बिहार सरकार
नगर विकास एवं आवास विभाग
अधिसूचना

संख्या–09 / न०वि०मा०प्ला०(आ०क्षे०)–07 / 2026 .....न०वि० एवं आ०वि०, दिनांक–

विकास आयुक्त –सह– अध्यक्ष, बिहार शहरी आयोजना तथा विकास बोर्ड की अध्यक्षता में दिनांक–08.09.2026 को बिहार शहरी आयोजना तथा विकास बोर्ड की पन्द्रहवीं बैठक में गया जी एवं बोधगया आयोजना क्षेत्र के एकीकृत मास्टर प्लान, 2047 (प्रारूप) पर गजट में प्रकाशन के माध्यम से 60 दिनों तक आमजनों / हितधारकों से आपत्ति / सुझाव प्राप्त करने की अनुशंसा की गयी है।

उक्त के आलोक में बिहार शहरी आयोजना तथा विकास अधिनियम, 2012 की धारा 24 के तहत तैयार गया जी एवं बोधगया आयोजना क्षेत्र के एकीकृत मास्टर प्लान, 2047 (प्रारूप) को उक्त अधिनियम की धारा 26 के तहत गजट में प्रकाशन की तिथि से अगले 60 दिनों तक के लिए आमजनों / हितधारकों से आपत्ति / सुझाव प्राप्त करने के लिए उक्त प्रारूप को अधिसूचित किया जाता है।

उक्त से संबंधित आपत्ति / सुझाव प्रमंडलीय आयुक्त, मगध प्रमंडल, गया जी –सह– अध्यक्ष, गया जी जिला आयोजना क्षेत्र प्राधिकार को डाक / कुरियर से अथवा Email (divcom-magadh-bih@nic.in) पर भेजा जा सकता है।

बिहार राज्यपाल के आदेश से

ह० / –
(मनोज कुमार)
अपर सचिव,
नगर विकास एवं आवास विभाग।

ज्ञापांक–09 / न०वि०मा०प्ला०(आ०क्षे०)–07 / 2026 .....न०वि० एवं आ०वि० पटना,दिनांक–.....

प्रतिलिपि–अधीक्षक, राजकीय मुद्रणालय, गुलजारबाग, पटना / ई–गजट कोषांग वित्त विभाग, पटना (सी०डी० के साथ) को बिहार गजट में अतिरिक्त प्रकाशन हेतु सूचनार्थ एवं अनुरोध है कि प्रकाशित गजट के 200 कॉपी कार्यालय उपयोग के लिए उपलब्ध कराया जाय।

ह० / –
अपर सचिव
नगर विकास एवं आवास विभाग

ज्ञापांक–09 / न०वि०मा०प्ला०(आ०क्षे०)–07 / 2026 10190 .....न०वि० एवं आ०वि० पटना,दिनांक–24/09/2026

प्रतिलिपि–मुख्य सचिव, बिहार / विकास आयुक्त, बिहार / मुख्यमंत्री के प्रधान सचिव / सभी अपर मुख्य सचिव / प्रधान सचिव / सचिव / सभी प्रमण्डलीय आयुक्त / सभी जिला पदाधिकारी / अध्यक्ष, बिहार भू–सम्पदा अपीलीय न्यायाधिकरण, पटना / अध्यक्ष, भू–सम्पदा विनियामक प्राधिकरण, बिहार, पटना / नगर आयुक्त, सभी नगर निगम / नगर कार्यपालक पदाधिकारी, सभी नगर परिषद् एवं नगर पंचायत / मुख्य कार्यपालक पदाधिकारी, सभी जिला आयोजना क्षेत्र प्राधिकार को सूचनार्थ एवं आवश्यक कारवाई हेतु प्रेषित।

प्रतिलिपि–समाहर्त्ता–सह जिला निबंधक, गया जी/जिला अवर निबंधक/सभी अवर निबंधक, गया जी को सूचनार्थ एवं आवश्यक कारवाई हेतु प्रेषित।

प्रतिलिपि–प्रमंडलीय आयुक्त, मगध प्रमंडल, गया जी/मुख्य कार्यपालक पदाधिकारी, गया जी जिला आयोजना क्षेत्र प्राधिकार/जिला पदाधिकारी, गया जी/नगर आयुक्त, नगर निगम, गया जी/नगर कार्यपालक पदाधिकारी, नगर परिषद्, बोधगया/अंचलाधिकारी, गया जी/बोधगया/परैया को सूचनार्थ तथा सुलभ स्थल पर प्रकाशन हेतु प्रेषित।

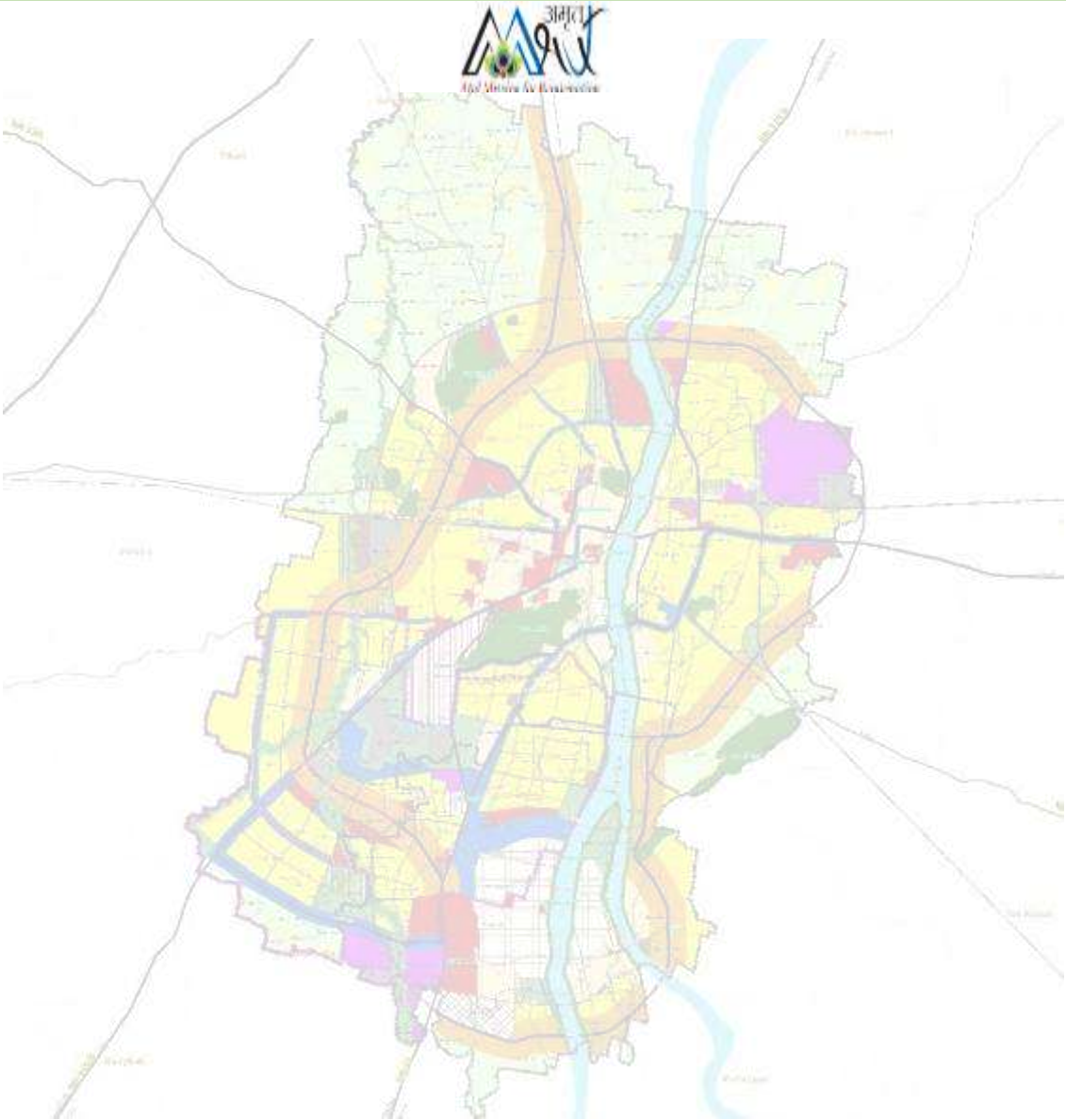
प्रतिलिपि–माननीय विभागीय मंत्री के आप्त सचिव/प्रधान सचिव के प्रधान आप्त सचिव, नगर विकास एवं आवास विभाग/विभाग के सभी पदाधिकारियों को सूचनार्थ एवं आवश्यक कारवाई हेतु प्रेषित।

23/5/2026

अपर सचिव
नगर विकास एवं आवास विभाग

GAYA JI MASTER PLAN- 2047 (DRAFT)

BODHGAYA MASTER PLAN- 2047 (DRAFT)



Prepared by

Stesalit Systems Limited

TOWN AND COUNTRY PLANNING ORGANIZATION

URBAN DEVELOPMENT & HOUSING DEPARTMENT

GOVERNMENT OF BIHAR

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LIST OF ABBREVIATIONS

ABBREVIATION	DEFINITION
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AOI	Area of Interest
AQI	Air Quality Index
BMTPC	Building Materials and Technology Promotion Council
BSDMA	Bihar State Disaster Management Authority
BUIDCO	Bihar Urban Infrastructure Development Corporation
BUPD	Bihar Urban Planning and Development
CAAQMS	Continuous Ambient Air Quality Monitoring System
CD Block	Community Development Block
CPCB	Central Pollution Control Board
CT	Community Toilet
DCR	Development Control Regulation
DPC	District Planning Committee
DU	Dwelling Unit
GCP	Ground Control Point
GDP	Gross Domestic Product
GDDP	Gross District Domestic Product
GIS	Geographic Information System
GPS	Global Positioning System
HH	Household
ICDS	Integrated Child Development Services
IPHS	Indian Public Health Standards
IHHL	Individual House-Hold Latrine
LPG	Liquid Petroleum Gas
LULC	Land Use Land Cover
MDR	Major District Road
MPC	Metropolitan Planning Committee
NAAQS	National Ambient Air Quality Standards
NAMP	National Air Quality Monitoring Program
NDDP	Net District Domestic Product
NDP	Net Domestic Product
NH	National Highway
NP	Nagar Parishad
OHR	Overhead Reservoir
PMAY	Pradhan Mantri Awas Yojana
PT	Public Toilet
SBPDCL	South Bihar Power Distribution Company Limited
SC	Scheduled Caste
SH	State Highway
ST	Scheduled Tribe
STP	Sewerage Treatment Plant
SWM	Solid Waste Management
SWTP	Solid Waste Treatment Plant
TDS	Total Dissolved Solids
UGSRs	Underground Storage Reservoirs
ULB	Urban Local Body
WHO	World Health Organization
WPS	Water Pumping Station
WTP	Water Treatment Plant

INTRODUCTORY NOTE

Land is one of the scarcest resources in an urban area, hence effective management of the resource is a crucial task. The Master Plan is one of the key instruments for Urban Management, comprehensive Land Use allocation to encourage sustainable development of the urban area. With the advancement in the field of Geographic Information Systems (GIS), the Master Plan exercise will be greatly benefitted through the integration of both the spatial and attribute data.

Atal Mission for Rejuvenation and Urban Transformation (AMRUT) aims to ensure:

i) Better access to the basic amenities,
ii) Access to Open Spaces in Urban areas,
iii) Shift to Sustainable Transportation Modes,

through the Master Plan exercise. The GIS-based Master Plan of the Planning area is to be formulated under this scheme, along with the 500 cities chosen under the scheme nationwide. The horizon year for the GIS Based Master Plan is set to be 2047. The infrastructure development of the planning area is projected considering the same.

Preparation of a Master Plan also referred to as a Development Plan, is a participatory process in conformity with The Bihar Urban Planning and Development Act,2012, which enables District Planning Area Authority and concerned urban local bodies within the Planning Area to plan and implement sustainable infrastructure development and upgradation of the same. Different stakeholders in the planning area are involved in the process to ensure inclusive decision-making. The focus on safeguarding the interests of vulnerable sections of society has elevated the planning concept to the level of development planning rather than land-use planning only.

The preparation of a Master Plan has now opened an avenue to identify deficiencies at the socio-economic level of the region and to identify possibilities for improvement through conducting various technical surveys along with obtaining all important citizens' inputs and specific suggestions. The BUPD Act, 2012, chapter- V, clause no. – 21 mentions the formulation of the Master Plan/ Development Plan which encompasses development in different sectors and indicates infrastructural development of the Planning Area based on the projected requirements considering the horizon year.

Master Plans are committed to ensuring Sustainable Development through achieving Community well-being, inclusive development and innovative and effective infrastructure development. This commitment to implement comprehensive development of the Planning Area is fulfilled through formulating the Master Plan/ Development Plan.

PART A

GAYA JI PLANNING AREA

MASTER PLAN - 2047 (DRAFT)

1 INTRODUCTION

1.1 NEED OF THE PROJECT

The Government of India took the initiative to transform Indian cities to provide basic infrastructure and service delivery to each individual. The objective of the scheme focuses on the following.

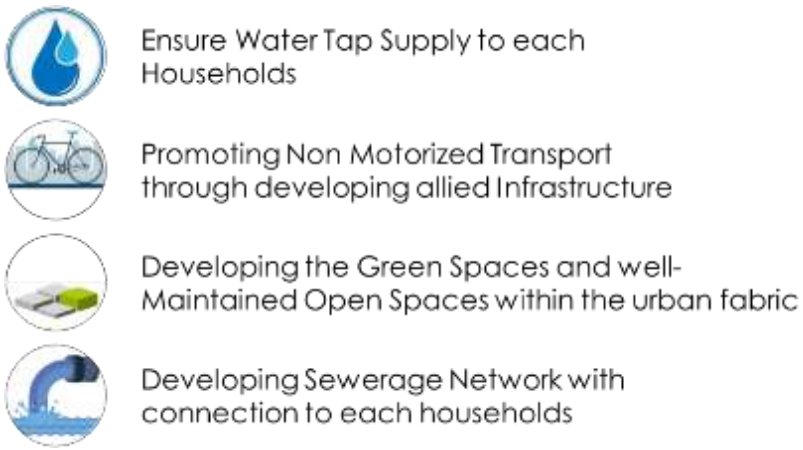


FIGURE 1-1 OBJECTIVES OF THE AMRUT SCHEME

1. **Water Supply:** Water being one of the Basic amenities required, the scheme aims to provide water supply to each household within the urban area.
2. **Sewerage System:** Developing the sewerage network for the urban areas to connect every household and scientific segregation of the Grey Water and Black Water and Scientific Treatment of the generated wastewater.
3. **Introducing Non-Motorized Transport:** Promoting the Non-Motorized Infrastructure (NMT) use for First-Last Mile Connectivity through developing allied infrastructure. The Pro-NMT Development of the urban area is to be ensured.
4. **Green Space Development:** Developing the Urban Green Patches within the whole area and developing open space for recreational facilities.

Considering the objectives, the overall development of the ULB is to cater to rapid urbanization and its respective needs. Hence the rejuvenation of the urban area with thorough development of the infrastructure and service delivery.

The urbanization rate of Bihar, as per the 2011 Census of India, is at a mere 11.3%, which is much lower than the national average of 31.2%. Though the state constitutes 8.6% of India's overall population, its urban population is only 3.1% of

the nation's total urban population. The current total urban population is concentrated within 261 Urban Local Bodies in the state encompassing 19 municipal corporations, 88 Municipal councils & 154 Nagar Panchayats (cities characterized by a population exceeding 200,000), 32% is located in Nagar Parishads (towns with a population ranging between 40,000 and 200,000), and 24% lives in Nagar Panchayats (towns with a population ranging between 12,000 and 40,000) (Census, 2011).

To ensure the development of the Gaya Ji Municipal Corporation and its adjacent areas, the **Gaya Ji Planning Area** was delineated by the Urban Development and Housing Department, Government of Bihar based on the powers invested by the Bihar Urban Planning and Development Act 2012 and the Bihar Urban Planning and Development Rules, 20l4 (Government of Bihar, 2017).

The **Gaya Ji Planning Area** is located in the Gaya Ji district of Bihar. It consists of one administrative unit — Gaya Ji Municipal Corporation along with 162 revenue villages spread across five C.D. blocks - Gaya Ji Town, Belaganj, Manpur, Paraiya, Bodhgaya. The total area of the planning area is 308.31 sq. km. out of which 50.17 sq. km. falls under urban area while the remaining 258.14 sq. km. falls under rural area (Government of Bihar, 2017).

1.1.1 SCOPE OF WORK

- Initiation of the project: The collection of data from the stakeholders and undertaking stakeholder discussions.
- GIS Base Map updation: Procurement of satellite images of the planning area and procurement of the cadastral maps of the planning area.
- Seminar and Workshop: Organization of seminars and workshops with the stakeholders for their feedback.
- Preparation of Master Plan: Preparation of Master Plan under the provisions made in Bihar Urban Planning and Development Rule 2014.
- Contents of Master Plan: The Proposal of the Master Plan must include reports, maps and Development Control Regulations (DCR).
- Implementation of building bylaws.
- Zonal Development Plan.
- Area Development Scheme.
- Investment and Implementation Strategies.
- Notification of Draft Master Plan for inviting objections and suggestions.
- Finalization of Draft Master Plan.
- Final GIS data.

1.1.2 OBJECTIVE OF THE STUDY

The prime objective of the Master Plan is to ensure an improved quality of life for the population residing in the Planning Area at present and in the future mainly through all locations of land for various uses, specifying demands for various physical and social infrastructure. Considering the extended limit of the Planning Area beyond the urban and rural settlements, a conservative approach will be followed thus ensuring adequate availability of land for agriculture and future development.

The prime objectives of the Master Plan preparation are as below:

- An analysis and review of Gaya Ji's current situation.
- Identifying existing gaps in physical and social infrastructure and bridging those gaps.
- Minimizing haphazard and uncontrolled growth of towns/cities and achieving planned growth and development in order to provide a healthy living environment.
- Establishing baseline data and formulating Master Plan objectives.
- Preparing an integrated geospatial database collecting and collating appropriate data.
- Ensuring systematic, balanced and integrated development.
- Rationalizing the orderly movement of traffic and transportation within the town.
- Formulating strategies for solving the core area problems.
- Skill, Knowledge Transfer and Dissemination through consultations and workshops.
- For better implementation of the Master Plan, involvement of identified key stakeholders and the public at various stages of Master Plan Preparation.

The main objective as addressed above can be assigned as the creation of the following: -

a) Base Map and Thematic Maps: Final base maps in the form of user-friendly spatial products at the functional scale of 1:4000 having defined layers as per Design & Standards of AMRUT Guideline. City/town base map and thematic maps including existing land-use map which is a prerequisite for the formulation of the master plan and other plans.

b) Urban Database Creation: Sector-wise data collection and data analysis report of 25 aspects as per the 'Design & Standards' manual for AMRUT sub-scheme

c) GIS-based Master Plan: These GIS-based Master Plans will help in different types of urban planning exercises, e.g. preparation of master plan, development plan, zonal plan, utility plan, infrastructure plan etc.

1.2 PLANNING AREA PROFILE

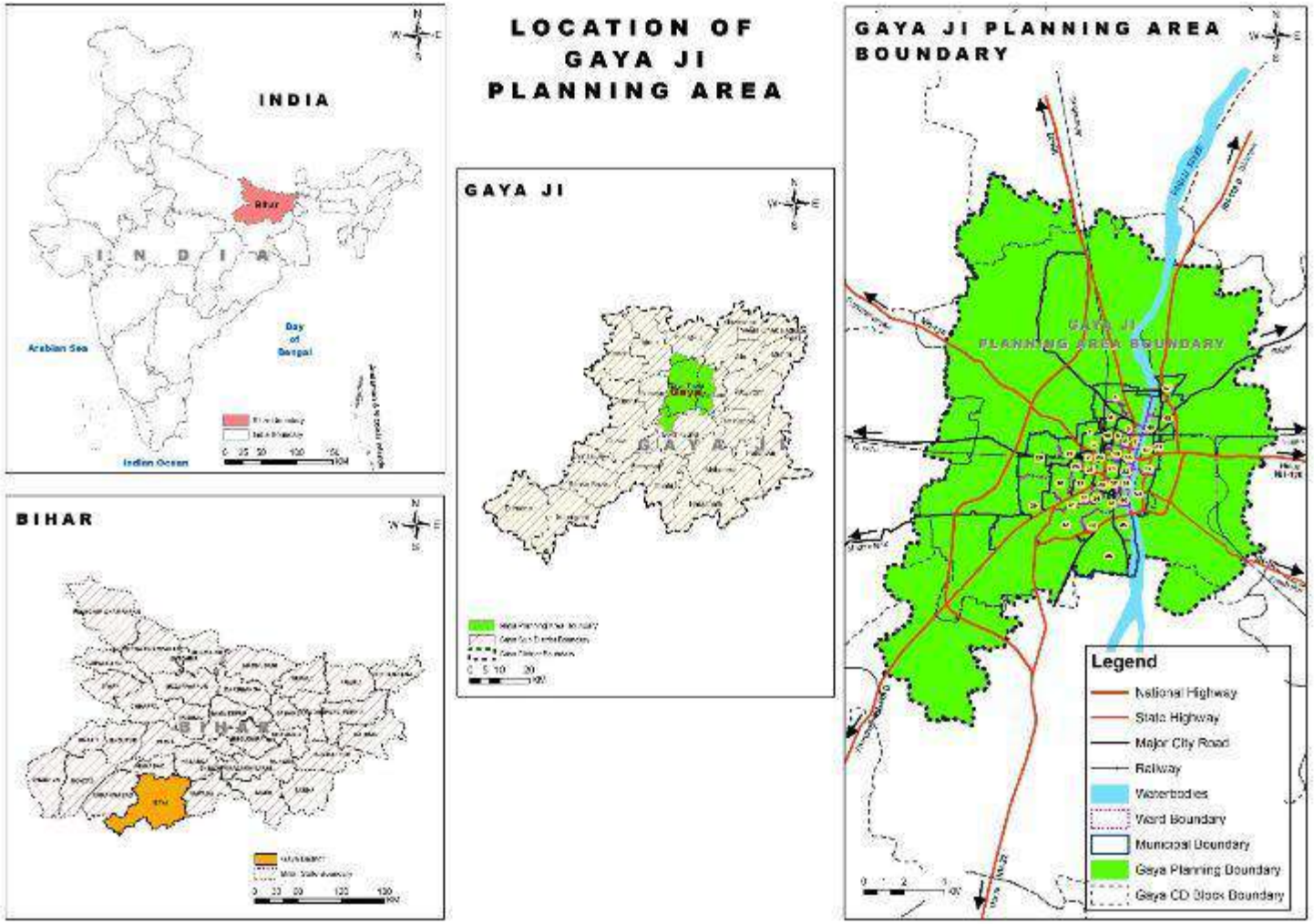
The Gaya Ji Planning Area, located in the Gaya Ji District of Bihar, was declared a Planning Area on 17 May 2017, under Section 9 of the Bihar Planning and Development Act 2012. The total area of the Gaya Ji Planning Area is 308.31 sq. km. of which 50.17 sq. km. is urban and the remaining 258.14 sq. km. is rural. The urban area comprises one urban administrative unit, the Gaya Ji Municipal Corporation. The rural area has 162 revenue villages spread across five C.D. blocks - Gaya Ji Town, Belaganj, Manpur, Paraiya, and Bodhgaya.

1.2.1 LOCATION AND SIZE

The district of Gaya Ji is situated almost at the centre of Bihar. Until 1865, Gaya Ji was part of the Bihar and Ramgarh districts. In that year, when the Bihar subdivision was transferred to the Patna district, a new district, named Gaya Ji, was established. From its creation in 1865, the Gaya Ji district remained unchanged until 1972. However, in January 1973, the Nawada and Aurangabad subdivisions were separated and designated as independent districts. Consequently, the Gaya Ji district was reduced to two subdivisions: Gaya Ji Sadar and Jehanabad. Later in 1973, on July 31st, the Jehanabad subdivision was also granted the status of an independent district, leaving Gaya Ji with only its original Gaya Ji subdivision. Subsequently, the Gaya Ji Sadar subdivision was further divided into four subdivisions: Gaya Ji Sadar, Sherghati, Nimchak Bathani, and Tekari.

The district is bordered to the north by the Arwal, Jehanabad, and Nalanda districts; to the east by Nawada district; to the south by the state of Jharkhand; and to the west by Aurangabad district.

The Gaya Ji district is situated between the latitudinal coordinates of 24°18' to 25°02' North and the longitudinal coordinates of 84°19' to 85°23' East on the global map. Encompassing an area of 4,976 sq. km, the district holds the distinction of being the second-largest in Bihar in terms of land area. The following table provides detailed administrative information pertaining to the planning area within the district.



MAP 1-1 LOCATION MAP OF GAYA JI PLANNING AREA

1.2.2 HISTORICAL BACKGROUND

The ancient town of Gaya Ji is of great historical significance and finds mention in texts dating back to 600 BC like the great epics of Ramayana and Mahabharata. It was projected to the world by Bimbisara, the fifth of the Shishunaga dynasty who lived and ruled around 519 BC.

The city draws its name from the mythological stories of Gaya Jisura, a demon who performed severe penance to please the Gods. Impressed, the Gods then granted him the boon of being the holiest of all. Thus, one would be able to attain moksha merely by touching him. The Gods soon realized that he made a terrible mistake by giving a demon such immense power and called upon Lord Vishnu to resolve the situation. He tricked to demon to offer his body for a pious *Yajna* and then killed him by stamping his foot on the demon's chest. It is believed that Vishnu's footprint is embedded in a stone in the Vishnupad Temple, one of the most sacred temples for Hindus.

Millions of Hindus follow this ritual every year for the salvation of the souls of their deceased ancestors as per Hindu mythology, Gaya Ji is also the site where Rama visited with Sita and Lakshmana to offer *pind daan* to Sita's father. There are 54 sites in Gaya Ji where the *pind daan* is offered and these areas are thronged with for the month-long *Pitra Paksh* mela annually during which the ritual is performed.

One of India's top tourist destinations, Gaya Ji has been selected as one of the twelve legacy cities to receive funding for urban planning, economic development, and heritage conservation initiatives under the City Development and Augmentation Yojana (HRIDAY) program of the Government of India. It is also one of the two cities in Bihar to receive funding for development under the Swadesh Darshan 2.0 scheme.



FIGURE 1-1 GAYA JI PIND DAAN

1.2.3 REGIONAL SETTING

The Gaya Ji district is located at 24°18' to 25°02' North latitude and 84°19' to 85°23' East longitude on a world map. The district covers 4,976 square kms. The district is the second largest in Bihar in terms of land area. The districts of Arwal, Jehanabad, and Nalanda border the district to the north; Nawada district borders it to the east; Jharkhand state borders it to the south; and Aurangabad district borders it to the west.

The district is one of the five districts of the Magadha division. It further comprises four sub-divisions: Gaya Ji Sadar, Tekari, Sherghatti, and Bathani. There are 24 Community Development Blocks under its jurisdiction. Its headquarters is in Gaya Ji City, situated in the Gaya Ji Sadar C.D. block of the district.

The district occupies a major portion of the South Bihar Plain. It is separated into three sub-micro areas according to geographical characteristics such as relief, drainage, geology, soil, and native vegetation: Phalgu Plain, Sherghatti, Fatehpur Uplands, and Rajgir Hills. The entire terrain has a mild northerly slope and is plain. Its height above mean sea level varies from 62 m in the north to 153 meters in the south. There are three principal rivers in the area. The Phalgu and Morhar Rivers flow through the region's centre, while the Dhadhar River borders the area on the east.

There are other pockets of forest in the southwest, close to Gaya Ji town. Maher (490 m) and Panra (363 m), two minor hillocks, are situated in the south-eastern and south-western regions, respectively. Except for a few isolated exposed areas of mica-schist, phyllite and quartzite, the majority of the geology is related to alluvium. The average rainfall for the year is around 900.8 mm. The primary crop grown in the area is paddy. Pulses, oilseeds, and wheat are also grown to a large degree. Both paved highways and broad-gauge railroads provide excellent connections throughout the region.

1.2.4 LINKAGES AND CONNECTIVITY

1.2.4.1 ROAD CONNECTIVITY

The Gaya Ji Planning Area has a strong and varied road network, with several important routes enabling both intra- and interregional travel. The region is very accessible due to the existence of State Highways (SH) and National Highways (NH).

Strong and varied transportation networks, including as three State Highways (SH-4, SH-7, and SH-70) and two National Highways (NH-22 and NH-120), provide urban mobility and connectivity in the Gaya Ji Planning Zone.

An essential highway that links important towns and promotes regional economic development by enabling the effective movement of people and products is NH-22, also known as Patna Gaya Ji Dobhi Road. One of the main contributors to lessening traffic on town roads is NH-120, the Gaya Ji-Nawada Road. The region's sustainable growth and economic prosperity depend on the efficient administration of these routes.

1.2.4.2 RAIL CONNECTIVITY

Gaya Ji benefits greatly from its advantageous location inside the East Central Railway system, which offers locals an affordable and dependable transit option. The city of Gaya Ji is easily connected to several important locations by the crucial junction known as Gaya Ji Railway Station, which is essential to regional trade, tourism, and economic development. Through the station's South Eastward connectivity, which reaches Koderma, Gaya Ji is connected to significant towns and cities, promoting trade and cross-cultural interaction. The railway, which links Gaya Ji and Patna to the north, is essential for the passage of passengers and freight and supports the local economy. Moving west, the Sone line to Dehri is

another important route for trade and transit. The North Eastward route to Munger also improves connection, encouraging trade, travel, and intercultural interaction throughout the region.



FIGURE 1-2 GAYA JI RAILWAY JUNCTION

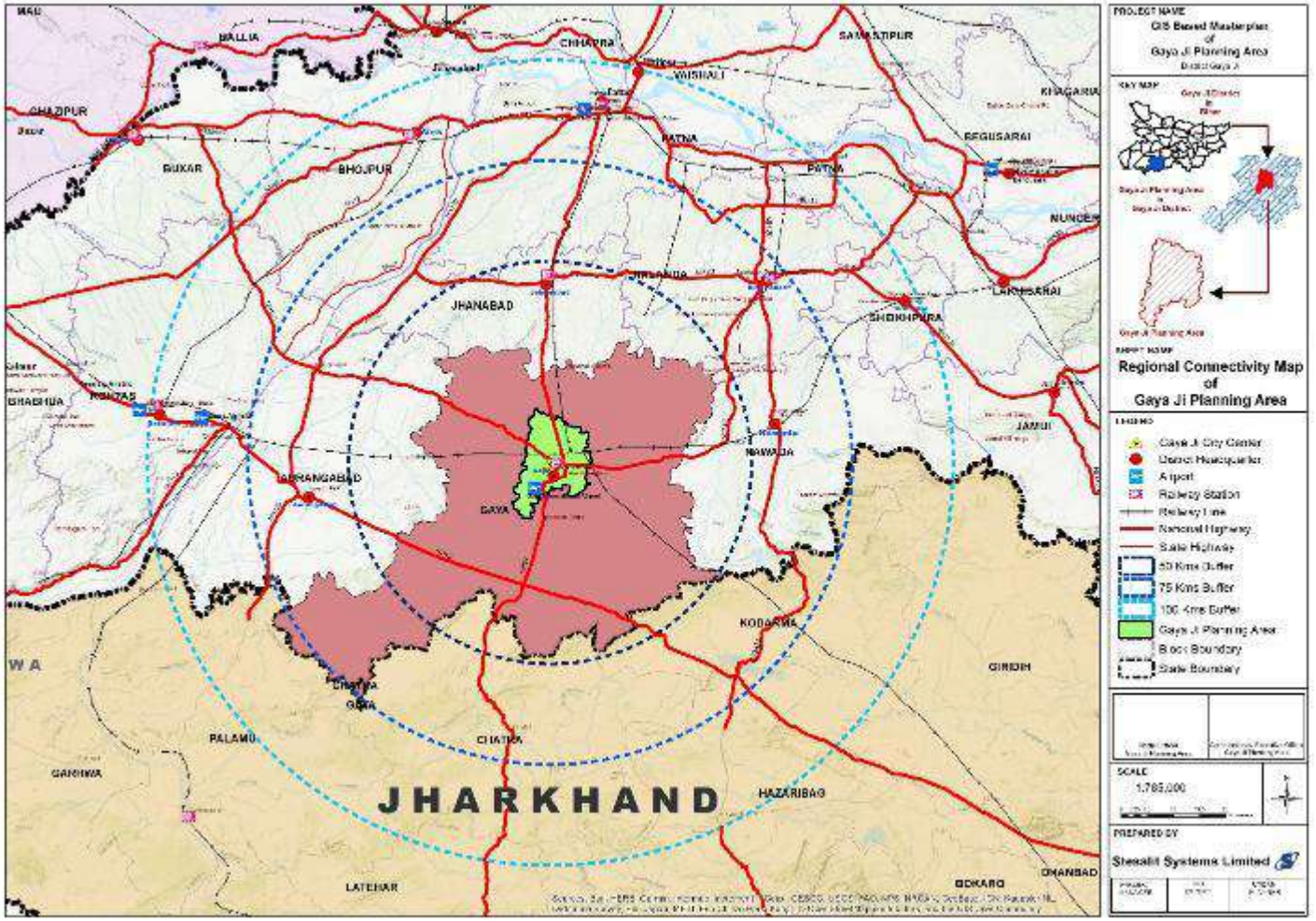


FIGURE 1-3 GAYA JI AIRPORT

1.2.4.3 AIR CONNECTIVITY

The air travel connectivity for the Gaya Ji Planning Area is facilitated through two nearby airports:

a) **Gaya Ji Airport (International):** Located in Gaya Ji city itself, it is the only airport located within the planning area. This airport serves as the closest domestic and international terminal, offering flights to major cities across India.
b) **Jayaprakash Narayan International Airport (International):** Approximately 120 km away in Patna, this airport also provides both domestic and international flight services, connecting the planning area with global destinations and serving as a critical gateway for international and domestic travel.



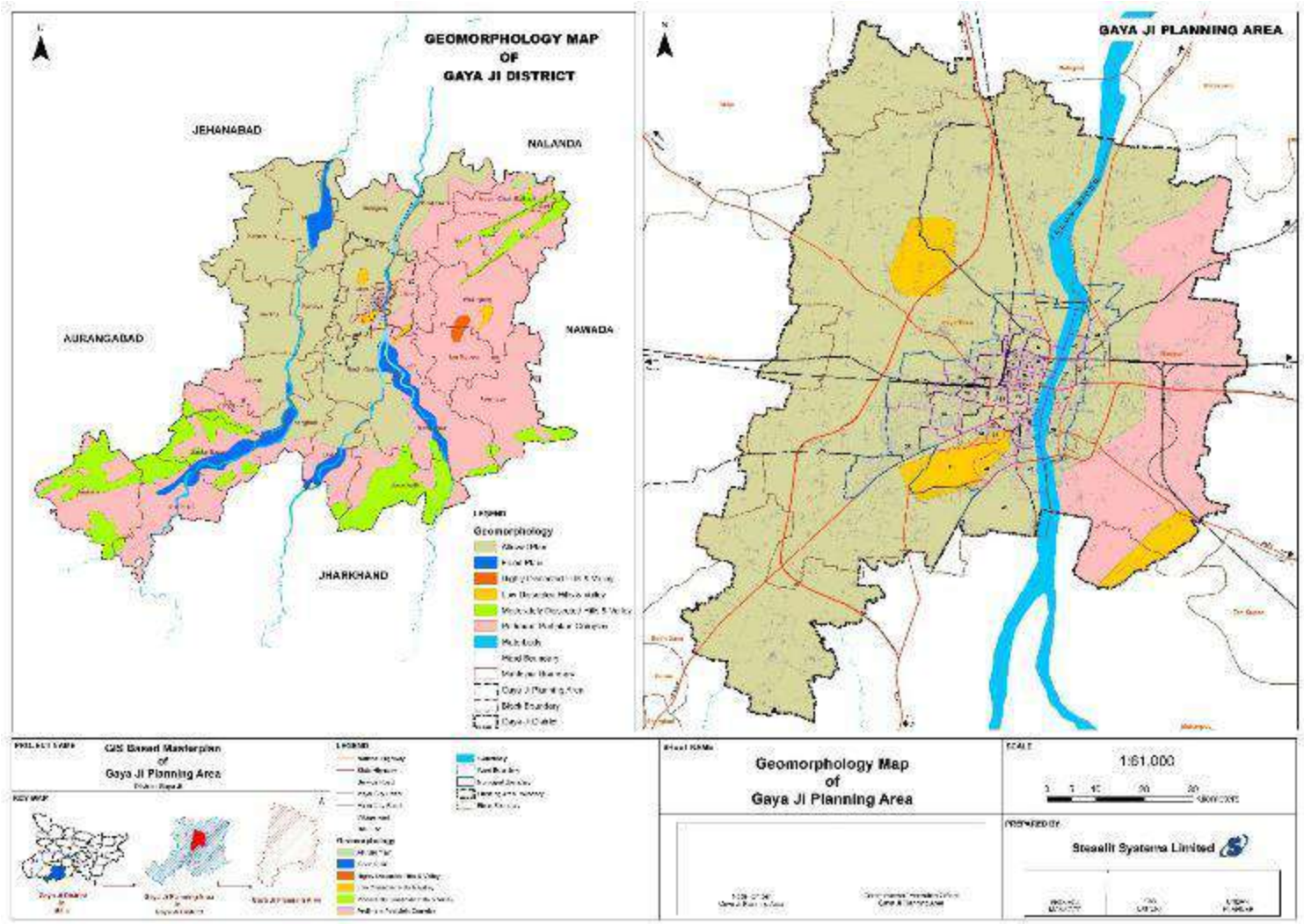
MAP 1-2 LINKAGES AND CONNECTIVITY MAP OF THE GAYA JI PLANNING AREA

1.3 PHYSICAL SETTING

1.3.1 GEOMORPHOLOGY

The geomorphology of the Gaya Ji district is marked by a variety of physiographic and geomorphic units, classified into four major zones: rocky upland, plateau and pediplain, high-level marginal alluvial terrace (Dobhi-Gaya Ji terrace) **, and the Sone-Ganga plain.

The rocky upland consists of southern hill tracts and extensions of the Chotanagpur Plateau, with prominent hills such as Ramshila, Katari, Brahma-yoni, Pretshila, and Barabar. The plateau and pediplain exhibit ancient tableland with mature, rolling topography. The Dobhi-Gaya Ji terrace, a high alluvial plain, transitions from the pediplain through colluvial deposits. The Sone-Ganga plain, situated between the Dobhi-Gaya Ji terrace and the Ganga-Sone rivers, features depositional landscapes with Quaternary alluvial deposits. The upland, plateau, and pediplain display erosional features, while the terrace and plain highlight depositional processes.



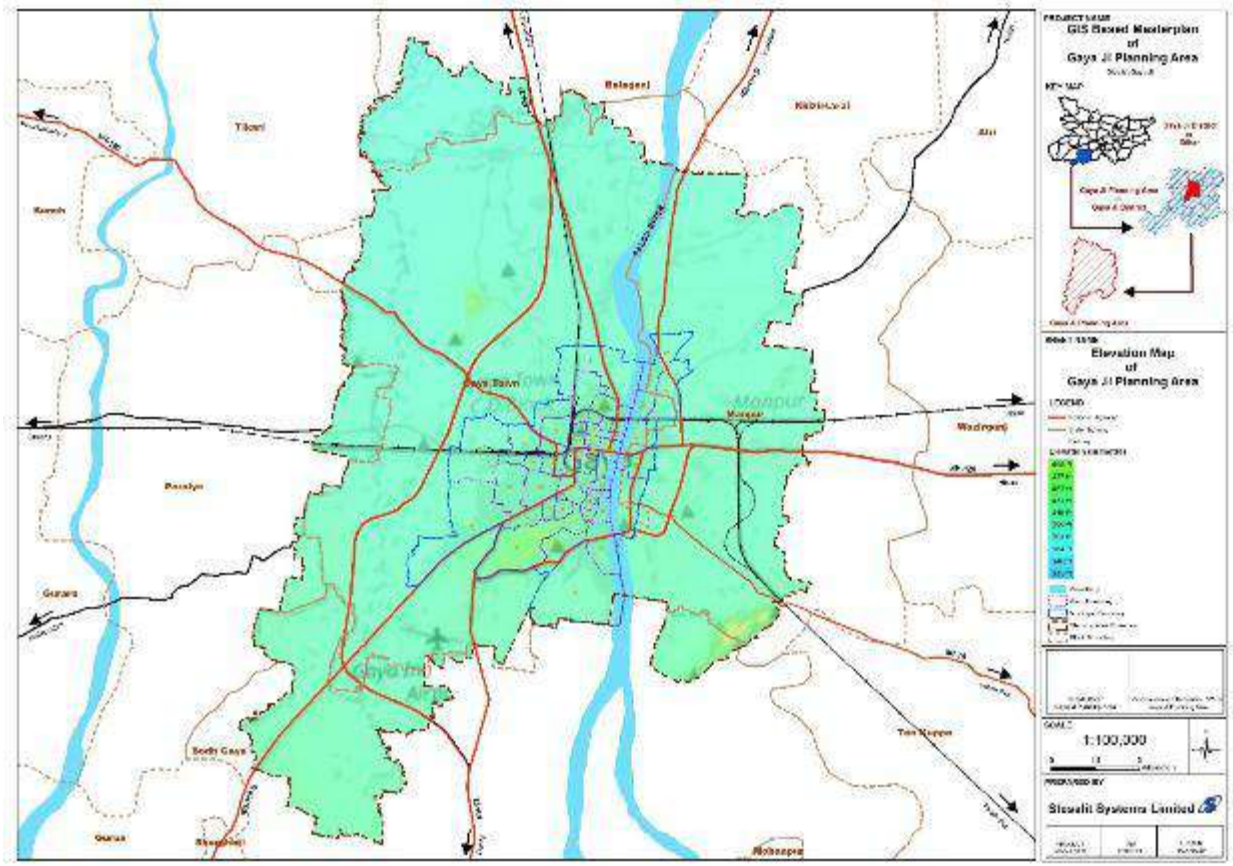
MAP 1-3 GEOMORPHOLOGY MAP OF THE GAYA JI PLANNING AREA

1.3.2 TOPOGRAPHY

The topography of Gaya Ji district is marked by diverse physiographic and geomorphic features, broadly classified into four major zones: rocky upland, plateau and pediplain, high-level marginal alluvial terrace (Dobhi-Gaya Ji terrace), and the Sone-Ganga plain. The **rocky upland** includes prominent hills like Ramshila, Katari, Brahma-yoni, Pretshila, and Barabar, which are outcrops of the Chotanagpur Plateau. The **plateau and pediplain** represent ancient, mature landscapes with residual soils from surrounding hills. The **Dobhi-Gaya Ji terrace**, a high alluvial plain, stands above flood levels, while the **Sone-Ganga plain** features flat depositional landscapes with Quaternary alluvial deposits. Together, these zones reflect a dynamic interplay of erosional and depositional processes, shaping Gaya Ji's varied terrain. (GROUND WATER RESOURCES OF INDIA, 2022)

1.3.2.1 ELEVATION

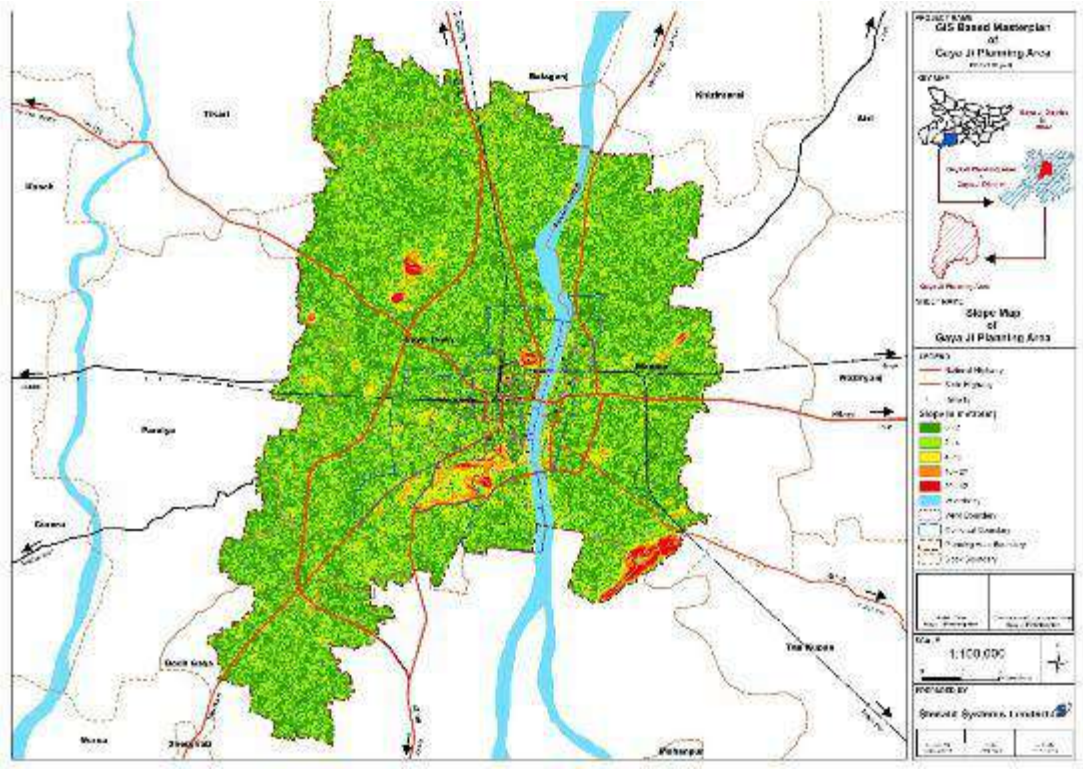
The Gaya Ji Plain is an alluvial plain that progressively dips down to the northeast. The minimum elevation ranges from 121.61 meters above sea level in the north to maximum elevation ranges from 139.29 meters in the south.



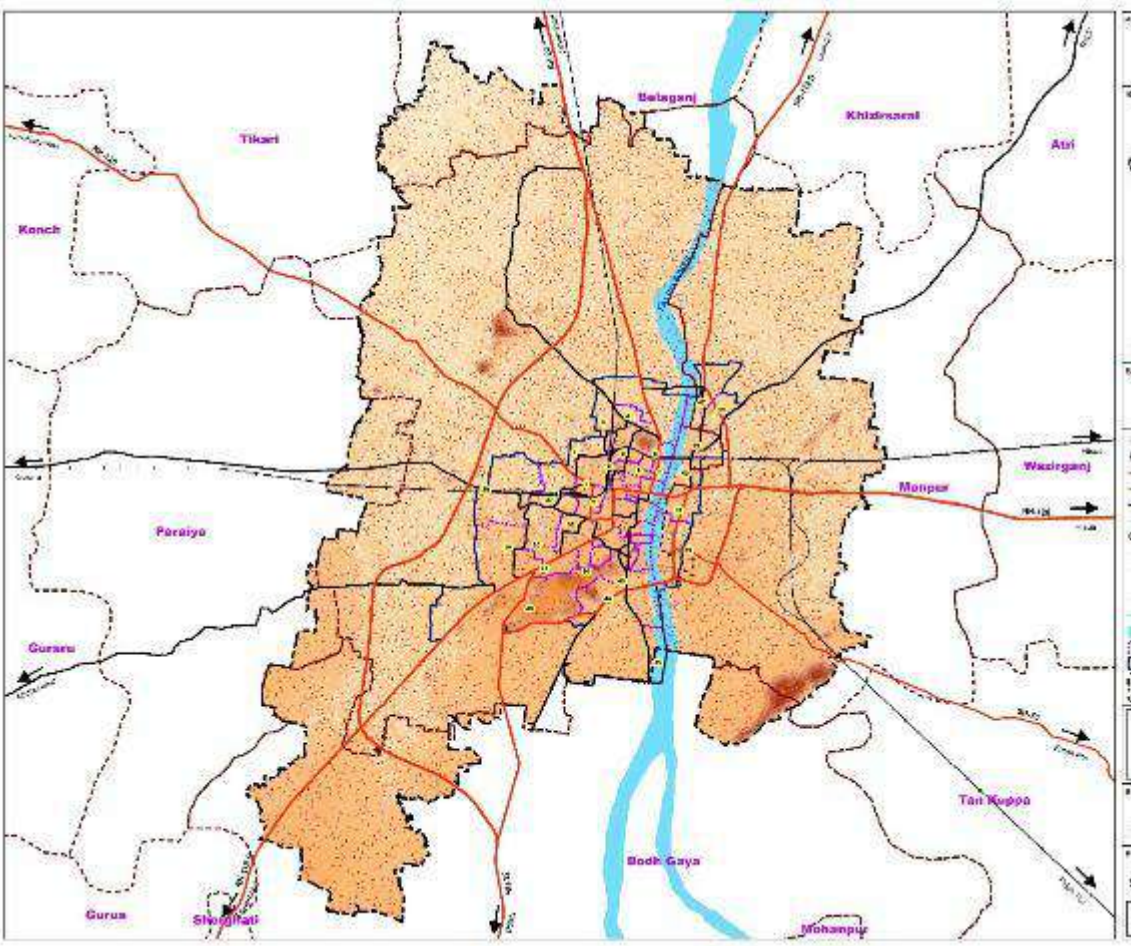
MAP 1-4 ELEVATION MAP OF GAYA JI PLANNING AREA

1.3.2.2 CONTOUR AND SLOPE

The slope map of the Gaya Ji Planning Area, as depicted below, indicates that the region is situated on moderately flat terrain. While the central and northern sections of the town are predominantly level, the southern area, especially around the Brahmayoni Hills, exhibits a more mountainous landscape. The topography of the southern part of the town is notably hilly, in contrast to the relatively flat geography of the rest of the area.



MAP 1-5 SLOPE MAP OF THE GAYA JI PLANNING AREA



MAP 1-6 CONTOUR MAP OF THE GAYA JI PLANNING AREA

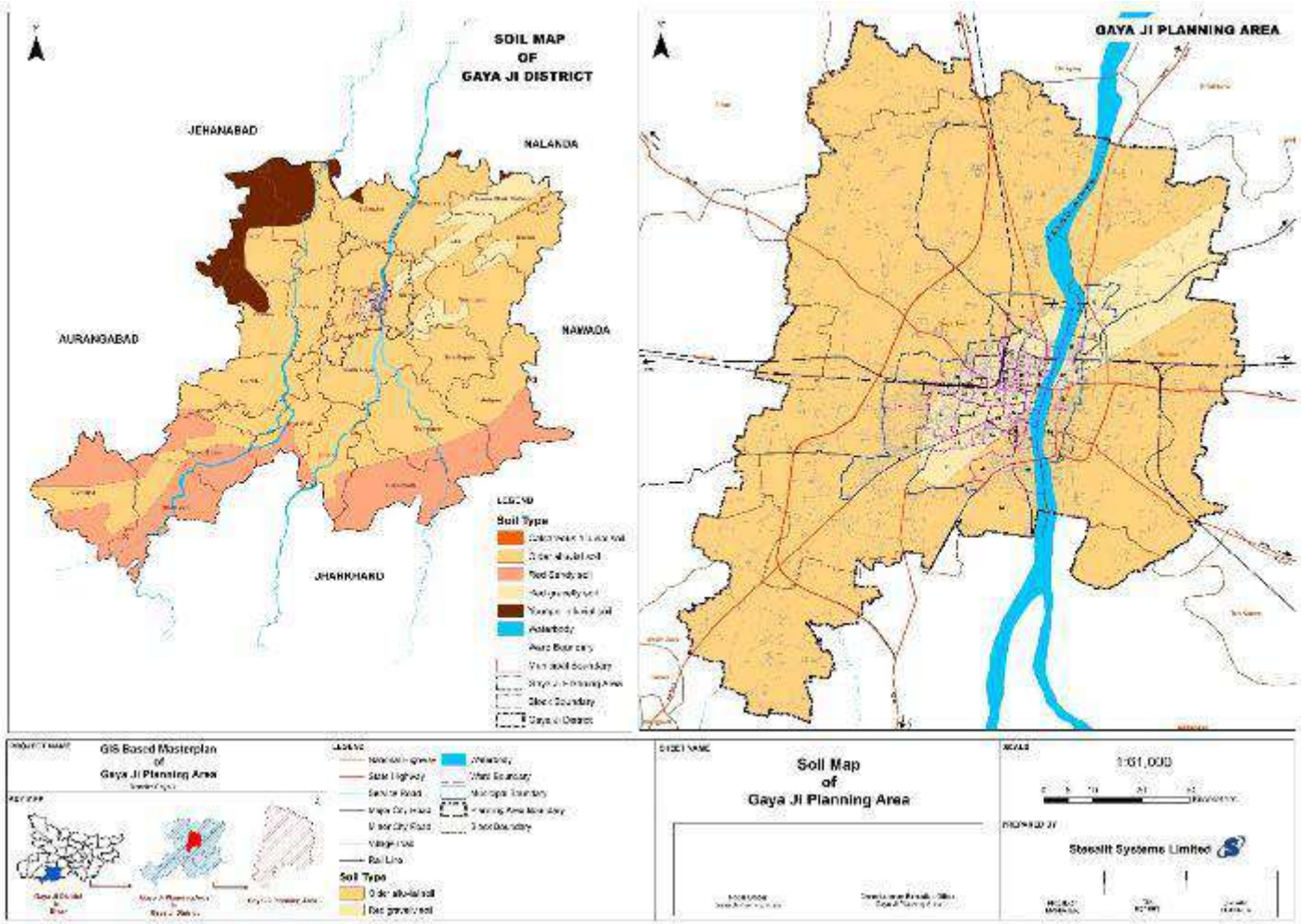
1.3.2.3 SOIL

Gaya Ji district features a variety of soil types, including sandy soil, red and yellow soil, and younger alluvial soil, each significant for its unique properties and distribution.

Sandy soil, along with red and yellow soil, is found in the southern and northeastern parts of the district, particularly in areas occupied by the plateau, pediplain, and the high-level marginal alluvial plain (terrace). Locally referred to as balwat, balmator, or balsundri, these soils are extremely deficient in nitrogen and organic matter, rendering them infertile.

In contrast, the younger alluvial soil is prevalent in the Sone-Ganga plain. This soil mainly comprises loam with a small proportion of sand and clay (kewal). Rich in nitrogen and calcium, the younger alluvial soil is highly fertile and supports robust agricultural activities.

The following map shows the soil map of the Gaya Ji Planning Area.

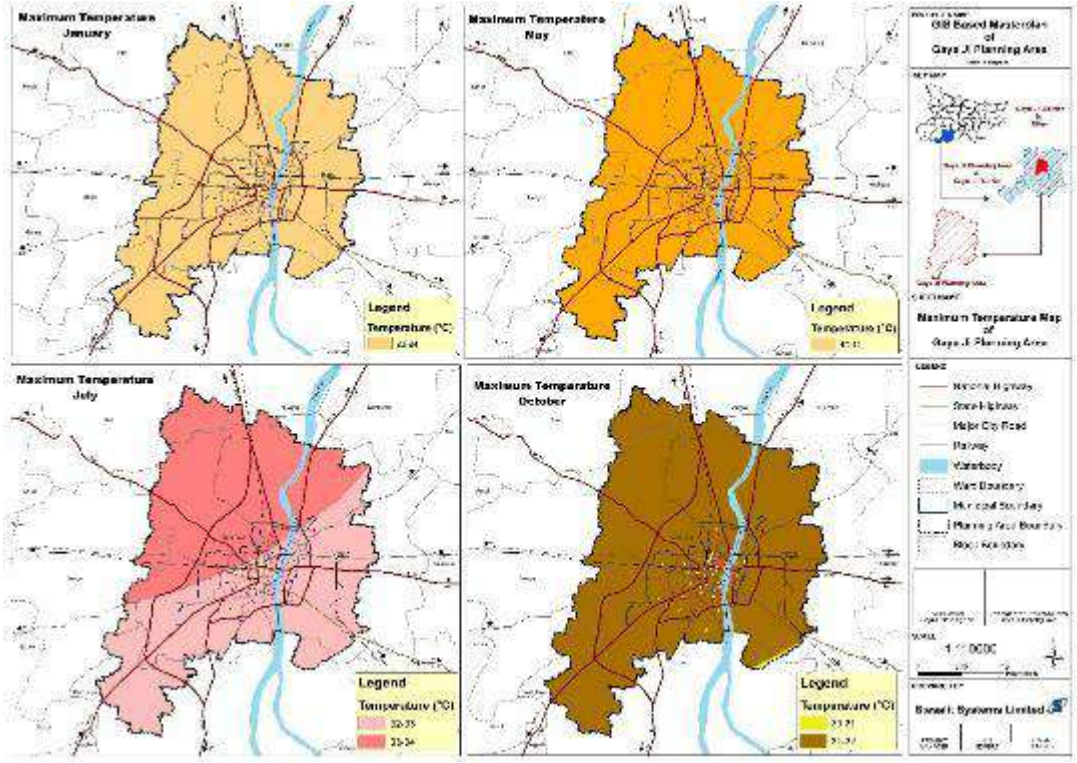


MAP 1-7 SOIL MAP OF GAYA JI PLANNING AREA

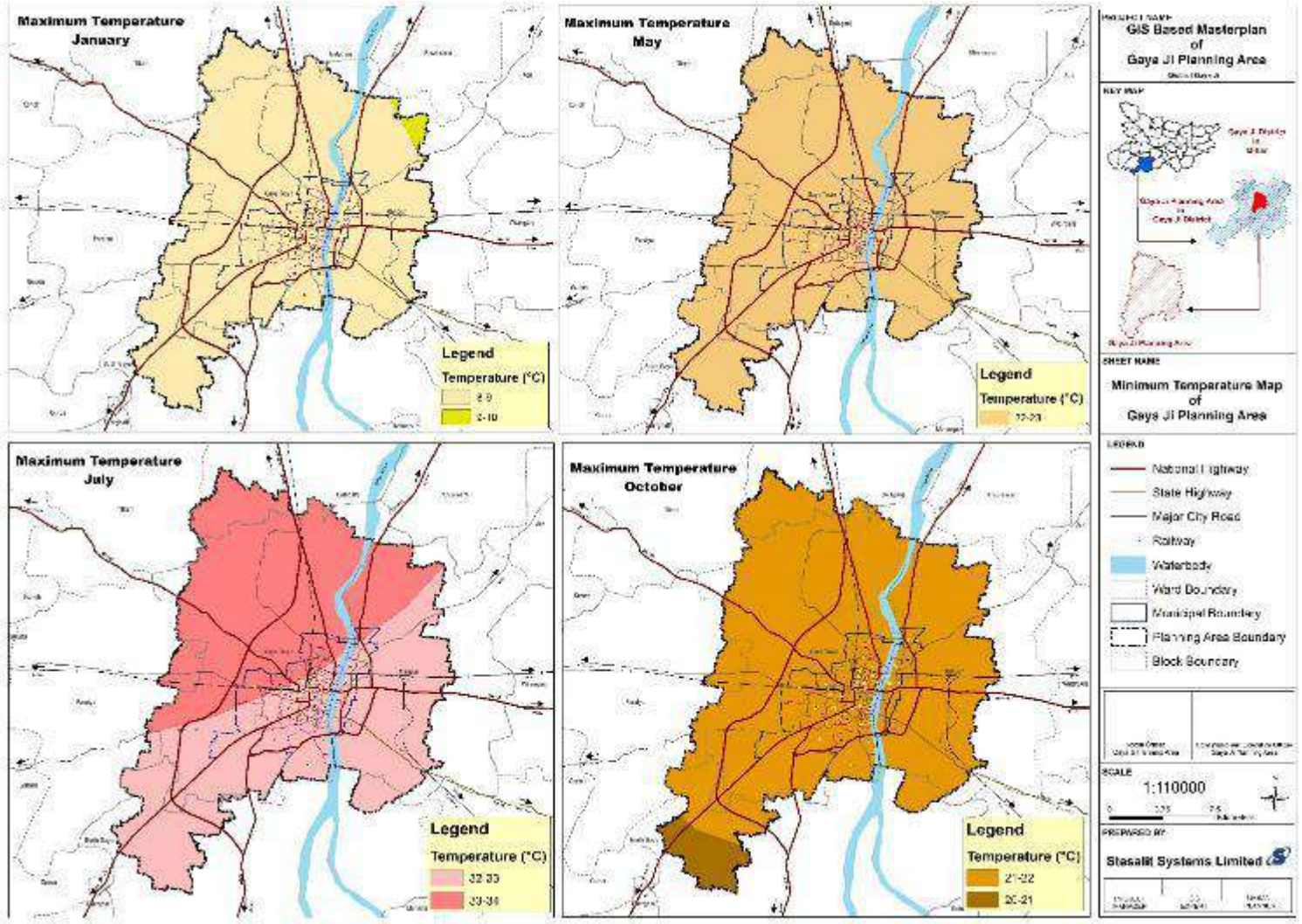
1.3.3 CLIMATE

1.3.3.1 TEMPERATURE

Gaya Ji experiences dry, humid winters in a subtropical environment. The district experiences 32.95°C annual temperatures, which is 4% warmer than the average for India. The following table shows the climate data of the Gaya Ji Planning Area.



