7 INFRASTRUCTURE & PUBLIC UTILITIES

Infrastructure is the key determinant to the community which decide the functions towards their socio-economic development of the city. Facilision of sustainable development the physical and social infrastructure are very much essential. Physical and social Infrastructure is the basic requirement which decides the quality of urban and rural life & overall productivity of the people. This chapter deals with the analysis of existing conditions of physical infrastructure such as Water Supply, Sewerage System, Solid Waste Management and Power as well as social infrastructure viz., Health and Educational facilities. Based on the analysis and clear understanding of existing scenario, future predicted the physical and social infrastructure for the projected year 2045.

In the formulation of infrastructure plan, attention was given to the followings. Emergency task is to directly respond to the basic needs of physical and social infrastructure both for the present communities and new settlement of the returnees.

Needs survey at the community level is a fundamental study for preparation of urgent rehabilitation and development programs for basic physical and social infrastructure. The plan is to be prepared as practicable and flexible one by staging the needs and level of services of basic infrastructure. Institutional strengthening and capacity building will be carried out through actual planning and construction of the basic infrastructure, at the Community, State Government and GOSS levels.

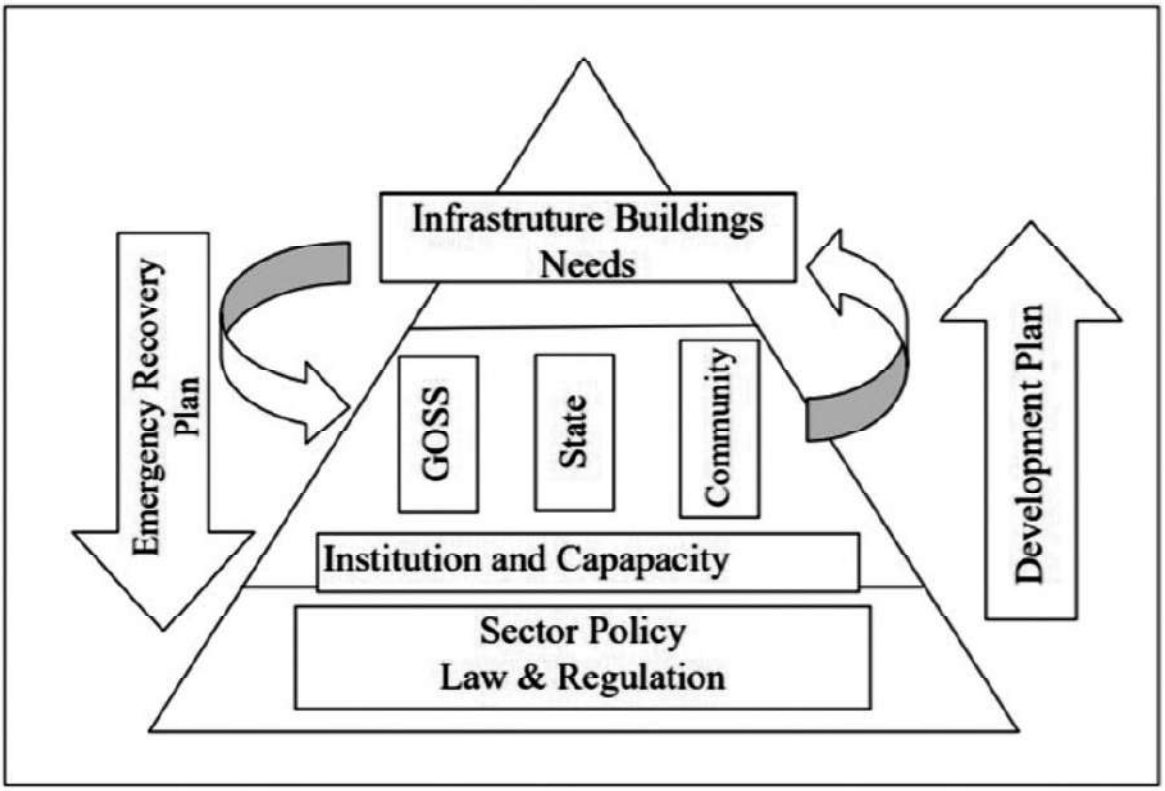


Figure 137 Conceptual Constitution for Infrastructure Plan

7.1 PHYSICAL INFRASTRUCTURE

Infrastructure is the basic physical structures needed for the operation of a society for an economy to function and physical networks that support society.Socio- economic growth of a town/city and the physical Infrastructure development in the town.Urban physical infrastructure (UPI) is one of the major assets of a city in terms of capital investment, critical services provisioning, and sustainable and resilient urban development. UPI includes physical objects like roads, sewerage, energy networks. Various data regarding details about amount of water supply, Hours of Supply, number of bore wells, details of sewerage system viz. capacity of STPs and details of drainage etc. have been procured from Public Health Division of PWD, Nagaon.

Nagaon Master Plan Area has the population of **2,98,680 (**Census, 2011) and the population is projected to increase up to **4,64,221** for the horizon year 2045. Therefore, in order to meet the future demand, calculation of the same for various sectors is necessary and the same is dealt with in this chapter.

7.1.1 WATER SUPPLY

Urban water supply infrastructure has often been designed with a focus on treatment and distribution and with only minimal consideration of source water characteristics. Sustainable urban water supply systems must link more closely with the natural water systems in which they are located. one of the important and essential resource of Water for the development any Region, saunter supply of the suffice the domestic, industrial and irrigation requirements within the planning area. Presently the planning area is influential on both part of ground and surface water sources to address the water requirements of the area. Due to the non-contiguous geomorphic nature of the planning area and for better management water supply within the planning area is divided into two parts, urban area and rural area.

7.1.1.1 Existing Water Supply Project under Execution

Water supply is one of the important infrastructure services for a city/town and a proper supply of water for its population ensures the city have strong basic infrastructure. The map showing the boundary of the area covered by PHED for water supply is given in the figure 138. Total water supplied quantities is 40.55 MLD and the main source of the water supply is Ground water.

Table 161 Data of Water supply project urnder excution by AMRUT

Sl.No.	Parameters	Details		
1	Location	Laokhowa Road	Fauzdaripatty	Meturpatty, R.K Road
2	Type of Reservoir	ESR (Elevated Service Reservoir)		
3	Water sources	Borewells		
4	Capacity of the ESR	1230558 L	1000743 L	1824328 L
5	Capacity of the Clear Water Sump	153654 L	124460 L	221280 L
6	Quantity of water supplied	40.55 MLD		
7	Sources of water supply	Ground water		
8	Dimension of Clear Water Sump	126 cu/m	126 cu/m	243 cu/m
9	Location of intake point	i) Madhav Dev Road ii) Inside Campus	i)Kadamtal ii) Inside Campus	i) R.K Road ii) Inside Campus
10	No of Raw Water Pump	2 Nos	2 Nos	2 Nos
11	Bore Well Depth (RWPM)	400 ft.	400 ft.	400 ft.
12	Discharge Flow (Raw Water Pump)	250 L/M	250 L/M	250 L/M
13	Discharge (Clear Water Pump)	228 cubic metre/ Hr	228 cubic metre/ Hr	228 cubic metre/ Hr
14	Outlet from the ESR	2 nos Delivery Line (14 inch & 12 inch of Cl pipe) 1 no Backwash Line (10inch Cl pipe) 1 no overflow line	1 nos Delivery Line (12 inch of Cl pipe) 1 no Backwash Line (12inch Cl pipe) 1 no overflow line	2 nos Delivery Line (14 inch & 12 inch of Cl pipe) 1 no Backwash Line (10inch Cl pipe) 1 no overflow line
15	Water level below ground level	10 feet	15 feet	15 feet
16	Clear Water Pump	6 Times Daily (45 Minute each)	6 Times Daily (45 Minute each)	6 Times Daily (45 Minute each)
17	Length of network in all 3 zones	113 KM.		

(Source: Water Supply project, AMRUT)

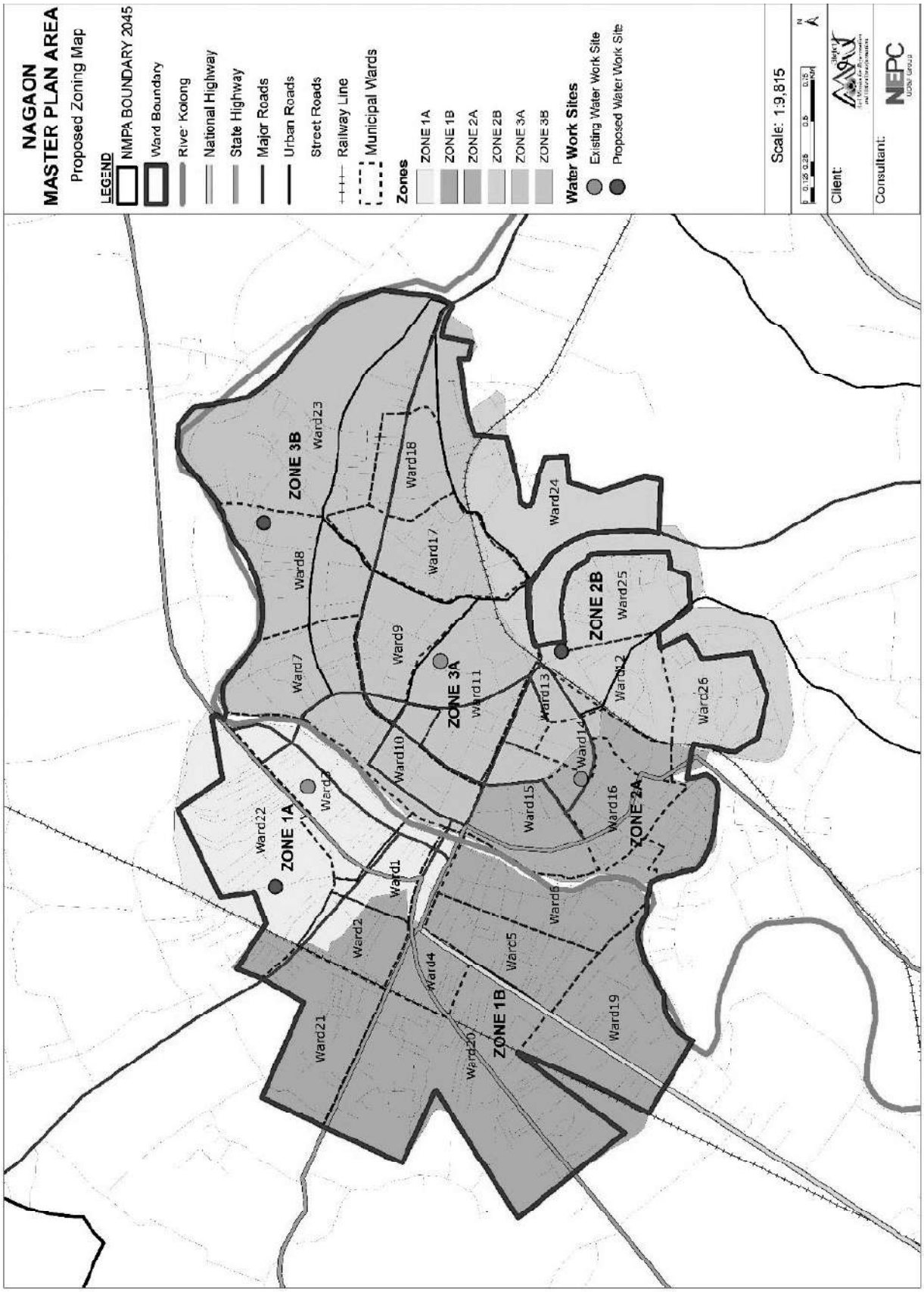


Figure 138 Water Supply Zones and Location of ESR in Urban Areas of Nagaon Region

7.1.1.2 Calculation of Future Demand Projections

In order to calculate the demand for a projected year, it has to be calculated for certain stages as per CPHEEO Manual. The four stages are mentioned below:

1. Intermediate Stage (10 years from the base year) - 2031
2. Ultimate stage demand (25 years from the base year) - 2045

The water supply demand should include the fire demand, institutional demand etc. as per the CPHEEO guideline. In order to calculate the demand, it is essential to calculate the projected population for the defined stages. The domestic water supply demand is taken as 135 lpcd. The Projected population corsidered for this project is as under As it is seen from the below table, the total demand for 2021 is 55.52 MLD and for final stage is 85.28 MLD. Currently, total water being supplied to Nagaon is 40.55 MLD. The total deficit for base year is 7.51 MLD and for the final stage it is 44.73 MLD.

- To meet the future demand, following proposals have been made under this project:
- 3 numbers of RO plants will be installed.
- Approx 12 number of new tube wells will be constructed
- New collection wells need be constructed

Sl. No	Particular	Popu lation	Amount of Water supply (LPCD)	Total demand in MLD	Popul ation	Amount of Water supply (LPCD)	Total demand in MLD	Popul ation	Amount ofWater supply (LPCD)	Total demand in MLD	Popul ation	Amount of Water supply (LPCD)	Total demand in MLD
	Year	2011			2021			2031			2045		
1	Demand for existing population	298680	135	40.32	346140	135	46.72	392696	135	53.01	464221	135	62.66
2	Fire Demand 100*((population)/1000^1/2)/1000			1.7			1.8			1.9			2.1
3	Unaccounted Water (15%)			6.04			7			7.95			9.4
4	**Total Demand**			**48.06**			**55.52**			**62.86**			**74.16**

Table 162 Water Demand assessment for Water Supply Source & Rehabilitation System

7.1.1.3 Summary of Water Demand

Table 163 Summary of Water Demand for 2045

Sr. No.	Particulars	Water Demand for 2045
1	Total Projected Population for MPA	464221
2	Water Demand @ 135 lpcd for planning area in 2045	62.66
3	Fire Demand Unaccounted Water	(2.1+9.4) = 11.5
4	Total Water Demand	74.16 MLD
5	**Total Water Demand (including Water loss @ 15% of water demand)**	**85.28 MLD**
6	WTP Capacity	85.28
7	Storage – GLSR @ 67% of WTP	57.14
8	Storage – ESR @ 33% of WTP	28.14

The Water Demand of entire planning area for 2045 will be around 85.28 MLD including fire demand and 15% of water losses during water supply. In absence of water treatment plan in planning area, there is an urgent need of Water Treatment Plant. Additional GLSR & OHT storage requirement is to be provided considering the future requirements of year 2045 respectively 57.14 and 28.14. The capacity of OHT and GLSR are worked out based on the thumb rules set for calculating storage capacity.

7.1.1.4 Proposed Strategies

There is an additional requirement of 44.73 MLD (existing supply 40.55 MLD) water to meet the drinking water demand of Nagaon Planning Area by horizon year 2045. As ground water potential of the area appears reasonably enough to support the drinking water needs, the present trend of relying solely on it may continue. But, apart from providing individual tube wells, a system of collector wells (cluster of tube wells) with an arrangement for treating the raw ground water is recommended for safe drinking water. Majority of the drinking water demand can be met using the surface/sub-surface flow of River Kolong as a source of supply through collector wells/intake wells.

Action Plan

- Planning, design and implementation of a sustainable water supply scheme mainly based on surface/sub-surface/intake wells water supply from the river Kalong and ground water
- Covering the entire planning area with a continuous water supply system assuring 24 hr supply with adequate pressure in the distribution system even at the tail ends
- Controlled use and management of ground water assuring treatment with disinfectants before distribution
- Public awareness against misuse of water
- Adequate reforms so as to balance the O&M cost with the revenue out of the water supply distribution

For areas outside conurbation, respective Commune Panchayats will have to arrange for the water supply without hampering the environment.

Rainwater Harvesting

Rain water harvesting must be made mandatory in newly developed houses to increase ground water potentials.

Desilting of Tanks

The water tanks located outside conurbation area are recommended to undergo desilting process. This will increase the capacity of the tanks and ultimately lead to better ground water recharge.

Ground Water Recharging

As agricultural land is being converted to urban use, identifying sites for additionalgroundwater recharge is essential to keep water supplies balanced. The existing village tanks which are normally silted and damaged can be modified to serve as recharge structure. The village tanks can be converted into recharge

structure. Several such tanks are available which can be modified for enhancing ground water. Construction of Percolation well is also an option for ground water recharge.

Recycling of Grey Water

Recycling of Grey Water is proposed for Car wash, landscaping, industrial cooling, flushing etc. Recycling of Grey Water should be promoted.

7.1.2 SEWERAGE SYSTEM

As at present, Nagaon does not have an integrated planned sewerage management system, and majority houses in the city have septic tanks, of which many are not maintained well; hence, overflowing and dysfunctional. In fact, many septic tanks are now non-functional because of the high water table, and as a result, much of the untreated wastewater directly flows into the storm water drains or into the natural drainage channels. It is a high time that the authority plan and implement proper public wastewater collection and disposal system to ensure that sewage or excreta and sludge discharged from communities is properly collected, transported, treated to the required degree and finally disposed off without causing any health or environmental problems.

As per the survey done, present wastewater generation by Nagaon town is approximately 16037.6 KLD but there is no STP provision done for sewerage generated by town.

Table 164 Sewerage Generation Calculation

Sr. no.	Area	Population	Water consumption (KLD)	Sewage generation (KLD)	No. of STPs proposed	Existing Treatment capacity (KLD)	Gaps in KLD
1	Nagaon	1,48,496	20046.9	16037.6	01	Nil	160

(Source: Action plan for Kolong river, PCB, Assam)

7.1.2.1 Estimation of Wastewater Generation

The total water requirement for the Master Plan Area is 85.28 MLD (by the year 2045). As per CHPEEO guideline, 80% of total water demand is considered as the sewerage flow; therefore, around 68 MLD water is expected to go in sewerage lines. As time passes, the area is expected to grow and along with high water demand, there will be larger wastewater discharge; hence, the project area required systematic sewerage system so the wastewater will not be discharged in the natural drains, which will help in reducing the flood problem.

There should be underground sewerage connection to each households and from where the discharged wastewater should go to sewerage treatment plant before discharging it into the natural drains. While planning for the proposed sewerage system, consideration should be given to the natural drainage pattern. The sewerage system should be planned in such a way that there will be minimum pumping involved in collection and conveyance of sewage. New Sewerage Treatment Plant (STP) sites should be identified depending on considerations such as the quantum of environmentally suitable land, and availability of government land, capital and O&M cost of different options. While the underground sewerage is been planned and implement, the authority needs to make sure that each household in the region has a septic tank installed and is being managed and is fully functioned. Water from commercial and industrial activities wastewater is being treated before discharging in the river.

7.1.2.2 Issues

- **Absence of sewerage system:** there is absolute absence of sewerage system in Nagaon planning area resulting in discharge of un-treated waste water in drains and river Salandi.
- **Mixing of storm water and sewage:** In absence of sewerage and improper drainage system, in many parts of planning area, there is discharge of sewage into storm water drains and other water bodies.
- **Maintenance of Septic Tank:** As per the present practice, the septic tanks are the only mode of disposal of sewage in Nagaon planning area, which are not frequently cleaned by the Nagaon Municipal Board.

- **Open Defecation:** Open defecation in slums and rural areas can be seen throughout the planning area and no efforts are taken till date.
- **Degradation of natural water bodies:** The disposal of waste water into river Kolong and in other water bodies resulting degradation and contamination of water and land.

7.1.2.3 Proposed Strategies

In a modern society, proper management of wastewater is a necessity, not an option. A wide range of communicable diseases can be spread through elements of the environment by human and animal waste products, if not disposed properly. The development of effective water and wastewater treatment methods has virtually eliminated major water borne epidemics in developed countries.

Developing countries like ours, where treated water is not available to a majority of the population, still experience epidemics like cholera and typhoid. It is also to be mentioned that as per the report of the Planning Commission for the Tenth Five Year Plan, which emphasizes that all cities, towns and industrial areas should compulsorily have sewage treatment plants and are to be implemented in a time bound manner. Advanced waste water treatment process is currently being so developed that it will produce palatable water from domestic wastewater.

Recommendations

- For treatment of waste water generated from the planning area, a decentralized wastewater treatment system would be more appropriate. The centralized sewage treatment system appears inappropriate as it may end up with very huge sizes of sewers and various issues of conveyance in handling this huge quantity of wastewater.
- The treatment plants and sewers are to be so aligned as to reduce the number of crossings with railway tracks and National Highways of the area. The proximities of natural drains for treated effluent disposal, minimum obstructions for laying sewers, and the possibilities of acquiring land for sewage treatment plants (STPs) turns important in orienting and locating the plants.
- The possibilities of re-use of treated wastewater effluent for irrigation, gardening etc. should be looked into.
- The construction of treatment plants could be carried out in a phased manner on a modular/zonal basis in the planning area consistent with the future development/demand.

