMED W D-PULL				5400
5	WINDOWCASEMENTDOUBLE: 49" X 60"				4900
6	CAST-IN-PLACE STAIR: MONOLITHIC STAIR				6500
7	BASIC ROOF: GENERIc12" – 2'	3.53	3500	m³	13205
8	FLOOR: GENERIC – 12"	3.4	3500	m³	12350
9	EXCAVATION	1.215*4	350	m³	1802
10	PCC	8.98	3500	m³	32650
11	BASIC WALL: 0.30	4	90	Ft2	12980
12	BASIC WALL: GENERIC - 0.40	6.04	90	Ft2	12340
13	BASIC WALL: GENERIC - 0.50	7.02	90	Ft2	12340
				GRAND TOTAL	1,93,317.3

The rates of their respective works provided in the abstract sheet along with quantities are inclusive of water charges, contractor's profit, contingencies, utilities and labor charges.

Total cost= 1,93,317.3

8.1.5 Design of Pharmacy Store

Scenario :

A pharmacy is a shop where therapeutic drugs are sold. Sometimes a pharmacy is also called a drug store. A pharmacy is the place where most pharmacists practice the profession of pharmacy. Pharmacists play a major role in providing healthcare services by means of community pharmacy services in rural areas where physicians are not available or where physician services are too costly for meeting the healthcare necessities

Existing Situation in Waghai:

In the WAGHAI village there is no any PHC or dispensary or private clinic or pharmacy store. So according to the feedback given by the villagers, one dispensary or pharmacy store should be there in the village. The villagers have to go in UNAI for any kind of health or medical facility. So that we have designed one Pharmacy store for the urgent requirement of medicines for the villagers.

Sustainability of the design :

Pharmacy Store as an important tool :

Design Utilized by,

All the people living in the village of even outsiders from nearby villages can use or utilize a pharmacy store for their medical uses.

Needs :

Anyone using drugs benefits when they have easier access to a pharmacist; When emergency requirements of drugs or medicines ; etc.

Design brief :

A pharmacy is a retail shop which provides pharmaceutical drugs, among other products. At the pharmacy, a pharmacist oversees the fulfillment of medical prescriptions and is available to give advice on their offerings of over-the-counter drugs. A typical pharmacy would be in the commercial area of a community.

Pharmacy Store Design :

Length : 4.16m ; Width : 4.11m : Height : 3.96m Carpet area : 14.162 m^2

Common repair and maintenance of the structure :

Some common repairs and maintenances are as below ; Exterior painting and plastering ; Landscaping and gardening ; Paving repairs ; Carpeting and flooring; Plumbing; Repairing cracking or leaning walls etc**.** For most effective maintenance , it should be organized through a programme of cyclical maintenance. At the most basic level this includes daily routines, and

works upwards to periodic programmes of weekly, monthly, semi-annual, annual, quinquennial and so on routines.

Proposed Design in Auto cad; Revit and Sketchup

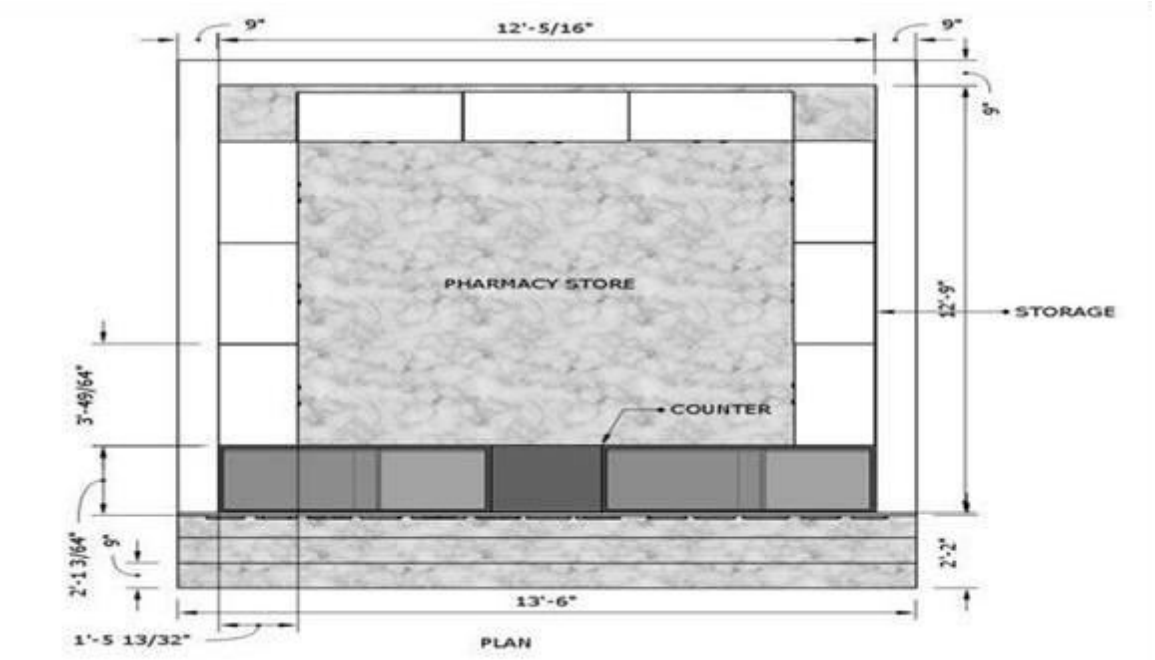


Fig-8.1.5 A Plan Of Pharmacy Store

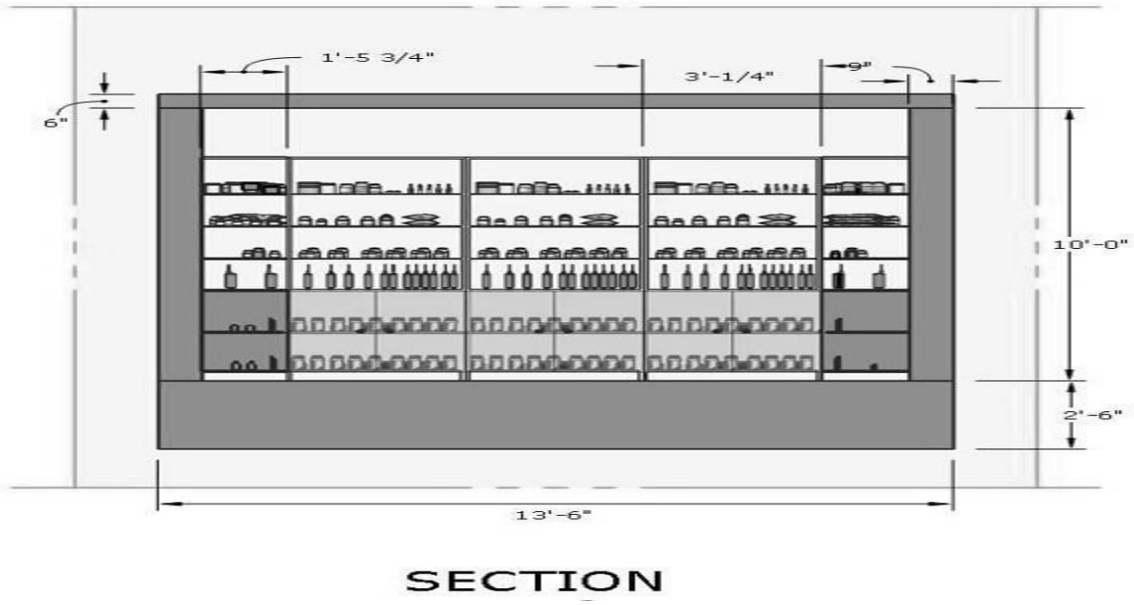


Fig- 8.1.5 B Sectional ElevationOf Pharmacy store

Fig –8.1.5 C Pharmacy Store 3D Model

T-8.1.5 A Pharmacy Store measurement sheet

Sr. No	Description	Length (M)	Width (M)	Height (M)	Count (Nos.)	Total Quantitym3
1	**Top Roof**	4.1148	4.1148	0.1524	1	2.580231
2.	**Wall 9''**	4.1148	0.2286	3	4	8.1126
3	**Plinth Wall With Stairs**	4.1148	0.2286	0.762	4	3.575
4	**Floor**	4.1148	4.1148	0.1524	1	2.58
5	**Pcc**	4.1148	0.90	0.4	1	5.02
6	**Basic Wall: 00.30**	18.3	1.2	0.4	1	2.2
7	**Basicwall:0.40**	18.3	1.6	0.4	1	2.94
8	**Basic Wall:Generic-0.50**	18.3	2	0.4	1	3.66
9	**Excavation**	22	1.2	1.5	1	3.6

T-8.1.5 B Pharmacy Store abstract sheet

No.	Description	Quantity (M^3)	Rate	Per	Amount
1	Basic Wall: 9"Exterior 1	8.282678	130	Ft^2	**50700**
2	Top Roof	2.580230	3500	M^3	**9030.30**
3	Floor	2.580230	3500	M^3	**9030.30**
4	Plinth Wall With Stairs	3.575850	90	Ft^2	**8750**
5	Excavation	1.215*4	350	M^3	**1701**
6	Pcc	5.02	3500	M^3	**17570**
7	Basic Wall: 00.30	2.94	90	Ft^2	**7200**
8	Basic Wall: 0.40	2.2	90	Ft^2	**7200**
9	Basic Wall: Generic - 0.50	3.66	90	Ft^2	**7200**
				Grand Total	**118380**

The rates of their respective works provided in the abstract sheet along with quantities are inclusive of water charges, contractor's profit, contingencies, utilities and labor charges.

Total cost = ₹ 118380 /-

8.1.6 Design of Tourist service center

Scenario :

A tourist information center, providing visitors to a location with information on the area's attractions, lodgings, maps, and other items relevant to tourism . Visitor centers used to provide fairly basic information about the place, corporation or event they are celebrating, acting more as the entry way to a place. The role of the visitor center has been rapidly evolving over the past 10 years to become more of an experience and to tell the story of the place or brand it represents. Many have become destinations and experiences in their own right.

Existing Situation in Waghai :

In waghai village there are many places which are very popular for tourists and students for trips so it is very important to have a tourist visitor center provide information about tourist places. In waghai village giradodh, botanical garden etc are popular for tourists.

Location

the location of tourist services center will suitable on the main road and infront of bus stand .so all people can easily find it and take advantages of it.

Sustainability of the design :

Design Utilized by,

All the people of waghai village and nearby villages who will visit the places in waghai village and the tourists, visitors, students.

Needs :

A tourist information center, providing visitors to a location with information on the area's attractions, lodgings, maps, and other items relevant to tourism. Visitor centers used to provide fairly basic information about the place, corporation or event they are celebrating, acting more as the entry way to a place. The role of the visitor center has been rapidly evolving over the past 10 years to become more of an experience and to tell the story of the place or brand it represents. Many have become destinations and experiences in their own right.

Design brief :

Length : 4.20m ; Width : 4.12m : Height : 3.5 m Carpet area : 15.02 m^2

Common repair and maintenance of the structure :

Some common repairs and maintenances are as below ; Exterior painting and plastering ; Landscaping and gardening ; Paving repairs ; Carpeting and flooring; Plumbing; Repairing cracking or leaning walls etc. For most effective maintenance , it should be organized through a programme of cyclical maintenance.

Proposed Design in Auto cad; Revit and Sketchup

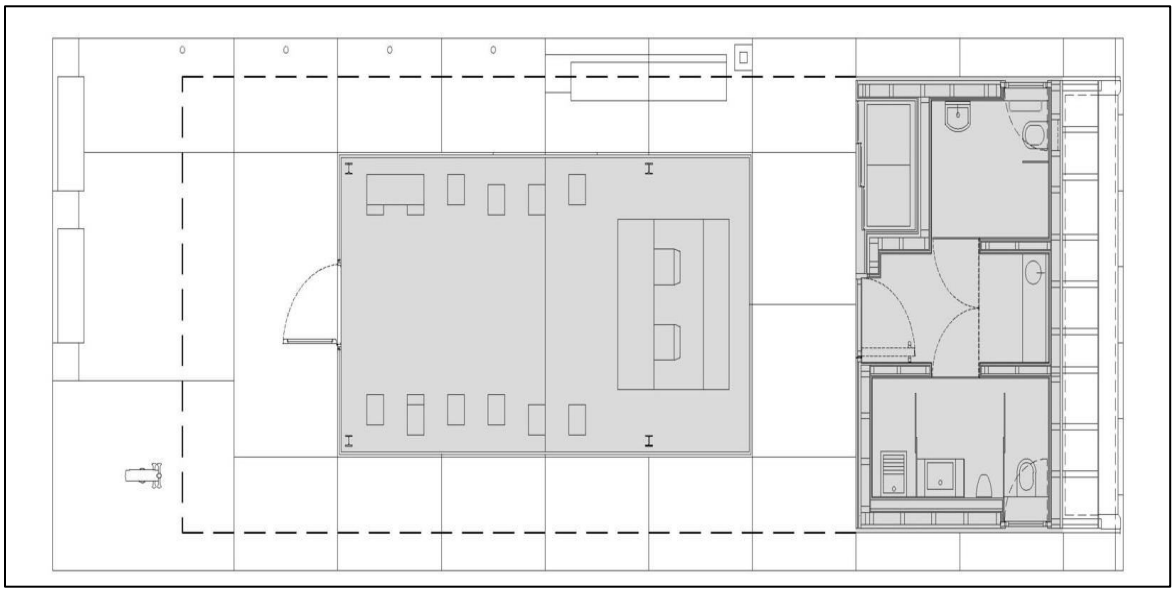
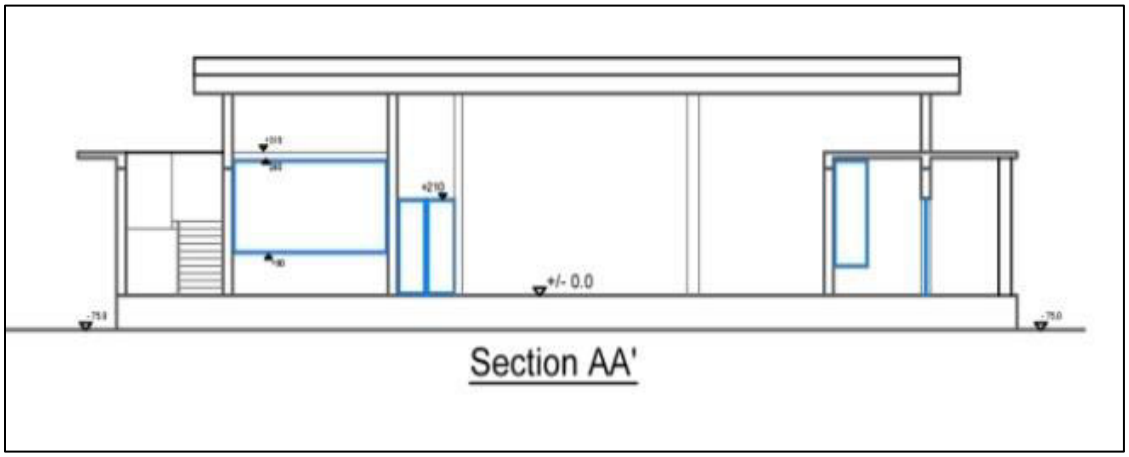


Fig- 8.1.6 A Floor Plan Of Tourist Visitor Center



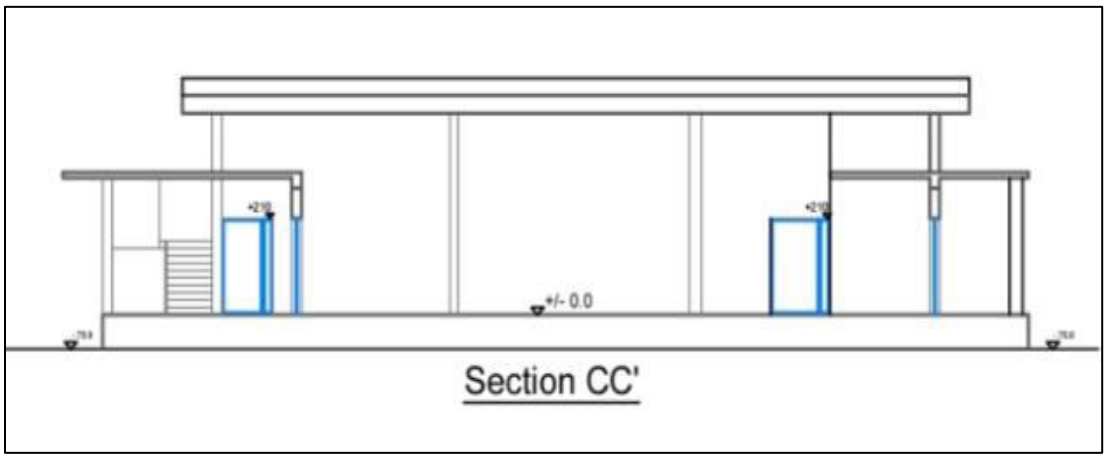


Fig-8.1.6 B Sectional View Of Tourist Visitor Center

Fig – 3D Model Of Tourist Visitor Center

T- 8.1.6 A Tourist Visitor center measurement sheet

SR. NO	Description	Length (m)	Width (m)	Height (m)	Count (Nos.)	Total Quantitym3
1	Top Roof	4.124	4.124	0.16	1	2.620231
2	Wall 9"	4.124	0.234	3	4	9.042
3	Plinth Wall With Stairs	4.124	0.234	0.74	4	3.645
4	Floor	4.124	4.124	0.16	1	2.69
5	Pcc	4.124	0.90	0.42	1	5.03
6	Basic Wall: 00.30	18.2	1.24	0.42	1	2.13
7	Basicwall:0.40	18.2	1.64	0.42	1	2.78
8	Basic Wall:Generic-0.50	18.2	2	0.42	1	3.04
9	Excavation	24	1.24	1.6	1	3.7

T-8.1.6 BTourism Service center abstract sheet

Sr No.	Description	Quantity (M^3)	Rate	Per	Amount
1	Basic Wall: 9" Exterior 1	8.620231	130	Ft^2	**51300**
2	Top Roof	2.620231	3500	M^3	**9120.20**
3	Floor	2.620231	3500	M^3	**9120.20**
4	Plinth Wall With Stairs	3.04	90	Ft^2	**8800**
5	Excavation	1.215*4	350	M^3	**1881**
6	Pcc	5.04	3500	M^3	**18041**
7	Basic Wall: 00.30	3.04	90	Ft^2	**7250**
8	Basic Wall: 0.40	2.4	90	Ft^2	**7250**
9	Basic Wall: Generic - 0.50	3.64	90	Ft^2	**7250**
				Total	**120,012**

The rates of their respective works provided in the abstract sheet along with quantities are inclusive of water charges, contractor's profit, contingencies, utilities and labor charges.

The cost of construction and design are shown in table .Take 20% of total cost as working cost of tourist service center

Total cost = Rs. 144044/-

8.1.7 Electrical Design Of Roof Top Solar

Scenario:

Renewable energy sources include solar energy, which comes from the sun and can be turned into electricity and heat. Wind, geothermal energy from inside the earth, biomass from plants, and hydropower and ocean energy from water are also renewable energy sources.

Existing Situation in Waghai :

In waghai village people are only depedent on the electricity supplied by the DGVCL. But for the irrigation and house facilities there are not any special supply system. So roof top solar system is very important.

Needs:

Energy plays a pivotal role in our daily activities. The degree of development and civilization of a country is measured by the amount of utilization of energy by human beings. Energy demand is increasing day by day due to increase in population, urbanization and industrialization. The world's fossil fuel supply viz. coal, petroleum and natural gas will thus be depleted in a few hundred years.

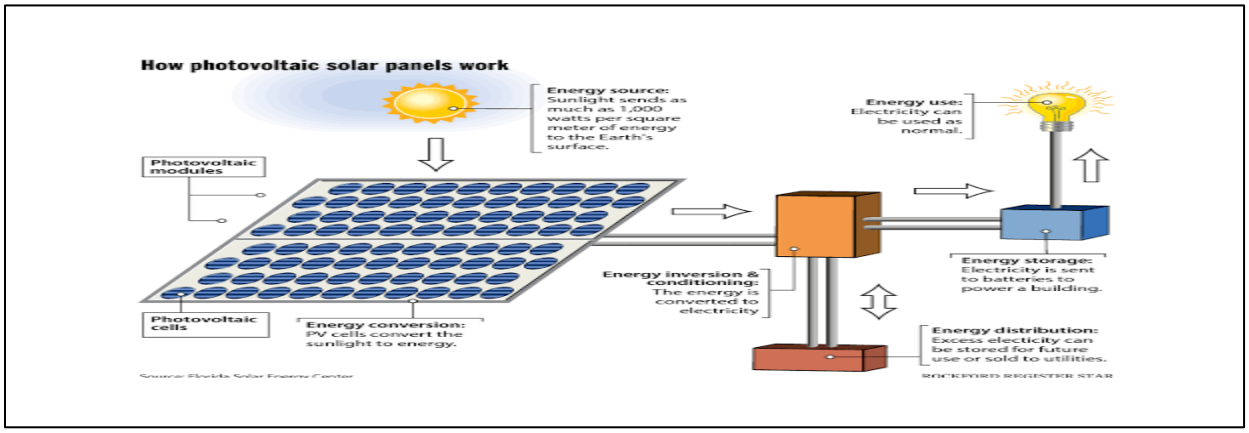


Fig- 8.1.7 A Design Diagram

Proposal design by auto cad revit and sketch up

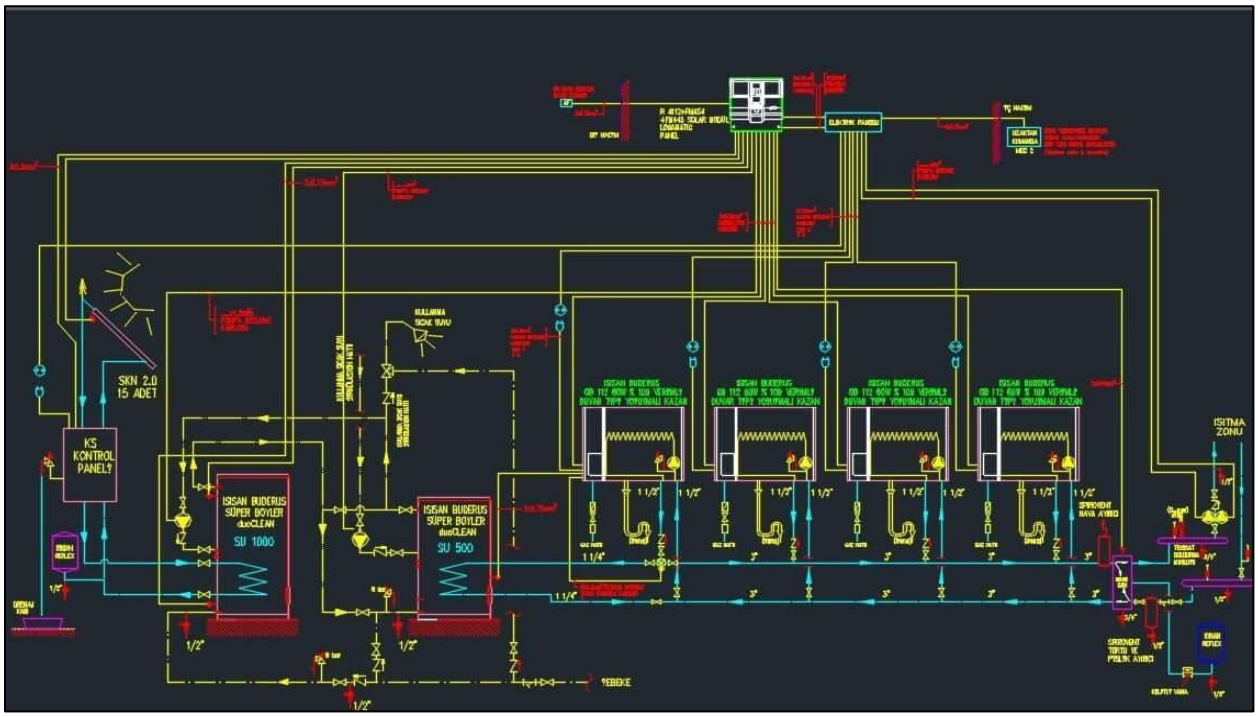


Fig-8.1.7 BAutocad Drawing Of Roof Top Solar

CALCULATIONS

1.Plant Capacity Calculation

- For TSM PC-14 Solar Panel,
- Peak power watts, Pmax= 295 W
- Plant Capacity =(496.8 × 295)

= 146.556 ≈ 150

- The Energy =plant capacity * plant efficiency

Operating Time

= 150* 0.85 Kwh/ day =28.333 Kwh/ day

4.5

2.DC Output Power Calculation

- Selected Utility Module of Solar panel is TSM PC-14
- Peak Power watts , Pmax=295 Wp
- Maximum Power Voltage, Vmp= 36.6 V

- Open Circuit Voltage ,Voc= 45.2 V
- Maximum Power Current ,Impp=8.07 A
- Short Circuit Current ,Isc =8.55 A

3.Output AC power Calculation :

- Number of strings =3
- PV modules per string=18
- So, the peak power (DC) of input A is = (3 × 18) =15.93 Kw/h
- Output Current CalculationL = p/(vcosq) =27.44/3*230*v*0.8= 87A
- Circuit Breaker Rating Calculation :For circuit breaker design, taking 20% overcurrent margin, the output AC

  current of each line becomes = (87 × 1.2)A
  = 104.4A

4.Wire Length Calculation :

1×4 NYY DC Cable for the connection between the solar panels and the Inverters.

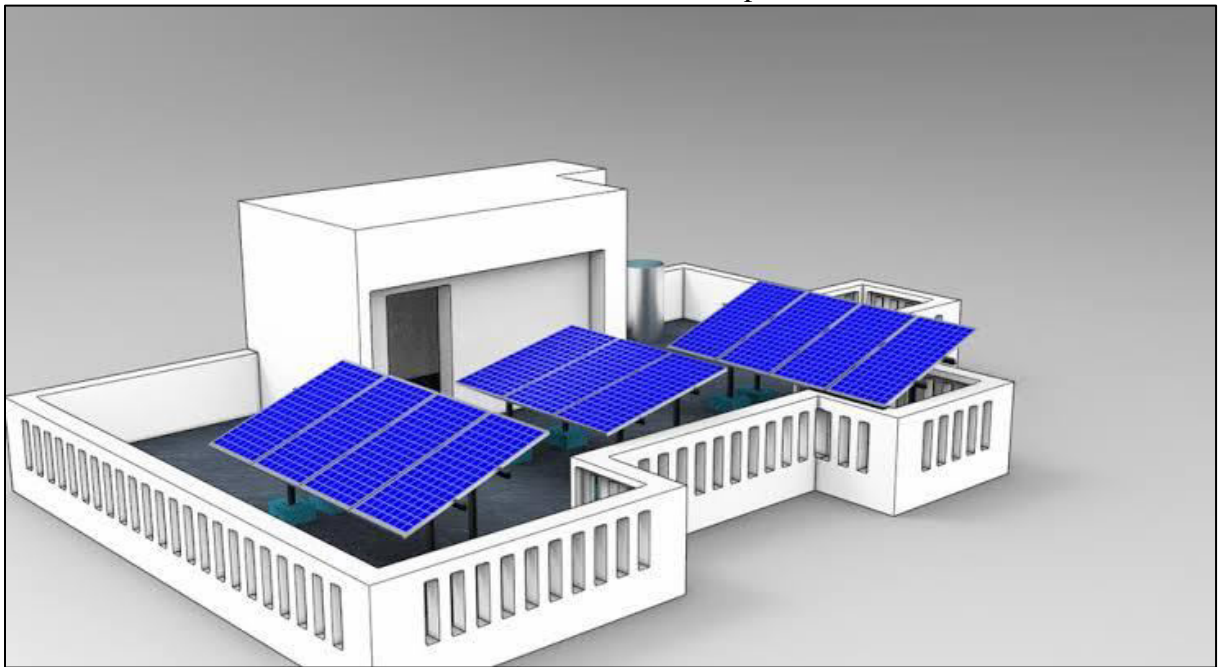


Fig-8.1.7 C 3D Model Of Roof Top Solar

T- 8.1.7 A Costing of roof top solar

SERIAL NO.	COMPONENT	QUANTITY	VALUE	UNIT
1	SOLAR PANEL	552 PIECES	73226.89	RS.
2	INVERTER	7 PIECES	20400.79	RS.
3	CABLE	4920 PIECES	3220	RS.
4	CIRCUIT BREAKER	32 PIECES	1457.57	RS.
5	MDB		2571.98	RS.
6	EARTHING		8573.27	RS.
				RS.
		TOTAL COST	**1,09445**	**RS.**

8.1.8 Solar pumping system (electrical)

Scenario :

Energy is a key ingredient for the overall development of an economy. India has been endowed with abundant renewable solar energy resource. India is large country and the rate of electrification has not kept pace with the expanding population, urbanization and industrialization and has resulted in the increasing deficit between demand and supply of electricity. This has not only resulted in under electrification but also put heavy pressure on the governments to keep pace with demand for electricity. People not served by the power grid have to rely on fossil fuels like kerosene and diesel for the poor people in rural areas.

Existing Situation in Waghai :

In waghai village people don't have very much knowledge about solar power system. People use only electricity supplied by the government for irrigation and other purposes. So solar pumping system is very necessary for irrigation and drinking water purposes.

Needs :

Energy plays a pivotal role in our daily activities. The degree of development and civilization of a country is measured by the amount of utilization of energy by human beings. Energy demand is increasing day by day due to increase in population, urbanization and industrialization. The world's fossil fuel supply viz. coal, petroleum and natural gas will thus be depleted in a few hundred years. The rate of energy consumption increasing, supply is depleting resulting in inflation and energy shortage. This is called energy crisis. Hence alternative or renewable sources of energy have to be developed to meet future energy requirement.

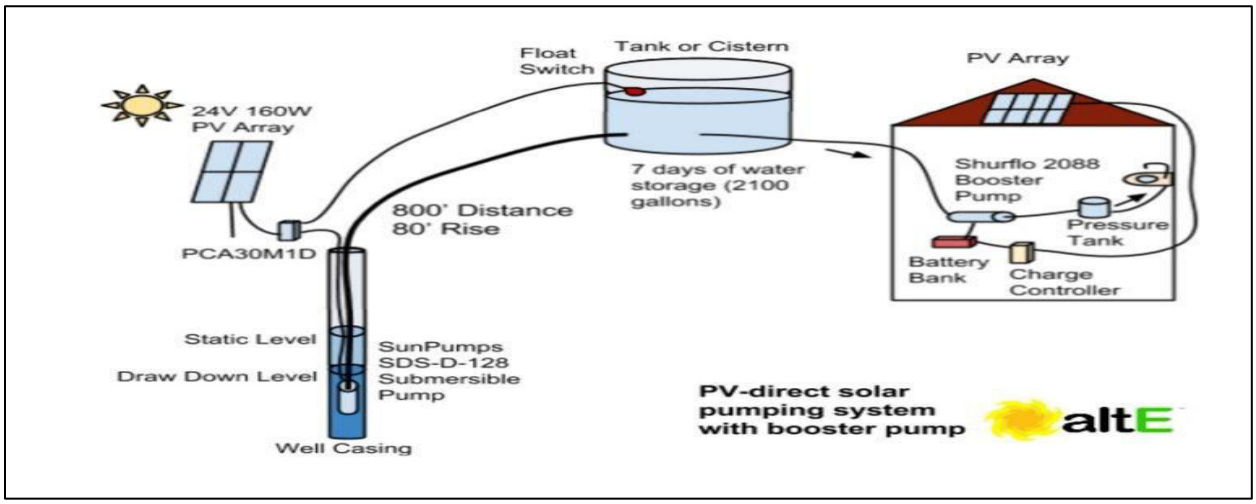
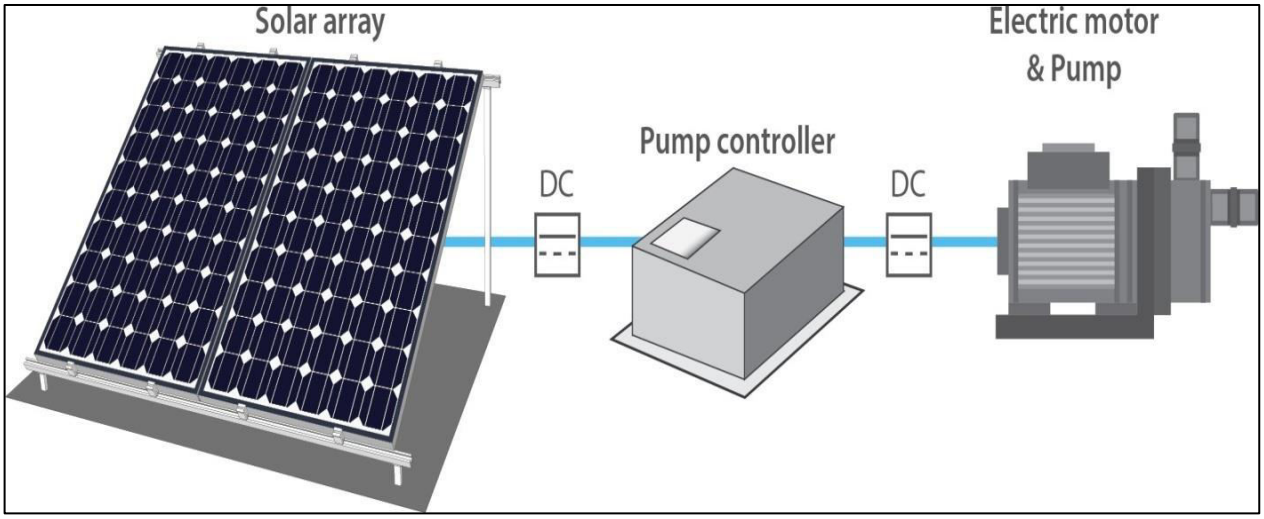


Fig- 8.1.8 A Diagram OfSolar Pumping System



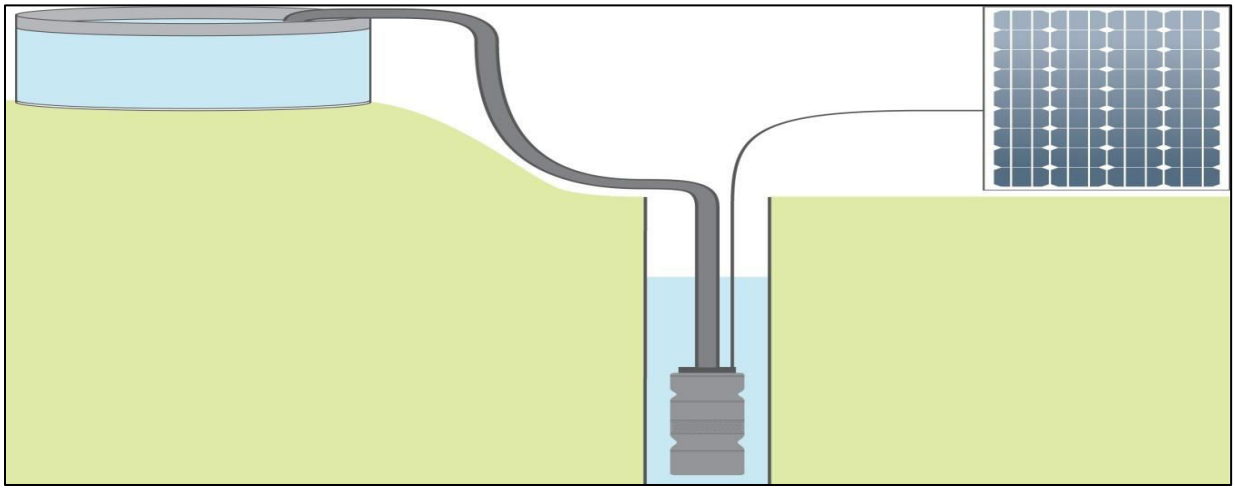


Figure 8.1.8 B Borehole pump system

Estimation of Water Supply Rate:

The hourly water output of the system which is essential to pump sizing was calculated using the daily water supply capacity of the system and the daily sun hours.

$$RequiredHourlyRate = \frac{Systemwatersupplycapacity}{AveragedailyInsolation}$$

$Waterusageper\ household = 200 litresperday$

$Numberofhouseholds = 250$

$Totalvolumeofwaterrequirementsperday = 250 \times 200 = 50{,}000 litresperday$

Designcapacity is20%oftotalwaterconsumption = $0.2 \times 50{,}000 = 10{,}000 litresperday$

Assuminga2-hourdailyoperationalperiod,thenewhourlyrateiscalculated thus:

$$Hourlyrate = \frac{10000}{2} = 5000 litres/hour$$

The new hourly rate is thus 5 m^3/ hour; using this value to estimate the hydraulic power

$$P_{hyd} = \frac{\rho \times g \times Q \times H}{3600 \times 1000}$$

$$P_{hyd} = \frac{1000 \times 9.82 \times 5 \times 58}{3600 \times 1000}$$

$P_{hyd} = 0.791 kW$

Therequired powerforthemotor-pumpunitis$= 1.15 \times 0.8 = 0.92 kW$

$Generatorpower = 2 \times 1.12$(1.12kW=1.5hp)$= 2.24 kW$

A 2.3 kW generator is used to supply the energy required by this system

The cost elements applicable directly to making a comparative analysis between a generator-poweredunitandsolarpoweredunitpumpingunitandasolarpoweredpumpingunitare:The system designed in this study uses a 750 Watts solar array to supply 15,000 litres of clean water per day in an area without electricity grid connection.

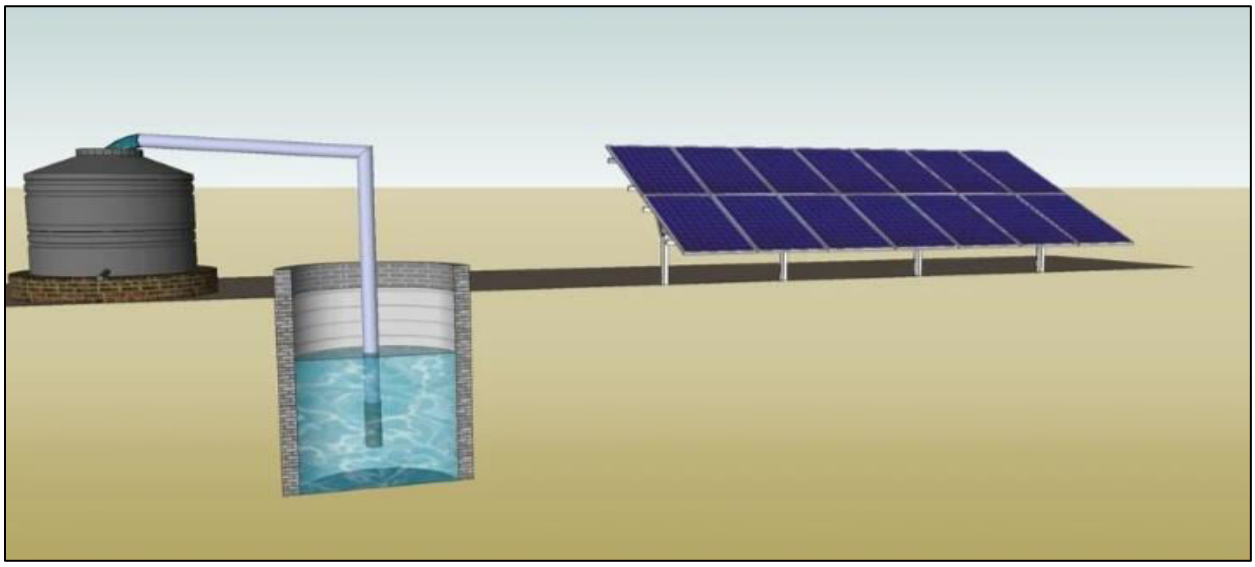


Fig-8.1.8 C 3d model of Solar pumping system

T-8.1.8 A Costing of Solar Pumping System

Sr.No.	Description	Material	Quantity	Unitary values(Rs)	Total cost
1	Sunction	Curve of 90*	1 unit	17.00	17.00
		Valve	1 unit	30.00	30.00
		Register	1 unit	218.00	218.00
		PVC tube	10.0 m	17.00	170.00
2	Head	Curve of 90*	2 unit	8.0	16.00
		Curve of 45*	2 unit	5.00	10.00
		Register	1 unit	85.70	85.00
		Retention valve	1 unit	30.00	30.00
		PVC tube	100.0 m	11.00	1100.00
3	Solar energy	Solar panel(240W)	13 unit	1800.00	23400.00
		Battery(120 A)	8 unit	720.00	5760.00
		Inverter	1 unit	1119.00	1199.00
		Load controller(60A)	1 unit	1113.00	1113.00
		Eletric motor+ Pump	1 unit	696.00	696.00
4	Diesel	Diesel motor+ pump	1 unit	1740.00	1740.00
				Total Cost	**35584.00**

8.1.9 Solar street light (electrical)

Introduction :

The solar street light does not need to set up the transmission line or route the cable, and no any special management and control are required. It can be installed in the entire public place such as the square, the parking lot, the campus, the street or the highway etc.

