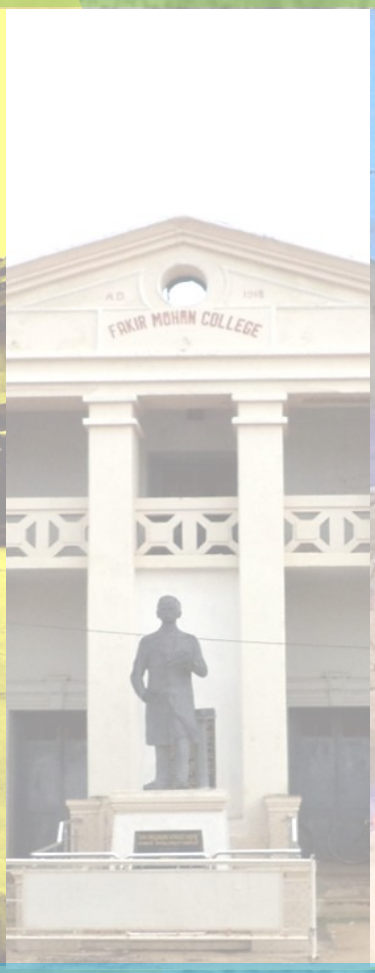
BALASORE REGIONAL IMPROVEMENT TRUST (BRIT)
ODISHA

GIS/RS BASED MASTER PLAN
BALASORE



FINAL MASTER PLAN
2030

March 2023

FEEDBACK INFRA (P) LIMITED

Table of Contents

List of Figures

List of Tables

List of Maps

Introduction

Chapter 1. Introduction

1.1 Introduction

Master plan is the 'Policy Document' for orderly planning process, which analyses the present and future needs and identify the future prospects of development.

The Master Plan (MP) describes the broad vision for the Town's future. It provides the core philosophy that directs all development and conservation activities in the town. It guides where and in what form development occurs in the community and frames the capital improvement projects. The Master Plan is used to test the appropriateness of both public and private development proposals.

Master Plan is a comprehensive physio-socio economic and environmental plan integrating all necessary facilities, services, and amenities over a defined space in socially, economically, environmentally conforming, and compatible placements in terms of uses. The plan ensures a sustainable growth-oriented development over foreseeable future for projected population. It is a statutory document (Long-term plan / 20 years) to be prepared and processed under "The Odisha Town Planning and Improvement Trust Act, 1956" for Balasore Planning Area.

1.2 Objectives of the Master Plan

The main objectives of the Master Plan are as follows:

- To prepare a Master Plan for the next 20 years for ensuring good quality of life for the people of Balasore.
- To check the haphazard and unplanned growth within and surrounding the town
- To ensure efficient and affordable transportation system within the planning area
- To promote the economic efficiency
- To improve quality of life particularly of the poor and the deprived

1.3 Vision

"To explore the economic potential through sustainable growth and development of Balasore as a trade centre, education and industrial hub along with promotion as a tourist centre through conservation and preservation of natural, religious features, historical and cultural values;"

1.3.1 Aim

- Develop Balasore as emerging growth of value-added industries and hub of Agro-based food processing industries as well as a wholesale trade centre.
- The master plan of Balasoreplanning area is based on the principle of neighbourhood planning concept.
- The entire town will be divided into planning zones and each planning zone will be further divided into sub use zones.
- The other uses such as commercial, recreational, health and education will be distributed all over the planning area in a hierarchical manner.

Based on the vision and aim, the goals are as below:

Goal 1:

Developing Balasore Town as a base of Industries, Wholesale market and distribution centre in the region

Goal 2:

Create a balanced city having important functions such as to live, work and recreation

Goal 3:

Regulated development and land use planning as per conformity along with better access to basic services and facilities

1.4 Planning Area briefly

To meet the emerging needs of population growth and prospective future development through planning of the entire area and to check haphazard, unregulated, and unplanned development, the planning area including Balasore town and surrounding villages have been notified for Master Plan. The planning area comprising of Balasore Municipality and 205 villages covers a total area of 233.82 sq km (Refer to Table 1.1). As per Census 2011, the population of the planning are coming out to be 2,60,532.

Table 1.1: Planning Interventions

S. No.	Description	Unit	Master Plan I	Master Plan II	Additional
1	Total Planning Area	Sq Km	123.8	233.82	110.02
2	Urban Area	Sq Km	14.41	14.41	-
3	Year of Inception	Nos	1976	2013	-
4	Year of Notification/ Base Year	Nos	1984	2030	-
5	Population	Nos	1,28,315	59,903	72,314
6	Revenue Villages	Nos	110	205	95
7	No of Mouza/Revenue Sheets	Nos	324	450	126

1.5 Planning Issues

Balasore has shown a significant growth potential since 2001, due to migration from the nearby villages and rapid growth of administrative and commercial facilities. Despite its physical constraints and limited land availability, the town is growing in an unplanned and uncontrolled manner. The demand for serviced land has increased tremendously to accommodate the increasing population in and around the Balasore town. The organic growth is putting immense pressure on land and other infrastructure of the town as well as forcing urban expansion in the surrounding villages. During 1976, for the first time the effort was made by the Government of Odisha for the preparation of Master Plan for Balasore. Presently, the town has been growing in an organic pattern with inadequate basic amenities. Unavailability of developable land within the town, is forcing its growth towards surrounding villages. Due to above mentioned factors, the 'Master Plan Report' is not only restricted to Balasore town but it will also include the nearby villages in Balasore Rigional Improvement Trust (BRIT) Area.

1.6 Purpose of the Master Plan

Like any other growing town, Balasore has its own share of concerns that need immediate attention like, provision of civic amenities, housing, alternative mode of transportation, protection of natural areas and supply of adequate infrastructural facilities. To meet the emerging needs of population growth, promote planned and systematic development of the entire area and to check haphazard, unregulated, and unplanned development we need a master plan of Balasore in place.

The Master plan for Balasore is an effort to achieve an appropriate balance between the spatial allocation for various activities i.e. housing, employment, social infrastructure, organised shopping centres, transport, adequate arrangements and reservations to accommodate different kinds of physical infrastructure and public utility systems. It comprises of a set of co-ordinated policies concerned with virtually all aspects of development in the town.

1.7 Limitation of the Project

The scope is to prepare a document which would translate the economics and balanced growth concept for the town. The base for the analysis of the town is mainly the Census of India. All physical data is limited to the quantitative inputs for the villages. The various maps including Mouzas of revenue villages, Town Map, Satellite Imagery are digitised and geo-referenced and are provided to the consultant by the Balasore Regional Improvement Trust, Balasore. The existing land use map of the concerned master planning area is provided to the consultant. Though the maps are correctly geo-referenced, their actual positions on the ground may still vary, and need verification while attending to use zones and use premises for real time. The consultant must verify the maps and carry out the ground truthing of the existing land use of the study area.

1.8 The Planning Process

The preparation of the Master Plan started with the study of the existing conditions and assessment of the future needs and quantifying the deficiency and accounting for the potential resources and constraints. Based on the above studies development priorities were set for the urban area taking into consideration the physical as well as socio-economic needs.

The formulation of the Master Plan for the development area started after status analysis and consideration of the prime issues as indicated below.

A. Physical characteristics and natural resources.
- Location and regional setting
- Climate
- Existing plot wise land use translated over digital revenue plan as per interpretation of satellite imagery and field verification. The land use interpretation shall be upto level
- 3 classifications as per TCPO guidelines.
- Environmentally and ecologically sensitive area
- Heritage sites and buildings

B. Demography
- Existing population, sex ratio, literacy level, ethnic population, population density as per census
- Occupational structure as per census
- Household characteristics

C. Economic base and employment
- Formal sector
  - Primary: Urban, administration, agriculture, mining, and quarrying
  - Secondary: Industries
  - Tertiary: Trade and commerce, services
- Informal sector / Tertiary sector employment

D. Housing and Slum
- Housing and Shelter
- Existing housing stock
- Sectoral share- formal and informal.

E. Transportation
- Network features
- Infrastructure

F. Facilities
- Health
- Education
- Administration / Institutional
- Recreation

G. Infrastructure
- Water
- Drainage and sewerage
- Power
- Telecommunications
- Police
- Fire Services
- Cremation and graveyards
- Postal services

H. Resources
- Fiscal
- Manpower
- Land

I. Environment
- Air
- Water

- Soil erosion
- Sanitation and solid waste management

J. Tourist Infrastructure

- Potential tourist places
- Availability of Tourist Infrastructure

K. Development Management

- Institutional set-up
- Legal support
- Sectoral integration and co-ordination
- Phasing of development

ACTIVITY 1.8.1 PROJECT INITIATION: Team Mobilization, Startup Meeting and Review of Methodology

ACTIVITY 1.8.2 DIGITAL BASE MAP CREATION

Task 1.8.2.1 Consequent to preliminary discussions and kick off meeting all secondary data related to GIS preparation of the proposed project would be integrated in a systematic and coordinated manner would be planned and collated accordingly. The description would be as follows:

Task 1.8.2.2 Digital Revenue Geo referenced Cadastral Maps of the Master Plan Area would be produced in GIS format

Task 1.8.2.3 Digital GIS based existing land use map prepared from satellite images on cadastral base in GIS format.

ACTIVITY 1.8.3 FIELD SURVEY, DATA COLLECTION AND UPDATION OF DIGITAL BASE MAP

Task 1.8.3.1 Data Collection and Supplementation of Data, Procurement of Maps, Consequence to the above stages of start-up meeting and base map compilation the secondary data requirements for timely completion of the project in a systematic and coordinated manner would be planned and collected accordingly. The data and published documents would be collected from the concerned authorities, Urban Development Department, Government of Odisha and other related agencies, academic institutions. Wherever, required, these data would be validated through primary survey.

To collect primary and secondary data pertaining to the demographic, socio economic profile, economic activities and trend in local economy and availability of resource and utilization, commercial and industrial establishment, housing trend and demand, public & semi-public facilities, and services available, traffic and transportation network scenario and public facilities, Utilities, and services available, data on special areas and problematic areas (if any), Development management mechanism.

Task 1.8.3.2 Preparation of Base Map

Task 1.8.3.3 Transfer of Existing Land Use data on Base Map.

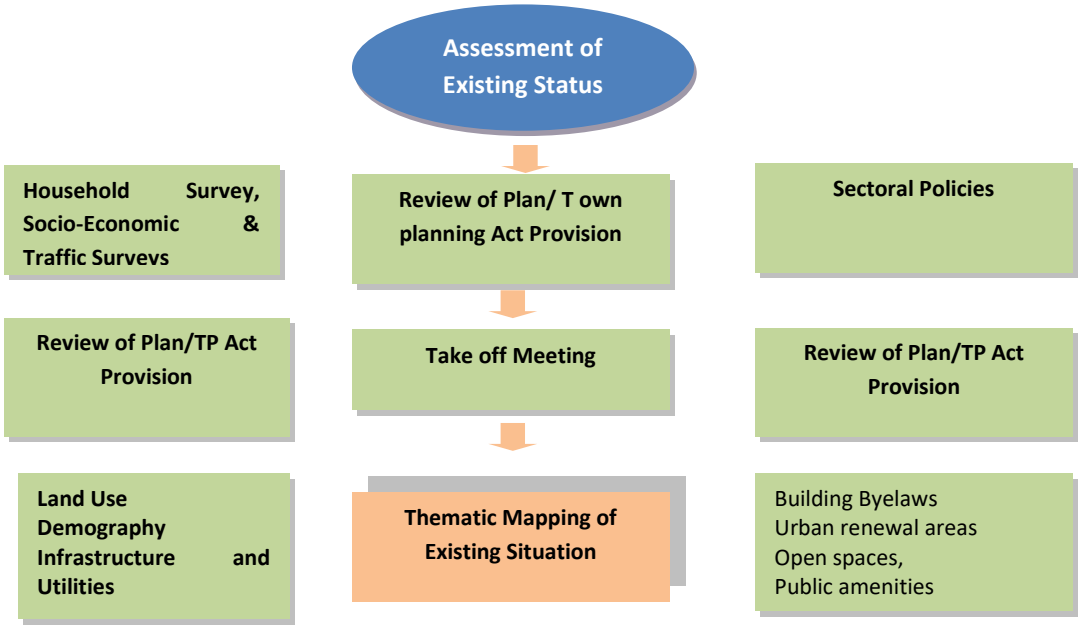
Field verification of Existing Land Use (Existing Land Use Maps in soft copy to be provided by CLIENT) and its up-dating as and when it is required. While transferring the updated land use on base map in layers it should be classified as per the Land Use classification and colour code recommended in URDPFI Guidelines.

Task 1.8.3.4 Primary Survey

A primary survey is to be to record the existing land use of the area, which will include, the types of land use including residential, Commercial, mixed land uses, Public & Semi-public, Recreation and open space etc. Based on the collated data, survey and interpreting the Satellite images, the consultant will transfer these changes in the base map. The consultants will prepare existing land use map incorporating the features as prescribed in NUIS layer IV and V and URDPFI.

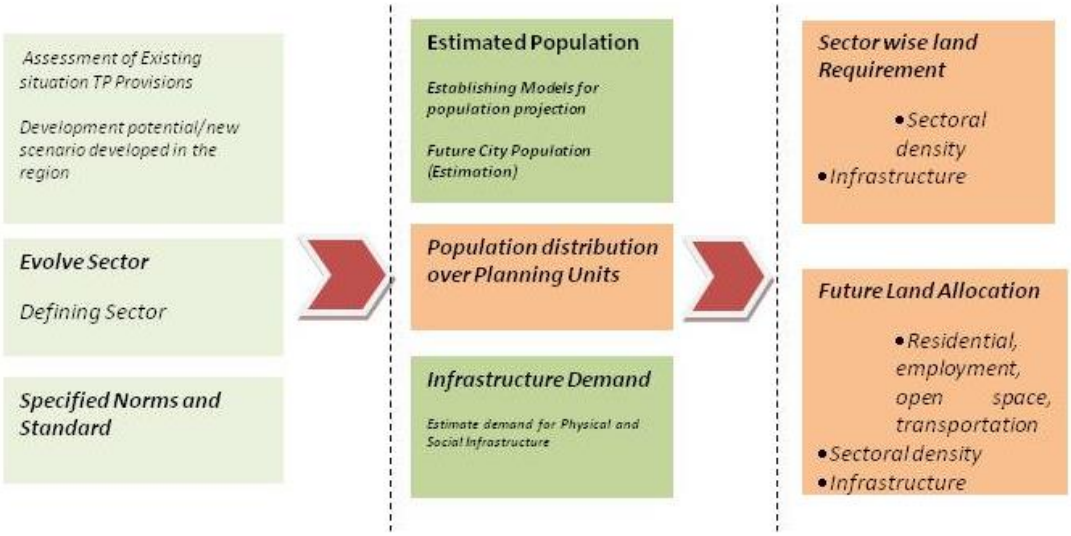
Task 1.8.3.5 Assessment of Existing Status

The Consultant will undertake general assessment of existing situation



Task 1.8.3.7 Evolve Growth Scenario

Evolving Growth Scenario for the city is an important and culmination activity of the entire Development Plan process which sets direction of future development. The parameter and process proposed for evolving the growth scenario are as follows



ACTIVITY 1.8.4 SEMINAR AND WORKSHOP

Interactive seminars and workshops involving various stakeholders, local bodies, official and non-official with the preparation of compendium of such proceedings for taking the feedback & views while preparing the Master Plan proposals would be conducted to compile and reflect the aspiration of people in the Master Plan. However, the consultant would prepare documents for circulation and presentation for the workshops. Such workshops shall be organized at the time of initiation, before draft proposals and after submission of status report soon after draft proposal has been submitted. The feedbacks are to be considered and usefulness of such suggestions are to be authenticated and incorporated in the draft Master Plan proposals.

ACTIVITY 1.8.5 PREPARATION OF MASTER PLAN

Task 1.8.5.1 Defining the Vision and Conceptual Development Strategy

The vision will be drawn out keeping in view the profile of Balasore City in terms of its national importance, demographic profile, existing development plans/Master Plans, housing status, trade and commerce, physical and social infrastructure, environmental issues, financial resources, land use pattern, urban growth, social and economic status, energy, public transport, etc.

Task 1.8.5.2 Framing Vision

A framework and general directions will be specified to spatially delineate the areas where development is to be focused and promoted. It will also provide a strategic vision for the city and forms the basis for the Balasore Master Development Plan considering the planned development of.

- Natural environment
- Promote economic efficiency
- Promote tourism and preserve historical heritage.
- Ensure efficient and affordable transport systems
- Structure development in relation to a strategic transport network.

Before initiation of transferring development strategy into the future land use plan, the Consultant will also study and prepare base for evaluating the previous land use zoning.

Task 1.8.5.3 Master planning process

Task 1.8.5.4 Preparation of Development Control Regulation (DCR)

ACTIVITY 1.8.7 NOTIFICATION OF DRAFT PLAN FOR INVITING OBJECTIONS AND SUGGESTIONS

Task 1.8.7.1 The consultant would notify the draft Master Plan suggestion and objections thru the concerned planning authority to the public soon after the same is prepared and submitted by the bidder.

Task 1.8.7.2 The consultant would provide necessary logistic & Technical support for display of the draft plan for the public through multimedia process or any compatible communication technology specified by the Planning Authority.

Task 1.8.7.3 The objections and suggestions received from the public will be tabulated, scrutinized and modifications to the draft master planning process would ensure incorporating the accepted suggestions through a Board of Enquiry to be constituted by the concerned Planning Authority. The bidder consultant shall facilitate such tabulation/ and generation of report and minutes for effecting required charges in the Master Plan.

1.9 Structure of the Report

The GIS/RS based Master Plan for Balasore Master Plan Area has been divided into sixteen chapters and structured in a sequence to organize the Plan document.

The first chapter explains the broad objectives, purpose, and the Master Plan process considering the vision for the development of Balasore, with an overview of the planning issues in the area. The second chapter provides an overview of the Balasore Planning Area with respect to administrative jurisdiction, geographical setting, topography, climate, socio-economic characteristics, chronological growth of settlement, traffic and transportation, housing, physical infrastructure, and social infrastructure. The third chapter explains the existing land use in Balasore Planning Area. The fourth chapter outlines the concept and planning strategy of the proposed plan.

The chapters fifth to eleventh give the sector wise detailed analysis as well as development policies and proposals of various aspects namely Population &Economic perspective, Traffic & Transportation, Housing, Physical Infrastructure, Social Infrastructure, Heritage Conservation and Tourism and Environment respectively, because development in a comprehensive sense requires improvement in socio-cultural, economic, and physical dimensions of a society. The twelfth chapter outlines the development management and finance for the implementation of the Master Plan including applicable legislations, land use policy, etc. The thirteenth chapter outlines the Future Land Use with the potential locations for distribution of land uses and central functions in the planning area through the assessment of the type and quantum of the various central functions and land uses. This chapter also provides Urban Design Guidelines to guide the future physical development of the area. Chapter fourteen highlights several land assemblies' tools that can be used get land parcels for the construction of various services and facilities proposed in the Master

plan. This chapter also includes suggested models of land assembly that have been successful in the other urban areas of the country. Chapter Fifteen discusses the applicable zoning regulations for the Balasore Planning Area. While the sixteenth chapter deliberates with the financial implication of the plan including cost estimates of the identified sector wise projects and the total investment required for their implementation.

Balasore Planning Area – An Overview

Chapter 2. Balasore Planning Area - An Overview

2.1 Introduction

Balasore is a strategically located city in the state of Odisha, about 199 kms north of the state capital, Bhubaneswar. It is one of the oldest towns of Odisha and the administrative headquarters of Balasore district. The town is the most important urban centre in the North-Eastern part of the state and well connected with south-eastern railways, National Highway 16 & 60 and other state highways. This district consists of two subdivisions namely Balasore and Nilagiri. There are 12 Tehsils for 12 Blocks of the district, containing 5 statutory towns viz. Balasore, Remuna, Jaleshwar, Soro and Nilgiri.

2.2 Administrative Jurisdiction

Balasore Municipality was constituted in 1876 and presently consists of 31 wards. The Balasore Regional Improvement Trust (BRIT), Balasore is constituted of the Balasore Municipality area along with surrounding villages. The roles and responsibilities of BRIT are to investigate the civic aspects of both the urban and rural areas to improve the living condition of the inhabitants in most planned and hygienic manner along with all required amenities and infrastructure.

2.3 Geographical Setting

Balasore is endowed by nature with location advantages that it has the potential to become hub of tourist activity. Excellent scenic tourist place Chandipur beach is within a short distance of 5 kms. Balasore lies in northeastern part of the state, and it is located between 21° 29' 24" North longitude and 86° 55' 48"East latitude. Its boundaries extend in the north up to Purba Midinipur District of west Bengal, in south to Bhadrak District, in west to Keonjhar and Mayurbhanja Districts and in the east to the Bay of Bengal (Refer to Fig. 2.1).

2.3.1 Linkages & Connectivity

The South-Eastern Railway line which connects Howrah and Chennai passes through the middle of Balasore. Balasore is also connected with NH-16 and NH-60 to the other parts of the country. Balasore -Thakumunda State Highway also passes through the area. The nearest airport for the town is Bhubaneswar.

Balasore is well connected to nearby cities and urban centers. Distance of Balasore from important Cities of eastern region is as follows:

- Bhubaneswar – 199 km
- Cuttack – 176.4 km
- Kolkata – 246.5 km
- Jamshedpur – 196.8 km
- Kharagpur – 123.4 km
- Rourkela – 384.5 km
- Raipur – 678.4 km

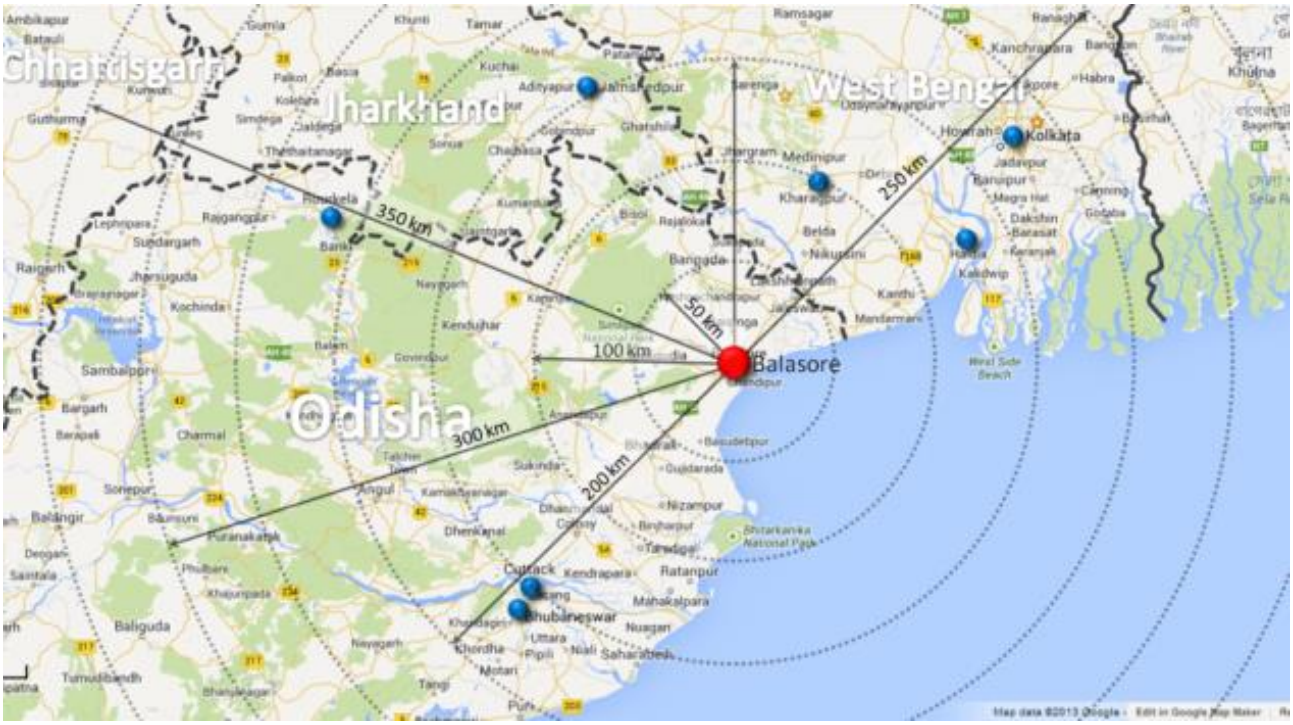


Figure 2.1: Regional Setting of Balasore

2.4 Topography

The Balasore district can be divided into three geographical regions, viz., the Coastal belt, the inner alluvial plain and the North-Western hills. The coastal belt is about 26 Kms wide and shapes like a strip. In this region, sand dunes are noticed along the coast with some ridges. This region is mostly flooded with brackish water of estuarine rivers which is unsuitable for cultivation. But presently this area is utilized for coconut and betel cultivation. Shrimp culture and salt manufacturing units are also developing in this area recently. The second contiguous geographical region is deltaic alluvial plain. It is a wide stretch of highly fertile and irrigated land. This area is highly populous and devoid of any jungle. The third region, north-western hilly region covers most of Nilgiri Sub-division. It is mostly hilly terrain and vegetated with tropical semi-ever green forest. The hills of Nilgiri have highest peak of 1783 ft. above the sea level.

Balasore district is crisscrossed with perennial and estuarine rivers because of its proximity to the sea.

2.5 Climate and Rainfall

Climatic condition of Balasore is mainly hot and humid in nature. Maximum temperature of the area reaches almost 36°C during the months of April and May. The coldest day for the region is in the month of December where the temperature drops to 14°C.

The area receives most its rainfall from the South-West monsoons during the months of July to October. Average rainfall of the area is high due to the proximity to the sea (Refer to Table 2.1).

Table 2.1: Annual Trend of Temperature & Precipitation of Balasore

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Avg. high (°C)	27.1	29.5	33.4	**35.9**	**35.7**	33.9	32.2	31.7	32.1	31.9	30.1	27.4	31.8
Avg low (°C)	**14.4**	17.5	21.4	24.4	25.7	26.0	25.7	25.6	25.2	23.1	18.7	**14.5**	21.9
Precipitation (mm)	13.4	42.4	47.3	71.0	134.3	279.6	**300.9**	**316.2**	261.5	150.8	41.7	7.1	1,666.2

2.6 Soil

The soil of Balasore district is mostly alluvial laterite. The soil of Central region is mostly clay, clay loam and sandy loam which is very fertile for paddy and other farm produces. Nilgiri Sub-division is mostly gravelly and lateritic soil, which is less fertile. A small strip of saline soil is also seen along the extreme coastal part of the district.

2.7 Wind

The wind speed is moderate throughout the year. During the south-west monsoon, the average wind speed is 3-4 kms per hour. From April to September, the wind direction is from South West to North East direction and the direction is reversed during South West monsoon when it is from North East to South West. During October to January, the prevailing wind direction is from North East. It becomes stronger during the south west monsoon peroid.

2.8 Water Resources

The state has 11-major river basins. Almost all the Rivers are interstate Rivers. Major basins like Mahanadi, Brahmani and Subarnarekha originate in other states but a significant portion of their catchments lie in Odisha, and they drain out to the Bay of Bengal. Similarly, there are other basins like Indravati, Vansadhara, Nagabali and Kolab which originate in Odisha but then meet their major parent basins in other states or drain out in other states.

Balasore, the coastal district of Odisha is crisscrossed with perennial and estuarine rivers because of its proximity to the sea. Two important rivers of Odisha, namely Budhabalanga and Subarnarekha pass through this district from west to east before surging into the Bay of Bengal. The other rivers that flow through Balasore district include Jalaka, Kansabansa and Sono.

The Budhabalanga river flows through the Balasore planning area. The river originates from Similipal hills of Mayurbhanj district and enters Balasore district near Kalyanpur of Remuna block. There is no flood protection embankment in either side of the river. It falls into Bay of Bengal near Balaramgadi. The Budhabalanga is about 175Kms in length and has a total catchment area of 4,840 Sq.km. Its major tributaries are river Sone, Gangadhar, and Catra. In addition to this, several tanks, ponds, and other minor water bodies also dot the planning area. The ground water of the planning area occurs under water table conditions in phreatic aquifer and in deeper aquifers it occurs under semi confined to confined conditions.

2.9 Flora and Fauna

The major forest area is in the Oupada Block of the Balasore District which lies on the western side of the district across the borderline, which divides it from the District of Mayurbhanj. And there are also small reserve forests in the Nilgiri Block of the district. Plantation forests have been raised in Jaleswar, Bhograi, Basta, Baliapal and Baleshwar blocks of the district. The coastal littoral tract of the district has a natural endowment of rich coastal vegetation of coconut, cashew, and casuarinas. The fauna found in the district includes wide variety of animals, birds, etc. As per the District Gazetteer, in the forest area of Balasore about 32 types of Mammals, 149 types of birds, 45 types of Amphibians and Reptiles as well as several types of marine and freshwater fish are found. The common types of fauna include tigers, elephants, leopards, bison, gaur, sambar, etc. while in bird species Asian Paradise Flycatcher, Indian Niguljan Cupper Smitha, Orange Brested Thrush, Horbill, Hill Nyna, etc. are common. Some of the flora found includes Sal, Tamarind, Bani, Amba, etc.

2.10 Culture

The district of Balasore accounts for people of different religions viz: - Hindu, Muslim, Sikh, Christian etc. with many a caste, creed, and community. The copper coin Collected from Bhograi and the collection of statues of Lord Budha from places like Avana, Kupari, Basta& Ajodhya magnify the existence of Buddhism in Balasore, and it is thought to be popular during “Bhoumakar”. The statue of Lord Jaina at Jaleswar, Balasore & Avana hints about Jainism at Balasore and thought to be popular in 10th –11th century. Balasore is highly famous also for “Saibapitha”. Many a temple of (LORD SHIVA) are seen in various places of Balasore. The temples of Lord Shiva are highly popular at Chandaneshwar,

Baneshwar, Jhadeshwar, Panchalingeshwar, Bhusandeshwar, Maninageshwar . District Balasore has got fame as "Saktapitha" as found from "Bhudhar Chandi" of Sajanagarh," Danda Kali" of Khantapara and "Chandi Mandir"of Kharjureshwar. The Sun temple of Ajodhya, Seragarh, Nilagiri & Bardhanpur give picture about "Sun Devotee ". Vaishnab Dharma was popular from Gupta dynasty.

Vishnu temples at different places of Balasore and Khirochora temple (built during 2nd Narasingha Dev) highlights the facts. The two Jagannath temples at the heart of Balasore& Jagannath temple at Nilagiri, Mangalpur, Gud, Jaleswar, Kamarda, Deuligan & Baliapal magnify the culture of Balasore. Many a Masjids, Churches, Gurudwar (at Remuna) etc. identify about different religion and place of worship at Balasore.

The famous festivals like Makara Sankranti, Raja Sankranti, Ganga Mela, Durga Puja, Kali Puja, Gonesh Chaturthi, Saraswati Puja, Laxmi Puja, Bishwakarma Puja, Chandan festival, Car festival, Maha Shivaratri, Dola Purnima, Id, Moharrum, Christmas Day etc. are performed with pomp and ceremony by the people of Balasore. Balasore is famous for the most attractive and enjoyable game "Akhada" played during Durga Puja by Hindus & during Moharrum by Muslims.

The pre–Independence Political scenario of Balasore is highly commendable and people of Balasore had played dynamic role for separate Orissa province and for freedom movement. "Including Salt Revolution (Lavana Satyagrah)" and "Srijang Satyagrah" for non-payment of Revenue Tax are famous in National Scenario as part of struggle for freedom movement.

Education has played an important role in Balasore both before and after Independence. At present many primary & secondary schools both in English and Regional language mediums are imparting School Education. Many a Degree Colleges, Law College, College of Education, Engineering School and Colleges, Song & Music colleges, Art and Craft Colleges, Industrial Training Institutes, Management Colleges & Computer Institutes are found at different parts of District. Fakir Mohan University of Balasore is in a rapid progressive stage. Balasore is also highly reputed in the field of Drama, Theatre, Music& Literature. The Radha Govinda Theatre, Bharati Theatre, Sunhat Theatre & Juvenile Theatre were highly reputed before Independence and the institutions like Srashtha, Fakir Mohan Natya Parishad, Fakir Mohan Sahitya Parishad, Chadrabhaga, Nrutya Sangeeta Kala Mandir, Sai Kala Mandir etc. after Independence are highly repute in the field of Culture.

Balasore is highly popular in 1st part of the 17th century for port culture. Pipilli, Sartha, Chhanua & Balasore were important ports the then time. People from this place were going abroad especially to Lacadive and Maldives island through sea root with the help of boat for business purpose.

People of Balasore had also played dominant role for language revolution in making separate Orissa province. The important newspapers "Bodhadayeenee" and "Balasore Sambad Bahika", by the efforts of Vysa Kabi Fakir Mohan Senapati had shown the seeds for Oriya language revolution and for development of Oriya literature. The Orissa cultural history will ever remember the contribution of Raja Baikuntha Nath Dev, Vysa Kabi Fakir Mohan, and Rai Bahadur Radha Chran Das for their long efforts in making Orissa a separate province and to magnify Oriya language and literature.

2.11 Socio-Economic Characteristics

The purpose of the socio-economic survey was to arrive at a socio-economic profile for the Balasore Planning Area based on a household survey. This profile of statistical information aids in the preparation of the Master Plan. Major findings considered include demography, infrastructure, socio-economic profile, and other benchmark information in the household sector in detail. Major findings of the Survey are:

1. Majority of families in Balasore Planning Area belong to nuclear family (76.6%).
2. Around 72 % of the surveyed population is either non workers or dependants.
3. Maximum percentage of population is engaged in unskilled activity (49.5%)
4. Major percentage of the households has average income up to Rs.10,000.
5. Majority of the households have been staying in Balasore area and in the same house for more than 25 years.

6. Almost all the households own their residences (96.4%), almost everyone resides in plotted houses. The town has 72 identified slum pockets with almost 11,000 population.
8. For majority of the households, tap water and community are the major sources for water
9. Sewer system is almost non-existent in the planning area, about 46% of the household's relay on septic tanks.
10. Average sex ratio in the planning area is 957.

2.12 Nature of Development and Landform

The river Budhabalanga passes through the northern end of the planning area flowing in west to east direction. The National Highway 16 and the railway line bisect the planning area, dividing it into parts. The broad land use map of the planning area reveals that the densely built-up urban areas exist only in older part of Balasore town, with built concentration getting thinned down along the transport corridors.

Major part of the town is covered with alluvial plains. It is characterized by gently sloping plain bordering Nilgiri Hills and its continuation in NE. The town slopes towards east and southeast and varies from 0.57 to 1.33 m /km with an average of 0.8m / km. The slope of the planning area is towards the Budhabalanga river.

2.13 Chronological Growth of the Settlement

Before Independence: Balasore district was part of the ancient Kalinga which later became a territory of Toshala or Utkal, till the death of Mukunda Dev. It was annexed by Moghuls in year 1568 and remained as a part of their suzerainty up to the middle of eighteenth century (up to 1750–51). Then the Marahattas occupied this part of Odisha, and it became a part of the dominion of the Marahatta Rajas of Nagpur.

The East India Company ceded this part through a treaty called treaty of Deogaon in 1803 and it became a part of Bengal Presidency up to 1912. But the first English Settlement came into existence in Balasore region in 1634 while Sahajahan was the emperor at Delhi. The first of English factories was established in this region in 1640.

The English settlement of Balasore, formed in 1642, was an early trading port for British, French, and Dutch ships at the early age of Enlightenment and became a colonial part of first Danish India, later British India. In 1763 Balasore became a Danish possession, governed from Tranquebar, as part of Danish India. Due to the shallowness of its bay, the trading post was abandoned, leaving behind only a small settlement in the area. Balasore as a separate district was created in October 1828 while it was in the Bengal Presidency. On 7th November 1845, all Danish India was sold to the British, who made it part of British India.

With the creation of Bihar Province, Odisha was diverted along with Balasore district from Bengal to Bihar. But with the creation of Odisha as a separate State on 1st April 1936 Balasore became an integral part of Odisha State. The national movement of independence surged ahead with the visit of Mahatma Gandhi in 1921. Similarly, Praja Andolan was initiated against the ruler of Nilagiri State.

Post-Independence: The state of Nilagiri merged with state of Odisha in January 1948 and became a part of Balasore district. On 3rd April 1993 Bhadrak sub-division became a separate district and from this day Balasore remains a district of Odisha with two Sub-divisions namely Balasore and Nilagiri having eight Tehsils, namely Balasore, Soro, Simulia, Nilagiri, Jaleswar, Basta, Baliapal and Remuna and 12-blocks namely Bhograi, Jaleshwar, Baliapal, Basta, Balasore, Remuna, Nilagiri, Oupada, Khaira, Soro and Bahanaga. The name of the district is being derived from the name of the town.

2.14 Economy

Balasore is one of the economically strong Districts in Odisha, which is privileged in both agriculture and industry. Despite being an agrarian economy, agriculture is not the main stay of the people of Balasore town and industry has been the nucleus of the economic development. This is also revealed by the category wise distribution of the working population of the town that the economy of the Balasore has been characterised by both tertiary and primary sector.

2.15 Traffic and Transportation

The Balasore acts as a node for regional transportation routes. National Highway-16; connecting Kolkata to Chennai, NH-60, and the South-Eastern Railway line pass through the planning area. The area is also connected by SH-19.

2.16 Housing

Nuclear families are predominant in the planning in general and Balasore municipality. In planning area, over percentage of the households live in pucca and kutcha houses is almost the same, 35.9% and 36.3% respectively. However, in rural area, 46% households live in kutcha houses and hutment while 49% live in pucca houses in the MC area. Since most of the people live on their ancestral land in Balasore, 96.4% households have their own houses which are 20 years old or more. Plotted housing is dominant having one or two floors.

2.17 Physical Infrastructure

Although Budhabalanga river; one of the major rivers of Odisha flows through the planning area, ground water remains the major source of water supply in the area. At present 18.91 MLD @ 94 lpcd is supplied to the Balasore town.

Balasore does not have a sewerage network laid out. Thus, the people depend on septic tanks for sewage disposal. Absence of a sewerage network has also resulted in mixing of storm and wastewater which goes untreated to Budhabalanga river, polluting its waters.

Planning area also lacks a proper drainage system. Most of the area has only kutcha drains. Over the years the natural drainage channels are being encroached upon as well as the man-made open drains are used for dumping garbage. 105.61 MT per day (2011) is generated from the Planning area daily. In the absence of a scientific landfill site, solid waste is dumped in empty low-lying areas.

2.18 Social Infrastructure

The high literacy rate among the population of Balasore is reflected in the large number of educational institutes in the area especially of higher learning. For this reason, Balasore is also the educational hub of northern Odisha. Heath care facilities, government and privately owned are sufficient for the current population of Balasore. However, it lacks in recreational facilities likes open spaces and parks and even in some community facilities. Commercial facilities are there but they are unplanned and have come majorly around main transport corridors like the NH, OT road, etc.

2.19 Heritage and Conservation

Balasore Planning area is well known for its historical monuments such as various temples. River Budhabalanga provides an important natural resource. Baleshwar district was part of the ancient Kalinga kingdom which later became a territory of Koshala or Utkal, till the death of Mukunda Dev. It was annexed by the Empire in 1568 and remained as a part of their suzerainty up until 1700s. The British East India Company (EIC) established a factory at Balasore in 1633. As Calcutta rose in importance, Balasore became the center for river pilot services for vessels seeking to ascend the Hooghly River. The Marathas then occupied this part of Odisha and it became a part of the dominion of the Bhosle Maratha Rajas of Nagpur. They ceded this part through a treaty called the Treaty of Deogaon in 1803 and it became a part of Bengal Presidency until 1912.

Balasore as a separate district was created in October 1828 while it was in the Bengal Presidency. On 7 November 1845, all of Danish India was sold to the British, who made it part of British India. With the creation of Bihar Province, Odisha was diverted along with Balasore district from Bengal to Bihar. But with the creation of Odisha as a separate State on 1 April 1936 Balasore became an integral part of Odisha State. The unique heritage of Balasore Planning Area is the natural heritage of Budhabalanga river front. The area needs a holistic approach and sensitive revitalization strategies. Preservation and redevelopment measures need to be guided by a policy of integrating conservation of natural, cultural, and built heritage with future development of this region.

Land Use and Land Ownership

Chapter 3. Land Use and Land Ownership

3.1 Introduction

Land and its use form the base of any development. Land is the most crucial economic tool for planned development of the urban areas and achievement of social objectives through its judicious allocation for future use. The existing land use of Balasore planning area was validated through primary survey on ground.

3.2 Existing Land Use Distribution

The existing land use study and analysis is necessary to understand and determine the forces responsible for shaping the urban morphology of a town or city and to get an insight into the future direction in which town has the potential to grow. Micro-level land use survey was conducted, and land use was broadly classified as (a) Developed and (b) Un-Developed land Use. The term 'Developed' indicates the land that is being used for the purposes, which are urban in character including open Spaces like parks and playgrounds, residential, commercial, industrial, public, and semi-Public etc. The 'Undeveloped' land use has been defined as the land not specifically mentioned above under urban use even though it may have the potential for land is considered as undeveloped land use.

3.2.1 Land Use/Cover of Balasore Municipal Area

Land Use provides an insight to coordinate relationship among transportation, residential, industrial, and recreational land uses, besides providing broad-scale inventories of natural resources and monitoring environmental issues, including land reclamation, mangrove restoration, disaster relief, water quality and planning economic development. Table 3.1 indicates the areas and percentage of different uses within the Balasore Municipal Limit. The detailed analysis of the existing land use within the Municipal limit reveals that 82% of the Municipal Area is developed Area while only 18.11% of the total Area constitutes Undeveloped Area (Refer Fig 3.1).

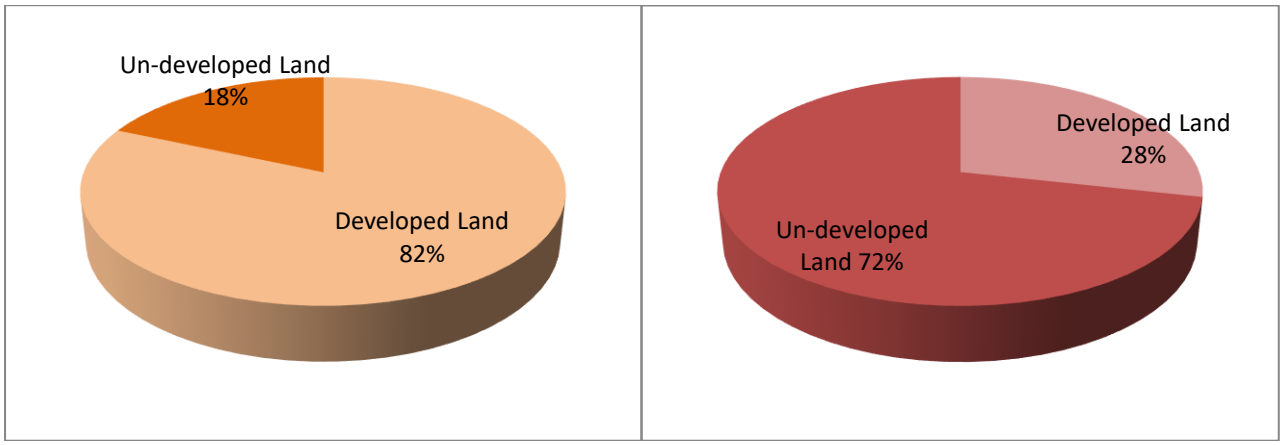
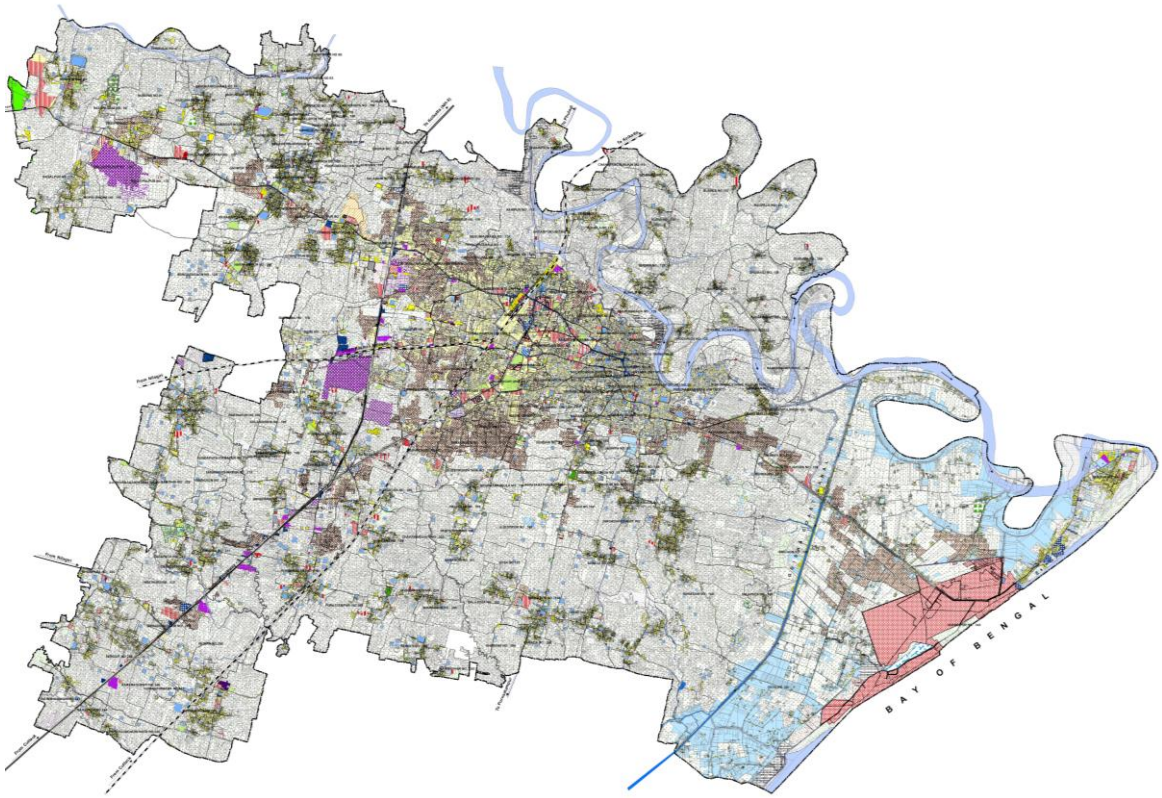


Figure 3.1: Distribution of Developed and Undeveloped Land within Balasore Municipal Limit and Planning Area

3.2.2 Land Use/ Land Cover of Balasore Planning Area

The Master planning area consists of Balasore Municipality and 205 Villages covering a total of 23,382 Ha. However, existing developed area is 6,941 Ha i.e., 28% while 72% land i.e. 17,504.56 Ha is undeveloped, indicating availability of land parcels for planned development of the area in future (Refer Fig 3.1). The Land use survey revealed that many new developments have taken place all over the planning area. These developments are mostly residential, commercial, and industrial in nature and are on agricultural and vacant lands. It is revealed from the Table 3.3 that the agriculture land use (61.70%) constitutes a major part of the area followed by residential (21.16%) land use.



Map 3.1: Existing Land Use, Balasore Planning Area

3.2.2.1 Urban Area (Municipal Area)

3.2.2.1.1 Developed Area

The total Urban area is about 1,180.39 hectares consists of developed area as 81.89 % and remaining 18.11 % area is undeveloped. The gross residential density of developed area is 100 PPH and net residential density is 127 PPH. Balasore lacks planned residential colonies and the organic growth has resulted in urban sprawl and inefficient utilization of land. Physical thresholds have played dominant role for shaping the urban structure of town. The major commercial activities are concentrated in the core area of the town. The commercial land use is 2.95 % of the developed area and 2.42 % of the total urban area. The mixed land use is also available in the urban area of Balasore and comprises of 1.18 hectares of land area occupies 0.10% of the developed area and 0.08 % of the total area. Under industrial land with industries like agro based, metal, chemical, Bottling plant and plastic industriesare located in the different part of the urban area. The industrial land use occupies an area of 6.59 hectares which is 0.56% of the developed area. Under public and semi-public land use the total area is 95.74 hectares. The public utilities and facilities comprise of all the service level facilities like water, sewerage, solid waste management, power, and other emergency services. The total area under this category is 3.38 hectares. The recreational facility in the urban area is lacking behind the standard. At present the area of recreational land use is 27.34 hectares occupies 2.32% of the developable area and 1.90% of the total urban area. Traffic and transportation occupy an area of 83.79 hectares of the developable area i.e.,7.10% of developable area and 5.81% of the total urban area.

3.2.2.1.2 Un-Developed Area

The un-developable area is comprising of agriculture, forest, water bodies and environmentally sensitive land uses. The total area under un-developed category is 261.04 hectares which is approx. 18.11 % of the total urban area. The maximum percentage area of the land use is covered under water bodies which occupies 105.01 Ha of land, followed by agriculture and environmentally sensitive land uses.

Table 3.1: Distribution of Existing Land Use of Urban Area (Municipal Area)

S. No.	Land Use Category	Area (in Ha)	% of Developed Area	% of Total Area
Developed Area				
1	Residential	927.50	78.58	64.35
2	Commercial	34.87	2.95	2.42
3	Mixed Use	1.18	0.10	0.08
4	Industrial	6.59	0.56	0.46
5	Pub & Semi Public	95.74	8.11	6.64
6	Public Utilities & Facilities	3.38	0.29	0.23
7	Recreational	27.34	2.32	1.90
8	Transportation	83.79	7.10	5.81
	Sub-total (Developed land)	**1180.39**	**100.00**	**81.89**
Un-Developed Area				
9	Agricultural	97.47	-	6.76
10	Forest	0.44	-	0.03
11	Water Bodies	105.01	-	7.28
12	Reclaimed Land	0.36	-	0.02
13	Waste Land	47.70	-	3.31
14	Wet Land	10.06	-	0.70
	Sub- Total (Un developed Land)	**261.04**	**-**	**18.11**
	Grand Total	**1441.43**	**-**	**100**

Source: Consultant's Analysis

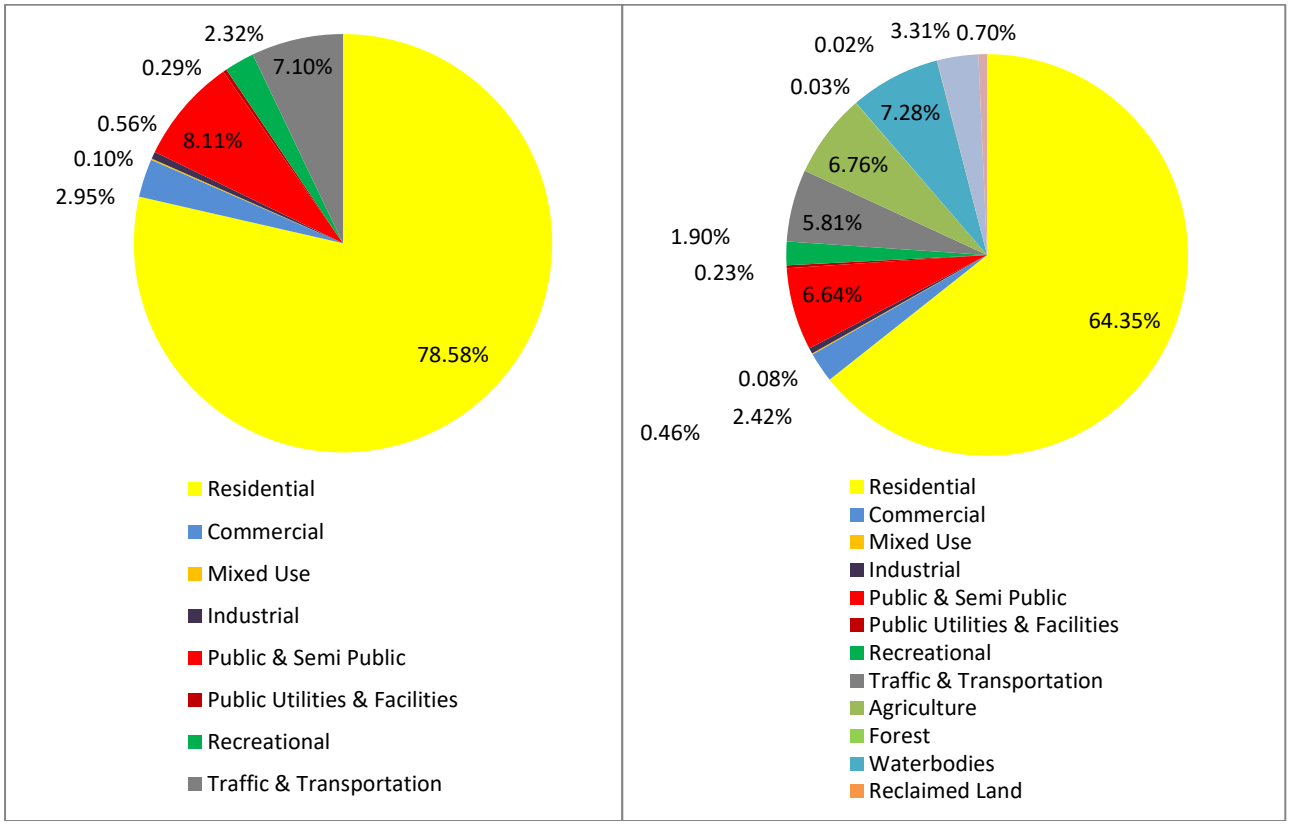


Figure 3.2: Existing Land Use Distribution (Developed & Total Municipal Area)

3.2.2.2 Rural Area

3.2.2.2.1 Developed Area

The rural area is occupying 23,031.67 hectares of land consisting of 5,788.15 hectares of developed area i.e., 25.13% of the total rural area and remaining 17,243.53 hectares of land under un-developed area which is 74.87% of the total rural area. The gross residential density of developable area is just 25 PPH and net residential density is 34 PPH indicating that the rural areas of Balasore are sparsely populated. The existing development pattern shows the

segregated settlement pattern in the rural area. The percentage of land comes under residential land use 4,245.05 hectares followed by public and semi-public use 702.02 hectares and traffic & transportation land use 367.74 hectares and Industrial use 325.25 hectares.

3.2.2.2.2 Un-Developed Area

Un-developed area is comprising of agriculture, forest, water bodies and environmentally sensitive land uses. The total area under un-developed category is 17,243.52 hectares which is 74.87 % of the total urban area. The maximum percentage area of the land use is covered under agriculture land use which covers 60.81% of the area, followed by water bodies. The minimum percentage area is under wetlands i.e., 84.31 hectare.

Table 3.2: Distribution of Existing Land Use of Rural Area

S. No	Land Use Category	Area (in Ha)	% of Developed Area	% of Total Area
Developed Area				
1	Residential	4,245.05	73.34	18.43
2	Commercial	93.97	1.62	0.41
3	Mixed Use	0.64	0.01	0.00
4	Industrial	325.25	5.62	1.41
5	Pub & Semi Public	702.02	12.13	3.05
6	Public Utilities & Facilities	17.43	0.30	0.08
7	Recreational	36.05	0.62	0.16
8	Transportation	367.74	6.35	1.60
Sub-total (Developed land)		**5,788.15**		**25.13**
Un-Developed Area				
9	Agricultural	14,001.29		60.81
10	Forest	143.96		0.63
11	Water Bodies	2,148.14		9.33
12	Reclaimed Land	0.06		0.00
13	Waste Land	657.10		2.85
14	Wet Land	84.31		0.37
Sub-total (Un developed Land)		**17,243.52**		**74.87**
Grand Total		**23,031.67**		**100**

Source: Consultant's Analysis

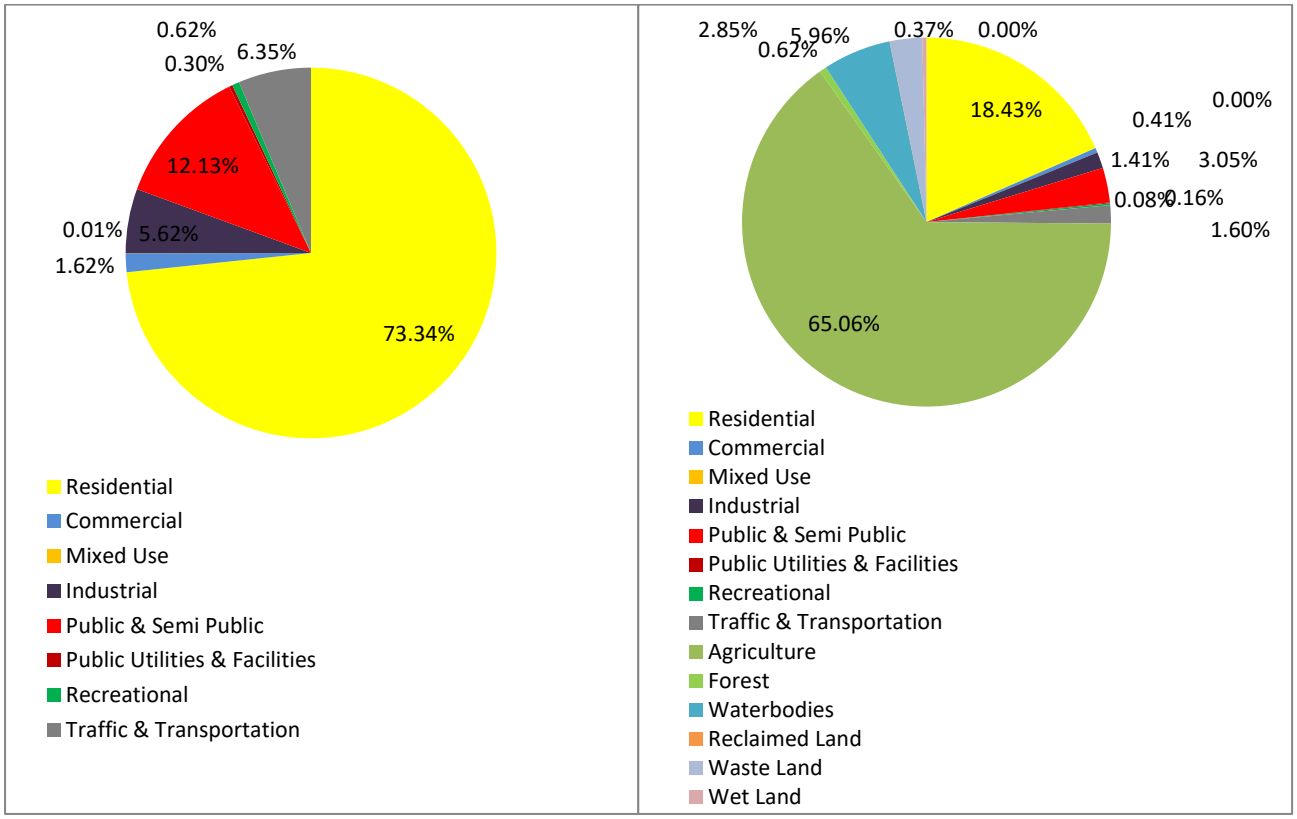


Figure 3.3: Existing Land Use Distribution (Developed Rural Area & Total Rural Area)

3.2.2.3 Balasore Planning Area

Out of the total land in the planning area, 61.63 % of the total land under agricultural use. 6.04 % of the land is under water bodies and 0.59 % under forest. Residential land use constitutes only 21.14 % of total planning area. All the land uses within the developed area are much lower than prescribed in URDPFI guidelines. Table 3.3 and Fig 3.4 give the detailed distribution of land uses in Balasore Planning Area.

Table 3.3: Land use Distribution-2014, Balasore Planning Area

S. No.	Land Use Category	Total Existing Area (in ha)	% of Developed Area	% of Planning Area	% As per URDPFI Guidelines
Developed Area					
1	Residential	5,172.55	74.23	21.14	**45-50**
2	Commercial	128.84	1.85	0.53	**2 - 3**
3	Mixed Use	1.82	0.03	0.01	
4	Industrial	331.84	4.76	1.36	**8 - 10**
5	Pub & Semi Public	797.76	11.45	3.26	**6 - 8**
6	Public Utilities & Facilities	20.81	0.30	0.09	
7	Recreational	63.39	0.91	0.26	**12 - 14**
8	Transportation	451.53	6.48	1.85	**10 - 12**
Sub-total		**6,968.54**	**100.00**	**28.47**	**-**
Un-Developed Area					
9	Agricultural	15,082.77	-	61.63	**Balance**
10	Forest	144.38	-	0.59	
11	Water Bodies	1,477.81	-	6.04	
12	Reclaimed Land	0.42	-	0.00	
13	Waste Land	704.80	-	2.88	
14	Wet Land	94.37	-	0.39	
Sub-total		**17,504.56**	-	**71.53**	**-**
Grand total		**24,473.10**	**-**	**100**	

Source: Consultant's Analysis

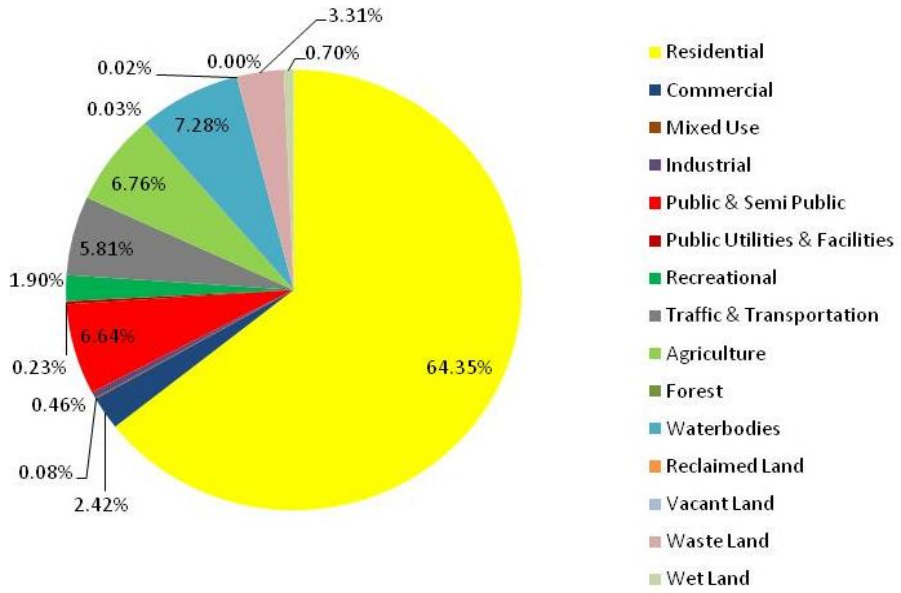


Figure 3.4: Existing Land Use (Total Planning Area) - 2014

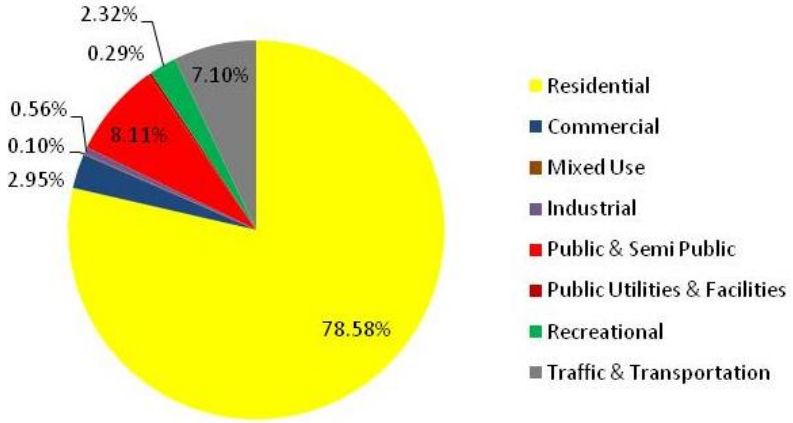


Figure 3.5: Existing land use, 2014- Developed Area

In the developed area after Residential land use, land under public & semi-public land use has the next highest percentage i.e., 11.45 %.

The structure of existing land use is honeycomb pattern. Small chunks of land within the residential area are either lying vacant or used as tanks (water bodies). This feature is also exhibit in the core area. Commercial uses are mostly located along the main roads. The existence of public facilities and civic amenities are inadequate.

3.3 Developed Area

3.3.1 Residential Use

Residential use constitutes 5,172.55 Ha of land area. The residential areas are concentrated in the core area and along the Budhabalanga river and along all major internal roads. The other concentration of residential development is on both sides of OT road in east and west direction (Refer to Fig 3.6).

The western part of the town (approx. 30% of area) is comparatively a new development. The character of the area shows dotted residential development. The eastern part of the town (the area between the river and the railway line, (almost 70% of area) is more developed and densely populated.

Majority of the building is G+2 or G+3 Structure. High-rise residential development is very less, some new constructions are coming up in few areas.

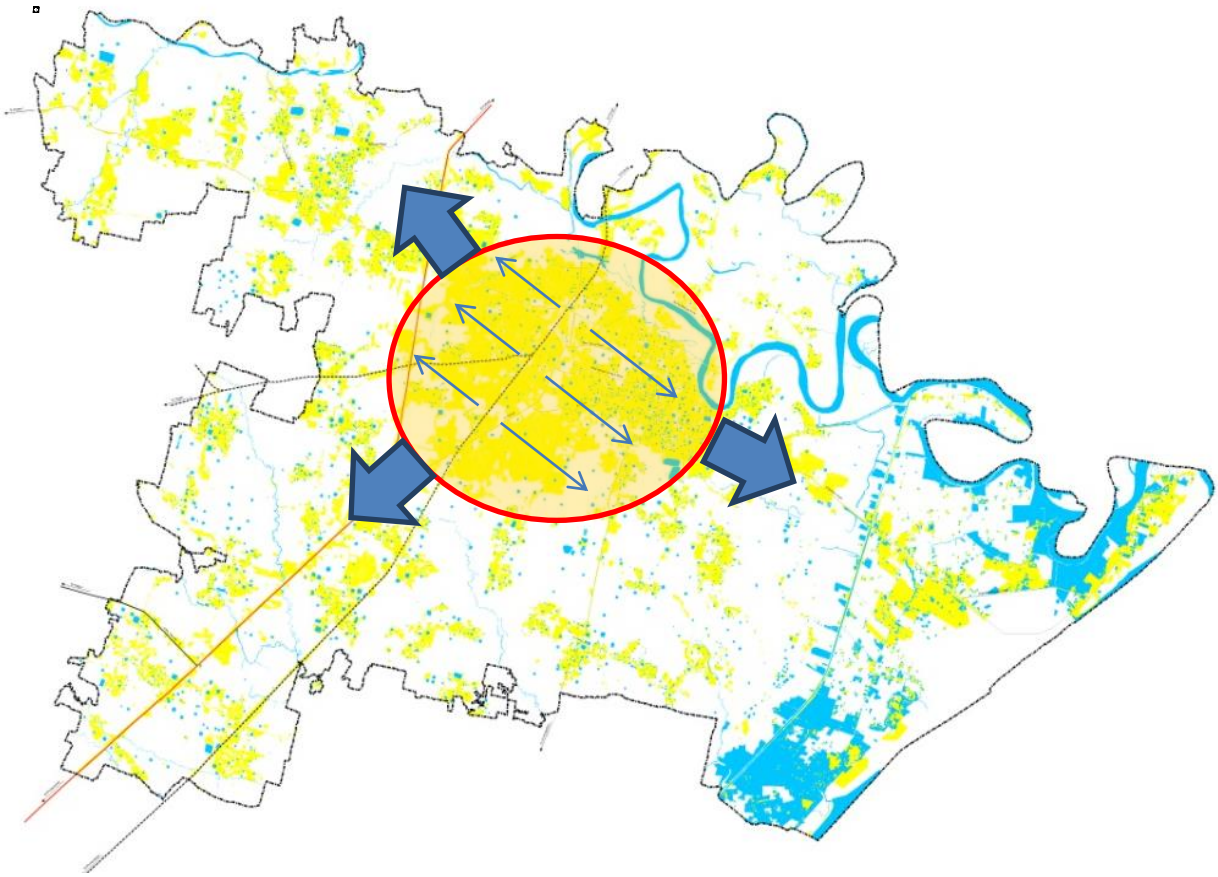


Figure 3.6: Residential Land use in Balasore Planning Area

3.3.2 Commercial Use

The existing commercial land use occupies 1.85% of developed area and 0.53 % of the planning area. Commercial use constitutes an area of 128.84 Ha of land area.