7.1.3 STORM WATER DRAINAGE SYSTEM

The Assam Urban Infrastructure Investment Program is a key urban infrastructure initiative of the Government of Assam. The investment program aims to provide improved access to water supply, sanitation, and urban infrastructure facilities to the urban population in Nagaon. The project uses a multi tranche financing facility (MFF) modality and, requires the preparation of a Resettlement Framework and Resettlement Plan for all subprojects under the Program. The major outputs of this program include improved drainage in Nagaon to reduce economic losses due to flooding, and comprehensive SWM. The Plan states infrastructure bottlenecks and lack of long-term funds for infrastructure investment, is one of the main constraints for growth.

With the rapid urbanization as well as the expansion of the area Nagaon city, the existing drainage facilities are not sufficient to the needs of the demand of the people. Brick or earthen drains are found here and there without proper linkage which could not carry the excess run-off to the outlet, resulting in water logging at different areas of the city. At present the total length of the existing drainage in the city is 1196 km out of which 20% of the drains are lined and 80% of the drains are earthen. About 85% drains are maintained by NMB and 15% drains are maintained by APWD.

Presently a drainage project report has been prepared by Nagaon Municipality Board for improvement of 49 km. of drain at different areas of Nagaon city amounting to total project cost of Rs. 34.01 crores for NLCPR funding under Ministry of DoNER and it is submitted to the, Govt. of India for approval.

The benefits would be improved environmental and

living conditions and public health in Nagaon. In addition, the economic benefits considered due to the proposed project are: (i) reduction of household healthcare cost due to flooding and water logging problems; (ii) reductionin person-days lost due to water logging and flooding; (iii) reduction in temporary resettlement costdue to flooding; (iv) reduction in annual cost of protection measures from flooding; (v) reduction inannual agricultural loss; and (vi) reduction in road maintenance cost.

Table 165 Length of open and covered drains

Sr. No.	Drains	Length of Drain (kilo metre)	Percentage
1	Covered Drains	40	20
2	Open Surface	156	80
	Total Length	196 km	100

7.1.2.1 Issues and Requirement

Open Channel Area:

- Closed channel water drainages are observed on many streets within municipal board where some streets are under progress.
- Unhygienic condition due to open channel leads to spread of diseases.
- It also leads to high health risk due to illegal discharge of wastewaters and solid waste.
- Another issue includes foul odour source establishment and becomes a breeding ground for insects and pests.
- Regular cleaning service is not done to remove solids from the open channel area which increases the chances of blockages which can cause spill-over and flooding.
- Open channel areas are differentiated into 3 parts and the locations are mentioned below:

The locations of open drainages are marked with major width along roadside

- Closed water drainages are observed on many streets within NMB, whereas some streets still need attention.
- Here marked green are the locations of open drainages with major width along roadside
- **Hinders accessibility** on road.
- **Unhygienic condition** due to open channel leads to **spread of dieses.**

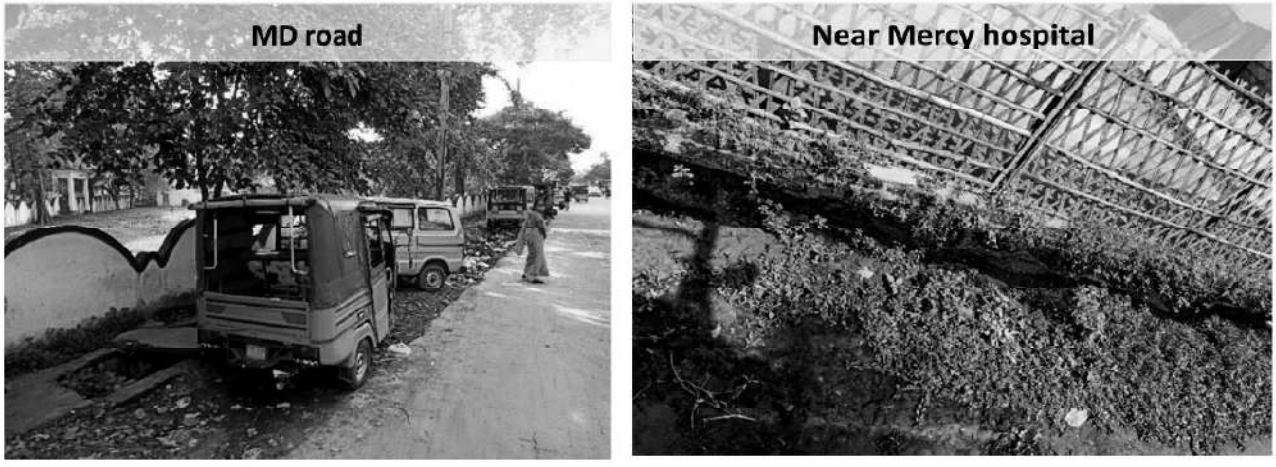


Figure 139 Showing MD road and Near Mecry hospital

Flood Prone Areas:

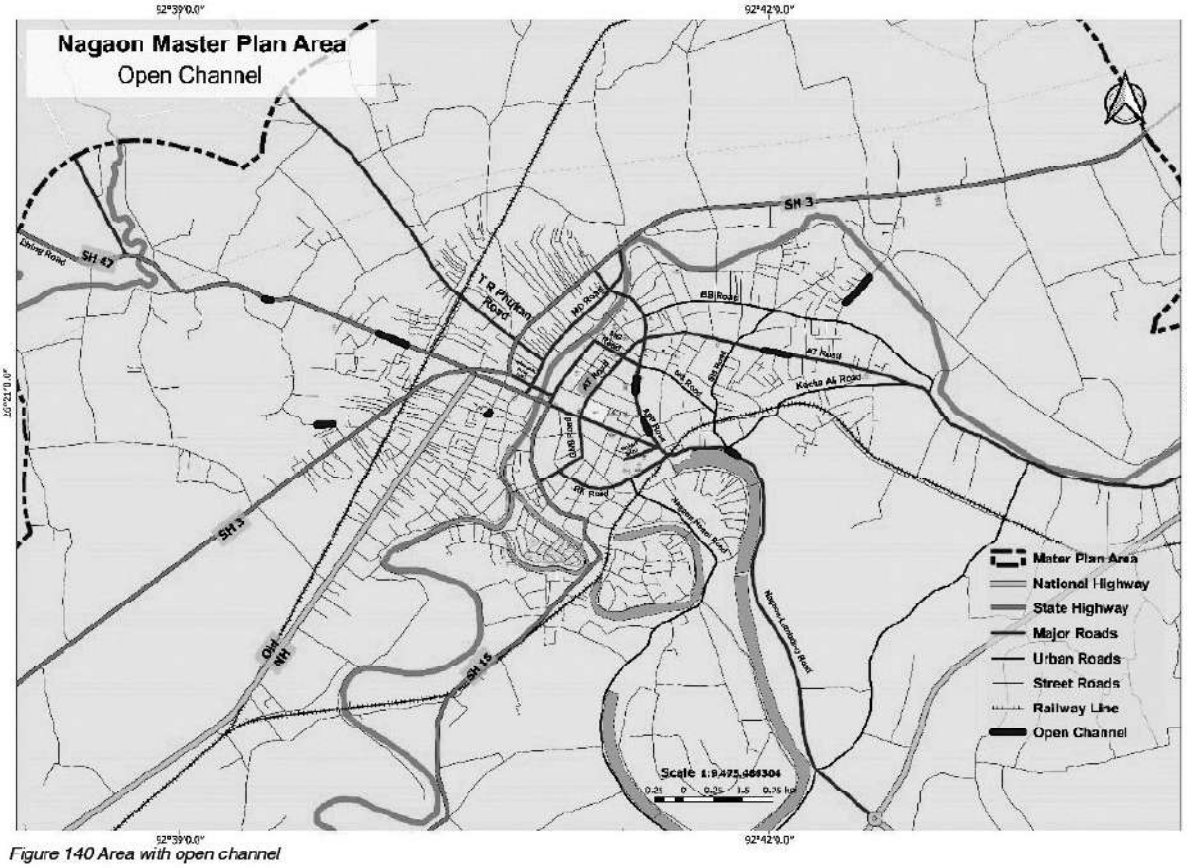


Figure 140 Area with open channel

- Many low-lying areas are found under water logging within the city area.
- Due to absence of storm water drain, the rainwater and the flash water, in monsoon, are unable to flow down stream and due to this the area becomes prone to water logging.
- At many places, the accessibility on pavement hinders due to presence of water logging end hence sometimes become a reason for traffic congestion.
- The major flood prone areas include the portion of AT road and Dhing gate. Due to absence of storm water drain the rainwater and in monsoon the **flash flood water unable to flow down stream and due to this becomes prone to waterlogged area.**

7.1.2.3 Proposed Strategies

A separate storm water drainage network has been proposed in the development area for the collection and safe disposal of storm water during rainfall. The design criteria to be followed for design of Storm Water Drainage network are broadly based on the recommendations as laid down in the CPHEEO Manual of Sewerage and Sewage Treatment, Ministry of Urban Development, Government of India and as per provisions laid down in the relevant I.S. Codes and Consultants' past experience in related field.

- Rectification of slope and width of drains shall be done, wherever required.
- Provision of new storm water drainage network as per phase wise requirements worked out considering key parameters of precipitation intensity, catchment delineation, percolation characteristics and surface runoff.

Recommendations

- The lack of proper sanitation and solid waste management, combined with indiscriminate dumping of solid waste in the drains reduces the carrying capacity of these natural drains. The implementation of a systematic solid waste and wastewater collection and treatment system is a necessary prerequisite for proper drainage of the area.
- The natural drains have been encroached upon and are almost in dilapidated state. Also, at many reaches the drain sidewalls are found to be damaged. The section of the drain is also irregular and less adequate at many locations. Proper gradient is not maintained at several stretches on its reach and the hydraulic parameters are also not uniform. Also, no definite drain section is maintained in many reaches. So, proper maintenance and management of the existing natural drains turns important. This necessitates a proper evaluation of the existing natural drainage system.
- Over the years the River Kolong has progressively silted up due to which the flood water flows at ever higher levels than the water levels in this main drain.
- The natural depressions and ponds, which were instrumental in preventing excess storm run-off, are getting filled up at a rapid rate due to urbanization. This may further aggravate the existing problem of water logging. It is necessary that 'natural sinks' be retained as such as, they are instrumental in controlling the water logging of the area.
- An organized drainage system is invariably associated with the implementation of a systematic solid waste and wastewater collection and treatment system.
- Periodic de-silting of the existing storm water drains should be done.
- Perimeter protection of all the major drains should be checked before every rainy season.
- Overall, the preparation and implementation of a master drainage plan appears essential for Nagaon planning area.
- All roads of the town/city should have side-drains, which will serve as minor or tertiary drains.
- Existing drains which can be used as storm water drains, need to be upgraded based on engineering aspects & runoff calculation.
- A plan for the drainage of some of these areas has been prepared. The implementation of a master drainage plan for these areas appears very essential.

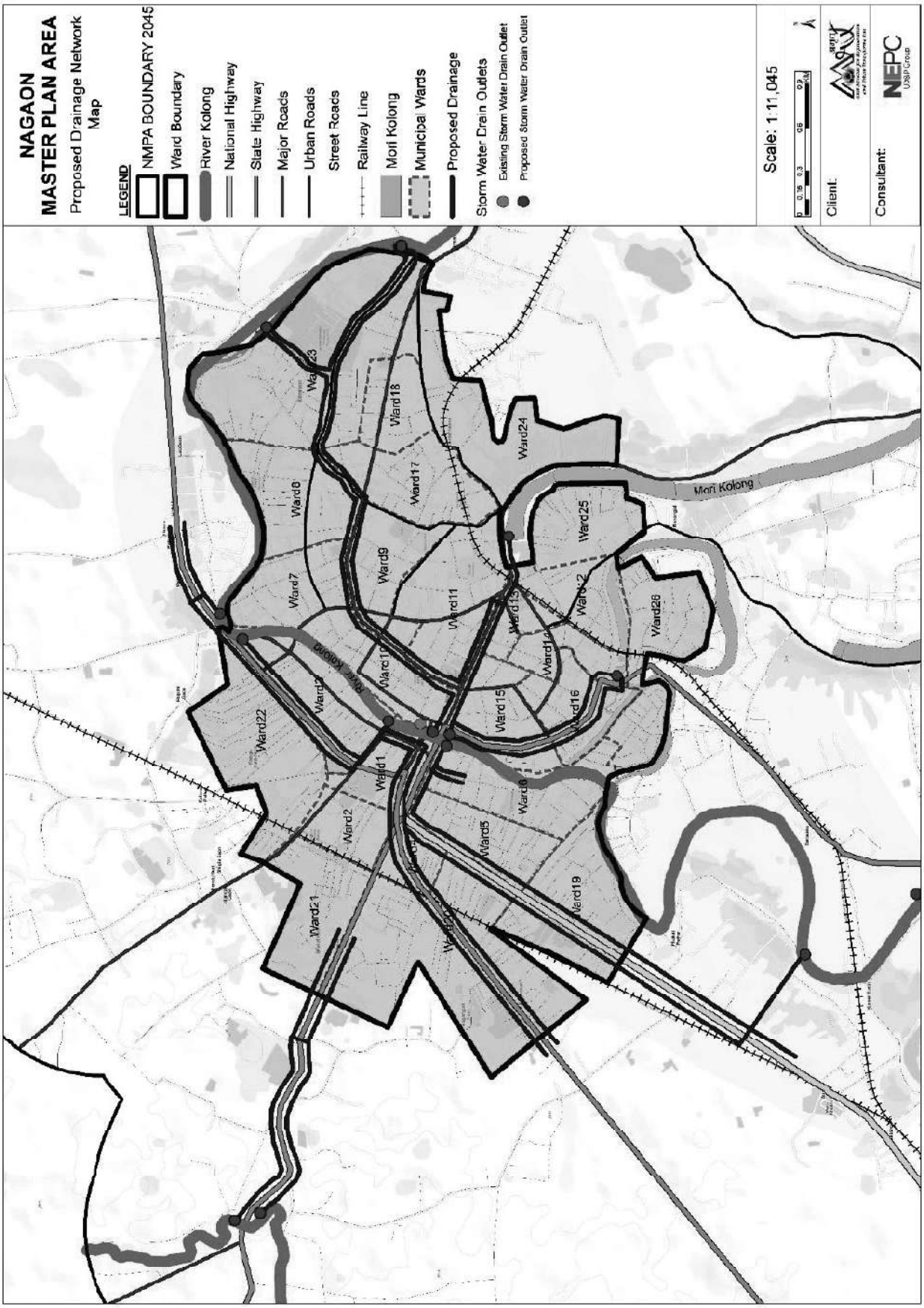


Figure 141 Proposed Storm Water Drainage lines and locations of Outlets

7.1.4 SOLID WASTE MANAGEMENT

At present, Solid waste management is one of the major challenges the Nagaon city is facing. The city has a formal garbage collection, and disposal system, which is insufficient to cater the total garbage generation in area and as a result it is affecting the living environment in the city.

7.1.4.1 Solid Waste Management in Urban Area

Presently, the solid waste generation in NMB area is 58.27 MT/Day whereas collection is 43.7 MT/Day as per Municipal Board record. Out of total collected waste, 20.27 MT found degradable and 23.43 MT as Biodegradable. No. of household covered in door-to-door waste collection are 11395 as per Municipal Board record. Vehicle deployed in Solid waste collection system are 13 Trippers, 52 Tricycles, 18 Hand cart, 4 Skid loader, 1 Excavator, 1 Focklane and 1 Compactor. Manpower deployed to run entire system are 2 Sanitary Supervisors, 98 Sweepers and 68 conservancy MR worker.

Citizens have habit of throwing garbage on streets, into the open drains, in the backyards, and in the open spaces. This section proposes explains the foreseen solid waste generation and the management for the same in the project area.

7.1.4.2 Quantity of Waste Generated

The quantity of MSW generated depends on numerous factors such as population, food habits, standard of living, degree of commercial activities and seasons. The increasing urbanization and changing lifestyles have increased the waste generation rate of Indian cities.

Criteria for assessing waste generation

- Projected populations for the design period
- Existing per-capita waste
- Annual rate of increase of per capita waste generation

7.1.4.3 Solid Waste Demand Projection

Based on the CPHEEO standards, following assumption were considered while estimating the volume of the solid waste and required area for the landfill site for the proposed urban population for the horizon year 2045:

- It is assumed, that MSW will be collected by responsible authorities at regular basis
- Characteristic of the collected MSW in the region will be the in consistent with the characteristics mentioned in CPHEEO manual.
- Per Capita Solid Waste Generation-270 Grams per Capita per Day

Table 166 Future assessment of Solid waste Generation

Sr. No.	Particulars	Demand for 2045
1	Projected Population	464221
2	Solid Waste Generation(in Conurbation area @270 gms/cap/day)	**125 MT**

7.1.4.4 Issues in Present System

Lack of Disposal Site

Presently, there is no engineered landfill, and Municipal Solid Waste is dumped in open area, which can lead to ground water and soil pollution, vector naissance etc.

Lack of Primary Collection System

Solid waste is discharged by establishment into open plots, open drains etc. these un-organized disposal methods have resulted in the accumulation of solid waste on roadsides, vacant plots, and storm water drains. This has resulted in a number of hygiene related problems such as breeding of flies/ mosquitoes and stray animals.

Un-hygienically Solid Waste Transportation

Municipal Solid Waste is transported primarily in open vehicles i.e. trucks, tippers and cycle rickshaw. It is also observed that these modes of transportations are overloaded with MSW, resulting in the littering of roads during transportation. The loading and unloading of waste are carried out manually, and Safai Karamcharis

involved in these activities do not use any safety measures.

In-sufficient collection and disposal of construction waste

The construction and demolition waste generated by residents is transported in tractor trolleys and disposed at either secondary collection points or open/low-lying areas in the town vicinity.

Handling of MSW with Slaughter Waste

Waste from the slaughters houses is disposed in open dumping sites, although there are provisions for separately disposing slaughter house waste in Nagaon town / planning area.

Disposed of Bio-medical waste without any treatment

Presently, there is no treatment facility available for bio-medical waste in Nagaon and Medical waste is disposed off along with general MSW.

Lack of primary Collection points

Unattended waste lying in open areas is common phenomena in the entire town because of non-availability of required numbers of bins in the planning area.

Multiple Handling of Wastes

The waste is handled multiple times leading to potential health hazards for the workers as all types of wastes contains hospital waste, human waste etc are disposed in the same containers.

Lack of Awareness

There is absolute lack of awareness among people w.r.t. handling and management of waste.

7.1.4.5 Proposed Strategies

Decentralized solid waste treatment system:

The developmental pattern of all the areas, especially Nagaon, demands the implementation of an integrated solid waste treatment system. It is felt that only a decentralized MSW Management System could help solve the seemingly intricate problem of solid waste treatment in this area in an economically viable, socially desirable and environmentally sound manner.

Public Participation:

General environmental awareness and information on health risks due to improper solid waste management are important factors which need to be continuously communicated to all sectors of the population. Building awareness among public and community about the need for a better solid waste management system is as essential as management. Public awareness and attitudes to waste can affect the people's willingness to cooperate and participate in adequate waste management practices. If people keep on throwing waste on the streets indiscriminately, the local body alone cannot keep the city clean in spite of their best efforts .Thus, it is very important to make people understand that the treatment and management of solid waste is a collective responsibility of the local authority and the community. Municipalities or local governments through participatory programs should convey this message to the people.

Collection Enhancement facilities:

- Old dustbins are to be replaced with different types of covered dustbins, which reduces the time of pickup and improves the process of primary collection of wastes.
- Sweepers may be provided with handcarts and detachable containers and be allotted a fixed area or number of houses for door to door collection. They should also be provided with safety gears and proper uniforms.
- It can be made compulsory for the management of societies/complexes to keep covered bins in which waste is to be stored at acceptable locations, to be picked up by the municipal staff.
- The local body may collect waste from community bins by using container handcarts or tricycles whichever may be convenient, for transferring the wastes to the waste storage sites by employing municipality sweepers.
- The collection service can be provided on a full-cost recovery basis using contractor services on a dayto-day basis from individual houses.

- The collection service can be provided on a full-cost recovery basis using contractor services on a dayto-day basis from individual shops also. The service of rag pickers and part-time sweepers can also be used in agreement with the shop owners.
- Sweeping of all public roads, streets, and lanes, by-lanes where there is habitation or commercial activities on either side of the street should be done daily. A list of such streets and roads together with their length and width should be prepared. The local body, keeping in view the norms of work prescribed should work out a program for their daily cleaning. However, roads and streets where there is no habitation around and do not require daily cleaning may be put in a separate group.