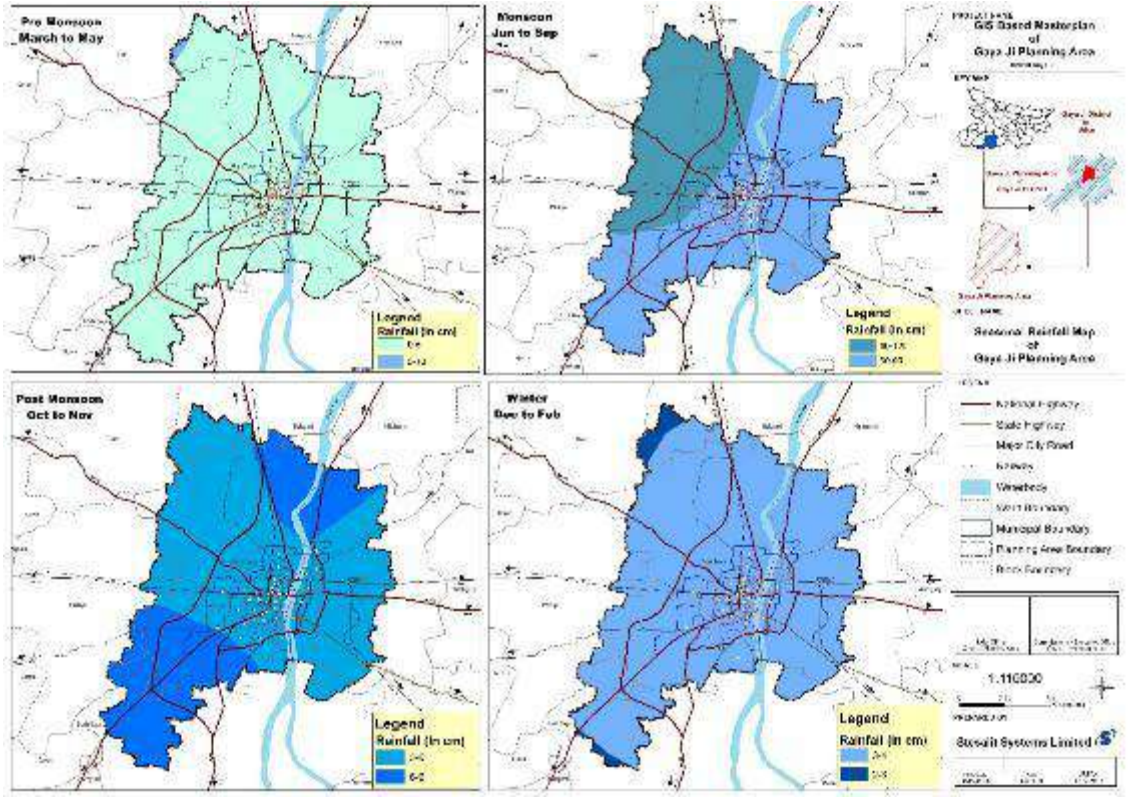
MAP 7 MAXIMUM TEMPERATURE MAP OF GAYA JI PLANNING AREA



MAP 1-8 MINIMUM TEMPERATURE MAP OF GAYA JI PLANNING AREA

1.3.3.2 RAINFALL

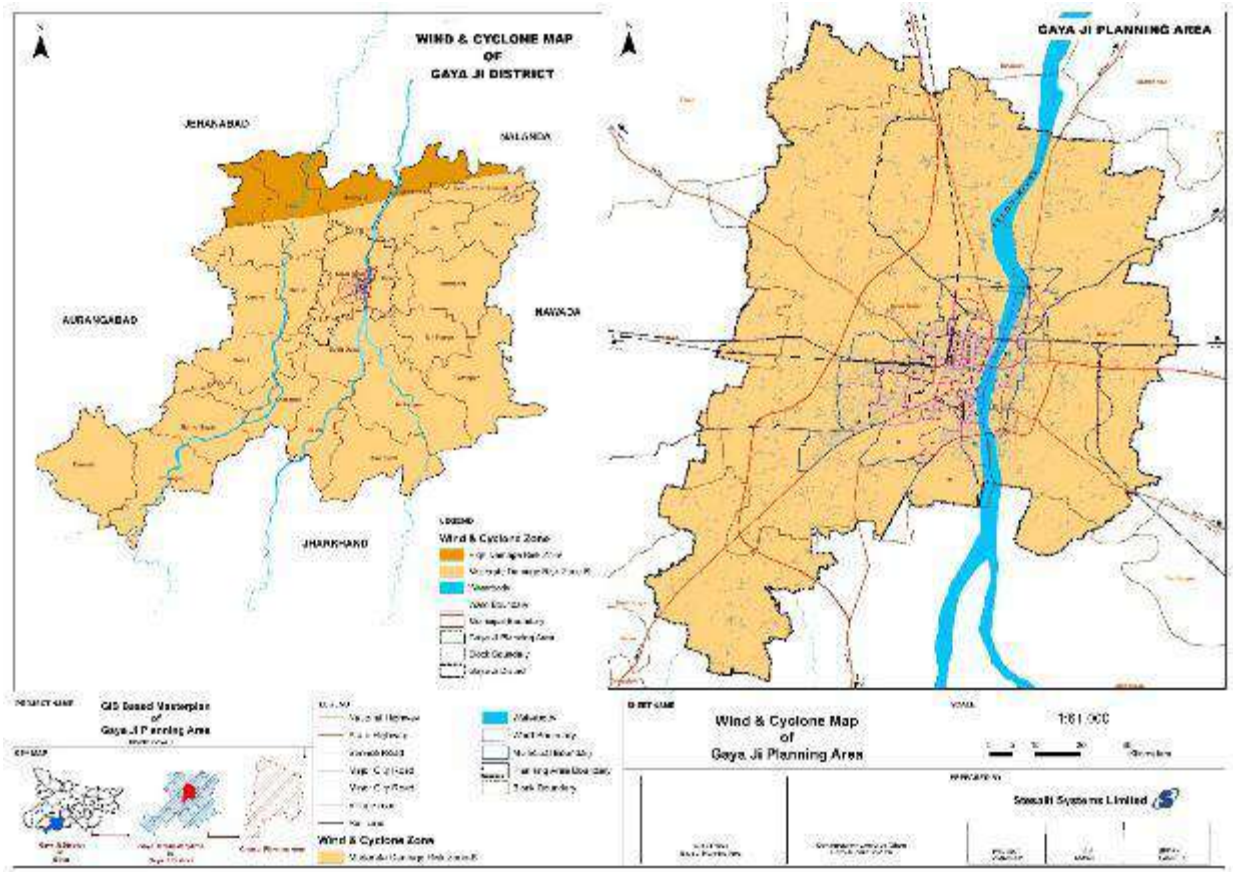
According to information held by Central Ground Water Board Department of Water Resources, River Development and Ganga Rejuvenation, the rainfall data shows that there has been a significant variation in annual rainfall over the course of these five years, nearly doubling from 702 mm in 2015 to 1404 mm in 2016. The months of June through September bring in the highest rainfall. December is the month with the least amount of rainfall in the area. The following maps show the seasonal rainfall map of the Gaya Ji Planning Area.



MAP 1-9 SEASONAL RAINFALL MAP OF GAYA JI PLANNING AREA

1.3.3.3 WIND

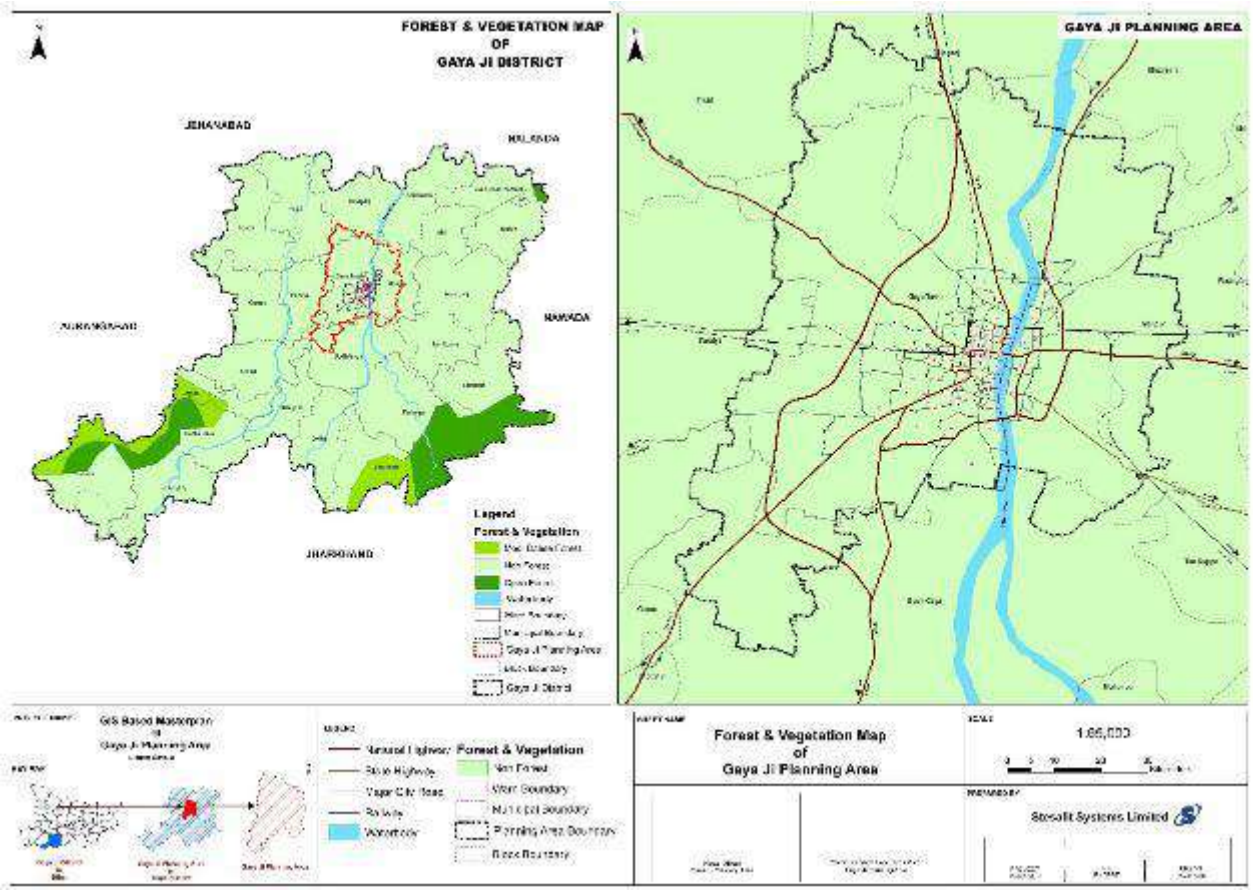
Although from the below Wind and Cyclone map, it is evident that the city lies under the moderate damage risk zone-B, all year long, winds are typically low to moderate.



MAP 1-10 WIND & CYCLONE ZONE MAP OF GAYA JI PLANNING AREA

1.3.4 FOREST & VEGETATION

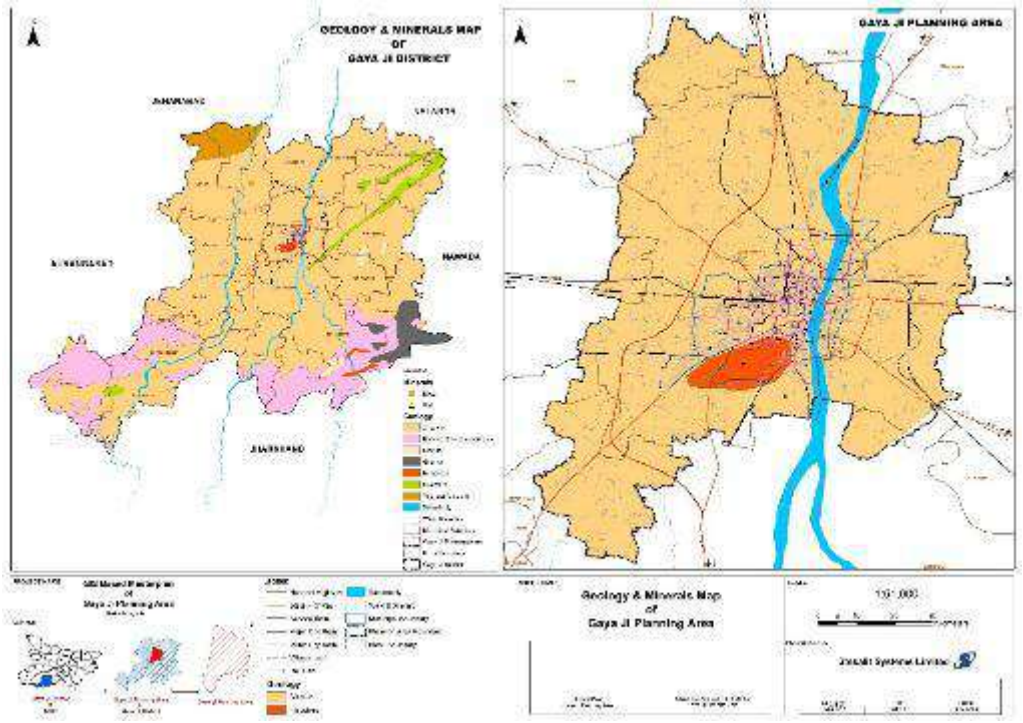
The Gaya Ji district is classified as a non-forest territory. However sparse vegetation is found in the southern parts



MAP 1-11 FOREST AND VEGETATION MAP OF GAYA JI PLANNING AREA

1.3.5 NATURAL RESOURCES

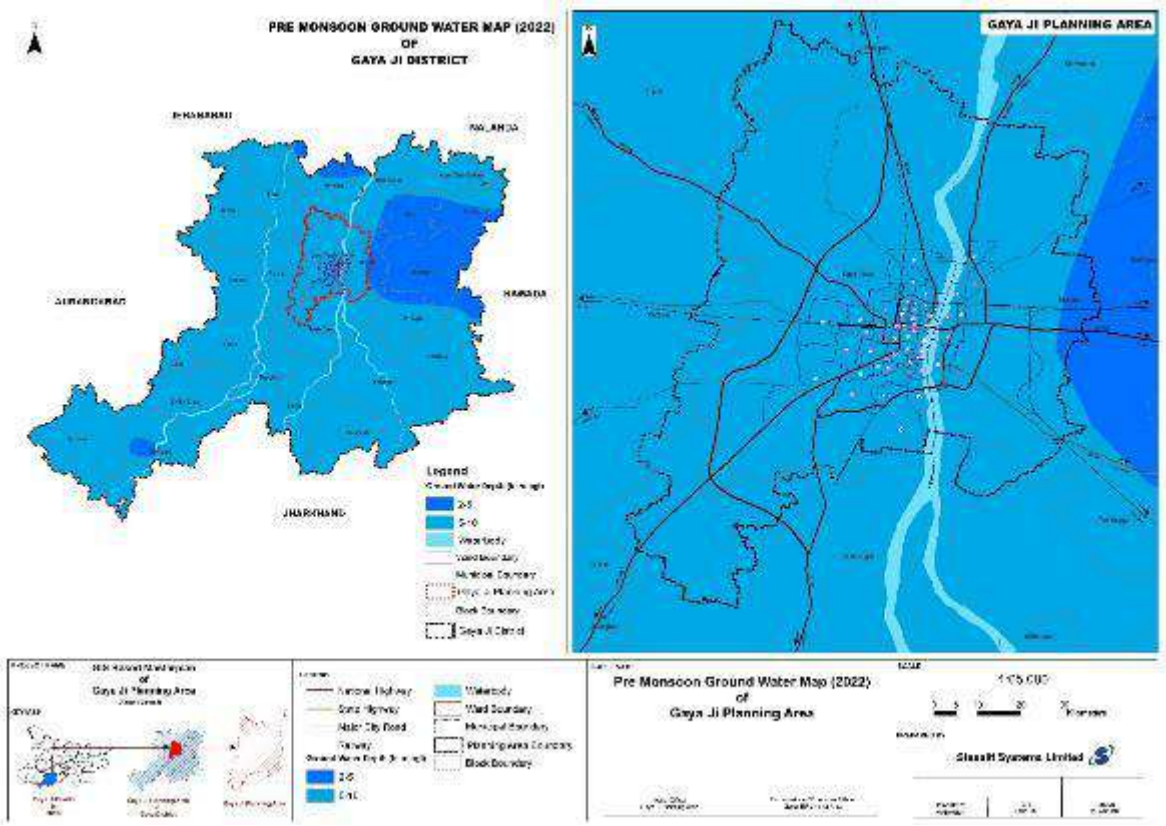
The Gaya Ji district's geology can be broadly divided into two groups: pre-Cambrian rock formations from the Chhotanagpur granite gneiss complex and meta-sedimentary rocks, and Quaternary sediments, which contain both younger and older alluvium. The metamorphosed sediments comprising argillaceous, arenaceous, and calcareous types—represented by mica schist, phyllite, and quartzite—are the oldest rocks in the region. This location contains two different forms of mica schist: one that contains staurolite and the other that contains sillimanite. This area's quartzite is folded into synclines and anticlines, resulting in long, linear ridges. The district's southern region contains rocks that are calc-silicate in nature. (Central Ground Water Board, July, 2022).



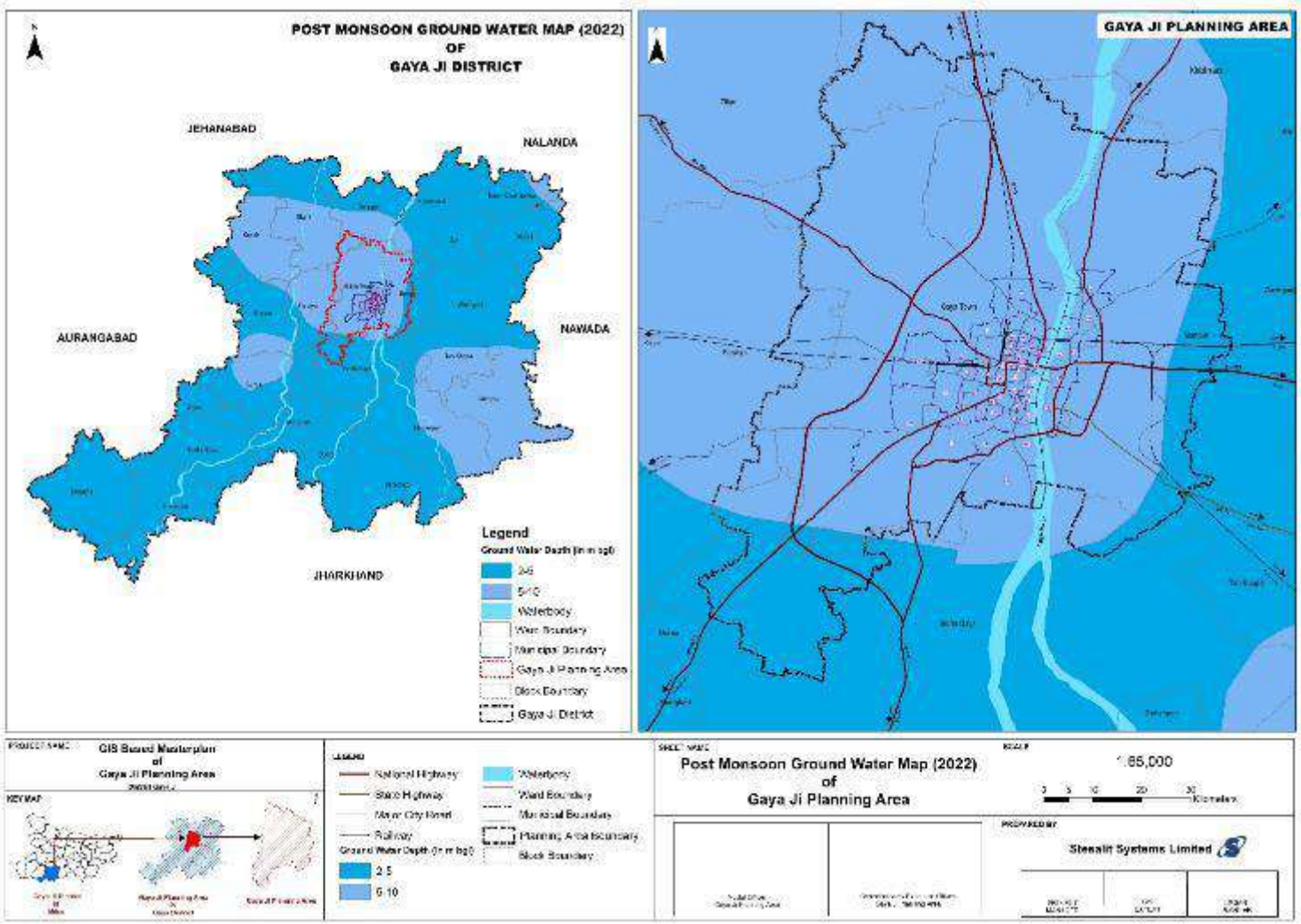
MAP 1-12 GEOLOGY MAP OF GAYA JI PLANNING AREA

1.3.6 GEOHYDROLOGY

From the groundwater map of the Gaya Ji Planning area, we can see that in the pre-monsoon period, the groundwater depth ranges from 5-10 billion cubic meters. Conversely, though in the post-monsoon period, the groundwater depth ranges from 2-5 billion per cubic meter.



MAP 1-13 PRE-MONSOON GROUNDWATER MAP (2011)

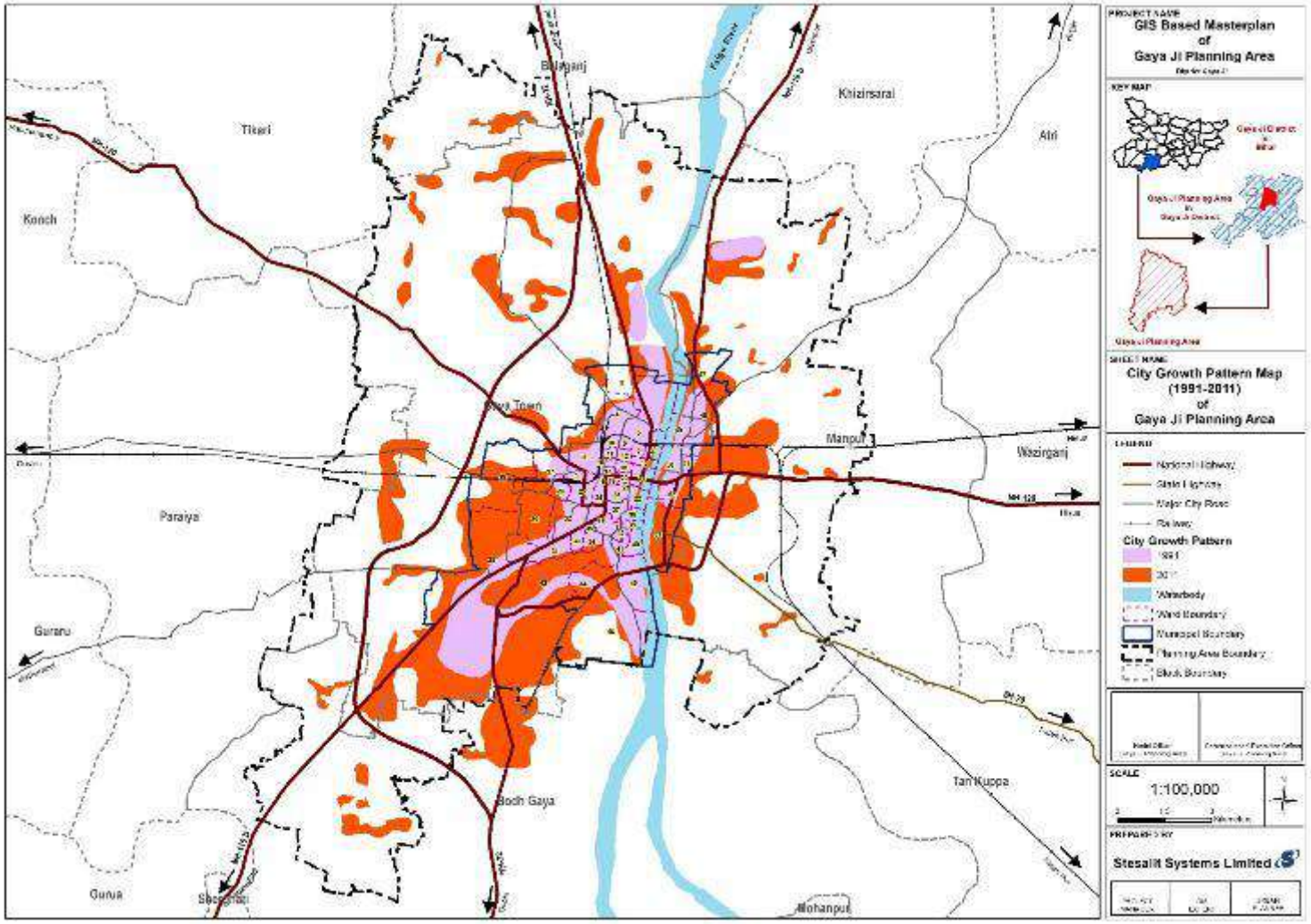


MAP 1-14 POST MONSOON GROUNDWATER MAP (2011)

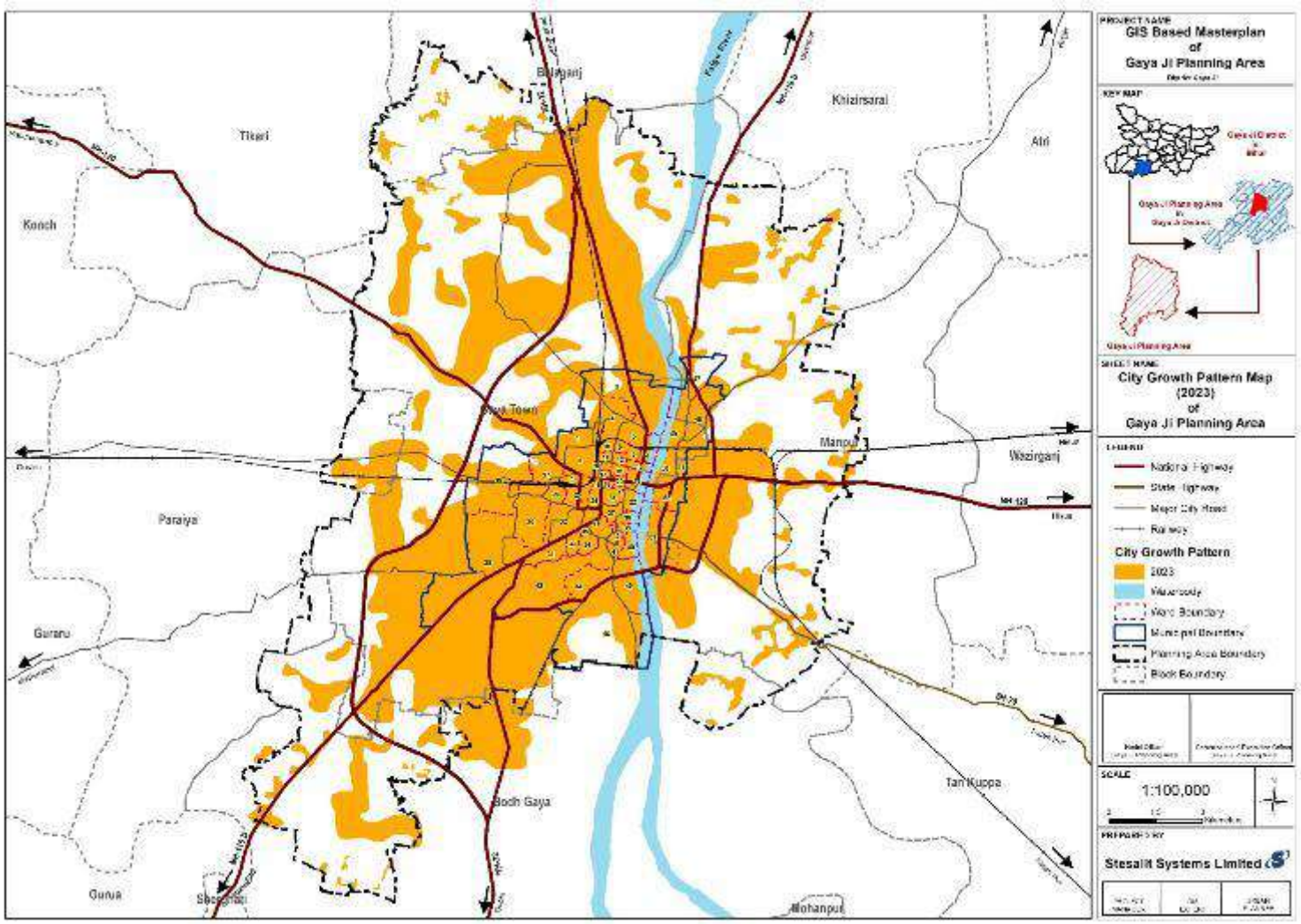
1.3.7 DEVELOPMENT STRATEGIES

The district of Gaya Ji is located near the geographical centre of Bihar. Until 1865, Gaya Ji was part of the Bihar and Ramgarh districts. However, in that year, when the Bihar subdivision was transferred to the Patna district, a new district named Gaya Ji was formed. The district is bordered by Arwal, Jehanabad, and Nalanda districts to the north; Nawada district to the east; the state of Jharkhand to the south; and Aurangabad district to the west. As one of India's leading tourist destinations, Gaya Ji has been selected as one of twelve heritage cities to receive funding for urban planning, economic development, and heritage conservation under the City Development and Augmentation Yojana (HRIDAY) program by the Government of India. Furthermore, it is one of only two cities in Bihar to receive funding for development under the Swadesh Darshan 2.0 scheme.

In the last two decades, Gaya Ji has witnessed significant growth in both residential and commercial sectors, particularly in its peripheral areas. The expansion of satellite towns and neighbourhoods, such as Bodhgaya, renowned for its religious importance in Buddhism, has fueled the demand for enhanced urban planning and services. Gaya Ji's proximity to Bodhgaya has been a key driver of its growth. Religious tourism has played a pivotal role in boosting the local economy, with an influx of global tourists leading to the development of hotels, transport facilities, and other service-oriented businesses. In terms of infrastructure, Gaya Ji has seen notable improvements, particularly in transportation. Roadways connecting Gaya Ji to other parts of Bihar, such as Sherghatti via the Gaya Ji-Sherghatti Road, and neighbouring states via State Highway (SH-120), have been upgraded, enhancing accessibility. The Gaya Ji Junction railway station remains one of the major railway hubs in Bihar, further improving the city's connectivity. Moreover, the city has witnessed the establishment and expansion of educational institutions, including universities and technical colleges. The presence of institutions like Magadh University, GD Goenka Public School, and Sujan ITI along Patna-Gaya Ji (SH-22) has bolstered Gaya Ji's reputation as an educational centre, attracting students from nearby regions.



MAP 1-15 GROWTH MAP OF THE GAYA JI PLANNING AREA (1991-2011)



MAP 1-16 GROWTH MAP OF THE GAYA JI PLANNING AREA (2011-2025)

1.4 CULTURE AND HERITAGE

The city of Gaya Ji holds immense historical value with its rich heritage and culture and has witnessed various significant historical events in the past. The city is home to individuals of diverse ethnicities, cultures, languages, and regions. The city celebrates all festivals with delight and enthusiasm.

East of Gaya Ji, the Falgu River seems dry most of the time, until it rains, and is an underground stream that is made accessible below ground by a curse placed by Sita Devi. Sita Kund, which shows where Sita carried out the pinda dana ceremony, is located across the Vishnupad Temple. Close by, the immortality-granting Akshya Vat tree is revered and blessed by Sita Devi.

The important Sati temple of Mangla Gauri is situated on a hill south of Gaya Ji. Dispersion of Sati's body parts is how Puranic legend describes Lord Vishnu as creating Shakti Peeths. Ramshila Hill lies to the southeast of Gaya Ji, and it is thought that Lord Rama made pinda there. On this hill, a crucial location for Pitrapaksha ceremonies, is the old Ramesvara Temple. Pretshila Hill, which is ten kms away, is the location of Brahma Kund and the Ahilya Bai Temple, which is well-known for its sculptures and architecture. Since ancient times, the city has been recognized for its contributions to the arts and crafts. The locals are skilled at Madhubani and Mithila painting, which is prevalent throughout, and they paint their walls and floors with rice power. They are adept at crafting one-of-a-kind items out of clay, cotton, bamboo, and red soil. You may find amazingly carved bamboo baskets, furniture, and toys all across the city. Additionally, exquisitely woven carpets, mats, and themes can be found in neighbourhood markets. The city is renowned for its

2 THE PLANNING PROCESS

2.1 LITERATURE REVIEW

TABLE 2-1 LITERATURE REVIEW MATRIX

Document / Source	Year	Issuing Agency	Relevance to Gaya Ji Planning Area	Key Provisions / Focus Areas	Implications for Master Plan
Bihar Urban Planning & Development Act (BUPD Act)	2012	Government of Bihar	Provides the statutory framework for urban planning and development in Bihar	Planning areas, preparation and implementation of Master Plans, development control and land-use regulation	Forms the **primary statutory basis** for preparation, approval and implementation of the Gaya Ji Master Plan
Bihar Urban Planning & Development Rules	2014	Government of Bihar	Provides procedural requirements under the BUPD Act	Planning procedure, development permissions, planning authorities and implementation mechanisms	Guides the **planning process, development control and statutory implementation**
Bihar Building Bye-Laws	2014, amended 2022	Government of Bihar / Urban Development & Housing Department	Applicable to building and development activities within the planning area	FAR, setbacks, height, coverage, parking, building safety, fire safety and other development controls	Provides the basis for **DCR provisions**, building controls and development permissions

Bihar Municipal Act	2007	Government of Bihar	Relevant for municipal governance and service delivery in Gaya Ji	Municipal functions, infrastructure, sanitation, roads, public services and development management	Supports proposals related to **municipal infrastructure, service delivery and institutional responsibilities**
URDPFI Guidelines	2014	MoHUA, Government of India	Provides national planning standards for preparation of Master Plans	Land-use planning, population projections, housing, transportation, infrastructure, environment and development control	Provides the **planning standards and methodology** for land use, infrastructure, housing and spatial development
AMRUT Mission Guidelines	2015	MoHUA, Government of India	Relevant to urban infrastructure and service improvement	Water supply, sewerage, drainage, urban transport, green spaces and institutional reforms	Helps integrate **water supply, sewerage, drainage, mobility and green infrastructure proposals**
Harmonised Guidelines & Standards for Universal Accessibility	2021	MoHUA / Government of India	Important for creating an inclusive and accessible Gaya Ji	Barrier-free access, pedestrian infrastructure, public buildings, streets and universal design	Incorporation of **universal accessibility and inclusive mobility** in public spaces, streets and infrastructure
National Building Code of India (NBC)	2016	Bureau of Indian Standards (BIS)	Provides technical standards for building	Building safety, fire protection, structural safety,	Supports preparation of **safe and technically compliant**

			developm ent	services, accessibility and occupancy	**building regulations**
IRC Guidelines / IRC:103 – Guidelines for Pedestrian Facilities	2012	Indian Roads Congress	Relevant to Gaya Ji's pilgrimage and pedestrian movement	Footpaths, pedestrian crossings, accessibility, pedestrian safety and street design	Supports **pedestrian-oriented streets, pilgrimage routes and improved walkability**
Street Design Guidelines	2010	UTTIPEC / applicable urban planning agencies	Relevant for redesign of streets and public realm	Street hierarchy, pedestrian facilities, carriageway s, cycle facilities and street furniture	Guides **complete-street and pedestrian-friendly street proposals**, particularly in the Core/Old City
Mahabodhi Temple Complex – UNESCO World Heritage Documentat ion	2002	UNESCO World Heritage Centre	Critical for Bodhgaya' s internation al heritage significanc e	Outstanding Universal Value, conservation , authenticity, integrity and manageme nt	Requires **heritage-sensitive spatial planning, controlled developmen t and protection of the setting** around the World Heritage property. (UNESCO World Heritage Centre)
UNESCO Conservatio n / State of Conservatio n Decisions – Mahabodhi Temple	2005–2012	UNESCO World Heritage Committe e	Addresses developm ent pressure around Mahabod hi Temple	Site manageme nt, buffer/perip hery controls, conservation and integration	Supports preparation of **heritage buffer/contr ol zones, visual protection and tourism manageme**

				of pilgrimage and community development	**nt strategies**. (UNESCO World Heritage Centre)
Heritage-led Perspective Development Plan for Bodhgaya – Vision 2005–2031	2005	Government of Bihar / Heritage Planning framework	Provides an important previous planning reference for Bodhgaya	Heritage conservation, development controls, pilgrimage, tourism and spatial development	Existing proposals should be **reviewed, updated and integrated** with the Gaya Ji Planning Area Master Plan. UNESCO records its adoption and relevance to the development planning framework. (UNESCO World Heritage Centre)
Bodhgaya Site Management Plan	2005	Government of Bihar / Heritage Management framework	Important for management of the Mahabodhi Temple and its surroundings	Conservation, site management, visitor management and protection of heritage values	Should be considered while preparing **heritage zones, tourism facilities, circulation and development controls**
Government Tourism Schemes and Projects	Ongoing	Ministry of Tourism / Government of Bihar	Tourism and pilgrimage are major economic drivers of Gaya–Bodhgaya	Pilgrimage infrastructure, tourism circuits, visitor facilities and destination	Supports development of a **pilgrimage and tourism-led spatial development strategy**

				developmen t	
Sustainable Developme nt Goals (SDGs)	2015	United Nations	Provides a broader sustainabili ty framework	SDG 6, 8, 9, 10, 11, 13 and 15 relating to water, economy, infrastructure , inclusion, sustainable cities, climate and ecosystems	Helps establish **sustainable, inclusive, resilient and environment ally sensitive planning objectives**

The literature review establishes the statutory, policy, technical, heritage and development framework for preparation of the Gaya Ji Planning Area Master Plan. The review of national guidelines, Bihar State Acts and Rules, building regulations, technical standards, heritage management documents, previous planning studies and ongoing development schemes provides the basis for formulating appropriate land-use, transportation, infrastructure, environmental, tourism, heritage conservation and development control proposals. Particular emphasis shall be given to conservation of the cultural and spiritual identity of Gaya Ji and Bodhgaya, protection of the Mahabodhi Temple World Heritage property and its setting, sustainable management of pilgrimage and tourism, universal accessibility, infrastructure adequacy and climate-resilient urban development.

The BUPD Act, BUPD Rules and Bihar Building Bye-Laws are currently listed by the Bihar planning authority, including the 2022 Building Bye-Laws amendment, so these should be treated as core statutory references in the final report.

2.2 STAKEHOLDER ENGNGMENT

2.2.1 STAKEHOLDER ENGAGEMENT FOR GAYA JI MASTER PLAN PREPARATION

Stakeholder engagement is a critical component of the **Gaya Ji Master Plan preparation process**, as it ensures that the planning proposals reflect the needs, aspirations, concerns, and development priorities of government departments, local institutions, elected representatives, citizens, businesses, tourism stakeholders, and other relevant agencies. Considering the **religious, cultural, heritage and tourism significance of Gaya Ji**, an inclusive and participatory approach is essential for preparing a practical, implementable and sustainable Master Plan up to 2047.

2.2.2 OBJECTIVES OF STAKEHOLDER ENGAGEMENT

The major objectives of stakeholder engagement for the Gaya Ji Master Plan are:

- To understand the existing development issues, opportunities and constraints within the Gaya Ji Planning Area.
- To obtain inputs from key government departments and line agencies regarding ongoing and proposed projects.
- To identify infrastructure and service delivery gaps related to water supply, sewerage, drainage, solid waste management, transportation, housing and social infrastructure.
- To understand the requirements of **pilgrims, tourists, local residents and the business community**.
- To incorporate heritage conservation and tourism-development requirements into spatial planning.
- To obtain inputs regarding proposed land-use changes, transportation networks, infrastructure corridors and development areas.
- To identify environmentally sensitive areas, flood-prone areas and areas requiring development restrictions.
- To build consensus among stakeholders regarding the proposed development vision, strategies and Master Plan proposals.
- To facilitate coordination between different departments for effective implementation of the Master Plan.



FIGURE 2-1 STAKEHOLDERS MEETING FOR DRAFT MASTER

2.3 VISION OF GAYA JI PLANNING AREA- 2047

2.3.1 GAYA JI PLANNING AREA – VISION FOR 2047

The year **2047**, marking 100 years of India's Independence, represents a defining milestone towards achieving **Viksit Bharat @2047**—a developed, sustainable, inclusive and globally competitive nation. The **Gaya Ji Master Plan- 2047** has been prepared in alignment with this national vision and the long-term development aspirations of the Government of Bihar.

Considering Gaya Ji's exceptional **religious, spiritual, cultural, heritage and tourism significance**, the Master Plan envisions the Planning Area as a **globally recognised spiritual and cultural urban centre**, supported by sustainable development, resilient infrastructure, improved connectivity and efficient public services. The presence of international monasteries, educational institutions, and meditation centres further enhances the area's **multicultural and international character**, positioning Gaya Ji as a major **spiritual, cultural, heritage, and tourism-driven growth centre** with strong potential for sustainable development and regional economic growth.

The Master Plan provides a comprehensive framework for **spatial development, land use, transportation, infrastructure, tourism, heritage conservation, environmental management and development control**, guiding the integrated and sustainable development of the Gaya Ji Planning Area up to **2047**.

TABLE 2-2KEY ATTRIBUTES

Attribute	Strength
Location	Strategically located in southern part of Bihar; holds significant regional and international importance as one of the most prominent sacred pilgrimage centers
Connectivity	Situated on NH-22 and NH-120; located near Gaya Ji International Airport connect it internationally
Agrarian Base	Fertile alluvial plains supported by the Falgu River system; high agricultural productivity (paddy, wheat, pulses, oilseeds); canal and groundwater-based irrigation supporting agro-based economy
Tourism Base	The city of Gaya is revered in Hinduism as a sacred pilgrimage centre associated with ancestral rituals and pind daan ceremonies performed along the banks of the Falgu River.
Economic Potential	Tourism Based economy, Agriculture based industry, Hospitality
Policy Support	Bihar Tourism Policy, Bihar Industrial Policy, PMKSY, Gati Shakti, and Agro Export Policy

Source: Stesalit Systems Ltd

"To transform Gaya Ji into a globally recognized spiritual, cultural and heritage destination by 2047, strengthening its role as a premier pilgrimage and tourism centre through enhanced connectivity, sustainable and inclusive urban development, efficient infrastructure, and tourism-led economic growth, while preserving its distinctive spiritual character, heritage and cultural landscape."

The vision is further elaborated as goals and strategies in the table below:

TABLE 2-3 GUIDING PRINCIPLES FOR THE VISION

GUIDING PRINCIPLE	OBJECTIVES	STRATEGIES / FOCUS AREAS
ECONOMIC DIVERSIFICATION	Heritage Zone	- Heritage Corridor, Hospitality, Exhibitions, Conventions, etc.
	Higher Education Facility	- Colleges, Library and Coaching center

GUIDING PRINCIPLE	OBJECTIVES	STRATEGIES / FOCUS AREAS
		- Integration with Education Policy, National Mission on Libraries (NML), Skill India Mission
	Skill Development Hub	- District Skill & Livelihood Centre with labs in food tech, aquaculture, and renewables - Hostel, digital learning, and placement facilities
	MSMEs and SHG-led rural enterprises	- NTFP clusters, eco-labelling, micro-packaging - Van Dhan Yojana convergence and financial linkage with SHGs
SUSTAINABLE & BALANCED DEVELOPMENT	Circular economy practices and climate-smart production	- Solar tunnel dryers, biodegradable packaging, organic compost units - Promote rainwater harvesting
	Agricultural resilience and water-based livelihood systems	- Falgu River Aqua-Agri Zone (cage culture, hatchery, feed units) - Alignment with PMMSY, fisheries value chain, and seed banks - Promote irrigation-linked fish farming and mixed cropping
	Access to treated water and sanitation systems	- Water Treatment Plants, Overhead Reservoirs (OHR)/Underground Reservoirs (UGR), dual-piping planning - Sewage Treatment Plants (STPs), Faecal Sludge Treatment Plants (FSTPs), CETP in food park, and decentralized wastewater reuse
	Sustainable Waste Management	- Material Recovery Facility (MRF), Material Collection Centres (MCC) for source segregation - Waste-to-compost and organic fertilizer linkage
	Integrated urban–rural development	- Phased land allocation for education, R&D, and industry till 2047- multi-sector synergy in land zoning
	Integrated green and blue infrastructure	- Green buffers and biodiversity belts along the Falgu River, Ahar, Pyne, Pond and canals - Urban forests and env. sensitive zones - Riverfront beautification and ecological restoration
ECO-TOURISM	Wellness and eco-tourism	- AYUSH Cluster with GMP-certified processing - Medicinal plantation with health trails, yoga zones, and interpretation centres
IMPROVED QUALITY OF LIFE & INNOVATION	Education, healthcare, and urban amenities	- Higher Education and Innovation Hub with biotech, IoT, and agri-sensor labs - R&D centres, incubation, and university-industry linkages

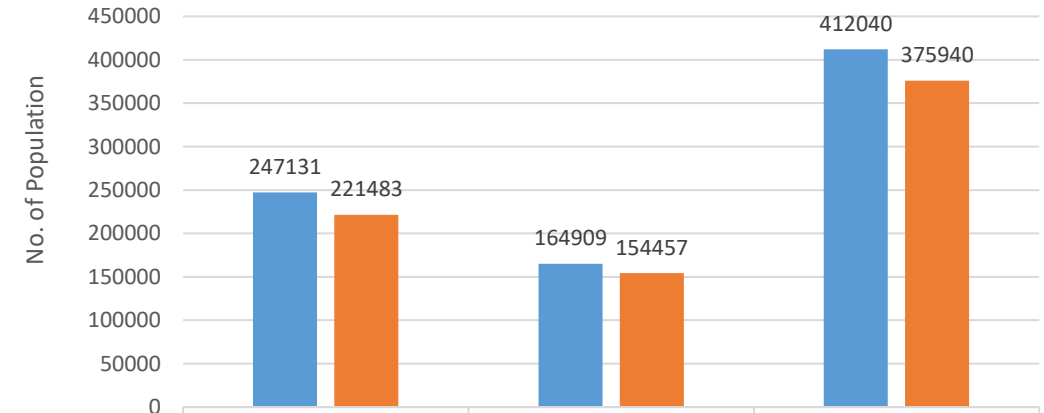
GUIDING PRINCIPLE	OBJECTIVES	STRATEGIES / FOCUS AREAS
		- Healthcare integration via AYUSH and mobile clinics
	Inclusive learning and digital empowerment	- Hostel and smart classroom infrastructure for rural youth - E-learning zones, library, AV studio, and remote access labs
	Strengthen social and physical infrastructure for inclusive service delivery	- Schools, libraries, remote education centers in rural nodes - Gender-safe public spaces, sports infrastructure, and Wi-Fi-enabled public libraries - Urban design with inclusive access to green, cultural, and recreational spaces - Public amenities integrated with solid waste management (MCC, MRF, composting)
	Improve urban sanitation, livability, and water security	- Modern public toilets, covered drains, faecal sludge reuse - Smart water metering, treated water reuse for green spaces
TRANSPORT & FREIGHT INTEGRATION	**Logistics and Export Hub**	- Logistics Hub with access to high speed road, and customs facilities - Export yard, packhouse, auction yard, and customs nodal cell
	Trade corridors	- NH 22 and 120 link to Patna, Dobhi, Aurangabad; integration with rail and airplane freight terminals

3 DEMOGRAPHY

3.1 EXISTING PROFILE

The development of a particular city, town or region is contingent upon a combination of natural, physical, and socio-economic elements. Among these factors, the population plays a pivotal role in defining the future trajectory of progress and development of the area.

As per the Census of India, the population of Gaya Ji Planning Area (162 villages and 1 ULB) in 2011 was 787980 people, of which 412040 (52.29%) were male and 375940 (47.71%) were female. Around 15.71% of the total population of the area is child population belonging to the age group of 0-6 years.



	Gaya (M. Corp.)	Rural Areas (162 villages)	Gaya Planning area
No. of Males	247131	164909	412040
No. of Females	221483	154457	375940

FIGURE 3-1 POPULATION DETAILS OF GAYA JI PLANNING AREA

Source: Census of India, 2011

3.2 POPULATION DISTRIBUTION

The spatial distribution of the population has been examined, based on the ward population of Gaya Ji Municipal Corporation and rural-urban distribution.

3.2.1 WARD-WISE POPULATION OF GAYA JI MUNICIPAL CORPORATION

The Gaya Ji Municipal Corporation was established in 1983. According to the Census 2011, it has 53 wards with a total population of 4,68,614 and a total number of 72,118 households. Ward number 27 has the highest population of 15,984, whereas ward number 21 has the lowest population of 2,700. Twenty-one wards

have a population above 10,000, with the rest of the wards having populations ranging between 2000 and 9000.

TABLE 3-1 WARD-WISE HOUSEHOLD AND POPULATION DISTRIBUTION IN GAYA JI MUNICIPAL CORPORATION (CENSUS, 2011)

Gaya Ji Municipal Corporation		
Ward Number	**Number of Households**	**Total Population**
1	1544	9398
2	1296	8264
3	2098	12881
4	2019	13015
5	576	3734
6	2057	13776
7	1279	8676
8	1764	10714
9	858	5741
10	1318	8219
11	1017	6779
12	1780	10526
13	675	4134
14	1668	10474
15	1245	7279
16	1182	6901
17	1048	6422
18	718	4365
19	793	5139
20	732	4576
21	369	2700
22	1283	8869
23	1023	7187
24	880	6636
25	1489	10346
26	1078	7003
27	2539	15984
28	1549	10663
29	1456	8407
30	2503	15981
31	1287	8804
32	1262	7402
33	800	5195
34	1607	10865
35	741	4990
36	1930	12581
37	593	3678
38	1554	10574
39	889	5535
40	1227	8584
41	1023	6747

Gaya Ji Municipal Corporation		
Ward Number	**Number of Households**	**Total Population**
42	1129	7399
43	1491	10175
44	866	580
45	1982	12501
46	1422	9344
47	1180	7974
48	1968	13521
49	2110	15482
50	2477	15587
51	1305	8487
52	1716	10972
53	1723	11628

Source: Census of India, 2011

The demographic characteristics provide crucial insights into age distributions, gender dynamics, educational attainments, and occupational structures. By investigating these demographic details, the analysis acquires a more nuanced knowledge of the diverse and dynamic makeup of the questioned community. Such insights not only guide targeted policy initiatives but also contribute to a broader socioeconomic story, offering light on the interconnected variables that shape the community's fabric.

the sample size for Gaya Ji Planning Area is considered as 5% of the total households as per the Census of India, 2011. According to it, the required sample size of 3606 households for the Gaya Ji Municipal Corporation. Therefore, a total of 3606households were collected in Gaya Ji Nagar Parishad during the survey conducted in 2023. Apart from the urban area to understand the rural fabric, 2640 households were surveyed in the 162 villages which is further elaborated.

The table below describes the distribution of the total number of households and their constituent members from Primary surveyed wards.

TABLE 3-2 NUMBER OF SURVEYED HOUSEHOLDS AND THEIR CONSTITUENT MEMBERS OF GAYA JI MUNICIPAL CORPORATION

Ward No.	No. of Surveyed Households	Total No. of Members from Surveyed Households
1	77	388
2	65	303
3	105	558
4	101	439
5	29	174
6	103	457
7	64	294
8	88	440

9	43	213
10	66	331
11	51	246
12	89	436
13	34	144
14	83	350
15	62	312
16	59	262
17	52	215
18	36	168
19	40	170
20	37	156
21	18	87
22	64	256
23	51	229
24	44	190
25	74	347
26	54	264
27	127	596
28	77	366
29	73	371
30	125	577
31	64	324
32	63	247
33	40	188
34	80	412
35	37	213
36	97	436
37	30	127
38	78	359
39	44	198
40	61	264
41	51	226

42	56	239
43	75	341
44	43	207
45	99	443
46	71	327
47	59	258
48	98	429
49	106	510
50	124	498
51	65	283
52	86	481
53	86	499
Urban Total	**3606**	**16848**

3.2.2 URBAN-RURAL DISTRIBUTION OF POPULATION

The Gaya Ji Planning Area comprises of 1 ULB and 162 revenue villages spreading over 5 C.D. blocks — Gaya Ji Town, Belaganj, Manpur, Paraiya and Bodhgaya.

The Gaya Ji Municipal Corporation constitutes the urban population within the planning area amounting to a total of 4,68,614 (59.47%). The rural population amounts to 3,19,366 (40.53%) and comprises of 78 villages from the Gaya Ji Town block, 8 villages from the Belaganj block, 49 villages from the Manpur block, 3 villages from the Paraiya block and another 24 villages from the Bodhgaya block.

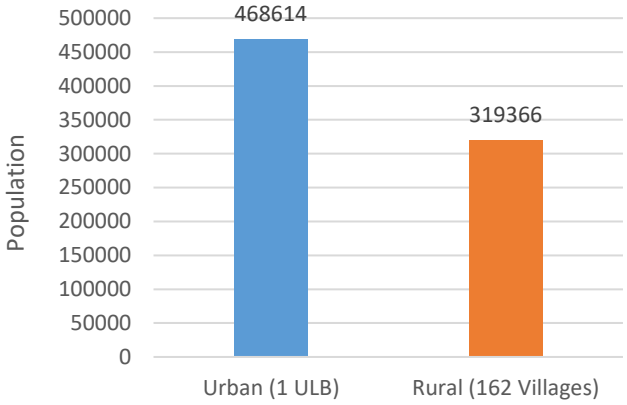


FIGURE 3-2 DISTRIBUTION OF URBAN-RURAL POPULATION OF THE GAYA JI PLANNING AREA

Source: Census of India, 2011

3.3 GROWTH RATE

The population of Gaya Ji Municipal Corporation was 4,68,614 (Census of India) in 2011. The overall population growth rate in the city has been recorded to be around 32.14% in 2001 and 21.58% in 2011. The rural population as per Census 2011, is 319366 with a growth rate of 30.47% in 2001 and 31.83% in 2011. For the total Gaya Ji Planning area, the growth rate in population has experienced a minor decline from 31.49% in 2001 to 25.54% in 2011.

TABLE 3-3 DECADAL POPULATION GROWTH IN GAYA JI PLANNING AREA

Area	Population and Decadal change	1991	2001	2011
Gaya Ji Municipal Corporation	Population	291675	385432	468614
	Change in %		*32.14*	*21.58*
Rural areas	Population	185681	242260	319366
	Change in %		*30.47*	*31.83*
Gaya Ji Planning Area (162 Villages, 1 ULB)	**Population**	**477356**	**627692**	**787980**
	Change in %		***31.49***	***25.54***

Source: Census of India, 2011, 2001, and 1991

3.4 POPULATION DENSITY

Population Density is defined as the number of persons per hectare (PPH). As per the census records of 2001 and 2011, the population density values for the Gaya Ji Municipal Corporation increased from 78 to 94.

TABLE 3-4 VARIATION IN DENSITIES IN DIFFERENT AREAS OF THE ARRAH PLANNING AREA

Name	Area (in hectares)	Population		Density (PPH)	
		2011	2001	2011	2001
Gaya Ji Municipal Corporation	4908	468614	389192	97	79
Rural areas (162 villages)	22384	319366	242260	14	11
Gaya Ji Planning Area (162 Villages, 1 ULB)	**27292**	**787980**	**631452**	**29**	**22**

Source: Census of India, 2011 and 2001

As per URDPFI guidelines cities with a population between 1 lakh to 5 lakhs are classified as Medium Town (Category Medium Town II). The ideal density for a medium town as per URDPFI guidelines can be 100 to 150 pph. Though as per population Gaya Ji Municipal Corporation is a Medium Town, its population density is still lower than the suggested standard.

3.5 SEX-RATIO

As of the 2011 census, in Gaya Ji Municipal Corporation there are 896 females per 1000 males in the city, which is lower than the Bihar state average of 915 per 1000 males. There are 918 girls under 6 years of age per 1,000 boys of the same age in the city, which is slightly lower than the state average of 935 girls per 1000 boys.

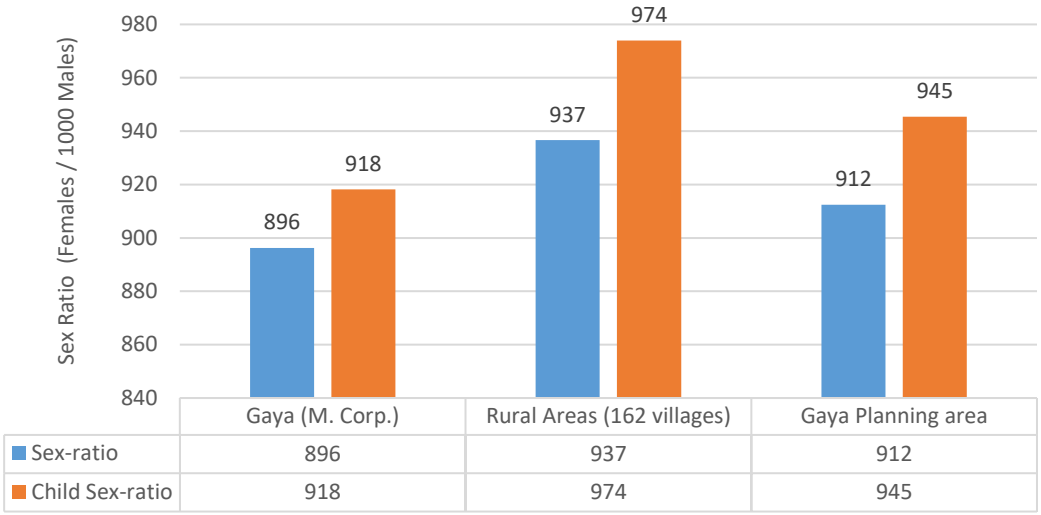


FIGURE 3-3 SEX RATIO (CENSUS, 2011)

Source: Census of India, 2011

In the Gaya Ji Planning Area, there are 912 females per 1000 males, marginally lower than the Bihar state average of 915 per 1000 males. There are 945 girls under 6 years of age per 1,000 boys of the same age in the city, which is higher than the state average of 935 girls per 1000 boys.

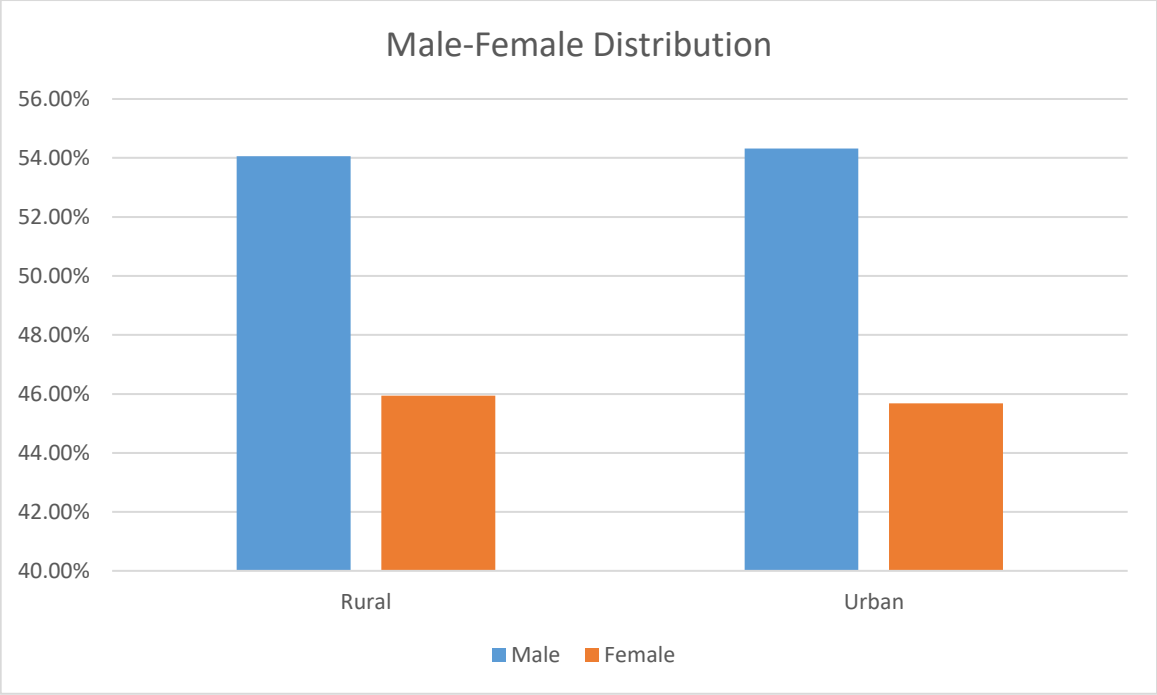


FIGURE 3-4 MALE-FEMALE DISTRIBUTION IN GAYA JI PLANNING AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

The 3606 urban households surveyed constitute 16848 people. Among this total surveyed population of 16848 people, 54.32% are male, while 45.68% are female.

3.6 HOUSEHOLD SIZE

The average household size has been calculated by dividing the total population by the total number of households. The average household size for the Gaya Ji Planning Area, as per the 2011 Census, is 6.31. This high average household size can be attributed to the fact that people in these regions prefer to stay with their extended families and also have a higher number of children.

TABLE 3-5 AREA-WISE DISTRIBUTION OF TOTAL HOUSEHOLDS AND AVERAGE HOUSEHOLD SIZE IN THE ARRAH PLANNING AREA (CENSUS, 2011)

Name	Number of Households	Total Population	Average Household Size
Gaya Ji (M. Corp.)	72118	468614	6.50
Rural Areas (162 Villages)	52804	319366	6.05
Gaya Ji Planning Area (162 Villages, 1 ULB)	**124922**	**787980**	**6.31**

Source: Census of India, 2011

Traditionally, large extended families living together in a single household were more typical in the past, resulting in greater household sizes. However, due to urbanization, changing lifestyles, and economic prospects, there has been a shift towards smaller nuclear families in recent years. In Gaya Ji, the average household size ranges from six to eight individuals. Variations in household sizes are influenced by factors such as migration, employment opportunities, and education.