Motiganj Bazaar is the main market area for the town, this area has place for perishable items as well as for garments, electronic goods, groceries etc. Apart from Motiganj, there are few areas which have predominant commercial establishment, like the area below rail over bridge (Bicharganj Crossing), around railway station and bus stand.

There are also some ribbon type commercial developments along the main roads in the town. The OT Road from Station Square to Bicharganj Crossing and from this place to Motiganj Bazaar shows this kind of character. Beside this the road leading to Chandipur also have similar developments but in pockets.

Figure 3.7: Commercial Areas in Balasore

3.3.3 Mixed Use

The development throughout the planning area reflects the picture of haphazard development and concentration of multiple activities in the same area. The planning area is missing dedicated mixed-use zone and areas. The mixed-use accounts for about 0.03 % of developed area and 0.01 % of the total planning area of Balasore. The total area under mixed use category is 1.82 Ha.

3.3.4 Industrial Use

The industrial land use occupies 4.76% of the total developed area and 1.36 % of the total planning area. It constitutes an area of 331.84 Ha out of the total planning area. Balasore being an important junction of both rail and roadways has witnessed a significant industrial development. The industrial area earmarked in last master plan is along the PWD Road. The industrial development is not restricted to this area butis spread through out the planning area but the major industrial activities are located in Remuna, Naya bazaar, and along both sides of the National Highway. These industries are comprises of agro based , metal, chemical , Bottling plant and plastic industries.

Figure 3.8: Industries in Balasore

3.3.5 Public and Semi-Public Use

The Balasore town is the district headquarters of Balasore district. The major governmental office, educational hub, health, and other community facilities have their base at Balasore.


Figure 3.9: Government Offices in Balasore

3.3.6 Public utilities and services

Public utilities and services are the essential features of any area. The level of these services will highlight the quality of infrastructure facilities. Water treatment plants, tanks, pump houses, pipelines, electric sub stations and Grid stations, sewerage and drainage lines, treatment plants and public toilets and other public facilities are grouped under public utilities and facilities.

3.3.7 Transportation Communication Use

Road network and related infrastructure is the most important sector for the growth of urban area. Roads act as arteries for the flow of goods and services and dissemination of urban influences. Efficient connectivity and improved linkages help in developing linkages between provider and the users. Traffic and transportation infrastructure accounts for about 6.48 % of developed area and 1.85 % of the total planning area of Balasore. The percentage area under traffic and transportation seems to be adequate however most of the roads including arterials are characterized by two lane undivided configuration only. The problem of inefficient road network is particularly more severe in the older parts of the urban area wherein the existing streets are highly narrow and winding wearing poor and dilapidated physical outlook. The pedestrian movement generally crouch the carriageways resulting in further reduction of the effective road width as no pedestrian facilities exist in the town. The existing traffic characteristics reveal a chaotic picture predominantly because of lack of basic road infrastructure, pedestrian facilities, non-segregation of vehicular and non-vehicular traffic, inadequate parking areas etc.

3.3.8 Recreational Use

Figure 3.10: Recreational Areas in Balasore

There are very few lungs spaces within the town. However, towards the far eastern side of the town, towards the coast has a lot of potential for water tourism.

3.4 Future Growth

Considering the physical constraints, land availability, land suitability, ongoing, committed, and proposed major activities nodes and consultant's' perception, it is envisaged that the town growth would likely to occur towards eastern side of the town (Remuna) and towards Chandipur. In both the cases, vast vacant / agricultural land is available for development. The eastern side of the town shows many new developments, the development of residential areas and industrial areas are the two major component of this development. There is a necessity to develop new commercial centres to cater this new population.

3.5 Ownership Pattern

The ownership of different category of land use of Balasore planning area is very crucial for preparation of Master Plan document. While preparing the Master Plan, it is necessary to gather information of plot wise land ownership. The land ownership record is important to the planners for development of Balasore as it is the basis for efficient administration, aimed at social justice through better implementation of plans and proposals. The general theme underlying the content of all plan documents has emphasized that land is an asset, which provides the primary and secondary needs of the people. As most of the problems of the people in the villages adjacent to Balasore town are due to land related issues, so to avoid these issues, it is necessary to take utmost care in creating the land ownership database.

3.5.1 Source and Classification of Ownership

It is stated under Odisha Survey and Settlement Act, 1958 that the Power of Government to order preparations of record-of-right in respect of lands in any local area in the state. The Government of Odisha has developed a site named 'Bhulekh Odisha land records Web Portal '*www.bhulekh.ori.nic.in*' for all people to view the Record-of-Rights. In Balasore Planning Area, there are 205 revenue villages, and the plot-by-plot Ownership of the land, of all those villages has been categorized into five different Ownership groups. The followings are the five different ownership categories:

1. Government Land
2. Temple/ Trustee
3. Government Reserved
4. Government Forest
5. Private

The Government land category includes all those lands owned by various Government departments like; revenue, PWD, Irrigation, Agriculture, Home, etc. The Government Reserved category includes the lands Reserved and Reserved Unused of whose kissam is mostly Bagayat (1) and (2), Basti yogya, Urban development in future, Patita, Gochara etc., which excludes the Chhota Jungle and Patra Jungle. The land owned by Forest Department and the land in the District Level Committee (DLC) report. It is very interesting to observe that there is almost equal distribution of ownership between public and privately ownership of land. This implies that renewal, re-development should start as a joint venture in near future to cater to all sort of development.

Conceptual Plan

Chapter 4. Conceptual Plan

4.1 Introduction

An extensive study of the Balasore Planning Area was done through primary surveys and secondary sources to identify the prospects and potentials of the area, its weak links in terms of improving physical connectivity, the possibility of economic revitalization, the development of its river front and address the issue of sporadic and haphazard growth.

4.2 Land Suitability Analysis

The analysis of land suitability combines a study of land (properties) with a study of land use and determines whether compounded requirements of land use are adequately met by the compounded properties of the land. To define the natural suitability of an area for an availability of buildable land, few criteria must be evaluated based on the specific growth requirements of each commodity. The study of land suitability analysis important due to following factors:

- Conserve the ecology of the area
- Elevation and slope of the area (Refer Elevation and Slope Map of Balasore Planning Area)
- Encourage sustainable use of natural resources
- Identify favourable land for habitation

The intent of this analysis to demarcate urbanisable limit with an understanding of the existing land and development conditions and constraints associated with the Master Plan area should be considered in the planning process.

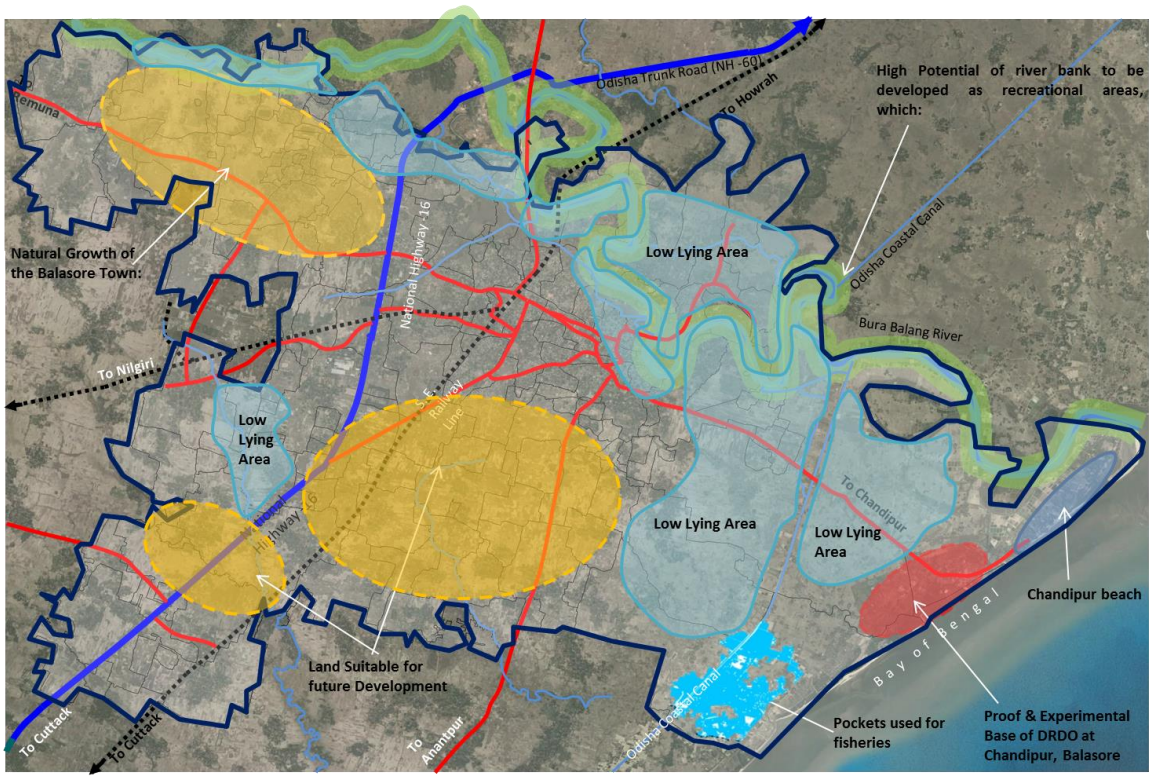


Figure 4.1: Land Suitability Analysis

4.3 Planning Principles

The concept for the future development of Balasore Planning Area will be based on certain planning principles which are as follows:

- Balanced growth and improved quality of life,
- To develop it as the major Industrial town of the region.

- Commercial, educational, medical, and recreational facilities on hierarchical manner.
- Visualizing the development potential along the roads.
- Exploiting the potential of higher order institutions and employment generation.
- Conserving Budhabalanga River to create city level recreational area.
- Transportation hierarchy based on Intercity and intra-city transportation network.
- Intra-city transportation such as Arterial, sub-arterial, local collector, distributor, access road, pathway, and cycle tracks.
- Zoning and sub-divisional regulations to be an integral part of Master Plan of Balasore.
- Taken care of shopping needs of the poor section of the people guidelines to be evolved for, informal shopping as weekly bazaar and hawker's zone.
- Recreational areas, besides serving as lung spaces for the city to provide an opportunity to enhance the image of the city.
- Concept of inter-connected green areas interspersed with recreational parks and sport complex has been incorporated.

4.4 Site Analysis

Based on the land suitability analysis and planning principles identified for development of Balasore, site analysis has been done for the entire planning area for its balanced physical development. Firstly, the analysis has revealed that there are links missing between the different parts of the planning area. The National Highway is not connected from all major roads properly and majority of the development has come up near or along the highway. Hence, there is a need to connect all parts of the planning area with the highway (Refer to Fig 4.2).

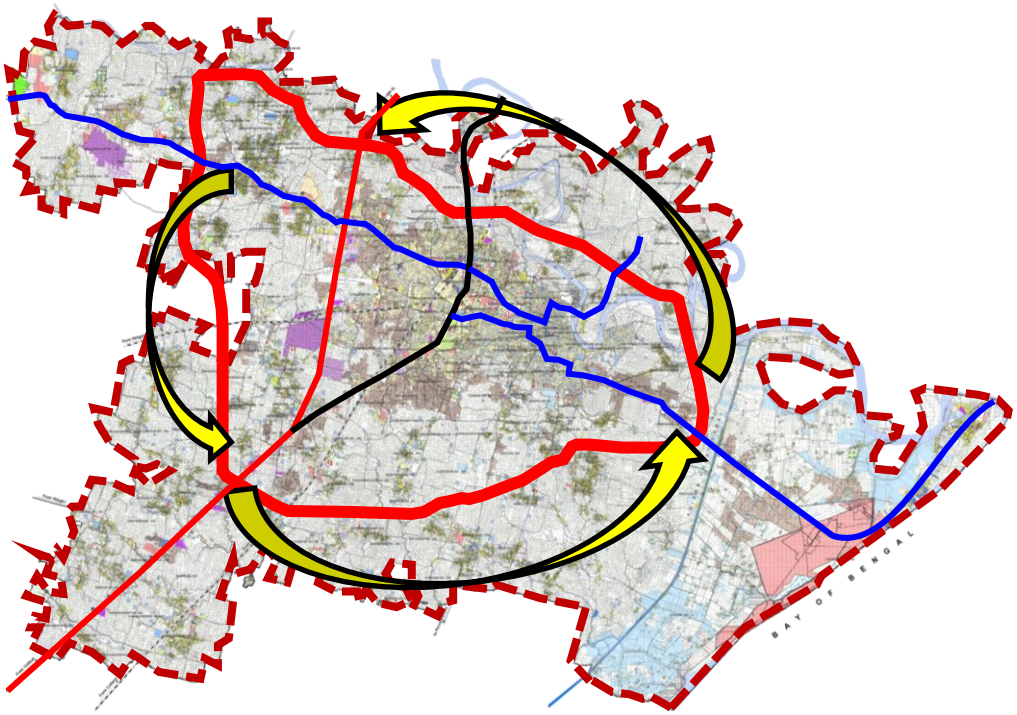


Figure 4.2: Missing links to the National Highway in Balasore Planning Area

Source: Consultant's Analysis

The other aspects that come out of the analysis area as follows (Refer to Fig 4.3):

- Natural Growth direction of the Balasore Town is towards Remuna, in-between Balasore and Remuna.
- Development of town is bifurcated into two halves because of the railway line passing through its middle. Area alongside the railway line is densely populated. These areas have lean road width with poor road surface.

- The National Highway-16 coming from Cuttack to Balasore has a very strong location for a focal point for the area and having maximum visibility from all roads. Here, a landscape garden and/or a landmark monument can be developed to create an image for the area.
- Further along, on the same side of the NH-16 there are good sites for development of Industrial activities & Logistic Hub due to its proximity with Railway line and NH.
- There are several land Parcels available (under agriculture use) for development on the eastern and south-eastern side of the Balasore Planning Area.
- There is high potential for the Buddha Balanga riverbank to be developed as recreational areas, which in turn will protect it from pollution as well as prevent Encroachment of the River fronts. Also, on the north-eastern side there is potential Site for Fishery Research & Development Centre as located on riverbank enclosed by fishponds.
- Tourism site at Chandipur beach also has potential for further development.

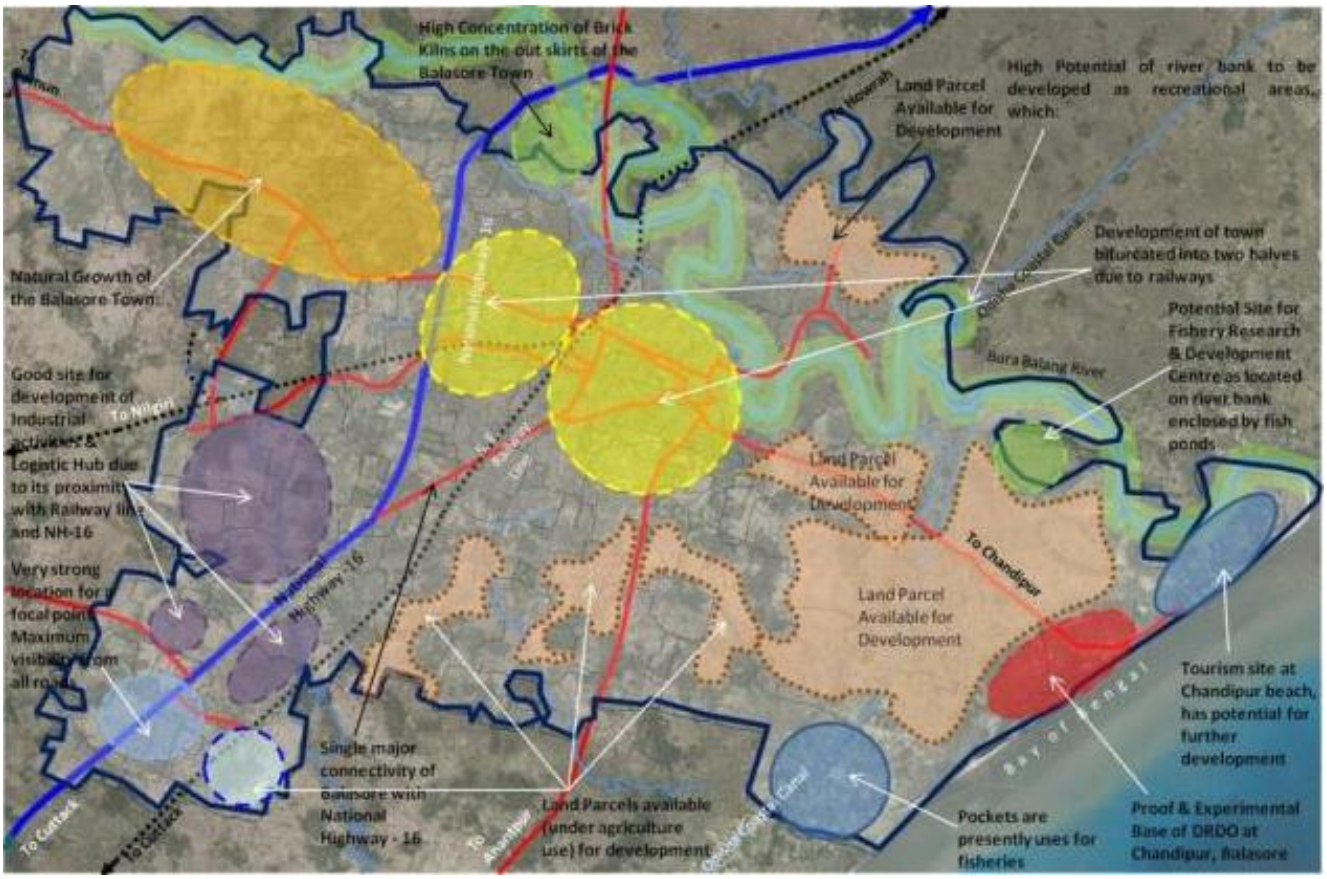


Figure 4.3: Site Analysis of Balasore Planning Area

Source: Consultant's Analysis

4.5 Development Concept

4.5.1 Alternative-I: New town Development

All the new development is proposed on eastern and western side of the old town. NH 16 and Railway line act as physical barriers and helps in creating a unique identity for the new town. The Balasore town is divided into two parts by Railway line and National Highway and there is very weak connectivity between east and west parts of the town. Hence, a Ring Road is proposed to connect two halves of the town (Refer to Fig 4.4).

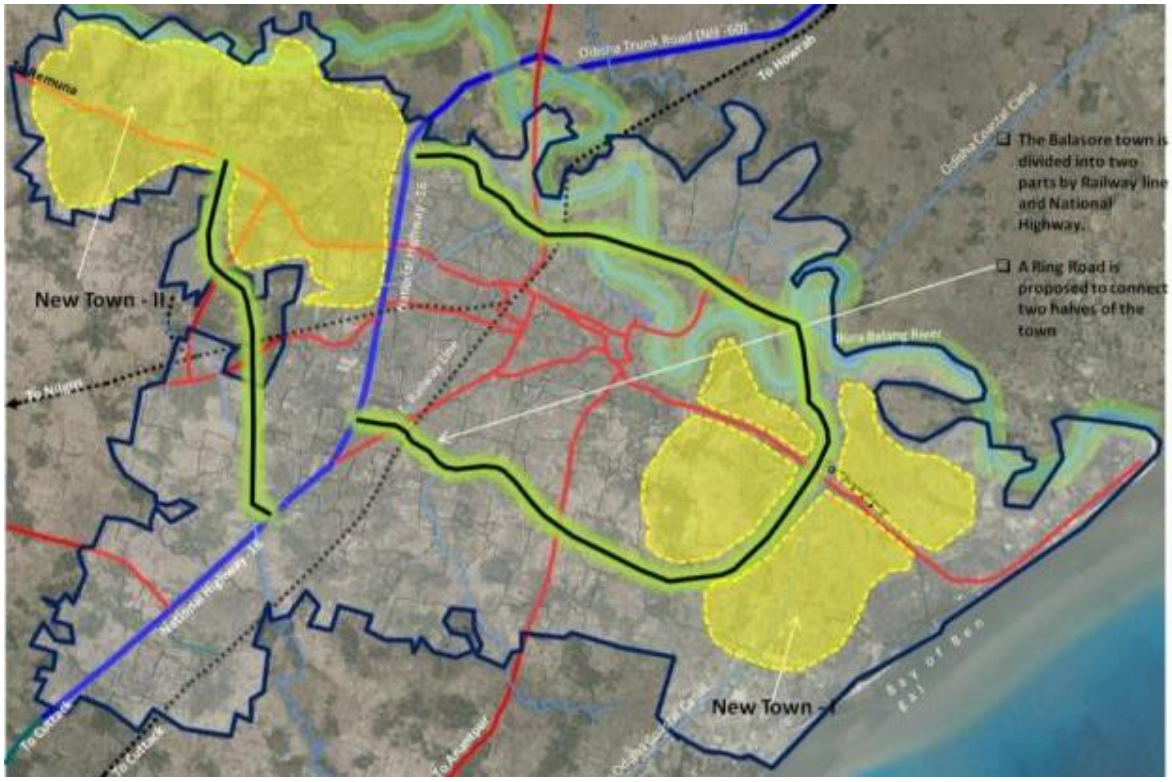


Figure 4.4: Alternative I: New town Development
Source: Consultant's Analysis

4.5.2 Alternative II: Corridor Development

Apart from the proposed ring road as in Alternative-1, the new development is proposed along all the major transport corridors i.e., NH 16, SH & the proposed Ring Road (Refer to Fig 4.4).

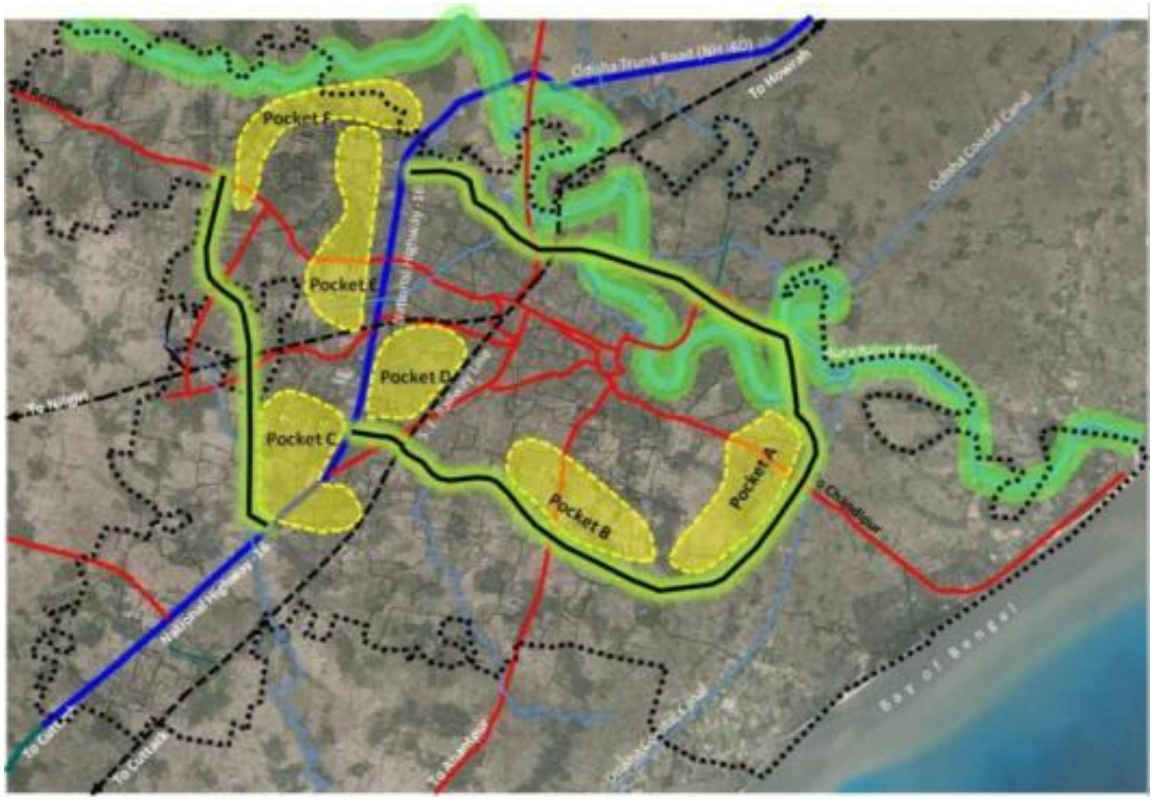


Figure 4.5: Alternative II: Corridor Development
Source: Consultant's Analysis

4.5.3 Alternative III: Cluster Development

Here, the natural ongoing pattern of development is proposed for future growth of town (Refer to Fig 4.6).

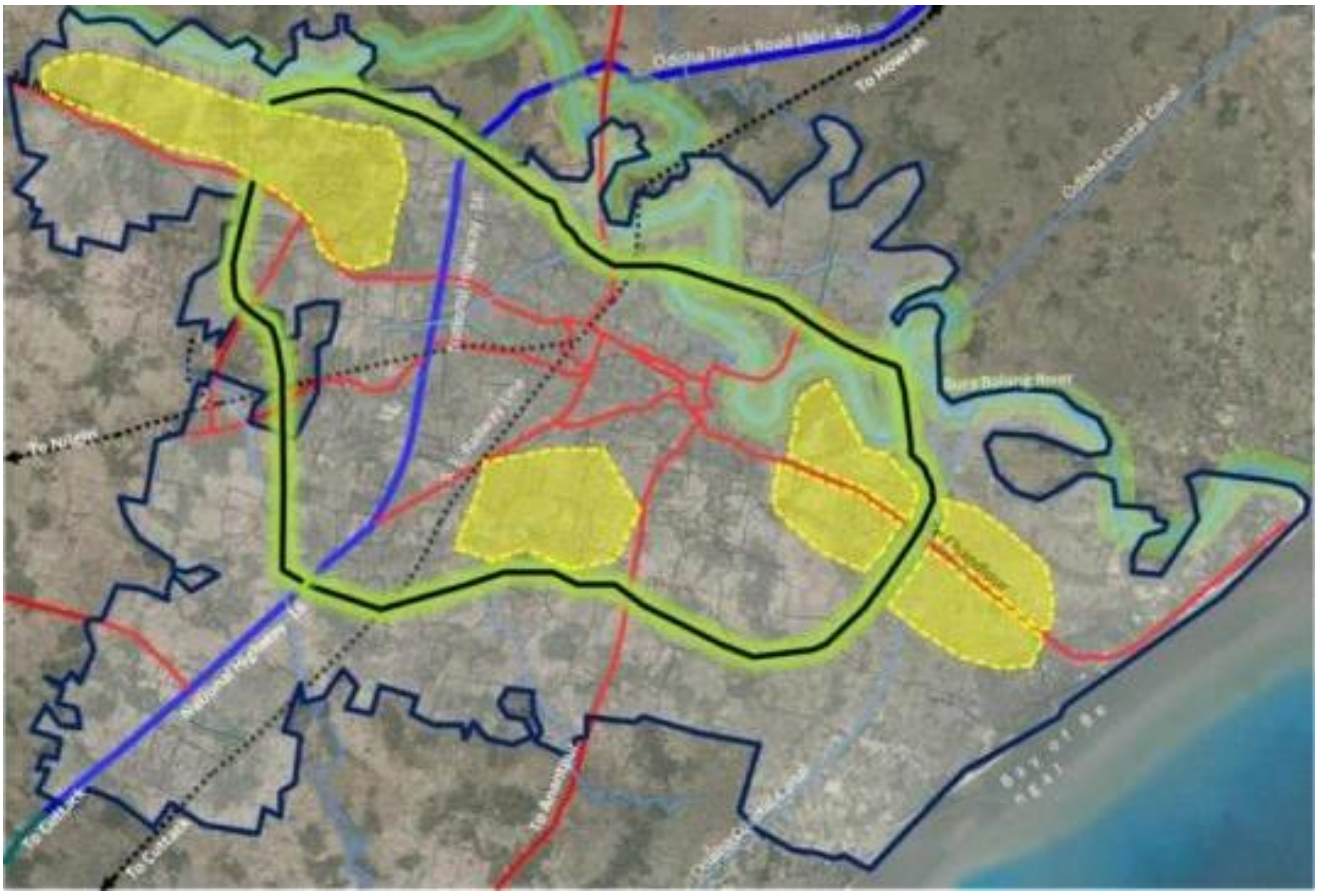


Figure 4.6: Alternative III: Cluster Development

Source: Consultant's Analysis

4.5.4 Concept: Alternative Development Scenario

After analyzing the feasibility of the three alternative development scenarios, it is proposed that the development of Balasore be in combination of development Alternatives – I and II.

Demography and Economy

Chapter 5. Demography and Economy

5.1 Introduction

Demography is the study of human population dynamics. Demography plays an important role in the field of analysis and prediction of Human settlement systems. The analysis of Demographic patterns and factors can give an excellent understanding of the present nature of social, economic, and industrial development of the settlement under consideration and pave way for reliable predictions of future population of settlements for allocation over the spatial and urban fabric.

5.2 Population Perspective

5.2.1 Population Growth in Planning Area

As per census 2011, population of planning area comes out to be 2,60,532 which includes surrounding 205 Villages and BMC (Balasore Municipal Council) (Refer to Table 5.1). Out of the 2.60 lakh population, 54.65% reside in the rural parts of the planning area (Refer to Fig 5.1).

Table 5.1: Planning Area Population

Master plan components	Population (2011)
Rural Areas	1,42,370
Balasore MC	1,18,162
Master Planning Area	**2,60,532**

Source: Census of India, 2011

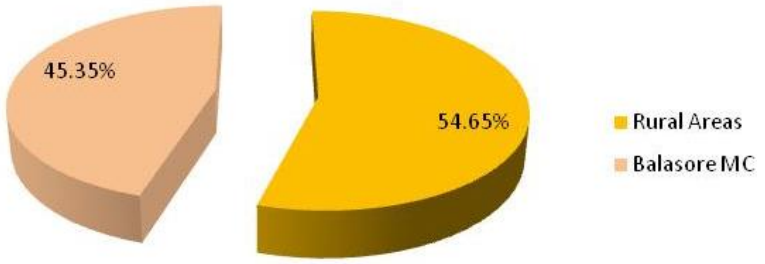


Figure 5.1: Percentage Distribution of Population in Rural & Urban Area

Source: Census of India, 2011

From population of 1.18 lakh in 1981, the population of the area in last 40 years has grown to only 2.60 lakh. Even the annual growth rate has seen a continuous decline.

Table 5.2: Planning Area Population & Growth Rate,1981-2011

Year	Population	Annual growth rate
1981	1,18,067	5.38
1991	1,59,000	3.47
2001	2,05,827	2.95
2011	2,60,532	2.66

Source: Census of India

5.2.2 Population Growth in Balasore Municipal Area

As per Census of India data, the population of Balasore area has seen steady increase, going over 1 Lakh in 2001 (Refer to Table 5.3 and Fig 5.2)

Table 5.3: Census Population of Balasore Urban Area & Decadal Growth

S. No.	Year	Total Population	Additional Population	Growth Rate (in %)
1	1901	20,880	-	-
2	1911	21,362	482	2.31
3	1921	17,037	-4,325	-20.25

S. No.	Year	Total Population	Additional Population	Growth Rate (in %)
4	1931	17,843	806	4.73
5	1941	19,405	1,562	8.75
6	1951	22,851	3,446	17.76
7	1961	33,931	11,080	48.49
8	1971	46,239	12,308	36.27
9	1981	65,779	19,540	42.26
10	1991	85,442	19,663	29.89
11	2001	1,06,082	20,640	24.16
12	2011	1,18,162	12,080	11.39

Source: Census of India, 1901-2011

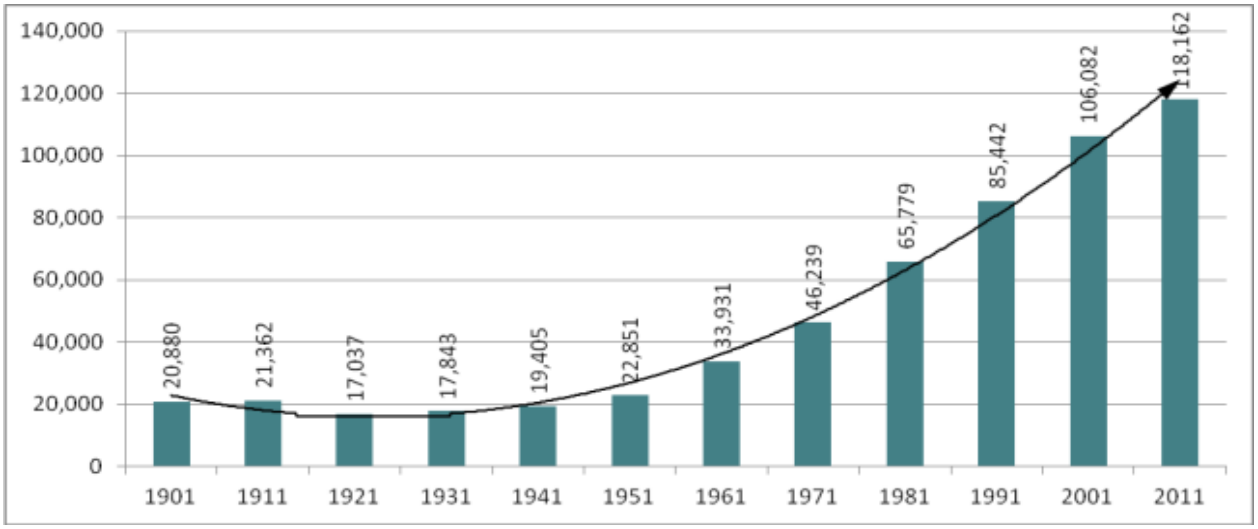


Figure 5.2: Population Trend of Balasore Urban Area

Source: Census of India, 1901-2011

As per 2011 Census, the total population of Balasore Town is 1,18,162 and registered a population growth rate of 11.39% during 2001-2011. Balasore' s registered population growth of 11.39% during 2001-2011 shows a downward trend as compared to previous decades (Refer to Fig 5.3). The growth trends of the town have been very unpredictable and irregular since 1961.

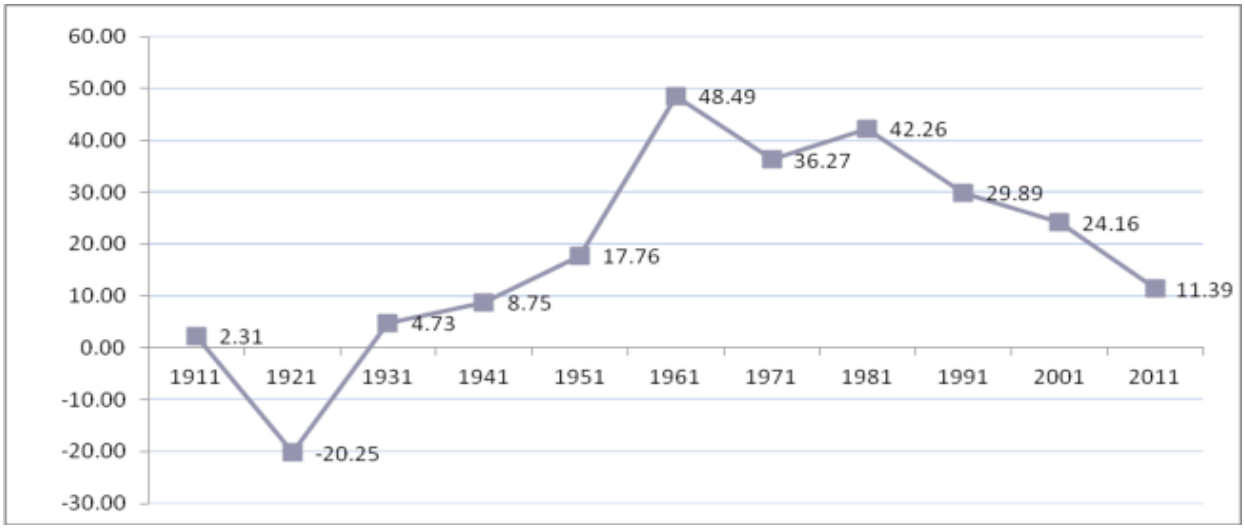


Figure 5.3: Decadal Growth Rate of Balasore Urban Area

Source: Census of India, 1911-2011

Percentage of males & females as per household survey analysis shows that male population ranges between 50-53% and 47-50% for females (Refer to Fig 5.4). In the surrounding rural areas, the percentage of females is lesser compared to males than within the municipal area.

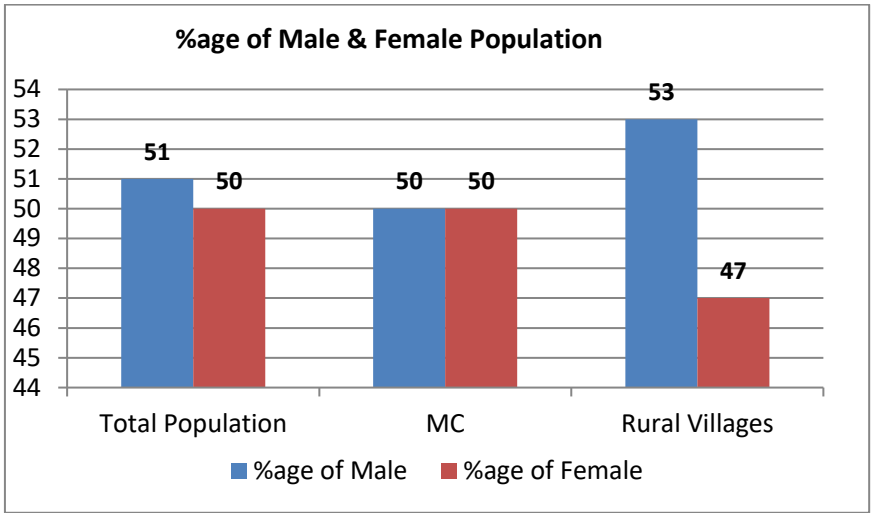


Figure 5.4: Percentage of Male & Female Population

Source: Consultant's Analysis

5.2.3 Population Density

As per Census of India, 2011 the average population density of the planning area is only 15 PPH, although, the density of the municipal area is 82 PPH (Refer to Table 5.1).

Table 5.4: Population Density

S. No.	Description	Persons per hectare
1	Population Density (Developed Area) of Balasore Municipal Area	100
2	Average Population density of Planning Area	15
3	Average Population density of Developed Area within Planning Area	37

Source: Census of India

5.2.4 Sex Ratio

As per the census of India - 2011, the sex ratio (No. of females per 1,000 male populations) of Balasore Municipality is 957, which is lower than the district urban of 981but higher than the national urban average of 940 of that period (Refer to Table 5.5). Since 1901 till 1971, the sex ratio of the Balasore town showed a decreasing trend. The sex ratio of the town was 918 in 1901, which decreased to 832 in the decadal year 1971. After the Master Plan-1976, the sex ratio has been showing an increasing trend due to improvement of health facilities in the Balasore region.

Table 5.5: Sex Ratio

Category	Sex Ratio
India	940
Odisha	978
Balasore	957
Child Sex Ratio	943

Source: Census of India, 2011

5.2.5 Literacy

In the Balasore town there were 93,642 literate persons in 2011 as against 78,857 persons in 2001 (Refer to Table 5.6). Hence, the percentage of male and female literacy during 2011 decadal period was 82.23% and 76.15% respectively. In comparison of 2011 with that of 2001 it was observed that there is a positive (4.91%) variation in total literacy of the Balasore town. This variation is quite high i.e. (7.33%) in case of female literacy of the town. There was an increase of male literate (2.91%) in the town in comparison of the figure of decadal year 2001.

Table 5.6: Literacy Rate in Balasore District & Planning Area

Literacy rate (Balasore District Urban)			
Year	**Literacy rate**	**Male literates**	**Female literates**
2001	68.65	74.86	61.90
2011	75.36	79.24	71.32

Literacy rate (Balasore Town)			
Year	Literacy rate	Male literates	Female literates
2001	74.34	79.32	68.82
2011	79.25	82.23	76.15

Source: Census of India, 2011

5.2.6 Broad Age and Sex Composition

The decadal (2011) sex composition of the Balasore Town revealed that the male ratio (51.0%) was at higher proportion than female ratio (49.0%) of the total population. The population in age group (0-6 years) in the town was 10.03% of the total population in decadal year 2011 which is 11,860.

5.3 Population Projection

The projected population for Balasore Planning Area for horizon year-2030 has been arrived at by the following three ways:

1. Projecting the population of the entire planning area using Linear, Geometric and Exponential Growth Methods and considering the average.
2. Projecting the urban and rural population separately using Linear, Geometric and Exponential Growth Methods and considering the average.
3. Projecting the population of the entire planning area considering the natural growth rate and migration rate of the planning area.

Some basic assumptions made in the third method are as follows (Refer to Table 5.7):

- Balasore, due to its proximity to Bhadrak, Cuttack and Dharma will not only accommodating the spillover of population of nearby towns (as it has witnessed that city already spread in those directions).
- Intervention as impetuous to growth in the area due to industrial development near the town and proposed development under master plan.
- Rate of Migration to Urban areas has been assumed to be 14.0% for decade 2011-2021 and 14.9% for 2021-2030.
- Natural growth rate in Total Planning Area has been assumed to be 14.4% for the decade 2011-2021 and 15.5% for 2021-2030.

Table 5.7: Birth, Death, and Natural Growth rate of Odisha& Balasore District - 2011

Description	Odisha				Balasore District	
	1981	1991	2001	2011	2001	2011
Birth Rate	33.1	28.8	23.5	19.8	23.40	19.80
Death Rate	13.1	12.8	10.2	8.2	10.20	8.2
Natural Growth Rate	20.0	16.0	13.2	11.6	13.20	11.60
Rate of Migration	Rural-to-Urban Migrants (1991-2001) as a % of Urban Population = 10.97%					
	Rural-to-urban Migrants (2001-2011) as a % of Urban Population = Not available					

Source: Census of India, 2011

- The population growth rate for Balasore Planning Area has been assumed based on comparative population projection with other major urban centers.
  In present scenario, Balasore has shown highest growth rate both in Urban and Rural area in comparison of surrounding towns.

Table 5.8: Comparison of growth rate (in %) with surrounding towns

Districts	Urban	Rural	Average
Kendrapara	12.68	10.50	10.63
Balasore	**36.10**	**19.97**	**28.03**
Bhadrak	31.73	10.72	12.94
Cuttuck	14.80	11.09	12.10

The final projected population arrived at for Balasore for the horizon year 2030 comes out to be 4.61 lakhs while by 2021 it is projected to be 3.42 lakhs (Refer to Table 5.9 and Fig 5.5).

Table 5.9: Population Projection for Balasore Planning Area, 2030

Year	Population	Annual growth rate
1981	1,18,067	5.38
1991	1,59,000	3.47
2001	2,05,827	2.95
2011	2,60,532	2.66
2021	3,42,608	3.15
2030	**4,61,933**	3.48

Source: Consultant's Estimation

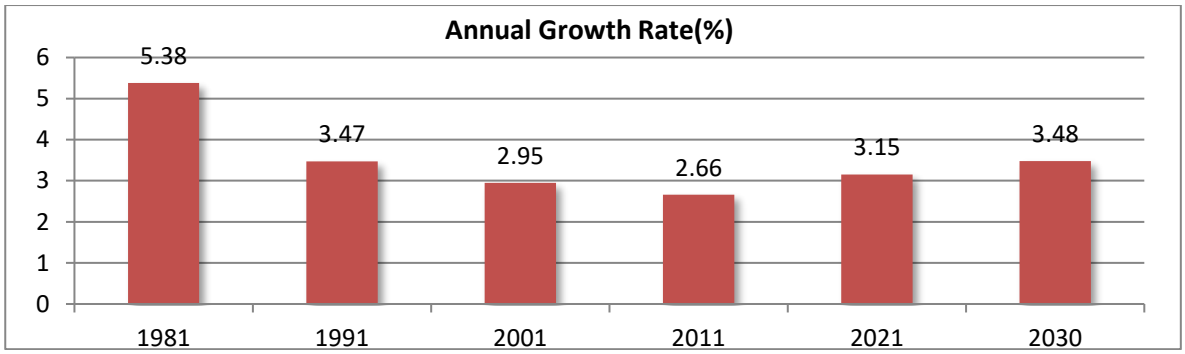


Figure 5.5: Trend of Annual population Growth Rate

Source: Census of India and Consultant's Estimation

5.4 Economic Perspective

5.4.1 Economy of the Region

Balasore District is one of the economically strong Districts in Odisha, which is privileged in both agriculture and industry. Despite being an agrarian economy, agriculture is not the main stay of the people of Balasore town. The district lies in the coastal part of Odisha and is blessed with hot and humid climate with alluvium soil and intersected by the perennial rivers, which collectively provides a conducive infrastructure for the growth of agriculture in this region. In the recent years, the utilization of the wasteland for ensuring the economic development of Balasore District has been taken into consideration and it is being used to produce coconut and betel. The local economy of Balasore District largely depends on the cultivation of paddy and wheat.

Though a major section of Odisha's population depends on agriculture, industry is the nucleus of the economic development of Balasore District. With the establishment of D.I.C, functioning from the year 1978, the district has witnessed prominent success in the field of industrial development. It is the nodal agency for promotion and establishment of small, medium, and large industries and as well as for the cottage and handicraft industries in the district. Ori Plast Limited, Jagannath Biscuits Private Limited, Odisha Rubber Industries and Odisha Plastic Processing are some of the award-winning small-scale units of the region. Birla Tyres, Ispat Alloys Limited, Emami Paper Mills Limited, and Polar Pharma India Limited are some of the large-scale industries which are contributing in a big way towards the growth of the economy of Balasore.

Figure 5.6: Industries in Balasore

Apart from the Government undertakings and the public sectors, a group of private entrepreneurs have come up, which accentuated the industrial development prominent in the economic scenario of the Balasore District. These industries in the recent times not only provide employment to the local people but at the same time accounts for a quantum of exports, which supports the economy of the district greatly.

5.4.2 Total Workers & Non-Workers

Out of the total Population surveyed, only about 28% are workers and 72% are either non workers or dependants. The percentage of workers as well as non-workers is greater in the Balasore Municipal area than in the rural part of the planning area (Refer to Fig 5.7).

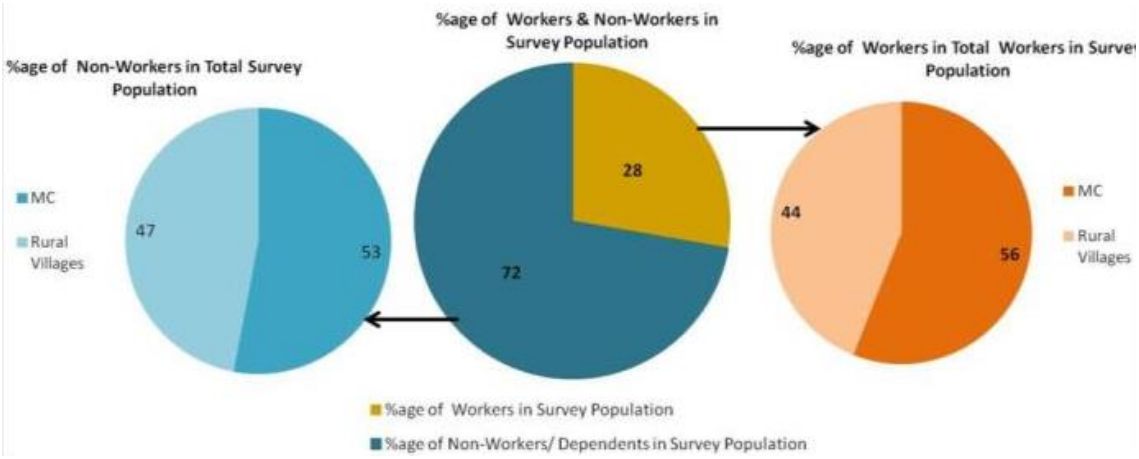


Figure 5.7: Percentage Distribution of Workers & Non-Workers

Source: Consultant's Analysis

The percentage of non-workers is more in the whole of the planning area due to low employment opportunities, lack of proper educational skills as well as household size being large with more dependants. In the MC area the percentage of workers is more due to low household size and comparatively better employment opportunities (Refer to Fig 5.8).

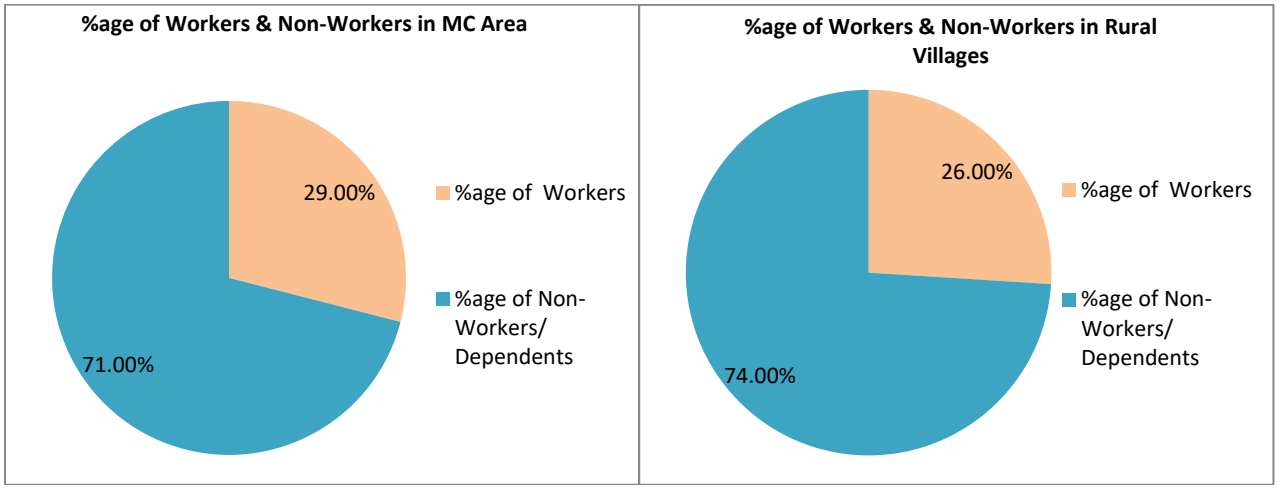


Figure 5.8: Percentage of Worker & Non-Workers in MC & Rural Area

Source: Consultant's Analysis

5.4.3 Work Force Participation

The work force participation rate of Balasore town during the decadal year 2001 was 28.88% which increased to 33.86% in the decadal year 2011. Out of the total work force of 40,004 persons, 83.29% are male and rest 16.71% are female workers. Amongst the three sectors, primary sector has seen major decline in workers than the rest. Further, maximum percentage (53.79%) is engaged in tertiary activities in the area. Refer to Table 5.9 and Fig 5.9 below.

Table 5.10: Sector wise workforce participation ratio

Year	Population	Total Workers	WFPR	Primary		Secondary		Tertiary	
				Workers	%	Workers	%	Workers	%
1991	1,59,000	45,569	28.66	8,840	19.40	15,817	34.71	20,912	45.89
2001	2,05,827	59,381	28.85	1,276	2.15	23,995	40.41	34,110	57.44
2011	260532	87,565	33.61	4,429	5.06	36,037	41.15	47,099	53.79

Source: Census of India, 2011

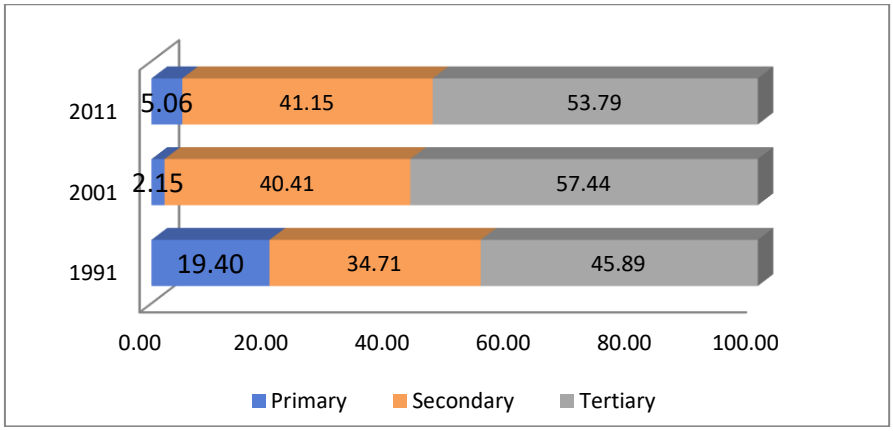


Figure 5.9: Percentage distribution of Sector wise workforce participation ratio

Source: Census of India, 2011

5.4.4 Occupation Structure

The category wise distribution of the working population of the town reveals that the economy of the Balasore has been characterised by both tertiary and primary sector. The main workers of the town constitute 29.19 % of the total population during the decadal year 2011, which is 2.80 % is higher than the main workers (26.39%) of the decadal year 2001(Refer to Table 5.10). The increase in WFPR shows a healthy growth of the economy of the Balasore town.

Table 5.11: Occupational Pattern of Balasore Town

S. No.	Category	Main Workers		Marginal Workers		Total Workers	
		Nos.	%	Nos.	%	Nos.	%
1	Primary	761	2.21	435	7.89	1,196	2.99
2	Secondary	1,577	4.57	632	11.46	2,209	5.52
3	Tertiary	32,153	93.22	4,446	80.65	36,599	91.49
	Total	**34,491**	**100.00**	**5,513**	**100.00**	**40,004**	**100.00**

Source: Census of India, 2011

If we compare the occupational structure in main and marginal workers, tertiary sector occupation is higher than primary and secondary. Tertiary structure constitutes 93.22% of the main worker's population. Secondary sector contribution is a matter of concern as it is less than 4.57%. Construction workers, Industrial workers and Household industrial workers come under secondary sector category.

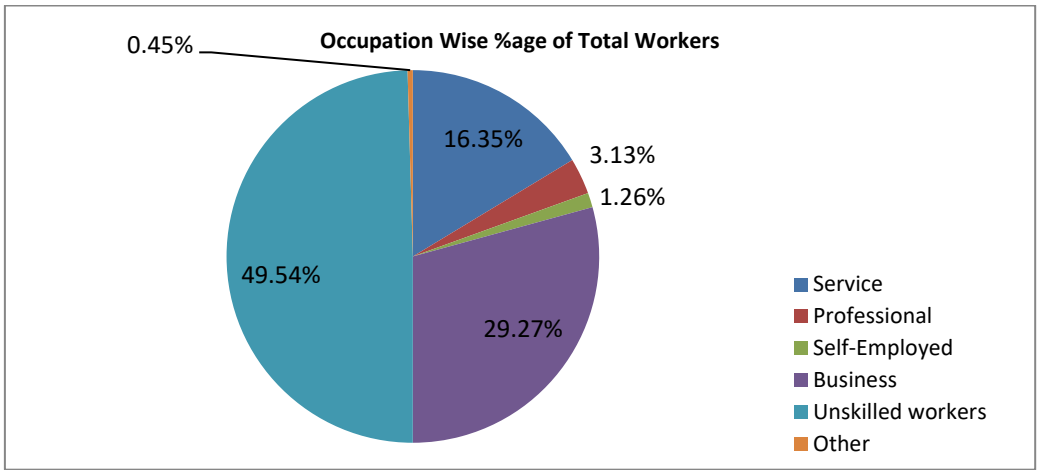


Figure 5.10: Distribution of Total Workers on basis on Occupation

Source: Consultant's Analysis

Maximum percentage of population is engaged in unskilled activity (49.5%) and followed by business (29.3%) and service (16.3%). Less percentage of population is engaged in self-employment (1.3%) and professional activity (3.1%) due to low educational facilities and migration. Refer to Fig 5.10 above.

While comparing between occupation of workers in MC and rural area, more percentage of people are involved in business (32.3% in MC while 26.7% in rural), followed by those in service (19.7% in MC while 13.5% in rural). Further, it can also be seen percentage of unskilled workers in more in rural area (53.9%) than in MC area (44.4%). Refer to Fig 5.11 below.

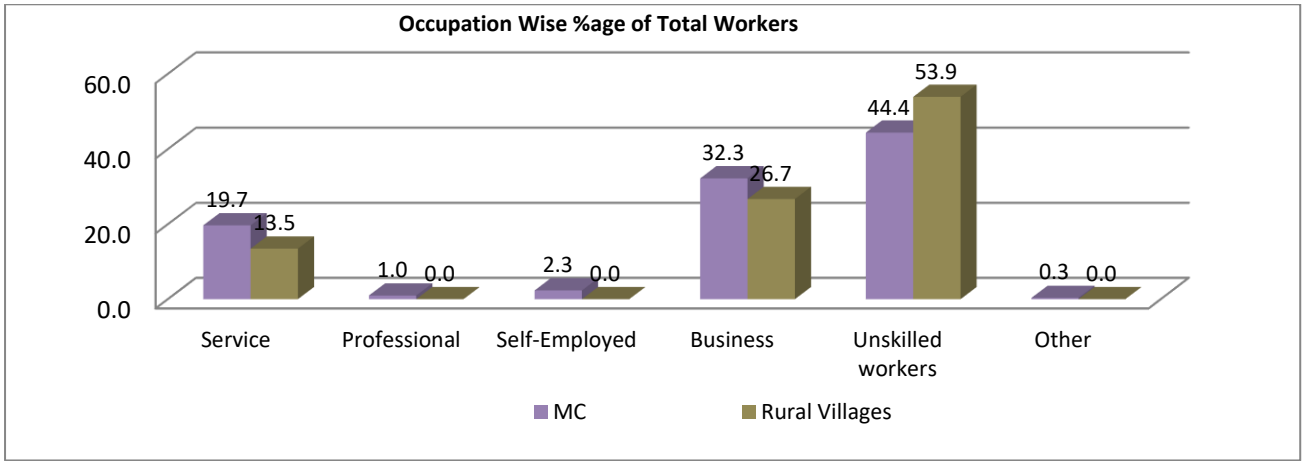


Figure 5.11: Occupation wise percentage of Total Workers in MC & Rural Area

Source: Consultant's Analysis

5.4.5 Household Income, Expenditure and Savings Analysis

Economic activity reflects a lower average for the monthly household income in Balasore Planning Area. Major percentage of households, among those surveyed, have average household income up to 10,000 (69%). After that 24% of the household's average monthly income is Rs. 11,000-20,000. Refer to Fig 5.12 below.

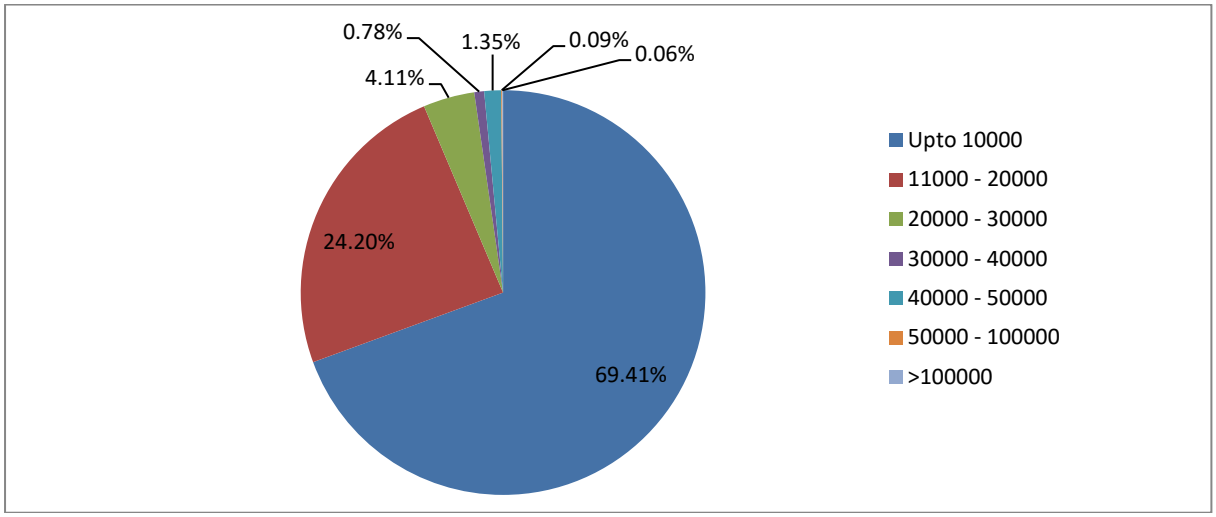


Figure 5.12: Percentage Distribution of Average Household monthly Income (Rs)

Source: Consultant's Analysis

In the rural part of the Planning area, more percentage of household's average income is up to Rs. 10,000 i.e. 72.9% as compared to MC area where 65.9% household's average income is up to Rs. 10,000. Further, more percentage of household's average monthly income is in the higher brackets as compared to in the rural areas indicating higher earnings in the urban area. Refer to Fig 5.13 below.

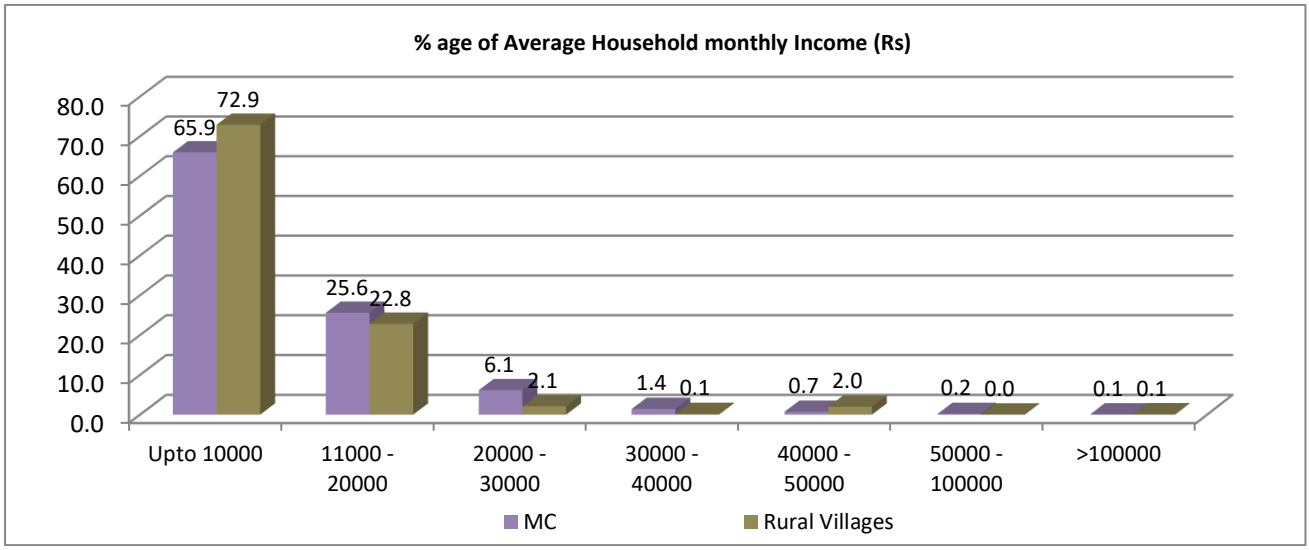


Figure 5.13: Percentage of Average Household monthly Income (Rs) in MC & Rural Area

Source: Consultant's Analysis

As seen from above, since the household's average monthly income is less, the monthly household expenditure is within the same bracket. This again reflects low economic activity. 92% of the households have low monthly expenditure i.e., up to Rs. 10,000. Refer to Fig 5.14 below.

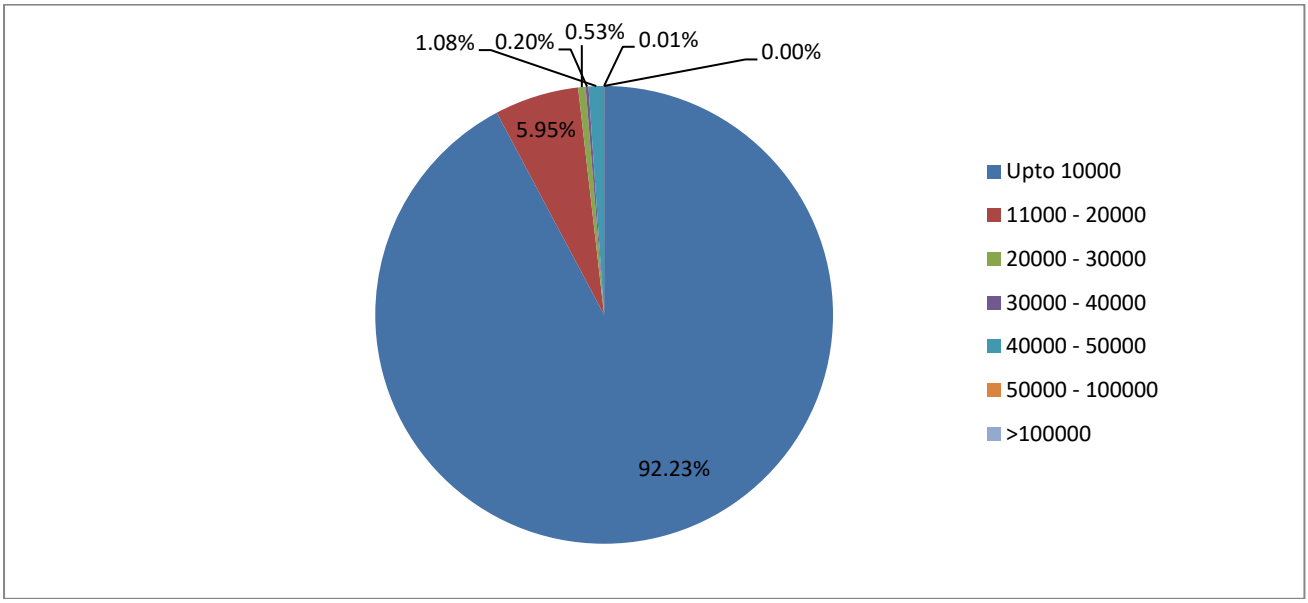


Figure 5.14: Percentage of Average Household monthly Expenditure (Rs) of Total Households

Source: Consultant's Analysis

Although, there is a difference in the average monthly income brackets of households in MC and rural areas, no such difference is seen in average monthly expenditure of the households (Refer to Fig 5.15 below)

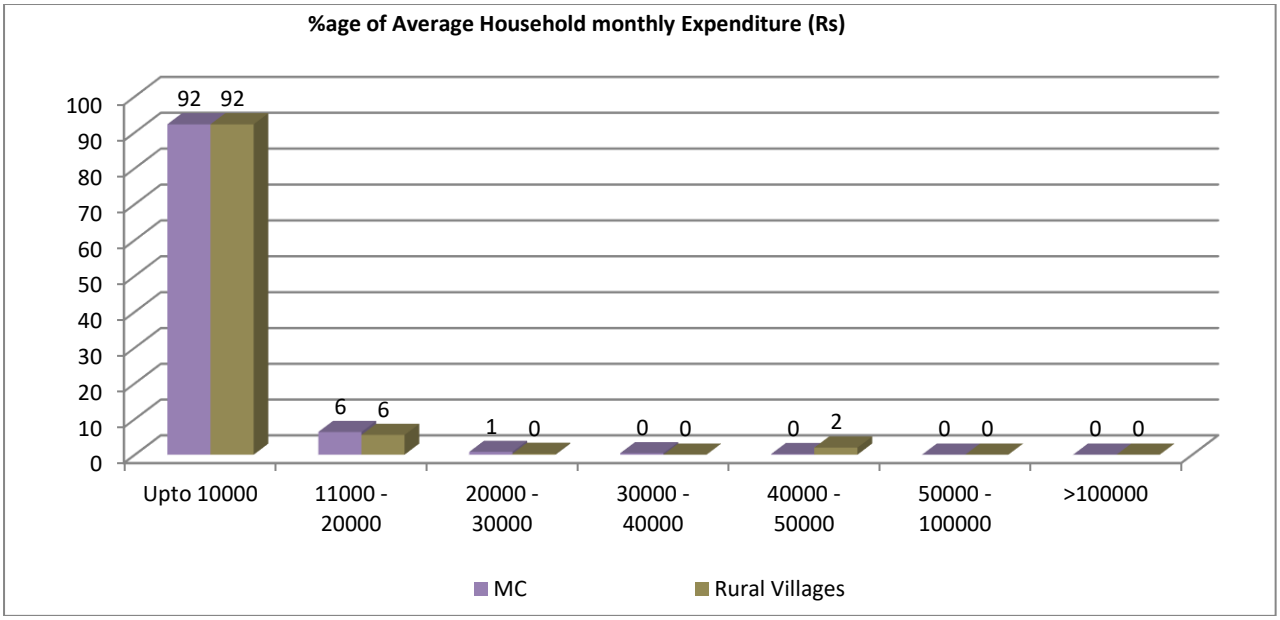


Figure 5.15: Percentage of Average Household monthly Expenditure (Rs.) in MC & Rural Areas

Source: Consultant's Analysis

Since mostly the monthly HH expenditure is less than 10000 hence income and savings also in the same scale.