Provision of Solid waste Storage:

One of the immediate measures to revamp the existing collection services structure would involve provision of covered community waste bins at proper distances for the people to deposit domestic waste. This is the first step that will ensure that people do not throw their garbage on the roads and hence do not create open dump sites. This will enable the sanitation workers to transfer waste to the transportation vehicle quickly and efficiently with minimum health risk which will also help to maintain the aesthetics of the surroundings. The Municipal solid waste (Management and Handling) Rules 2000 of the Government of India have prescribed the compliance criteria for waste storage depots as under:

- Storage facilities shall be created and established by taking into account quantities of waste generation in a given area and the population densities. A storage facility shall be so placed that it is accessible to users.
- Storage facilities to be set up by municipal authorities or any other agencies shall be so designed that waste stored are not exposed to open atmosphere and shall be aesthetically acceptable and userfriendly.
- Storage facilities or "bins" shall have "easy to operate" design for handling, transfer and transportation of waste. Bins for storage of biodegradable waste shall be painted green, those of recyclable waste shall

Table 167 Solid waste Generation Source

S.No.	Generation Source	Action Proposed
1	**Residential**	• Not to throw any waste in neighborhoods, on streets, open space, and vacant lands, in drains or water bodies. • Keep food waste / biodegradable waste in a non corrosive bin type – D1 • Keep hazardous waste separately • Keep dry/ recyclable waste in bin type – D2
2	**Multistoried buildings, commercial complexes, private societies**	• 1 to 4 as above. • Provide separate bin type – B large enough to hold wastes generated both biodegradable and recyclable. • Direct member of the association / society to deposits waste in bins provided. Sanitary inspectors should vigil the area and fineshould be imposed for not following the actions
3	**Slums**	• 1 to 4 as above. • Use bin type –C
4	**Shops, offices, Institutions**	• 1 to 4 as above. • Store the waste in bin type - D1, D2
5	**Hotels and restaurant**	• 1 to 4 as above • They should arrange their own bins and dispose waste in nearby municipal bins
6	**Vegetable, fruit markets, meat, fish markets, and street Vendors**	• Keep small baskets with them and transfer waste to large bin type-A. • Shop keepers not to dispose of the waste in front of their waste or shops or open space. • Deposit waste as and when generated into bin type-A. • Fines should be imposed for not following the action
7	**Marriage halls, Community halls, Kalyan Mondaps**	• 1 to 4 as above. • Provide a large bin type -B
8	**Garden Waste**	• Compost the waste in garden itself, if possible. • Store wastes in large bags or bins and transfers it to community bins.

Note: Bin Type A (volume 7 m3), Type B (0.75 m3), Type C (0.5 m3), Type D1 and Type D2 (12 liters)

be painted white and those of other wastes shall be painted black.

- Manual handling of waste shall be prohibited. If unavoidable due to constraints, manual handling shall be carried out under proper precaution with due care for safety of workers. So, the storage and handling of SW are extremely important, and hence the steps to be taken by the Municipal authorities for storage of solid wastes are detailed in table below:

Segregation:

These compositional characteristics of the solid waste underline the need for proper segregation before treatment. Proper segregation of waste into different components and their separate collection can definitely lead to remarkable changes in the entire system.

The segregation of the waste would be a long drawn exercise as it involves attitudinal changes in people and will have to be done with careful planning, in a phased manner. The general public is to be first sensitized towards the whole concept and educated about the need and advantages of doing the segregation. Segregation of waste at the source itself is extremely important as municipal solid waste, which is otherwise environmentally benign on getting mixed with hazardous waste like paints, dyes, batteries, and human excreta turns hazardous. The recyclables like paper and plastic etc. become unsuitable for recycling as these get soiled by the organic matter.

Although, it would be more fruitful to sort and place different kinds of recyclables in separate receptacles, the waste could be segregated into at least two categories of biodegradable and non-biodegradable initially. The recyclables obtained through segregation could be straightway transported to recycling units which in turn would pay certain amount to the corporations, thereby adding to their income. This would help in formalizing the existing informal set up of recycling units, and this formalization in turn could lead to multi-advantages. The biodegradable matter could be disposed off either by aerobic composting, anaerobic digestion or sanitary land filling. Depending upon land availability and financial resources, either of these disposal methods could be adopted. Though simple land filling is the traditionally practiced system of solid waste management in the planning area, aerobic composting by wind-row method will be an appropriate option. All the nonbiodegradable waste which is non-recyclable, non-reusable shall be dumped into sanitary land fill. Biodegradable waste shall be subjected to composting. Area required for composting shall include the area for storage of unprocessed material, processing facilities for composting operation and storage for green compost.

The area required for windrow composting with 15 days composting period with moisture content between 55-60% for aerobic composting, the first turning shall be done at the 4th day and thereafter every third day shall be 1.5 acres to 2 acres per 50 MT per day waste.

Reuse and Recycling:

The concepts of reuse and recycling can well be applied in solid waste management as solid waste is basically a heterogeneous mixture. In typical Indian municipal solid wastes, there is a small percentage of recyclable material and more of compostable and inert materials like ash and road dust. There is a very large informal sector of rag pickers, who can collect recyclable wastes (paper, plastic, metal, glass, rubber, etc) from the streets, bins and disposal sites for their livelihood. Thus, the rag pickers can be effectively used for the collection of reusable materials especially because the use of non recyclable packaging materials like PET bottles for soft drinks, mineral wastes, and soft -foam products and metalized plastic film coated food packing materials are on the rise. During recycling, many of these release toxic gases and ozone depleting products. So it is advisable to educate people to replace these items with eco-friendly packaging materials. The desirable home sorting mechanisms includes dry recyclable materials (e.g. glass, paper, plastic, cans etc.), kitchen and garden wastes, bulky wastes, hazardous wastes, construction and demolition wastes. Sorting can also be done just prior to waste processing or land filling.

Energy from Solid Waste:

Electricity can be produced by burning MSW as a fuel. MSW power plants, also called waste-to-energy

(WTE) plants, are designed to dispose of MSW and to produce electricity as a byproduct of the incinerator operation. Mass Burn is the most common waste-to-energy technology, in which MSW is combusted directly in much the same way as fossil fuels are used in other direct combustion technologies. Burning MSW converts water to steam to drive a turbine connected to an electricity generator. Burning MSW can generate energy while reducing the volume of waste by up to 90 percent, an environmental benefit. However, this burning MSW in WTE plants produces comparatively high carbon dioxide emissions, a contributor to global climate change. The net climate change impact of these emissions is lessened because a major component of trash is wood, paper and food wastes that would decompose if not burned. If left to decompose in a solid waste landfill, the material produces methane, a potent greenhouse gas. The concept of producing energy from MSW derives significance as it is given high priority by the Ministry of Non-Conventional Energy Sources (MNES), Government of India.

Treatment options:

The biodegradable portion of the waste is considerably high. So, aerobic composting of SW after proper segregation will be more appropriate. In selected locations especially in rural areas, Vermi-Composting can also be recommended. The manure obtained by these methods can be sold to the local public as fertilizer. Though costly, sanitary land filling can also be practiced at selected urban locations where the recovery from the waste will be very high, serving minimum ecological damage. It appears that the aerobic composting by Windrow method may be a desirable option for the management of the solid waste. The possibilities of generating energy from SW could be looked into on an experimental basis.

Biomedical wastes and its management:

Biomedical waste has been a growing concern because of the awareness in public regarding HIV, AIDS and Hepatitis B and exposure to discarded needles, syringes and other medical waste from municipal garbage bins and disposal sites. The management of biomedical waste turns important as it has serious bearing on the quality of human life. This becomes more significant especially in the context of the recent trend of establishing multispecialty hospitals in urban centers. Biomedical waste can be regarded as any waste generated during the diagnosis, treatment or immunization of human beings or animals or produced due to ac tivities of biological research, human anatomical waste, animal waste, microbiology and biotechnology waste, waste sharps, discarded medicines and cytotoxic drugs, solid wastes, liquid waste, incineration ash, chemical waste, etc. Medical wastes contain pathological waste (such as human tissues such as limbs, organs, fetuses, blood and other body fluids), infectious waste (soiled surgical dressing, swab material in contact with persons or animals suffering from infectious diseases, waste from isolation wards, cultures or stocks of infectious agents from laboratory, dialysis equipment, apparatus and disposable gowns, aprons, gloves, towels, etc.), sharps (any item that can cut or puncture such as needles, scalpels, blades, saws, nails, broken glass, etc.), pharmaceutical waste (drugs, vaccines, cytotoxic drugs and chemicals returned from wards, outdated drugs, etc.), chemical waste (any discarded solid, liquid or gaseous chemicals from laboratories, cleaning and disinfection) etc.

Implementation of Bio-medical Wastes (Management and Handling) Rules, 1998

The Ministry of Environment and Forests issued the Bio-medical Wastes (Management and Handling) Rules, 1998 which were amended subsequently. These rules provide for segregation, packaging, transportation, storage, treatment and disposal of wastes generated by hospitals, clinics and laboratories. Bio-medical wastes (BMW) have been classified into various categories and the treatment and disposal options for each of the categories are specified. The treatment and disposal should be in compliance with the standards prescribed in Schedule V, which stipulates standards for incinerators (operating and emission standards), for waste autoclaving, for liquid waste, of microwaving and for deep burial. A schedule for implementation of BMW rules has been laid down in Schedule VI. Imposing segregated practices within hospitals to separate biological and chemical hazardous wastes that will result in a clean solid waste stream, which can be recycled easily. An Advisory Committee is to advise the prescribed authority on the implementation of these Bio-medical wastes (Management and Handling) Rules.

7.1.4.6 Processing and Disposal of Solid Waste

The solid waste can be processed by composting, vermi-composting, anaerobic digestion, sanitary land filling, incineration or any other biological processing for stabilization of wastes. Since it contains a high amount of biodegradable portion, composting may be a cost-effective option for processing. The process of microbial composting or vermi-composting may be adopted with least mechanization to keep the cost low, and to market the compost as fertilizers to adjoining villages. So the concerned municipalities are duty bound to earmark required acres of land to meet the requirement of solid waste treatment. The areas of existing dumping yards can also be developed. The rejects from these plants and domestic hazardous wastes may be carefully landfilled. The bio-medical wastes may be disposed off as per the Bio-Medical Waste Management and Handling Rules as described above.

A decentralized treatment system will be more feasible option for solid waste treatment. In combination with primary waste collection, composting improves the precarious waste situation in the communities, and residents become less dependent on the poor municipal waste collection service. Decentralized composting can be operated by an appropriate technology and implemented at reduced investment and operating costs. Manual composting in small, decentralized plants is more easily integrated in the prevailing level of development in India and the socio-economic background, as it requires labour-intensive processes. It will create employment opportunities and a source of income to the underprivileged people in the rural Nagaon. Decentralized composting allows reuse of organic waste where it is generated, thereby reducing waste quantities to be transported as well as transport costs. This may drastically reduce the overall cost of municipal solid waste treatment.

7.1.4.7 Proposals for Solid Waste Treatment

The solid waste generation expected in Nagaon Planning Area by 2045 is very high, providing compost treatment facilities for this huge quantum of wastes, though essential, may not be practically possible in a single phase. So, it is necessary to propose economically feasible and, technically viable solutions which can be implemented in a phased manner. The densely populated urban areas of NMPA are to be given first priority in providing the composting facilities for solid waste treatment. The area required for solid waste treatment and disposal facilities will be 8 hectares.

1.7.4.8 Disposal of Hazardous Waste

The Notification from the Government of India, Ministry of Environment dated 20th July 1998, which deals with the collection of Bio-Medical Wastes entrusts the liability of its disposal with the waste producer itself. Thus the management of bio-medical waste is not the responsibility of Municipalities. But, however, they can assist in the management of biomedical wastes on a full cost recovery basis without sharing any legal responsibilities. It is advisable to have bio-medical facility for the entire Nagaon Planning Area. The bio-medical wastes collected from spots can be stored in selective transfer stations and can be transported to this central treatment facility at village Kachamarigaon Western side of planning area. If so desired, the authorities can formulate an action plan for implementing this plant through some competent agencies and can suitably charge for the treatment and disposal of bio-medical wastes. The solid waste dumping sites closest to industrial sites will be a more appropriate option.

7.1.5 ELECTRIC ENERGY

7.1.5.1 Power Grid of Nagaon Master plan Area

The present power demand of the city including that of the three regions of Nagaon, area is 35.42 MW. At present there is no shortage in meeting the requirements of the present demand in any of the region. Present electricity demand of Nagaon city and its adjoining small villages mentioned in the table below.

Table 168: Annual or Monthly Supply of Power of Nagaon

Type of Consumer	Demand (mw)	Supply (mw)
Residential	29.12	29.12
Government	1.82	1.82
Social and Institutional	1.92	1.92
Commercial	1.66	1.66
Industrial	0.40	0.40
Agriculture	0.50	0.50

(Source: APDCL, Nagaon)

Table 169 Demand and Supply of Power

Sr. No.	Particulars	Details
1	Demand for energy	35.42 MW Peak Demand
2	Annually or monthly supply of power	Average 7 MU per Month
3	Numbers of metered connections	111344 Nos

(Source: APDCL, Nagaon)

7.1.5.2 Power Supply Demand Projection

The present power demand is 35.42 MW. The power demand for 2045 is calculated by assuming 2.74 kWh per capita per day considering domestic, commercial, industrial and other requirements as per URDPFI guidelines 2015. The power demand for the 2045 will be 127.2 MW.

Table 170: Power Demand for 2045

Sr. No.	Particulars	Demand		
		2021	2031	2045
1	Projected Population	346140	392696	464221
2	Power Requirement @2.74 kWh per capita per day	94.84 MW	107.59 MW	127.2 MW

(Source: Compiled by Consultant)

Power demand – 2.74 kWh per capita per day considering domestic, commercial, industrial, and other requirements as per URDPFI guidelines 2015.

As per the population 2021 for Nagaon Master Plan Area, the Power Demand is 94.84 MW considering 2.74 kwh per capita per day. The Power Requirement for 2045 will be 127.2 MW. Even if the possibility of use renewable energy is to be explored and promoted. The strategies are proposed below:

7.1.5.3 Proposed Strategies

- There are various other sources, such as Wind energy and solar energy for generating power which is required to be explored.
- Additional solar energy to be sold to public grid/ electricity authority.
- Sector-wise power demand needs should be worked out which will be helpful in proper planning & estimating future power requirement.
- Incorporation of Renewal Power Obligations (RPO) in building byelaws (applicable to major building projects >20,000 sq.ft.)
- Tax concession on material and appliances procured for renewable energy products.

7.2 SOCIAL INFRASTRUCTURE

Social infrastructure plays an important role to provide quality of life to the residents of the city. The effectiveness of social infrastructure in achieving the objective of city development plan would depend upon its capacity to contribute to improvement in the quality of life, enhanced self-dependency and city's sustainability. The level of social infrastructure shall aim the creation of liveable city through reducing the sense of alienation among the residents with less dependence on other settlements for basic infrastructure.

Social infrastructure refers to the facilities and mechanisms that ensure education, health care, community development, and social security, recreational and social welfare. The development cannot be looked at in isolation without considering the basic needs of the people, and a significant level of investment is needed in this sector. Usually this development referred to as the commitment towards realizing the visionof the city.

7.2.1 EDUCATION

Education is an important factor influencing the quality of life of the people and future development of an area. It empowers them with skills and knowledge and helps them to better lead their life and to access best of the employment opportunities available in the market. This in turn will impact the work force participation rate and economy of the area.

7.2.1.1 Educational Facilities in Pre-Primary & Secondary Education

There are many government and private schools, colleges in Nagaon city town and District.

The existing scenario of Primary, Middle school and Higher secondary school for the Nagaon area is shown in the table given below:

Table 171: No. of Pre-primary Schools to Secondary Schools of Nagaon Master Plan Area

Sl. No.	Category of Education Institutions	Total No. of Institutions	Enrolment	Teachers
1	Lower Primary School's	86	9503	692
2	M.E & M.V School	20	3399	216
Total		**106 Nos.**	**12902**	**908**

(Source: Inspector of Schools, Elementary and Higher education)

Nowgong College

Dawson school, Nagaon

7.2.1.2 Educational Facilities in Higher Education

The existing scenario of university, Art/Science/Commerce colleges and professional colleges for the Nagaon area is shown in the table given below:

Table 172 higher education facilities in Nagaon

Sl. No.	Category of Education Institutions	Total No. of Institutions	Enrolment	Teachers
3	High school	30	8420	452
4	Higher Secondary School	8	6028	359
5	**1. General College**	4		
	i. Nagaon College	1	3258	109(79-part timer)
	ii. A.D.P College	1	1327	72
	iii. Khagarijan College	1	577	25
	iv. Nagaon Girls College	1	1189	51
	2. Junior College	28(6 permitted)		-
	3. B. ED College	2	160	21
	4. Commerce College	1	-	-
	5. Law College	1	302	8
	6. Homeopathic College	1	-	-
	7. Polytechnic	1	452	110
	8. I.T.I	1	492	37
Total		**168 Nos.**	**26155**	**2173**

(Source: Inspector of Schools, Elementary and Higher education)

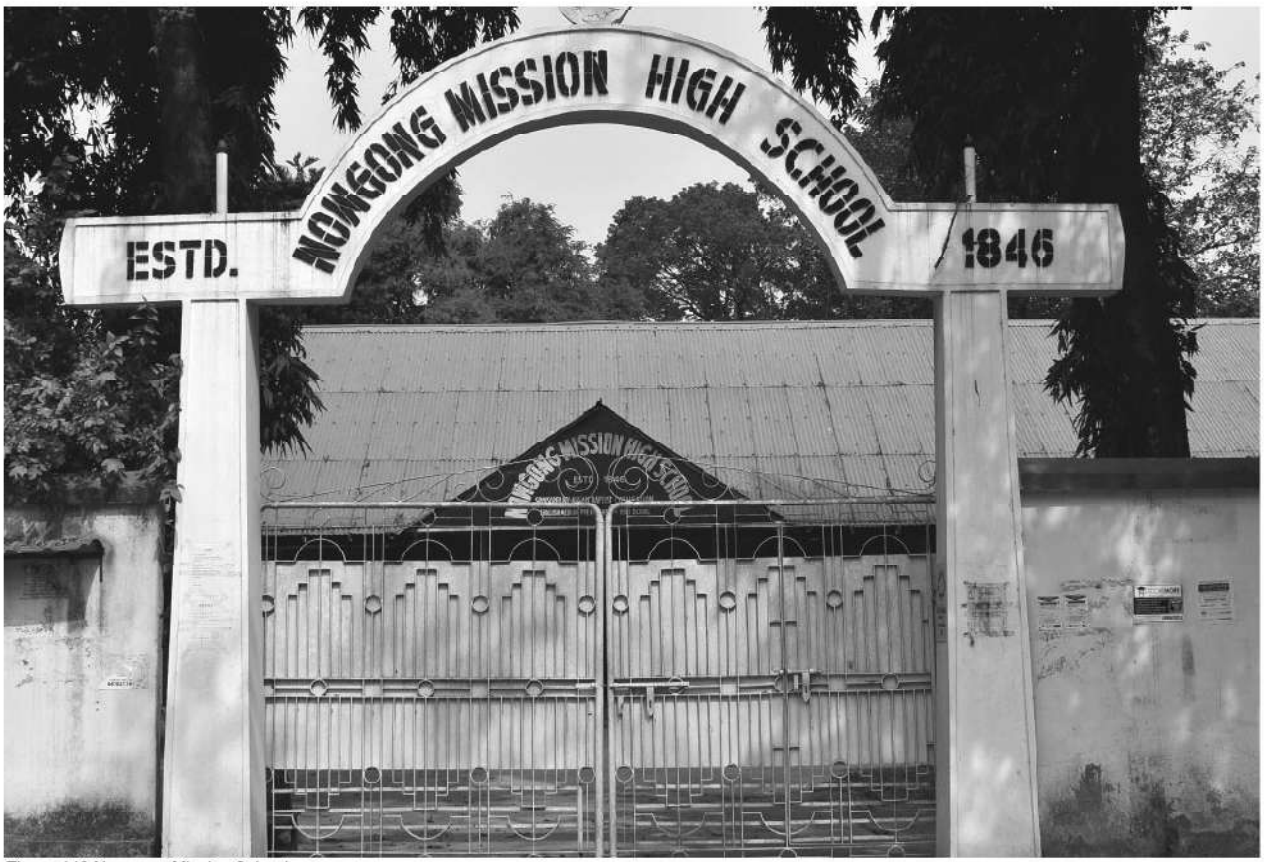


Figure 142 Nowgong Mission School

Table 173: Demand-Supply Gap Assessment of Educational Facilities: School Level

Existing Scenario					Desired Level as per URDPFI guideline	Short Term		Medium Term		Long Term		LAND REQUIREMENT AS PER FUTURE NEED							
						2021		2031		2045			2021		2031		2045		
Sl. No.	Particular	Indicator Unit (number)	Current Level (2011)	Current Gap		Demand	Gap	Demand	Gap	Demand	Gap	Area Require (Ha)	Gap	Total Area Require (Ha)	Gap	Total Area Require (Ha)	Gap	Total Area Require (Ha)	
1.	Population		298680			346140		392696		464221									
2.	School																		
		Pre-Primary, Nursery School	86	1	2500	138	52	157	19	185	28	0.08 ha	52	4.16	19	1.52	28	2.24	
		Primary School (Class I - V)	20	1	5000	69	49	78	9	92	14	0.40 Ha	49	19.6	9	3.6	14	5.6	
		Secondary School (VI - XII)	38	1	7500	46	8	52	6	61	9	1.80 Ha	8	14.4	6	10.8	9	16.2	
		Integrated School without hostel facility (I - XII)	0	0	100000	3	3	4	1	4	0	3.50 Ha	3	10.5	1	3.5	0	0	
		Integrated School with hostel facility (I - XII)	0	0	100000	3	3	4	1	4	0	3.90 Ha	3	11.7	1	3.9	0	0	
		School for physically challenged	-		450000	0	0	0	0	1	1	0.70 Ha	0	0	0	0	1	0.7	
		School for Mentally challenged	-	0	1000000	0	0	0	0	1	1	0.20 Ha	0	0	0	0	1	0.2	