The street lighting is closely related to people's daily life. Following quick development in process of the global urbanization, the green, efficient, and long-life LED light gradually enters into our lives.

Scenario :

LED is a solid state semiconductor device which can convert electrical energy intovisible light. It is characterized with small size, low power consumption, long servicelife, environmental protection and durance. The spectrum of the LED is almostlyconcentrated in the visible light spectrum, so it has a high luminous efficiency whichcanbe describedasthegreatreform in thesolidlight source.

Existing Situation in waghaivillage :

In waghai village facility of solar led light is not provided. In night driving drivers have not any commandation in driving. So solar street light is necessary in waghai village.

Needs :

A good LED street lighting system is characterized with high efficiency, energy-saving, long-life, high color rendering index and environmental protection, which not only has a great significance on energy-saving of the city lighting.

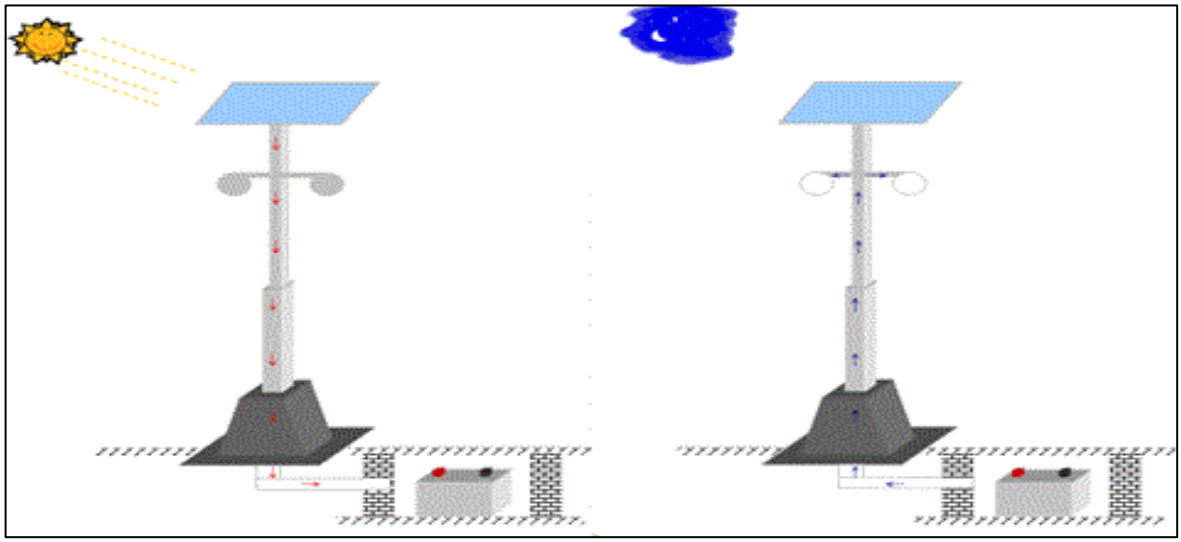
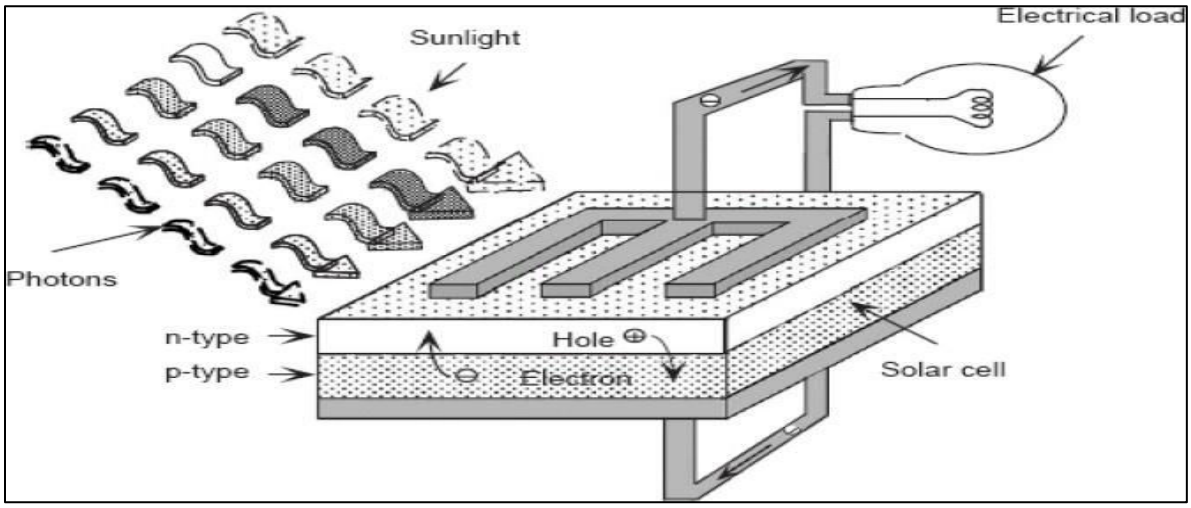


Fig- 8.1.9 AOperationPrinciple Of Solar Street Light



Fig– 8.1.9 B PrincipleOfSolar Cell

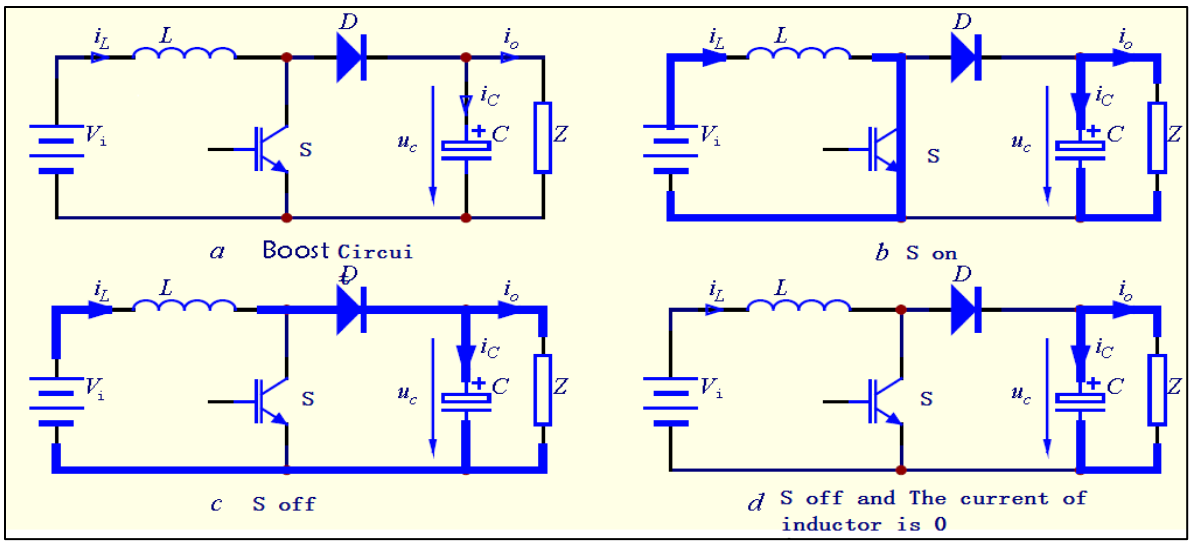


Fig -8.1.9 C Schematic Diagram OfBoost Converter And

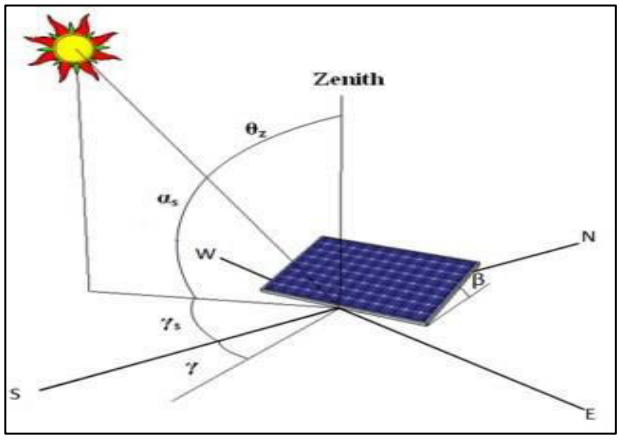


Fig.- 8.1.9 D SolarAngles UsedInPower CalculationsForPVPanels.

- **Calculation Illumination at the Lamp Point to theEnd of the Road :**
  - Calculation Currents The large calculation of lights based on the selection, analysis, and needs with consideration in accordance with expectations and is not too extravagant. The magnitude of K (efficiency) of lamp with a large angle of slope ω = 4π

$$\text{Then } i = \frac{KP}{\omega} = \frac{200x100}{4x3.14\omega} = 1592.36 \text{ Cd}$$

- **Calculating the illumination with a 3 meters road width**:

$$r = \sqrt{9^2 + 3^2} = 9.49 \text{ meters}$$

$$\text{So Cos } \emptyset = \frac{h}{t} = \frac{9}{9.49} = 0.95$$

$$\emptyset = Cos^{-1}0.95 = 20.42^0$$

$$Er = \frac{i}{r^2} Cos\ \beta = \frac{1592.36}{9.49^2} \text{ x } \frac{9}{9.49} = \frac{1592.36}{90} \text{ x } 0.95 = 16.81 \text{ Lux}$$

- **Illumination at a distance of 5 meters (r)**

$$r = \sqrt{9^2 + 5^2} = 10.29 \text{ meters}$$

$$\text{So Cos } \emptyset = \frac{h}{t} = \frac{9}{10.29} = 0.87$$

$$\emptyset = Cos^{-1}0.87 = 32.82^0$$

$$Er = \frac{i}{r^2} Cos\ \beta = \frac{1592.36}{10.29^2} \text{ x } \frac{9}{10.29} = \frac{1592.36}{105.88} \text{ x } 0.87 = 13.08 \text{ Lux}$$

- **Number of Lamp Points Required At 35 MetersDistance :**

$$B = \frac{l}{s} + 1 = \frac{1500}{35} + 1 = 44$$

- So the number of light points needed is 44 point lights.For public road with length of 1500 meters can be installed lamps with a distance of 35 meters as many as 44 pieces of light poles. Lamp that will be installed as many as 44 pieces with a distance of 35 meters is the result of calculations in the field. The results of this analysis may change in accordance with the common wish between thecommunity and the government. But this change will notwiden the distance but can be changed by minimizing thedistance, because the intensity obtained is the maximum intensity.

➢ **Power used 44 pieces of light = 44 x 200 = 8800 Watt.**

$$I_n = \frac{P}{V\ Cos\ \emptyset} = \frac{44x200}{220\ x\ 0.85} = 47.06\ A$$

$$I_{rating} = K\ x\ I_n = 125\%\ x\ I_n = 125\%\ x\ 47/06 = 58.82\ A$$

➢ **Current APP rating flows is are**

$$I_n = \frac{P_{total}}{\sqrt{3}\ V\ Cos\emptyset} = \frac{200\ x\ 44}{\sqrt{3}\ x\ 380\ x\ 0.85} = 8.68\ A$$

Fig- 8.1.9 E 3D Model OfSolar LED Street Light

Costing :

Solar LED street light price starts from Rs.12,000 to Rs. 50,000 and its rating starts from 9 watt to 60 watt.

Load rate of PJU = (40 (flash time) xconnected power x usage cost per(KWH)

T-8.1.9 A Costing Of Solar Led Street Light

No.	Number of pole	Number of zone	Power of electricity (Kwh)	Basic electricity traffic (TDL)(Rp/Kwh)	Total electricity traffic(Rp)
1	T20	1	1694.12	1049	1777131.88
2	T20	1	1694.12	1049	1777131.88
3	T4	1	338.82	1049	35522.18
				Total Cost	**= 2309685.94**

Total operational cost /month = Rs. 2,309,685.94 + Rs.1,846,240

= Rs. 4,155,925.94,

Total operational cost / year = Rs. 4,155,925.94 x 12

= Rs 49,871,111.28,

8.2 Reason for Students Recommending this Design:

- Public sanitary complexes- to provide batter sanitation facilities and improve health conditions.
- Sewage treatment plant- To provide better disposal facilities for people
- PharmacyStore-tosatisfytherequirementsofmedicinestothepublic
- Communityhall -toorganizeeventseasilyforthevillagers
- Cybercafe-toprovideasourceofinternetasasmartvillageconcept
- Tourist visitor center – to increase in tourism and provide better facilities for tourists.
- Solar street light – To provide better driving facilities at night
- Roof top solar – to provide other source of electricity.
- Solar water Pumping system - to provide electricity for irrigation .

8.3 About designs Suggestions / Benefit of the villagers:

1.Public sanitary complexes : It provides better sanitation facilities for all villagers workers and tourists and to increase cleanliness in village.

2. Sewage treatment plant: To provide nbetter health facilities and provide better water facilities sewage treatment plant is necessary

3.Cyber Cafe: The design of cyber cafe is the smart concept in the WAGHAI village. A cybercafe is a type ofbusinesswherecomputersareprovidedforaccessingtheinternet,playinggames,chattingwithfriends ordoingothercomputerrelatedtasks.

4.Community Hall: There is no Community hall in the WAGHAI village. Community hall is a public location wheremembers of a community gather for group activities, events, festivals and social purpose. A community hall of village generally consists of a hall ,storage or kitchen area and washroom.

5.Pharmacy store:A pharmacy is a shop where therapeutic drugs are sold. Sometimes a pharmacy is also called a drug store. A pharmacy is the place where most pharmacists practice the profession of pharmacy.

6.Tourist visitor center:A tourist information center, providing visitors to a location with information on the area's attractions, lodgings, maps, and other items relevant to tourism. Visitor centers used to provide fairly basic information about the place.

7.Roof top solar : Renewable energy sources include solar energy, which comes from the sun and can be turned into electricity and heat. Wind, geothermal energy from inside the earth, biomass from plants, and hydropower and ocean energy from water are also renewable energy sources.

8. Solar water pumping system : In waghai village people don't have very much knowledge about solar power system. People use only electricity supplied by the government for irrigation and other purposes. So solar pumping system is very necessary for irrigation and drinking water purposes.

9. Solar LED street light :LED is a solid state semiconductor device which can convert electrical energy into visible light. It is characterized with small size, low power consumption, long service life, environmental protection and durance.

8.4 About Maintenance

For maintenance to be most effective, it should be organized through a program of cyclical maintenance. At the most basic level this includes daily routines, and works upwards to periodic programs of weekly, monthly, semi-annual, annual, quinquennial and so on routines.

Common maintenance tasks include:

- Exterior painting and plastering.
- Paving repairs.
- Window and door repairs.
- Debris/rubbish removal and clearance.
- Jet washing with chemical cleaning agents to remove fungal stain or mould.
- Gutter clearance and repair.

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

CIVIL

1. Sustainabledesign: 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. Socio-Cultural Design:Supermarket : Super market is important thing for rurban of any village. It also provides some recruitment for low qualified villagers and provide new way of income for sellers .

3. Socialdesign: Skill developmentdesign : There is no any child development or maternity home or skill development center in the Waghai village but for the better development of students and children there should be one skill development center in the village.

4. Physicaldesign: SolidWasteManagement : Currently the villagers are dumping their solid waste at outer part of the village and burn it at a specific location.

5. Haritage village design: Mechanization Of AgroCenter : To enable Small Farmers, who cannot afford bullocks or other farm machinery, to hire services of Agro-service Centre for farm operations. To make available services of Agro-Service Centre (ASC) for repair and maintenance of farm machinery owned by farmers.

6. Smart Village Design: Water Tank Design : The main objectives in design of water tanks are to provide safe drinkable water after storing for a long time, optimizing cost strength, service life, and performance during a special situation like earthquakes.

ELECTRICAL

1. Solar energy Charge controller : Solar charge controller enable control on thr charge of plate by a devuce which is known as solar charge controller.The project allows for battery charging system from a solar panel. With the help of the solar panel the solar energy is converted into electrical energy through photo-voltaic cells.

2. Power supply system with autoswitching : Power supply with auto switching system is important system in now a days. It reduces cost and uses of electricity cost.Most of embedded electronic based systems need a regulated supply of power.

3. Energy Harvesting System

Energy is basic requirement of all people and at present time energy is not renewable and the electrical energy is very expensive for poor. So it becomes very important to harvest solar energy by different methods. So that we recommended this design.

Chapter 10.
Conclusion of the Entire Village Activities of the Project :

We have visited the ideal village Unai and that visit helped us to know about the type of infrastructure needed by the village. With help of techno-economic survey and gap analysis and also studying / surveying our ideal village Unai , we were able to broadly define requirements of development for people of Waghai village. Then we have visited the smart village Punsari and by that visit we better understood the smart technologies and concepts as smart development of our Waghai village.

In the Waghai village, the basic requirements like like gram panchayat , any recreational area, cyber café ,super market etc. were not existing. By implanting given design proposals, all the missing amenities can be provided which will stop the migration of rural people towards the urban area which will in turn reduce pressure on cities. The amenities designed under this Vishwakarma project phase viii will be helpful for better development of the village as physically as well as socially, which improves the overall lifestyle of people along with nation with preserving nature bit by bit. This will help in developing Smart villages in sustainable manner, reduce migration from villages and prevent the cities from the urban pressure.

This should lead to some rethinking about the meaning of efficiency beyond the usual conceptions of economic or technical efficiency. Indeed, employment expansion is at least as important as growth in productivity. In a sense, both represent the utilization of labor as a resource. Why, then, does thinking about efficiency focus on one and neglect the other It is important to reflect on this question. The answer, which calls for change in both economics and politics, could make a real difference.

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

In waghai village it requires some facilities like drainage system , rain water harvesting system , electricity for irrigation purpose , street light, public garden , cinema hall, recreational facilities and others and this facilities should properly maintained by villagers as shown in unai village . In the Waghai village, the basic requirements like like gram panchayat , any recreational area, cyber café ,super market etc. were not existing. By implanting given design proposals, all the missing amenities can be provided which will stop the migration of rural people towards the urban area which will in turn reduce pressure on cities .In unai village there is proper distribution of electricity for 24 hours and drainage facility is also available

Chapter 11.
References refereed for this project

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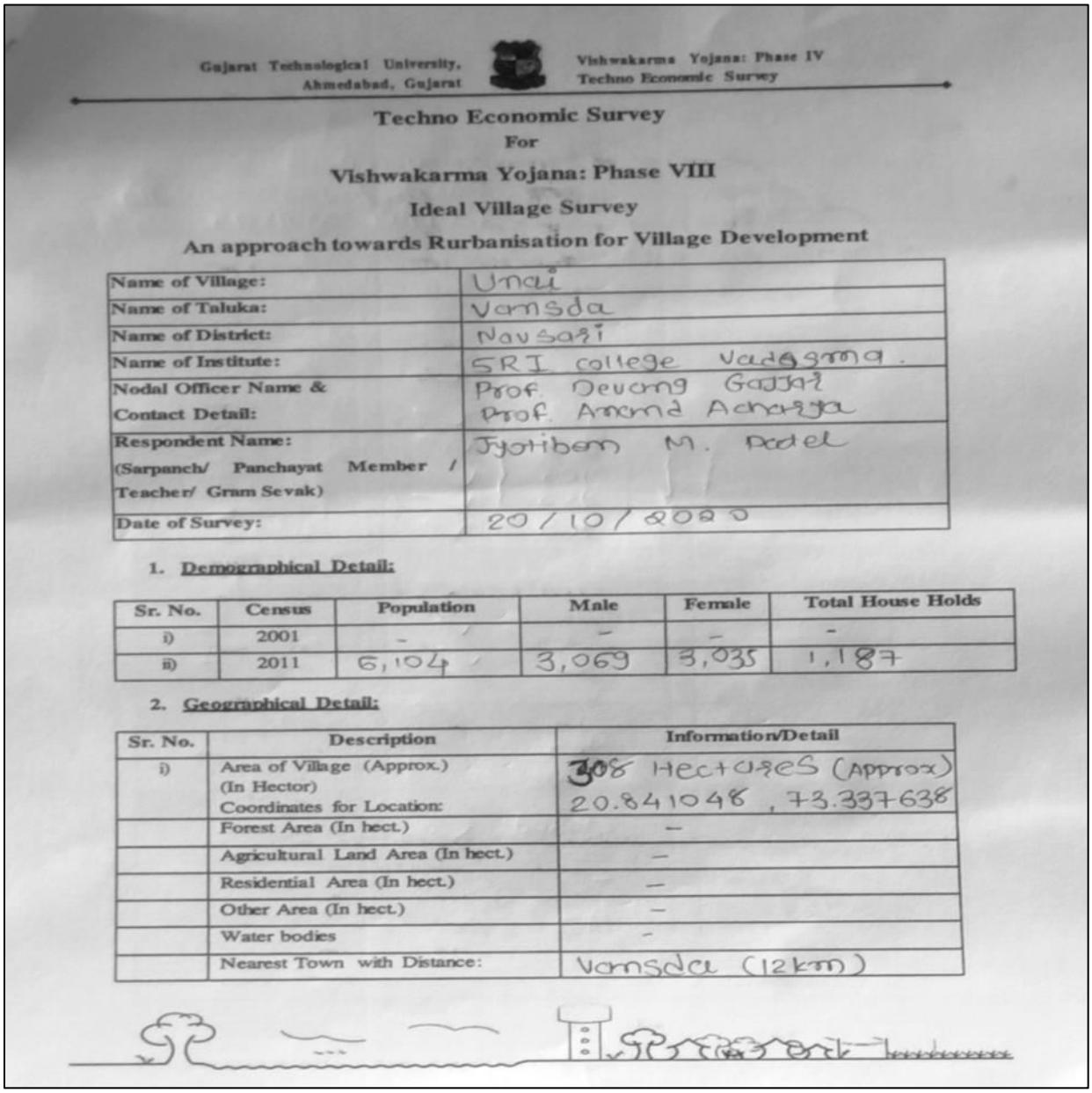
Chapter 12.
Annexure attachment

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



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase IV
Techno Economic Survey

Techno Economic Survey
For
Vishwakarma Yojana: Phase VIII
Ideal Village Survey
An approach towards Rurbanisation for Village Development

Name of Village:	Unai
Name of Taluka:	Vansda
Name of District:	Navsari
Name of Institute:	SRI college Vadgam.
Nodal Officer Name & Contact Detail:	Prof. Devang Gajjar Prof. Aroma Acharya
Respondent Name: (Sarpanch/ Panchayat Member / Teacher/ Gram Sevak)	Jyotiben M. Patel
Date of Survey:	20/10/2020

1. Demographical Detail:

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	-	-	-	-
ii)	2011	6,104	3,069	3,035	1,187

2. Geographical Detail:

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	308 Hectares (Approx) 20.841048, 73.337638
	Forest Area (In hect.)	–
	Agricultural Land Area (In hect.)	–
	Residential Area (In hect.)	–
	Other Area (In hect.)	–
	Water bodies	–
	Nearest Town with Distance:	Vansda (12km)

Gujarat Technological University, Ahmedabad, Gujarat

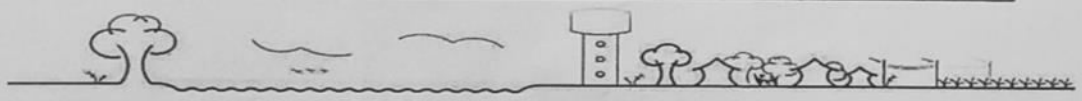
Vishwakarma Yojana: Phase IV
Techno Economic Survey

3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1. Shopkeepers 2. Private / Government Job 3. Labour / workers

4. **Physical Infrastructure Facilities:**

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



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase IV
Techno Economic Survey

E.	Road Network: All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road	WBM	✓		–
	Main road	CC/RCC	✓		–
	Internal streets	CC/RCC	✓		–
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH 53 GJSH 5	✓		–
Suggestions if any:					
F.	Transport Facility				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	yes		✓	–
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	yes Good	✓		–
	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	✓		–
	Power supply for Domestic Use	yes	✓		–
	Power supply for Agricultural Use	NO			–
	Power supply for Commercial Use	NO			–
	Road/ Street Lights	yes	✓		–

	Electrification in Government Buildings/ Schools/ Hospitals	yes	✓		-
	Renewable Energy Source Facilities (Y/ N)	NO			-
	LED Facilities	NO			-
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	NO			-
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	NO			-
	Solid & liquid waste Disposal system available	NO			-
	Any facility for Waste collection from road	works are enabled	✓		-
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	River	✓		-
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	PUCCA (94.20.1)	✓		-

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

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Vishwakarma Yojana: Phase IV
Techno Economic Survey

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

L.	Education Facilities:				
	Aaganwadi/ Play group	Yes			
	Primary School	Yes			
	Secondary school	Yes			
	Higher sec. School	Yes			
	ITI college/ vocational Training Center	NO			
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	NO			
	If any of the above Facility is not available in village than approx. distance from village: 9.6...kms.				
Suggestions if any:					

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

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	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	No			–
	Public Garden Location: Condition:	No			–
	Village Pond Location: Condition:	yes GJSHS Good	✓		–
	Recreation Center Location: Condition:	No			–
	Cinema/ Video Hall Location: Condition:	No			–
	Assembly Polling Station Location: Condition:	yes near vidya kisan school Good	✓		–
	Birth & Death Registration Office Location: Condition:	yes Good	✓		–

If any of the above Facility is not available in village than approx. distance from village: 52 **kms.**

Suggestions if any:

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

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

6. Sustainable /Green Infrastructure Facilities:

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

7. Data Collection From Village

Village Base Map Available: Hard Copy/Soft Copy	NO

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Techno Economic Survey

Recent Projects going on for Development of Village	NO
Any NGO working for village development	NO

8. Additional Information/ Requirement:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities(School Building, Health Center, Panchayat Building, Public Toilets & any other)	Existing infrastructure etc in good condition	—
2.	Additional Information/ Requirement	NO	—
		—	—
		—	—

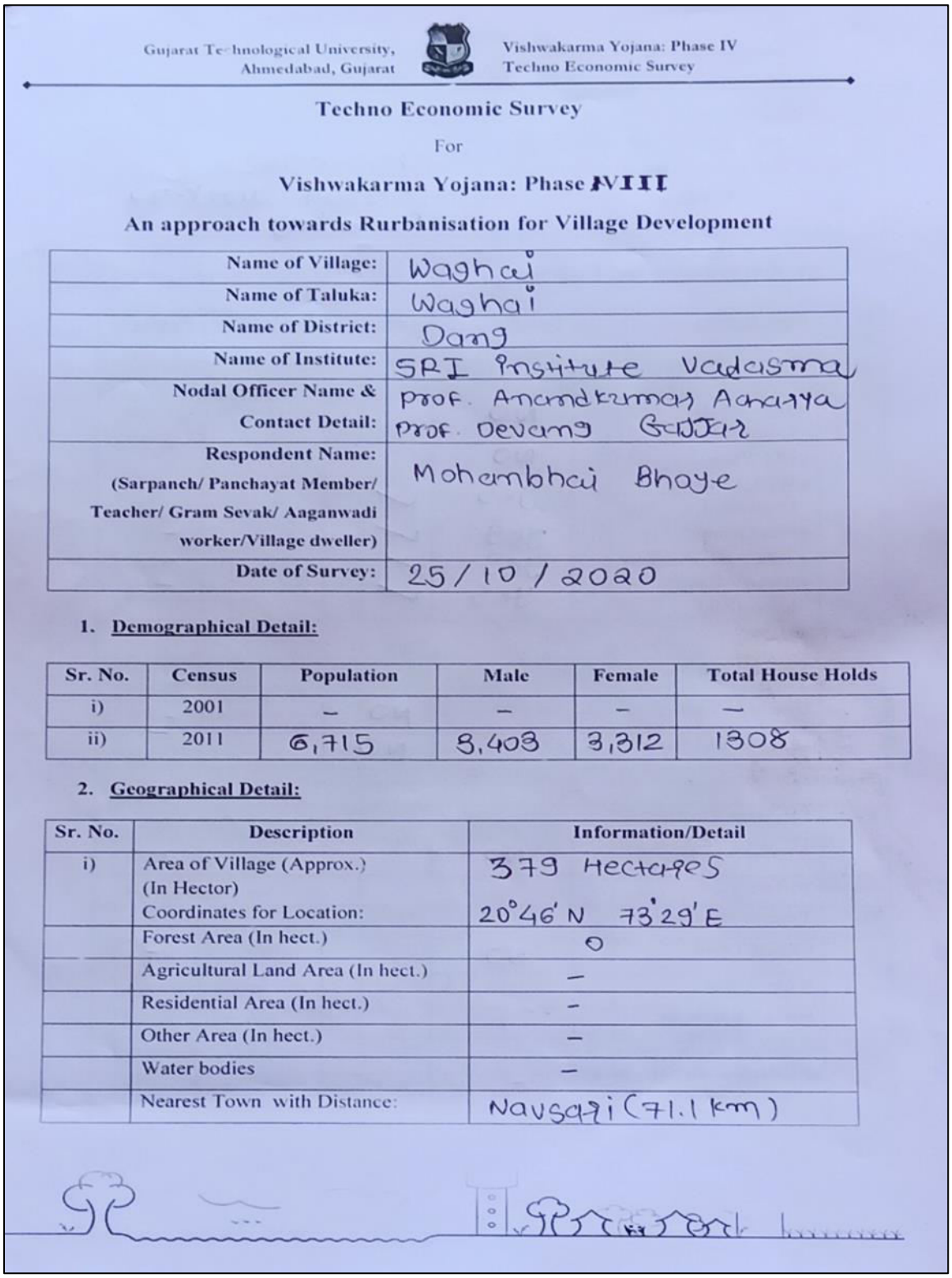
Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Technical queries/ Difficulties:
Ms Jagruti Shah, OSD
Contact no. 9978980170

For Any Administration queries/ Difficulties:
Ms. Darshana Chauhan, OSD
Contact No. 9909944891

Email ID: rurban@gtu.edu.in

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



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Vishwakarma Yojana: Phase IV
Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

An approach towards Rurbanisation for Village Development

Name of Village:	Waghai
Name of Taluka:	Waghai
Name of District:	Dang
Name of Institute:	SRI Institute Vadasma
Nodal Officer Name & Contact Detail:	Prof. Anandkumar Aahirrao Prof. Devang Gajjar
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Mohanbhai Bhoye
Date of Survey:	25/10/2020

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	–	–	–	–
ii)	2011	6,715	3,403	3,312	1308

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	379 Hectares 20°46'N 73°29'E
	Forest Area (In hect.)	0
	Agricultural Land Area (In hect.)	–
	Residential Area (In hect.)	–
	Other Area (In hect.)	–
	Water bodies	–
	Nearest Town with Distance:	Navsari (71.1 km)

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Techno Economic Survey

3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1. Shopkeepers 2. Labour workers 3. Farming

4. **Physical Infrastructure Facilities:**

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

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E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Pucca	✓		–
	Main road	Pucca	✓		–
	Internal streets	Kutchha	✓		–
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH 8	–		–
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Yes	✓		–
	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)	DGVCL	✓		–
	Power supply for Domestic Use	Yes	✓		–
	Power supply for Agricultural Use	NO			–
	Power supply for Commercial Use	Yes			–
	Road/ Street Lights	NO			–

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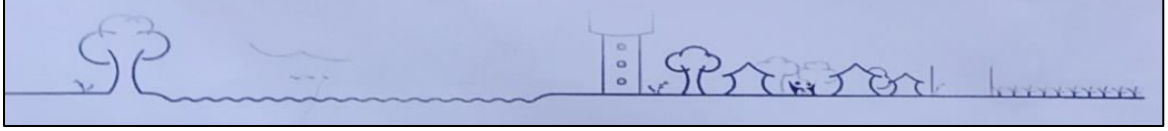
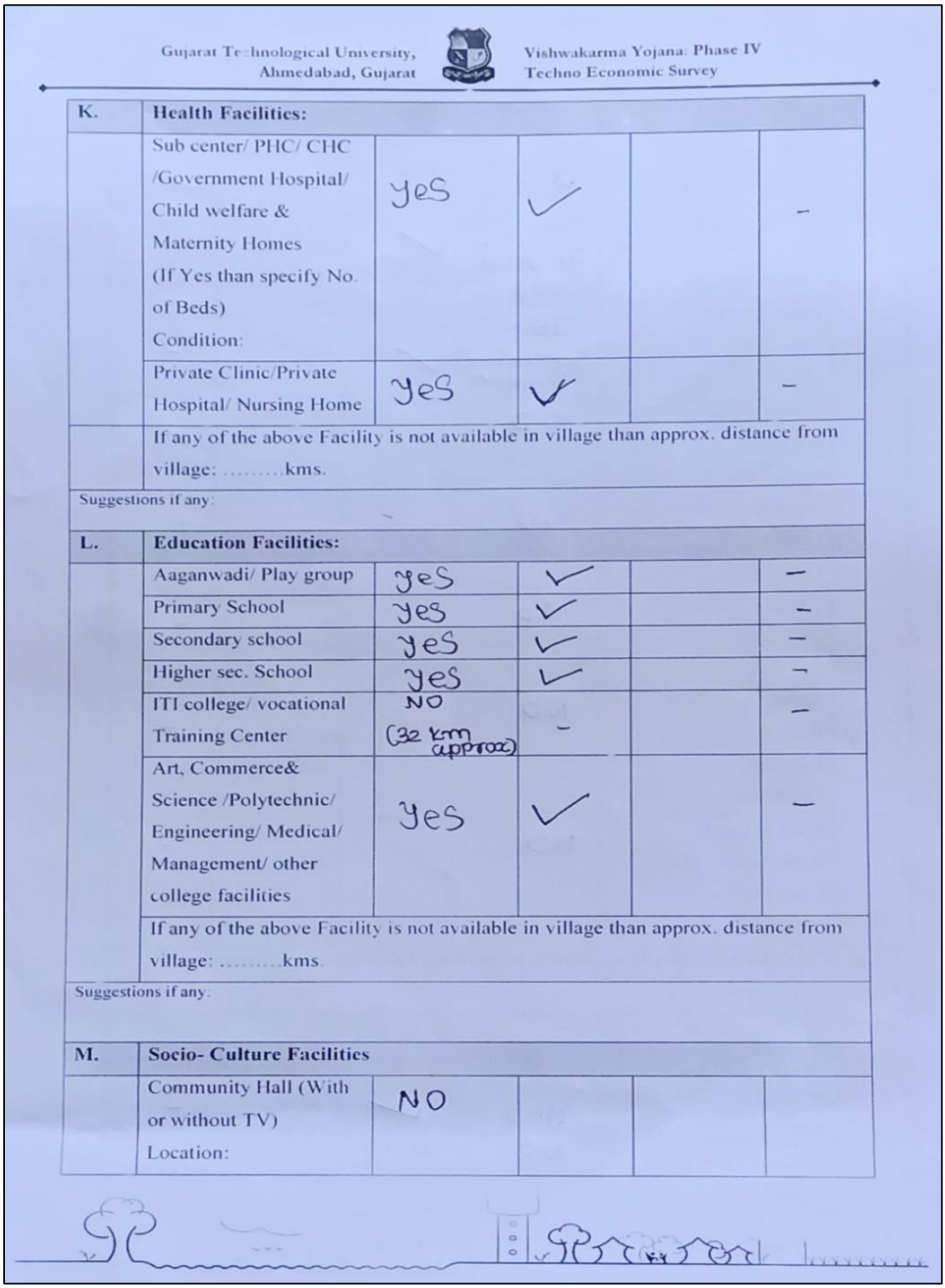
Techno Economic Survey

	Electrification in Government Buildings/ Schools/ Hospitals	Yes	✓		-
	Renewable Energy Source Facilities (Y/ N)	NO			-
	LED Facilities	NO			-
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	NO			-
	Location Condition	-			-
	Community Toilet (With bath/ without bath facilities)	NO			-
	Solid & liquid waste Disposal system available	NO			-
	Any facility for Waste collection from road	-			-
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	River		✓	-
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	0.79%			

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks





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K.	**Health Facilities:**				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	yes	✓		-
	Private Clinic/Private Hospital/ Nursing Home	yes	✓		-
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
L.	**Education Facilities:**				
	Aaganwadi/ Play group	yes	✓		-
	Primary School	yes	✓		-
	Secondary school	yes	✓		-
	Higher sec. School	yes	✓		-
	ITI college/ vocational Training Center	NO (32 km approx)	-		-
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	yes	✓		-
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
M.	**Socio- Culture Facilities**				
	Community Hall (With or without TV) Location:	NO			

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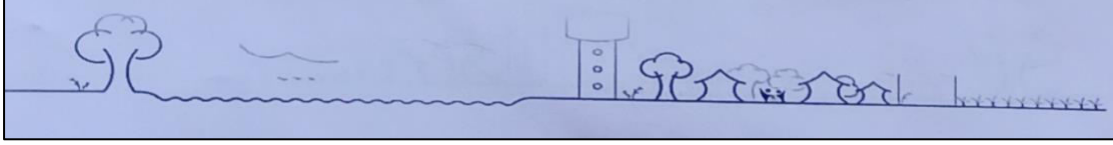
Vishwakarma Yojana: Phase IV
Techno Economic Survey

	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	Yes Waghai Good	✓		–
	Public Garden Location: Condition:	Yes Botanical Garden	✓		–
	Village Pond Location: Condition:	NO			–
	Recreation Center Location: Condition:	NO			–
	Cinema/ Video Hall Location: Condition:	NO			–
	Assembly Polling Station Location: Condition:	NO			–
	Birth & Death Registration Office Location: Condition:	NO			–

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

Suggestions if any:

N.	Other Facilities				
	Post-office	yes	✓		–
	Telecommunication Network/ STD booth	NO			–



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

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

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
O.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	NO			–
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	Yes

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Techno Economic Survey

Recent Projects going on for Development of Village	NO
Any NGO working for village development	NO

8. Additional Information/ Requirement:

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

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 Technical queries/ Difficulties:
Ms Jagruti Shah, OSD
Contact no. 9978980170

For Any Administration queries/ Difficulties:
Ms. Darshana Chauhan, OSD
Contact No. 9909944891

Email ID: rurban@gtu.edu.in

સરપંચશ્રી
ગૃપ ગ્રામ પંચાયત ...
તા.વઘઈ, જિ.ડાંગ.

12.3Gap Analysis of the Waghai Village :

As per UDPFI guide lines and as per ideal village survey the requirement as per population, basic amenities analyze in Waghai village. Gape analysis as under.

12.1 A gap analysis of Waghai village

Village Facilities	Planning Commission	Existing	Required as per Norms	Gap
SOCIO CULTURAL INFRASTRUCTURE FACILITIES				
Community Hall	Per 10000Population	0	1	-1
Cremation Ground	Per 20,000 population	0	0	0
Post Office	Per 10000 Population	1	0	+1
Gram Panchayat	Each individual/group Panchayat	0	0	0
Fire station	Per 10000 Population	0	0	0
Public Garden	Per village	0	1	-1
Police station	Per 40,000Population	1	0	+1
APMC	Per 10000 Population	1	0	+1
SOCIOAL INFRASTRUCTURE FACILITIES				
Education				
Angadwadi	Per 2500 population		3	0
Primary school	Per 2500 population	3	3	0
Secondry school	Per 7,500 population	2	1	+1
Higher secondary school	Per 15000population	1	0	0
College	Per 125,000 Population	2	0	0
Training Institute	Per 100000 Population	0	0	0
Agriculture research center	Per 100000 Population	1	0	0
Skill Development	Per 100000 Population	O	0	0

Center				
Health Facilities				
Health Centre	Each village	1	1	0
PHC	Per 20,000 Population	1	0	+1
CHC	Per 20,000 Population	1	0	+1
Child Welfare	Per 100000 Population	0	0	0
Hospitals	Per 100000 Population	1	0	+1
Public latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets)	0	0	0
PHYSICAL INFRASTRUCTURE FACILITIES				
Transportation		Inadequate /Adequate		
Pucca Village Approach Road	Each village	Adequate	2 km approach road	-
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	Adequate	1	--
Drinking water(minimum 60)		Inadequate /Adequate		
Over head tank	1/3 of Total Demand	inadequate	1	-
U/G sump	2/3 of Total Demand	Adequate	1	-
Electricity system	Yes	adequate	-	-
Drainage Network – Open		Inadequate	30% open	-

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

T-12.4 A Summary Details of all villages in table format

Sr. No	VillageName	Discipline	Part-I	Part-II
1.	**Waghai**	**Civil**	Public Sanitary Complexes	Super market
			Sewage Treatment Plant	Rain water harvesting system
			Community Hall	Solid Waste management
			Cyber Café	Skill development center
			Pharmacy Store	Intze water tank
			Tourist Visitor Center	Agro Service center
		Electrical	Solar Street Light	Solar Energy Charge Controller
			Roof Top Solar	Power Supply With Auto Switching
			Solar Water Pumping System	Home Automation With IOT
2.	**Chikar**	**Civil**	PostOffice	CommunityHall
			SkillDevelopmentCenter	EntranceGate
			PublicGarden	PublicToilet
			RainWaterHarvesting	Anganwadi
			CremationGround	CyberSecurity
			Krishi Kendra	PharmacyStore
		Electrical	Energy Harvesting System	Solar Street Light
			Moisture Monitoring System	Roof Top Solar
			PC Based Electrical Load System	Solar Water Pumping System
3.	**Chichigaontha**	**Civil**	WaterTank	Pharmacy Store
			PublicToilet	KrishiKendra
			BiogasPlant	MaternityHome

			SolidWasteManagement	Underground Sump
			Bank	Cremation Ground
			SmartCenter	PostOffice
		Electrical	Roof Top Solar	Solar Energy Charge Controller
			Solar Water Pumping System	Power Supply With Auto Switching
			Energy Harvesting System	Home Automation With IOT

12.5 Drawings (If, required, A1, A2, A3 design is not visible then Only) :

All the drawings and images are attached in their respective chapters along with designs and their listing are mentioned in the list of figures along with their page numbers.