5.4.6 Travel Distance to Work

Fig 5.16 below shows that approx. 76% workers travel a distance between 0-5 km for their workplace indicating that they engaged in local activities**.** Approx. 16.4% travel 6-10 kms

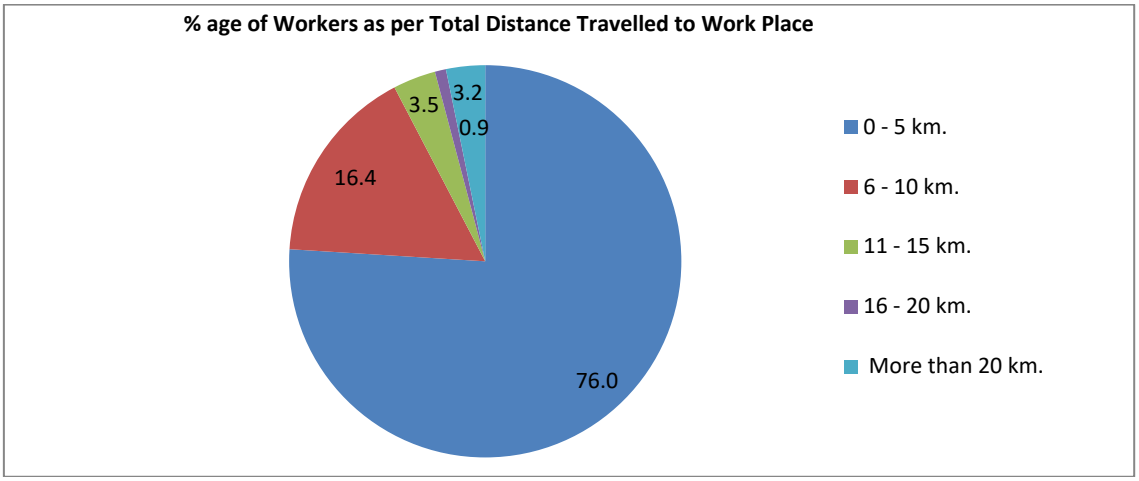


Figure 5.16: Percentage of Workers as per Total Distance Travelled to Workplace

Source: Consultant's Analysis

Fig 5.17 below indicates that more percentage of people have their workplace between 0-5km in the MC area (82.4%) as compared to in rural parts (69.5%). While, more percentage of people travel further to work i.e., 6-10kms in rural areas (23.1%) only 9.7% do so in MC area.

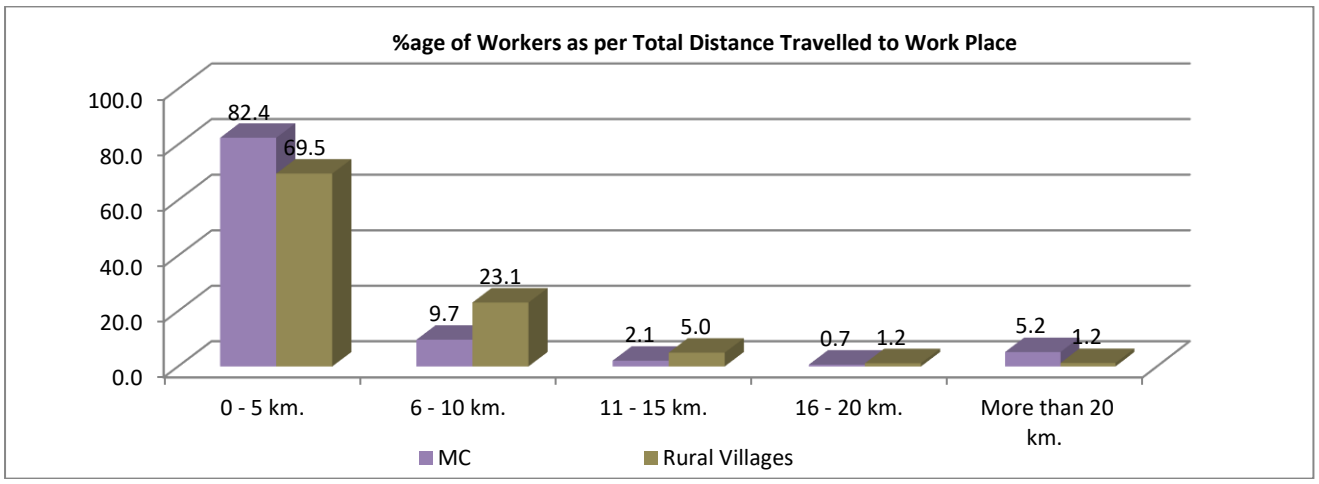


Figure 5.17: Percentage of Workers as per Total Distance Travelled to Workplace in MC & Rural Area

Source: Consultant's Analysis

5.4.7 Issues

Some issues regarding economy in Balasore Planning Ares are as below:

- Non availability of Skilled & Technical Manpower.
- Inadequate Finance.
- Complexity of procedure in issuing VAT exemption certificate.
- Single window system is ineffective.
- Problems with EPM on rate contract.
- Delay in getting the incentives from the Govt.

5.4.8 Future Profile of Economy and Workforce Participation

Balasore is situated in between two major PCPIR hub of India, i.e., Haldia and Paradip Port. Growth of Industries particularly in Plastic Sector has a tremendous scope to prosper. Ports at Chudamani and ongoing Dhamra port in the nearby district will act as a boost to the industrialization process of the Balasore. Thus, considering the potential of the area, it is estimated that with the rise of population, the total number of workers and work force participation will also increase by the horizon year of 2030 (Refer to Table 5.12 and Fig 5.18).

Table 5.12: Projected Work force Participation in Planning Area for horizon year - 2030

Year	Total Population	Total Workers	Cultivators	Agricultural Laborer	Household Industries	Others	WFPR
2016	3,01,472	1,02,621	1,206	3,165	6,029	92,220	34.04
2021	3,42,608	1,18,200	1,199	3,426	7,537	1,06,037	34.50
2026	4,01,652	1,46,402	1,205	3,012	9,640	1,32,545	36.45
2030	**4,61,933**	**1,77,382**	**924**	**2,079**	**11,825**	**1,62,554**	**38.40**

Source: Census of India and consultant estimation

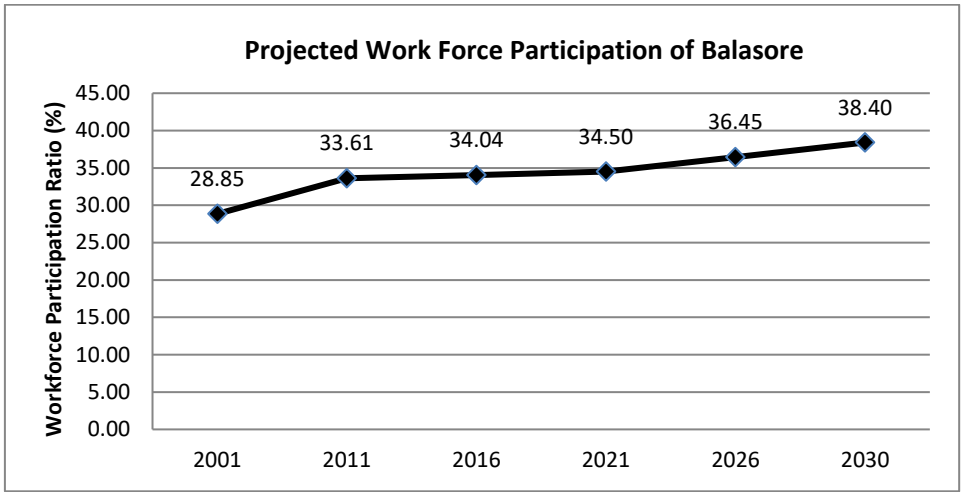


Figure 5.18: Projected Work force Participation in Planning Area

Source: Census of India and consultant estimation

Further, it is also estimated that Tertiary sector will see the maximum rise in the percentage of workers followed by the secondary sector while, primary sector will see a decline (Refer to Table 5.13).

Table 5.13: Sector wise Workforce Participation - 2030

Year	Population	Total Workers	WFPR	Primary		Secondary		Tertiary	
				Workers	%	Workers	%	Workers	%
2016	301472	102621	34.04	4371	4.47	42918	41.70	55332	53.83
2021	342608	118200	34.50	4625	3.91	49952	42.26	63622	53.83
2026	401652	146402	36.45	4217	2.74	62658	42.82	79527	54.44
2030	**461933**	**177382**	**38.40**	**3003**	**1.69**	**76847**	**43.32**	**97533**	**54.98**

Source: Consultant's estimation

Traffic and Transportation

Chapter 6. Traffic and Transportation

6.1 Introduction

The Traffic and Transportation system is the backbone of any town. The role of transport in enabling and directing urban development has been long. In the planning for a transport system, several objectives form the base. The main objective is to enable the mobility of people and goods, faster economic development and enhance social interactions.

The concept plan of transport system essentially consists of the road network systems in terms of their form (pattern), hierarchy and identification of potential operating systems (public transport). It also includes location of other components of the transport system with reference to the network configuration and in relation to other activity use dispositions. The required traffic surveys and studies have been carried out to appreciate the traffic and travel characteristics, for identifying issues, constraints, and potentials and to work out the most appropriate transport system for the city.

- Incorporating urban transportation as an important parameter at the urban planning stage rather than being a consequential requirement.
- Encouraging integrated land use and transport planning so that travel distances are minimized and access to livelihoods, education, and other social needs, especially for the marginal segments of the urban population is improved.
- Bringing about a more equitable allocation of road space with people, rather than vehicles, is its focus.
- Investing in transport systems that encourage greater use of public transport and non-motorized modes instead of personal motor vehicles.
- Promoting the use of cleaner technologies.
- Associating the private sector in activities where their strengths can be beneficially tapped.

In the context of growth of the planning area focused on religious centers and other developments, improvement of transportation network is imperative for establishing a well-developed transport system. A transport system acts as a bridge between places of origin and destination. It opens out a region by providing an access to its development centers and other places. The media of traffic at Balasore are roads and railways and the mode of transportation include train, lorry services and a variety of manually propelled vehicles such as cycle, rickshaw, bullock carts, motorcycles, taxies, buses etc.

The information and analysis presented in the following sections is based on the traffic and transportation surveys conducted on site.

6.2 Study Area and Traffic Zone

The study area consists of Balasore M.C area (consisting of 31 wards) and surrounding 205 villages. Balasore is connected through National Highway 16 linking to Bhadrak and Cuttack in the South and it divides Balasore Planning Area into 2 parts. State Highway 19 also connects Balasore to other cities in the region.

For traffic survey analysis, the entire Balasore Planning Area is divided into 12 zones for Origin and destination Survey.

6.3 Transport Surveys and Studies

Traffic surveys and studies have been carried out to appreciate the traffic and travel characteristics, for identifying issues, constraints, and potentials and to work out the most appropriate transport system for the city and for a realistic estimation of the transportation demand.

6.3.1 Classified Traffic Volume Count (TVC)

Traffic volume studies are conducted to determine the number, movements, and classifications of roadway vehicles at a given location. These data can help identify critical flow time periods, determine the influence of large vehicles or pedestrians on vehicular traffic flow, or document traffic volume trends.

Classified Traffic Volume Count Surveys have been carried to appreciate traffic characteristics in terms of volume, composition, peak hour, and directional split.

6.3.2 Origin and Destination Survey

Origin-destination (O-D) surveys provide a detailed picture of the trip patterns and travel choices of a cities or region's residents. These surveys collect valuable data related to households, individuals, and trips. This information helps to understand travel patterns and characteristics; measure trends; provide input to travel demand model development, forecasting, and planning for area-wide transportation infrastructure needs and services. Origin and Destination surveys (OD) have been conducted to obtain the information regarding the travel pattern of passenger and goods vehicles.

6.3.3 Road Inventory Survey

Road Inventory survey of strategic road networks has been conducted to assess the physical characteristics and conditions of the roads in the study area, identify physical constraints and bottlenecks, assess potential capacity, and identify the extent for its future development. The data collected in road inventory survey includes Right of Way width, Carriageway width, and surface type, Abutting land use, Utility & services (on surface), On-street parking and condition of drains, Trees (within ROW), Traffic Control and Management measures, and other special features.

6.3.4 Parking Survey

Parking survey has been conducted to appreciate the parking demand and supply characteristics, identify issues and constraints, and suggest appropriate policies for meeting the target year demand. The parking survey has facilitated information on the parking supply and demand characteristics in terms of accumulation, composition, duration, and turnover.

6.3.5 Types of Traffic and Transportation Survey Conducted in Balasore Town

Different types of Traffic and Transportation surveys has been conducted for analyzing the existing capacities, issues, constraints, and potentials in Balasore Planning Area.

Table 6.1: Types of Traffic and Transportation Survey Conducted

S. No.	Type of Survey
1	Road Network Inventory
2	Traffic Volume Count survey
	Mid-Block Volume count
	Outer cordon volume count
3	Parking survey
4	Origin and Destination Survey (Goods and Passenger vehicles)
5	Passenger and Goods terminal Survey

Source: Consultants' Transport Survey

6.4 Overview of Travel Characteristics

6.4.1 Vehicle Ownership Pattern

Of the total vehicle ownership in the planning area, maximum accounts to cycle. Approx. 76.2% of the population owns cycles. Ownership of two-wheelers accounts to approx. 21%. Only 0.4% people own cars in Balasore. Refer to Fig 6.1 below.

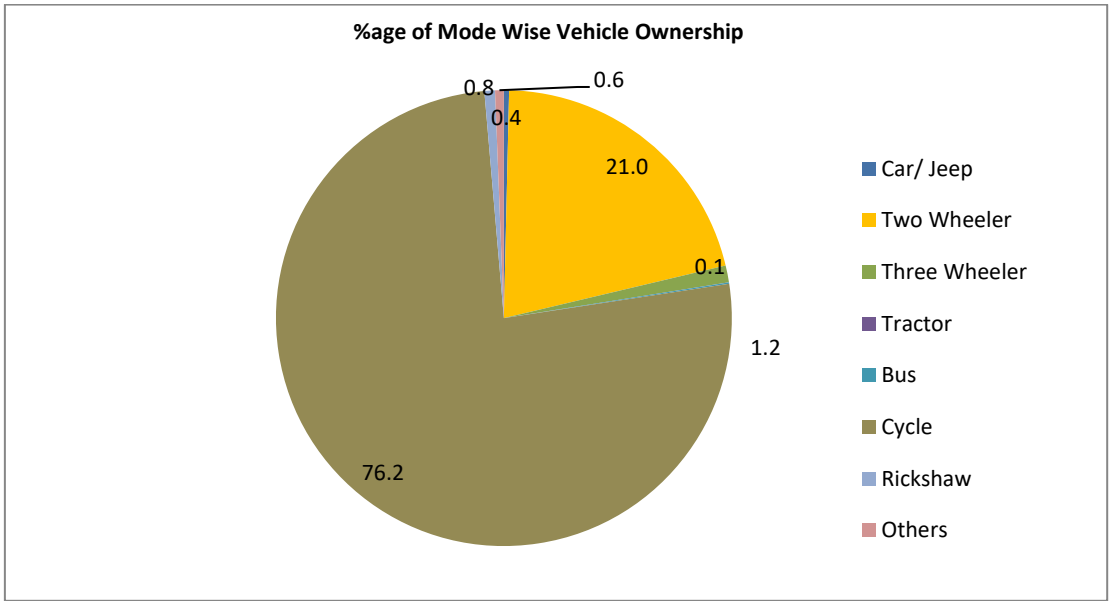


Figure 6.1: Percentage Distribution of Mode Wise Vehicle Ownership

Source: Consultant's Analysis

While comparing the MC and the rural areas, more percentage of people (26%) own two-wheelers in MC than 16% in the rural areas. But more percentage of people i.e., 81% own cycles in the rural areas than in the MC area (72%). Refer to Fig6.2 below.

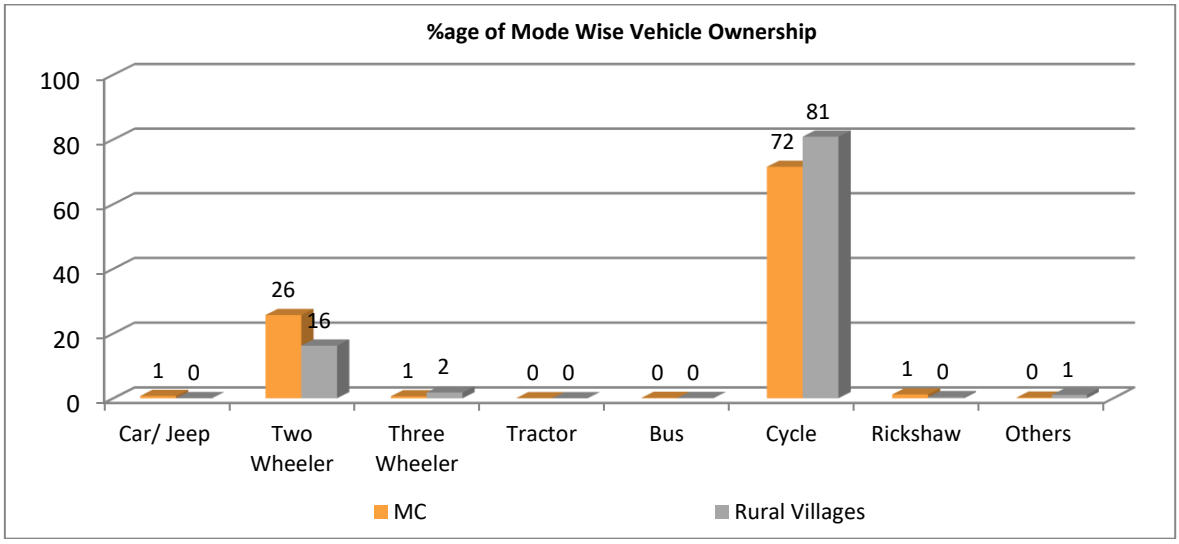


Figure 6.2: Percentage of Mode Wise Vehicle Ownership in MC & Rural Areas

Source: Consultant's Analysis

As per data available from RTO, the growth trend of registered vehicles in Balasore has shown a significant increase in the last five years from 2009-10 to 2013-24. But there has been a slight dip in the registered vehicles in the year 2013-14. The total number of registered vehicles in Balasore has increased from 17,647 in 2009-10 to 24,748 in 2013-14 (Refer to Fig 6.3). Amongst the total vehicles registered in Balasore, two-wheelers are highest in number followed by four-wheelers, both being personalised modes. In 2013-14 84% of the vehicles registered were two-wheelers (Refer to Fig 6.4)

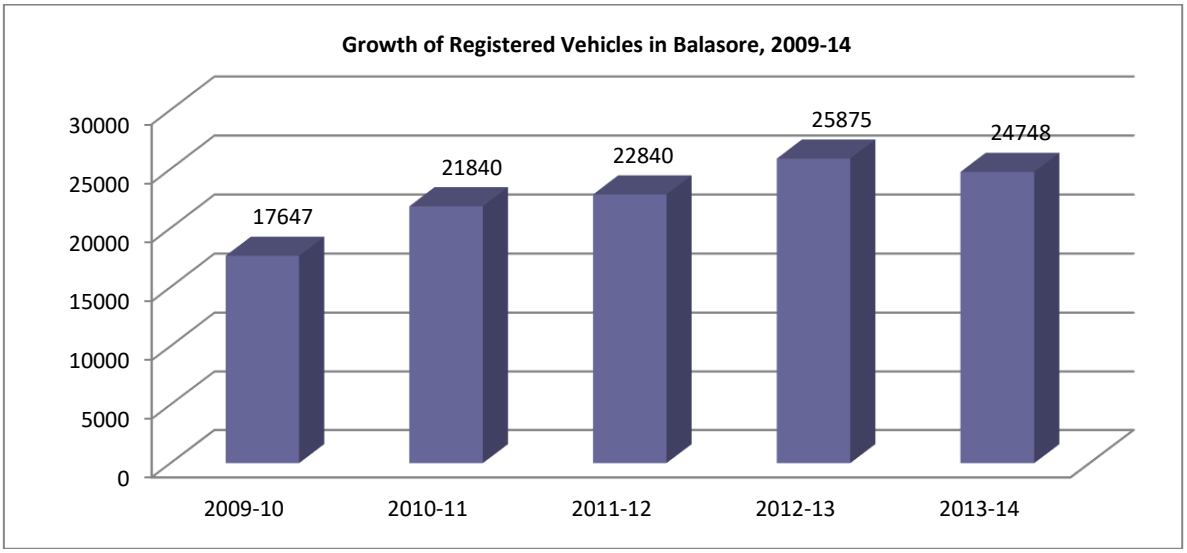


Figure 6.3: Growth of Registered Vehicles in Balasore, 2009-14

Source: RTO, Balasore

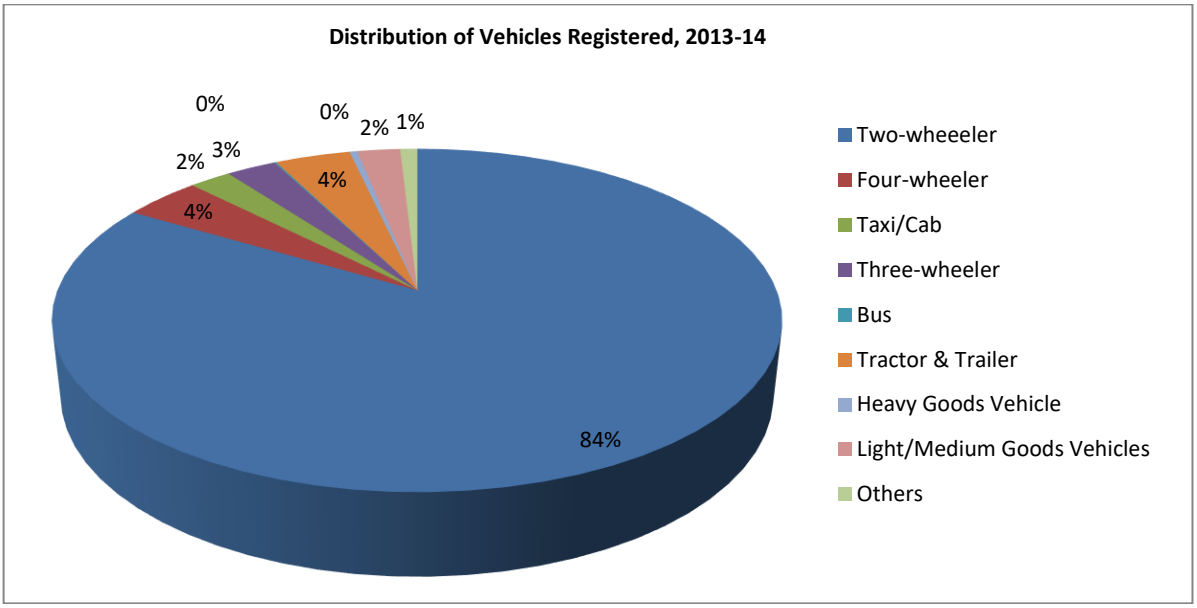


Figure 6.4: Distribution of Vehicles Registered, 2013-14

Source: RTO, Balasore

6.4.2 Travel Characteristics

Similar to the vehicular ownership pattern, it can be observed here also that cycle is the most preferred mode of travel. 64.5% of the population uses cycle to travel to work (Refer to Fig 6.5). It can also be seen that 71% of population prefer to either cycle or walk to work i.e., non-motorized modes for travel. This could also be since for most people in Balasore workplaces are within 0-5kms from their homes.

After cycle, two-wheelers are most preferred mode for travelling to work. 24.3% people use this mode.

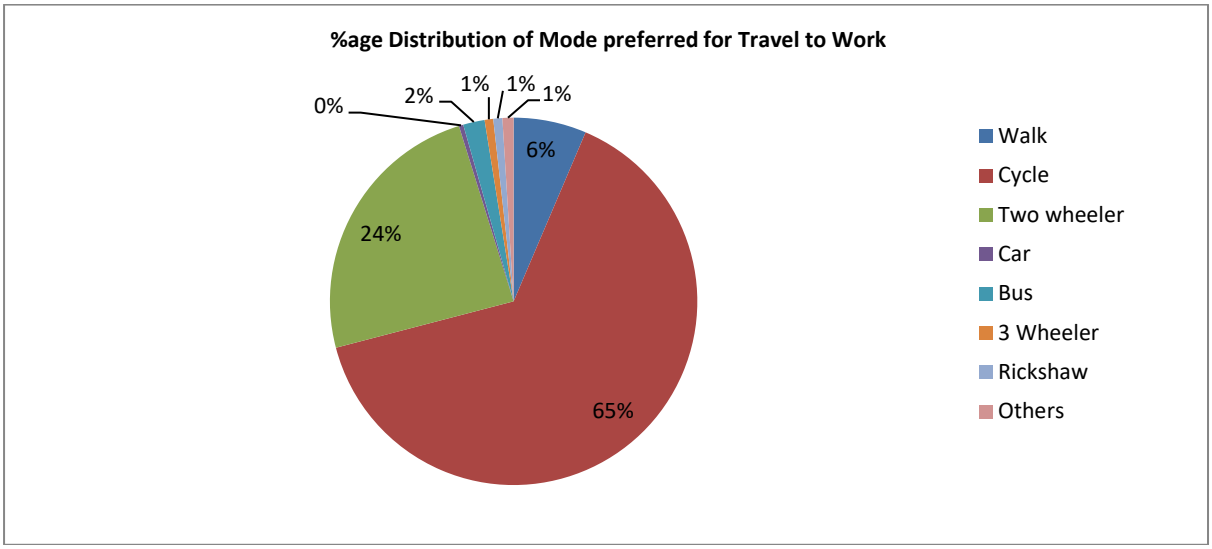


Figure 6.5: Percentage Distribution of Mode preferred for Travel to Work

Source: Consultant's Analysis

6.5 Road Transportation

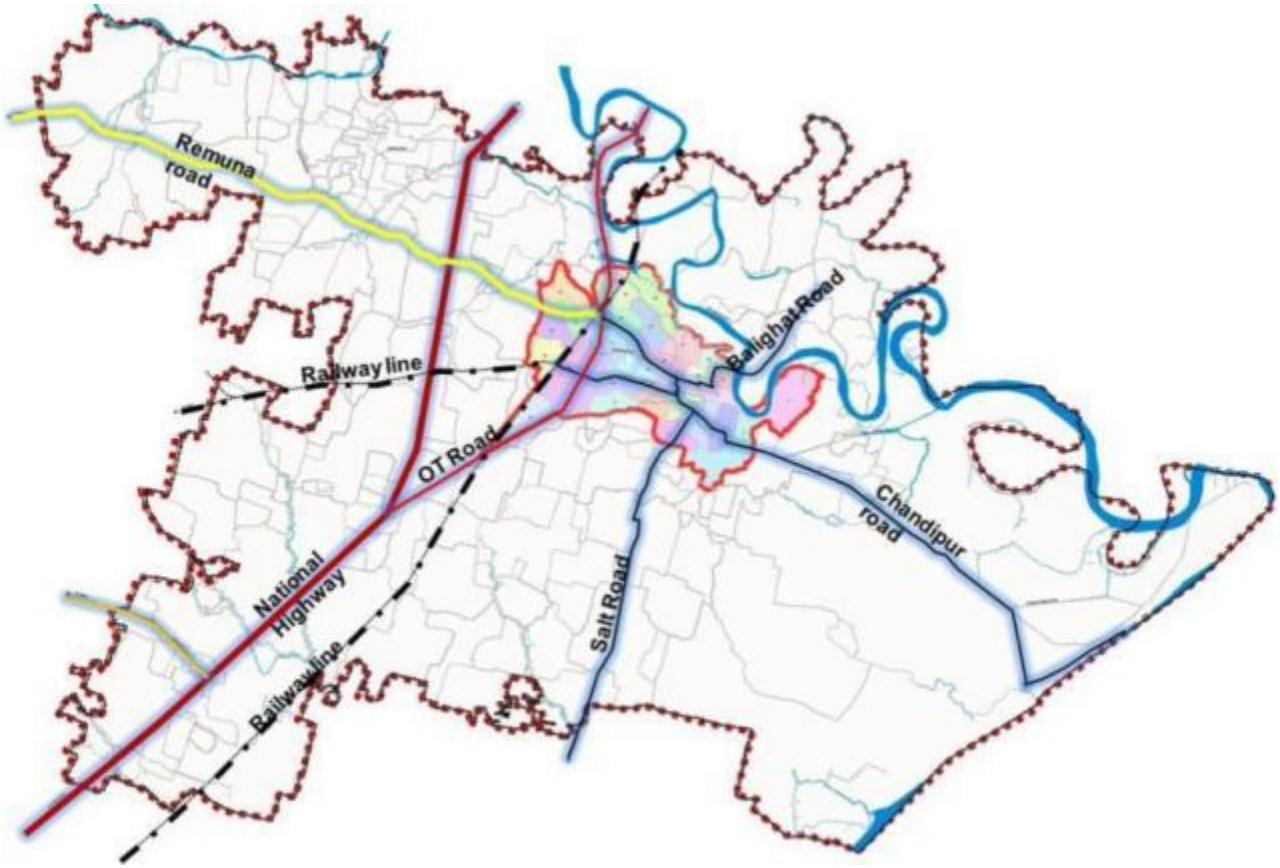
6.5.1 Regional and Local Level Linkages

In terms of connectivity through roads, the planning area is bisected by National Highway-16, connecting Kolkata to Chennai. The area is also connected by SH-19 and Renuma road. Table 6.2 below gives the road lengths of the major regional and local roads in Balasore, and Map 6.2 shows the location of these roads.

Table 6.2: Distribution of roads according to type

Major regional roads	Length in kms (inside boundary)
NH-16	16.89
SH-19	19.24
Renuma Road	9.55km
Major City Roads	
OT Road	6.24
Chandipur Road	18.25
FM College Road	7.70
Balighat Road	5.89
Salt Road	6.66

Source: Consultant's Analysis



Map 6.1: Major Roads linking Balasore Planning Area

6.5.2 Connectivity

To assess the level of connectivity of various parts of the planning and road infrastructure, 11 major roads in the planning area were surveyed. The survey revealed the following:

- Footpath is missing in all the road alignments.
- Most of the roads surveyed are two-way but median is missing.
- Road shoulders are usually used for vehicle parking which creates traffic congestion due to less available carriageway width for driving.
- Except National highway there is no survey road which caused accidents especially near the rural pockets.
- Heavy commercial development along the roads restricts widening of roads, so there is an urgent need of alternative link road.

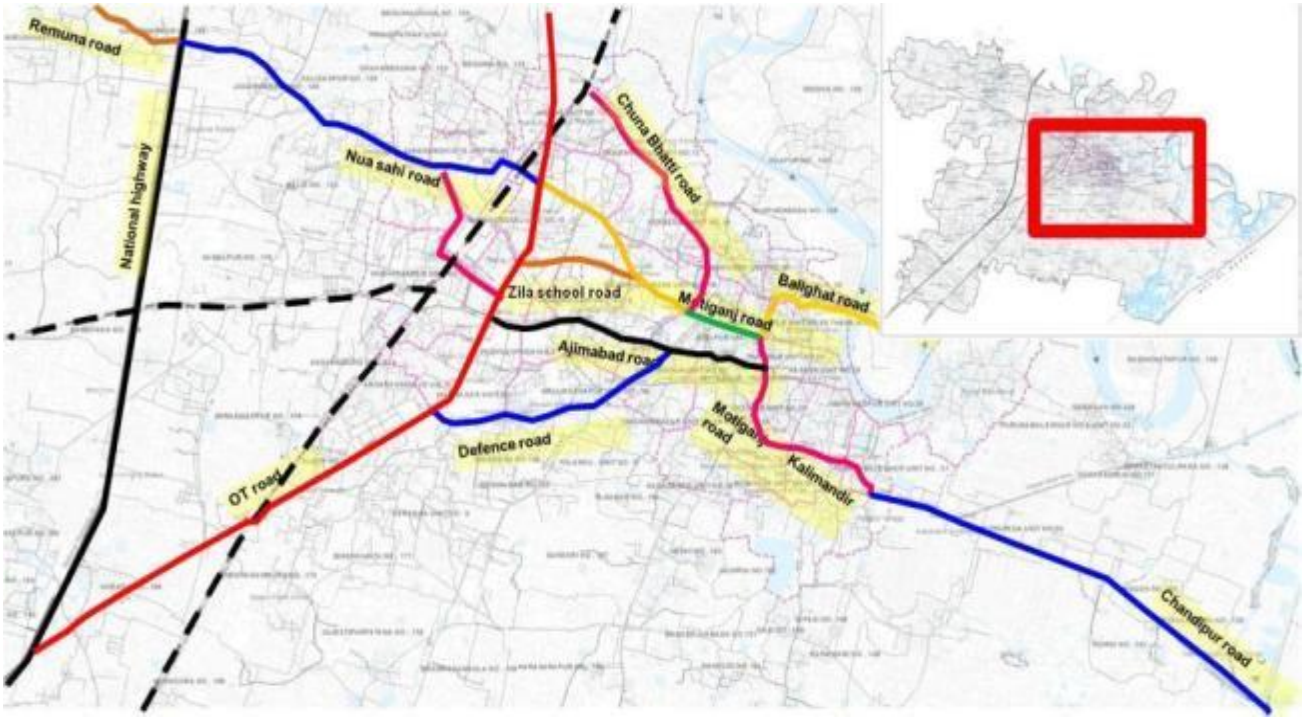
Details of the Road inventory is given in Table 6.3 below and Map 6.2 shows the roads surveyed.

Table 6.3: Road Inventory, Balasore Planning Area

Name of Road	ROW	Carriage way(m)		Shoulder(m)			Median
		Right	Left	Left side	Right side	Type	
OT Road	53.5	7	7	12	12	Unpaved	Present
OT Road	34	7		3	3	Unpaved	Absent
OT Road	26.5	7		3.5	3.5	Unpaved	Absent
NH-16	59	18	18	2	2	Unpaved	Present
NH-16	67	10	10	3	4	Unpaved	Present
Jagannath road (MDR)	27.5	5.5		2	2	Unpaved	Absent
Jagannath road (Malgodam road)	20	8			2	Unpaved	Absent
Naya Sai Road	24	9		2.5	3	Unpaved	Absent
OT Road	29	8	8	4	3	Unpaved	Present
Zila School road (Near ADM Chhak)	12	6		3	3	Unpaved	Absent

Name of Road	ROW	Carriage way(m)		Shoulder(m)			Median
		Right	Left	Left side	Right side	Type	
Ajimabad Road	13	7		2	2	Unpaved	Absent
Defence road	14	7		2.5	2.5	Unpaved	Absent
Motiganj Kali mandir Road	17	6	6	1	1	Unpaved	Absent
Chunabhati road	10.6	6		1	0.5	Unpaved	Absent
Balighat Road	13	7		X	X	X	Absent
Motiganj Road (in front of Municipality)	21	8		4.5		Unpaved	Absent
Chandipur road	13.5	7		2	2.5	Unpaved	Absent
Chandipur road	24	7		3	3	Unpaved	Absent

Source: Consultant's Analysis



Map 6.2: Road Inventory, Balasore Planning Area

Figure 6.6: Roads Surveyed

Within the Balasore Municipal Corporation area, the total length of roads is 487 kms. Amongst the various types of roads within the BMC area, 63% i.e., 307 kms of road length is of Bitumen. The distribution of various categories of roads is given in Fig 6.7 below.

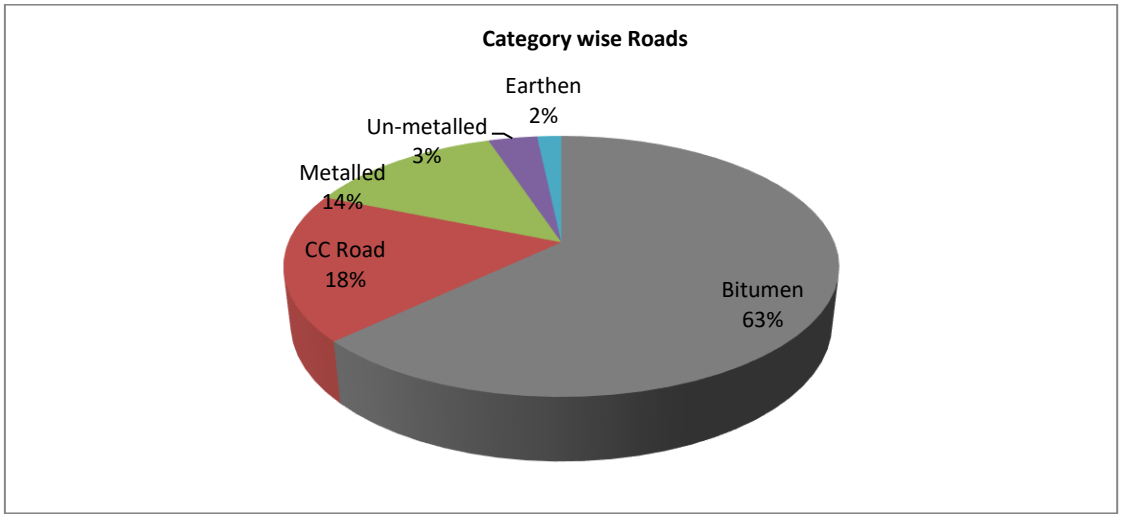


Figure 6.7: Category wise roads lengths in BMC area

Source: Balasore Municipality

6.5.3 Network Performance

The performance of the road network has been done based on primary traffic survey of selected intersections. The summary observations and findings are presented in the following section.

6.5.3.1 Intersection Analysis

Intersection analysis has been carried out for 97selected intersections where Traffic Volume Count survey was conducted out of total 109 survey location identified. Table 6.4 gives the information about the location's surveys.

Table 6.4: Traffic Volume Count Survey at Selected locations of the Balasore Master Plan Area

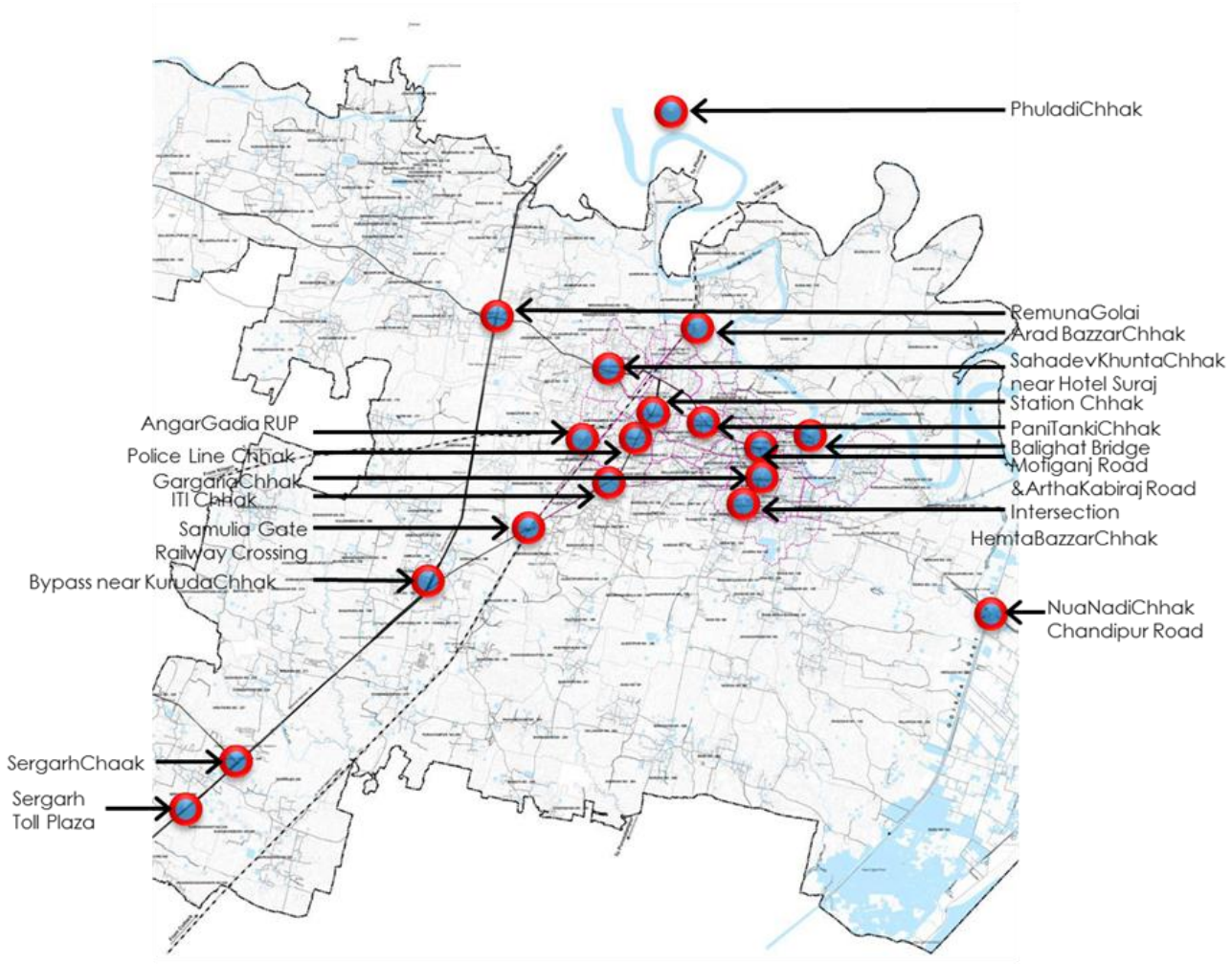
S. No.	Location Name	Type of TVC	Survey Location Code
1	Sergarh Chaak	Junction Survey	V1, V2, V3, V4, V5, V6
2	Bypass near Kuruda Chhak		V7, V8, V9, V10, V11, V12
3	Remuna Golai		V13, V14, V15, V16, V17, V18, V19, V20
4	Phuladi Chhak		V21, V22, V23, V24, V25, V26
5	ITI Chhak		V43, V44, V45, V46, V47, V48, V106, V107
6	Police Line Chhak		V49, V50, V51, V52, V53, V54, V108, 109
7	Station Chhak		V55, V56, V57, V58, V59, V60, V100, V101
8	Arad Bazzar RUP		V27, V28, V29, V30, V31, V32
9	Sahadev Khunta Chhak near Hotel Suraj		V33, V34, V35, V36, V37, V38
10	Pani Tanki Chhak		V61, V62, V63, V64, V65, V66
11	Motiganj Road & Artha Kabiraj Road Intersection		V67, V68, V69, V70. V71. V72
12	Gargaria Chhak		V73, V74, V75, V76, V77, V78, V102, V103
13	Hemta Bazzar Chhak		V79, V80, V81, V82, V83, V84, V104, V105
14	Samulia Gate Railway Crossing	Screen Line Survey	V41, V42
15	Angar Gadia Railway Crossing		V39, V40
16	Balighat Bridge		V85, V86
17	Nua Nadi Chhak @ Chandipur Road		V87, V88

Intersection analysis has been carried out for 13 selected intersections, as shown in Map 6.3. Table 6.5 provides gives the peak hour and peak traffic volume in terms of PCU of the intersections surveyed. Gadagadia-Motiganj location at NH-16 of Motiganj Road & Artha Kabiraj Road Intersection has the highest peak hour traffic volume which is observed around 5:30-6:00 pm during the day. It is followed by Cinema Chhak-Motiganj location of the same intersection, where peak hour is also around the same time. Other than this, Sergarh Chhak,Bypass near Kuruda Chhak and Remuna Golai are some of the other intersections having high peak hour traffic volume.

Table 6.5: Summary of Traffic Volume Count at Selected Intersections

Name of Intersection	Location	Peak Hour	Peak Traffic Volume (PCU)
Sergarh Chhak	Nilagiri-Sergarh Chhak	9-9:30AM	266
	Sergarh Toll Plaza	6.30 -7.00 AM	1388.5
Bypass near Kuruda Chhak	NH-16 (BBSR-Kolkata)	7.30 - 8.00 AM	1021.5
	NH-16 (N.H-5-Fm Golai)	7.00-7.30 AM	1095.5
Remuna Golai	NH-16 (Bhadrak-Kolkata)	5:30-6:00 PM	6307
	NH-16 (Mitra Pur-Bls Town)	4.15- 5.00 PM	1136
	NH-16 (Kolkata-Bhadrak)	9.30-10.00 AM	1131.5
	NH-16 (Januganj-Balasore)	5.30- 6.00 PM	1490.5
Phuladi Chhak	NH-16 (Bhubaneswar-Jaleswar)	5.15-5.45 PM	1599
	NH-16 Ananda Bazar-Phuladi Chhak	9.00-9.30 AM	415
ITI Chhak	NH-16 Kuruda-F.M Golei	8.00- 8.30 AM	662.5
	NH-16 I.T.I Chhak-Hemakapada	4.15 -5.00 PM	340
Police Line Chhak	NH-16 Kuruda-F.M Golei	9.00 -9.30 AM	1450
	NH-16 Police Line-F.M College	5.45 -6.00 PM	3360.5
	NH-16 Angargodia-Police Line	9.30 -10.00 AM	595
Station Chhak	NH-16 Police Line-Station Sqr	9.00 -9.30 AM	1311
	NH-16 Kuruda-F.M Golei	11.30-12PM	505.5
	NH-16 Station Chk-Chandipur	9.30- 10 AM	662
	NH-16 Station-Station Chk)	9.00 -9.30 AM	818
Arad Bazzar RUP	NH-16 Aradhbazar-Chunavati	5.15 - 5.45 PM	1620.5
	NH-16 (Nuabazar-Galapolo)	5.45 - 6.00PM	474.5
Sahadev Khunta Chhak near Hotel Suraj	NH-16 Remuna Road-Bus Stand	9.00 -9.30 AM	894.5
	NH-16 Remuna Road-Bhaskar Gan	9.00 -9.30 AM	275.5
Pani Tanki Chhak	NH-16 Station Sqr-Motiganj)	5.45 -6.00PM	1665
	NH-16 Fandi Chhak-Motiganj	1.45 -2.15 PM	2157
Motiganj Road & Artha Kabiraj Road Intersection	NH-16 Cinema Chhak-Motiganj	5.45 - 6.00 PM	3466.5
	NH-16 Gadagadia-Motiganj	5.30 - 6.00 PM	8449.5
Gargaria Chhak	NH-16 Chandipuur-Policeline	5.00 -5.30 PM	745.5
	NH-16 Chandipur-Gadagadia	9.30 - 10 AM	693.5
	NH-16 Artakabiraj-Moti	9.30 - 10 AM	614
	NH-16 Golapokhari-Gadagadia	9.30 -10 AM	269
Hemta Bazzar Chhak	NH-16 Hemokapada-Iti Chk	10-10.30 AM	365
	NH-16 Chandipur-Gadagadia	10.30 -11AM	1568
	NH-16 Municipality -Hemkapada	10 -10.30 AM	238.5

Source: Consultant's Analysis



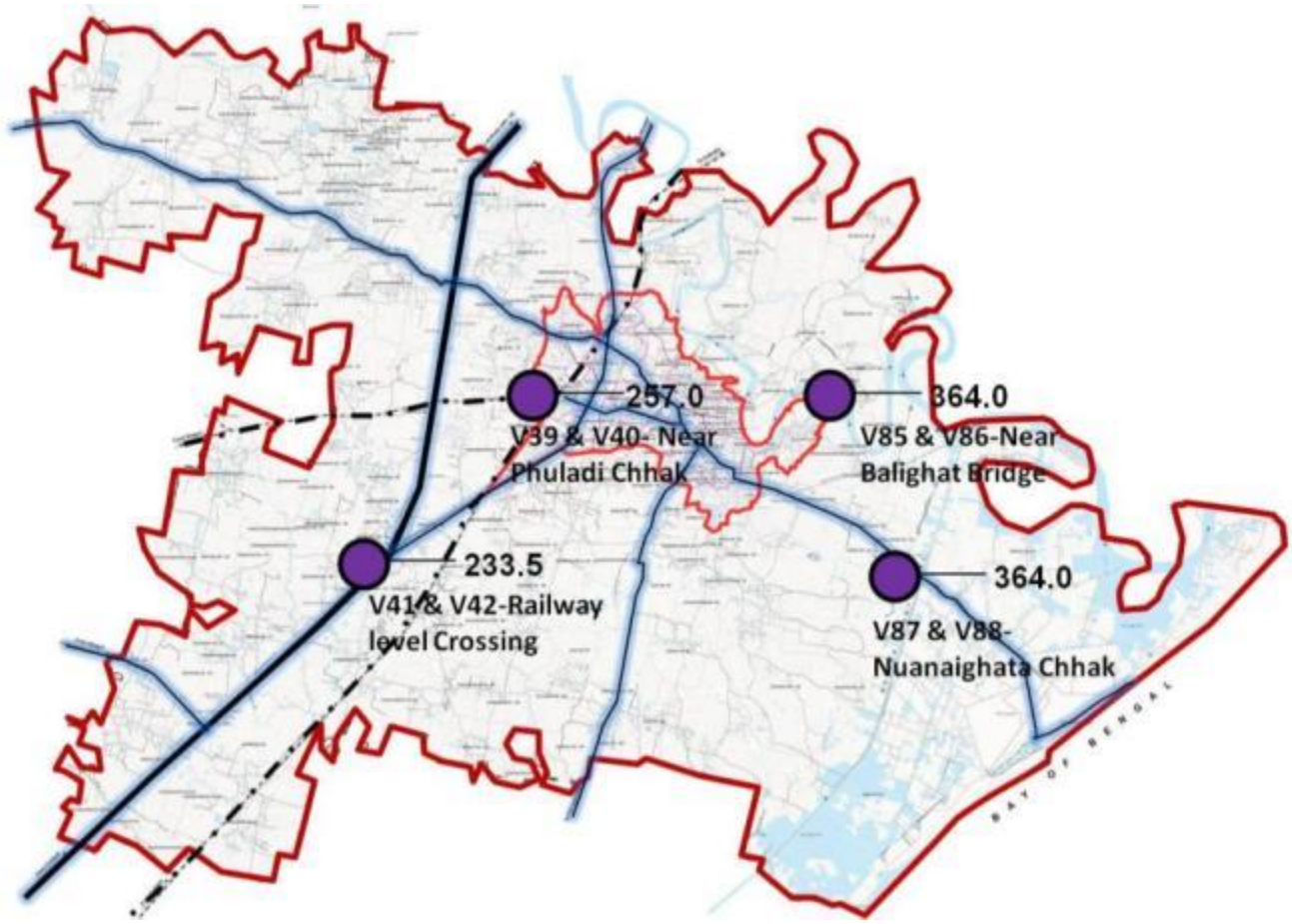
Map 6.3: Intersection Locations for Volume Count Survey

The peak volume and peak hour observed from the analysis of the screen line survey done at four locations for goods and passenger vehicles is given in Table 6.6 and Map 6.4. The peak hour for all these locations is during the morning.

Table 6.6: Summary of Screen Line Survey

Location Number	Location Name	Peak Hour	Peak Volume
Location- V39-V40	Near Phuladi chhak	10.00 to 10.30 am	233.5
Location- V41-V42	Railway level craying tamulia	8.30 to 9.00 am	257.0
Location- V85-V86	Near Balighat Bridge	9.00 am to 9.30 am	364.0
Location- V87-V88	Nuanaighata chhak	8 am - 8.30 am	928.0

Source: Consultant's Analysis



Map 6.4: Locations of Screen Line Survey

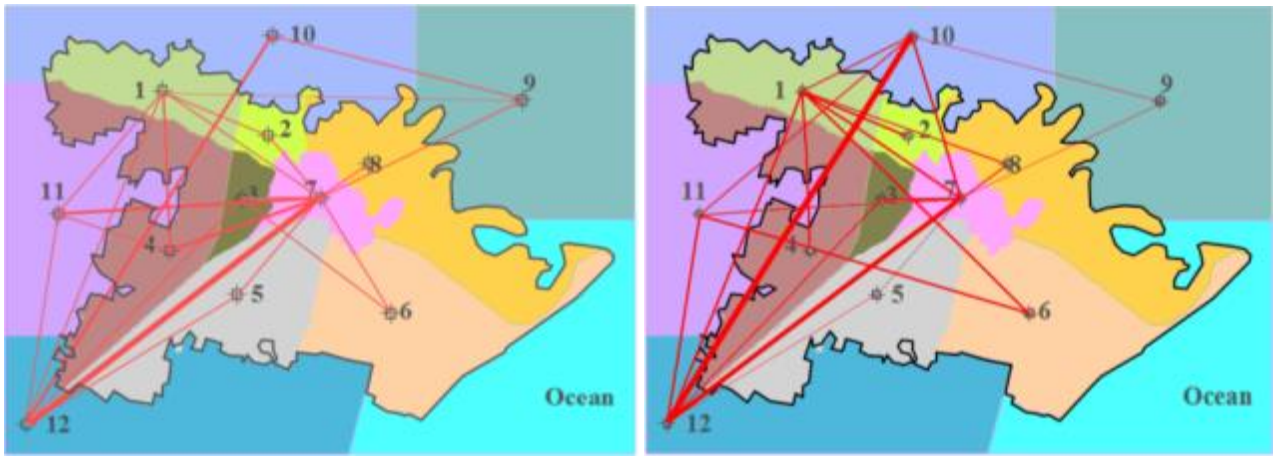
Level of service has been calculated for four locations where Origin and Destination survey was conducted as given in Table 6.7 below. Out of the four locations, Remuna road has a high V/C ratio which indicates traffic congestion while Samulia Crossing gate has a very low V/C ratio i.e., 0.2. A volume capacity (V/C) ratio of 0.4 has been proposed for all these four locations for optimum Level of Service.

Table 6.7: Existing and Proposed V/C ratio of OD Survey Locations

OD Survey Locations	Existing V/C Ratio	Proposed V/C Ratio
Sergarh Toll Gate	0.4	0.4
Nilgiri road (Sergarh Chhak)	0.2	0.4
Remuna Road	0.9	0.4
Samulia Crossing Gate	0.2	0.4

Source: Consultant's Analysis

Based on the analysis of the origin and destination survey, desire line diagram was generated for passenger and goods vehicles as shown in Map 6.5. It reveals that for passenger vehicles, the major trip attraction and distribution zones are 7and 12 followed by zones 10 and 11. For goods vehicles, the major trip attraction and distribution zones are 10 and 12 followed by zones 1, 6, 7 and 11.



Map 6.5: Desire Line Diagram- Passenger and Goods, Balasore Planning Area

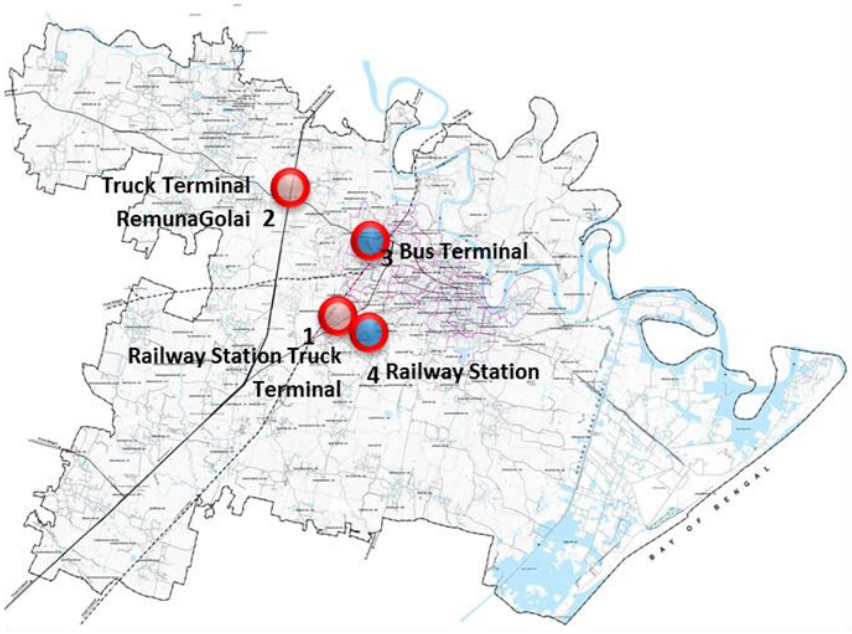
Source: Consultant's Analysis

6.6 Rail Connectivity

The Balasore acts as a node for regional transportation routes. The South- Eastern Railway line passes through Balasore. Balasore railway station is an important station on the Howrah-Chennai main line of the South-Eastern Railway. Therefore, town has direct link with important towns, cities and ports in the country resulting major passenger and goods movement in the region. There are direct trains from Capital city Bhubaneswar, Kolkata, Chennai, etc. There are 136 trains that halt at Balasore while four trains that originate and four that terminate at Balasore Railway Station. Railway has been responsible for the development of the town and extending its commercial/economic functions to a considerable extent. The bulk commodities required in the town and its periphery for import export transaction has been handled through the railway.

6.7 Transit and Terminal Facilities

For passenger and goods, there are four transit and terminal facilities available in Balasore. For passengers, the terminals are Railway Station and the Bus terminal. For goods, there are two truck terminals, one near the Railway station and the other at Renuma Golai. These locations are indicated in Map 6.6 below. The existing Bus Terminal at Balasore - "Sahadev Khunta Bus Terminal" is located on about 2.54 acres of land in the heart of the town. The bus terminal handles about 450 daily schedules with peak hour traffic of 21 schedules.



Map 6.6: Location of Transit and terminal facilities in Balasore

Figure 6.8: Bus Station & Railway Station, Balasore

From Fig 6.9 below, the most preferred mode for reaching the bus terminal or railway is bus, which is a public mode, followed by two-wheelers which is a private mode.

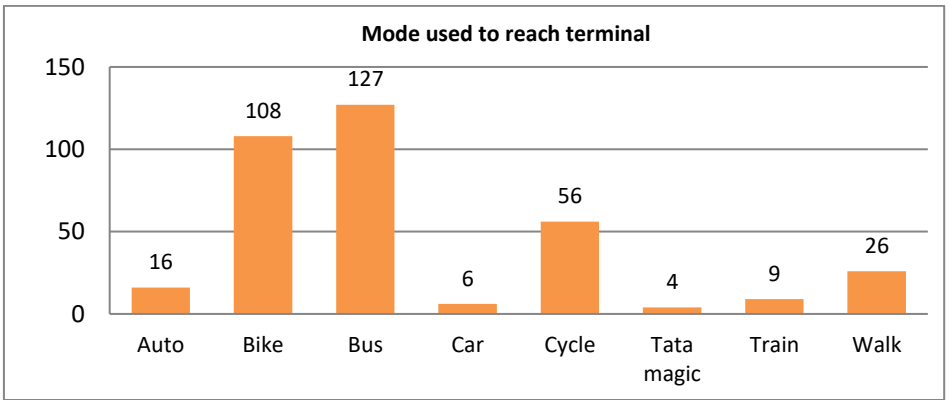


Figure 6.9: Mode used to reach terminal

Source: Consultant's Analysis

For people using the terminal facilities, nearby town of Bhadrak is the most preferred destination. After Bhadrak, maximum people either travel to the state Capital of Bhubaneshwar or the next major city of the state, Cuttack (Refer to Fig 6.10).

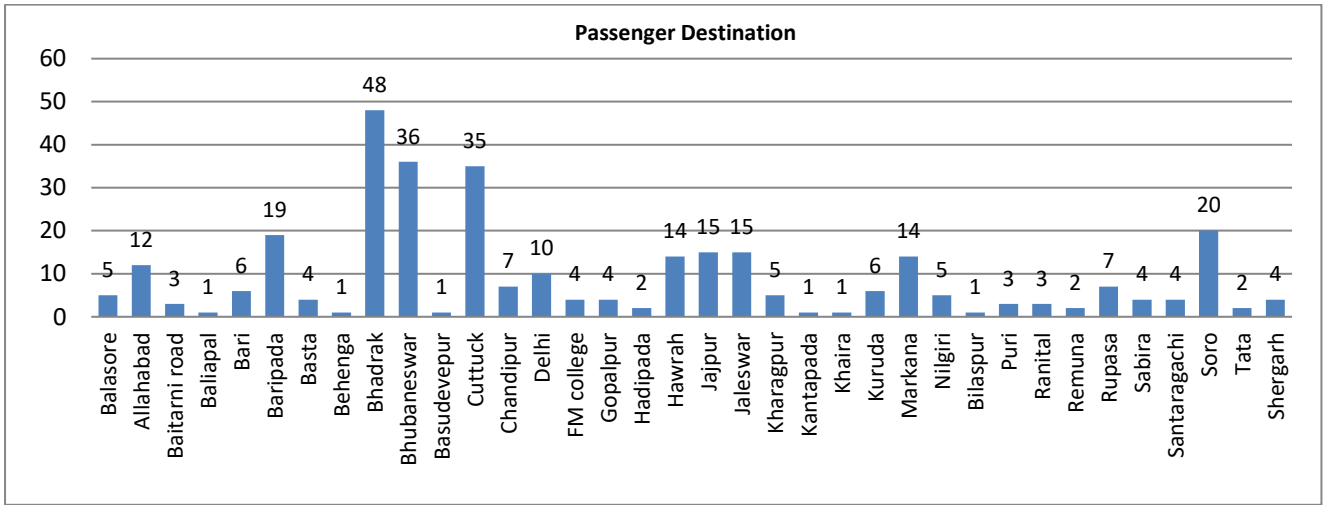


Figure 6.10: Destination of passengers using Terminal facilities

The purpose of travel to the above destinations is majorly social (35%), meaning people travel to meet family and relatives. 29% people travel for work purposes to these destinations (Refer to Fig 6.11). As can be seen from Fig 6.12

below, the frequency of travel and thus usage of the terminal facilities by people is occasional (41%) or once a month (32%).

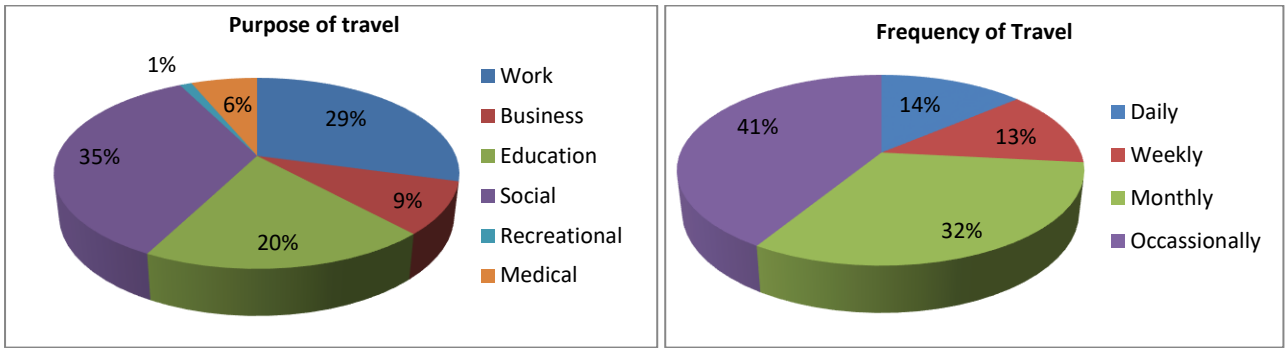


Figure 6.11: Purpose of Travel and Frequency of Travel

Source: Consultant's Analysis

Amongst the trucks using the terminals in Balasore, 57% carry cement followed by 14% carrying Cartons and 14% carrying Salt (Refer to Fig 6.13). 62% of the trucks are destined for nearby town of Remuna while 14% to Baripada (Refer to Fig 6.14).

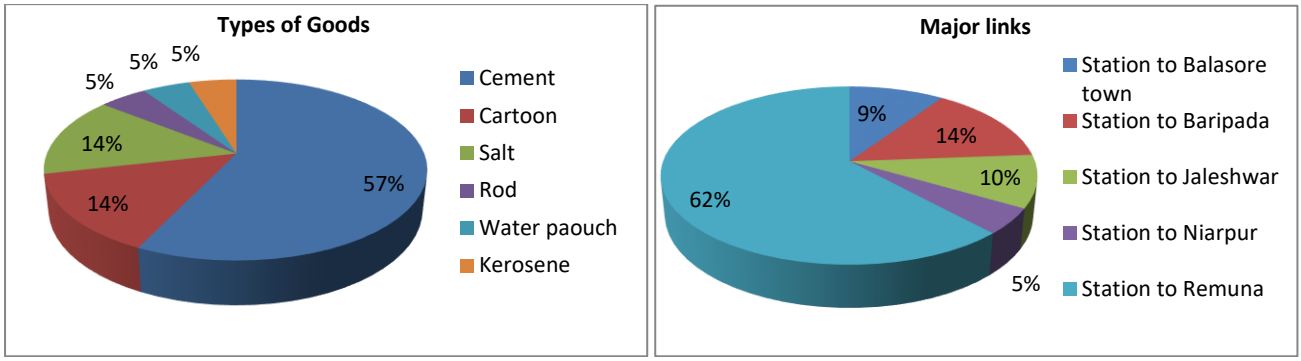


Figure 6.12: Types of Goods and Major Links from Balasore Station

Source: Consultant's Analysis

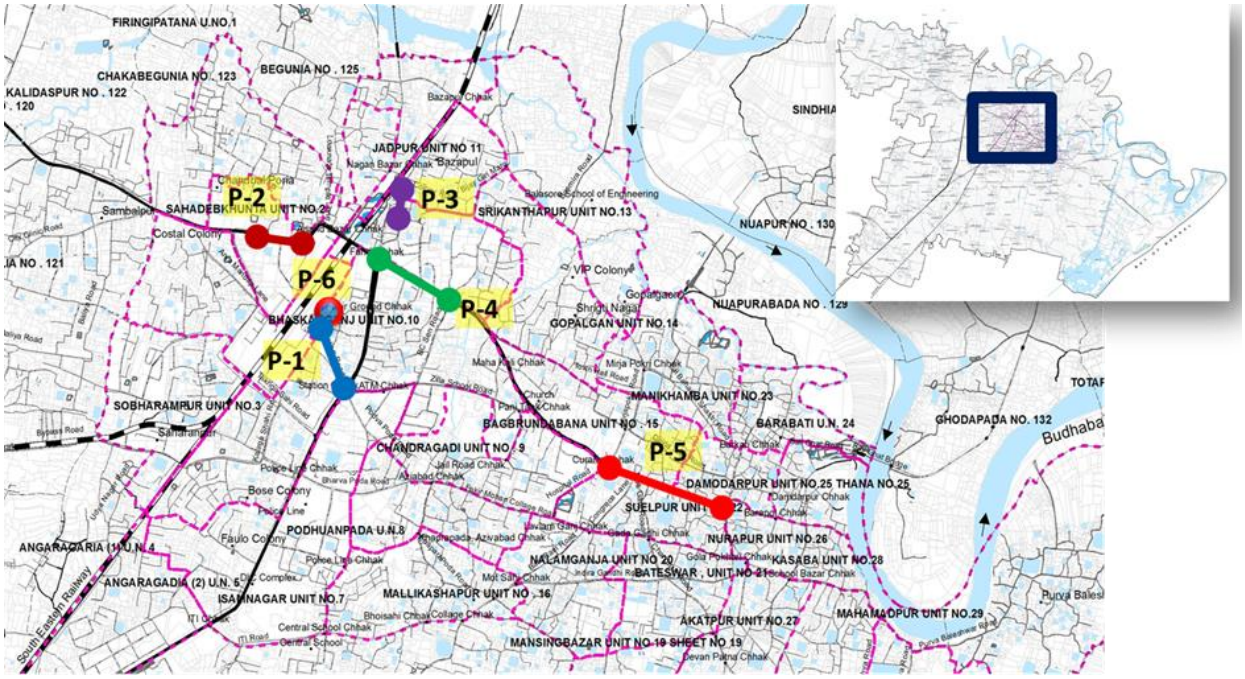
6.8 Parking Characteristics

There are almost no off-street parking facilities in Balasore. Hence, vehicles are parked along the roads. This roadside parking tends to reduce the width of road and leads to traffic congestions. Parking Survey was conducted for six locations in the planning area where parking accumulation was observed to be significant. Most of these parking are in front of commercial and public semi-public establishments. The locations of the survey are shown in Map 6.7 and listed in Table 6.8 below.