Table 174: Demand-Supply Gap Assessment of Educational Facilities: College level

Existing Scenario					Desired Level as per URDPFI guideline	Short Term		Medium Term		Long Term		LAND REQUIREMENT AS PER FUTURE NEED									
Sl. No.	Particular	Indicator Unit (number)	Current Level (2011)	Current Gap		2021		2031		2045		Area Require (Ha)	Short Term			Medium Term			Long Term		
						Demand	Gap	Demand	Gap	Demand	Gap		2021			2031			2045		
													Gap	Total Area Require (Ha)		Gap	Total Area Require (Ha)		Gap	Total Area Require (Ha)	
1.	Population		296680			346140		392696		464221											
2.	Collage																				
		College	37		125000	3	4	3	0	4	1	5.00 Ha	4	20	0	0	0	0	1	5	
		University Campus			125000	3	1	3	0	4	1	10.00 to 60.00 Ha	1	10	0	0	0	0	1	10	
		ITI's/Vocational Training	1		100000	3	0	4	1	5	1	4.00 Ha	0	0	1	4	4	1	4		
		Polytechnic	-		1000000	0	0	0	0	0	0	4.00 Ha	0	0	0	0	0	0	0		
		Engineering College	-		100000	3	0	4	1	5	1	6.00 Ha	0	0	1	6	6	1	6		
		Medical College	-		100000	3	0	4	1	5	1	15.00 Ha	0	0	1	15	15	1	15		
		Other Professional Colleges	-		1000000	0	0	0	0	0	0	2.00 Ha	0	0	0	0	0	0	0		
		Nursing and Paramedical Institute	1		1000000	0	0	0	0	0	0	2000 sqm	0	0	0	0	0	0	0		

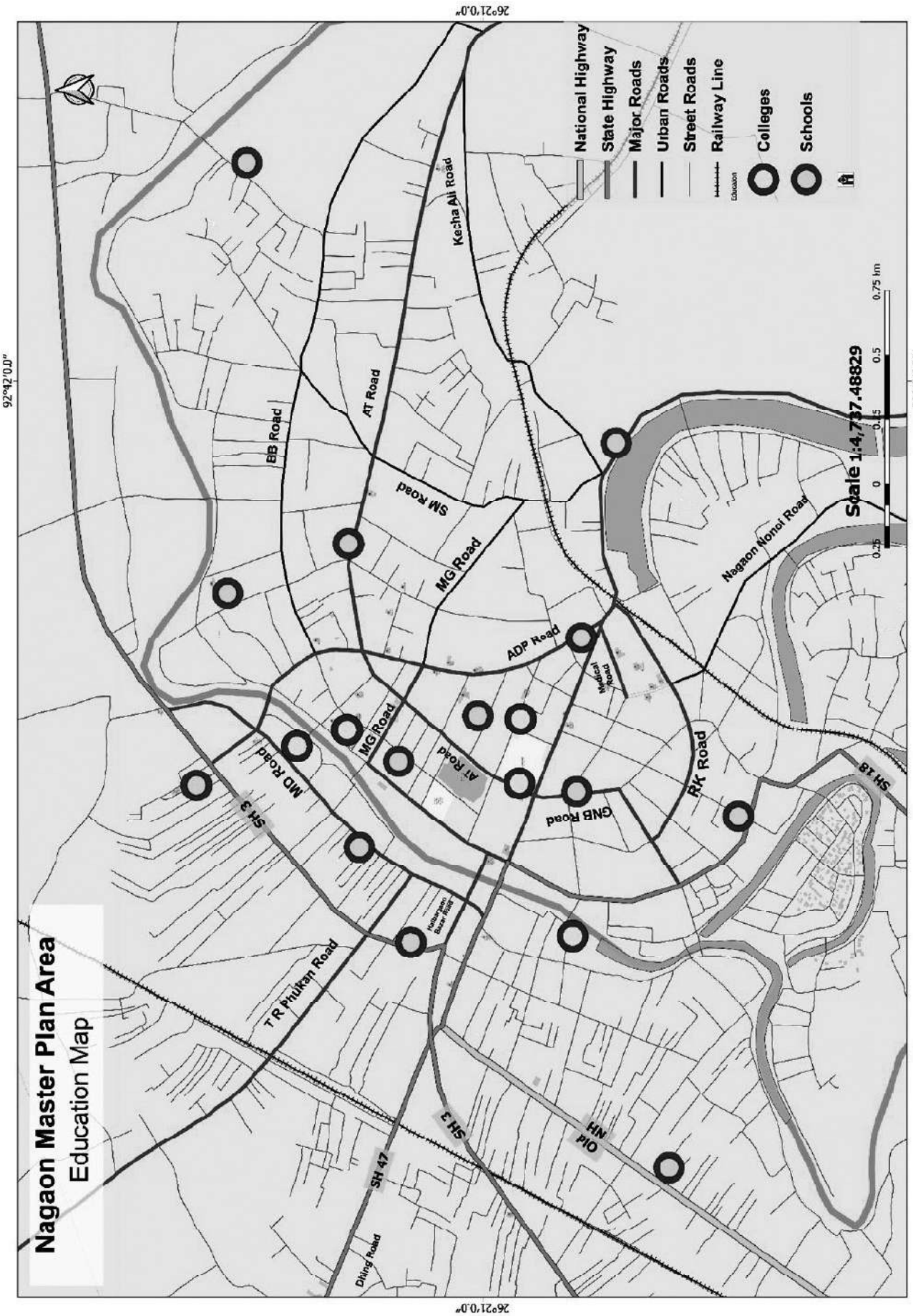


Figure 143 Schools and Collages in NMPA

7.2.1.4 Summary of Educational Facilities Requirement

The demand of various Educational Facilities for the year 2045 is mentioned below in the table 175. The calculations are done based on URDPFI Guidelines.

Table 175: Demand of Educational Facilities & Land Requirement for 2045

Sl. No.	Particular	Demand in 2045	Land required in 2045 (Ha)
1	Pre-Primary, Nursery School	28	7.92
2	Primary School (Class I - V)	63	28.8
3	Senior Secondary School (VI - XII)	23	41.4
4	Integrated School without hostel facility (I - XII)	4	14
5	Integrated School with hostel facility (I - XII)	4	15.6
6	School for physically challenged	1	0.7
7	College	5	25
8	University Campus	2	20
9	ITI's / Vocational Training	2	8
10	Polytechnic	0	0
11	Engineering College	2	12
12	Medical College	2	30
13	Other Professional Colleges	0	0
14	Nursing and Paramedical Institute	0	0

Source: Compiled by Consultant)

Based on the area requirement for each unit, land requirement for the above mentioned educationalfacilities is worked out. There will be a need of 155 Ha. of land for the above mentioned educational facilities.

7.2.1.5 Proposed Strategies

- As the process of Educational department recruitment should be consolidate to make sure only highly skilled teachers are recruited.
- More infrastructural facilities like public library, laboratory, and computers should be provided to schools to enhance the pupil's learning.
- There is a need to set up more schools in villages and out growths of the planning area to improve the people's access to educational facilities.
- Welfare for the differently-abled children should be given due emphasis by setting up special learning schools for them.
- Special emphasis should be laid on technical and skill based vocational education.
- More jobs oriented vocational courses should be introduced by utilizing the existing infrastructure facilities of polytechnic institutions.
- Keeping in view, the influence zone of Nagaon, it is suggested that more emphasis should be laid on professional education, thus more number of professional institutes are proposed for future development.
- Looking in to the potential of area, Knowledge District is been proposed in region.

7.2.2 MEDICAL

The existing health facilities in Nagaon include primary health centre, government and private hospitals, eye hospital, veterinary hospital, national polio surveillance centre and nursing homes. These facilities have been set up by both public and private sector organisations, although, the key medical facilities in the area are provided by private sector.

7.2.2.1 Current Scenario

Table 176: Existing Health Facilities of Nagaon Master Plan Area

Sr. No.	Health facility in NPA	Number (as per Census 2011)	
		Govt.	Private
1.	Dispensary	78	-
2.	Nursing home, child welfare and maternity centre	-	12
3.	Polyclinic	-	-
4.	Intermediate Hospital (Category B)	-	-
5.	Intermediate Hospital (Category A)	-	-
6.	Multi-Specialty Hospital	-	-
7.	Specialty Hospital	-	-
8.	General Hospital	1	-
9.	Family Welfare Centre	-	-
10.	Diagnostic centre	-	48
11.	Veterinary Hospital for pets and animals	-	-
12.	Dispensary for pet animals and birds	-	-

Source: Joint Director, Health Services, Nagaon, 2020)

Table 177: Demand-Supply Gap Assessment of Medical Services

Existing Scenario					Desired Level as per URDPFI guideline	Short Term		Medium Term		Long Term		Land Requirement as Per Future Need						
Sr. No.	Particular	Indicator Unit (number)	Current Level (2011)	Current Gap		2021		2031		2045		Area Require (Ha)	Short Term		Medium Term		Long Term	
1.	Population		298680			346140		392696		464221			2021		2031		2045	
2.	Hospital					Demand	Gap	Demand	Gap	Demand	Gap		Gap	Total Area Require (Ha)	Gap	Total Area Require (Ha)	Gap	Total Area Require (Ha)
		Dispensary	78	0	15000	23	0	26	0	31	0	0 Ha	0	0	0	0	0	0
		Nursing home, child welfare and maternity centre	12	-1	45000 to 1 lakh	8	-4	9	-3	10	-2	0.20 to 0.30 Ha	-4	0	-3	0	-2	0
		Polyclinic	-	3	1 lakh	3	3	4	1	5	1	0.20 to 0.30 Ha	3	0.9	1	0.3	1	0.3
		Intermediate Hospital (Category B)	-	3	1 lakh	3	3	4	1	5	1	1.00 Ha	3	3	1	1	1	1
		Intermediate Hospital (Category A)	-	3	1 lakh	3	3	4	1	5	1	3.70 Ha	3	11.1	1	3.7	1	3.7
		Multi-Specialty Hospital	-	3	1 lakh	3	3	4	1	5	1	9.00 Ha	3	27	1	9	1	9
		Specialty Hospital	-	3	1 lakh	3	3	4	1	5	1	3.70 Ha	3	11.1	1	3.7	1	3.7
		General Hospital	1	0	2.5 lakh	1	0	2	1	2	0	6.00 Ha	0	0	1	6	0	0
		Family Welfare Centre	-	6	50,000	7	7	8	1	9	1	500 -800 sqm	7	0.56	1	0.08	1	0.08
		Diagnostic centre	48	6	50,000	7	0	8	0	9	0	500 sqm to 800 sqm	-41	-3.28	0	0	0	0
		Veterinary Hospital for pets and animals	-	0	5 lakhs	1	1	1	0	1	0	2000 sqm	0	0	0	0	1	0.02

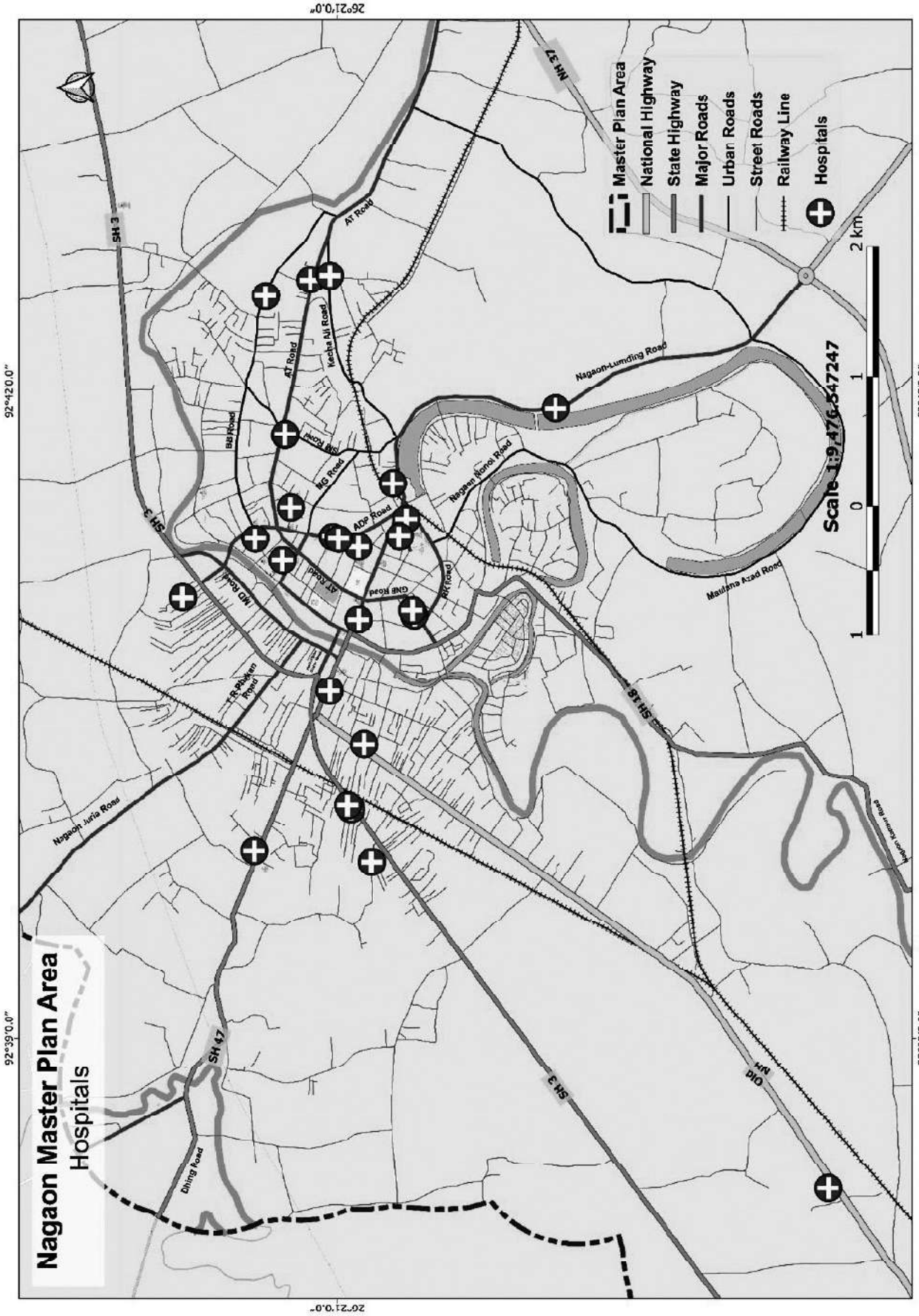


Figure 144 Medical facility within NMPA

7.2.2.3 Summary of Health Facilities Requirements

Table 178: Demand of Health Facilities & Land Requirement for 2045

Sr. No.	Particular	Demand in 2045
1.	Dispensary	0
2.	Nursing home, child welfare and maternity centre	0
3.	Polyclinic	5
4.	Intermediate Hospital (Category B)	5
5.	Intermediate Hospital (Category A)	5
6.	Multi-Specialty Hospital	5
7.	Specialty Hospital	5
8.	General Hospital	1
9.	Family Welfare Centre	9
10.	Diagnostic centre	0
11.	Veterinary Hospital for pets and animals	1

(Source: Compiled by Consultant)

Based on the URDPFI Guidelines 2015, the demand of health facilities in 2045 for Nagaon Planning Area is worked out. There will be a need of 1 General hospital, 05 Policlinics, 10 Intermediate Hospitals, 5 Special Hospitals and 1 vetenary hospitals for pets and animals till 2045. This shall be spatially distributed in the planning area. Based on the area requirement for each unit, land requirement for the above-mentioned health facilities is worked out. There will be a need of 89.24 Ha. of land for the above-mentioned health facilities.

7.2.2.4 Proposed Strategies

Some important measures that can be taken up by appropriate authority to augment and improve the Health care system and facilities in Nagaon Plannig area:

The rural health system has to be improve the medical services. Government agencies carrying out the planning and implementation of the initiatives in medical services have to be provided with enough funds to upgrade the existing medical infrastructure in the government hospitals and for modernization medical equipment's.

- It is also important to cater to needs and welfare of the elderly and differently-abled residents of the area. Thus, old Age Home-cum-Care Centre for Senior Citizens and Mentally Challenged should be appropriately set-up.
- Introduction of new technology like provision of multi specialty facilities and equipments etc. in the hospitals and primary health centers.
- There is requirement for training centers for nurses and paramedical staff like pathology, pharmacy may be started to train local and regional students.
- There is a need for the up-gradation of existing hospital, Clinics, Nursing Homes, etc in the planning area especially those publically owned.
- Setting up of dispensaries in rural parts of the planning area which are currently absent.

7.2.3 OTHER SOCIAL INFRASTRUCTURAL FACILITIES REQUIREMENT

Other social infrastructure facilities like commercial centres; Socio-Cultural facilities, library, milk booths, LPG Go-downs, Police stations, Post Office, Fire stations, etc.; Recreational facilities like parks, Multi-Purpose Grounds, sports facilities, etc. are also essential for the balanced development of the planning area and improving the quality of life of the its residents.

7.2.3.1 Other social infrastructure Demand Projection

Table 179: Existing and Future assessment of social infrastructure facilities

Category	Population served per unit	Area Requirement	Requirment	Existing	Future Requirement (2045)	Future Area Required (Ha)
Anganwadi - Housing area/cluster	5000	0.02-0.03 Ha	93	34	59	1.79
Community Room	5000	0.0750 sqm	93	0	93	6.9
Community hall, Mangalkaryayala, barat ghar/library	15000	2000 sqm	31	2	29	5.8
Music, dance, and drama centre	1 lakh	1000 sqm	5	2	3	3
Meditation and spiritual Centre	1 lakh	5000 sqm	5	0	5	2.5
Recreational Club	1 lakh	Max. 1000 sqm,	5	0	5	0.5
Old age home	5 lakhs	0.03	1	1	0	0
Religious Facilities						
At Neighbourhood /Housing cluster level	5000	400 sqm	93	0	93	3.72
At sub city level in urban extension	10 lakhs	4.00 Ha	0	0	0	0
Other Facilities						
Orphanage/ Children's Centre one each	10 lakhs	Max. 1000 sqm,	0	1	0	0
Care centre for physically /mentally challenged	10 lakhs	Max. 1000 sqm,	0	0	0	0
Working women – men hostel	10 lakhs	Max. 1000 sqm,	0	1	0	0
Adult education centre	10 lakhs	Max. 1000 sqm,	0	0	0	0
Night Shelter	10 lakhs	Max. 1000 sqm,	0	0	0	0
Socio – Cultural centre/Exhibition cum fair ground	10 lakhs	15 Ha	0	0	0	0
Science Centre	10 lakhs	As per requirement	0	0	0	0
International Convention	City level	As per requirement	0	0	0	0

7.2.4 PARKS & OPEN SPACES

Table 180 Existing and future assessment of open spaces.