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

T - 12.2 A Summary Of Photographs Of Waghai Village

T- 12.2 B -C Summary Of Photographs Of Ideal Unai Village






T-12.2 D Photographs of Punsari village Smart village

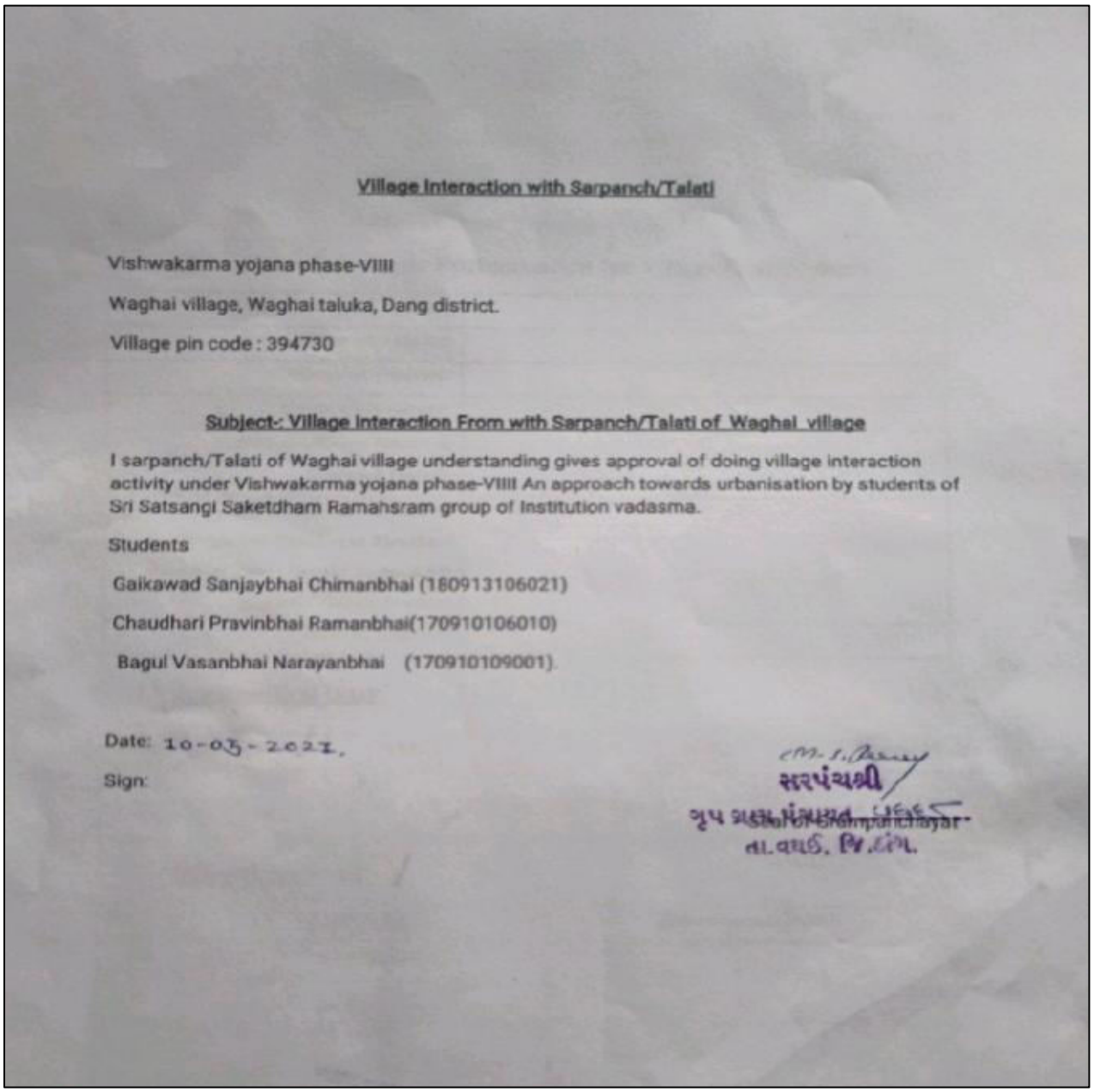




12.7Village Interaction with Sarpanch/Talati Report

We have visited waghai village and interact with sarpanch named MohanbhaiSonubhaiBhoye.

During interaction with sarpanch he gave us information about available facilities in waghai village , village population details , cultural activities done in waghai village , infrastructure facilities available and required in waghai village , about educational facilities and school infrastructure , people economical conditions and there way of income, health facilities etc.



Village Interaction with Sarpanch/Talati

Vishwakarma yojana phase-VIIII

Waghai village, Waghai taluka, Dang district.

Village pin code : 394730

Subject:- Village Interaction From with Sarpanch/Talati of Waghai village

I sarpanch/Talati of Waghai village understanding gives approval of doing village interaction activity under Vishwakarma yojana phase-VIIII An approach towards urbanisation by students of Sri Satsangi Saketdham Ramahsram group of Institution vadasma.

Students

Gaikawad Sanjaybhai Chimanbhai (180913106021)

Chaudhari Pravinbhai Ramanbhai(170910106010)

Bagul Vasanbhai Narayanbhai (170910109001)

Date: 10-03-2021.

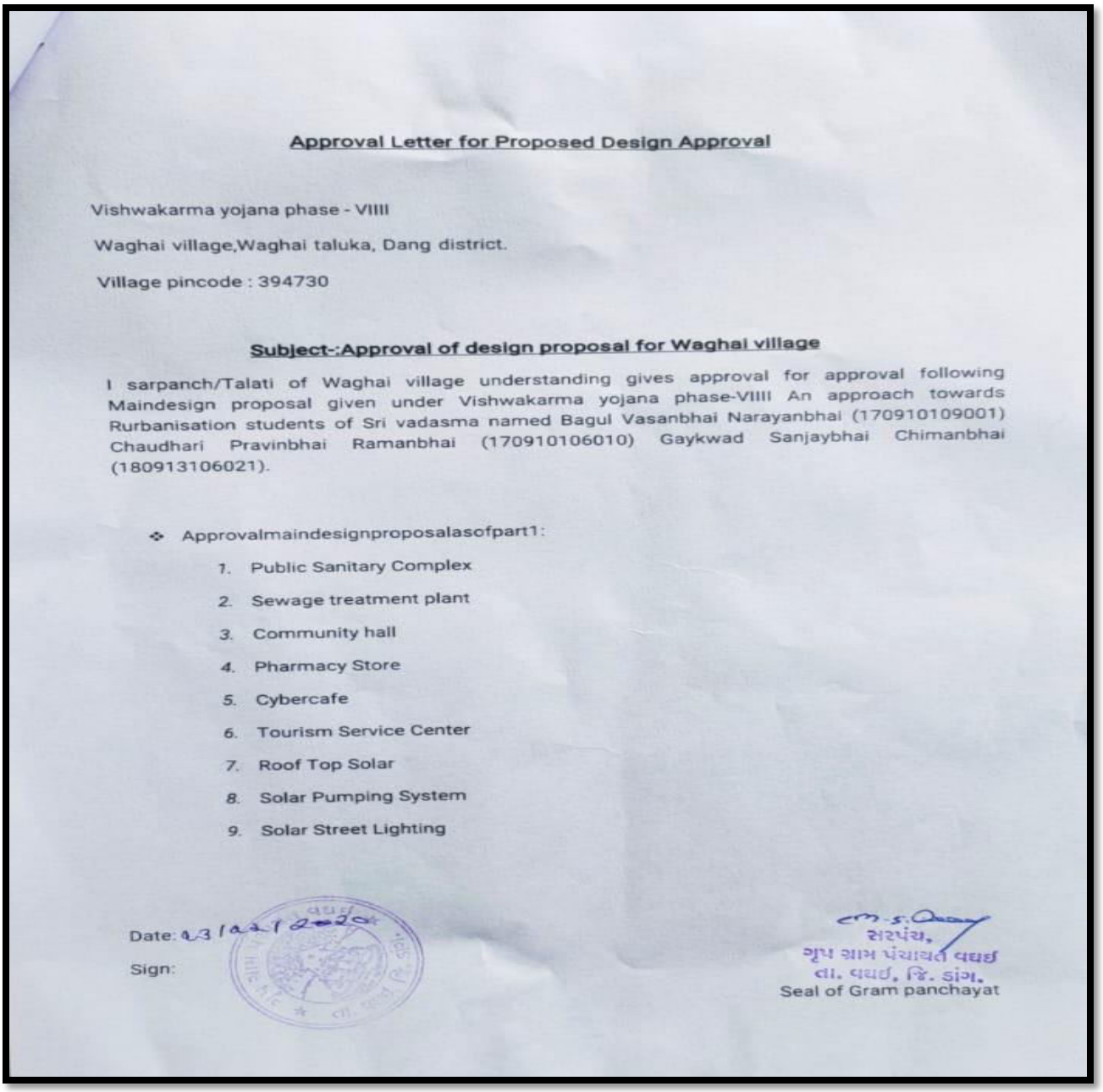
Sign:

સરપંચશ્રી

12.8 Sarpanch Letter giving information about the village development

While interaction with people of waghai village they give some information about required in waghai village like public sanitary facilities ,community hall , maintenance of school structure , drainage facilities , sewage disposal facilities. So we designed some facilities as requires to people of waghai village.

❖ Approval Letter for Proposed Designs approval:



Approval Letter for Proposed Design Approval

Vishwakarma yojana phase - VIIII

Waghai village,Waghai taluka, Dang district.

Village pincode : 394730

Subject-:Approval of design proposal for Waghai village

I sarpanch/Talati of Waghai village understanding gives approval for approval following Maindesign proposal given under Vishwakarma yojana phase-VIIII An approach towards Rurbanisation students of Sri vadasma named Bagul Vasanbhai Narayanbhai (170910109001) Chaudhari Pravinbhai Ramanbhai (170910106010) Gaykwad Sanjaybhai Chimanbhai (180913106021).

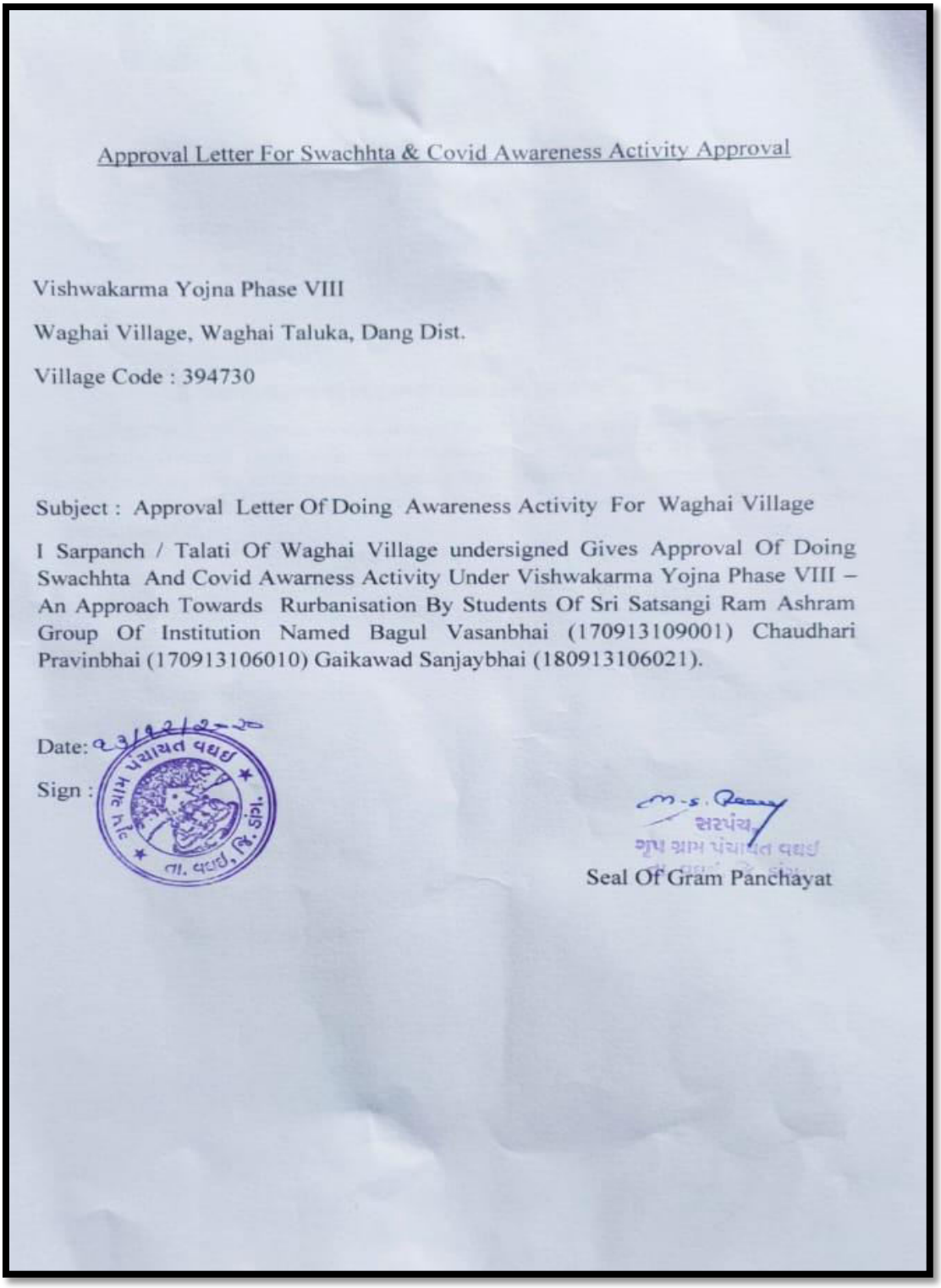
- Approvalmaindesignproposalasofpart1:
  1. Public Sanitary Complex
  2. Sewage treatment plant
  3. Community hall
  4. Pharmacy Store
  5. Cybercafe
  6. Tourism Service Center
  7. Roof Top Solar
  8. Solar Pumping System
  9. Solar Street Lighting

Date: 23/12/2020

Sign:

સરપંચ,
ગૃપ ગ્રામ પંચાયત વઘઈ
તા. વઘઈ, જિ. ડાંગ.
Seal of Gram panchayat

- Approval Letter ForSwachhta& Covid Awareness Activity approval



Approval Letter For Swachhta & Covid Awareness Activity Approval

Vishwakarma Yojna Phase VIII

Waghai Village, Waghai Taluka, Dang Dist.

Village Code : 394730

Subject : Approval Letter Of Doing Awareness Activity For Waghai Village

I Sarpanch / Talati Of Waghai Village undersigned Gives Approval Of Doing Swachhta And Covid Awarness Activity Under Vishwakarma Yojna Phase VIII – An Approach Towards Rurbanisation By Students Of Sri Satsangi Ram Ashram Group Of Institution Named Bagul Vasanbhai (170913109001) Chaudhari Pravinbhai (170913106010) Gaikawad Sanjaybhai (180913106021).

Date: 23/12/2020

Sign :

સરપંચ

Seal Of Gram Panchayat

VY – PHASE- VIII-PART -II

Chapter: 13
From the Chapter- 9 future designs of the aspects (Feasibility, Construction ,Operation and maintenance of various design options in Rural Areas along with cost with AutoCAD designs / planning with any software

13.1 Design Proposals :

13.1.1. Super Market

Scenario :
A supermarket is a self-service shop offering a wide variety of food, beverages and household products, organized into sections. It is larger and has a wider selection than earlier grocery stores, but is smaller and more limited in the range of merchandise than a hypermarket or big-box market.

Existing Situation in Waghai:
In the waghaivillage there is no any self-service shop and having variety in it. So we have designed a Supermarket as socio-cultural design or structure of the village. Supermarket is a self-service shop offering a wide variety of food, beverages, and household products, organized into sections. It is larger and has a wider selection than earlier grocery stores.

Design Utilized by,
All the people living in the village of even outsiders from nearby villages and relatives of the villagers can use or utilize a supermarket for their different uses.

Location :
The suitable place for super market in waghai village is on main approach road and front side of state bank of indiainfront of petrol pump.

Design brief :
Supermarket - a large self-service grocery store selling groceries and dairy products and household goods food market, grocery, grocery store, market - a marketplace where groceries are sold; "the grocery store included a meat market" hypermarket - a huge supermarket . A self-service retail market selling especially for the foods and household merchandise

Supermarket Design :

Length : 9.1m ; Width : 6.1m : Height : 4.36m Carpet area : 51.29 m^2

Common repair and maintenance of the structure :

Some common repairs and maintenances are as below ; Exterior painting and plastering ; Landscaping and gardening ; Paving repairs ; Carpeting and flooring; Plumbing; Repairing cracking or leaning walls etc**.**

Proposed Design in Auto cad; Revit and Skechup

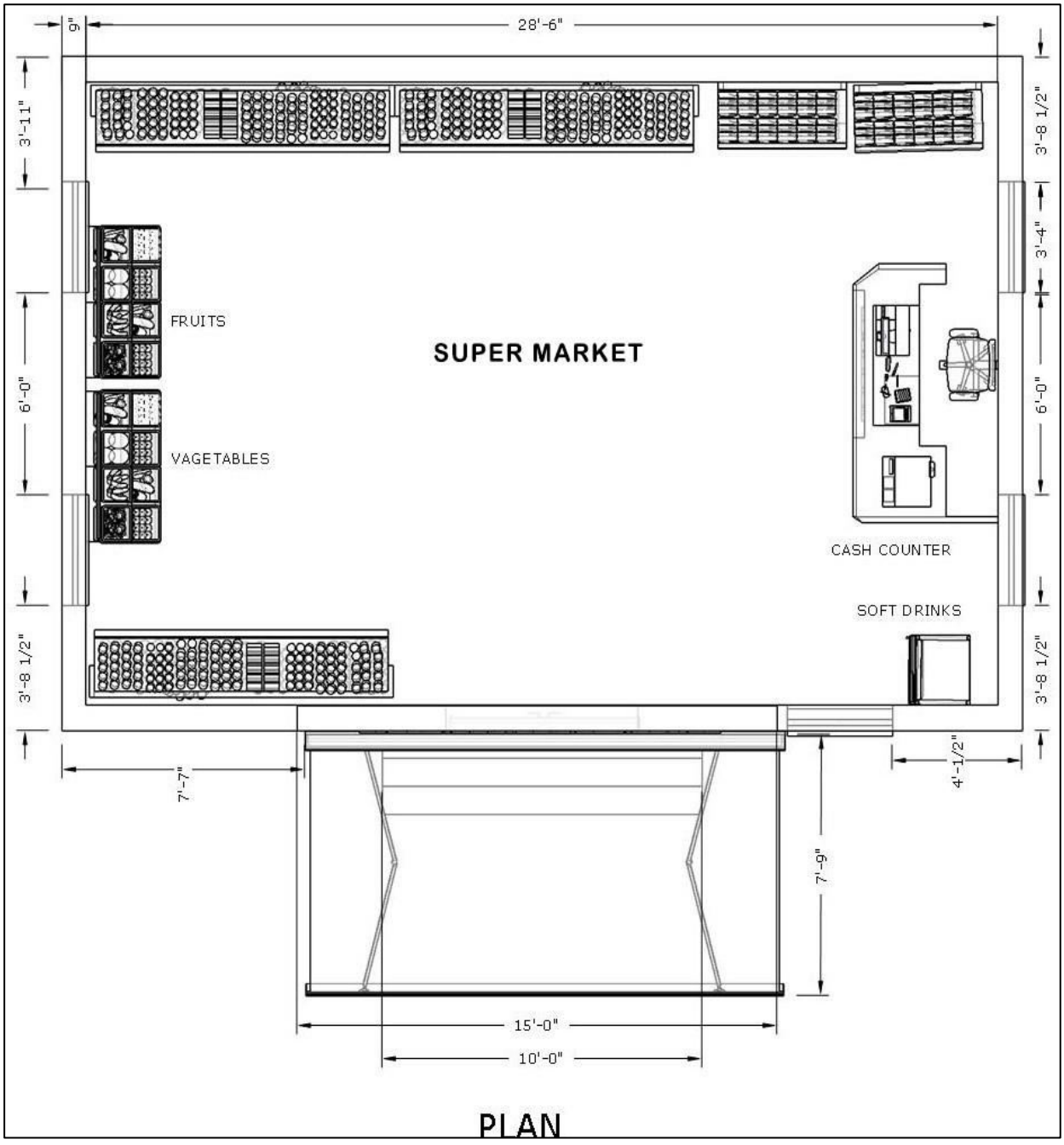


Fig-13.1.1. A Super Market Plan

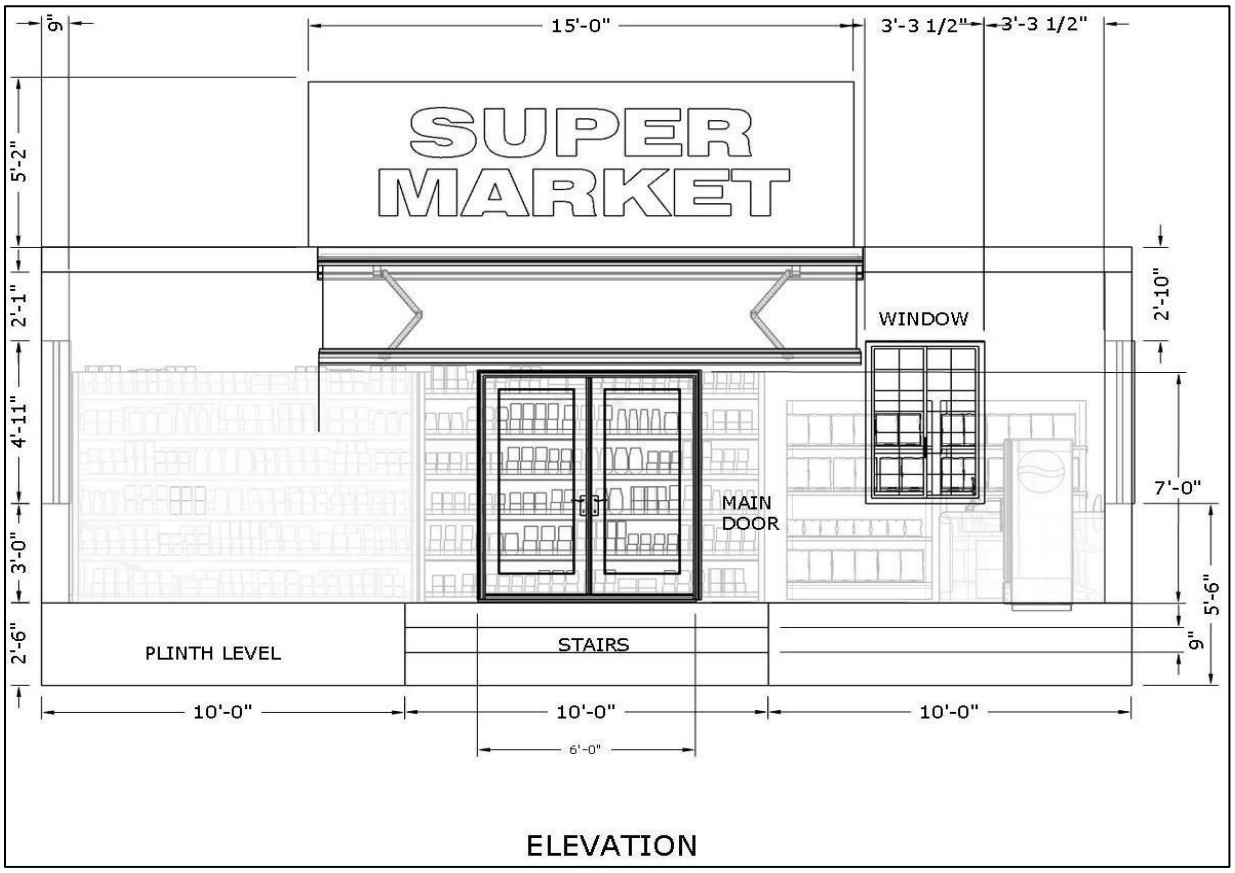


Fig-13.1.1. B Super market Elevation

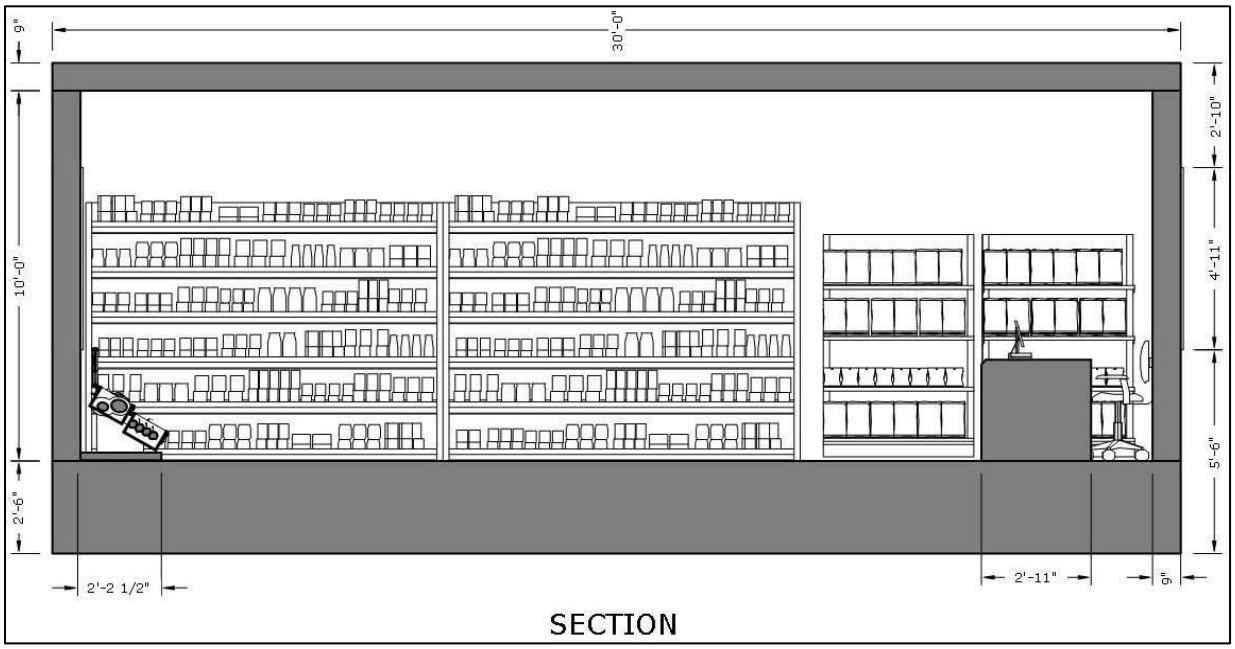


Fig-13.1.1 C Super market Section

Fig-13.1.1. D Super Market 3D model

T-13.1.1. A Measurement Sheet Of Super Market

SR. NO	Description	Length (m)	Width (m)	Height (m)	Count (Nos.)	Total Quantity (m^3)
1	ROOF	9.12	6	0.15	1	12.60
2	WALL 9"	21.306	0.2286	3	1	18
3	PLINTH WITH STAIRS	21.306	0.2286	0.762	4	5.90
4	FLOOR	9.12	6	0.15	1	8.6
5	DOOR	1.8796	-	2.1336	1	-
6	WINDOW	1	-	1.524	4	-
7	PCC	29.98	1.2	0.4	1	8.22
8	BASIC WALL: 00.30	29.98	1.2	0.4	1	3.6
9	BASIC WALL: 0.40	29.98	1.6	0.4	1	4.8
10	BASIC WALL: GENERIC -0.50	29.98	2	0.4	1	6
11	EXCAVATION	33.60	1.2	1.5	4	60.44

T-13.1.1. B Abstract Sheet Of Super Market

SR NO.	Description	Quantity (m^3)	rate	per	Amount
1	WALL	18	4590	Ft^2	82636.32
2	DOOR		6000	-	6000
3	WINDOW		4*2400	-	9600
4	ROOF	12.74	3500	m^3	44590
5	FLOOR	8.5	3500	m^3	29750
6	PLINTH WALLSTAIRS	5.89	90	Ft^2	18720.1
7	EXCAVATION	1.215*4	350	m^3	1701
8	PCC	8.22	3500	m^3	28770
9	BASIC WALL:00.30	3.6	90	Ft^2	11520
10	BASICWALL:0.40	5.44	90	Ft^2	11520
11	BASIC WALL:GENERIC-0.50	6	90	Ft^2	11520
				GRANDTOTAL	256327

The rates of their respective works provided in the abstract sheet along with quantities are inclusive of water charges, contractor's profit, contingencies, utilities and labor charges.

Total cost = ₹ 256327/-

13.1.2. Rain Water Harvesting System :

Introduction

Rain Water Harvesting can be defined as activity of direct collection of Rain Water and storage of Rain Water as well as other activities aimed at harvesting and conserving surface and Ground Water, prevention of loss through evaporation and seepage and other hydrological studies and

engineering inventions aiming at most efficient utilization of the Rain Water towards best use for the humanity.

Existing Situation in Waghai

In waghai village there is not any system of rain water harvesting and it is very important to provide in waghai village because in summer days when ground water table goes down there is some lack of water in this village.

Design Utilized by

All people of Waghai village and at the time of emergency the different municipal departments can also use.

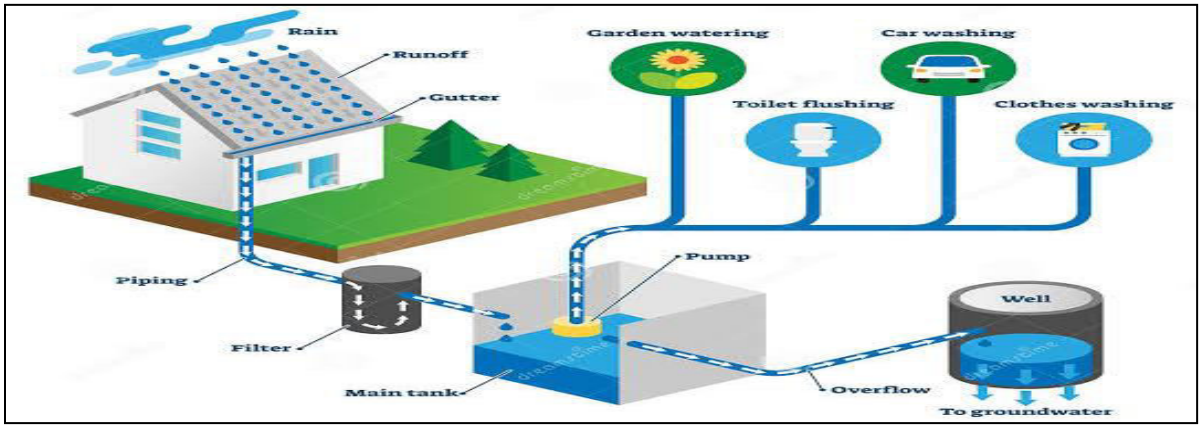
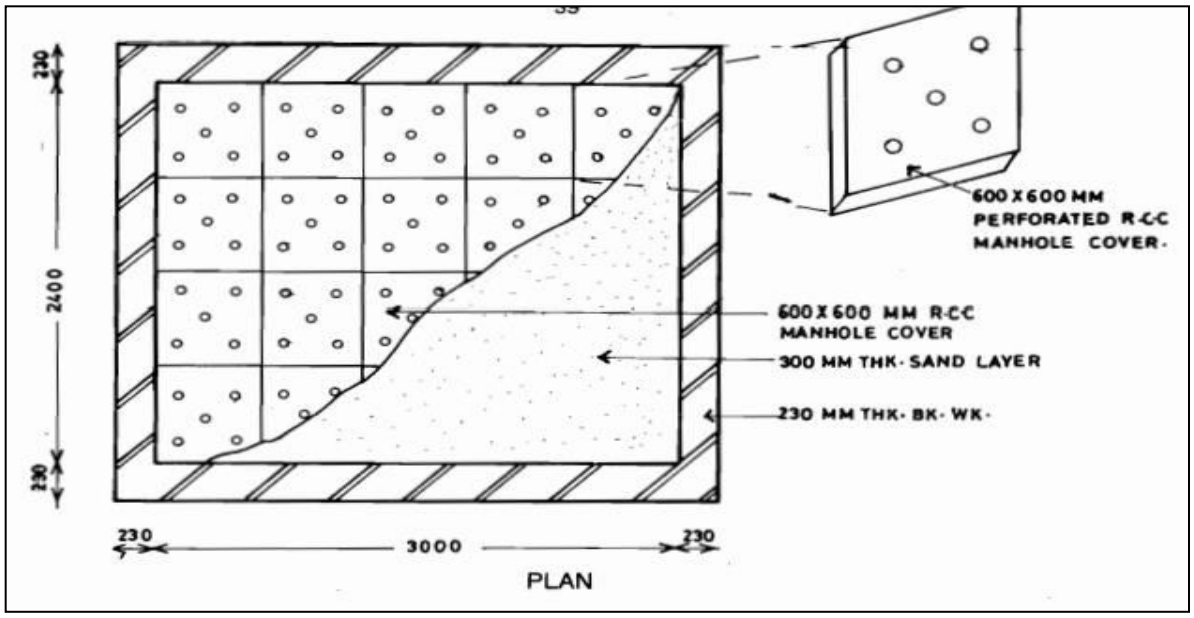


Fig-13.1.2. A Diagram Of Rain Water Harvesting



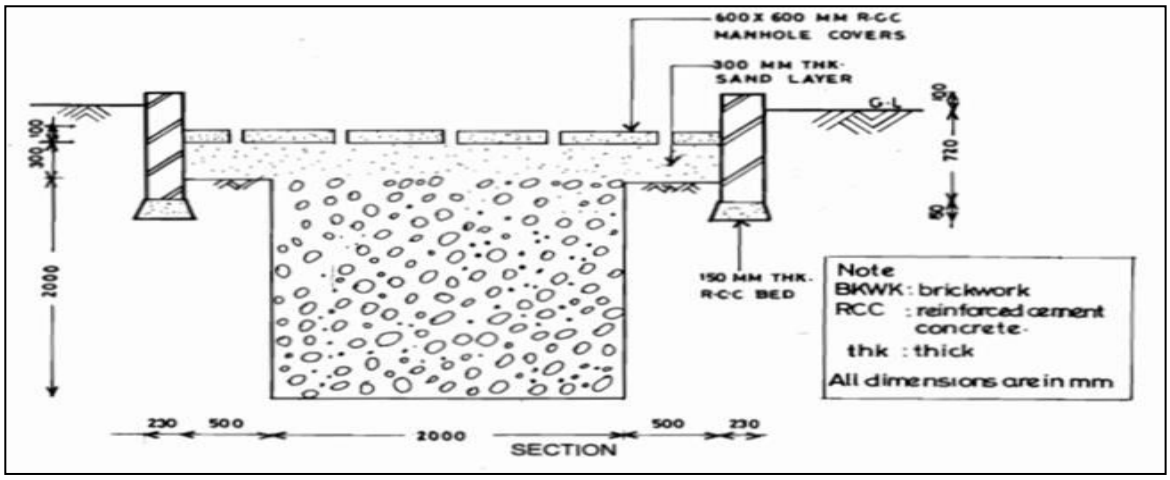
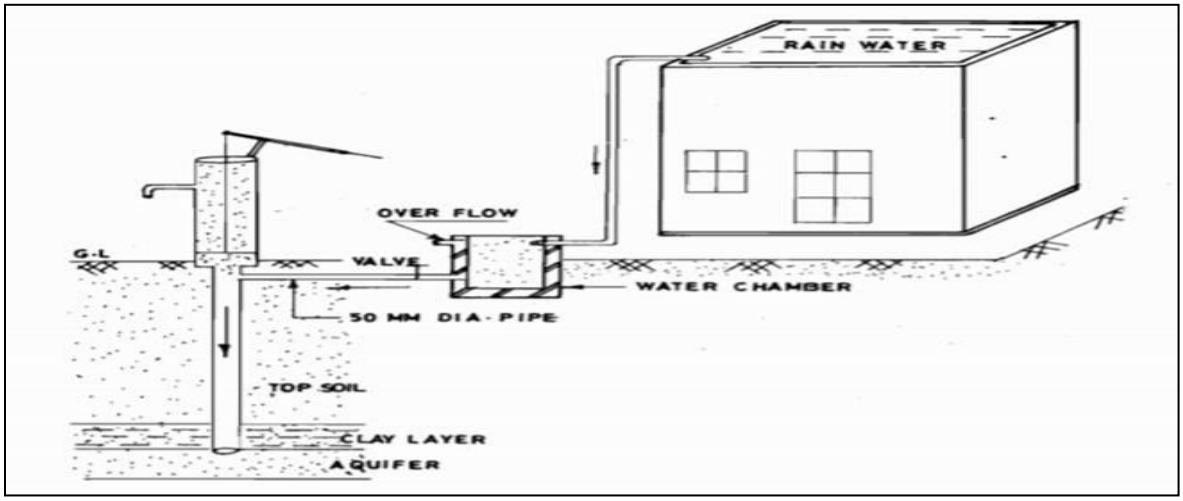


Fig-13.1.2. B Details Of Recharge Pit



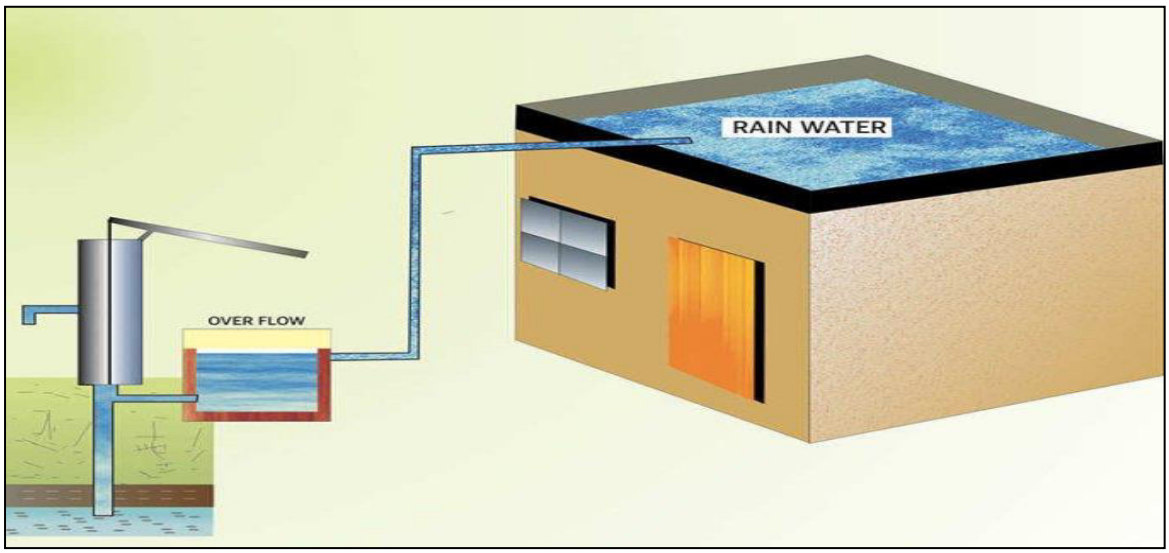


Fig-13.1.2. C 3D Model Of Rain Water Harvesting

Design:

The quantity of water stored in a water harvesting system depends on size of the catchment area and the size of the storage tanks. The storage tanks has to be designed according to the water requirements, rain fall and catchment availability.

Taking an averagethe system has to be designed for meeting drinking water requirement of a 5 member family living in a building with a roof top area of 100 Sqm. Avg. annual rain fall is 600 mm. Daily drinking & cooking water requirement per person is 10 litres.