TABLE 3-6 HOUSEHOLD SIZE IN THE GAYA JI PLANNING AREA

Area Name	Total Households	Household size						
		1	2	3	4	5	6-8	9+
Gaya Ji (M Corp.)	72,118	1,164	2,967	4,986	10,828	12,992	25,396	13,785
		1.61%	4.11%	6.91%	15.01%	18.01%	35.21%	19.11%
Rural Area (162 villages)	52,804	678	3,838	4,359	7,142	9,275	20,014	7,498
		1.28%	7.27%	8.25%	13.53%	17.57%	37.90%	14.20%
Gaya Ji Planning Area	**1,24,922**	**1,842**	**6,805**	**9,345**	**17,970**	**22,267**	**45,409**	**21,282**
		1.29%	**7.25%**	**8.25%**	**13.54%**	**17.57%**	**37.89%**	**14.23%**

Source: Census of India, 2011

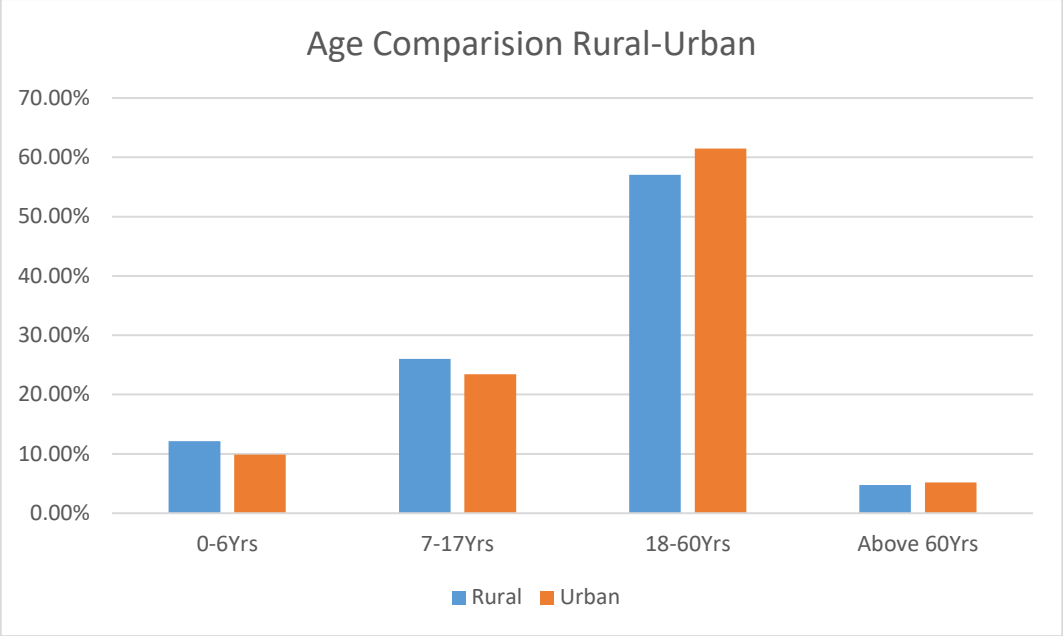


FIGURE 3-5 AGE OF THE SURVEYED POPULATION IN GAYA JI PLANNING AREAS

SOURCE: SOCIO-ECONOMIC SURVEY,2023, STESALIT SYSTEMS LIMITED

FIGURE 3-6 HOUSEHOLD SIZE COMPARISON IN GAYA JI PLANNING AREA

Source: Socio-Economic survey,2023, Stesalit Systems Limited

3.7 SC-ST RATIO

As per Census 2011, out of a total of 787980 people, 157018 (19.93%) belong to the scheduled caste category, and 711 (0.09%) belong to the scheduled tribe category. The remaining population of 630251 (79.98%) belongs to the General category.

The caste analysis from the primary survey highlights the need for tailored support to marginalized groups in both urban and rural areas.
In the urban areas of Gaya Ji planning area, 2.74% of the population is tribal (Scheduled Tribe (ST)), while 13.45% belongs to the Scheduled Caste (SC) and 36.91% hail from Other Backward Castes (OBC).

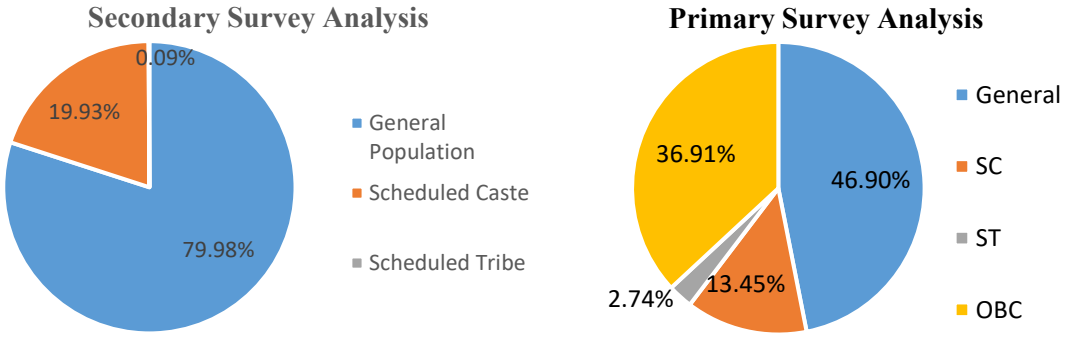


FIGURE 3-7 SOCIAL GROUP COMPOSITION FOR GAYA JI PLANNING AREA SECONDARY SURVEY VS PRIMARY SURVEY

Source: Census of India, 2011

TABLE 3-7 DISTRIBUTION OF SOCIAL GROUPS IN THE GAYA JI PLANNING AREA (CENSUS, 2011)

Name	General Population (in %)	Schedule Caste (in %)	Schedule Tribe (in %)
Gaya Ji (M Corp.)	90.00	9.87	0.12
Rural (162 villages)	65.28	34.68	0.04
Gaya Ji Planning Area (162 Villages, 1 ULB)	**79.98**	**19.93**	**0.09**

Source: Census of India, 2011

3.8 LITERACY RATE

As per the Census of India, 2011, the literacy rate for Gaya Ji Municipal Corporation is 81.51%. For the entire Gaya Ji Planning Area, it is 73.83% which is higher than the state average of 61.8%.

TABLE 3-8 AREA-WISE LITERACY RATE IN THE GAYA JI PLANNING AREA (CENSUS, 2011)

Name	Literacy Rate (%)
Gaya Ji (M Corp.)	81.63
Rural areas (162 villages)	61.59
Gaya Ji Planning Area (162 Villages, 1 ULB)	**73.84**
Bihar State Average	61.80

Source: Census of India, 2011

TABLE 3-9 AREA-WISE LITERACY RATE IN THE GAYA JI PLANNING AREA (CENSUS, 2011)

Name	Total Literates		Total Illiterates	
	Male	*Female*	*Male*	*Female*
Gaya Ji (M Corp.)	185665	145931	61466	75552
Rural Areas (162 villages)	94705	64146	70204	90311
Gaya Ji Planning Area (162 Villages, 1 ULB)	**280370**	**210077**	**131670**	**165863**

Source: Census of India, 2011

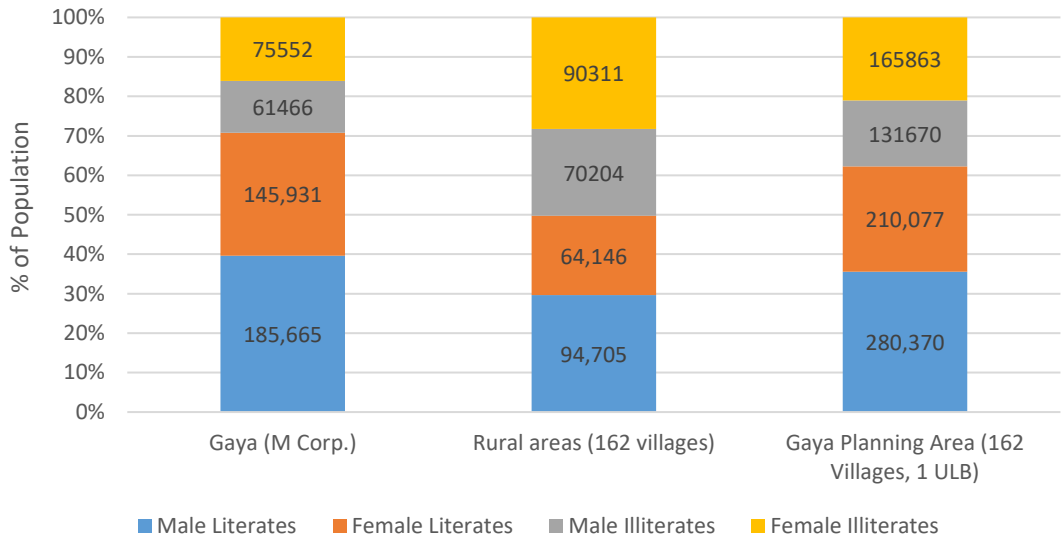


FIGURE 3-8 GENDER-WISE LITERATE AND ILLITERATE POPULATION PERCENTAGES IN DIFFERENT AREAS OF GAYA JI PLANNING AREA

Source: Census of India, 2011

LITERACY

The literacy rate among the surveyed population in the urban and rural areas of Gaya Ji Planning Area shows that the majority of residents are literate. In the urban areas, the literacy rate is 62.33%, while in the rural areas it is 29.15%.

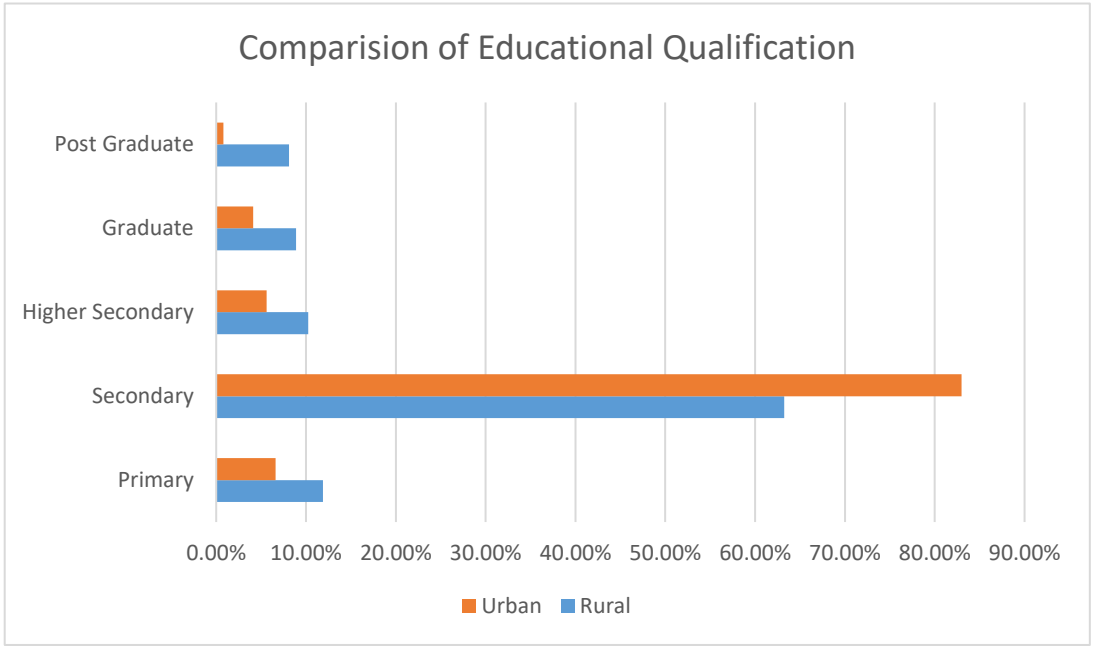


FIGURE 3-9 EDUCATIONAL QUALIFICATION OF SURVEYED POPULATION IN GAYA JI PLANNING AREAS

SOURCE: SOCIO-ECONOMIC SURVEY,2023 STESALIT SYSTEMS LIMITED

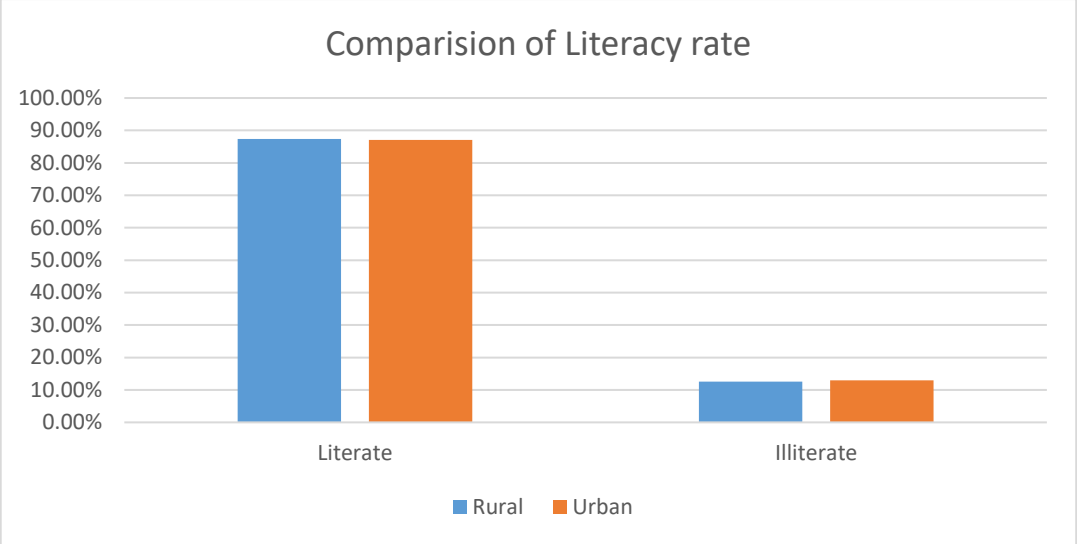


FIGURE 3-10 PERCENTAGE OF LITERATES AND ILLITERATES IN THE SURVEYED POPULATION IN GAYA JI PLANNING AREA

SOURCE: SOCIO-ECONOMIC SURVEY,2023, STESALIT SYSTEMS LIMITED

3.9 MIGRATION

Migration refers to the process of individuals or groups relocating from one geographical location to another within a specific time frame. This phenomenon is thus place and time-specific and has also direction — from and to. Migration is a significant factor in population dynamics. While changes in a population might occur naturally over time owing to variables like fertility and mortality, these changes tend to happen gradually and continuously. On the other hand, migration responds more immediately to both internal and external changes affecting the area in question. Migration has a transformative effect on the composition of the native population, introducing its own distinct structural patterns in terms of social, economic, and demographic perspectives.

3.9.1 MIGRANT POPULATION

Gaya Ji Municipal Corporation (inclusive of outer growth) being the headquarters of the Gaya Ji district attracts migrants from the adjoining area. The total migrant population has increased from 68,212 in 2001 to 1,75,266 in 2011. About 36.97% of the population, as per Census 2011, is in-migrant.

TABLE 3-10 MIGRANTS IN THE GAYA JI MUNICIPAL CORPORATION AND ITS OUTER GROWTH (CENSUS OF INDIA 2011 AND 2001)

Year	Total Population	Migrants	Share of Migrants (in %)
2001	3,94,945	68,212	16.39
2011	4,74,093	1,75,266	36.97

Source: Census of India, 2001 and 2011

Out of the total migrant population, 98.59% (1,72,795 people) are born in India. Among the migrant population born in India, 93.86% (1,59,659 people) are born within the state of enumeration but outside the place of enumeration, while a

mere 7.60% are born in states in India beyond the state of enumeration (Census of India, 2011).

Moreover, 41.10% of the in-migrants are males, while 58.90% are females. This may be attributed to the migration related to marriage which is a common practice for women in India.

TABLE 3-11 MALE -FEMALE MIGRANTS (2011)

Total Migration	Male	Female
1,75,266	72,034	1,03,232
	41.10%	*58.90%*

Source: Census of India, 2011

3.9.2 REASONS FOR MIGRATION

The factors influencing migration may be categorized as a combination of "Push" factors (reasons to leave a region) and "Pull" factors (reasons to go to an area). The causes of migration can be attributed to economic factors (like moving in search of better job opportunities and for higher education purposes), social factors (like marriage or in search of a better quality of life), political causes (like change in policies forcing people to change occupation or to escape adverse situations), and environmental reasons like movement due to some natural calamity.

TABLE 3-12 REASONS FOR IN-MIGRATION TO GAYA JI MUNICIPAL CORPORATION AND ITS SURROUNDING OUTER GROWTH AREAS (2011)

2011	Reasons for in-migration							
	Work/ Employment	Business	Education	Marriage	Moved after birth	Moved with household	Others	Total Migrants
Gaya Ji (M Corp. + OG)	15,354	2,344	3,571	53,929	9,858	28,831	61,379	61379

Source: Census of India, 2011

As per the Census of India 2011, 9% of the total number of migrants who have moved into the Gaya Ji Municipal area along with its surrounding outer growth areas, have done so in search of employment and work opportunities.
The highest proportion of migration is due to marriage (31%) and other reasons (42%). About 6% have moved to Gaya Ji after birth and 16% moved with a household.

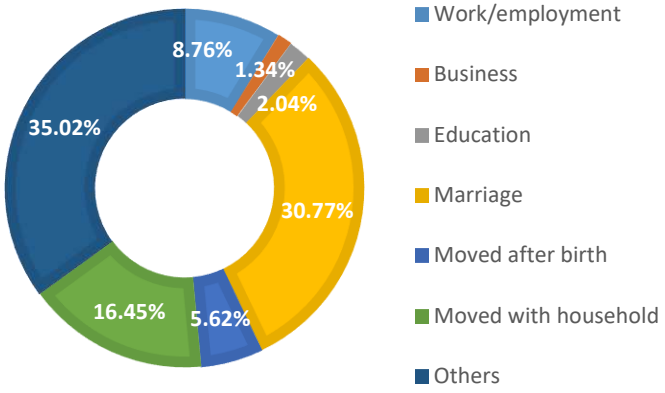


FIGURE 3-11 REASONS FOR IN-MIGRATION TO GAYA JI MUNICIPAL CORPORATION AND OUTER GROWTH

Source: Census of India, 2011

3.10 POPULATION PROJECTION

Population is the basis for determining existing and future infrastructure requirements. Thus, it is necessary to forecast the anticipatory future population and its characteristics, in order to undertake adequate and appropriate measurements. Thus, based on the trend of population growth in the target area in the last few years, the population of the Gaya Ji Planning Area has been projected for the future planning years.

The Gaya Ji Planning Area consists of 1 ULB and 162 villages. Therefore, the population projection of these villages also needs to be done, in order to estimate the increase requirements in 2047.

The existing population scenario for the Gaya Ji Planning Area is as follows:

TABLE 3-13 EXISTING POPULATION IN THE GAYA JI PLANNING AREA (CENSUS, 2011)

Name	Total Population (Census, 2011)
Gaya Ji (M Corp.)	4,74,093
Rural Areas (162 villages)	3,19,366
Gaya Ji Planning Area (162 Villages, 1 ULB)	**7,93,459**

Source: Census of India, 2011

3.10.1 ARITHMETIC POPULATION PROJECTION METHOD

Arithmetic projection assumes the continuation of the amount of population change observed in what is defined as the base period, the period from which the projection is started, through successive equal intervals of time. The major drawback of this method is its tendency to underestimate population growth.

TABLE 3-14 POPULATION PROJECTION OF GAYA JI PLANNING AREA BASED ON THE ARITHMETIC PROGRESSION METHOD

Year	Gaya Ji (M Corp.)	Rural Area (162 villages)	Gaya Ji Planning Area (162 Villages, 1 ULB)
1991	291675	185681	477356
2001	385432	242260	627692
2011	468614	319366	787980
2025	592471	412946	1005417
2030	636706	446367	1083073
2035	680941	479788	1160729
2040	725176	513209	1238385
2045	769410	546631	1316041

Source: Computed value

3.10.2 GEOMETRIC INCREASE METHOD

Geometric projection method determines population changes in terms of percentage changes rather than numerical changes. Geometric mean increase is used to find out the future increment in population. Since this method gives higher value and hence should be applied for a new industrial town at the beginning of development for only a few decades.

The population at the end of n^{th} decade 'Pn' can be estimated as: Pn = P (1+ IG/100) n

Where, IG = geometric mean (%) P = Present population N = no. of decades. (Source: M.M. Ghangrekar, IIT Kharagpur)

A major criticism of this projection of population at a fixed rate is the fact that an increase in population may affect the future rate of growth of the population, a factor overlooked by using rigid increments.

TABLE 3-15 POPULATION PROJECTION OF GAYA JI PLANNING AREA BASED ON THE GEOMETRIC PROGRESSION METHOD

Year	Gaya Ji (M Corp.)	Rural Area (162 villages)	Gaya Ji Planning Area (162 Villages, 1 ULB)
1991	291675	185681	477356
2001	385432	242260	627692
2011	468614	319366	787980
2025	650079	466796	1116875
2030	730691	534562	1265254
2035	821300	612166	1433467
2040	923145	701036	1624181
2045	1037619	802807	1840427

Source: Computed value

3.10.3 INCREMENTAL INCREASE METHOD

The incremental increase is determined for each decade from the past population and the average value is added to the present population along with the average rate of increase.

Hence, population after nth decade is Pn = P+ n.X + {n (n+1)/2}.Y

Where, Pn = Population after nth decade X = Average increase Y = Incremental increase. (Source: M.M. Ghangrekar, IIT Kharagpur).

The incremental increase method is based on the assumption that the growth rate progressively either increases or decreases. However, a major criticism is its over-estimation of the projected population.

TABLE 3-16 POPULATION PROJECTION OF GAYA JI PLANNING AREA BASED ON INCREMENTAL PROGRESSION METHOD

Year	Gaya Ji (M Corp.)	Rural Area (162 villages)	Gaya Ji Planning Area (162 Villages, 1 ULB)
1991	291675	185681	477356
2001	385432	242260	627692
2011	468614	319366	787980
2025	574705	447431	1022136
2030	607572	502919	1110491
2035	637795	563538	1201333
2040	665374	629289	1294663
2045	690309	700172	1390482

Source: Computed value`

3.10.4 FINALISING THE DESIGN POPULATION

Thus, considering the various projection methods and their disadvantages and advantages, and keeping in mind the fact that the Gaya Ji Planning Area consists of the Gaya Ji Municipal Corporation, which is the administrative headquarters of the Gaya Ji district, it will act as a big impetus for population growth. The Municipal Corporation area is expected to grow at a higher rate while the rest of the planning area will follow a different growth trajectory. Hence, Geometric Progression method from all the projection methods seems to be the most appropriate method for projecting its population. This projection also align with Bihar Caste Based Census, 2022. And for rural part of planning area Arithmetic method is considered for slow and steady growth. Thus, the total population of the Gaya Ji Planning Area is expected to be around 15.84 lakhs in the year 2045.

TABLE 3-17 DESIGN RESIDENT POPULATION FOR GAYA JI PLANNING AREA 2045

Year	Gaya Ji (M Corp.)	Rural Area (162 villages)	Gaya Ji Planning Area (162 Villages, 1 ULB)
1991	291675	185681	**477356**
2001	385432	242260	**627692**
2011	468614	319366	**787980**
2025	650079	412946	**1063024**

Year	Gaya Ji (M Corp.)	Rural Area (162 villages)	Gaya Ji Planning Area (162 Villages, 1 ULB)
2030	730691	446367	**1177058**
2035	821300	479788	**1301088**
2040	923145	513209	**1436355**
2045	1037619	546631	**1584250**

Source: Computed value

The Gaya Ji Master Plan is being prepared for a 20-year planning horizon, with 2025 adopted as the base/analysis year, thereby establishing 2045 as the original horizon year. However, in alignment with the long-term national vision of Viksit Bharat @2047, the planning horizon has been extended to 2047 to ensure that the development framework remains responsive to the broader national aspirations and long-term transformation goals.

The projected population of the Gaya Ji Planning Area is estimated at approximately 15.84 lakh by 2045. Considering negligible net population growth during the additional two-year period up to 2047, a rounded design population of approximately 16.00 lakh has been adopted for the 2047 planning horizon.

Considering Gaya Ji's significance as an administrative headquarter, 5% of the total projected population, which is approximately 0.79 lakhs, has been considered as floating population to account for the substantial influx of working population and visitors. Accordingly, the infrastructure, land, utilities and service requirements will be assessed for the 2047 planning horizon considering the floating population.

4 EXISTING LAND USE

4.1.1 LAND USE INTRODUCTION

In the context of the country's rapid urbanization, land has become the scarcest natural resource in urban areas, requiring careful management. Land use planning has become increasingly vital and complex due to the population surge in urban regions. The primary goal of methodical and comprehensive land use planning is to regulate development, thereby preventing the misuse, overuse, and exploitation of this critical resource. Consequently, a land use plan for Gaya Ji is essential to accommodate the demands of urban growth. Effective and efficient land use planning must ensure the following objectives.

1. Identification of the prospective use of the land (based on the Gap analysis and Need Assessment)
2. Efficient resource utilization to cater the urban growth.
3. Preparation of zone-wise Development Control regulation based on the existing land profile and surroundings.
4. Understanding the growth direction of the concerned area and providing amenities and services to cater the urbanization.

The Land Use Plan includes detailed Land Use Maps – Existing and Proposed and Development Control Regulation (DCR) designed for the city specifically. The plan includes proposals for Making land available based on the project proposals articulated in different components of the Master Plan. The land is identified based on the Record of Rights (RoR) available with the existing scenario. The focus is on 'Developing the land under the jurisdiction of Urban Local Body (ULB) with regulatory control' to ensure comprehensive development of the area. While incorporating the proposals with the land use, Urban and Regional Development Plans, Formulation and Implementation (URDPFI) guides and The Bihar Urban Planning & Development Act, 2012/ BUPD 2012 will be taken into consideration. The overall incorporation of the proposals for the Proposed Land Use Map will be formulated in compliance with the above-mentioned act and BUPD rules.

4.2 OBJECTIVES

The primary objectives of a land use plan according to the Bihar Urban Planning and Development Act, 2012, typically align with broader principles of sustainable urban development and efficient land management. Referring to the BUPD Act, 2012, the Primary Objectives of the Land Use Plan can be classified into the following:

1. **Use and Development of Land to be in conformity with the Development Plan:**
   - No one may use or permit the use of any land or carry out any development in an area once a development plan has gone into effect unless it is in accordance with the development plan.

- With the caveat that the Planning Authority may permit the continuation of any land's use for the purposes for which it was intended to be used on the day the Development Plan went into effect for a maximum of ten years, subject to any restrictions that may be imposed by the regulations made in this regard.

2. **Approval for Development in the Periphery.**
   Anybody wishing to develop any land or building in an area designated as a Peripheral Area to a Planning Area must submit a written request for permission to the Planning Authority, along with any required documents and fees, in the prescribed format and with the necessary details.

3. **Orderly growth and Optimal Land allocation**
   - Ensuring that urban development occurs in a systematic and organized manner, avoiding haphazard expansion and sprawl.
   - Efficiently allocating land for various purposes such as residential, commercial, industrial, institutional, recreational, and open spaces based on the needs of the population and economic activities.

4. **Development of Land for Comprehensive Infrastructure Development of the ULB**
   - To ensure effective and efficient development of the required Healthcare, Education and Recreational Infrastructure to better the lives of the communities.
   - To develop and earmark the land for the provision of Basic Amenities such as integrated Water Supply, Sewerage, Drainage, and Transport system etc.
   - Development of Residential areas based on the neighborhood Concepts and provision of green belts in the metropolitan areas.

5. **Land Development for social equity and economic development**
   - Ensuring equitable access to housing, services, and amenities for all residents, regardless of income or social status.
   - Supporting economic growth and job creation by identifying areas for commercial, industrial, and mixed-use development, as well as promoting entrepreneurship and investment.

6. **Regulatory Control over Development**
   - Segregation of the Industrial areas from the Residential areas by providing green buffer areas.
   - Recovery of ribboned Road Side land and restriction of development on the same
   - Preservation of the Monuments or Structure of Historical Importance and conserve cultural heritage of the area

4.3 EXISTING LANDUSE

According to Census 2011 data, Gaya Ji Municipal Corporation has a population of 4,68,614 which can be categorized into Medium Town-II- Population – 5,00,000-10,00,000) as per URDPFI Guidelines 2015. However, developed area guidelines suggest that a medium town should have a density of 100-150 pph. Gaya Ji municipal corporation has a much lower density i.e. 97 PPH as per the census 2011. The projected population (Average of the Arithmetic, Geometric & Incremental Projection) density for the Horizon year 2047 is 207 PPH which is much higher than

the suggested guideline. Hence, it can be concluded that the ULB can be considered as a developed area.

Thus, highlighting achieving good livability conditions of the ULB, proper Integration of basic infrastructure and services are important. Hence a comprehensive land use analysis and Land development plan to be formulated considering the same.

4.3.1 BASELINE ANALYSIS

As there is no preexisting Proposed land use map following any past master plan exercise, Gaya Ji has to consider the respective guidelines and the gap analysis and needs assessment to prepare the proposed land use map (PLU). The prescribed Land Use categories as per URDPFI guidelines, for different classifications of towns are mentioned in the table below.

Land use category	Percentage of Developed Area (URDPFI guideline)			
	Small	Medium	Large cities	Metro Cities
Residential	45-50	40-45	35-40	35-40
Commercial	2-3	3-4	4-5	4-5
Industrial	8-10	8-10	10-12	12-14
Public & Semi-Public	6-8	10-12	12-14	14-16
Recreational	12-14	18-20	18-20	20-25
Transport & Communication	10-12	12-14	12-14	15-18
Agriculture &Water Bodies	Balance	Balance	Balance	Balance
Total Developed Area	100	100	100	100

Source: URDPFI Guidelines 2014

It is interesting to note that as the population of an urban area grows, that is cities move from small to metro areas, and the percentage of land under **Residential use decreases,** but to house the growth of population, the city gradually **intensifies the residential density**.

Commercial land use allocation increases and so does land under **Public and Semi-public use and Recreational use increasing** the land for creating social infrastructure and facilities.

Land under **Transport use also increases** with population growth. **Industrial growth is kept the same** for small and medium cities and grows only for large cities.

As the population of a city grows and a city moves from the category of a small town to that of a medium town, the envisaged land use allocation shifts focus from agricultural and water bodies to more commercial, public and semi-public following larger areas allocated for transportation to increase the reach and ease of trade. Residential land use focuses on larger densities housed in smaller land areas. Major non-polluting industrial growth is suggested.

4.3.2 EXISTING LANDUSE DISTRIBUTION ACCORDING TO AMRUT DESIGN STANDARDS

TABLE 4-1 LAND USE CLASSES AS PER AMRUT

Sl. No.	Class
1	Agricultural Land
2	Central Govt. Property
3	Commercial
4	Communication
5	Educational
6	Green Areas
7	Health Services
8	Heritage
9	Industrial
10	Mixed
11	Others
12	Public Utilities
13	Public and Semi-public
14	Railway Property
15	Recreational
16	Religious
17	Residential
18	Rural
19	Specific Land Use
20	State Govt. Property
21	Traffic-Related
22	Transportation
23	Vacant Land
24	Waterbodies
25	Wetland

Source: AMRUT Guidelines

The total area of the Gaya Ji Planning Area is 272.925 sq. km. and existing land use is categorized into 25 landuse categories. The Existing Land Use Distribution is mentioned in the table below.

4.3.3 EXISTING LANDUSE DISTRIBUTION

TABLE 4-2 GAYA JI PLANNING AREA EXISTING LANDUSE AREA CALCULATION

GAYA JI EXISTING LANDUSE AREA CALCULATION				
Sl. No.	**Class**	**Sub Class**	**Area in Hectar**	**Percentage**
1	Residential	Residential Area/Colony	1262.3563	4.63%
2	Commercial	Petrol Pump / LPG filling station	8.4420	0.03%
		Wholesale	4.6775	0.02%
		General Business	143.4092	0.53%
		Storage Godown	30.0144	0.11%
		Warehouse	0.7758	0.00%
		Hotel / Lodge / Restaurant	13.1090	0.05%
		Function Hall / Marriage Garden	3.1749	0.01%
		Resort	5.4489	0.02%
		Hostel	6.6587	0.02%
		Multiplex / Cinema	0.0942	0.00%
		Market (Daily & Weekly) / Mandi	5.9212	0.02%
		Shopping Centre / Mall	1.2731	0.00%
		Retail	0.5210	0.00%
3	Mixed	Residential & Commercial	185.9949	0.68%
		Residential & Educational	6.2646	0.02%
		Commercial & Educational	1.5636	0.01%
		Commercial & Industrial	1.6750	0.01%
		Commercial & Health Services	0.1000	0.00%
		Residential & Health Services	0.3524	0.00%
		Residential & Household Industry	1.2068	0.00%
4	Educational	School	81.9383	0.30%
		College	50.2382	0.18%
		Training Institute	8.5472	0.03%
		University	0.3065	0.00%
		Anganwadi	0.0859	0.00%
5	Health Services	Private Hospital	5.5327	0.02%
		Govt. Hospital	25.1439	0.09%
		Clinic/Dispensary	2.4693	0.01%
		Veterinary Hospital/Clinic	0.0463	0.00%
		Nursing Home	0.9798	0.00%

GAYA JI EXISTING LANDUSE AREA CALCULATION				
Sl. No.	**Class**	**Sub Class**	**Area in Hectar**	**Percentage**
		Primary/Community Health Centre	0.1011	0.00%
		Diagnostic Centre	0.0434	0.00%
6	Industrial	Other Industries	180.0105	0.66%
		Service	1.4024	0.01%
		Agro based & Food Processing	0.1921	0.00%
		Manufacturing	4.4456	0.02%
7	Public & Semi-public	Community hall	0.2955	0.00%
		Banks	3.0893	0.01%
		Private Office	3.4714	0.01%
		Public Library	1.3893	0.01%
		Crematorium / Burial Ground /Grave Yard	22.8687	0.08%
		Police Station	3.6387	0.01%
		Dharmashala	0.2346	0.00%
		Ticket Booking & Reservation Office	0.5904	0.00%
		Social Welfare Centre	0.6956	0.00%
		Public/Community Toilet	0.5025	0.00%
		LPG/CNG Gas Booking Office	0.5277	0.00%
		Guesthouse	1.0050	0.00%
		Museum	0.6132	0.00%
		Fire Station	0.2680	0.00%
		Convention Centre	0.4738	0.00%
		Jail	13.1259	0.05%
8	Public Utilities	Electric Sub-Station	6.2678	0.02%
		Water Pumping Station	0.4628	0.00%
		Water Treatment Plant	4.2092	0.02%
		Land Fill Site	7.6408	0.03%
		Dumping Yard	0.4252	0.00%
9	Transportation	Airport / Airstrip	262.9279	0.96%
		Bus Stop	0.0162	0.00%
		Railway Station	1.6089	0.01%
		Cycle rickshaw/Cycle/Cart stand	0.1551	0.00%

GAYA JI EXISTING LANDUSE AREA CALCULATION				
Sl. No.	**Class**	**Sub Class**	**Area in Hectar**	**Percentage**
		Auto Stand	0.0823	0.00%
		Bus stand /Terminus	4.7529	0.02%
		Railway Track Area	123.6797	0.45%
		Road	831.6310	3.05%
10	Railway Property	Railway Property	91.9974	0.34%
11	Traffic-related	Parking Space / Area	2.7565	0.01%
		Median / Divider	14.0678	0.05%
12	Communication	Post/Telegraph Office	0.4718	0.00%
		Radio/TV Station	2.1285	0.01%
		Satellite & Telecommunication Centre	0.0281	0.00%
13	Recreational	Sports Centre	0.3641	0.00%
		Club	0.1286	0.00%
		Play Ground	24.3622	0.09%
		Gymnasium	0.2065	0.00%
		Park	3.8081	0.01%
		Garden	9.2748	0.03%
		Stadium	5.9037	0.02%
14	Religious	Temple	18.0587	0.07%
		Mosque	5.6159	0.02%
		Aashram/Math/Bhojan Shala	2.3627	0.01%
		Gurudwara	0.5524	0.00%
		Church	1.2055	0.00%
15	Heritage	Monument	1.2954	0.00%
16	Central Govt. Property	CG_Office	466.8266	1.71%
		CG_Quarter	41.3907	0.15%
17	State Govt. Property	SG_Office	72.4465	0.27%
		SG_Quarter	41.3907	0.15%
18	Specific Land Use	Hill / Mountain	600.9710	2.20%
		Ghats	1.2586	0.00%
19	Rural	Village / Abadi Area	1233.1682	4.52%
20	Others	Nursery	0.2858	0.00%
		Brick kiln	247.4647	0.91%

GAYA JI EXISTING LANDUSE AREA CALCULATION				
Sl. No.	**Class**	**Sub Class**	**Area in Hectar**	**Percentage**
		Poultry farm	1.6506	0.01%
		Dairy farm	3.8433	0.01%
		Farm house	1.3075	0.00%
		Dam	0.1439	0.00%
		Aquaculture	1.2167	0.00%
21	Agricultural Land	Fallow land	382.5844	1.40%
		Cropland	18120.3122	66.39%
22	Green Areas	Tree Clad Area	22.6262	0.08%
23	Vacant Land	Private Vacant	970.9353	3.56%
24	Wastelands	Scrubland	179.8311	0.66%
		Rocky	12.4305	0.05%
25	Water Bodies	River	806.3953	2.95%
		Ponds	94.0161	0.34%
		Canal	231.2348	0.85%
		Stream	87.3320	0.32%
26	Wetlands	Low lying area	93.0580	0.34%
		Waterlogged	52.6154	0.19%
Total Area			**27292.4908**	**100.00%**

Source: Land Use Survey 2024, Stesalit Systems Ltd.

RESIDENTIAL AREAS- A total of 1262.3563 hectares of area is covered under residential land use which is almost 4.63 % of the whole urban area.

COMMERCIAL AREAS- In the case of Gaya Ji, 0.81% of the area i.e. 223.5199 hectares is under commercial use.

RECREATIONAL AREAS- An area of 44.048 hectares i.e. 0.15% of the area is dedicated to recreational use. Hence, it can be concluded that there is an immediate need to upgrade the recreational area within the boundary.

PUBLIC AND SEMI-PUBLIC- There is 52.7896 Ha of the area dedicated to PSP use.

TRANSPORT AND COMMUNICATION- The transport Infrastructure covers almost 1227.482 Ha which is almost 4.50% of the whole urban area.

AGRICULTURE & WATER-BODIES- In the case of Gaya Ji, a total of 19721.87 Ha area comes under agriculture and waterbodies which is almost 72.25 % of the area.

4.3.4 COMPARATIVE ANALYSIS

Comparing the Land use distribution with the one suggested in the URDPFI Guideline the resultant table is shown below,

TABLE 4-3 LAND USE COMPARISON BETWEEN EXISTING AND URDPFI

Land use category	Percentage of Developed Area as per URDPFI guideline (Small)	Percentage of Developed Land Use
Residential	45-50	22.31
Commercial	2-3	3.80
Public & Semi-Public	6-8	0.93
Recreational	12-14	0.78
Transport & Communication	10-12	21.69
Agriculture &Water Bodies	Balance	0.83
Others	-	50.34
Total	**100**	**100**

Source: Land Use Survey 2024, Stesalit Systems Ltd.

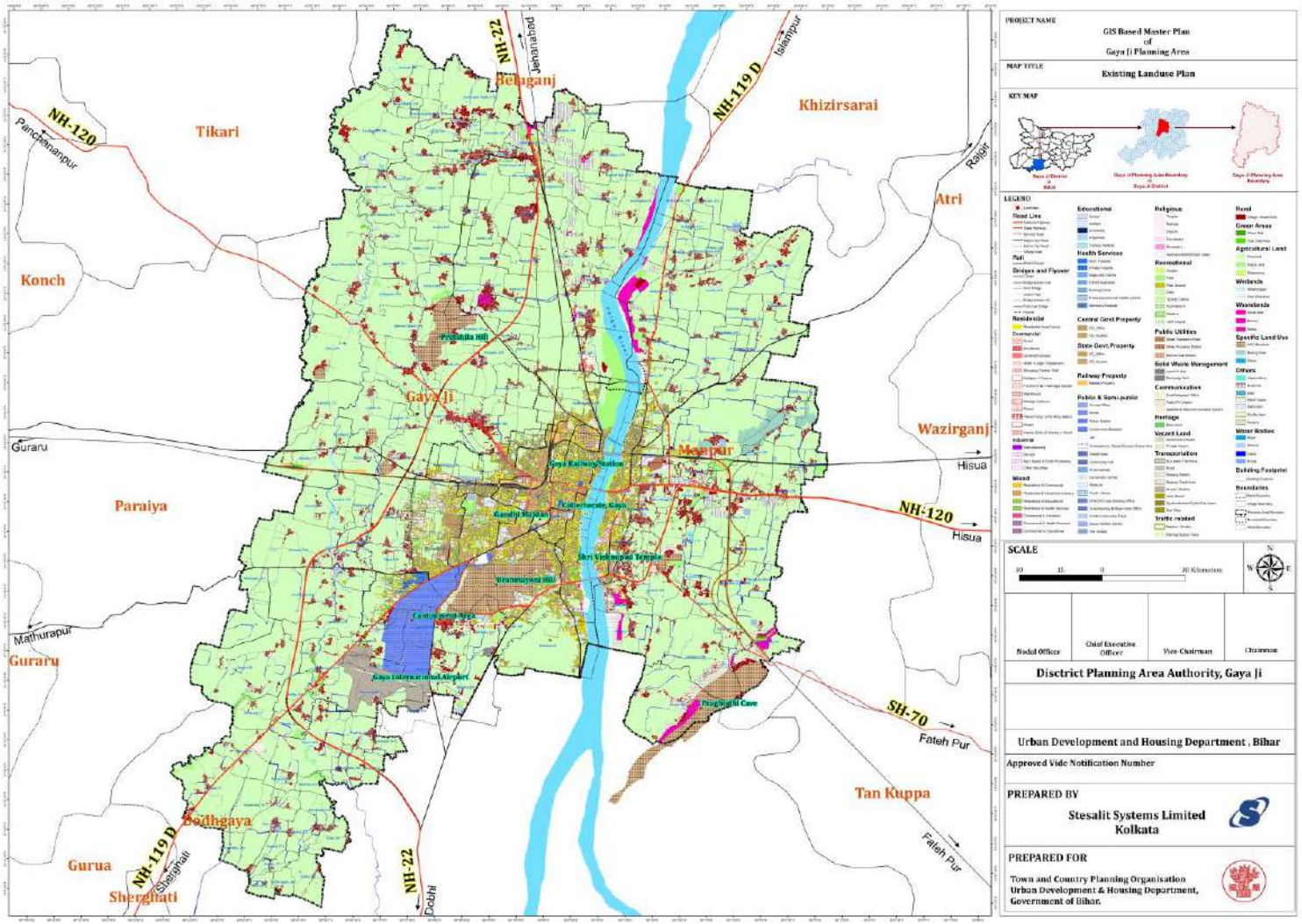
Note:

- *Public & Semi-Public Category includes activities under health Facilities, Educational Facilities, Central & State Govt. properties and PSP category as per AMRUT guidelines.*
- *Residential category includes residential and rural abadi areas.*
- *Traffic & Transportation includes activities under the Transportation Category, Railway Property and activities under Traffic related category as per AMRUT guidelines*
- *Agricultural Category includes activities under Agricultural and Green Areas as per AMRUT guidelines*
- *Other Category includes activities under others as per AMRUT guidelines.*

The comparative analysis highlights a notable disparity in the development of the Public and Semi-Public and recreational sectors located within the Boundary. The results show an apparent lack of investments geared towards the expansion of the same. Agriculture is one of the major sectors of Gaya Ji's Economy, the land is used for agricultural purposes extensively. As a result, the growth of the area grows to be stagnant as well as the residential growth.

The economic scenario of any urban area has a direct effect on the land use distribution. Economic diversification and employment generation are hindered due to a lack of investment in the urban area. The lack of connectivity of the ULB with the nearby bigger urban area hinders the investment opportunity. The overall situation of the ULB results in slow urban expansion.

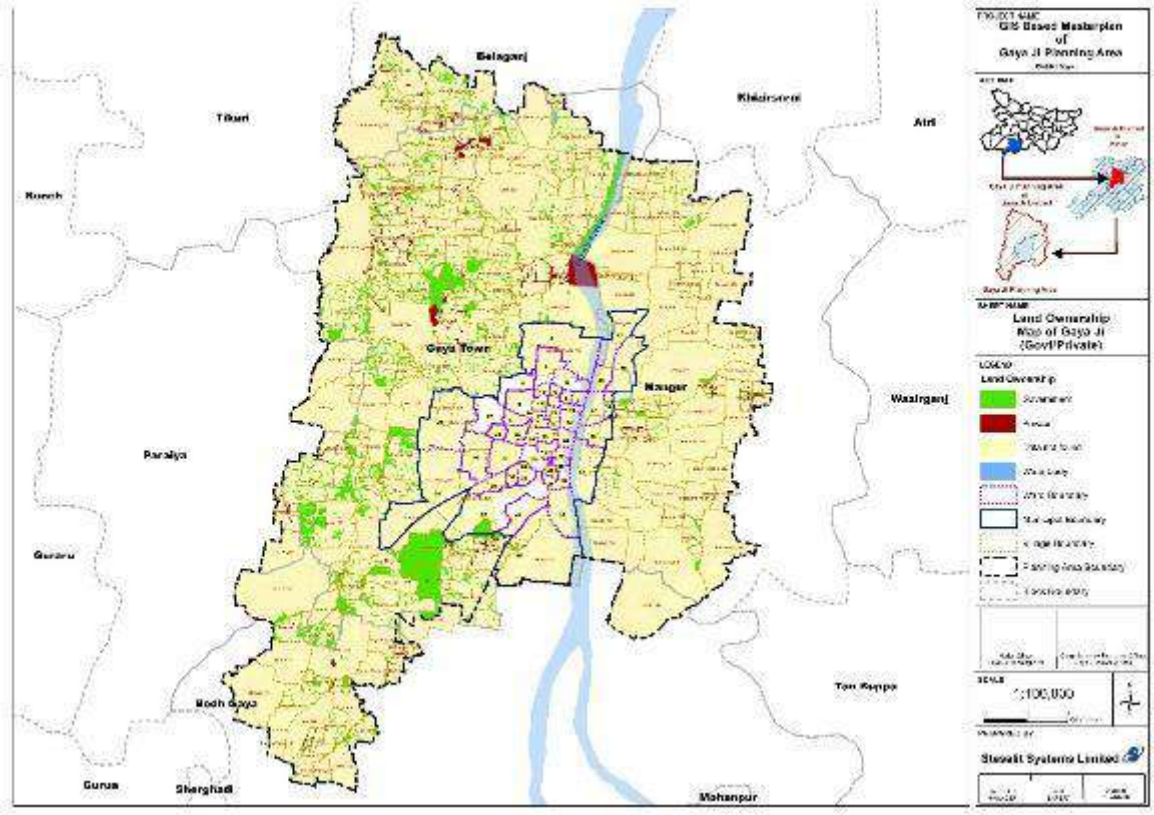
Hence, the development directive of the ULB should be aligned with the focus on developing the commercial and industrial sectors through incentivizing investment in these sectors. The connectivity and utility sectors are also to be developed accordingly to support urban growth.



MAP 4-1 EXISTING LANDUSE MAP OF GAYA JI PLANNING AREA

Source: Land Use Survey 2024, Stesalit Systems Ltd.

4.4 GOVERNMENT OWNERSHIP



5 HOUSING AND SLUM

Housing and shelter in Indian cities exhibit a diversified landscape, representing a mix of traditional and modern dwellings. They frequently include a variety of housing alternatives, ranging from detached houses and small apartments to semi-urban villages. While some regions may have well-planned residential colonies with basic facilities, others may have informal settlements or slums with substandard housing conditions.

Local governments and government programmes work to improve housing conditions, promote affordable housing, and enhance infrastructure in the cities. Initiatives such as the Pradhan Mantri Awas Yojana (PMAY) aim to provide affordable housing to the urban poor, while schemes like Smart Cities Mission focus on infrastructure development and urban renewal. However, issues such as limited access to formal housing finance, growing urbanization leading to housing shortages, and the need for sustainable urban planning to ensure adequate housing for all citizens remain. Moreover, implementing policies and programmes is often challenged by bureaucratic inefficiencies, land acquisition hurdles, and financial constraints, necessitating a multifaceted approach to effectively address the burgeoning urban population's housing needs.

5.1 ANALYSIS OF EXISTING HOUSING STOCK

Gaya Ji's housing scenario varies throughout the planning area; some areas have well-structured houses with access to basic services, whereas others experience issues due to limited housing infrastructure. Traditional mud houses and older structures coexist with new structures and planned residential communities. As per Census 2011, in rural areas (162 villages), 33.16% of the total households are in good condition, 57.89% are in livable condition and 8.93% are in dilapidated condition. In urban areas, 61.6% of the total households are in good condition, 34.3% are in livable condition and 4.1% are dilapidated.

TABLE 5-1 CONDITION OF CENSUS HOUSEHOLDS IN THE GAYA JI PLANNING AREA

Area Name	Number of households with the condition of Census House as											
	Total				Residence				Residence-cum-other use			
	Total	Good	Livable	Dilapidated	Total	Good	Livable	Dilapidated	Total	Good	Livable	Dilapidated
Gaya Ji (M Corp.)	72,118	44,425	24,736	2,957	67,791	41,901	23,078	2,813	4,327	2,524	1,659	144

Area Name	Number of households with the condition of Census House as											
	Total				Residence				Residence-cum-other use			
	Total	Good	Livable	Dilapidated	Total	Good	Livable	Dilapidated	Total	Good	Livable	Dilapidated
		61.60%	34.30%	4.10%	94.00%	58.10%	32.00%	3.90%	6.00%	3.50%	2.30%	0.20%
Rural Area (162 villages)	52,804	17,512	30,572	4,719	50,652	16,771	29,275	4,605	2,152	740	1,299	114
		33.16%	57.89%	8.93%	95.92%	31.76%	55.44%	8.72%	4.08%	1.40%	2.46%	0.22%
Gaya Ji Planning Area	**1,24,992**	**61,937**	**55,309**	**7,676**	**1,18,443**	**58,672**	**52,353**	**7,418**	**6,479**	**3,264**	**2,957**	**258**
		33.34%	**57.75%**	**8.90%**	**95.91%**	**31.93%**	**55.29%**	**8.69%**	**4.09%**	**1.41%**	**2.46%**	**0.22%**

Source: Census of India, 2011

As per the households surveyed in urban areas, 58.23% houses are in good condition, 8.92% houses are in bad condition, 32.52% are in average condition.

As per the households surveyed in rural areas, 74.44% houses are in good condition, 10.22% houses are in bad condition, 15.34% are in average condition.

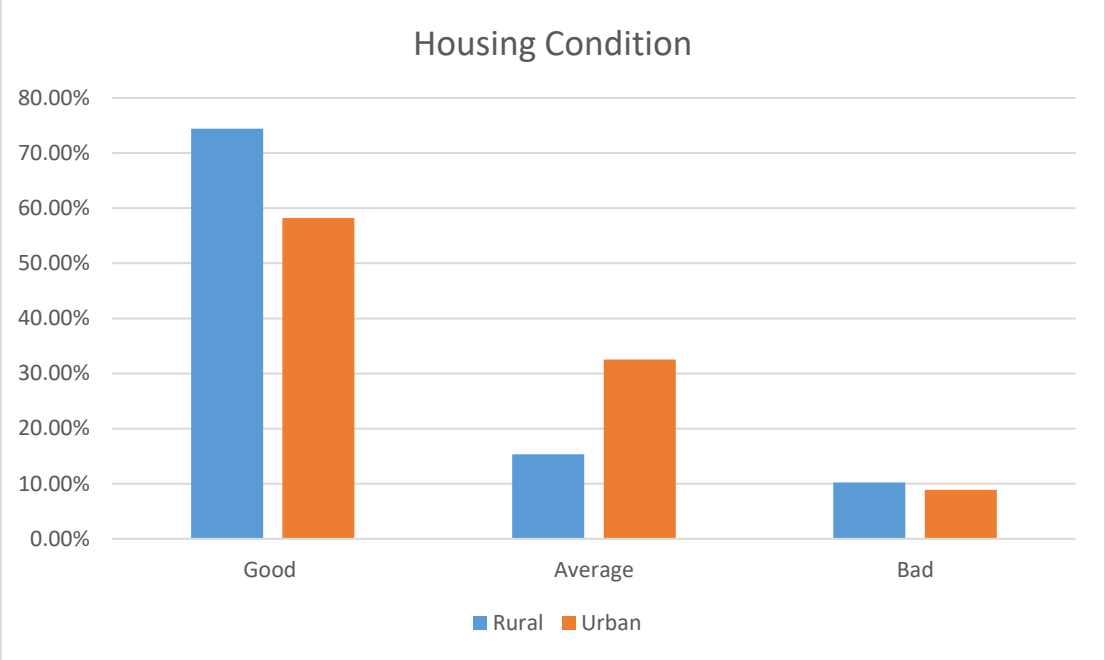


FIGURE 5-1 HOUSING CONDITION OF THE SURVEYED HOUSEHOLDS IN GAYA JI PLANNING AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

TABLE 5-2 TYPE OF HOUSES IN THE GAYA JI PLANNING AREA

Area Name	Total households	Type of Census Houses					Unclassifiable
		Permanent	Semi-permanent	Temporary			
				Total	Serviceable	Non-Serviceable	
Gaya Ji (M Corp.)	72,118	61,679	6,509	3,263	2,596	649	667
		85.53%	9.03%	4.53%	3.60%	0.90%	0.92%
Rural Area (162 villages)	52,804	27,791	10,031	14,700	13,565	1,135	282
		52.63%	19.00%	27.84%	25.69%	2.15%	0.53%
Gaya Ji Planning Area	**1,24,922**	**89,470**	**16,539**	**17,964**	**16,161**	**1,785**	**949**
		52.84%	**18.93%**	**27.69%**	**25.55%**	**2.14%**	**0.54%**

Source: Census of India, 2011

86.49% of the households surveyed in urban areas live in pucca houses, 5.16% still live in kuccha houses, and 8.35% in semi-pucca houses, which is a matter of concern.
74.10% of the surveyed households in rural areas live in pucca houses, 13.41% still live in kutcha houses, while 12.49% in semi-pucca houses, which is a matter of concern.

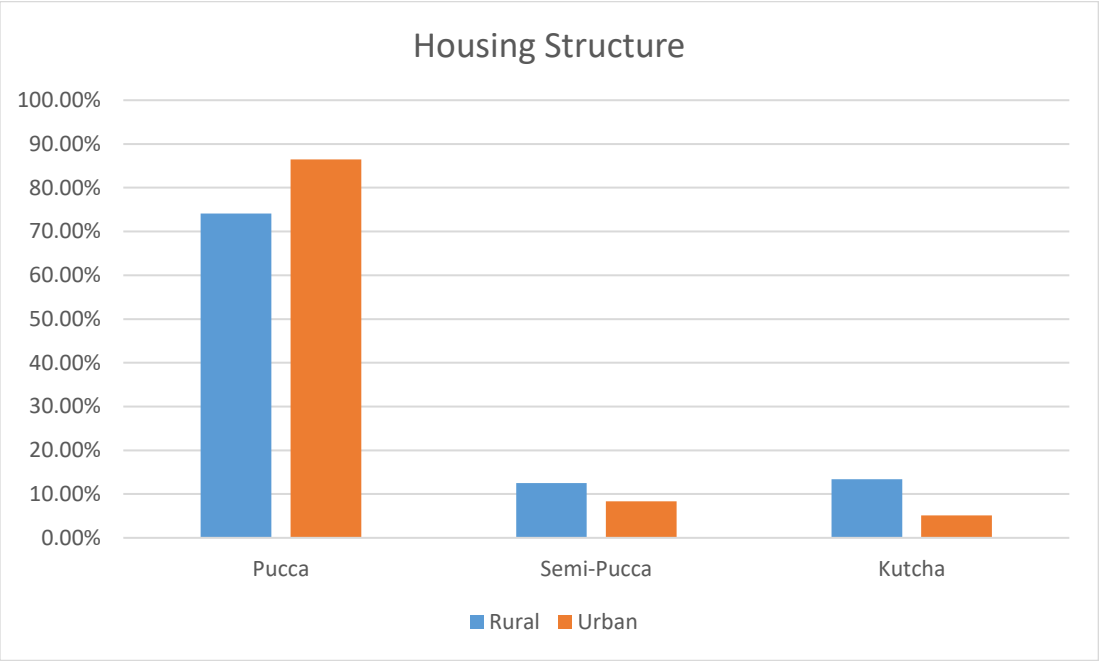


FIGURE 5-2 HOUSING STRUCTURE OF THE SURVEYED HOUSEHOLDS IN GAYA JI PLANNING AREAS

Source: Socio-Economic Survey,2023, Stesalit System Limited

5.2 AVAILABILITY OF UTILITIES AND SERVICES

5.2.1 MATERIAL OF THE WALL

The materials used to make walls in the Gaya Ji planning area vary based on the type of construction and budget. Traditional dwellings frequently include walls composed of locally produced materials such as mud, clay bricks, or adobe. The predominant material, however, is burnt bricks. This material is not only easily available but also provides durability and stability. As per Census 2011, in rural parts of the planning area, 54.65% of houses have walls made of burnt bricks, while 39.49% of the houses have walls made of mud or unburnt bricks. In urban areas, 75.42% of houses have walls made of burnt bricks, while 10.22% of the houses have walls made of mud or unburnt bricks.

TABLE 5-3 MATERIAL OF WALLS IN THE GAYA JI PLANNING AREA

Area Name	Total households	Material of the Wall									
		Grass/ Thatch/ Bamboo etc.	Plastic/ Polythene	Mud/ Unburnt brick	Wood	Stone not with mortar	Stone packed with mortar	G.I./ Metal/ Asbestos sheets	Burnt brick	Concrete	Other material
Gaya Ji (M Corp.)	72,118	736	159	7370	159	1529	4702	519	54391	2322	231
		1.02%	0.22%	10.22%	0.22%	2.12%	6.52%	0.72%	75.42%	3.22%	0.32%
Rural Area (162 villages)	52,804	1,348	80	20,850	42	366	655	37	28,860	507	58
		2.55%	0.15%	39.49%	0.08%	0.69%	1.24%	0.07%	54.65%	0.96%	0.11%
Gaya Ji Planning Area	**1,24,922**	**2,083**	**239**	**28,220**	**201**	**1,895**	**5,357**	**557**	**83,251**	**2,829**	**288**
		2.54%	**0.15%**	**39.30%**	**0.08%**	**0.70%**	**1.28%**	**0.08%**	**54.79%**	**0.98%**	**0.11%**

Source: Census of India, 2011

5.2.2 MATERIAL OF ROOF

Roofing materials in Gaya Ji vary according to traditional practices, availability, and pricing. Roofs on traditional dwellings are frequently built of thatch, straw, corrugated metal sheets or stone/slate. For roofing, modern structures mostly use reinforced concrete, metal sheets, tiles, or asbestos sheets. These materials, which are extensively used in urban residential and commercial buildings, provide durability, weather resistance, and endurance. As per the Census of India 2011, in the urban area, 5.61% of the households have roofs made with grass, thatch, wood or mud while 64.71% have concrete roofs. In rural parts of the planning area, 32.07% of the households have roofs made with grass, thatch, wood or mud while 39.46% have concrete roofs.

TABLE 5-4 MATERIAL OF ROOF IN THE GAYA JI PLANNING AREA

Area Name	Total households	Material of Roof								
		Grass/ Thatch/ Bamboo/	Plastic/ Polythene	Hand made Tiles	Machine made Tiles	Burnt Brick	Stone/ Slate	G.I./Metal/ Asbestos sheets	Concrete	Any other material
Gaya Ji (M Corp.)	72,118	4,047	729	6,066	729	4,407	6,571	2,460	46,668	441
		5.61%	1.01%	8.41%	1.01%	6.11%	9.11%	3.41%	64.71%	0.61%
Rural Area (162 villages)	52,804	16,936	229	8,976	330	1,593	3,187	487	20,838	228
		32.07%	0.43%	17.00%	0.63%	3.02%	6.03%	0.92%	39.46%	0.43%
Gaya Ji Planning Area	**1,24,922**	**20,983**	**958**	**15,042**	**1,060**	**6,000**	**9,757**	**2,948**	**67,506**	**668**
		31.91%	**0.44%**	**16.95%**	**0.63%**	**3.04%**	**6.06%**	**0.94%**	**39.62%**	**0.43%**

Source: Census of India, 2011

5.3 OWNERSHIP STATUS OF HOUSE

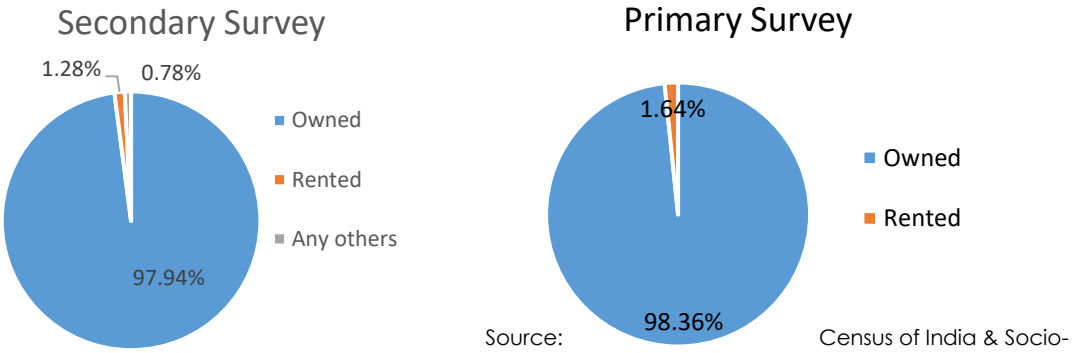
The ownership status of houses in Gaya Ji reflects a combination of ownership patterns based on socioeconomic considerations. Most residents are homeowners, either outright or through mortgages with banking institutions. This ownership is frequently passed down over generations, with properties being passed down within families. A rented housing is where individuals or families lease houses or apartments from landlords or property owners. This arrangement allows for flexibility but lacks the long-term security that comes with ownership. A relatively higher percentage of the population lives in rented housing in the urban area compared to the rural areas.