Category	Population served per unit	Area Requirement (Ha)	Require ment	Existing	Future Requirement (2045)	Future Required Area
Housing Area Park	5000	0.50 to 1.00	93	98	41	41
Neighbourhood Park	10000	1.20 to 2.00	46			
City Parks/ playgrounds/ maidan/exhibition grounds/ cultural gathering grounds	1 for every town	-	-	0	1	3
Botanical Garden	1 for every town	10.00 to 20.00	-	0	1	10
Recreational complex including zoo	1 for every settlement with tourist potential	10.00 to 12.00	-	0	0	0

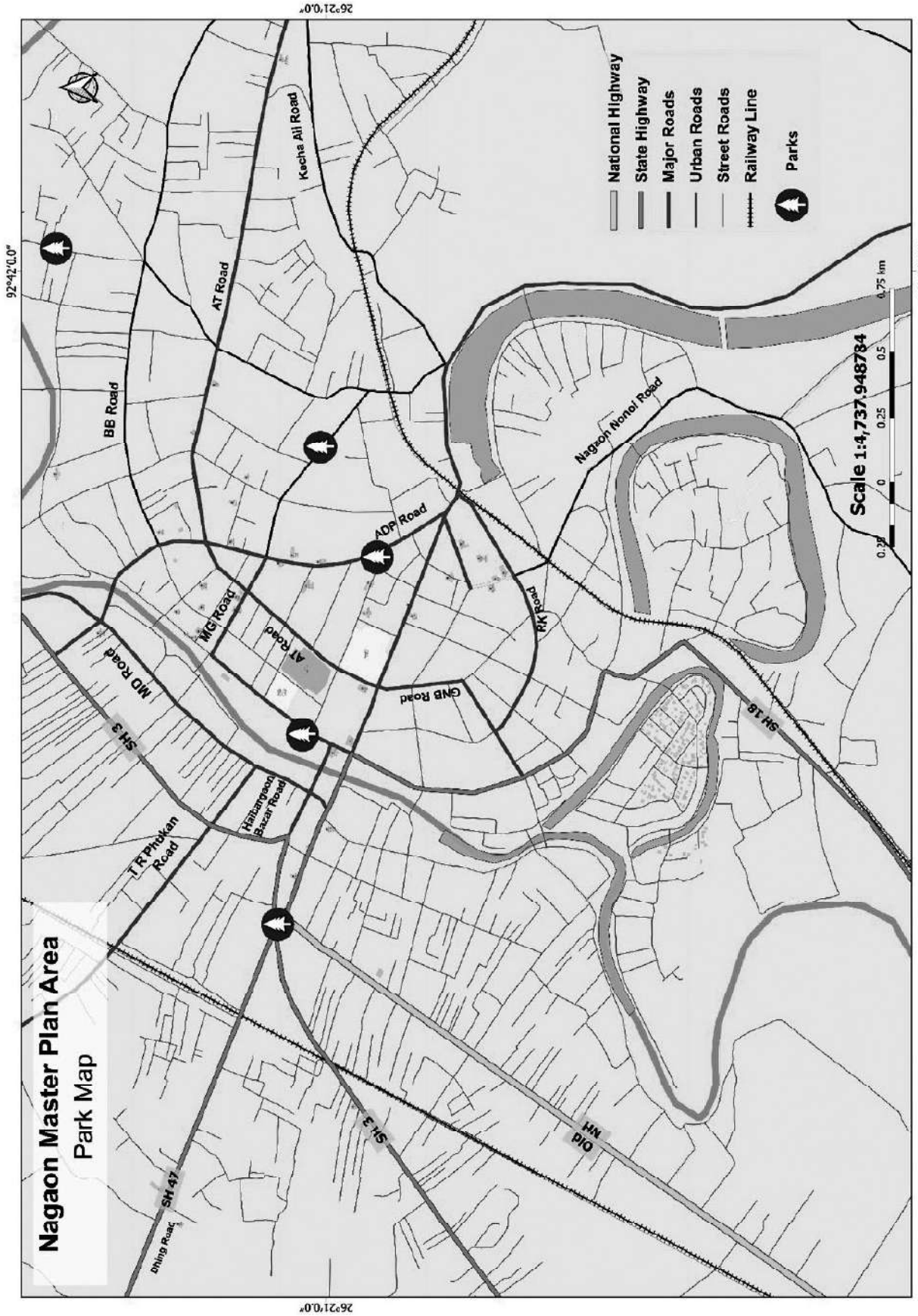


Figure 145 Parks within NMPA

7.2.5 MULTI-PURPOSE GROUNDS AND SPORTS FACILITIES REQUIRED

Table 181 Existing and future assessment of multipurpose grounds and sports facilities

Category	Population served per unit	Area Requirement (Ha)	Requirement	Existing	Future Requirement (2045)	Future Required Area
Sub city level multipurpose ground	10 lakhs	8	0	0	0	0
District level multipurpose ground	5 lakhs	4	1	0	1	4 Ha
Community level Multipurpose ground	1 lakh	2	5	0	5	10 Ha
Residential unit play area	5,000	0.5 Ha	93	0	93	46.5 Ha
Neighbourhood Play area	15,000	1.50 Ha	31	0	31	46.5 Ha
District Sports Centre	1 lakh	8.00 Ha	5	0	5	40 Ha
Divisional Sports Centre	10 lakhs	20.00 Ha	0	0	0	0

7.2.6 COMMUNITY FACILITIES

7.2.6.1 Existing Communities and other Facilities

Table 182: Existing Communities Facilities

Sr. No.	Facilities	Numbers
1	Corporation Gardens	1
2	Community Hall	1
3	Swimming Pool	1
4	Corporation Playgrounds	1
5	Gymnasia	Nil
6	Corporation Stadium	Nil
7	Cinemas	Nil
8	Open Air Theatres	1
9	Zoo	Nil
10	Public libraries	1
11	Art Galleries	Nil
12	Museum	1
13	Other (specify)	1
14	Fire Services	1
	No. of Fire stations	1
	No. of fire tenders	5
	Personnel	22
15	Cremation/Burial Ground	7
16	Petrol/Gas Station	10
17	Hotels and Eating Places	51

(Source: Nagaon Municipal Board)

7.2.6.1 Existing and Future assessment of Community facilities

Table 183: Existing and Future assessment of community facilities.

Category	Population served per unit	Area Requirement (Ha)	Requirement	Existing	Future Requirement (2045)	Future Required Area
Milk Booths	5000	0.015	137	28	109	1.64ha
LPG Godowns	50000	0.2	14	0	14	2.8ha
Police Station	90000	1.5	8	2	6	7.5ha
Police Post	40000	0.16	18	7	11	1.76ha
District Jail	1000000	10	0	0	0	0
Fire Station	200000	1	3	1	2	2ha
Sub Fire Station	within 3-4km radius	0.6	0	0	0	0
Disaster Management Centre	One in each administrative zone	1	1	1	0	0
Post Office	15000	0.6	46	9	37	22.2ha
Graveyard / Burial Ground	10000	1	68	7	54	54ha

(Source: Compiled by Consultant)

7.2.7 COMMERCIAL FACILITIES

7.2.7.1 Existing Commercial Facilities

Table 184: Existing Commercial Facilities

Year	Hotel	Restaurant	Wholesale	Retail shop
2011	-	-	-	-
2012	-	-	-	-
(up to 2019)	51	400	-	-

(Source: Nagaon Municipal Board)

7.2.7.2 Existing and Future assessment of Community facilities

Table 185: Existing and future assessment of commercial facilities.

Category	Population served per unit	Area Requirement (Ha)	Requirement	Existing	Future Requirement (2045)	Future Required Area
Convenience Shopping	5000	0.15	137	28	109	16.35ha
Local shopping including service centre	15000	0.46	46	9	37	17.36ha
Community centre with service centre	100000	5	7	-	7	35ha
District centre	500000	1	1	-	1	1ha

(Source: Compiled by Consultant)

7.2.8 BANKS/FINANCIAL INSTITUTIONS

The entire planning area is served by 24 nos. of banks, out of which 23 nos. of banks are in Nagaon town and 1 is located at Bebejia Chariali. The banks located within the planning area are shown in the table below:

Table 186 Banks in NMPA

Sl. No.	Name of banks	No. of banks
1	State bank of India	3 nos
2	Union Bank of India	1 nos
3	United Bank of India	2 nos
4	Canara Bank	1 no
5	Punjab National Bank	1 no
6	Central Bank OD India	2 nos
7	Indian Bank	1 no
8	UCO Bank	1 no
9	Assam Gramin Bikash Bank	4 nos
10	Apex Bank	1 no
11	Canara Bank	1 no
12	Lead Bank	1 no
13	Axis Bank	1 no
14	Bank of Boroda	1 no

7.2.9 POST OFFICE

There are 6 post offices within Nagaon Revised Master Plan Area. One is head post office located near Deputy commissioner's Office, Nagaon 4 sub post offices are located within Nagaon town area and remaining one is located at Bebeji and one is at Barghat.

7.2.10 FIRE STATION

There is one fire station located at Fouzdari patty to take care of fire hazards of the planning area.

8 CULTURE & HERITAGE

8.1 CULTURE OF NAGAON

The present district of Nagaon is one of the historically famous districts in the state of Assam of North-East India. Bardowa, the birthplace of the Vaisnava saint and reformer is situated in Nagaon. It has been attracting a quantitatively large number of the population and has become a major tourist spot in recent years. This may be another reason of housing a good number of Sattras- the seat of Vaisnava learning and cultural development which are scattered in almost whole of the district except Hojai. In recent years it has become one of the culturally affluent districts of Assam cantering round Vaisnava religion and heritage.

8.1.1 SANKARDEV'S CULTURAL VISION AND THE NAGAON SOCIETY

In Sankardev's time, religion was the source of various socio-cultural disparities and depravities, the victims of which were the so-called low castes and backward communities. The dregs of Varnasram Dharma in the form of the caste system deprived the Sudras from many rights including the right to religious practices. Simultaneously, the tantric section of the Buddhists indulged themselves in various bacchanalian practices polluting the social atmosphere. The person who came forward at that juncture to shoulder the historic responsibility of upholding before the Assamese society the right path of cultural uplift was Mahapurus Srimanta Sankardev.

Before the emergence of Shrimanta Sankardeva, the most power religious cults in Assam were Saivism and Saktism.

8.1.1.1 Religious form of Music and Dance

Srimanta Sankardev created a new classical school of music, known as Sankari music with his Bargeet. These Bargeet songs are one of the main modes of conveying the principles of the Ek Sarana Nama Dharma, founded by the saint. Sankari music is one of the three major classical schools of music in India, the other two being the Hindustani and Carnatic music. In fact, the development of Sankari music was even older than Hindustani music, the grammer of which was systematically recorded only in the twentieth century by Bhatkhande. Srimanta Sankardev belonged to an earlier period than Tansen, Man Singh Tomar etc, the major contributors of Hindustani music.

The method of singing in Sankari school of music differ a lot from both the Hindustani and the Carnatic schools. For instance, the extensive rise and fall all over the scales along the path of a Raga is a unique character of Bargeet, the devotional songs composed by Srimanta Sankardev and his foremost disciple Madhavadeva. They called the first verse in every Bargeet as Dhrung, which means constant. This concept is a basic requirement in classical music. (Source: Dr. Sanjeev kumar borkakati)

8.1.1.2 Tales and Ragas

Kirtan from Sankari Culture

Srimanta Sankardev created twenty-five Raga for his Bargeet, a unique group of devotional songs. These were Ashowari, Dhanashree, Gouri, Suhai, Basanta, Sri, Kedar, Mahur Dhanashri, Tur Basanta, Kalyan, Ahir, Mahur, Bhatiyali, Sindhura, Nat, Belowar, Sri Gandhara, Saranga, Nat Mallar, Kow, Shyam, Kanra, Purbi, Sri Gouri, and Tur. His disciple Madhavadeva also composed seven Raga. These were Mallar, Bhupali, Tur Bhatiyali, Barari, Kamod, Syamgara, and Lalit. Though some of these names are similar to the Raga in the Hindustani and the Carnatic schools, the Raga of Srimanta Sankardev and Madhavadeva are different from these two schools.

Musical Instrument

Thirty-two Raga are called Mela Raga, meaning open Raga. That means these can be sung by using any Tala or rhythm. It deserves mention here that the Bargeet does not have any fixed Tala. Some maestros sing a single Bargeet by using several Tala. Moreover, the same Bargeet is sung by using different Tala in Barpeta Than, Bordowa Than and Kamalabari Satra. These three Than and Satra have thus created three sub-schools of the Sankari music.

Srimanta Sankardev and his disciples used many instruments in the performance of Sankari music. All these were innovated indigenously. Some of these instruments are Sarengdar, Nagara, Manjira-tal, Khol, and Bhortal. The most famous among these is Khol, which was innovated by Srimanta Sankardev himself in 1468 AD at the time of enacting his first play Chihna Yatra. It was made by a Kachari artisan from Kapili valley at the instruction of the saint. At that time the structure was made of baked earth, but nowadays it is made of wood. The diametre on two sides are respectively 9.75 inches and 5.25 inches. These are covered with cowhide. A paste of iron dust and rice is put on it. It is called Ghun.

The popular instrument (drum) Nagara, which is used in community prayer sessions, is also a contribution of the Tiwa people. However, it came to be used after the demise of Srimanta Sankardev only. Another instrument of the Tiwas, the Ludang khram is very much akin to Khol. It may be mentioned that though Khol was innovated to some extent from the ancient Mridanga, the accoustic property of Khol differ a lot from Mridanga. It is pertinent here that the Kachari tribe also has an ancient tradition of playing Dhol or drum. In fact, the Gayan-Bayan tradition itself has been derived from the Sonowal Kachari tribe. An ancient sculpture has been found in the Na-Nath temple of the Kapili valley, where a drum is being played.

8.1.1.3 Sattriya Dance

The Sattriya dance form was introduced in the 15th century A.D by the great Vaishnava saint and reformer of Assam, Mahapurusha Sankardev as a powerful medium for propagation of the Vaishnava faith. The dance form evolved and expanded as a distinctive style of dance later. This neo-Vaishnava treasure of Assamese dance and drama has been, for centuries, nurtured and preserved with great commitment by the Sattras i.e., Vaishnava or monasteries. Because of its religious character and association with the Sattras, this dance style has been aptly named Sattriya.

Sattriya dance tradition is governed by strictly laid down principles in respect of hastamudras, footworks, aharyas, music etc. This tradition, has two distinctly separate streams - the Bhaona-related repertoire starting

from the Gayan-Bhayanar Nach to the Kharmanar Nach, secondly the dance numbers which are independent, such as Chali, Rajagharia Chali, Jhumura, Nadu Bhangi etc. Among them the Chali is characterized by gracefulness and elegance, while the Jhumura is marked by vigor and majestic beauty.

Sankardev introduced this dance form by incorporating different elements from various

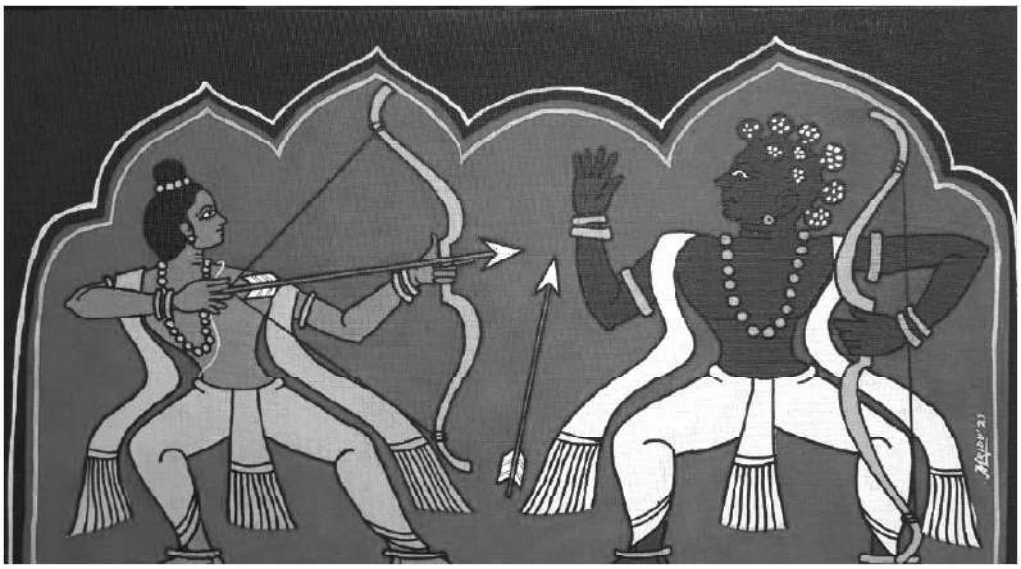
Sattriya dance in Borduwa satra

treatises, local folk dances with his own rare outlook. There were two dance forms prevalent in Assam before the neo-Vaishnava movement such as Ojapali and Devadasi with many classical elements. Two varieties of Ojapali dances are still prevalent in Assam i.e., Sukananni or Maroi Goa Ojah and Vyah Goa Ojah. Sukananni Oja paali is of Sakti cult and Vyah Goa Oja paali is of Vaishnava cult. Sankardev included Vyah Goa Ojah into his daily rituals in Sattra. Till now Vyah Goa Ojah is a part of rituals of the Sattras of Assam. The dancers in a Oja paali chorus not only sing and dance but also explain the narration by gestures and stylized movements. As far as Devadasi dance is concerned, resemblance of a good number of rhythmic syllables and dance postures along with footwork with Sattriya dance is a clear indication of the influence of the former on the latter. Other visible influences on Sattriya dance are those from Assamese folk dances namely Bihu, Bodos etc. Many hand gestures and rhythmic syllables are strikingly similar in these dance forms. **(Source:** Center of cultural resources and training)

Sattriya dance depiction of Bhagvad gita

8.1.1.4 The Sankari Art

Among the different art forms, the art of manuscript painting was also practiced and maintained traditionally in the Satras. The skill and quality of artists and their aesthetic sense of vision were executed through this medium visual art. The paintings were made following a traditional technical process of preparation using natural ingredients and colours.



The manuscripts were three to four hundred years old but still looking fresh and glazing which is also a significant characteristic of Satriya paintings. The paintings of Bhagavata-Purana, X, is the best example of the satriya style of traditional painting. The precursor of Neo-Visnavism, Srimanta Sankardeva was responsible for the development of painting tradition in the medieval history of Assam.

Srimanta Sankardeva

Manuscrpits Painting

The alive or existing proofs of art of practicing manuscript painting in Assam was date back to the time of Bhakti- movement headed by Vaishnava saint Srimanta Sankardeva (1449-1569) and his direct disciple Madhavdeva. The Sankardevas initiation of this art of manuscript painting was remain a most significant visual learning system in medieval Assam.

The work of this art is also representing the patience and intellectuality of the unknown master artist of the medieval traditional school of paintings. The paintings also generate the knowledge traditional science &

craftsmanship which depends on natural ingredients of making surface for painting like Tulapat & Sanchipat with simplification in representation of a subject in visual form rather than any kind of confusing representation.

There are mostly three types of masks that are made at the Samaguri Satra viz. 'Mukha' – face masks, 'Lotokai Mukha' – masks to move lips, eyes, hands, etc. and the 'Bor Mukha' – life size or even larger masks. The frame is generally built of bamboo but sometimes even paper is used to make these masks.

(Source: A traditional art practice, Sri Bikram Sakar)

Masks in Samaguri Satra

8.2 HERITAGE

Conservation of buildings, artefacts, structures, areas and precincts of Historic, aesthetic, architectural, cultural significance (Heritage buildings and heritage precincts) will fall under the norms prescribed by the ASI, would need redevelopment and redesign without hampering the fabric of area. Following are the tangible and intangible identified heritage site which fall under the National, Regional and Local context levels.

8.2.1 REGIONAL LEVEL HERITAGE

8.2.1.1 District library

The concept of library comes into existence with the interest of people to preserve their knowledge for their future generation. Sankardeva had established 'Satras' which is a place for religious practice as well as it acts like a source of informal education for the illiterate people. So, it can be called the older version of modern public library. Later, British rulers had also established some libraries in major district headquarters of Assam, where Central Library of Nagaon is one of them.

8.2.1.2 Narowa Satra and Salaguri Satra

Bordowa also referred to as Batadrava is situated 18 km north west of Nagoan. It is the birthplace of the revered Vaishavite saint of Assam Sirmanta Shankardev. Famous for its two satras, namely the Narowa Satra and Salaguri Satra, the town is a collage of Assam's rich religious history. It is believed that the satras were founded when Srimanta Sankardeva returned from his first pilgrimage in 1494. He named the shrine as Thaan, for propagating the principle of one god, one mind and one soul. The satrra at Bordowa is a major religious center for Vaisnava devotees from around the state. The Narowa Kuji Satra in Nagaon –Morigaon border area geographically Morigaon district occupies an area under Dolongghat Development Block. The Satras are institutional centers associated with the Ekasarana tradition of Vaishnavism. Naruwa Kurjistra Historical Mandir.

8.2.1.3 Minaret Puranigudam

The century old Minaret in Puranigudam Masjid is famous for the community efforts and unity for its shifting and preservaing. The shifting was done to pave way for the four-lane highway in the area. The whole process of minaret shifting has been done within a month. Earlier, people of Puranigudam had decided to preserve the century old minaret and the two-storey minaret near the NH 37 in Puranigudam was gradually shifted from its original site with the help of modern technology.

8.2.1.4 Central Jail

Spread over 36 Bigha 04 Kotha and 14 lecha of land in the heart of Nagaon city, this Special Jail was established in the year 1898 as District Jail and subsequently upgraded to Central Jail in the year 2002, presently known as Central Jail Nagaon.

8.2.1.5 Daul Temple

Locate 17 km far on North-West side of Nagaon, Daul Temple is famous religious place for Krishna's idol. In Bordowa Sankardeva first drama "Chihna yatra" was staged at the present site of Daul Mandir. He played the musical instruments by himself. "Chihna yatra" was played continuously for seven days. During "Daul Utsav", Lord Krishna's idol is taken to Daul Mandir and it serves as "Ghunusha griha".