Area of Roof top	=	100 Sqm
Average annual rain fall	=	600 mm
Runoff co-efficient for tiles surface (typical case)	=	0.85
Co-efficient for evaporation, spillage and first flush etc.	=	0.80
annual water harvesting potential from		

100 Sqm roof top = Area of roof top x Annual rain falls x Run off coefficient x Constant co-efficient
= 100 x .60 x .85x0.80 = 40.8 cum= 40,800 litres
Drinking water requirement for family for dry season 245x5x10=12,250 litres
Then capacity of tank= Ax r x C =100x0.025x0.85 =2.125 cum= 2,125 litres.

T-13.1.2. A Measurement sheet of Rain Harvesting system

Sr. No.	Particular	Length	Width	Height	Quantity	Total Quantity
1.	Excavation for Foundation for depth more than 3.3m including sorting out and stacking of useful material and disposing off the excavated stuff upto 50 m lead	17.5	17.5	3.5	1071.8 m3	1071.8 m3
2.	Providing and laying Cement Concrete 1:3:6 (1 cement : 3 coarse sand : 6 stone aggregate 40 mm nominal size) and curing complete excluding cost offormwork in foundation	17.5	17.5	0.10	30.625 m3	30.625 m3
3.	Providing and laying controlled cement concrete M15 for curing complete excluding the cost of formwork	17.5	3.5	0.10	24.50 m3	85.75 m3
4.	Deduction of Manholes from the top slab	0.60	0.60	0.10	0.072 m3	61.25-0.072 =61.178m3
5.	Providing H.Y.S.D bar reinforcement for R.C.C work including bending binding and placing in position	@	70 kg/m3		6000 kg	6000 kg

T-13.1.2 B Abstract sheet of Rain Water Harvesting System

Sr. No.	Particular or Item	Quantity	Rate (Rs.)	Per	Amount (Rs.)
1.	For Excavation of foundation	1071.8	124.00	Cum	**132903.20**
2.	Providing and laying P.C.C (1:3:6) excluding cost of formwork	30.625	2932.00	Cum	**89792.50**
3.	Providing and laying controlled cement concrete M15 for the walls excluding cost of reinforcement	24.50	4077.00	Cum	**99886.50**
4.	Providing and laying concrete and finishing smooth curing including the cost of formwork but excluding the cost of reinforcement in R.C.C slab	61.25	5927.00	Cum	**363028.75**
5.	Reinforcement	6000	40.00	Kg	**24000.00**
				Total Rs.	**709613.95**
				Say Rs.	**709614.00**

13.1.3 Solid Waste Management System

Introduction

Solid Waste Management (SWM) is a part of public health and sanitation and according to the Indian constitution, falls within the purview of the State list. Since this activity is nonexclusive, unrivalled & essential, the responsibility for providing the service lies within the public domain, The activity being of local nature is entrusted to the municipal government.To carry out this essential activity an annual provision for the recurring and capital expenditure is made in the municipal budget. The municipal budget is based on the total income from various revenue sources and other funds including the grants from Central and State Government.

Existing System in Waghai village

In Waghai village all people dumping their waste in open area. There is not any solid waste management system in Waghai village.

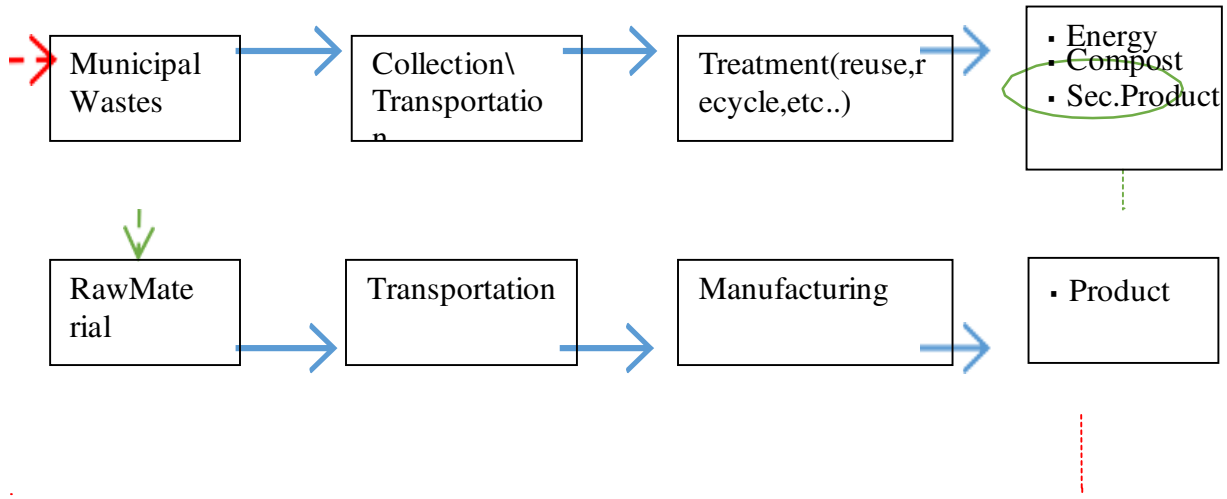


Fig-13.1.3 A Supply Chain Within A Waste Management System.

The current research links the economic and environmental models underlying the waste management problem. Figure shows the supply chain within the waste management system. Both an example of a reverse supply chain and a forward supply chain are presented. In the case of reverse supply chain the municipal solid wastes represent the raw materials (provided by a supplier) which go through a treatment process (manufacturing process) resulting in energy, compost and secondary products. The secondary products act as raw material for the forward supply chain that end in a product. Thus, clarifying the closed loop process that could be attainable.

System Design's Strategic Planning Model

Let W be the set of all possible waste types and QQ_{ww} be the total amount of waste type w that is generated on a yearly basis. α_{ww} is the at source unsorted fraction of the total amount QQ_{ww}. The amount $\alpha_{ww}QQ_{ww}$ can either go to a Separator S or can directly go to treatment facilities without sorting .There are four possible treatment categories in the current model; recycling R, organic composting C, waste to energy W and Landfilling L. Within each category different technologies could exist which are not determined at this level.

The design is according to the population of waghai village and designed for 1,308 houses and population of 6,715. As per population 40 dustbins are estimated for 1,308 houses one dustbin for 30 family. At the strategic planning phase of the waste management system's design, the treatment categories are variables that would be decided.

Accordinglyα_{ww}, QQ_{ww} are input parameters that describe the current waste management practices of a given city. $QQUQQ_{ww}$, $QQUE_{ww}$, $QQUL_{ww}$, $QQQQR_{ww}$, $QQQQC_{ww}$, $QQQQE_{ww}$, $QQQQL_{ww}$, $QQSR_{ww}$, $QQSC_{ww}$, $QQSE_{ww}$, $QQSL_{ww}$ are the amounts of wastes going between different facilities and are independent variables assigned by the model as an output.

$QQRE$, $QQRL$, $QQCE$, $QQCL$, $QQEL$ are wastes generated from different treatment facilities and are dependent variables which are also outputsof the model.

REC, SEC, COM, $CCTE$, $LTCC$ stand for the amount of recycled material, secondary products, compost, energy, and biogas from landfill consecutively.

Choosing the treatment technology depends on the waste composition of the city and the amount of investments they are willing to make in the system. For example, different alternatives of treating wastes are proposed such as incineration, gasification and recycling but choosing on whether to use the three technologies simultaneously or choose among them and with which capacities are all decision variables that would be obtained by solving a specific problem.

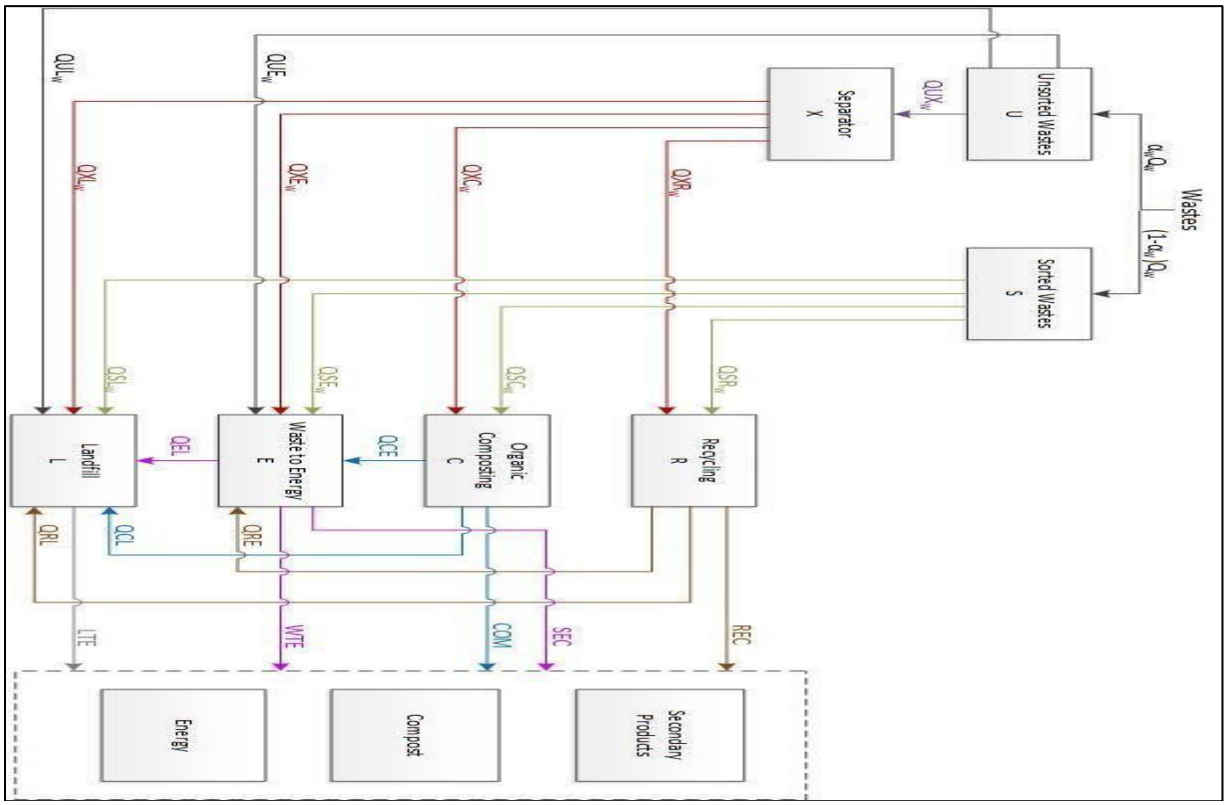


Fig-13.1.3 B Diagram Representing The Flow Of Wastes In Solid Waste Management System

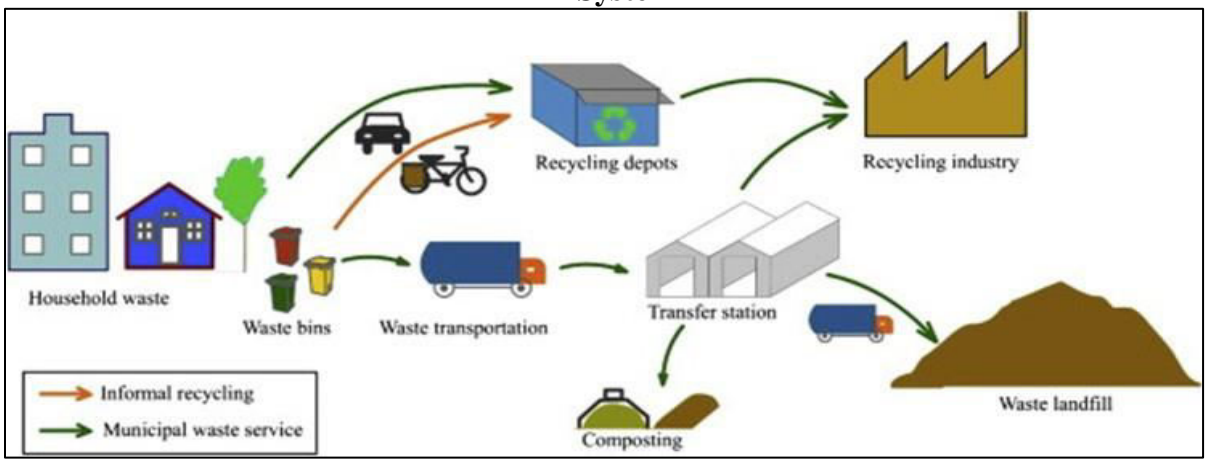


Fig-13.1.3 C Solid Waste Management Cycle

T-13.1.3 A Cost Estimation Of Solid Waste Management System

Sr.No	Item	QuantityNumber	Unit cost(Rs.)	Total Cost
1.	Containerizedhandcrafts	2	3000	6000
2.	Containerizedtricycles	5	3000	15000
3.	Total Dustbins Required as per 1,308 houses	40	150	6000
4.	Smallvehiclefordirectcollectionof waste	0	0	0
5.	The Cost of Collecting and transporting MSW	-	-	8000Rs/year
6.	Containersfordomestichazardous waste	10	300	3000
7.	The operation and maintenance cost of the collecting and transporting vehicles.	-	-	10000 Rs/Year
8.	The indirect operating cost	-	-	3000 Rs/year
			TOTAL COST	**51, 000**

13.1.4 Skill Development Center

Introduction

Skill development is a vital tool to empower people, to safeguard their future and for the overall development of an individual. It is an important aspect that enhances employability in today's globalisation. Skills are as essential as one's academic status. Education and skills should now go hand in hand. Education, entrepreneurship, and physical and social infrastructure all play an important role in developing rural regions. Skills are central to improving employability and livelihood opportunities, reducing poverty, enhancing productivity and promoting environmentally sustainable development.

Existing Situation in Waghai

Skill development center is very important for a rurbanisation of any village. there is not any skill center in wagai village. As per feedback of people of waghai village we have designed a skill development center.

Location

The suitable location for skill development center in waghai village is near the civil hospital Waghai in front of waghai police station.

Design Utilized by

All the people living in the village of even outsiders from nearby villages and relatives of the villagers can use or utilize a skill development centre for their different uses with the permission of Sarpanch, Talati and some authorized people of the village.
Dimensions : Ground Floor- 1215 m^2 First Floor-712 m^2

Some common repairs and maintenances are as below :

Exterior painting and plastering ; Landscaping and gardening ; Paving repairs ; Carpeting and flooring; Plumbing; Repairing cracking or leaning walls etc. For most effective maintenance , it should be organized through a program of cyclical maintenance.

Proposed Design in Auto cad, Revit and Sketch up

Fig-13.1.4. A Ground floor plan

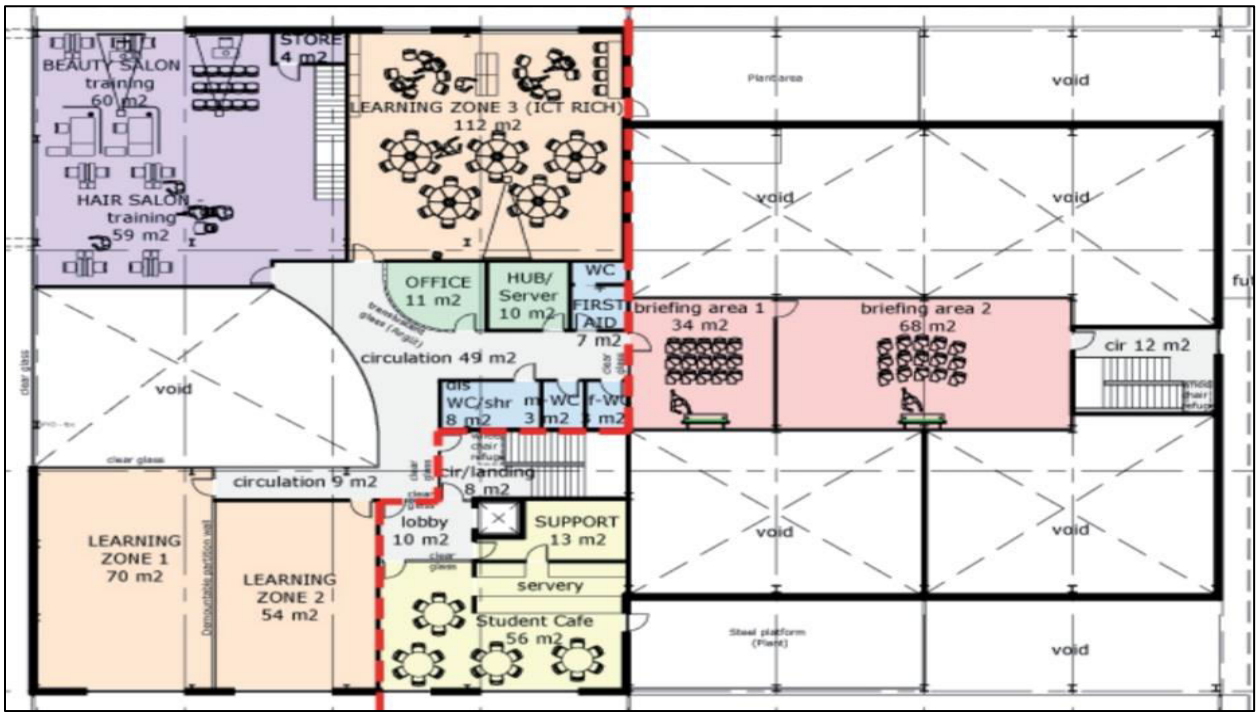


Fig-13.1.4 B First floor plan

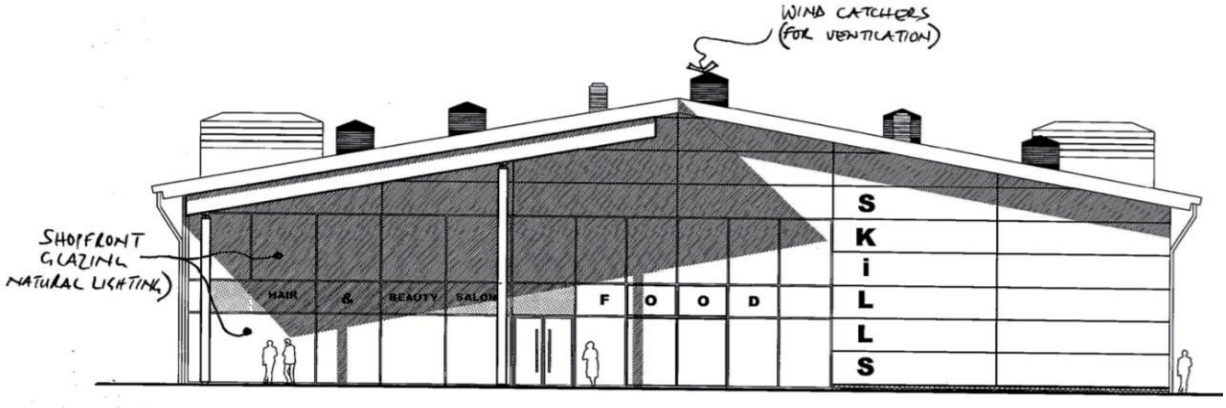


Fig-13.1.4 C South Elevation

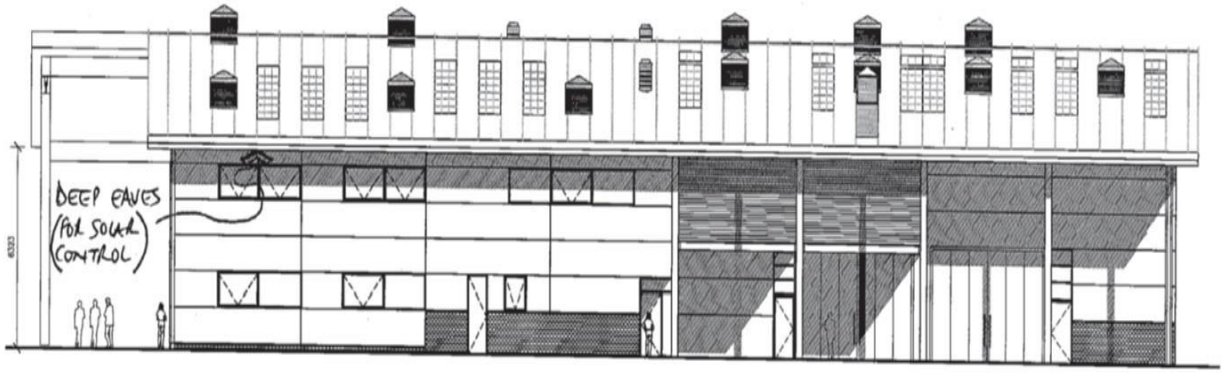


Fig-13.1.4 D East Elevation

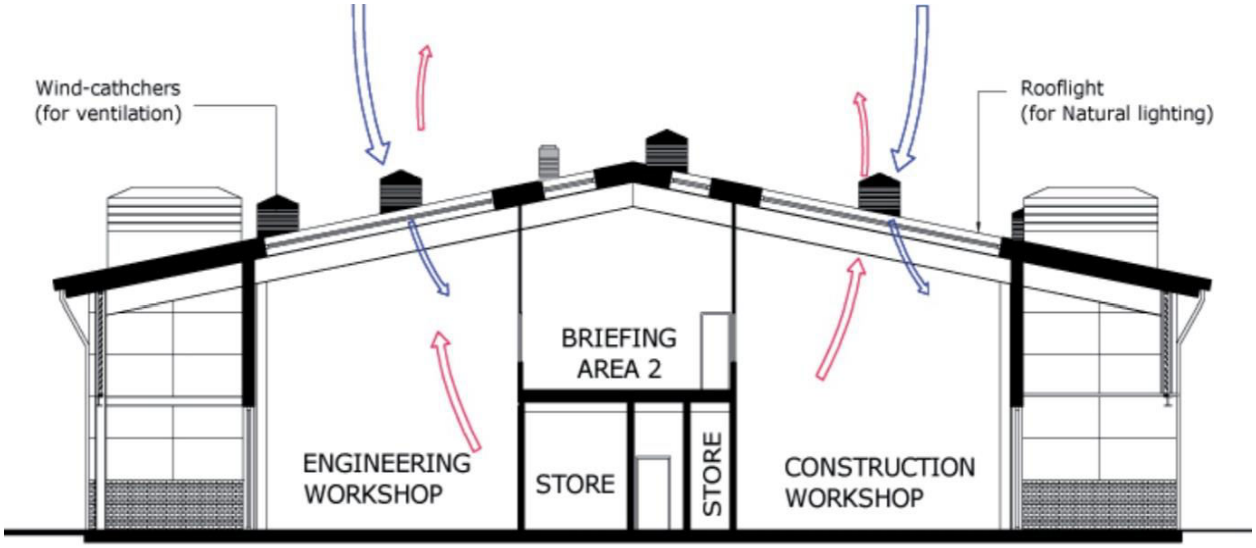


Fig-13.1.4 E Section of Skill Development Center

Fig-13.1.4 F 3D model of skill development center

T- 13.1.4 A skill development centre : Measurement Sheet

No	PARTICULARS	No.	Measurement In Meters			Area M^3
	GROUND FLOOR		Height	Length	Width	
1.	Earth Work Excavation					
	Columns	1X22	1.50	1.50	1.80	89.10
	LongWalls	1X2	16.50	0.60	0.60	11.88
	CrossWalls	1X2	11.65	0.60	0.60	8.38
						103.8
2.	Sand Filling And Water Ramming					
	Foundation					
	Columns	22.00	1.50	1.50	0.30	14.85
	LongWalls	1X2	16.50	0.60	0.15	2.95
	CrossWalls	1X2	11.65	0.60	0.15	2.09
	Basement	1X1	16.50	11.65	1.00	192.22
						212.13
3.	P.C.C. In (1:4:8) To Use 40 Mm Metal					
	Foundation					
	Columns	1X22	1.50	1.50	0.30	14.85
	LongWalls	1X2	1.50	1.50	0.15	2.97
	CrossWalls	1X2	1.50	1.50	0.15	2.09
	Basement	1X1	16.50	11.65	0.15	28.83
4.	R.R. In C.M.(1:6)					
	LongWalls	1X2	14.75	0.60	1.60	28.32
	CrossWalls	1X2	10.50	0.60	1.60	20.16
	Footings	1X22	1.50	1.50	0.46	22.77
	Columns	1X22	0.35	0.23	8.00	14.16
a.	Plinth Beam					
	LongBeams	1X2	16.50	0.23	0.35	2.65
	CrossBeams	1X4	11.65	0.23	0.35	3.75
	AnotherBeams	1X4	5.30	0.23	0.35	1.70
	AnotherBeams	1X2	3.46	0.23	0.35	0.55
b.	RoofSlab	1	16.50	11.65	0.10	19.22
	StairCase	1	4.57	1.80	0.15	1.23
5.	SSF Steel Grills					1840.00
	Columns			14.16 X 130		2277.00
	Footings			22.77 X 100		1038.00
	Plinth Beam			8.65X120		1038.00
	RoofBeams			8.65X120		1729.00
	RoofSlab			19.22X90.		147.00
	StairCase			1.23X120.		8069.00
6.	Brick Masonary C.M. (1:6)					
	LongWalls	1X2	16.50	0.23	2.75	2.75
	CrossWalls	1X4	11.65	0.23	2.75	2.75
	AnotherWalls	1X6	4.67	0.23	2.75	17.72
	AnotherWalls	1X2	3.00	0.23	2.75	3.79
	Deductions					71.85
	D.Doors	1X8	1.00	0.23	2.10	3.86
	WWindows	1X20	1.00	0.23	1.20	5.52

						9.38
7.	Plastering With C.M.(1:4)					
	LongWalls	1X4	16.50		3.10	204.60
	CrossWalls	1X8	11.65		3.10	288.92
	AnotherWalls1	1X12	4.67		3.10	173.72
	AnotherWalls2	1X4	3.00		3.10	37.20
	FIRST FLOOR					
1.	R.C.C. (1:2:4)					
	Columns	1X22	0.35	0.23	2.75	14.16
	RoofBeams					
	LongBeams	1X2	16.50	0.23	0.35	2.65
	CrossBeams	1X4	11.85	0.23	0.35	3.75
	AnotherBeams	1X4	5.30	0.23	0.35	1.70
	AnotherBeams	1X2	3.46	0.23	0.35	0.55
						8.65
	RoofSlab	1X1	16.50	11.65	0.10	19.22
2.	SSF Steel Grills					-
3.	Brick Masonry C.M. (1:6)					
	LongBeams	1X2	16.50	0.23	2.75	20.82
	CrossWalls	1X4	11.65	0.23	2.75	39.47
	AnotherWalls	1X6	4.67	0.23	2.75	17.72
		1X4	3.00	0.23	2.75	3.79
						71.85
	Deductions					
	DDoors	1X8	1.00	0.23	2.10	3.86
	Windows	1X20	1.00	0.23	1.20	5.52
4.	Plastering With C.M.(1:4)					9.32
	LongWalls	1X4	16.50		3.10	204.60
	CrossWalls	1X8	11.65		3.10	288.92
	AnotherWalls1	1X12	4.67		3.10	173.72
	AnotherWalls2	1X4	3.00		3.10	37.20
						704.44

T- 13.1.4 BSkill Development Centre :Abstract Sheet

No.	Particulars	Quantity(M^3)	Rate **Per** M^3	Total **Cost**
	GROUND FLOOR			
1.	Earth Work Excavation	103.36	80.00	8748.80
2.	Sand Filling And Water Ramming	212.3	160.0	33940.80
3.	P.C.C. In (1:4:8)	45.08	1950.00	95043.00
4.	R.R. In C.M.(1:6)	48.48	1800.00	87264.00
5.	R.C.C. (1:2:4)			
	Footings	22.17	3500.00	113255.00
	Columns	14.16	3500.00	114552.00
	Plinth Beam	8.65	3500.00	32870.00
	Roof Beams	8.65	4000.00	34600.00

	RoofSlab	19.22	4000.00	76880.00
	StairCase	1.23	4000.00	4935.00
6.	SSF Steel Grills	8069.00	42.00	338898.00
7.	Brick Masonary C.M. (1:6)	62.47	1900.00	118693.00
8.	Plastering With C.M.(1:4	704.44	120.00	84532.80
9.	Provision For Electrical Charges@ 7.5 %	-	-	98139.00
			TOTAL GROUND FLOOR	=12,42,349.8
		FIRST FLOOR		
10.	R.C.C. (1:2:4)			
	Columns	14.16	4500.00	63720.00
	RoofBeams	8.65	4500.00	38954.00
	Roof Slab	19.22	4500.00	86490.00
11.	SSF Steel Grills			
	Columns	14.16*160 KGS	42/kg	19349.00
	RoofBeams	8.65*120KGS	1038/kg	
	RoofSlab	19.22*90 KGS	1729/kg	
12.	Brick Masonry C.M. (1:6)	71.85	2100	131187.00
13.	Plastering With C.M.(1:4)	704.44	130.00	91577.00
14.	Electrification Charges @ 7.5%	-	-	61748.00
		TOTAL FISRT FLOOR= 493,302.5		
			TOTAL COST= 1,735,374.8	

13.1.5Intze Water Tank

The water supply and sanitation facility for each person must be continuous and sufficient for personal and domestic uses. These uses ordinarily include drinking, personal sanitation, washing of clothes, food preparation and personal and household hygiene. According to the World Health Organization (WHO), between 50 and 100 litres of water per person per day are needed to ensure that most basic needs are met and few health concerns arise.Water tanks are liquid storage containers. These containers are usually storing water for human consumption, irrigation, fire, agricultural farming chemical manufacturing, food preparation, rainwater harvesting as well as many other possible solutions. Water plays a predominant role in day to day life so water storage is necessary to store the water.

Existing Situation in Waghai village

In Waghai Village and its nearby villages have very poor conditions of water suppy. So we designed a water tank for the proper supply of water.

Location

The suitable location water tank is beside of civil hospital. It will become very important way of water.

Needs

In Waghai Village and its nearby villages have very poor conditions of water suppy. So we designed a water tank for the proper supply of water.

Design utilized by

All people of Waghai villages for its domestic and to fulfilled besic need of water.

Some Common Repaire and maintenance

Exterior painting and plastering ; Landscaping and gardening ; Paving repairs ; Carpeting and flooring; Plumbing; Repairing cracking or leaning walls etc. For most effective maintenance , it should be organized through a program of cyclical maintenance.

Design Data

The Design Data are Considered As

T-13.1.5 A Population DataByGeometric Increase Method

Year	Population Dacadal Souls	Increment	Rate of Growth
1981	1300	-	
1991	2,180	880	0.67
2001	4,140	1,960	0.89
2011	6,715	2,275	0.54
		5,440	

Geometric Increase Method
Geometric Mean Ig = 0.7532 i.e.75.32%
Population In Year2021 is P2021 = $6715*(1+0.735)^1 = 11650$
Population In Year2031 is P2031 = $6715*(1+0.735)^2 = 20213.63$
Water tank is designed for life period about 50 years. For future population of Waghai village the capacity of water tank 1000 m^3 is preferable. As per Economic considerations and for 1000 m3 capacity water tank the design materials should be preferable as below.

T-13.1.5 B Design Data OfIntze Tank

Sr.No	Description	Details
1	Tank Capacity	1000 M3
2	Height Of Tower From G.L.	16.00m
3	Live Load On Dome	1.50 Kn/m2
4	Intensity Of Wind	1.50 kn/m2
5	Number Of Columns	8
6	Concrete	M20
7	Steel HYSD	Fy 415
8	Nominal Cover	25 mm

9	Reinforcement	
10	Top Dome	8 mm
11	Top Ring Beam	12 mm
12	Vertical wall	
13	2 m From top hoop ring	10 mm
14	4m From top hoop ring	16 mm
15	8m From top hoop ring	20 mm
16	2m From top Distri. steel	10 mm
17	4m From top Distri. Steel	10 mm
18	8m From top Distri. steel	10 mm
19	Bottom Ring Beam	Main Steel 20 and disti.-10
20	Bottom Spherical Dome	10 mm
21	Bottom Circular Dome	10 mm
22	Column Supporting Tower	Main Steel 32 and disti.-10
23	Bracing	Main Steel 25 and disti.-10
24	Foundation From Ground	1 m

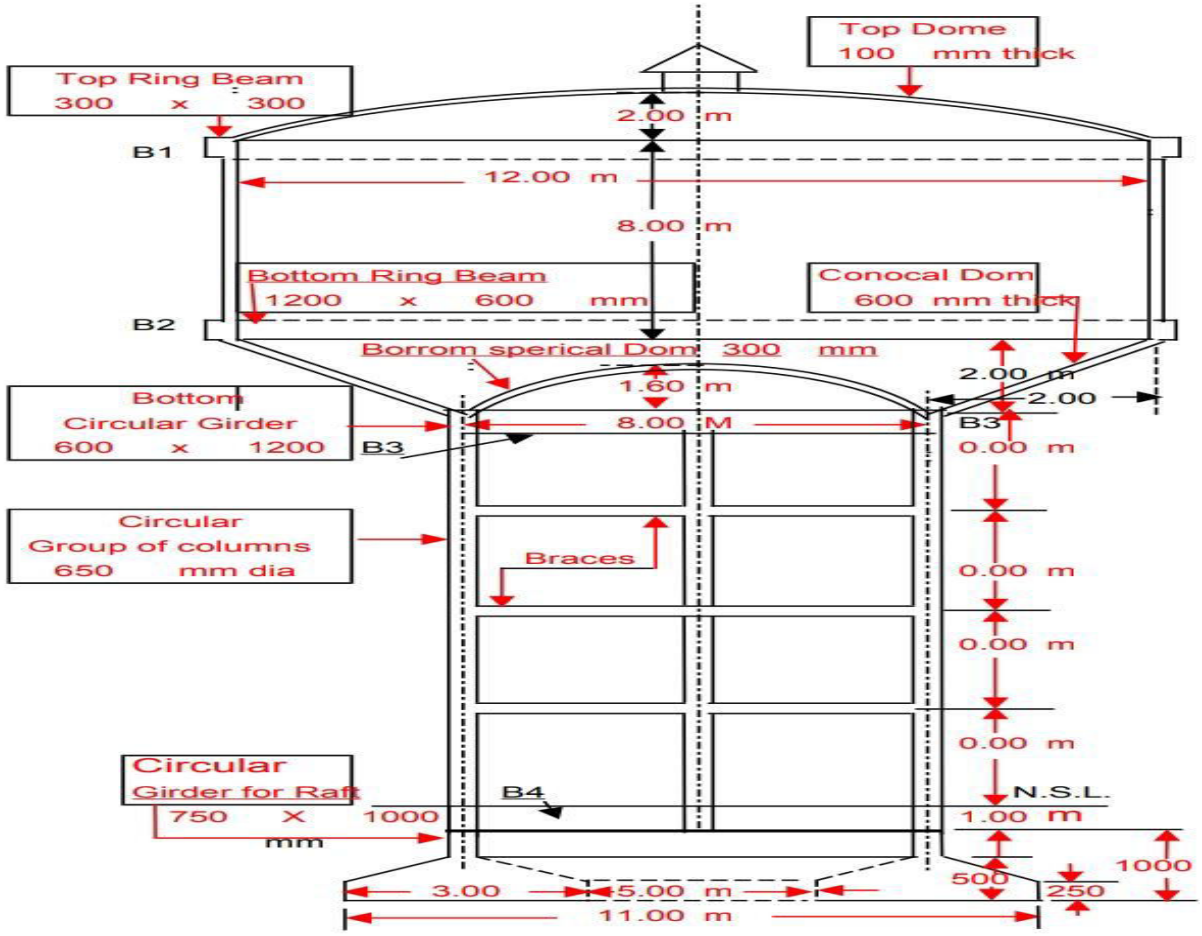


Fig-13.1.5 A Water tank Drawing

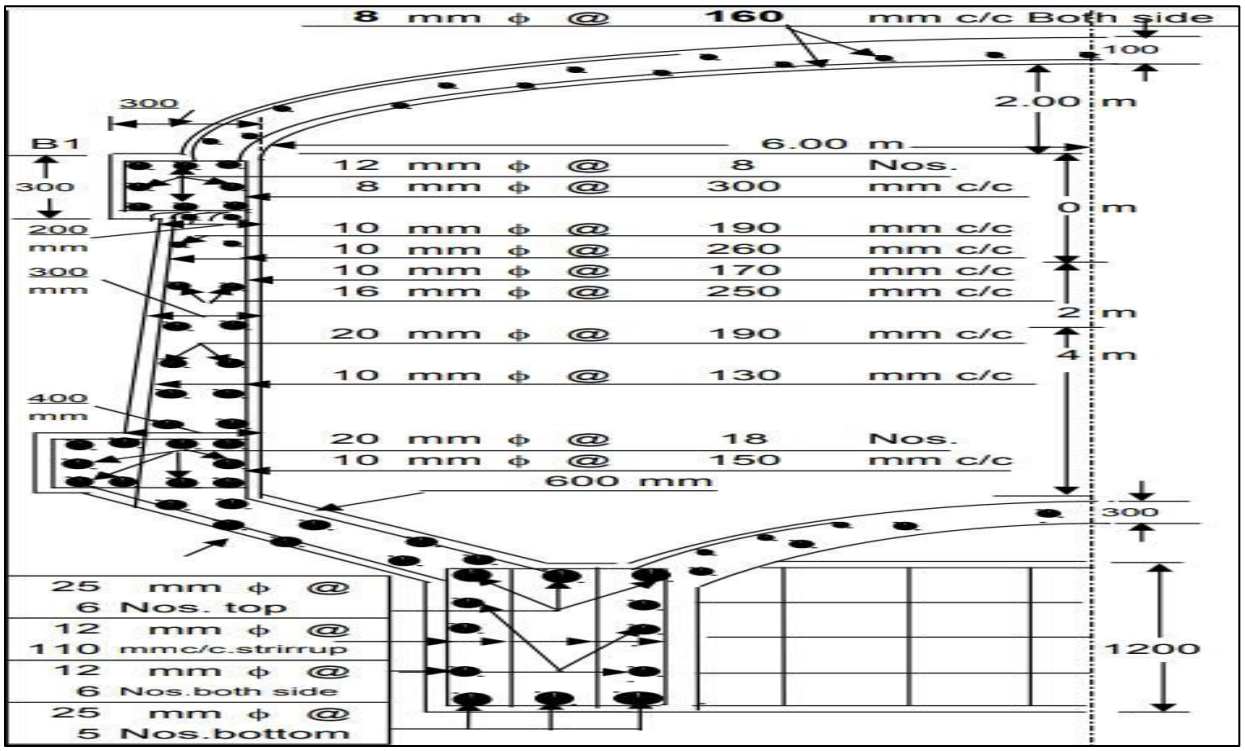


Fig-13.1.5 B Reinforcement Details

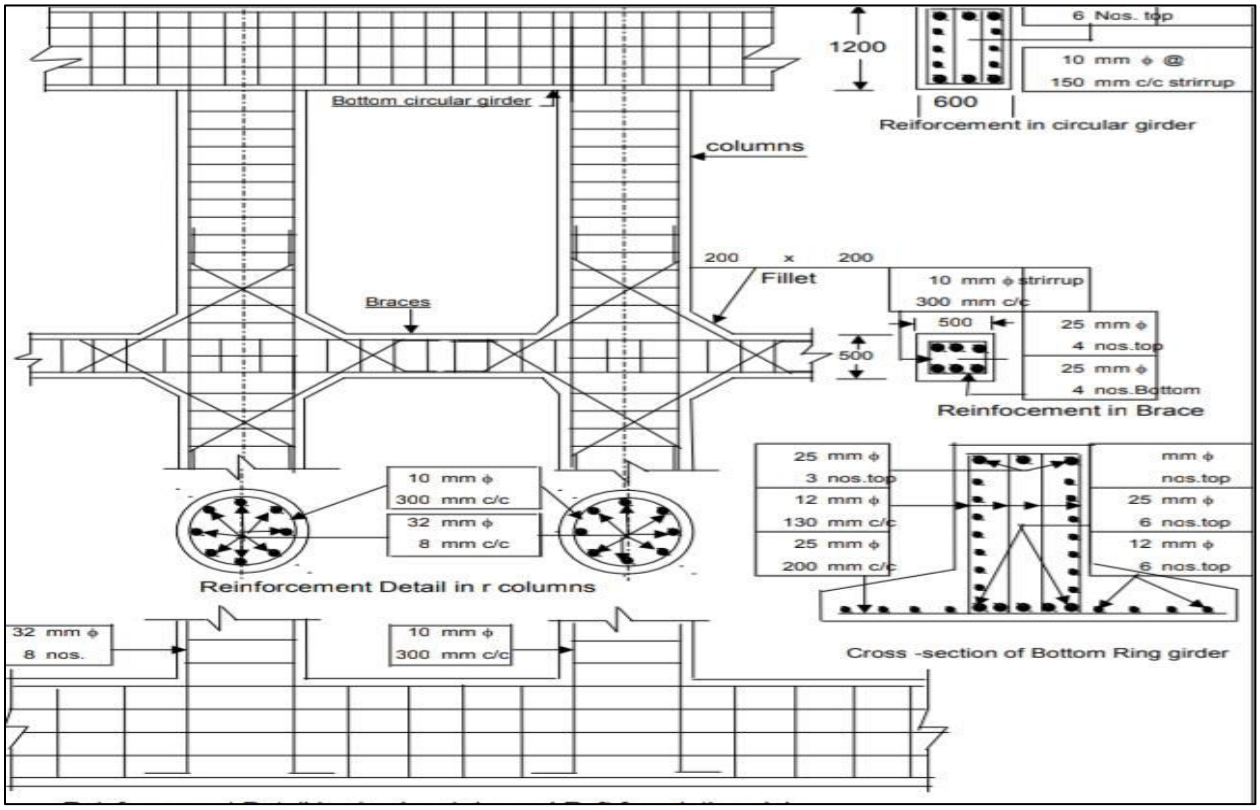


Fig-13.1.5 C Reinforcement details in foundation and girder

T-15.2.5 C Measurement sheet

Sr.No	Description	Length(M)	Width(M)	Depth(M) Thickness(M)	Total Quantity Of Materials Used
1.	Top Dome	-	-	100mm	7.63m3 RCC 1.08 m3 steel
2.	Top ring beam	300mm	300mm	100mm	2 m3
3.	Bottom ring beam	1200mm	600mm	100mm	2.214m3
4.	Conical dom	-	-	600mm	2.325m3
5.	Bottom spherical dom	-	-	300mm	4.523 m3 RCC 2.341 m3 Steel
6.	Bottom circular girder	600mm	1200mm	-	1.112m3
7.	Circular groups of column	-	-	650 mm dia	24.33m3
8.	Circular girder of raft	750mm	1000mm	-	1.235m3
9.	Cylindrical wall		200mm	400mm	1.854m3
10.	Earthwork in excavation	-	-	1000mm	72.53m3

T-13.1.5 D Abstract sheet for water tank

SR.No	Materials	Qty	Rates(Including Material And Labour Charge	Amount(Including Labour And Material And Equi. cost
1	Earthwork in Excavation and filling	72.53 m3	-	**10240**
2	Foundation	15..04m3	8000/M3	**12574**
3	Columns	24.33 M3	900/M3	**24897**
4	Ring Beam At Top	2.02 M3	900/M3	**4987**
5	Cylindrical Wall	4.045 M3	1500/M3	**22240**
6.	Bottom Ring Beam	2.214 m3	900/M3	**2004.6**
7	Circular Girder	1.112m3	800/M3	**1125.5**

8	RCC Doomed Roof	9 m3	-	**35245.15**
9	Bracing At 2.5m Ht.	0.784 m3	-	**1024.0**
10	Plastering			
	1:6	65.44 m3	552 /M3	**28164**
	1:2	40.09 m3	780/M3	**30673**
11	Mason 1st Class	39 m3	285/M3	**94511**
			Total	**2676935 Rs**

13.6 Mechanization Agro service center

Introduction

To enable Small Farmers, who cannot afford bullocks or other farm machinery, to hire services of Agro-service Centre for farm operations. To make available services of Agro-Service Centre (ASC) for repair and maintenance of farm machinery owned by farmers.