TABLE 5-5 OWNERSHIP STATUS IN THE GAYA JI PLANNING AREA

Area Name	Total Households	Ownership status		
		Owned	Rented	Any other
Gaya Ji (M Corp.)	72,118	57,983	12,260	1,875
		80.40%	17.00%	2.60%
Rural Area (162 villages)	52,804	51,778	621	406
		98.06%	1.18%	0.77%
Gaya Ji Planning Area	**1,24,922**	**1,09,761**	**12,881**	**2,281**
		97.94%	**1.28%**	**0.78%**

Source: Census of India, 2011

As per the Census of India 2011, 97.94% of the households in the Gaya Ji planning area own the property where they stay while 1.28% stay in rented properties. Among the households surveyed in urban areas, 98.36% own the property where they live while 1.64% live on rented property.



Source: Census of India & Socio-Economic survey,2023 Stesalit Systems LTD.

FIGURE 5-3 COMPARATIVE ANALYSIS OF OWNERSHIP OF THE HOUSE OF THE SURVEYED HOUSEHOLDS IN URBAN AREAS

5.4 DWELLING ROOMS IN THE HOUSE

The number of dwelling rooms within a home in Gaya Ji varies depending on factors such as family size, economic level, and available living space. Rural hhouseholds contain fewer rooms and are frequently intended to meet the fundamental necessities of the family. Urban residences often have many rooms, with separate sections designated for living, dining, bedrooms, and kitchen areas. As per the Census of India 2011, most households in the urban area have two-to-three rooms whereas in rural areas, most households have one-to-two rooms.

However, there are differences amongst households, with some families living in smaller accommodations, particularly in densely crowded areas or informal settlements where the number of rooms is limited. As per the Census of India 2011, in rural areas 20.51% of households have one room, 30.45% have two rooms, 17.25% have three rooms, and 12.73% have four rooms while 1.6% of the households have

no exclusive rooms while in urban areas only 1.79% of the households have no exclusive rooms, whereas in urban areas, 17.39% of households have one room, 28.69% have two rooms, 19.69% have three rooms, and 15.09% have four rooms.

TABLE 5-6 NUMBER OF DWELLING ROOMS IN THE GAYA JI PLANNING AREA

Area Name	Total households	Households with a number of dwelling rooms						
		No exclusive	One room	Two rooms	Three rooms	Four rooms	Five rooms	Six rooms and above
Gaya Ji (M Corp.)	72,118	999	12,538	20,688	14,197	10,880	4,533	8,283
		1.39%	17.39%	28.69%	19.69%	15.09%	6.29%	11.49%
Rural Area (162villages)	52,804	946	10830	16079	9109	6722	3782	5336
		1.79%	20.51%	30.45%	17.25%	12.73%	7.16%	10.10%
Gaya Ji Planning Area	**1,24,922**	**1,946**	**23,368**	**36,767**	**23,306**	**17,602**	**8,315**	**13,619**
		1.79%	**20.49%**	**30.44%**	**17.27%**	**12.75%**	**7.16%**	**10.11%**

Source: Census of India, 2011

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

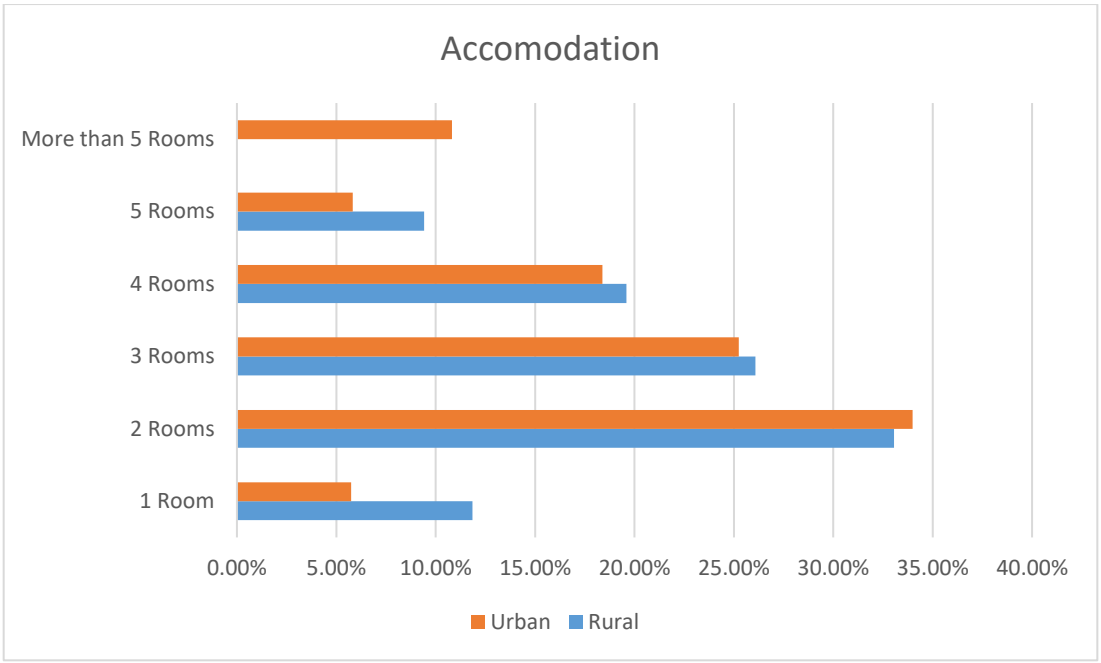


FIGURE 5-4 REPORTED NUMBER OF ROOMS IN THE HOUSES OF THE SURVEYED HOUSEHOLDS IN GAYA JI PLANNING AREAS

Source: Socio-Economic Survey,2023, Stesalit Systems Limited

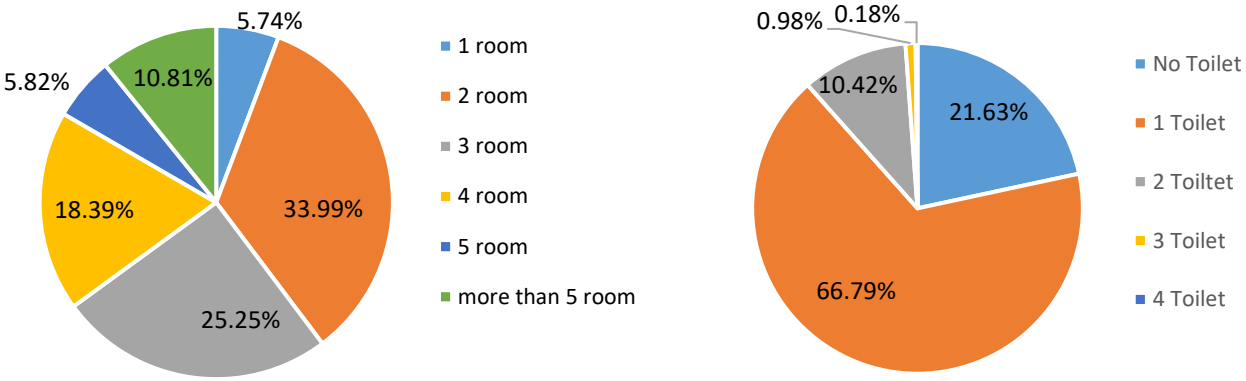


FIGURE 5-5 COMPARISON OF NO. OF TOILETS IN BETWEEN URBAN & RURAL AREAS IN GAYA JI PLANNING AREAS

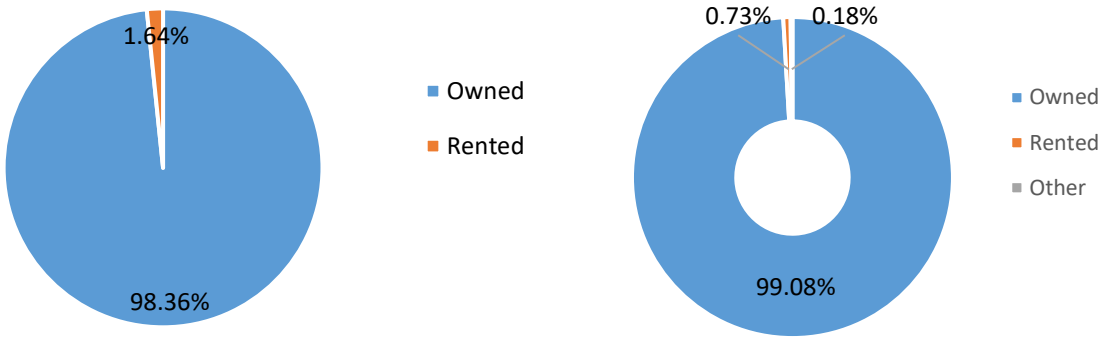


FIGURE 5-6 COMPARISON OF PROPERTY OWNERSHIP BETWEEN URBAN & RURAL IN GAYA JI PLANNING AREA

5.5 CURRENTLY PROPOSED / ONGOING HOUSING PROJECTS

5.5.1 HOUSING FOR ALL

The **Housing for All** scheme, launched by the Government of India under the **Pradhan Mantri Awas Yojana (PMAY)** in 2015, aims to provide affordable housing to all urban residents by 2022. Targeting the economically weaker sections (EWS), low-income groups (LIG), and middle-income groups (MIG), the scheme promotes home ownership through various measures, including financial assistance, subsidies, and incentives for housing developers. With a focus on inclusive urban growth, the initiative seeks to address India's housing shortage by encouraging the construction of affordable homes, the rehabilitation of slum dwellers, and the promotion of sustainable urban planning practices.

TABLE 5-7 HOUSING FOR ALL DETAILS OF THE GAYA JI PLANNING AREA

Sr. No.	Name of Projects	No. of Sanctioned Houses	No. of Surrendered Houses	No. of Workorder given to Beneficiaries	No. of Beneficiaries 1st Installment given	No. of Beneficiaries 2nd Installment given	No. of Beneficiaries 3rd Installment given	No. of Beneficiaries 4th Installment given	No. of Completed Houses
1	Gaya Ji Nagar Nigam Ph-1	1,249	522	727	727	727	701	673	673
2	Gaya Ji Nagar Nigam Ph-2	2,429	623	1,806	1,806	1,806	1,593	1,336	1,336
3	Gaya Ji Nagar Nigam Ph-3	1,440	139	1,301	1,301	1,301	1,156	678	678
4	Gaya Ji Nagar Nigam Ph-4	847	93	754	754	656	411	318	318
5	Gaya Ji Nagar Nigam Ph-5	5,928	2,682	3,246	2,561	1,883	965	315	315
Total		**11,893**	**4,059**	**7,834**	**7,149**	**6,373**	**4,826**	**3,320**	**3,320**

Source: Gaya Ji Nagar Nigam 2024

5.6 SLUMS

Cities are at the forefront of this crisis, grappling with declining economic activity, high infection rates, and insufficient resources. The slums, in particular, are highly vulnerable due to unsanitary conditions and dense populations, necessitating an urgent implementation of public healthcare measures.

The Gaya Ji Planning Area, with its expanding infrastructure and intricate urban fabric, exemplifies the challenges inherent in urban development. Slums, often characterized by inadequate sanitation, overcrowding, and limited access to essential services, starkly illustrate the socioeconomic disparities in the region. They serve as a reminder of the deficiencies in urban planning and underscore the pressing need for inclusive policies aimed at improving the lives of marginalized populations, both within the Gaya Ji Planning Area and across many other regions globally. Effectively addressing the multifaceted issues faced by slums and fostering sustainable urban development requires a comprehensive understanding of their dynamics.

5.6.1 SLUM INFRASTRUCTURE DETAILS

Slums, known for their haphazard dwellings and overpopulation, frequently lack basic utilities such as clean water, sanitation, power, healthcare, and education. Despite efforts to improve infrastructure in some regions, the scope of the challenge remains enormous, necessitating new solutions and long-term commitment from stakeholders. Understanding the complexities of infrastructure provision in slums necessitates a comprehensive approach that takes into account socioeconomic dynamics, governance structures, and environmental factors, emphasizing the importance of addressing this pressing urban issue within the larger context of equitable development. The infrastructure conditions of the slums of Gaya Ji Planning Area are described below.

TABLE 5-8 SLUM INFRASTRUCTURE DETAILS OF THE GAYA JI PLANNING AREA

Ward No.	Slum	Address	Drainage	Toilet	Waste disposal	Collection of waste	Type of Drainage	water logging	Road
11	Harijan Toli	Harijan Toli	GMC	Open Defecation	roadside	some time	pucca	no	pucca
9	Harijan Toli	Harijan Toli	individual Borewell	individual	roadside	every day	pucca	no	pucca
8	Harijan Toli	Harijan Toli	individual Borewell	Open Defecation	roadside	some time	kuccha	no	pucca

Ward No.	Slum	Address	Drainage	Toilet	Waste disposal	Collection of waste	Type of Drainage	water logging	Road
22	Harijan Toli	Harijan Toli	individual Borewell	Open Defecation	roadside	some time	kuccha	swamp	pucca
3	Bhai Toli	Bhai Toli	NA	Open Defecation	roadside	NA	NA	swamp	pucca
43	Harijan Toli, Bhairaio Asthan	Harijan Toli, Bhairaio Asthan	individual Borewell and GMC	Open Defecation	roadside	some time	pucca	NA	pucca
10	Harijan Toli, Bhairagi	Harijan Toli, Bhairagi	individual Borewell and GMC	individual	roadside	optional	pucca	swamp	pucca
22	Harijan Toli, Ramna	Harijan Toli, Ramna	individual Borewell	Open Defecation	roadside	some time	pucca	swamp	pucca
45	Harijan Toli, Lakhanpura	Harijan Toli, Lakhanpura	individual Borewell	individual	roadside	some time	pucca	NA	pucca
45	Harijan Toli, Dhudritad Chattu Bigha	Harijan Toli, Dhudritad Chattu Bigha	individual Borewell	Open Defecation	roadside	some time	pucca	NA	pucca
34	Harijan Toli, Golbigha, Part-1	Harijan Toli, Golbigha, Part-1	individual Borewell	Open Defecation	roadside	once in a week	kuccha	NA	kuccha
34	Harijan Toli, Golbigha, Part-1	Harijan Toli, Golbigha, Part-1	individual Borewell	Open Defecation	roadside	once in a week	kuccha	NA	kuccha

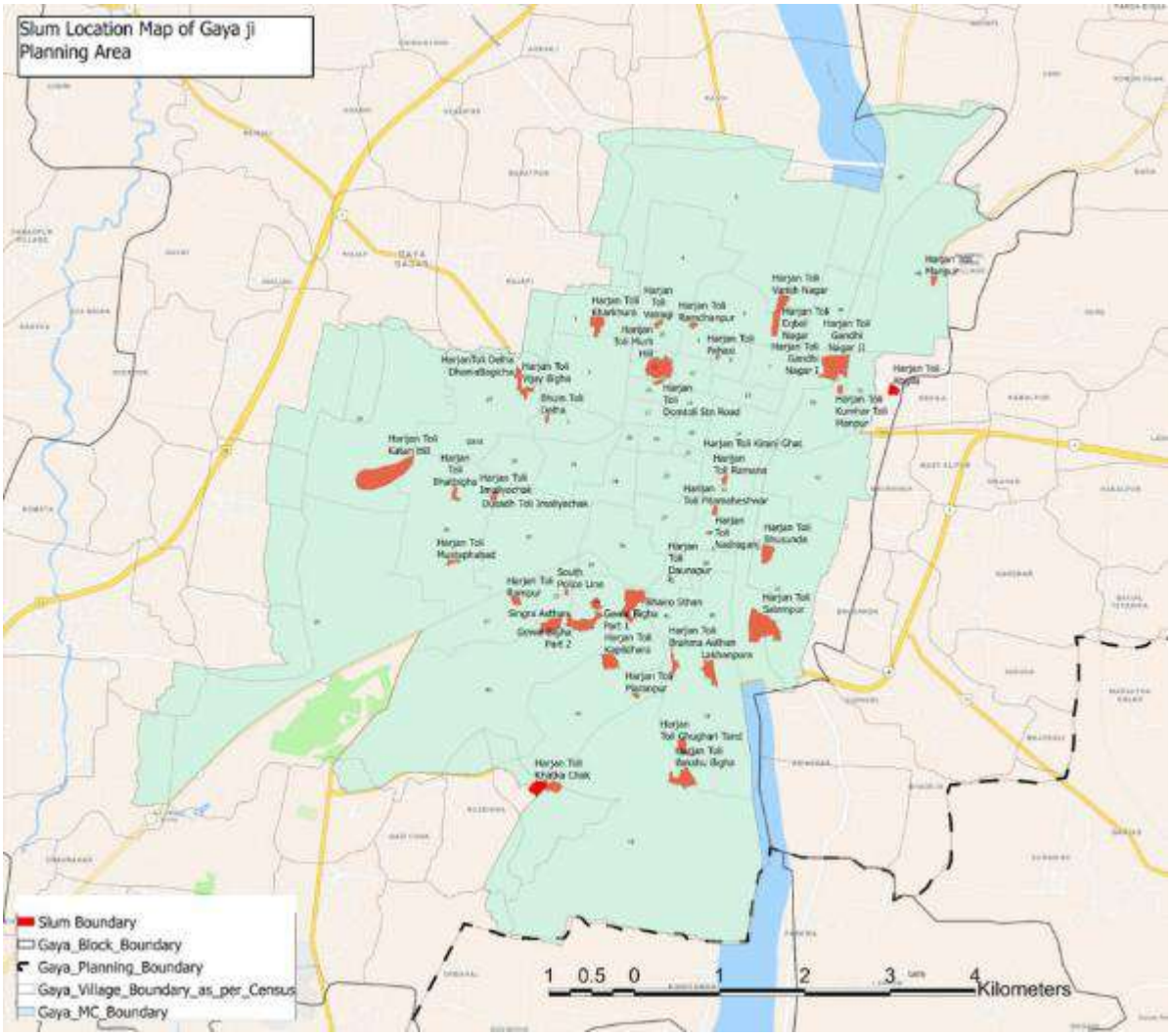
Ward No.	Slum	Address	Drainage	Toilet	Waste disposal	Collection of waste	Type of Drainage	water logging	Road
32	Harijan Toli, Mustafabad	Harijan Toli, Mustafabad	GMC	Open Defecation	roadside	NA	pucca	yes	kuccha
2	Harijan Toli, Dehla, Dhaniya Bagicha	Harijan Toli, Dehla, Dhaniya Bagicha	individual Borewell	Open Defecation	roadside	some time	kuccha	yes	pucca
27	Harijan Toli, Dehla, Dhaniya Bagicha	Harijan Toli, Dehla, Dhaniya Bagicha	individual Borewell	Open Defecation	roadside	some time	kuccha	less	pucca
46	Harijan Toli, Baksu Bigha	Harijan Toli, Baksu Bigha	GMC	Open Defecation	roadside	some time	pucca	NA	kuccha
44	Harijan Toli, Maran pur	Harijan Toli, Maran Pur	individual Borewell	Open Defecation	roadside	some time	pucca	less	pucca
44	Harijan Toli, Kapil Dhara	Harijan Toli, Kapil Dhara	individual Borewell	Open Defecation	roadside	some time	kuccha	NA	kuccha
14	Harijan Toli, Kiranighat	Harijan Toli, Kiranighat	individual Borewell	Open Defecation	roadside	NA	NA	less	kuccha
29	Harijan Toli, Imlilachak	Harijan Toli, Imlilachak	individual Borewell	Open Defecation	roadside	once in a week	kuccha	less	kuccha
44	Harijan Toli, Acharawat	Harijan Toli, Acharawat	individual Borewell and GMC	individual	roadside	alternate day	pucca	NA	pucca

Ward No.	Slum	Address	Drainage	Toilet	Waste disposal	Collection of waste	Type of Drainage	water logging	Road
9	Harijan Toli, Ramdhanpur	Harijan Toli, Ramdhanpur	individual Borewell and GMC	individual	roadside	every day	pucca	NA	pucca
47	Manpur, Suraipura	Manpur, Suraipura	individual Borewell and GMC	Open Defecation	roadside	NA	kuccha	less	kuccha
50	Gandhi Nagar, Harijan Toli, Part-1 Manpur	Gandhi Nagar, Harijan Toli, Part-1 Manpur	individual Borewell	individual	roadside	some time	pucca	NA	pucca
50	Gandhi Nagar, Harijan Toli, Part-1 Manpur	Gandhi Nagar, Harijan Toli, Part-1 Manpur	individual Borewell	individual	roadside	some time	pucca	NA	pucca
53	Harijan Toli, Bhusunda	Harijan Toli, Bhusunda	individual Borewell	Open Defecation	roadside	NA	kuccha	less	kuccha
16	Dom Toli, Station Road	Dom Toli, Station Road	individual Borewell	individual	roadside	some time	pucca	NA	pucca
45	Harijan Toli, Brahmasath	Harijan Toli, Brahmasath	GMC	Open Defecation	roadside	alternate day	pucca	NA	pucca
49	Harijan Toli, Kumahar Toli, Mampur	Harijan Toli, Kumahar Toli, Mampur	individual Borewell	Open Defecation	roadside	some time	kuccha	very much	kuccha
28	Harijan Toli, Katari Hill	Harijan Toli, Katari Hill	individual Borewell and GMC	individual	roadside	once in a week	pucca	NA	pucca

Ward No.	Slum	Address	Drainage	Toilet	Waste disposal	Collection of waste	Type of Drainage	water logging	Road
27	Harijan Toli, Bhat Bigha	Harijan Toli, Bhat Bigha	individual Borewell and GMC	Open Defecation	roadside	alternate day	pucca	NA	pucca
38	Harijan Toli, Nadra ganj	Harijan Toli, Nadra ganj	individual Borewell and GMC	individual	roadside	some time	pucca	less	pucca
6	Harijan Toli, Ikbalnagar	Harijan Toli, Ikbalnagar	individual Borewell	Open Defecation	roadside	some time	kuccha	less	kuccha
5	Harijan Toli, Warish Nagar	Harijan Toli, Warish Nagar	individual Borewell	Open Defecation	roadside	some time	kuccha	less	kuccha
31	Harijan Toli, Rampur	Harijan Toli, Rampur	individual Borewell	Open Defecation	roadside	some time	pucca	less	pucca
50	Harijan Toli, Abgila	Harijan Toli, Abgila	individual Borewell and GMC	individual	roadside	some time	kuccha	very much	pucca
44	Dushad Toli, Ghatakchak	Dushad Toli, Ghatakchak	individual Borewell	individual	roadside	NA	pucca	NA	pucca
29	Dushad Toli, Imaliyachak	Dushad Toli, Imaliyachak	GMC	Open Defecation	roadside	NA	kuccha	NA	kuccha
33	Harijan Toli, Police Line	Harijan Toli, Police Line	individual Borewell	Open Defecation	roadside	once in a week	kuccha	NA	pucca
33	Singha Asthan, Harjantoli	Singha Asthan, Harjantoli	GMC	Open Defecation	roadside	NA	kuccha	very much	kuccha

Ward No.	Slum	Address	Drainage	Toilet	Waste disposal	Collection of waste	Type of Drainage	water logging	Road
28	Harijan Toli, Katari Hill	Harijan Toli, Katari Hill	individual Borewell	individual	roadside	some time	kuccha	very less	pucca

Source: District Disaster Management Department, Gaya Ji



MAP 5-1 SLUM LOCATION MAP OF GAYA JI

5.7 Present Housing Gap

Housing projections are essential for evaluating the demand for shelter among the homeless population. The housing deficit is determined based on the average household size, as recorded in the Census of India 2011. With the rapid expansion of cities, the number of people residing in slums and informal settlements has significantly increased. Escalating land and property prices in urban areas have forced economically weaker sections to settle in marginal locations, often characterized by substandard housing, overcrowding, and deteriorating infrastructure.

India's urban housing crisis is primarily concentrated in the Economically Weaker Sections (EWS) and Lower Income Groups (LIG). However, most newly constructed housing in metropolitan areas remains out of reach for these income groups. This has resulted in a severe shortage of affordable housing, creating a significant gap between supply and demand, both in terms of quantity and quality. Addressing this issue requires strategic urban planning and policy interventions to ensure adequate and affordable housing for all sections of society.

5.7.1 CALCULATION OF HOUSING SHORTAGE

The housing shortage for Gaya Ji has been calculated by putting together the number of households residing in unacceptable dwelling units including the obsolescence factor, those residing in unacceptable social and physical conditions and houseless households. As per the Census of India 2011, the housing shortage for Gaya Ji has been worked out based on the following components and has been summarized below:

- Obsolescence Factor
  I. Dilapidated condition of houses
  II. Temporary structure of houses
- Congestion factor
  I. Households with one or more married couples with no exclusive room
- Houselessness
  I. Households living without any house

To compute the total housing shortage till 2011, the obsolescence factor is considered which includes dilapidated houses and temporary houses as per Census 2011, the congestion factor and the homelessness factor. The total housing shortage in 2011 was 7,219 houses in the urban area, 20,365 houses in the rural parts and 27,586 houses in the total planning area.

TABLE 5-9 HOUSING SHORTAGE

Area Name	Total Census Houses	Dilapidated Houses	Temporary Structures	One/more married couples with no exclusive room	HH of Slums	Total Housing Shortage
Gaya Ji (M Corp.)	72,118	2957	3,263	999	-	7,219
Rural Areas	52,804	4719	14,700	946	-	20,365

Gaya Ji Planning Area	**1,24,922**	**7676**	**17,964**	**1,946**	**-**	**27,586**

Source: computed based on Census of India, 2011

As per Census 2011, the total number of census houses recorded was 1,24,922, out of which 7,676 were classified as dilapidated houses. Additionally, 17,964 houses were categorized as temporary structures, highlighting the prevalence of inadequate housing conditions. Furthermore, 1,946 households had one or more married couples without an exclusive room, indicating overcrowding and a lack of privacy. As a result, the total housing shortage was estimated to be 27,586, reflecting the urgent need for sustainable and affordable housing solutions.

5.8 FUTURE HOUSING NEEDS

TABLE 5-10 HOUSING DEMAND FOR GAYA JI FOR 2047

Name	Total Population (Census 2011)	Number of Households (Census 2011)	Average Household Size	Projected Population (2047)	Projected Household (2047)	Total Housing Shortage as per census 2011	Total household required (2047)
	A	**B**	**C**	**D**	**E***	**F**	**H***
Gaya Ji (M Corp.)	4,68,614	72,118	6.50	10,37,619	1,59,634	7,219	1,66,853
Rural Areas	3,19,366	52,804	6.05	5,45,631	90,187	20,365	1,10,552
Gaya Ji Planning Area	**7,87,980**	**1,24,922**	**6.31**	**15,84,250**	**2,49,821**	**27,586**	**2,77,405**

Note: Including rounding errors

Calculation:

- *E = D / C*
- *H = E + F*

The housing projections for the Gaya Ji Planning Area, which includes Gaya Ji Nagar Nigam and 162 villages, indicate a significant housing demand by 2047. Based on Census 2011 data and future population projections, the assessment considers household size, projected households, dilapidated houses, and existing housing shortages to estimate the total housing requirement.

In Gaya Ji Nagar Nigam, the population in 2011 was 4,68,614 with 72,118 households, having an average household size of 6.50 persons. By 2047, the population is expected to reach 10,37,619, requiring approximately 1,59,634 households. Additionally, as per census 2011, there was housing shortage of 7,219 houses, leading to a total housing demand of 1,66,853 units. Similarly, in rural areas covering 162 villages, the 2011 population stood at 3,19,366 with 52,804

households, and an average household size of 6.05 persons. The projected population for 2047 is estimated at 5,45,631, necessitating 90,187 households. With 20,365 housing shortage, the total housing requirement for rural areas is projected to be 1,10,552 units.

For the entire Gaya Ji Planning Area, which comprises both urban and rural regions, the population in 2011 was 7,87,980, with 1,24,922 households and an average household size of 6.31 persons. By 2041, the projected population is 15,84,250, requiring around 2,49,821 households. The housing shortage is 27,856, leading to a total housing requirement for 2047 is estimated to be 2,77,405 units.

This analysis highlights a critical need for housing development, particularly in rural areas, where the shortage is more pronounced. The current sanctioned housing under PMAY is insufficient to meet future demand. There is an urgent need for comprehensive housing policies, infrastructure development, and affordable housing programs targeting low-income groups and slum rehabilitation. Addressing these challenges will require a focused approach from both government and private stakeholders to bridge the demand-supply gap and improve living conditions in the Gaya Ji Planning Area.

TABLE 5-11 HOUSING GAP FOR PROJECTED POPULATION OF 2041

Required Household for 2047	Existing Households (2011)	Gap
A	**B**	**C**
2,77,405	1,24,922	1,52,483

Note: Including rounding errors

The housing scenario in the Gaya Ji Planning Area highlights a significant gap between projected household requirements and the availability of housing. By 2047, the total projected households are estimated to be 2,77,405. However, as per the 2011 Census, the existing number of houses stood at 1,24,922 and the shortage as calculated in above table, is found to be 27,586. This results in a substantial gap of 1,52,483 housing units that need to be addressed through planned development and housing initiatives.

To bridge this gap, there is a critical need for strategic urban and rural housing policies, government interventions, and private sector involvement. The increasing housing demand highlights the necessity for affordable housing projects, improved infrastructure, and efficient land use planning to accommodate future population growth and prevent issues like slum proliferation and housing inadequacy.

5.9 ISSUES AND POTENTIAL

TABLE 5-12 SWOT OF HOUSING CONDITION IN GAYA JI PLANNING AREA

Strength	Weakness	Opportunity	Threat
POTENTIAL FOR URBAN EXPANSION • Availability of land for new housing projects allows planned urban growth and development. • The development of residential projects by Vastu Vihar Phase-1 in the Southern part of the planning area (Near Gaya Ji International Airport) strengthens the region by addressing housing shortages and enhancing infrastructure, providing better living conditions for residents.	**SLUM** There are 34 notified slums present in the city which is lacking basic amenities such as proper roads, sanitation, water supply, and electricity, affecting overall quality of life and urban development.	**DEVELOPMENT UNDER HOUSING FOR ALL SCHEME** • Full-fledged implementation of PMAY can ensure 100% pucca housing for both urban and rural areas. • Green building concepts (solar panels, rainwater harvesting, and energy-efficient designs) can be integrated into new housing projects. • Vertical expansion (mid-rise and high-rise apartments) can optimize land use while preserving greenery.	**LACK OF STRICT URBAN REGULATIONS** Uncontrolled and unplanned development may lead to congestion, poor sanitation, and environmental degradation.

5.10 RECOMMENDATION

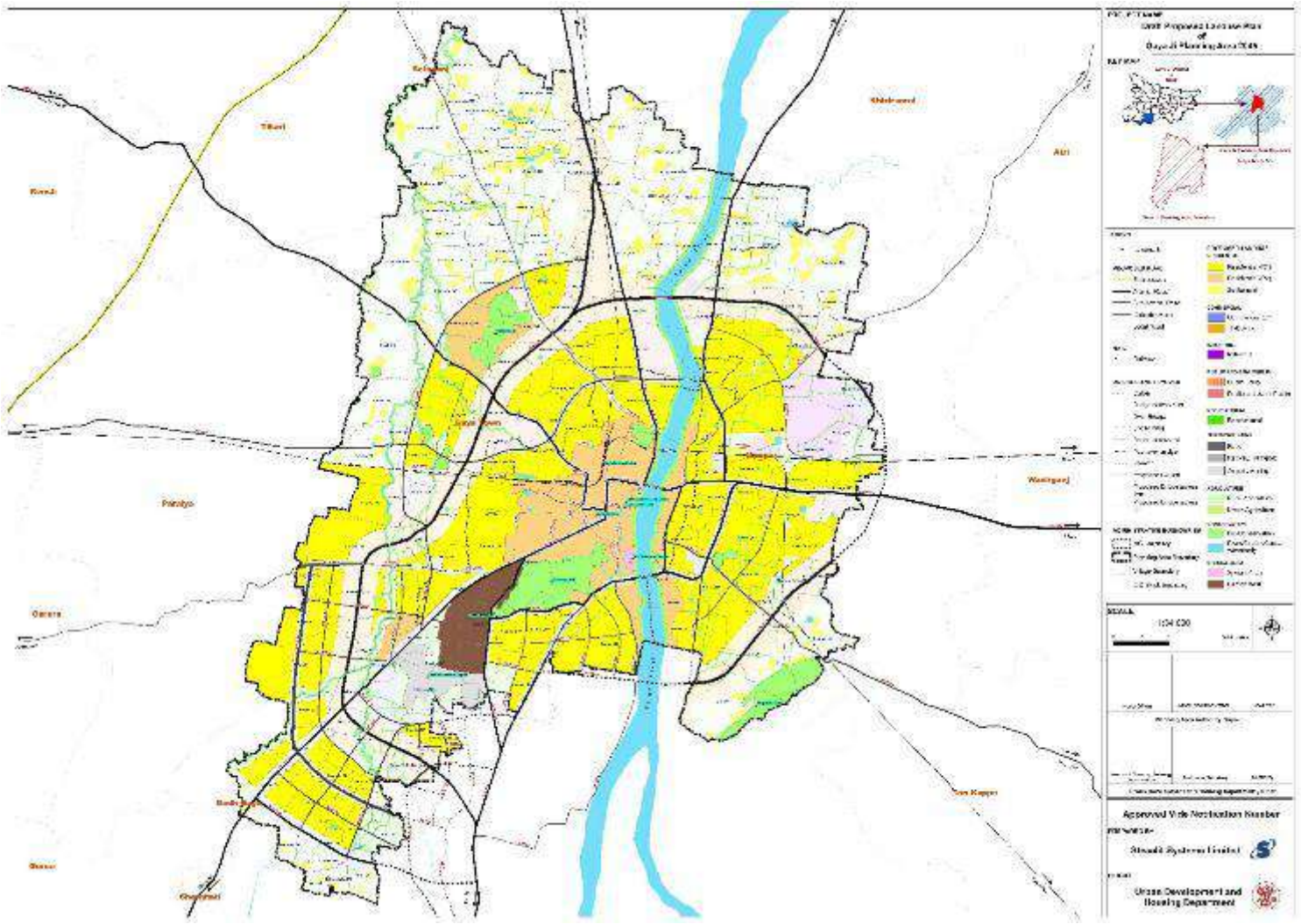
The housing strategy for the Gaya Ji Master Plan adopts an inclusive and balanced approach to accommodate diverse income groups and respond to existing housing challenges while supporting planned urban growth. The focus is on improving living conditions, increasing formal housing supply, encouraging planned real estate development, and promoting mixed-income communities to ensure social equity and sustainable urban expansion.

Slum improvement through in-situ rehabilitation and relocation prioritizes upgrading existing informal settlements by providing secure tenure, improved infrastructure, and essential services while minimizing displacement. Preference is given to on-site redevelopment, particularly on government or publicly owned land, ensuring community continuity and social stability. Relocation will be considered only where in-situ solutions are not feasible. The strategy emphasizes community participation, GIS-based identification and targeting, and implementation through schemes such as PMAY 2.0, Bihar Slum Policy, and PPP-based redevelopment models.

Affordable housing for EWS and LIG groups aims to address the shortage of formal housing options for low-income households by promoting compact and efficient group housing typologies with shared amenities. The approach encourages rental housing, rent-to-own models, and cross-subsidy mechanisms to enhance affordability. Integration with national and state housing schemes and innovative financing models will help expand access to formal housing while ensuring proximity to employment and services.

Mid-income (MIG) housing focuses on meeting the growing demand from salaried urban households seeking secure and bank-financed housing options. Development will be encouraged near employment hubs, educational institutions, and well-connected urban corridors to support transit-oriented growth and reduce commuting pressures. Mixed-income developments, subsidy-linked loan schemes, and planning incentives for developers will help promote a balanced and inclusive residential environment.

Market-led housing for HIG groups supports premium residential development driven by private investment, including plotted developments, gated communities, and vertical residential towers within planned residential zones. This segment is intended to strengthen the real estate market, attract investment, and improve overall urban quality through regulated development frameworks, zoning mechanisms, and local area planning strategies that ensure alignment with the broader master plan vision.



MAP 5-2 PROPOSED RESIDENTIAL LANDUSE OF GAYA JI PLANNING AREA

6 ECONOMIC PROFILE

6.1 DISTRICT SCENARIO

Gaya Ji is one of the state's biggest districts with an area of 4,976 square kms and the second-largest contributor to the economy of Bihar, after Patna. The district also presents a multifaceted economic landscape shaped by agriculture, tourism, small-scale industries, and trade.

The district of Gaya Ji is a portion of the south Bihar plain which is bordered to the north by Jehanabad and Nalanda, to the south by Palamu Chatra and Hazaribag, to the east by Nawada, and to the west by Aurangabad. Situated in the South Bihar Alluvial Plain along the three major rivers in the region, Dhadhar flows on its eastern border, and Phalgu and Morhar flow in the central portion of the region. This fertile alluvium soil, locally known as Kewal, is very suitable for cultivating paddy, wheat, and sugarcane. Agriculture being the primary economic activity, rice production is the main crop of the district, and sugarcane is the district's only cash crop. Other important food grains cultivated there include maize, lentils, and barley.

The Phalgu River irrigates a large number of agricultural lands via a vast network of canals linked to the Uderasthan Barrage. While some areas rely on groundwater and monsoon rainfall, these canals serve most of the central region. However, the bulk of the district's streams have an irrigation system built over them to distribute and store water, which is the main source of agricultural growth in the Gaya Ji district. According to the Handbook on Water and Related Information, Central Water Commission 2017, ERM (Extension, Renovation and Modernization) of Uderasthan Barrage Scheme, Lower Morhar Major Irrigation Project and Tilaiya Dhadhar Diversion Scheme are a few initiatives taken by the Government to provide irrigation infrastructure.

In the whole district Gaya Ji town is the only manufacturing town. Few other smaller manufacturing units in the districts include sugar mill in Guraru, Manpur situated to the east of Gaya Ji town across the Phalgu River is an important belt of cottage industry. In Buniadganj and the surrounding areas near Manpur, some households manufacture textile using power looms and by hand weaving where towels, bedsheets, Dari, coarse Dhoti, sarees, and long cloth are the primary products of manufacture. In Buniadganj, silk weaving is also practiced. In the Arti block, stone carving is done in the village of Patharkatti. The skill of stone carving was introduced to this area around 200 years ago by workmen from Jaipur who were employed to construct the Vishnupad temple. According to data from the Ministry of Micro, Small, and Medium Enterprises, Government of India's "Brief Industrial The primary industrial activities in Gaya Ji include stone chip crushing, rice milling, and flour milling, alongside a variety of small-scale and cottage industries, including agro-based and food processing ventures, with promising potential for expansion. Three major industrial clusters specialize in blanket weaving, stone crushing, and

rice milling, with the latter comprising 40 units. Additionally, the district thrives in Profile of Gaya Ji District," there were 6,911 small scale registered units in total in 2008–09, employing 25,339 people, despite the district is still regarded as industrially backward.

The districts' main trading hubs are situated at Bankey Bazar, Sherghati, Tekari, and Gaya Ji. The export trades of Gaya Ji mainly consist of oil seeds, gur, hides, stone chips and vegetables while the district's key imports include coal, cloth, kerosene oil, tea, cotton, timber, tobacco, spices, dried and fresh fruits, paper and other consumer goods. Although agriculture and tourism are the mainstays of its economy, there are opportunities for growth in small-scale industries and trade. With focused development initiatives and infrastructure improvements, Gaya Ji can harness its resources to achieve sustainable economic growth and enhance the quality of life for its residents.

6.1.1 GROSS DISTRICT DOMESTIC PRODUCT (GDDP) AND NET DISTRICT DOMESTIC PRODUCT (NDDP)

The Gross Domestic Product (GDP) and Net Domestic Product (NDP) figures for Gaya Ji District from 2004 to 2012, obtained from the Bihar Directorate of Economics and Statistics, show a steady rise in the district's overall level of economic activity. This incremental growth trajectory during the selected time is shown in the table below, which is supplemented by the graphical representation. The GDDP and NDDP had a significant growth of almost 20% between 2010 and 2011.

TABLE 6-1 GROSS DISTRICT DOMESTIC PRODUCT (GDDP) AND NET DOMESTIC PRODUCT FOR GAYA JI DISTRICT AT CURRENT PRICE (IN LAKH)

Year	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
GDDP	2,60,080	2,85,181	3,60,071	4,09,997	4,76,165	5,42,300	6,52,871	8,12,420
% Increase	-	9.65%	26.26%	13.87%	16.14%	13.89%	20.39%	24.44%
NDDP	2,30,955	2,52,324	3,21,386	3,65,419	4,27,262	4,86,037	5,87,733	7,31,975
% Increase	-	9.25%	27.37%	13.70%	16.92%	13.76%	20.92%	24.54%

Source: Directorate of Economics and Statistics, Dept. of Planning and Development, Govt. of Bihar

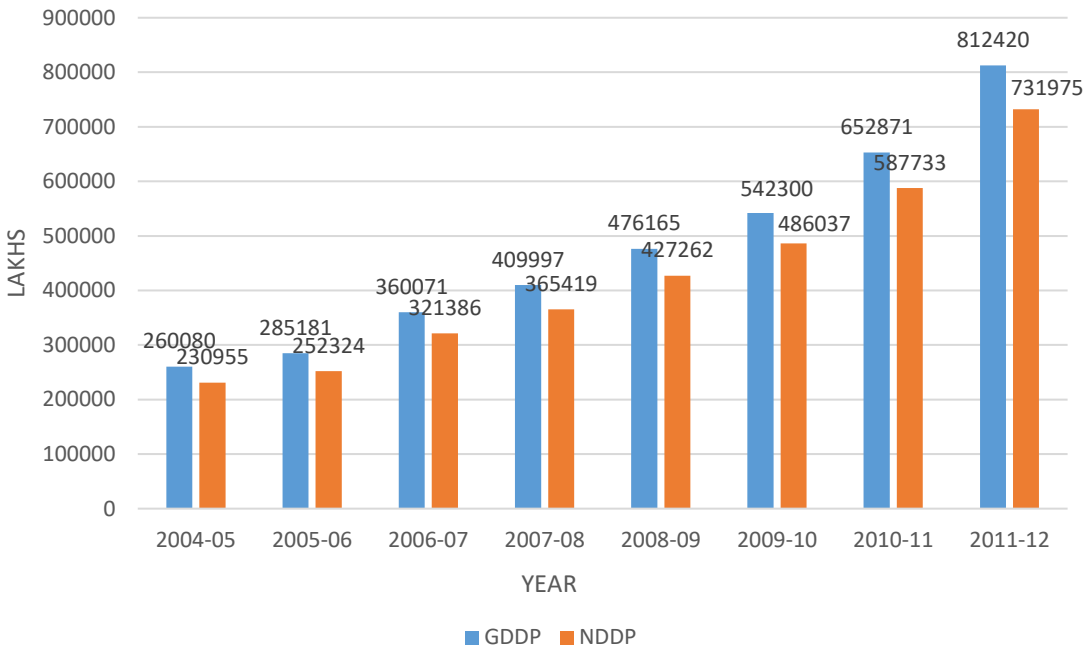


FIGURE 6-1 GROSS DISTRICT DOMESTIC PRODUCT (GDDP) AND NET DOMESTIC PRODUCT FOR GAYA JI DISTRICT AT CURRENT PRICE (IN LAKH)

Source: Directorate of Economics and Statistics, Dept. of Planning and Development, Govt. of Bihar

The primary, secondary, and tertiary sectors' contributions to the Net Domestic Product (NDP) for the fiscal years 2004–05 and 2009–10 are shown in the table below. According to analysis, the primary sector, which includes agricultural, dairy and allied industries, comes in second with a share of 60%, after the service sector, which represents tertiary activities. On the other hand, industrial activities are the least prevalent in the area and provide the least contribution. A comparison of the two time periods reveals an impressive 110% rise in just 5 years. The sector-by-sector net domestic product for the Gaya Ji district at the present pricing (in lakhs) is displayed in the following table.

TABLE 6-2 SECTOR-WISE NET DOMESTIC PRODUCT IN DIFFERENT SECTORS FOR GAYA JI DISTRICT AT CURRENT PRICE (IN LAKH)

Year	PRIMARY ACTIVITY		SECONDARY ACTIVITY		TERTIARY ACTIVITY		TOTAL ACTIVITY	
	NDP	% of Total	NDP	% of Total	NDP	% of Total	NDP	% Annual Increase
2004-05	67,323.38	29.15	26,929.35	11.66	1,36,702.26	59.19	**2,30,955**	
2009-10	1,15,336.58	23.73	74,072.04	15.24	2,96,628.38	61.03	**4,86,037**	**110.45%**

Source: Directorate of Economics and Statistics, Dept. of Planning and Development, Govt. of Bihar

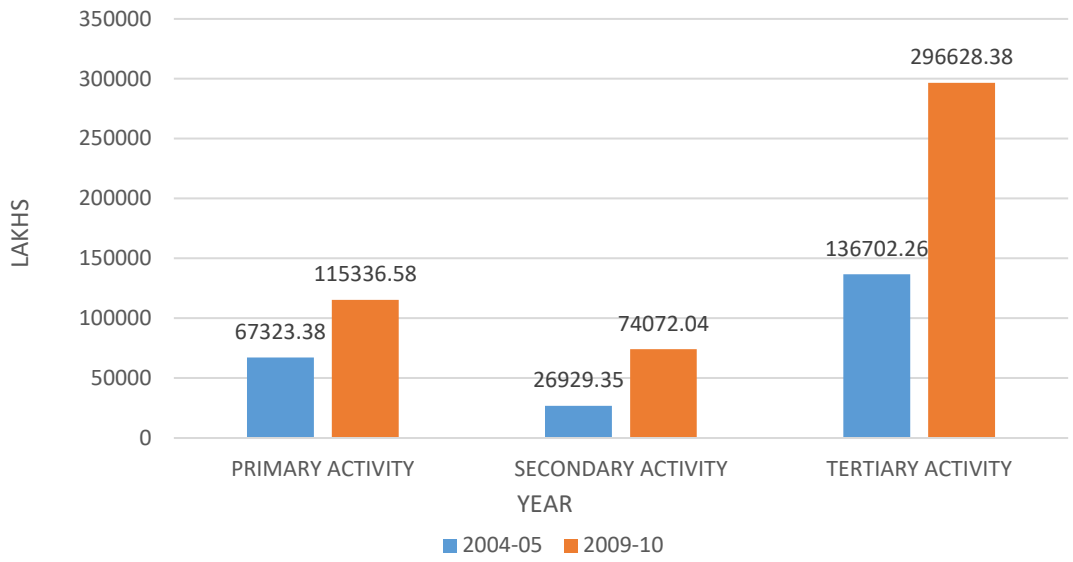


FIGURE 6-2 SECTOR-WISE NET DOMESTIC PRODUCT IN DIFFERENT SECTORS FOR GAYA JI DISTRICT AT CURRENT PRICE (IN LAKH)

Source: Directorate of Economics and Statistics, Dept. of Planning and Development, Govt. of Bihar

6.1.2 PRIMARY SECTOR

Agriculture serves as the backbone of the district's economy, with a significant portion of its residents depending on farming for their livelihoods. The fertile South Bihar alluvium plains along three major rivers in the region viz., Dhadhar, Phalgu and Morhar Plain provide an ideal setting for farming. Positioned amidst these nutrient-rich alluvial plains, the district is second-largest contributor to the economy of Bihar. Among the primary crops cultivated are rice and sugarcane, alongside other significant crops like maize, pulses, and barley, contributing significantly to the agricultural landscape of the region.

According to the records kept by the Department of Agriculture, Government of Bihar (NABARD, 2022-23), the districts forested area spans 77,836 hectares. The gross cropped land covers 2,12,900 hectares, while area not available for cultivation comprises 73,061 hectares within the district. The agricultural cycle traditionally starts in July and ends in June the following year, preceding the annual monsoon season. Consequently, the agricultural year is divided into four specific seasons: Bhadai, Aghani, Rabi, and Garma.

TABLE 6-3 GAYA JI DISTRICT LAND UTILIZATION PATTERN FOR THE YEAR 2018-19

Name of the District	Geographical Area	Area under Forest	Land not available for cultivation				Culturable Waste Land	Uncultivated land excluding fallow		Fallow Land		Total Uncultivable Land
			Barren & Unculturable land	Non-Agriculture Use								
				Land Area	Water Area			Permanent Pastures	Tree Crops	Current Fallow	Other Fallow	
					Perennial	Temporary						
Gaya Ji	493.8	77.8	27.5	63.5	3.8	6	3.2	2	3.9	124.8	11.2	323.8

Source: Bihar Economic Survey, 2020-21, Government of Bihar

TABLE 6-4 MAJOR CROP PRODUCTION IN GAYA JI DISTRICT

Year	Rice		Maize		Wheat		Barley		Gram		Tur(Arhar)		Khesari	
	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT
2018-19	94,118	1,42,546	723	2,568	66,839	1,85,887	615	760	4,176	4,999	1,447	2,907	189	142
2019-20	82,937	1,50,248	3,259	3,546	65,674	1,13,281	180	400	3,615	2,494	1,292	1,822	172	116
2020-21	84,101	2,22,678	262	1,092	66,582	1,84,099	191	220	4,062	3,924	1,366	1,847	167	194
2021-22	84,474	2,82,185	257	994	66,809	1,83,764	192	245	3,913	3,670	1,366	2,615	169	165

Year	Lentil (Masoor)		Sugarcane		Kulthi		Moong		Urad		Ragi		Rape & Mustard	
	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT
2018-19	6,216	6,210	149	10,186	1,106	1,022	2,723	1,636	310	270	106	114	894	1,443
2019-20	5,917	3,722	0	0	0	0	2,600	2,868	18	15	64	51	791	509
2020-21	6,005	4,282	0	0	942	869	1,807	752	27	22	96	90	845	748
2021-22	6,170	5,029	0	0	790	729	1,790	1,359	25	24	93	91	888	803

Source: Directorate of Economics and Statistics, Dept. of Planning and Development, Govt. of Bihar

The district's agricultural production in 2019–20 consists primarily of food crops, accounting for 91.26% of the total, with non-food crops representing just 8.74%. Pulses (8.06%) and wheat (36.31%) were the next most important food crops, with rice (45.86%) coming in first. Fruits (1.38%) and vegetables (3.79%) are the most notable. Among non-food crops, sugarcane accounts for 0.06% of the total land area. Sweet potatoes, rapeseed/mustard, and sugarcane were the main non-food crops (Gaya Ji DIPS). The district's horticultural sector comprises of a variety of fruits, vegetables, flowers, plantation crops, medicinal, and fragrant plants. The majority of the district's agricultural output is made up of fruits and vegetables. Small and marginal farmers favor horticulture since it is a labour-intensive yet very lucrative industry. For the same amount of land, a well-kept orchard yields a higher return than field crops.
In the Gaya Ji Planning Area, horticulture activity is notably prominent for fruit orchards. This area is renowned for cultivating a diverse range of horticultural crops, including bananas, guavas, and mangoes, among others. Various species of these crops thrive in the region, underscoring its ideal agricultural conditions and commitment to horticultural excellence.

TABLE 6-5 BLOCK-WISE MAJOR HORTICULTURE PRODUCTION IN BLOCKS

GAYA JI DISTRICT	Banana		Guava		Mango		Potato		Onion		Brinjal		Cauliflower	
	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20
Area	0.31	0.32	0.74	0.76	1.43	1.44	11.21	8.98	1.45	1.46	1.62	1.63	2.02	2.02
Production	13	13.01	5.7	5.71	14.73	14.74	11.21	10.66	28.1	26	1.62	1.63	2.02	2.02

Source: Bihar Economic Survey, 2020-21, Government of Bihar

Irrigation plays a vital role in the agricultural landscape of this district, drawing from both surface water and groundwater sources. Surface water, primarily channelled through the Phalgu River, is the main irrigation source. Several physical resources, including lift irrigation projects, open wells and dug irrigation systems, watershed harvesting projects, and minor irrigation projects, viz., ERM (Extension, Renovation and Modernization) of Uderasthan Barrage Scheme, Lower Morhar Major Irrigation Project and Tilaiya Dhadhar Diversion Scheme have been developed in the area to increase agricultural production.

TABLE 6-6 GROSS IRRIGATED AREAS (HECTARES) IN GAYA JI DISTRICT

Source of Irrigation	2017-18	2018-19
Canals	60.36	56.62
Tanks	0.13	0.15
Tube wells	126.1	118.38
Other Wells	0.00	0.00
Other Sources	2.04	1.79
Total	**188.63**	**176.94**

TABLE 6-7 FISHERIES PRODUCTION IN GAYA JI DISTRICT (2020-21)

S. No.	Year	Fish Production (1000 tonnes)	Fish Seeds (Lakhs)
1	2017-18	8.07	152.15
2	2018-19	8.10	155.00
3	2019-20	8.90	10

Source: District Fisheries Office, Gaya Ji, Bihar

Fisheries play a crucial role in enhancing food security and nutrition. To bolster this sector, it's imperative to develop aquaculture infrastructure, promote sustainable fishing practices, and integrate fisheries management into urban planning. This holistic approach ensures the sector's growth and resilience, benefiting both the local economy and community well-being.

The major mineral available in the Gaya Ji district is Stone (Boulders). The minor mineral sand available along the major river beds of Dhadhar, Phalgu, and Morhar is collected and transported to other parts of the district besides the adjoining districts and is useful in construction work. These resources are necessary for building and developing the district's infrastructure as well as those of the neighbouring areas. Hence, an important portion of the workforce in Gaya Ji is employed in the sand mining sector which includes labour-intensive tasks including extraction, transportation, and processing.

According to the District Survey Report of Sand Mining for the district of Gaya Ji, Bihar 2018, lists of newly proposed sand ghat locations are Gaya Ji Falgu, Gaya Ji Morhar, Gaya Ji Lilajan, Gaya Ji Mohana, Gaya Ji Budh, Gaya Ji Dhadhar, Gaya Ji Paimar and Gulsakari River. Sand that has been extracted from Gaya Ji is sent to nearby areas, assisting with local building initiatives and promoting trade. Many people in the region, from manual labourers to truck drivers, depend on the mining and transportation of sand for their livelihoods. The district also receives revenues and taxes from the sale and export of stone. There are large stone deposits in the district, mostly in the form of boulders. Known for their abundant mineral

concentration, these geological formations are a component of the Chotanagpur Plateau and its expansions. Apart from that, mica, sandstones, and quartzite are also available in the district in small proportions.

TABLE 6-8 MINING PRODUCTION OF GAYA JI DISTRICT

GAYA JI DISTRICT (2010-2011)		
Sl. No.	**Name of Mineral**	**Production in Tones**
	Major Mineral	
1	Stone (Boulders)	1,57,870.7

Source: Brief Industrial Profile of Gaya Ji District, Ministry of Micro, Small & Medium Enterprises (Dept. of Mines & Geology, Govt. of Bihar)

As per the National Bank for Agriculture and Rural Development (NABARD) Area Based Plan/ Schemes for Gaya Ji, Bihar, the block-wise Potential Linked Physical and Financial Estimate for the year 2022-23, mentions the sectoral estimate for Belagani, Bodhgaya, Manpur, Paraiya and Gaya Ji Sadar blocks as given below.

TABLE 6-9 BLOCKWISE ESTIMATED CROPPED AREA FOR MAJOR CROPS (2022-23)

Estimated Cropped Area for 2022-23						
Sl. No.	**Crop**	**Area in Hectare (Ha)**				
		Belaganj	**Bodhgaya**	**Manpur**	**Paraiya**	**Gaya Ji Sadar**
1	Paddy	7,380.00	7,995.00	7,380.00	4,920.00	9,840.00
2	Wheat	3,622.26	3,924.12	3,622.26	2,414.84	4,829.68
3	Maize, Jowar, Bajra	311.40	337.35	311.40	207.60	415.20
4	Pulse	686.76	743.99	686.76	457.84	915.68
5	Oil Seeds	142.80	154.07	142.80	95.20	190.40
6	Vegetables	672.00	728.00	672.00	448.00	896.00
7	Potato	486.00	526.50	486.00	324.00	648.00
Total		13,301.22	14,409.03	13,301.22	8,867.48	17,734.96

Source: Area-Based Plan/ Schemes for Gaya Ji, Bihar, NABARD, 2022-23

TABLE 6-10 BLOCKWISE ESTIMATED FORESTED AREA (2022-23)

Estimated Forested Area for 2022-23						
Sl. No.	**Timber Plant**	**Area in Hecter (Ha)**				
		Belaganj	**Bodhgaya**	**Manpur**	**Paraiya**	**Gaya Ji Sadar**
1	Eucalyptus/Bamboo	4.00	2.00	4.00	5.00	4.00
2	Subbaool	0.00	0.00	0.00	0.00	0.00
Total		4	2	4	5	4

Source: Area-Based Plan/ Schemes for Gaya Ji, Bihar, NABARD, 2022-23

In rural areas in Bihar, the resources related to cattle determine the household income. The establishment and steady operation of dairy cooperatives stabilizes and increases rural households' revenue from their animal resources. As recorded

in the District Industrial Potential Survey with District Development Plan Gaya Ji, 2021-22 the Magadh Dairy Project gathered 51,830 kg of milk every day from throughout the area in 2019–20. Given the district's considerable dairy potential, COMFED (a state PSU) also intends to establish a two-lakh-litre dairy facility in Gaya Ji. The number of dairy cooperative societies in the Gaya Ji district that are now involved in the Magadh Dairy Project is as follows:

TABLE 6-11 DAIRY COOPERATIVE SOCIETIES IN GAYA JI DISTRICT, 2019-20

Name of the Project	Organized Societies	Working Societies	Registered Societies
Magadh Dairy Project, Gaya Ji	2,287	2,035	333

Source: District Industrial Potential Survey with District Development Plan Gaya Ji, 2021-21

TABLE 6-12 BLOCKWISE ESTIMATED DAIRY UNITS (2022-23)

Dairy Estimate for 2022-23							
Sl. No.	**Dairy**	**Unit**	**Belaganj**	**Bodhgaya**	**Manpur**	**Paraiya**	**Gaya Ji Sadar**
1	Two crossbred cows (with shed)	Nos.	130.00	160.00	180.00	50.00	460.00
2	Graded 04 Murrah Buffalo (with shed)	Nos.	55.00	55.00	72.00	44.00	125.00
3	05 cow- Mini Dairy (With shed)	Nos.	65.00	50.00	80.00	16.00	200.00
4	10 cow- Mini Dairy (With shed)	Nos.	10.00	12.00	20.00	10.00	20.00
5	KCC Dairy	Nos.	1,500.00	1,800.00	1,500.00	1,500.00	1,800.00
Total			1,760	2,077	1,852	1,620	2,605

Source: Area-Based Plan/ Schemes for Gaya Ji, Bihar, NABARD, 2022-23

TABLE 6-13 BLOCKWISE ESTIMATED POULTRY UNITS (2022-23)

Poultry Estimate for 2022-23							
Sl. No.	**Poultry**	**Unit**	**Belaganj**	**Bodhgaya**	**Manpur**	**Paraiya**	**Gaya Ji Sadar**
1	Layer unit for 1000 Birds- with Deep Litter System	Nos.	40.00	40.00	20.00	15.00	30.00
2	Layer unit of 10000 birds with feed meal	Nos.	5.00	5.00	5.00	5.00	5.00
3	Unit Low input-SHG/JLG MODE-500 birds- Broiler	Nos.	20.00	20.00	20.00	15.00	20.00
4	Broiler unit of 5000 birds	Nos.	12.00	12.00	15.00	15.00	20.00
Total			77	77	60	50	75

Source: Area-Based Plan/ Schemes for Gaya Ji, Bihar, NABARD, 2022-23

TABLE 6-14 BLOCKWISE ESTIMATED FISHERY UNITS (2022-23)

Fishery Estimate for 2022-23							
Sl. No.	**Fishery**	**Unit**	**Belaganj**	**Bodhgaya**	**Manpur**	**Paraiya**	**Gaya Ji Sadar**
1	Pond Restoration	Ha.	0.00	5.00	2.00	2.00	2.00
2	Rearing Pond Construction	No.	0.00	1.00	0.00	1.00	0.00
3	Construction of new pond for fishing - 5 feet depth	Ha.	3.00	3.00	3.00	3.00	3.00
4	KCC Fisheries	No.	300.00	300.00	300.00	200.00	300.00
Total			303	309	305	206	305

Source: Area-Based Plan/ Schemes for Gaya Ji, Bihar, NABARD, 2022-23

The Gaya Ji Planning Area district's economy continues to be bolstered by agriculture and allied sectors. The main crops grown are rice, wheat, and maize, along with oilseeds, pulses, and other items. The Pradhan Mantri Jan Dhan Yojana (National Mission for Financial Inclusion) and the National Mission for Sustainable Agriculture (Central Government Scheme) have been implemented in the planning area to develop the agricultural sector.

The agricultural and related amenities are spread across the 162 revenue villages in the Gaya Ji Planning Area as shown below.