8.2.2 LOCAL LEVEL HERITAGE

8.2.2.1 Nowgong Mission high school

Established in 1846 at the time of British Rule, Nowgong Mission High School is a historical educational Institution of Assam. The school was established by American Baptist Missionary Rev. Miles Bronson. It was initially the 1st Women Educational Institution. Now it is a co-educational Institution.

Table 187: Tangible and Intangible Heritage

Context level	Tangible Heritage	Intangible Heritage
National	Not identified	Ranthali Jewelry Cluster, Nagaon. Ankia Bhaona (one act play). These plays are popularly known as Ankia Nats and staging is known as Bhaona. Weaving (Muga Silk) is a traditional household activity.Nonoi Tea Estate (35 km from the town).
Regional	• District Library (1955) • Narowa Sattra and Salaguri Sattra (Bordowa) • Minaret of Puranigudam (15 km from the town) • Central Jail (1950)	Bordowa Than (15 km from the town) is birthplace of Sri Sankardev. Manufacturing of Kuhila craft, Pottery & Terracotta, Jute, Cane & Bamboo products.
Local	• Nowgong Mission High School (1846). • Jayashree Cinema Hall (1944) • Nikamul Uriagaon Sattra • Karchung Sattra • Special Jail (1898)	Not identified

8.3 ISSUES

Dilapidated Condition of structures: Most of the heritage structures are in dilapidated condition due to the unavailability of conservation, restoration and preservation practices in Nagaon area. These structures need periodic preservatory treatments in order to enhance their cultural life for coming generations.

Unavailability of Infrastructure and Services: There is an absolute absence of proper infrastructure and services in the immediate areas around the possible heritage as well as tourist spots of Nagaon. The basic tourist amenities also lack at these places which have to be planned accordingly.

Absence of Monitoring: There is no nodal body responsible for periodic monitoring of the heritage structure around Nagaon. Such nodal bodies are to constituted in order to provide proper jurisdiction to such capable heritage areas so that there's no threat to them in future.

Haphazard Development: The unplanned developmental activities around the heritage sites are serious threats and it harms the integrity of the heritage structures. Such activities are to be monitored by a proper administrative framework under by the local, regional or state authorities.

Lack of Awareness among Public: The citizens are unaware about the cultural assets owned by them and they are to be made aware in order to have proper public participation in order to preserve such important historic sites. Public participation is an utmost important aspect for the conservation of any site.

Absence of Legal Plan: There is an absence of a visionary master plan available specifically for the heritage sites in Nagaon. Such important sites require a separate space in the administrative framework of the authorities in the form of a legal document which has been prepared after consulting proper stakeholders and experts.

Documentation of Heritage Structure: The heritage structures of Nagaon region are not documented till date. There is a need of proper listing and documentation of heritage sites in Nagaon. Such sites are to be properly listed under various grades of their importance and documented specifically so that a proper conservation approach can be implemented for such important sites.

8.4 PROPOSED STRATEGIES

8.4.1 HERITAGE MANAGEMENT AND ORGANIZATIONAL STRUCTURE

There is a need to setup a Heritage Committee for Nagaon Panning Area. The concerned Development Authorities/municipalities as well as local stakeholders, NGOs have significant role to play in successful implementation of strategies proposed for Nagaon's Areas.

Formulations of special regulations to control or mediate development within the available heritage areas are a prerequisite for effective implementation of the proposed recommendations. Special regulations for all development within heritage areas, including new construction, demolition or modification to existing buildings around historic structures or within historic precincts must be formulated by the concerned authority with the advice of Heritage Committee.

Detail plans must be prepared by respective development Authorities and Municipalities. It is necessary to prepare an inventory of built, cultural and natural heritage resources of the special areas. The inventory must include both protected and unprotected resources. the cost for most of the new developments in special heritage areas is already covered in budget allocation for 'Tourism, Recreation and Culture' and hence not included in this table. Estimates for projects those are specific for preservation of heritage resources are only included. River Front Development is treated as a separate item of budgetary allocation.

8.4.2 HERITAGE CONSERVATION PROPOSAL

Figure 146 Heritage Conservation process

Where to start	Institutional setup	Special Control Areas
• Listing of buildings • Locating on city map • Form clusters of significant buildings • Name as Heritage Zone/ Conservation Zone	• Institutions responsible for maintenance – ULB,PPA, TCPD, ASI, state Depts. • Inter institution linkages – ULB, ASI, INTACH • Heritage Cell • Civil society groups/industrial house	• For heritage structures and precincts • Controlled Development • Heritage Conservation Committee

Figure 147 Heritage Conservation Chart

The primary objective of listing is to record extant architectural heritage and sites and the outcome of this process should invariably be to grade the heritage by a multidisciplinary team of experts whose recommendations should be available for public stakeholders and they can assess those for further changes if required. The importance of this process cannot be underestimated because its results determine subsequent conservation decisions and it facilitates the prioritisation of decisions relating to the future of architectural heritage and sites.

Listing does not prevent change of ownership or usage but change of use of such Listed Heritage Building / Listed Precincts is not permitted without the prior approval of the Heritage Conservation Committee. Listed Heritage Buildings / Listed Heritage Precincts may be graded into three categories. The definition of these and basic guidelines for development permissions are as follows:

Table 188: Heritage Building Catagory and Grading

Grade-I	Grade-II	Grade-III
(A) Definition: Heritage Grade-I comprises buildings and precincts of national or historic importance, embodying excellence in architectural style, design, technology and material usage and/or aesthetics; they may be associated with a great historic event, personality, movement or institution. They have been and are the prime landmarks of the region. All-natural sites shall fall within Grade-I.	Heritage Grade-II (A&B) comprises of buildings and precincts of regional or local importance possessing special architectural or aesthetic merit, or cultural or historical significance though of a lower scale than Heritage Grade-I. They are local landmarks, which contribute to the image and identity of the region. They may be the work of master craftsmen or may be models of proportion and ornamentation or designed to suit a particular climate.	Heritage Grade-III comprises building and precincts of importance for townscape; that evoke architectural, aesthetic, or sociological interest through not as much as in Heritage Grade-II. These contribute to determine the character of the locality and can be representative of lifestyle of a particular community or region and may also be distinguished by setting, or special character of the façade and uniformity of height, width and scale.
(B) Objective: Heritage Grade-I richly deserves careful preservation.	Heritage Grade-II deserves intelligent conservation	Heritage Grade-II deserves intelligent conservation (though on a lesser scale than Grade-II and special protection to unique features and attributes).
(C) Scope for Changes: No interventions be permitted either on exterior or interior of the heritage building or natural features unless it is necessary in the interest of strengthening and prolonging the life of the buildings/or precincts or any part or features thereof. For this purpose, absolutely essential and minimum changes would be allowed and they must be in conformity with the original.	Grade-II(A) : Internal changes and adaptive re-use may by and large be allowed but subject to strict scrutiny. Care would be taken to ensure the conservation of all special aspects for which it is included in Heritage Grade-II. Grade-II (B) : In addition to the above, extension or additional building in the same plot or compound could in certain circumstances, be allowed provided that the extension / additional building is in harmony with (and does not detract from) the existing heritage building(s) or precincts especially in terms of height and façade	Not Requires
(D) Procedure: Development permission for the changes would be given on the advice of the Heritage Conservation Committee.	Development permission for the changes would be given on the advice of the Heritage Conservation Committee.	Development permission for changes would be given on the advice of the Heritage Conservation Committee.
(E) Vistas / Surrounding Development: All development in areas surrounding Heritage Grade-I shall be regulated and controlled, ensuring that it does not mar the grandeur of, or view from Heritage Grade-I.	All development in areas surrounding Heritage Grade-II shall be regulated and controlled, ensuring that it does not mar the grandeur of, or view from Heritage Grade-II	All development in areas surrounding Heritage Grade-III shall be regulated and controlled, ensuring that it does not mar the grandeur of, or view from Heritage Grade-III.

(Source: CPWD)

For the conservation of heritage buildings, the abovesaid steps are to be followed.

8.4.3 POLICIES ON CULTURAL DEVELOPMENT IN NAGAON

The proposals for propagation and development of Cultural activities at Nagaon include:

- Promotion of Traditional Fairs and Festivals through government and NGOs participation so as to generate awareness among the new generation towards rich cultural heritage and inviting cultural tourism
- Development of a cultural centre at Nagaon with infrastructural development for round the year activities
- Centre for Development of horse dance (Ghora Naach) and handicrafts development and tourism promotion for the region.

8.4.4 UNESCO NOMINATION UNDER THE WORLD HERITAGE SITE

The historic site of Borduwa Satra, birthplace of Sri Sankardeva along with other important sites related to Sri Shankradeva in the state of Assam can be nominated for the World Heritage Site nomination as he was an important social and religious figure who was instrumental in shaping the cultural fabric of Assam which is thriving till date. His literary and artistic contributions are living traditions in Assam today. The religion he preached is practised by a large population, and Sattras (monasteries) that he and his followers established continue to flourish and sustain his legacy.

Thus, Nagaon authorities can take up an initiative with proper experts in preparing a document specifically mentioning the importance of Sri Sankardeva with the reference to his birthplace which can be used for tentative nomination in UNESCO by the state parties.

8.5 CONCLUSION

The relevant policy guidelines and management of cultural and natural heritage can rejuvenate and revitalize the Nagaon region and support the existing cultural identity. It can also promote tourism, boost local economy and contribute a great sense of pride amongst the residents and become a touchstone for future development.

9 TOURISM

9.1 INTRODUCTION

Tourism sector is emerging as the largest service industry for generating employment and boosting economic growth, having forward and backward linkages. There are several reasons for Nagaon district as tourist hub in Assam. Nagaon district has a strategic geographical location. It is located in Central Assam, and is a place of extraordinary scenic beauty, with the mighty Brahmaputra in its north, the Mikir and the Karbi hills in the south. It also connects Arunachal Pradesh, Assam, Meghalaya and Nagaland.

9.2 TOURISM DESTINATIONS

Nagaon, is an excellent spot for the promotion of eco-tourism and natural tourism. The famous Kaziranga National Park which is home for rhinos and tigers is located at travelling distance of only 2 hours from Nagaon Town on the south bank of the Brahmaputra. The other Wildlife Sanctuaries such as Laokhowa- Burhachapori (separated by a channel of the Brahmaputra) and Pobitora, a famous spot for bird watching is easily accessible from Nagaon Town. All these biodiversity hotspots represent a range of ecosystems, including evergreen mixed forest, and freshwater mangrove vegetation. It becomes a very lucrative spot for tourism, especially in winter. Additionally, Nagaon has numerous small and big tea garden which host special place in history. The first tea garden in Nagaon, Loongsoong, came up in 1880's. The tea gardens such as Jiajuri, Saloneh and many others, located at the foothills of the Mikir and the Karbi hills, are places of excellent scenic beauty. Provision of visiting tea garden accompanied by a sip of excellent Assam tea can further enhance the importance of natural tourism.

Eco tourism can also be encouraged in sites like Chapanala waterfalls, also known as Champawati Kund, located in Chapanalla town of Nagaon district. Within a two-hour travelling time, in the jurisdiction of Karbi- Anglong District, the picturesque waterfall of Kanthilangso Waterfalls is a nice spot, for a day trip, and for experiencing eco-tourism. It is famous for a mysterious cave, full of bats. This is widely believed by the local Tiwa villagers, to be an ancient village, which was turned by some sorcerer into a cave, and the inhabitants were transformed into bats. This incident is commemorated by an annual fair, held in each winter, by the villagers.

Thirdly, Nagaon has always been considered as the centre of Art, Culture, Literature, and heritage. It is renowned for being the birthplace of Srimanta Shankar Deva, the founder of medieval Vaishnavite faith in Assam, which was largely egalitarian.

Shankar Deva was born in Bordowa Than, near the present Nagaon town, which was later developed as the Bordowa Satra. Nagaon is also the birthplace of Lakshminath Bezbarua, a prolific writer in modern Assamese language, and a well-known artist. Beside the Vaishnavite cult, Assam has one of the oldest traditions of worshipping of the Goddess, Shakti, which was propagated by the Tantric Cult, and by the Ahom kings. One such ancient site for worshipping Shakti is the Akashiganga Waterfall, which is the largest waterfall in Nagaon. It is one of the 'Sati Pith's. In Akashiganga stream, many people assemble to take bath and worship, during the time of the 'Magh Bihu'. Another such place of worship of 'Kamakhya', as the mother Goddess is known in Assam is in Silghat which was built in 18th century by the Ahom kings. Silghat is also famous for the early 18th century Hatimura Durga temple and the Samantagiri hills, from where a fantastic view of the Brahmaputra may be obtained. A trail through the forests, along the bank of the Brahmaputra, leads to the ancient Shiva temple of Trishuldhari.

Additionally, Nagaon also have several sites of archaeological importance such as Baduli Khurung, Jayantipur Bar Masjid, Jungle Bolohu Fort Channel and Jagijan. Inside the Jiajuri tea estates, still, there can be seen, ancient stone pillars, gates, and water management system, possibly, older than thousand years, when the region was ruled by some unknown tribal rulers. Remnants of their ancient houses can still be noticed.

Lastly, Nagaon is famous for its diverse culture and handicrafts. To learn about the Assamese handicrafts industry, a visit to the Rontholi-Xunari Jewellery

Cluster is a must. Rontholi-Xunari is a small village within a radius of 6 km from Nagaon, where all the households are engaged in making of traditional gold ornaments, which is worn by Assamese women during Bihu dances, and in marriage. The art was once patronized by the local Ahom and Bhuyan kings and is specific only to Rontholi- 'Sonarigaon', or an abode of goldsmiths. In absence of patent rights, or state patronization, the industry is facing heavy competition and is in high risk of eventual annihilation. For an insight into the life and culture of the diverse tribes of Nagaon, trips can be undertaken to visit the isolated Karbi villages like Amsoi and Bali Chara Dalani, Tiwa Tribe in Roha, Villages of Nagas and Bodos. Much is to learn, from the sustainable lifestyle, led by the tribals. Thus, Nagaon have ample resources, and immense tourism potential, that required to be developed. Fullest development of tourism potential, can lead to economic and social development of the district, in terms of generation of non-farm activities, and rejuvenation of the near stagnant economy, largely dependent on the primary sector.

9.2.1 TOURISM DESTINATIONS FROM NAGAON WITHIN 25 KM OF RADIUS

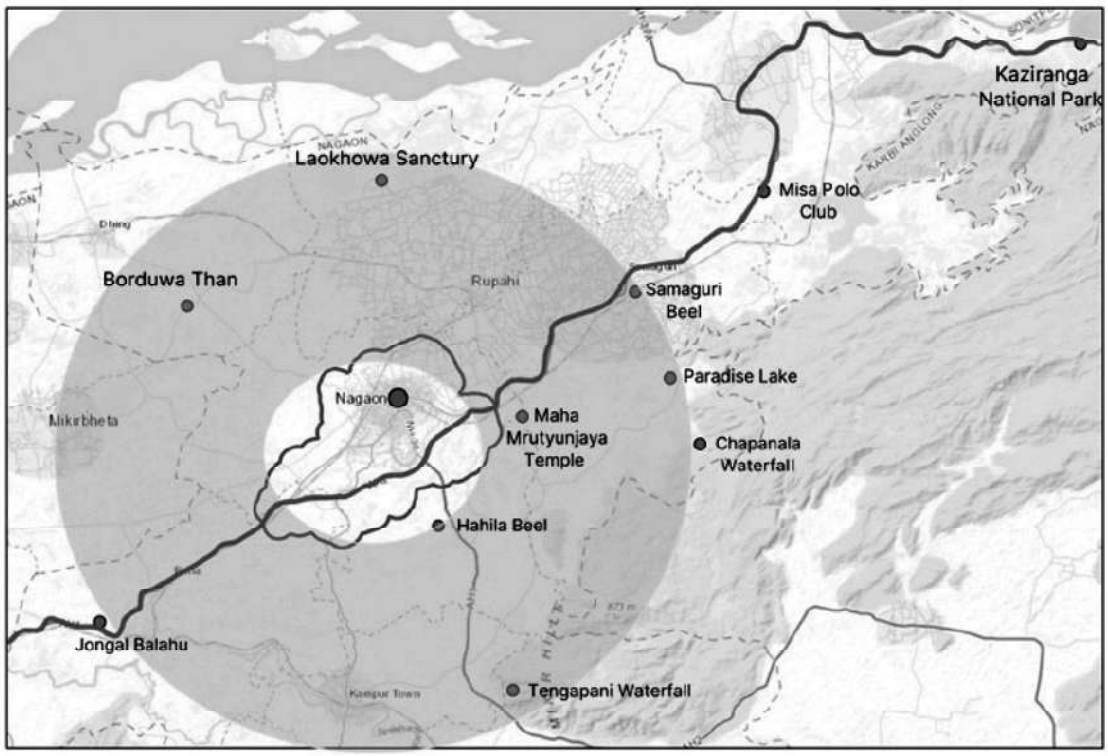


Figure 147.1 Tourism Destination in Nagaon within 25 kms

9.2.1.1 Borduwa satra

Bordowa or Bordowa Satra is a shrine, a centre of art and culture and is the birthplace of a great litterateur, artist, dramatist and founder of Vaishnav dharma in Assam. It is around 140 km away from the town of Guwahati and is 18 km north-west from Nagaon district of Assam. The Bordowa Satra is founded by great saint Sankardeva after his return from his first pilgrimage in about 1494 A.D. He found the first Namghar or Kirtanghar at Bordowa and used that place to practice and preach the newly found faith in Puran and Bhagwat. He used to call the place as Thaan or Dham and not Satra which was later called to be as such.

Mahapurusha Srimanta Sankardev (1449 AD -1568 AD) was an important personality in the annals of Indian history. He was not only a religious preceptor, but also a social reformer, who had sanskritized the ethnic groups of the volatile North East India and assimilated them with the national mainstream. He is considered as the father of the modern Assamese race. He was a great messiah, who rescued the people of Brahmaputra valley from the regressive medieval practices like human sacrifice.

Srimanta Sankardev was a cultural maestro too. He created a classical dance form known both as Sankari

Borduwa Satra

Srimanta Sankardev Birthplace

dance and Satriya dance. The Sangeet Natak Academy of India recognized it as a classical dance form in 2000 AD. Srimanta Sankardev also evolved a school of classical music, which is named after him. He created as many as 25 Râgas of his own. He was also the first playright in all modern Indian languages. Above all these, he was the first prose writer in the entire world. He introduced drop-scene and elevated stage in the world of drama way back in 1468 AD. He was also a fine artist. His art works have been preserved in the Albert Museum of London.Than means a sacred place in Assamese society. Traditionally this word has been used to indicate a sacred place. It was derived from the Sanskrit word 'Sthan' meaning place. Srimanta Sankardev used this indigenous Assamese word 'Than' to indicate the residential religious institution created by him. At that time the word 'Satra' was not used. Srimanta Sankardev himself used the word 'Than'. It was only later that the word 'Sattra' started to be used.

(source: Borduwa satra portal)

9.2.1.2 Laokhaow and burhachapori wildlife sanctuary

Laokhowa Wildlife Sanctuary covers an area of around 70.13 sq km and lies on the southern bank of the Brahmaputra River. It forms an integral part of the Laokhowa-Burachapori eco-system and is a notified buffer of the Kazairanga Tiger reserve. The sanctuary is home to the great Indian-one horned Rahinocoros, elephants, royal Bengal tigers, Asiatic water buffaloes and more than 225 species of birds.

The barking deer, fishing cat, leopard cat, civet and wild pig are some of the other animals seen in the sanctuary. The sanctuary is also a breeding ground for around 39 species of fishes, 9 species of amphibians and 14 species of reptiles.

The Laokhowa and Burhachapori Wildlife Sanctuaries from time to time. In addition to that, wet alluvial grassland sustains a large number of herbivores like sambar, barking deer and hog deer along with nocturnal species like pangolins, slow loris, porcupine and hare etc. Many rare and endangered species (many of them coming under the Schedule I species category under the Wildlife Protection Act. 1972) of small cats, civets and otters, reptiles like pythons, common and water monitor, turtles like Assam Roofed, Indian Roofed, Peacock Softshelled, Soft shelled Turtles, Butterflies like Birdwing, Common Map, Crimson Rose etc.

River and wetland tourism: The Brahmaputra River flows along the north of Burachapori. The river is dotted by numerous sandy river islands. There is a houseboat available with the Burhacapori WLS which can be used by tourists to visit the sandy islands where one can entertain themselves by indulging in beachsports and other such activities. The scenic beauty of the landscape and the glorious sunsets can be enjoyed by the tourists.

Burachapori Sanctury

Laokhaow sanctury

9.2.1.3 Samaguri

Samaguri Satra- This small satra out on a country road 11km east of Kamalabari, was founded in 1663 and has been making traditional dance masks from bamboo, cloth, clay, cow dung and paint ever since. One will be given a short explanation of the process in a room filled with masks and large images of Krishna in his Narasingha incarnation. Some small masks are for sale as souvenirs. Also, this place is known for making masks.