Benefits of Mechanization of agricultural operations helps in :

- Increasing production, productivity and profitability in agriculture by achieving timeliness in farm operations;
- Increasing cropping intensity and additional employment generation at farmers level;
- Remove drudgery in farm operations.
- Employment generation through setting up of agro clinics on farm machinery.

Existing situation in Waghai village

In Waghai village there is a agro center located at near the circle in Waghaivillage . But the existing agro center is not capable to store some machineries and it is not facilitate for mechanization.

Location

The preferable location for reconstruct and mechanization of agro center its existing site is most suitable.

Design Utilised by

All people, farmers, small business holders, small investors of Waghai village as well farmers and other people of surrounding villages.

Common repair and maintenance :

1) Since the equipment will eventually get older and will require replacement.As preventive maintenance, it is necessary to keep doing daily and/or routine checkup. When needed, damaged parts must be replaced right away.

2) Some components would be discontinued manufacturing in the future and making substitute parts will be indispensable. Therefore, it is essential that universal machines, electric tools, and manual tools would be sufficiently maintained and utilized.

3) Except for small electric tools, equipment for repair and maintenance has long lives and can be used for longer than 20 years for general purposes. While daily maintenance and checkup are required, it is also necessary to make plans for renewal.

Proposed plan from AutoCAD ,revit,and sketch up

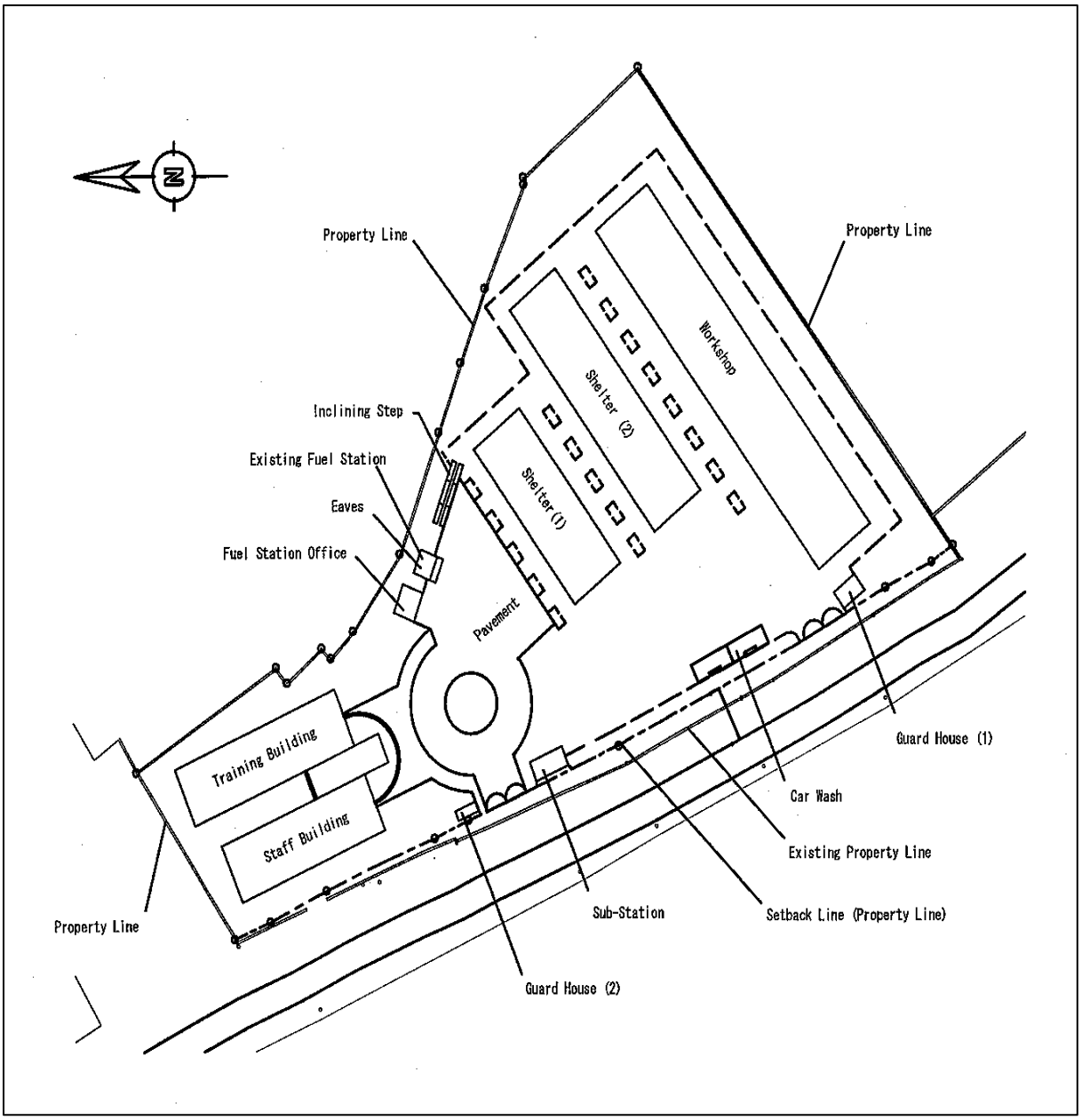


Fig-13.1.6 ASite plan of agro service center

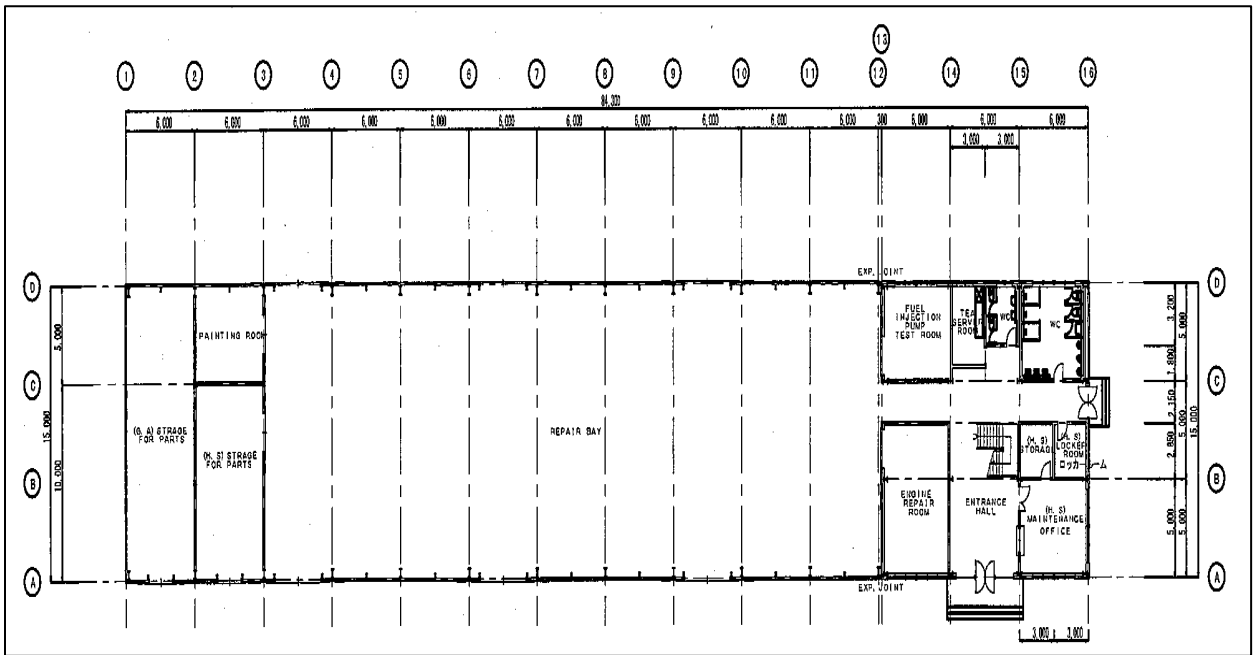


Fig-13.1.6B Workshop Floor Plan

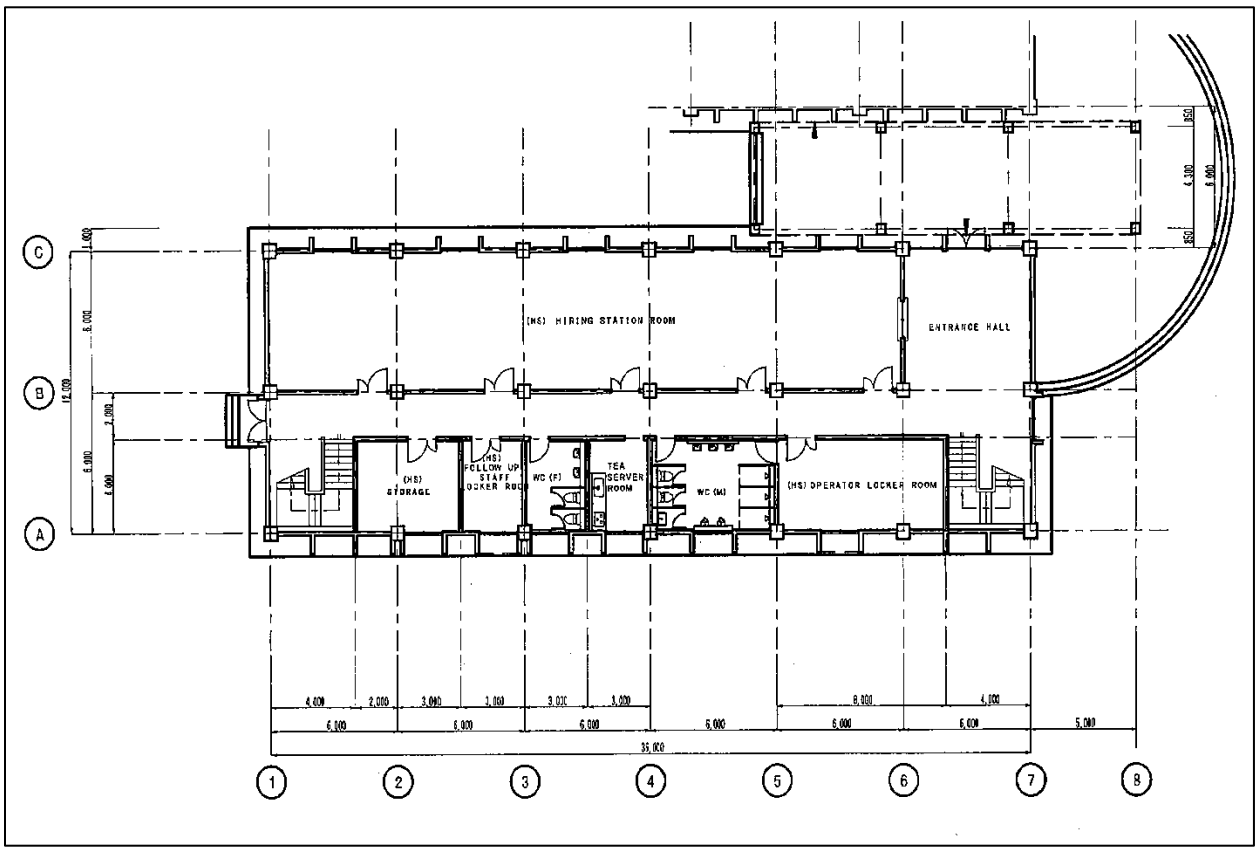


Fig-13.1.6 C Staff room floor plan

T-13.1.6 A Workshop building Floor area

Name of room	Number of staff and others	Standard area (m2)
Farm Machinery Service Division, O/M section		
Room of maintenance section	**1 section chief, 4 general staff**	**32**
Locker room	**11 machinery maintenance staff**	**11**
Store for tools and parts (forfarm machinery hiring service division)	**Equivalent to existing part store of farm machinery hiring servicedivision and storage space for tools**	**60**
Central Workshop (Cwo), Farm machinery repair bay is commonly used by GA and by HS		
Room of central workshop	**1 division chief, 11 general staff**	**86**
Locker room	**36 machinery maintenance staff**	**36**
Repair bay	**Flow-lines and layout based on the design standard of farm machinery maintenance workshops**	**810**
Fuel injection testing room		**32**
Engine repair room		**50**
Painting room		**30**
Store for parts(for other 9 stations: (GA)	**Equivalent to the total area for store of Cwo as dispersed over theexisting 3 locations**	**90**

T-13.1.6 B Staff Building floor area (864 m2)

Farm Machinery Hiring Service Division (HS)		
Room for farm machinery hiring service	1 division chief, 3 section chiefs, 21 general staff and14 general staff (in charge of follow-up)	226
Locker room for operators	35 operators	35
Central Administration (CA)		
Central Administration director's room	1 CA director	30
Central Administration division's room	1 superintendent division chief, 6 general staff, and5 general staff (in charge of itinerant circuit instruction)	76
General Administration (GA)		
General Administration division's room	1 superintendent division chief, 12 general staff, and20 general staff (in charge of itinerant circuit instruction)	172

T-13.1.6 C Measurement Sheet for Agro Center

No	PARTICULARS	No.	Measurement In Meters			Area M^3
	Workshop		Height	Length	Width	
1.	Earth Work Excavation					
	Columns	1 X 8	1.60	1.60	1.80	90.10
	Long Walls	1 X 2	15.50	0.60	0.60	12.88
	Short Walls	1 X2	10.65	0.60	0.60	8.88
						111.86
2.	Sand Filling And Water Ramming					
	Foundation					
	Columns	8.00	1.60	1.60	0.30	14.95
	Long Walls	1 X 2	15.50	0.60	0.15	2.95
	Cross Walls	1 X 2	10.65	0.60	0.15	2.80
	Basement	1 X 1	15.50	10.65	1.00	192.72
						426.25
3.	P.C.C. In (1:4:8)					
	Foundation					
	Columns	1 X 8	1.60	1.60	0.30	13.82
	Long Walls	1 X 2	1.60	1.60	0.15	3.02
	Cross Walls	1 X 2	1.60	1.60	0.15	2.80
	Basement	1 X 1	16.50	11.65	0.15	28.88
4.	R.R. In C.M.(1:6)					
	Long Walls	1 X 2	11.65	0.65	1.60	25.85
	Cross Walls	1 X 2	9.350	0.35	1.60	19.52
	Footings	1 X 22	2.45	1.49	0.46	30.32
	Columns	1 X 22	0.98	0.28	8.00	12.45
	Plinth Beam					
	Long Beams	1 X 2	15.65	0.25	0.35	2.65
	Cross Beams	1 X 4	10.65	0.25	0.35	2.65
5.	Brick Masonry C.M. (1:6)					

	Long Walls	1 X 2	15.65	0.25	2.75	2.70
	Short Walls	1 X 4	10.05	0.25	2.75	2.70
	Doors	1 X 4	1.00	0.25	2.10	3.80
	Windows	1 X 10	1.00	0.25	1.20	5.50
6.	Plastering With C.M.(1:4)					
	Long Walls	1 X 4	15.65		3.10	204.60
	Short Walls	1 X 8	10.05		3.10	288.92
	For Staff Building					
7.	Roof	10.20	6	0.12	1	11.40
8.	Wall 9"	22.451	0.24451	4	1	22
9.	Plinth With Stairs	22.451	0.24451	0.821	3	6.44
10.	Floor	10.20	6	0.12	1	9.2
11.	Door	1.925	-	2.1336	1	-
12.	Window	1	-	1.524	4	-
13.	Pcc	22.81	1.4	0.45	1	9.23
14.	Basic Wall: 00.30	22.81	1.4	0.45	1	4.8
15.	Basic Wall: 0.40	295.80	1.4	0.45	1	5.7
16.	Basic Wall:-0.50	29.58	2	0.45	1	8
17.	Excavation	30.01	1.4	1.45	4	59.92

T-13.1.6 D Abstract sheet of Agro center

No.	Particulars	Quantity(M^3)	Rate Per M^3	Total Cost
	WORKSHOP			
1.	Earth Work Excavation	111.86	75.00	8389.5
2.	Sand Filling And Water Ramming	426.25	130.0	55412.5
3.	P.C.C. In (1:4:8)	42.4	1950.00	95043.00
4.	R.R. In C.M.(1:6)	47.88	1800.00	87264.00
5.	R.C.C. (1:2:4)			
	Footings	24.57	3500.00	113255.00
	Columns	14.16	3500.00	114552.00
	Plinth Beam	8.45	3500.00	32870.00
	Roof Beams	8..45	4000.00	34600.00
	RoofSlab	18.82	4000.00	76880.00

	StairCase	1.45	4000.00	4935.00
6.	SSF Steel Grills	8788.00	42.00	338898.00
7.	Brick Masonry C.M. (1:6)	62.47	1900.00	118693.00
8.	Plastering With C.M.(1:4)	704.44	120.00	84532.80
STAFF BUILDING				
10.	Wall	22	4700	89758.5
11.	Door		5000	5000
12.	Window		4*2500	10000
13.	Roof	15.57	3500	42570
14.	Floor	9.00	3500	27840
15.	Plinth WallStairs	6.02	90	148750.1
16.	Excavation	1.451*7	350	1781
17.	Pcc	8.04	3500	298770
18.	Basic Wall:00.30	4.01	90	12845
19.	BasicWall:0.40	6.04	90	14211
20.	Basic Wall: Generic - 0.50	6	90	13920
			GRAND TOTAL = 18,30,169.8	

13.1.7 Solar Energy Charge Controller

Introduction

Sometimes, electricity can be cut-off due to natural disasters aften happened. So, this type of energy such as wind energy, hydrulic energy and solar energy, they are needed as the source of electricity. Solar energy has become a promising alternative source because it has many advantages such as abundance, pollution free and renewability. The advantages of choosing solar energy by using a solar panel are thet the lifetime of solar panel is long lasting than any other source of energy.

Design Utilized By

All people of Waghai village which have installation of solar system for their domestic purpose and agricultural purpose. Solar charge controller results in efficient use of solar energy and helps in good performance of solar sytem.

The solar power will play and important role in alleviating the energy crisis and reducing the environment pollution and has a bright propspect of applications. A charge controller is an essential part of nearly all power systems the charge batteries, wind, hydro, fuel, or utility grid. Its purpose is to keep the battery properly fed and safe fo long term. Acharge controller is a regulator that goes between the solar panels and the batteries.

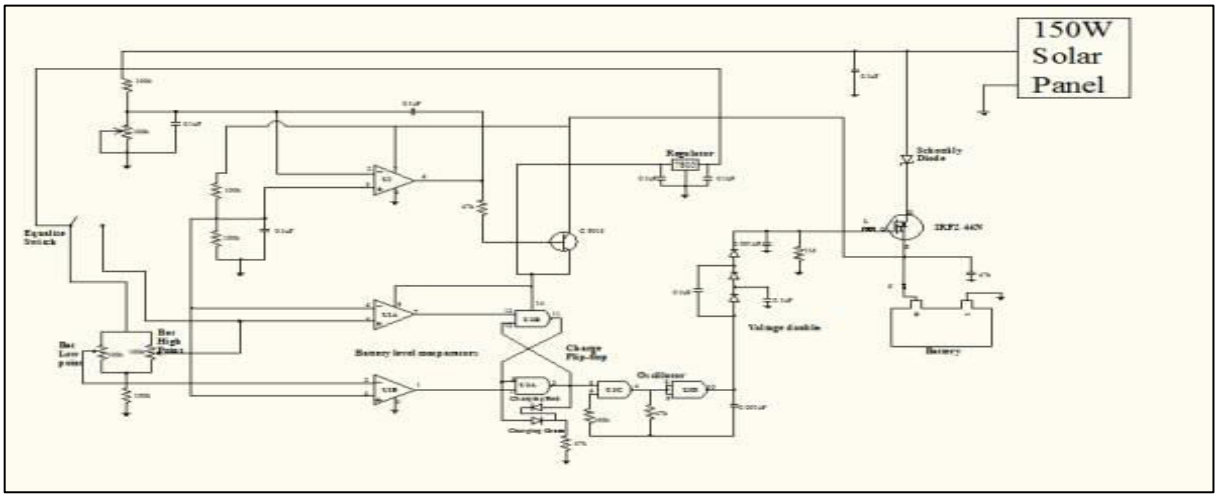


Fig.13.1.7A The circuit design of the charge controller

Circuit Operation Of Charge Controller Design

In any circuit design, during charging, current flows from the solar panel through the diode, MOSFET, fuse F_1 and into the battery. Fuse F_1 provides a safely limit on the current available from the battery in the event of a short. Comparator U_2 is used to control power to the rest of the circuit. When the solar panel voltage is lower than the battery voltage, the rest of the circuitry is disabled. When the solar panel voltage rises above the battery voltage, the output of U_2 goes on, switching on transistor which provides power to the rest of the circuit. Resistor networks scale the battery and the solar panel voltages to a range that is useful to U_2. Voltage regulator is used as a reference for the battery set points, the reference points are adjusted the resistor network in U_{1A} and U_{1B}.

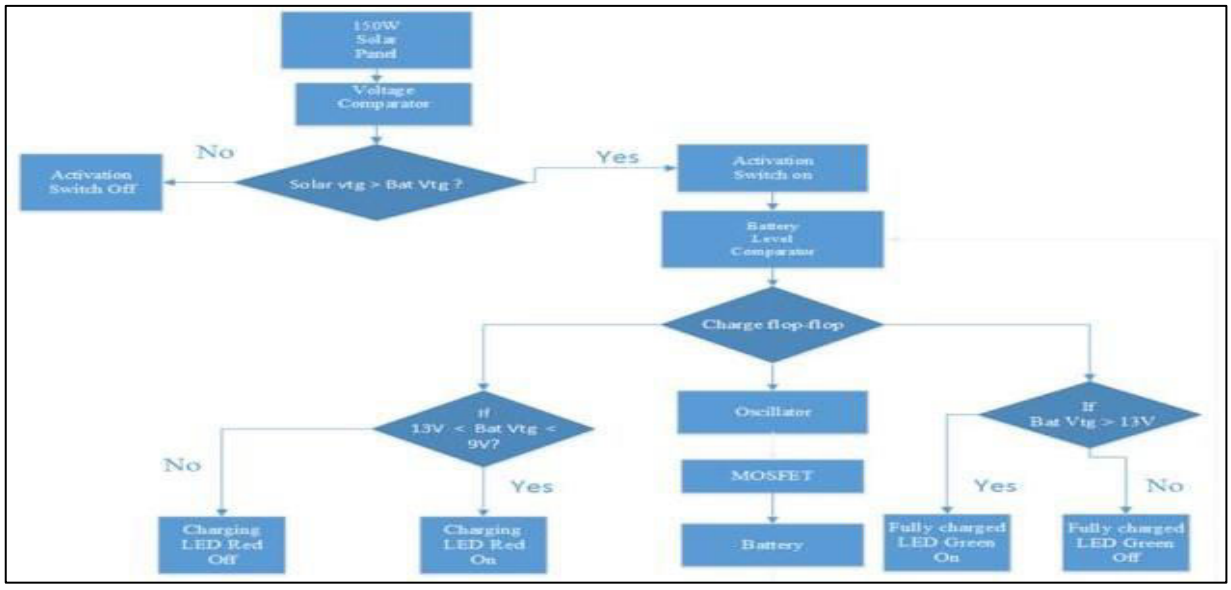


Fig13.1.7 B The flow chart of charge controller

Design Calculation And Simulation

1.Calculation for 741 op-amp

ForInvertingpin,

R_1=100kΩ,R_2=100kΩ,+V_{bat}=12V

$$(-)vtg=\frac{100k}{100k+100k}\times 12 = 6V$$

For Non-inverting pin, When solar panel vtg= 5V,

R_3=100kΩ, R_4=100kΩ

$$(+)vtg=\frac{100k}{100k+100k}\times 5=2.5V$$

(+)vtg< (-)vtg,

2.5V <6V, **Vout** = 0 V

When solar panel vtg= 12V,

$$(+)vtg=\frac{100k}{100k+100k}\times 12= 6V$$

(+)vtg = (-)vtg,

6V = 6V, **Vout** = 0 V

When solar panel vtg= 13.5V,

$$(+)vtg=\frac{100k}{100k+100k}\times 13= 6.75V$$

(+)vtg> (-)vtg ,

6.75V > 6V, **Vout** = 10.96 V (11V)

When solar panel vtg= 15 V,

$$(+)vtg=\frac{100k}{100k+100k}\times 15= 7.5V$$

(+)vtg> (-)vtg

7.5V >6V, **Vout** = 10.96 V (11V)

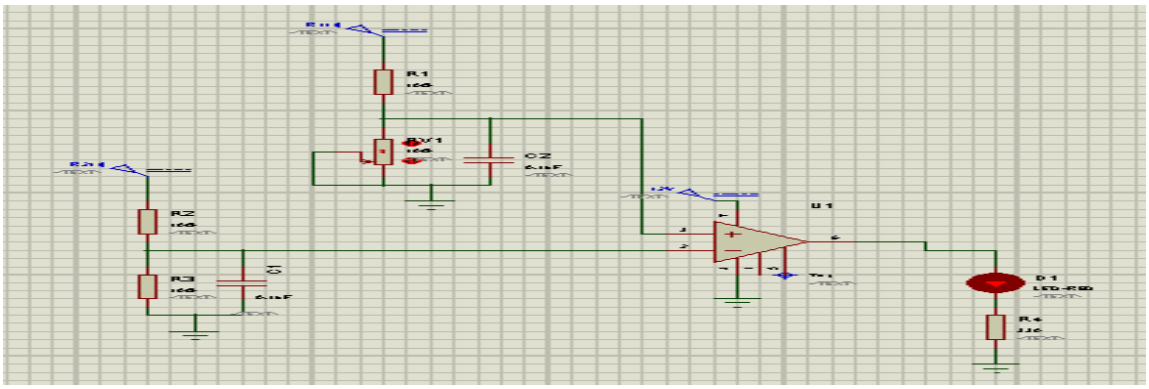


Fig-13.1.7 C The simulation result when the output at 5V and 12V

2.Calculation for battery level comparator

At the battery low point,
Let battery low level point = 9V
For upper comparator, Inverting comparator,
V_{in}, (-) pin =4.5V
V_{ref}, (+) pin=4.8V
Vin<Vref, Vout =1
For lower comparator,
Non-inverting comparator,
$V_{in,}$(+) pin=4.5V
V_{ref}, (-) pin=4.8V
Vin<Vref, Vout =0
At the battery high point,
Let the battery high level point= 13V
For upper comparator,
Inverting comparator,
V_{in}, (-) pin =6.5V
V_{ref}, (+) pin=4.8V
Vin>Vref, Vout =0
For lower comparator,
Non-inverting comparator
$V_{in,}$(+) pin=6.5V
V_{ref}, (-) pin=4.8V
Vin>Vref, Vout =1

3.Calculation for battery level comparator

R= 47kΩ, 0.001uF T=2.2RC
=2.2 × 47k ×0.001u
=0.1ms

4.Calculation for MOSFET

C rate = 70A/H

$$K=\frac{ID}{(VGS-VT)2}=\frac{7}{(3-0)2}=0.78A/V2$$

where, $V_G = 12V$, $Vs = 9V$

$V_{GS} = 12 - 9 = 3V$

$V_T = 0V$

When $V_S = 9.5V$, $V_{GS} = 12 - 9.5 = 2.5V$

$I_D = k(VGS - VT)^2 = 0.78(2.5 - 0)^2$

$= 4.8A$

When $V_S = 10V$, $V_{GS} = 12 - 10 = 2V$

$I_D = k(VGS - VT)^2 = 0.78(2 - 0)^2$

$= 3.12A$

When $V_S = 11V$, $V_{GS} = 12 - 11 = 1V$

$I_D = k(VGS - VT)^2 = 0.78(1 - 0)^2$

$= 1V$

When $V_S = 12V$, $V_{GS} = 12 - 12 = 0V$ $I_D = 0$ A

As the solar power system is very advantageous and solar recourse is unlimited of various countries tried to take the use of such recourses but they faced many difficulties in actually implementing the technology.

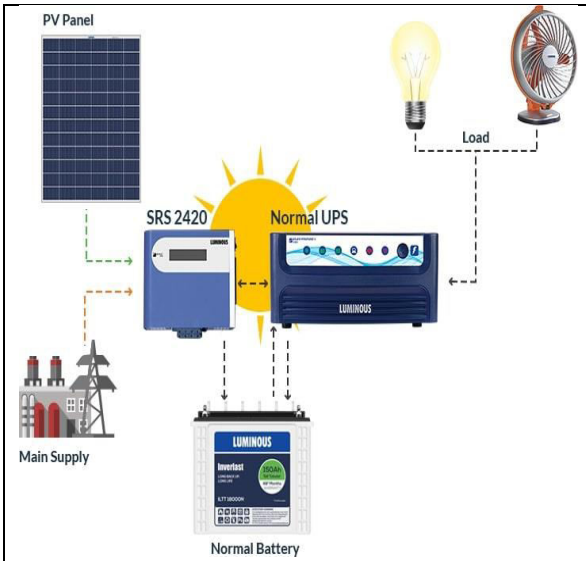


Fig-13.1.7 D Diagram of solar charge controller

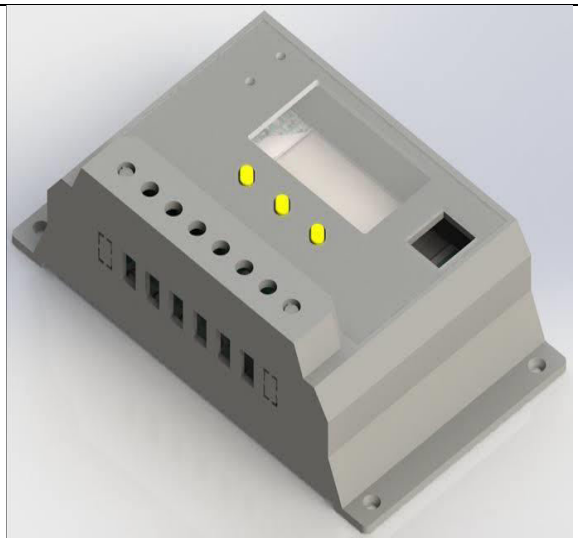


Fig-13.1.7E Model of solar charge controller

Costing :

T-13.1.7 A Costing Of Solar Charge Controller

Solar Charge Controller Model	Cost of Solar charge controller(Rs.)
6 amps, 12 volt Charge controller	570
10 amps, 12-24 volt Charge controller	1050
20 amps, 12-24 volt Charge controller	1800
50amps, 48 volt Charge controller	8350
50 amps, 96 volt Charge controller	12150
50 amps, 120 volt Charge controller	15000
30 amps, 12 volt Charge controller	1520
30 amps, 24 volt Charge controller	1800
60 amps, 12 volt Charge controller	2280
60 amps, 24 volt Charge controller	2650

13.1.8 Power supply system with auto switching

Introduction

Electrical power supply is one of the primary essential needs of human life today, that is to say, without electrical power supply, most human works become stand still, postponed and even cancelled since most human actions are dependent on the electrical power supply.

Needs

The need for steady source of power has called for alternative source of power especially in Nigeria where power failure is no surprise. The introduction of these alternative sources of supply bring forth the challenge of switching smoothly and timely between the mains supply and the alternative sources whenever there is power failure. There is also the need to reduce drudgery from switching between the two sources on the human side.

Design Utilized By

All People of Waghai village to minimize the cost of electricity and to fulfill the requirement of electricity.

Design

The design and implementation of each of the fundamental circuit units and how the program is designed to be implemented, control the plan and perform the required functionality.

The steps involved in designing this project includes:

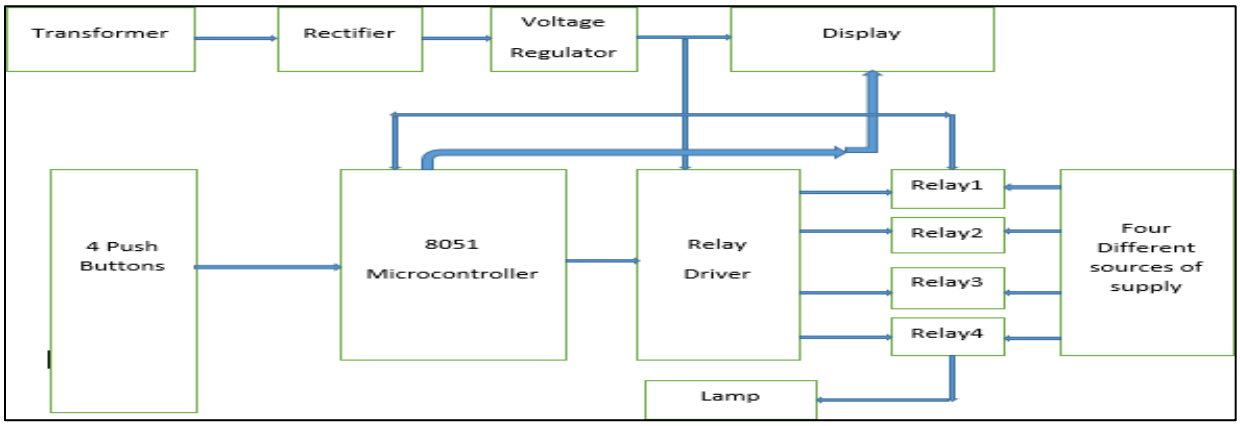


Fig-13.1.8 A Block Diagram of Power Supply With Auto Switching

Transformer

This system uses a step down transformer which converts 230V AC to 12V AC with less power loss depending on the *turns* ratio.

The input varies in the event of input a cat 230V A C section varies from 160V to 270Vin the ratio of the transformer primary voltage Vp to Secondary Voltage,Vsgoverned by formula;

$$(Vp/Vs)=(Np/Ns)$$

Thus, if the transformer delivers 12V at 220V input, it will give;At160V; $(160/Vs)=(220/12)$

$$Vs=(160\times12)/220=8.72V$$

$$\text{A270V;}Vs=(270\times 12)/220=14.72V$$

Therefore, a step down between 8Vto15V was sufficient since current limitation was handled by the regulator.

Bridge Rectifier

Next stage was the AC/DC conversion process that involved inverting the negative cycles of the AC input. The process required the use of a full wave rectifier diode bridge and required specific bridge rectifier that would be able to handle a peak voltage of 20V and 2A. The 2W04G rectifier was used for simulation process.

At 220V; $inputvoltageVs$ = $12V$

$Outputdcvoltage$ = $0.9Vs$ = $0.9 \times 12 = 10.8V$

The bridge rectifier delivers pulsating DC$Ripplefactor$ = √{$(Vrms/Vdc)$^2 – 1} = √{(12/10.8)^2 − 1}^0.5 = 0.66

$Efficiency = Pdc/Prms \times 100\% = (10.8/12) \times 100\% = 90\%$

Filter Capacitor

The Capacitance Value Was Needed To Minimize The Voltage Ripple. The Output Of The Transformer Was 12v Ac At 50hz. The Required Minimum Capacitor Value Can Be Calculated From The Formula;

$C = Iout/(2 \times f \times RF \times Vin)$

$Iout = Imax = 1A$, since it is the maximum output current of the LM7805 regulator

$C = I/(2 \times 50 \times 0.66 \times 12) \cong 1000\mu F$

Therefore, an electrolytic capacitor of about $470\mu F to\ 1000\mu F$ to filter the output DC from the bridge rectifier.

Voltage Regulator Lm7805

Since the filtered DC being unregulated, IC LM7805 was used in simulation process to get 5V DC at its pin number 3 irrespective of input DC varying for 8V to 15V, and the regulated output from the LM7805 remains at a 5V constant. The regulated 5V DC is further filtered by a small electrolytic capacitor of 10µF for any noise generated by the circuit.

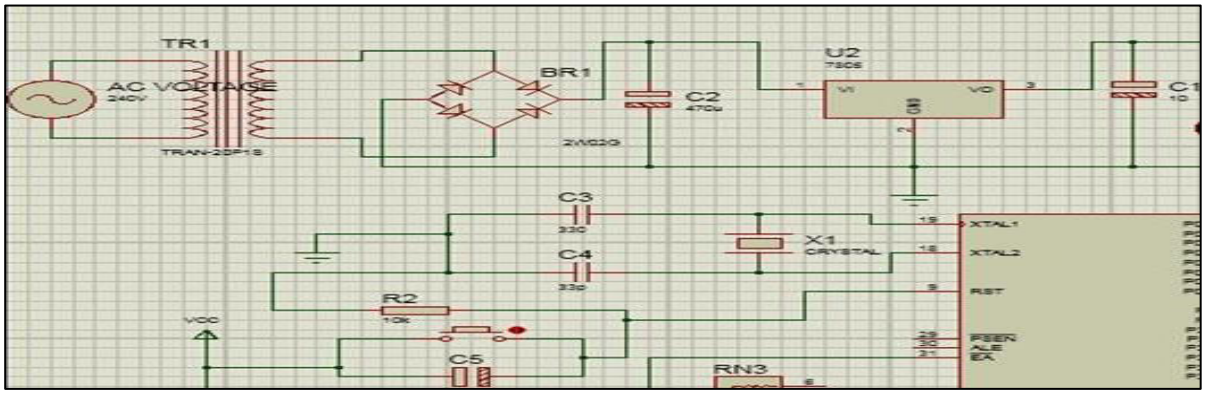


Fig-13.1.8 B Standard Connections

Working Principle

This project uses an arrangement where fourdifferent sources of supply are channelized to a load to have an uninterrupted operation of the load. As it is not practicable to get four sources of supply such as mains supply, wind supply, thermal supply and solar supply, we use relays only.

LOGIC DESIGN

The project basically supplies continuous power to a load in automated mode through one of the four sources of supply that are: solar, mains, thermal, and wind when any one of them is un available. Four switches are used for four respective sources. These are connected to a microcontroller of 8051 families that provides input signals to it. Whenever a switch is pressed, it shows the absence of that particular source. A relay driver receives microcontroller generated an output signal and switches that particular relay to provide continuous power supply.