TABLE 6-15 VILLAGE-WISE AGRICULTURE AND ALLIED FACILITIES AVAILABLE IN THE GAYA JI PLANNING AREA (2020)

Sl. No.	Facility	Name of Block	Name of Village	Number of Villages
1	Government Seed Centre	Belaganj	Kachanpur Agthu, Antiya	2
		Manpur	Gandhar, Abgila, Bhadeja, Baijal Tetariya, Sohaipur	5
3	Community Rain Water Harvesting System	Belaganj	Kachanpur Agthu, Barhai Bigha, Gobraha	3
		Bodhgaya	Bagdaha, Antiya, Naudiha, Ilara, Larpur, Nawan, Kharanti	7
		Manpur	Gandhar, Sikahar, Lodipur, Nanhak Chak, Bara, Mirzapur, Lodipur, Rasalpur, Mast Alipur, Gangti, Sohaipur, Ganjas, Bhualpur, Berewa	14
4	Farmers Collective	Bodhgaya	Antiya, Kharanti	2
		Manpur	Sikahar, Kamalpur, Abgila, Bhadeji, Lodipur, Sohaipur, Usri, Panda Bigha	8
5	Food Grain Storage	Bodhgaya	Antiya,Kharanti	2
		Manpur	Sikahar, Kamalpur, Abgila , Bhadeji, Lodipur , Sohaipur, Usri , Panda Bigha	8
6		Bodhgaya	Antiya, Bagdaha, Barawan,	3

Sl. No.	Facility	Name of Block	Name of Village	Number of Villages
	Primary Processing Facility	Manpur	Sikahar, Abgila , Surheri , Bhadeja,	4
7	Custom Hiring Centre	Bodhgaya	Antiya	1
		Manpur	Abgila, Lakhanpur	2
8	In-Land Fishery/Coastal Fishery/Any Other	Belaganj	Tikuli	1
		Bodhgaya	Antiya, Jamari	2
		Manpur	Gandhar, Sikahar, Bhadeja, Sohaipur	4
9	Community Ponds	Belaganj	Tikuli,	1
		Bodhgaya	Antiya,	1
		Manpur	Gandhar, Sikahar, Abgila, Bandhuwa	4
10	Extension facilities for Aquaculture	Belaganj	Tikuli	1
		Bodhgaya	Antiya,	1
		Manpur	Gandhar, Sikahar, Abgila, Gangti	4
11	Milk Collection Centre /Milk routes / Chilling Centres	Bodhgaya	Antiya,	1
		Manpur	Abgila,Bhadeja ,	2
12	Poultry Development	Bodhgaya	Antiya,	1
		Manpur	Gandhar, Sikahar, Kamalpur, Abgila, Bhadeja, Berewa	6
13	Goatery Development	Belaganj	Kachanpur Agthu	1
		Bodhgaya	Antiya, Dirawan, Jamari,	3
		Manpur	Gandhar, Sikahar, Kamalpur, Abgila, Bhadeja	5
14	Veterinary Clinic or Hospital	Belaganj	Kachanpur Agthu, Gobraha,	2
		Bodhgaya	Antiya,	1
		Manpur	Sikahar, Abgila, Kukiasin	3
15	Bee Keeping	Manpur	Abgila	1
16	Sericulture (Silk Production)	Manpur	Abgila	1
17	Handloom	Belaganj	Lachhmipur, Tikuli	2
		Bodhgaya	Kharanti	1
		Manpur	Bhadeja, Hunrrahi	2
18	Cottage and Small Scale Units	Bodhgaya	Antiya	1
		Manpur	Baijal Tetariya,	1
19	Social Forestry	Belaganj	Lachhmipur, Tikuli, Shahmohammadpur,	3
		Manpur	Abgila	1
		Paraiya	Paranpur	1

Sl. No.	Facility	Name of Block	Name of Village	Number of Villages
20	Minor Forest Produce	Belaganj	Tikuli	1
		Bodhgaya	Antiya	1
		Manpur	Lodipur	1

Source: Sector Specific Report, Mission Antyodaya 2020

6.1.3 SECONDARY SECTOR

The economy of the Gaya Ji district is characterized by a combination of traditional agricultural practices, tourism, artisan crafts, and the extraction of natural resources where traditional crafts and small-scale enterprises play a crucial role in the Gaya Ji economy. The district is known for its bamboo products, handloom textiles, and stone carvings, which support local artists while simultaneously preserving the cultural past. The core industries of Gaya Ji's industrial sector include agro-based industries, textile and clothing manufacturing, and stone-cutting and polishing facilities. However, these sectors must modernize and contend with issues like poor infrastructure and restricted financing availability. Few of the prominent enterprises listed in District Industrial Potential Survey with District Development Plan, Gaya Ji 2021-22 are M/s Daya Engineering works Ltd, M/s Nilkanth Chawal Udyog, Ahiyapur, M/s Anant Pulses Pvt Ltd., M/s Maa Annapurna Food Products Pvt Ltd and M/s Maya Food & Drinks Pvt Ltd.

The Bihar Industrial Area Development Authority manages a 30-acre industrial zone in Gaya Ji, with all 30 acres developed. According to the MSME report on the Brief Industrial Profile of Gaya Ji District (2017-18), there are 7,572 registered industries with a combined investment of 12,595.79 Lakhs in micro and small-scale industries.

TABLE 6-16 EXISTING INDUSTRIAL AREA/CENTRE IN GAYA JI

Name of the Industrial Area/ Estate/ Growth Centre	Land Acquired (in acres)	Land developed (in acres)	Prevailing Rate Per Sq.m. (in Rs.)	No. of Plots	No. of the allotted Plots	No. of Vacant Plots	No. of Units in Production
Industrial Area, Gaya Ji	30	30	15.68	51	50	1	17

Source: Brief Industrial Profile of Gaya Ji District 2017-18, Ministry of Micro, Small & Medium Enterprises, Government of India

The following figure shows details of existing Micro & Small Enterprises and artisan units in the Gaya Ji district.

TABLE 6-17 DETAILS OF EXISTING MICRO & SMALL ENTERPRISES AND ARTISAN UNITS IN THE GAYA JI DISTRICT

Sl. No.	Category Name	No. of SSI unit set up	Investment (Rs. in lakh)	Employment (Nos.)
1	Agro based	983	1,152.97	3,055
2	Soda water	34	238.66	184
3	Cotton textile	900	5,670.22	4,851
4	Woolen, Silk & Artificial Thread based clothes.	33	63.32	152

Sl. No.	Category Name	No. of SSI unit set up	Investment (Rs. in lakh)	Employment (Nos.)
5	Jute & Jute based	0	0	0
6	Ready-made garments & embroidery	244	66.91	715
7	Wood/wooden based furniture	759	861.01	2,534
8	Paper & Paper products	138	157.21	511
9	Leather-based	592	122.41	842
10	Chemical/chemical-based	737	658.78	2,459
11	Rubber, Plastic & petro based	115	250.73	461
12	Mineral based	380	626.38	5,858
13	Metal-based (Steel Fab.)	388	373.95	1221
14	Engineering units	862	872.39	2,503
15	Electrical machinery and transport equipment	18	117.3	99
16	Repairing & servicing	1,021	566.78	1929
17	Others	368	796.77	1187
Total		7572	12,595.79	28,531

Source: Brief Industrial Profile of Gaya Ji District 2017-18, Ministry of Micro, Small & Medium Enterprises, Government of India

As per the National Bank for Agriculture and Rural Development (NABARD) Area Based Plan/ Schemes for Gaya Ji, Bihar, the block-wise Potential Linked Physical and Financial Estimate for the year 2022-23, mentions the sectoral estimate for Belaganj, Bodhgaya, Manpur, Paraiya and Gaya Ji Sadar blocks as given below.

TABLE 6-18 BLOCKWISE ESTIMATED ANCILLARY ACTIVITIES (2022-23)

Ancillary Activities Estimate for 2022-23						
Ancillary Activities		**Belaganj**	**Bodhgaya**	**Manpur**	**Paraiya**	**Gaya Ji Sadar**
Food and Agro Processing	Mini Flour mill	17.6	22	22	17.6	22
	Mini Flour + Paddy mill	84.48	96	96	84.48	96
	Pulse Mill	120	80	120	100	100
	Mini Pulse Mill	38.4	38.4	38.4	38.4	38.4
	Gram flour/sattu/Achar/Papad/Tilori	14.4	24	19.2	9.6	28.8
	Tomato Processing	20	40	40	0	40
	Milk Processing	232.32	232.32	232.32	232.32	232.32
	Total Food & Agro Processing	527.2	532.72	567.92	482.4	557.52
Others	Agri-clinic/Agri-business Unit	36	48	36	36	36

Ancillary Activities Estimate for 2022-23						
Ancillary Activities		Belaganj	Bodhgaya	Manpur	Paraiya	Gaya Ji Sadar
	Loan to Lamps/ PACS as MSC	16	16	0	0	0
	Loan to Farmer Producer Organization	400	400	400	400	400
	Total Others	452	464	436	436	436
	Total Ancillary	979.2	996.72	1,003.92	918.4	993.52

Source: Area-Based Plan/ Schemes for Gaya Ji, Bihar, NABARD, 2022-23

Various major industrial establishments have come up in Gaya Ji since 1981 and the industrial prowess of the district continues to grow with employment opportunities being generated by the broad varieties of industries.

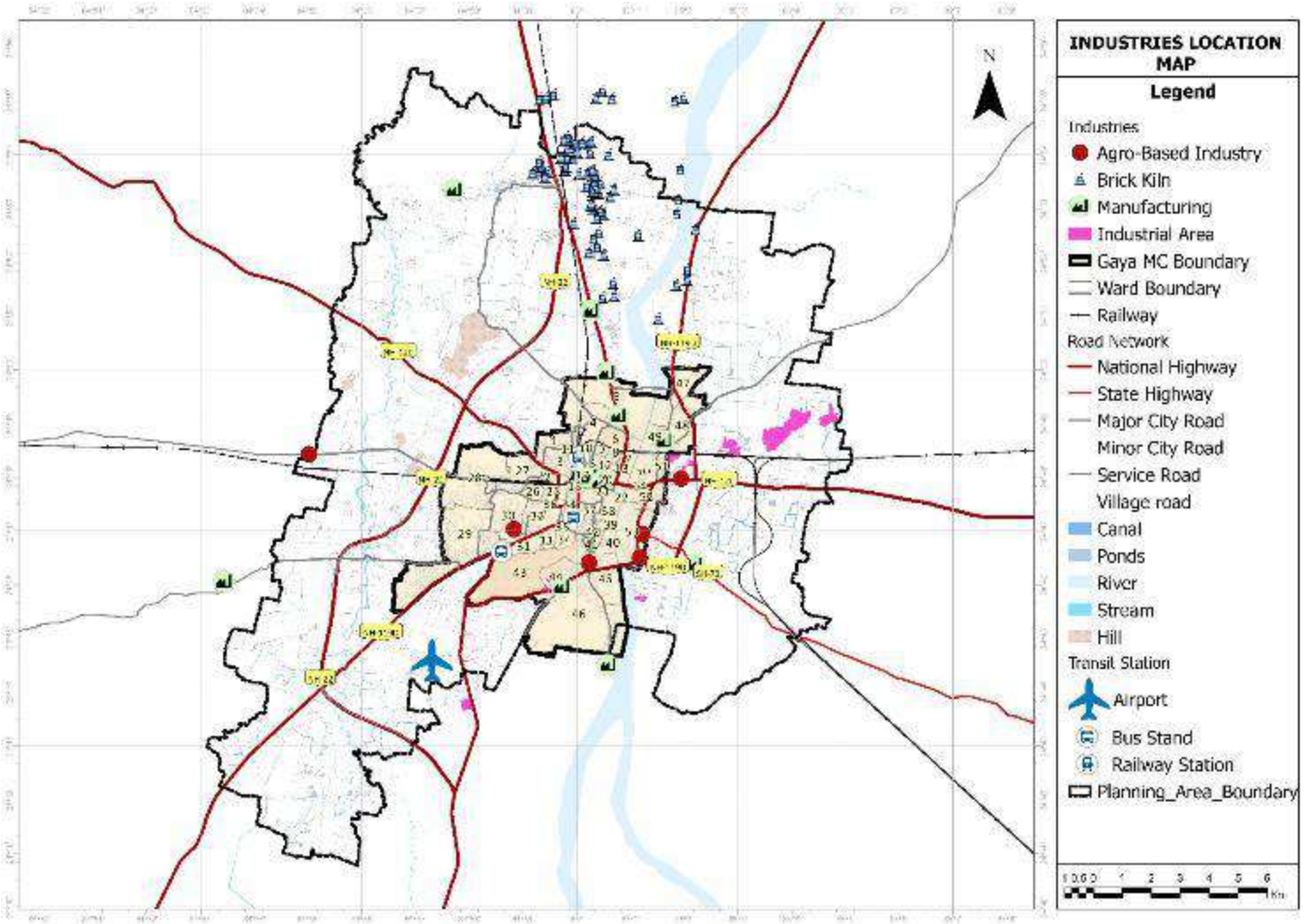
TABLE 6-19 INDUSTRIES IN GAYA JI

Year	Product name	Industry wise details
1981	Flour mill	M/S Shree Durga Roller Flour Mill
	Paint	M/S International Paints
1982	Flour mill	M/S Shree Durga Roller Flour Mill
1995	Packaging of food item and storage of food product and cotton	M/S Shri Khusi Enterprises
1996	Namkeen	M/S Mahalaxmi Udyog
1997	Dry paints and color	M/S Alfa Paints
1998	Soft coal submersible pump set	M/S Jai Mangla Fuels Pvt. Ltd
	Monoblock pump set	M/S N.T.P Industries
1999/2000	Cold storage and Ice-slab	M/S Triraj Cold Storage Pvt. Ltd (Closed)
2001/2006	Dal mill	M/S Anant Pulses Pvt. Ltd
2000/2008	Mill Board, copy, register and file, wooden furniture	M/S Sadhan Industries
2007	Rice mill	M/S Basanti Food Products

	Namkeen	M/S Star Industries
	Bleaching powder	M/S Madhu Chemical
2007/2010	Transformer Battery	M/S Amvo Infra Power
2008	Multiplex Hotel and Management	M/S Buddha Multiplex Hotel and Management
	Educational Institute	M/S Um Samaj Vikas Parshad, M/S Buddha Institute Of Technology
	Training and production center	M/S Buddha Socio Economic Development Trust
	Corrugated Box	M/S Rajiv Corrugated Box Industries
2010	Flour mill	M/S Kumar Industries
	Printing press	M/S Neutral Publishing House Ltd.
2012	Agarbatti	M/S Maa Gaya Jitri Traders
	Plastic Granules	M/S Shah Industries
2013	Plastic packing and wrapping Product	M/S H.K. Plastic
2104	P.V.C. granules	M/S Warsi Enterprises
2018	P.V.C. pipes	M/S Sagar Enterprises
2019	Paper cup plate	M/S Shristhi Enterprises
	Agricultural equipment and wooden furniture	M/S Buddha Agricultural Equipment's
2020	Bakery, bread and biscuits	M/S Qnomics Biz Solution LLP
2023	Plastic granules & household plastic goods	M/S H.K. Plastic
	Dal mill	M/S Anant Pulses Pvt. Ltd
	Bakery	M/S Mother Choice
	Paper plate	M/S Star Paper Plate

	Makhana	M/S RFP Groups
	Readymade garments	M/S All Weather Clothes
2024	Note book printing & stationary mfg.	M/S Manglam Paper &Cards
	Soya, bari, pasta, chowmin, noodles & sewai mfg.	M/S Bihari Soya Foods
	Bread, loaves, buns, rusk bread, cake, pastry, biscuits/cookies, makuti etc	M/S New Suraj Food Products

Source: District Industries Center, Gaya Ji



MAP 6-1 INDUSTRIES OF GAYA JI PLANNING AREA

Source: DIC, Gaya-2024, Map prepared by Stesalit System Ltd.

6.1.4 TERTIARY SECTOR

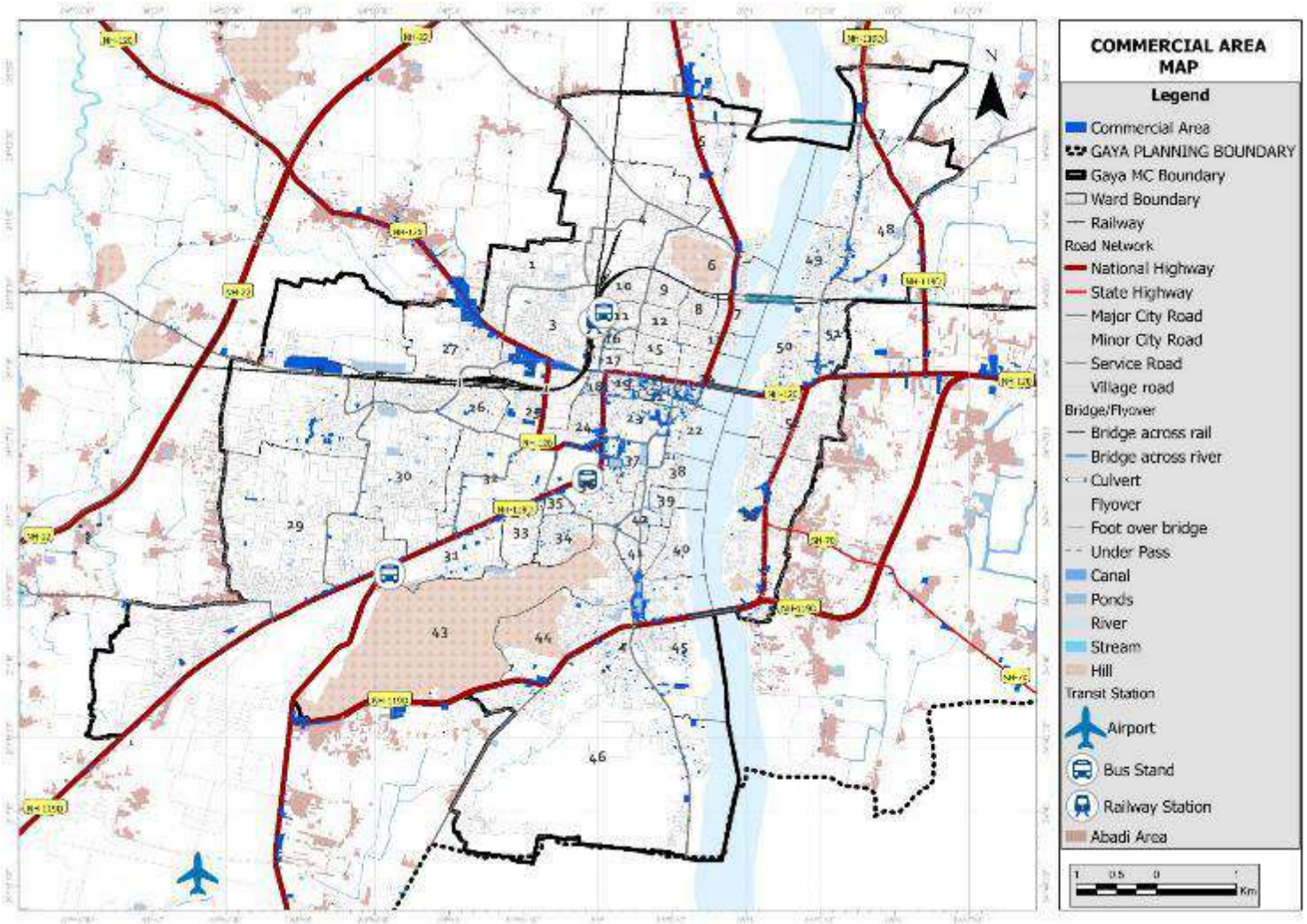
In Gaya Ji district, the tertiary or service sectors play a crucial role in the local economy, which is dynamic and diverse and makes a major contribution to the general economic growth of the region. This sector provides a wide range of services, including banking, tourism, retail, healthcare, education, and transportation. These services all function together to enhance the quality of living for the local residents of the area and stimulate economic growth.

The district's economy is significantly enhanced by the wide range of service-oriented industries and activities. Gaya Ji is a renowned pilgrimage destination that receives millions of visitors each year. Buddhists travel from all over the globe to visit Bodhgaya, a UNESCO globe Heritage site where Lord Buddha obtained enlightenment. Vishnupad Temple, popularly referred to as the "temple of Vishnu's feet", Singheshwar Temple and Ramnagar Temple which is situated along the Phalgu River draws a diverse spectrum of domestic tourists to the Gaya Ji Planning Area. This surge of tourists increases the need for services and stimulates the hospitality industry, which includes hotels, dining establishments, motels, and local transportation services. It also creates a significant number of employment and revenue. As per Statistics of Domestic and Foreign Tourist visit to the state of Bihar 2023, total domestic tourists visits to Gaya Ji is reported to be 10, 37,085 and foreign tourists visit is 96,328, this is because Gaya Ji serves as a link for road travellers to get to Bodhgaya.

Retail trade is a vital part of Gaya Ji's tertiary sector, catering to both locals and tourists. The region is linked to a wide range of marketplaces and retail establishments selling items from handicrafts to everyday essentials. Handloom textiles, bamboo goods, and stone carvings are among the traditional crafts made by local artists that are offered to visitors and local markets. The retail industry boosts small enterprises and creates a lot of job possibilities, which helps the local economy. The chief centers of trade in the district are located at Gaya Ji, Tekari, Sherghati and Bankey Bazar. The primary exports from Gaya Ji include vegetables, gur, oil seeds, hides, and stone chips. Key imports into the district include coal, cloth, kerosene oil, tea, cotton timber, tobacco, spices, dried and fresh fruits, paper and other consumer goods, supporting the district's diverse economic activities.

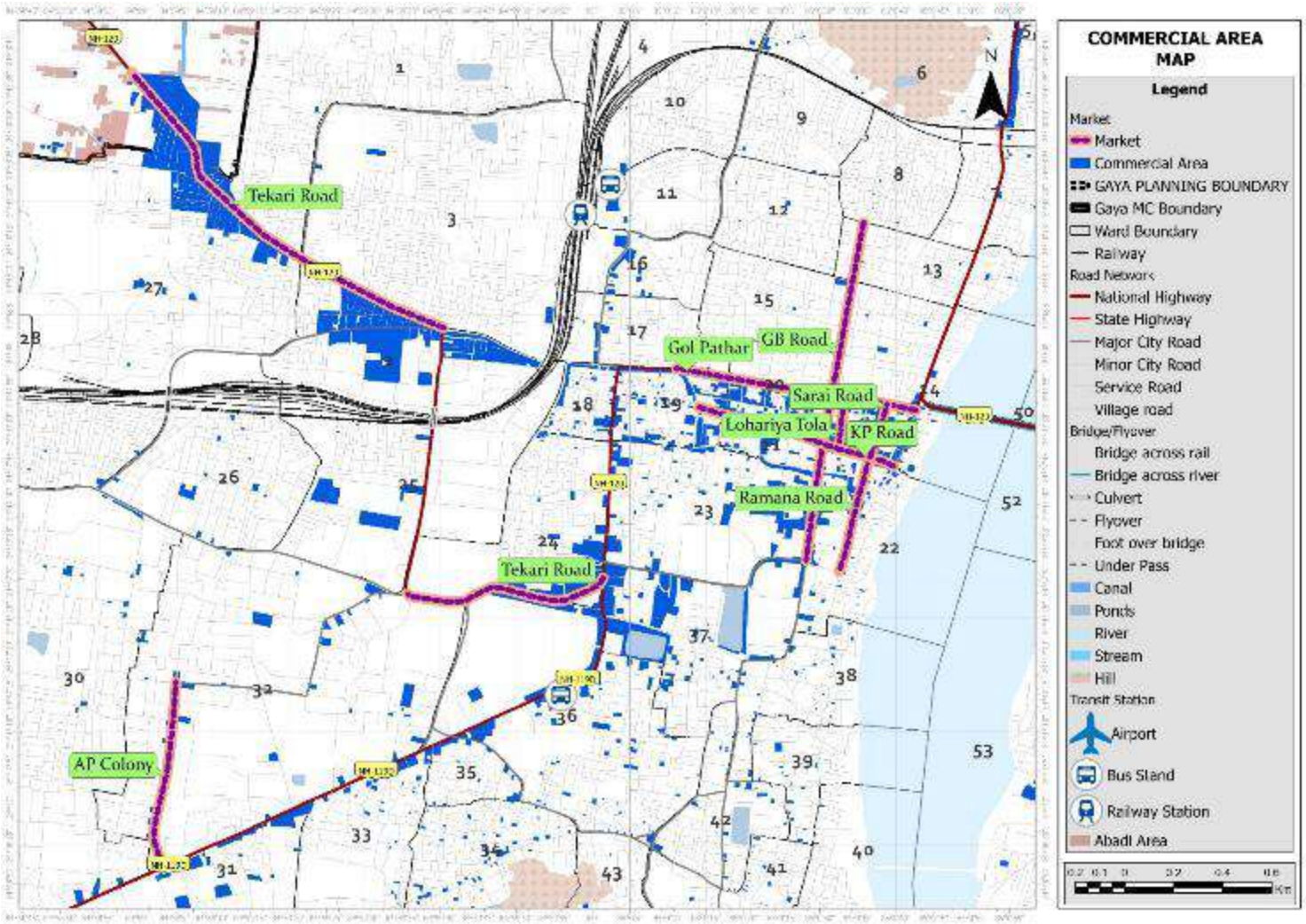
6.1.4.1 STREET VENDORS

7,103 street vendors have been identified in the urban streets in the Gaya Ji Planning Area, out of which, 7,098 of them have received ID cards and COV. The preparation for city street vending plan is under process, which shows that there is an effort to organize the largely unorganized street vending sector in Gaya Ji.



MAP 6-2 COMMERCIAL AREAS OF GAYA JI NAGAR NIGAM

Source: Landuse Survey, 2024



MAP 6-3 FAMOUS MARKETS OF GAYA

Source: Landuse Survey, 2024

6.2 OCCUPATION STRUCTURE

6.2.1 WORKING POPULATION

The active workforce plays a crucial role in driving a nation's economic growth and ensuring social stability. The progress of a municipality is largely dependent on the active participation of its labour force. Therefore, bolstering the workforce in urban areas is fundamental to achieving sustainable economic development. The following table illustrates the number of workers and non-workers in the Gaya Ji Planning Area.

TABLE 6-20 NUMBER OF WORKERS AND NON-WORKERS IN GAYA JI PLANNING AREA

Name	Total Population	Total Working Population	Total Non-working Population
Gaya Ji Municipal Corporation (Urban)	4,74,093	1,48,311	3,25,782
162 Villages (Rural)	3,19,366	1,09,948	2,09,418
Gaya Ji Planning Area (Total)	**7,93,459**	**2,58,259**	**5,35,200**

Source: Census of India, 2011

In the Gaya Ji Planning Area, while the total number of working individuals has increased, the proportion of the working population has increased from 28.79% (1,81,421 people) in 2001 to 32.55% (2,58,259 people) in 2011.

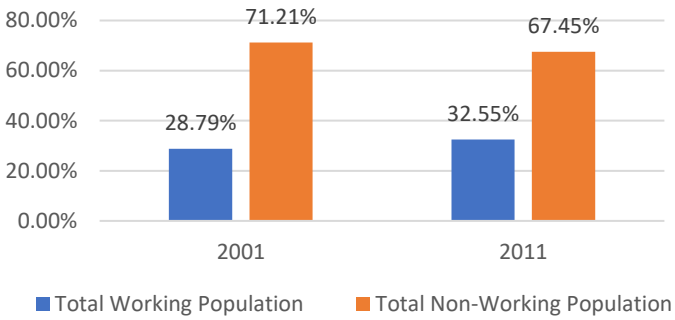


FIGURE 6-3 WORKERS AND NON-WORKERS IN GAYA JI PLANNING AREA

Source: Census of India, 2001& 2011

6.2.2 MAIN AND MARGINAL WORKERS

Among the total workers, 70.97% are main workers while 32.20% are marginal workers. Main workers are those who are engaged in any economically productive work for more than 183 days in a year and Marginal workers are the ones who are engaged in only economically productive work for less than 183 days in a year.

TABLE 6-21 WORKFORCE CLASSIFICATION, GAYA JI PLANNING AREA

Sl. No.	Occupation Category	Number of Workers	% of the Total Working Population
Main Workers		**39,197**	**70.97%**
1	Cultivators	19,166	7.42%
2	Agricultural Labors	33,332	12.91%
3	Household Industry Workers	12,520	4.85%

4	Others	1,10,134	42.64%
Marginal Workers		**83,107**	**32.20%**
1	Cultivators	7,062	2.73%
2	Agricultural Labors	26,702	10.34%
3	Household Industry Workers	7,115	2.80%
4	Others	42,228	16.35%

Source: Census of India, 2011

The occupation structure as census is divided into four categories — Cultivators, Agricultural labourers, Household Industry Workers, and others.

- **Cultivators:** Cultivators are classified as the persons engaged in the cultivation of land owned or held by the Government or held from private persons or institutions for payment in money, kind or share. Cultivation includes effective supervision or direction in cultivation. A person who has given out her/his land to another person or persons or institution for cultivation for money, kind or share of the crop and who does not even supervise or directly cultivate on land, is not treated as a cultivator.

- **Agricultural Labourers:** A person who works on another person's land for wages in money or kind or share is regarded as an agricultural labourer. She or he has no risk in the cultivation but merely works on another person's land for wages. An agricultural labourer has no right of lease or contract on land on which she/he works.

- **Household Industry Workers:** Household Industry is defined as an industry conducted by one or more members of the household at home or within the village in rural areas and only within the precincts of the house where the household lives in urban areas. The larger proportion of workers in the household industry consists of members of the household. The industry is not run on the scale of a registered factory where more than 10 persons with power or 20 persons without power are in use as it would qualify or has to be registered under the Indian Factories Act. The main criterion of a Household industry even in urban areas is the participation of one or more members of a household. Even if the industry is not located at home in rural areas there is a greater possibility of the members of the household participating even if it is located anywhere within the village limits. In the urban areas, where organized industry takes greater prominence; the Household Industry should be confined to the precincts of the house where the participants live.

- **Other Workers:** Workers other than cultivators, agricultural laborer's or workers in the Household Industry, as defined above are termed as Other Workers. Examples of such types of workers are government servants, municipal employees, teachers, factory workers, plantation workers, those engaged in trade, commerce, business, transport, banking, mining, construction, political or social work, priests, entertainment artists, etc.

6.2.3 WORKFORCE PARTICIPATION RATE (WPR)

In comparison between 2001 and 2011 as per the Census of India, it is evident that the working population has increased significantly in Gaya Ji Planning Area.

TABLE 6-22 WORKFORCE PARTICIPATION RATE CHANGE FROM 2001 TO 2011

Area	2001			2011		
	Total Population	Working Population	WPR (%)	Total Population	Working Population	WPR (%)
Gaya Ji Planning Area	6,30,120	1,81,421	28.80%	7,93,459	2,58,259	32.55%
Male	3,31,540	1,41,131	42.57%	4,14,946	1,89,307	45.62%
Female	2,98,580	40,290	13.50%	3,78,513	68,952	18.22%

Source: Census of India, 2001 and 2011

6.2.4 GENDER-WISE DISTRIBUTION OF WORKFORCE

According to the Census of India 2011, the Gaya Ji Planning Area consists of 2,58,259 individuals engaged in the workforce, while the remaining are categorized as non-workers. Among the total working population, 73.30% are male, with only 26.70% being female workers. The lower participation rate of women in the workforce can be attributed to various factors including educational barriers, gender-related policies, societal norms, and the nature of employment opportunities available. Addressing these challenges necessitates the development of gender-responsive policies aimed at facilitating improved access to employment opportunities for women, fostering entrepreneurship, and promoting economic growth. The overarching goal is not only to increase female labour force participation but also to create avenues for dignified employment that will contribute to the overall empowerment of women in the economy. The following figure shows the gender-wise distribution of total workers in the Gaya Ji Planning Area.

A little over one-fourth of the total population in the Gaya Ji Planning Area are working, with the rest classified as non-workers. The significant gender disparity in workforce participation is notable.

TABLE 6-23 GENDER-WISE DISTRIBUTION OF TOTAL WORKERS IN GAYA JI PLANNING AREA

Name	Total Worker	Male Workers	% of Total	Female Workers	% of Total
Gaya Ji Municipal Corporation (Urban)	1,48,311	1,13,966	76.84%	34,345	23.16%
162 Villages (Rural)	1,09,948	75,341	73.30%	34,607	31.48%
Gaya Ji Planning Area (Total)	**2,58,259**	**1,89,307**	**73.30%**	**68,952**	**26.70%**

Source: Census of India, 2011

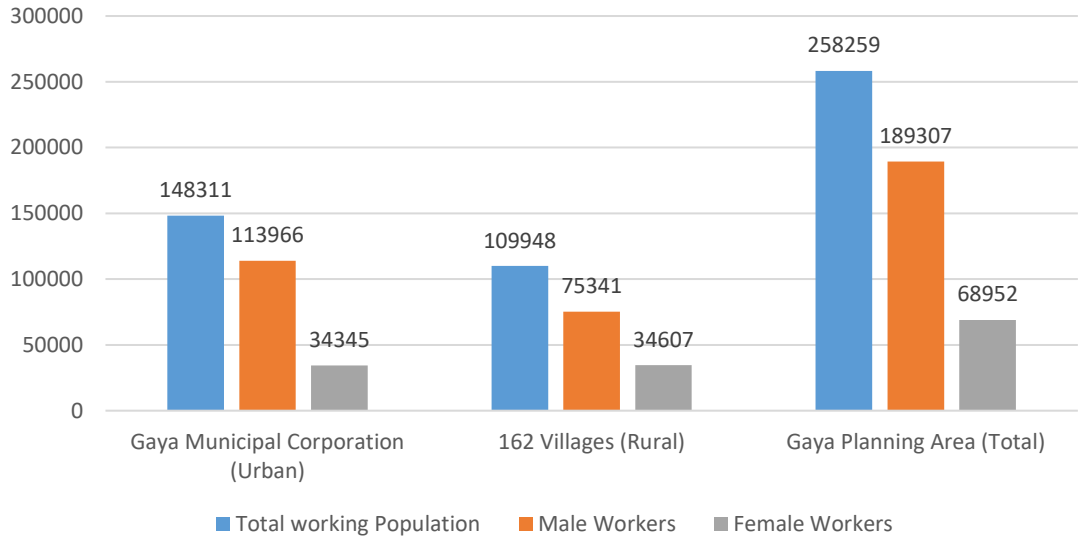


FIGURE 6-4 GENDER-WISE WORKFORCE IN THE GAYA JI PLANNING AREA

Source: Census of India, 2011

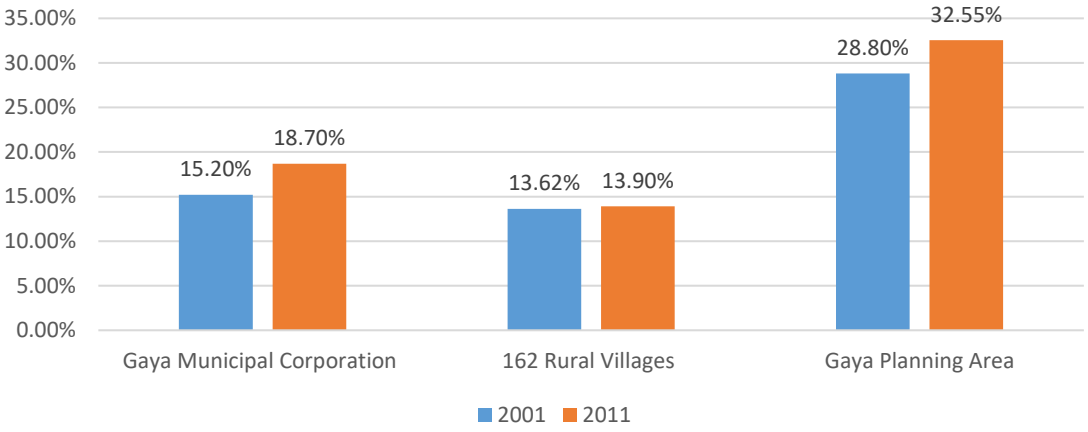


FIGURE 6-5 CHANGE IN WORKERS FROM 2001 TO 2011 (GAYA JI PLANNING AREA)

Source: Census of India, 2011 and 2001

Women play a crucial and productive role in the Indian economy; however, their employment status remains precarious due to significantly lower participation in various economic activities compared to men. Critical factors distinguishing women from men include inequitable work burdens and unequal access to and control over productive resources such as land, credit, technology, education, and skills, as well as an unjust distribution of consumption resources within households. The foundations of women's economic empowerment lie in access to economic and other productive assets and the expansion of employment opportunities. The data indicates that female workforce participation in the rural area of the Gaya Ji Planning Area is lower than in the Gaya Ji Municipal Corporation. The lower rate of female participation in the rural area reflects fewer opportunities for women in agriculture and allied sectors. Conversely, in urban areas, female unskilled and skilled laborers are actively involved in skilled or service sectors. Despite an overall increase in the workforce in the Gaya Ji Planning Area,

the numbers of workers in rural areas remained the same while there has been a 3% increase in the urban workforce, particularly in Gaya Ji Municipal Corporation.

6.2.5 CHANGE IN OCCUPATIONAL STRUCTURE

TABLE 6-24 CHANGE IN OCCUPATIONAL STRUCTURE FROM 2001 TO 2011 AS PER CENSUS

Sl. No.	Occupation Category	2001		2011	
		Number of Workers	% of the Total Working Population	Number of Workers	% of the Total Working Population
Main Workers		**36,347**	**83.42%**	**39,197**	**70.97%**
1	Cultivators	22,982	12.67%	19,166	7.42%
2	Agricultural Labours	35,223	19.42%	33,332	12.91%
3	Household Industry Workers	9,486	5.23%	12,520	4.85%
4	Others	84,309	46.47%	1,10,134	42.64%
Marginal Workers		**29,421**	**16.22%**	**83,107**	**32.20%**
1	Cultivators	3,628	1.99%	7,062	2.73%
2	Agricultural Labours	10,595	5.84%	26,702	10.34%
3	Household Industry Workers	3,909	2.15%	7,115	2.80%
4	Others	11,289	6.22%	42,228	16.35%

Source: Census of India, 2001 and 2011

The shift in occupational structure indicates a general increase, where, there is a notable increase in the number of marginal workers and a small increase in the number of main workers between 2001 and 2011. The percentage of primary main workers in 2011 was less than those in 2001 in the categories of cultivators, agricultural labourers, and home industry workers. We can also observe that there was a rise in the percentage of marginal workers in 2011.

OCCUPATION

The vast range of occupations represented by the studied population provides insights into employment structures, professional sectors, and skill distributions. The approach seeks to understand employment trends, income inequality, and economic resilience in the community by examining occupational patterns. This research not only gives significant insights into individuals' lives but also helps to build focused initiatives for workforce development and economic empowerment.

EMPLOYMENT STATUS

The work participation rate is almost identical in both urban and rural areas, with roughly **one-fourth of the population engaged in economic activity**.

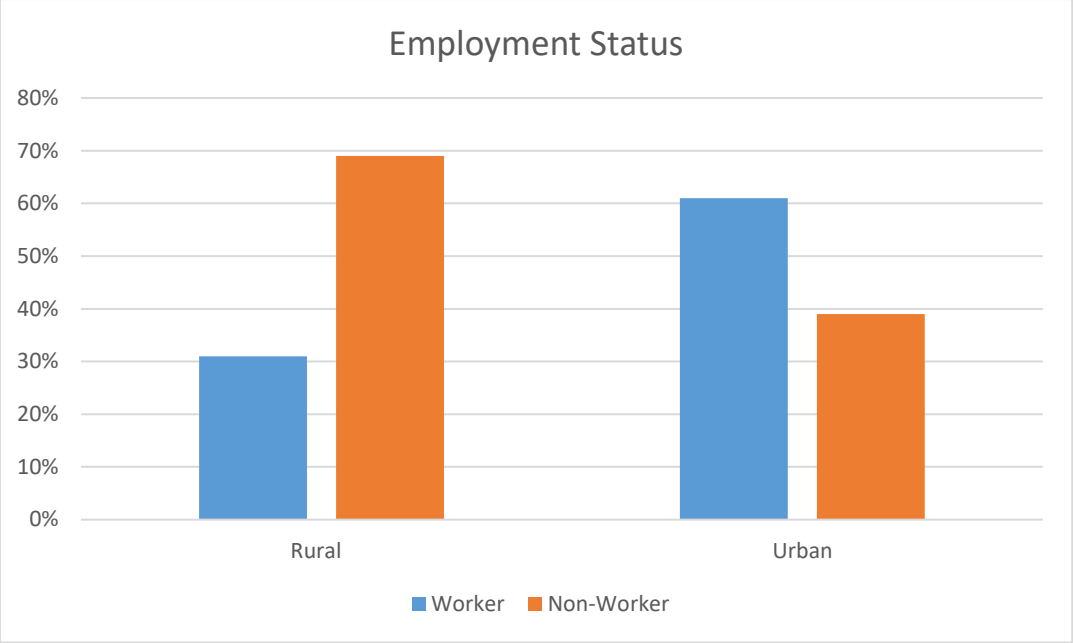


FIGURE 6-6 EMPLOYMENT STATUS OF THE SURVEYED POPULATION IN GAYAJI PLANNING AREAS

SOURCE: SOCIO-ECONOMIC SURVEY,2023, STESALIT SYSTEMS LIMITED

6.3 KEY OBSERVATIONS

LOW WORK PARTICIPATION RATE

Only about 26% of the population is classified as working. This indicates:

- A high dependency ratio.
- A large proportion of children, the elderly, students, homemakers, or unemployed persons.
- Possible underemployment or informal employment not fully captured.

This is significant, especially when compared with the earlier data showing a strong working-age population (18–60 years).

Planning Implications for Gaya Ji Planning Area

A. Employment-Oriented Land Use Planning
B. Skill Development and Workforce Activation
C. Strengthening Rural Economic Base
D. Infrastructure and Economic Corridors

If economic infrastructure expands in alignment with demographic strength, the planning area can convert its population base into a productive economic engine rather than a dependent burden.

WORK TYPE

In the urban areas, employment within the surveyed households predominantly falls under the tertiary sector, with significant variation across sub-sectors.

In the rural areas, employment within the surveyed households predominantly falls under the tertiary sector, with significant variation across sub-sectors.

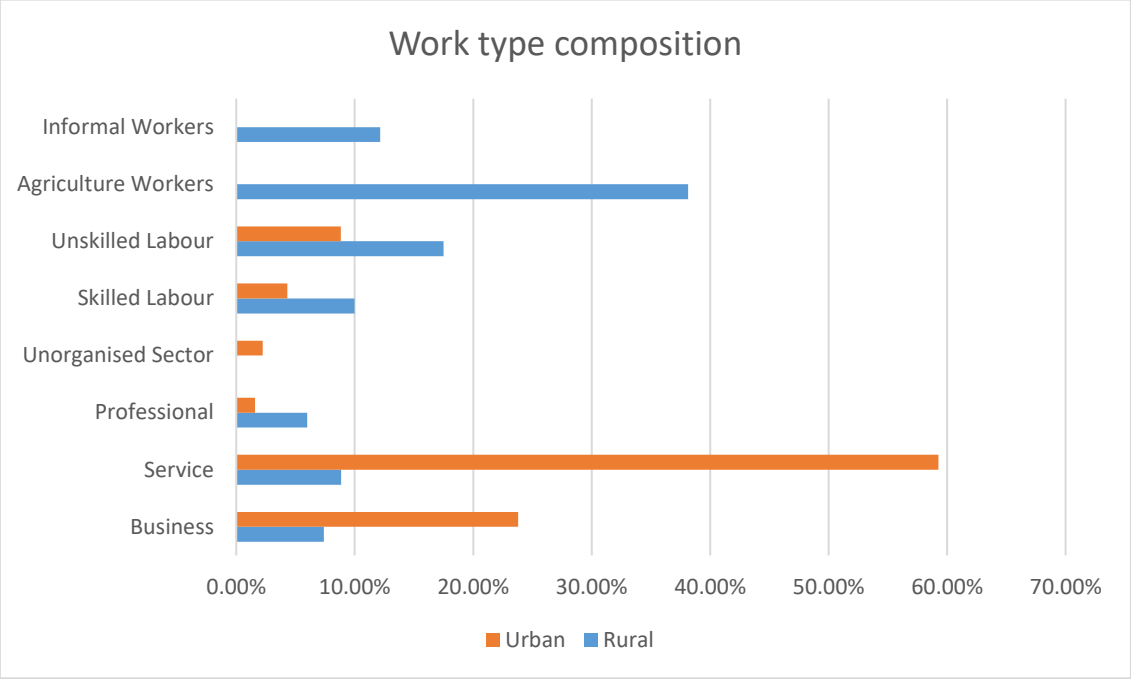


FIGURE 6-7 EMPLOYMENT STATUS OF THE SURVEYED POPULATION IN GAYA JI PLANNING AREAS

Source: Socio-Economic Survey,2023, Stesalit Systems Limited

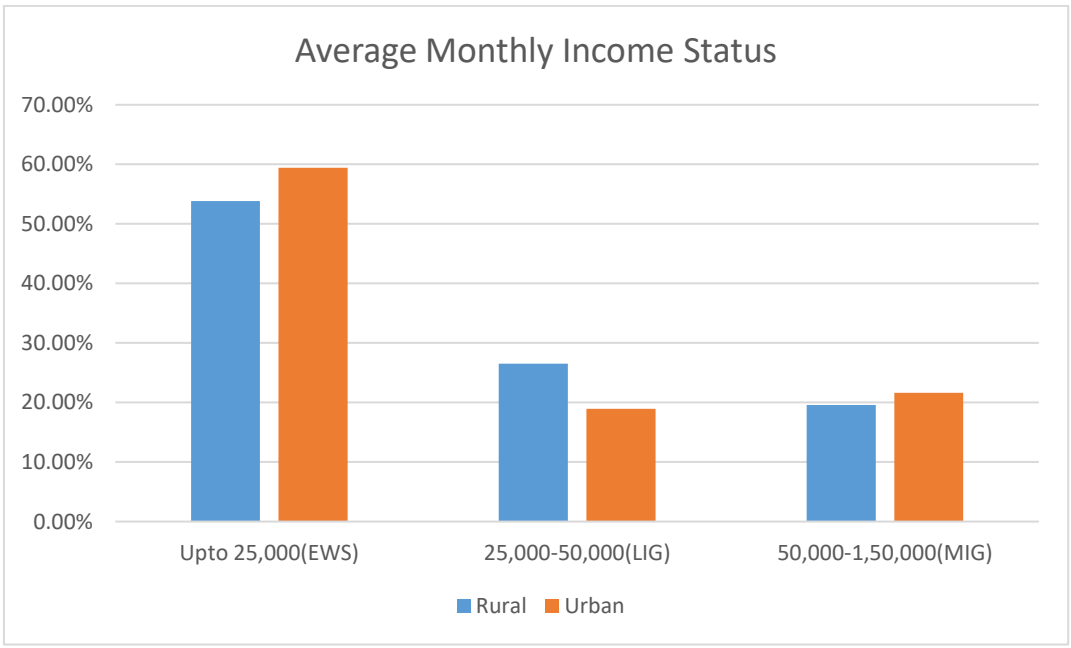


FIGURE 6-8 AVERAGE MONTHLY INCOME OF THE SURVEYED HOUSEHOLDS IN GAYA JI PLANNING AREAS

Source: Socio-Economic Survey,2023, Stesalit Systems Limited

Planning Implications for Gaya Ji Planning Area

The income distribution of the Gaya Ji Planning Area reflects a predominantly low-income economic base with a relatively small high-income segment.

Future urban planning should therefore focus on:

- Affordable and inclusive development
- Employment generation and skill enhancement
- Strengthening rural economic productivity
- Expanding the middle-income base

If income growth strategies are integrated with land use and infrastructure planning, the area can transition toward a more economically stable and resilient urban–rural system.

6.4 WORKFORCE PROJECTION

Workforce projection is crucial in urban planning as it helps estimate future employment demand, guides infrastructure development, and informs policy decisions. Understanding workforce trends allows planners to allocate land for industrial, commercial, and service sectors, ensuring balanced economic growth. It aids in designing efficient transportation networks, optimizing housing and public services, and forecasting migration patterns. Workforce projections also support labor market planning, skill development programs, and sustainable urban expansion by aligning job opportunities with population growth.

To project the workforce using Primary Census Abstract (PCA) data, first, the Workforce Participation Rate (WPR) is calculated as Total Workers / Total Population × 100, disaggregating by marginal and main worker categories. Next, future population is projected using the suitable method. Then the future workforce is estimated by multiplying the projected population with the Workforce Participation Rate.

TABLE 6-25 WORKFORCE PROJECTION OF GAYA JI PLANNING AREA

Year	Total Worker	Main Worker	Marginal Worker
2011	2,56,957	173932	83,025
2025	273404	222786	50618
2030	302733	246685	56048
2035	334633	272679	61954
2040	369423	301028	68395
2047	407461	332024	75437

Source: Census 2011 and Computed Value by Stesalit System LTD.

6.4 ISSUES & POTENTIALS

TABLE 6-26 SWOT OF ECONOMY IN GAYA JI PLANNING AREA

Strength	Weakness	Opportunity	Threat
INDUSTRY • There are around 10,000 Power loom unit in Manpur, which employed around 35,000 to 40,000 workers • NH 22 serves as a vital freight and logistics corridor for the Gaya Ji Industrial Area, linking it to major cities like Patna in north and NH 19 in south connecting Varanasi, and Kolkata, thereby exhibiting potential for future industrial growth. **BUSINESS** • Gaya Ji export Sand, vegetables, Jaggery, Oil seeds, Hides and Stone chips contributes in district's economy • Export Local sweet "Tilkut and Lai" Domestic and international • Gaya Ji is famous for its retail trade market. Different streets are famous for its specific items they sell **HIGH PRODUCTION OF RICE AND WHEAT** • Gaya Ji and its surrounding areas produce rice and wheat in high quantities, making agriculture the primary economic driver and the main livelihood source for a significant section of the population.	**LOW FEMALE WORKFORCE** Female workforce participation remains low at 26.70%, highlighting gender disparity in employment.	**AGRO-BASED INDUSTRIES** • Expansion of agro-based industries can boost employment and the economy. Potential Agro-based industries are: • Bread: Made from wheat • Noodles: Made from wheat • Pasta: Made from wheat • Biscuits: Made from wheat • Cakes: Made from wheat • Puffed-rice snacks: Made from rice • Rice flour: Used to make cakes, puddings, and baked goods • Rice starch: Used in many products *(Rice and Wheat is the main produce)*	**WORKFORCE** Percentage of main worker has decreased from 2001 to 2011, while marginal workers has shown rise

6.5 RECOMMENDATION

6.5.1 AGRO-BASED & FOOD PROCESSING INDUSTRIES

The economic strategy for Gaya Ji emphasizes strengthening its agrarian economy through the development of agro-based and food processing industries. Given the significant production of crops such as rice, wheat, pulses, potato, onion, and cauliflower, the establishment of primary processing units including rice mills, flour mills, pulse processing units, and mustard oil extraction facilities will promote local value addition and reduce post-harvest losses. In addition, secondary processing and value-added industries such as fruit and vegetable processing, pickle and ready-to-eat food production, and dehydration units are proposed to diversify agricultural outputs and enhance market potential. The agro-processing zone will be supported by common infrastructure including internal roads, power supply, water, and waste management systems to ensure efficient operations. This approach aligns with URDPFI guidelines and national initiatives promoting agro-industries, while also creating local employment opportunities and improving farmers' income through integrated supply chains.

6.5.2 STORAGE & LOGISTICS-BASED INDUSTRIES

The development of storage and logistics-based industries is proposed to strengthen the agricultural supply chain and support the seasonal nature of agricultural production in Gaya Ji. Establishing cold storage facilities, controlled atmosphere storage, warehouses, and godowns will help reduce post-harvest losses, maintain product quality, and stabilize market prices for farmers. These facilities are planned near major transport corridors and mandi areas to improve connectivity and ensure efficient movement of agricultural produce. The initiative aligns with national programs such as the Agriculture Infrastructure Fund (AIF) and PMKSY Integrated Cold Chain scheme, promoting modern, energy-efficient storage solutions and enhancing overall agri-marketing systems.

6.5.3 AGRO-INPUT & SUPPORT INDUSTRIES

The development of agro-input and support industries is proposed to enhance agricultural productivity and strengthen the local agricultural ecosystem in Gaya Ji. Facilities such as seed processing and packaging units, bio-fertilizer and organic manure production units, and farm or irrigation equipment repair and assembly centers will help reduce dependency on external markets while supporting farmers with timely access to essential inputs and services. These industries will promote sustainable farming practices, improve efficiency in agricultural operations, and generate local employment opportunities. The proposal aligns with the National Mission on Sustainable Agriculture (NMSA) and follows URDPFI industrial zoning norms to ensure planned and environmentally responsible development.

6.5.4 LIVESTOCK-BASED INDUSTRIES

The development of livestock-based industries is proposed to leverage the strong presence of dairy and animal husbandry activities in the surrounding rural areas of Gaya Ji. Establishment of dairy processing plants for products such as milk, paneer, and ghee, along with poultry processing units and feed and fodder manufacturing facilities, will support value addition within the livestock sector. These industries will

enhance rural income, create local employment opportunities, and strengthen the agricultural economy through integrated supply chains. The initiative aligns with programmes such as the National Dairy Development Programme (NDDB) and will follow environmental clearance and pollution control norms as per CPCB guidelines to ensure sustainable and responsible development.

6.5.5 BIO-ENERGY & WASTE-BASED INDUSTRIES

The promotion of bio-energy and waste-based industries is proposed to utilize agricultural residues such as paddy straw, wheat waste, and rice husk, transforming agricultural by-products into valuable resources. Establishment of biogas plants, agri-waste composting units, and rice husk-based product industries will support renewable energy generation, reduce waste, and encourage sustainable resource management. This approach promotes a circular economy by converting agricultural waste into energy and organic inputs, thereby reducing environmental impact while creating additional income opportunities and local employment. The initiative aligns with the National Bio-Energy Mission and URDPFI sustainability principles, ensuring environmentally responsible and resource-efficient development.

6.5.6 AGRO-BASED SEZ / CLUSTERS

The development of Agro-Based Special Economic Zones (SEZs) and Agro-Processing Clusters (APCs) is proposed to leverage Gaya Ji's strong agricultural resource base and promote integrated agro-industrial growth. The strategy includes establishing an agro-processing cluster, agro-based SEZ, and a Mega Food Park with shared infrastructure and modern facilities to support efficient food processing and value addition. Key components will include basic enabling infrastructure such as internal roads, power supply, water systems, and effluent treatment plants, along with core shared facilities like specialized cold storage, IQF units, testing laboratories, and sorting and grading lines. The cluster-based approach will allow multiple food processing units to operate within a plug-and-play environment, reducing investment costs for small and medium entrepreneurs while improving efficiency. Inspired by successful models such as the Srini Food Park in Chittoor, Andhra Pradesh, this approach aims to reduce post-harvest losses, create direct market linkages for farmers, generate employment, and strengthen the rural economy. The proposal aligns with national initiatives such as PMKSY and the SEZ Act, 2005, supporting sustainable agro-industrial development.

6.5.7 AGROTOURISM

Agrotourism is proposed as a specialized development zone located outside the urban core to promote rural-based economic activities while preserving the agricultural character of the region. The agrotourism zone aims to integrate farming practices with tourism experiences, offering activities such as farm visits, "pick-your-own" farmer markets, plantation activities, and immersive rural experiences that connect visitors with local agricultural traditions. Tourist accommodation in the form of traditional buildings, huts, cottages, or eco-friendly structures will be encouraged to reflect local architectural identity and support rural livelihoods. Low-rise residential development up to a height of 9 meters is permissible to maintain the rural landscape and low-density character of the area, along with supporting infrastructure such as EV charging stations to promote sustainable mobility. The proposal draws inspiration from successful models such as

Mahabaleshwar's agritourism stays, where farming has evolved into experiential tourism, and aligns with national initiatives like the National Strategy for Promotion of Rural Homestays (2022) under the Aatmanirbhar Bharat vision, encouraging diversification of farmer income and rural economic development.

6.5.8 LIGHT MANUFACTURING & NON-POLLUTING INDUSTRIES

The development of light manufacturing and non-polluting industries is proposed to diversify the local economy while ensuring environmentally sustainable growth. With the availability of a local workforce and improving regional connectivity, the planning area has strong potential for small-scale industries such as light engineering units, electrical goods manufacturing, assembly units, packaging industries, plastic goods production, and repair workshops. These industries will generate employment opportunities and support economic resilience without causing significant environmental impacts. Development will follow pollution control norms, include appropriate buffers, and align with URDPFI guidelines promoting non-polluting industries in peri-urban areas, along with applicable state industrial policies and MSME guidelines.

6.5.9 CONSTRUCTION MATERIAL & BUILDING COMPONENT UNITS

The development of construction material and building component units is proposed to support the growing demand arising from urbanization and infrastructure development in the region. The presence of an existing cement factory within the planning area provides a significant advantage through the availability of fly ash, encouraging the establishment of sustainable building material industries. Proposed activities include brick and block manufacturing, fly-ash brick units, precast construction components, tiles production, and stone cutting units, subject to necessary environmental clearances. The development will align with URDPFI industrial zoning norms and the National Fly Ash Utilization Policy, ensuring resource efficiency, environmental safeguards, and promotion of eco-friendly construction practices.

6.5.10 TRADE, WHOLESALE & LOGISTICS HUB

The development of a trade, wholesale, and logistics hub is proposed to capitalize on the planning area's strategic location along major transport corridors, enabling efficient movement of goods and strengthening regional supply chains. The proposal includes the establishment of wholesale markets, transport Nagar, truck terminals, logistics parks, and freight handling facilities integrated with road and rail networks to improve connectivity and reduce transportation inefficiencies. This hub will support local trade, agricultural marketing, and industrial distribution while generating employment opportunities and enhancing economic competitiveness. The initiative aligns with URDPFI guidelines that recommend locating logistics facilities near highways and is supported by national initiatives such as PM Gati Shakti and relevant state transport policies.

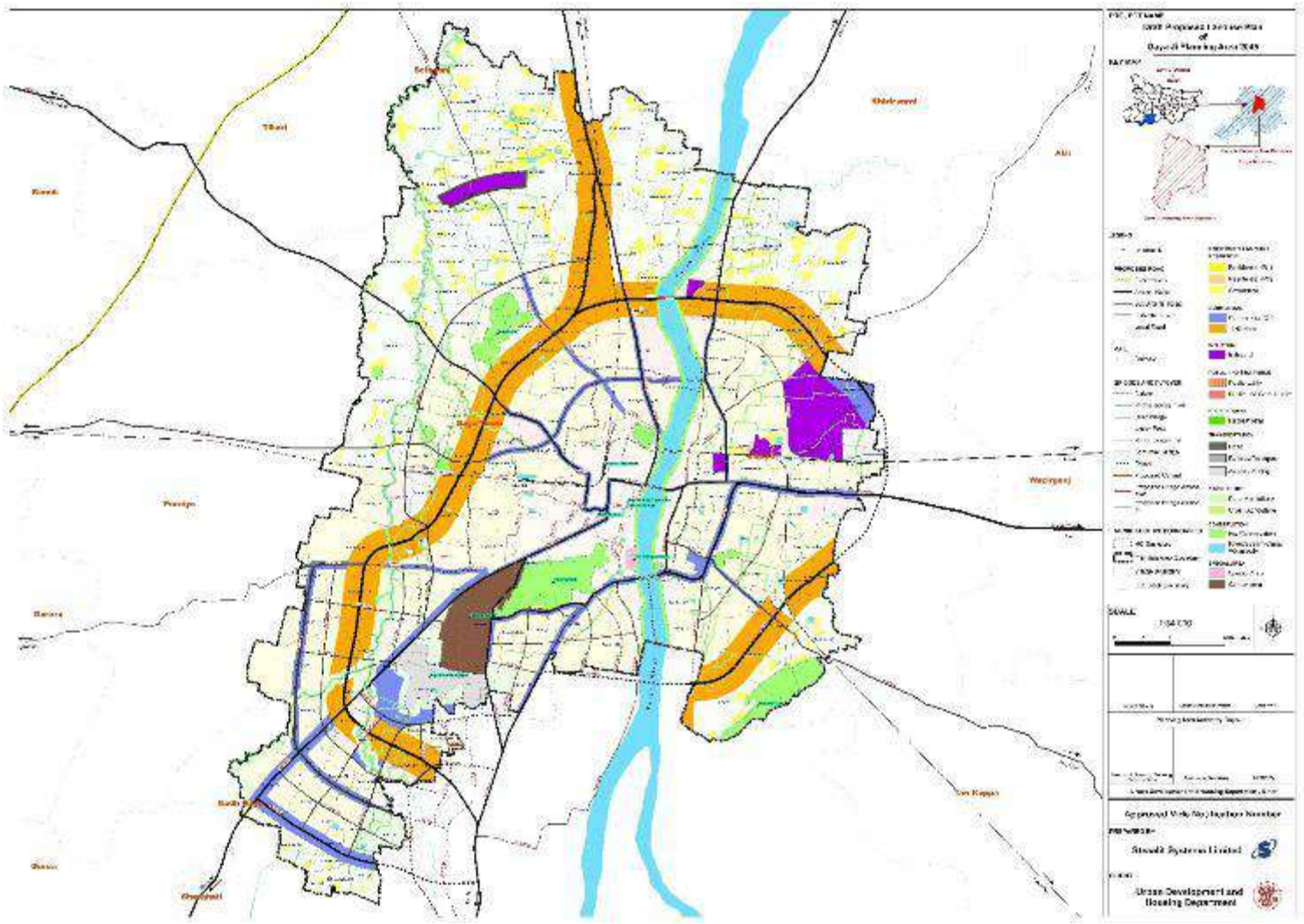
6.5.11 EDUCATION & KNOWLEDGE-BASED INSTITUTIONS

The development of education and knowledge-based institutions is proposed to strengthen Gaya Ji's role as an emerging learning and skill development hub. With increasing demand for competitive exam preparation, dedicated coaching centers for BPSC, SSC, Railway, Banking, and other examinations are envisioned to

provide structured learning environments with classrooms, faculty spaces, and administrative facilities. In addition, online learning facilities equipped with computer labs and reliable internet infrastructure will promote digital education, enabling access to online courses, mock tests, and remote learning opportunities. This initiative supports skill development, enhances employability among youth, and aligns with national programs such as Skill India and the growing trend of digital education in India.