Table 6.8: Locations of Parking Survey, Balasore Planning Area

Location Number	Location Name
P-1	Station Chhak to Station
P-2	Bus Stand to Sahadev Khunta PS
P-3	Nua Bazzar road to Railway crossing
P-4	Fandi Chhak to BC Sen Road Intersection
P-5	Motiganj Thana to Fire station lane Intersection
P-6	Railway Station Parking

Source: Primary Survey



Map 6.7: Locations of Parking Survey, Balasore Planning Area

Parking accumulation between Bus stand to Shahdev Khunta PS (towards Remuna Golai) is maximum during the morning hours especially 9:30-10:30am. Amongst the various modes, other vehicles are parked more along this stretch followed by two wheelers (Refer to Table 6.9).

Table 6.9: Total no of vehicles parked between Bus stand to Shahdev Khunta PS (towards Remuna Golai)

MODE	9:30-10:30AM	10:55-11:30AM	11:55-12:50PM	1:15-1:50PM	2:40-3:30PM	3:40-4:10PM	4:30-5:00PM	5:15-6:00PM
Car/4 Wheelers	10	17	14	10	12	11	8	15
2 Wheelers	73	52	49	39	47	32	38	44
3wheelers	14	16	13	13	14	6	8	14
***Other**	133	94	50	53	41	48	33	48
Total	**230**	**179**	**126**	**115**	**114**	**97**	**87**	**121**

Source: Primary Survey

If the number of parked vehicles is converted to their equivalent ECS (Equivalent Car Space), then in this area two-wheelers have the maximum ECS followed by cars. Refer to Fig 6.15 below.

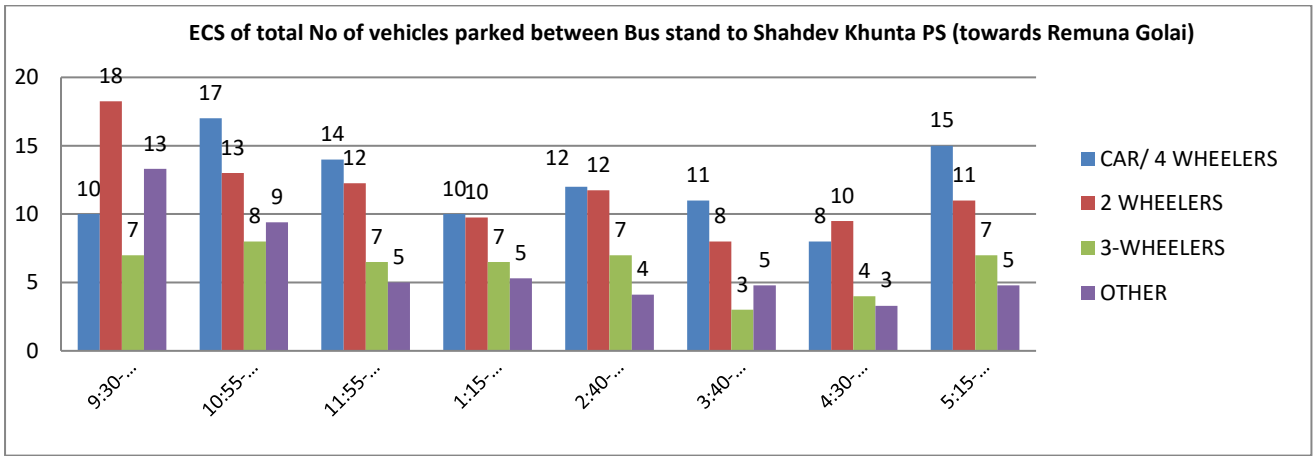


Figure 6.13: ECS of total No of vehicles parked between Bus stand to Shahdev Khunta PS (Towards Remuna Golai)

Source: Consultant's Analysis

Figure 6.14: Parking along Balasore Bus stand to Shahdev Khunta PS

As compared to parking accumulation between Bus stand to Shahdev Khunta PS, parking between Cinema Chhak to Motiganj Thana is very less. Amongst the various modes, maximum cars/four wheelers are parked along this stretch (Refer to Table 6.10).

Table 6.10: Total No of vehicles parked between Cinema Chhak to Motiganj Thana

MODE	9:35-12:15 AM	12:40-2:40 PM	2:40-3:15 PM	3:15-4:25 PM	4:30-5:00 PM	5:10-6:05 PM
Car/4 Wheelers	4	11	15	12	8	7
2 Wheelers	0	2	2	1	2	1
3-Wheelers	2	2	4	5	1	0
***Other**	0	0	0	0	0	0
Total	**6**	**15**	**21**	**18**	**11**	**8**

Source: Primary Survey

As can be seen from Fig 6.17 below, the ECS of cars is maximum among all vehicles throughout the day in this area.

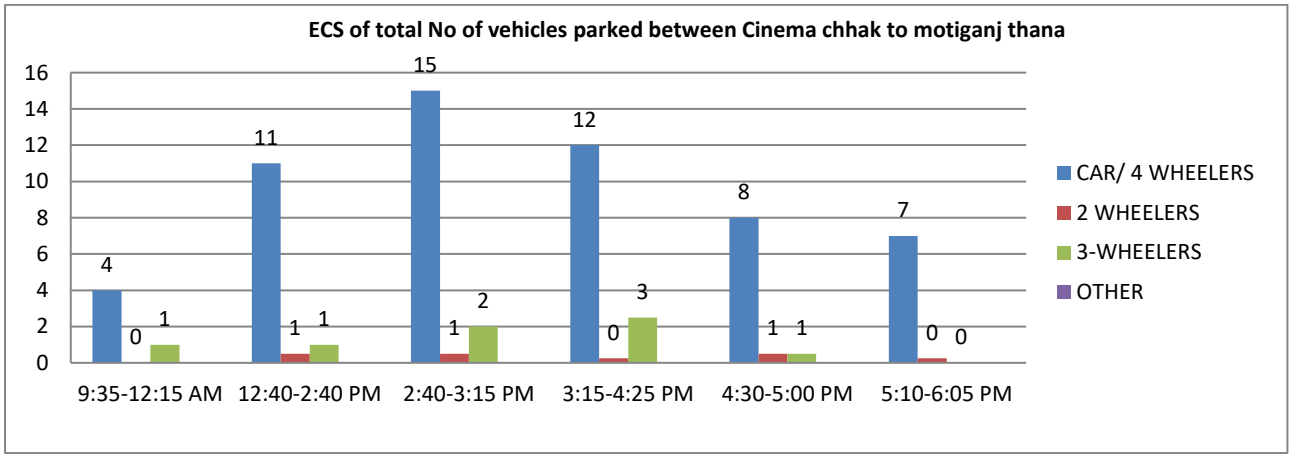


Figure 6.15: ECS of total No of vehicles parked between Cinema chhak to Motiganj Thana

Source: Consultant's Analysis

In the stretch between Nuabazar and Railway Crossing, the parking volume is high in the morning. The maximum number of parking is observed between 9:30-10:45am in the morning followed by 10:50-11:50 am. Other vehicles such as goods vehicles are the ones which are maximum in number among the vehicles parked. Refer to Table 6.11 below.

Table 6.11: Total No of vehicles parked between Nuabazar to Railway crossing

Mode	9:30-10:45 AM	10:50-11:50 AM	11:55-12:25AM	12:25-12:45PM	1:00-1:30PM	1:40-2:00PM	2:10-2:25PM	2:55-3:20PM	3:30-3:53PM	4:00-4:37PM	4:45-5:20PM	5:30-6:05PM
CAR/ 4 WHEELERS	0	0	0	0	0	3	0	1	1	0	0	0
2 WHEELERS	47	28	36	10	32	20	17	15	9	15	17	18
3-WHEELERS	0	0	1	0	0	3	1	0	0	0	1	1
***OTHER**	220	160	130	55	50	80	55	60	35	45	87	53
Total	**267**	**188**	**167**	**65**	**82**	**106**	**73**	**76**	**45**	**60**	**105**	**72**

Source: Primary Survey

Figure 6.16: Parking along Nua Bazar Road to Railway Level Crossing

Amongst the vehicles observed, other vehicles have been observed to occupy the maximum ECS especially during the morning hours. Refer to Fig 6.19 below.

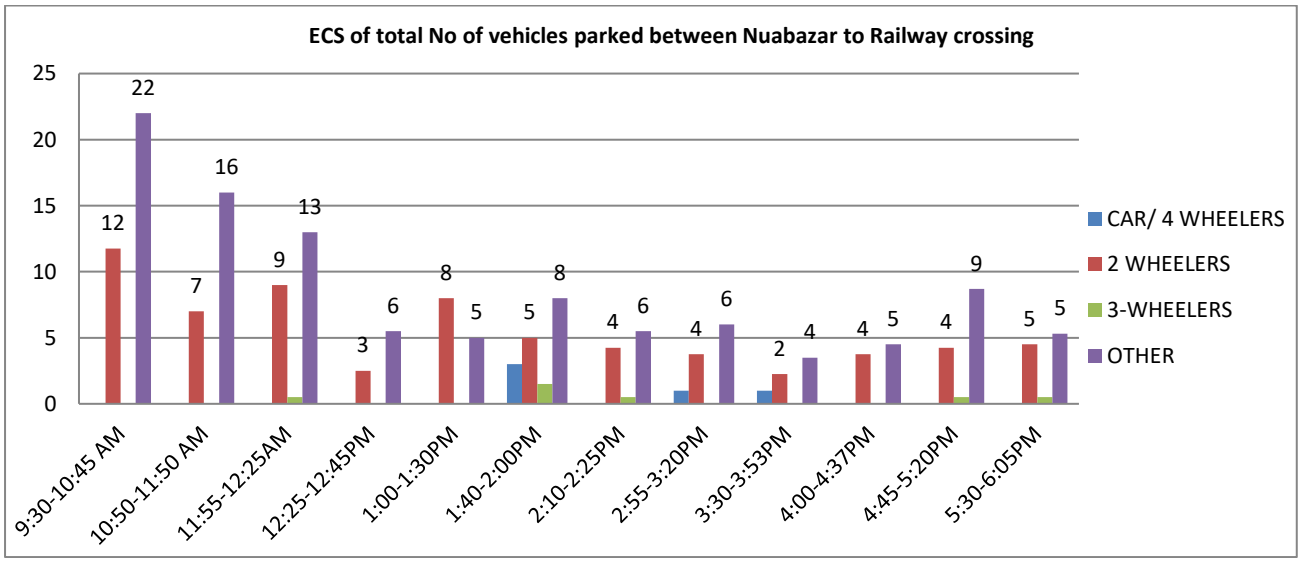


Figure 6.17: ECS of total No of vehicles parked between Nua bazar to Railway crossing

Source: Consultant's Analysis

In the stretch between Railway Station to Station Chhak, the maximum number of vehicles is parked in the evening around 5pm followed in the morning around 10am. Refer to Table 6.12 below.

Table 6.12: ECS of total No of vehicles parked between Railway station To Station Chhak

Mode	9:30-10:10AM	10:15-11:00AM	11:30-12:10PM	12:25-1:00PM	1:20-1:55PM	2:15-3:10PM	3:10-3:45PM	4:05-4:30PM	4:40-5:10PM	5:10-5:30PM	5:35-5:56PM
CAR/4 WHEELERS	8	9	10	8	6	4	7	7	7	7	8
2 WHEELERS	37	57	59	44	30	26	23	32	37	38	35
3-WHEELERS	4	9	4	3	6	5	5	10	9	7	10
***OTHER**	45	70	50	50	50	30	35	55	50	115	70
Total	**94**	**145**	**123**	**105**	**92**	**65**	**70**	**104**	**103**	**167**	**123**

Source: Consultant's Analysis

Figure 6.18: Parking along Station Chhak to Balasore Railway Station

Amongst the vehicles observed, two-wheelers have been observed to occupy the maximum ECS especially during the morning hours. Refer to Fig 6.21 below.

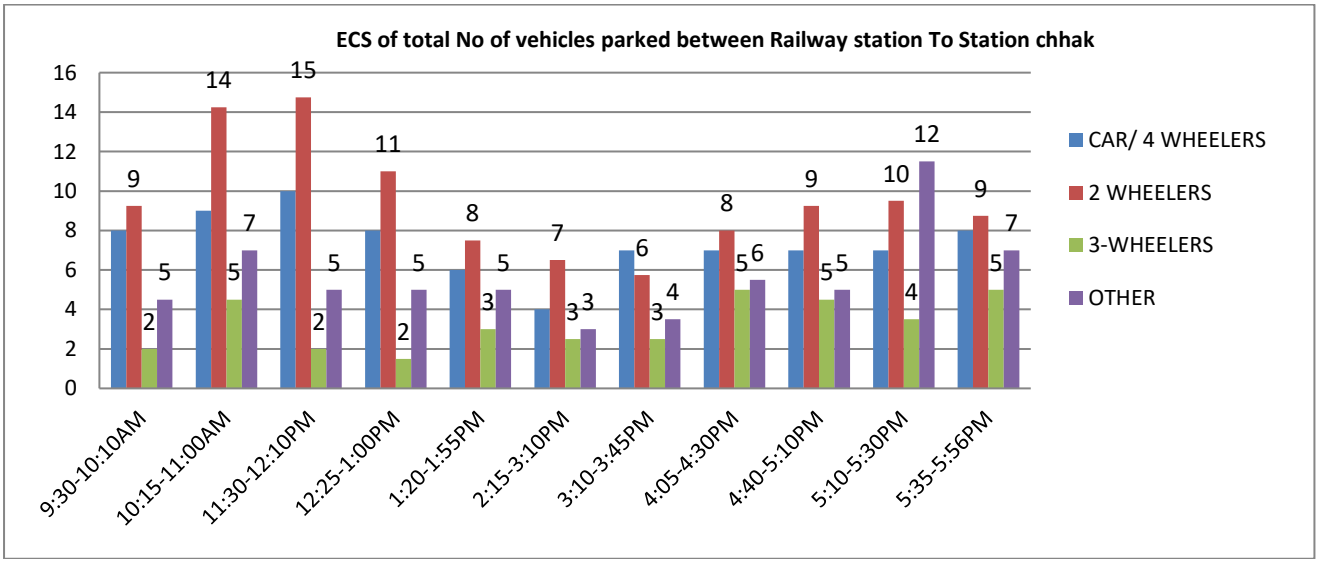


Figure 6.19: ECS of total No of vehicles parked between Railway station To Station Chhak

Source: Consultant's Analysis

6.8.1 Parking Facility at Household Level

Due to low ownership of 4-wheelers and majority of the households having ownership of cycle and 2-wheelers, parking facility is very few. Only 4.21% households in the entire planning area have parking facility (Refer to Fig 6.22)

In MC area, approx. 94% households do not have a parking facility. While, in rural households also approx. 99 % HHs do not have parking facility (Refer to Fig 6.23)

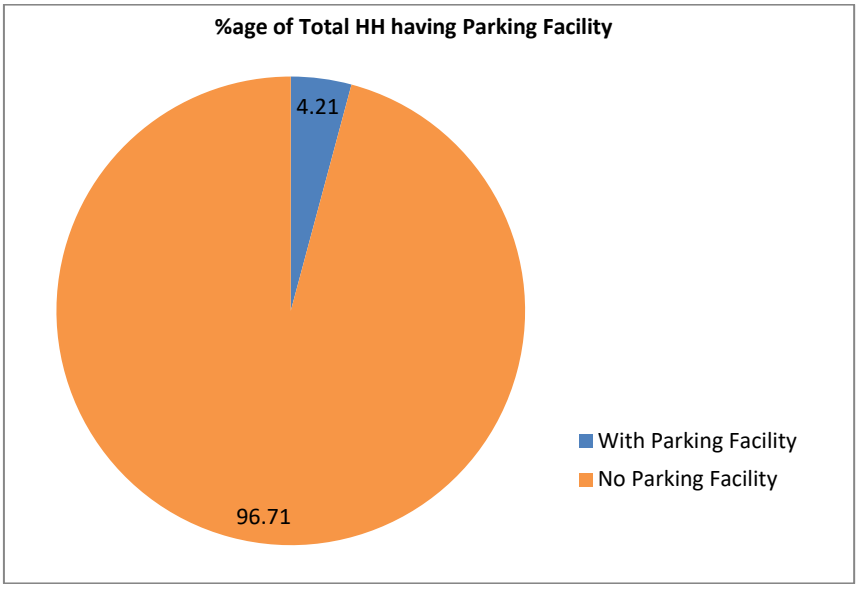


Figure 6.20: Percentage of Total HH having Parking Facility

Source: Consultant's Analysis

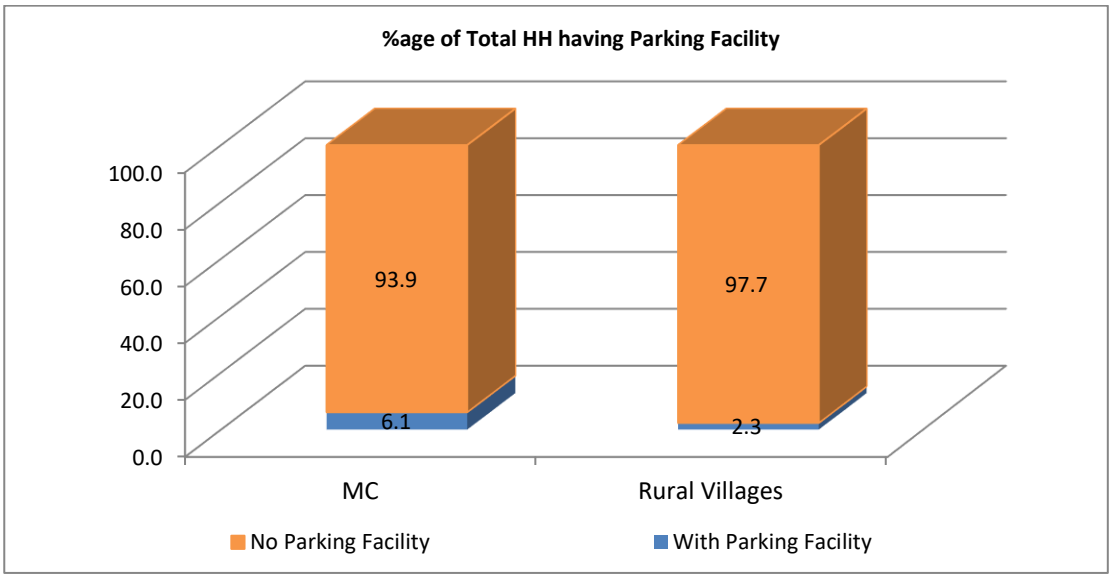


Figure 6.21: Percentage of Total HH having Parking Facility

Source: Consultant's Analysis

6.8.2 Improvement of Passenger Terminal Facilities

The Passenger terminal facilities in Balasore planning area needs to be augmented to cater the future need of the users. Augmentation of the existing rail passenger terminal in under process to be able accommodate more daily commuters and cater to the future need of the population.

Regional level bus terminal is also proposed at Ghaneswarpur beside NH-16 will provide easy and flawless accessibility to the daily commuters. Moreover, the proposed augmentation of the link road will further enhance the Passenger Terminal facilities.

Within Balasore Planning area, strategically location of the bus terminal facilities in Begamapur & Badadeulabada (in proximity to the proposed industrial and administrative zone) will improve improved level of bus transit accessibility.

6.8.3 Improvement of Freight Terminal Facilities

The strategic location of Balasore between the significant freight corridor of Kolkata – Chennai route. It is positioned with excellent comparative advantage to emerge as a regional level freight hub. A lot of ancillary processing activities

will agglomerate in this location, providing boost to the local economy of the Remuna and Chandipur areas. The Integrated Logistic Hub at Bampada and proposed truck terminal (10 hectares) at Bangarganpatana near proposed wholesale and trade centre and industrial area will further boost the heavy traffic movement outside the core area of the town. Moreover, for through and smooth movement of the heavy vehicles these facilities are proposed in the proximity to the proposed link road.

6.9 Road Accidents and Safety

Road safety becomes a cause of prime concern with increasing number of transport modes. Large volume of regional traffic passes through the Balasore which leads to significant conflict between slow moving and fast-moving vehicles. Mixing of slow- and fast-moving vehicles not only slow the movement along the regional corridors but also increases the accident risks. Also, an inadequate facility for pedestrians and NMVs and their non-segregation from fast moving traffic causes road fatalities. Further, inadequate road widths, mixed traffic and lack of traffic sense is also responsible for traffic accidents.

6.10 Issues

Some of the major issues related to traffic and transport in Balasore are as follows:

- Balasore shows radial pattern of road network with three screen lines (physical thresholds). Due to these screen lines the town is divided into various small pockets and road network appears staggered. Three screen lines include the River, South- Eastern Railway line and National Highway No.-16. The grade separators and RoB is already constructed wherever necessary by NHAI and PWD department.
- Due to overall sporadic development and dispersed commercial development goods/ commodity movement in Balasore is through utility vehicles in heavily crowed/ main market areas through 2-Axel, 3-Axel trucks in Regulated Market area.
- Passenger moment is through privatised mode and through IPT (Cycle, Cycle rickshaw as Non-motorised Transport option) & passenger movement to hinterland is through IPT (Shared Vehicles/ autos: Motorised Transport). Pedestrian traffic is also significant in the town.
- The bus stand of Balasore town is located near to the railway station, which is placed within the city area. Relocation of this bus stand is required as this may cause huge traffic congestion in Remuna, Mitrapura Road. A suitable location for the bus stand should be along the NH and in the periphery of Balasore Town.
- The town has one Railway Over Bridge (OT Road), another can be proposed in near future for the crossing on PWD Road, as this is an entry point for the traffic coming from Bhubaneswar.
- Designated Auto and Taxi stand is required in the whole planning area.
- The access between OT road and Kachhary Roads needs Improvement
- The take-off point of the bypass flyover has gradually come within the city limit; an alternative bypass road may require depending on detailed traffic study.
- Junction improvement and improvement of road geometry is necessary for few areas in Balasore.
- Stray animals and cattle on the roads area creating traffic congestions

6.11 Recommended Actions

6.11.1 Augmentation of Road Network Capacity

Balasore is situated at the hub of the regional transportation routes. It acts as a receiving and distribution centre of consumer goods for the delta portion. Based on the existing traffic volume and proposed allocation of economic and residential functions, there is a need to augment the network – primarily to extend accessibility to the newly proposed areas as well as to reduce the growing congestion in the existing links.

It is suggested that the future development of the town can be diverted to the village Remuna towards western side and Chandipur towards eastern side of the existing Balasore town due to availability of developable land pockets and good connectivity.

A new road is proposed which would serve as the main road for the future developable area by connecting it to N.H. 16. It will also serve as a kind of ring road for these areas thus relieving the pressure inside the town. The road width for this ring road should be kept 30 m as this will carry the maximum traffic of the town and will also act as the major line

of movement. It is also proposed to strengthen of other links within the town to main roads as per the hierarchy (Refer to Table 6.13).

Table 6.13: Proposed Roads

S. No.	Major Roads	Row
1	**NEW ROADS**	
a	Bye pass Road/Circular Road	30 m
b	Link road from existing road	18/24 m
c	Strengthening /up gradation of roads	Internal roads

Source: Consultant's Estimation

Table 6.14: Proposed Grade Separators & ROBs

S. No.	Location of Grade Separators	**Numbers**
1	RIVER/CANAL	4 new bridges
2	RAIL LINE and NH-16	4 New bridges (ROB)

Source: Consultant's Estimation

6.11.2 Proposed Parking Policy

The recommended parking policy for the town should have the following salient features as per the National Urban Transport Policy (NUTP)-2006:

- Preferential allocation of parking space(s) for public transport vehicles and non-motorized modes of transport.
- Levy of graded scale of parking fee representing truly the value of the land occupied.
- Development of efficient accessibility to parking lots.
- Encourage to go in for electronic metering for better realization of parking fee.
- Development of underground parking in green areas (considering the social acceptance of the people).
- Development of multi-level parking complexes in city centre(s).
- Encouraging people to use public transport to reach city centre(s).
- Development of parking lots on PPP format for reducing burden on public funds.

Housing and Slums

Chapter 7. Housing and Slums

7.1 Introduction

Housing is one of the necessities, which is to be provided for better quality of life. Detailed description and analysis regarding housing in Balasore Planning Area is given in sections below.

7.2 Existing Scenario and Trends

As per Census 2011, the average household size in Urban Area (including OG) has been found to be 4while in rural areas it has been found to be 5 (Refer to Table 7.1). The Planning area comprises of approx. 39.96 % good Houses, 50.62 % livable Houses and 9.42 % are dilapidated Houses. The average number of households in a dwelling unit is one for the entire planning area (Refer to Fig 7.1).

Table 7.1: Details of Household Survey

S. No.	Planning Area	No of Wards/Villages	No of HH/ Survey Samples	No. of Persons			Avg. no of Persons/HH	Avg. No. of HH in Dwelling Unit
				Male	**Female**	**Total**		
1	MC Wards	31	3295	7206	7142	14348	4	1
2	Rural Villages	206	2778	6558	5877	12435	5	1
Total		**237**	**6073**	**13764**	**13019**	**26783**	**4**	**1**

Source: Primary Survey

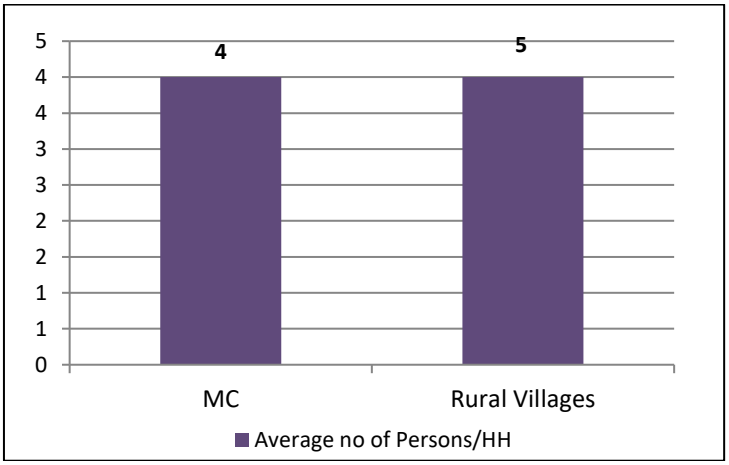


Figure 7.1: Average Household Size in MC and Rural areas

Source: Primary Survey

7.2.1 Household Distribution

Based on the criteria “if a HH has parents along with at least 1 non-working son then it would be considered as Nuclear family”, the maximum percentage of the Households i.e., 76.6% are of nuclear type (Refer to Fig 7.2). While comparing the Household family types in Municipal and rural areas, it is seen that joint family type is more prominent in rural areas (28.5%) than in Municipal area (18.3%).

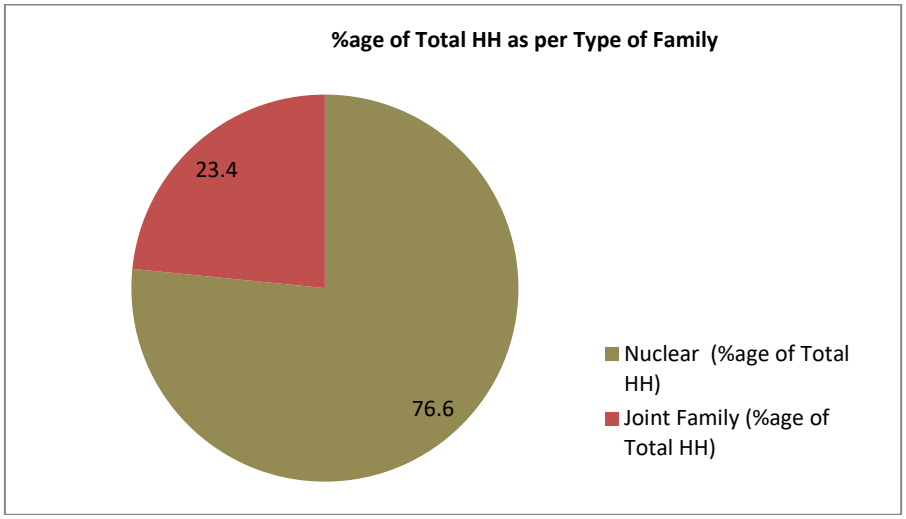


Figure 7.2: Percentage of Total Household as per Type of Family

Source: Consultant's Analysis

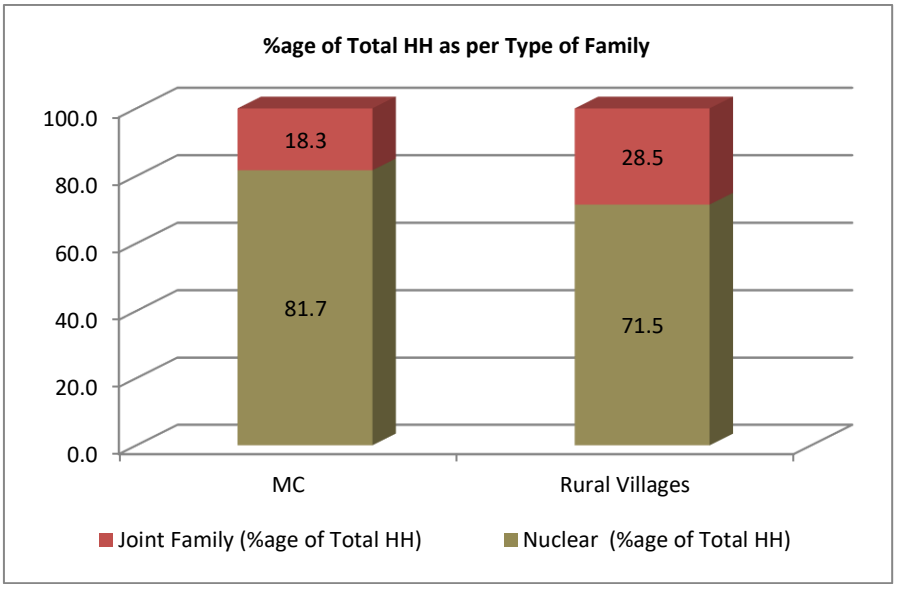


Figure 7.3: Percentage of Total Household as per Type of Family in MC & Rural Areas

Source: Consultant's Analysis

7.2.2 Distribution of Household by type of Dwelling Unit

In the Municipal Corporation area percentage of pucca Household is more than the surrounding rural area, at about 49 % (Refer to Fig 7.5). Due to income levels and rural character in villages, percentage of kuccha and semi-pucca is more. Overall, the percentage of households having pucca and kutcha houses in the planning area are almost similar. 35.9% of the total households have pucca structure, while 36.3% have semi-pucca and 27.5% have kutcha structures (Refer to Fig 7.4).

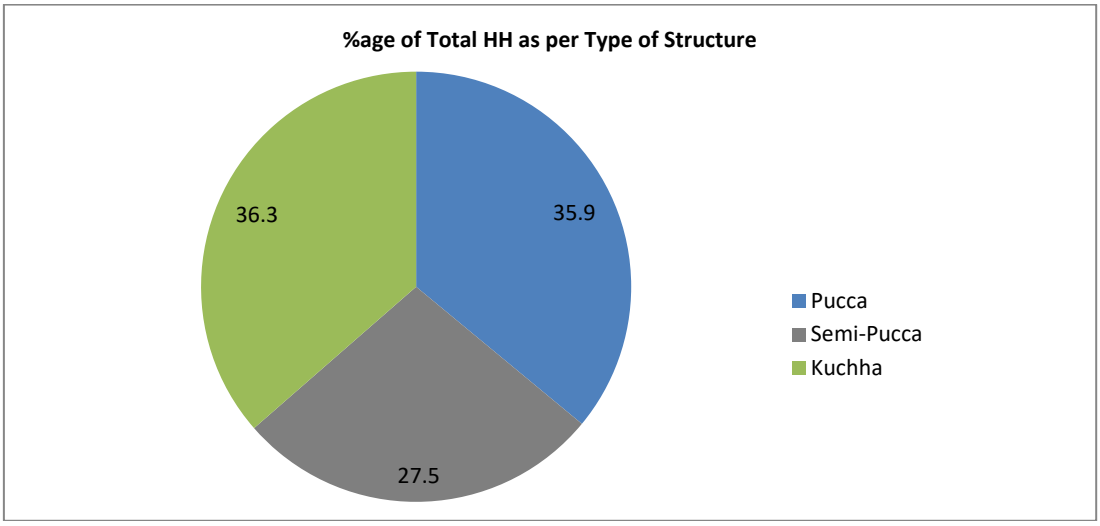


Figure 7.4: Percentage of Total Households as per Type of Structure

Source: Consultant's Analysis

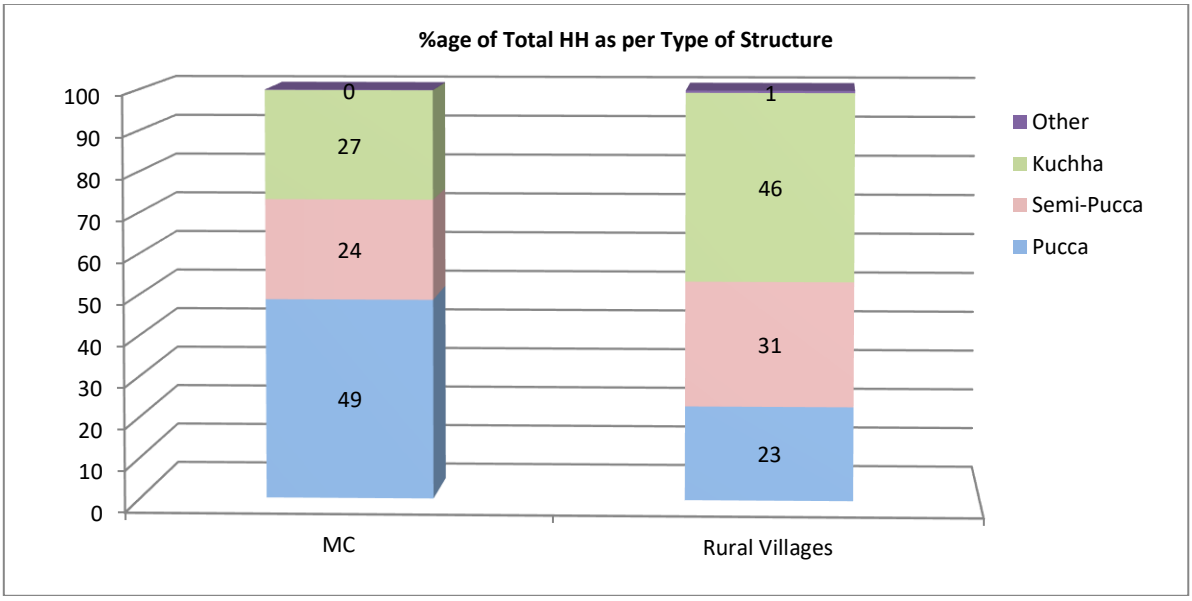


Figure 7.5: Percentage of Total Households as per Type of Structure in MC & Rural Areas

Source: Consultant's Analysis

Figure 7.6: Different Types of Dwelling Units in Balasore

7.2.3 Ownership Pattern

In Municipal area and Rural Villages, 96.4% of the total household are owned and very less percentage i.e., 3.6% are rented. Most of them have their ancestral lands due to which owned household are more. Refer to Fig 7.7 and 7.8 below.

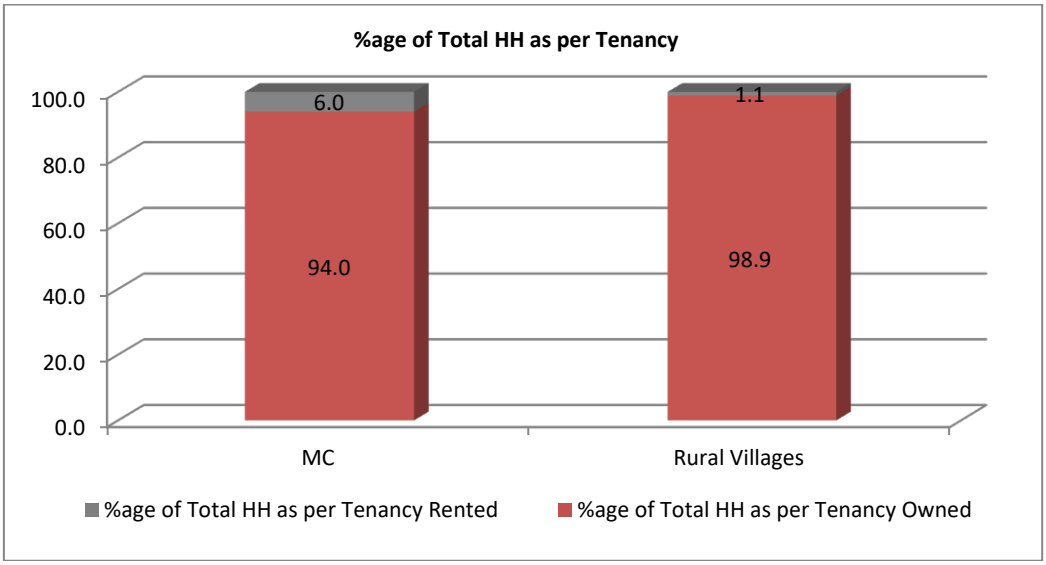


Figure 7.7: Percentage of Total HH as per Tenancy in MC & Rural Areas

Source: Consultant's Analysis

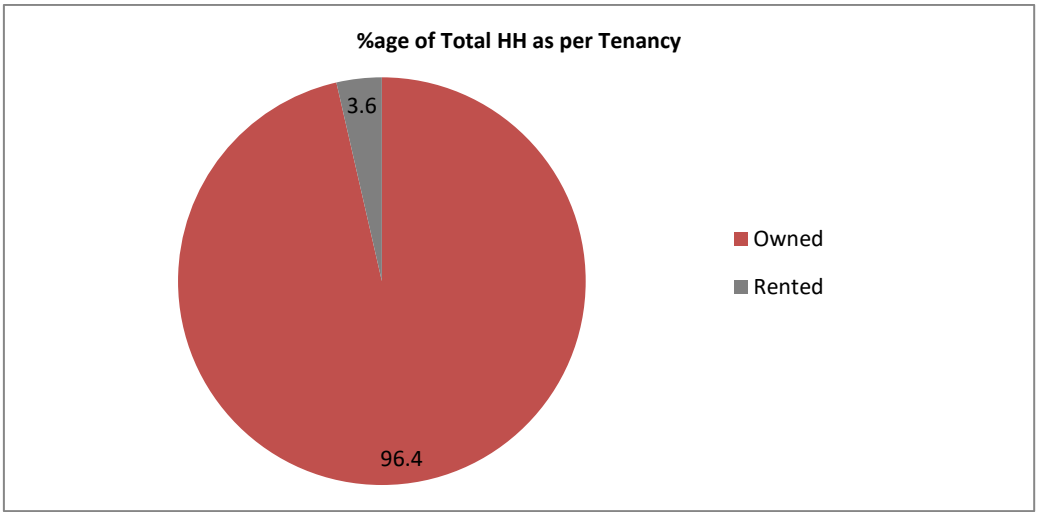


Figure 7.8: Percentage of Total HH as per Tenancy

Source: Consultant's Analysis

7.2.4 Duration of Stay

Majority of the households are old residents of the area who have been staying in the same house for more than 25 years i.e., 49% of the households in the planning area. After this, the next maximum percentage i.e.,15% of the households has been staying the same house for 6-10 years (Refer to Fig 7.9).

While comparing the years of stay in present house between households of Municipal and rural areas, more percentage of households (55.9%) in rural areas have been staying for 25 years or more than 41.9% in Municipal area. Also, in Municipal area more percentage of households stays in the same house for lesser number of years than in rural areas. Refer to Fig 7.10 below.

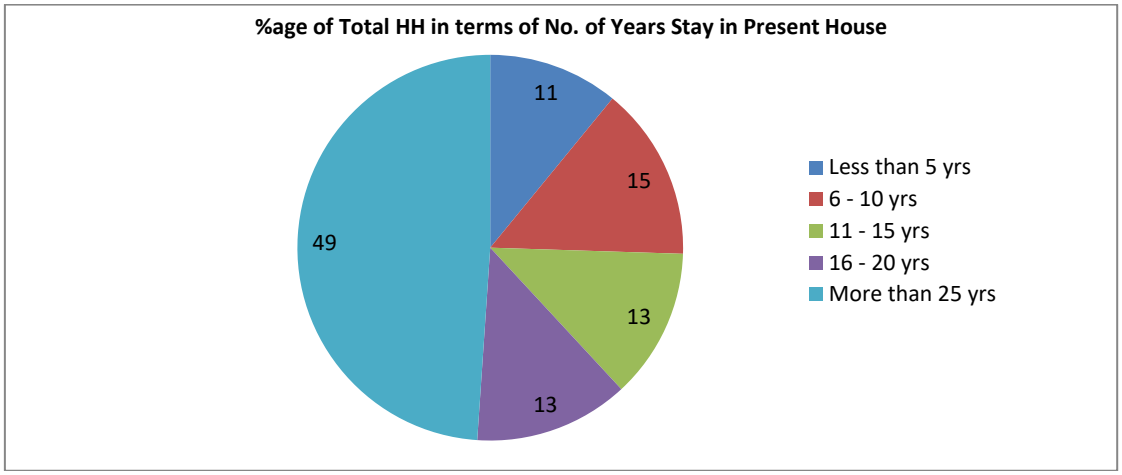


Figure 7.9: Percentage of Total Households in terms of No. of Years of Stay in Present House

Source: Consultant's Analysis

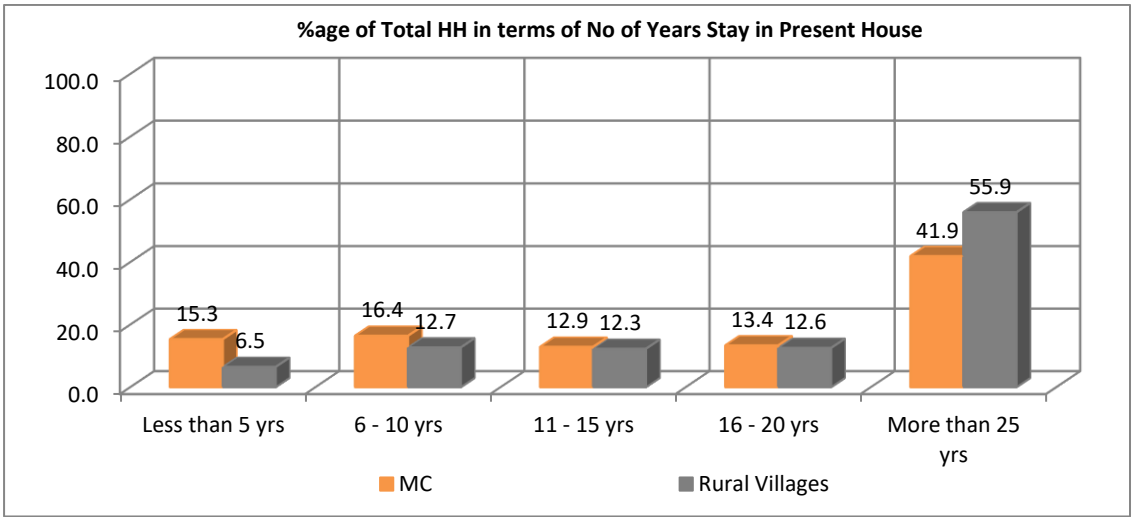


Figure 7.10: Percentage of Total Households in terms of No. of Years of Stay in Present House, MC & Rural areas

Source: Consultant's Analysis

Figure 7.11: Old and New Housing in Balasore

In terms of number of years stay in Balasore, majority i.e., 96% of the households have been living in the area for more than 25 years and shifting to nearby places for employment. Refer to Fig 7.12 and 7.13 below.

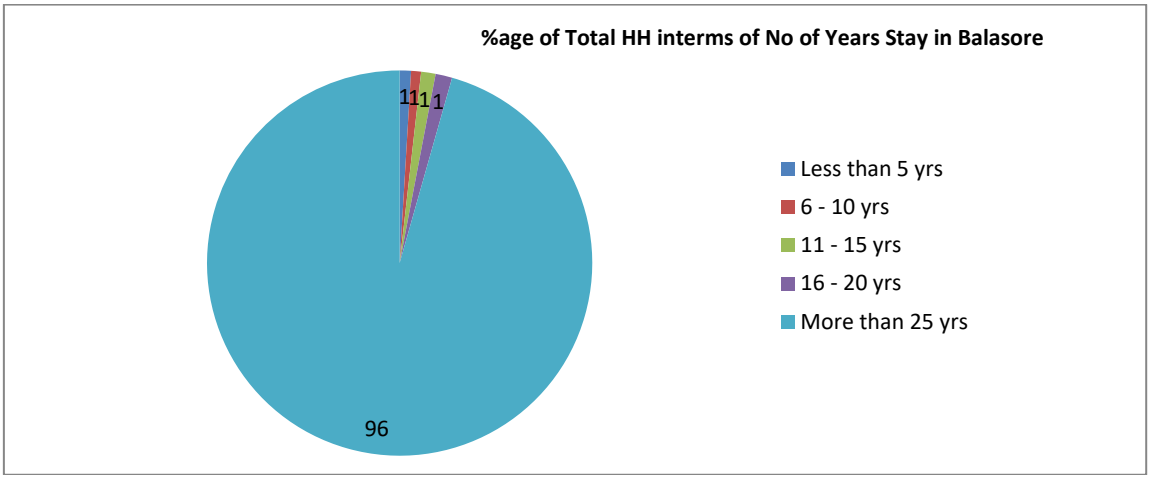


Figure 7.12: Percentage of Total HH in terms of No. of Years Stay in Balasore

Source: Consultant's Analysis

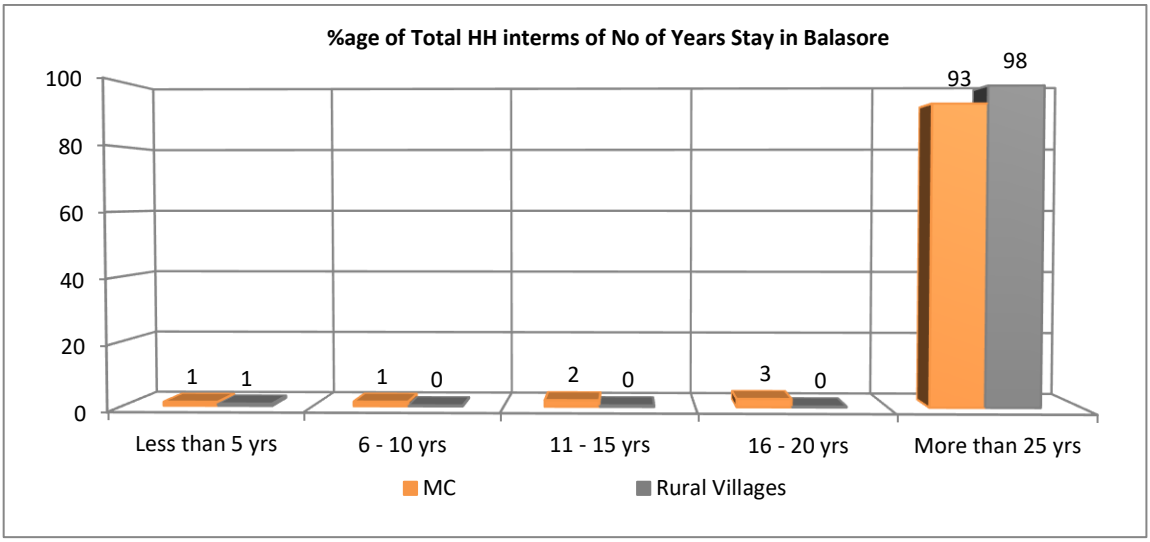


Figure 7.13: Percentage of Total HH in terms of No of Years Stay in MC & Rural Areas

Source: Consultant's Analysis

7.3 Access to Basic Services

In all parts of Balasore, tap water and community are the major sources for water. While in Municipal area, both tap and community source are equally used for getting water, in rural areas community source is more prominent. After community source, tap and hand water are the next major sources for getting water. Refer to Table 7.2 and Fig 7.14 below.

Table 7.2: Type of Water Source Available to Households

S. No.	Planning Area	Type of Water Facility				
		Tap Water	Hand Pump	Bore Well	Open Well	Community Source
1	**MC**	37	10	15	0	37
2	**Rural Villages**	24	23	2	0	51

Source: Consultant's Analysis

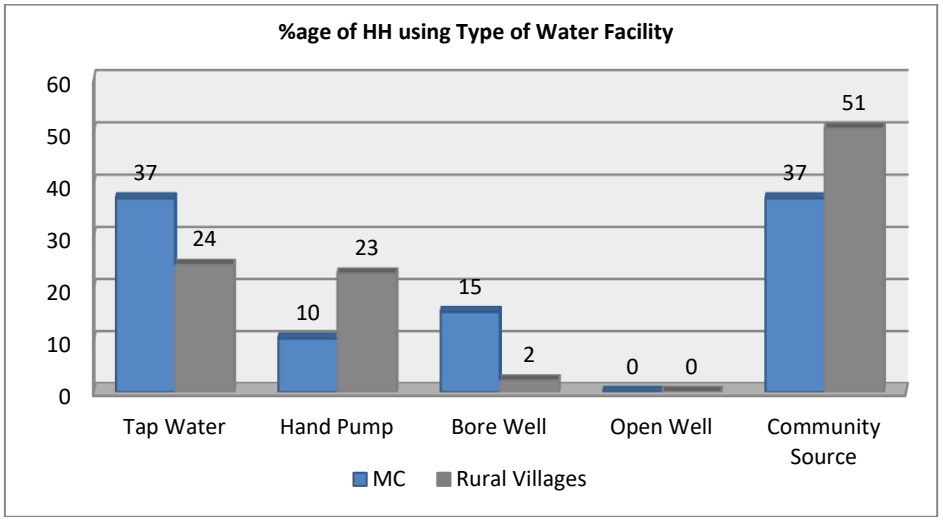


Figure 7.14: Type of Water Source Available to Households

Source: Consultant's Analysis

In both Municipal area and rural villages, municipal council is the only agency responsible for Solid Waste Management. Refer to Table 7.3 below.

Table 7.3: Solid Waste Management Departments in Balasore

S. No.	Planning Area	Solid Waste Management Department			
		Corporation	Private	Society	Other
1	**MC**	100	0	0	0
2	**Rural Villages**	100	0	0	0

Source: Consultant's Analysis

In planning area, the sanitary system is majorly Septic Tank and wet pit system. 46% of the households use septic tanks while 32% use wet pit system (Refer to Fig 7.15). This indicates lack of planned sewerage network in the area.

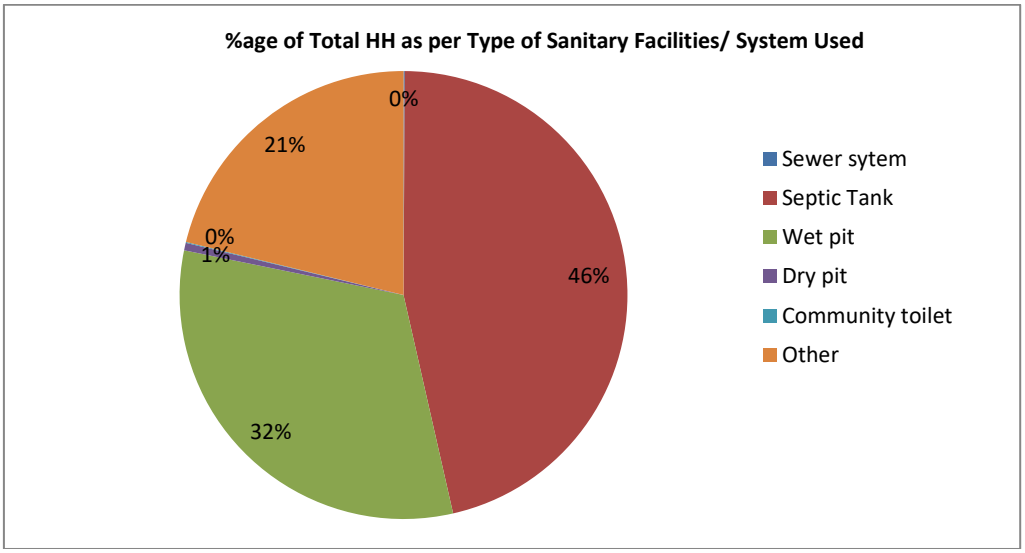


Figure 7.15: Percentage of Total Household as per Type of Sanitary facilities/ System used

Source: Consultant's Analysis

In the Municipal area, majority of the households i.e., 76.5% use septic tank system. In rural areas wet pit system is more prominently used by 51.4% of the households followed by 31.4% using others like open defecation. Refer to Fig 7.16 below.

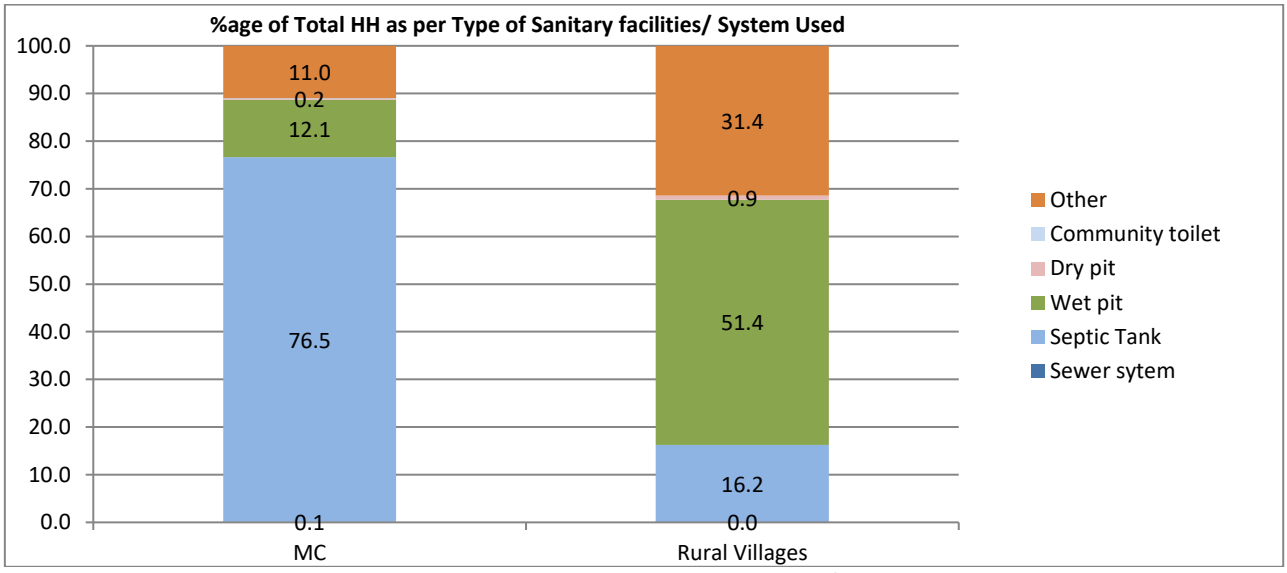


Figure 7.16: Percentage of Total HH as per Type of Sanitary facilities/ System used in MC & Rural areas

Source: Consultant's Analysis

7.4 Availability of Other Infrastructure Facilities

In Municipal area the average distance of facilities availability is less when compared to rural villages. Facilities like Hospitals, Colleges and Transport are comparatively at a greater distance. Facilities like Dispensaries and Parks and Playgrounds are at shorter distances in rural villages. Refer to Table 7.4 below.

Table 7.4: Average Distance of Infrastructure Facilities Availability (in Kms)

Planning Area	Dispensary	Hospital	Primary School	Sec School	College	Market	Transport	Parks & Ground	Open disposal system
MC	0.7	2.5	0.8	1.2	1.7	1.5	3.1	1.3	0.0
Rural Villages	0.3	7.3	1.1	2.4	6.1	4.3	4.0	0.2	0.0

Source: Consultant's Analysis

7.5 Issues Related to Infrastructure Facilities

Issues regarding to infrastructure facilities like Water supply facility, Power, Hygiene, Parking, Road access are predominant in all areas of Balasore Planning Area. In Municipal area issues are in regarding to Education, Commercialization, Safety and security and Parking are more prominent. Whereas, in rural areas issue related to Water Supply, Power, Hygiene, road access and Parking are more pressing than others. Refer to Table 7.5 below.

Table 7.5: Predominant Infrastructure Related Issues

Water (quality / quantity)	Power (frequency, wattage)	Hygiene/ living conditions	Parking	Road Access	Education	Commercialization	Polluting house-hold industries	Safety and security	Mix land-use (specified)
72	100	79	62	93	14	7	0	24	0
55	41	51	51	41	53	57	57	52	54

Source: Consultant's Analysis

7.6 Future Housing Requirement

In next 20 years, the household size within the planning area will would decrease due to better health facilities and emerging trend of nuclear family system. Congestion factor was 30.84 in year 2001, which decreased by 2.15 during census year 2011. It is further assumed that congestion factor will be 26.05 by 2021 and 22.32 till horizon year 2030. Dilapidated factor is assumed to be decreased from 6.6 % (2011) to 3.3 % by 2021 and further it will be reduced to 1.1 by horizon year 2030.

As per estimation, the population of Balasore planning area will grow to 4.61 lakh by the horizon year of 2030 and the household size will be 4. By then the deficit in housing would grow to 55,742. Refer to Table 7.6 below.

Table 7.6: Housing Demand for the horizon year -2030

Year	Population	HH Size	No. of HH	Ratio of HH	Natural Housing Need	Occupied Residential Houses	Obsolescence Factor	Habitable Houses	Apparent Shortage	Concealed Shortage	Deficit
2011	2,60,532	4.70	55,432	1.10	50,393	49,790	0.07	46504	1281	3,286	3,889
2016	3,01,472	4.50	66,994	1.10	60,904	49,790	0.05	47350	10,466	2,440	13,553
2021	3,42,608	4.30	79,676	1.10	72,433	49,790	0.03	48147	21,885	1,643	24,286
2026	4,01,652	4.20	95,632	1.10	86,938	49,790	0.02	48695	35,482	1,095	38,243
2030	4,61,933	4.00	1,15,483	1.10	1,04,985	49,790	0.01	49242	50,684	548	55,742

Source: Census of India and consultant estimation

7.7 Major Housing Providers

Odisha State Housing Board (OSHB), Central government bodies (Railway, DRDO and AIR), Balasore Municipality and Private developers are the major providers of housing. After establishment of Balasore Regional Improvement Trust (BRIT) the planned development of housing societies are initiated. Balasore Municipality is proving housing for the EWS, LIG and MIG sections. The govt. housing schemes, and PPP housing schemes should continue to provide affordable housing and generate across subsidy arrangement to offset the cost reduction.

7.8 Housing Trend in Balasore

The trend of developed housing schemes started in Balasore by Odisha State Housing Board, Railway Board as well as after setting up of Defence Research and Development Organization (DRDO) at Chandipur, etc. From 80's decade, group housing schemes included govt. quarters, bungalows and single dwelling units were in prominence. The 80's-90's decade continued the emphasis on walk-ups and included group housing and plotted development schemes. The late 90's saw the development of multi-storied dwelling units and apartments which ranged upto 4-5 storied. From 2000 onwards the trend has been of plotted housing schemes including group housing and core housing for various income groups under various govt. schemes. In Remuna area, Korakora, Bangara, Jujestipurpatana, Mallikashapur and along the Salt Road housing societies are being developed by private developers.

7.9 Land Requirement

The future land requirement in the Balasore Planning Area has been worked out based on the apportionment of future population density based on population projection for 2030. Population forecast for Balasore Planning Area is 4.62 lakh in the year 2030.

Table 7.7: Future Land Requirement for Housing

Year	Population	HH Size	No. of HH	Housing Requirement	Housing Density (DU/ Acre)	Housing Area (In Acres)
2016	3,01,472	4.50	66,994	13,553	25	542
2021	3,42,608	4.30	79,676	24,286	25	971
2026	4,01,652	4.20	95,632	38,243	25	1,530
2030	4,61,933	4.00	1,15,483	55,742	25	2,230

Source: Consultant's estimation

7.10 Cost of Development

The cost of development depends upon the level of infrastructure provided. Thus, the housing development cost is assumed as per the current market prices which are subject to change. The land acquisition cost per acre has been taken considering the prevailing market rates and discussions with developers and brokers.

Table 7.8: Cost of Development of Housing

Year	Population	Housing Area (in Acres	Land Acquisition Cost (Lakhs/Acres)	Land Development Cost (Lakhs/Acres)	Total Development Cost (Lakhs/Acres)	Total Development Cost 2030 (in Lakhs)
2016	3,01,472	542	15	15	30	16,260
2021	3,42,608	971	15	15	30	29,130
2026	4,01,652	1,530	20	15	35	53,550
2030	4,61,933	2,230	20	15	35	78,050

Source: Consultant's estimation

7.11 Housing Policy

The existing population of Balasore is around 2.64 lakh which will reach 4.61 lakh by the period of 2030. This will mean an addition of around 1.97 lakh people. With an average household size of 4, this implies an addition of 55,000 dwelling units. If the qualitative shortage and obsolescence factors are added to that, the total housing requirement for Balasore in 2030 is around 55,742 dwelling units.

The housing policy envisages:

- Re-development of the traditional houses and buildings especially in the core area of Balasore
- Development of new housing colonies and new townships planned as per the neighborhood planning concept.
- Augmentation of the existing housing schemes that are indicating slow growth.

7.12 Slums

Balasore being the district headquarters as well as centre of economic activity in the region has been attracting people in search of better opportunities. Most of them being poor and due to inadequate housing available, slums have proliferated in the town.

7.12.1 Existing Slums in Balasore

There are 72-identified slums in Balasore town with a population of 11,000. These slums have dilapidated housing structure with poor ventilation, over-crowding and face a lack of basic services like supply potable water, sanitation, etc.

Slums and squatter settlements have come throughout Balasore, but mostly along the Budhabalanga river, both sides of the railway line and on government land.

In terms of basic services, very few slum households have access to piped water supply and are mostly dependent on public stand post and municipality tap. Sewerage and sanitation facilities are altogether absent with open defecation being rampant. Lack of drainage in these slums especially those situated on low-lying areas along the river means that water logging and flooding during monsoons is common. Further, there are also serious gaps in solid waste collection and management from these areas.

Out of the 72 Slum Pockets, 27 have been registered and taken up for IHSDP schemes.

7.12.2 Slums Rehabilitation

Under the assistance from State and Central Government several programs are initiated and being implemented in BPA to tackle with the problems of slum dwellers and to reduce urban poverty. Number of programs are initiated and implemented by the Balasore Municipality.

Integrated Housing and Slum Development Programme (IHSDP)

The basic objective of the Scheme is to strive for holistic slum development with a healthy and enabling urban environment by providing adequate shelter and basic infrastructure facilities to the slum dwellers of the identified urban areas. The components for assistance under the scheme will include all slum improvement, up gradation and relocation projects including up gradation and new construction of houses and infrastructure facilities like water supply

and sewerage. Four slums of the city area have been selected under IHSDP scheme by Balasore Municipality. DPRs for all slums have been prepared and work is under progress.

National Slum Development Programme (NSDP)

Under this scheme, roads, drains, street lighting, community toilet/bath for the slum people cab be constructed. The allotment under the scheme involves 70% as loan portion carries a grace period of 5 years for, repayment with 10% interest per annum, with 15 equated instalments per annum and with a penal interest of 2.75% if not paid in time. Special Priority is given to community Centres, roads, drains and Street lighting.

Swarna Jayanti Shehri Rojgar Yojna (SJSRY)

Swarna Jayanti Shehri Rojgar Yojna (SJSRY) consists of two special schemes, viz Urban Self Employment Programme (USEP) and Urban Wage Employment Programme (UWEP). It is funded in a ratio of 75:25 between the centre and the state. Under UWEP of SJSRY, socially and economically useful public assets i.e. roads, drains, culverts, community latrines are constructed in slum areas, providing wage employment to the urban under the UWEP, the Balasore Municipality has provided loan and subsidy for income generation activities to about 109 beneficiaries during 2006-07. 139 beneficiaries have been trained on computer and appliqué/ knitting. Under the UWEP activities, roads, drains, culverts, community centres, community latrines etc have been constructed in many slum areas. In addition, 17 Balwadis are functioning under the SJSRY scheme.

Development of women and children in Urban Areas (DWCUA)

This scheme is distinguished by the special incentive extended to urban poor women who decide to set self-employment ventures as a group as opposed to individual effort. Groups of poor women shall take up an economic activity suited to their skill, training, aptitude, and local conditions. Besides generations of income, their groups shall strive to empower the urban poor women by making them independent as also providing a facilitation atmosphere for self- employment.

Other programmes

Following is some of the improvement programmes initiated/ completed to the Balasore Municipality its efforts to upgrade quality of life of slum dwellers in the Town.

- Training: About 139 beneficiaries have been provided training in computers, appliqué/ knitting etc. for self-employment.
- Tube wells: About 229 tube wells and public stand posts have been constructed to provide water to slum dwellers under SJSRY, Balasore Municipality Funds.
- Old Age / Widow Pension and Odisha Disability Pension: 1,408 SOAP, 1,296 beneficiaries are being provided with old age/widow pension and 290 beneficiaries have been assisted under the Odisha Disability Pension. The beneficiaries are getting pension on 15th day of every month @ Rs. 200 each.
- Health Facilities: Health camps are being organised in slums throughout year. Also, First-Aid training is imparted for slum dwellers.
- Antyodaya Anna Yojanna (AAY): About 6,034 families have been covered under BPL programme 1,118 beneficiary families have been covered under expended AAY to provide with 35 kg rice per month @ 3.00 per kg.
- Annapurna Yojana: 206 families are provided with 10 kg rice per month free of cost under Annapurna Yojana.
- National Family Benefit Scheme: Financial assistance @ Rs. 10,000/- is provided to the legal heir of the urban poor after the death of the chief bread earner of the family.