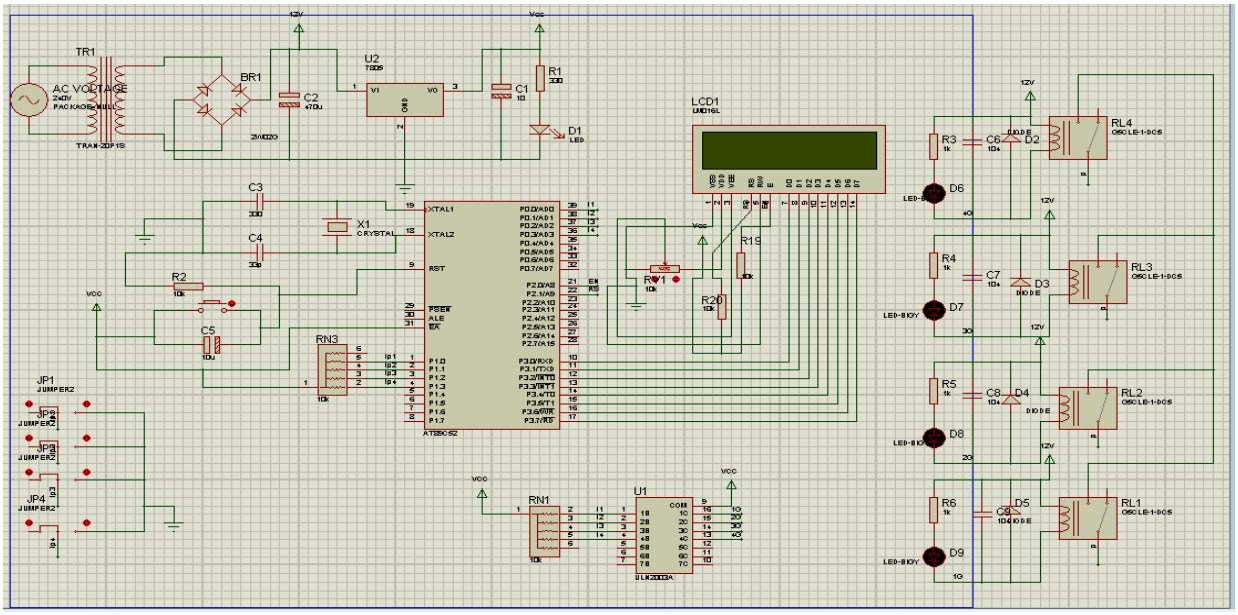


Fig-13.1.8 C Schematic Circuit Diagram

Costing

The Average cost of setting out power supply with auto switching is around 4800/per unit. So taking average cost of setting out self switching power supply about 5000/per unit.

13.1.9 Energy Harvesting System

Introduction

Energy harvesting is beneficial because it provides a means of powering electronics where there are no conventional power sources, eliminating the need for frequent battery replacements and running wires to end applications .Energy harvesting (EH) is a technique that captures, harvests or scavenges a variety of unused ambient energy sources such as solar, thermal, vibration and wind, and converts the harvested energy into electrical energy to recharge the batteries. In our environment, there are full of waste and unused ambient energy gener- ated from these energy sources.Energy harvesting is the conversion of ambient energy present in the environment into electrical energy for use in powering autonomous electronic devices or circuits.

Existing system in Waghai village

In Waghai village there is not any haevesting system. All people are depended on electricity supplied by electric department.

Design utilized by

All people of Waghai village and it is most suitable for people who uses electrical equipment agricultural activities

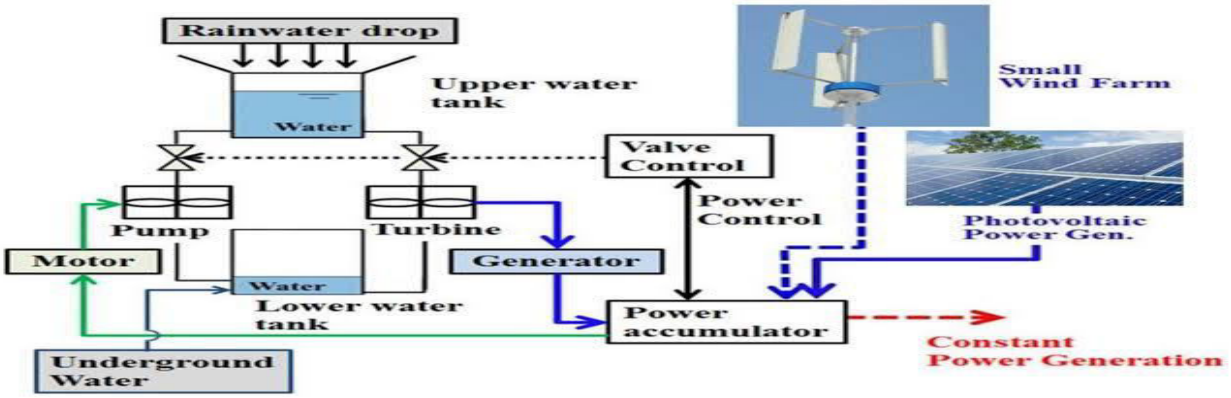


Fig-13.1.9A Diagram of rainwater harvesting

The main objective of the power electronics technology in the power conditioning circuit as seen in Figure is to process and control the flow of electrical energy from the source to the load in such a way that energy is used efficiently. This matching process is a crucial step to ensure that maximum power is transferred from the source to the electrical load. To ensure continuity in the load operation even when the external power. Depending on the environmental condition of the ambient energy source, the characteristic of the energy harvester and the power requirement of the load.

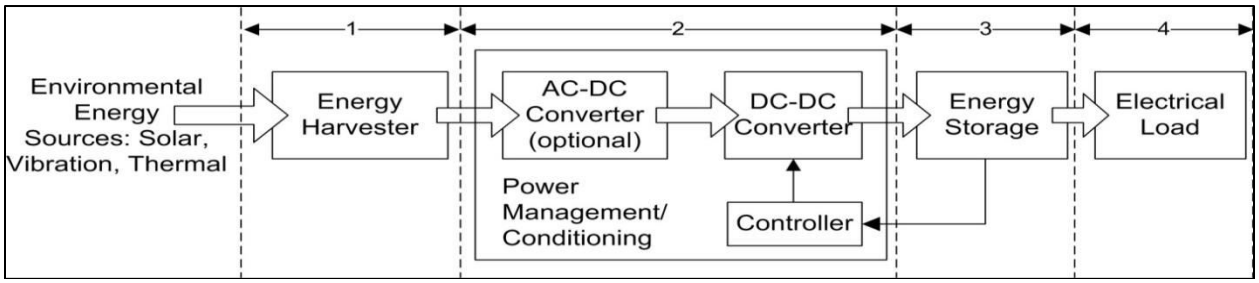


Fig-13.1.9 B General block diagram of energy harvesting system

Materials and Methods:

Various types of renewable energy sources such as geothermal, ocean tides, wind and sun have geographical limitations, but solar energy has less geographical limitation as compared to other non-conventional energy sources because solar energy is available over the entire globe. It is the size of the collector field that needs to be increased to provide the same amount of heat or electricity. It is free, inexhaustible, non-polluting and devoid of political control.

Solar Thermal:

The solar collectors concentrate sunlight to heat a heat transfer fluid to a high temperature. The hot heat transfer fluid is then used to generate steam that drives the power conversion subsystem, producing electricity. Thermal energy storage provides heat for operation during periods without adequate sunshine. Figure 1 shows the solar thermal system for generating electrical energy

Solar Photovoltaic

Another way to generate electricity from solar energy is to use photovoltaic cells; magic slivers of silicon that converts the solar energy falling on them directly into electricity.It is a device that produces an electric reaction to light, producing electricity. PV cells do not use the sun's heat to produce electricity. They produce electricity directly when sunlight interacts with semiconductor materials in the PV cells.

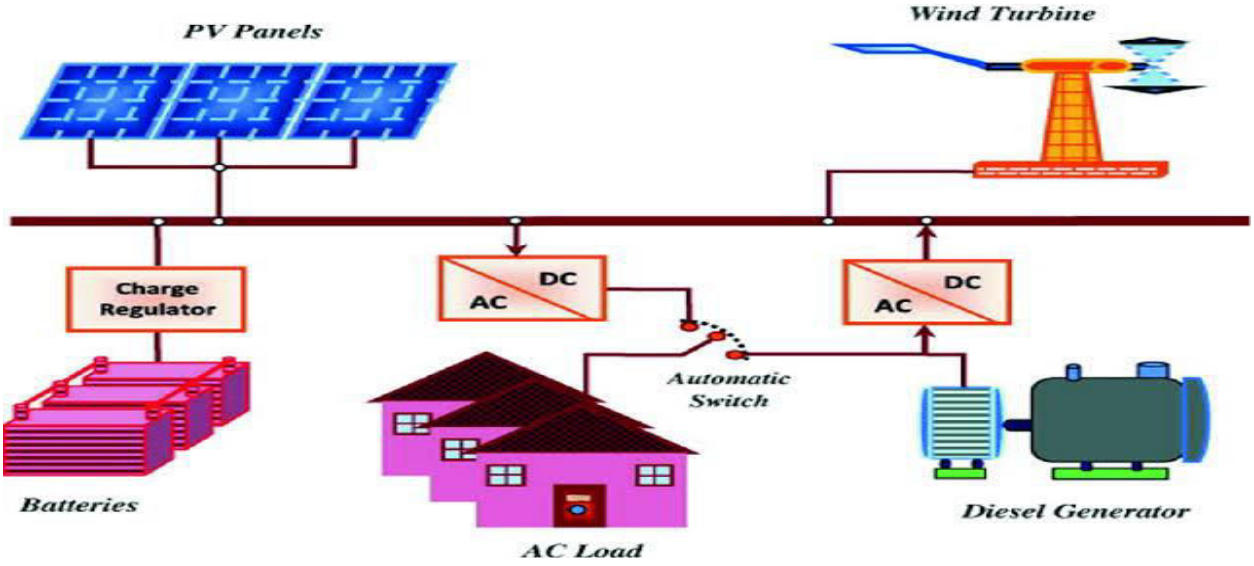


Fig-13.1.9C-Elements included in a System of Photovoltaic Conversion:

The main elements that can be included in a system of photovoltaic conversion are solar panels, batteries, regulators/controllers, invertors and load as summarized in the block diagram of Figure 8. For a reliable generation system that can function independent of the utility grid, batteries may be a viable component to the total system .

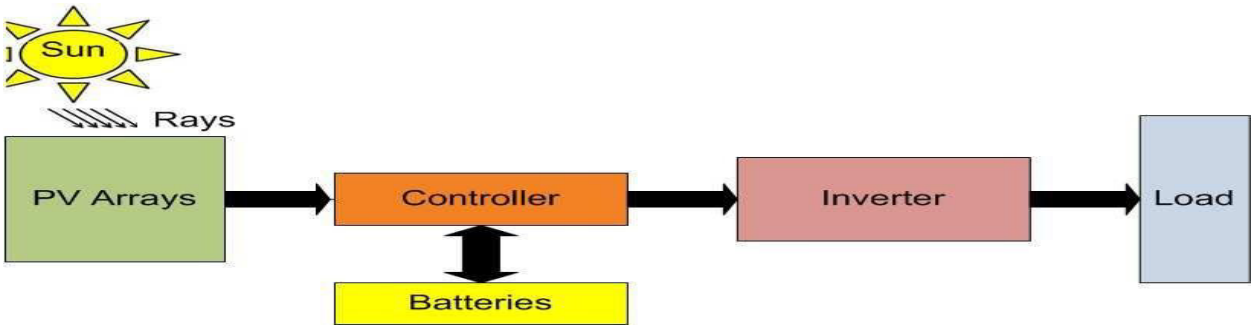


Fig-13.1.9D-Elements OfPhotovalic Method

Material used

The materials employed for this design are categorized into software and PV hardware components. The PVSYST V5.0 software is a computer software package for the study, sizing and data analysis of complete PV systems. It deals with grid-connected, stand-alone,

pumpingand DC-grid PV systems, and includes extensive meteorological and PV systems components databases, as well as general solar energy tools.

Proposed Design Output

The function of the proposed design is to provide an alternative source of electrical energy to power the lighting circuits of the premise. The design produced 8 modules at12.53 kWp (peak kilowatt) at operating conditions and a battery capacity of 17850 Ah, thereby improving the reliability, adequacy, economic and environmental impacts. The graph in Figure demonstrates the proposed design output. The green bars in the graph represent the monthly energy demands of the premise with the red bars representing the amount of energy that can be produced by a12.53 kWp system. It can clearly be seen that the design produces enough electricity to fully offset the lighting load of the premise.

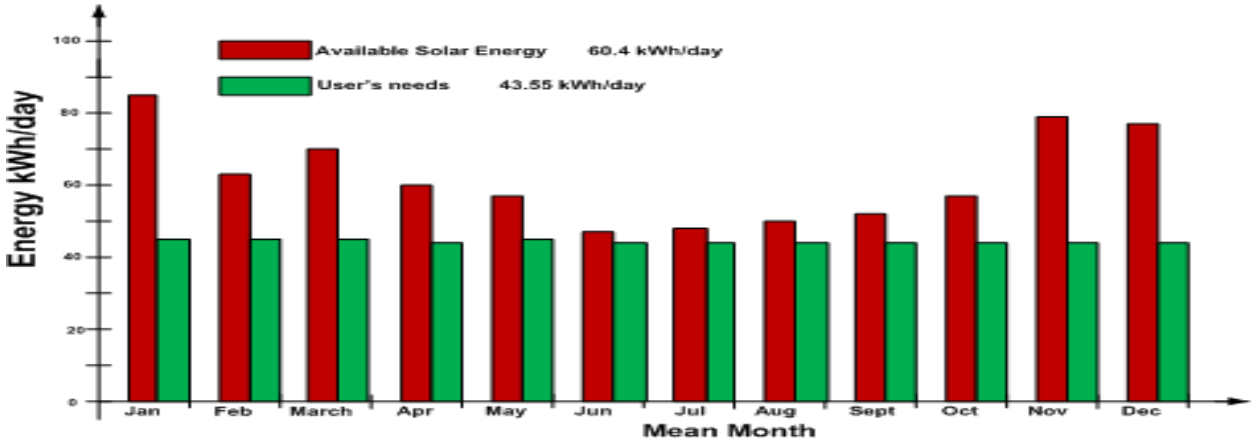


Fig-13.1.9 E Graph of available solar energy vs users needs.

Costing of Design

The life cycle costs (LCC) are the sum of the equipment (initial) costs and operational costs arising during the project until the end of the project horizon, which is usually set between 20 and 30 years . Tables 1 and 2 below represents the initial and maintenance cost respectively for a period of 20 years and at a rate of 5%.

T-13.1.9 A Costing of rain water harvesting system

PV Components	Quantity	Unit Price (GH¢)	Price (GH¢)
Solar PV Module	8	1,000.00	**8,000.00**
Battery	30	390.00	**11,700.00**
Inverter	1	6,504.70	**6,504.70**
Controller	1	3,000.00	**3,000.00**
Labour and Miscellaneous	-	-	**10,000.00**
Total Initial Cost (GH¢)			**28,674.70**

Maintenance cost	
Energy cost (GH¢/hour)	1.78
Annuities and maintenance (GH¢/20 year)	14460
Total life cost	43,134.70

13.2Reason for students recommending this design

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. Socio-Cultural Design: Supermarket

Super market is important thing for rurban of any village. It also provides some recruitment for low qualified villagers and provide new way of income for sellers .

3. Social design : Skill development design

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

4. 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.

5. Heritage village design: Agro Center

To enable Small Farmers, who cannot afford bullocks or other farm machinery, to hire services of Agro-service Centre for farm operations. To make available services of Agro-Service Centre (ASC) for repair and maintenance of farm machinery owned by farmers.

6. Smart Village Design: Water Tank Design

The main objectives in design of water tanks are to provide safe drinkable water after storing for a long time, optimizing cost strength, service life, and performance during a special situation like

earthquakes. The other objectives are to maintain pH of the water and to prevent the growth of the microorganism.

7. Solar energy Charge controller

Solar charge controller enable control on thr charge of plate by a devuce which is known as solar charge controller. The project allows for battery charging system from a solar panel. With the help of the solar panel the solar energy is converted into electrical energy through photo-voltaic cells. The system is beneficial for storing the energy for night time use.

8. Power supply system with auto switching

Power supply with auto switching system is important system in now a days. It reduces cost and uses of electricity cost. Most of embedded electronic based systems need a regulated supply of power.

9. Energy Harvesting System

Energy is basic requirement of all people and at present time energy is not renewable and the electrical energy is very expensive for poor. So it becomes very important to harvest solar energy by different methods. So that we recommended this design.

13.3AboutdesignsSuggestions /Benefitofthevillagers:

1. Rain water harvesting

The water harvesting system is most beneficial system for Waghai village because in Waghai village there is lack of water during certain days of year and store water will used at that time and at the time of any emergency people can used stored water.

2. Supermarket

There is not any super market in Waghaivillage .In Super market different things are available at one place. People does not have to travel from one place to another. Super market is important thing for rurban of any village..

3. Skilldevelopmentcenter design

It is very important that every person should have some skills so it can be withstand in life. Skill development center provides basic skills for all villagers. For the better development of students and children there should be one skill development center in the village.

4. Solid Waste Management

A better management of waste improve health conditions of all villagers. For better health and sanitation solid waste management system is necessary. 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.

5. Agro Center

According to reach farmers aspect the number of small farmers are very large. For better farming facilities agro center is required. To enable Small Farmers, who cannot afford bullocks or other farm machinery..

6. Water Tank Design

Water is Basic requirement of every people. The main objectives in design of water tanks are to provide safe drinkable water after storing for a long time, optimizing cost strength.

7. Solar energy Charge controller

We can use lot of energy from son but we does not have proper instrument to store energy. Solar chargecontroller enable control on the charge of plate by a device which is known as solar charge controller.

8. Power supply system with auto switching

Electricity is very expensive this time to reduce the cost of energy this systm proves to be very useful. Power supply with auto switching system is important system in now a days.

9. Energy Harvesting System

Energy is basic requirement of all people and at present time energy is not renewable and the electrical energy is very expensive for poor. So it becomes very important to harvest solar energy by different methods. So that we recommended this design.

Maintenance can help:

- Prevent the process of decay and degradation.
- Maintain structural stability and safety.
- Prevent unnecessary damage from the weather or from general usage.
- Optimize performance.
- Determine the causes of defects and so help prevent re-occurrence or repetition.
- Ensure continued compliance with statutory requirements.

For maintenance to be most effective, it should be organized through a program of cyclical maintenance. At the most basic level this includes daily routines, and works upwards to periodic program of weekly, monthly, semi-annual, annual and so on routines.
Common maintenance tasks include:

- Exterior and plastering.
- Landscaping and gardening.
- Paving repairs.
- Window and door repairs.
- Debris/rubbish removal and clearance.

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

14.1 CIVIL ENGINEERING

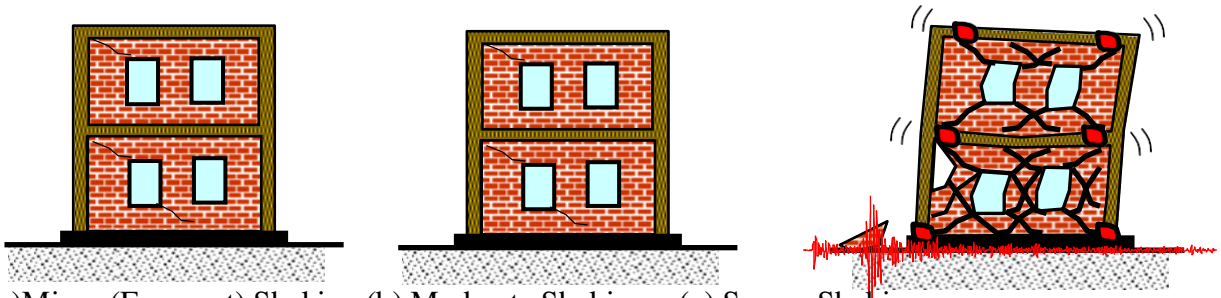
14.1.1 Advance Earthquake Resistant:

Basic Aspects of Seismic Design

The mass of the building being designed controls seismic design in addition to the building stiffness, because earthquake induces inertia forces that are proportional to the building mass. Designing buildings to behave elastically during earthquakes without damage may render the project economically unviable. As a consequence, it may be necessary for the structure to undergo damage and thereby dissipate the energy input to it during the earthquake. Therefore, the traditional earthquake-resistant design philosophy requires that normal buildings should be able to resist.

(a) Minor (and frequent) shaking with no damage to structural and non-structural elements;
(b) Moderate shaking with minor damage to structural elements, and some damage to non-structural elements; and
(c) Severe (and infrequent) shaking with damage to structural elements, but with NO collapse (to save life and property inside/adjoining the building).

Therefore, buildings are designed only for a fraction (~8-14%) of the force that they would experience, if they were designed to remain elastic during the expected strong ground shaking and thereby permitting damage. But, sufficient initial stiffness is required to be ensured to avoid structural damage under minor shaking.



(a)Minor (Frequent) Shaking (b) Moderate Shaking (c) Severe Shaking

Fig-14.1.1AEarthquake-Resistant Design Philosophy for buildings

It is relatively simple to design structures to possess certain lateral strength and initial stiffness by appropriately proportioning the size and material of the members. But, achieving sufficient ductility is more involved and requires extensive laboratory tests on full-scale specimen to

identify preferable methods of detailing. Wind design requires only *elastic* behaviour in the entire range of displacement, but in earthquake design there are two options, namely design the building to remain elastic or to undergo inelastic behavior. The latter option is adopted in normal buildings, and the former in special buildings, like critical buildings of nuclear power plants.

Earthquakes are one of the most destructive of natural hazards. Earthquake occurs due to sudden transient motion of the ground as a result of release of elastic energy in a matter of few seconds. The impact of the event is most traumatic because it affects large area, occurs all on a sudden and unpredictable. They can cause large loss of life and property and disrupts essential services such as water supply, transport etc. They do not destroy villages, town and cities but the aftermath leads to destabilize the economic and social structure of the nation. Earthquake is sudden rolling or shaking events caused by movement under the earth surface, resulting from the sudden release of energy in the earth's crust that creates seismic waves. Earthquakes are measured using observations from seismometers.

Earthquake-resistant structures are those structures designed to withstand earthquakes. While no structure can be entirely immune to damage from earthquakes, the goal of earthquake resistant construction is to erect structures that fare better during seismic activity than their conventional counterparts. There are many techniques to resist earthquake, but they are costly & generally not used by normal people.

Base isolation is a method in which a suspension is introduce between structure and the base. The structure above the ground, which is most affected during earthquake is separated from the effects of earthquake forces by introducing a mechanism that will help the structure to remain in the air. The concept of base isolation is quite easy to understand. It can be explained as a bird flying during an earthquake is not affected. In simple words if structure is floating on its base, the movement of ground will have no effect on the structure. Purpose of base isolation is to reduce the seismic demand instead of increasing the capacity.

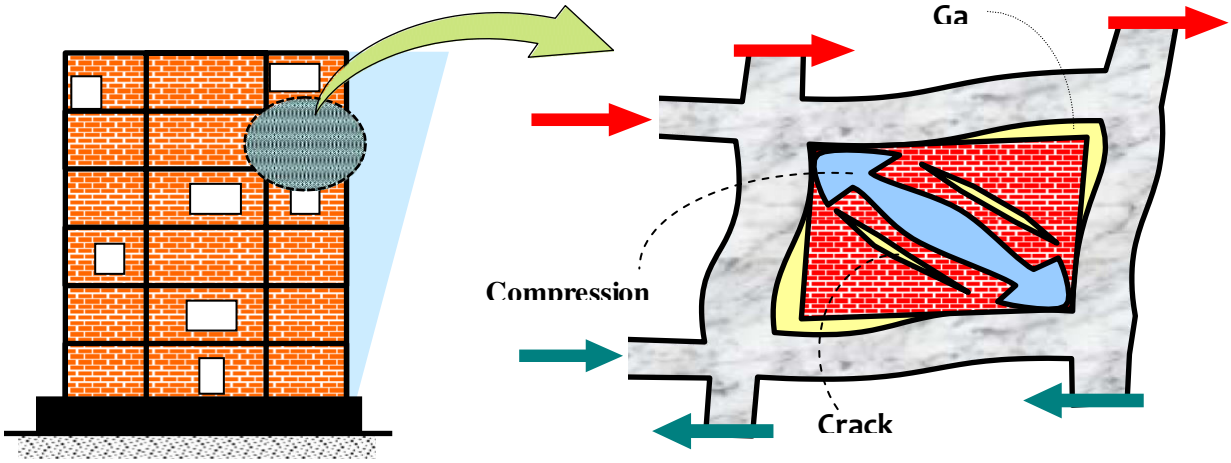
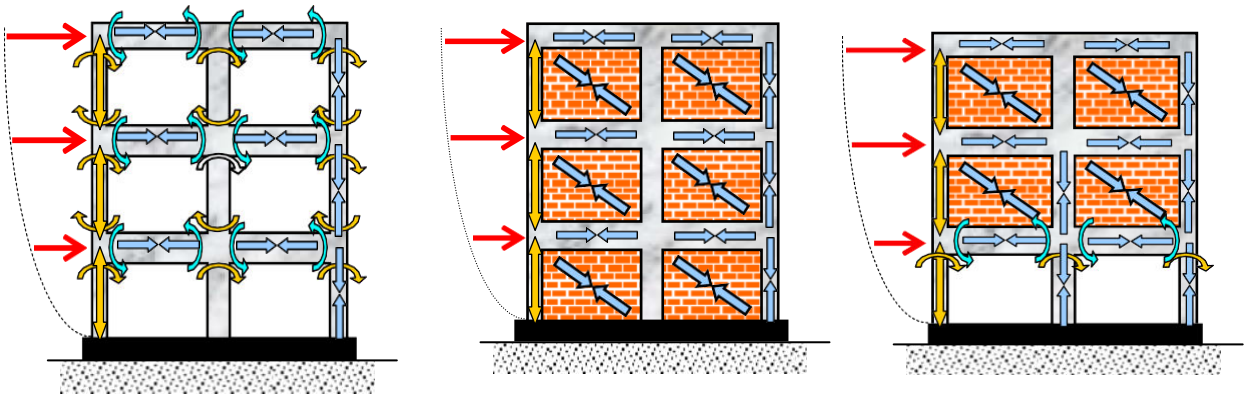


Fig-14.1.1 B Deformation Of RC Frame Building With URM Infill Walls



Bare Frame Infilled frame Hybrid Frame

Fig-14.1.1 C Lateral Force Transfer Mechanism in RC Frame Buildings

Fig-14.1.1 D Bhuj Earthquake

Modern-Day Construction Methods For Earthquake Resistant Buildings

A. Shape-memory alloys :

This demonstrate exceptional characteristics desirable in a seismic risk resistant building. They have a capability to disintegrate considerable energy without permanent deformation or considerable destruction. Generally common shape memory alloys are makeup of metal blends comprising, nickel titanium, copper-aluminum-nickel and copper-zinc-aluminum-nickel. This is more suitable for extensive applications.

B. Seismic Dampers :

In Seismic Dampers are the diagonal braces in a moment resisting frame which is used for efficient lateral load resisting scheme. In modern area the structural seismic retort to control have taken the lead to the alternative of these bracings with seismic dampers. These dampers behaves similar to the hydraulic shock absorbers in cars considerably in

case the sudden jerks are engaged in the hydraulic fluids and only small is transferred to the chassis of the car. In this case the seismic energy is conveyed through it and dampers is absorbed a small part of it and decrease the magnitude of the force which is acting on a structure. Generally used types of seismic dampers are included the friction dampers (energy is fascinated by surfaces within the friction between them rubbing beside each other), viscous dampers (energy is absorbed by silicone-based fluid passing between piston-cylinder structure), and yielding dampers (energy is fascinated by metallic components that produce). The friction dampers were delivered in an 18-story RC frame structure in Gurgaon, India.

C. Steel Plate Shear walls :

Shear walls are deemed as an important component of a lateral load resisting systems and steel is known for its flexible behavior. Merging these two attractive properties, an efficient load resisting system was established and has noticed wide applications in North America and Japan. These walls are intended and also, they turn as a bend as an alternative of buckling below the action of lateral loads. The walls are substantially lighter and thinner; thus, they reduce the building weight. So, these walls not needed to be cured and consequently, it leads to increase the speed of the construction process.

D. Carbon Fibers :

The tensile features and the constant nature of a spider web was studied by many researchers in Japan. This is theworld's first seismic reinforcement structure made of carbon fiber material. An seismic risk Resistant Building Rendered with Carbon Fabric and it is redolent of a giant spider web has been erected in Nomi City of Ishikawa Prefecture in Japan.

E. Ecological ductile cementations composite (EDCC) spray :

A many researcher from the University of British Columbia (Vancouver, Canada) has established a new extreme method to make up the buildings resist against seismic risks. EDCC blends the fly ash, cement with polymer-based fibers, and other extracts in making it ecological and has been provided the molecular level to be malleable and strong at the same time. This material when utilized as a slim coating (10mm), was noticed to have enhanced seismic resistance of the structure by enduring a seismic risk of intensity 9 to 9.1 on Richter scale (Tohoku earthquake, Japan 2011). So this method has been proposed for retrofitting of the vacant structures such as an uncomplicated school building in Vancouver.

F. Blue mussels :

It is found sea decks and clinging to rocks all laterally the coast of New England. They are affixed in place by a gristly outcrop of cabling that occurs from among their twin

shells. Generally the most ferocious of high tides Can't pry them very loose. To remain affixed to their precarious perches, mussels secrete sticky fibers well known as byssal threads. These threads are inflexible and stiff while others are flexible and elastic. Researchers are annoying to combine this particular element into structures in order to make up the building endure the seismic risks.

G. Seismic Invisibility Cloak :

A sequence of the borehole is mined about the periphery of the structure that needs to be endangered. These boreholes seem to work as a seismic cloak‖ that could hide a building or possibly an complete city from an earthquake's deadly waves. This makes the use of dampers, isolators, and also other vibration response control devices obsolete.

14.1.2 Seismic Retrofitting of Buildings:

Seismic retrofitting is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes.Retrofitting is the process of addition of new features to older buildings, heritage structures, bridges etc. Retrofitting reduces the vulnerability of damage of an existing structure during a near future seismic activity. Retrofit in structures is done to increase the survivability functionality.Seismic retrofitting of vulnerable structures is critical to reducing risk. It is important for protecting the lives and assets of building occupants and the continuity of their work. ... If you live or work in retrofitted structures, you're less likely to be injured during an earthquake.

Methods for Seismic Retrofitting of Structures

Retrofitting of existing structures with insufficient seismic resistance accounts for a major portion of the total cost of hazard mitigation.Thus, it is of critical importance that the structures that need seismic retrofitting are identified correctly, and an optimal retrofitting is conducted in a cost effective fashion. Once the decision is made, seismic retrofitting can be performed through several methods with various objectives such as increasing the load, deformation, and/or energy dissipation capacity of the structure. Conventional as well as emerging retrofit methods are briefly presented in the following subsections.

1. Conventional Strengthening Method :

Conventional retrofitting methods include addition of ew structural elements to the system and enlarging the existing members.it is seen that post-cast shear walls andsteel braced frames are the most effective strengthening techniques. Although the latter is more effective due to its much higher ductility, post-cast concrete shear walls are the most commonly applied method due to their lower cost and familiarity of the construction industry with the method. Design of additional shear walls is performed to resist a major fraction of the lateral loads likely to act on the structure. This reduces the demand on the beams and columns, hence increasing their safety. Those still likely to be overstressed are strengthened through concrete or steel jacketing, which are relatively more laborious applications.

2.Retrofit of Structures Using Innovative Materials

Current research on advanced materials in civil engineering is mainly concentrated on high performance.concrete and steel, and fiber reinforced plastic (FRP) composites. FRP composite materials have experienced a continuous increase of use in structural strengthening and repair applications around the world in the last fifteen years. High specific stiffness and specific weight combined with superior environmental durability of these materials have made them a competing alternative to the conventional strengthening methods. It was shown through experimental and analytical studies that externally bonded FRP composites can be applied to various structural members including columns, beams, slabs, and walls to improve their structural performance such as stiffness, load carrying capacity, and ductility.

FRP composites have enjoyed varying degrees of success in different types of applications. In general, applications that allow complete wrapping of the member with FRP have proven to be effective. Wrapping of columns to increase their load and deformation capacity is the most effective and most commonly used method of retrofitting with composites.

Additional Shear Wall

Additional Foundations

Additional Columns

Fig.14.1.2 A Applications of conventional strengthening methods

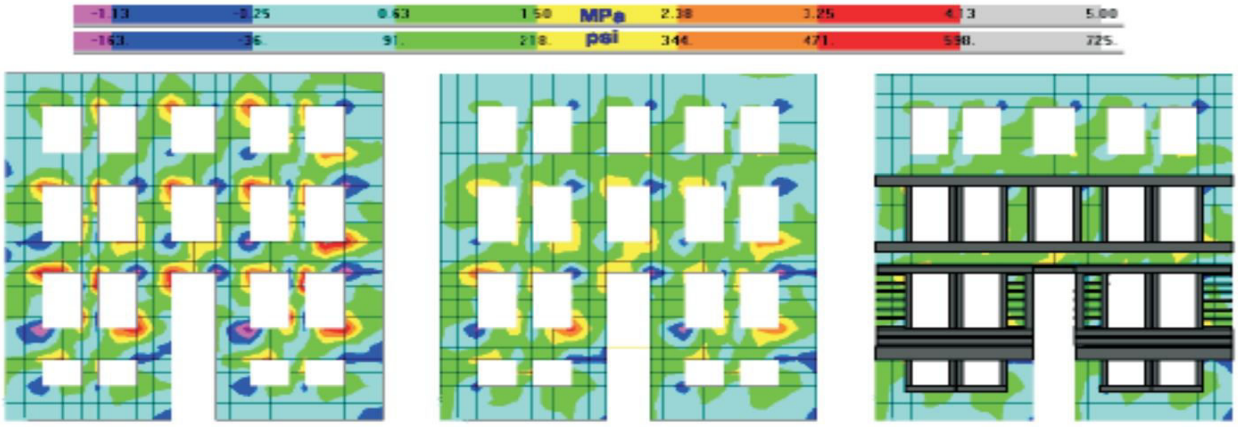
3.Retrofit Application Combining Conventional And Composites Retrofitting :

When wrapping is difficult or not allowed, such as when strengthening beams, slabs, or walls, success of the method is sometimes hindered by premature deboning failures. Sometimes flexural strengthening of beams without proper attention to brittle shear and deboning failure modes not only renders the strengthening application ineffective, but also harms the member by decreasing its ductility. This constitutes one of the main factors, along with their high material costs, hindering wide-range use of FRP materials. Such problems can be reduced through proper design and anchorage of the external FRP reinforcement .Thus, decision makers must approach using these materials with caution and must ensure that the design is performed with adequate knowledge and skill, and verified through laboratory testing.

The main benefit of retrofitting with composites is the increase in deformation capacity of the building, and in its load capacity to an extent. This may achieve the retrofit objectives for

buildings with lightly insufficient seismic resistance. For buildings with large seismic deficiencies, a combination of conventional and FRP strengthening techniques may prove to be an effective retrofitting solution shows such an application where a historical school building in Istanbul was retrofitted using steel and FRP composites. The analysis of which revealed that under seismic design loads excessive cracking is expected around the openings in the exterior unreinforced concrete walls in the short direction due to stress concentrations. As a practical and economical solution, the retrofit design involved replacement of the existing window frames with structural steel frames constructed from steel C-sections.

Although FRP composites are known for their favorable durability characteristics, only limited information is available on long-term durability and performance of FRP bonded concrete and steel systems. These issues need to be investigated through accelerated test studies and related design, application and protection requirements must be included in the design codes.



(A) wall stresses before retrofitting

B) after installation of steel window framesretrofitting

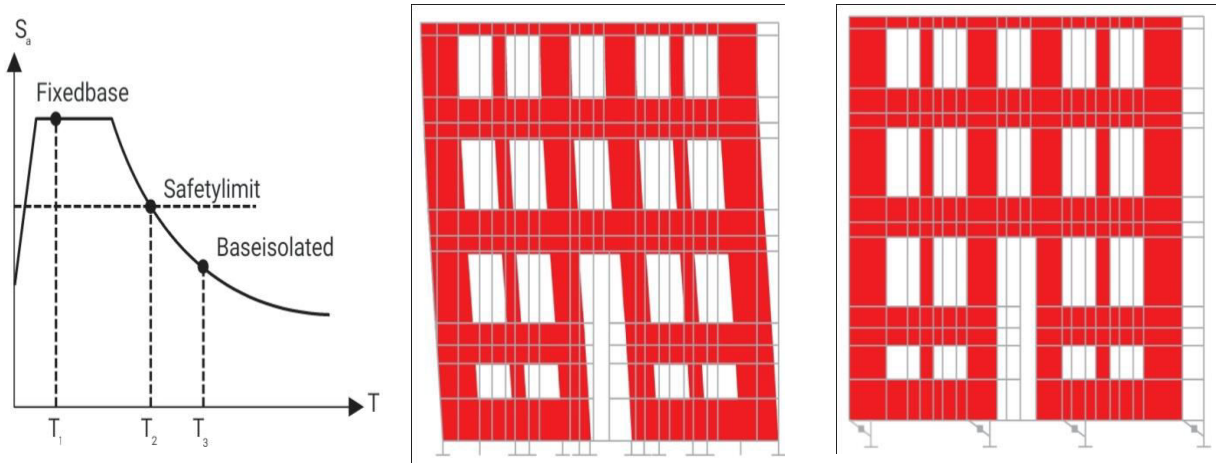
(C) additional FRP retrofitting

Fig. 14.1.2 B A Retrofit Application Combining Conventional And Composites Retrofitting

4. Base Isolation :

The seismic base isolation technology involves placing flexible isolation systems between the foundation and the superstructure. By means of their flexibility and energy absorption capability, the isolation systems reflect and absorb part of the earthquake input energy before this energy is fully transmitted to the superstructure, reducing the energy dissipation demand on the superstructure. Base isolation causes the natural period of the structure to increase and results in increased displacements across the isolation level and reduced accelerations and displacements in the superstructure during an earthquake. The structural system of the building is formed by thick exterior unreinforced concrete walls resisting lateral loads and interior steel frames carrying the vertical loads. A combination of lead-plug rubber bearings and natural rubber bearings were considered for the exterior walls and the interior frames, respectively. The basic design philosophy shown in (a) is to increase the fundamental period of the structure so that the effective seismic demand on the structure is less than that can safely be resisted by the structure. Analysis results showing the deformed shape of the building before and after the base isolation

in (b) and (c), respectively, make it clear that base isolation reduces the deformations and hence the stresses in the building.



(a) Design of base isolation (b) Deformations before base isolation (c) After base isolation

Fig. 14.1.2 C Analysis and design of building base isolation

14.1.3 Advance Practices in construction field in Modern Material, Techniques and equipments:

Advanced ConstructionPractices:

The construction industry is repeatedly criticised for being inefficient and slow to innovate. The basic methods of construction, techniques and technologies have changed little since Roman times. But the application of innovation in the construction industry is not straight forward.
Every construction project is different, every site is a singular prototype, construction works are located in different places, and involve the constant movement of personnel and machinery. In addition, the weather and other factors can prevent the application of previous experience effectively.The term 'advanced construction technology' covers a wide range of modern techniques and practices that encompass the latest developments in materials technology, design procedures, quantity surveying, facilities management, services, structural analysis and design, and management studies.The adoption of advanced construction technology requires an appropriate design, commitment from the whole project team, suitable procurement strategies, good quality control, appropriate training and careful commissioning.

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

- 3D printing.
- Materials.
- Building information modeling (BIM).
- Cladding systems.
- Computer aided design and computer aided manufacturing (CAD/CAM).

- Computer numerical control.
- Construction Innovation Hub.
- Construction plant.
- Modern methods of construction.
- Modular construction.
- Offsite manufacturing.
- Prefabrication and preassembly.
- Research and development.
- Site investigations and surveying.
- Substructure works.
- Water engineering.
- Temporary works.
- Smart technology.
- Robotics.
- GPS controlled equipment.

Advanced Construction equipments :

The construction industry is experiencing more demand than ever before, given that urbanization is taking place at a faster pace the world over. The role that construction equipment plays therefore is of paramount importance. The more a company understands how to derive the maximum efficiency from each piece of equipment it has, the better its project execution becomes. Here's a look at the many purposes served by different kinds of advanced construction equipment:

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

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

2.Excavation:
Any kind of operation that requires digging, excavation, making trenches, etc. falls under this category. Many of the examples of machinery that are grouped under this require a great degree of flexibility and maneuverability, because of the limited area they might be operating under.

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

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

5. Railroads:
The use of several types of highly specialized machinery is needed when constructing railroads. Many factors like high cargo levels, passenger transit, energy consumption and safety have to be taken into consideration; so the equipment needed to serve these purposes has to be just right. Some of the commonly used machinery includes ballast tampers and ballast regulators.