Samaguri Beel - Samaguri beel lies towards the north eastern side of the Nagaon District. The Samaguri beel is located between 260 25' N latitude and 920 51' E longitude. Samaguri beel one of the ox-bow lake shaped wetland of Nagaon district. This wetland is formed due to the shifting of meandering courses of river Kolong. It is situated about 20 kms away from Nagaon town. The area covered by the beel is 43.65 hectares in 2015 according to Google earth image. It is surrounded by Sonaibali and NH 37 in the north, Gatanga in the east, Samaguri Grant and Auniati satra in the south and Baziagaon in the west direction. Still Samaguri beel is connected with a small stream which is locally known as Ghatir Ghulung.

The mesmerizing view of the lake is one of the most popular things to see and when the wetland is surrounded by migratory birds then it is the best place in entire Assam. Apart from that, a nature conservation park is also there which will attract you as well.

Samaguri beel

Mirgratory birds in Samaguri beel

9.2.1.4 Rockland amusement park:

Facing the Samaguri Lake Tourism Project, the Rockland Park is in Samaguri Grant falling around 24 Kms from Nagaon, it can be reached in around 45 minutes via the AT Road and NH 37. Falling under Nagaon District, the Rockland Park serves as the: only recreational park in the city of Samaguri. Rockland Park itself is quite a package for children as well as for the adults, there are several large rides installed making it more of a small amusement park for the children. For grownups there is ample space for relaxing and enjoying the majestic view of the lake along with fountains and flowering plants and large tree growths inside the park premises.

Rockland Amusement Park

9.2.1.5 Maha Mritunjay Mandir

The Maha Mrityunjay Temple in Puranigudan, Nagaon is now quite renowned for the record of constructing the 126 feet tall Shiva linga which is the largest Shiva Linga in the world. The construction commenced in the year 2003 which was initiated by Acharya Bhrigu Giri Maharajas this was his place where he used to meditate. As per the mythological beliefs of the Maharaj, during the historic period, Shukracharya, the guru of the Daityas or Asuras performed religious rituals where the temple is situated.

9.2.1.6 Hahila picnic spot

The Hahila beel is one of the largest natural wetlands in Assam having great economical, ecological, biological and sociocultural importance. It has rich floral and faunal diversity. Besides, huge congregations of residential water birds are also found in the beel. The Hahila beel harbors large number of migratory birds each year.Not only for tourism but this beel have economic importance for fishing, irrigation, Root Collecting (Especially of arum) and grass cutting.

(Source-Socio-Economic Influences of Wetlands International Research Journal of Social Sciences)

9.2.1.7 Champavati Waterfall

Champawati Kunda in Chapanala, NagaonChampawati Kunda is a famous fall situated in Chapanala in Nagaon. Chapanala waterfall is a lovely place to visit for weekends and daytime leisure creation. The waterfall and Tea Gardens around and birds and different species of breeds are lovely to watch. This place is 1hour (approx) from Nagaon Town. Weekly marketing (Bazaar) on Sunday is a tradition market with local products are point of attraction.The inhabitants are mostly assamese and Bengali peoples with some percentage of Christians and adivasi villagers around the tea gardens. Road condition is quite bad for small cars but good for HUV segment cars to reach at the site. People must arrange their food along with or can cook at site for fresh food.Perfect place for refreshment in weekends.

Champavati Waterfall

9.2.1.8 Paradise Lake

The beautiful Paradise/Neelapani lake is located at Kothalguri village in Nagaon district, Assam. The village has a population of around 300 people. The lake has become a popular picnic spot and people from different places of North East India have started visiting this stunningly beautiful lake.

(Source: Nagaon district portal, Assam govt. https://nagaon.gov.in/)

9.2.1.9 Tengapani Kathiatoli Waterfall

Tengapani is one of the beautiful and dangerous but attractive Waterfalls in Assam located at Kathiatoli Hill Range, Assam. Tengapani is laying down in the lap of the Reng-Beng Hill in Assam and attracts tourists by its natural beauty of waterfalls and cascades of the streamlet. The name 'Tengapani' is given for its Sweet Water Spring.

9.2.2 TOURISM DESTINATIONS FROM NAGAON WITHIN 50 KM RADIUS

9.2.2.1 Misa Polo Club

The Misa Polo Club was built with the intention of creating a social and educational hub for the tea planting community. It is located in the picturesque Kellyden Tea Estate which is a 3 hour's drive from Guwahati, the capital of Assam. It is just 40 kms from Nagaon and 35 kms from Tezpur. The Misa Polo Club was established in 1888 as a social Polo Club for the planters and heads of the British District Administration. The British planters introduced the club culture and encouraged social interaction through sports and other celebratory occasions. Apart from the facilities for indoor games, tennis and cricket, a 9 hole golf course was added later.

The Club was used by the US Army when they were temporarily stationed in Misa during World War II and gifted a plaque to the Club in appreciation for its hospitality. Ports. The outdoor sports centre has a 18 Hole Golf Course with a driving /chipping range and a putting green. There are also 3 Lawn Tennis Courts and a Badminton Court along with a Kiddy's Corner. There is a fully equipped gymnasium as well as provisions for playing indoor games like Billiards, Table Tennis, Carrom, Darts, Chess and Cards.

Outdoor game	Indoor games
• 18 Hole Golf Course • Driving/Chipping Range • Putting Green • Lawn Tennis • Badminton • Volleyball • Croquet • Kiddy Corner	• Table Tennis • Billiards • Darts • Chess • Carrom • Cards

Management and development centres

- Drop down screen with overhead projector
- Wi Fi connectivity
- Library with E-book facility and browsing
- Fully equipped Gymnasium
- On-site cook with catering
- Fully functional Bar
- Customized stationary on order
- Visit to Tea Estate and Factory

Infrastructure Plans on the Anvil

To establish Misa Polo Club as a 'one of a kind' recreational hub in Assam, a phase-wise plan is being put in place to build duplex cottages with modern amenities adjacent to the Club.

Misa Polo Club

(Sources: Amalgamated plantation, https://amalgamatedplantations.co.in/)

9.2.2.2 Kaziranga National Park

One of the most sought-after wildlife holiday destinations in India, Kaziranga National park's 430 square kilometre area sprinkled with elephant-grass meadows, swampy lagoons, and dense forests is home to more than 2200 Indian one-horned Rahinocoros, approximately 2/3rd of their total world population. Formed in 1908 on the recommendation of Mary Curzon, the park is located in the edge of the Eastern Himalayan biodiversity hotspots – Golaghat and Nagaon district. In the year 1985, the park was declared as a World Heritage Site by UNESCO. After a series of meetings and documentations, the Kaziranga Proposed Reserve Forest was created with an area of 232 km2 (90 sq mi) in 1905.

Along with the iconic Greater one-horned Rahinocoros, the park is the breeding ground of elephants, wild water buffalo, and swamp deer. Over the time, the tiger population has also increased in Kaziranga, and that's the reason why Kaziranga was declared as Tiger Reserve in 2006. Also, the park is recognized as an Important Bird Area by BirdLife International for the conservation of avifaunal species. Birds like lesser white-fronted goose, ferruginous duck, Baer's pochard duck and lesser adjutant, greater adjutant, black-necked stork, and Asian Openbill stork specially migrate from the Central Asia during the winter season.

The park is known for its good population of animals but more than that its the wildlife conservation initiatives that take place in the park are more popular. With its amazing wildlife conservation activities, the park has successfully managed to grow the population of Greater one-horned Rahinocoros, an endangered species.

Flora:

Due to the difference in altitude between the eastern and western areas of the park, here one can see mainly four types of vegetation' like alluvial inundated grasslands, alluvial savanna woodlands, tropical moist mixed deciduous forests, and tropical semi-evergreen forests. Kumbhi, Indian gooseberry, the cotton tree, and elephant Apple are amongst the famous trees that can be seen in the park. Also, a good variety of aquatic flora can be seen in lakes, ponds, and along the river shores.

Fauna:

The forest region of Kaziranga Park is home to world's largest population of Indian Rahinocoros. Other animals that can be seen in the elephant grass, marshland and dense tropical moist broadleaf forests of Kaziranga are Hoolock Gibbon, Tiger, Leopard, Indian Elephant, Sloth Bear, Wild water buffalo, swamp deer, etc. With increase in tiger population every year, the government authorities declared Kaziranga as a Tiger Reserve in the year 2006. Also here one can find good number of migratory bird species from Central Asia.

Safari Gate/Zones

Sprawling over an area of 430 sq km, the park alias the hotspot of diversity is split into four areas; each has its own distinguish feature regarding grasslands, the density of mammals & bird, land topography, terrains.

Major Attractions in & Around the Park

Around Kaziranga, one can find an ample number of nature getaways options like wildlife sanctuaries, parks for bird watching and hill stations.

9.2.3 TOURISM DESTINATIONS WITHIN NMPA

9.2.3.1 Religious Destinations

Shiva Mandir -This is old temple in Nagaon town, situated in the heart of the city. It is beautiful vibrant temples with open premises in main market area, i.e., Haiborgaon, Nagaon.

Kalibari Durga Temple- This is Goddess Durga temple, established by Bangali community. The temple facades reflect the Bengali culture, and many hindu festivals majorly durga puja and Navratri celebrate here.

Hanuman Temple: This is an ancient hanuman temple, probably the ancient temple in Nagaon. It is situated in the main market of Nagaon.

Ram – Krishna Satsang Samiti

This trust has a cultural background from Bengal, and many satsaung festival used to celebrate here.

Satsung Seva Trust

The Satsung Seva trust is charitable trust managing all hindu religious activities and festival celebrations in Nagaon town.

Nagaon town Eidgah

The Eidgah is in the center of city, with a beautiful garden premises along with prayer place. This Eidgah situated in Decapatty, the main market in Nagaon.

Baptist Church-

Nagaon Town Baptist Church is one of the oldest churches in Assam. It was set up by Pitt Holand More in the year 1846.It has long history and considered the oldest Church in Nagaon town.

Jagganath Temple The jagganath temple is lord Vishnu's avtar, considered as 'lord of universe'. This is temple in main town, special fasting and festival have been celebrated since ages.

9.2.3.2 Art and Craft Destination

Nagaon kala mandir

This place of cultural activity is situated in the Fauzdaripatty of Nagaon town. A small durga temple is also there. The place is well known for cultural knowledge of tradition and also counted as a holy place.

Pranab Barua Art Gallery

This art place is situated in the core area of Nagaon, Artist Pranab Baruah paved a new path in the contemporary art movement in Assam with a unique style of his own. Pranab Baruah, a versatile artist, born in a cultured and well-off family in 1935. His home, a paradise like abode by Kolong paar, the channel, which had been the constant source of inspiration for many creative artists and writers of this region.

3.1.3.2 Recreational Areas

Marar park

Situated on MG Road, at a distance of 1.5 Kms from the center, one can reach the Marar Park in under 10 minutes via the AT and MG Road. Marar Park is the only proper park in the city of Nagaon bringing in the essential need for place to hang out and revitalise oneself.

Spread in a small area, the Marar Park is very common hangout place in the whole of the city providing a much-needed break from the monotonous life and being a haven for children. Reaching the park, one is welcomed with a gated entry with large fonts stating the name of the park, upon entering one can find a much greener and peaceful environment all around, pathways are built for casual strolls and jogging. Marar Park recently went under renovations which resulted in a number of new additions to it, one such is a game zone much loved by the children for all the games provided to them. One can find numerous statues of birds and animals all around the park, statue of flamingos and other birds can be found, the largest being that of a dinosaur. Benches and small wooden trunk cut are installed for people to sit and relax with children playing around in the park. The garden inside the park also features a number of flowers which adds to the beauty of it. In the center is a small fountain installed with running water show, visitors can also find a cabin like refreshment center inside the premises. A number of rides including see-saws, swings, slides and others complete the park.

Marar park

9.3 HOTELS AND RESTAURANTS

Table 189: Hotels and Resorts in Nagaon

Sr. No.	Hotels		Resorts
1	Hotel Blue Bird Annexe Hotel Nagaon Point Hotel Piyush Regency Hotel Bohagi Hotel Abhinandan International Hotel Swagat Prashanti Tourist Lodge Hotel Am palace	**3 Star**	**Okinawa Resort and Botanical Park** (Uriagaon, Old Nonoi Road, Nagaon)21 • Situated at 6 km from the town. • Spread over a sprawling area of 20 bigha.
2	Hotel Natraj Hotel Bidisha Hotel Relax Hotel Star Hotel Perth Hotel Rajasthan	**2 Star**	**Jasingfaa Aqua Tourism Resort** (Marikolong, Nagaon) It is a fish-based Aqua Tourism project and is 5.5 km away from the town. Covers land area of 15 acres out of which 8 acres are covered by water consisting of small tanks.

Table 190: Restaurants in Nagaon

Sr. No.	Name of Restaurant	Type of outlet	Veg/Non-veg
1	Regal Palace Restaurant	Family-friendly, Indian cuisine restaurant	Both
2	Hotel Aashirwad		
3	Restaurant Kuhelika		
4	Restaurant Kolong		
5	Tulips Restaurant		
6	Mint Leaf Restaurant		
7	Nightingale Restaurant		
8	China Town Restaurant	Chinese cuisine restaurant	
9	Red Chilly	Fast Food	
10	My Shyam Restaurant		
11	Domino's Pizza		
12	IFC		
13	Chalachal Restaurant	Middle eastern cuisine restaurant	
14	Na Khuwa Restaurant	Ethnic restaurant	
15	Rupak Assam	Nasi goreng restaurant	Non-veg
16	Lebanese Shawarma	Lebanese cuisine reataurant	
17	Meat and Eat	Indian cuisine restaurant	
18	Tandoor Cave		
19	Blue Ginger Cafe	Cafe	Veg
20	Barabazar Diary	Family-friendly, Indian cuisine restaurant	

(Source: Domestic Tourism, Assam, Ministry of Tourism)

As per Survey in Tourism statistics in Assam, total number of visitors in Nagaon is 20,000 (approx.), out of which 20 are foreign visitors (not to count Kaziranga). It is one of the lowest when compared with other cities of the state though it has got a lot of tourist spots. The problems are listed below:

Table 191: Tourism problems with solution

Problems	Solutions
Lack of Awareness - A large percentage of tourists found the tourist attractions not interesting.	To develop a proper website, that enables to give enough information to domestic and foreign tourists.
Lack of Skilled Manpower - 81% of the visitors found shopping facilities inadequate.	To involve tribal youth to showcase the art, culture, heritage and livelihood.
Problems	**Solutions**
Lack of Service Infrastructure - No youth hostels, tourist bungalows. - Accommodation facilities are assessed as poor by those who visited. - Just 1.6 is the average duration of the stay (around 80% of the tourists come for a day trip only). - 57% assessed entertainment facility as poor.	To develop sufficient accommodation in all tourist spots and should be well-maintained too.
Lack of Connectivity - Transport facilities are assessed as poor by those who visited.	To develop the road network and public transportation should be accessible to all the spots and cabs facility should also be provided.

9.4 STRATEGIES FOR DEVELOPMENT OF RECREATIONAL AREAS

Recreation is any physical or psychological revitalization through the voluntary pursuit of leisure time. It is an activity which is relaxing to people and provides diversions from their normal routine. Generally there are four types of recreation activities:

- **Revitalization:** restoration and enhancement of mental and physical health.
- **Play:** relaxation and exercise
- **Adventure:** excitement and challenge
- **Education:** organized and incidental
- City level recreational facilities are of two types:
- **Indoor** facilities consist of libraries, clubs, cinema hall, auditorium, multiplex, art and craft centre, shopping malls, food courts, cyber cafés, gymnasium etc.
- **Outdoor** recreation facilities consist of gardens, parks, play grounds, golf courses, zoo, botanical garden, race course, stadium, exhibition ground, water sports complex, green ways, bike ways etc.

9.4.1 PROPOSALS FOR AUGMENTATION AND DEVELOPMENT OF RECREATIONAL FACILITIES

- Development of green belts, plantations, parks, Ghats, plazas along the Salandi riverfront abreast the Urban set up and invite nature in harsh built environment through myriad ways.
- Amusement Parks to be developed along with horticulture, Pisi-culture, herbal parks, etc.
- Development of eco-tourism with provision of water theme parks, lagoon resorts, weekend resorts and world class recreation centres such as club towns, golf clubs, spa resorts, etc. at Planning Area level.

9.5 PROPOSED STRATEGIES TO BOOST TOURISM

As a service industry, tourism has numerous tangible and intangible elements. Major tangible elements include transportation, accommodation, and other components of a hospitality industry. Major intangible elements relate to the purpose or motivation for becoming a tourist, such as rest, relaxation, the opportunity to meet new people and experience other cultures, or simply to do something different or have an adventure. Tourism is vital for every place, due to the income generated by the consumption of goods and services by tourists, the taxes levied on businesses in the tourism industry, and the opportunity for employment and economic advancement by working in the industry. For these reasons government and private agencies sometimes promote a specific region as a tourist destination, and support the development of a tourism industry in that area. The contemporary phenomenon of mass tourism may sometimes result in overdevelopment; however alternative forms of tourism such as ecotourism seek to avoid such outcomes by pursuing tourism in a sustainable way.

Nagaon Region offer great potential for tourism development. According to the existing scenario analysis, it has been observed that the following categories of tourism have immense potentialities for this region:

- Religious Tourism with historically important structures such as temples and other outdoor worshipping areas in the vicinity.
- Cultural and Heritage Tourism with annual / seasonal traditional village fairs and festivals, folk or tribal socio-cultural events with arts, crafts, music, dance etc.
- Nature based outdoor recreation and Eco-tourism for hills, forest, riverfront, wildlife sanctury and vast agricultural area/ village settlements with undulating landforms including picnic spots, sightseeing, camping sites etc. Presence of all these tourism products calls for the growth of Adventure Tourism.

10 ENVIRONMENT

10.1 INTRODUCTION

Environment plays an important role in the sustainability of a region. The balance between different environmental aspects and development defines the progress and livability of an area. The most crucial factors which affects the livability of an area are primarily, land and water. With an increase in the demand of the water, the demand for urban land is also increasing. People flock to urban areas to seek employment, entertainment, shopping and generally a higher standard of living. At the same time, environmental infrastructure for works and services are inadequate to serve the resulting increase in population and population densities.

The inevitable congestion causes environmental hazards and degradation until strategies for reversing environmental deterioration can be implemented. Hence, the magnitude of urban population growth in developing countries is a direct indicator of the degree of spatialconcentration of people, industries, commerce, vehicles, energy consumption, water use, waste generation and other environmental stresses. Several environmental aspects are considered and studied to access the environmental conditions of the planning area. This analysis is presented in this chapter along with proposed strategies to safeguard the environment of the planning area.

10.2 GEOGRAPHY OF THE REGION

Geography of Nagaon District is appositely characterized by various highlands, rivers, and marshy lands. Geo-morphologically, Morigaon District and Nagaon District together form the shape of a broken dish. Nagaon District is bounded by Sonitpur District and Brahmaputra River on the north, by West Karbi Anglong District and North Cachar Hills on its south, by East Karbi Anglong District and Golaghat District on its east. Geographically, Nagaon District is one of the largest districts of Assam. Its highlands include Hatimura Parbat with an altitude of 186.5 metres, Barkandali with an elevation of 853 metres and Kamakhya Parbat with a height of 244 metres.

Geography of Nagaon District comprises some major rivers like Brahmaputra River, Kalong, Sonai, Nanoi, Yamuna River, Kopili and the Barpani. The major river is the Kalong which divides the town into two halves - Haibargaon and Nagaon. Moreover, there are several beels, marshy lands and swamps; these are actually the old abandoned channels of Kalong and Kopili rivers. These are Marikalong, Potakalong, Haribhanga, Jongalbalahu, Samoguri beel. These beels are the unused resources of the district. There are about two hundred numerous marshy lands here. Northern and the southern regions are uplands. General slope of Nagaon District is towards the west. The eastern, north eastern and the south eastern parts are hilly terrains. Geologically, the soil of Nagaon District is of sandy texture.

Figure 148 Brahmaputra riverbank near Silghat, Nagaon

Geography of Nagaon District is also determined by the pleasant weather of the region. In fact, it enhances the picturesque topography of this district of Assam. The climate is in general monsoon type. However, there are some differences from the other districts of Assam. The climate is of an extreme type compared to other districts of Assam. The pattern of rainfall is such that the south is usually dry and the north is relatively rainier. Rainfall from south to north increases. The average rainfall is near about 1750 mm. Deforestation, speedy

urbanization and global warming, etc. are changing the rainfall pattern of the district. Nagaon District has a vegetation cover of around 12 percent. Thus, it is noticeable that geography of Nagaon District is spread over vast plain lands dotted with fewer hilly terrains. The wonderful climate enhances the topographical features of the region.