7.12.3 Vision for Development of Slums

The vision is based on National Slum Policy. It shall strive to achieve the following:

- Strengthen the legal and policy framework to facilitate the process of slum development and improvement on a sustainable basis.

- Ensuring all the slum households have access to basic services like water supply, sanitation, etc.
- Integrate slum settlements and communities residing within them into the urban areas by creating awareness amongst the public and in Governance of underlying principles that guide process of slum development and improvement and the options that are available for bringing about the integration.
- Encouraging participation of the slum communities in all areas of planning and development.

7.12.4 Strategies

- Improvement and provision of basic physical infrastructure like water supply, construction of drains, sanitation, etc. to improve the quality of life of the slum residents. Provision of community toilets and low-cost individual toilets in slums; provision of piped water connection with minimum fixed prices.
- Since the slum pockets are spread all over the city, it is proposed that the basic services for slums will be treated at par with rest of the town and will be taken care on priority for development.
- Provision of affordable houses for poor living in dilapidated houses or having no house.
- Integrated development of slums including both housing and basic services shall be done, wherever relocation of slums is required
- In-situ development of slums wherever possible

Physical Infrastructure

Chapter 8. Physical Infrastructure

8.1 Introduction

The quality and adequacy of urban infrastructure directly influence the quality of life of the residents. The infrastructure profile refers to the status of infrastructure and utility systems in the town. Its analysis has been indicated the adequacy or inadequacy of infrastructural services in terms of coverage, quantity, and quality. The gap between demand and supply of different infrastructural services has been measured.

Urban growth both spatially and population wise puts pressure on infrastructure, particularly water supply, sewerage, solid waste, drainage, electricity, road network etc. Unless infrastructure is improved to the required level, quality of life suffers. Most importantly, it influences economic development of the city and investment climate.

A detailed analysis has been done by consultants to study the service level of the physical infrastructure and requirement to serve the population till 2030 by understanding the existing infrastructure system, present gap and future requirement which has explained in subsequent sections.

8.2 Water Supply

8.2.1 Water Supply Scenario

Piped water supply was started in 1940 in Balasore. Before that bore wells, ponds and lakes were the only source of water supply. Currently, the area does not have 100% piped water connection. Although, the town has ample amount of surface water (Budhabalanga passes through the town), its water cannot be used for drinking purposes. The natural ponds (Pokhris) are used for washing and bathing, which are spread throughout the planning area.

Groundwater, therefore, is the only main source of water supply in the area. The water table of the planning area is quite high. The water is available at 25-30 foot below ground level. Also, piped water supply is costlier than underground water supply. Other than piped water supply stand posts, well and ponds are the other source of water. In the villages within the planning area the water supply is managed by the RWSS department. Refer to Table 8.1 below for more details.

Table 8.1: Status of Existing Water Supply System

Existing Water Supply System	Service level
Source of Water Supply	Ground water and tube wells
Existing Rate of Water Supply	94 lpcd
Ground water reservoirs	11 Nos capacity: 2.38 million litres
Elevated storage reservoirs	5 Nos 0.80 million litres
Frequency of Water Supply	1 hr to whole day
No. of Connections	Residential – 9825 Commercial – 75 Institutional – 75 Govt quarters- 600 ULB- 07

Source: PHED Deptt, Balasore

Figure 8.1: Water Storage Reservoirs

At present 18.91 MLD water is supplied for Balasore town whereas at least 40 MLD is required as per Census 2011 population. Thus, there is a major demand-supply gap in Balasore. Also, per capita supply is @ of 94 LPCD which is again low as compared to the norm of 135 LPCD.

Within the municipal area, 29 out of 31 wards are fully covered by the supply line while 2 are partially covered.

8.2.2 Proposals

The Balasore Master Plan proposes to cover the water supply scheme for planning area based on criteria, norms, standards mentioned in CPHEEO Manual. The objectives of full coverage of urban communities with easy access to potable drinking water in quantities recommended to meet the domestic and other essential non-domestic purposes, the recommended per capita water supply levels for designing water supply scheme are as follows:

Residential Water Demand: Total water demand for Residents of residential area has been taken as 135 lpcd for Potable use.

Industrial water demand: Total water demand for Industrial Area has been computed considering 6,000 Gallons / acre/day)

Fire Demand: Fire Demand has been calculated as 1.0 % of the total water demand. The Fire water demand will be stored in the UGT as dead water demand and will be supplied in the network in case of fire. Fire hydrants will be provided near the major road intersections so that in case of emergency the fire tenders can be filled at the Fire Hydrant locations.

Unaccounted for Water (UFW): 15% towards losses/ 'Unaccounted for water has been considered for Potable water for residential population

Horticulture: The water demand for irrigation of green areas is estimated at 20,000 litres/acre/day of the area under soft landscape.

8.2.2.1 Domestic Water Demand for Horizon Year 2030

As can be seen in Table 8.2 below, by horizon year 2030 the domestic demand for water will rise to 71.60 MLD (Refer to Table 8.2).

Table 8.2: Water Supply Demand for Projected Population-2030

Description	Year				
	2011	**2016**	**2021**	**2026**	**2030**
Residential Population	260,532	301,472	342,608	401,652	461,933
Domestic Water Demand (MLD)	40.38	46.73	53.10	62.26	71.60

Source: Consultant's Estimation

8.2.2.2 Proposals for Implementation

There is an additional requirement of 31.22 MLD (existing supply 18.91 MLD) water to meet the drinking water demand of Balasore Planning Area by horizon year 2030. Refer Proposed Water Supply Zones Map.

Action Plan

- In order to augment the water supply system in Balasore Planning Area, the Master Plan proposes to prepare a detailed project report (DPR) for Water Network System**.**
- Source Augmentation: Budhabalanga River near Village Aktiapur flowing through the town can be utilized as a potential surface water source.
- Public awareness against misuse of water
- Adequate reforms to balance the O&M cost with the revenue out of the water supply distribution
- Master Plan proposes to prepare a detailed project report (DPR) for Water Network System.

8.3 Sewerage System

8.3.1 Existing System of Sewerage

Sewerage network facility is absent in the planning area including the Municipal area. All through out household level septic tanks are provided and maintained by residents. In rural parts, wet pit system is also prominently used by residents. Due to absence of sewerage system, there is mixing of storm water and wastewater takes place resulting unhygienic conditions. This water gets discharged directly into Budhabalanga river untreated or through the natural drains meeting the river, hence polluting it. Open defecation in slum areas is normal phenomenon in the city and takes place in the rural areas.

8.3.1.1 Wastewater Generation

The population of Balasore as per Census 2011 was 2.60 lakh and the total sewage generated from planning area is 32.31 MLD (considering 80% of the total water supply).

8.3.1.2 Sanitation

Due to absence of a sewerage network in the Municipal as well as the planning area, the wastewater is disposed of into the storm water drains. This inter-mixing of wastewater with storm water leads to breeding of vectors and hence turns into a health hazard for the whole community. Also, the untreated sewer when discharged into the river, further contaminate, and pollutes the water. Further, due to dumping of garbage in open storm water drains near hospitals, market area, etc. leads to clogging of drains as well as adds to the unsanitary conditions created. Also, during rainy seasons, unable to carry the load of storm water due added burden of wastewater as well as blockage due dumping of garbage; these tend to drain overflow and increase the unsanitary conditions.

Few Public Toilets are present in Municipal area, but they are less than the required number and there is lack of maintenance. There are a total of 9 public toilets in the Municipal area, one each in ward numbers 9, 11, 16, 17, 18, 19, 22, 26, and 27.

8.3.2 Wastewater Management In 2030

8.3.2.1 Expected Sewage Generation

The design criteria to be followed for design of sewage collection, conveyance and treatment system for the project are based on the recommendations as laid down in the CPHEEO Manual of Sewerage and Sewage Treatment published by Ministry of Urban Development, Government of India and as per provisions laid down in the relevant I.S. codes. The various design considerations and norms are described below.

Wastewater Flows: The wastewater is generated in sewers mostly from the spent water of the community with some ground water infiltration and fraction of storm water. Domestic sewage is the wastewater from kitchen, bathrooms, lavatory, toilets, and laundries. The composition of domestic wastewater normally remains consistent, whereas industrial wastewater varies in composition with industrial operation.

Per capita Wastewater Flow: The rate of wastewater flow depends upon the rate of water supply to the community and the rate of ground water infiltration. The entire spent water of a community should normally contribute to the total flow in a sewer. However, the actual dry weather flow quantities usually are slightly less than the per capita water consumption. Since some water is lost in evaporation, seepage into ground, leakage etc. Generally, 80% of the water supply for the residential development may be expected to reach the sewers unless there is data available to the contrary

As can be seen in Table 8.3 below, that approx. 57.28 MLD sewage would be generated from the entire planning area by horizon year 2030.

Table 8.3: Sewage Generation for Projected Population-2030

Year	Population	Sewage Generation	Total Sewage Generation (during peak hours excluding infiltration)
2011	2,60,532	32.31	27.46
2016	3,01,472	37.38	31.78
2021	3,42,608	42.48	36.11
2026	4,01,652	49.80	42.33
2030	4,61,933	57.28	48.69

Source: Consultant's estimation

8.3.3 Proposals for Implementation

There is an urgent requirement for an underground sewerage network system in entire planning area. The entire Planning Area should be divided into 3-Sewage zones with their own individual sewerage treatment plants (STP). Table 8.4 below gives the estimate of area required for setting up a Sewage Treatment Plant in the future. By 2030, to treat 57.28 MLD of sewerage, an area of 10.31 Ha will be required to set up a STP.

Table 8.4: STP Requirement for Horizon year-2030

Description	Year				
	2011	2016	2021	2026	2030
Population	2,60,532	3,01,472	3,42,608	4,01,652	4,61,933
Area of STP (Ha)	5.82	6.73	7.65	8.96	10.31

Source: Consultant's estimation

The identified projects include:

- Preparation of DPR for Sewerage System for Balasore Planning Area.
- Laying of Sewer Network for Planning Area
- At present, to treat around 32MLD of sewerage, an STP will have to be constructed on 6.79 Ha area.

8.3.3.1 Recommendations

- 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 investigated.
- 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.

8.3.3.2 Treatment Options

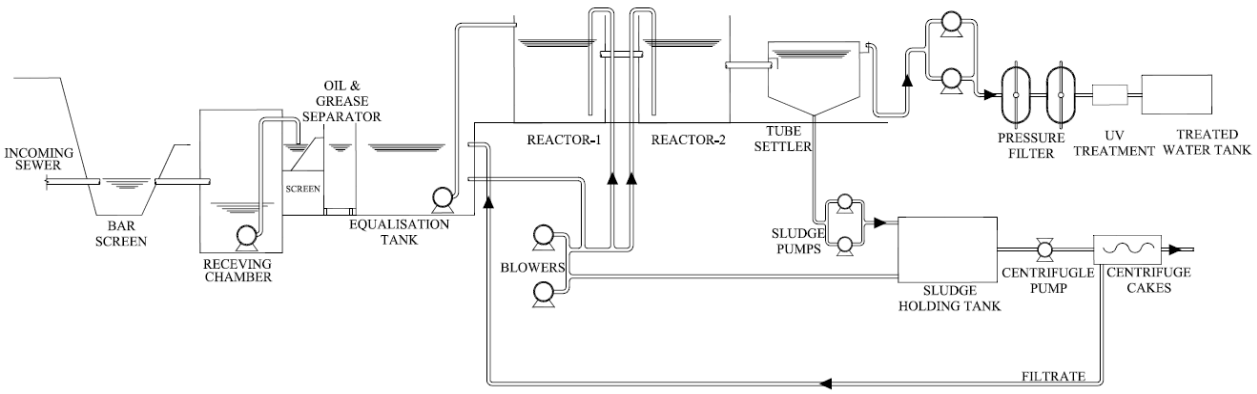
Considering the technical feasibility and economic viability of different treatment options for treatment of wastewater (like Activated sludge process (ASP), Up-flow anaerobic sludge blanket (UASB) reactors, fluidized aerobic beds, trickling filters, and waste stabilization ponds) for Balasore Planning area, the choice can be either the conventional activated sludge process or UASB reactors.

The conventional ASP system is a widely used wastewater treatment option in major cities of India. It has become popular as a reliable technology with good resource recovery (60-75% methane) of biogas. It assures a removal rate of more than 90-95% of organics from wastewater. UASB reactors are also gaining ground as an alternative to the conventional treatment techniques with their simplicity and comparable removal efficiency. However, the UASB renders effluents with relatively high NPK values demanding post treatment by polishing units. The cost of treatment of wastewater, unit cost, and quality of the effluent varies only marginally among these two treatment options. The success of the ASP systems elsewhere, with its easy maintenance and management makes it an appropriate choice.

8.3.3.3 Sewerage Treatment System Proposed

The ASP system proposed as shown as below should contain the following units:

- Screens
- Grit chamber
- Primary clarifier (PC)
- Aeration tank or ASP tank
- Secondary clarifier (SC)
- Sludge digesters
- Sludge drying bed for the treatment of sludge obtained from primary clarifier and secondary clarifier.



8.4 Drainage

In Balasore the drainage system consists of natural drains and man-made drains along the roads. The roadside drains are either pucca or kutcha. The entire drainage system is open in Balasore planning area. These drains discharge all wastewater to minor drains, which finally discharges into river Budhabalanga.

8.4.1 Topography and Slope

Physiography of town shows it doesn't have any derived drainage pattern due to plain land and gentle slopes. The general slope of the area is towards the Budhabalanga river. Refer to Fig 8.2 & 8.3 below.

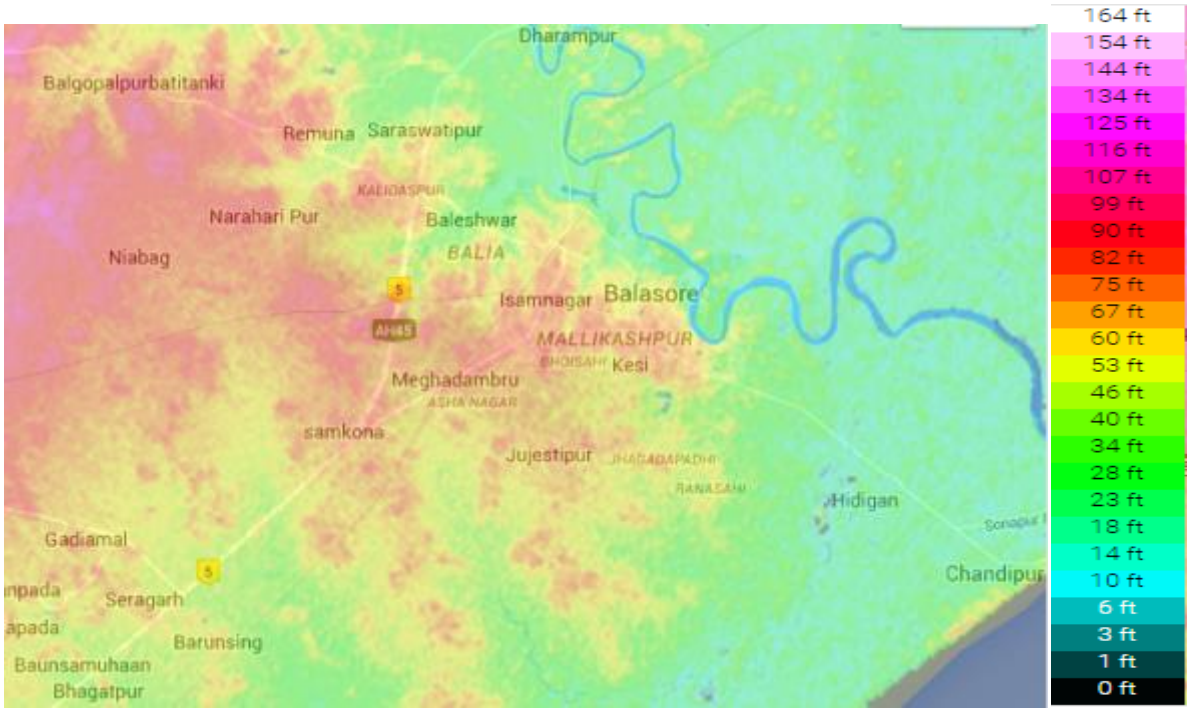


Figure 8.2: Topography of Balasore Planning Area

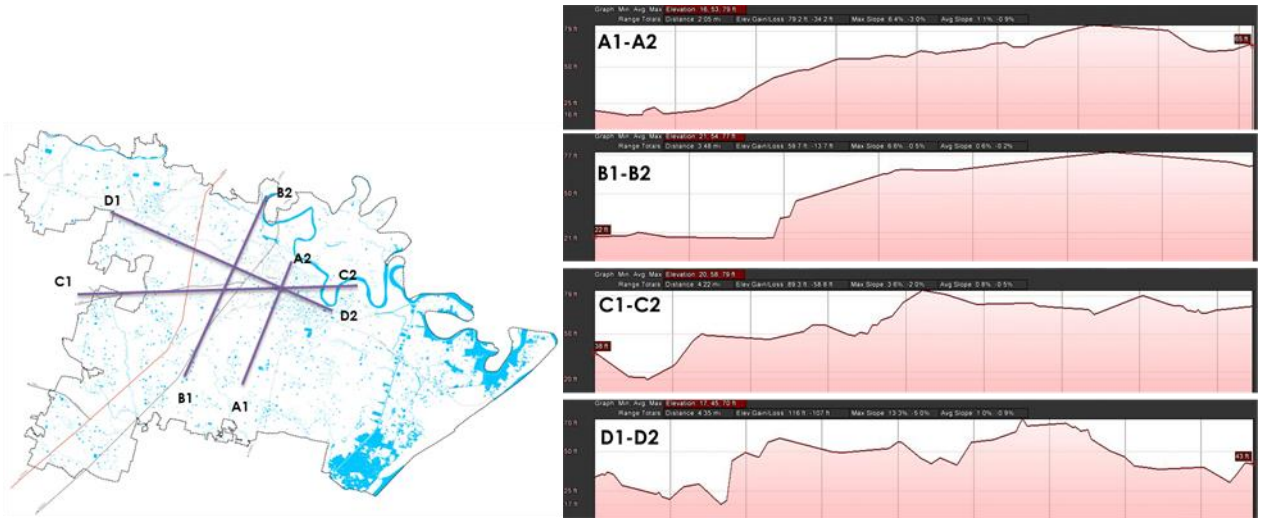


Figure 8.3: Slope Analysis of Balasore Planning Area

Source: Google Earth

8.4.2 Existing Drainage System

The natural drainage of the area is through Budhabalanga river which flows from west to east direction, finally discharging in the Bay of Bengal. The high flood line of the river is 10 m**.** The planning area is not fully covered by man-made drainage system. Though, a total of 630.52 km drainage system is developed within the town, of which 20 % are covered. Out of this pucca drains area cover a length of 110 kms while 519.9 kms have kuccha drains (Refer to Table 8.5). Thus, only 18 % of the municipal area has pucca drains (Refer to Fig 8.4).

Table 8.5: Length of Drains by Type within Balasore Municipal Area

	PUCCA DRAIN			KUTCHA DRAIN
LENGTH(Kms)	Less Than 300mm	Less Than 500mm	Greater Than 500mm	
	51.51	50.66	8.45	519.9

Source: Balasore Municipality, 2014

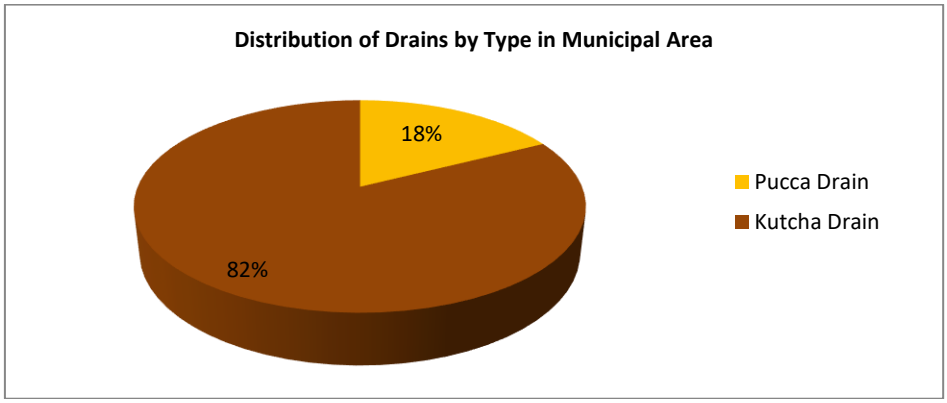


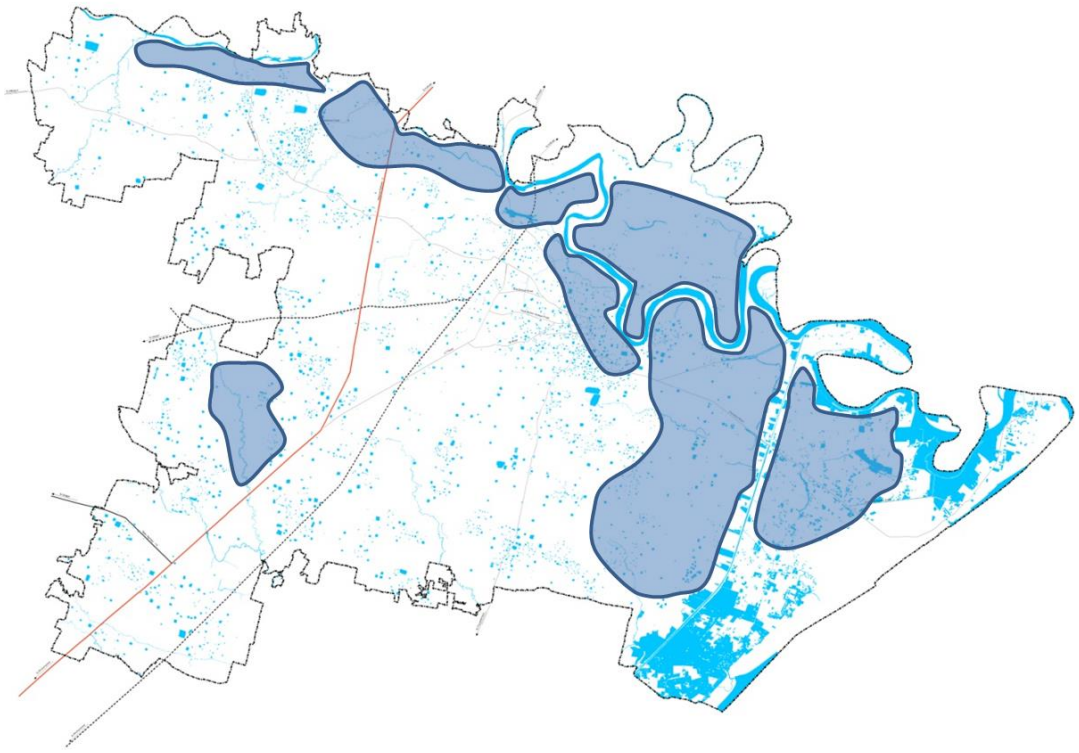
Figure 8.4: Distribution of Drains by Type in Municipal Area

Source: Balasore Municipality, 2014

8.4.3 Flooding

Water logging and flood is a prevailing problem in rainy season. Flooding mainly occurs in the low-lying areas in the vicinity of the Budhabalanga river (Refer to Map 8.1). The National Highway forms a major obstruction to the natural drainage.

Figure 8.5: Area flooded during monsoons



Map 8.1: Low Lying Areas in Balasore

8.4.4 Critical Issues of Concern

- **Absence of proper drainage system:** In existing situation, Balasore lacks proper and efficient drainage system in both urban and rural areas. 82% of the Municipality itself has only kuccha drains which are also in poor condition. The low-lying areas along with Budhabalanga River lack drainage system hence these areas are highly prone to water logging situations.
- **Choked Drains:** Most of the drains are choked with solid waste and causing water logging situation in many of the residential areas
- **Functioning of Drains as Sewer:** Storm water drains of Balasore planning area have functioned as media for carrying sewage. Further due to absence of proper sewerage system and lack of awareness sewage from residential areas is discharging into drains
- **Silting of Drainage System:** The available drainage system of the Balasore is not properly and frequently cleaned. Majority of drains are cleaned once in a year before the monsoon or on complaints. Heavy silting of drains resulting into overflow of water and water logging in rainy season.
- **Encroachment around natural water bodies** especially in residential and commercial areas has resulted in the choking. There has been development of Commercial complex and new constructions without following the natural slope and drainage pattern of the area.

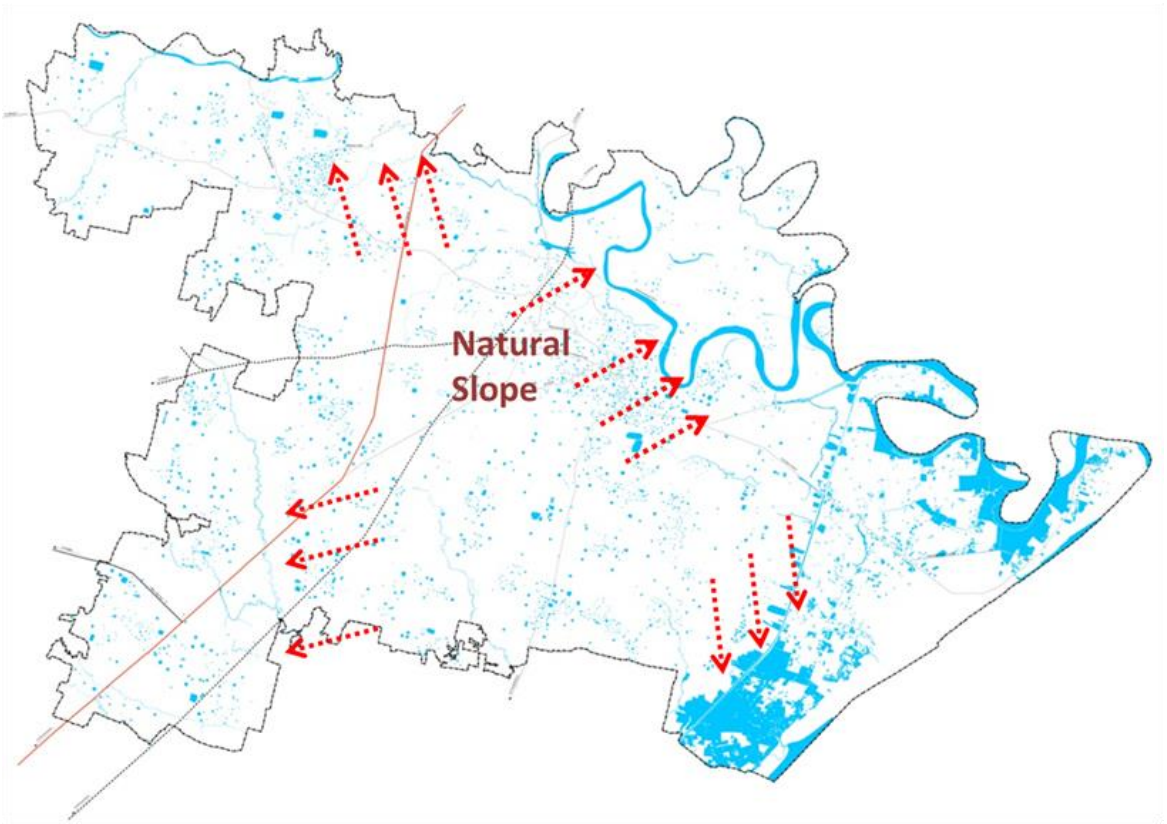
8.4.5 Proposals

A separate storm water drainage network apart from sewerage system 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' experience in related field.

8.4.5.1 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 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.
- 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 Balasore planning area
- All roads of the town/city should have side-drains, which will serve as minor or tertiary drains
- A master plan for the drainage of some of these areas has not yet been prepared. The implementation of a master drainage plan for these areas appears very essential.
- Since, the natural slope of the city is towards the river in the North-East direction, the main collector drains can be in laid in this direction (Refer to Map 8.2). The drainage should connect to the local small water bodies to resist water logging.



Map 8.2: Natural Slope of Balasore Planning Area

8.4.5.2 Drainage System Planning

While planning the drainage system for Balasore, the stages given in Fig 8.6 should be adhered to.

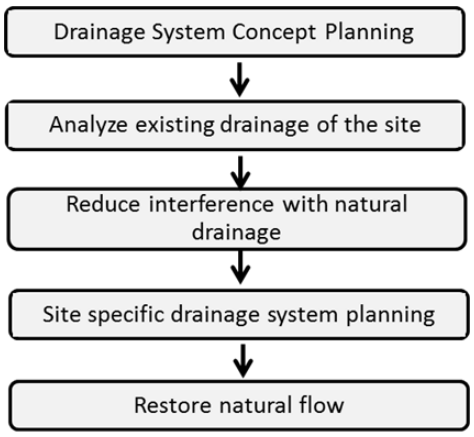


Figure 8.6: Stages in Drainage System Planning

Also, while planning the drainage system, the following alternatives can be considered (Refer to Fig 8.7):

- Rainwater Harvesting - Collecting rainwater within the boundaries of a property, from roofs and surrounding surfaces and either storing it for use or artificially recharging the groundwater.
- Porous/Pervious Surfaces- Infiltrates water into the ground- grass, parks.
- Infiltration Trenches- Infiltration of surface water to ground.
- Detention Basins- Vegetated depression normally dry, constructed to store water temporarily
- Retention Ponds/ Wetlands- Ponds with vegetation.

Figure 8.7: Alternatives in Drainage Planning (Clockwise); Pervious Surface, Retention Pond, Rainwater Harvesting

8.5 Solid Waste Management

8.5.1 Solid Waste Management Scenario

Balasore town lacks planned solid waste management systemwhich includes adequate garbage collection, transportation, and disposal system. In general, there is no systematic collection, segregation and storage system for the solid waste generated in the urban area. All the municipal wastes generated from various sources are generally dumped either on the streets or into the storm water drains, canals and in low lying areas. The present system of solid waste collection is through dust bins placed in different places and street sweeping followed by carriage by open trucks or tractors by the Municipal Council to the open low-lying areas available in planning area for disposal.

8.5.1.1 Solid Waste Generation Rate

Total generation of solid waste from the Balasore planning area is about 105.61 MT per day in 2011.

Figure 8.8: Areas used for Solid Waste Disposal

Qualitatively, this waste is constituting of organic waste, Construction and Demolition Waste, Street sweeping, recyclable and inert waste from the following sources:

- Residential
- Commercial areas
- Healthcare establishments – Hospitals, dispensary, private clinics etc.
- Hotels and Banquet Halls
- Drains silts
- Street Sweeping

8.5.1.2 Existing System of Collection and Storage of Solid Waste

Town doesn't have any notified solid waste disposal site. Door to door collection is not practised in the town. There is lack of segregation of solid waste is also not practised. Solid waste is collected in bins. Residents must dispose the domestic waste into bins placed in different localities. The collection and disposal of municipal solid wastes that generates from the town is carried out by the Balasore municipality.

8.5.1.3 Disposal of Solid Waste

Presently, no processing of municipal waste is being carried by Municipal Corporation of Balasore town. There is no proper site has been identified by the BMC to dump the MSW. Out of total solid wastes generated from the town, about 36 MT is disposed of by the municipality in the low-lying areas located within or at periphery of the town.

8.5.1.4 Issues in Present Management 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 several 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 Karamchari 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 slaughterhouse waste in Balasore town / planning area.
- Disposed of Bio-medical waste without any treatment- Presently, there is no treatment facility available for bio-medical waste in Balasore 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.

8.5.2 Proposals

8.5.2.1 Assessment of Solid Waste Generation

The total waste generation by 4.62 lakh populations by the horizon year 2030 would be 184.77 MT (Refer to Table 8.6 and Fig. 8.9).

Table 8.6: Solid Waste Generation (MT), 2011-2030

Year	2011	2016	2021	2026	2030
Residential Population	260,532	301,472	342,608	401,652	461,933
Solid Waste Generation MT)	104.21	120.59	137.04	160.66	184.77

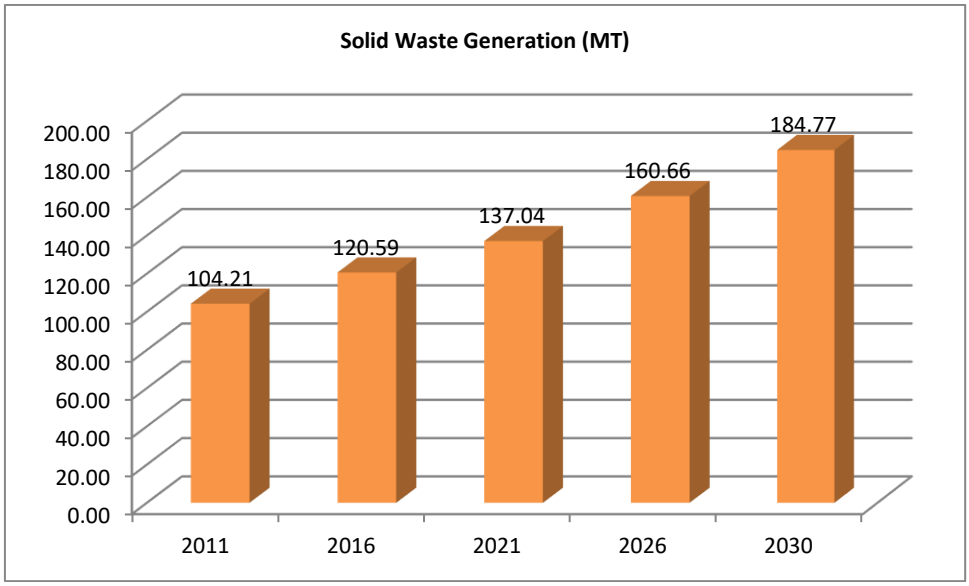


Figure 8.9: Solid Waste Generation (in MT) for Horizon year-2030

Source: Consultant's estima tion

8.5.2.2 Action Plan for a Sustainable SWM Programme

Decentralized solid waste treatment system

The developmental pattern of all the areas, especially Balasore, 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 despite 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 day-to-day basis from individual houses.
- The collection service can be provided on a full-cost recovery basis using contractor services on a day-to-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 considering quantities of waste generation in each 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 user-friendly.
- 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 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:

Table 8.7: Proposed Action for Storage of MSW

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 dry/ recyclable waste in bin type – D2 • Keep hazardous waste separately
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 fine should 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 m^3), Type B (0.75 m^3), Type C (0.5 m^3), Type D1 and Type D2 (12 liters)		

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 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 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 non-biodegradable waste, which is non-recyclable, non-reusable shall be dumped into sanitary land fill. Bio-degradable 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 investigated 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 multi-specialty 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 activities 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.

If a small part of these infectious hospital wastes is mixed with other hospital wastes or municipal solid wastes, the entire waste will have to be treated as infectious. Segregation helps in reducing the total treatment cost, stops general waste from becoming infectious, reduces the chances of infecting the Health Care Workers, etc. All these wastes after segregation must be stored in colour coded containers. Infectious waste should be disinfected before disposal. It has been observed that majority of the hospitals, nursing homes, pathology laboratories and health care centers located in these areas are not taking adequate measures for safe disposal of their bio-medical wastes. These hospitals generate waste in substantial quantities, which needs to be managed by the hospitals themselves. Many large hospitals dispose of their mixed wastes within the hospital premises, where waste remains unattended in the open for a long time. Some hospitals and nursing homes have set up low-temperature incineration plants for the disposal of wastes, which quite often remain out of order as they are not managed and maintained properly. Infectious and non-infectious wastes are generally not segregated at source and instead the mixed (often wet) waste is taken to the incineration plant in a very unhygienic manner. The system of collection, transportation and disposal of bio-medical waste is thus not scientifically designed and practiced in these areas.

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 follow 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.

Table 8.8: Handling of Bio Medical Waste

Waste Category No.	Waste Class	Description of Waste
1	Human Anatomical Wastes, Blood, and Body Fluids	Waste consisting of human tissues, organs, body parts, body fluids, blood and blood products and items saturated or dripping with blood, body fluids contaminated with blood and body fluids relieved during/after treatment, surgery or autopsy or other medical procedures
2	Animal Waste	Waste consisting of animal tissues, organs, body parts, carcasses, bleeding, fluid blood and blood products, items contaminated with blood

Waste Category No.	Waste Class	Description of Waste
		and fluids, wastes from surgery treatment, and autopsy and wastes of experimental animals used in research, Waste generated by veterinary hospitals, colleges, animal houses and livestock farms
3	Microbiological	Wastes from laboratory cultures, stocks, or specimens of micro-organisms, live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes and production of biological, dishes and devices used for transfer of cultures
4	Waste Sharps	Wastes consisting of sharps such as needles, syringes, scalpels, blades, glasses etc. those can cause puncture and cuts. This includes both used and unused sharps
5	Highly infectious Wastes	Waste containing highly infectious living and nonliving pathogens and exposure to it could cause disease
6	Isolated Waste	Biological wastes from discarded materials contaminated with blood, excretion exudates or secretions from human and animals isolated due to communicable diseases
7	Discarded Medicines	Wastes comprising of outdated, contaminated, and discarded medicines
8	Discarded Glass Wares	Wastes generated from glassware and equipment used
9	Soiled Waste	Wastes generated from soiled cotton, dressings, liners, beddings including the packaging materials
10	Disposables	Wastes generated from disposable items other than the waste sharps
11	Liquid wastes	Wastes generated from laboratory and washing, cleaning, housekeeping, and disinfecting activities
12	Biotechnology	Wastes generated from activities involving genetically engineered organisms or products and their cultures not declared to be safe
13	Slaughterhouse	Wastes generated in the form of animal tissues, blood, and body fluids
14	Incineration Waste	Ash from incineration of any Bio-medical wastes

Source: Report of the high-power committee, Urban Solid waste Management in India, Planning Commission, Government of India, 1995

Table 8.9: Treatment and Disposal of Bio Medical Waste

S. No.	Waste Class	Treatment and Disposal Options
1	Human Anatomical Wastes	Disinfection and incineration/Burial
2	Animal Waste	Disinfection and burial
3	Microbiological	Disposal in special container
4	Human Blood and Body Fluids	Dilution with disinfectant Disposal in special drains
5	Waste Sharps	Disposal in special containers and landfill
6	Highly infectious Wastes	Special decontamination, packing in specially designed containers and final disposal on secured landfill.
7	Isolated Waste	Secured landfill disposal after suitable treatment
8	Discarded Medicines	Incineration
9	Discarded Glass Wares	Decontamination, destruction
10	Soiled Waste	If infectious, to be disposed of as infectious waste, if no infectious to be disinfected and disposed
11	Disposables	Packaging in appropriate containers and incineration, disposal on secured Landfill
12	Liquid wastes	Disinfection and discharge in special drains
13	Biotechnology	Packaging in special containers and disposal on land
14	Slaughterhouse	Disinfection and disposal on land for solid and treatment and discharge for liquid

Source: The Gazette of India (extraordinary) no. 233 dated 25th April 1995, New Delhi

8.5.2.3 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 land-filled. The bio-medical wastes may be disposed of 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 recent times, there is a trend towards smaller, manually operated composting plants at community level, initiated primarily by citizens' initiatives or non-governmental organizations NGOs) supported by many national and international nodal funding agencies. 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 labor-intensive processes. It will create employment opportunities and a source of income to the underprivileged people in the rural Balasore. 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.

8.5.2.4 Proposals for Solid Waste Treatment

The solid waste generation expected in Balasore Planning Area by 2030 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 BMP are to be given priority in providing the composting facilities for solid waste treatment.

Considering the increase in solid waste generation in Balasore, it is estimated 12.68-hectare land for solid waste landfill site will be required by 2030, which has been identified besides Birla Tyres industrial area. This landfill area can be developed in phases as given Table 8.7 below.

Table 8.10: Solid Waste Generation & landfill site requirement for the horizon year- 2030

Year	2011	2016	2021	2026	2030
Land Area Required	7.60	8.80	10.00	11.70	12.68

Source: Consultant's estimation

Social Infrastructure

Chapter 9. Social Infrastructure

9.1 Introduction

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 livable 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.

9.2 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.

9.2.1 Existing Educational Facilities

Balasore is an important educational hub in Northern Odisha having the famous Fakir Mohan University, named after the father of Oriya nationalism and modern Oriya literature as well as many engineering colleges, universities, and training centres.

There are many premier institutes like Ramarani Institute of Technology, Balasore College of Engineering and Technology, Balasore School of Engineering, etc. These institutes provide courses in various professional and non-professional areas.

Figure 9.1: Educational Institutions in Balasore

9.2.2 Assessment of Future Requirement and Proposal

Considering the population growth to 4.62 lakh by horizon year 2030, the existing number of Primary schools will be sufficient till then. In other levels of schools, by 2030 the maximum requirement will be of Secondary schools. 29 more such schools will be needed by the growing population. In higher education facilities, there is a need to setup more professionally institutes providing courses in engineering and medicine as the demand for technical professionals in the tertiary sector of the region will be high. One more college will have to be set up by 2030.

The assessment of future requirements for educational facilities has been done based on the recommended norms specified by the URDPFI guidelines and given in Table 9.1 below.

Table 9.1: Existing Educational facilities and Future Requirement in Balasore

S. No.	Particulars	Standards	Area (HA)	Population / unit	Future Requirement	Land Requirement (HA)
1	Pre-Primary / Nursery	1 per 2500 pop	0.08	2500	29	2.32
2	Primary School (I-VIII)	500 students/School, 1 per 5,000 Pop	0.4	5000	29	11.60
3	Senior Secondary	1 per 7,500 Pop	1.8	7500	56	100.80
4	Integrated School without Hostel (I-XII)	1,000-1,500 Students, 1 for 90,000 Pop	3.5	90000	3	10.50
5	Integrated School with Hostel (I-XII)	1,000-1,500 Students, 1 for 90,000 Pop	3.9	90000	5	19.50
6	School for Physically challenged	400 Students / 45,000 Pop	0.7	45000	12	8.40
7	College	1,000-1,500 students /1.25 Lac Pop	5	125000	1	5.00
8	ITI's	400 Students/ 10 Lac Pop	1.6	125000	3	4.80
9	Polytechnic	500 Students / 3 Lac Pop	2.4	350000	2	4.80
10	Professional Institute (Engineering College/Medical College)	1,500-1,700 Students	6.0	500000	0	0.00
11	Vocational Institutes	1 for 50,000 Pop	3.5	350000	0	0.00
Total Area						**167.72**

Source: Consultant's Analysis and estimation

In order to provide adequate educational facilities and infrastructure all through the planning area, Master Plan has proposed setting up these facilities on a hierarchical basis i.e., at City Level (Planning Area), at Planning Unit Level, neighborhood Level and lastly at Residential Area Level. For instance, higher order facilities like college, integrated schools, school for handicapped are to be provided at the master plan level while facilities like Nursery and primary schools are to be provided at the neighborhood level.

Further, Master plan has proposed the development of an educational hub in the planning area to further develop Balasore has the educational centre for northern Odisha as well as an ITI in the area as none are existing right now.

9.2.3 Suggested Policies and Strategies for Education

Some important measures that can be taken up by appropriate authority to augment and improve the educational facilities Balasore:

- 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 Balasore, it is suggested that more emphasis should be laid on professional education, thus a greater number of professional institutes are proposed for future development.

9.3 Health Care

To ensure the progress of any area, it is important that its citizens are healthy and have access to adequate health infrastructure.

9.3.1 Existing Health care Facilities

The existing healthcare facilities in Balasore include primary health centers, hospitals which either government and privately owned and various nursing homes. Within the Municipality itself, there are 13 hospitals and nursing homes, out of which 5 like District Head Quarter Hospital, Sunhat Hospital, etc. are government owned while 8 are privately owned ones.

The district hospital to cater the needs of health-related facilities of the town and villages is located on Vivekananda Marg. The trauma centre is also located within this campus. The private nursing homes and clinics are dotted in the planning area.

Figure 9.2: Health care Facilities in Balasore

9.3.2 Assessment of Future Requirement and Proposal

The assessment of future requirements for healthcare has been done based on the recommended norms specified by the URDPFI guidelines and given in Table 9.2 below.

Table 9.2: Future Requirement of Health facilities Balasore

S. No.	Name	Nos	Standards	Population	Future Requirement	No. of Beds	Area (HA)	Land Requirement (HA)
1	Intermediate Hospital	1	1 for 1 Lac	1,00,000	4	80	1.00	4.00

S. No.	Name	Nos	Standards	Population	Future Requirement	No. of Beds	Area (HA)	Land Requirement (HA)
			Pop					
2	Multi-Specialty Hospital	1	1 for 1 Lac Pop	1,00,000	3	200	9.00	27.00
3	Nursing home, Maternity and Child Hospital	1	1 for 1 Lac Pop	1,00,000	3	30	0.30	0.90
4	Family Welfare Centre	1	1 for 1 Lac Pop	1,00,000	3	-	0.08	0.24
5	Diagnostic centre	2	1 for 1 Lac Pop	1,00,000	3	-	0.08	0.24
6	Veterinary Hospital	1	1 for 5 Lac Pop	5,00,000	1	-	2.00	2.00
7	Dispensary for pet animals and Birds	1	1 for 1 Lac Pop	1,00,000	4	-	0.03	0.12
Total								**34.50**

Source: Consultant's Estimation

In order to provide adequate educational facilities and infrastructure all through the planning area, Master Plan has proposed setting up these facilities on a hierarchical basis i.e., at City Level (Planning Area), at Planning Unit Level, at Neighborhood Level and lastly at Residential Area Level. For example, higher order facilities as Multi Specialty Hospital, intermediate hospital, etc. are to be provided at the master plan level while facilities like dispensary should be provided at the neighborhood level for better access to these.

Master Plan proposes setting up of a multi-Specialty hospital on 1 Ha land.

9.3.3 Suggested Policies and Strategies for Health Care

Some important measures that can be taken up by appropriate authority to augment and improve the health care system and facilities Balasore are:

- There is a need for the up gradation of existing hospital, Clinics, Nursing Homes, etc. in the planning area especially those publicly owned.
- Setting up of dispensaries in rural parts of the planning area which are currently absent.
- Optimization of Patients Bed Ratio and Doctors Patient Ratio is required.
- 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 equipment 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.

9.4 Other Social Infrastructural facilities

Other social infrastructure facilities like commercial centres; Community facilities like library, milk booths, LPG Godowns, Police stations, Post Office, Fire stations, etc; Recreational facilities like parks, sports facilities, etc. are also essential for the balanced development of the planning area and improving the quality of life of its residents.

9.4.1 Existing Scenario of other Social Infrastructural facilities

The commercial areas of Balasore although spread through the planning area, have majorly come up along the major transportation nodes like the National Highway. The existing community facilities in Balasore consist of two halls/auditoriums located Zila school.

The recreational facilities at Balasore are not sufficient to cater the need of the town. Small play areas and playgrounds are located within the premises of schools, colleges located in the town. Apart from these, people utilise vacant plots

for playing. There is also a cinema hall, library, and cremation ground in Balasore.Balasore has two functional cinema halls located in main market and on OT Road.


Figure 9.3: Existing Recreational Areas in Balasore

The Balasore is a multi-cultural town with all religion's inhabitant in this town. The town has the highest percentage of Hindu population. The temples, Mosques and Churches are dotted in different parts of the town.


Figure 9.4: Religious Places in Balasore

9.4.2 Assessment of Future Requirement and Proposal

For the equitable distribution of commercial facilities in the planning area, the Master Plan suggests planning for hierarchical commercial areas. The assessment of future requirements for such commercial facilities has been done based on the recommended norms specified by the URDPFI guidelines and given in Table 9.3 below.

Table 9.3: Future Requirement of Commercial Facilities in Balasore

S. No.	Particulars	Standard	Population	Area (HA)	Future Requirement	Total Area (Ha)
1	Convenience shopping	1 for 5,000 Pop	5,000	0.15	92	13.86
2	Local shopping including service centre	1 for 5,000 Pop	15,000	0.46	31	14.17
3	Community centre with service centre	1 for 1,00,000 Pop	1,00,000	5	5	23.10
4	District centre	1 for 5 Lac Pop	5,00,000	41.6	2	83.22
	Total					**111.13**

Source: Consultant's Estimation

Amongst the various community facilities, there will be a major requirement of Community rooms, libraries, Milk Booths, Police office, Post Office, and Graveyard / Burial Grounds in the planning area. The assessment of future

requirements for various types of community facilities has been done based on the recommended norms specified by the URDPFI guidelines and given in Table 9.4 below.

Table 9.4: Future Requirement of Community Facilities in Balasore

S. No.	Particulars	Standard	Area (HA) per unit	Additional Requirement	Total Area (Ha)
1	Community Room	1 for 5,000 Pop	0.075	92	6.90
2	Community Hall and Library	1 for 15,000 Pop	0.20	30	5.93
3	Recreational Club	1 for 1 Lac Pop	1.00	5	5.00
4	Music, Dance and Drama Centre	1 for 1 Lac Pop	0.10	5	0.50
5	Meditation and Spiritual Centre	1 for 1 Lac Pop	0.50	5	2.50
6	Milk Booths	1 for 5,000 Pop	0.015	92	1.38
7	LPG Godowns	1 for 50,000 Pop	0.05	8	0.42
8	Police Station	1 for 90,000 Pop	1.50	3	4.50
9	Police Post	1 for 50,000 Pop	0.16	8	1.28
10	Fire Station	1 for 2 Lac Pop	1.00	2	2.00
11	Sub Fire Station	1 for 1 Lac Pop	0.60	4	2.40
12	Post Office	1 for 15,000 Pop	0.01	30	0.26
13	Head Post Office	1 for 2.5 Lac Pop	0.08	1	0.08
14	Graveyard / Burial Ground	4 Ha site for 5 Lac Pop	4.00	1	4.00
	Total				**37.21**

Source: Consultant's Estimation

In terms of Recreational facilities, Balasore will have a major requirement of cluster level and neighborhood level parks. The town requires some organised parks and open spaces to enhance the recreational activity of the residents. The assessment of future requirements for various types of recreational facilities has been done based on the recommended norms specified by the URDPFI guidelines and given in Table 9.5 below.

Table 9.5: Future Requirement of Recreational Facilities in Balasore

S. No.	Particular	Standards	Population	Requirement	Area (HA) per unit	Total Area (Ha)
1	Cluster Parks	1 / 5,000 Pop	5,000	104	0.50	52.00
2	Neighborhood Parks	1 / 10,000 Pop	10,000	30	1.00	30.00
3	Sport Complex	1 at City Level	-	1	25.00	25.00
4	Exhibition Ground	1 at City Level	-	1	10.00	10.00
5	City Level Sports Centre	1 at City Level	-	1	10.00	10.00
6	District Park	1 at City Level	1 for 5 Lac Pop	1	25.00	25.00
7	District level multipurpose ground	1 at City Level	1 for 1 Lac Pop	1	4.00	4.00
	Total Area					**156.00**

Source: Consultant's Estimation

Like educational and health care, for the equitable distribution of other social infrastructure facilities as well in the planning area and to cater to the maximum number of residents in Balasore, the Master Plan suggests planning for these on a hierarchical basis i.e., at City Level (Planning Area), at Planning Unit Level, neighborhood Level and lastly at Residential Area Level. Further, recreational zone with many activities is proposed to be developed as part of river front development along the Budhabalanga river.

9.4.3 Identified Projects

Identified Projects for development of Commercial Facilities in Balasore include:

- Development of two Community Centers (15.15 and 10.24 Ha)
- Development of three Wholesale and Trade Centers (30.19Ha, 21.57 Ha and 25.2 Ha)

Identified Projects for development of Recreational Facilities in Balasore include:

- Development of Sport complex (38.01 Ha)
- Development of three Recreational Centers (35.44 Ha, 36.44 Ha and 53.86 Ha)
- Development of Multi-purpose Ground (52.73 Ha)

- Development of Exhibition Ground (54.97 Ha)
- Development of three District Parks (197.13 Ha)

9.5 Power

9.5.1 Existing Scenario

The Balasore planning area receives electricity through two divisions of power department of 33/11 KV. The power supply in the town is very erratic and a frequent curtailment has become the routine. Electricity demand in the town is 8 MVA while the supply is 4.6 MVA. Power supply in the Planning area is done by NESCO with 100% coverage. Table 9.6 below gives the details about existing 33/11 KV Sub stations in Balasore.

Table 9.6: Existing 33/11 KV Sub stations under BED, Balasore

S. No.	Name of 33/ 11kV S/s	Name of 33kV line	Name of 11KV Line	Existing line	
				From Location	To Location
1	City	Balasore No-I	Bls-I	City structure	Nua bazar
2			Bls-II	City structure	Damodarpur
3			Industrial	City structure	Rameswarnagar
4			city-Sunhat	City structure	Sunhat
5			Alupur	City structure	Meghadamburu
6	Sovarampur	Balasore No-I	Balia	Sovaram st	Vigilance office near Bampada
7			Sahadevkhunta	Sovaram st	Galapole near Haripur
8	Gopalgaon	Chandipur	Ranipatna	Gopalgaon Structure	Ajikalipress
9			Suelpur	Gopalgaon Structure	Barabati
10	Digrania	Chandipur	Sunhat	Digrania	Gachhamalia
11			Baniamandir	Digrania	Chowk bazar
12	Chandipur	Chandipur	Balaramgodi	Chandipur st	Balaramgadi
13			Gabagan	Chandipur st	Nidhipada
14	Ganeswarpur	Balasore-II	Industrial No -I	Ganeswarpur Structure	Industrial area
15			Industrial No -II	Ganeswarpur Structure	Bamuls/S, baghajatil hotel
16			Bamul	Ganeswarpur Structure	Oripol
17			Town	Ganeswarpur Structure	Bhimpura Manoranjan Hotel
18			Kuruda	Ganeswarpur Structure	Sasinagar

9.5.2 Estimation of Electricity Demand

Table 9.7 below gives the domestic power demand for the horizon year-2030 assuming 2 KW is required for each household. The demand for power supply will be 230.97 MW in the planning area.

Table 9.7: Projected Requirement for Power Supply for the horizon year- 2030

Estimated population (2030)	**4,61,933**
Households by 2030 (@ 4 persons per household)	1,15,483
Power Demand (2030) @ 2 KW per household	230.97 MW

Source: Consultant's Estimation

9.5.3 Bottlenecks

Bottlenecks or impediments in the distribution system are as given below:

- The electricity network system is old.
- The infrastructure like LT poles, conductors and transmission lines seem to be decades old. A threat to life and property lures always in the old areas of Balasore town**.**
- There is loss of power due to power theft in rural areas.

9.5.4 Recommendations

The identified projects and proposals for implementation include:

- Renovation and modernization of 33/11 KV and 11 KV / 440 V sub- stations
- Improvement and replacement of old power infrastructure like LT poles, conductors, and transmission lines
- Installation of a HVDS (High Voltage Distribution System)
- Laying of underground power lines.

Heritage Conservation and Tourism

Chapter 10. Heritage Conservation and Tourism

10.1 Introduction

Heritage is the built, cultural, social, and spiritual legacy that we inherit from our past and pass on to the future. Heritage is unique in its reverence for Mother Nature in all her manifestations. Ancient traditions, rituals and practices have embedded this reverence in religion and even in normal day-to-day living. Heritage and cultural resources of the town are the show cases of its history, people's identity, and culture.

Tourism development at both the national and international levels can make positive contributions to a nation provided the supply is well planned and of high standard, protects the cultural heritage, values of the place and people simultaneously with natural, social, and human development. Tourism must be directly correlated to the resources that are available and this aspect needs be closely looked into. It is the demand of time that tourism should be developed and managed from the resource point of view so that it is compatible with the environment and does not harm/ degrade it.

10.2 Significant Heritage Areas

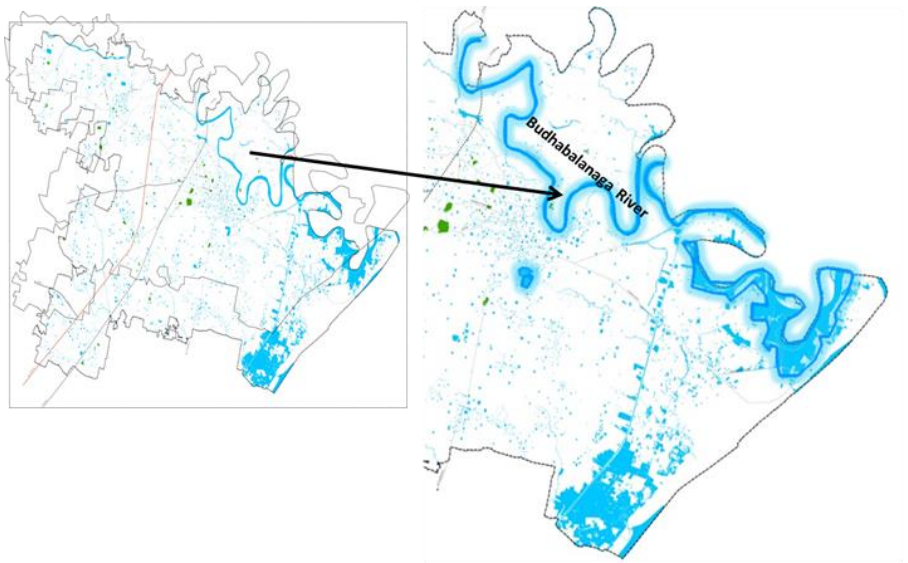
Balasore is considered to the first major town in northern Odisha. The built heritage of the area mainly consists of many temples located in and around the town, which are historic and have beautiful architecture.

There are several structures and sites of heritage and religious value, areas of cultural and natural significance, mainly seven areas and specific stretches of river front that need attention.

10.2.1 Natural Heritage: River Front

Budhabalanga River, the second largest river of the state flows through the Balasore planning area. It originates from the Similipal range of hills on Mayurbhanj district. It bisects the northern side of the area, flowing west to east before it merges into the Bay of Bengal (Refer to Map 10.1). It is also the main drainage channel for the area as well as represents the natural heritage of Balasore and the state of Odisha. The river is also providing a steady supply fish, with inland fishing being an important activity of the people in the area.

The river has been facing a lot of threat in the recent years due to unplanned activities along its banks like brick kilns, coming up of slums and squatter settlements, etc. Also, the river is getting polluted due to the untreated wastewater that flows directly into it, making the river water unfit for drinking purposes as well. Apart from the river, there are few ponds and lakes in the area called Pokhris.



Map 10.1: Water bodies in Balasore

10.3 Existing State of Natural, Built and Cultural Heritage

10.3.1 Religious Heritage

Jhadeshwar Temple, Balasore

It is an ancient and famous Temple of Lord Shiva situated at Naya-Bazaar near Balasore Railway station and bus stop. The highlight of the temple is its ancient carvings on its walls. The temple attracts many tourists during festival times and special days like Shivaratri.

Banesvara Siva Temple, Balasore

It is located on the right side of the river Budhabalanga in Puruna Balasore and 1km. from the Balasore town. It is a modern concrete flat-roofed temple but houses a few ancient images of different faiths such as Saiva, Sakta, Saurya and Jaina, which ichnographically are assigned to the 10th Century A.D.

Figure 10.1: Banesvara Siva Temple, Balasore

Jagannatha Temple, Nilagiri

It is situated near the palace complex of the ex-ruler of Nilagiri. It is a living temple where the presiding deities are lord Jagannatha, Balabhadra and Subhadra, just like in Jagannatha temple of Puri. It was constructed in 1750 A.D. by Raja Ramachandra Mardaraja Harichandana. It is also a protected monument of Orissa State Archaeology, Orissa Govt.

Khirochora Gopinath Temple, Remuna

It is 9-kms from Balasore in Remuna town dedicated to Lord Krishna. Khirachora means one who stole the milk *bhog* (ambrosia). Every aspect of the temple has a story attached to it, including the story behind the christening of the temple.

Figure 10.2: Khirochora Gopinath Temple (Left); Shyamsundar Temple (Right)

Shyamsundar Temple, Balasore

It is located on the right side of the road leading from Lala bazar to Balighat and about half km north of Lala bazar. It is one of the leading Vaisnavite shrines of the town and greatly attended by religious devotees. The presiding deity is

Krishna (locally called Shyamsundar) with his consort Radha. It is a double storied char-chal temple of Gaudiya architecture.

10.3.2 Raibania Fort

It has great historic importance as it is considered as the biggest medieval fort of eastern India and finds mention in Akbar's biography, Ain-i-Akbari. It has a group of four forts off which archaeological remains are left. Several structures like the Jay-Chandi Temple Complex, a huge well, numerous tanks and remains of an ancient bridge add to the uniqueness of the Fort.

Figure 10.3: Raibania Fort Ruins

There are many more temples in the district which also have historic importance like Bhushandeswar temple, Langaleswar temple, Chandaneswar temple, etc.

10.3.3 Cultural Heritage

The many fairs and festivals of Balasore are an integral part of its cultural and intangible heritage. Some of the important festivals celebrated are Kali Puja; one of the most important festivals for the local people, Durga Puja, Kartikeshwar Puja, Ganesh Chaturthi, Rath Yatra, Maha Shivratri, etc. All these festivals are celebrated with great pomp and splendor.

Balasore is also famous for the attractive and enjoyable game "Akhada" played during Durga Puja by Hindus & during Moharrum by Muslims. Some of the important fairs held area Megha mela in January and February and Taratarini mela in months of March and April; latter being one of Orissa's biggest fairs.

10.3.4 Areas of tourist interest

There are several tourist attractions in Balasore district. Apart from the many temples attracting tourists to the area, there also some places of natural and scenic beauty in Balasore which attracts tourists.

Chandipur Beach

It is a popular tourist destination located at the coastal village of Chandipur. It is a unique beach where one can see water receding approximately 5 kms during low tide and advancing to the shore during high tide every day. It is about 16 kms from the main town of Balasore. The state tourism department has been trying to promote Chandipur and other spots nearby as potential tourist destinations. An elaborate beach festival, showcasing the dance forms, art, and culture of the state, has become an annual affair here and takes place every February.

Most of the tourists here are local t and those from the neighboring states. The area needs proper infrastructure so that it attracts more tourists, and the locals around can benefit.

Figure 10.4 Chandipur beach (Left); Balaramgadi (Right)

Balaramgadi

Balaramgadi is situated just 2 km from the beach of Chandipur. This is the place of estuarine where the river Budhabalanga is merges with the Bay of Bengal. This is also a place of docking yards for hundreds of fishing steamers and boats. The beach area also has a natural health resort of the state.

Bhujakhia Pir

It is located at Sunhat at the heart of the city. It has the tomb of Sufi saint Aasthana Sharif Hazrat Pir also known as Bhujakhia Pir. This shrine is the center of devotion and worship for different religions and sects

Figure 10.5: Bhujakhia Pir (Left); Kuldiha Wildlife Sanctuary (Right)

Kuldiha Wildlife Sanctuary

The sanctuary is about 31kms from the Balasore city in the hilly part of the district. It spreads across an area of 272.75 square kilometers. The thick wooded forests are home to wild animals like the tiger, elephant, leopards, sambar, bison, gaur and giant squirrels. The forest also houses a variety of birds like hornbills, hill myna and peafowl. The perennial streams that water the forests are home to a variety of reptiles. The state government of Orissa maintains the wildlife sanctuary. The sanctuary also has accommodation facilities.

10.3.5 River Front

The riverfront of Budhabalanga has a lot of scope for tourism development and recreational activities. But right now, except at Balaramgadi, where the river meets the sea, no other spots have been developed as tourist and/or recreational areas. Currently, most of the area along the river is surrounded by agricultural land or occupied by slum and squatter settlements. Also, due to poor drainage in the planning area and slope, these low-lying areas around river are prone to flooding during the monsoon season.

The river front is a natural asset of the Balasore Planning area which is intricately linked with its history and cultural development. Its development potential is manifold and that can only be ensured through a sound riverfront development strategy that integrates management of environmental and cultural assets with future development of the area.

Figure 10.6: Existing Budhabalanga River front

10.4 Issues

Heritage and tourist areas described above, show that these have good opportunities to attract more tourists, provide more spaces for recreational activities and improve the sense of cultural identity of the residents of Balasore. Some of the major issues being faced are as follows:

- Lack of documentation of built, intangible and natural heritage as well as areas of tourist interest of Balasore.
- Inadequate information and promotion of the religious heritage, festivals, and unique tourist spots like Chandipur beach.
- Inadequate infrastructure and facilities at tourist spots and places of religious importance.
- Unplanned and unauthorized development has been taking place along the riverbank of Budhabalanga which is an environmentally fragile area.
- Pollution of the River due discharge of untreated wastewater.
- Too few recreational and open spaces in the area.

10.5 Policies on Heritage Conservation

Almost all the built heritage of Balasore is its many temples. Thus, their proper up-keep, maintenance, and adequate infrastructure like toilets, drinking water facilities, etc. for people coming there should be provided.

The traditional Fairs and Festivals of the area need to be promoted further. This can be done through government and NGOs participation to generate greater awareness inviting cultural and religious tourism.

10.6 Policies 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, playgrounds, golf courses, zoo, botanical garden, racecourse, stadium, exhibition ground, water sports complex, green ways, bike ways etc.

10.6.1 Proposals for Augmentation and development of Recreational Facilities

10.6.1.1 Recreation and Open Areas

The Master plan envisages parks and open spaces need to be developed in a hierarchical and distributed manner catering to the needs of the various parts of the city.

City Greens and Open Space System

Master plan recommends following aspects related to create a balance green and open space system in an integrated manner:

a) Development as recreational space of unorganized pond/water bodies available in the planning area.
b) The more formal and organised components as city level ecological balance through riverfront development creating green buffer.
c) The bye pass road will also create buffer through a green belt.
d) The open space system within the planning unit and neighbourhood and housing area level.

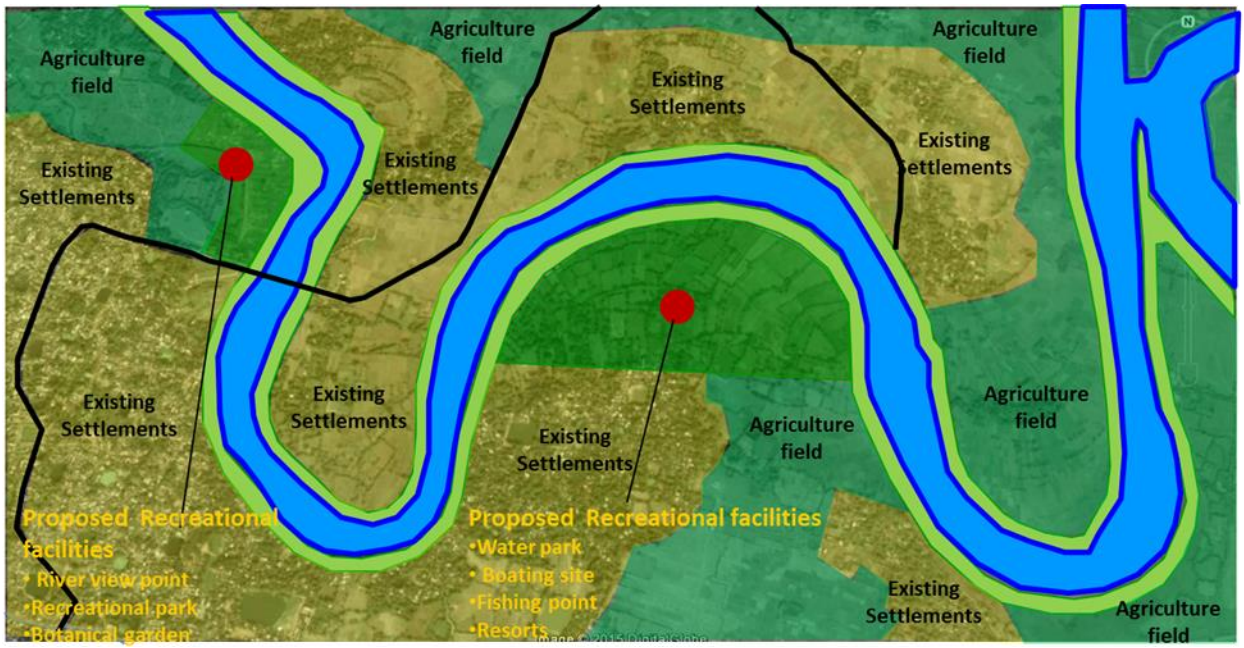
River front Development

As discussed earlier, the river front of Budhabalanga river has big scope for the development of tourist and recreational activities. Such activities can help to attract more tourists to the area while also providing large recreational spaces to the resident population.