	A bulldozer is a crawler equipped with a substantial metal plate used to push large quantities of soil, sand, rubble, or other such material during construction or conversion work and typically equipped at the rear with a claw-like device) to loosen densely compacted materials.
	A tractor is an engineering vehicle specifically designed to deliver a high tractive effort at slow speeds, for the purposes of hauling trailer or machinery used in construction.
	A grader, also commonly referred to as a road grader, a blade, a maintainer, or a motor grader, is a construction machine with a long blade used to create a flat surface during the grading process.
	A compact or mini excavator is a tracked or wheeled vehicle with an approximate operating weight from 0.7 to 8.5 tonnes. It generally includes a standard backfill blade and features independent boom swing.
	Excavators are heavy construction equipment consisting of a boom, dipper (or stick), bucket and cab on a rotating platform known as the "house". The house sits atop an undercarriage with tracks or wheels. They are a natural progression from the steam shovels and often mistakenly called power shovels.

	A Backhoe Loader Is A Heavy Equipment Vehicle That Consists OfTractor Like Unit Fitted With A Shovel/Bucket On The Front And A Small Backhoe On The Back. Due To Its Small Size And Versatility, Backhoe Loaders Are Very Common In Urban Engineering And Small Construction Projects As Well As Developing Countries.
	A Backhoe Is A Piece Of Excavating Equipment Or Digger Consisting Of A Digging Bucket On The End Of A Two-Part Articulated Arm.
	A Cherry Picker Is A Type Of Aerial Work Platform That Consists Of A Platform Or Bucket At The End Of Hydraulic Lifting System.

14.1.4 Engineering aspect of Soil Mechanics-environmental Impact Assessment

Environmental Impact Assessment (EIA) is a planning tool generally accepted as an integral component of decision making in Sustainable Development. The course is aimed at providing comprehensive information, on Environment (physical and biological), its degradation due to developmental activities, methods of determining consequences or impacts and possible methods of mitigation, to a group of post graduate, students in Arts, Science and Management. The students who have undergone studies both in theory and practice in respective disciplines and are knowledgeable in specific subjects may not be fully aware on the consequences of developmental projects being planned and executed in the vicinity. They are also anxious to know the world of futurology, so that they are able to visualize the dreams of next generation. The rapid growth of population, improvements in standards of living and concomitant growth of infrastructure have altered the environment, sometimes beyond its power of resilience. These changes have resulted in ecological crisis and have become a matter of grave concern to managers and decision makers throughout the world.

In India, Ministry of Environment and Forests (MOEF) has been recognized by Govt. of India as the nodal agency to regulate through its functionaries the provision of water Act, 1974, Air Act, 1981 and Environmental Protection Act of 1986 and provide guidelines for its implementation. As per the procedures outlined, EIA is required to provide a comprehensive account of the state of existing environment, the stresses produced by diverse activities and the impacts these will

have on various components of environment. The proponents of the development projects also need to suggest and provide the measures to mitigate the adverse effects.

The EIA has been Define as:

- Determining and managing (identifying, describing, measuring, predicting, interpreting, integrating, communicating, involving and controlling) the,
- Potential (or real) impacts (direct and indirect, individual and cumulative, likelihood of occurrence)
- Proposed (or existing) human actions (projects, plans, programs, legislation, activities) and their alternatives on the
- Environment (Physical, Chemical, biological, human health, cultural, social, economic, built and interactions)".

ComponentsofanEnvironmentalImpactAssessment

The EIA will comprise of three components: Environmental Baseline Study; Environmental Assessment; and Environmental Impact Statement. The Environmental Impact Assessment may be submitted as the three components highlighted above or could be submitted as one document depending on the size and nature of the proposed project.

The Environmental Baseline Study will record the present quality of the environment within the area of influence before project implementation. This data will then be analyzed in the environmental assessment and will be used to predict and quantify impacts.The Environmental Impact Statement is a summary of the findings of the Environmental Baseline Study and the Environmental Assessment and includes an Environmental Management Plan. For large EIAs, the EIS will be the document which decision makers and the public will use. The Environmental Baseline Study and the Environmental Assessment will then serve as reference documents to the EIS.

ENVIRONMENTAL ASSESSMENT

The environmental assessment will provide technical detail on the environmental effects of the project. The EA will focus on the proposed project but must also address alternatives. A summary of the data in the EA would be incorporated into the Environmental Impact Statement (see below). The EA should provide the following information and components;

1. Analysis of the compatibility of the proposal with the existing environmental legislation that applies to the project itself or to its area of influence. In the event that national or local environmental standards do not exist, at least two international standards must be informed.
2. Results of the regulatory and public participation program.These programswouldnormallyincludemeetings,workshops,informationbrochuresandshould include consultation with NGOs, regulators, members of the publicincluding indigenous peoples, etc. with the objective of identifying all issuesandpotentialmitigationstrategies.
3. Identification,descriptionandassessmentofalternativesinrelationtoprocessing, technology selection and reclamation. Provide a comparison ofthe alternatives with and without the implementation of mitigation measures,including the recommended alternative (from the

environmental point of view).Indicate the main reasons for selection of alternatives taking into accountenvironmentalfactors.Includealsoaprognosisofthestateoftheenvironment ineachofthealternatives.

- Siteselectionmethodologyandrationalfortheproposedtailingsandminewastestoragean ddisposalareas.Factorsforconsideration should include cost, minimization of environmentaleffects (for example land requirements, spill potential, effects onaquatic and terrestrial ecology, social effects such as loss oflandfor residential, agricultural or other cultural uses), long term stabilityand closure. Proposed methods should consider the current stateoftechnology.Potentialoptionsandissuestoexplorewouldinclude:backfillingofmi nedpits,wastedisposalinminedoutunderground mines and/or use of tailings as structural backfill, useof engineered liners for seepage control and the need for long termcare.
- Alternativeminingandprocessingmethodsshouldbeexploredwhen there are potential non-mitigatable impacts to demonstratethat there are no practical cost effectivealternativemethodstoreduce impacts andefficientlyexploit theresource.

4. Detailed information regarding the methods used to analyse impacts (EIAmethods) and the techniques used to estimate the magnitude of the impacts(prediction techniques).

5. Identification, characterization, description and determination of magnitudeand importance of the social distribution of the potential impacts in the short,medium and long term.Analysis of impacts must include as a minimum,direct,primaryandsecondary,temporaryandpermanent,reversibleandirreversible impacts on the physical, biological, social, economic and culturalcomponentsoftheenvironment,whenapplicable.

6. Special emphasis should be placed on indirect impacts which may arise fromproject implementation.

7. Assessmentofphysicaleffectsforallphasesincludingconstruction,operation and closure including the effects on soils; air quality – characterizeand quantify all sources and model effects on suspended particulate; SO_2 andNO_x ;noise–quantify all sourcesandmodel effects; ground andsurfacewaterquality– inventoryofallcontaminantsourcesandmodeleffects;hydrology – model effects; and climate – greenhouse gases, physical micro –climate changes and the effects of climate change on the project if any;residualimpacts.Mine wastecharacterization data:
   - Runoff and leachate characterization.Provide information on thepotentialchemicalcharacteristicsofrunoffandseepagefromtailingsandwasterockpiles.T estingprotocolsincludefieldplots,column leachingtestsandhumiditycelltests.
8. Identify how much of a particular resource is degraded or eliminated and howquicklythenatural systemmaydeteriorate.

9. Assessment of the biological effects on ecosystems of all project phases(construction, operations and closure).Specific emphasis should be placedon flora, fauna, rare and endangered species, endemic plants and animals,metals uptake and effect on biota and human health, effects on populations,habitat and species diversity. These aspects may in part be dealt with throughan ecological riskassessment.

10. Assessment of the positive and negative impacts on land use (compatibility),futuredevelopment,cultural/historicresources(archaeology),indigenouspeoples,demographics,infrastructure,employment,income,skillsandeducation,andpublichealth.

11. A description of any hazards or dangers which may arise from the projectandanassessment oftherisk totheenvironment.

ENVIRONMENTAL IMPACT STATEMENT

The EIS will provide all relevant details on the project and its effect on the environment. This document should provide a summary level of detail adequate to allow the average reader to make an informed decision on the project. This document will include a broad range of data including information on the developer, schedule, the detailed description of the project, regulatory framework, a review of alternatives, environmental management plans, socioeconomic factors, environmental impacts, mitigation, monitoring and reclamation. The EIS would be accompanied by supporting appendices, the baseline study report and the environmental assessment which will provide technical detail on specific issues, assumptions and modelling projections. These supporting documents would be more technical.

- Executive summary stressing information regarding the potential impacts and theproposed mitigation measures.

- Introduction-overview of the project; details on the developer, ownership, the resource, company and history with mining, brief description of partners and their role in the project, description of the key components with site/land use maps; and regulatory framework and requirements.

- Detailed project description including the area of influence (spatial and temporal boundaries), location, layout, description of present land use of the project area and the area contiguous to it, project size and production, land requirements, activities associated with all development stages from construction to closure, alternatives considered, staffing and employment, emission characteristics, water supply and waste disposal, environmental/waste management plans.

- Executive summary stressing information regarding the potential impacts and the proposed mitigation measures.

- Introduction-overview of the project; details on the developer, ownership, the resource,company and history with mining, brief description of partners and their role in the project, description of the key components with site/land use maps; and regulatory framework and requirements.

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

Water is an essential natural resource for human existence. It is needed in every industrial and natural process, for example, it is used for oil refining, for liquid-liquid extraction in hydro-metallurgical processes, for cooling, for scrubbing in the iron and the steel industry, and for several operations in food processing facilities.

Need is for sustainable wastewater treatment technologies - to locally treat the sewage and also reuse/recycle. The decentralised sewage treatment can be both electro-mechanical system that have higher energy requirement or natural systems with less or no energy requirement.A sustainable urban water supply network covers all the activities related to provision of potable water. Sustainable development is of increasing importance for the water supply to urban areas. Incorporating innovative water technologies into water supply systems improves water supply from sustainable perspectives. The development of innovative water technologies provides flexibility to the water supply system, generating a fundamental and effective means of sustainability based on an integrated real options approach. Water is an essential natural resource for human existence. It is needed in every industrial and natural process, for example, it is used for oil refining, for liquid-liquid extraction in hydro-metallurgical processes, for cooling, for scrubbing in the iron and the steel industry, and for several operations in food processing facilities. It is necessary to adopt a new approach to design urban water supply networks; water shortages are expected in the forthcoming decades and environmental regulations for water utilization and waste-water disposal are increasingly stringent.

To achieve a sustainable water supply network, new sources of water are needed to be developed, and to reduce environmental pollution.The price of water is increasing, so less water must be wasted and actions must be taken to prevent pipeline leakage. Shutting down the supply service to fix leaks is less and less tolerated by consumers. A sustainable water supply network must monitor the freshwater consumption rate and the waste-water generation rate.

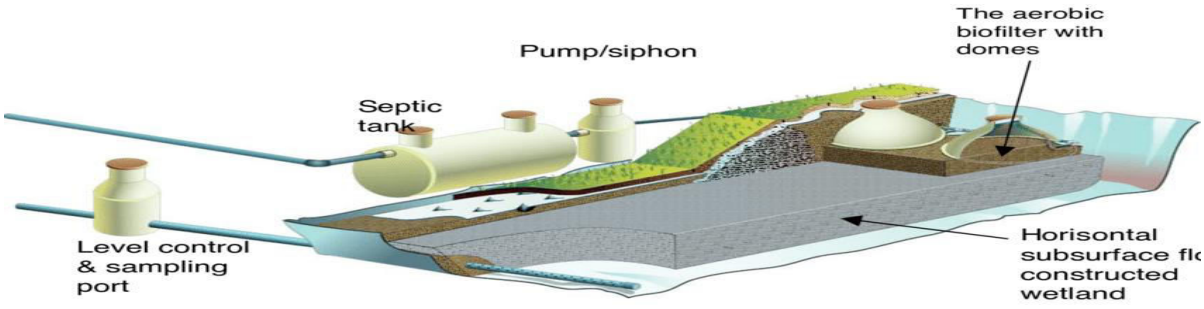


Fig-14.1.5 ASewarage Treatment BySeptink Tank

The municipal government can develop a "Municipal Water Reuse System" which is a current approach to manage the rainwater. It applies a water reuse scheme for treated wastewater, on a municipal scale, to provide non-potable water for industry, household and municipal uses. This technology consists in separating the urine fraction of sanitary wastewater, and collecting it for recycling its nutrients. The feces and graywater fraction is collected, together with organic wastes from the households, using a gravity sewer system, continuously flushed with non-potable water. The water is treated anaerobically and the biogas is used for energy production.

A sanitary sewerage system includes laterals, submains, and interceptors. Except for individual house connections, laterals are the smallest sewers in the network. They usually are not less than 200 mm (8 inches) in diameter and carry sewage by gravity into larger submains, or collector sewers. The collector sewers tie in to a main interceptor, or trunk line, which carries the sewage to a treatment plant. Interceptors are usually built with precast sections of reinforced concrete pipe, up to 5 metres (15 feet) in diameter. Other materials used for sanitary sewers include vitrified clay, asbestos cement, plastic, steel, or ductile iron.

14.2 Electrical Engineering

14.2.1 Design of Power Electronics converter:

In power electronics, the solid state devices are used as switches. They can be either on or off. They are never used for amplification. The frequency with which the solid state devices are switched on and off is called the switching frequency. The inductor and capacitors used can lead to an increase in weight and also an increase in the volume of the power converters which leads to a decrease in the power density of the converters. This can be remedied by using a higher switching frequency which reduces the size of the components used in the converter. But higher switching frequency leads to higher switching losses. However, switching losses are small compared to conduction losses.

The main types of conversion are DC to DC, AC to DC, DC to AC and AC to AC. The use of DC to DC converters to step-up or step-down a DC voltage is a great boon because AC voltages can be stepped up or stepped down easily using a transformer but using a transformer with DC leads to saturation of the core and will ultimately damage the transformer. The conversion of AC to DC is known as rectification which is used to supply DC loads, such as DC motors, using AC power supply.DC to AC conversion is known as inversion and is a very useful important part of our daily lives nowadays where we are trying to remove our dependency on fossil fuels. Inverters can take power from DC sources, such as batteries, and convert them to AC power for use in AC motors as can be seen in Toots, etc. AC to AC conversion is done using either Cycloneconverters or Matrix Cycloneconverters. Control of converters deals with the logic implemented, either with analog electronics or digital based microcontrollers, DSP processors or FPGA's, to switch on and off the solid-state devices. The simplest is the Pulse Width Modulation (PWM) scheme. Control of the converters becomes complicated when the converters use feedback loops.

- **AC to DC** = Rectifier: It converts AC to unipolar (DC) current
- **DC to AC** = Inverter: It converts DC to AC of desired frequency and voltage

- **DC to DC** = Chopper: It converts constant to variable DC or variable DC to constant DC
- **AC to AC** = Cycloneconverter, Matrix converter: It converts AC of desired frequency and/or desired voltage magnitude from a line AC supply.

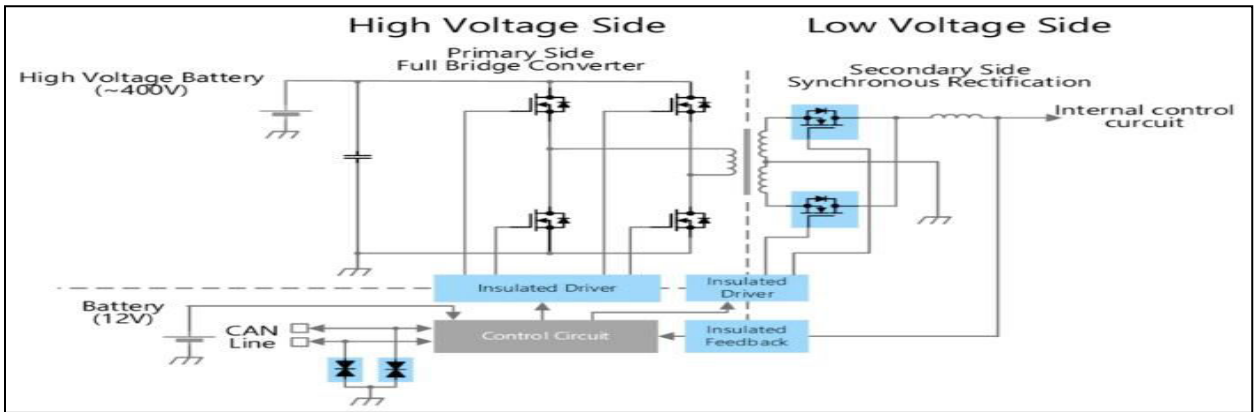


Fig-14.2.1 A DC-DC Converter Diagram

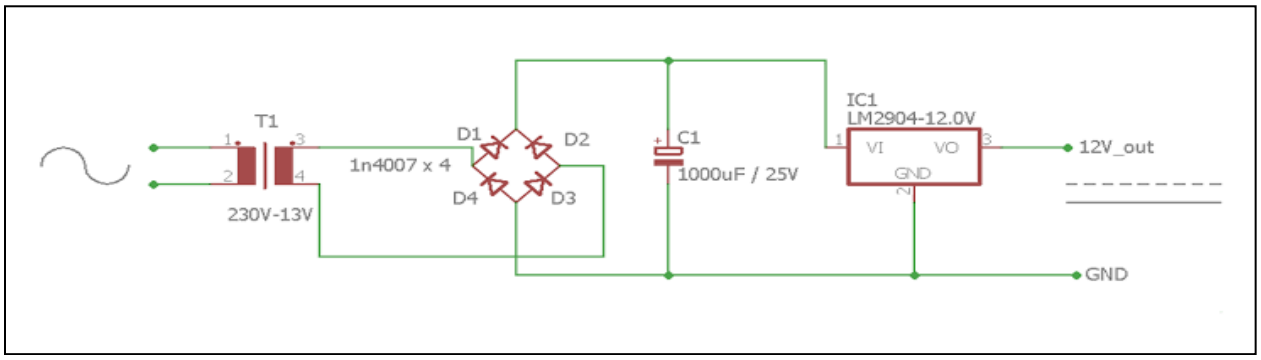


Fig-14.2.1 B AC to DC Converter Circuit

14.2.2 Electronic Soft Starter for 1/3 Phase Induction Motor for Agriculture:

An induction motor draws current more than the rated capacity during starting phase which might damage stator windings of three phase induction motor. To avoid the problem of high starting current, voltage is increased gradually from lower to higher level using smooth and soft starters. A smooth and soft starter is employed in a three phase induction motor to eliminate the surge in current and electromagnetic torque during starting. The surge in current and torque are eliminated temporarily using soft started at the time of starting. This in turn reduces the stress applied on an electric motor and shaft attached with rotor. The soft starter also eliminates the unwanted effects in electric cables and power distribution network. This paper provides a detailed description of soft and smooth start to an induction motor. At the time of starting, an induction motor draws significant amount of current from the supply and this drawn current is higher than the rated current of three phase induction motor. The motor reaches the full rated speed instantaneously as soon as the voltage is applied. The smooth start of three phase induction motor is based on the delay angle of TRIAC circuit. The firing angle is delayed during starting and delay angle reduces as the motor picks up the speed. The firing delay angle is further

reduced to zero when motor reaches full speed. This proposed technique provided reduced voltage at the time of starting and full rated voltage when motor reaches full speed. Due to proposed technique, motor starts at a slow speed and gradually increases to full rated speed. By using soft starters, performance of induction motor is improved and it also improves load torque characteristics**.**

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 reducedvoltage 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.

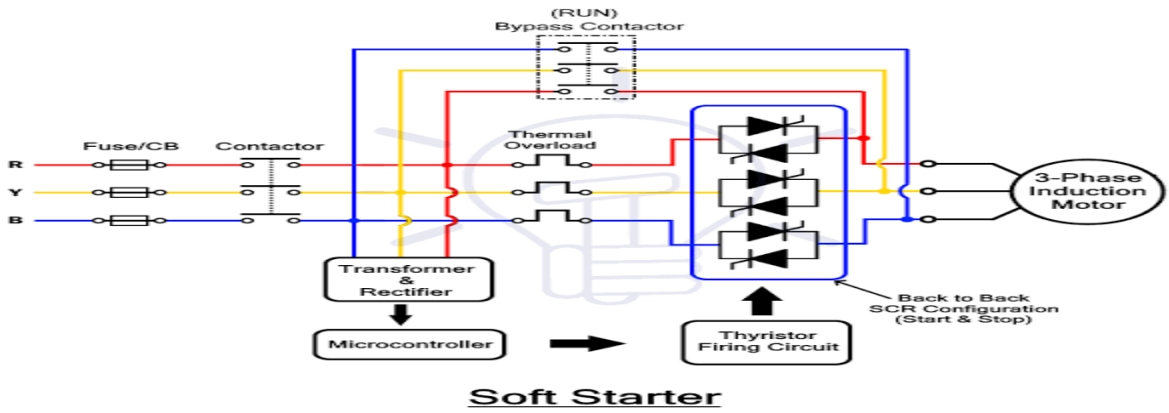


Fig-14.2.2 A Working Diagram Of Soft Starter

A soft starter provides reduced voltage to stator windings of three phase induction motor by controlling the acceleration of an electric motor. A three phase induction motor is a self-starting motor and electromagnetic torque is produced due to an interaction between revolving magnetic field around rotor and rotor current. Initially during starting, a rated voltage is applied which causes high current to flow through stator windings. Now this high current is greater than the rated current which can cause heating of the stator windings and eventually damaging the insulation applied on stator windings. To avoid the problem of high starting current, there is a need of motor starters in an electric motor. The motor can be started in three ways. Firstly by

applying full load voltage i.e. direct on line starting. Secondly, by applying voltage gradually using star-delta starter and soft starter. Thirdly, by applying part winding starting i.e. autotransformer starter. A soft starter provides reduced voltage and hence reduced torque on electric motor. A soft starter comprises of solid state devices like thyristors. The supply voltage to the motor is controlled by power semiconductor devices like thyristors.

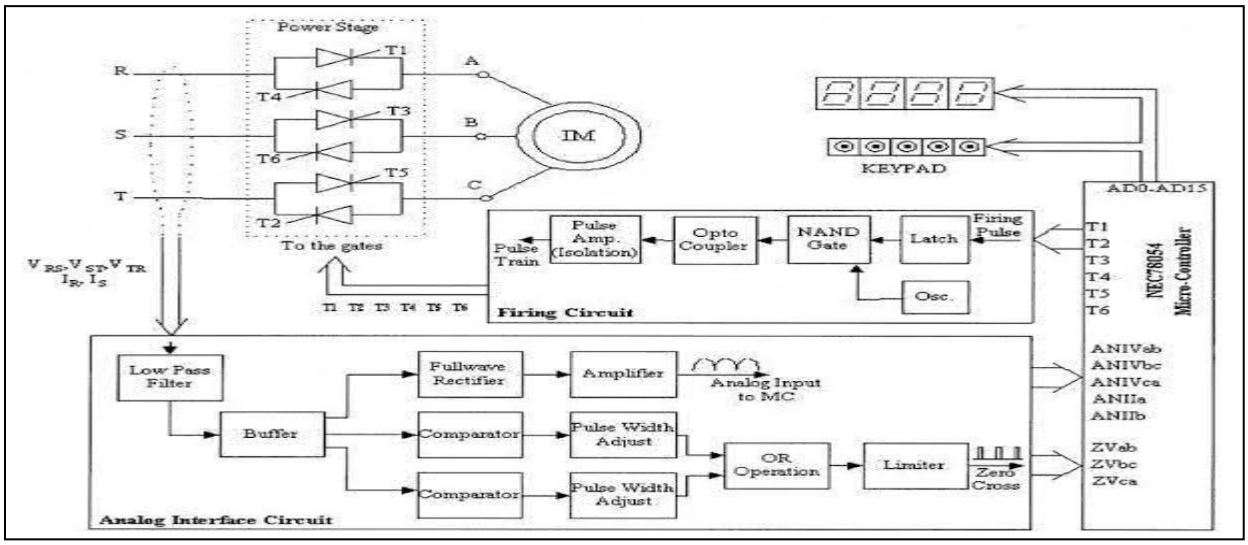


Fig-14.2.2B Block Diagram Of Soft Starter

The first one is open loop control and second is closed loop control. In an open loop control, a start voltage is applied with time. This start voltage is applied irrespective of the current drawn or the speed of the motor

The reduced voltage ramps up to the full voltage and simultaneously, the firing angle is reduced from 1800 to 00 . This type of system is known as time voltage ramp system. This method has a drawback that it cannot control the acceleration of motor. In a closed loop control, any characteristic of the motor is monitored for the desired response. The starting voltage is modified depending on required motor current or motor speed. The current in each phase is monitored properly and time voltage ramp is stopped when current in each phase exceeds a certain set point.There are total six SCRs required for all three phases for smooth acceleration of electric motor. These SCRs are power semiconductor devices which normally are in OFF state but these SCRs starts to conduct when firing signals are given to them and hence allows voltage and current to pass through them. through SCRs. Finally, the firing pulses are applied exactly at the zero crossing of the voltage which allows 100% of the voltage to pass through.

14.2.3 Advanced Wireless Power Transfer System:

Introduction

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.All these problems are the main motivation for researchers. Nikola Tesla was the first who introduce the concept of wireless power transfer [2]. 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 Method

1.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.

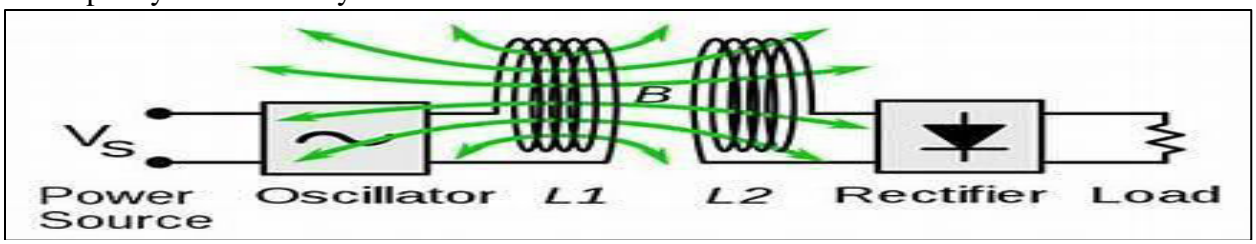


Fig14.2.3 A Inductive Coupling

2.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 upto some extent which arise in nonresonant 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 .

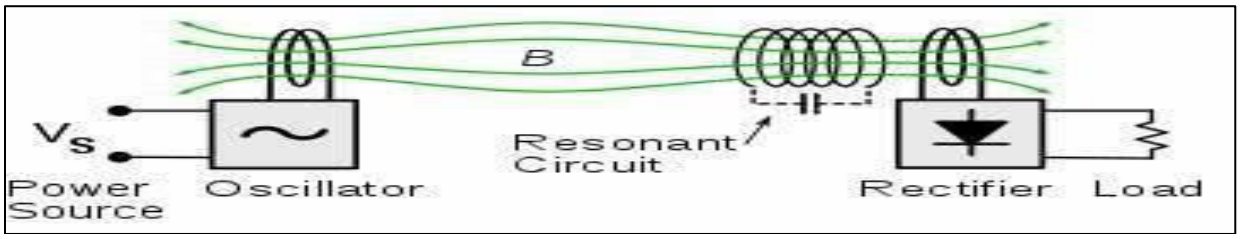


Fig.14.2.3 B Magnetic resonance coupling

3. Microwave WPT

This is one of the type of far-field technique of WPT which have range upto KM, with power transfer upto 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.

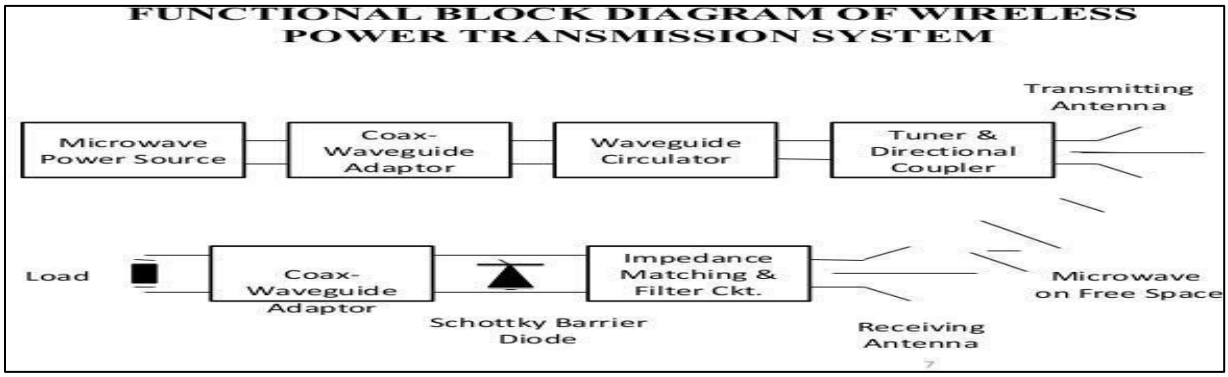


Fig-14.2.3C Block Diagram Of WPT

14.2.4 Industrial Temperature Controller

The modern sensing technology and control methods are undergoing continuous innovation, where the real-time temperature control is demanding higher accuracy and faster response more than ever. Temperature control is widely used in production and industrial control processes in all aspects. For example, in the iron and steel smelting process, iron and steel to be baked requires heat treatment in order to achieve their performance indicators; plastic qualitative process also needs to maintain a certain temperature range. The fact is that the temperature control system is a complex process object involving large inertia and pure delay with multi-variable and time-varying parameters. At present, the PID control methodology is adopted in most cases . In this way, different PID parameters should be selected for different control objects, for which some practical experience is needed. As a language controller, the fuzzy PID control is to imitate the way of human thinking and experience to achieve its control process that can more closely reflect the best control behavior of the controller. With strong robustness and control stability, it can be applied to different control objects.

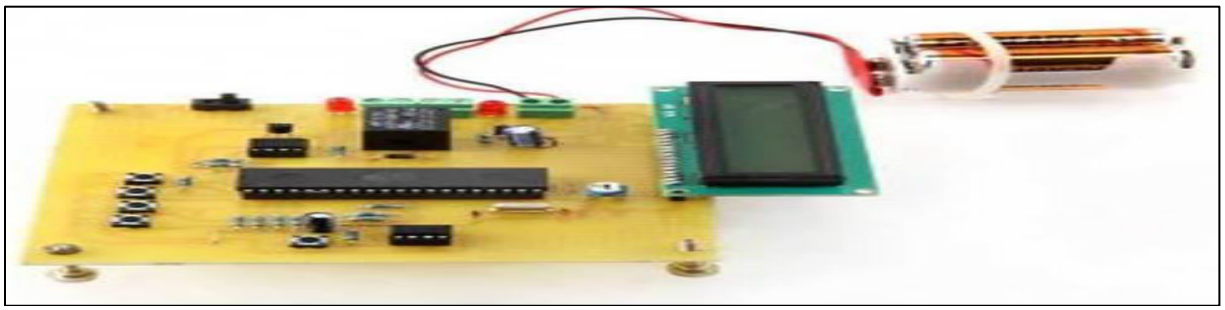


Fig-14.2.4. A Industrial Temperature Controller

14.2.5 Accident Alerts in Modern Traffic Signal Control System -Camera Surveillance System:

In intelligent surveillance system based on visual information gathered by smart cameras, aimed at traffic monitoring with emphasis on traffic events caused by cars, is presented in the paper. The system components and their capabilities for automatic detection and recognition of selected parameters of cars, as well as different aspects of system efficiency, are described and discussed in detail. Smart facilities for Make and Model Recognition (MMR), License Plate Recognition (LPR) and Color Recognition (CR), embedded in the system in the form of their individual software implementations, are analyzed and their recognition rates detailed. Finally, a discussion of the system's efficiency as a whole, with an insight into possible future improvements, is included in the conclusion.The growth of the digital camera market can be said to have begun in the late 1990s and early 2000s. Reasons for this growth are numerous technological advancements in chip manufacturing, progress in embedded system design, the coming-of-age of CMOS (Complementary Metal Oxide Semiconductor) image sensors and so on. In particular, the development of CMOS image sensors (CIS) - cheaper to be manufacture than CCDs (Charge-Coupled Devices), boosted this growth. Together with digital stand-alone cameras and camera phones, accessibility and demand for smart cameras have also increased. The market for this category of smart devices grew 22% in 2012, and is projected to climb at an annual average of 12% through 2017 . In total, the global CIS market is expected to increase from $6.6 billion in 2012 to $11 billion by 2017

Fig-14.2.5 A Traffic Surveillance By Camera

Chapter -15
Smart and/or Sustainable features of Chapter 8 & 13 designs, Impact on society. (For Waghai village development, villagers happiness, comfortable and for enhancement of the village) (With the Smart village development Concept As Per Your Idea And Village Visit, modern technology with innovation)

Smart and/or Sustainable features of Chapter 8 & 13 designs:

Smart and sustainable buildings have been designed, built and utilized in order to consume less energy, facilitate efficient building operation, and improve the comfort, health and productivity of users. Hence, they become a critical component of smart cities. Nonetheless, perceived importance rankings of different features of smart and sustainable buildings have yet to be identified and prioritized from the users' perspective. Based on responses from 494 building users in Hong Kong, it was found that building users tended to focus more on intelligent security systems, followed by intelligent and responsive fresh air supply and lifts and escalators. On the other hand, building users generally considered the systems that monitor people's movement and harvest rain water to be the least important features. Exploratory factor analyses were used to identify key factors of perceived smartness and sustainability of a building. The results of factor analyses showed that different user groups would characterize a building's smartness differently. Smart and sustainable buildings have attracted considerable attention in recent years. According to a report published by BSRIA [1], the smart building market alone was projected to grow from US$427 billion in 2011 to US$1036 billion by 2020, thereby creating vast opportunities to develop and apply advanced building technologies, and information and communications technologies (ICT). China will account for a 46% market share in the global smart building industry Smart and sustainable buildings are the ones that through their physical design and ICT installations are responsive and adaptive to the changing environment and needs of users throughout their lifetimes. Because of the adaptive nature of smart and sustainable buildings, the usage of materials, water, and energy resources can be optimized while comfortable and healthy indoor environments can be achieved.

As a building block of smart cities, smart and sustainable buildings promote sustainable urbanization, healthy life style, and social inclusion Although the concept of smart and sustainable buildings is not new, the development of smart and sustainable buildings is now becoming a reality because of the emergence of smart sensors, smart appliances, smart systems, cloud computing, and ubiquitous connectivity. In that regard, intelligence means making decisions on behalf of building users. The concept of intelligent buildings gradually expanded over time .Clements-Crone suggests that intelligent buildings must be responsive to the requirements of occupants, organizations, and society. Such buildings must also be sustainable because of the minimized use of energy and water resources as well as the reduced emissions of pollutants and waste. Thus, smart and sustainable buildings must promote the well-being of users, must adapt to their functional needs, and keep the impact on the environment minimal .Yet, the extant literature on smart and sustainable buildings predominantly focuses on technological details; there is scant literature to adopt the user-centric approach to evaluate the

smartness and sustainability of buildings. Hence, the study aims to address the following three research questions: (i) How do building users evaluate the importance of different features of smart and sustainable buildings? (ii) What are the key factors of perceived smartness and sustainability from the users' perspective? (iii) Are the perceptions of building smartness and sustainability different among different user groups? The study's results can provide important insights that allow building designers and owners to focus on what users really expect from smart and sustainable building.

A smart and sustainable building should definitely be intelligent. Nevertheless, a building's excessive intelligence does not only minimize human interaction with the building's systems but also dictates how the systems should be operated, possibly causing frustration among users Thus, a smart and sustainable building must provide users with the "appropriate" services (in view of its intelligence) and information The building's environment shall adapt to most users' needs but it also allows individual users to adjust the settings according to his/her individual needs and preferences at The three basic drivers for designing a smart and sustainable building are energy and efficiency, longevity and evolving capabilities to sustain the building over its life cycle, and users' comfort and satisfaction Arditi explored the degree of smartness of a building. Based on responses from 120 building designers, contractors and owners, Arditi et al developed a smartness index that covers economic issues, energy issues, and comfort issues. Arditi et al. found that building designers, contractors, and owners emphasized more on energy issues over the other two issues. Moreover, numerous people now spend more than 8 hours a day for 5 days a week in commercial and office buildings. They reported that perceived ease of use, perceived usefulness, and facilitating conditions induced building professionals and designers to have a high level of intention to use smart and sustainable building technologies.

Methods:

In order to answer the three research questions, we adopted a cross-sectional survey study. We developed a self-administered questionnaire based on an extensive literature review. We used a chain referral sampling approach in which Village People working in different field were invited to participate in the survey voluntarily.

The Context of the Study :

Waghai is village for building design studies because so it require an smart infrastructure Additionally, the Gujrat Government is taking a proactive approach in developing Waghai village. The Waghai panchayat have organized numerous conferences and exhibitions to promote the design and use of smart and sustainable buildings as well as smart and sustainable smart village over the past few years..

Design of the Questionnaire:

The questionnaire has two parts. The first part consisted of items that describe key features of a smart and sustainable building . The items cover intelligent and responsive building elements such as lighting, fresh air supply, thermal control, acoustic element, expandable network infrastructure, security system, etc. responsive designs to cope with the changing external environment such as daylight, rain, smart grid, etc. and indoor ecology and social features . All

items were rated using a five-point Likert scale with 1 being "very unimportant" and 5 being "very important". More specifically, Table 1 shows the first part of the questionnaire including an introduction to the study, the core dimensions, the items used, and the rating scale.

T-15A- The items used in the study

Core Dimension	Item
Building indoor environment	An intelligent and responsive fresh air supply. An intelligent and responsive thermal control . An intelligent and responsive lighting. A responsive acoustic environment.
Smart building skin i.e., responsive to ambient environment	A responsive system that can harvest solar and wind energy' A responsive facade that can harvest daylight. A responsive system that can harvest rainwater.
Eco and social spaces communal factor	An indoor social space. A real indoor green space with a variety of plants. Different social venues that facilitate interaction between users.
Building security and network systems	An intelligent security system. An intelligent system that monitors people movement An expandable network infrastructure is

Data Collection Procedure:

Although we only solicited respondents' importance ratings of different features of smart and sustainable buildings, we followed the standard research protocol approved by the University's ethical committee strictly. We explained clearly the purpose of the study in the questionnaire. As respondents were invited to participate in the survey voluntarily, they could withdraw from the survey at any time. All data were anonymous and kept confidential. We invited part-time Master's students from a university in gujrat who have full-time jobs to participate in the survey and requested them to distribute a total of 1000 paper-based questionnaires to their colleagues, friends, and relatives after the pilot test. After a 2-month period, we received 494 valid responses, representing a 49.4 percent usable response rate. All respondents were employees working in office environments.

Data Analysis:

We used demographics to characterize the profile of respondents. The relative importance rankings of smart and sustainable building features were determined and categorized by gender and industry. A number of t-tests were performed to examine whether gender had any influence on the mean scores. Analyses of variance (ANOVAs) were performed to investigate industry as a significant between-group factor. We used exploratory factor analyses (EFA) to identify the factor structure of perceived smartness of smart and sustainable buildings from the users' perspective.

Impact on society:

1. Locally produced and locally consumed energy: In villages if the mountains, hilly area are present then use of solar energy & wind energy then energy is produce in that village itself & use for development of village.

2. Creation of job: Generally village people migrate from village to city for purpose of job. If village becomes smart so all the job requirements are fulfills & people not migrate from one place to another.

3. Contribution to global environment: The system can reduce reliance on fossil fuels &contribute to reduction of green house gases such as carbon dioxide .Energy consumption optimization 25-30% average energy saving.

4. For farmer e-learning etc. facility that will be able to ask there quarries online.

5. New technologies in education, e-learning, desktop publishing, horoscope generation of interested person of the village. Transportation of village into comfortable & safe space that enhance quality

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

7.At a community or societal level, the social benefits of sustainable design include knowledge transfer, improved environmental quality, neighborhood restoration, and reduced health risks from pollutants associated with building energy use.

8.Minimize waste with their lower environmental impact and use of renewable sources and materials. Products such as demolition debris, sand and burnt coal can be used with excellent environmental and aesthetic results.