6.5.12 IT, OFFICE & SERVICE SECTOR DEVELOPMENT

The development of IT, office, and service sector infrastructure is proposed to support the expansion of a service-based economy and capitalize on emerging remote-working trends in Tier-II and Tier-III cities like Gaya Ji, and business incubation centers equipped with robust digital infrastructure to attract startups, back-office operations, and technology-enabled services. This sector will generate skilled employment opportunities, encourage entrepreneurship, and diversify the local economy beyond traditional sectors. The proposal aligns with national initiatives such as Digital India and Startup India, promoting innovation-driven and knowledge-based economic growth.



MAP 6-4 PROPOSED ECONOMY LANDUSE OF GAYA JI PLANNING AREA

Source: map prepared by Stesalit System Ltd.

7 ENVIRONMENT

The environmental profile of an area refers to the assessment of various environmental factors that characterize that area. These factors can include the quality of air, water, and soil, the level of pollution, and the impact of human activities on the environment. Key to sustainable growth is when the development of an area happens in tandem with environment preservation and resource optimization. It can only be achieved if existing environmental parameters are identified and analysed.

7.1 FOREST COVER

According to the analysis of IRS Resourcesat-2 LISS III satellite data from October 2017 to December 2018, the forest cover in Bihar measures 7,305.99 sq. km., accounting for 7.76% of the state's total geographical area. The State contains 333.13 sq. km. of land classified as Very Dense Forest (VDF) in terms of forest canopy density. Additionally, there are 3,280.32 sq. km classified under other density classifications. Around 3,692.54 sq. km. of land is covered by Moderately Dense Forest (MDF) and an additional 3,692.54 sq. km is covered by Open Forest (OF). The forest cover in the state has expanded by 6.99 sq. km. in comparison to the last evaluation documented in ISFR 2017. Only 29.04% of the total geographical area of Gaya Ji district comes under forest area which consists of 134.40 sq. km. of moderate dense forest and 455.91 sq. km. of open forest area. Approximately 14.69 sq.km. Of forest land in Gaya Ji district have decreased with respect to the previous assessment (2017).

TABLE 7-1 FOREST COVER IN GAYA JI DISTRICT

District	Geographical Area (GA)	2019 Assessment				% of GA	Change wrt 2017 assessment	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Gaya Ji	4,976	0	134.40	455.91	29.04	29.04	-14.69	62.34

Area in sq. km.

Source: (India State of Forest Report, 2019)

7.2 WATER BODIES

7.2.1 FALGU RIVER

The Gaya Ji Planning Area lies on the banks of the Falgu River. The river flows through the planning area and is a major tributary of the Ganges. The river holds immense cultural and religious significance, particularly within Hinduism and Buddhism. Numerous rituals and ceremonies are conducted on its banks. Among the most notable of these is the *Pind Daan* ritual, performed by Hindus which attracts countless devotees. Being a subterranean river, its riverbed appears dry for much of the year with only a sandy expanse visible on top. However, during the monsoon season, the river transforms, with visible water flows reappearing and rejuvenating the surrounding landscape.

7.2.2 SURFACE WATER QUALITY

The water quality of the Falgu River in Gaya Ji is impacted by industrial pollution, urban runoff, agricultural runoff, domestic waste, and religious activities. The disposal of ritualistic offerings and urban waste poses a significant threat to the environmental sustainability of the river and its ecosystem. To address these challenges, efforts should focus on improving wastewater treatment, enforcing regulations, raising public awareness, implementing green infrastructure, and conducting regular monitoring and research. These measures are essential for safeguarding both the environment and the river's cultural significance. The biological water quality of the Falgu River falls under the class C which indicates moderate pollution therefore the water from the river should preferably not be used for drinking purposes without proper treatment and disinfection.

TABLE 7-2 WATER QUALITY STANDARD

Location Name	Month of sampling	Saprobic Score	Diversity Score	Biological Water Quality	Biological Water Quality Class
Falgu River	May, 2017	5.87	0.68	Moderate Pollution	C
	March, 2018	5.7	0.60	Moderate Pollution	C

Source: Biological Water Quality Assessment of the River Ganga (2017-18), CPCB

Bio-monitoring is the biological surveillance of benthic macro-invertebrate (BMI) communities dwelling in fresh water bodies. Benthic macro-invertebrates are of particular interest because they are a diverse group of long-lived, sedentary species that react strongly and often, predictably to changes in water quality. Taxonomic richness (Diversity Score) and composition (Saprobic Score) characterization of benthic macro-invertebrate communities is an effective method for assessing biological health of aquatic ecosystems.

Physico-chemical and bacterial parameters (including BOD, COD, DO, temperature, pH, total coliforms, faecal coliforms etc.) provide only the momentary account of water quality i.e. water quality that prevails at that particular time of monitoring. Biological monitoring, on the other hand, has much longer dimension since the aquatic biota can be affected by chemical and/or

hydrological events that may have lasted only a few days, some months or even years before monitoring was carried out. The table below enumerates the biological water quality standards and its categorisation.

TABLE 7-3 BIOLOGICAL WATER QUALITY STANDARD

Water Quality Class	Criteria		
	Saprobic Score	Diversity Score	Water Quality
A	> 7	0.2 - 1.0	Clean
B	6 - 7	0.5 - 1.0	Slight Pollution
C	3 - 6	0.3 - 0.9	Moderate Pollution
D	2 - 5	0.4 - 0.2	Heavy Pollution
E	0 - 2	0 - 0.2	Severe Pollution

Source: Biological Water Quality Assessment of the River Ganga (2017-18), CPCB

7.3 GROUNDWATER

Groundwater is the underground water found in the voids and fractures of rock, soil, and sediment. It travels gradually via aquifers, which are geologic formations made of rocks, sand, and soil. For the agricultural industry, which creates jobs and makes a substantial economic contribution to the country, groundwater supplies are crucial. Irrigation with groundwater is common, particularly in areas with insufficient or inconsistent precipitation. Moreover, millions of Indians rely on them as their main supply of drinkable water, particularly in rural areas where surface water supplies are few. Groundwater resources are very valuable since they serve many different commercial and industrial sectors, including manufacturing, mining, and power generation. Therefore, the sustainability and accessibility of groundwater resources in India exert a substantial influence on numerous facets of the nation's socio-economic progress.

TABLE 7-4 GROUND WATER RESOURCE OF GAYA JI PLANNING AREA

Block	Annual Extractable GW Resource	Annual GW allocation for domestic use (as on 2025)	Net GW availability for future use	Stage of GW Extraction (%)	Categorization
Gaya Ji Sadar	3834.06	2295.41	1507.59	55.91 %	safe
Bodhgaya	6011.91	849.19	4417.30	34.37 %	safe
Manpur	2929.57	502.64	930.98	66.86 %	safe
Belaganj	5581.88	751.85	1183.42	79.69 %	semi critical
Paraiya	4149.06	345.33	1691.76	58.56 %	safe

Source: (DYNAMIC GROUND WATER RESOURCES OF INDIA, 2022)

In Bihar potable water supply is predominantly sourced from groundwater. The Current Annual Ground Water Extraction for all uses has been estimated as 13.75 bcm and the Stage of Ground Water Extraction in the State is 44.76 %. Sustained groundwater extraction can lead to depleted groundwater resources in the area. Apart from Belaganj, all other blocks under the Gaya Ji planning area fall within the 'safe' category, thus the groundwater resources in these blocks can be

judiciously developed. However, at no point of time, the extraction level should exceed 70% (CGWB). Groundwater extraction has exceeded the 70% mark in Belaganj, hence the block is under the 'semi-critical' category and requires immediate intervention to reduce dependency on groundwater resources.

TABLE 7-5 COMPARISON OF GROUNDWATER EXTRACTION IN 2022 W.R.T. 2010

District	Block	Stage of Ground Water Extraction (%) in 2020	Stage of Ground Water Extraction (%) in 2022	Remark
Gaya Ji	Gaya Ji Sadar	89.80	55.91	Improved
	Bodhgaya	19.92	34.37	Deteriorated
	Manpur	103.25	66.86	Improved
	Belaganj	119.47	79.69	Improved
	Paraiya	61.73	58.56	Improved

Source: (DYNAMIC GROUND WATER RESOURCES OF INDIA, 2022)

The pre-monsoon groundwater level varies from 5.63 mbgl to 7.95 mbgl in the planning area with Belaganj having the lowest groundwater level at 11.24 m. Belaganj also has the highest ground water extraction, thus, the block might soon face a depletion of ground water resources.

TABLE 7-6 GROUND WATER LEVELS OF GAYA JI PLANNING AREA

District	Block	Pre-Monsoon Water Level (mbgl)	Post-Monsoon Water Level (mbgl)	Fluctuation (m)
Gaya Ji	Gaya Ji Sadar	6.01	3.15	2.86
	Bodhgaya	5.63	3.49	2.14
	Manpur	7.18	3.53	3.65
	Belaganj	11.24	8.43	2.81
	Paraiya	7.95	4.33	3.62

Source: (DYNAMIC GROUND WATER RESOURCES OF INDIA, 2022)

7.3.1 GROUNDWATER QUALITY

The groundwater quality in the Gaya Ji planning area is safe. The pH levels range from 7.04 to 7.51, indicating a desirable range for human consumption. The overall groundwater structure of the planning area has a slightly alkaline nature. Moreover, the pH values of the studied samples were within the permissible limits of 6.5 to 8.5 (Bureau of Indian Standard, 2012) (World Health Organization). The pH of water primarily regulates the solubility of trace metals. Higher pH values in water can reduce the trace metals' solubility, whereas lower pH values speed up the dissolving process.

Spatial distribution analysis shows that some areas have higher concentrations of fluoride and iron, impacting overall water quality (CGWB, Central Ground Water Board, 2021). The groundwater quality in the Gaya Ji region reveals that fluoride content is generally within the permissible limits, but some areas have higher

concentrations that can be detrimental to human health. The following table enumerates the groundwater quality metrics for each of the blocks.

TABLE 7-7 GROUND WATER QUALITY OF GAYA JI PLANNING AREA IN 2021

Block	Location	pH	EC	CO_3	HCO_3	Cl	SO_4	NO_3	PO_4	TH	Ca	Mg	Na	K	F	SiO_2	TDS
Gaya Ji	Bitho Sharif	7.21	1890	0	298.9	440.2	50.13	29.35	0	680	38	142.16	95.8	28.1	0.08	14.84	1228.5
Bodhgaya	Bodhgaya	7.75	463	0	189.1	31.92	14.92	22.94	0	185	z22	31.59	19.8	4.16	0.15	20.43	300.95
Gaya Ji Sadar	Chand Chowra Chowk	7.4	1060	0	280.6	127.8	71.7	31.73	0	305	26	58.32	80.54	16.54	0.79	20.7	689
Gaya Ji Sadar	Ram kund	7.35	1204	0	292.8	166.85	96.31	32.51	0	405	26	82.62	78.8	14.77	1.4	18.47	782.6
Gaya Ji Sadar	Sangat gali	7.4	810	0	268.4	92.3	38.13	27.88	0	295	26	55.89	50.67	0.73	0.74	17.85	526.5
Manpur	Manpur	7.51	1140	0	353.8	134.9	55.65	31.01	0	395	12	88.69	56.44	25.64	0.1	15.15	741

Source: Central Ground Water Board, 2016

The ability of water to conduct electrical current is measured by its electrical conductivity (EC). The number of ions in the water has a direct bearing on this process. The conductivity of water increases with an increase in ions and vice versa. The average EC reading in the Gaya Ji region was found to be 796.2 µs/cm, which is within the acceptable limit of more than750 µs/cm (acceptable limit) and within 3000 µs/cm (permissible limit in the absence of alternate source) for different purposes of uses (Bureau of Indian Standard, 2012).

The amount of organic and inorganic substances, such as ions, metals, and minerals, dissolved in a specific volume of water is known as total dissolved solids or TDS. Rich Ca^{2+} and Mg^{2+} ion-containing minerals and human activities such as chemical fertiliser application in agricultural runoff and industrial discharges are the main causes of high TDS in water. The average TDS reading in the Gaya Ji region was found to be 517.4 mg/l, which is higher than the permissible limit of 300 mg/l for drinking water. This suggests that the groundwater in the region is contaminated with high levels of dissolved solids. The groundwater in the Gaya Ji planning block is thus unsuitable for drinking without proper treatment as per standards. It can however be used as drinking water in absence of an alternate source after purification and chlorination according to Indian Standards specified in the table below. Proper utility and management of groundwater through canals, channels, and underground movement from safe to affected blocks/zones are advisable to avoid carcinogenic diseases among the population in the future.

TABLE 7-8 TDS LEVEL CHART FOR DRINKING WATER

TDS in Water (mg/L)	Suitability for Drinking Water
Between 50-150	Excellent for drinking
150-250	Good
250-300	Fair
300-500	Poor, not good for drinking
Above 1200	Unacceptable

Source: Bureau of Indian Standards, 2012

In the country, groundwater is used for domestic and drinking purposes by 85% of the rural population. The health issue is caused by high fluoride concentrations in groundwater that are higher than the permissible limit of 1.5 mg/l (Bureau of Indian Standard, 2012). An average of 0.31 mg/l of fluoride has been observed based on the chemical analysis of water samples collected from the groundwater observation wells. Iron is a significant contaminant in this region, with concentrations often exceeding the World Health Organization (WHO) permissible limit of 0.1 mg/l for drinking purposes.

Nitrate is a very common constituent in groundwater, especially in shallow aquifers. The source is mainly from anthropogenic activities. High concentration of Nitrate in water beyond the permissible limit of 45 mg/l causes health problems according to (Bureau of Indian Standard, 2012). The nitrate concentration in the groundwater of the area is well within the permissible limit.

7.4 SOIL

7.4.1 SOIL COMPOSITION

Gaya Ji district features a variety of soil types, each with unique properties and distributions. These include sandy soil, red and yellow soil, and younger alluvial soil. Sandy soil, along with red and yellow soil, is found in the southern and north eastern parts of the district, particularly in the plateau, pediplain, and the high-level marginal alluvial plain (terrace) areas. The soil composition of the Gaya Ji region in Bihar, India, is dominated by fertile alluvial soils (60%), formed by the deposition of sediments from rivers like the Ganges, Gandak, and Kosi. These soils support a variety of crops, including rice, wheat, sugarcane, and legumes. The region also has Karail-Kewal soil (20%), characterized by heavy clay composition suitable for rice and rabi crops, and Tal soil (15%), found in the backwater belt of the Ganges, with medium to heavy texture suitable for rabi crops. Balthar soil (5%), found in the Kaimur plateau is sandy, calcareous and yellow, less fertile, and suitable for coarse crops like maize, jowar, and bajra. The soil has neutral to slightly alkaline pH levels rich organic matter and high nutrient content supporting diverse crop patterns and well-developed irrigation systems including canals and tube wells.

7.4.2 SOIL POLLUTION

Soil pollution also referred to as soil contamination, is a form of land degradation that is predominantly brought about by chemical or other alterations in soil properties that are induced by human activities. Soil contamination is predominantly attributed to industrial and agricultural processes, as well as the

utilization of chemicals in agriculture and the disposal of waste. In India, there are no regulations or standards for assessing the severity of soil contamination resulting from the disposal of solid waste, hazardous materials, and other human activities that affect soil quality. As a consequence, international standards are the primary means by which soil contamination in a given area is determined (Central Pollution Control Board, 2016).

TABLE 7-9 INDIRECT INDICATORS OF SOIL CONTAMINATION

Potential source (primary and secondary)	Potential exposure pathways	Receptors		
		Human Receptors		Indirect receptors such as cattle, flora, fauna
		Including residents and workers within the impacted area	Outside the impacted site, exposed indirectly	
Soil impacted by Hazardous waste	Incidental ingestion or Dermal contact	Y	N	Y
	Inhalation of dust	Y	N	Y
	Inhalation of volatiles	Y	Y	Y
***Note: Y= Yes and N= No*				

Source: *Central Pollution Control Board, 2016*

7.5 AIR POLLUTION

Air pollution has been widely acknowledged as a potentially lethal form of pollution. Pollutants are introduced into the atmosphere through the emission of gases or particles. Due to the ongoing transformation, mingling, and trans boundary transport of air pollutants, the air quality in a given area is always unpredictable. Air pollution worsens due to improper implementation of stringent emission standards and the expansion of industry, population, and vehicles.

The analysis by Climate Trends indicates that the mean yearly $PM_{2.5}$ concentration in rural India was 46.4 micrograms in 2022, which was marginally lower than the urban level of 46.8 micrograms. The national limit is 40 micrograms. $PM_{2.5}$ is an exceptionally hazardous air pollutant with the ability to deeply infiltrate the lungs and induce a variety of illnesses, some of which are potentially fatal. Since 2017, the levels of $PM_{2.5}$ in India's urban and rural areas have been virtually identical, with few distinctions between the two sets of data, according to a report by Climate Trends.

793 stations have been installed under the National Air Quality Monitoring Program (NAMP), and 274 are real-time monitoring stations (CAAQMS), as reported by the Central Pollution Control Board (CPCB). The majority of these monitoring stations are urban-only installations. In rural regions, real-time monitoring is virtually nonexistent, according to a cursory examination. Therefore, it is automatically presumed that the air quality in rural areas conforms to national ambient air quality standards (NAAQS) in the absence of data regarding air pollution in those regions. Therefore, robust regional monitoring systems are required to evaluate the air quality in rural regions.

Air pollution in rural areas is primarily caused by the lack of access to pure household energy, as the majority of the rural population continues to rely on inefficient fuels for cooking, lighting, and heating. Traditional methods of brick production, waste disposal, and crop residue fire are also significant contributors to air pollution. Pollutants transported across boundaries from urban to rural regions also contribute to air pollution in rural India. Consequently, the issue of air pollution in rural India requires additional focus.

TABLE 7-10 NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

Pollutants	Time Weighted Average	Concentration in Ambient Air	
		Industrial, Residential, Rural and other Areas	Ecologically Sensitive Area (notified by Central Government)
$S0_2$ in µg/m^3	Annual	50	20
	24 Hours	*80*	*80*
$N0_2$ in µg/m^3	Annual	40	30
	24 Hours	*80*	*80*
$P.M_{2.5}$ (µg/m^3)	Annual	40	40
	24 Hours	*60*	*60*
$P.M_{10}$ (µg/m^3)	Annual	60	60
	24 Hours	*100*	*100*

Source: Central Pollution Control Board, 2009

As the concentration of airborne pollutants increases, so does the Air Quality Index (AQI), which ranges from 0 to 500. A safety threshold for AQI is 50 or less, whereas readings exceeding 100 are considered detrimental to health. The Bihar State Pollution Control Board has identified three non-attainment cities in the state which includes Gaya Ji Town. Non-attainment cities (NAC) are those where the National Ambient Air Quality Standards (NAAQS) have not been met consistently over 5 years. The air pollutants of concern are PM_{10}, $PM_{2.5}$ and O_3.

TABLE 7-11 AIR QUALITY INDEX OF GAYA JI TOWN AS ON JUNE 24, 2024

City	Air Quality	Index Value	Prominent Pollutant
Gaya Ji	Satisfactory	64	$PM_{2.5}$, PM_{10}, O_3

Source: (Central Pollution Control Board, 2009)

The average air quality index of Gaya Ji district is 132 at the peak time of summer, and the air quality level is regarded as unhealthy. The main pollutant detected in the air is $PM_{2.5}$, which is currently 3.4 times the WHO annual air quality guideline value and 2.04 times the NAAQS (National Ambient Air Quality Standards, 2019). Particulate matter ($PM_{2.5}$) with a diameter of less than 2.5 micrometers can cause health problems such as worsening asthma symptoms, coughing, and breathing difficulties, and may irritate the eyes and throat.

TABLE 7-12 AMBIENT AIR QUALITY OF GAYA JI DISTRICT

District	PM2.5 (RSPM) in µg/m3		
	2001	2015	2020
Gaya Ji	69.19	79.07	55.86

Source: State Pollution Control Board

The concentrations averaged over the Gaya Ji district for the years 2001, 2015 and 2020 are tabulated above. There was a steady increase in $PM_{2.5}$ in Bihar from the year 2000. However, the rise accelerated after 2011, mostly in the central Bihar and southeastern districts. The rise continued till 2016 when annual $PM_{2.5}$ exceeded 79 $\mu g/m^3$ in the study area. In 2017, $PM_{2.5}$ decreased before increasing again in 2018. After 2018, the levels started decreasing. The larger reduction in $PM_{2.5}$ in 2020 is attributed to the sudden stoppage of most anthropogenic emissions due to the national lockdown after the COVID-19 pandemic hit the country. However, the recent trends suggest that the rising trend is perhaps stabilized. Though it would be too early to interpret it confidently, one plausible explanation could be the penetration of LPG through the Pradhan mantra Ujjwala Yojana, which would have reduced residential emissions at a regional scale. In the Gaya Ji District, residential emissions are the largest contributor to ambient $PM_{2.5}$ which account for approximately 60% of the total emissions and completely mitigating residential emissions which would help most of the districts meet NAAQS (National Ambient Air Quality Standards).

TABLE 7-13 STATUS OF AMBIENT AIR QUALITY (ANNUAL AVERAGE)

Location	PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)		SO_2 (µg/m3)		NO_2 (µg/m3)	
	2017	***2018***	***2017***	***2018***	***2017***	***2018***	***2017***	***2018***
Bodhgaya	77.5	90.1	-	-	11.1	11.8	21.6	21.5
Gaya Ji	-	-	71.85	90.57	5.53	6.92	19.21	54.38
Standard value	*60*		*40*		*50*		*40*	

Source: **Invalid source specified.**

7.6 NOISE POLLUTION

Noise is defined as any disagreeable, unwanted, or excessively loud sound that has the potential to disrupt or irritate. Noise pollution refers to the persistent presence of sound in the environment, which has the potential to inflict temporary or permanent damage upon humans or animals. Noise prevention and control are important as noise affects hearing, ability to communicate, and behaviour. Undoubtedly, less noise can make the environment friendlier and life becomes pleasant (Central Pollution Control Board, 2016). The major source of noise is:

1. Transportation noise
2. Occupational /Industrial Noise
3. Neighborhood Noise
4. Recreational Noise

The permissible noise levels in industrial zones are 75 dB during the day and 70 dB at night. During the day, it is 65 dB and 55 dB in commercial areas, whereas at night, it is 55 dB and 45 dB in residential areas.

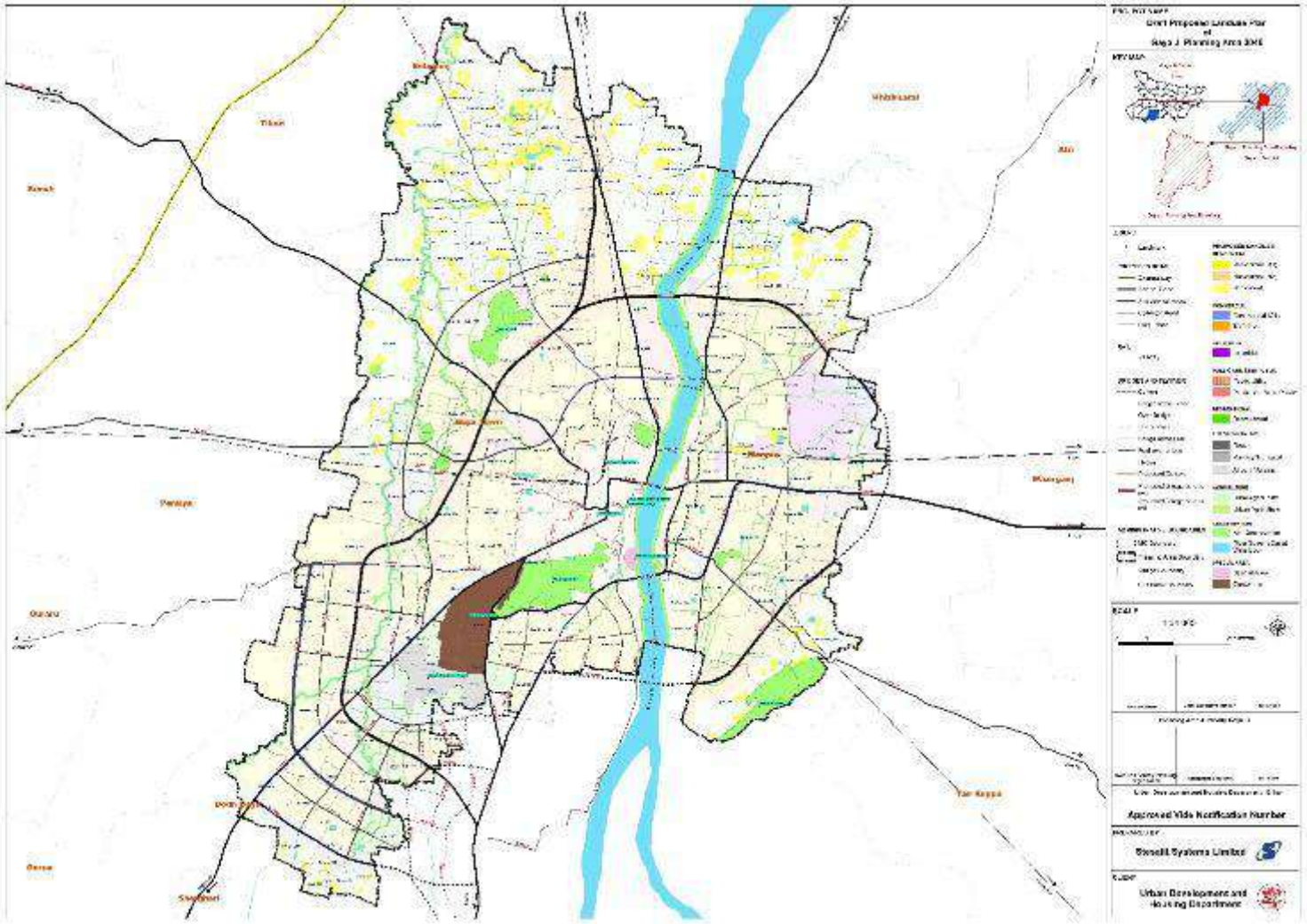
7.7 ISSUES AND POTENTIAL

Strength	Weakness	Opportunity	Threat
• Presence of **rivers, ponds, and traditional water structures (ahar/pyne)** contributing to ecological balance. • Moderate climate and fertile soil conditions support greenery and agriculture. • Scope for development of eco-parks, green belts, and urban forestry projects	**MINING** • Illegal sand mining has emerged as a significant environmental concern where exploitation of natural resources is practiced against the Enforcement & Monitoring Guidelines for Sand Mining (EMGSM-2020) and Sustainable Sand Mining Management Guidelines 2016. There are 123 cases filled regarding this crime. **WATER POLLUTION** • Falgu river water is polluted due to industrial pollution, urban and agricultural runoff, domestic waste and religious activities (mainly during Pitri-Paaksh for Pind-Daan) • Biological water quality of Falgu River falls under class-C (CPCB Report) **GROUND WATER** • Belaganj of Gaya Ji planning area falls under the semi-critical category of Ground Water extraction **HEAT WAVE** Gaya Ji district falls under High Normal category in heat vulnerability	• Promotion of **Green industries and renewable energy projects** (solar, biomass) • Scope for **urban greening initiatives**: roadside plantations, parks, and open space development. • Opportunities to develop **environmentally sustainable housing colonies** with rainwater harvesting, energy-efficient designs, and waste segregation • Government schemes (e.g., **Green India Mission, National Clean Air Programme, Jal Jeevan Hariyali Mission**) can be leveraged for environmental improvement	**Polluting industries** (brick kilns) and **vehicular pollution** may deteriorate living conditions, air quality, and public health.

7.8 RECOMMENDATION

Green Area G1 is designated as a protected green buffer zone along canals, ponds, ahar-pyne systems, streams, and around industrial areas to ensure ecological protection and environmental sustainability. The primary objective of this zone is to maintain natural drainage systems, safeguard water bodies, reduce pollution impacts, and create ecological buffers between sensitive land uses. Only heavy plantation, horticulture activities, and ecological landscaping are permitted within this zone to enhance biodiversity, improve microclimate conditions, and strengthen natural environmental functions. Development activities and built structures are restricted to preserve the green character and maintain environmental resilience.

Green Area G2 is designated as a green buffer zone around public utility areas, particularly waste management facilities, to minimize environmental impacts and protect surrounding land uses. This zone serves as a protective landscape barrier that helps reduce pollution, control odors, and improve visual quality through strategic plantation and green cover. Permitted activities include agriculture, plantation, and horticulture, ensuring productive land use while maintaining ecological balance. Development within this zone is regulated to preserve its function as an environmental buffer and to enhance sustainability around essential infrastructure areas.



MAP 7-1 PROPOSED GREEN AREA OF GAYA JI PLANNING AREA

Source: map prepared by Stesalit System Ltd.

8 DISASTER RESILIENCE

8.1 VULNERABILITY OF Gaya Ji DISTRICT

The Gaya Ji district is vulnerable to both man-made and natural disasters. The Vulnerability Atlas of India, Third Edition, 2019 states that the district is vulnerable to earthquakes and droughts. As per the Gaya Ji District Disaster Management Plan (DDMP 2022), the main issues the district is facing are drought heat waves, earthquakes, wind cyclones and cold waves. The area's proximity to the Falgu River and the presence of small rocky hills makes it prone to flooding and landslides. The town's infrastructure, including its housing and transportation systems, is ill-equipped to withstand the impact of these hazards. Additionally, the district's high population density and lack of infrastructure in some areas increase the risk of disasters. The region's vulnerability is further exacerbated by the presence of hazardous industries and the lack of effective disaster management systems. Situation control, monitoring, precise risk assessment and impact estimation, future event forecasting, and structural preparedness for disaster prevention are critical in preventing these events from happening or minimizing the harm they cause. The list below enumerates the various hazards that Gaya Ji district faces at different times of the year.

TABLE 8-1 DISASTER INTENSITY CALENDER OF GAYA JI DISTRICT

Disaster	January	February	March	April	May	June	July	August	September	October	November	December
Earthquake												
Drought												
Heat Wave												
Cold Wave												
Intensity	High				Moderate				Low			

Source: (District Disaster Management Plan, Rohtas, 2017)

8.2 EARTHQUAKE

The entire Gaya Ji planning area falls under seismically sensitive zone-III, Moderate Damage Risk Zone (MSK VII), making it susceptible to significant earthquakes, though they haven't happened often recently. There is no pattern of occurrence of Earthquakes in the district. The last time any major earthquake struck this region was in the year 2015. The town's high population density and profusion of unplanned settlements exacerbate this vulnerability.

8.3 FLOOD

The Gaya Ji region in Bihar is prone to flooding, which poses significant risks to the local population. According to the Bihar State Disaster Management Authority (BSDMA), the district experiences flooding every year, impacting approximately 3.5 lakh people. The district's northern region experiences flooding every year. Every year, millions become homeless, a few hundred lives are lost, and several hectares of crops are damaged on average. During a short monsoon season, approximately 75% of the total rainfall occurs. (June – September) (BSDMA, Bihar State Disaster Management Authority, 2013). As per the Vulnerability Atlas of India, 2019, the district is not prone to floods.

Bihar is India's most flood-prone state, with 76% of its population living under the recurring threat of devastating flooding. The BSDMA plays a crucial role in managing floods in the Gaya Ji region, working closely with local authorities and emergency services to respond to flood situations and provide relief to affected communities.

8.4 DROUGHT

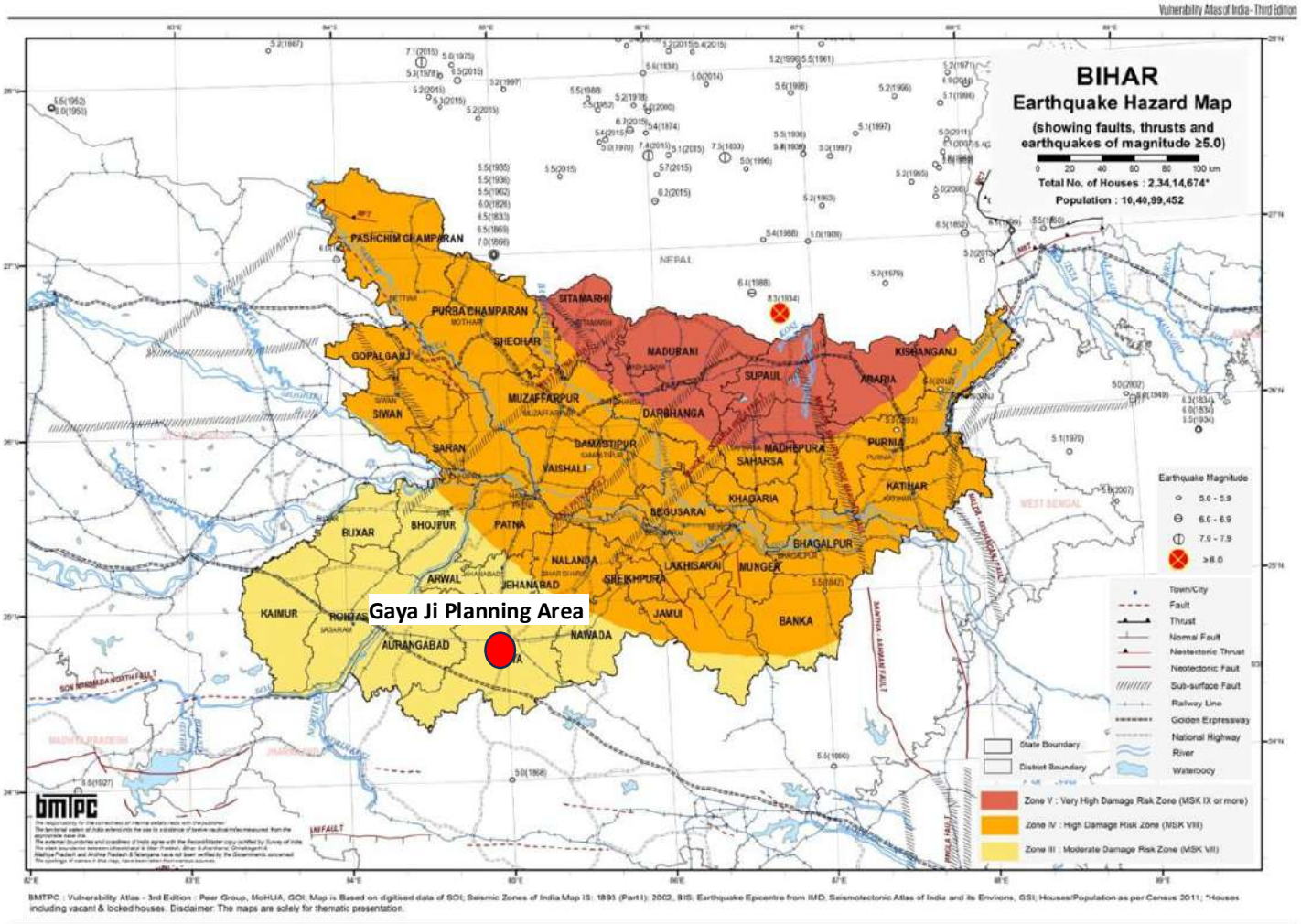
IMD defines drought in any area when the rainfall deficiency in that area is ≤ 26% of its long-term normal. It is further classified into moderate and severe drought depending upon whether the deficiency is between 26-50% and more than 50% respectively. The district is largely under threat from drought rather than flood because of the effects of climate change. The monsoon's dry spell has increased the severity of droughts in recent years. The effects can be felt particularly between February & May when the water table dips below particularly in Gaya Ji town block and Bodhgaya.

TABLE 8-2 VULNERABILITY OF GAYA JI DISTRICT TO DROUGHTS

District	Exposure	Sensitivity	Adaptive Capacity	Vulnerability Index	Vulnerability
Gaya Ji	0.410	0.140	0.360	0.091	Low

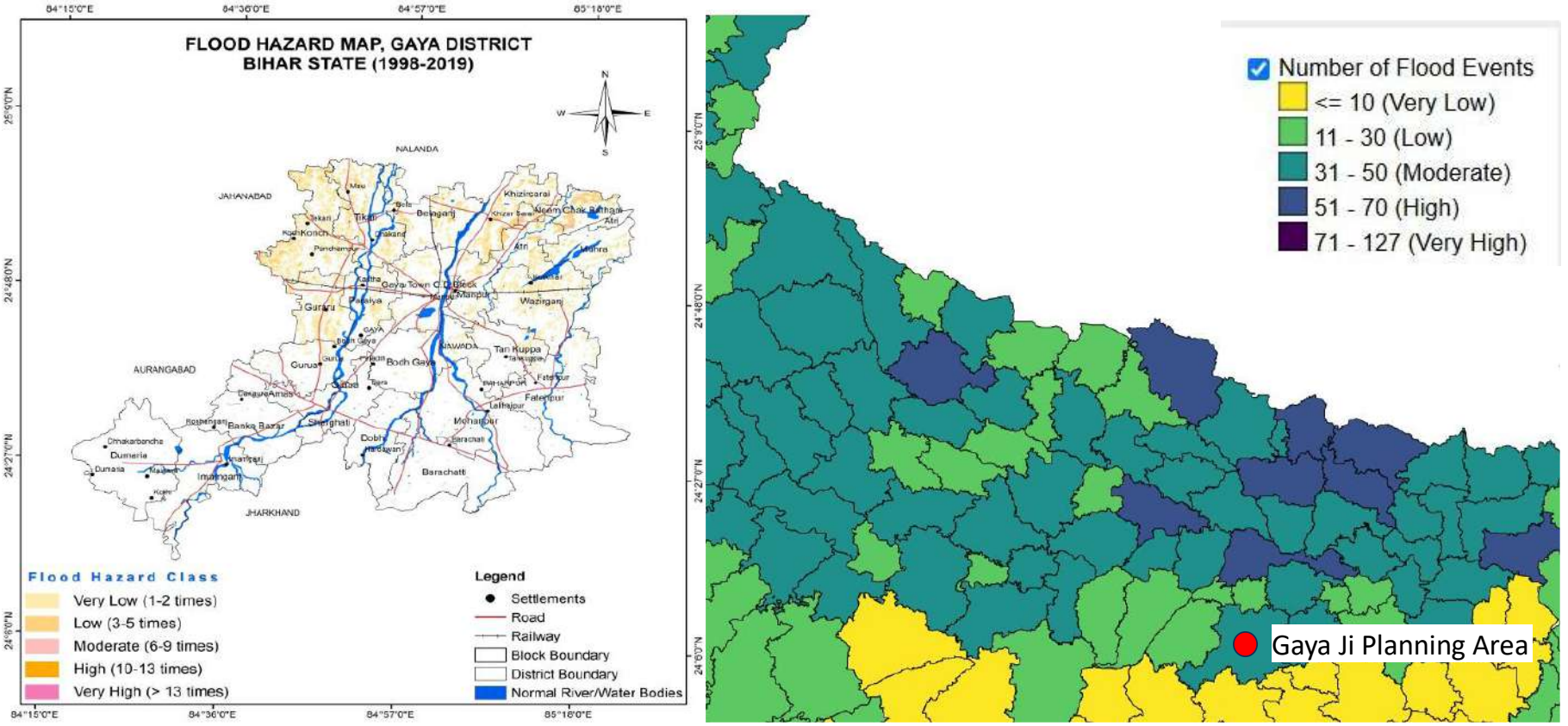
Source: CEEW

The Gaya Ji district in Bihar, India, is facing a severe drought situation due to the effects of climate change. The district has been experiencing a decline in rainfall over the past decade, with the current year seeing significantly less rainfall than normal. In June, the district received only 95.3 mm of rain, which is 46.5% less than the normal rainfall of 178.3 mm. In July, the district received 156.5 mm of rain, which is 50.6% less than the normal rainfall of 316.6 mm. As a result, large areas of land remain desolate, and about half of the district's cropped area has not yet had paddy saplings planted, despite the Kharif crop-planting season drawing to a close. Rainfall in central Bihar has been declining over the past ten years and is still 25–45% below average, according to data collected over a century of observations.



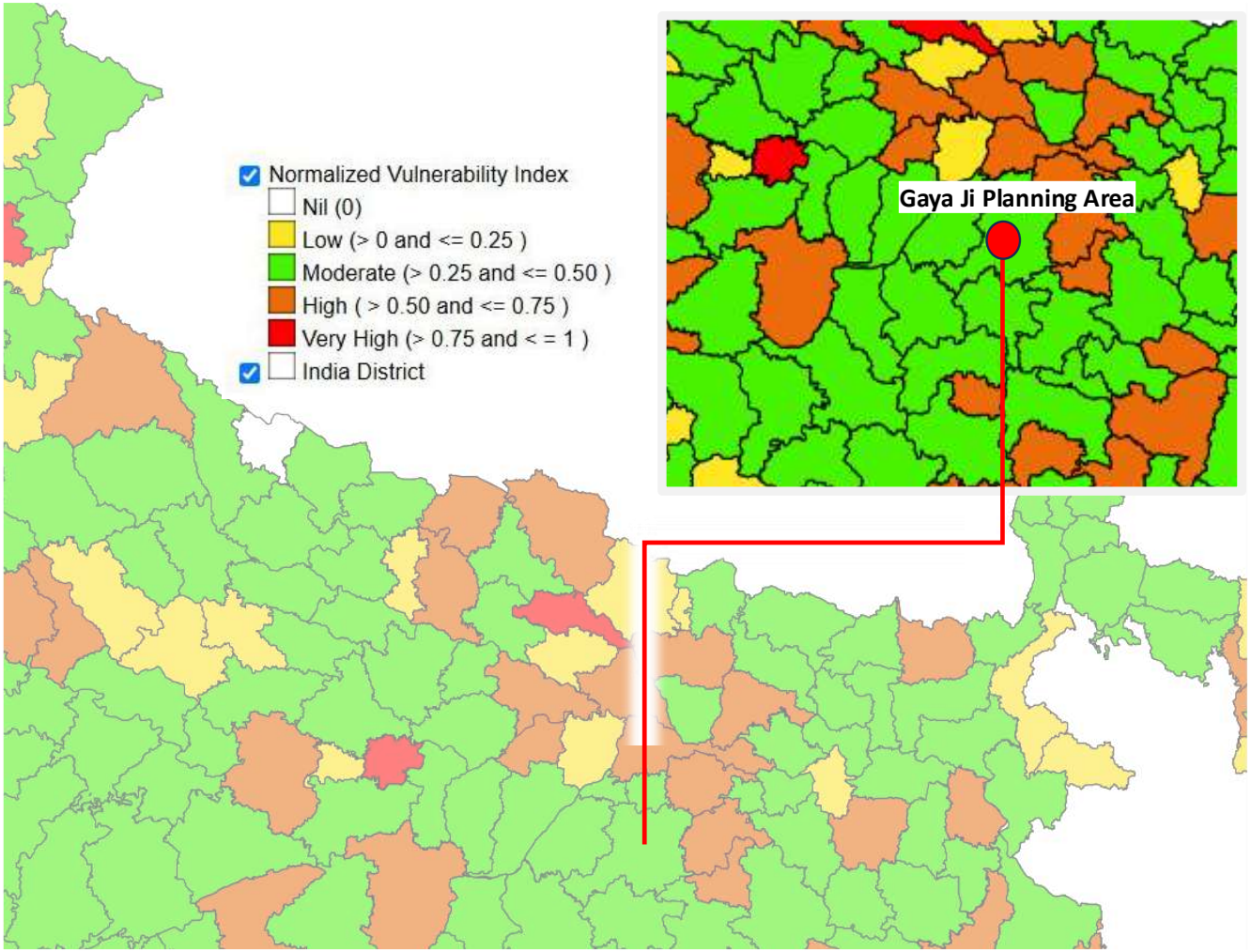
MAP 8-1 EARTHQUAKE HAZARD MAP

Source: Vulnerability Atlas of India, Third Edition, 2019



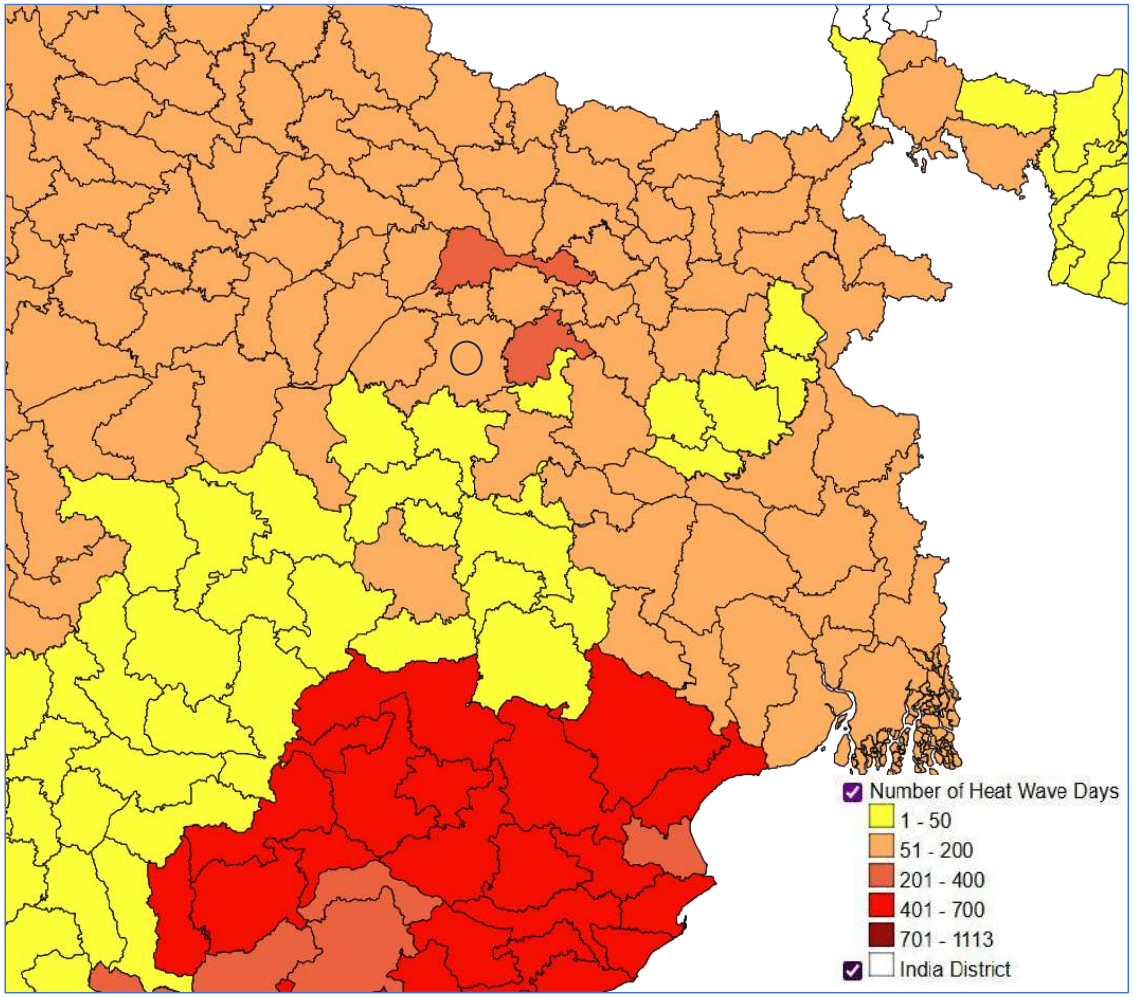
MAP 8-2 FLOOD HAZARD MAP

Source: Bihar Flood Hazard Atlas, 2020; Climate Application and user Interface Group (CAUI) India Meteorological Department, Pune-05



MAP 8-3 DRAUGHT VULNERABILITY MAP

Source: Climate Application and user Interface Group (CAUI) India Meteorological Department, Pune-05



MAP 8-4 HEAT VULNERABILITY MAP

Source: Climate Application and user Interface Group (CAUI) India Meteorological Department, Pune-05

8.5 HIGH-SPEED WINDS/CYCLONIC STORM

High-speed winds are by far the most destructive of all the natural hazards associated with surface cyclones, as they can result in both fatalities and losses to socioeconomic development. Large-scale fatalities as well as destruction to property, agriculture, and human life are caused by strong tropical high-speed winds. Its three components—water, whirling, and wind speed—leave behind three-dimensional effects in the surrounding area. The only thing that saves it is that one can observe its formation from the point of depression development to the point of landfall. According to the Vulnerability Atlas of India, Gaya Ji district is affected by high-speed winds of 47 m/s intensity in the northwest parts of the district while other areas of the district is affected by 39 m/s intensity winds.

8.6 HEATWAVES

Bihar is also among one of heat vulnerable states in India and several cases related to heat injuries have been reported in some southern districts which includes Gaya Ji district. Based on the Heat Vulnerability Index (HVI) prepared by a consortium of organisations led by IIPH Gandhinagar, Gaya Ji district falls under the "high normal" category (category 3). In recent years, chances of heat wave has increased in Gaya Ji district due to arid land belt & environmental condition. The peak month of heatwaves in Gaya Ji is around May when the maximum temperature is rises to 48°C or more. In year 2019 section of 144 of CRPC was imposed in Gaya Ji after crucial impacts of Heat Wave. In year 2022 Gaya Ji recorded temperatures above 45 degree Celsius triggering a raging heat wave which led to the deaths.

8.7 MEASURES FOR DISASTER MANAGEMENT

The measures for disaster management have been classified under three categories which are as follows:

1) Prevention measures, 2) Mitigation measures, 3) Preparedness measures

Prevention measures reduces the likelihood of a disaster event occurring or the severity of an event should it eventuate. These include regulations in environmental management, site selection, urban planning and sound construction for the safety of communities, whereas socio-economic measures can be used to increase resilience, spread risk and responsibility, create redundancy and minimize the impact.

Mitigation measures encompass all actions implemented to decrease the consequences of the hazard itself with the aim of minimizing the impact of a future disaster. It is often classified into two categories, namely structural and non-structural. Structural mitigation encompasses the implementation of physical structures and engineering methods to minimize or prevent the potential consequences of hazards. This includes the development of protective structures and infrastructure that are designed to withstand and resist the effect of these hazards. Non-structural mitigation encompasses a range of measures such as legislation, awareness campaigns, knowledge building, public engagement, and operational practices. These measures, including participatory procedures and

information dissemination, aim to decrease the risk and associated consequences.

Preparedness measures ensure the comprehensive state of readiness to deal with the consequences of a hazard of any degree. The DDMA is responsible to deal with all phases (Preparedness, Prevention, Mitigation, Response and Recovery) of Disaster Management within the district. The Bodhgaya Planning Area is most prone to droughts and heatwaves. The table below enumerates the measures to undertaken by the respective departments in the face of a calamity.

TABLE 8-3 MEASURES FOR DISASTER MANAGEMENT

Department	Prevention	Mitigation	Preparedness
		DROUGHT	
DDMA	Establish infrastructure for drought warning and dissemination	1) Upgrade existing drought forecasting system 2) Train stakeholders involved in drought management	1) Awareness of water conservation techniques 2) Arrange for electricity supply during drought situation
Agriculture Department	1) Encourage solar energy systems for irrigation and electricity generation 2) Training farmers in disaster risk reduction techniques 3) Use of technology inputs for agricultural production	1) Strengthen irrigation system 2) Coordinate with insurance companies to ease response during times of relief 3) Awareness of farmers on govt. Schemes 4) Provide cold storages	1) Identify drought prone areas through GIS mapping 2) Crop Contingency Plan and storage of seeds 3) Develop strategies for optional cropping 4) Ensure availability of drought resilient crops
Animal Husbandry and Fisheries Department	Preparation of drinking water sources at proper locations for animals	1) Adaptation of green fodder 2) Capacity building and training of key line department officials on various aspects of disaster mitigation	1) Storage of fodder 2) Renovate fishponds and ox-bow lakes 3) Open offices at block level to understand the ground realities 4) Training of fish farmers in aquaculture 5) Ensure recharging of various water sources
Energy Department	Repairing and changing damaged and burned transformers	Proper planning for maximum electricity supply in rural areas for irrigation during drought situation	1) Ensure electricity supply through agriculture feeder in vulnerable areas 2) Provide minimum of 16 hr electricity to affected villages

Department	Prevention	Mitigation	Preparedness
Health Department	Conduct regular surveillance of public health measures	Capacity building and training of community to deal with drought situations	1) Medical camps in affected areas 2) Prepare Monitoring Cell under the chairmanship of Civil Surgeon 3) Ensure health kit at PHC and CHC level
Irrigation Department	1) Enact laws for GW exploitation 2) Availability of water till tail-end of canals	1) Carryout regular water audits 2) Encourage use of drip and sprinkle irrigation	1) Availability of water resource in the area 2) Monitor watershed in drought prone areas
Public Health Engineering Department	1) Repair non-functional hand pumps 2) Provide water tanks where necessary	1) Encourage traditional rain water harvesting and conservation	1) Install hand pumps 2) Conduct drinking water need assessment
Food Corporation	Construct warehouse and cold storages for preservation/ storage of food grains	1) Conduct assessment of required food resources 2) Under Shatabdi Ann Kalash Yojna, provide one quintal food grains at every village	Setup centres for supply of food grains at subsidized rates or for free
Water Resource Department	1) Construct dams, reservoirs, tubewells, tanks, farm ponds and canals for surface irrigation 2) Initiate rainwater harvesting	1) Strengthen water conservation techniques. 2) Ensure supply of water in drought situation	1) Construction of sluice gates and channels for distributing river water to ponds 2) Identify potential emergencies. 3) Prepare contingency specific action plans
EARTHQUAKE			
DDMA	1) Instruct Building Department to identify weak buildings and retrofit them. 2) Ensure fire audit also	1) Provide seismic micro-zonation maps to all stakeholders 2) Training of engineers and architects to design seismically safe building	1) Training of engineers and masons for safe construction 2) Mock drill for the community 3) Follow-up with departments about the safety measures under their ambit

Department	Prevention	Mitigation	Preparedness
Animal Husbandry	-	Shed for animals should be earthquake resistant or of lightweight material so that the animals remain unharmed	1) Identify animal safe shelters for animals. 2) Arrange vehicle for transport of injured animals 3) Fodder storage at safe places.
Public Works Dept. (PWD)	1) Establish appropriate mechanisms for compliance review of all construction designs submitted to ULBs. 2) Slope stabilisation on hilly areas	1) Assess the seismic risk and vulnerability of the existing built environment by carrying out structural safety audits 2) Develop seismic strengthening and retrofitting standards and guidelines	1) Arrange vehicles/ heavy equipment, such as front-end loaders, towing vehicles, earth moving equipment, water tank supplies
Public Health Engineering Department	Construction of earthquake resilient water supply channels	Repair damaged water sources on	Create drinking water facilities in relief camps and in shelter for livestock
Health Department	Equip buildings with basic first aid facilities.	1) Prepare mass casualty management plans 2) Training of doctors and paramedics to meet emergencies	Mobile unit should be ready to reach at any affected places
HEAT WAVE			
DDMA	Provision of drinking water at all public places	1) Fixing of summer working hours in schools/colleges and other establishments.	1) Announcement of weather forecast 2) Conduct awareness campaigns
Health Department	To issue necessary advisories for the community to avoid heatstroke	Adopt heat- driven examination techniques at local hospitals and UHC.	1) Ensure sufficient availability of ORS, IV drops and medicines 2) Start mobile medical units for quicker response
Animal husbandry	Supply adequate drinking water for cattle during scarcity	Publicize protective for safeguarding poultry and cattle during heat wave	1) Ensure sufficient stock of medicine in all veterinary hospitals
Local Government	Promote tree plan plantation and green energy	Promote the schemes on non- conventional energy sources	Aarrangements for temporary electric supply or generators

Source: District Disaster Management Plan, Gaya Ji, 2022

9 CONSERVATION AND PRESERVATION

Conservation and preservation are essential approaches in urban planning aimed at safeguarding the cultural, natural, and built heritage of cities while supporting sustainable growth. Conservation focuses on the careful management, restoration, and adaptive reuse of historic structures, landscapes, and ecosystems, ensuring their continued relevance in a changing urban context. Preservation emphasizes maintaining sites, buildings, and natural features in their existing state, protecting them from alteration or deterioration. Together, these principles help maintain the identity, character, and ecological balance of urban areas, fostering a sense of place, community pride, and environmental resilience for future generations.

9.1 HERITAGE AND MONUMENTS

Gaya, one of the oldest living cities in India, is a place of immense historical, cultural, and religious importance. Situated on the banks of the Phalgu River in Bihar, the city is revered by both Hindus and Buddhists and is known for its ancient temples, sacred sites, and spiritual traditions. For Hindus, Gaya is one of the most significant places for performing *Pind Daan*—ritual offerings made for the salvation of ancestors. For Buddhists, the nearby Bodhgaya, where Lord Buddha attained enlightenment under the Bodhi Tree, is one of the holiest pilgrimage sites in the world and is recognized as a UNESCO World Heritage Site.

The city is home to several remarkable heritage structures and monuments. The most famous among them is the Vishnupad Temple, dedicated to Lord Vishnu. The temple enshrines a footprint of Lord Vishnu imprinted on a solid rock, believed to mark the spot where He subdued the demon Gayasura. The present temple structure was built in the 18th century by Ahilyabai Holkar, the queen of Indore, and is an excellent example of traditional Hindu temple architecture. The Phalgu River ghats, such as Sita Kund and Brahma Kund, hold great ritual significance and are the central locations for the Pitru Paksha Mela, an annual event that attracts thousands of devotees from across the country.

Another important religious site is the Mangla Gauri Temple, one of the 51 Shakti Peethas, dedicated to Goddess Shakti. It is believed that the breasts of Goddess Sati fell at this spot, making it a sacred shrine for devotees. The Pretshila Hill and Brahmayoni Hill are also notable landmarks in Gaya. These sites are associated with several mythological legends and contain ancient temples and caves, offering a panoramic view of the city and its surroundings. Not far from Gaya, the Barabar Caves—dating back to the Mauryan period in the 3rd century BCE—are among the earliest examples of rock-cut architecture in India and are associated with the Ajivika sect patronized by Emperor Ashoka.

Architecturally, Gaya reflects a beautiful blend of Hindu and Buddhist styles. The temples and monuments display intricate carvings, stone sculptures, and inscriptions in Sanskrit and Pali that highlight the city's long-standing religious and

cultural traditions. The annual Pitru Paksha Mela and other festivals further enrich the intangible cultural heritage of the city, keeping its ancient customs alive.

Efforts have been made by the Archaeological Survey of India (ASI) and the Department of Art, Culture, and Youth, Government of Bihar, to preserve and protect Gaya's monuments and heritage sites. Conservation and restoration initiatives focus on maintaining the temple structures, improving visitor facilities, and safeguarding the riverfront and surrounding sacred zones.



FIGURE 9-1 VISHNUPAD TEMPLE GAYA JI

Source: Google Map

9.2 TANGIBLE CULTURAL HERITAGE

Tangible cultural heritage refers to physical objects and places that carry historical, artistic, or cultural value. This includes monuments, buildings, archaeological sites, sculptures, paintings, manuscripts, artifacts, and cultural landscapes. These are visible, touchable, and often preserved through conservation, restoration, and adaptive reuse.

Gaya Ji, located in the Gaya district of Bihar, is a treasure house of tangible cultural heritage that reflects the city's rich religious, architectural, and historical legacy. The tangible heritage includes temples, monuments, ghats, caves, sculptures, and ancient structures that have stood the test of time and continue to attract devotees, pilgrims, and historians from across the world.

The Vishnupad Temple is the most prominent and sacred monument of Gaya Ji. Dedicated to Lord Vishnu, it houses a footprint of the deity engraved on a black basalt stone, believed to be the spot where Lord Vishnu subdued the demon Gayasura. The temple, rebuilt in the 18th century by Queen Ahilyabai Holkar of Indore, is an outstanding example of Hindu temple architecture, featuring beautifully carved pillars and sanctum walls. The Phalgu River and its series of ghats such as Sita Kund, Brahma Kund, and Ramshila are also integral parts of Gaya's tangible heritage, serving as sacred sites for performing Pind Daan and other religious rituals.

Among other significant monuments, the Mangla Gauri Temple, one of the 51 Shakti Peethas, holds immense importance for devotees of Goddess Shakti. The Pretshila Hill and Brahmayoni Hill contain ancient temples, shrines, and stone inscriptions that illustrate the city's mythological and spiritual significance. From these hilltops, visitors can also view the entire landscape of Gaya and its ancient settlements.

Nearby, the Barabar and Nagarjuni Caves stand as remarkable examples of early rock-cut architecture from the Mauryan period (3rd century BCE). Carved during Emperor Ashoka's reign, these caves are among the oldest surviving examples of Indian rock architecture and are associated with the Ajivika sect. Their polished interiors and simple yet precise craftsmanship demonstrate advanced construction techniques of ancient India.

Gaya's tangible heritage also extends to its sculptures, inscriptions, and old monasteries, which reflect a blend of Hindu, Buddhist, and Jain influences. The ancient stone idols, Buddhist stupas, and temple ruins scattered across the city and nearby regions showcase the area's historical depth and artistic excellence.