River front development along the river Budhabalanga is envisaged to celebrate the beauty of the river and integrate it with the recreational green belt along it. The riverfront area may be developed based on a landscape plan with seating in part of the area and on the water expanse attractive laser shows could be organized for tourists and for the local population. River front development /beautification along the banks of Budhabalanga River is also important as it will help to ensure that the water flowing in the river is clean and pure.

The river side shall make way for the river development zone. Also, in areas on new development along the river, ranging from 25-100 m wide belt is proposed to maintain the serenity of the river. Some of the proposed recreational facilities include (Refer to Map 10.2):

- River viewpoint
- Recreational Park
- Botanical garden
- Water park
- Boating site
- Fishing point
- Resorts



Map 10.2: Proposed location of Recreational Facilities

Fig 10.7 below shows a typical cross section of how the Bandh Road along the Budhabalanga river can be developed. Adjacent to the riverbank can be a wide walkway, giving uninterrupted view to the river. A green verge next to it which can be used for plantation of trees and shrubs can be provided. Next to it, a cycle track or track for non-motorized vehicles can be provided.

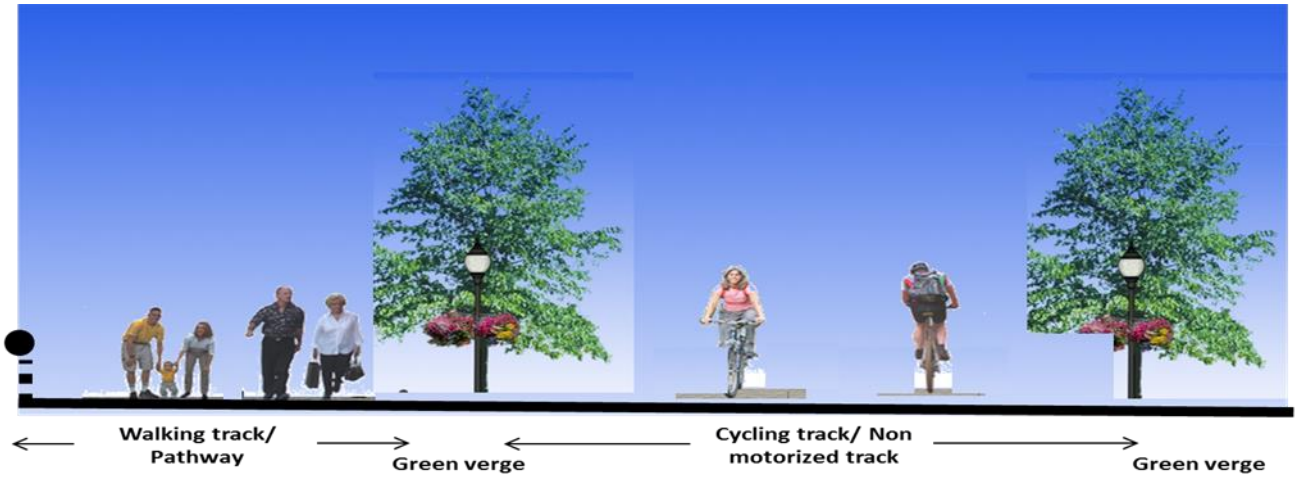


Figure 10.7: Typical Road section of Bandh Road along Budhabalanga river

In order to maximise the potential of the riverbank for river front development, the following are proposed:

- Development riverbank to be developed as recreational areas, which will not only protect it from pollution but also prevent encroachment of the river fronts from unplanned activities and unauthorized constructions.
- Since fishing is an important activity taking place around the river, a fisheries research and development centre can be developed which will also help the local fishing industry.
- Other recreational facilities like multi-purpose ground, sport complex, etc. can be developed around the river which will also cater to the recreational needs of Balasore' s residents.
- Framing of Urban Design Guidelines for the future development along the river.
- The open and green spaces can be developed as a system of linked open spaces along the riverbank

10.7 Policies for Development of Tourism Development

Tourism can be a big contributor to the local economy 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 for those working in the industry. Balasore has a good potential for tourism development.
According to the existing scenario analysis of Balasore, it is observed that religious and nature based outdoor recreation and eco-tourism has immense possibilities in the area. To enhance the tourism in the area, following are proposed:

- There are many important religious places in and around Balasore where religious tourism can be promoted through better information and promotion as well as by creating religious tourism circuits in the area.
- Better infrastructure faculties and management of existing places frequented by tourists.
- Improvement of accessibility through different public modes to the places of tourist interest.
- Nature based outdoor recreation and Eco-tourism for hills, forest, riverfront / derelict stone quarries 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.

10.7.1 Integrated Approach and Strategy for Development of Tourism

The strategies for Tourism development at Balasore Planning Area includes:

- Coordinated Marketing to attract more tourists from other states and foreigners.
- Enhancing Product Quality to create a brand image for tourist destinations and enhancing service quality.
- Facilitating Travel for easy access of tourists to major urban centers and tourist destinations.
- Developing Human Resources for lasting impression
- Developing Eco-tourism based on Nature and Culture for Sustainable Tourism Development.
- Developing Tourism Travel Circuits for destinations having a common theme.
- Enabling Private Sector Participation for accelerated growth of the industry and efficiency in facilities and services.

10.8 Heritage Management and Organizational Structure

There is a need to setup a Heritage Committee for Balasore 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 Balasore' 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 as per the provision mentioned in 'Conservation of Heritage Buildings, Heritage Precincts and Natural Features' (section 54) of the Bhubaneswar Development Authority (Planning & Building Standards) Regulations, 2008.

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.

10.9 Conclusion

The relevant policy guidelines and management of cultural and natural heritage can rejuvenate and revitalize the Balasore 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.

Environment and Disaster

Chapter 11. Environment and Disaster

11.1 Environment Profile of Balasore

11.1.1 Air Environment

The quality of human life is associated with the quality of air we breathe. The rising levels of various pollutants in the air generate concern as it drastically reduces the quality of life in any habitat. Transport, domestic and industrial sectors are the major contributors to the rise in ambient air pollution levels in area.

11.1.1.1 Pollution Level

The average concentration of Reparable Suspended Particulate Matter (RSPM or PM_{10}), Sulphur Dioxide (SO_2) and Nitrogen Dioxide (NO_2) is recorded by the State Pollution Control Board, Odisha around four locations in Balasore district. This area being Shahadev Khunta (Residential Zone), Motiganj bazaar (Commercial Zone), Dist. Headquarter Hospital (Silence Zone) and Balasore Industrial Estate (Industrial Zone).

As can be seen from Fig 11.1 below even during the Diwali festival, mostly the PM_{10}levels were found to below the standard 100 µg/m^3. Amongst the four areas, PM_{10}levels exceeded in Motiganj bazaar which is the major commercial area in Balasore.

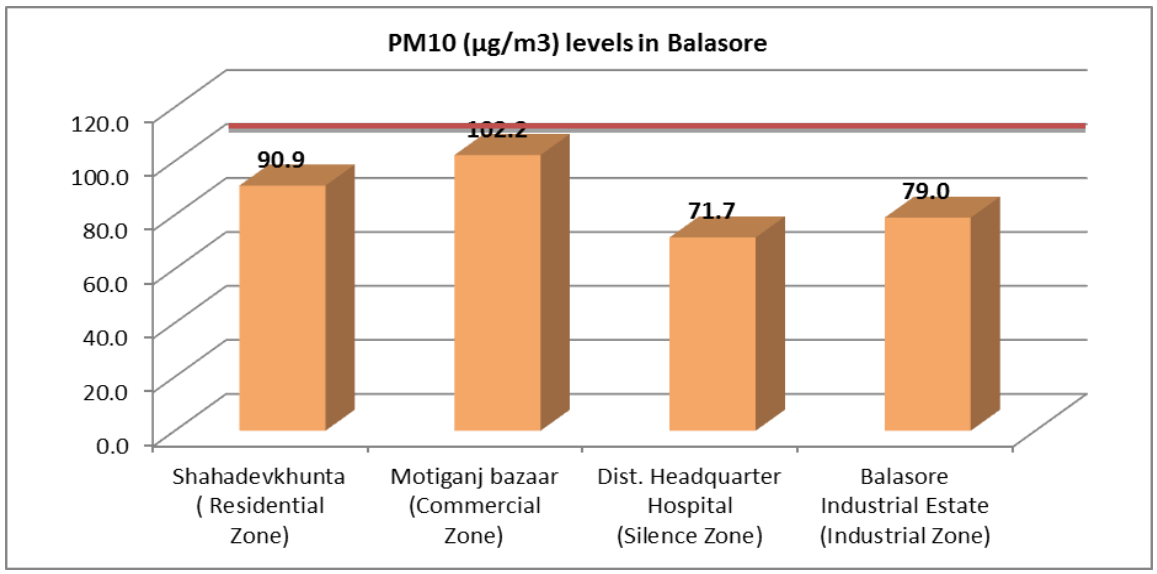


Figure 11.1: PM10 levels in Balasore during Diwali,2014

Source: SPCB, Odisha

Fig 11.2 below indicates that the SO_2 levels in Balasore were much below the standard of 80 µg/m^3 in all the four areas. The NO_2 levels also show similar trend the four areas of Balasore and are again less than the standard of 80µg/m^3 (Refer to Fig 11.3).

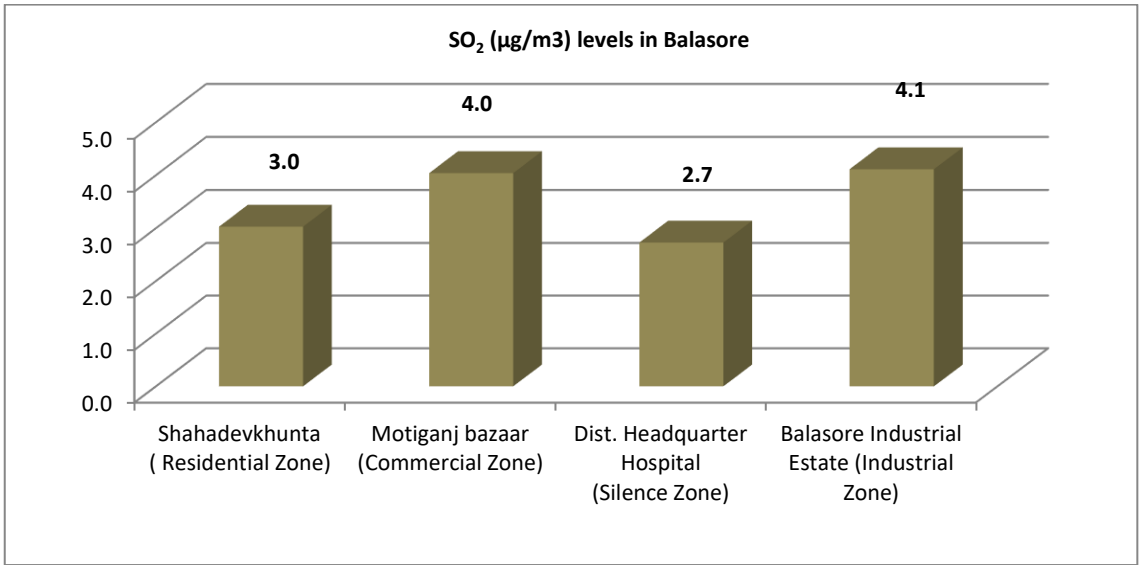


Figure 11.2: SO_2 (µg/m3) levels in Balasore during Diwali,2014

Source: SPCB, Odisha

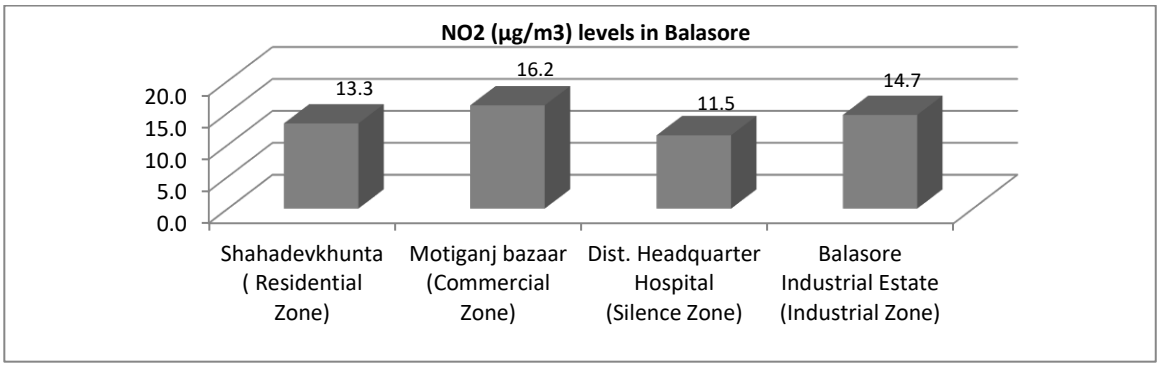


Figure 11.3: NO_2 (µg/m3) levels in Balasore during Diwali,2014

Source: SPCB, Odisha

11.1.1.2 Noise Environment

The ambient noise levels reported at four zones of Balasore for day and nighttime in dB (A) is shown in Table 11.1 below. The analysis of the data indicates that in all the noise monitoring locations except the industrial zone, the noise level exceeds both the daytime and nighttime standards.

Table 11.1: Ambient Noise Levels, Balasore 2014

Pre-Dusshera, On Dussehra & Post Dushahara,2014				
Monitoring Location	Day Time (6-10 AM)	Standard	Nighttime (10 PM-6 AM)	Standard
Shahadevkhunta (Residential Zone)	60.1	55	52.4	45
	67.8		55.6	
	60.5		51.2	
Motiganj bazaar (Commercial Zone)	76.3	65	66.4	55
	77.2		55.6	
	70.35		65.2	
Dist. Headquarter Hospital (Silence Zone)	56.3	50	50.6	40
	58.3		53.2	
	54.9		49.6	
Balasore Industrial Estate (Industrial Zone)	60.3	75	55.2	70
	65		58.4	
	63.9		53.6	

Source: SPCB, Odisha

11.1.1.3 Proposals

- Development of green belts/buffer along the major roads in the planning area.
- To control the particulate matter levels especially in around the Motiganj area, as far as possible convert the unpaved pathways to paved pathways to minimize re-suspension of road dust and associated particulate pollution levels.
- Steps should be taken to control the use of loudspeakers, especially in residential areas and in the silent zones like hospitals. In no case are loudspeakers should be permitted after 10 p.m.

The identified projects include:

- Development of green belts/buffer along the major roads in the planning area

11.1.2 Water Environment

The quality of water has become an integral part of any sustainable water supply system. Pollution of water resources has increased due to population pressure, industrial and agricultural activities, to the point where even human health is endangered. As human health is directly linked to the availability of water in sufficient quantity and quality, its preservation is very much critical in imparting the required quality to human life.

11.1.2.1 Sources of Water

Surface water

The sources of surface water in Balasore are the Budhabalanga river, the various natural drains falling into it as well as the many small ponds and lakes called Pokhris dotting the area. These Pokhris are mostly used for bathing and washing purposes.

Due to the untreated wastewater from households being discharged into the natural drains which flow into the river and directly to the river itself has made the river polluted. Often in the area storm water and wastewater are also getting mixed. Hence, its water cannot be used for drinking purposes. Many stretches of riverbanks are also open defecation grounds. Many of natural drains are clogged due to encroachments and construction activities resulting flooding in many areas.

Ground water

Ground water is the main source of water supply in area and the water table is also high.

11.1.2.2 Proposals

- The riverbanks on both sides of the town should be evacuated and beautification should be carried out which can also help in minimizing the direct disposal of drainage from the residents.
- Measures also must be taken to provide better quality water facilities and sewerage system in the town. Setting up of a STP is important to prevent untreated sewage from being discharged directly into the surface water bodies of the area.
- Preservation of the natural drains and Pokhris.

The Identified projects include:

- Repair and Renovation of Water Bodies in Planning Area
- Development of Green Belt around all water bodies

11.2 Need for Disaster Mitigation

Disaster is an extreme disruption of the functioning of a community/society that causes widespread human, material, economic or environmental losses which exceed the ability of the affected to cope using its own resources. Odisha state has a history of recurring natural disasters. It is the unique geo-climatic conditions of the state that make it vulnerable to various natural disasters. It is vulnerable to earthquakes, floods and due to its location at the eastern coast of India it also vulnerable to cyclones and tsunami. Similarly, Balasore lying near the coast is vulnerable to all these hazards which can turn into major disasters in absence of mitigation and prevention measures.

Disaster Mitigation includes measure taken in advance to reduce the impact of disasters on society, individuals, and the environment.

11.2.1 Vulnerability Issues in Balasore

11.2.1.1 Earthquake and Fire

Though a large part of the state comes under Earthquake Risk Zone-II (Low Damage Risk Zone), the Brahmani Mahanadi graven, and their deltaic areas come under Earthquake Risk Zone-III (Moderate Damage Risk Zone) covering 43 (excluding Balasore Town) out of the 103 urban local bodies of the state. Balasore planning area lies in low-risk zone (Refer to Fig 11.4).

The forest areas are also not present in the Balasore planning area which may result in natural fire in this forest.

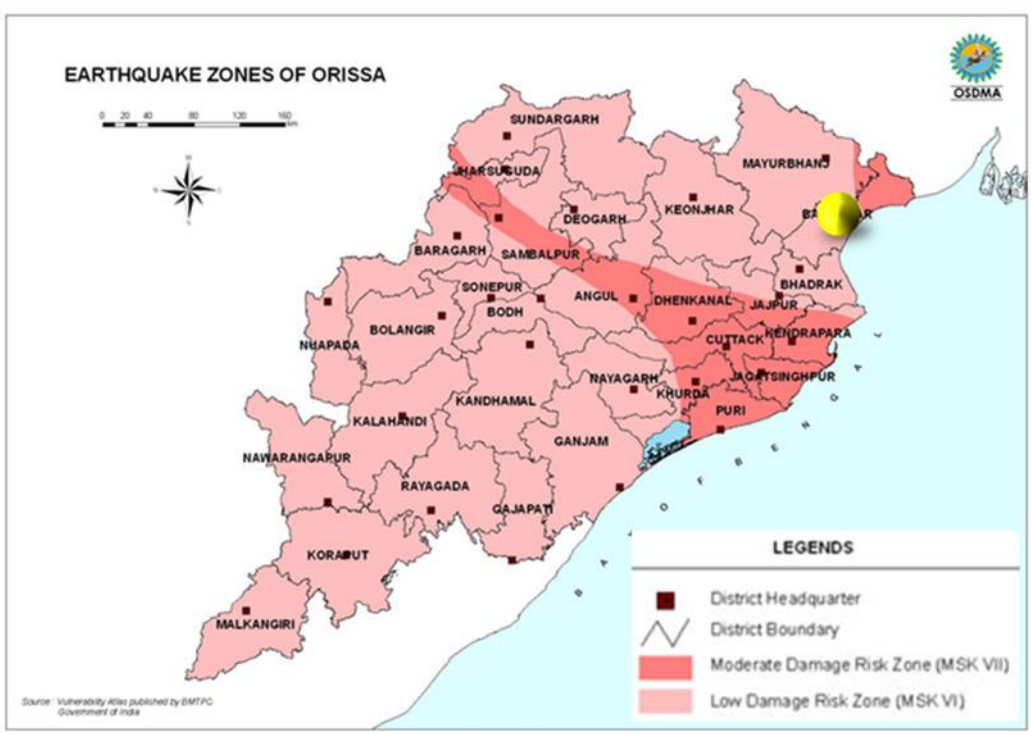


Figure 11.4 Earthquake Zones in Odisha

11.2.1.2 Flood and Cyclone

Amongst all the natural disasters the region is most prone to floods, which happens very frequently in the area. This is also since almost 80% of the annual rainfall is concentrated over the short span of three months. The state's densely populated coastal plains are the alluvial deposits of its river systems. The rivers in these areas with heavy load of silt have very little carrying capacity, resulting in frequent floods, only to be compounded by breached embankments.

The second largest river of the state Budhabalanga flows through Balasore. The river tends to overflow during the monsoon season because of which the city faces floods frequently. The inadequate drainage system in the area only compounds the problem. Further, the low-lying areas around the river where settlements have come up over the years are more vulnerable to flooding than other parts of Balasore. Also, since most of these settlements are occupied by slums and squatters, due to their poor socio-economic condition these people come under the vulnerable section. The problem of flooding is also especially seen in the old area of Balasore where the level of the narrow roads has increased due to repeated overlaying as compared to the plinth level of the adjacent houses, due to which water enters the households during rains.

Due to its sub-tropical location, the state is also prone to tropical cyclones, storm surges and tsunamis as the east coast of India is one of the six most cyclone prone areas in the world. These storm surges are often accompanied by heavy

rainfall which makes the estuary region vulnerable to both storm surges and river flooding. As can be seen from Fig 11.5 below, Balasore is in one of the high damage risk zones of the state.

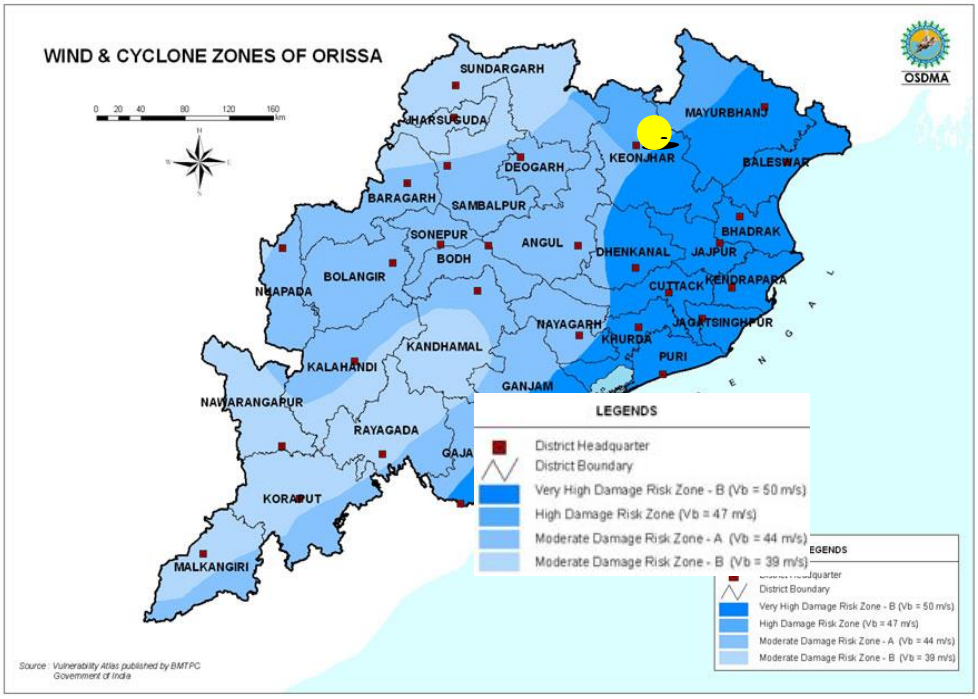


Figure 11.5: Wind & Cyclone Zones of Odisha

11.2.1.3 Environment and Public Health

The unplanned, unrestricted urban sprawl along the narrow lanes and pathways, without any firm land use policy has added to the Urban Environment Degradation. Lack of civic amenities in densely populated residential areas, unsanitary conditions and narrow winding streets have further aggravated the conditions. This is more prominent during the rains when most of the streets are flooded and many low-lying areas (i.e., located on the bank of Budhabalanga River) remain submerged for several days. The problem of unhygienic and unsanitary conditions is accentuated as the underground drainage system is yet to be active and the entire sewerage is discharged through open drains. Open dump yards are yet another menace to the environment. The lack of solid waste dump yard and dumping of garbage into open drains affects the sanitation of the town. There are nallahs and ponds covered with weeds and the worst part of it is that there are slums and weak housing along canals. All this leads to increase in breeding of vectors, mosquitos, disease causing germs, etc. which pose a serious risk to people's health.

11.2.1.4 Traffic Congestion

In the old areas of the Balasore, the roads are very narrow and winding, suitable only for smaller vehicles. Thus, narrow roads with heavy traffic are the major concern of the old part of the town. Intersections like Municipality Chowk, Daily market area, Collector Office Road, FM Square, Station Square, etc. are where there is more traffic congestion and traffic jam has become a chronic problem. No one-way system of movement has yet been implemented to simplify this problem. To add to this, there are several illegal encroachments and temporary stalls along the roadsides by the hawkers and by the shop owners further decreasing the width of the road. In absence of space availability for parking in the city, incidence of on-road parking is found everywhere, adding to the woe of traffic.

11.2.2 Summary of Findings

11.2.2.1 Cyclone and Flood

- The main reason of flooding situation at Balasore Planning Area are the low-lying areas created by excavation of soil. The residents usually constructing all new buildings with high plinth - created out of soil excavation from nearby areas, thereby forming random low-lying areas in the peripheral of the urban areas.

- Construction of buildings by diverting the natural drains and reclamation of water bodies for the construction are also accelerating risk flooding in planning area.
- Most of the areas along the river Budhabalanga and other natural drains are occupied by the slum dwellers that put up their hutments and often carry out their livelihood activities thereby increasing the vulnerability for natural disaster.

11.2.2.2 Earthquake and Fire

- The core areas of Balasore road are having high dense development unsafe buildings, thereby increasing the risk of earthquake and fire risks
- The new development that are constructing at present does not fully adhere to the norms of seismic and cyclone safety norms.
- Large % of slums in the core of the town and furthering increase in their population living in unsafe structures are more prone of to earthquake and fire.
- Most of the high-rise buildings do not have proper space for the MFEs or the provision of fire-hydrant systems installed.

11.2.3 State Initiative and Objectives

The Orissa State Disaster Mitigation Authority (OSDMA) was set up on 28 December 1999 as the first disaster management authority in the country. Its name was later changed to Odisha State Disaster Management Authority in 2008. It has the mandate not only to take up the mitigation activities but also the relief, restoration, reconstruction, and other measures. The main objectives of OSDMA are:

- To act as the nodal agency for disaster reconstruction works.
- To coordinate with the line departments involved in reconstruction.
- To coordinate with bilateral and multi-lateral aid agencies.
- To coordinate with UN Agencies, international, national, and state-level NGOs.
- To promote disaster preparedness at all levels in the state,
- To network with similar and relevant organizations for disaster management, and
- To prepare suitable guidelines for disaster mitigation.

11.2.4 Proposals for Disaster Mitigation

- Open spaces in urban areas such as parks, green tracts, and roads, have important functions in disaster prevention. Efforts to secure such open spaces should be given top priority to areas where they are lacking.
- Embankment along the Budhabalanga river is needed to prevent the flooding of surrounding low-lying areas.
- Land along the river should be reserved only for open spaces and recreational activities so that unauthorized constructions do not come up, putting people at risk of flooding.
- City disaster management plan should be in place which coordinates with the district disaster management plan.

Development Management & Finance

Chapter 12. Development Management and Finance

12.1 Introduction

The sustainable development of projects identified in Master Plan for Balasore Planning Area requires coordination between various line departments and adequate funds from different agencies (private and Governmental). Implementation of Master Plan for Balasore Planning area would involve setting up of new infrastructure and up-gradation of existing ones. Projects that include new construction, as well as, major improvement of existing roads, installation or replacement of infrastructure (water, sewer, storm drainage, electrical) networks, re-development of slum areas including construction of large number of residential units for the growing population, provision of new industrial sites, regional and local commercial complexes, tourism facilities, provision of open spaces and recreational areas, etc., shall need to be implemented and then managed properly for delivering services to beneficiaries.

The sources of funding available to existing major development agencies such as Balasore Municipal Council (BMC) and the Village Panchayats have been investigated and their performances evaluated. The new roles of the urban local bodies in the context of urban governance have also been evaluated.

12.2 Committed Projects and Schemes

12.2.1 Identified Development Projects Translating Master Plan VISION 2030

A tentative scheme identified for Balasore Planning Area and the concerned Government Departments with reference to the VISION 2030 proposals.

Table 12.1: Projects identified to be developed in Balasore by 2030

Location	Project name	Concerned Department
Urban Development		
Core area of Balasore Town	Urban Renewal of Core Old Areas of Balasore Town	ASI, BMC, BRIT
Core area of Balasore Town	Development of Heritage Buildings of Balasore Town	ASI & BRIT
Distributed in Town	Rehabilitation of Slums dwellers (72-Pockets) along River Budhabalanga and on Water Bodies located in Planning Area	BMC, H&UDD
Balasore Planning Area	Green Belt along Major Proposed Roads	R & B Division
Ganipur No. 129 Begamapur No. 128	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Haripur No. 140 Ganipur No. 129	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Isani No. 160	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Patrapada Unit No. 33	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Achhutpur No. 150 Srikrushnapur No. 151	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Bhimapur No. 119 Beguniachaka No. 124	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Madhipur No. 149 Naraharipur No. 127	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Kanrali No. 85 Patripal No. 87	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Uparasanakia No. 182 Badaghai N0o. 178 Sutei No. 177	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Meghadamburu No. 172	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Harida No. 197 Bangara No. 199	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Harasarapur No. 159	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept

Location	Project name	Concerned Department
Pachudia No. 169 Chakadaruhati No. 200	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Chanapura No. 187 Banaparia No. 190	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Saragaon No. 165	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Nuapadhi No. 43	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Taradei No. 137 Bahabalapur No. 134 Ramachandi No. 135 Dipali No. 136	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Banaparia No. 190	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Harida No. 197 Korakora No. 198	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Pachudia No. 169	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Sundari No. 157 Badadeulabada No. 151	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Ganipur No. 129 Bidyadharapur No. 108	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Ganeswarpur No. 152 Salabani No. 153	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Hirigaon No. 142 Srikona No. 104	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Chanapura No. 187	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Balia No. 121 Samalpur No. 175	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Srikona No. 104 Tetnuliapura No. 139 Patrapada Unit No. 33	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Mangalpur No. 154 Sasanbar No. 169 Ganeswarpur No. 152	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Kaindhari No. 148 Jhagadapadhi No. 162 Badadeulabada No. 151 Sana Deulabada No. 147	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Khananagar No. 210	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Sindhia No. 128 Baincha No. 131	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Kisimila No. 127	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Rudrapur No. 147 Goudadanda No. 143 Kunkumasuli No. 142	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Ghodapada No. 132	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Sundari No. 157 Keshi No. 153	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Sundari No. 157	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Puruna Baleswar No. 2 Unit No. 32 Chakasimilia No. 137 Patrapada Unit No. 33	Neighborhood Centre	BRIT, BMC, H&UDD, Revenue Dept, Trade & Commerce Dept
Water Supply System		

Location	Project name	Concerned Department
Balasore Planning Area (BPA)	Preparation of DPR for Water Supply System for Balasore Planning Area	Water Resource Dept, PHE Dept, BMC & BRIT
Existing Balasore Town	Improvement of Water Supply System of Balasore	Water Resource Dept, PHE Dept, BMC & BRIT
Balasore Planning Area	Laying of truck water distribution System in new Areas	Water Resource Dept, PHE Dept, BMC & BRIT
Power		
Existing Balasore Town	Renovation and modernization of 33/11 KV and 11 KV / 440 V sub- stations	State Electricity Board & BMC
Existing Balasore Town	Installation of new transformers and capacity augmentation of existing transformers	State Electricity Board & BMC
Existing Balasore Town	Metering of all connections	State Electricity Board & BMC
Existing Balasore Town	Installation of a HVDS (High Voltage Distribution System);	State Electricity Board & BMC
Balasore Planning Area	Preparation of DPR for Power Supply System for Balasore Planning Area	State Electricity Board & BMC
Sewerage System		
Balasore Planning Area	Preparation of DPR for Sewerage System for Balasore Planning Area	PHE Dept, BMC & BRIT
Balasore Planning Area	Laying of Sewer Network for Planning Area	PHE Dept, BMC & BRIT
Balasore Planning Area	Construction of STP (14 MLD) on 3.31 Hectare of Land	PHE Dept, BMC & BRIT
Balasore Planning Area	Construction of STP (15 MLD) on 3.34 Hectare of Land	PHE Dept, BMC & BRIT
Solid Waste Management		
Balasore Planning Area	Improvement and Modernization of Solid Waste Collection, Transportation and Disposal System of Balasore	Balasore Municipality & Balasore Regional Improvement Trust (BRIT)
Bramhapur	Development of Solid Waste Engineering Landfill Site on 8.99 Hectare of Land	Balasore Municipality & Balasore Regional Improvement Trust (BRIT)
Drainage System		
Balasore Planning Area	Preparation of DPR for Drainage System for Balasore Planning Area	PHE Dept, BMC, BRIT & Revenue Dept.
Balasore Town	Cleaning and maintenance of existing main drains	PHE Dept, BMC, BRIT & Revenue Dept.
Balasore Planning Area	Laying of Roadside drains in new proposed areas within Balasore Planning Area	PHE Dept, BMC, BRIT & Revenue Dept.
Balasore Town	Construction and Improvement of Existing Storm Water Drains	PHE Dept, BMC, BRIT & Revenue Dept.
Flood Control		
Balasore Planning Area (Under State Plan 2016-17)	Slope protection, Construction, Repair & Restoration	PHE Dept, BMC, BRIT & Revenue Dept.
Balasore Planning Area (Under Salandi Canal Division)	Slope protection, Construction, Repair & Restoration	PHE Dept, BMC, BRIT & Revenue Dept.
Water Bodies		
Balasore Planning Area	Development of Green Belt around all water bodies	Revenue and Water Resource Dept. & BMC
Balasore Planning Area	Excavation and Renovation of High-Level Canal	Revenue and Water Resource Dept. & BMC
Balasore Planning Area	Excavation and Cleaning of River Buda Balanga within Balasore Planning Area	Revenue and Water Resource Dept. & BMC
Balasore Planning Area	Development of Buda Balanga Riverfront as recreational zone	Revenue and Water Resource Dept. BMC & BRIT
Traffic and Transportation		
Balasore Town	Repair and Renovation of Existing Road Network of Balasore Town	Road Department, NHAI, BMC & PWD
Balasore Planning Area	Improvement and Renovation of Balasore and Balasore Railway Stations	Road Department, NHAI, BMC & PWD
Balasore Planning Area	Development of Bus terminal – I (5.07 Ha)	Road Department, NHAI, BMC & PWD

Location	Project name	Concerned Department
Balasore Planning Area	Development of Bus terminal – II (5.08 Ha)	Road Department, NHAI, BMC & PWD
Balasore Planning Area	Development of Integrated Freight Complex - I (58.89 Ha)	Road Department, NHAI, BMC & PWD
Balasore Planning Area	Development of Integrated Freight Complex - II (21.07 Ha)	Road Department, NHAI, BMC & PWD
Balasore Planning Area	Development of Truck Terminal (10.02 Ha)	Road Department, NHAI, BMC & PWD
Balasore Planning Area	Preparation of DPR on City Mobility Plan (Sanctioned Under AMRUT)	Road Department, NHAI, BMC & PWD
Balasore Planning Area	Augmentation of City Bus Fleet (Sanctioned Under AMRUT)	Road Department, NHAI, BMC & PWD
Balasore Planning Area	Construction of Cycle parking near Bus stand (Sanctioned Under AMRUT)	Road Department, NHAI, BMC & PWD
Balasore Planning Area	Up gradation of Bus Depots (Sanctioned Under AMRUT)	Road Department, NHAI, BMC & PWD
Balasore Planning Area	Development of Transport Nagar (Sanctioned Under AMRUT)	Road Department, NHAI, BMC & PWD
Balasore Planning Area	Construction of Foot Over Bridges (Sanctioned Under AMRUT)	Road Department, NHAI, BMC & PWD
Balasore Planning Area	Construction of Non-motorised Transport facilities (Footpaths & Cycle Tracks & Cycle Parking) (Sanctioned Under AMRUT)	Road Department, NHAI, BMC & PWD
Commercial		
Naraharipur No. 127 Achhutpur No. 150	Development of Wholesale and Trade Centre (28.94 Ha)	Dept of Commerce, Revenue Dept & BRIT
Hirigaon No. 142	Development of Wholesale and Trade Centre (22.38 Ha)	Dept of Commerce, Revenue Dept & BRIT
Khannagar No. 210 Purastampur No. 209 Bangra No. 199 Harida No. 197	Development of Wholesale and Trade Centre (25.21 Ha)	Dept of Commerce, Revenue Dept & BRIT
Balasore Planning Area	Development of Commercial Centre (15.15 Ha)	Dept of Commerce, Revenue Dept & BRIT
Balasore Planning Area	Development of Commercial Centre (10.24 Ha)	Dept of Commerce, Revenue Dept & BRIT
Social Infrastructure		
Ward 17	Development of Multi-Specialist Hospital (1 Ha)	Health Dept & BRIT
Bindha No. 156, Mangalpur No. 154, Salabani No. 153	Development of Hospital (36.41 Ha)	Health Dept & BRIT
	Development of Education Hub (24.44 Ha)	Health Dept & BRIT
Environment and Ecology		
Balasore Planning Area	Development of Bio-Diversity Park (50.43 Ha)	BRIT & Tourism Department
Balasore Planning Area	Plantation along River, Canal, Nallah and Water Bodies	BRIT & Tourism Department
Recreational		
Kisimila No. 150	Development of Sport Complex (38.01 Ha)	Tourism & Sport Department, BMC & BRIT
Pakharabad No.134	Development of Recreational Centre (35.16 Ha)	Tourism & Sport Department, BMC &BRIT
Ghodapada No. 132	Development of Recreational Centre (36.44 Ha)	Tourism & Sport Department, BMC & BRIT
Totapal Alias Palbaleswar No. 133	Development of Recreational Centre (53.86 Ha)	Tourism & Sport Department, BMC & BRIT
Sindhia No. 128 Baincha No. 131	Development of Multi-purpose ground (52.73 Ha)	Tourism & Sport Department, BMC & BRIT
Balasore Planning Area	Development of Exhibition ground (54.97 Ha)	BMC & BRIT
Balasore Planning Area	Development of District Park (197.13 Ha)	Tourism & Sport Department, BMC & BRIT
Industrial Area		

Location	Project name	Concerned Department
Achhutpur No. 150	Development of Industrial Estate – I (291.38 Ha)	Revenue and Industrial Dept. & IDCO
Tigiria No. 141	Development of Industrial Estate – II (35.88 Ha)	Revenue and Industrial Dept. & IDCO

12.3 Strategy for Plan Implementation

The essential elements of successful plan implementation strategies include:

- Clear identification of projects translating the plan proposals into physical implementation
- Adequate financial resources for the required investment
- A flexible, pragmatic, and responsive approach to management of development process.

12.4 Projectization and Packaging the Projects

The plan proposals are statements of intention, or at best, a guiding framework which need to be translated into a set of implementable projects. Then the projects shall need to be prioritized, suitably packaged and the phasing of implementation determined.

12.5 Institutional Framework

The establishment of appropriate organizational/institutional set up along with procedural layout is as important as finances. The set of organization/institution would need to work in a coordinated manner so that the proposed initiatives from project conception, formulation, financing, execution and operation and maintenance through the project lives can happen as conceived or visualized. The concerned agencies in the Balasore Planning Area will be Balasore Regional Improvement Trust (BRIT) Balasore Municipality and the local bodies of 205 villages of Balasore planning area. The necessity on convergence of planning and development initiatives, particularly those identified in the Master Plan, is of immense importance.

12.5.1 Inter-Agency Coordination

Coordination among various agencies for providing infrastructure and services in the urban areas requires consideration on priority basis. Execution must be done in a planned and coordinated manner. There is an evident need to re-strategies and streamline the responsibility of the functions of the participating agencies. Many programmes have suffered serious setback due to lack of adequate communication, commitment, co-operation and co-ordination between different agencies and department within. Greater participation of the citizen and other stakeholders must generate better partnership. Partnership should go beyond mere participation in emphasizing collaborative activities among interested groups, based on mutual recognition of respective strength and weaknesses.

12.6 Urban Governance

In India and Odisha, the Urban Local Bodies (ULBs) and Panchayati Raj Institutions (PRIs) are the tiers of government representing decentralised planning along with devolution of power to the grassroots and increased people' participation. The process of building institutions at local level in Orissa attained its peak only after 1985 when the Government decided to revitalize the Local Self Government. The 74th CAA, 1992, of the GOI has imparted constitutional status on the ULBs and has assigned appropriate functions to them. Constitutional basis has been given to the relationship of the ULBs with the state Government with respect to their functions and powers, ensuring timely and regular elections, arrangements for revenue sharing etc. ULBs are given additional powers including preparation of local development plans, programmes for ensuring social justice, and environmental management there by making them more responsive to the local needs. This was a noble attempt to overhaul the Local Self Government and introduce drastic systematic changes in it. The tenure of these bodies is fixed for five years. The Orissa Municipal Corporation Act, 2003 have come into force w.e.f. 11.02.2003.

The Proposed Balasore Master Plan should investigate:

- Redefining the role and responsibilities of Municipal Council
- The Municipalities and other urban areas must augment their status of Governance and strengthen capacity building
- It is expected that some of the non-municipal areas will attain municipal status
- It is further expected that proposed distribution of development will also suggest creation of new municipalities

The National Action Plan for Good Urban Governance (Government of India & UNCHS) with specific focus on Participatory Planning Process along with strengthening the local bodies have been accepted and adopted by the State Governments. This has been also reflected in their various Legislative efforts. Salient points have been towards:

- Active decentralization of power.
- Facilitating with more planning and development functions as well as taxing powers.
- Improve Capacity Building of local bodies by introduction of community participation and delivery of public services. Interactive participation of Ward Committees, CDS and HHW is made responsible for infrastructural development at the community level.
- Augment resource base for revenue generation including rationalized fiscal transfer.
- Adopting modern financial tools for development functions.
- Change of mindset and public awareness is essential for implementation of Cost Recovery.
- Enhancement of Tax base and improvement of collection of Property Tax and other taxes.
- Thrust and focus on adopting Transformation in Civic engagement.
- Expanded role in capital budgeting and selecting their priority schemes.
- The integration of urban local bodies with its own decentralized management through ward committees as well as with the high-level District Planning Committees is essential.
- The participation through micro planning process, prioritization of needs, organizing community structure as well as hygiene education program are the essential framework.
- Trans-Municipal Projects, should be centrally examined by the specialized and higher-level agencies, who should be entrusted for planning designing etc. with active participation, and involvement of concerned ULBs
- Training of officials as well as non-officials connected with all agencies and institutions need to be given appropriate training to enable them to perform the new set of tasks.
- Augmenting capacity building in collecting base line information, data updating and compilation in GIS format
- Municipalization of urban centers at appropriate time must be organized.
- Involvement and induction of professionally trained urban planners, engineers and architects must be considered for various institutions as a part of capacity building.
- All institutions must also be supported by modern communication and information technology.
- Strong capacity to ensure the delivery of services through a variety of mechanism.
- Adopt appropriate regulatory system.
- Generate strong public trust and public access to information.

12.6.1 Good Governance

The principals of high impact governance have been distilled to identify the major issues for Balasore Region

- Create the right structure
- Make the concerned agencies accountable by instituting target setting, MoUs and monitoring processes
- Streamline key processes
  - Redesigning the Development Control and Building approval process
  - Strengthening internal systems through accounting reforms
- Increasing dialogue with citizens
  - E – governance
  - Citizen involvement in Prioritization of projects at grass root level
  - Strengthening of Grievance Redressal System
- Generate momentum through quick wins
- Institute a report card system for all agencies

12.6.2 Legislation

The evolutionary process of development needs has been reflected in the new legislation and amendments of existing legislation. The following Acts are in operation:

- Odisha Town Planning and Improvement Trust Act, 1956 (Odisha Act 10 of 1957).
- Odisha Development Authority Act, 1982 (Odisha Act 14 of 1982).
- Odisha Development Authority Rules, 1983.
- 73rd & 74 Constitution Amendment Act in 1992.
- Odisha Municipal Corporation Act, 2003
- Panchayat Extension to Schedule Areas Act (PESA), 1996
- Odisha Zilla Parishad Act, 1994
- Odisha Gram Panchayat Act
- Special Planning Authority (Planning and Building standards) Draft Regulations 2010
- Ancient and Historical Monuments and Archaeological Sites and Remains Act (1958) and the Rules of 1959
- Section 4 of the (Water Prevention and Control of Pollution) Amendment Act 1975

The following Rules are in operation:

- Odisha Zilla Parishad Rules 2001
- Odisha Zilla Parishad Standing Committee Rules 2002
- Odisha Panchayat Samiti Standing Committee Rules 2002
- Odisha Gram Panchayat Standing Committee Rules 2002
- Odisha Gram Panchayat Rules 2002

12.6.3 Orissa Municipal Corporation Act 2003

The provisions of the Orissa Municipal Corporation Act 2003 define the functions of CMC from 2003, till then Orissa municipal act 1951 is the base for CMC. The Act came into force with effect from February 11, 2003.

i. Empowers elected persons having special knowledge or experience in municipal administration by assigning them with various functions of the corporation.
ii. Envisaged democratic decentralization by devolving powers and functions to the corporation on one hand and introducing decentralized planning on the other.
iii. Appointment of officers to receive complaints relating to the provision of the various services of the Corporation and to arrive at a settlement by agreement through negotiation by passing award in accordance with the provisions of the Arbitration Land Conciliation Act, 1996.

12.6.4 Orissa Development Authority Act, 1982

The salient features of the Act are:

i. Extension of the provisions of the Act over the identified area and declaring such area as a development area.
ii. Constitution of Development Authority.
iii. Preparation of interim, comprehensive, and zonal development plans.
iv. Publication of development plans for inviting objections and suggestions.
v. Finalizing the development plan in the light of objections and suggestions.
vi. Approval of the development plan by the State Government.
vii. Enforcement of the provisions of the development plan, zoning regulations and planning and building standards by the Development Authorities by way of issuing permissions for construction of buildings.
viii. Preparation of development schemes and their implementation.

12.6.5 Land Use Policy

Adhering to the requirements of environment the current thinking is in favor of flexible land use, which reaps the synergies between workplace, residence, and transportation as well as also between complementary vocations. Ideally land use should be responsive to the dynamics of market. The proposed Master Plan has indicated the land use pattern to accommodate the dynamic growth of the planning area using land efficiently in a planned manner, fulfilling the conservation obligation.

12.6.6 Development Promotion Regulation

The contents or proposals of the Master Plan outlining the development of various areas suggested through Land Use Zoning or Development Promotion Guidelines serves as legal instrument for planning and execution.
Master Plan for Balasore primarily being a policy document did not attempt to show very many details of land use and adopt a very simplified main use. Based on the Urban Regional Development Plans Formulations and Implementation (URDPFI) Guidelines, 2014 of the Ministry of Urban Development suggested simplified Development Control Rules for the different Land Uses, an exhaustive list of activities / use premises has been prepared.

We have followed the land use categories as specified by the URDPFI with minor changes in the classification. Residential Use Zone, Retail Commercial and Business Use Zone, Wholesale Commercial Use Zone, Industrial Use Zone, Public and Semi-public Use Zone, Utilities and Services Use Zone, Recreational Use Zone, Transportation Use Zone, Agriculture and Forest Use Zone and Water Bodies Use Zone have been retained as it is. Special Area Use zone has been re-grouped as:

(i) Environmentally Sensitive Use Zone
(ii) Special Heritage Use Zone

Environmentally sensitive river front areas, forest areas, marshy areas etc. as Environmentally Sensitive Use and old built-up areas, scenic value, archaeological sites, etc. as Special Heritage Use.

12.6.7 Financing Urban Development

Financing urban development in a sustained manner requires looking at two major aspects of financing, i.e., capital finances and revenue finances. Capital financing that usually figures in the current account of development budget pertaining to the development of urban infrastructure comprising of basic services (utility) infrastructure, social infrastructure and economic or commercial infrastructure. For achieving this, it would be essential to mobilize adequate resources. Traditionally these are funded through budgetary support of Central, State Government and local bodies through five-year plans and the annual plans. These resources have in some cases been supplemented by assistance (in the form of loan or grant) from financial institutions such as World Bank, multilateral agencies such as ADB, JBIC, CFIC, USAID, DFID, and UNICEF etc. The domestic financial institutions like HUDCO, HDFC and NHB also provide financial assistance for urban infrastructure development projects. ICICI, IDBI, UTI and other commercial banks have also made forays into the sector with their urban infrastructure portfolios. However, with the process of economic liberalization being in practice throughout the country, the public sector resources are becoming increasingly scarce. On the other hand, domestic financial institutions lay emphasis on financial viability of projects, which is difficult to achieve especially in case of basic infrastructure projects. In such a scenario, exploring alternative sources of financing capital investment is the only major option left.

Thus, much of the investment will have to come from the private sector and the government will have to create an enabling environment for private initiative in economic activities. This will include improving governance, creating world-class infrastructure, and developing people's capacity to participate in economic activities. In creating the enabling environment, therefore, public expenditure must play an important role, and State Governments will have to significantly enhance the level of spending on development and improve the efficiency of delivery systems.

12.6.8 Innovative Options for Resource Mobilization

Infrastructure financing requires long-term lending, whereas the normal borrowing in the Indian capital and debt market is short-term only. Financial Institution would need a mix of resources and balanced combination of lending portfolio constituting both long and short-term fund. Some of such suggested mechanism is listed below.

(i) Consortium Finances
(ii) Development Authority Bond or Municipal Bond
(iii) Project Initialization Fund / Project Development Fund
(iv) Foreign Direct Investment
(v) Leveraging Insurance Sector Funds

(vi) Special Economic Zone

Some of the areas could be brought under Special Economic Zone (SEZ) as duty free zones for industrial, services and trade operations to attract foreign investment and facilitate expeditious development. They will be treated as priority areas in the provision of infrastructure, convergence in statutory clearance, exemption from duties and levies as well as liberal regulations.

(vii) Public Private Partnership

(viii) Balasore Master Plan Capital Infrastructure Fund

It is proposed to create a dedicated Balasore Master Plan capital infrastructure fund, which can attract debt and private finance.

12.6.9 Revenue Financing Options

Capital investments on infrastructure entail expenditure on recurrent basis for proper operation and maintenance, without which delivery of services would not happen as expected and the same would frustrate the very objectives of capital investment programmes carried out. Any capital investment expenditure calls for meeting, on recurrent basis, the requirement of funds for debt servicing, operation and maintenance and capital replacement reserve. Some of the innovative instruments are:

a) Water Supply

- Advance registration fees.
- Enhancement of water tariff and metering
- Connection charges
- Water tax
- Development Charges
- Other sources such as property tax,
- Sale of plots etc.

b) Sewerage

- Connection charges
- Sewerage Tax
- Conservancy tax
- Sale of sludge
- Sale of renewable waste
- Fines for untreated effluent disposal

c) Solid Waste Management

- Collection charge
- Cess
- Sale of renewable waste
- Fines on Dumping waste

d) Roads

- Toll tax
- Advertising rights
- Cess on diesel and petrol
- Land as a resource

e) Airport/ Railway Station / Bus Terminus

- Toll tax
- User charges for transport terminals
- Advertising rights
- Land as resources
- Surcharge on tickets

g) Property tax reforms

One area that needs adequate attention is the collection of property tax on which count most of the municipalities in the state have performed poorly. Property tax is the single largest source of revenue and is an indirect user charge for municipal services whose benefits are collective and are not confined to any identified individual. Reform in property tax is necessary to for promoting efficiency through linking of provision of municipal services closely to their financing. Some recommended Property tax reforms are:

(iii) simplification of tax laws

(iv) coverage of tax net

(v) valuation accuracy

(vi) collection efficiency

(vii) rate setting

(viii) administrative incentives and

(ix) Policy and institutional reforms.

Steps should be taken for transparent assessment of properties (unit area method), increased coverage by property mapping using GIS applications and rationalization of self-assessment system. Every property in the city must be given a Property Tax Index Number (PTIN) whereby the payment, the changes and nature of use of the property can be done through computer and E–Seva centre.

12.6.10 Non-Tax Revenue Generation through Commercial Development of Properties

- Build and lease
- Sell land for private development
- Public-private joint development

12.6.11 Non-Tax Revenue Generation through Innovative Land Planning and Development Control Regulation

- Creation of Special Development Districts (SDD) to make major investment in infrastructure and services and formulate different Development Control Regulations.
- Imposition of Development Impact Fees in the SDD, the designation of district zones with differing built form parameter is assumed.
- Utilization of Transfer of Development Right (TDR) enabling flexible development control and permitting trade for their lost FSI.
- Imposition of User Charges i.e., cost recovery through direct charges to beneficiaries.

Future Land Use & Urban Design

Chapter 13. Future Land Use and Urban Design Guidelines

13.1 Introduction

The Master Plan provides strategic framework for land use planning in the Balasore Planning Area, for shaping its future towards the horizon year-2030. It sets out the spatial strategy, structure as well as urban design guidelines for the balanced growth and development of the planning area in the future.

13.2 The Proposed Concept Plan

An outer ring road is proposed to improve connectivity between the two halves of the planning area divided by railway line and NH-16 which will also improve accessibility to the railway and highway. New townships are proposed on the eastern and western side along the ring road where development is presently scattered, and large tracts of land parcels are available for development. Since NH-16 and the railway line are the main transportation nodes, mixed use and industrial centers are proposed along these. An institutional hub is proposed on the western side towards Remuna. Further, along the coast where already small pockets are used for fisheries, more area has been proposed for Fishery site development to give a boost to this sector. Also, as the riverbanks of Budhabalanga holds a lot of potential for recreational and tourism development, sites have been proposed for various recreational facilities. Refer to Fig 13.1 below.

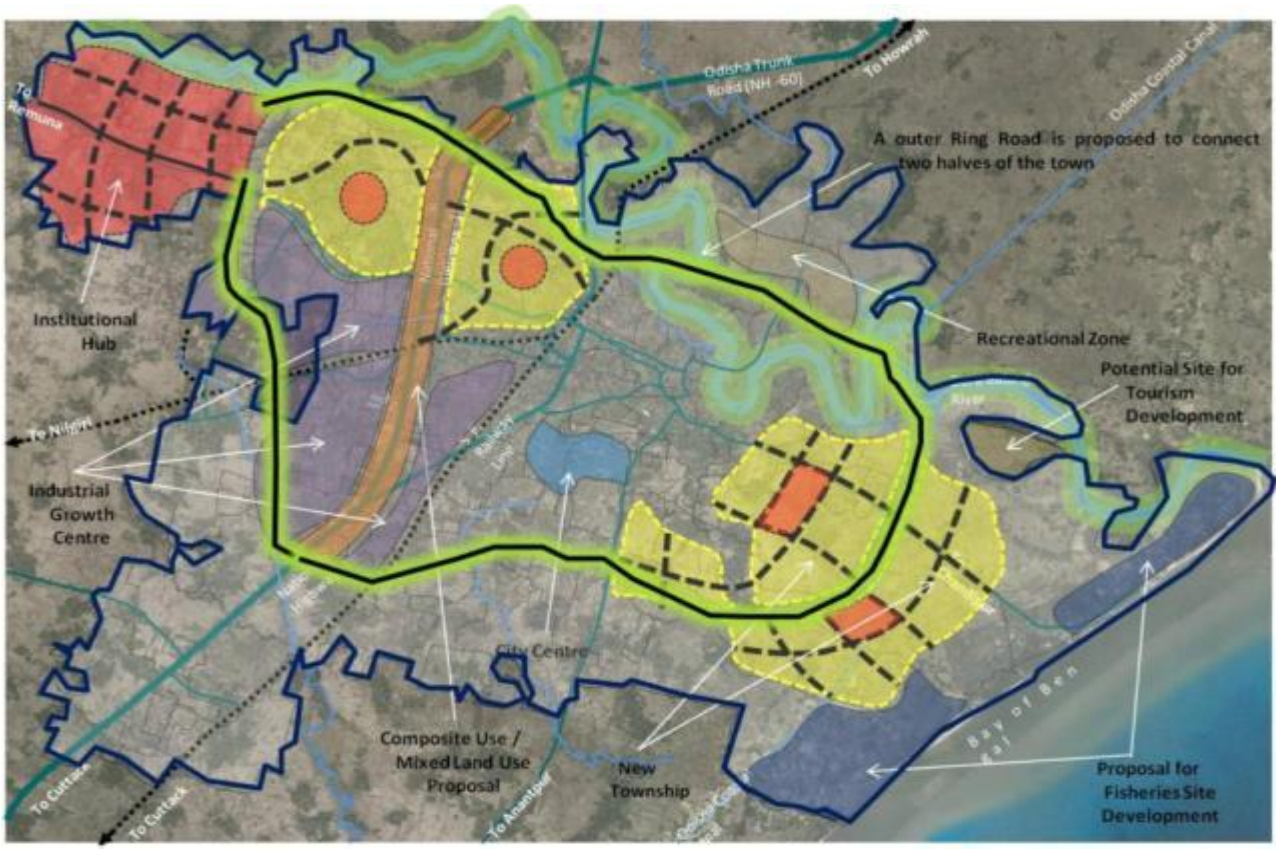


Figure 13.1: Proposed Concept Plan
Source: Consultant's Analysis

13.3 Spatial Structure

A planned town, for an environment of convenience should be a hierarchical cellular structure; with nuclei to contain essential facilities and services at different levels. Such a structure could be created in the process of the preparation of

divisional plans and area plans based on the following standards.

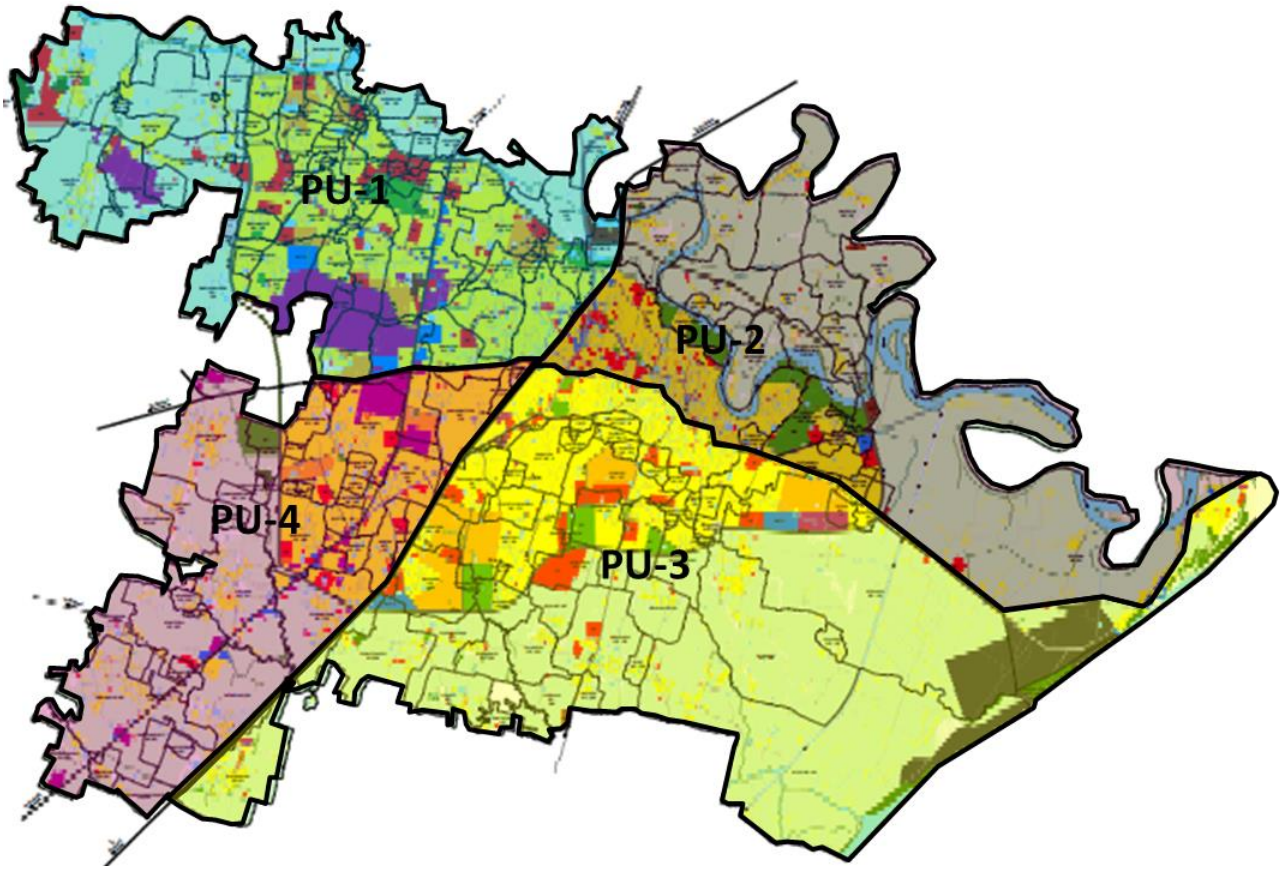
Hence, the Balasore Planning Area is proposed to be developed in a hierarchical manner with four Tier system. The entire planning area (Tier – I) of Balasore will be divided into planning units (Tier – II) having population of 1,00,000 persons (Refer to Fig. 13.2) and each planning zone will be further divided into residential sectors or neighborhoods (Tier – III) of 10,000 population and lastly residential areas having 5,000 population will be there. The other uses such as commercial, recreational, health and education will be distributed all over the planning area in a hierarchical manner (Refer to Table 13.1). The town Structure is to be evolved based on major corridor of development along road converging on Balasore. Visualizing the development potential along the roads, of higher order institutional, industrial, commercial, and recreational zone etc. can be suitably located in an integrated manner. Zoning and sub-divisional regulations will an integral part of the Master Plan of Balasore.

Table 13.1: Proposed Spatial Structure of Balasore Planning Area

S. No.	Level	Facilities	Area (Sqm)			Plan in	
			Nos	**Per Unit**	**Total**	**Area / Layout Plan**	Division Plan
1	**Housing Cluster** No. of Families = 50 Population = 250	Tot Lot	1	480	480	◯	
2	**Housing Area** No. of Families = 1000 Population = 5,000 Area = 1.63 Ha	1 Nursery School	2	800	1600	◯	
		2 Primary School	1	4000	4000	◯	
		3 Community Room	1	660	660	◯	
		4 Religious Building	1	400	400	◯	
		5 Milk Booth	1	150	150	◯	
		6 Convenience Shopping	1	1100	1100	◯	
		7 Housing Area Park	1	5000	5000	◯	
		8 Housing Area Playground	1	5000	5000	◯	
3	**Neighbourhood** No. of Families = 3000 Population = 10,000 - 12,000 Area = 10 Ha	1 Senior Secondary School	2	16000	32000	◯	
		2 Dispensary	2	1000	2000	◯	
		3 Community Hall & Library	1	2000	2000	◯	
		4 Electric Sub Station	2	160	920	◯	
		5 Local Shopping with SC	1	4600	4600	◯	
		6 Taxi Stand	1	500	500	◯	
		7 Neighbourhood Park	1	15000	15000	◯	◯
		8 Neighbourhood Play Area	1	15000	15000	◯	◯
4	**Community** No. of Families = 20,000 Population = 1,00,000 Area = 39.73 Ha	1 Intermediate Hospital A	1	37000	37000	◯	◯
		2 Intermediate Hospital B	1	10000	10000	◯	◯
		3 Public Clinic	1	3000	3000	◯	◯
		4 Nursing Home	2	2000	4000	◯	◯
		5 Integrated School	1	3900	3900	◯	◯
		6 Integrated School + Hostel	1	35000	35000	◯	◯
		7 School for Handicapped	2	5000	10000	◯	◯
		8 College	1	40000	40000		
		9Telegraph Booking Counter	1	-	-		
		10 Police Station	1	11500	11500		
		11 Police Post	2	1600	3200	◯	
		12 Recreational Club	1	10000	10000	◯	
		13 Music Dance Centre	1	1000	1000	◯	
		14 Meditation Centre	1	5000	5000	◯	
		15 LPG/Godowns	2	520	1040	◯	◯
		16 SKO/LDO Outlet	1	400	400		◯
		17 Electric Sub Station, 66 KV	2	10800	21600	◯	◯
		18 Community Centre	1	54200	54200		◯
		19 Organised Informal Sector	1	2000	2000		◯
		20 District Sports Centre	1	80000	80000		◯
		21 Petrol Pump	2	1670	3340	◯	◯
		22 Bus Terminal	1	2000	2000	◯	◯
		23 Green / Part	1	40000	140000	◯	◯

Source: Consultant's Estimation

Figure 13.2: Proposed Planning Units of Balasore Planning Area



It is intended to create a balanced city development having important functions such as work and study areas, residential development, green spaces, roads and parking, and other common physical and social infrastructure.

13.3.1 Commercial Areas

To accommodate required shopping, commercial offices, offices for undertakings and other related activities like cinema, hotel, and needed facilities, the following four tier system of commercial activity is envisaged (Refer to Table 13.2).

Table 13.2: Proposed System of Commercial Areas

Four Tier System of Commercial Areas			
I	**II**	**III**	**IV**
District centre	Community Level	Local Shopping Centre	Convenience Shopping Centre
Population Served			
About 5 Lakh	About 1 Lakh	About 15,000	About 5,000
Area (in Hectare)			
14.97	5.4	0.46	0.11
Land Requirement per Thousand Persons (Sq. m.)			
880	540	306	220
Activities			
Shopping (Retail Service, Repair & limited Wholesale), Informal Shopping, Commercial Offices, Cinema, Hotel, Guest, Electric Sub, Post & Telegraph, Petrol, Convenience, Residential, Pump, office, Station, house, Nursing, Science, Art / Craft / Music / Dance,	Shopping (Retail Services, Repair & Limited Wholesale), Informal Shopping, Commercial Offices, Cinema, Hotel, Guest House, Nursing Home,	Shopping (Retail Services, Repair), Informal Shopping, Commercial Offices,	Shopping (Retail Services, Repair), Informal Shopping,
	Service Industries	Community Hall and Library	

Four Tier System of Commercial Areas			
I	II	III	IV
Telephone, Electric Sub Station Exchange school/police post, Bus, Fire Post Terminal Mela/ Book Bazar, Weekly Market (on close day), Special Planning Authority, Municipal Offices centre Home, Service, Library Industries, Auditorium, Museum	Post Office, Dispensary, Petrol Pump, Weekly Markets, Electric Sub Station, Post & Telegraph, Telephone exchange, Bus Terminal, Museum, Fire Station, Bazaar, Science Centre, Library, Conveniences	Electric Sub Station, Conveniences	
			Electric Sub Station, Conveniences

Source: Consultant's Estimation

13.3.2 Industrial Areas

In the Master Plan- 2030, 507.69 hectares area is reserved for Industrial use which also includes the existing Industrial area of 322.77 hectares, it is envisaged that out of the total estimated 1,79,540workers, the industrial area will generate 35,908 employments, which constitute almost 20%. The additional industrial areas are proposed to be developed at density of 125 workers per hectare. The remaining secondary sector employments are other tiny rural base non-polluting industries are within the rural area.

13.4 Future Land Use Proposal

The future land use proposals are mainly based on existing land use characteristics, and availability of vacant land parcels and landforms.