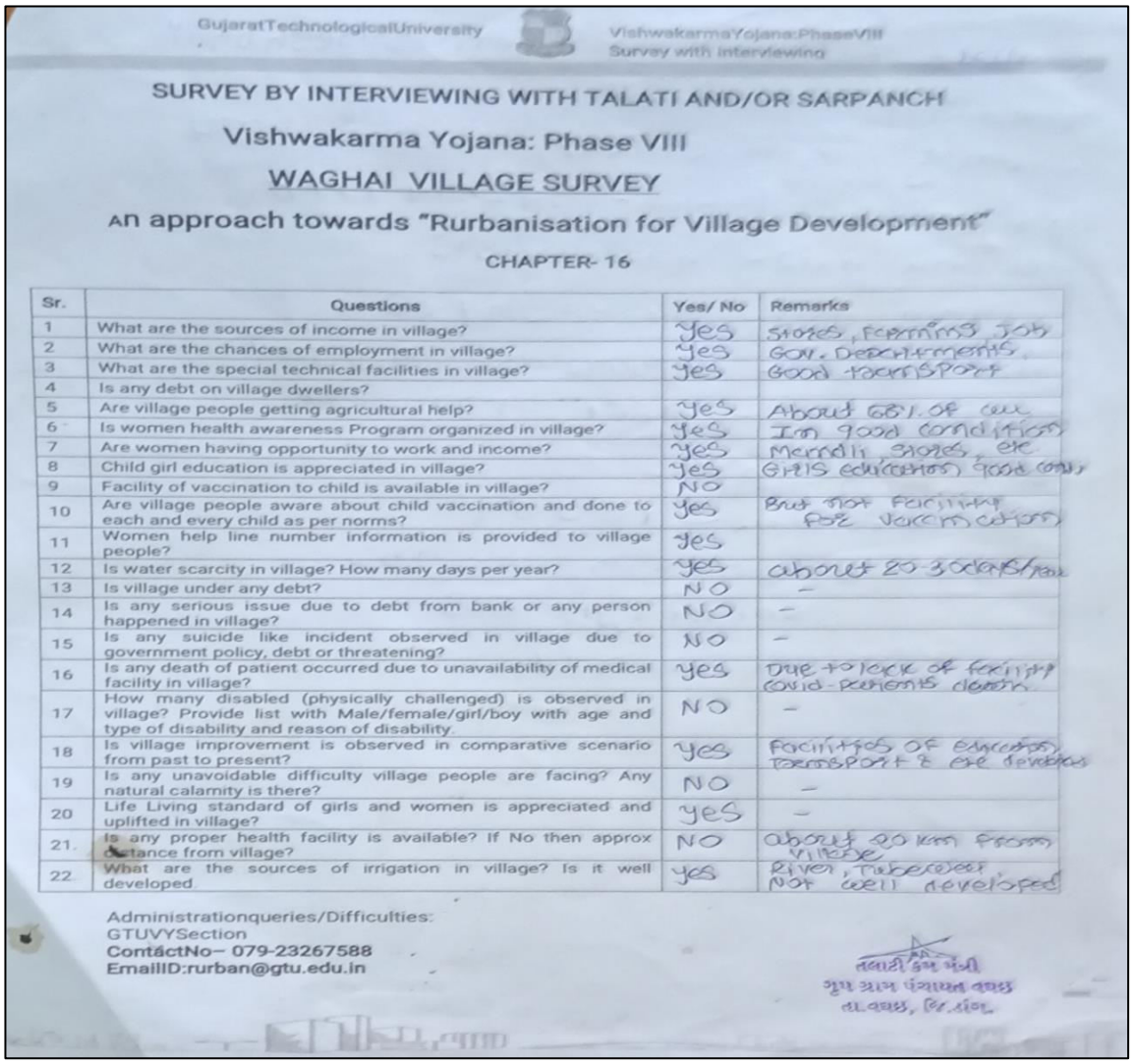
9. Sustainable buildings manage water in a more effective and environmentally friendly manner. Sustainable buildings can be equipped with systems that recycle water, such as collecting rainwater for toilet cleaning. Sustainable buildings can collect and preserve natural energy, such as solar or wind energy, storing it and reusing it accordingly.

10. Sustainable construction has a plethora of benefits in every stage of a construction project. Improved health due to safer materials, increased productivity thanks to better surroundings and more effective noise protection are only a few of the advantages. Green buildings can improve life quality.

Chapter 16
Survey By Interviewing With Talati And/or Sarpanch

Under Vishwakarma Yojana phase VII, we visited Waghai village to collect some information of Waghai village and people of Waghai village. In Waghai village people have good sources of income like their own shops like general store, Xerox , shop of sweets etc. and farming is the main source of income in Waghai village.

In Waghai village there are good source of irrigation like river (In Waghai village a big river is flowing) and tube wells, boreholes and wells etc. in Waghai village there are good condition of girls education and woman employment and opportunity of income for woman.



GujaratTechnologicalUniversity VishwakarmaYojana:PhaseVIII
Survey with interviewing

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

WAGHAI 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	stores, farming, job
2	What are the chances of employment in village?	yes	Gov. Departments.
3	What are the special technical facilities in village?	yes	Good transport
4	Is any debt on village dwellers?		
5	Are village people getting agricultural help?	yes	About 60% of all
6	Is women health awareness Program organized in village?	yes	In good condition
7	Are women having opportunity to work and income?	yes	Mandli stores, etc.
8	Child girl education is appreciated in village?	yes	Girls education good con.
9	Facility of vaccination to child is available in village?	NO	
10	Are village people aware about child vaccination and done to each and every child as per norms?	yes	But not facility for vaccination
11	Women help line number information is provided to village people?	yes	
12	Is water scarcity in village? How many days per year?	yes	about 20-30 days/year
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?	yes	Due to lack of facility Covid-Patients death
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	Facilities of education, transport & etc developed
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	-
21	Is any proper health facility is available? If No then approx distance from village?	NO	about 20 km from village
22	What are the sources of irrigation in village? Is it well developed.	yes	River, Tubewell Not well developed

Administrationqueries/Difficulties:
GTUVYSection
ContactNo– 079-23267588
EmailID:rurban@gtu.edu.in

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

This village has about 1308 families belonging to several different castes. The 80 upper caste families own the majority of land in the village. Their houses, some of them quite large, are made of brick with cement plastering and some are very kuttcha house. The SCs (davits) comprise one third of the population and live in one corner of the village and in much smaller houses some of which are of mud and straw. Most of the houses have electric connections. Electricity powers all the tubewells in the fields and is used in various types of small business. Waghai has two primary schools and one high school.

There is a primary health centre run by the government and one private dispensary where the sick aretreated. The description above shows that Waghai has fairly well-developed system of roads, transport, electricity, irrigation, schools and health centre. Compare these facilities with those in your nearby village. The story of Waghai, an imaginary village, will take us through the different types of production activities in the village. In villages across India, farming is the main production activity. The other production activities, referred to as non- farm activities include small manufacturing, transport, shop-keeping, etc. We shall take a look at both these types of activities, after learning a few general things about production.

The aim of production is to produce the goods and services that we want. There are four requirements for production of goods and services. The first requirement is land, and other natural resources such as water, forests, minerals. The second requirement islabour, i.e. people who will do the work. Some production activities require highly educated workers to perform the necessary tasks. Other activities require workers who can do manual work. Each worker is providing the labour necessary for production. The third requirement is physical capital.

Tools, machines, buildings*:* Tools and machines range from very simple tools such as a farmer's plough to sophisticated machines such as generators, turbines, computers, etc. Tools, machines, buildings can be used in production over many years, and are called fixed capital**.**

T-17- A Land Utilization Of Dang District

Sr.No	Land Utilization	Area(ha.) In 2004-05
1.	Total Graphical area	172356
2.	Forest area	101329
3.	Uncultivable area	3894
4.	Permanent pasture & other grazing land	262
5.	Current fallows	1524
6.	Net area sown	57843
7.	Area sown more than once	4545
8.	Cultivable area	70845
9.	Total area under irrigation	10500
10.	Cropping intensity	122%
11.	Land not available for cultivation	11660

Farming or Agriculture activity in village :

Farming is the main production activity in Waghai. 68 per cent of the people who are working are dependent on farming for their livelihood. They could be farmers or farm laborers. The well-being of these people is closely related to production on the farms. But remember that there is a basic constraint in raising farm production. Land area under cultivation is practically fixed. Since 1960 in Waghai, there has been no expansion in land area undercultivation. By then, some of the wastelands in the village had been converted to cultivable land. There exists no further scope to increase farm production by bringing new land under cultivation.

In the kind of crops grown and facilities available, Waghai would resemble a village of the western part of the state of Dang. All land is cultivated in Waghai. No land is left idle. During the rainy season (kharif) farmers grow Dangar(rice),Juvar,tuver.Alad,Nagali(Ragi),vari,kuet,sunflower, bajra. These plants are used as cattle feed. It is followed by cultivation of peas grams,masoor between October and December. In the winter season (rabi), fields are sown with wheat.

The main reason why farmers are able to grow three different crops in a year in Waghai is due to the well-developed system of irrigation. Electricity came early to Waghai. Its major impact was to transform the system of irrigation. Persian wheels were, till then, used by farmers to draw water from the wells and irrigate small fields. People saw that the electric-run tubewells could irrigate much larger areas of land more effectively. The first few tubewells were installed by the government. Soon, however, farmers started setting up private tubewells.

T-17 B Distribution of respondents according to irrigation facilities

Sr.no	Irrigation Facilities	Percentage
1.	Bore well	2.5
2.	Well	15.0
3.	Pond	1.0
4.	Check dam	9.5
5.	River	33.5
6.	No source	38.5

To grow more than one crop on a piece of land during the year is known as multiple cropping. It is the most common way of increasing production on a given piece of land. All farmers in Waghai grow at least two main crops; many are growing potato as the third crop in the past fifteen to twenty years.

Land being a natural resource, it is necessary to be careful in its use. Scientific reports indicate that the modern farming methods have overused the natural resource base. In many areas, Green Revolution is associated with the loss of soil fertility due to increased use of chemical fertilizers. Also, continuous use of groundwater for tubewell irrigation has led to the depletion of the water-table. Environmental resources, like soil fertility and groundwater, are built up over years. Once destroyed it is very difficult to restore them. We must take care of the environment to ensure future development of agriculture.

Method and Instruments are use for farming:

i. **Instruments :** Tractor,Hal,bullock cart,water pumping motor,and other accessory

ii. **Method**: Generally in the village there are not anymethod use for irrigation people are dependent on the rain water.

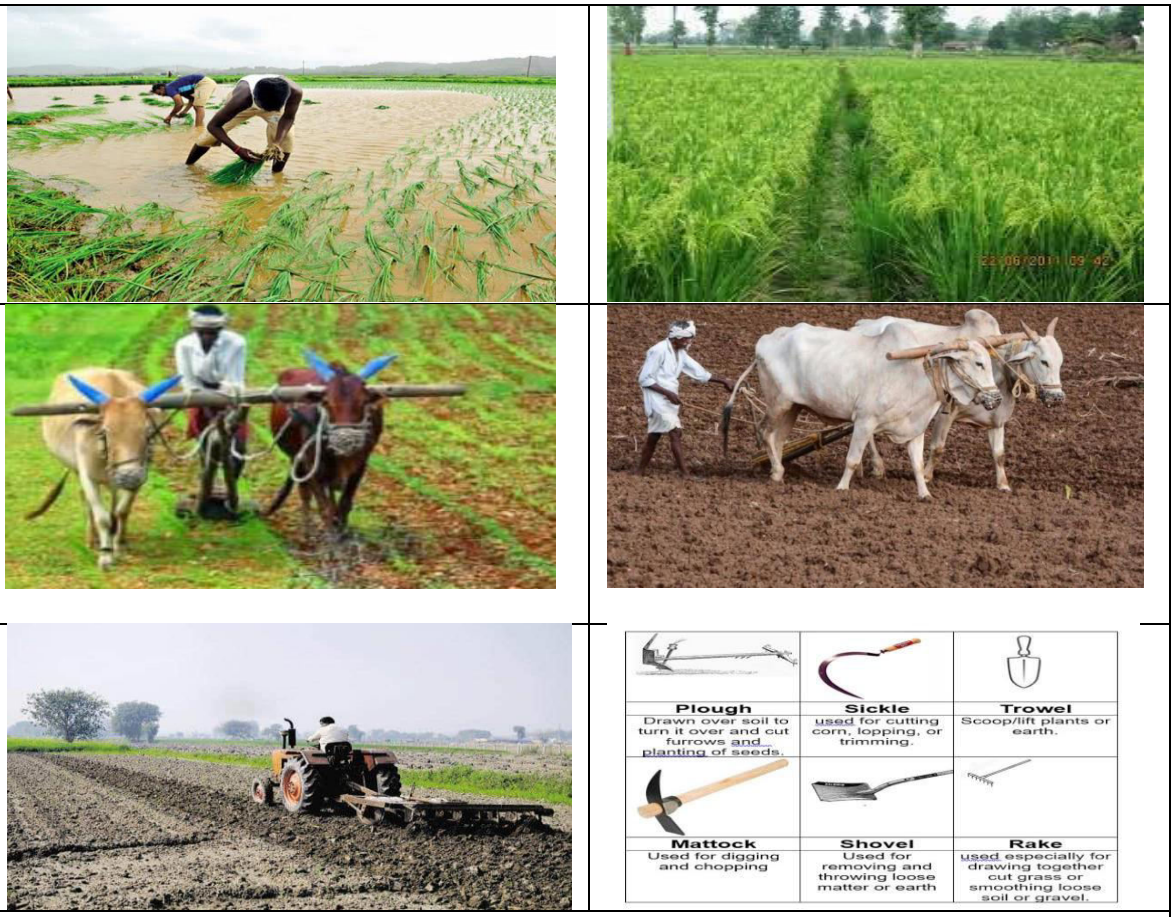
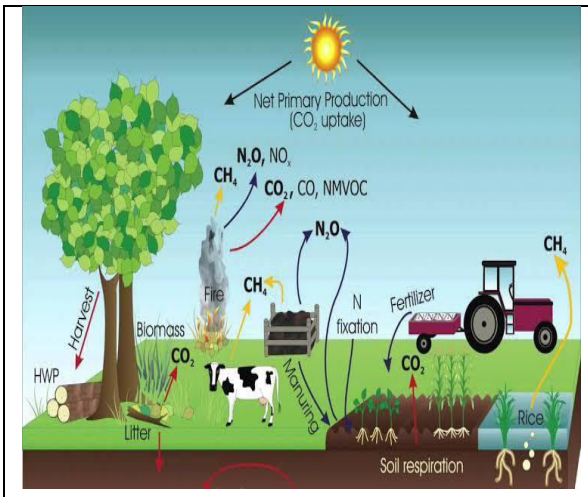


Fig-17 A Agricultural Tools And Equipment

AlternateTechniques And Solution :

You have seen that one way of increasing production from the same land is by multiple cropping. The other way is to use modern farming methods for higher yield. Yield is measured as crop produced on a given piece of land during a single season. Till the mid- 1960s, the seeds used in cultivation were traditional ones with relatively low yields. Traditional seeds needed less irrigation. Farmers used cow-dung and other natural manure as fertilizers. All these were readily available with the farmers who did not have to buy them. The Green Revolution in the late 1960s introduced the Indian farmer to cultivation of wheat and rice using high yielding varieties (HYVs) of seeds. Compared to the traditional seeds, the HYV seeds promised to produce much greater amounts of grain on a single plant. As a result, the same piece of land

would now produce far larger quantities of food grains than was possible earlier. HYV seeds, however, needed plenty of water.



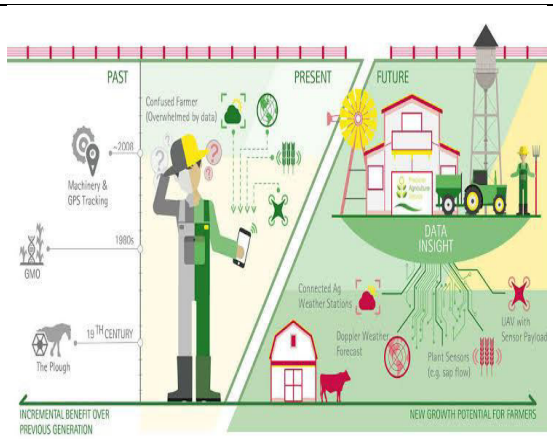


Fig-17 B Alternate Techniques In Farming

Environmental sustainability is a major driving force for the development and adoption of sustainable farming practices where monoculture production of agriculture and forestry commodities has led to reduced biodiversity and loss of wildlife habitat, increased non-point source pollution of ground and surface water, and deterioration of family farms (Jose and Gordon The different forms of integrated land-use systems that embrace the concepts of sustainable agriculture include:

- Organic farming
- Bio-dynamic farming
- No tillage farming
- Urban and Peri-urban Farming
- Natural farming
- Eco-farming
- Perm culture
- Polyculture
- Integrated farming system
- Floating Farming

These are the predominant potential sustainable farming techniques practiced in various parts of the world. This article reviews the potentials, constraints, strategies and case studies for these ten alternative farming techniques. Based on an extensive critical review of literature, it may be concluded that these farming techniques have demonstrated their ecological, economic, social and cultural sustainability. The last section for the review comprises of some innovative endogenous farming techniques practices in India, as there is a rapid revival of alternative farming in recent decades.

Chapter 18.
Social Activities – Any Activates Planned By Students e.g Teaching Learning activities, awareness camp, business idea for Self Help Group Or Any Other

The various activity planned by student in village :

- Cleaning of village
- Mask Distribution for covid-19

Cleaning of village:

We Visited waghai village and we have seen that the people are maintaining cleanliness of the village but in some streets there is no swachhata because there are animal and their waste , mud, etc. The village pond has to need a proper maintenance. Other than these there are clean streets, main road and approach road.We clean all the village by the use of various cleaning instruments and people of village are also help to us .we clean every street of village ,road, school, anganvadi etc..

Swachh Bharat Mission i.e. Clean India Mission, a national level campaign, recently launched by the Government of India is a major step towards the protection of degrading environmentf Swachh Bharat Mission (SBM) is implemented properly with all its stakeholders taking their respective responsibilities, there is no wonder that one day India will become an open defection free country.

In WaghaiVillage there are clean streets, main road and approach road. We clean all the village by the use of various cleaning instruments and people of village are also help to us .we clean every street of village ,road, school, anganwadi etc..

The cleaning Mission of the village has the following objectives:

- Elimination of open defecation
- Eradication of Manual Scavenging
- Modern and Scientific Municipal Solid Waste Management
- To effect behavioral change regarding healthy sanitation practices
- Generate awareness about sanitation and its linkage with public health
- Capacity Augmentation for Urban Local Bodies (ULB's)




Fig-18 A Cleaning Activities Done by Students in Waghai village

Awareness Activities of covid-19 in Waghaivillage:

The rapid and extensive spread of the COVID-19 pandemic has become a major cause of concern for the healthcare profession. The aim of this study is to assess the awareness of COVID-19 disease and related infection control practices among healthcare students in Waghaivillage.A total of 362 responders from the Waghai completed a questionnaire-based survey on the awareness, knowledge, and infection control practices related to COVID-19 infection in the healthcare setting. The questionnaire students was adapted from the current interim guidance and information for healthcare workers published by the US Centers for Disease Control and Prevention (CDC). Convenient sampling method was used for data collection and the distribution of responses was presented as frequencies and percentages. Descriptive statistics were performed for all groups and subgroups based on the percentage of correct responses. Individual pairwise comparisons were done using the median test for the percentage of correct responses.The overall awareness for all subgroups was adequate with 71.2% reporting correct answers. The highest percentage of correct responses were from undergraduate medical students and the lowest was from non-clinical/administrative staff. Less than half of the total respondents could correctly define “close contact.” More than three-fourths of the responders were aware of the various infection control measures like rapid triage, respiratory hygiene, and cough etiquette and having a separate, well ventilated waiting area for suspected COVID-19 patients. However, only 45.4% of the responders were aware of the correct sequence for the application of a mask/respirator, and only 52.5% of the responders were aware of the preferred hand hygiene method for visibly soiled hands.

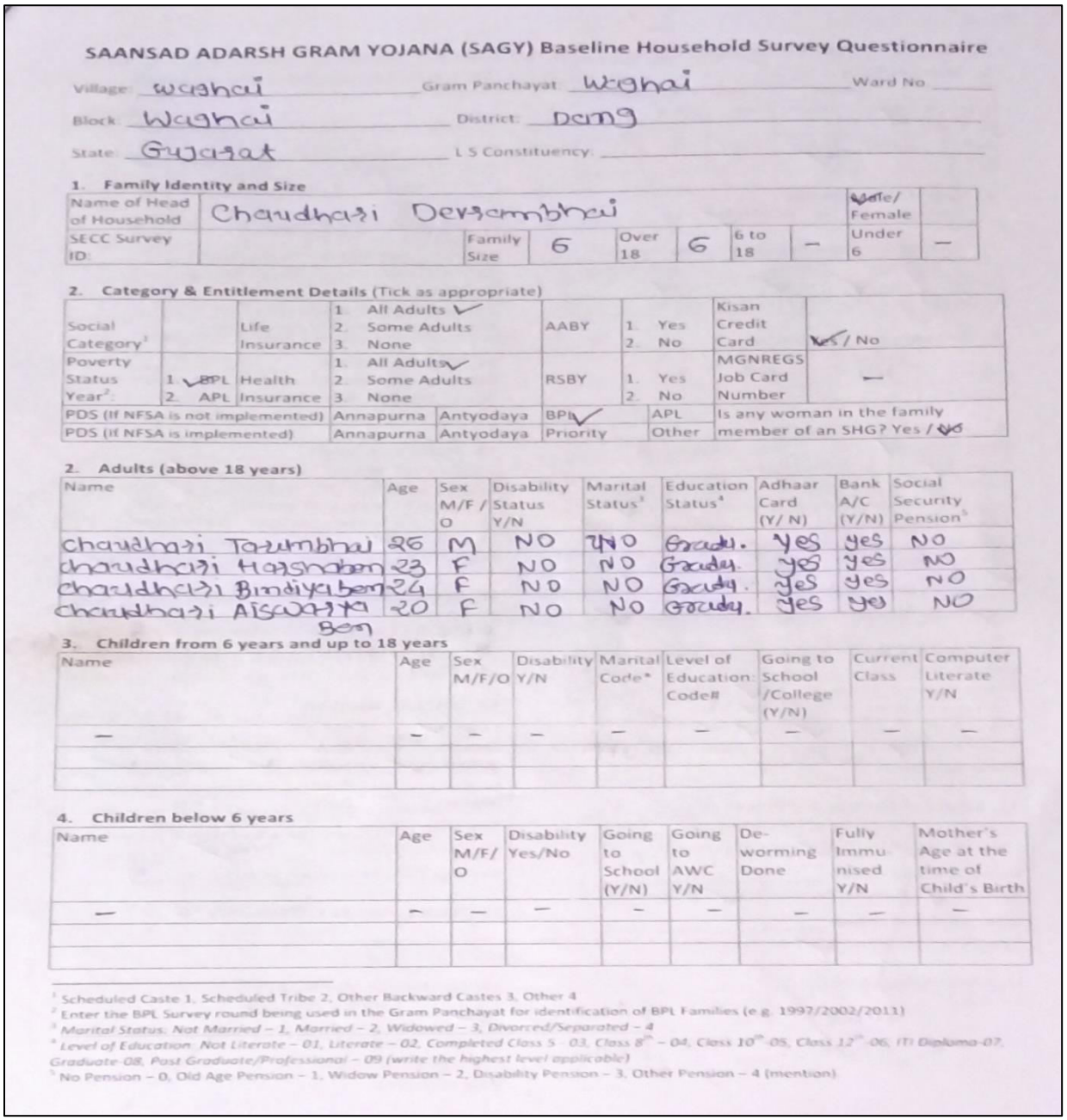
There is a need for regular educational interventions and training programs on infection control practices for COVID-19 across all healthcare professions. Occupational health and safety are of paramount importance to minimize the risk of transmission to healthcare students and professionals and provide optimal care for patients

India braces for the COVID-19 pandemic; healthcare workers on the frontlines are particularly vulnerable to this infection. The virus that causes COVID -19 was initially called as 2019-nCoV and was then termed as syndrome coronavirus 2 (SARS-CoV-2) by the International Committee on Taxonomy of Viruses (ICTV) . It is a new strain discovered in 2019 which was not found previously in humans.

Fig- 18 B Mask distribution

Chapter 19.
Waghai SAGY Questionnaire Survey form with the Sarpanch Signature (Scanned copy attachment in the soft copy report and Original copy in hardbound report)

SAGY Questionnaire Survey Report Of Waghai Village



SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Waghai Gram Panchayat: Waghai Ward No:

Block: Waghai District: Dang

State: Gujarat L S Constituency:

1. Family Identity and Size

Name of Head of Household	Chaudhari Devambhai						Male/ Female	
SECC Survey ID:		Family Size	6	Over 18	6	6 to 18	–	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	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]
Chaudhari Tarumbhai	26	M	NO	MO	Gradu.	yes	yes	NO
Chaudhari Harshaben	23	F	NO	NO	Gradu.	yes	yes	NO
Chaudhari Bindiyaben	24	F	NO	NO	Gradu.	yes	yes	NO
Chaudhari Aishwarya Ben	20	F	NO	NO	Gradu.	yes	yes	NO

3. Children from 6 years and up to 18 years

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

4. Children below 6 years

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

[1] Scheduled Caste 1, Scheduled Tribe 2, Other Backward Castes 3, Other 4
[2] Enter the BPL Survey round being used in the Gram Panchayat for identification of BPL Families (e.g. 1997/2002/2011)
[3] Marital Status: Not Married – 1, Married – 2, Widowed – 3, Divorced/Separated – 4
[4] Level of Education: Not Literate – 01, Literate – 02, Completed Class 5 - 03, Class 8th – 04, Class 10th-05, Class 12th-06, ITI Diploma-07, Graduate-08, Post Graduate/Professional – 09 (write the highest level applicable)
[5] 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	NO	NO
Children		

9. House & Homestead Data

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

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

Source of Water		Distance
Piped Water at Home	Yes / No	
Community Water Tap	Yes / No	
Hand Pump (Public / Private)	Yes / No	
Open Well(Public / Private)	Yes / No	0.9 KM
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	10 Acre	2. Cultivable Area	8 Acres
3. Irrigated Area	2 Acre	4. Uncultivable Area	2 Acre

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
Rice		
Ladies finger		
Varai		

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): 5		

18. What games do Children Play –

19. Do children play musical instrument (mention)

–

Schedule Filled By:
Principal Respondent:
Date of Survey:

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

I. Basic Information

a. Gram Panchayat: Waghai

b. Block: Waghai

c. District: ~~Waghai~~ Dang

d. State: Gujarat

e. Lok Sabha Constituency: Valsad

f. Number of Wards in the Gram Panchayat: 1

g. Number of Villages in the Gram Panchayat: 1

h. Names of Villages: –

Demographic Information

Number of Households 1308 Total Population 6,715 Male 3,403 Female 3,312

SC HHs 111 ST HHs 3842 OBC HHs – Other HHs –

I. Access to Infrastructure / Facilities / Services

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
a.	ANM/ Health Sub Centre	Y	
b.	Nearest Primary Health Centre (PHC)	Y	
c.	Nearest Community Health Centre (CHC)	N	20 Km
d.	Nearest Post Office	Y	
e.	Nearest Bank Branch (Any)	Y (SBI)	
f.	Nearest Bank with CBS Facility	Y	
g.	Nearest ATM	Y	
h.	Nearest Primary School	Y	
i.	Nearest Middle School	Y	
j.	Nearest Secondary School	Y	
k.	Nearest Higher Secondary School / +2 College	Y	
l.	Nearest Graduate College	Y	
m	Nearest ITI / Polytechnic Centre	Y	
n	Kisan Seva Kendra	Y	

1

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
o	Agriculture Credit Cooperative Society	N	about 17 km
p	Nearest Agro Service Centre	N	about 17 km
p	MSP based Government Procurement Centre	N	-
q	Milk Cooperative /Collection Centre	Y	-
r	Veterinary Care Centre	N	about 9 km
s	Ayurveda Centre	N	about 32 km
t	E – Seva Kendra	N	about 11 km
u	Bus Stop	Y	-
v	Railway Station	Y	-
w	Library	Y	-
x	Common Service Centre	Y	-

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 2 Public 2 Private –

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 2

b. Number of villages without Angan Wadi Centres –

Names of such villages: Dali pada, Jhariya, dhadhal Pada, Dabdar

c. Schools (Number)

Primary Private: 2 Primary Govt.: 1

Middle Private: – Middle Govt.: –

Secondary Private: 2 Secondary Govt.: 2

Higher Secondary Private: – Higher Secondary Govt: 1

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)			✓			near Anganwadi centre	
b.	Kerosene			✓			–	
c.	Other (mention) (Oil)			✓			–	

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: YES / Not Covered:	Waghai, Chikar, Vati, Dungarda, Kudkash, Ahava	Dhodhalpada, Borpada
b.	Hand Pump Coverage in Villages:	Covered: YES / Not Covered:	Waghai, Vati, Ambapada, Chikar, Ahava	
c.	Coverage under Covered Drains:	Covered: - / Not Covered: ✓	Ahava –	Waghai, Dhodipada, Dhodalpada, Kudkash
d.	Coverage under Open Drains:	Covered: / Not Covered: ✓	Ahava -	Waghai, Chikar, Vati, Dungarda
e.	Villages with Household Electricity Connection (Numbers)	Connected: ✓ / Not Connected:	Ahava, Waghai, Chikar, Vati, Dungarda, Kudkash	-

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	3542	d.	Pasture / Grazing Land	52	g.	Check Dam	–
b.	Irrigated Land	1,155	e.	Forests/ Plantations	2,155	h.	Wells/Bore Wells	10
c.	Un-irrigated Land	2,410	f.	Other Common Land	–	i	Tanks /Ponds	2

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

3

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	[illegible]928
b)	Number of Households receiving pension (old age, widow, disability)	300
c)	Number of eligible Households who are not receiving pension	412
d)	Number of Households eligible for Ration Card	1,308
e)	Number of eligible HHs having ration cards	1,308
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	[illegible]1300
i)	Number of Job Card holders who completed 100 days of work during 2013-14	923
j)	Number of shops selling alcohol	16
k)	Number of BPL families	415
l)	Number of landless households	20
m)	Number of IAY beneficiaries	–
n)	Number of FRA[2] beneficiaries	–
o)	Number of Community Sanitary Complexes	0
p)	Number of Households headed by single women	54
q)	Number of Households headed by physically handicapped persons	3
r)	Total number of Persons with Disability in the village	12
s)	Number of SHGs	–
t)	Number of active SHGs	–
u)	Number of SHG Federations	–
)	Number of Youth Clubs	–
w)	Number of Bharat Nirman Volunteers	–

Name and Signature of Surveyor and Respondent'

Chaudhari Pravinbhai, Gaikawad Sanjay, Bagul Vasant bhai Surveyor	સોનુ ચૌધરી PRI Respondent (Preferably Gram Panchayat Chairperson)	સરપંચશ્રી જુથ ગ્રામ પંચાયત તા.વઘઈ, જિ.ડાંગ Seal of Grampanchayat Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	10-5-2021 Date of Survey

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

4

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

This questionnaire should be filled for each of the villages in the selected Gram Panchayat

I. Basic Information

a. Village: Chikar

b. Ward Number: _____

c. Gram Panchayat: chikar Gram panchayat

d. Block: waghai

e. District: Dang

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 314 Total Population 1,530 Male 795 Female 735

SC HHs 0 ST HHs 1,514 OBC HHs - Other HHs -

II. Access to Infrastructure/Amenities etc.

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
a.	Nearest Primary School	Y	
b.	Nearest Middle School	Y	
c.	Nearest Secondary School	N	waghai (10 km)
d.	Kisan Seva Kendra	N	waghai (10km)
e.	Milk Cooperative /Collection Centre	N	Ahwa (8 km)
g.	Health Sub Centre	N Y	waghai
h.	Bank	N	waghai (10 km)
i.	ATM	N	waghai (10km)
j.	Bus Stop	Y	
k.	Railway Station	N	waghai (10km)

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

1

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
l	Library	N	10km-Waghai
m	Common Service Centre	N	22km-Vansda
n	Veterinary Care Centre	N	22km-Vansda

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: 2 (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: 2 (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: 2

vi. Sports Facilities in the Village

a. Number of Play Grounds in the Village (minimum size 200 square meters):
b. Mini Stadium : NO Yes(Y) /No (N)

vii. Education, ICDS

a. Number of Anganwadi Centres: 7

c. Schools (Number)

Primary Private: – Primary Govt.: 7
Middle Private: – Middle Govt.: 7
Secondary Private: – Secondary Govt.: –
Higher Secondary Private: – Higher Secondary Govt: –

2

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in Acres		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	–	d.	Pasture / Grazing Land	–	g.	Check Dam	-
b.	Irrigated Land	–	e.	Forests/ Plnatations	–	h.	Wells/Bore Wells	24
c.	Un-irrigated Land	–	f.	Other Common Land	–	I	Tanks /Ponds	2

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	250
2	Number of active Job Card holders who have completed 100 days of work	200
3	Number of shops selling alcohol	30
4	Number of BPL families	280
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'

Chaudhari Pravinbhai Gaikaoad Sanjaybhai Bagul Vasantbhai	Dhana Bhoye	સરપંચશ્રી Seal of Grampanchayat ધૂપ ગ્રામ પંચાયત તા.વઘઈ, જિ.ડાંગ.	12-05-2021
Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

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

As a part of Vishwakarma Yojana

1 message

PRAVINCHAUDHARI<chaudharipravin948@gmail.com> Fri,Jun25,2021at10:02AM
To:collector-dan@gujarat.gov.in

We are the students of Sri Satsangi Saketdham Ramahsram group of institution vadasma affiliated to Gujarat TechnologicalUniversity-GTU.GTUhasbeenassignedVishwakarmaYojanaVYPhaseVIIIunderwhichstudentssurvey variousvillagesanddesignveriousamenitiestodelivertothevillagersmakingthemanidealplaceforlivingasper requirements and villages problem statement.

AsapartofVishwakarmaYojana'sguidelines,wehavebeenaskedtoallrespectedaboutourprojectinwichwewillnotify about'Waghaivillage'profileofissuesfordevelopmentandourdesignworkforthemwichisattachedintheformof report below.

Chapter 21
Comprehensive report for the entire village

COMPREHENSIVE REPORT
ON
VISHWAKARMA YOJNA: PHASE VIII
AN APPROACH TOWARDS RURBANISATION
WaghaiVillage
Dang District

Prepared by

STUDENT NAME	BRANCH NAME	ENROLLMENT
CHAUDHARI PRAVINBHAI RAMANBHAI	CIVIL	170910106010
GAIKAWAD SANJAYBHAI CHIMANBHAI	CIVIL	180913106021
BAGUL VASANBHAI NARAYANBHAI	ELECTRICAL	170910109001

COLLEGE NAME:

SRISATSANGI SAKETDHAM RAM ASHRAM GROUP OF INSTITUTION VADASMA

NODAL OFFICERS NAME
Prof. D.V. GAJJAR
Prof. A.G ACHARYA

COLLEGE LOGO

Year: 2020-21
Gujarat Technological University
Chandkheda, Ahmedabad – 382424 Gujarat

INTRODUCTION

Vishwakarma Yojana scheme is one of the approaches to mitigate the migration from rural areas and to overcome the urban city pressure by developing a rural soul with urban amenities provision in rural areas itself. This scheme would provide 'Design to Delivery' solution for development of villages in 'Rurban' areas. This initiative of Government of Gujarat was allotted as a pilot project to Gujarat Technological University. In this Project firstly we have visited and surveyed our allocated village Waghai. Then we have surveyed our ideal and smart villages Unai. That visits helped us to know the type of infrastructure needed in allocated village Waghai. With the help of Techno economic survey , Village Gap Analysis and also studying the existing situations in ideal and smart village, we were able to broadly define the requirements of development for people of Waghai village and also understood the smart technologies and concepts as smart development of village. In the Waghai village, the basic requirements like community hall, any recreational area, public healthcare, bank, etc. are not existing. By implanting given design proposals, all the missing amenities can be provided which will stop the migration of rural people towards the urban area.

NEED OF STUDEY

The Vishwakarma Yojana Scheme aims at developing the village by providing all the urban facilities that a city may have, yet maintaining the Rural soul. This can be achieved by considering various aspects such as Physical, Social, and Renewable infrastructural facilities. The concept of Rurbanization at regeneration and revitalization of both the physical as well as social environment in villages through a judicious and economic consumption of resources is the thought for betterment of the villages. Find out the village data and survey of the whole village and improving the growth of village. The development should be Gram panchayat, Hospital, Primary school, Water tank, Anganwadi, Road & Transportation, Recreational areas, etc. The government schemes are being operated and run for rural development in rural areas of the country. The survey studies are taken up on trial basis to access the impact of important schemes as a whole in rural area development in some selected villages like this Vishwakarma Yojana.

OBJECTIVES OF STUDY

This village development scheme has been proposed to provide the benefits of real world experience to engineering students of Gujarat Technological University and simultaneously apply their technical knowledge practically in the development of infrastructure in rural development. With this Project students can improve their communication by communicating to various stake holders in the village and also with the higher authorities of this project. The important objectives of this study are to provide infrastructures for better connectivity, civic and different infrastructures. A. Physical Infrastructure Facilities :- Water, Drainage, Road, Electricity, Solid waste management, Strom water network, Telecommunication & Other B. Social Infrastructure Facilities :- Education, Health, Community hall, Library, Recreational facilities & Other C. Renewable Energy :- Rain water harvesting, Biogas plant, Solar street lights & Other These infrastructure facilities should be implanted for the sustainable development of any rural area or village in the country

SPECIAL FEATURES OF VY PHASE VIII

HIGHLIGHTS

GTU VY section had already planned the work action plan for both part 1 and 2. The new format has been given to students in advance to enhance the knowledge and criteria.

- Orientation programs to understand the aim, objectives and scope of the Vishwakarma Yojana have been organized at GTU.
- In phase V students have directed to study and observe the ideal village than the vy section had allotted the different villages to team.
- Techno economic and smart village forms had been filled by the students for the data collection and the GAP analysis.
- In part-II, SAGY form is introduced to students for the planning the suitable proposed design in priorities.
- In part 1 & 2 students has to provide the following designs after data collections:
  A. Sustainable design (Civil)
  B. Physical design (Civil)
  C. Social design (Civil)
  D. Socio-Cultural design (Civil)
  E. Smart Village Design (Civil)
  F. Heritage Village Design (Civil)
  G. Smart Village Design (Electrical Design 1)
  H. Smart Village Design (Electrical Design 2)
  I. Smart Village Design (Electrical Design 3)

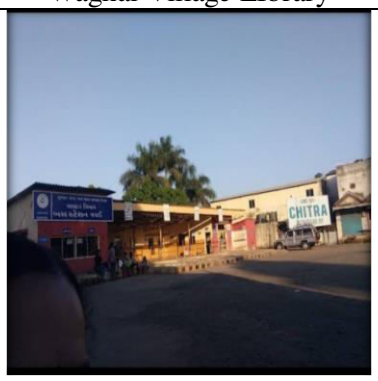
CONCLUSION

We have visited the allocated village unai and that visit helped us to know about the type of infrastructure needed by the village. With help of techno-economic survey and gap analysis and also studying / surveying our allocated village Waghai , we were able to broadly define requirements of development for people of Waghai village. Then we have visited the smart village PUNSARI and by that visit we better understood the smart technologies and concepts as smart development of our allocatedvillageWaghai.

In the Waghai village, the basic requirements like community hall, any recreational area, bank, etc. were not existing. By implanting given design proposals, all the missing amenities can be provided which will stop the migration of rural people towards the urban area which will in turn reduce pressure on cities.The amenities designed under this Vishwakarma project phase viii will be helpful for better development of the village as physically as well as socially, which improves the overall lifestyle of people along with nation with preserving nature bit by bit. This will help

in developing Smart villages in sustainable manner, reduce migration from villages and prevent the cities from the urban pressure. This should lead to some rethinking about the meaning of efficiency beyond the usual conceptions of economic or technical efficiency. Indeed, employment expansion is at least as important as growth in productivity. In a sense, both represent the utilization of labor as a resource. Why, then, does thinking about efficiency focus on one and neglect the other It is important to reflect on this question. The answer, which calls for change in both economics and politics, could make area difference.

❖ Summary Of Photographs Of Kamrol – Allocated Village

		
DGVCL Office	Hospitals In Waghai Village	Waghai Taluka Panchayat
		
Water Supply System	Waghai Main Road	Waghai Village LIbrary
		
Waghai Post Office	Waghai Railway station	Waghai Bus Station

Feedback from Nodal Officer:

The Government of Gujarat has launched "Vishwakarma Yojana" (a scheme) with motto of Rurbanization for the undeveloped villages. Keeping the rural soul with urban facility is the main objective of this Yojana. As we had worked for the phase IV, V, VI and VII with this project, we feel very proud and this project is very much helpful to the final year engineering students. The definition of Civil Engineering is satisfied with this project. In Project students get the experience in communication skill, technical aspects and find the problems to the villagers.

The frequently arranged technical workshop by the GTU help the student to expose their knowledge and ideas. It is a great platform for the students to interact, learn and solving the problems.

We really thankful to whole GTU Vishwakarma Yojana team for successful implementation of such a noteworthy project. We wish to express our sincere thanks to our HOD, Principal & Staff members for their continuous support.

Thank You.

Prof. A.G. ACHARYA
Prof. D.V. GAJJAR
Nodal Officer, VY
SRI College Vadasma