9.3 INTANGIBLE CULTURAL HERITAGE

Intangible cultural heritage consists of non-physical traditions, practices, and expressions passed down through generations. It includes oral traditions, performing arts, social practices, rituals, festive events, traditional knowledge, craftsmanship techniques, and languages. Intangible heritage keeps cultural identity alive through living practices rather than physical structures.

Magadhi, also known as Magahi, is predominantly spoken in the Magadh region of Bihar, covering districts such as Patna, Gaya, Nalanda, Jehanabad, Nawada, Aurangabad, Arwal, and parts of Palamu in Jharkhand. It is considered the direct descendant of Magadhi Prakrit, the language of the Mauryan Empire (4th–2nd century BCE). Historical accounts suggest that Lord Buddha delivered his teachings in Magadhi Prakrit, which later evolved into Pali, the sacred language of early Buddhist scriptures. Owing to this legacy, Magadhi is often regarded as the language of the ancient Magadh civilization and is closely associated with cultural and historical centers like Nalanda, Rajgir, and Bodhgaya. Rich in folk traditions, proverbs, and storytelling, Magadhi continues to thrive through vibrant cultural expressions such as folk songs performed during festivals like Chhath, Holi, and marriage ceremonies. Beyond being a spoken language, it remains a significant marker of the cultural identity of the people of the Magadh region.

Ancestor-Rituals ('Pind Daan' during Pitru Paksha Mela): One of the most important living traditions of Gaya is the annual ritual of pind daan, when large numbers of devotees gather on the ghats of the Falgu River to perform offerings for their ancestors. For example, on the 12th day of the 16-day Pitru Paksha period, three stone altars at Gaya draw millions of devotees. These rituals are not merely religious ceremonies but form a core part of the cultural identity of families and communities—linking memory, faith and place.

Sacred Geography and Belief Systems: Gaya's intangible heritage also involves how people understand and relate to the sacred landscape: hills, river banks, altars and temple precincts. A study by INTACH mapped this intangible dimension: how people's beliefs around pind daan, the role of the local pandits (the "Gayawals"), and the pilgrimage flows all form culture in motion. The belief system, including how pilgrims conceive of merit, liberation of souls, and ritual time, is a living heritage beyond the physical monuments.

Rituals and Cross-Cultural Pilgrimage: Recently, news reported that pilgrims from Russia, Ukraine, the U.S. and Spain joined together in Gaya for ancestral rites, showing the reach and adaptability of the tradition beyond local audiences. The

way the ritual is conducted, adapted and practiced—including foreign visitors taking part—is part of the intangible cultural fabric of Gaya.

Traditional Games, Festivals and Community Practices: Heritage at Gaya also includes local festivals beyond the major pilgrimage events, as well as community customs. For example, a news article noted that at the Central University of South Bihar in Gaya a fortnight-long event revived indigenous childhood games such as langdi, tug-of-war, etc., as part of preserving cultural forms. Additionally, the vegetarian village in Gaya district (over 300 years) with abstinence from certain foods—a community discipline tied to faith—is another example of living cultural heritage. THEHANSINDIA.COM

9.4 FESTIVALS

1. Pitrapaksha Mela: In Gaya, the Pitrapaksha Mela is an annual 16-day observance (usually in the month of Bhadrapada / September) during the Krishna Paksha when thousands of Hindu devotees converge to perform the ritual of *piṇḍa-dāna* (offering for ancestors) and *tarpan* along the banks of the Falgu River and at the sacred Vishnupad Temple. The importance of Gaya as this ritual centre is rooted in mythological tradition: for example, it is believed that the offering of piṇḍa at Gaya brings salvation for departed souls. During this period the city takes on a very special religious character, with accommodations, pilgrimage facilities and special services organised for the large influx of visitors.



FIGURE 9-2 PIND DAAN AT GAYA JI

Source: Patnapress

2. Chhath Puja: Chhath Puja, the four-day festival dedicated to the Sun-God and his consort, is celebrated with great fervour in Gaya (and Bihar more broadly). In Gaya, the river-bank of the Falgu (and other ghats) becomes the setting for evening and morning arghya (offerings) to the setting and rising sun. the fruit market near Gandhi Maidan in Gaya becomes a hive of communal activity, where vendors from different communities collectively work to meet the devotional demand, reflecting social cohesion.



FIGURE 9-3 CHHATH PUJA AT FALGU RIVER

Source: Tripnstay.com

3. Bodh Mahotsav: the Bodh Mahotsav is a three-day festival held annually (late January to early February) intended to promote the region's Buddhist heritage and culture through international and national performances, exhibitions, music & dance. It features troupes from multiple countries (Thailand, Japan, Vietnam, Cambodia, Sri Lanka, Bhutan) alongside local artists, and includes craft fairs, food festivals, lighting, and improved transport/parking arrangements.



FIGURE 9-4 BODH MAHOTSAV BODHGAYA

Source: Times of India

10 TOURISM

Tourism refers to the act of individuals traveling from one location to another, such as historical sites, mountainous regions, or environmentally sensitive locations, for the purpose of leisure, education, sports, medical treatment, and other activities. As per United Nations World Tourism Organization, 'Tourism' is defined as a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors (which may be either tourists or excursionists; residents or non-residents) and tourism has to do with their activities, some of which imply tourism expenditure (United Nations World Tourism Organization, 2008).

Tourism is one of the fastest-growing sectors in India today. Since the inception of the 'Incredible India' campaign in 2002, India has effectively marketed itself as a desirable tourist destination worldwide. In terms of GDP, the direct and indirect contribution of tourism and travel was nearly 1.77% during 2021-2022 (India Tourism Statistics 2023). It fosters the growth of related sectors such as the hotel business, transportation, handicrafts, and travel agencies. Tourism generates substantial revenue for a local economy through the purchase of goods and services required by tourists. Additionally, the sector contributes immensely to foreign exchange reserves in the country and provides significant employment opportunities, both in the formal and informal sector. Establishes a foundation for job opportunities in the service industry of the economy. It is also instrumental in bringing about economic development, particularly in remote and backward areas. The money spent by the tourists in an area is circulated back into the local economy, which thereby generates more income and employment. Thus, the actual economic benefit to the area is much greater than the original amount spent by the tourists.

10.1 BRIEF TOURISM PROFILE OF BIHAR

Bihar has got its name from the word 'Vihara' or the place where monks live. In the past it was the focal point of knowledge and culture in India. It is from here that Buddhism emerged as a major religion. The Magadha and the Licchavi kingdoms which thrived during the 7th and 8th BC have left behind a rich legacy of art and architecture. The state has immense potential for tourism especially religious tourism, heritage tourism and eco-tourism. But its tourism potential for generating much needed income and employment remains greatly underutilized.

Every rupee spent by a tourist in the state changes hands thirteen times. Every hotel room generates direct employment to three persons and indirect employment opportunities to eight persons (Bihar Tourism Policy 2009). But despite innumerable tourist attractions and an unbounded potential for tourism, Bihar is yet to flourish as a major tourist spot in India. In 2022, the state has been able to attract only 1.46% of domestic tourist and a mere 1.01% of foreign tourists (India Tourism Statistics 2023). The

underdevelopment of the tourism sector in Bihar can be primarily attributed to poor tourist infrastructure and low budget for tourism development.

10.2 EXISTING AND IDENTIFIED TOURIST SPOTS/ CIRCUITS IN AND AROUND PLANNING AREA

Gaya Ji is a prominent tourist hotspot in the state of Bihar, attracting nearly 1.4% of the tourist traffic in the state (in 2023). Considered as one of the most venerated Hindu religious sites, the town draws in Hindu pilgrims from all over India specially to perform the *pind daan* ritual in the memory of their deceased ancestors. The central attraction of Gaya Ji is the Vishnupad Temple Complex which is believed to house Lord Vishnu's footprint. The city also has one of the 52 *mahashaktipeeths* in India – the Mangla Gauri Temple. This makes Gaya Ji a profound spiritual destination for Hindus.

Tourism is a significant part of Gaya Ji's economy. It is one of the 12 pilgrimage destinations in India that are covered under the PRASAD scheme. It has also been selected for the development and promotion of tourism under Swadesh Darshan 2.0 (Ministry of Tourism, India).

10.2.1 HISTORY OF TOWN

The ancient town of Gaya Ji is of great historical significance and finds mention in texts dating back to 600 BC like the great epics of Ramayana and Mahabharata. It was projected to the world by Bimbisara, the fifth of the Shishunaga dynasty who lived and ruled around 519 BC.

The city draws its name from the mythological stories of Gaya Jisura, a demon who performed severe penance to please the Gods. Impressed, the Gods then granted him the boon of being the holiest of all. Thus, one would be able to attain moksha merely by touching him. The Gods soon realized that he made a terrible mistake by giving a demon such immense power and called upon Lord Vishnu to resolve the situation. He tricked to demon to offer his body for a pious *Yajna* and then killed him by stamping his foot on the demon's chest. It is believed that Vishnu's footprint is embedded in a stone in the Vishnupad Temple, one of the most sacred temples for Hindus.

As per Hindu mythology, Gaya Ji is also the site where Rama visited with Sita and Lakshmana to offer *pind daan* to Sita's father Dasharath. Millions of Hindus follow this ritual every year for salvation the souls of their deceased ancestors. The city is thus an important place for Hindus as they come here for pind-daan. It sees a huge influx of visitors for the month-long *Pitra Paksh* mela annually during which the ritual is performed.

10.2.2 TOURIST CIRCUITS

A 'tourist circuit' is defined as a trail or route comprising of at least three major tourist destinations which have distinct locations and are situated far apart from one another in different towns and villages. A circuit can be confined to a single state or have a regional spread spanning across multiple states and union territories. The aim is to encourage visitors to explore each of the destinations along the circuit, often in a predefined order, offering a seamless experience. Circuits

usually have defined entry and exit points and may have a dominant theme and sub-themes.

10.2.2.1 THE HINDU PILGRIMAGE CIRCUIT

The Hindu Pilgrimage Circuit connects several destinations which hold religious significance for Hindus. Multiple sub-circuits exist in India that promotes Hindu tourism destinations which may either have a pan-India coverage or be confined to a single state. Due to Gaya Ji's prominence as a Hindu religious site, it is one of the most visited destinations on this circuit.

The following are the most prominent routes that pilgrims undertake in Bihar (Study on Identification of Hindu Pilgrimage Circuit, Ministry of Tourism, Government of India, 2016):

- Sasaram – Aurangabad – Gaya Ji – Patna – Vaishali – Muzaffarpur – Sitamarhi
- Buxar – Aurangabad – Gaya Ji – Patna (Bihar, India) – Vaishali – Muzaffarpur – Darbhanga – Madhubani

Pilgrims also tend to visit each of these places separately due to the absence of a specific theme inking these destinations.

10.2.2.2 THE RAMAYANA CIRCUIT

The Ramayana Circuit is a theme-based circuit that connects the locations in Bihar which are related to the incidents that are mentioned in the great epic. Bihar is believed to the ancient land of King Janak, where Goddess Sita was born. It is also the land where the ashram of Rishi Valmiki was once located. Gaya Ji is a major spot on this circuit.

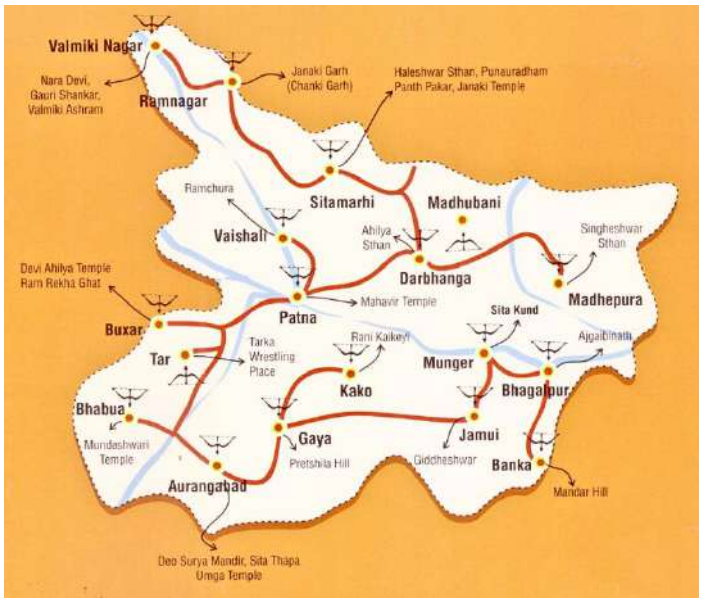


FIGURE 10-1 RAMAYANA CIRCUIT OF BIHAR

Source: Bihar Tourism Website

10.2.2.3 THE ECO-TOURISM CIRCUIT

The Eco-Tourism Circuit covers all those destinations that house wildlife sanctuaries, national parks and locations of scenic beauty. Gaya Ji is a prominent stop/node on this circuit from where tourists visit the Pretshila Hills, the Dungeshwari Hills and the Gautam Buddha Wildlife Sanctuary.



FIGURE 10-2 ECO CIRCUIT OF BIHAR

Source: Bihar Tourism Website

10.2.2.4 THE HERITAGE CIRCUIT

The Heritage Circuit focuses on giving tourists a comprehensive experience of places in Bihar that hold historic significance and uphold the heritage and culture of Bihar. This circuit again has multiple sub-circuits, but the most popular is the Patna – Gaya Ji – Bodhgaya circuit.

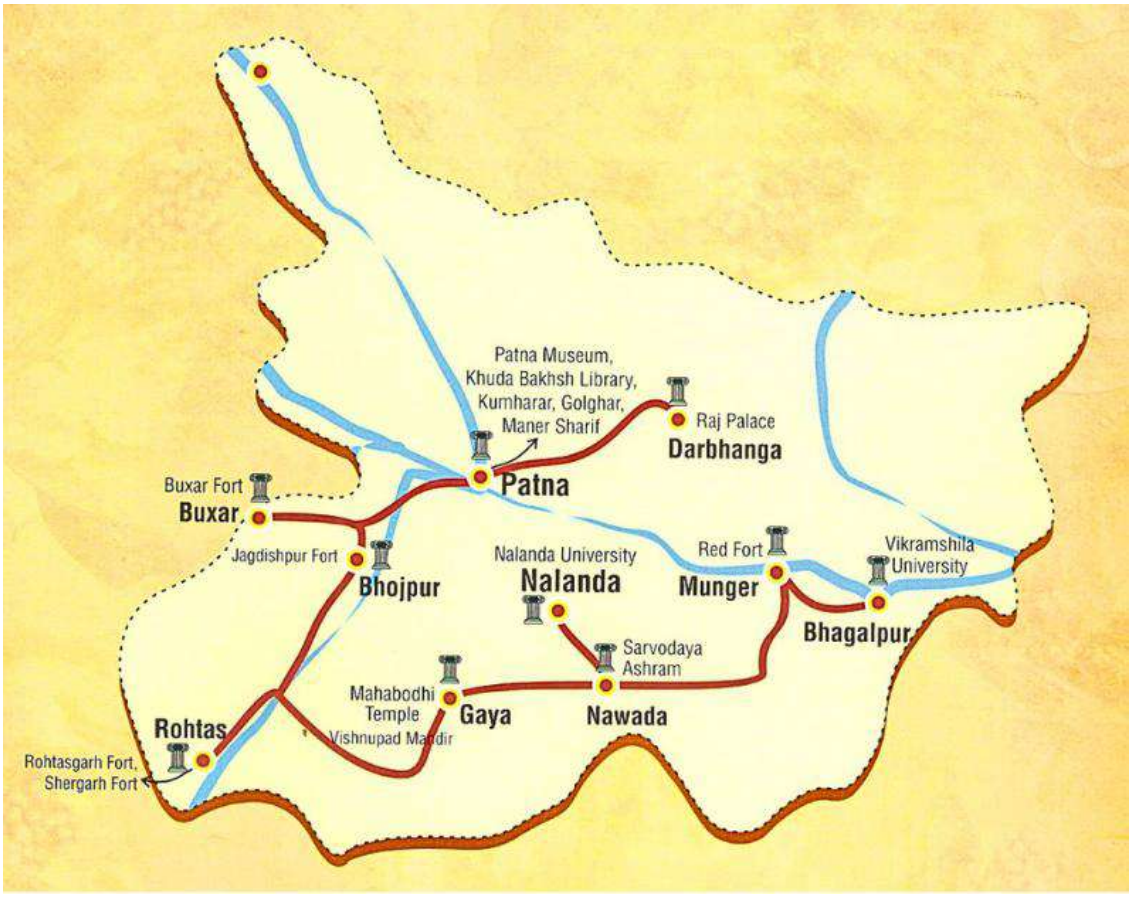


FIGURE 10-3 HERITAGE CIRCUIT OF BIHAR

Source: Bihar Tourism

10.2.3 TOURISM IN GAYA JI

Gaya Ji offers a diverse range of tourist experiences catering to various interests and preferences. It is renowned for both its rich historical legacy and religious significance. Although there aren't many natural features in Gaya Ji itself, there can be chances to go on nature walks along the Falgu River and experience scenic beauty from the nearby hillside.

10.2.4 RELIGIOUS TOURISM

The city is a pivotal pilgrimage site for Hindus and draws millions of tourists from around the country. Gaya Ji is thus one of the epicentres of religious tourism in India. the Vishnupad Temple, Mangla Gauri Temple, and the Prestshila Hills are some of the most visited religious sites in Gaya Ji. Apart from these, there are nearly 54 sites in Gaya Ji like the Brahma Kund, Ram Kund, Uttarmanas, Brahma Sarovar, and Sita Kund, where the *pind daan* is performed. These sites draw a large crowd mostly during the *Pitra Paksha*, a sixteen-day period during which the ritual is supposed to be performed. The government has farsighted plans on linking Gaya Ji with other important Hindu religious sites in the region, like Varanasi and Allahabad, to create a comprehensive 'Hindu pilgrimage circuit'. However, very little has been done to bring these plans to fruition.

10.2.5 ECO TOURISM

Eco-tourism which refers to a form of sustainable tourism that focuses on experiencing and appreciating natural environments and local cultures with minimal impact on the environment. Some of the important attraction spots for ecotourism around Gaya Ji are Dungeshwari Hills, Pretshila Hills and Falgu River. The Gautam Buddha Wildlife Sanctuary is a major eco-tourist spot.

10.2.6 ATTRACTION SPOTS IN GAYA JI PLANNING AREA

10.2.6.1 RELIGIOUS TOURISM SPOTS

A) Vishnupad Temple

This temple holds immense religious significance as it is believed to be the site where Lord Vishnu's footprint is imprinted in a rock. It is a central pilgrimage destination for Hindus. The peak season typically coincides with the *Pitra Paksha* when the daily footfall can reach anywhere between 10,000 to 50,000 devotees. The peak visiting hours are typically in the morning, from 6:00 am to 10:00 am, and in the evening, from 4:00 pm to 8:00 pm. It is owned and managed by the Vishnupad Temple Trust.



Source: Bihar Tourism

B) Mangla Gauri Temple

It is counted as one of the 52 mahashaktipeeths dedicated to Goddess Sati. The temple witnesses a major influx of devotees especially during Navratri. The daily peak season footfall during the time ranges from 10,000 to 20,000 visitors per day. It is maintained by local temple authorities.



Source: Bihar Tourism

C) Pretshila

It is one of the spots for the pind daan ritual. It also offers a stunning view from the hilltop. The place was thus renowned for its religious significance and natural beauty. It draws considerable footfall on weekends and during the Pitra Paksha period.



Source: Bihar Tourism

D) Sita Kund

Believed to be the place where Goddess Sita bathed during the exile, it attracts devotees who perform various rituals along the ghats and take holy dips in its water. The site receives a moderate number of visitors which peaks during special festivals like Ram Navami and Pitra Paksha.



Source: Bihar Tourism

10.2.6.2 ECO-TOURISM SPOTS

A) Falgu River

The river is called sacred and according to Hindu and Buddhist traditions, the river is closely associated with important events such as important rituals like pind daan (offerings to ancestors) on its banks, while the latter consider it a holy site of spiritual significance. It is a popular spot for boat rides. The daily peak season footfall during the Pitra Paksha ranges from 500 to 1,500 visitors. The peak hours in the morning are around 7:00 am - 10:00 am and 4:00 pm - 6:00 pm.



Source: Bihar Tourism

B) Brahmayoni Hills

It is a hilltop location offering panoramic views of the surrounding landscapes. The site is adorned with small shrines and structures where rituals and prayers are conducted by devotees. The site receives a moderate number of visitors which peaks during special festivals like Makar Sankranti and Mahashivratri.



Source: Bihar Tourism

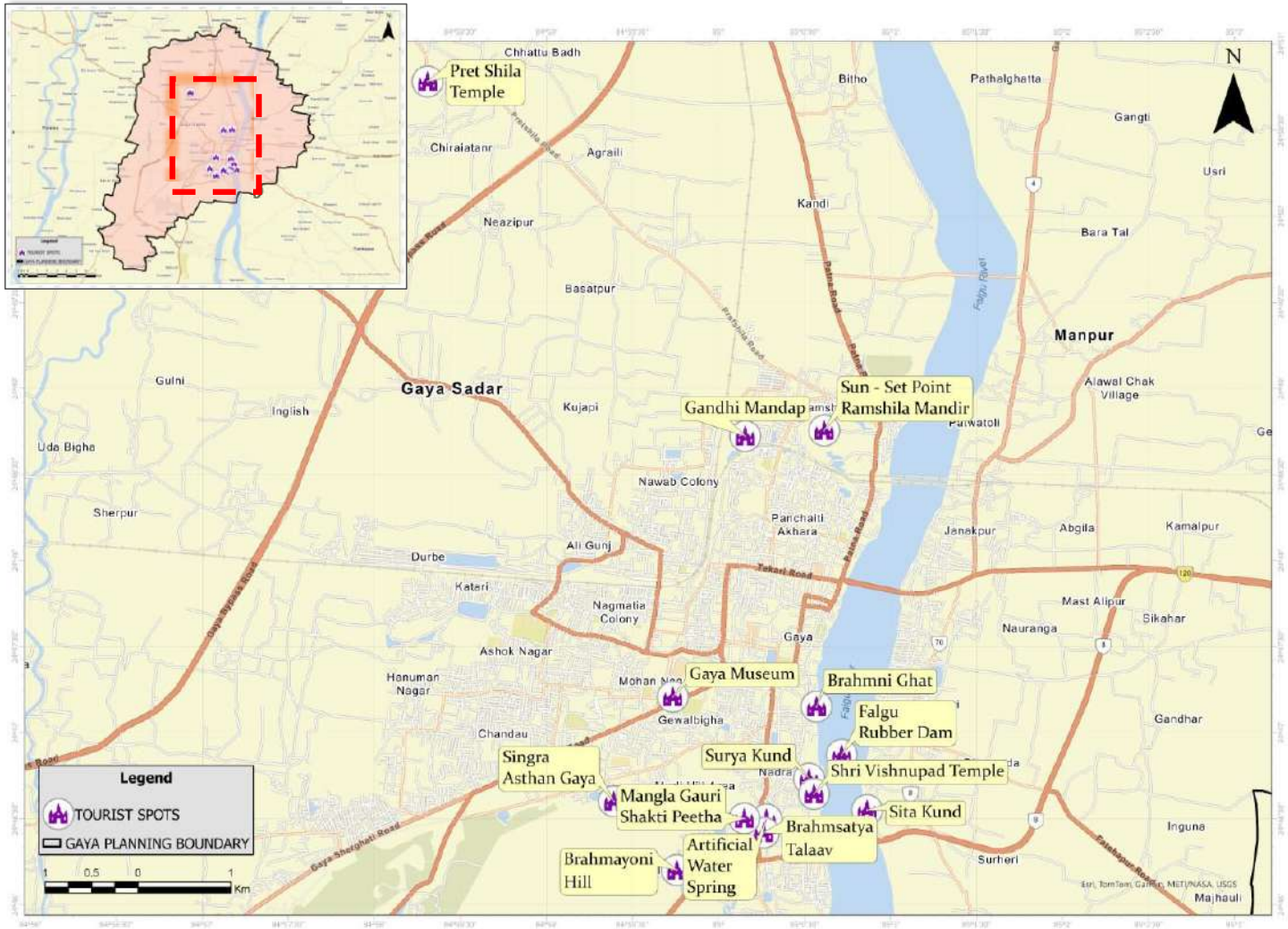
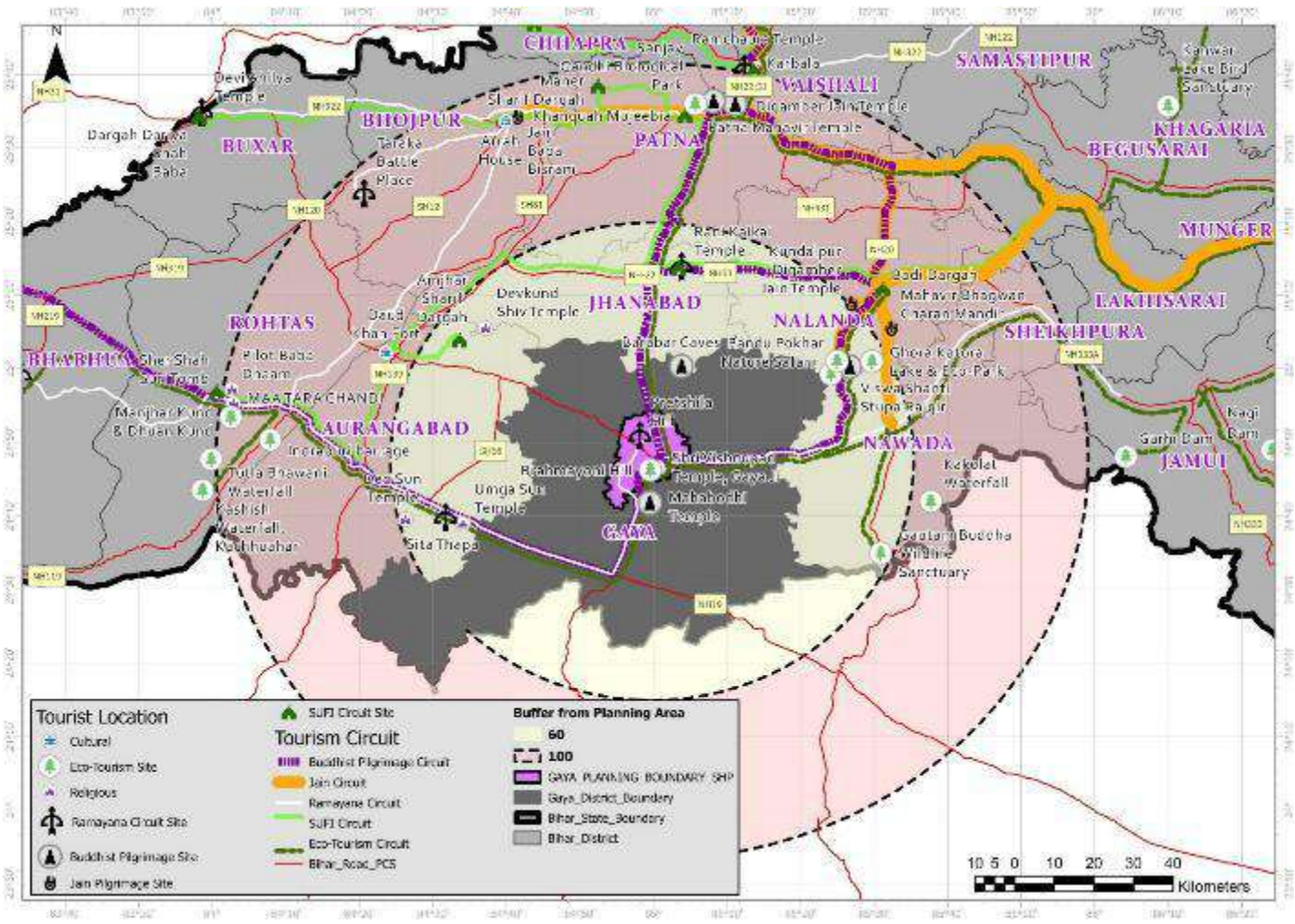


FIGURE 10-4 TOURIST ATTRACTIONS OF GAYA JI



MAP 10-1 REGIONAL TOURISM OF GAYA JI

Source: Bihar Tourism, Map prepared by Stesalit System Ltd.

10.2.7 TOURIST TRAFFIC

The term "tourist traffic" generally denotes the number of tourists or visitors who visit a specific area or destination in a given time frame. The number of tourists visiting a place can be influenced by a variety of factors, such as accessibility, marketing initiatives, weather, events, and economic situations. While a high volume of visitors is often viewed as advantageous to the local economy, it can also present problems including congestion and environmental effects.

Gaya Ji's significance as a Hindu religious spot has a great impact on the number of tourists that visit the place. The city tends to draw a significant number of domestic tourists, especially from countries like Japan and Nepal which have a sizeable number of Buddhist population.

10.2.7.1 ANNUAL INFLOW OF TOURISTS

The tourist inflow to Gaya Ji has exhibited a consistent upward trend from 2015 to 2019 before the COVID-19 pandemic. In 2015, the total tourist inflow was 39,39,843 with domestic tourists comprising nearly 94% of the total inflow. However, the data suggests a notable decline in tourist footfall during 2021, which can be attributed to the impact of the COVID-19 pandemic. Since then, the number of tourists has rebounded strongly.

In 2023, Gaya Ji had received the highest number of tourists in the last three years with 10,37,085 domestic tourists and 96,328 foreign tourists. Although the number of visitors had peaked, it was still far off from the average tourist inflow recorded prior to the pandemic.

TABLE 10-1 TOURIST INFLOW OF GAYA JI

Gaya Ji			
Year	**Domestic**	**Foreign**	**Total**
2015	37,01,226	2,38,617	39,39,843
2016	28,90,268	2,88,914	31,79,182
2017	36,39,728	3,13,817	39,53,545
2018	36,03,628	3,26,228	39,29,856
2019	37,41,250	3,44,934	40,86,184
2020	7,20,176	83,339	8,03,515
2021	1,72,650	162	1,72,812
2022	4,54,893	20,464	4,75,357
2023	10,37,085	96,328	11,33,413

Source: Tourism Department, Govt. of Bihar

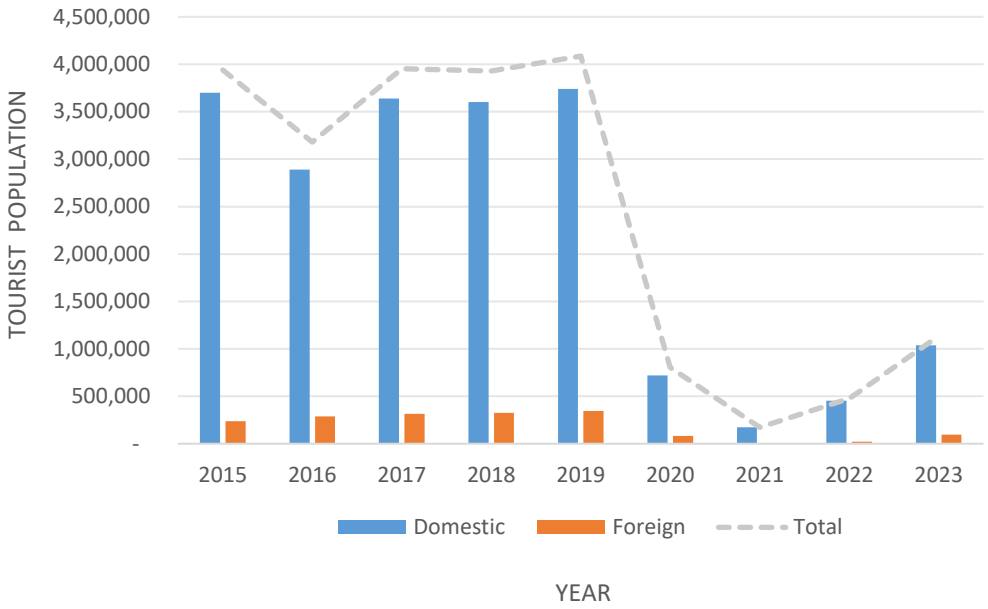


FIGURE 10-5 TOURIST TRAFFIC OF GAYA JI

Source: Tourism Department, Govt. of Bihar

10.2.7.2 MONTHLY INFLOW OF TOURISTS

Maximum tourist traffic is observed around September and October during the *Pitra Paksha*, which is a 16-day period during which rituals like *shraddh*, *tarpan*, and *pind daan* are performed. The months from November to March witnessed higher numbers of foreign tourists. The tourist inflow is particularly low in the summer months from April to September mostly due to high temperatures.

TABLE 10-2 MONTHLY TOURIST INFLOW OF GAYA JI

PLACE	TOURIST	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	TOTAL
Gaya Ji	Domestic	83,008	84,778	87,741	79,753	87,289	75,659	82,336	84,616	73,739	1,20,504	83,105	94,557	**10,37,085**
	Foreign	11,734	17,686	17,390	5,177	7	3,215	2,771	14	13	2,416	17,434	18,471	**96,328**
	TOTAL	94,742	1,02,464	1,05,131	84,930	87,296	78,874	85,107	84,630	73,752	1,22,920	1,00,539	1,13,028	**11,33,413**

Source: Tourism Department, Govt. of Bihar

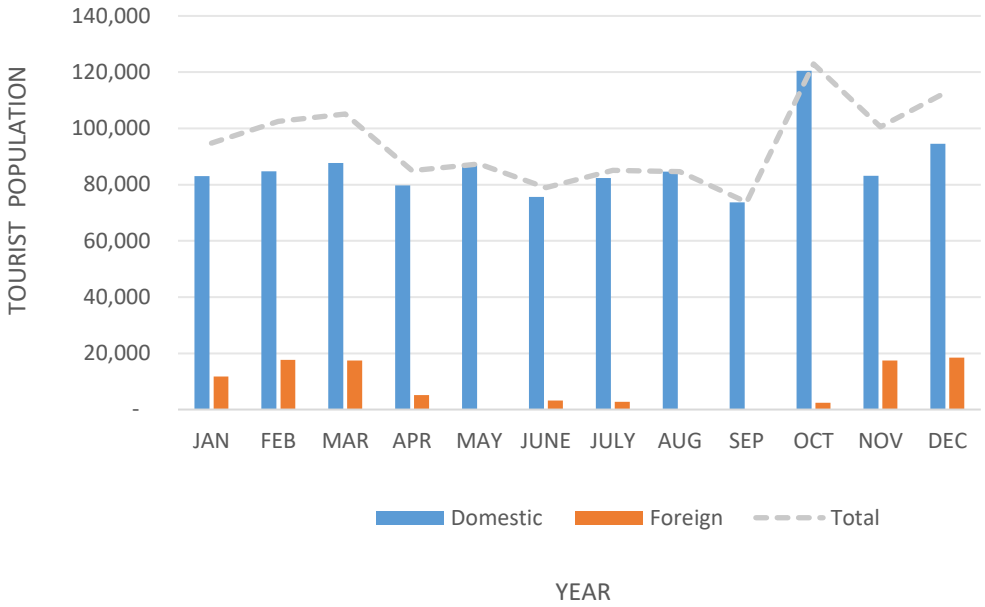


FIGURE 10-6 TOURIST TRAFFIC IN GAYA JI

Source: Tourism Department, Govt. of Bihar

10.3 TOURISM CONNECTIVITY AND INFRASTRUCTURE

Easy mobility and connectivity are an absolute necessity to foster tourism. In the case of circuit tourism, seamless entry and movement for tourists between various locations encourages them to cover the entire Circuit, and has a major effect on the length of stay and dispersion of travellers across the various locations.

Gaya Ji is the most common entry/exit point to the Buddhist Circuit. While rail and air services bring tourists up to certain key points, full-circuit travellers rely on road transport for large sections of their journeys. Most domestic travellers arrive by road (in personal/rented cars) and rail whereas linternational tourists utilize a combination of transport modes.

10.3.1 AIR

Gaya Ji has its own international airport. Unfortunately, flights to Gaya Ji remain seasonal and the majority of these flights are discontinued during the off-season. The footfall of foreign tourists and the frequency of flights have increased significantly. The availability of charter flights from Vietnam and other international flights is expected to boost tourist traffic.

10.3.2 RAIL

Rail connectivity can play an important role in boosting tourism in the region. The nearest railway station is in Gaya Ji itself and all the major trains pass through the station. Due to its nationwide connectivity, most domestic tourists arrive in the city via the railroad.

10.3.3 ROADS

Road transport is the most utilized by tourists mainly for intra-state travel. The road infrastructure is constantly improving and most state-level roads are in fair, if not good, condition. The Grand Trunk Road (NH-2) connects Gaya Ji to all major cities in the region allowing unhindered arrival of tourists. The state capital, Patna, is 120 km away and well connected by road (NH-83).

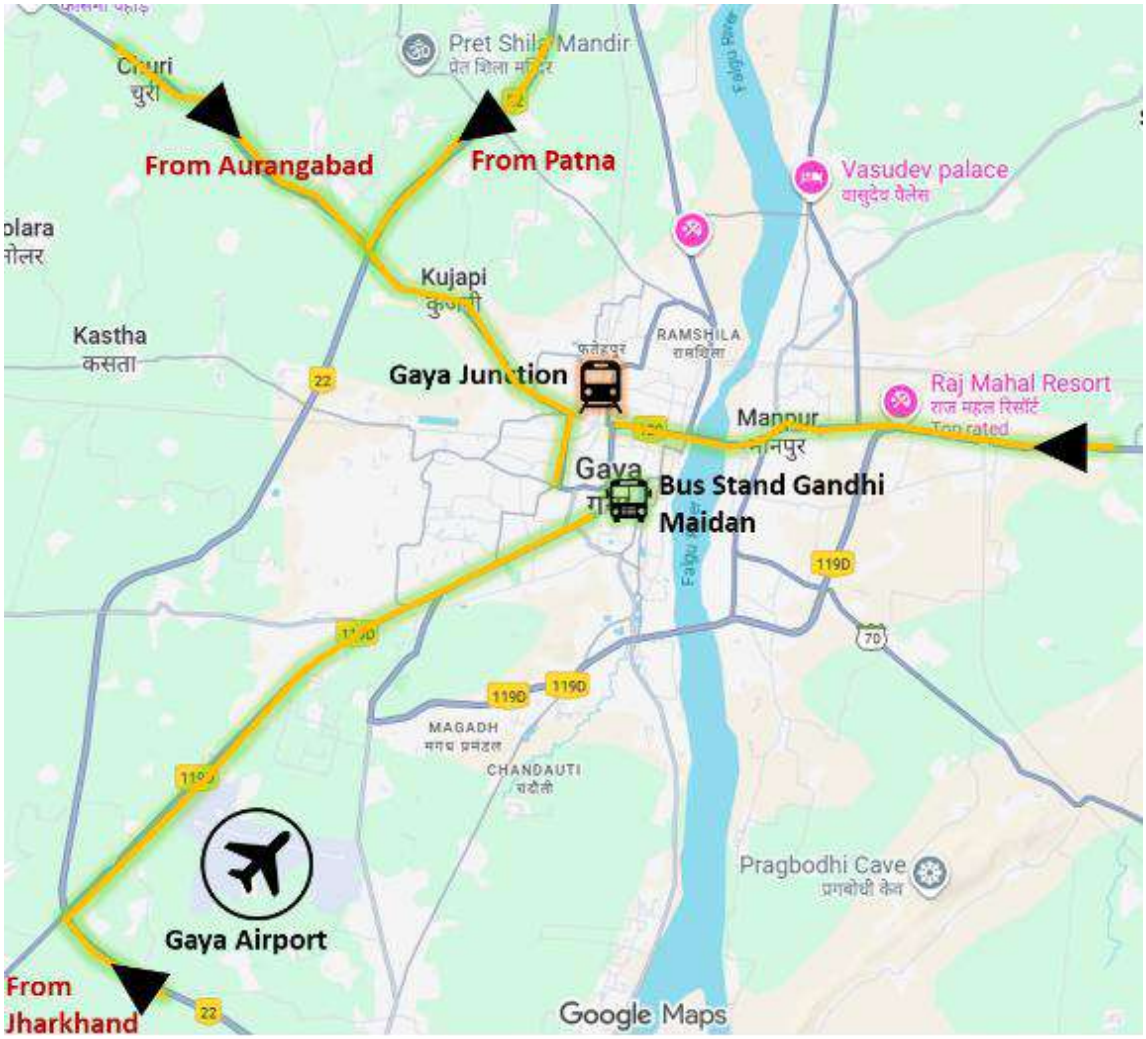


FIGURE 10-7 TOURISM CONNECTIVITY

Source: Google Map, Reconnaissance Survey, 2024

10.4 WAYSIDE AMENITIES

The availability of wayside amenities along travel routes enhances the overall tourist experience and reinforces the overall regional connectivity between far-off tourist destinations. Considerable efforts have been undertaken to improve such infrastructure in India with the central government sanctioning major projects along routes connecting Gaya Ji to other major tourist destinations.

TABLE 10-3 CENTRAL FUNDING Under Swadesh Darshan Scheme for development of wayside amenities

State	Name of the Project/Circuits	Year of Sanction	Amount Sanctioned (Rs. Crore)	Amount Released (Rs. Crore)	Project Status
Bihar	Development of Wayside Amenities in Uttar Pradesh and Bihar at Varanasi-Gaya Ji and Kushinagar-Gaya Ji	2018-19	15.07	14.32	Complete

Source: Ministry of Tourism, India

10.5 GOVERNMENT SCHEMES AND INITIATIVES

The great potential for tourism in Gaya Ji remains impeded by issues like poor infrastructure, lack of tourism amenities, and inadequate promotion and tourism branding. These challenges need to be addressed and resolved to realize its potential and attract more tourists both domestic and international. Both the state and the central government have undertaken the following initiatives to reinstate Gaya Ji as a prime tourist destination:

- Swadesh Darshan 2.0 has identified Gaya Ji as one of the as one of the destinations for development under this scheme.
- PRASHAD Scheme focuses on developing and identifying pilgrimage sites across India. Gaya Ji is one of the 12 pilgrimage cities covered under this scheme.

VISHNUPAD CORRIDOR PROJECT

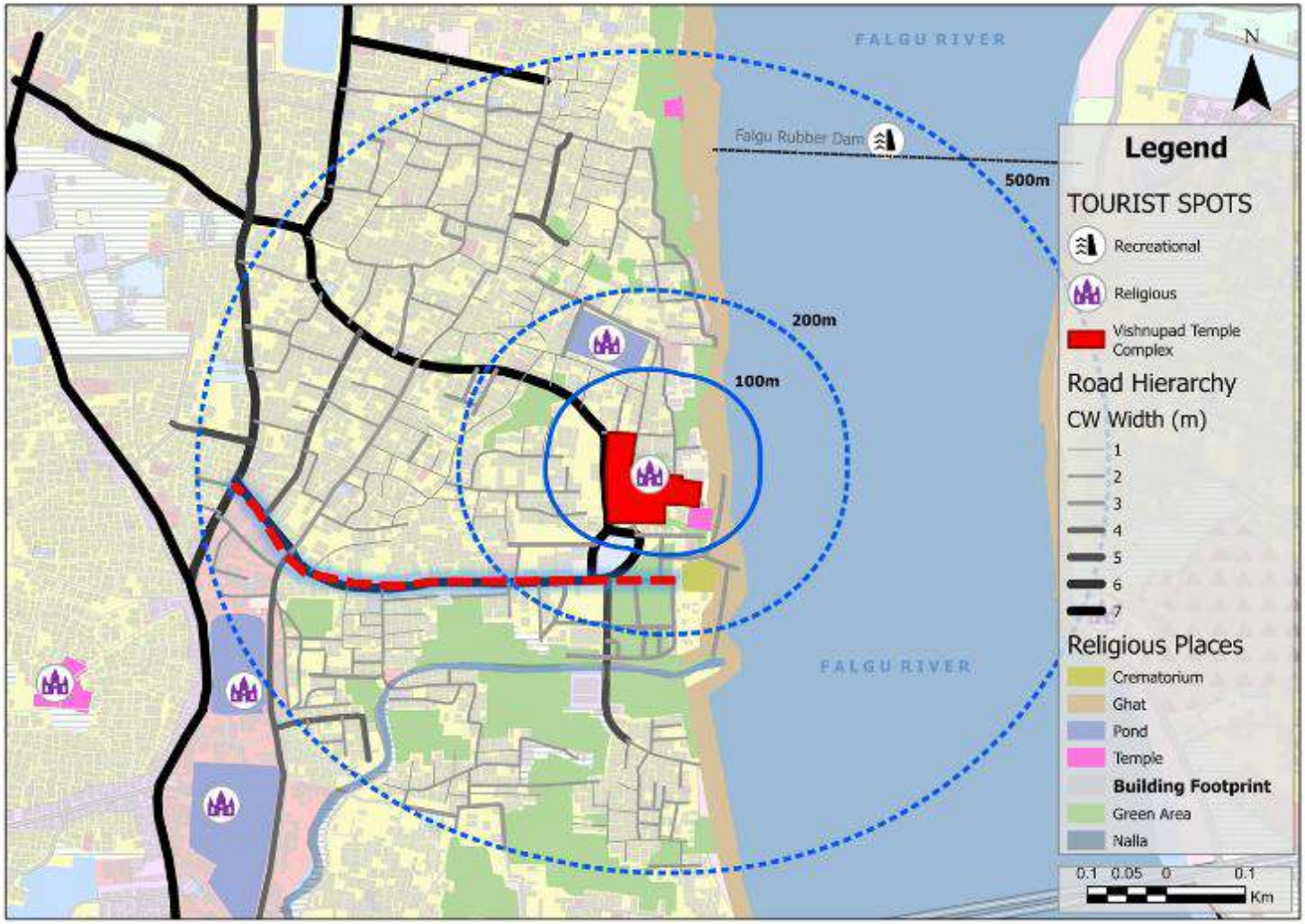
- For the Vishnupad Corridor, Rs. 57.74 crores were allocated in the Union budget of 2024-25 to enhance facilities around the Vishnupad temple
- As per District Magistrate of Gayaji, "144-foot corridor will be constructed from Ghughritand bypass through the cremation ground, providing direct access to Vishnupad temple.
- A significant ₹300-crore rubber dam project has been constructed to ensure year-round water availability for Pind Daan rituals.
- Proposed corridor consists following:
    - 144 ft (44m) wide corridor
    - Beatification of Temple
    - Visitor's facilitation Center
    - Grand entrance from Falgu River
    - Bus Stand

E-PIND DAAN" & PIND DAAN TOURISM PACKAGES

- The Bihar State Tourism Development Corporation (BSTDC) has announced a range of travel packages that allow pilgrims to participate in the religious

ceremonies at key sites including Vishnupad Temple, Akshayvat, and the banks of the Falgu river.

- For those unable to travel in person, an e-Pind Daan service will enable devotees to perform the rituals remotely.
- In addition to the religious ceremonies, the packages offer guided visits to historic and cultural sites across Gaya, Patna, Nalanda, Rajgir, and Bodhgaya.



MAP 10-2 VISHNUPAD TEMPLE AND PROPOSED CORRIDOR

Source: Landuse Survey, 2024, Times of India, 26th May, 2025

10.6 ISSUES AND POTENTIAL

TABLE 10-4 SWOT OF TOURISM CONDITION IN GAYA JI PLANNING AREA

Strength	Weakness	Opportunity	Threat
HISTORICAL AND RELIGIOUS SIGNIFICANCE • The **Mangala Gauri Temple** in Gaya Ji is one of the 18 Maha-Shakti-Peeths of India • The **Vishnupad temple** holds immense religious significance as it is believed to be the site where Lord Vishnu's footprint is imprinted in a rock. It is a central pilgrimage destination for Hindus • There are nearly 54 sites in Gaya Ji like the **Brahma Kund, Ram Kund, Uttar-manas, Brahma Sarovar, and Sita Kund**, where the ***Pind-Daan*** is performed. These sites draw a large crowd mostly during the ***Pitra Paksha***, a sixteen-day period during which the ritual is supposed to be performed **TOURIST CIRCUIT AND TOURISM PROMOTION**	**TOURIST TRANSPORT INFRASTRUCTURE** • Despite attracting a significant influx of domestic and international tourists, Gaya Ji Road infrastructure remains inadequate for ensuring seamless accessibility. • Existing road width of access road of Vishnupad temple and Pind-Daan Ghats is narrow (5-6m), mostly encroached by informal shops. It	**DEVELOPMENT UNDER TOURISM OR INFRASTRUCTURE SCHEMES** • Government initiatives such as **AMRUT** and **Swadesh Darshan** continue to support in enhancing Gaya Ji's transport and overall infrastructure, improving accessibility for pilgrims and tourists. • Gaya Ji is one of the 13 pilgrimage destination in India that are covered under the **PRASAD scheme**, aims to integrate pilgrimage destinations in a prioritized, planned and sustainable manner to provide a complete religious tourism experience.	**ENVIRONMENTAL CHALLENGES** • Increased tourist footfall will lead to increased pollution, waste generation and infrastructure service demands. • Unless the city is equipped to tackle the demand, it will pose a serious threat to the environment and quality of life. **SEASONAL EMPLOYMENT** • Seasonal employment in the tourism industry is highly vulnerable, as job opportunities for guides, street vendors, and other local workers are largely

Strength	Weakness	Opportunity	Threat
• The development of a **Ramayana Circuit** under the **Swadesh Darshan Scheme** *(2016-17)* and **PRASAD** *(Pilgrimage Rejuvenation and Spiritual Augmentation Drive, 2014-15)*, linking Gaya Ji with other sites has enhanced tourist footfall over the years. **TOURIST FOOTFALL** • It attracts the **highest number of Hindu Pilgrimage as well as Foreigner tourists** in Bihar during the **Pitra-Paksha**. **TOURIST INFRASTRUCTURE** The development of Tourist Infrastructure in terms of accommodation and tourist services has also increased the tourist footfall many folds.	causes traffic problem and highly crowded during Pitri-Paksha Month.	• Furthermore, eco and cultural tourism can be fostered by developing sites like the Falgu River, Dungeshwari Hills, Pretshila Hills and heritage walks, enriching the visitor experience beyond religious tourism. Upgrading tourism infrastructure—including transport, accommodation, visitor services, and promotional efforts—to international standards can significantly boost revenue and elevate the overall travel experience.	dependent on the peak tourist season in September. • Any disruptions during this period—such as economic downturns, travel restrictions, or climate changes—can severely impact livelihoods, leaving many without income for the rest of the year. **ENCHORACHMENT NEAR HERITAGE STRUCTURE** Encroachment near heritage structures will a significant threat, as the influx of street vendors can lead to overcrowding, obstructed views, and damage to the historical site.

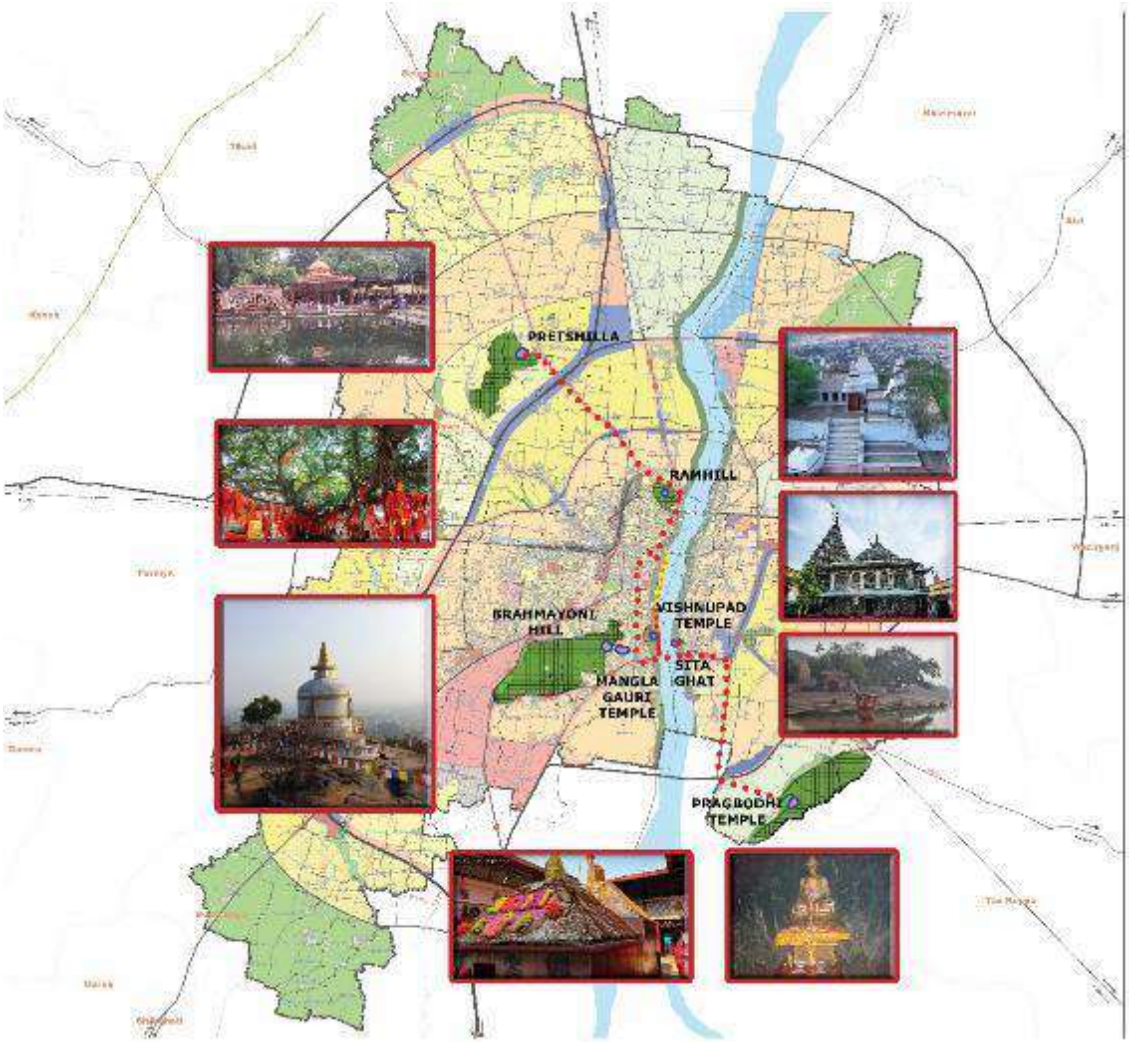
10.7 RECOMMENDATION

The tourism development proposal for the Gaya Ji Planning Area focuses on strengthening the region's identity as an international spiritual, cultural, and eco-tourism destination by improving connectivity between major pilgrimage, heritage, natural, and recreational sites. Considering the increasing inflow of domestic and foreign tourists, an integrated tourism circuit system has been proposed to enhance accessibility, visitor experience, and regional economic growth. The proposal includes the development of internal tourism circuits through an efficient network of roads and waterways connecting important destinations such as Mahabodhi Temple, Vishnupad Temple, Falgu River ghats, Dungeshwari Hills, Brahmayoni Hills, Pretshila, Ramshila, Mangla Gauri Temple, Sujata Stupa, and nearby eco-tourism and rural tourism areas.

The proposed tourism circuits are planned in a hierarchical manner comprising spiritual circuits, heritage circuits, eco-tourism circuits, and riverfront tourism routes. Major pilgrimage routes will be upgraded with wider roads, pedestrian-friendly pathways, signage systems, landscaping, parking facilities, tourist amenities, and public transport integration. Dedicated tourism corridors connecting Gaya city, Bodhgaya, and surrounding tourist villages are proposed to ensure seamless movement of visitors throughout the planning area. In addition, skywalks and pedestrian pathways may be developed at selected high-footfall religious zones to improve walkability and reduce congestion.

To further enhance the tourism potential, water-based tourism has been proposed along the Falgu River and selected water bodies within the planning area. The development of waterways for tourist movement, recreational boating, cultural cruises, and eco-tourism activities will provide an alternative mode of transport while promoting the riverfront as a major attraction. Riverfront development with ghats, promenades, cultural plazas, open spaces, landscaping, and night-time illumination is also proposed to improve the overall tourist experience. A controlled eco-sensitive development zone along river stretches is recommended to preserve the natural environment and maintain the spiritual character of the region.

The proposal also emphasizes the development of tourism-supportive infrastructure including hotels, dharamshalas, wellness centers, meditation zones, information centers, parking hubs, souvenir markets, food streets, and cultural activity spaces. Commercial and hospitality-related land uses are proposed along major tourism corridors, particularly along the Gaya–Manpur–Rajgir road and other regional connectors, to encourage private investment and generate employment opportunities for local communities. Agro-tourism and eco-tourism activities are additionally proposed in rural and hilly areas to diversify tourism attractions and promote sustainable local livelihoods.



MAP 10-3 PROPOSED TOURISM CIRCUIT MAP

11 PHYSICAL INFRASTRUCTURE

India has a dynamic yet ever-changing physical infrastructure. Local commuting is typically served by public transportation services such as buses and auto-rickshaws. Healthcare and educational services, while not as numerous as in larger cities, are present and serve the population. However, both urban and rural areas frequently suffer issues with the quality and accessibility of amenities like water supply, sanitation, and electricity. As these towns expand, there is a drive towards infrastructure development, to close gaps and improve general living standards for their citizens. The Water and Sanitation Sustainable Development Goals (SDGs) offer a more expansive agenda: By 2030, all people ought to have equitable access to affordable, suitable sanitation and hygiene, as well as reasonably priced drinking water. Efforts are being made to strengthen the infrastructure, allowing it to support a growing population and meet the increasing needs of urban life.

11.1 WATER SUPPLY

Rapid urbanization exacerbates the imbalance between the demand and supply of water leading to water shortage conditions. One of the most fundamental needs in every civilization is a reliable supply of potable water. Potable water shortage demonstrates sincere and careful management of the water supply. Water supply and management for every household must be handled effectively and efficiently by the concerned Urban Local Body (ULB)s.

11.1.1 EXISTING SUPPLY SYSTEM

SOURCE OF WATER

The river Falgu is Gaya Ji Planning Area's principal supply of water and serves as a lifeline for the region. Despite its importance, a sizable proportion of the population relies on alternative water sources. According to Census of India 2011 data, 18.3% of total households in the urban area have access to treated tap water, showing that an organized supply system exists for a small portion of the population. In rural areas, merely 1.09% of the total households i.e. 574 homes receive tap water from treated sources. This reflects a level of infrastructural development in certain locations for delivering treated or managed water directly to households.

TABLE 11-1 SOURCES OF DRINKING WATER IN GAYA JI PLANNING AREA, CENSUS OF INDIA,2011

Area	Total Households	Tap water from a treated source	Tap water from un-treated source	Covered well	Un-covered well	Hand pump	Tubewell/ Borehole	Spring	River/ Canal	Tank/ Pond/ Lake	Other sources
Rural Area (162 villages)	52,515	*1.09 %*	*1.04%*	*0.53%*	*1.80%*	92.96 %	*0.83%*	*0.07 %*	*0.05%*	*0.30%*	*1.33%*
		574	545	278	947	48819	436	35	27	157	696
Gaya Ji Municipal Corporation	72,974	*18.3%*	*6.8%*	*0.7%*	*0.7%*	*52.3%*	*18.9%*	*0.1%*	*0.1%*	*0.4%*	*1.8%*
		13347	4955	504	504	38158	13785	66	66	285	1306
Gaya Ji Planning Area (162Villages+ 1Municipal Corporation)	**1,25,489**	**13921**	**5500**	**782**	**1450**	**86977**	**14221**	**101**	**92**	**441**	**2003**

Note: Includes rounding error

Source: Census of India, 2011

In rural areas, 0.53% of the total households continue to rely on covered wells for water supplies. This reliance on covered wells may indicate a combination of traditional practices as well as locations where piped water has not yet been established. The usage of hand pumps by 92.96% of households demonstrates the predominance of decentralized water sourcing.

In the Gaya Ji Municipal Corporation area, 52.3% of the total households i.e. approximately 38158 homes depend on hand pumps for their daily water need. Furthermore, 18.9% of households rely on tube wells and other sources for their water supply, demonstrating that the population employs a variety of means to secure water for various domestic activities.

11.1.1.1 LOCATION OF DRINKING WATER SOURCE

By the Census of India the 2011, a household's location is classified as "near the premises" if it is less than 100 meters away, and as "away from the premise" if it is more than 100 meters away.

In the rural areas, 44.19% of the total households have water sources within their household premises whereas 37.39% of the total homes have water sources near their household premises. 18.41% of the total rural households i.e. approximately 9669 homes have to access water from a distance away. In the Gaya Ji Municipal Corporation area, 81.7% of the total households have water supply connections within their household premises. Merely, 8% of the total households (approximately 5838 homes) have to access water from a distance away.

TABLE 11-2 LOCATION OF DRINKING WATER SOURCE, CENSUS OF INDIA, 2011

Area	Total Households	Within premises	Near premises	Away
Rural Area (162 villages)	52,515	*44.19%*	*37.39%*	*18.41%*
		23210	19636	9669
Gaya Ji Municipal Corporation	72,974	*81.7%*	*10.3%*	*8%*
		59620	7516	5838
Gaya Ji Planning Area (162Villages+ 1Municipal Corporation)	**1,25,489**	**82830**	**27153**	**15507**

Source: Census of India, 2011

The water supply study examines the accessibility, quality, and reliability of water supplies in the survey region. The investigation aims to find critical insights regarding the community's health, sanitation, and overall quality of life by examining water supply patterns, usage habits, and potential concerns. Understanding the dynamics of water supply not only addresses immediate concerns but also informs sustainable development policies and public health measures, resulting in a more complete socioeconomic profile of the studied population.