13.4.1 Summary of Proposed Land Use Distribution

The Master Plan proposes an increase in the total developed area from existing 6,968.54 Ha to 10,819.41 Ha i.e., 24.84 % of the planning to 44.21% of the planning area. Thus, the undeveloped land will reduce from existing 71.53% to 55.79 % (Refer to Table 13.3).

As compared to land area exiting under various uses in the developed area, for the horizon year 2030 the Master Plan proposes substantial increase in land area allocated for mixed use development, industries, for traffic and transport as well as for recreational use.

Within the un-developed land in the planning area, although agricultural land has been proposed for conversion for development purposes, significant amount of land under categories of Gochar has also been proposed for conversion while preserving land under forests, water bodies, etc.

Table 13.3: Proposed Land Use Distribution-2030 for Balasore Planning Area

Land use	Area (in Ha)		% of Total Area
Developed area	**% of Developed Area**		
Residential	6,223.79	56.91	25.43
Commercial	217.33	1.99	0.89
Mixed Use	154.31	1.41	0.63
Industrial	664.78	6.08	2.72
Public & Semi Public	1,210.52	11.07	4.95
Public Utilities & Facilities	62.48	0.57	0.26
Recreational	984.63	9.00	4.02
Traffic & Transportation	1,417.79	12.96	5.79
Sub-Total	**10,935.64**	**100.00**	**44.68**
Un Developable area			
Agriculture	11,334.41	-	46.31
Gochar	385.28	-	1.57
Forest	187.17	-	0.76
Water bodies	1,630.60	-	6.66

Land use	Area (in Ha)		% of Total Area
Sub-Total	**13,537.46**	-	**55.32**
Grand Total	**24,473.10**	-	**100.00**

Source: Consultant's Estimation

Within the developed area, residential use constitutes as the largest land use at 56.91% of the developed area or 25.43% of the total panning area; followed by land allocated to traffic & transportation and public and semi-public area. As compared to existing land use distribution of the developed area, Master Plan proposes an increase in mixed use (from existing 0.03% to proposed 1.41%), in recreational use (from existing 0.91% to proposed 9%) as well as traffic and transportation (6.50% in 2014 to proposed 12.96%). Refer to Fig 13.3 below

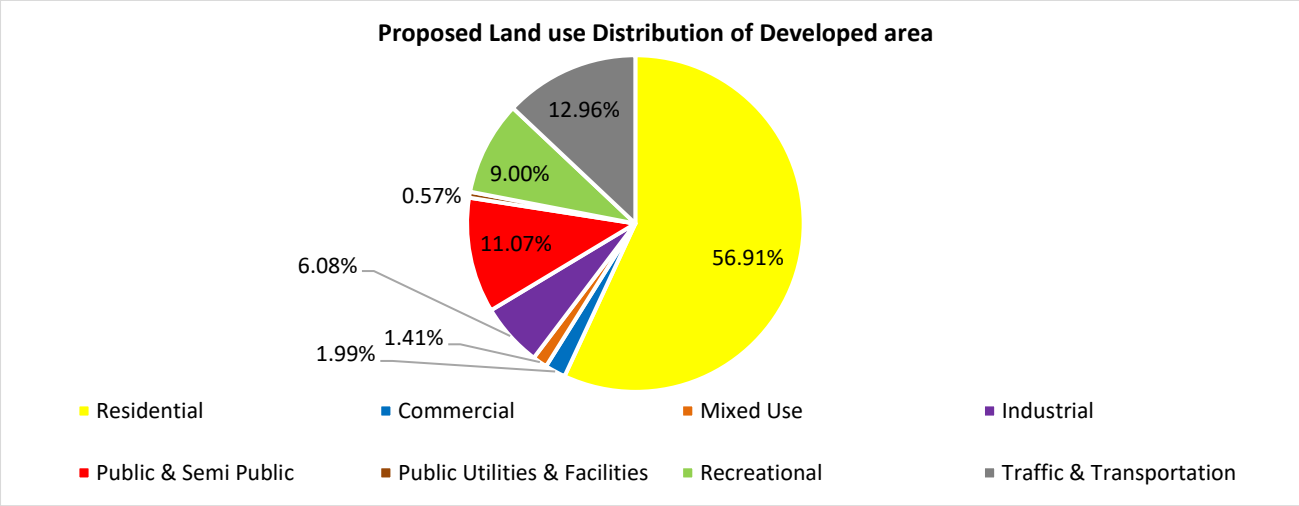


Figure 13.3: Proposed Land use Distribution of Developed area
Source: Consultant's Estimation

Within the un-developed parts of the planning area, agricultural land use still constitutes as the largest land use occupying approx. 83.72% of the undeveloped area or 46.31% of the total planning area. In terms of the whole planning area, agricultural land will still occupy the maximum percentage. After agricultural land, water bodies have the major share within the undeveloped area at 12.05% which in terms of land area has increased from the existing 1,477.81 Ha to 1,630.60 Ha. refer to Fig 13.4 below.

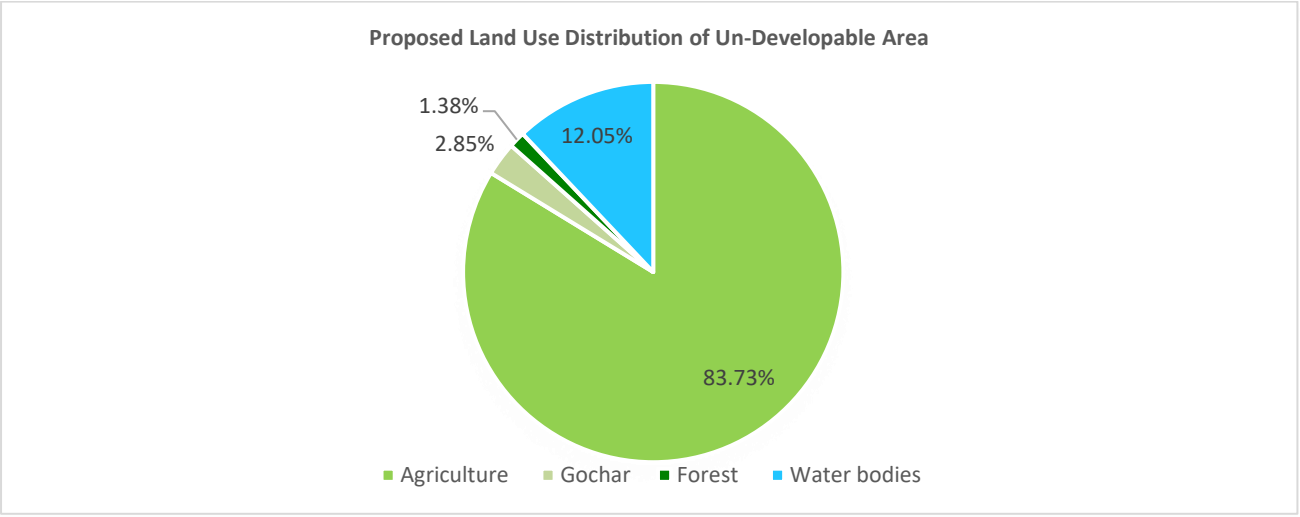


Figure 13.4: Proposed Land Use Distribution of Un-Developable Area
Source: Consultant's Estimation

13.5 Urban Design Guidelines

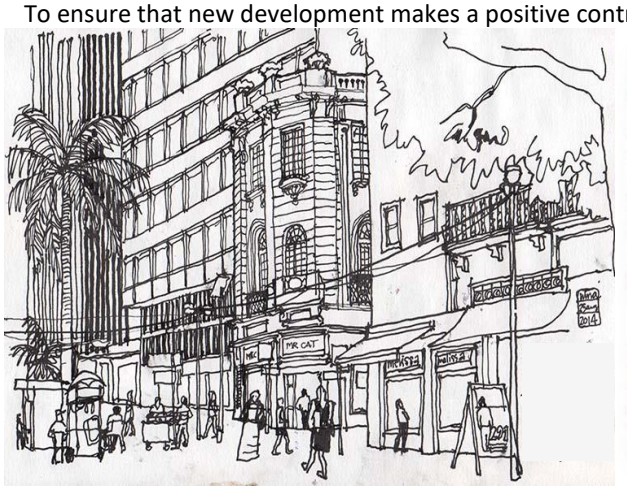
Urban design is the discipline through which planning, and architecture can create or renew a sense of local pride and identity. It has great potential for enhancing the visual image and quality of neighborhoods by providing a three-dimensional physical form to policies described in the Master Plan. The key elements of these guidelines are:

- The plan
- Design guidelines for buildings,
- Design of the public realm - the open space, streets, sidewalks, and plazas between and around buildings and the public interest issues of buildings (include massing, placement, sun, shadow, and wind)

13.5.1 Objectives

The objectives of these guidelines are:

- ❑ To ensure that development responds positively to the existing patterns of urban form landscape qualities, historic, cultural elements, social dimensions, and aspirations of the Balasore.
- ❑ To reinforce image of Balasore as an attractive place to live, do business.
- ❑ To ensure network of transport and movement corridors makes a positive contribution to Balasore' s image.
- ❑ To enhance and protect the landscape qualities.
- ❑ To enrich distinct topographic and landscape qualities and characteristics.
- ❑ To ensure that new development makes a positive contribution to sustainability and the urban fabric



13.5.2 Vision

While recommending the Urban Design Guidelines, the vision is:

"To guide physical development toward a desired scale and character that is consistent with the social, economic, and aesthetic values of Balasore".

13.5.3 Specific Guidelines

13.5.3.1 Natural Features

Preserve and protect natural landforms and features. Conserve Balasore' s natural environment and create a linked open space system. Preserve and enhance naturally occurring features such as riverfronts, slopes, and forests. The identified areas include:

- Budhabalanga River and Areas along the riverbank
- High Level Canal

13.5.3.2 Open Spaces Linkages

The Master Plan proposes to link neighborhood, public attractions, parks, and other destinations together through trail systems, bikeways, landscaped boulevards, formalized parks, and natural open space. This will preserve and encourage physical connectivity and access to open spaces.

Reorganize open spaces that prevent the continuation of transportation corridors and inhibit mobility between communities. Where conflicts exist between mobility and open space goals, site-specific solutions may be addressed in community plans.

13.5.3.3 Development Adjacent to Natural Features

Design and development adjacent to natural features should be in a sensitive manner to highlight and complement the natural environment in areas designated for development. Development on river fronts should be integrated with the natural environment to preserve and enhance views and protect areas of natural drainage. Grading should be minimized to maintain the natural topography, while contouring any landform alterations to blend into the natural terrain. Developments adjacent to natural features need to be screened as appropriate so that development does not appear visually intrusive or interfere with the experience within the open space system. The provision of enhanced landscaping adjacent to natural features could be used to soften the appearance of or buffer development from the natural features. Use building and landscape materials can be done that blend with and do not create visual or other conflicts with the natural environment. Design and site buildings should be done to permit visual and physical access to the natural features from the public right-of-way. Location of entrances and windows in development should be encouraged adjacent to open space to overlook the natural features. Protecting views from public roadways and parklands to resource areas and scenic vistas should be done. Views and view corridors along and/or into waterfront areas can be preserved from the public right-of-way by decreasing the heights of buildings. Provision of public pedestrian, bicycle, and equestrian access paths to scenic viewpoints, parklands, and were consistent with resource protection, in natural resource open space areas can be done. Special consideration to the sensitive environmental design of roadways that traverse natural open space systems can be provided to ensure an integrated aesthetic design that respects open space resources. This could include the use of alternative materials such as “quiet pavement” in noise sensitive locations, and bridge or roadway designs that respect the natural environment.

13.5.3.4 Street Frontage

Street frontages can be created with architectural and landscape interest to provide visual appeal to the streetscape and enhance the pedestrian experience. Buildings can be located on the site so that they reinforce street frontages. Buildings should be related to existing and planned adjacent uses. It should be ensured that building entries are prominent, visible, and well-located. Existing setback patterns, except where community plans call for a change to the existing pattern should be maintained. Visual impact of garages, parking and parking portals can be minimized to the pedestrian and street façades. The identified areas include:

- Chandipur and Remuna Road
- All bridges on Budha Balanga River

13.5.3.5 Public Spaces

These include public plazas, squares, or other gathering spaces in each neighborhood center. Public spaces should be in prominent, recognizable, and accessible locations. Outdoor open areas should be designed as “outdoor rooms,” developing a hierarchy of usable spaces that create a sense of enclosure using landscape, paving, walls, lighting, and structures. Each public space can be developed with a unique character, specific to its site and use. Public spaces should be designed to accommodate a variety of artistic, social, cultural, and recreational opportunities including civic gatherings such as festivals, markets, performances, and exhibits. Artistic, cultural, and social activities unique to the neighborhood can be considered and designed for varying age groups that can be incorporated into the space. Use of landscape, hardscape, and public art can be done to improve the quality of public spaces. Active management and programming of public spaces should be encouraged. Outdoor spaces should be designed to allow for both shade and the penetration of sunlight. Parks and plazas can be framed with buildings, which visually contain and provide natural surveillance into the open space. Addressing of maintenance and programming should be done.

The identified areas include Parks, Stadium, Playgrounds etc.

13.5.3.6 Civil Architecture and Landmarks

Civic architecture and landmark institutions should be treated and located prominently. Wherever feasible, distinctive public open space, public art, greens, and/or plazas around civic buildings such as courthouses, libraries, post offices, and community centers can be provided to enhance the character of these civic and public buildings. Such civic and public buildings are widely used and should form the focal point for neighborhoods and communities. Sustainable building principles should be incorporated into building design. Civic buildings at prominent locations, sites fronting open space, sites framing a public vista, and those affording a silhouette against the sky should exhibit notable architecture. Innovative designs that distinguish civic and public buildings and landmarks from the surrounding neighborhood can be encouraged as a means of identifying their role as focal points for the community.

The identified areas include Proposed government offices and other public buildings.

13.5.3.7 Public Art & Cultural Amenities

Public art and cultural amenities should be integrated such that they respond to the nature and context of their surroundings. For this, the unique qualities of the community and the special character of the area should be considered in the development of public art and programming for cultural amenities. Public art and cultural amenities can be used to celebrate unique character of the town. The urban environment can be enhanced by animating the Town's public spaces. The quality of new development can be improved through public art and spaces for cultural use while also providing opportunities for the collaboration of artists and community members.

The identified areas include Road Intersections.

13.5.3.8 Transit Integration

Attractively designed transit stops, and stations should be provided that are adjacent to active uses, recognizable by the public, and reflect desired neighborhood character. Designing of safe, attractive, accessible, lighted, and convenient pedestrian connections should be done from transit stops and stations to building entrances and street network. Generous rights-of-way for transit, transit stops, or stations should be provided. Buildings along transit corridors should be located to allow convenient and direct access to transit stops/stations.

The identified areas include proposed Multi modal transit hub

13.5.3.9 Lighting

Lighting should be provided from a variety of sources at appropriate intensities and qualities for safety. For pedestrian circulation and visibility pedestrian-scaled lighting should be provided. Effective lighting should be used for vehicular traffic while not overwhelming the quality of pedestrian lighting. Lighting can also be used to convey a sense of safety while minimizing glare and contrast. Use vandal-resistant light fixtures that complement the neighborhood and character. Lighting should focus to eliminate spill-over so that lighting is directed, and only the intended use is illuminated.

The identified areas include on all streets, important buildings, and city level open spaces.

13.5.3.10 Parking

The amount and visual impact of surface parking lots should be reduced. Placement of parking along the rear and sides of street-oriented buildings should be encouraged. Blank walls facing onto parking lots can be avoided by promoting treatments that use colors, materials, landscape, selective openings, or other means of creating interest. Clear and attractive pedestrian passes/pathways and signs should be designed that link parking and destinations. Locate pedestrian pathways in areas where vehicular access is limited. Large areas of uninterrupted parking especially adjacent to community public view sheds should be avoided. Building of multiple small parking lots in lieu of one large lot can be done. Retrofitting of existing expansive parking lots with street trees, landscape, pedestrian paths, and new building placement can be done. Promoting the use of pervious surface materials to reduce runoff and infiltrate storm water should be done. Trees and other landscape to provide shade, screening, and filtering of storm water runoff in parking lots should be done.

The identified areas include all over Balasore wherever necessary.

13.5.3.11 Signage

Designing and projection of signage should be effectively done to utilize sign area and complement the character of the structure and setting. Architecturally signage should be integrated into project design. Pedestrian-oriented signs can be included to acquaint users to various aspects of a development. Placement of signs should be to direct vehicular and pedestrian circulation. Signs should be posted to provide directions and rules of conduct where appropriate behavior control is necessary. Designing of signs should be such to minimize negative visual impacts. Community-specific signage issues should be addressed in community plans, where needed.

13.5.3.12 Utilities

Minimizing of the visual and functional impact of utility systems and equipment on streets, sidewalks, and the public realm should be attempted. Conversion of overhead utility wires and poles, and overhead structures such as those associated with supplying electric, communication, community antenna television, or similar service to underground should be done. Designing and location of public and private utility infrastructure, such as phone, cable and communications boxes, transformers, meters, fuel ports, back-flow preventers, ventilation grilles, grease interceptors, irrigation valves, and any similar elements, should be integrated into adjacent development and as inconspicuous as

possible. To minimize obstructions, elements in the sidewalk and public right of way should be in below grade vaults or building recesses that do not encroach on the right of way (to the maximum extent permitted by codes). If located in a landscaped setback, they should be as far from the sidewalk as possible, clustered, and integrated into the landscape design, and screened from public view with plant and/or fencelike elements. Traffic operational features such as streetlights, traffic signals, control boxes, street signs and similar facilities should be located and consolidated on poles, to minimize clutter, improve safety, and maximize public pedestrian access, especially at intersections and sidewalk ramps. Other street utilities such as storm drains and vaults should be carefully located to afford proper placement of the vertical elements.

Land Assembly

Chapter 14. Land Assembly

14.1 Land Assembly Tools

14.1.1 Through Compulsory Acquisition through Land Acquisition Act 1894

The Land Acquisition Act of 1894 provides legal provision for acquisition of land for public purpose in India. The step-by-step procedure involved in acquiring land through this tool is:

- Notification of intention to acquire,
- Joint measures of land,
- Notification signifying the final decision to acquire land,
- Notices to landowners to hear claims for compensation and to decide ownership,
- Declaration of land acquisition award and finally
- Taking over of physical possession of land.

14.1.2 Optimum Utilization of Vacant Government Land (O.U.V.G.L) Scheme

It is a scheme for identifying vacant government land (including municipal land) and using it as source for providing land for public purposes. However, given the need for using government land for generating financial resources, entire stock of government land need not be assigned to non-remunerative public purposes. In fact, government land would offer many opportunities for PPP where part of the land could be used for public purpose.

Rationalizing obsolete uses of public lands could be another way of putting public land to more relevant public purpose. But for relocation of these activities requires availability of adequate and suitable public land at other locations. To rationalize the land demand and supply, specific designations of land for different uses in the master plan must be made before proceeding with compulsory acquisition of land. However, the use for these lands shall be as determined by the State Government, irrespective of the use shown on the proposed land use plan. In case of Panchayat land of villages falling in local planning area, these lands shall be used for creating public utilities, services, physical and social infrastructure including parks, open spaces, community facilities etc. and not for any other purpose.

14.1.3 Transfer of Development Rights (TDR)

Alternative to monetary compensation could be award of Transfer of Development Rights either to remainder of the land or to a distant location. This could be in 3-generic cases i.e.

- Roads and Road widening: Development rights calculated at the FAR permissible in adjoining area may be allowed to be used in the remainder of the plot up to a limit.
- The development rights that cannot be so consumed can be transferred elsewhere in receiving areas. If FAR is related to width of the road, resistance to widening may get reduced.
- Public purposes on open land or exclusive plots: Lands required for parks and playgrounds or exclusive uses like secondary school, fire station etc. can be obtained by providing TDRs in lieu of compensation. However, price differentials in originating and receiving zones could be considered as an incentive in such cases.
- Public purposes that require built-up space but not necessarily exclusive plot: Examples of this could be municipal vegetable market, library etc. In such cases, landowner may be permitted to use the full potential of development in terms of FAR over the plot provided he offers the built-up space required for the public purpose to the local body.

The executing agency/the government can acquire the property by compensating owner with TDR If property is in the way of executing a large infrastructure project. What is issued to the owner as a Development Rights Certificate specifying a built-up area that is 1.5 times what the person have originally surrendered. For e.g., if gave up 600 sq. ft. Built-up area to the Authority under the Roads Widening Scheme, then will receive a certificate for 900 sq. ft. of built-up area. Built-up area is also known as Floor Space Index (FSI) or Floor Area Ratio (FAR). The DRC is a certificate, and it is not land itself.

The owner can use DRC either to exceed his/her allowed (i.e., sanctioned) built-up area or on another plot of land/building that may own in some other part of the city. Or, can sell the DRC in the market. Many big developers and builders are keen to purchase the DRCs because it legally gives them more FAR. This means that they now have additional built-up area that they can factor into their building plans.

14.1.4 Through Land Pooling or Town Development Schemes

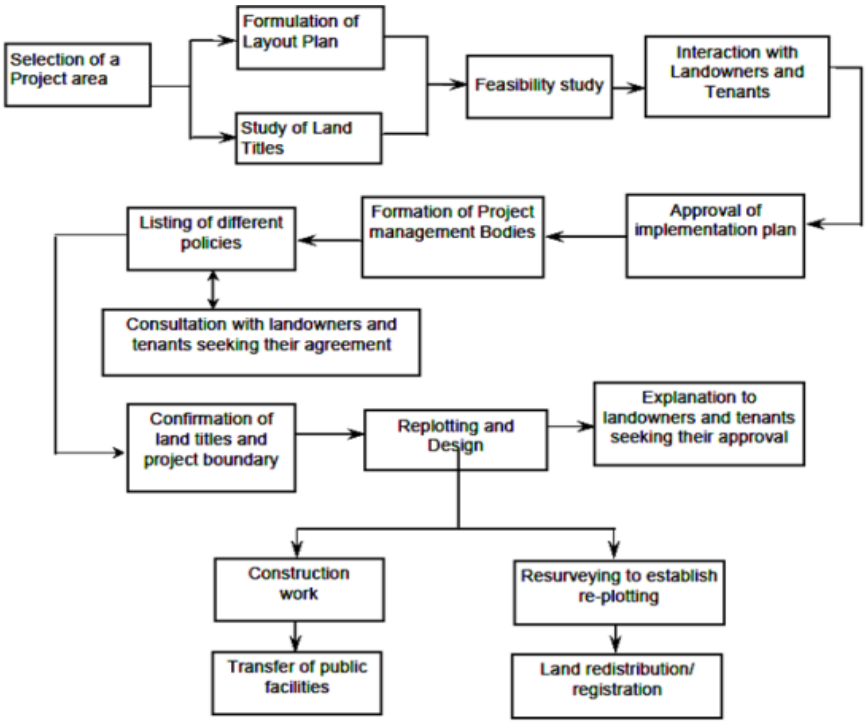


Figure 14.1: Process of Land Pooling Scheme

As per the provisions, the concerned Authority may for the purpose of implementation of the provision of the Master Plan or for providing amenities where the same are not available or are inadequate, frame the Town Development Scheme and land for various amenities can be earmarked as per these provisions.

The strategic approach would relate to geographically depicting the sites required for public purpose and proposing regulatory framework for obtaining the land for public purpose whether shown on the plan or not. For this, master plan must consider various options as defined as below. However, these options have their own limitations and must be uses selectively based on the ground reality, existing conditions, development potentials, involving private sector, etc.

14.1.5 Innovative Techniques

14.1.5.1 Voluntary Surrender/Deposit Scheme

With the acquisition of the land, the landowners receive substantial amounts as compensation. It is likely that these amounts be quickly spent with adverse effects on the farmer's future. An innovative scheme was formulated according to which, if an owner of the land in selected areas voluntarily offers his land to Government at an agreed rate, the amount so agreed can be placed in deposit with Agency at a rate of interest such that the yield will approximate to the net amount the land holder now gets from his land by way of crop yield. The land holder will go on getting this yearly amount from agency as interest until he wants repayment of his deposit.

14.1.5.2 Rehabilitation

Rehabilitation can be done by three specific measures:

- *Individual oriented programmes*: Education, training and providing employment to the villagers to integrate them with the urbanization process.

- *Village oriented programmes*: Devising ways to upgrade the village infrastructure to bring it at par with the newly built city around them, and
- *Land compensation:* Making villagers effective partners in the development of the new city by sharing the assets created in the new city with them.

14.1.5.3 Road Widening Scheme

Often the widening of existing roads is a difficult task as these involve acquisition of private lands, In Hyderabad a new way has been explored whereby the loss of land to the landowners required for widening of roads is compensated by giving them additional floor space index on the remaining land. If a landowner cannot use the extra FSI in situ, he can use the same elsewhere or transfer them to other developers on sale. Compensation for loss of structures is directly paid and extensive consultation with affected landowners.

14.1.5.4 Creation of Land Bank

- ❖ Public Land Bank
    - Identify Government Land
    - Acquired through
    - Facility Proportion
    - Government Land Bank
- ❖ Private Land Bank

14.2 Land Assembly Models

14.2.1 CIDCO Navi Mumbai Model

It was envisaged that after acquisition the lands will vest in the Corporation (CIDCO), which act as an agent of Government for the development of the area into the new town. The land development strategy in Navi Mumbai started with the concept of land banking. The entire area of Navi Mumbai was notified for acquisition, primarily to use it as a major resource for development, to achieve equitable distribution of benefits of the development to all those affected by the project of urbanization, and to achieve a better environment. Large scale acquisition of private land and transfer of Government land and salt pan lands was taken as a prime strategy for land assembly.

Land banking has also helped in reserving land for environmental purposes. 50% of the land Navi Mumbai is reserved for regional parks, nodal open spaces, and non-developable service corridor reservations including for channels and holding ponds and for circulation. 900 ha of land reserved as electric transmission corridors was put to profitable use such as plant nurseries, vegetable gardens etc.

- ❑ Financing Arrangement
- ❑ Innovative Techniques
    - Voluntary Surrender/Deposit Scheme:
    - Rehabilitation:
    - Entrepreneurship Development
- ❑ Entrepreneurship Development
- ❑ Strengthening of Village Infrastructure
- ❑ Land Compensation Schemes (GES Scheme and 12.5% Scheme)

14.2.2 DDA Model

One of the most important initial documents regarding urban land policy as enunciated along with the preparation of Master Plan for Delhi in 1962 was the communication of Home Affairs, Government of India regarding Control on Land Values in the Urban Areas of Delhi, Acquisitions, Development and Disposal of Land in Delhi. The important content of the communication is as following:

A. About 8,000 acres of land should be acquired, in the first instance, under the provision of the Land Acquisition Act, 1894. The land so acquired will be developed by various authorities i.e.,
    - The Central Public Works Department

- Delhi Development Authority
- The Delhi Municipal Corporation

B. The developed land was to be provided for:
   - Public and private institutions for and public utilities and community facilities like open spaces, parks, playgrounds etc.
   - Industrial and commercial use and
   - Housing plots for individuals including those whose land has been acquired by the Government under this scheme.

C. All the land acquired under the schemes would be Nazul and will vest with the president and will be given out in his name only on lease-hold basis to local bodies and private parties including co-operative societies industrialists, individuals, and institutions.

D. For achieving optimum utilization of land, the following was recommended:
   - The size of residential plots was restricted to 800 sq. yds, which was subsequently reduced to 400 yds.
   - Allotment of land only to such institutions which directly serve the interest of the population of Delhi.
   - Setting up of housing and other areas. Those which could be located elsewhere to be discouraged.

E. No plot should be allotted to any person who or any of his/her dependent relations own a house or residential plot in Delhi, New or Delhi Cantonment.

F. Encouragement to private investment in housing was envisaged through regular auction of residential plots to higher income group (general auction) where this group could also provide for rental housing.

G. The entire responsibility for acquisition, development, and disposal of land under the scheme was that of the Chief Commissioner (now Lt. Governor) Delhi.

14.2.3 Greater Noida Model

In the traditional Land Acquisition process, the acquiring body faces problems such as delays in the process of urban development as the land acquisition process is very time consuming; the interest burden on the amount is deposited with SLAO/DM, which directly effects cost; unauthorized constructions taken place during the process of acquisition; there is uncertainty on compensation rate; enhancement of rate in revisions/appeals in different courts, etc. At the same time even the farmer's face problems like low rate of compensation, variation of rate due to belting system, delay in distribution of the compensation amount, lack of rehabilitation policy (housing and employment) as well as problems in the payment of compensation amount by authorities.

In 1994, Greater Noida Authority also faced the problems of agitation from farmers stopping the development work, stay orders obtained from local / high court, agitation supported by Builders / Colonizers and cooperative societies, who had purchased land before the creation of the authority, etc. The Authority negotiated with the farmers on the compensation rate, its distribution process and an out of court settlement was made after the declaration of award and submitted in the District Judge court during references. This policy was adopted for a single village.

But, in 1996-97, villagers again started agitation for Increase in compensation rates decided in 1994 (Rs. 110/- per sq. yard), employment / jobs in the local industries and allotment of developed plots in the schemes at cheaper rate for family expansion. Negotiations were done again to arrive at the compensation rate linked to Consumer Price Index; this rate is revised at every financial year (Rs. 110/-per sq. yard in 1994, increased to Rs. 139/- per sq. yard in 1997 and Rs. 232/- per sq. yard in 2002). The compensation rate would be irrespective of location (no belting system) and an additional 15% on basic rate would be provided as rehabilitation package. Further, it included allotment of 10% of the acquired land or 5% of net developed land would be done for residential use adjacent to village abadis (Plot sizes 40 sqm. – 2500 sqm.), payment of development charges by the villagers and distribution of compensation through special camps to reduce harassment and corruption. Plus, in case of urgency – land on the fixed rate can directly be purchased from villagers.

In Noida, where villagers, whose land were acquired, were eligible to get a developed plot in the schemes. The value of plots was 5 to 6 times the allotment rate. Noida also adopted the similar policy like Greater Noida – A uniform land compensation rate is fixed for whole of development area for each financial year linked with Consumer Price Index

(CPI). Since the year 2002, Noida/Gr. Noida did not have any disputes regarding land acquisition for the last 5 years and have a land bank of 2000-3000 Acres (800 to 1200 ha).

14.2.4 Gujarat Model: Town Planning Scheme

The Town Planning Schemes, popularly known as T.P. Schemes, are prepared, and implemented under the Gujarat Town Planning & Urban Development Act. 1976. In fact the T.P. Schemes are in vogue since 1917 A.D. It is a German model, adopted by England and effectively implemented in Gujarat & Maharashtra. The schemes were first prepared under the Bombay Town Planning Act 1915, then the Bombay Town Planning Act 1954, now revised as the GTP & UD Act 1976. Provision of T.P. Scheme in all these three acts remains same, with some variation. The T.P. Scheme is an instrument to implement the master plan/development plan. The T.P. Scheme may be prepared for an area as envisaged in the Sector 40 of the GTP & UD Act 1976 for areas:

- Under the course of development
- Already developed
- or likely to be developed in near future

The stages of the TP scheme are as follows:

- Declaration of Intention to make a Scheme by appropriate authority
- Preparation of Draft TP Scheme
- Publication of Draft TP Scheme (within one year)
- Inviting Suggestions/Objection
- Submission to State Government for Sanction (4 months from publication)
- Sanction by State Govt. & appointment of Town Planning Officer
- Splitting up of TP Scheme-Preliminary Scheme and Final Scheme
- Preliminary Scheme: Survey, Hearing of each owner, reconstitution of each original plot to Final plot, Reservation for public purpose
- Final Scheme: Cost of Scheme, Compensation, Incremental value, and contribution on each plot.
- Award of preliminary scheme (one year from appointment)
- Sanction of TP Scheme & land vest absolutely in appropriate authority.
- Implementation of TP Scheme
- Award of Final Scheme by Town Plan Officer
- Constitution of Board of Appeal & hearing
- Submission of Final TP Scheme
- Sanction of Final Scheme by State government
- Appropriate Authority gets betterment accrued on each plot
- Variation of TP Scheme (if required)

14.2.5 Gurgaon Model

Gurgaon in Haryana and is only 30 km away from the national capital, New Delhi. The Haryana development & Regulation of Urban Areas Act of 1975 enables private developers to apply for licenses to assemble parcels of land in a designated area. After assembly, the developer would apply for permission to develop, which is permitted by Haryana Urban Development Authority under a set of conditions such as allotment of a fixed proportion of plots to the middle-income groups on no profit and not loss basis and to the poor on subsidized basis. The plan for the land is prepared by the private developer and is got approved as per provisions of the relevant laws.

The agreement between the owner of land, or developer, intending to set up a colony (hereinafter called the owner) and the Director, Town and Country Planning, Haryana contains the following conditions:

- The owner shall deposit 30% of the amount realized by him from plot holders, from time to time, within 10 days of its realization in a separate account in a scheduled bank and this amount shall be used only for internal development of the colony.

- The owner shall undertake to pay proportionate external development charges with a break-up of 25% within one month and the balance 75% in two years in four equal half-yearly installments. Interest at the rate of 18% per annum shall be charged on deferred payments.
- If there is any delay in payment of installments, penal interest at the rate of 3% per month on the belated amount shall be charged in addition.
- Enhanced compensation on land, if any, will be payable by the owner.
- Some amount has been added for the construction of internal community buildings in the external development charges and for this, no recovery shall be made from the plot holders. However, grants will be given by the HUDA for the internal buildings constructed by the owner of the colony.
- The owner shall pay electrification charges directly to the Haryana State Electricity Board (HSEB). No external development charges would be recovered from the EWS/LIG categories.
- The owner shall be responsible for the maintenance of services for a period of 5 years from the date of issue of completion certificate or transfer of services to the local authority whichever is earlier.
- The owner shall complete the internal development works within two years of the grant of the license. The owner shall pay a service charge on the total plotted area of the colony, excluding areas for social infrastructure.
- The owner shall give requisite land for the water and sewage treatment works, oxidation ponds at his own cost till the external sewerage system is completed by the Haryana Urban Development Authority (HUDA).
- The owner shall reserve 20% of the total number of residential plots for the EWS/LIG. For the allotment of these plots, the owner shall invite applications and would allot only to eligible persons falling in this category by draw of lots.
- The owner shall further reserve 25% of the residential plots for allotment on `No Profit No Loss' basis and would also allot the applicants registered with him via draw of lots. Lot of these plots, 75% would be allotted in the general category and the balance 25% to (i) Non-Resident Indians (NRIs) against foreign exchange; ii) alternate allotment to those whose lands were required by the owner, and iii) 5% at the discretion of the owner.
- The balance 55% residential plots of 125 sq.m. and above would be sold by the owner in the free market subject to the condition that he will not get a net profit of more than 15%.
- The owner shall submit the list of allottees to the Director twice a year.

Zoning Regulations

Chapter 15. Zoning Regulations

15.1 Introduction

In order to promote public health, safety and the general social welfare of the community, it is necessary to apply reasonable limitation on the use of land and buildings. This is to ensure that the most appropriate economical and healthy development of the city takes place in accordance with the land use plan. For this purpose, the Town is divided into several use zones, such as residential, commercial, industrial, public, and semi-public, etc. Each zone has its own regulations as the same set of regulations cannot be applied to the entire town.

Zoning protects residential area from the harmful invasions of commercial and industrial uses and at the same time promotes the orderly development of industrial and commercial areas. By regulation the spacing of buildings, adequate light, air, protection from fire etc. can be provided. It prevents overcrowding in buildings and land thus ensures adequate facilities and services.

Zoning is not retrospective. It does not prohibit the uses of land and buildings that are lawfully established prior to the coming into effect of the zoning regulations. If these uses are contrary to the newly proposed uses, they are termed as non-conforming uses and are gradually eliminated over years without inflicting unreasonable hardship upon the property owners.

The zoning regulations and their enforcement are a major tool in keeping the land uses pattern of the Master Plan. It has been stated that the consultants have adopted the UDPFI guidelines with minor modification. However, while detailing out the use permissibility, etc. in various categories all care has been taken to integrate:

(A) “Special Planning Authority” (Planning and Building Standards), Regulation 2010.

(B) “Bhubaneswar Development Authority” (Planning and Building Standards), Regulation 2008.

(C) URDPFI Guidelines.

This formulated guideline may adopt other provision of the regulation towards intensity of development and built form guidelines, etc.

1) In the Balasore Planning Area (BPA), various use zones namely Residential, Commercial, Industrial, Public and Semi- Public, Utilities and Services, Recreational, Transportation, Agricultural, Water bodies and Special Areas having their location as indicated in the Master Plan shall be regulated and guided as per Table 14.5. Except or otherwise provided, no structure or land hereinafter shall be erected, recreated, or altered unless its use is in conformity with the following regulations.

2) All existing places of worship, temples, churches, mosques, burial, and cremation ground etc. shall be exempted from being treated as nonconforming uses, if continuance of such uses is not detrimental to the locality as decided by the Authority from time to time.

3) All non-conforming uses of land and buildings shall be discontinued by the owner and the modified uses shall be made to conform to the land use of the development plan in force within six months of the Regulations coming in force.

14.5.1 Simplified Urban Land Use Zoning Regulations Buildings and premises listed below are permitted normally on specific sites/locations forming part of the provision of the Master Plan. Besides the activities Permitted (column A) for each of the 10 land use zones in Table 14.5, it also contains the buildings/premises which could be allowed upto 30% of the area on an application to the Competent Authority if such sites do not form a part of the plan. Such use/activity is termed as Permissible on Application to Competent Authority (with conditions/on special consideration) (column B). The uses/activities which are otherwise not allowed in a particular use zone are termed as Activities/Uses Prohibited in certain use zones and are presented in (column C). A broad description of the proposed land uses according to

'Activities/Uses Permitted', 'Permissible on application to Competent Authority (upto 30% area on special consideration)' and 'Activities/Uses Prohibited' is given below.

15.2 Zoning Regulations

Residential Use Zone:

In Residential Use Zone 'R' (Primary Residential with densities, Mixed Residential Zone Unplanned/ Informal Residential Zone) have been marked for general guidance.

I. Uses/Activities Permitted:

Residence plotted (detached, semi-detached and row housing), group housing, work-cum-residential centre, hostels, boarding and lodging houses, night shelters, dharmshalas, guest houses, educational buildings nursery, primary, high school), neighborhood level social, cultural and recreational facilities with adequate parking provisions, marriage and community halls, convenience shopping, local (retail) shopping, community centers, clubs, auditoriums, exhibition and art galleries, libraries and gymnasiums, health clinics, yoga centers, dispensaries, nursing homes and health centers (20 beds), yoga Centers, public utilities and buildings except service and storage yards, electrical distribution depots and water pumping stations, nursery and green houses, services for households (salon, parlors, bakeries, sweet shops, dry cleaning, internet kiosks etc.), banks and professional offices not exceeding one floor, bus stops, taxi stands, 3 wheeler/auto stands, rickshaw stands, police posts and post offices, parks and tot–lots, Accessory uses clearly incidental to residential use (except service uses) which will not create nuisance or hazard, customary home occupation if the area for such use does not exceed 25% of the total floor area of the dwelling and there shall be no public display of the goods.

II. Uses/Activities Permissible on Application to Competent Authority (with conditions/ upto 30% area on special consideration):

Places of worship, shopping centers, municipal, state and central government offices, colleges and research institutions, petrol filling stations, places of entertainment, cinema halls, restaurants and hotels, markets for retail goods, IT and IT enabled services, tourism related services, motor vehicle repairing workshop, garages, storage of LPG cylinders, burial grounds, printing presses employing not more than 10 persons, godowns /warehousing of non-perishables, bus depots without workshop, household industries if the area for such use does not exceed one floor and there shall be no public display of the goods, consulates.

III. Prohibited Uses/Activities:

Heavy, large and extensive industries, noxious, obnoxious and hazardous industries, warehousing, storage godowns of perishables, hazardous, inflammable goods, wholesale mandis, junk yards, workshops for buses, slaughter houses, hospitals treating contagious diseases, sewage treatment plants and disposal sites, water treatment plants, solid waste dumping grounds, outdoor and indoor games stadiums, shooting range, zoological garden, botanical garden, bird sanctuary, international conference centers, district battalion offices, forensic science laboratory, all uses not specifically permitted.

Retail Commercial Business Use Zone:

In Commercial Use Zone 'C-1' (Retail Shopping Zone/ and General Business, Commercial District Centers) have been marked for general guidance.

I. Uses/Activities Permitted:

Retail business, mercantile, commercial centers, banks, financial services and stock exchanges, perishable goods markets, business and professional offices, private institutional offices and semi government offices, shops and shopping malls, commercial services, restaurants and hotels, hostels, boarding houses, social and welfare institutions, guest houses, convenience and neighborhood shopping centers, local shopping centers, weekly and formal markets, bakeries and confectionaries, cinema halls, theaters, banquet halls, auditoriums, marriage and community halls, night shelters, clinics and nursing homes, petrol pumps and service stations on roads of 12 meter or more ROW, IT and IT enabled services, commercial institutes, research and training institutes, service uses like hair salon, tailoring shops,

beauty parlor, laundry and dry cleaning shops etc. bus stops, Taxi stands, 3 wheeler/auto stands, rickshaw stands and parking spaces.

II. Uses/Activities Permissible on Application to Competent Authority (with conditions/ upto 30% area on special consideration):

Associated residential uses, wholesale storage yards, junk yards, service garages provided they do not directly about the main road, printing presses employing not more than 10 persons, 20 bedded hospitals not treating contagious diseases and mental patients, weigh bridges, colleges, polytechnics and higher technical institutes, sports complex and stadiums, transient visitor's homes, places of entertainment, recreational uses and museums, convention centers, religious places, public utilities, telephone exchanges, police posts and post offices, residential plot/group housing, picnic hut, parks, playgrounds, clubs.

III. Prohibited Uses/Activities:

Polluting industries, heavy, extensive, noxious, obnoxious, hazardous and extractive industrial units, large scale storage of hazardous and other inflammable materials except in areas, specifically earmarked for the purpose, poultry farms, dairy farms, slaughter houses, sewage treatment plants and disposal sites, solid waste treatment plants and dumping grounds, agricultural uses, storage of perishable and inflammable commodities, quarrying of gravel, sand, clay and stone, zoological gardens, botanical gardens and bird sanctuary, sports training centers, district battalion offices, forensic science laboratory and all other related activities which may cause nuisance, hospitals, research laboratories treating contagious diseases, court, all uses not specifically permitted here in.

Wholesale Commercial Use Zone:

In Wholesale Commercial Use Zone 'C-2' (Wholesale, Godowns, Warehousing, Regulated Markets) have been marked for general guidance.

I. Uses/Activities Permitted:

Wholesale business, commercial and business offices and workplaces, wholesale, and storage buildings, godowns, covered storage and warehousing, weigh bridges, bus stops, Taxi stands, 3-wheeler / auto stands, rickshaw stands, truck terminal, bus depots and parking spaces, restaurants, public utilities.

II. Uses/Activities Permissible on Application to Competent Authority (with conditions/ upto 30% area on special consideration):

Freight terminal, railway yards and stations, warehousing, storage godowns of perishable, inflammable goods, coal, wood, timber yards, non- polluting, non- obnoxious light industries, service centers, garages, workshops, junkyards, gas installation and gas works, government and semi-government offices, banks, financial services, associated residential uses, water treatment plants.

III. Prohibited Uses/Activities:

Polluting Industries, large scale storage of hazardous and other inflammable materials except in areas, specifically earmarked for the purpose, all uses not specifically permitted herein.

Mixed Use Zone:

In Mixed Use Zone 'MU' (All the residential and commercial activities) have been marked for general guidance.

Mixed Use: 1 Plot depth or 50 m from Road Centre whichever is minimum.

I. Uses/Activities Permitted:

All the uses /activities are permitted which are mentioned in para 14.2 under Mixed use Zone Category

II. Uses/Activities Permissible on Application to Competent Authority (with conditions/ upto 30% area on special consideration):

All the uses /activities are permitted which are mentioned in para 14.2 under Mixed use Zone Category

III. Prohibited Uses/Activities:

All the uses /activities are permissible which are mentioned in para 14.2 under Mixed use Zone Category

Industrial Use Zone:

In Industrial Use Zone 'I' (Service and Light Industry, Extensive and Heavy Industry and Special Industrial Zone) have been marked for general guidance.

I. Uses/Activities Permitted:

All kind of non-polluting industries, IT & ITES, SEZs notified by government of India, Loading, unloading spaces, warehousing, storage and depots of non-perishable and non- inflammable commodities, cold storage and ice factory, gas godowns, banks, financial institutions and other commercial offices, wholesale business establishments, petrol filling station with garages and service stations, bus terminals and bus depots and workshops, parking, taxi stands, 3-wheeler/auto stands, rickshaw stands, residential buildings for essential staff and for watch and ward, public utilities, railway siding, incidental and utility use incidental to the main use.

II. Uses/Activities Permissible on Application to Competent Authority (with conditions/ upto 30% area on special consideration):

Heavy, extensive and other obnoxious, hazardous industries subject to the approval of the Orissa Pollution Control Board, Industrial Research Institute, Technical Educational Institutions, junkyards, sports/ stadiums/ playgrounds, sewage disposal works, electric power plants, service stations, govt. semi-govt., private business offices, agro-based industries, dairy and farming, gas installations and gas works, workshops garages, hotels and guest houses, museum, helipads, hospitals and medical centers, quarrying of gravel, sand, clay and stone.

III. Prohibited Uses/Activities:

Polluting industries, general business unless incidental to and on the same site with industry, schools and colleges, hotels, motels and caravan parks, recreational space or centers, other non-industrial related activities, religious buildings, irrigated and sewage farms, major oil depot and LPG refilling plants, social buildings, all uses not specifically permitted.

The indicative list of industries which could be permitted subject to the condition that it satisfies above norms is given in Appendix-I. The List naturally cannot be exhaustive. Therefore, any such industry which has not been indicated in the above referred list can be permitted provided it satisfies the above norms and is approved by the Director of Town Planning, Odisha

Table 15.1: List of Industries which permissible in residential and commercial use zones

S. No	Type of Industries	S. No	Type of Industries
1	Cosmetic products	18	Perfumery compounds
2	Agarbati	19	Pharmaceutical Units
3	Writing Ink	20	Ball Pen
4	Sealing Wax	21	Food Products
5	Wax Candle	22	Creamery & Dairy Products
6	Acrylic Sheet Button	23	Ata- chakki & masala Grinding
7	Plastic Covers (Dairy & Files etc.)	24	Re-packing of Medicines etc.
8	Plastic Seeds	25	Paper products
9	Knitting Plastic Bags	26	Cardboard Boxes
10	Plastic Molding Goods (Hand operated)	27	Book Binding
11	Fiber Glass, Reinforced Plastic Products	28	Printing Press
12	Phenyl	29	Ready-made Garments
13	Camphor and Phenyl Tablets	30	Batic printing
14	Cleaning powder	31	Embroidery
15	Rubber stamps	32	Watch-steps (Nylon)
16	Rubber Molded goods	33	Canvas bags and products
17	Detergent powder	34	Hosiery items

S. No	Type of Industries
35	Surgical Bandages
36	Shoelaces etc.
37	Thread reels
38	Tailors' labels
39	Scientific glassware
40	Mirror and Frame making
41	Spectacle lenses
42	Thermometers
43	Decorative Glass articles
44	Chalk Sticks
45	Distemper
46	Nalidar Coal
47	Shikakai & Soap nut powder
48	Wire Brush
49	Umbrella Assembly
50	Wooden toys
51	Paper Pins, Gem Clips
52	Hair Pins
53	Hypodermic Needles
54	Wire staples
55	Wire stands for Kitchen
56	Wire for curtains
57	Wire Loops
58	Decorative Key Rings
59	Aluminum Tower Bolts
60	Steel watch strips
61	File clips
62	Link Clips
63	Shoe and Tent Eyelets
64	Brass Jewelry
65	File cover accessories
66	Garments Hooks and Eyes
67	Link Chain
68	Chokes (Aluminum)

S. No	Type of Industries
69	Electrical Bell (Buzzer)
70	Small Transformer
71	Printed Circuit Board Wiring
72	Band Switch & Tag
73	Board Wiring
74	Circuit Board
75	Heating Element (for cosmetic electrical appliances)
76	Decoration fighting series
77	Leather goods and garments
78	Transistor Radio Covers
79	Decorative Leather goods
80	Industrial Leather goods
81	Production of soft beverages
82	Manufacture of Bidi
83	Processing of supairs
84	Dyeing & Darning
85	Cotton Cloth Weaving in Handlooms
86	Making of Ropes and Niwar
87	Making of Textile Garments including Rain- Coats & Caps
88	Ivory carving
89	Engraving Embossing, Polishing & Welding of Metal Products
90	Gold & Silver thread, Zari work, Jewelry, Gold Ornaments
91	Silver art ware including silver repouse work on copper
92	Manufacture, repairing & Tunning of Musical Instruments such as Harmonium, Sitar, Bansuri etc.
93	Making of lac Bangles
94	Service Station for light vehicles
95	Repairing of Electronic instruments
96	Assembly of Furniture Units
97	Electroplating Buffing Polishing

Public and Semi-Public Use Zone:

In Public and Semi–Public Use Zone 'PS' (Govt./Semi-Govt./Public Offices Zone) have been marked for general guidance.

I. Uses/Activities Permitted:

Government offices, central, state, local and semi-government, public undertaking offices, universities and specialized educational institutions, colleges, schools, research, and development centers, social and welfare

centers, libraries, hospitals, health centers, dispensaries and clinics, social and cultural institutes, religious buildings, conference halls, community halls, Kalyan mandap, museums, art galleries, exhibition halls, auditoriums, police stations, police lines, jails, local state and central govt. offices uses for defense purpose, educational and research institutions, social and cultural and religious institutions, local municipal facilities, hotels, Dharamshala, guest houses, monuments, convention center, banking and financial services, commercial uses center, shopping complex, public utility buildings, uses for defense purpose, defense quarters, educational and police headquarters, radio transmitters and wireless stations, uses incidental to govt. offices and for their use, incidental/ancillary residential use.

II. Uses/Activities Permissible on Application to Competent Authority (with conditions/ upto 30% area on special consideration):

Residential flats, residential plots for group housing and staff housing, IT services, defense quarters, hostels, transit accommodation, entertainment and recreational complexes, nursery and kindergarten, welfare center, open air theater, playground, residential club, guest house, bus and truck terminals, helipads, parking areas, taxi stands, 3-wheeler/auto stands, rickshaw stands, retail shops, shopping complexes, residential and other uses which is no way causing any nuisance and hazard incidental to main use.

III. Prohibited Uses/Activities:

Heavy, extensive, and other obnoxious, hazardous industries, slaughterhouses, junkyard, wholesale mandis, dairy and poultry farms, farmhouses, workshops for servicing and repairs, processing and sale of farm products and uses not specifically permitted herein.

Utilities and Services Use Zone:

In Utilities and Services Use Zone 'US' (Water Supply/Sewerage/Drainage/Solid Waste, Power, Transmission and Communication, and Cremation and Burial Ground Zone) have been marked for general guidance.

I. Uses/Activities Permitted:

Post offices, Telegraph offices, public – utilities and buildings, water Treatment Plant, Sewage Treatment Plant, Solid waste Treatment Plant solid waste dumping grounds, radio transmitter and wireless stations, telecommunication centers, telephone exchange, water supply installations, sewage disposal works, service stations, cremation grounds and cemeteries/burial ground, power plants/ electrical substation, radio and television station, fire stations, observatory, and weather office.

II. Uses/Activities Permissible on Application to Competent Authority (with conditions/ upto 30% area on special consideration):

Service industry, warehouse/storage godowns, health center for public and staff or any other use incidental to public utilities and services, information/Payment kiosk, incidental/ancillary residential use, truck terminals, helipads, commercial use center.

III. Prohibited Uses/Activities

Any building or structure which is not required for uses related to public utilities and activities is not permitted therein, heavy, extensive, and other obnoxious, hazardous industries, all uses not specifically permitted herein.

Recreational Use Zone:

In Recreation Use Zone 'P' (Playgrounds/Stadium/Sports Complex, Parks and Gardens, Special Recreational Zone, and Multipurpose Open Space Zone), have been marked for general guidance.

I. Uses/Activities Permitted:

Specialized parks/ maidans for multipurpose use, regional parks, district parks, playgrounds, children's parks, clubs, stadiums, picnic huts, holiday resorts, shooting range, sports training center, swimming pools, botanical/ zoological garden, bird sanctuary, green belts, bus and railway passenger terminals, public utilities and facilities such as police post, fire post, post and telegraph office, health center for players and staff, animal racing or riding stables, library, incidental/ancillary residential use.

II. Uses/Activities Permissible on Application to Competent Authority (with conditions/ upto 30% area on special consideration):

Building and structure ancillary to use permitted in open spaces and parks such as stands for vehicles on hire, taxis and scooters, commercial use of transit nature like cinemas, circus and other shows, public assembly halls, restaurants, parking areas, caravan parks, open air cinemas/ theatre, entertainment and recreational complexes, community hall,

library, open air theater, theme parks, amphitheaters, residential club, guest house, camping sites, yoga and meditation centers, fire post, police station, post and telegraph office, commercial uses center, special education areas.

III. Prohibited Uses/Activities:

Any building or structure, which is not required for open air recreation, dwelling unit except for watch and ward, and uses not specifically permitted therein, all uses not specifically permitted herein.

Transportation and communication Use Zone:

In Transportation Use Zone 'T' (Roads, Railways, Airport and Bus Depots/Truck Terminal/ Freight) have been marked for general guidance.

I. Uses/Activities Permitted:

All types of roads, railway stations and yards, airport, bus stops and bus and truck terminals, taxi stands, auto stands, rickshaw stands, ferry ghats, parking areas, multi-level car parking, filling stations, transport offices, booking offices, information kiosks, night shelter, boarding houses, banks, restaurants, workshops and garages, automobile spares and services, godowns, loading and unloading platforms (with/without cold storage facility), weigh bridges, ware houses, storage depots, utility networks (drainage, sewage, power, tele-communications).

II. Uses/Activities Permissible on Application to Competent Authority (with conditions/ upto 30% area on special consideration):

Way side shops and restaurants authorized/Planned Vending areas, incidental/ancillary residential use, emergency health care centre, tourism related projects, all ancillary (complimentary) uses for above categories (subject to decision of the Authority).

III. Prohibited Uses/Activities:

Use/activity not specifically related to transport and communication permitted herein, all uses not specifically permitted herein.

Primary Activity Use Zone:

In Agriculture Use Zone 'A' (Agriculture and Horticulture, Forest, Brick kilns and Extractive Area) have been marked for general guidance.

I. Uses/Activities Permitted:

Agriculture and Horticulture, dairy and poultry farming, milk chilling center, storage, processing, and sale of farm products, dwelling for the people engaged in the farm (rural settlement), farmhouses and accessory buildings, public utility and facility buildings, forest use, afforestation.

II. Uses/Activities Permissible on Application to Competent Authority (with conditions/ upto 30% area on special consideration):

Houses incidental to this use, parks and other recreational uses, wayside shops and restaurants, educational and research institutions, agro serving, agro processing, agro business, cottage industries, burial and cremation grounds, service industries accessory to obnoxious and hazardous industries, ice factory, cold storage, godowns and ware houses, soil testing lab, normal expansion of land uses only in the existing homestead land, special outdoor recreations, solid waste management sites, Sewage disposal works, electric sub-station, quarrying of gravel, sand, clay or stone, building construction over plots covered under town planning scheme and conforming uses, brick kilns and extractive areas, servicing and repair of farm machineries and the sale of agricultural supply, small scale fertilizer chemicals, alcohol and distillery industry, petrol and other fuel filling stations, hospital for infectious and contagious diseases, mental hospital after clearance from the Authority, eco-tourism, camping sites, eco-parks, eco lodges, special outdoor recreations.

III. Prohibited Uses/Activities:

Residential use except those ancillary uses permitted in agricultural use zone, heavy, extensive, obnoxious, noxious and hazardous industries, any activity which is creating nuisance and is obnoxious in nature, for notified forest lands only afforestation is permitted and eco-tourism, camping sites, eco-parks, eco lodges, special outdoor recreations are permissible by the competent authority, all uses not specifically permitted here in.

Water Bodies Use Zone:

In Water bodies Use Zone 'W' (River/Canal/Streams/Water Spring, Ponds/Lakes/Wetland/Aqua culture pond and Waterlogged/Marshy area) have been marked for general guidance.

I. Uses/Activities Permitted:

Rivers, canals, streams, water spring, ponds, lakes, wetland, aqua culture pond, reservoir, waterlogged/marshy area.

II. Uses/Activities Permissible on Application to Competent Authority (with conditions/ upto 30% area on special consideration):

Fisheries, boating, water theme parks, water sports, lagoons, water-based resort with special by-laws, any other use/activity incidental to Water Bodies use is permitted.

III. Prohibited Uses/Activities:

Use/activity not specifically related to Water bodies Use not permitted here in, all uses not specifically permitted here in.

Table 15.2: Shows the (a) Uses/Activities Permitted (b) Uses/Activities permissible on application to the Competent Authority (with conditions / up to 30% area on special consideration) & (c) Activities Prohibited as it has been already stated according to the Model Zoning regulations.

Use Zone	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
	A	B	C
RESIDENTIAL **(Primary residential zone, unplanned / informal residential Zone)**	Residence plotted (detached, semidetached and row housing), group housing, work-cum- residential centre	Dharmshala foreign missions, night shelters	Heavy, large, and extensive industries, noxious, obnoxious, and hazardous industries
	Hostels, boarding and lodging houses (accommodation for transit employees of Govt/Local bodies) houses.	petrol pumps, motor vehicle repairing workshop / garages,	Warehousing, storage godowns of perishables,
	marriage hall, community hall	household industry, bakeries, and confectionaries,	hazardous, inflammable goods,
	old age home	storage of LPG gas cylinders,	wholesale mandis, junk yards
	police post	burial grounds	Workshops for buses
	guest houses	restaurants and hotels	Slaughterhouses
	Crèches	printing press	Hospitals treating contagious diseases
	Day care centre	godowns/ warehousing	Sewage treatment plants and disposal sites
	Convenience shopping centers, local (retail shopping)	bus depots without workshop	water treatment plant
	Medical clinic, dispensaries, nursing home and health centers, (20 bed), dispensary for pets and animals.	cinema hall, auditoriums, markets for retail goods,	solid waste dumping yards
	professional offices, educational buildings: nursery, primary, high school, college), school for mentally/ physically challenged.	weekly markets (if not obstructing traffic circulation and open during non-working hours)	outdoor games stadium, indoor games stadium
	research institutes	informal markets	shooting range
	community centre	multipurpose or junior technical shops	zoological garden

Use Zone	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
	religious premises	transient visitors camp	botanical garden
	library	municipal, state, and central government offices.	bird sanctuary
	gymnasium		picnic hut
	park/tot-lots		international conference centre
	plant nursery		courts
	technical training centre, yoga centers/health clinic		sports training centre
	exhibition and art gallery, clubs		reformatory
	A	B	C
	banks/ATM, police stations		district battalion office
	taxi stand /three-wheeler stands, bus stops		forensic science laboratory
	electrical distribution depot		
	water pumping station		
	post offices		
	hostels of non-commercial nature		
	kinder gardens		
	public utilities		

Use Zone	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
	A	B	C
COMMERCIAL USE **(Retail shopping zone, general business and commercial district / centers, wholesale godowns, warehousing/ Regulated markets, service sector, regulated / informal weekly markets)**	shops, convenience neighborhood shopping centre,	non-polluting, non-obnoxious light industries	Dwellings except those of service apartment
	local shopping centers	warehousing / storage go downs of perishable	essential operational: watch and ward personnel
	professional offices, workplaces/ offices	inflammable goods, coal, wood, timber yards	heavy, extensive, noxious obnoxious, hazardous, and extractive industrial units
	banks	bus and truck depots	Hospitals / research laboratories treating contagious diseases.
	stock exchange / financial institutions	gas installation and gas works	poultry farms/dairy farms
	bakeries and confectionaries	poly techniques a higher technical institute	slaughterhouses
	cinema hall/ theatres	junk yards	sewage treatment / disposal sites
	malls, banquet halls	water treatment plant	agricultural uses,
	guest houses	railway yards/stadium and public utility installation	storage of perishable and inflammable Commodities
	restaurants, hotels	hotel and transient visitors' homes	quarrying of gravel, sand, clay, and stone,
	weekly market	religious buildings	zoological garden, botanical garden, bird sanctuary, picnic hut
	petrol pumps	hospitals and nursing homes	international conference centre
	go-downs and ware housing		courts

Use Zone	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
	A	B	C
	general business		sports training centre
	wholesales		reformatory
	residential plot group housing		district battalion office
	hostel/boarding housing		forensic science laboratory
	hostel		all other activities which may cause nuisance and are noxious and obnoxious in nature
	auditoriums		
	colleges		
	nursing homes/medical clinics, pet clinics		
	religious places		
	commercial centers		
	research/training institute		
	commercial services centers/ garages/work shops		
	night shelter, weekly/ informal markets		
	library, parks/open space		
	museum		
	police stations/post taxi stand /three-wheeler stands, parking site		
	post offices, government/institutional offices, telephone exchange/centers		
	Warehousing covered storage, research institutions		

Use Zone	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
	A	B	C
INDUSTRIAL USE ZONE **(Service and Light Industry, extensive and Heavy Industry, Special Industrial Zone- Hazardous, Noxious and Chemical)**	Residential building for essential staff and for watch and ward personnel.	Noxious, obnoxious, and hazardous industries except storage of perishable and inflammable goods,	Residential dwellings other than those essential operational
	all kind of industries	junkyards, sports / stadium/playground	service and watch and ward staff
	public utilities	sewage disposal works	schools and colleges
	parking	electric power plants	hotels, motels, and caravan parks
	loading, unloading spaces	service stations	recreational sports or centers
	warehousing, storage and depot of non-perishable and noninflammable commodities and incidental use.	cemeteries government/private business offices	other non-industrial related activities
	cold storage and ice factory	bank and financial institutions	religious buildings
	gas godowns	helipads, hospitals/medical centers	irrigated and sewage farms
	cinema	religious buildings	major oil depot and LPG refilling plants
	bus terminal	taxi stands	commercial office
	bus depot and workshop	gas installations and gas	educational institutions

Use Zone	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
		works	
	wholesale business establishments	animal racing or riding stables	social buildings
	petrol filling stations with garage and service stations	workshops/garages,	
	parks and playgrounds	dairy and farming	
	medical centers, restaurants	quarrying of gravel, sand, clay, or stone.	

Use Zone	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
	A	B	C
PUBLIC AND SEMI-PUBLIC USE ZONE **(Govt / semi Govt / Public Offices, Govt land use, Police Headquarter / Station, police Line, educational & Research, Medical & Health, Socio cultural & Religious (incl. cremation and Burial grounds)**	Government offices, central, state local and semi-Government, Public undertaking offices.	Residential flat and residential plot for group housing for staff employees' hostels.	heavy, extensive, noxious obnoxious, hazardous and extractive industrial units
	defense court, universities, and specialized educational institute	Water supply installation	slaughterhouses
	polytechnic	sewage disposal works	junk yards
	colleges	service stations	wholesale mandis
	schools, nursery, and kinder garden (not to be located near hospital or health care facility)	railway station/yards/bus / truck terminals	dairy and poultry farms
	research and development centers	burial grounds cremation grounds and cemeteries / graveyards.	farms- houses
	social and welfare centers	Warehouse/ storage godowns	workshop for servicing and repairs
	libraries, social and cultural institutes	helipads commercial uses/ centers	processing and sale of farm product and uses not specifically permitted herein.
	religious buildings / centers	other uses/ activities	
	conference halls, community halls, marriage halls		
	dharmshala		
	guest house		
	museum/art galleries		
	exhibition centers, auditorium, open air theatre		
	recreational club, playground		
	banks, police station/police posts, police lines, police headquarters, jails		
	fire station/ fire posts		
	post offices		
	public utilities and buildings		
	solid waste dumping ground / sites		
	local state and central government offices and use for defense purposes.		
	bus and railway passengers' terminals, public utility, and buildings		
	local municipal facilities		
	uses incidental to Government offices and for their use		

Use Zone	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
	monuments		
	radio transmitter and wireless stations, telecommunication centre, telephone exchange		
	hospitals, health centers, nursing homes, dispensaries, and clinic		

Use Zone	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
	A	B	C
MIXED USE ZONE **(Mixed Industrial use, Mixed Residential use, Mixed Commercial)**	In M1 Zone activities falling within non-polluting industry/service industry (dominant land use) categories can coexist with maximum up to 30% of commercial institutional, recreational, and residential land use.	Activities related to commercial, institutional, and residential land use in M1 zone and non-polluting industrial land use in M2 Zone can be increased to between 20-50% depending on the contextual and locational feasibility of the area.	All other activities especially industrial which are polluting in nature, and which will have an adverse impact on the overall activities of this zone.
	In M2 Zone all activities falling within permitted residential land use (dominant land use) shall be minimum 60% and to coexist with commercial, institutional, recreational.		Note: Mixed land use to be well defined by the Development control body by prescribing the limits on the use of activity based on the abutting road width, compatible uses, plots size, ground coverage, FAR/FSI, density, any other urban design guidelines.
	In M3 Zone all activities falling within permitted commercial, institutional land use (dominant land use) shall be minimum 60% and to coexist with residential, recreational, and non-polluting and household industry.		
Use Zone	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
	A	B	C
RECREATIONAL USE ZONE **(Playgrounds / Stadium / Sports Complex, Parks, and Gardens- Public Open Spaces and Multi-Open Space)**	Regional parks, district parks, playgrounds, children traffic parks,		Any building or structure which is not required for open air recreation, dwelling unit except for watch and ward personnel and uses not specifically permitted therein.
	Botanical / zoological garden, bird sanctuary	facilities such as police post, fire post, post, and telegraph office,	
	Clubs	commercial use of transit nature like cinema, circus, and other shows	
	stadiums (indoor), outdoor stadiums	public assembly halls	

Use Zone	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
	with/ without health centre for players and staff		
	picnic huts, holiday resorts	restaurants and caravan parks	
	shooting range, sports training centers	sports stadium	
	specialized parks/ maidans for multi-use	Open air cinemas	
	swimming pool		
	special recreation and special educational utilities.		

Use Zone	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
	A	B	C
TRANSPORT AND COMMUNICATION USE ZONE (Roads / BRTS, Railway / MRTS, Airport, Sea Ports / Dockyard, Bus Depots / Truck Terminals and Freight Complexes, Transmission and Communication)	Road transport terminals (bus terminals and depots)	Any other use / activity incidental to transport and communication, residential dwelling units for essential staff and watch and ward personnel.	Use/activity not specifically permitted herein. In vicinity of airports: butcheries tanneries and solid waste disposal sites shall be prohibited within 10 km from the Aerodrome Reference Point (ARP)
	goods terminals		
	parking areas, circulations, airport, building and infrastructure		
	truck terminal		
	motor garage, workshop		
	repair and repair shop and		
	facilities such as night shelter, boarding house,		
	banks		
	restaurants		
	booking offices		
	transmission centre, wireless station, radio, and television station		
	observatory and weather office		

Use Zones	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
	A	B	C
PRIMARY ACTIVITY USE ZONE (Agriculture, Forest, Poultry and Dairy Farming, Rural Settlements, Brick Kiln and Extractive Areas, Others like Fishing Pottery etc.)	Dwelling for the people engaged in the farm (rural settlement),	Farmhouses, extensive industry,	heavy extensive, noxious, obnoxious, and hazardous industries,
	farmhouses and accessory buildings,	brick kilns,	any activity which is creating nuisance and is Obnoxious in nature.
	agriculture,	Sewage Disposal Works,	
	horticulture and forestry,	Electric Power Plant,	
	poultry, piggeries, and dairy farm,	Quarrying of gravel, sand, clay, or stone,	
	cottage industries,	service industries	

Use Zones	Uses/Activities Permitted	Uses/Activities Permitted on application to the Competent	Authority Uses/Activities Prohibited
	storage, processing, and sale of farm produce,	accessory to obnoxious and hazardous industries,	
	petrol and other fuel filling stations,	school and library,	
	fishing,	temple, churches	
	Public utility and facility buildings.		
	Residential uses permissible only after subdivision of land by the Authority in case of normal expansion of existing human habitation.		