10.3 THE KOLONG RIVER

10.3.1 EXISTING CONDITION

Urbanization has got its own advantages and disadvantages. The main advantage is that it provides scope for provision of common infrastructure facilities. The main disadvantage is that it creates more strain on the resources (including land and water). The environmental consequences of urban growth are considerable. Cities are prolific users of natural resources and generators of wastes. The urban ways of living contribute to relatively more pressure on resources. Migration of people to cities puts enormous pressure on the infrastructure in terms of available land, water etc. Some of the issues will be water scarcity and water pollution, air pollution, climate and Heat Island Effect, poor management of solid wastes, urban congestion etc. in the system. Economic activities also constitute an indirect pressure in the sense they increase the movement of men and material. This leads to increased fuel consumption, waste generation etc.

Figure 149 kolong River, Nagaon

The Kolong River of Nagaon district, Assam has been facing serious degradation leading to its current moribund condition due to a drastic human intervention in the form of an embankment put across it near its take-off point from the Brahmaputra River in the year 1964. The blockage of the river flow was adopted as a flood control measure to protect its riparian areas, especially the Nagaon town, from flood hazard. The river, once a blooming distributary of the mighty Brahmaputra, had high navigability and rich riparian biodiversity with a well established agriculturally productive watershed. However, the present status of Kolong River is highly wretched as a consequence of the post-dam effects thus leaving it as stagnant pools of polluted water with negligible socio-economic and ecological value. The Central Pollution Control Board, in one of its report has placed the Kolong River among 275 most polluted rivers of India. The river Kolong is fed with several rivulets namely Diju, Misha, Diphalu, Haria-Nanoi and Titaimari or Rahasuti. Receiving the water from aforesaid rivulets, the river Kolong become bigger and enters the district of Morigaon passing through

the National High Way-37 at Bhatigaon and MulankotaManipurtup area under Raha circle. In the district of Morigaon, another important river Kapili joins Kolong course at Dukhutimukh of Jagibhakatgaon area.

10.3.1.1 Polluted River Stretch

The length of the polluted stretch of Kolong river at downstream ADP bridge is 7.5km (approx.) with an area of 21.4 sq.km. (Fig 150) and the stretch identified as polluted is from Diphalu to Kutayani.

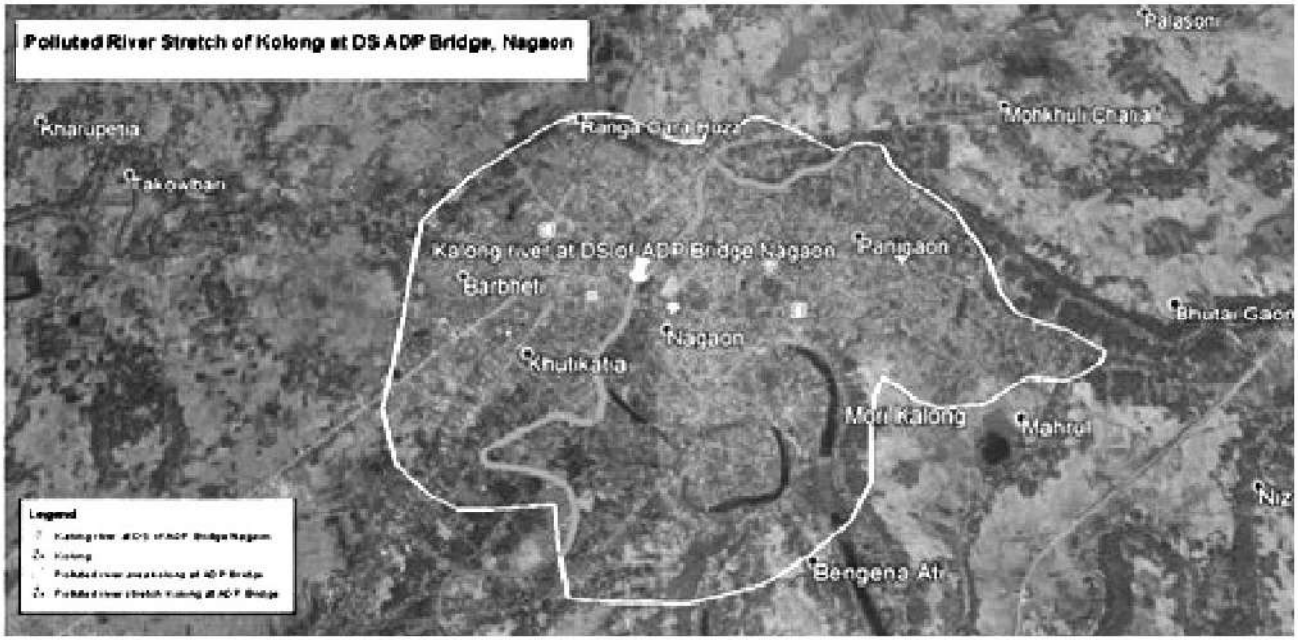


Figure 150 Map showing the polluted river stretch of Kolong river at d/s ADP bridge

The length of the polluted stretch of Kolongriver at Morigaon is about 1.5 km with an area of 2.0 sq.km. (Fig 151) and the identified polluted stretch is from Bangthaigaon road to Baghjap.

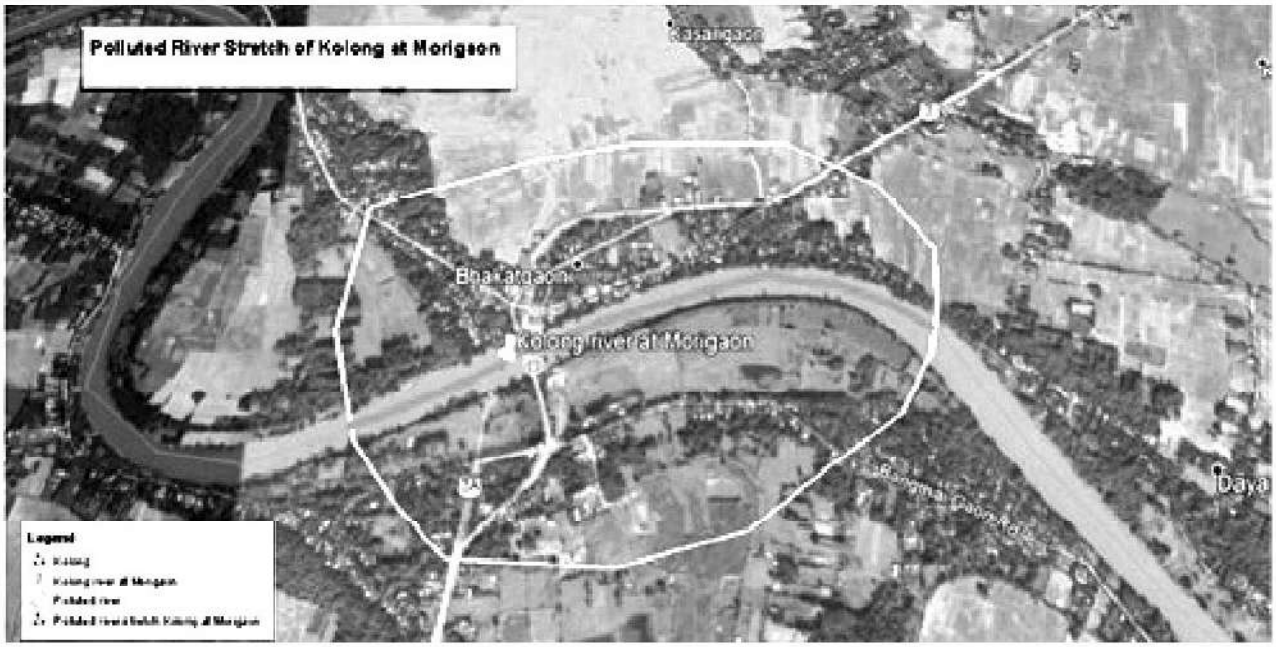


Figure 151 Map showing the polluted river stretch of Kolong river at Morigaon

10.3.1.2 Identification of Locality around riverbank

Nagaon is the major town located on the bank of the Kolong river. The approximate population of the Nagaon town is 1,48,496 as per Census 2011. The major localities identified in and around the catchment areas of polluted stretch of Kolong river at down streams of ADP bridge are Diphalu, Ratnapur, Anandanagar, Panigaon, Jyotinagar, Kachali (No.2), Dimoruguri, ChotoHoibor, Kachalukhuwa, Morikolong, Barbheti, Khutikatia, Sensuwa etc.

Kolong river also enters Morigaon district at Manimurtup, however, the polluted stretch of the river is not identified across the major populated locality of the district i.e Morigaon town. Bhakatgaon is the only major village located in the bank of the polluted river stretch of Kolong river at Morigaon area. The area is a medium sized locality with a population of around 1780 with 378 households as per Census 2011.

10.3.1.3 Quantity of Sewage generated

The major town/village responsible for contribution of sewage in the polluted stretches of Kolong river is Nagaon. The waste generated by Nagaon town is approximately 16037.6 KLD. (Source: Action plan for Kolong river, PCB, Assam).

10.3.1.4 Sewerage Treatment Proposal

As per the survey done, one (01) number of STP has been proposed at Nagaon town in consultation with the District Administration.

Table 192 Sewerage Generation Calculation

Sr. no.	Area	Population	Water consumption (KLD)	Sewage generation (KLD)	No. of STPs proposed	Existing Treatment capacity (KLD)	Gaps in KLD
1	Nagaon	1,48,496	20046.9	16037.6	01	Nil	16037.6

(Source: Action plan for Kolong river, PCB, Assam)

10.3.1.5 Drains contributing to pollution

Three major drains are identified in the Nagaon town, which is responsible for draining off majority of the municipal, industrial and commercial waste from the town to the river. The details of the drains or outfalls that carries majority of the city sewage in Nagaon town is presented in Table 193.

Table 193 Natural Drains merging Kolong

Sr. no.	Location
Drain 1	Near ASTC bus stand, Nagaon
Drain 2	Near Anandaram Dhekial Phukan bridge, Nagaon
Drain 3	Near Law College, Nagaon

Most of the households have individual drainage that has been connected to soak pit, kitchen garden and stagnated pool to take care of the waste.

The drains mainly carry industrial as well as residential wastes. Direct dumping of residential and commercial garbage into the channel is making it shallower and heavily silted. As a result, during rainy season water overflows and inundates the areas. It is also observed that the drains of the town are also becoming a regular garbage-dumping site. Moreover, these drains are not planned properly to carry even the regular water.

There is no well-connected drainage system in Nagaon town, resulting in occasional flooding particularly in the monsoon season. Drains along the side of roads exist in some areas but may be blocked or not linked up properly. Flooding is of particular concern in the following areas:

- Part of Panigaon
- Hotelbar area
- Teliapatti
- Santipur
- Lakshminagar

- Islampatty
- Area opposite to the Haibargaon railway station.

In recent times, improvement schemes for the drains have been proposed by the state government with possible assistance from the Government of India. A roadside drainage improvement project has been sanctioned by the NMB but has not yet started.

10.3.1.6Wastewater flow carried by drains

At present the Nagaon town does not have an integrated sewerage system. The only collection and treatment process being followed is the use of septic tanks. Therefore, part of the wastewater generated in the town is being disposed off into the rivers without any treatment.

The wastewater volume discharged into the Kolong River is based on the following assumptions:

- Estimated number of inhabitants contributing to wastewater discharging into the river. The estimation is carried out as follows. On the basis of the town's topography a delineation of the town is made. Based on this delineation the areal percentage of each ward contributing to the discharge is determined. The number of people living in each ward is known. And hence the number of people in each ward contributing to the discharge in the Kolong River can be found simply by multiplying the percentage and the number of people in the ward.
- Daily contribution of 108 lcpd, calculated as follows: 0.8 x 135 lcpd.

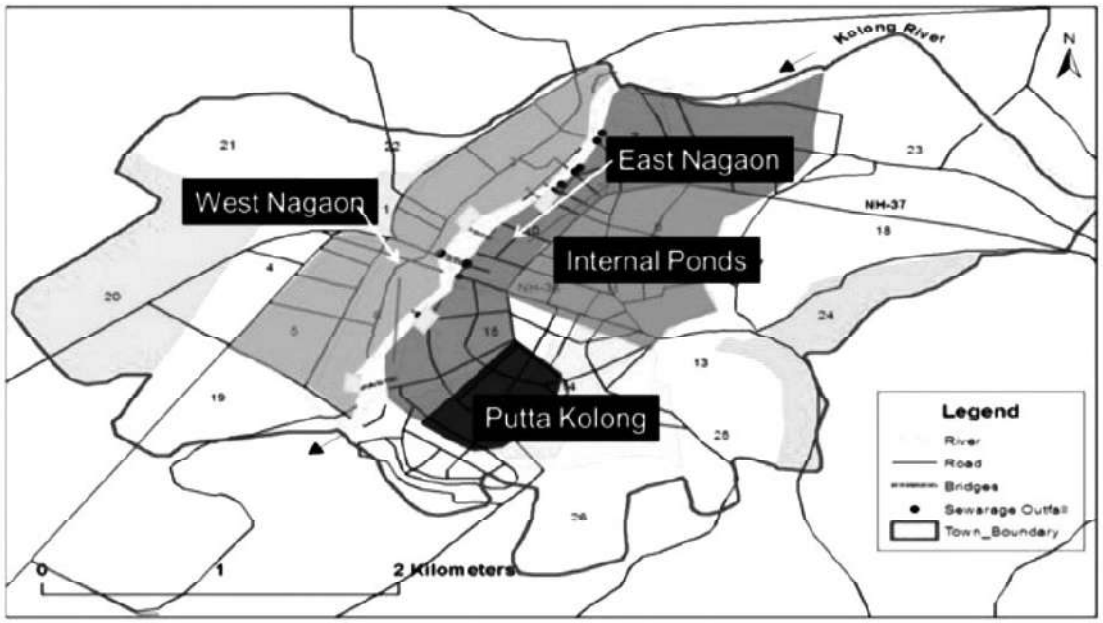


Figure 152 Wastewater Flow Carried by Drains

10.3.1.7Wastewater Characteristics of Different Drains

The sources that have been identified include the following:

- Domestic sewage: Raw domestic sewage and partially treated sewerage in the form of septic tank effluent drains are directly connected to the storm water drainage system. The direct sewage discharges contribute heavy organic loads which affect water quality and include bacteria, viruses, and other pollutants which are harmful to human and ecological health. Similarly, the septic tank effluent contributes organic loads but at a much lower magnitude.
- Municipal solid waste (MSW): MSW (i.e., garbage) is routinely dumped in town streets and along the banks of the Kolong River. At numerous locations along the riverbank, MSW is strewn about in thin, non-contiguous layers, but in many locations, thicker, contiguous fills exist on the river banks and lie in contact with the flowing water. In many cases, metal, wood, and food wastes appear to be scavenged by local populations, dogs, and other animals, and the resulting mixture is dominated by plastic wastes. As these wastes slowly degrade, they release toxic pollution to the water.
- Storm water: Storm water is directly discharged to the Kolong River via the surface drainage system, and also as overland surface runoff. In both cases, this storm water carries solids and pollution from the town streets into the river. In addition to domestic sewage, this runoff likely includes particulates from combustion of diesel fuel and other petroleum fuels, pollution from MSW, oils and greases from pavement areas, abraded asphalt particulate, animal wastes, agricultural, and other pollution sources.
- Industrial pollution: Industrial pollution sources may include automotive maintenance areas, fuelling stations, and other industries indigenous to the area. These pollution sources can be directly discharged to the drainage system, can flow overland, or can infiltrate groundwater which ultimately discharges to the Kolong River.
- Atmospheric deposition: The air quality in Nagaon town is affected by sources such as the combustion of petrochemicals for transportation, energy, and industrial purpose and regional air quality pollution. Particulates which contain toxic combustion by-products and heavy metals such as mercury settle and dissolve into the town's waterways.

10.3.1.8Sewage generation from the towns located on the banks of the river

The main contributor of pollution in the river is municipal sewage. There are no treatment systems for the sewages which are dumped in open thereby ultimately finding their ways to water bodies without treatment. Moreover, Sewage treatment facility has not been set up yet in Assam.

10.3.2SOLID WASTE DUMPING

It is a process of storage, collection and disposal of the waste generated from various sources like households, commercial, markets, etc. Improper disposal of Municipal Solid Waste (MSW) has a negative impact in terms of contamination of soil, surface water, ground water and generation of toxic and green-house gases. However, use of adequate information, resources, and efficient management practices could turn some of the solid waste into a useful resource.

According to the Municipal Solid Waste (Management and Handling) Rules, 2000, municipalities are responsible for municipal solid waste management and in Nagaon town; the NMB is doing the municipal solid waste management. The total waste generated per day in Nagaon town is approximately 30-32 metric tonnes (MT) from various sources like households, commercial establishments, hotels, marketplaces, drain cleaning and street sweeping, construction waste etc. Out of the total generated waste about 22-23 MT are collected on the daily basis, which is about 70% only. As per the information provided by NMB staff, there are around 90-100 bins placed all over the town. The material of these bins is either fibre or cast iron. The condition of these bins is bad as can be seen from Figure 153.

Figure 153 Solid waste dumping along Kolong River

As stated above, the estimated waste generated across the town is 32 MT, which implies that the total waste generated per capita is approximately 0.2 kg/capita/day, considering an average family size of 5 persons. Official data on the category wise solid waste generated are not available. However, the general composition of the solid waste is as shown in table below.

Table 194 Solid Waste Composition

Sr. no.	Composition of waste	Percentage (%)
1	Food and garden waste	40
2	Glass and ceramics	5
3	Paper	27
4	Metal	15
5	Inert	4
6	Plastic rubber	6
7	Textile	3
Total		**100**

(Source: Pollution Control Board, Assam Conservation of River Kolong, Nagaon)

10.3.3 GROUND WATER

The quality of ground water in the Nagaon district is suitable for both the drinking and irrigation purposes except the high concentration of fluoride (F) with concentration varying between 0.5 to 8 ppm and iron with a concentration varying from 0.14 to 1.29 mg/l in certain areas.

The quality of ground water in the near by district is suitable for both the drinking and irrigation purposes except with higher concentration of iron (Fe) in the range of 0.1 to 2.5 ppm is observed in few pockets in shallow and deep aquifers of the district. However, the high concentration of iron beyond permissible limit in ground water in some of the areas of Nagaon and Morigaon districts can pose problem, which can be lowered by aeration and filtration method.

10.3.4WASTE MANAGEMENT PLAN

Table 195 Waste Management Plan

Sr. no.	Type	Status	Proposed actions	Authority
1	Industrial Waste	• No industrial waste dumped on land or discharged into water bodies/river. • Industrial wastes are managed by industries itself • Authorisation have been granted to different industries in line with Water act 1974, Hazardous Waste (Management, Handling and Transboundary Movement) Rule, 2008 as amended. • Regular monitoring by PCBA to ensure that the terms and conditions are strictly adhered in accordance with the prescribed standard	Direction issued to the industries to identify the non-point sources and arrest contamination of storm water.	**Pollution Control Board Assam**
2	Municipal waste	• Dumping is carried out unscientifically in the open space. • No proper segregation of bio-degradable and nonbiodegradable waste • No proper segregation of dry and wet waste • Lack of unscientific disposal facilities/ infrastructure technology like decentralized composting or bio-methanation plant, waste to energy plant, solid waste management plant.	Municipal Body is in process of inducting the following activity • Implementation of segregation of waste at source • Door-to-door garbage Collection of waste • Formation of Sanitation task Force • Formation of Neighbourhood Community • Awareness campaigns Processing and disposal of waste	**Municipal Body**
3	Plastic Waste	• Dumping is carried out unscientifically in the open space along with the municipal waste. • No proper segregation of bio-degradable and nonbiodegradable waste • No proper segregation of dry and wet waste • Lack of unscientific disposal facilities/ infrastructure technology like decentralized composting or bio-methanation plant, waste to energy plant, solid waste management plant.		**Municipal Body/ Pollution Control Board Assam**
4	Hazardous Waste	• Hazardous waste are managed by hazardous waste generating industries itself by disposing the same through authorised recycler, secured landfill area, Bioremediation etc. • PCBA has engaged collection centre for collection of Hazardous waste • Lack of TSDF facility for commonly utilization by hazardous waste generating industries		**Pollution Control Board Assam**
5	Biomedical Waste	• Segregation at the source under Biomedical waste Management Rules, 1998 as amended • The HCFs have installed ETP for treatment of liquid waste generated		**HCF units/ Pollution Control Board Assam**
6	E –waste	• Most of the e-waste generator have sent their e-waste to their respective manufacturer. • Annual return in (Form-3) is submitted by E-Waste generating units to PCBA from time to time for onwards transmission to CPCB • There is no authorised recycler, refurbisher, dismantler etc. available to ensure environmentally sound management of Ewaste. • There is no "facility" wherein the process of dismantling, recycling, and disposal of ewaste are carried out. Most of the e-waste generator sent their e-waste to their respective manufacturers		**Pollution Control Board Assam**

(Source: Pollution Control Board, Assam Conservation of River Kolong, Nagaon)