Each Planning Zone can be put to such use(s) as detailed out in the Master Plan. The proposed Land use Plan indicates the location of broad uses and major facility areas. The requirements of these facilities are subject to necessary modifications when the detailed Zonal Development Plans are conceived. Therefore, the purpose of Zonal / Sub-zonal byelaws and regulations is not to stop the urban development activities in the Planning Area but to serve as broad policy framework for the promotion of planned development. The Master Plan proposes building activity within the prescribed Local Area limits should be controlled and guided by following set of regulations as spelt out.

The aim of enforcing the regulations is to achieve a desirable development pattern and structure with good quality of life. To ensure complete harmony between land uses, town has been divided into various Use Zones including Residential, Commercial, Mixed use, industrial, Recreational, Public & Semi-Public, Transport & Communication, Agriculture, Plantation, Water bodies etc. However, in enforcing master Plan proposals the regulations have been made efficient to avoid inconvenience to public. Mixed land use concept has also been adopted and prescribed which shall need approval of Government. The adoption of mixed land use concept is to enhance functionality of the uses.

15.3 Space Standards & Development and Design Controls

Space standards are fundamental to obtain the basic objective of Zoning Regulations to achieve desirable pattern of development in each Use Zone. Strict enforcement is needed to achieve articulated urban development as envisaged in the Master Plan.

Table 15.3: Spatial Norms and Standards

S. N	Description	Standard Prescribed	Plot Area / Unit (HA)
A	**Educational Facilities**		
1	Pre-Primary School	1 for 2,500 – 4,000 Population	0.08
2	Primary School (including a playfield)	500 students / 4,000 Population	0.40
3	Middle School (including a playfield)	1000 students or 1 for 7,500 Population	0.60
4	Middle School with Hostel	1000 students or 1 for 7,500 Population	0.75
5	Higher Secondary School (IX-XII) including a playfield	1000 students or 1 for 10,000 Population	1.60
6	Higher Secondary School (IX-XII) with Hostel	1000 students or 1 for 1,00,000 Population	2.00
7	Integrated School (Class I-XII) with Hostel	1000 students or 1 for 1,00,000 Population	3.90
8	Integrated School (Class I-XII) without Hostel	1500 students or 1 for 1,00,000 Population	3.50
9	School for Handicapped (including a playfield)	400 students / 45,000 Population	0.50
10	College (including a hostel and playfield)	Students 1000-15000 or 1.25 Lac Population	4.00
11	University campus without residential quarters	-	10.00
12	New University Campus with residential quarters	-	30.00
13	Industrial Training Institute (ITI)	500 students / 10 Lac Population	2.00
14	Polytechnic	400 students / 10 Lac Population	2.00
15	New Engineering College	1500-1700 Students	30.00

S. N	Description	Standard Prescribed	Plot Area / Unit (HA)
16	Medical College with Specialized General Hospital	1500-1700 Students	15.00
B	**Health Care Facilities**		
17	Health Unit / Dispensary	1 for 15,000 Population	0.10
18	Nursing Home / Maternity Centre	30 Beds / 1 per 45,000 Population	0.25
19	Polyclinic with some observation beds	1 for 1 Lac Population	0.25
20	General Hospital (300-500 beds) with residential accommodation	1 for 1 to 2.5 Lac Population	6.00
21	Intermediate Hospital with residential accommodation	100-200 Beds / 1 Lac Population	3.70
22	Intermediate Hospital	80-100 Beds / 1 Lac Population	1.00
C	**Socio-Cultural Facilities**		
23	Community Room	1 per 5,000 Population	0.10
24	Community Hall and Library or Multi-purpose Hall	1 per 15,000 Population	0.20
25	Recreational Club	1 per 15,000 Population	0.30
26	Recreational Club	1 per 50,000 Population	0.50
27	Recreational Club	1 for 1 Lac Population	1.00
28	Music, Dance & Drama Centre	1 for 1 Lac Population	0.20
29	Club Houses	1 for 1 Lac Population	1.00
30	Museum & Art Gallery with Parking	-	1.00
31	Community Centre with Hall and Library etc.	1 for 15,000 Population	0.30
32	Meditation and Spiritual Centre	1 for 50,000 Population	0.50
33	Botanical / Zoological Park	1 for 1 Lac Population	5.00
34	Exhibition Area (s)	1 for 1 to 10 Lac Population	10.00
35	Cinema / Theatre	1 for 1 Lac Population	0.50
36	Stadia / Sports Centre / Complex	1 for 1 Lac Population	8.00
37	Mini-Play Field	1 for 2,500 Population	0.75
38	Play Field	1 for 15,000 Population	1.50
39	Religious Place / Structure	1 for 2,000 Population (for all community)	0.20
40	Religious Place / Structure	1 for 10,000 Population (for all community)	0.50
41	Graveyards	1 for 20,000 Population	2.00
42	Cremation Ground	1 for 50,000 Population	0.50
D	**Distribution Services**		
43	Post and Telegraph Office	1 for 1.5 Lac Population	0.40
44	Post Office	1 for 40,000 Population	-
45	Telephone Exchange	-	0.20
46	Petrol Pump	1 per 225 ha of Gross Residential Density	0.20
47	Petrol Pump	1 per 40 ha of gross Industrial Density	0.20
48	Milk Booth	1 for 5,000 Population	-
49	LPG Godown	1 for 50,000 Population	0.20
50	LPG Plant with Bottling Facility	-	1.00
51	Electrical Sub Station of 11 KV	1 for 15,000 Population	-
52	Electrical Sub Station 66 KV	1 for 1 Lac Population	-
E	**Police and Fire Services**		
54	Police Station	1 for 90,000 Population	1.50
55	Police Post	1 for 40,000 Population	0.20
56	Fire Station	1 for 90,000 Population	1.50
F	**Slaughterhouse**		
57	Slaughterhouse	1 for 1 Lac Population	0.40
58	Abattoir	1 for 1 Lac Population	1.00

15.4 Urban Design Guidelines

15.4.1 Urban Design Concept

Urban design is the discipline through which planning, and architecture can create or renew a sense of local pride and identity. It has great potential for enhancing the visual image and quality of neighborhoods by providing a three-dimensional physical form to policies described in the Master Plan. It focuses on design of the public realm, which is created by both public spaces and the buildings that define them. Urban design views these spaces holistically and is concerned with bringing together the different disciplines responsible for the components of cities into a unified vision. Compared to comprehensive plans, urban design plans generally have a short time horizon and are typically area or project specific. Key elements of an urban design plan include the plan itself, the preparation of design guidelines for buildings, the design of the public realm - the open space, streets, sidewalks, and plazas between and around buildings and the public interest issues of buildings. These include massing, placement, sun, shadow, and wind issues.

Vision

To guide physical development toward a desired scale and character that is consistent with the social, economic, and aesthetic values of the city.

Specific Guidelines

a) Natural Features

Preserve and protect natural landforms and features. Conserve natural environment and create a linked open space system. Preserve and enhance naturally occurring features such as wetlands, riverfronts, slopes, and forests.

b) Open Space Linkages

- Link neighborhood, public attractions, parks, and other destinations together through trail systems, bikeways, landscaped boulevards, formalized parks, and natural open space.
- Preserve and encourage preservation of physical connectivity and access to open space.

Recognize that sometimes open spaces prevent the continuation of transportation corridors and inhibit mobility between communities. Where conflicts exist between mobility and open space goals, site-specific solutions may be addressed in community plans.

c) Development Adjacent to Natural Features (River and Hill slopes)

- Design, development adjacent to natural features in a sensitive manner to highlight and complement the natural environment in areas designated for development;
- Integrate development on river fronts with the natural environment to preserve and enhance views, and protect areas of natural drainage;
- Minimize grading to maintain the natural topography, while contouring any landform alterations to blend into the natural terrain;
- Screen development adjacent to natural features as appropriate so that development does not appear visually intrusive, or interfere with the experience within the open space system. The provision of enhanced landscaping adjacent to natural features could be used to soften the appearance of or buffer development from the natural features;
- Use building and landscape materials that blend with and do not create visual or other conflicts with the natural environment;
- Design and site buildings to permit visual and physical access to the natural features from the public right-of-

way;

- Encourage location of entrances and windows in development adjacent to open space to overlook the natural features;
- Protect views from public roadways and parklands to natural canyons, resource areas, and scenic vistas.
- Provide public pedestrian, bicycle, and equestrian access paths to scenic view points, parklands, and where consistent with resource protection, in natural resource open space areas;
- Provide special consideration to the sensitive environmental design of roadways that traverse natural open space systems to ensure an integrated aesthetic design that respects open space resources. This could include the use of alternative materials such as “quiet pavement” in noise sensitive locations, and bridge or roadway designs that respect the natural environment.

d) Street Frontage

- Create street frontages with architectural and landscape interest to provide visual appeal to the streetscape and enhance the pedestrian experience.
- Locate buildings on the site so that they reinforce street frontages.
- Relate buildings to existing and planned adjacent uses.
- Ensure that building entries are prominent, visible, and well-located.
- Maintain existing setback patterns, except where community plans call for a change to the existing pattern.

e) Historic Character

- Respect the context of historic streets, landmarks, and areas that give a community a sense of place or history. A survey may be done to identify "conservation areas" that retain original community character insufficient quantity and quality but typically do not meet designation criteria as an individual historical resource or as a contributor to ahistorical district.
- Create guidelines in community plans to be used for new development, so that a neighborhood's historic character is complemented within the conservation areas where appropriate.
- Review the redevelopment of property within conservation areas to maintain important aspects of the surviving community character that have been identified as characteristics of a neighborhood that could be preserved.

f) Public Spaces

- Include public plazas, squares, or other gathering spaces in each neighborhood center.
- Locate public spaces in prominent, recognizable, and accessible locations.
- Design outdoor open areas as “outdoor rooms,” developing a hierarchy of usable spaces that create a sense of enclosure using landscape, paving, walls, lighting, and structures.
- Develop each public space with a unique character, specific to its site and use.
- Design public spaces to accommodate a variety of artistic, social, cultural, and recreational opportunities including civic gatherings such as festivals, markets, performances, and exhibits.
- Consider artistic, cultural, and social activities unique to the neighborhood and designed for varying age groups that can be incorporated into the space.
- Use landscape, hardscape, and public art to improve the quality of public spaces.
- Encourage the active management and programming of public spaces.
- Design outdoor spaces to allow for both shade and the penetration of sunlight.
- Frame parks and plazas with buildings, which visually contain and provide natural surveillance into the open space.

g) Civic Architecture and Landmarks

- Treat and locate civic architecture and landmark institutions prominently.
- Where feasible, provide distinctive public open space, public art, greens, and/or plazas around civic buildings such as courthouses, libraries, post offices, and community centers to enhance the character of these civic and public buildings. Such civic and public buildings are widely used and should form the focal point for neighborhoods and communities.
- Incorporate sustainable building principles into building design.
- Civic buildings at prominent locations, sites fronting open space, sites framing a public vista, and those affording a silhouette against the sky should exhibit notable architecture.
- Encourage innovative designs that distinguish civic and public buildings and landmarks from the surrounding neighborhood as a means of identifying their role as focal points for the community.

h) Landscape

- Landscape materials and design should enhance structures, create, and define public and private spaces, and provide shade, aesthetic, and environmental benefits
- Maximize the planting of new trees, street trees and other plants for their shading, air quality, and livability benefits.
- Use water conservation using drought-tolerant landscape, porous materials, and reclaimed water where available.
- Use landscape to support storm water management goals for filtration, percolation, and erosion control.
- Use landscape to provide unique identities within neighborhoods, villages, and other developed areas.
- Landscape materials and design should complement and build upon the existing character of the neighborhood.
- Design landscape bordering the pedestrian network with new elements, such as a new plant form or material, at a scale and intervals appropriate to the site. This is not intended to discourage a uniform street tree or landscape theme, but to add interest to the streetscape and enhance the pedestrian experience.
- Establish or maintain tree-lined residential and commercial streets. Neighborhoods and commercial corridors in the town that contain tree-lined streets present a streetscape that creates a distinctive character.
    - Identify and plant trees that complement and expand on the surrounding street tree fabric.
    - Unify communities by using street trees to link residential areas.
    - Locate street trees in a manner that does not obstruct ground illumination from streetlights.

- Shade paved areas, especially parking lots.
- Demarcate public, semi-public/private, and private spaces clearly using landscape, walls, fences, gates, pavement treatment, signs, and other methods to denote boundaries and/or buffers.
- Use landscaped walkways to direct people to proper entrances and away from private areas.
- Reduce barriers to views or light by selecting appropriate tree types, pruning thick hedges, and large overhanging tree canopies.
- Utilize landscape adjacent to natural features to soften the visual appearance of a development and provide a natural buffer between the development and open space areas.

i) Parking

- Reduce the amount and visual impact of surface parking lots.
- Encourage placement of parking along the rear and sides of street-oriented buildings.
- Avoid blank walls facing onto parking lots by promoting treatments that use colors, materials,

landscape, selective openings, or other means of creating interest.

- Design clear and attractive pedestrian passes/pathways and signs that link parking and destinations.
- Locate pedestrian pathways in areas where vehicular access is limited.
- Avoid large areas of uninterrupted parking especially adjacent to community public view sheds.
- Build multiple small parking lots in lieu of one large lot.
- Retrofit existing expansive parking lots with street trees, landscape, pedestrian paths, and new building placement.
- Promote the use of pervious surface materials to reduce runoff and infiltrate storm water.
- Use trees and other landscape to provide shade, screening, and filtering of storm water runoff in parking lots

j) Lighting

- Provide lighting from a variety of sources at appropriate intensities and qualities for safety.
- Provide pedestrian-scaled lighting for pedestrian circulation and visibility.
- Use effective lighting for vehicular traffic while not overwhelming the quality of pedestrian lighting.
- Use lighting to convey a sense of safety while minimizing glare and contrast.
- Use vandal-resistant light fixtures that complement the neighborhood and character.
- Focus lighting to eliminate spill-over so that lighting is directed, intended use is illuminated.

k) Signage

- Design project signage to effectively utilize sign area and complement the character of the structure and setting
- Architecturally integrate signage into project design.
- Include pedestrian-oriented signs to acquaint users to various aspects of a development. Place signs to direct vehicular and pedestrian circulation.
- Post signs to provide directions and rules of conduct where appropriate behavior control is necessary.
- Design signs to minimize negative visual impacts.
- Address community-specific signage issues in community plans, where needed.

l) Utilities

- Minimize the visual and functional impact of utility systems and equipment on streets, sidewalks, and the public realm.
- Convert overhead utility wires and poles, and overhead structures such as those associated with supplying electric, communication, community antenna television, or similar service to underground.
- Design and locate public and private utility infrastructure, such as phone, cable and communications boxes, transformers, meters, fuel ports, back-flow preventers, ventilation grilles, grease interceptors, irrigation valves, and any similar elements, to be integrated into adjacent development and as inconspicuous as possible.
- To minimize obstructions, elements in the sidewalk and public right of way should be in below grade vaults or building recesses that do not encroach on the right of way (to the maximum extent permitted by codes). If located in a landscaped setback, they should be as far from the sidewalk as possible, clustered, and integrated into the landscape design, and screened from public view with plant and/or fencelike elements.
- Traffic operational features such as streetlights, traffic signals, control boxes, street signs and similar facilities should be located and consolidated on poles, to minimize clutter, improve safety, and maximize public pedestrian access, especially at intersections and sidewalk ramps. Other street utilities such as storm drains and vaults should be carefully located to afford proper placement of the vertical elements.

Facade Development and Control Measures

In the town areas, absolute architectural and zoning control should be adhered to and remain operative. These include volume, outline and skyline, forms, spatial setting, facades, materials, textures, colours, fenestrations and even the basic outer boundary wall and gates. Since the experiment of developing small plots attached to each other and showing common walls on both the sides according to zoning guidelines resulted in a haphazard street picture, the need for frame controls was felt. Frame control design comprises of fixing the extent and heights of the party walls and a top course and connecting them with a frame. The building portion which can be of any design stays behind the frame. This is needed because most of the construction has skewed proportions, using all sorts of materials without any consideration for aesthetics and ethnic material and proportion.

(i) Design Concepts and Proportions of Building Elements

The shape of the building will be determined by its functional mass. False appurtenances and decorative architectural elements with no function will not be permitted. It is intended that the style be rustic, solid, and true, with its elegance and grace provided by good proportions, good massing, and good relationship to the other buildings.

(ii) Land Slope and Contours

Design must evolve considering zero or minimal alteration of existing slopes and contours. Slope cutting shall not be allowed to accommodate any structure that is not compatible to slopes and contours.

(iii) Landforms and Geographical Character of Soil

Landforms and geographical character must be respected while planning any road access and the raising of structure and its allied infrastructure. No retaining wall of concrete or stone shall be permitted for forced placement of any building.

(iv) Impact on Environment

Services such as garbage disposal, wastewater management, Sewerage etc., shall be individually or collectively managed to leave underground or above ground resources unpolluted.

(v) Energy Efficient Planning

All building placements, their windows and roof slopes along with tree foliage shall be planned to achieve maximum energy efficient designs to reduce dependence on mechanical and non-renewable energy resources which otherwise are environmentally and financially expensive.

Investment Plan

Chapter 16. Investment Plan

16.1 Introduction

The different sectoral projects for Balasore Planning Area have been drawn up for implementation over the period up to the horizon year-2030. The summary of Sector- wise identified projects required for the realization of the Master Plan proposals have been discussed in the section below.

16.2 Sector-wise Identified Projects

A summary of sector-wise investment plan for all the sectors covering traffic and transportation, physical infrastructure, social infrastructure, commercial facilities, recreational facilities, river front development, environment and development of industrial areas have been shown in the **Tables 16.1-16.11 below.**

Table 16.1: Identified Projects for Traffic and Transportation

S. No.	Project	Unit	Total Cost (in Lakh)
1	Repair and Renovation of Existing Road Network of Balasore Town	-	1,500.00
2	Improvement and Renovation of Balasore and Balasore Railway Stations	-	600.00
3	Development of Bus terminal – I (5.07 Ha)	HA	456.30
4	Development of Bus terminal – II (5.08 Ha)	HA	457.20
5	Development of Integrated Freight Complex - I (58.89 Ha)	HA	5,300.10
6	Development of Integrated Freight Complex - II (21.07 Ha)	HA	1,896.30
7	Development of Truck Terminal (9.86 Ha)	HA	1,093.00
8	Preparation of DPR on City Mobility Plan (Sanctioned Under AMRUT)	-	500.00
9	Augmentation of City Bus Fleet (Sanctioned Under AMRUT)	-	1,000.00
10	Construction of Cycle parking near Bus stand (Sanctioned Under AMRUT)	-	300.00
11	Up gradation of Bus Depots (Sanctioned Under AMRUT)	-	50.00
12	Development of Transport Nagar (Sanctioned Under AMRUT)	-	1,000.00
13	Construction of Foot Over Bridges (Sanctioned Under AMRUT)	-	300.00
14	Construction of Non-motorized Transport facilities (Footpaths & Cycle Tracks & Cycle Parking) (Sanctioned Under AMRUT)	-	600.00

Source: Consultant's estimation

Table 16.2: Identified Water Supply Projects

S. No.	Project	Total Cost (in Lakh)
1	Preparation of DPR for Water Supply System for Balasore Planning Area	500.00
2	Improvement of Water Supply System of Balasore	1,200.00
3	Laying of truck water distribution System in new Areas	1,100.00

Source: Consultant's estimation

Table 16.3 Identified Drainage Improvement Projects

S. No.	Project	Total Cost (in Lakh)
1	Preparation of DPR for Drainage System for Balasore Planning Area	500.00
2	Cleaning and maintenance of existing main drains	1,500.00
3	Laying of Roadside drains in new proposed areas within Balasore Planning Area	3,000.00
4	Construction and Improvement of Existing Storm Water Drains	2,000.00

Source: Consultant's estimation

Table 16.4 Identified Solid Waste Management Projects

S. No.	Project	Total Cost (in Lakh)
1	Improvement and Modernization of Solid Waste Collection, Transportation and Disposal System of Balasore	250.00
2	Development of Solid Waste Engineering Landfill Site on 12.68 Hectare of Land	1,141.20

Source: Consultant's estimation

Table 16.5: Identified Projects for Social Infrastructure

S. No.	Project	Total Cost (in Lakh)
1	Development of Multi-Specialist Hospital (1 Ha)	90.00
2	Development of Hospital (36.41 Ha)	3,276.90
3	Development of Education Hub (24.44 Ha)	2,199.60

Source: Consultant's estimation

Table 16.6: Identified Projects for Commercial facilities

S. No.	Project	Total Cost (in Lakh)
1	Development of Wholesale and Trade Centre (28.94 Ha)	2,604.60
2	Development of Wholesale and Trade Centre (22.38Ha)	2,014.20
3	Development of Wholesale and Trade Centre (25.21 Ha)	2,268.90
4	Development of Community Centre (15.15 Ha)	1,363.50
5	Development of Community Centre (10.24 Ha)	921.60

Source: Consultant's estimation

Table 16.7: Identified Projects for Recreational facilities

S. No.	Project	Total Cost (in Lakh)
1	Development of Sport Complex (38.01 Ha)	972.90
2	Development of Recreational Centre (35.16 Ha)	3,164.40
3	Development of Recreational Centre (36.44 Ha)	3,279.60
4	Development of Recreational Centre (53.86 Ha)	4,847.40
5	Development of Multi-purpose ground (52.73 Ha)	2,243.70
6	Development of Exhibition ground (54.97 Ha)	2,270.70
7	Development of District Park (197.13 Ha)	2,360.70

Source: Consultant's estimation

Note: *The Recreational Areas shall be designed in 53.13 Ha. The areas for the development of the three Recreational Centre mentioned above includes Budhabalanga River Front and River Green Buffer area.*

Table 16.8: Identified Projects for Power

S. No.	Project Name	Total Cost (in Lakh)
1	Renovation and modernization of 33/11 KV and 11 KV / 440 V sub- stations	500
2	Installation of new transformers and capacity augmentation of existing transformers	350
3	Metering of all connections	350
4	Installation of a HVDS (High Voltage Distribution System);	650
5	Preparation of DPR for Power Supply System for Balasore Planning Area	400

Source: Consultant's estimation

Table 16.9: Identified Projects for River Front Development

S. No.	Project Name	Total Cost (in Lakh)
1	Development of Green Belt around all water bodies	1,000.00
2	Excavation and Cleaning of River Buda Balanga within Balasore Planning Area	1,500.00
3	Development of Buda Balanga Riverfront as recreational zone	4,000.00

Source: Consultant's estimation

Table 16.10: Identified Projects for Environmental Improvement

S. No.	Project Name	Total Cost (in Lakh)
1	Development of Bio-Diversity Park (50.43 Ha)	4,538.70
2	Plantation along River, Canal, Nallah, and Water Bodies	50.00

Source: Consultant's estimation

Table 16.11: Identified Projects for Industrial development

S. No.	Project Name	Total Cost (in Lakh)
1	Development of Industrial Estate – I (291.38 Ha)	26,224.20
2	Development of Industrial Estate – II (35.88 Ha)	3,229.20

Source: Consultant's estimation

16.3 Total Investment Proposal

The Master Plan of Balasore Planning Area will require a total public and private sector investment of approx. Rs. 1929.84 crores till horizon year 2030. The summation of all the costs of sectoral level plans provides the total estimate as detailed in Table below.

Table 16.12: Summation of Sectoral Investment Plan for Balasore Planning Area

S. No.	Sector	Approx. Cost (in Corers)
1	Traffic and Transportation	150.53
2	Physical Infrastructure	230.40
3	Social Infrastructure	55.67
4	Commercial Development	386.26
5	Heritage and Conservation	79.40
6	Recreational	215.87
7	Environment and Ecology	491.18
8	Mixed use/Neighborhood centers	320.52
Total		**1,929.84**

Source: Consultant's estimation

16.4 Phasing of Projects

Based on priority of targets, potential demand, and fiscal investment, it is held that the Master Plan will have a horizon period of 20-years to be implemented in four phases of 5-years duration. The Master Plan for Balasore Planning Area is proposed to be implemented from financial year 2011 to 2030.

It is proposed to prioritize development in such a way that initially those components are proposed that would induce spontaneous development in the region and connectivity to all major urban centers. It is proposed that Phase-1 shall comprise all those components which may act as catalysts and contain multiplying effects for development. Therefore, road connectivity, urban renewal of the old core area of Balasore town, development of neighborhood centers, flood control, development of physical infrastructure, etc. shall be taken up in Phase-I and Phase-II.

The follow-up phases i.e., Phase-III and IV shall have thrust on further industrial expansion, rehabilitation of slum pockets and land acquisition for further infrastructure development. The Master plan of Balasore being a legal guiding policy document asserts that possibilities of migration to other major urban centers have to be checked by providing the infrastructure is envisaged in the Master Plan.

Year	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Projects	**Phase-I**					**Phase-II**					**Phase-III**					**Phase-IV**				
Urban Development																				
Urban Renewal of Core Old Areas of Balasore Town																				
Development of Heritage Buildings of Balasore Town																				
Rehabilitation of Slums dwellers (72-Pockets) along River Budhabalanga and on Water Bodies located in Planning Area																				
Green Belt along Major Proposed Roads																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				

Year	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Projects	**Phase-I**					**Phase-II**					**Phase-III**					**Phase-IV**				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Neighborhood Centre																				
Water Supply System																				
Preparation of DPR for Water Supply System for Balasore Planning Area.																				
Improvement of Water Supply System of Balasore.																				
Laying of truck water distribution System in new Areas																				
Power																				
Renovation and modernization of 33/11 KV and 11 KV / 440 V sub- stations.																				
Installation of new transformers and capacity augmentation of existing transformers.																				
Metering of all connections.																				
Installation of a HVDS (High Voltage Distribution System).																				
Preparation of DPR for Power Supply System for Balasore Planning Area.																				
Sewerage System																				
Preparation of DPR for Sewerage System for Balasore Planning Area.																				
Laying of Sewer Network for Planning Area.																				
Construction of STP (14 MLD) on 3.31 Hectare of Land.																				
Construction of STP (15 MLD) on 3.34 Hectare of Land.																				
Solid Waste Management																				
Improvement and Modernization of Solid Waste Collection, Transportation and Disposal System of Balasore.																				
Development of Solid Waste Engineering Landfill Site on 12.68 Hectare of Land.																				
Drainage System																				
Preparation of DPR for Drainage System for Balasore Planning Area.																				

Year	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Projects	**Phase-I**					**Phase-II**					**Phase-III**					**Phase-IV**				
Cleaning and maintenance of existing main drains.																				
Laying of Roadside drains in new proposed areas within Balasore Planning Area.																				
Construction and Improvement of Existing Storm Water Drains.																				
Flood Control																				
Slope protection, Construction, Repair & Restoration																				
Slope protection, Construction, Repair & Restoration																				
Water Bodies																				
Development of Green Belt around all water bodies																				
Excavation and Renovation of High-Level Canal																				
Excavation and Cleaning of River Budhabalanga within Balasore Planning Area																				
Development of Budhabalanga Riverfront as recreational zone.																				
Traffic and Transportation																				
Repair and Renovation of Existing Road Network of Balasore Town																				
Improvement and Renovation of Balasore and Balasore Railway Stations																				
Development of Bus terminal – I (5.07 Ha)																				
Development of Bus terminal – II (5.08 Ha)																				
Development of Integrated Freight Complex - I (58.89 Ha)																				
Development of Integrated Freight Complex - II (21.07 Ha)																				
Development of Truck Terminal (9.86 Ha)																				
Preparation of DPR on City Mobility Plan (Sanctioned Under AMRUT)																				
Augmentation of City Bus Fleet (Sanctioned Under AMRUT)																				
Construction of Cycle parking near Bus stand (Sanctioned Under AMRUT)																				
Up gradation of Bus Depots (Sanctioned Under AMRUT)																				
Development of Transport Nagar (Sanctioned Under																				

Year	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Projects	**Phase-I**					**Phase-II**					**Phase-III**					**Phase-IV**				
AMRUT)																				
Construction of Foot Over Bridges (Sanctioned Under AMRUT)																				
Construction of Non-motorized Transport facilities (Footpaths & Cycle Tracks & Cycle Parking) (Sanctioned Under AMRUT)																				
Commercial																				
Development of Wholesale and Trade Centre (28.94 Ha)																				
Development of Wholesale and Trade Centre (22.38 Ha)																				
Development of Wholesale and Trade Centre (25.21 Ha)																				
Development of Community Centre (15.15 Ha)																				
Development of Community Centre (10.24 Ha)																				
Social Infrastructure																				
Development of Multi-Specialist Hospital (1 Ha)																				
Development of Hospital (36.41 Ha)																				
Development of Education Hub (24.44 Ha)																				
Environment and Ecology																				
Development of Bio-Diversity Park (50.43 Ha)																				
Plantation along River, Canal, Nallah and Water Bodies																				
Recreational																				
Development of Sport Complex (38.01 Ha)																				
Development of Recreational Centre (35.16 Ha)																				
Development of Recreational Centre (36.44 Ha)																				
Development of Recreational Centre (53.86 Ha)																				
Development of Multi-purpose ground (24.93 Ha)																				
Development of Exhibition ground (25.23 Ha)																				
Development of District Park (20.94 Ha)																				
Industrial Area																				
Development of Industrial Estate – I (291.38 Ha)																				
Development of Industrial Estate – II (35.88 Ha)																				

Annexure

Chapter 17. Annexure

List of Villages as per the Notification by BRIT (Balasore Regional Improvement Trust)

S. No.	Village	P.S. No.
1.	FIRINGIPATANA	1
2.	SAHADEVKHUNTA	2
3.	SOVARAMPUR	3
4.	ANGARAGADIA (1)	5
5.	ISAMNAGAR	7
6.	PADHUANPADA	8
7.	CHANDRAGADI	9
8.	BHASKARGANJ	10
9.	JADAPUR	11
10.	AKTIARPUR	12
11.	SRIKANTHAPUR	13
12.	GOPALGAON	14
13.	BAGBRUNDABAN	15
14.	MALLIKASHPUR	16
15.	MANASINGBAZAR	19
16.	NALAMGANJ	20
17.	BATESWAR	21
18.	SUELPUR	22
19.	MANIKHAMB	23
20.	BARABATI	24
21.	DAMODARAPUR	25
22.	NURUPUR	26
23.	AKATPUR	27
24.	KASABA	28
25.	MAHAMADPUR	29
26.	SUNHAT	30
27.	PURUNABALASORE (1)	31
28.	PURUNABALASORE (2)	32
29.	ANGARAGADIA (2)	4
30.	KARANJIA	6
31.	TOLANKA	17
32.	KADARABAD	18
33.	PATRAPADA	33
34.	BALIA	121
35.	KALIDASPUR	122
36.	CHAKABEGUNIA	123
37.	BEGUNIA	125
38.	NUAPURBADA	129
39.	JAUNRIA	152
40.	KESI	153
41.	TAZIABAD	154
42.	KASIMABAD	155
43.	BIDEISANA	156
44.	SUNDARI	157
45.	BISEIKHUNTA	171
46.	MEGHADAMBARU	172
47.	ALAPUR	173
48.	SARASWATIPUR	174
49.	SAMALPUR	175
50.	SRIKONA	104
51.	HARIPUR	118
52.	BHIMPURA	119
53.	JOGESWARPUR	120
54.	BEGUNIA CHHAKA	124

S. No.	Village	P.S. No.
55.	GABAGAON	136
56.	CHAKA SIMILIA	137
57.	RAGHUNATHPUR	135
58.	CHAKA TENTULIPURA	138
59.	TENTULIPURA	139
60.	GHISUAN	140
61.	TIGIRIA	141
62.	HIDIGAON	142
63.	CHANDIPUR	143
64.	BAMPADA	176
65.	SUTEI	177
66.	CHHANAPUR	187
67.	MAHASAYAPATANA	188
68.	BILIPARIA	189
69.	BANAPARIA	190
70.	SAMKONA	191
71.	NOTI	192
72.	NOTIPATANA	193
73.	AMBUA	194
74.	SRIBANTAPUR	195
75.	KORADA	196
76.	KHANNAGAR	210
77.	BIRUAN	211
78.	KAMAGAON	213
79.	GADAPADA	225
80.	CHANDATIKIRI	226
81.	HIRATIKIRI	227
82.	BHUINPADA	235
83.	KARANAGHANTI	246
84.	SUNAMUHINPADA	247
85.	SERAGARH	248
86.	MADAGHODASAHI	249
87.	PATRA	250
88.	HARIDA	197
89.	KORKORA	198
90.	UPAR SANAKIA	182
91.	SALAPADA	145
92.	RANASAHI	146
93.	KAINDHARI	148
94.	TAPASI	149
95.	DASI	150
96.	BADADEULIBAD	151
97.	BRAHMANA NEULA	158
98.	HARASPURA	159
99.	ISANI	160
100.	NAGUDI	161
101.	JHAGADPADHI	162
102.	SAHADA	163
103.	BIDEI	164
104.	SARAGAN	165
105.	JUJESTIPUR	166
106.		167
107.	PABITRAPUR	168
108.	PACHHUDIA	169

S. No.	Village	P.S. No.
109.	JUJESTIPUR	170
110.	CHAKADARUHATI	200
111.	BARANGIA	201
112.	DALASOSA	202
113.	SANASAUN	203
114.	PAKHAR SAUN	204
115.	GENGUTI	205
116.	PURUSOTTAMPUR	436
117.	KANTABANIA	263
118.	KHERANA	264
119.	GARADA	265
120.	BALIPAL	80
121.	POKHARABAD	134
122.	RAGHUNATHPUR	135
123.	SANADEULABAD	147
124.	KULASANDHA	186
125.	JAGANNATHPUR	95
126.	DUMURIA	108
127.	DHUSUTI	109
128.	BUANLA	110
129.	BELABARIA	114
130.	KUDIA	115
131.	CHAKPANCHURUKHI	116
132.	BANGARA	199
133.	BEDHAPANCHARADHA	126
134.	SINDHIA	128
135.	NUAPUR	130
136.	BAUNCHIA	131
137.	GHODAPADA	132
138.	TOTAPALASIA SAMIL PAL BALASORE	90
139.	GUDU	144
140.	ATHANTARA	140
141.	DIHAREMUNA	133
142.	HARIPUR	131
143.	PURUSOTTAMPUR	138
144.	SHYAMRAIPUR	146
145.	RADHANAGAR	139
146.	GANIPUR	100
147.	BEGUMPUR	128
148.	BIDYADHARPUR	101
149.	BIDYADHARPURPATANA	101
150.	BALGOPALPUR	107
151.	SRIKRUSHNAPUR	151
152.	GANESWARPUR	152
153.	MADHIPUR	149
154.	GANAPATIBHANDAR	132
155.	BALGOPALPUR BATITANKI	105
156.	GOPALBINDHA	103
157.	RUDRAPUR	147
158.	SANAPURUSOTTAMPUR	163

S. No.	Village	P.S. No.
159.	GOUDADNDA	142
160.	JAGANNATHAPUR	86
161.	KANRALI	91
162.	KURUNIA PATANA	49
163.	RAINAGAR	99
164.	KURUNIA	50
165.	SERIPUR	47
166.	BRAHAMANA CHHADA	51
167.	MENDHRA	149
168.	RAMCHANDI	145
169.	ACCHUTAPUR	164
170.	GADIAPAL	148
171.	BANGARAGAON	128
172.	BANGARAGAON PATTNA	134
173.	NRAHARIPUR	133
174.	SALABANI	161
175.	NUAPADHI	43
176.	CHAKULIA	44
177.	PATRIPAL	96
178.	MAKUNDAPUR	98
179.	HALUPATTNA	48
180.	RASALPUR	107
181.	BAHABALPUR	144
182.	DIPALI	136
183.	TARADEI	147
184.	CHANDIMANDAL	146
185.	KHIRI	160
186.	KUNKUMSULI	159
187.	MANGALPUR	167
188.	GOLAPAT	155
189.	BINDHA	156
190.	PATNARAIPUR	157
191.	DUHUNI	150
192.	SASANBAR	169
193.	DAHAPADA	117
194.	KASIMILA	127
195.	BADAGHAI	178
196.	UPERSANKIA	182
197.	BIGHNAPUR	185
198.	KUNDAPURUSOTTAMPUR	212
199.	SANAMANOHARPUR	214
200.	SOMANATHPUR	215
201.	AJODHYANAGARPATNA	221
202.	BARTANA	222
203.	BAUNSAMUNHA	243
204.	BARAPADA	244
205.	PHARADAUKHUNTA	245
206.	BARUNASING	251

List of Villages as per the data extraction from GIS Maps

S. No.	Village Name	Part	Area (Ha)
1	Belbaria Unit No.114	Two	45.65
2	Firingipatana Unit No.1	Two	8.03
3	Srikona No.104	Two	2,533.57
4	Akatpur Unit No.27	Two	22.14
5	Aktiarpur Unit No 12	Two	69.77
6	Alapur No. 173	Two	12.42
7	Angaragadia (1) Unit No. 4	Two	30.00
8	Angaragadia (2) Unit No. 5	Two	127.21
9	Bagbrundabana Unit No. 15	Two	71.59
10	Baincha Unit No. 131	Two	138.39
11	Balipala Unit No. 80	Two	200.16
12	Barabati Unit No. 24	Two	15.55
13	Bateswar, Unit No 21	Two	8.10
14	Bedhapachhaaradha No. 126	Two	75.51
15	Begunia No. 124	Two	4.68
16	Begunia No. 125	Two	47.22
17	Bhaskarganj Unit No.10	Two	91.09
18	Bideisana No 156	Two	3.53
19	Buanla No.110	Two	282.74
20	Chakapanchurukhi No.116	Two	51.77
21	Chakasimilia No.137	Two	23.80
22	Chakatentulipada No. 138	Two	22.84
23	Chandipur No. 143	Two	42.02
24	Chandragadi Unit No. 9	Two	41.17
25	Damodarpur Unit No.25	Two	33.22
26	Dhahapada No. 117	Two	94.82
27	Dhushuli No. 109	Two	112.88
28	Dumuria No. 108	Two	171.51
29	Gabagan No.136	Two	4.99
30	Ghisuan No. 140	Two	31.42
31	Ghodapada No. 132	Two	164.53
32	Gopalgan Unit No.14	Two	49.96
33	Gudu No 144	Two	1,620.70
34	Haripur No. 118	Two	136.87
35	Hidigaon No. 142	Two	1,477.53
36	Isamnagar Unit No.7	Two	25.13
37	Jadpur Unit No 11	Two	78.66
38	Kadarabad Unit No.18	Two	5.17
39	Kasaba Unit No.28	Two	10.11
40	Kasimabad No.155	Two	24.65
41	Kisimila No.127	Two	185.15
42	Kudia No. 115	Two	181.59
43	Mahamadpur Unit No.29	Two	9.31
44	Mallikashapur Unit No. 16	Two	72.11
45	Mangalpur Unit No 154	Two	68.67
46	Manikhamba Unit No.23	Two	44.42
47	Mansingbazar Unit No 19	Two	62.60
48	Nalamganja Unit No 20	Two	15.07
49	Nuapur Unit No. 130	Two	33.28
50	Nuapurabada No. 129	Two	95.23
51	Nurapur Unit No.26	Two	12.87
52	Pakharabad No. 134	Two	75.73
53	Patrapada Unit No. 33	Two	177.64
54	Podhuanpada Unit No. 8	Two	103.04
55	Purunabaleswar No. 32	Two	169.43
56	Purunabaleswar Unit No. 31	Two	181.39
57	Raghinathpur No. 135	Two	68.49
58	Ranasahi No. 146	Two	648.15
59	Sahadebkhunta Unit No.2	Two	110.45
60	Salapada No. 145	Two	28.50
61	Sasanbar No 169	Two	131.74
62	Sindhia No. 128	Two	194.39
63	Sobharampur Unit No.3	Two	53.32
64	Srikanthapur Unit No.13	Two	106.02
65	Suelpur Unit No.22	Two	19.93
66	Sunahata Unit No.30	Two	146.65
67	Tetnuliapura No. 139	Two	56.54
68	Tigiria No. 141	Two	32.23
69	Totapal Alias Palbaleswar No.133	Two	96.84
70	Tulanka, Unit No .17	Two	23.44
71	Bhimapur No. 119	One	189.63
72	Bramhanichhara No.89	One	81.31
73	Chakulia No.47	One	113.01
74	Jagannathpur No.93	One	34.43
75	Patara No.250	One	284.76
76	Somanathapur No.215	One	382.60
77	Achhutapur No.150	One	90.93
78	Ambua No. 194	One	16.84
79	Athantar No.140	One	68.32
80	Ayodhyanagar No. 221	One	73.37
81	Badadeulabada No.151	One	24.72
82	Badaghai No. 178	One	64.78
83	Bahabalapur No. 134	One	13.96
84	Balgopalpur No. 106	One	183.53
85	Balgopalpur No. 107	One	58.98
86	Balia No. 121	One	150.12
87	Bamapada No. 176	One	232.67
88	Banaparia No. 190	One	204.65
89	Bangara No. 199	One	203.13
90	Bangaragaon 125	One	161.09
91	Bangarganpatana No.126	One	26.71
92	Barangia No. 201	One	87.56
93	Barapada No.244	One	40.05
94	Bartana No. 222	One	172.84
95	Barunasing No.251	One	384.17
96	Baunshamuhan No.243	One	122.74
97	Bengiti No. 205	One	130.37
98	Bhuinpada No. 235	One	112.21
99	Bidei No. 164	One	36.02
100	Bidyadharapur No.108	One	184.94
101	Bidyadharpurpatana No. 109	One	2.92
102	Bighnapur No.185	One	69.26
103	Biliparia No. 189	One	11.31
104	Bindha No. 156	One	32.37
105	Biruana No. 211	One	346.84
106	Biseikhunta No. 171	One	21.31
107	Bramhananeula No. 158	One	21.03
108	Chakabegunia No. 123	One	14.77

S. No.	Village Name	Part	Area (Ha)
109	Chakadaruhati No. 200	One	18.19
110	Chanapura No. 187	One	364.07
111	Chandatikiri No. 226	One	6.51
112	Chandimandala No. 139	One	0.26
113	Dalasosa No. 202	One	120.71
114	Dasi No. 150	One	14.01
115	Dihiremuna No.133	One	15.57
116	Dipali No. 136	One	5.28
117	Duhuni No. 160	One	4.27
118	Gadapada No. 225	One	23.05
119	Ganapatibhandara No. 132	One	16.62
120	Ganeswarpur No. 152	One	373.62
121	Ganipur No. 129	One	224.98
122	Garada No. 265	One	37.00
123	Gariapal No. 138	One	8.65
124	Golapata No. 155	One	30.37
125	Gopalbindha No. 105	One	4.50
126	Goudadanda No.143	One	57.90
127	Halupatana No. 92	One	8.00
128	Harasarapur No. 159	One	118.76
129	Harida No. 197	One	105.33
130	Haripur No. 131	One	63.44
131	Hiratikira No. 227	One	241.65
132	Isani No. 160	One	156.92
133	Jaganathpur No. 86	One	4.02
134	Jagannathapur No. 95	One	21.37
135	Jaunria No.152	One	19.59
136	Jhagadapadhi No.162	One	122.36
137	Jogeswarpur No. 120	One	12.09
138	Jujestipur No. 166	One	106.27
139	Jujestipurpatana No. 170	One	76.37
140	Kaindhari No. 148	One	48.54
141	Kalidaspur No. 122	One	73.86
142	Kamagaon No. 213	One	33.65
143	Kanrali No. 85	One	112.65
144	Kantabania No. 263	One	70.12
145	Karanaghanti No.246	One	43.66
146	Karanjia Unit No. 6	One	134.95
147	Keshi No. 153	One	16.93
148	Khananagar No. 210	One	340.89
149	Kherana No. 264	One	92.93
150	Khiri No. 141	One	11.70
151	Korada No. 196	One	152.93
152	Korakora No. 198	One	93.89
153	Kulasandha No. 186	One	11.59
154	Kundapurastamapur No. 212	One	16.30
155	Kunkumasuli No. 142	One	20.23
156	Kurunia No. 91	One	280.69
157	Kuruniapatana No. 90	One	2.01
158	Madagodashahi No. 249	One	71.92
159	Madhipur No. 149	One	112.70
160	Mahasayapatana No. 188	One	5.94
161	Meghadamburu No. 172	One	154.61
162	Mendhara No. 158	One	51.21
163	Mukundapur No. 88	One	73.17
164	Nangudi No. 161	One	6.21
165	Naraharipur No. 127	One	173.77
166	Noti No. 192	One	42.96
167	Notipatana No. 193	One	15.80
168	Nuapadhi No. 43	One	453.18
169	Pabitrapur No. 168	One	7.35
170	Pachudia No. 169	One	241.99
171	Paharadaoaukhunta No. 245	One	61.66
172	Pakharasaun No. 204	One	136.92
173	Patanaraipur No. 157	One	60.80
174	Patripal No. 87	One	79.06
175	Purastampur No. 209	One	267.73
176	Purusottampur No. 145	One	40.23
177	Radhanagar No. 144	One	5.48
178	Rainagar No. 130	One	25.67
179	Ramachandi No. 135	One	3.46
180	Rudrapur No. 147	One	48.03
181	Sahada No. 163	One	133.18
182	Salabani No. 153	One	44.21
183	Samakona No. 191	One	48.92
184	Samalpur No. 175	One	166.17
185	Samamanoharpur No. 214	One	53.24
186	Sanapurusottampur No. 148	One	10.28
187	Saragaon No. 165	One	303.98
188	Saraswatipur No. 174	One	193.95
189	Shan Deula Bada No. 147	One	6.04
190	Shanasaun No. 203	One	93.83
191	Sireipura No. 93	One	88.94
192	Sribantapur No.195	One	26.15
193	Srikrushnapur No. 151	One	162.04
194	Sunamuhinbara No. 247	One	20.25
195	Sundari No. 157	One	199.18
196	Susa No. 167	One	74.43
197	Sutei No. 177	One	145.45
198	Syamarayapur No. 146	One	21.57
199	Tajiabad No. 154	One	19.34
200	Tapasi No. 149	One	26.50
201	Taradei No. 137	One	21.68
202	Uparasanakia No. 182	One	68.22
203	Begamapur No. 128	One	47.11
204	Rasalpur No.107		327.33
205	Sergar No. 248	One	426.53
	Total		**24,473.20**

The Odisha Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

No. 220 CUTTACK, MONDAY, JANUARY 28, 2019/MAGHA 8, 1940

BALASORE REGIONAL IMPROVEMENT TRUST

At Station Square, O. T. Road, Balasore - 756 001, Tel. (06782) 263080

OFFICE OF THE BALASORE REGIONAL IMPROVEMENT TRUST, BALASORE/B.R.I.T.

AT- BLOCK-A,1st FLOOR, O.T. ROAD SHOPPING COMPLEX,

STATION SQUARE, P.O./DIST.-BALASORE- 756 001.

Phone-06782-263080, EMAIL-*writ2britbalasore@gmail.com*.

NOTIFICATION

The 15th November 2018

No. 5355—BRIT,Balasore—In exercise of the powers conferred under sub-section (1) of Section 31 of the Odisha Town Planning & Improvement Trust Act,1956 (Odisha Act, 10 of 1957), the Balasore Regional Improvement Trust, Balasore, do hereby notify for the information of the General Public of Balasore that the Draft GIS/RS based Master Plan for the Master Plan Area, Balasore comprising 205(two hundred five) nos. of Revenue villages i.e. existing 109 nos. & newly included 96 nos. of Revenue Villages as specified in the Schedule given below over which the aforesaid Act has already been enforced by the Govt., in H. & U.D. Department vide S.R.O. Notification No. 866/1974, dated the 19th November 1974, No. 30978-HUD., dated the 15th September 1995 & No.,22334-HUD., dated the 21st September 2016 is hereby published for information of the general public likely to be affected thereby and notice is hereby given that the said draft would be taken into consideration on or after expiry of a period of 60(sixty) days from the date of publication in the *Odisha Gazettee* :

SCHEDULE

Sl. No.	Name of the Revenue Villages with P.S.No.	Area in Acres	Name of the ULBs/GPs
(1)	(2)	(3)	(4)
1	BELBARIA NO.114	45.65	BUANLA G.P.
2	FIRINGIPATANA U. No.1	8.03	BALASORE MCPL.
3	SRIKONA No.104	2533.57	SRIKONA G.P.
4	AKATPUR UNIT No.27	22.14	BALASORE MCPL.
5	AKTIARPUR UNIT No. 12	69.77	HARIPUR G.P.
6	ALAPUR No . 173	12.42	KORODA G.P.
7	ANGARAGADIA (1) U.N. 4	30.00	BALASORE MCPL.
8	ANGARAGADIA (2) U.N. 5	127.21	BALASORE MCPL.
9	BAGBRUNDABANA UNIT No. 15	71.59	Ditto
10	BAINCHA No. 131	138.39	BAINCHA G.P.
11	BALIPAL No. 80	200.16	SINDHIA G.P.
12	BARABATI U.N. 24 THANA No. 24	15.55	BALASORE MCPL.
13	BATESWAR , UNIT No. 21	8.10	BALASORE MCPL.
14	BEDHAPACHAARADHA No. 126	75.51	NAGRAM G.P.
15	BEGUNIA CHAK No. 124	4.68	HARIPUR G.P.
16	BEGUNIA No. 125	47.22	Ditto
17	BHASKARGANJ UNIT No.10	91.09	BALASORE MCPL.
18	BIDEISANA No. 156	3.53	GUDDU G.P.
19	BUANLA No.110	282.74	BUANLA G.P.
20	CHAKAPANCHURUKHI No.116	51.77	NAGRAM G.P.
21	CHAKASIMULIA No.137	23.80	PATRAPADA G.P.
22	CHAKA TENTULIPURA No. 138	22.84	Ditto
23	CHANDIPUR No. 143	42.02	CHANDIPUR G.P.

Sl. No. (1)	Name of the Revenue Villages with P.S.No. (2)	Area in Acres (3)	Name of the ULBs/GPs (4)
24	CHANDRAGADI UNIT No . 9	41.17	BALASORE MCPL.
25	DAMODARPUR UNIT No.25	33.22	Ditto
26	DHAHAPADA No. 117	94.62	DAHAPADA G.P.
27	DHUSHULI No. 109	112.88	SINDHIA G.P.
28	DUMURIA No. 108	171.51	Ditto
29	GABAGAN No.136	4.99	PATRAPADA G.P.
30	GHISUAN No. 140	31.42	Ditto
31	GHODAPADA No. 132	164.53	BAINCHA G.P.
32	GOPALGAN UNIT No.14	49.96	BALASORE MCPL.
33	GUDU No. 144	1620.70	GUDU G.P.
34	HARIPUR No. 118	136.87	HARIPUR G.P.
35	HIDIGAON No. 142	1477.53	HIDIGAON G.P.
36	ISAMNAGAR UNIT No. 7	25.13	BALASORE MCPL.
37	JADPUR UNIT No. 11	78.66	Ditto
38	KADARABAD UNIT No.18	5.17	SARAGAN G.P.
39	KASABA UNIT No. 28	10.11	BALASORE MCPL.
40	KASIMABAD No.155	24.65	KORODA G.P.
41	KASIMILA No.127	185.15	HARIPUR G.P.
42	KUDIA No. 17	181.59	BUANALA G.P.
43	MAHAMADPUR UNIT No. 29	9.31	BALASORE MCPL.
44	MALLIKASHAPUR UNIT No. 16	72.11	Ditto
45	MANGALPUR No. 167	68.67	MANGALPUR G.P.
46	MANIKHAMBA UNIT No.23	44.42	BALASORE MCPL.
47	MANSINGBAZAR UNIT No. 19	62.60	Ditto
48	NALAMGANJA UNIT No. 20	15.07	Ditto
49	NUAPUR No. 130	33.28	SASANGA G.P.
50	NUAPURABADA No. 129	95.23	HARIPUR G.P.
51	NURAPUR UNIT No. 26	12.87	BALASORE MCPL.
52	PAKHARABAD No. 134	75.73	BAINCHA G.P.
53	PATRAPADA UNIT No. 33	177.64	PATRAPADA G.P.
54	PODHUANPADA U.N.8	103.04	BALASORE MCPL
55	PURUNABALESWAR No.2	169.43	PATRAPADA G.P.
56	PURUNABALESWAR UNIT No. 31	181.39	BALASORE MCPL.
57	RAGHUNATHPUR No. 135	68.49	BAINCHA G.P.
58	RANASAHI No. 146	648.15	RANASAHI G.P.
59	SAHADEBKHUNTA UNIT No.2	110.45	BALASORE MCPL.
60	SALAPADA No. 145	28.50	HIDIGAON G.P.
61	SASANBAR No. 169	131.74	MANGALPUR G.P.
62	SINDHIA No. 128	194.39	SINDHIA G.P.
63	SOBHARAMPUR UNIT No.3	53.32	BALASORE MCPL.
64	SRIKANTHAPUR UNIT No.13	106.02	Ditto
65	SUELPUR UNIT No.22	19.93	Ditto
66	SUNAHATA UNIT No.30	146.65	Ditto
67	TETNULIPURA No. 139	56.54	PATRAPADA G.P.
68	TIGIRIA No. 141	32.23	Ditto
69	TOTAPALALIAS PALBALESWAR No.133	96.84	BAINCHA G.P.
70	TULANKA , UNIT No.17	23.44	KARANJIA G.P.
71	BHIMAPUR No. 119	189.63	BIMPURA G.P.
72	BRAMHANICHHADA No. 51	81.31	GANIPUR G.P.
73	CHAKULIA No. 44	113.01	PATRIPAL G.P.
74	JAGANNATHPUR No. 93	34.43	MANDARPUR G.P.
75	PATARA No. 250	284.76	BARUNASING G.P.
76	SOMANATHAPUR No. 215	382.60	BIRUAN G.P.
77	ACHHUTAPUR No. 164	90.93	SRIKRUSHNAPUR
78	AMBUA No. 194	16.84	KORORA G.P.
79	ATHANTAR No. 158	68.32	REMUNA G.P.
80	AYODHYANAGARPATANA No. 221	73.37	BIRUAN G.P.
81	BADADEULABADA No.151	24.72	RANASAHI G.P.
82	BADAGHAI No. 178	64.78	SUTEI G.P.
83	BAHABALAPUR No. 144	13.96	MANDARPUR G.P.
84	BALGOPALPUR No. 104	183.53	NUAPARHI G.P.
85	BALGOPALPUR BATITANKI No. 105	58.98	NARAHARIPUR
86	BALIA No. 121	150.12	BALIA G.P.
87	BAMAPADA No. 176	232.67	SARASWATIPUR
88	BANAPARIA No. 190	204.65	KORORA G.P.
89	BANGARA No. 199	203.13	KHHANNAGAR
90	BANGARAGAON No. 128	161.09	NARAHARIPUR
91	BANGARGANPATANA No.134	26.71	NARAHARIPUR
92	BARANGIA No. 201	87.56	GENGUTI G.P.
93	BARAPADA No.244	40.05	SERGARH G.P.
94	BARTANA No. 222	172.84	BIRUAN G.P.
95	BARUNASING No.251	384.17	BARUNASING
96	BAUNSHAMUHAN No. 243	122.74	SERGARH G.P.
97	BENGITI No . 205	130.37	GENGUTI G.P.
98	BHUINPADA No. 235	112.21	NUAGAON G.P.
99	BIDEI No. 164	36.02	GUDU G.P.
100	BIDYADHARAPUR No.102	184.94	GANIPUR G.P.
101	BIDYADHARPURPATANA No. 101	2.92	GANIPUR G.P.
102	BIGHNAPUR No.185	69.26	SERGARH G.P.
103	BILIPARIA No. 189	11.31	KORORA G.P.
104	BINDHA No. 156	32.37	REMUNA G.P.
105	BIRUAN No.211	346.84	BIRUAN G.P.
106	BISEIKHUNTA No. 171	21.31	KARANJIA G.P.
107	BRAMHANANEULA No. 158	21.03	GENGUTI G.P.
108	CHAKABEGUNIA No. 124	14.77	HARIPUR G.P.
109	CHAKADARUHATI No. 200	18.19	GENGUTI G.P.
110	CHHANAPUR No. 187	364.07	SUTEI G.P.
111	CHANDATIKIRI No. 226	6.51	BIRUAN G.P.
112	CHANDIMANDALA No. 146	0.26	MANDARPUR
113	DALASOSA No. 202	120.71	SARAGAON
114	DASI No. 150	14.01	RANASAHI G.P.
115	DIHIREMUNA No.143	15.57	REMUNA G.P.
116	DIPALI No. 136	5.28	MANDARPUR
117	DUHUNI No. 160	4.27	REMUNA G.P.

Sl. No. (1)	Name of the Revenue Villages with P.S.No. (2)	Area in Acres (3)	Name of the ULBs/GPs (4)
118	GADAPADA No. 225	23.05	BIRUAN G.P.
119	GANAPATIBHANDARA No. 141	16.62	PATRIPAL G.P.
120	GANESWARPUR No. 166	373.62	GANESWARPUR
121	GANIPUR No.100	224.98	GANIPUR G.P.
122	GARADA No. 265	37.00	SARAGAON G.P.
123	GARIAPAL No.148	8.65	MANDARPUR
124	GOLAPATA No. 155	30.37	REMUNA G.P.
125	GOPALBINDHA No. 106	4.50	KHARID MUKHURA
126	GOUDADANDA No.142	57.90	REMUNA G.P.
127	HALUPATANA No. 48	8.00	NARAHARIPUR
128	HARASPUR No. 153	118.76	SARAGAON G.P.
129	HARIDA No. 197	105.33	KHANNAGAR G.P.
130	HARIPUR No. 118	63.44	HARIPUR G.P.
131	HIRATIKIRA No. 227	241.65	BIRUAN G.P.
132	ISANI No.160	156.92	SARAGAON G.P.
133	JAGANATHPUR No. 86	4.02	MANDARPUR G.P.
134	JAGANNATHAPUR No.95	21.37	MANDARPUR
135	JAUNRIA No.152	19.59	GENGUTI G.P.
136	JHAGADAPADHI No.162	122.36	RANASAHI G.P.
137	JOGESWARPUR No. 120	12.09	BHIMPURA
138	JUJESTIPUR No. 166	106.27	SARAGAON G.P.
139	JUJESTIPURPATANA No. 170	76.37	GENGUTI G.P.
140	KAINDHARI No. 148	48.54	RANASAHI G.P.
141	KALIDASPUR No. 122	73.86	BHIMPURA G.P.
142	KAMAGAON No. 213	33.65	BIRUAN G.P.
143	KANRALI No. 91	112.65	GANIPUR G.P.
144	KANTABANIA No. 15	70.12	GENGUTI G.P.
145	KARANAGHANTI No.246	43.66	BARUNASING
146	KARANJIA UNIT No. 6	134.95	KARANJIA
147	KESHI No. 153	16.93	SARAGAON G.P.
148	KHANANAGAR No. 210	340.89	KHANNAGAR G.P.
149	KHERANA No. 264	92.93	SARAGAN G.P.
150	KHIRI No. 160	11.70	REMUNA G.P.
151	KORORA No. 196	152.93	KORORA G.P.
152	KORAKORA No. 198	93.89	KHANNAGAR G.P.
153	KULASANDHA No. 186	11.59	KARANJIA G.P.
154	KUNDAPURASTAMAPUR 212	16.30	SERGARH G.P.
155	KUNKUMASULI No. 159	20.23	REMUNA G.P.
156	KURUNIA No. 49	280.69	GANIPUR G.P.
157	KURUNIAPATANA No. 50	2.01	GANIPUR G.P.
158	MADAGODASHAHI No. 249	71.92	SERGARH G.P.
159	MADHIPUR No. 136	112.70	REMUNA G.P.
160	MAHASAYAPATANA No. 188	5.94	KORORA G.P.
161	MEGHADAMBURU No. 172	154.61	Ditto
162	MENDHARA No. 149	51.21	MANDARPUR G.P.
163	MUKUNDAPUR No. 98	73.17	PATRIPAL
164	NANGUDI No.161	6.21	RANASAHI
165	NARAHARIPUR No. 138	173.77	NARAHARIPUR
166	NOTI No. 192	42.96	KORORA G.P.
167	NOTIPATANA No. 193	15.80	Ditto
168	NUAPADHI No. 46	453.18	NUAPARHI G.P.
169	PABITRAPUR No. 168	7.35	GENGUTI G.P.
170	PACHUDIA No. 169	241.99	Ditto
171	PAHARADAUKHUNTA No.245	61.66	BARUNASINGH
172	PAKHARASAUN No. 204	136.92	GENGUTI G.P.
173	PATANARAIPUR No.157	60.80	MANGALPUR
174	PATRIPAL No. 96	79.06	PATRIPAL G.P.
175	PURASTAMPUR No. 138	267.73	SERGARH G.P.
176	PURUSOTTAMPUR No. 145	40.23	REMUNA G.P.
177	RADHANAGAR No. 139	5.48	Ditto
178	RAINAGAR No. 199	25.67	GANIPUR
179	RAMACHANDI No. 184	3.46	MANDARPUR
180	RUDRAPUR No. 162	48.03	REMUNA G.P.
181	SAHADA No.163	133.18	GUDU G.P.
182	SALABANI No. 161	44.21	MANGALPUR
183	SAMAKONA No. 191	48.92	KORORA
184	SAMALPUR No. 175	166.17	SARASWATIPUR
185	SANAMANOHARPUR No. 214	53.24	BIRUAN G.P.
186	SANAPURUSOTTAMPUR . 148	10.28	SRIKRUSHNAPUR
187	SARAGAON No. 165	303.98	SARAGAN G.P.
188	SARASWATIPUR No. 163	193.95	SARASWATIPUR
189	SHAN DEULA BADA No. 147	6.04	RANASAHI G.P.
190	SHANASAUN No. 203	93.83	GENGUTI G.P.
191	SIREIPURA No. 93	88.94	NUAPARHI G.P.
192	SRIBANTAPUR No.195	26.15	KORORA G.P.
193	SRIKRUSHNAPUR No. 165	162.04	SRIKRUSHNAPUR
194	SUNAMUHINBARA No.247	20.25	NUAGAON G.P.
195	SUNDARI No. 157	199.18	SARAGAON G.P.
196	SUSA No. 167	74.43	Ditto
197	SUTEI No. 177	145.45	SUTEI G.P.
198	SYAMARAYAPUR No. 179	21.57	REMUNA G.P.
199	TAJIABAD No. 154	19.34	SARAGAON G.P.
200	TAPASI No. 149	26.50	RANASAHI G.P.
201	TARADEI No. 94	21.68	MANDARPUR
202	UPARASANAKIA No. 182	68.22	SUTEI G.P.
203	BEGAMAPUR No. 135	47.11	NARAHARIPUR
204	RASALPUR No.107	327.33	NUAPARHI G.P.
205	SERGAR No. 248	426.53	SERGAR G.P.

The Plans, Reports and Zoning Regulations in respect of above areas of Balasore can be inspected in the office of Balasore Regional Improvement Trust, Balasore on any working day during office hours with effect from the date of notification in the *Odisha Gazette*. Any objections and suggestions in respect of said Master Plan proposal including Report and Zoning Regulation may be submitted to the Balasore Regional Improvement Trust, Balasore in duplicate within 60(sixty)days from the date of publication in the *Odisha Gazette*.

Hereinafter, from the date of publication of notification no person, Private/Public Institution/ Industry, Department of Government/Semi-Government shall erect or proceed with construction of any building or structure or work or enter into or carry out a contract in respect of any land within the area included in the Master Plan unless he/she has applied for and obtained permission from the Secretary, B.R.I.T., Balasore as required under sub-section(3) of Section 31 of the Odisha Town Planning and Improvement Trust Act,1956.

Further, hereinafter all Subdivisional lay-out plan intended for parceling out, or selling in smaller plot with adequate provision of roads and open spaces shall also require prior approval of B.R.I.T., Balasore.

Any development which shall be made in any land without permission of B.R.I.T., Balasore and which is contrary to the provisions of Master Plan shall not be taken into account in awarding compensation in event of land being acquired. Subsequently under provision of O.T.P. & I.T. Act, 1956 for implementation of any Development Scheme. Taking up construction without permission shall be punishable under provisions of the said Act.

NABIN CHANDRA SINGH
Secretary, B.R.I.T.
Balasore

SJ. GOURI KUMAR ROUT
Chairman, B.R.I.T.
Balasore

Printed and published by the Director, Directorate of Printing, Stationery and Publication, Odisha, Cuttack-10

The revenue data of following 43 villages have not yet been updated due to the existing old maps, which has yet been revised by the ORSAC.

S. No.	Name of the Village
1	Mangalpur No 154
2	Bramhanichhara No.89
3	Chakulia No.47
4	Achhutapur No.150
5	Athantar No.140
6	Bahabalapur No. 134
7	Balgopalpur No. 106
8	Balgopalpur No. 107
9	Bangaragaon No. 125
10	Bangarganpatana No. 126
11	Bidyadharapur No. 108
12	Bidyadharpurpatana No. 109
13	Chandimandala No. 139
14	Dihiremuna No. 133
15	Dipali No. 136
16	Duhuni No. 160
17	Ganapatibhandara No. 132
18	Ganeswarpur No. 152
19	Ganipur No.129
20	Gariapal No. 138
21	Gopalbindha No. 105
22	Goudadanda No.143

S. No.	Name of the Village
23	Halupatana No. 92
24	Kanrali No. 85
25	Khiri No. 141
26	Kunkumasuli No. 142
27	Kurunia No. 91
28	Kuruniapatana No. 90
29	Madhipur No. 149
30	Mendhara No. 158
31	Naraharipur No. 127
32	Patripal No. 87
33	Purusottampur No. 145
34	Radhanagar No. 144
35	Rainagar No. 130
36	Ramachandi No. 135
37	Salabani No. 153
38	Sanapurusottampur No. 148
39	Sireipura No. 93
40	Srikrushnapur No. 151
41	Syamarayapur No. 146
42	Taradei No. 137
43	Begamapur No. 128

Details of Neighborhood Centers (10 hectares for 10,000 to 12,000 population)

S. No.	Facility	No.	Area per unit (ha)	Total Area (ha)
1	High Secondary School	1	1.6	1.6
2	Dispensary	1	0.1	0.1
3	Community Hall cum Library	1	0.2	0.2
4	Community Room	2	0.1	0.2
5	Primary School with Playfield	2	0.4	0.8
6	Middle School with play field	1	0.5	0.5
7	Electric Sub Station	1	0.05	0.05
8	Local shopping including Service Centre	1	0.45	0.45
9	Neighborhood Park	1	0.75	0.75
10	Neighborhood Play Area	1	0.75	0.75
11	Three-wheeler cum Taxi Stand	1	0.05	0.05
12	Religious Building	1	0.05	0.05
	Sub Total - A			**5.5**
13	Transportation and Communication			2.5
	Total			**8.0**

Feedback Infra (P) Limited
First Floor, Tower East, 77 A, Sector 18, IFFCO Road, Gurugram – 122015, India
Tel: +91 124 416 9100 I Fax: +91 124 462 9255
www.feedbackinfra.com

Advisory and Transactions I Design, Planning and Engineering I Project Management I Operations and Maintenance