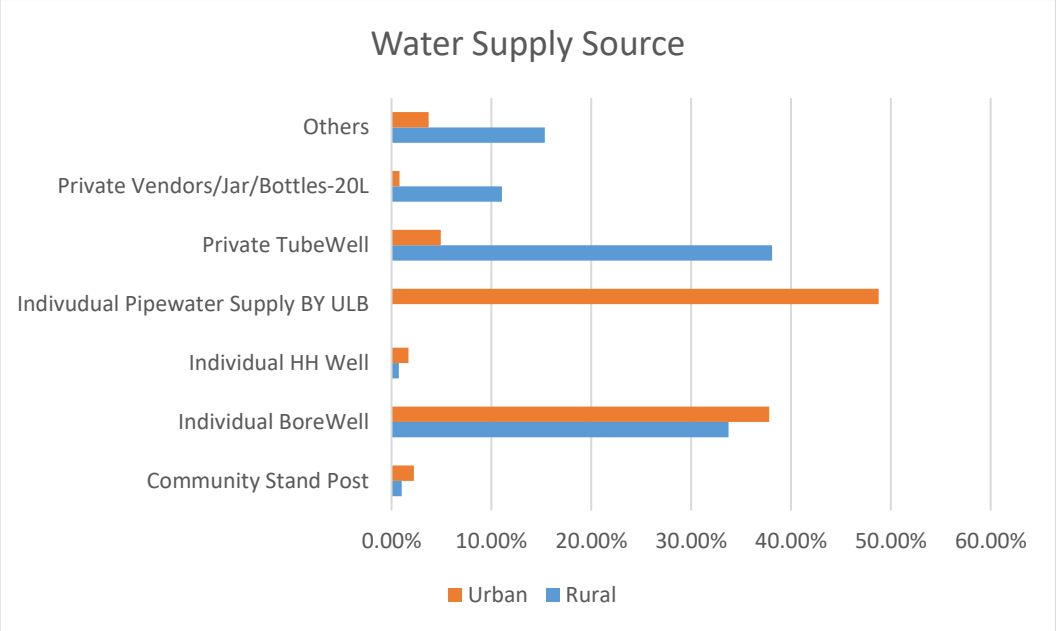


FIGURE 11-1 SOURCE OF DRINKING WATER SUPPLY IN THE HOUSES OF THE SURVEYED HOUSEHOLDS IN GAYA JI PLANNING AREAS

Source: Socio-Economic Survey,2023, Stesalit Systems Limited

11.1.1.2 EXISTING WATER SUPPLY SYSTEM

Water supply refers to the process of providing clean water to individuals, communities, or cities. This is done through a comprehensive water supply scheme that includes water collection, treatment, storage, and distribution. The process involves various components such as intake wells, borewells, water treatment plants (WTPs), underground storage reservoirs (UGSRs), overhead reservoirs (OHRs), pumps, motors, and a network of pipes. Urban local bodies (ULBs), government organizations, community arrangements, or individuals can be responsible for providing water supply services.

The ULB supplies a total of 85 million litres of water for residential purposes, including slum households. Each resident is provided with 135 LPCD (litres per capita per day) of water. The ULB has a total of 80,869 household connections, and below are the details of the residential water supply.

TABLE 11-3 DETAILS OF WATER SUPPLY SYSTEM IN GAYA JI PLANNING AREA

Quantity of water supply in (MLD)	Times and Hours of supply per day	No of Connections	Old water connection	New water connection	Per capita Consumer (LPCD)	Metering achieved %	Efficiency in the collection of charges
85	5	80,869	23,500	57,369	135	55.55%	0

Source: Bihar Urban Infrastructure Development Corporation Ltd., 2024

Although the Ganga River is the main drinking water supply, local Baring in Dandi Bagh is also a source.

TABLE 11-4 GAYA JI PLANNING AREA WATER SUPPLY SCHEME

Name of Municipal Body	Target Ward No.	Target houses	Complete Ward No.	Complete houses	Occupied Ward no	Occupied Houses no	Working Agency	Status of O&M
Gaya Ji Nagar Nigam	53	New-58,250 Existing-12,750 Total-71,000	33 and randomly -20	New-47,860	0	10,390	BUDICO	Ongoing

Source: Bihar Urban Infrastructure Development Corporation Ltd., 2024

The Gaya Ji Water Supply Scheme, spearheaded by the Gaya Ji Nagar Nigam, aims to enhance water supply infrastructure across the city, targeting 53 wards. This scheme involves providing water supply to a total of 71,000 houses, with 58,250 new connections and 12,750 existing ones. As of now, water supply infrastructure has been completed in 33 priority wards, along with 20 additional wards selected at random. A total of 47,860 new houses have been covered under the scheme. However, while the infrastructure has been laid, none of the completed houses have yet been fully occupied for water usage. The current occupancy of houses receiving water stands at 10,390.

The project is being executed by BUDICO, with a planned completion date of June 30, 2024. The operations and maintenance (O&M) phase is currently ongoing, ensuring that all aspects of the water supply system are efficiently implemented. Once complete, the scheme will significantly improve access to reliable water services for thousands of households in Gaya Ji Nagar Nigam, marking a major step forward in the city's public utility development.

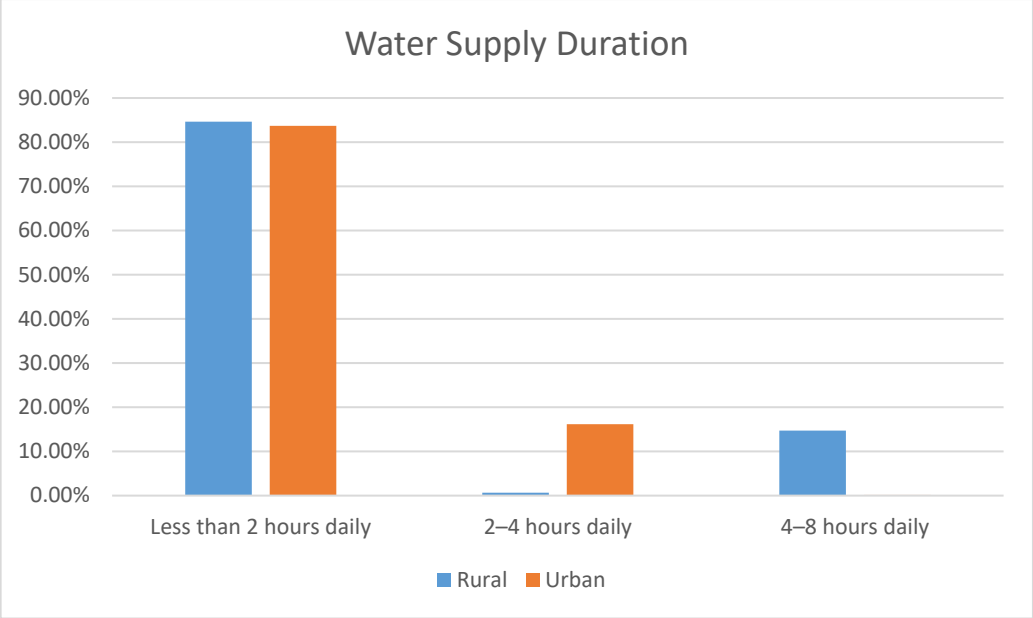


FIGURE 11-2 DURATION OF WATER SUPPLY IN GAYAJI PLANNING AREA

Source: Socio-Economic Survey,2023, Stesalit Systems Limited

11.1.1.2.1 LEVEL OF SATISFACTION

The households surveyed connected to tap water in urban areas are found to be not satisfied with the water quality and quantity. 64.70% of them have given a bad rating to the water quality while 11.49% have given an average to the supplied water. This indicates that there are some issues with the tap water services.

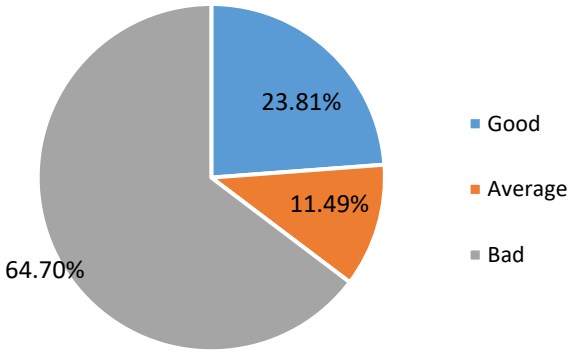


FIGURE 11-3 WATER QUALITY OF TAP WATER IN THE SURVEYED HOUSEHOLDS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

11.1.1.3 RESERVOIRS

The Overhead Reservoir (OHR) is a storage tank that holds a measured quantity of water. This collected water is used for various domestic and commercial purposes. To provide its citizens with effective water distribution, the Gaya Ji planning area has a strong network of overhead water reservoirs (OHR). As of 2024, there are six OHRs spread throughout the city's strategic locations, according to the Bihar Urban Infrastructure Development Corporation Ltd. These reservoirs, whose capacities vary, are essential to preserving the water supply in various areas.

TABLE 11-5 DETAILS OF OVERHEAD WATER RESERVOIR IN GAYA JI PLANNING AREA

No. of OHR	Location of the Existing OHR	Capacity (ML- Million Litres)	Condition
1	Budhwa Mahdev	1	Good

No. of OHR	Location of the Existing OHR	Capacity (ML- Million Litres)	Condition
2	Bushunda mela	2.15	Good
3	Mastalipur	2	Good
4	Joda Masjid	2.15	Good
5	Delha	3.2	Good
6	Azad Park	0.45	Good

Source: Bihar Urban Infrastructure Development Corporation Ltd., 2024

TABLE 11-6 DETAILS OF OVERHEAD WATER RESERVOIR IN GAYA JI PLANNING AREA

Component	Location	Status as of date	% of Progress
OHR	Budhwa Mahdev	Completed	100%
	Bushunda mela	Completed	100%
	Mastalipur	Completed	100%
	Joda Masjid	Completed	100%
	Delha	Completed	100%
Refurbishment of OHR	Azad Park	Completed	100%

Source: Bihar Urban Infrastructure Development Corporation Ltd., 2024



FIGURE 11-4 OVERHEAD WATER TANK AT BHUSUNDA MELA & BUDHWA MAHADEV, GAYA JI

Source: Land use Survey, 2024, Stesalit Systems Ltd

11.1.1.4 TREATMENT PLANTS

A Water Treatment Plant (WTP) is a crucial part of the public water supply system, where water undergoes treatment to improve its physical, chemical, or biological quality. In the Gaya Ji region, there is only one WTP.

TABLE 11-7 DETAILS OF WATER TREATMENT PLANT IN GAYA JI PLANNING AREA

No. of WTP	Location of the Existing WTP	Capacity (ML- Million Litres)	Condition
1	Manpur block	186	Good

Source: Water Resource Department, 2024

11.1.1.5 PUMPING FACILITIES

There are 25 pump houses located in Gaya Ji. All of these pump houses are in working condition.

TABLE 11-8 EXISTING WATER PUMPING FACILITIES IN GAYA JI PLANNING AREA

Component	Location of the Pump House	Status as of date	% of Progress
New Pump House	9 new (6-Dandhibagh, Fire station, Central school, Janta colony)	Completed	100%
Refurbishment Pump House	16 renovations	Completed	100%

Source: Bihar Urban Infrastructure Development Corporation, 2024

TABLE 11-9 PIPELINE NETWORK IN GAYA JI PLANNING AREA

Component	BOQ Scope	Status as of date	% of Progress
Pipeline	Original Scope – 447.776 KM	524.51 KM	100%
	Revised Scope - 514.64 KM		
	Rising main – 14.694 km	13.33 KM	81%
	Road restoration – 265.40 km (Variable)	263.80 km	99%

Source: Bihar Urban Infrastructure Development Corporation, 2024

In Gaya Ji, the pipeline network initially covered 447.776 km but was later revised to 514.64 km. Remarkably, the project has now completed 524.51 km, exceeding the updated scope. This includes 13.33 km of the rising main and 263.80 km of road restoration, which are close to being fully completed.

TABLE 11-10 GROUND LEVEL WATER RESERVOIR (GLSR) IN GAYA JI PLANNING AREA

Component	Location of the GLSR	Capacity	Status as of date
GLSR	Brahmayoni - 01	4.64 ML	100%
	Brahmayoni - 02	4.64 ML	90%
	Ramshilla	2.6 ML	100%
Refurbishment of GLSR	Murali Hills	-	100%
	Singrasthan	-	70%
	Brahmayoni - 03	-	5%
	Brahmayoni - 04	-	-

Source: Bihar Urban Infrastructure Development Corporation, 2024

Gaya Ji has improved its water distribution and storage capacity by constructing several Ground Level Water Reservoirs (GLSRs). At Brahmayoni, two reservoirs have been developed—Brahmayoni-01, with a capacity of 4.64 million litres (ML), is 100% complete, while Brahmayoni-02 with the same capacity is 90% complete. The

Ramshilla GLSR, with a capacity of 2.6 ML, is also fully completed. Additionally, refurbishment work on existing GLSRs is ongoing. The Murali Hills GLSR refurbishment has been completed, while Singrasthan is 70% complete. Meanwhile, refurbishment at Brahmayoni-03 has just started, with 5% progress, and Brahmayoni-04 is yet to begin. These reservoirs are essential to the city's ability to meet water needs since they provide a dependable and effective supply chain.

Gaya Ji's water supply system is bolstered by the operation of tube wells spread across various locations, ensuring effective water distribution across the city. These tube wells collectively operate 25 bore wells, with a combination of working and standby units to maintain uninterrupted service. Below are the breakdown of the tube well and VT pump performance:

TABLE 11-11 TUBE WELLS IN GAYA JI PLANNING AREA

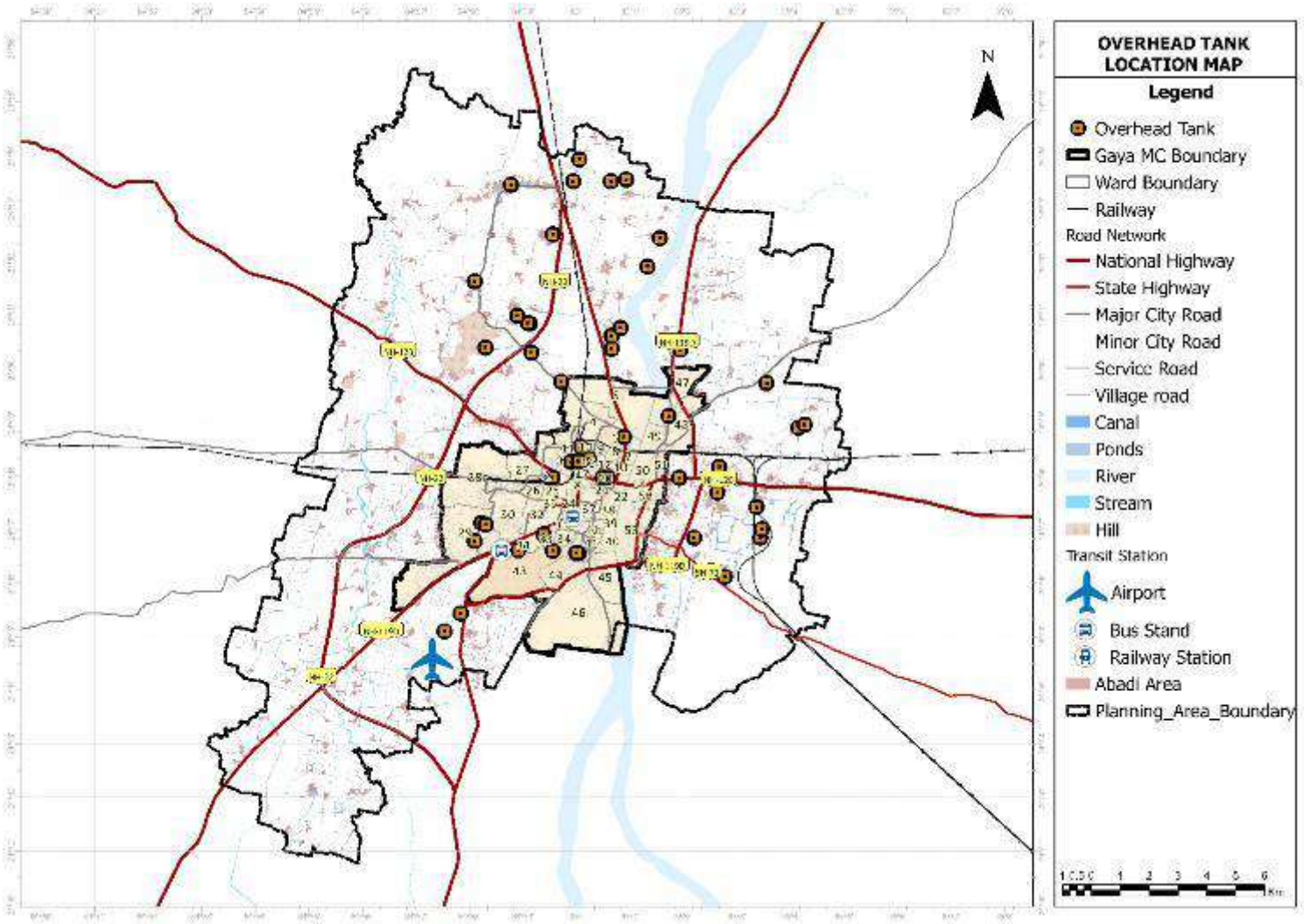
Sl. No.	Location of Tube wells	No. of Bore wells	Working	Standby	Capacity in HP	Discharge Cum/Hrs	Total Discharge Cum/Hrs
1	Joda Masjid	4	3	1	40	100.08	300.24
2	Budwama	1	1	-	40	109.98	109.98
3	Bhusundamela	2	1	1	30	100	100
4	ITI Backside	3	2	1	25	129.99	259.99
5	Kendui	3	2	1	25	129.99	259.99
6	Khiriyama	7	5	2	25	129.99	649.98
7	Warish nagar	4	3	1	40	100.08	300.24
8	Govind pur	1	1	-	25	129.99	129.99
Total		**25**					**2110.428**

Source: Bihar Urban Infrastructure Development Corporation, 2024

TABLE 11-12 VT PUMPS IN GAYA JI PLANNING AREA

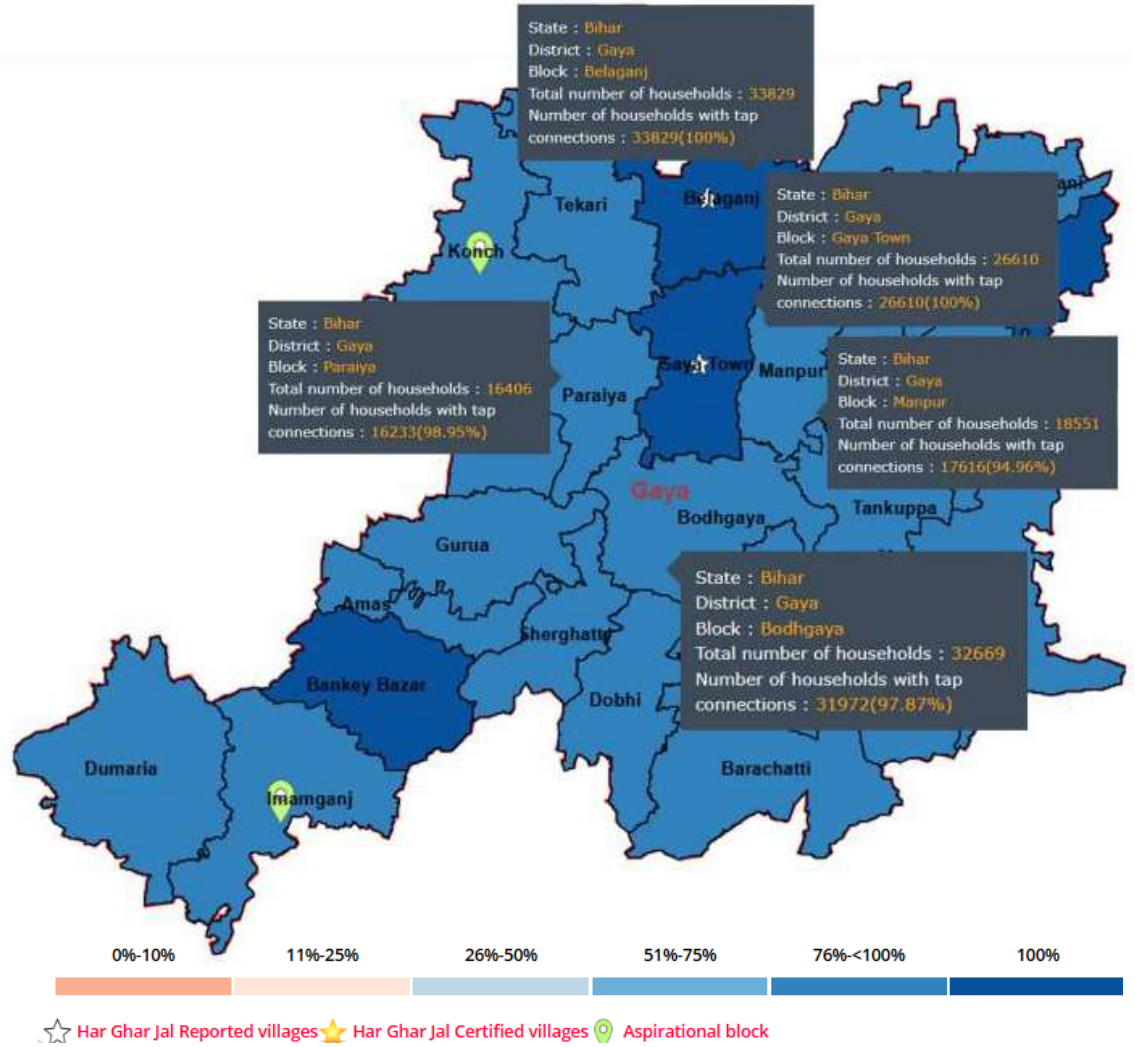
Sl. No.	Location of VT Pumps	No. of VT Pumps	Working	Standby	Capacity in HP	Discharge Cum/Hrs	Total Discharge Cum/Hrs
1	VT pumps @ ITI CWR	6	4	2	180	500	2000

Source: Bihar Urban Infrastructure Development Corporation, 2024



MAP 11-1 OVERHEAD TANK MAP OF GAYA JI PLANNING AREA

Source: Landuse Survey, 2024 and Nagar Nigam Office, 2024



MAP 11-2 WATER SUPPLY STATUS OF RURAL AREA

Source: Jal Jiwan Mission Dashboard, 2025

11.2 SANITATION

Nowadays, the social advancement of a city, town or area may be gauged by its sanitation. In urban areas, unregulated growth, urban sprawl, rapidly increasing population, and inadequate or badly designed and broken sewage treatment systems all contribute to the problem of untreated sewage being disposed of into rivers or nearest water bodies. Significant effects of this practice include harm to human health, aquatic systems in rivers, ecosystems etc. Because wastewater treatment in urban areas is now far below acceptable standards, there is an urgent need to improve it. Better sanitation enhances public health, lowers child mortality and morbidity, and benefits an area's ecology, economy, and water quality.

11.2.1 TOILET FACILITY

One of the development goals for India is to make sure that everyone has access to clean sanitation by the year 2030. It is possible that doing so can assure improved outcomes for both physical and mental health. Therefore, it becomes pertinent to understand the toilet facilities available to the households in the Gaya Ji Planning Area. In rural areas, out of the total of 17.2% of households having toilet facilities within the premises, merely 0.7% of the homes are equipped with piped sewer network and 11.2% of the homes have septic tank facilities. In the Gaya Ji Municipal Corporation Area, 82.9% of the total households have individual household latrine facility. Out of the total households having latrine facility, 8.9% of the homes are equipped with piped sewer system network and 69.1% of the households have septic tank facilities.

- Increase vulnerability during monsoon flooding.

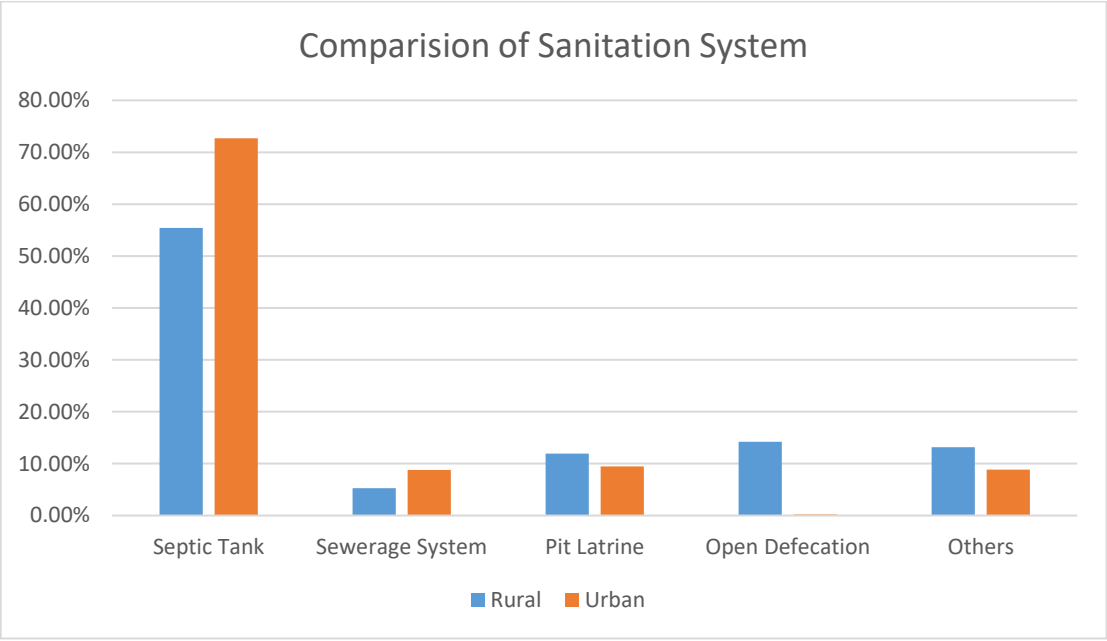


FIGURE 11-5 SANITATION SYSTEM IN THE HOUSES OF THE SURVEYED HOUSEHOLDS IN GAYA JI PLANNING AREAS

TABLE 11-13 AVAILABILITY OF TOILET FACILITY IN GAYA JI PLANNING AREA, CENSUS OF INDIA, 2011

Area	Number of Households	Percentage of households having latrine facility within the premises	Flush/pour flush latrine connected to			Pit latrine		Night soil disposed into open drain	Service Latrine		Percentage of households not having latrine facility within the premises
			Piped sewer system	Septic tank	Other system	With slab/ventilated improved pit	Without slab/ open pit		Night soil removed by human	Night soil serviced by animal	
Rural Area (162 villages)	52,515	*17.2%*	*0.7%*	*11.2%*	*1.7%*	*1.6%*	*0.6%*	*0.1%*	*0.8%*	*0.1%*	*82.7%*
		9037	416	5880	910	887	354	79	444	64	43478
Gaya Ji Municipal Corporation	72,974	*82.9%*	*8.9%*	*69.1%*	*1.8%*	*1%*	*0.7%*	*0.7%*	*0.5%*	*0.3%*	*17.1%*
		60487	6487	50417	1306	722	503	503	357	211	12471
Gaya Ji Planning Area (162Villages+ 1Municipal Corporation)	**1,25,489**	**69525**	**6903**	**56297**	**2215**	**1609**	**857**	**582**	**801**	**275**	**55948**

Note: Includes rounding error

Source: Census of India, 2011

11.2.2 PUBLIC TOILET FACILITY IN GAYA JI PLANNING AREA

To abolish open defecation nationwide and equip every home with a toilet that has access to water and sewage, Prime Minister Shri Narendra Modi announced the Swachh Bharat Mission (Gramin) in 2014. The different sanitation components are Individual Household Toilets (IHHL), Public Toilets (PT), Community Toilets (CT), and Open defecation-free areas.

TABLE 11-14 AVAILABILITY OF PUBLIC LATRINE FACILITY IN GAYA JI PLANNING AREA, CENSUS OF INDIA, 2011

Area	Number of households not having latrine facility within the premises	Alternative source	
		Public latrine	Open
Rural Area (162 villages)	*82.7%*	*0.64%*	*82.15%*
	43478	334	43144
Gaya Ji Municipal Corporation	*17.1%*	*1.7%*	*15.3%*
	12471	1270	11201
Gaya Ji Planning Area (162Villages+ 1Municipal Corporation)	**55949**	**1604**	**54345**

Source: Census of India, 2011

According to the Census of India, 2011, In the rural area, 82.7% of the total households do not have individual household latrine facilities. Out of the total households not having toilet facilities within their premises, 0.64% of the total households use public latrine facilities and the rest defecate in the open. This indicates poor planning of the drainage and sewage systems in rural areas, particularly inside of homes.

In the Gaya Ji Municipal Corporation Area, only 17.1% of the total households do not have a latrine facility within their premises. Out of this, only 1.7% of the total households i.e., 1270 homes use public latrines and the rest defecate in the open. The data points to the fact that there is a lack of improved public toilet facilities in Gaya Ji Planning Area thus resulting in the increased practice of open defecation.

Community sanitary complexes, which can be put up in a location within the village that is both acceptable and accessible to everyone, can include a suitable number of toilet seats, bathing cubicles, washing platforms, wash basins, etc. The construction of Community Sanitary Complexes (CSC) in the Gaya Ji Planning Area has advanced significantly, guaranteeing better public sanitation services. The following is a detailed progress update on the CSCs constructed at various locations within the area:

TABLE 11-15 DETAILS OF COMMUNITY SANITARY COMPLEXES IN GAYA JI PLANNING AREA

Component	Location	Status as of date	% of Progress
CSC	Dandibagh	Completed	100%
	Budhwa Mahadev	Completed	100%
	Bushunda mela	Completed	100%

Component	Location	Status as of date	% of Progress
	Delha	Completed	100%
	Nigam store	Completed	100%

Source: Bihar Urban Infrastructure Development Corporation Ltd., 2024

Through the provision of necessary sanitation infrastructure, these accomplishments demonstrate the dedication of local authorities to promoting public health and cleanliness. The facilities at all of the locations that have been identified are 100% complete, meaning that they are ready for public use and functionality.

11.2.3 BATHROOM FACILITY IN GAYA JI PLANNING AREA

Approximately 27.7% of the total households in rural areas have bathroom facilities within their household premises that are not enclosed with a roof while 64.85% of the total rural households do not have any bathroom facility within their household premises. In the Gaya Ji Municipal Corporation area, 17.8% of the total households i.e. 46047 homes have a bathroom facility without roof enclosure. Only 19.1% of the total urban households do not have bathroom facilities within their household premises.

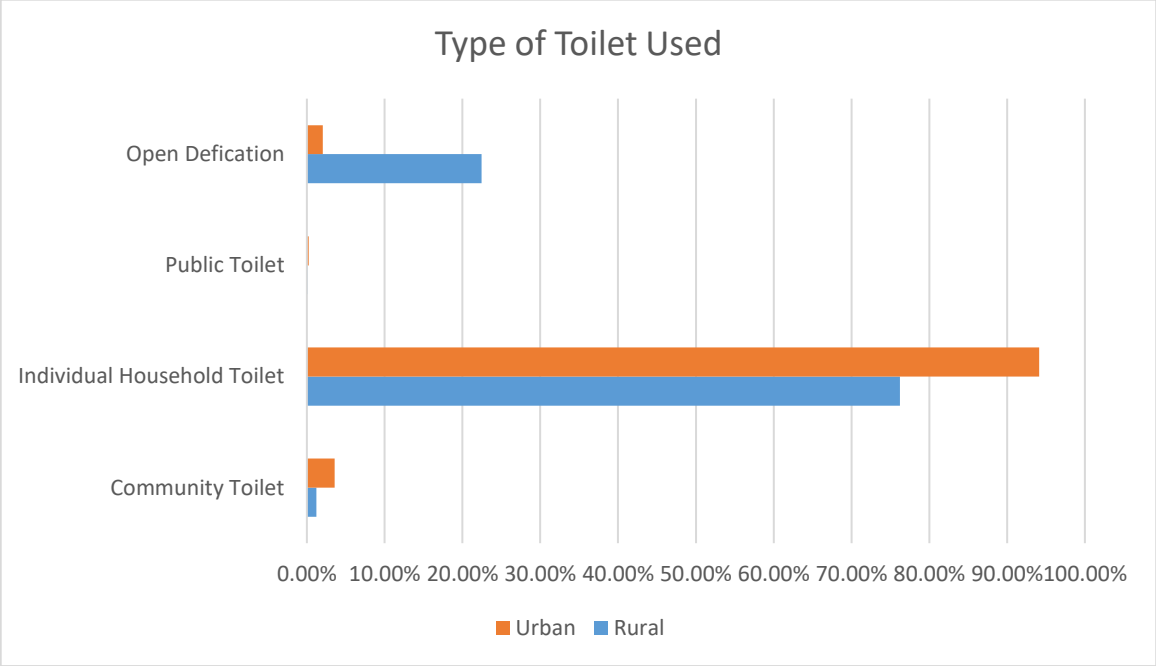


FIGURE 11-6 TYPE OF TOILET USED IN THE HOUSES OF THE SURVEYED HOUSEHOLDS IN GAYA PLANNING AREAS

Source: Socio-Economic survey.2023, Stesalit Systems Limited

TABLE 11-16 AVAILABILITY OF BATHROOM FACILITY IN GAYA JI PLANNING AREA, CENSUS OF INDIA, 2011

Area	Number of households having bathing facility within the premises		
	Yes		No
	Bathroom	Enclosure without roof	
Rural Area (162 villages)	*7.43%*	*27.7%*	*64.8%*
	3902	14555	34057
Gaya Ji Municipal Corporation	*63.1%*	*17.8%*	*19.1%*
	46047	12989	13938
Gaya Ji Planning Area (162Villages+ 1Municipal Corporation)	**49949**	**27545**	**47995**

Source: Census of India, 2011

11.2.4 PUBLIC TOILET (PT) AND COMMUNITY TOILET (CT) FACILITY IN GAYA JI PLANNING AREA

In 2014, Prime Minister Shri Narendra Modi announced the Swachh Bharat Mission (Gramin) to eliminate open defecation throughout India and ensure that every household has access to a toilet with proper water and sewage facilities. The sanitation components of this mission include Individual Household Toilets (IHHL), Public Toilets (PT), Community Toilets (CT), and the creation of Open defecation-free areas. Community toilets are shared facilities, provided for a group of residents or an entire settlement. They are typically used in low-income and informal settlements or slums, where space and land are limited, and household toilets are not feasible. On the other hand, public toilets are facilities provided for the floating population in public places such as bus stands and markets.

The details of existing Public and Community toilets have been enlisted below.

TABLE 11-17 LIST OF PROPOSED TOILET FACILITIES IN GAYA JI NAGAR NIGAM AREA

S.N	Location of the Toilet	Types of Toilets	Installation Year	Status as of date	Cleaning and Drinking availability
1.	Dehla Bridge	Pre-fab	2020	Working	Available
2.	Dehla railway Quarter	Pre-fab	2020	Working	Available
3.	Dainik Jagaran	Pre-fab	2020	Working	Available
4.	Bagesawari Temple	Pre-fab	2020	Working	Available
5.	Bagesawari Gumti	Pre-fab	2020	Working	Available
6.	Kust Hospital	Pre-fab	2020	Working	Available
7.	Govindpur Tempel	Community Toilet		No working	
8.	Ramshila Dharmshala	Community Toilet		working	
9.	Ramshila More	Pre-fab	2020	Working	Available
10.	Kabarla	Pre-fab	2020	Working	Available

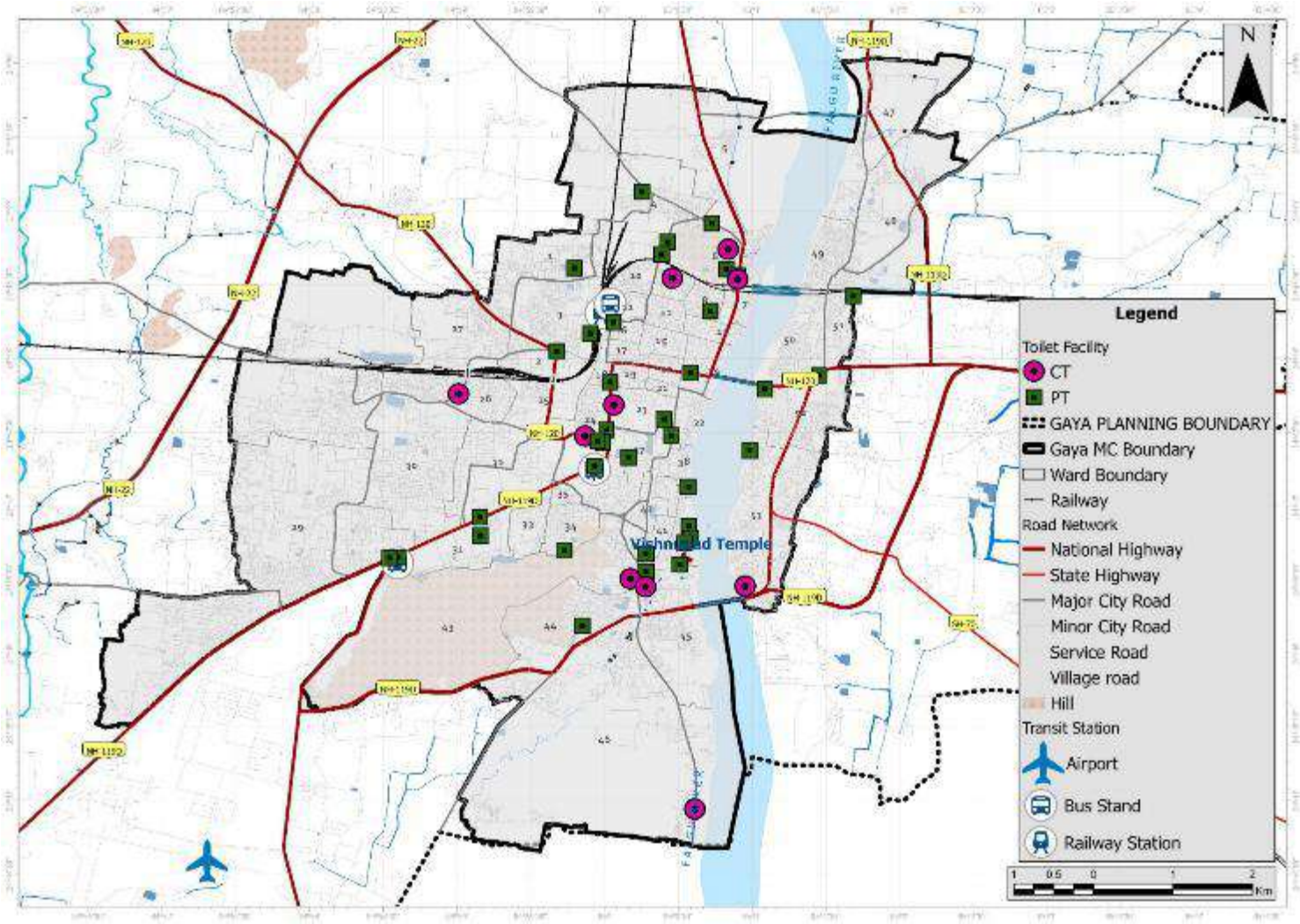
S.N	Location of the Toilet	Types of Toilets	Installation Year	Status as of date	Cleaning and Drinking availability
11.	Kabarla	Community Toilet		No working	Not available
12.	Lal Baba	Community Toilet		No working	Not available
13.	Lal Baba	Community Toilet		No working	Not available
14.	Bam Baba	Community Toilet		No working	Not available
15.	Shelter homes(Raiin Bashera)	Community Toilet		No working	Not available
16.	Shelter homes(Raiin Bashera)	Community Toilet		Working	Available
17.	Ravidas Tola	Community Toilet		Working	Available
18.	Bangla asthan Mandir	Community Toilet		Working	Available
19.	Shelter homes(Raiin Bashera)Dak Ashtan	Bio-Toilet	2017	Working	Available
20.	Harijan Mandir	Community Toilet		Working	Available
21.	Police adda new godam	Pre-fab	2020	Working	Available
22.	Balika school, Ramdhanpur Bairagi	Pre-fab	2020	Working	Available
23.	Tower Chowk	Pre-fab	2020	Working	Available
24.	kirani ghat	Pre-fab	2020	Working	Available
25.	Tekari road	GMC Toilet		Working	Available
26.	Dom toli, Tel bigha unit-1	Pre-fab	2020	Working	Available
27.	Dom toli, Tel bigha unit-2	Pre-fab	2020	Working	Available
28.	Dom toli, Tel bigha unit-3	Pre-fab	2020	Working	Available
29.	Station Road, Nagar Nigam store	Bio-Toilet		Working	Available
30.	Nala road	Pre-fab	2020	Working	Available
31.	Dhilkiya gali	GMC Toilet		Working	Available
32.	Pitamaheshwar	Bio-Toilet	2017	Working	Available
33.	Registry office	Pre-fab	2020	Working	Available
34.	DM Office	Pre-fab	2020	Working	Available
35.	GMC Office	Sulabh	19980	Working	Available
36.	Shelter homes (Raiin Bashera), Gandhi maidan unit-1	Pre-fab	2020	Working	Available
37.	Shelter homes (Raiin Bashera), Gandhi maidan unit-2	Bio-Toilet	2017	Working	Available
38.	Beside red cross	Deluxe	2023	Working	Available
39.	Fire station	Bio-Toilet	2017	Working	Available
40.	Najrath school	Pre-fab	2020	Working	Available

S.N	Location of the Toilet	Types of Toilets	Installation Year	Status as of date	Cleaning and Drinking availability
41.	Gandhi Maidan front of Prabhuji	E-toilet	2017	Working	Available
42.	Near gandhi maidan church	Sulabh	1998	Working	Available
43.	Mirza galib college	Deluxe	2022	Working	Available
44.	karimganj	Bio-Toilet	2017	Working	Available
45.	Medical college thana	Pre-fab	2020	Working	Available
46.	kashipura pokhra	Pre-fab	2020	Working	Available
47.	Shikariya more	Pre-fab	2020	Working	Available
48.	kaler dom toli	Pre-fab	2020	Working	Available
49.	kaler dom toli	Pre-fab	2020	Working	Available
50.	Shiyadi	Pre-fab	2020	Working	Available
51.	Pind	Community Toilet		No working	Not available
52.	Muttan bigha	Pre-fab	2020	Working	Available
53.	Narayen dom toli	Pre-fab	2021	Working	Available
54.	Khel parishar	Pre-fab	2020	Working	Available
55.	Opposite of khel parishar	Pre-fab	2020	Working	Available
56.	Shikariya more dilux toilet	Deluxe	2020	working	Available
57.	Khel parishar	PHED		No working	Not available
58.	Khel parishar	PHED		No working	Not available
59.	Gaya Ji college	Pre-fab	2020	Working	Available
60.	Near paal Mandir	Pre-fab	2020	Working	Available
61.	GRDA	Bio-Toilet	2017	Working	Available
62.	Singara chhat ghat	Pre-fab	2020	Working	Available
63.	Singara mundal asthal	Pre-fab	2020	Working	Available
64.	khalish park unit 1	Pre-fab	2020	Working	Available
65.	khalish park unit 2	Bio-Toilet	2017	Working	Available
66.	khalish park	Deluxe	2022	Working	Available
67.	Dom toli unit-1	Pre-fab	2020	Working	Available
68.	Dom toli unit-2	Pre-fab	2020	Working	Available
69.	Lal Baba colony	Community Toilet		Working	Available
70.	Bus stand	Pre-fab	2020	Working	Available
71.	Front of hotel sarawgi	sulabh	1998	Working	Available
72.	Maulana mahsjid	Pre-fab	2020	Working	Available
73.	Zila school	Pre-fab	2021	Working	Available
74.	Vishar talab	Pre-fab	2022	Working	Available
75.	Rajendra ashram	Pre-fab	2023	Working	Available

S.N	Location of the Toilet	Types of Toilets	Installation Year	Status as of date	Cleaning and Drinking availability
76.	Community hall	Pre-fab	2024	Working	Available
77.	Magistrate quarter	Community Toilet		Working	Available
78.	Ravidas Tola	Community Toilet		not working	Available
79.	Nadira ganj	Community Toilet		not working	Not available
80.	Inside zila school	Sulabh	1998	Working	Available
81.	Pitamaheshwar	Pre-fab	2024	Working	Available
82.	Tilaha Dharamshala	Bio-Toilet	2017	Working	Available
83.	Nadira ganj	Pre-fab	2024	Working	Available
84.	Police adda ramsagar	Bio-Toilet	2017	Working	Available
85.	Dev ghat	PHED	2023	Working	Available
86.	Gayetri ghat	Tourism		Working	
87.	Samsanghat	Community Toilet	2023	not working	Not available
88.	Front of vishnupath parking	Deluxe	2023	Working	Available
89.	Samir takiya	E-toilet	2017	not working	Not available
90.	Narayan chua	Deluxe	2023	Working	Available
91.	CHC	Deluxe	2020	Working	Available
92.	Chand chaura	E-toilet	2017	not working	Not available
93.	Ramsagar talab	Sulabh		Working	Available
94.	Dr manoj ram sagar		2020	Working	Available
95.	Tilaha dharamshala	Bio-Toilet	2020	Working	Available
96.	No toilet				
97.	Khatakchak school	Pre-fab	2020	Working	Available
98.	Parmagyan brahmyoni	Pre-fab	2020	Working	Available
99.	Akshay Vat	Deluxe		Working	Available
100	Mangala gauri	Community Toilet		Working	Available
101	Khajuriya	Community Toilet		not working	Not available
102	Chandrasekhar school	Gel		Working	Available
103	Bypass road chattu bigha	Pre-fab	2020	Working	Available
104	Near Narayani Mandir	Pre-fab	2020	Working	Available
105	Vishnupath Thana	Pre-fab	2020	Working	Available
106	brahisath Sarovar	Community Toilet		Working	Available
107	brahisath Sarovar	dilux		not working	Not available

S.N	Location of the Toilet	Types of Toilets	Installation Year	Status as of date	Cleaning and Drinking availability
108	Baksu bigha	Pre-fab	2020	Working	Available
109	kendue	Community Toilet	2020	Working	Available
110	Buniyad ganj thana	Pre-fab	2020	Working	Available
111	khanjah pur mandir	Pre-fab	2020	Working	Available
112	khanjah pur pani tanki	Pre-fab	2020	Working	Available
113	Kukra ali pur	Pre-fab	2020	Working	Available
114	Budha mahadev	Pre-fab	2020	Working	Available
115	Near Dayanand Factory	Pre-fab	2020	Working	Available
116	ishwar chaowdhary halt	Bio-Toilet	2020	Working	Available
117	Bhaskar ghat	Pre-fab	2020	Working	Available
118	Mufashil police thana	Pre-fab	2020	Working	Available
	Inside Mufashil police thana	Pre-fab	2020	Working	Available
	Bhusunda rubbur dam	Pre-fab	2020	Working	Available
	Sita kund	Deluxe	Tourism Dept.	Working	Available

Source: Gaya Ji Nagar Nigam, 2024



MAP 11-3 TOILET FACILITY MAP OF GAYA JI PLANNING AREA

Source: Bihar Urban Infrastructure Development Corporation Ltd., 2024

11.3 DRAINAGE

The environmental state of a city or town is impacted by the quality of its physical infrastructure, particularly the sewer system, which calls for careful planning, building, and maintenance. The system that moves sewage via a sewer network and additional pumping apparatus is called a sewerage system. Sewage is transported to the sewage treatment facility by a network of pipes, manholes, chambers, a sewage pumping station, and pumping equipment. It is essential to construct a suitable sewage infrastructure with efficient sewage treatment to encourage balanced and harmonic development.

In the Gaya Ji Planning Area, no integrated sewerage system has been established. There is no drainage system beneath the surface. As a result, the wastewater does not undergo any additional treatment. The area's surface drainage system is not entirely reliable. However, the lack of a well-established sewerage system prevents safe sanitation facilities from covering the slum areas.

TABLE 11-18 CONNECTION OF WASTEWATER OUTLET, CENSUS OF INDIA, 2011

Area	Closed drainage	Open Drainage	No Drainage
Rural Area (162 villages)	8.2%	54.3%	37.4%
Gaya Ji Municipal Corporation	54.4%	35.8%	9.8%

Source: Census of India, 2011

A natural drainage system provides the basic drainage function for the area. Data from the 2011 Census shows that 37.4% of the rural region has no drainage system. Merely 8.2% of the remaining area is comprised of a covered sewage network while the rest 54.3% of the total area is served by the open drainage system. In the Gaya Ji Municipal Corporation area, 9.8% of the total urban area lacks any drainage system and 54.4% of the total area is served by a covered drainage network. Approximately 35.8% of the total area is comprised of a closed drainage network.

11.4 SOLID WASTE MANAGEMENT

The most crucial service for maintaining the level of living in metropolitan areas and ensuring improved sanitation and health is solid waste management or SWM. As per the Swachh Bharat Mission guidelines, municipal solid waste management is a methodical procedure that encompasses waste segregation and storage at the point of origin, primary collection, secondary storage, transportation, secondary segregation, resource recovery, processing, treatment, and ultimate disposal of inert generated post-solid waste treatment.

11.4.1 EXISTING SCENARIO

Waste is primarily generated from residential areas, commercial establishments, and markets in Gaya Ji. At present, the solid waste generated per day is 661.38 TPD. The wet waste generated was estimated to be 297.62 TPD, dry waste 198.41 TPD, and mixed waste 165.34 TPD.

TABLE 11-19 CURRENT STATUS OF SOLID WASTE MANAGEMENT

No. of wards	Dry Waste (in TPD)	Wet Waste (in TPD)	Mixed Waste (in TPD)	Total Waste (in TPD)
53	198.41	297.62	165.34	661.38 (Avg.)

Source: Gaya Ji Nagar Nigam, Integrated Solid Waste Processing Plant, 2024

Legacy waste refers to Municipal Solid Waste (MSW) that has been accumulated and stored for several years on unused land or landfill sites. Currently, the estimated volume of legacy waste is 0.44 ton per day, with 390,000 metric tons already processed and disposed of, meaning the majority of the waste has been cleared. The plant's processing capacity is 2000 cubic meters per day, indicating the amount of waste it can manage daily. It operates with 5 trommels, which are machines designed to screen and separate waste materials by size.

TABLE 11-20 PLANT STATUS OF LEGACY WASTE

Sl. No.	Details	Qty.
1	Legacy Waste (As per Estimation)	0.44 TPD
2	Disposed off	429901.76 TPD
3	Capacity of Plant	2000 Cum/Day
4	No of Trommels	5 Nos

Source: Gaya Ji Nagar Nigam, Integrated Solid Waste Processing Plant, 2024

An ISWPP plant in solid waste management refers to an Integrated Solid Waste Processing Plant. These plants are designed to handle multiple stages of waste treatment and disposal, with a focus on recycling, resource recovery, and minimizing environmental impact. The Integrated Solid Waste Processing Plant (ISWPP) has a capacity of 600 tons per day (TPD), based on an 8-hour shift. The Material Recovery Facility (MRF) can process 100 tons per day (TPD) of waste over 8 hours. The Wet Waste Plant processes 20 MT of waste daily.

TABLE 11-21 CAPACITY OF PLANTS

Sl. No.	Plant Details	Qty.
1	Capacity of ISWPP Plant (8 Hours)	600 TPD
2	Capacity of MRF Plant (8 Hours)	100 TPD
3	Capacity of Wet Waste Plant	20 MT

Source: Gaya Ji Nagar Nigam, Integrated Solid Waste Processing Plant, 2024

The plant generates and collects 7.5 tons of waste per day. However, no waste is being processed.

TABLE 11-22 CONSTRUCTION AND DEMOLITION WASTE DETAILS

Sl. No.	CONSTRUCTION AND DEMOLITION WASTE (C&D waste)	Qty.
1	Generation	7.5 TPD
2	Collection	7.5 TPD
3	Processing	0 TPD

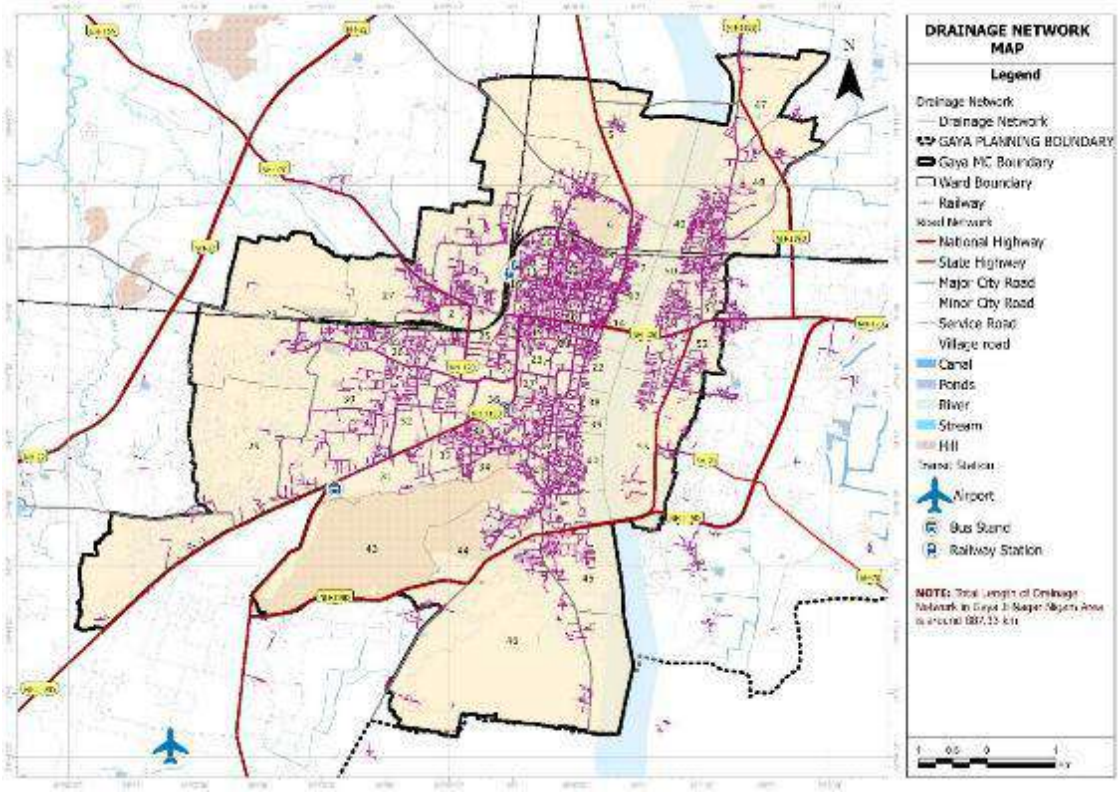
Source: Gaya Ji Nagar Nigam, Integrated Solid Waste Processing Plant, 2024

TABLE 11-23 BIO-MEDICAL WASTE DETAILS

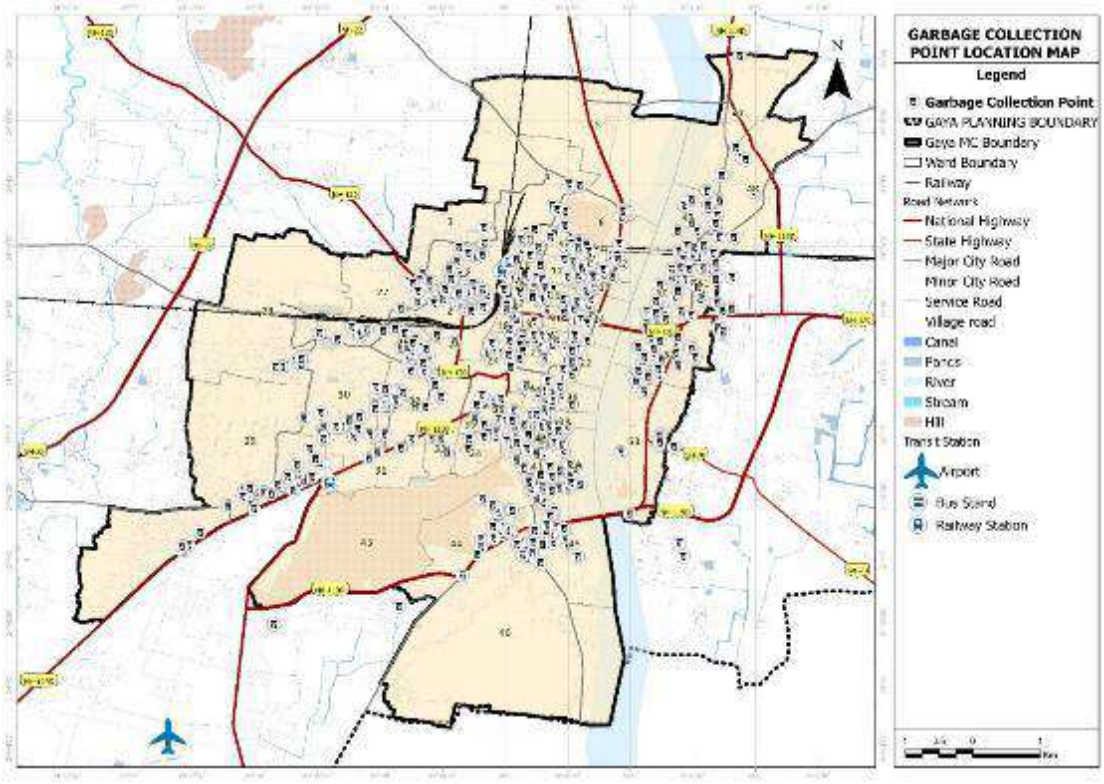
Sl. No.	BIO-MEDICAL WASTE	Qty.
1	Generation	2146.13 Ton

Source: Gaya Ji Nagar Nigam, Integrated Solid Waste Processing Plant, 2024

The biomedical waste generated was estimated to be 2146.13 Ton.



MAP 11-4 EXISTING DRAINAGE NETWORK MAP OF GAYAJI



MAP 11-5 EXISTING SOLID WASTE MANAGEMENT MAP OF GAYA JI

Urban Areas – Strong Collection, Weak Disposal Control

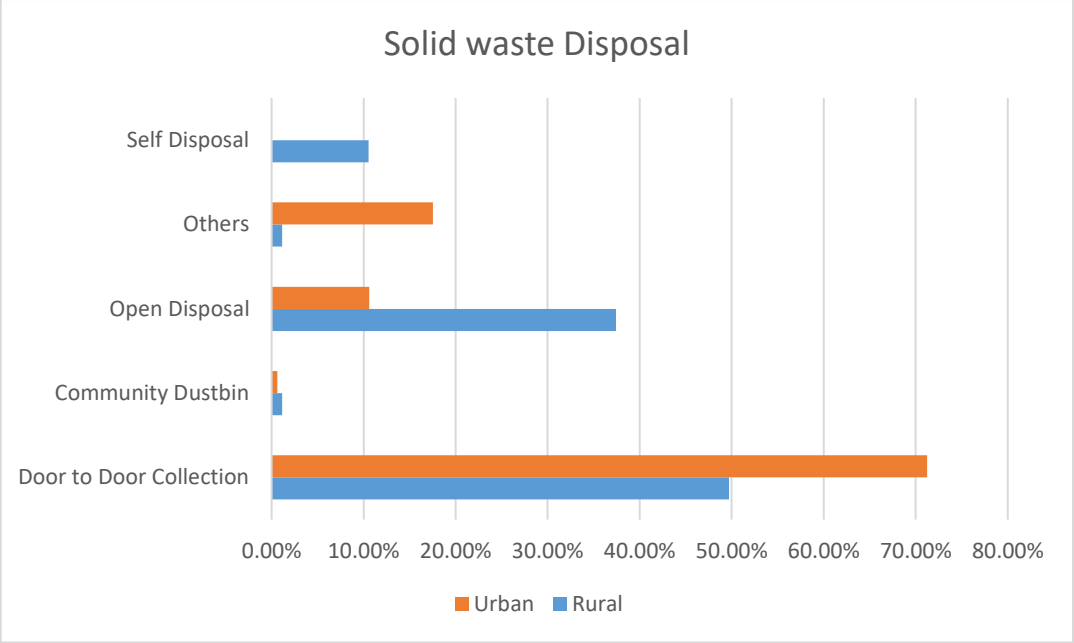


FIGURE 11-7 SOLID WASTE DISPOSAL SYSTEM BY THE SURVEYED HOUSEHOLDS

Source: Socio-economic survey,2023, Stesalit Systems Limited

11.5 ENERGY

11.5.1 SOURCE OF POWER SUPPLY

To ensure the smooth operation of any city, town, or area, power supply plays a vital role in physical infrastructure. All other infrastructural facilities, including the market, business space, sewage system, and water supply, function well and in order only if there is adequate electricity supply. The power services include the production, transmission, and distribution of electricity to a town, city or a particular area. A town or city cannot develop better without sufficient electrical infrastructure. In rural households, the majority of the homes i.e. 85% of the total households use kerosene as a source of power. Only 13.7% of the total households have access to electricity. In the Gaya Ji Municipal Corporation area, 87.3% of the total households have electricity and 11.2% of the households use kerosene as a source of power.

PRIMARY SURVEY FINDINGS

In all of the households surveyed in the urban area, the electricity is supplied by the government.

Additionally, among the households connected to electricity, almost all households (96.69%) have a metered connection. The remaining 3.31% households do not have a metered connection.

11.5.1.1.1 POWER CUT

Among the surveyed households in urban areas, the majority (44.20%) experience power cuts for 2–4 hours, while 28.33% face 0–2 hours of outages. About 6.33% households face electricity outage for 1-4 hours daily. Very few households report longer durations, with less than 4% (3.13%) experiencing cuts of 3 to 4 hours.

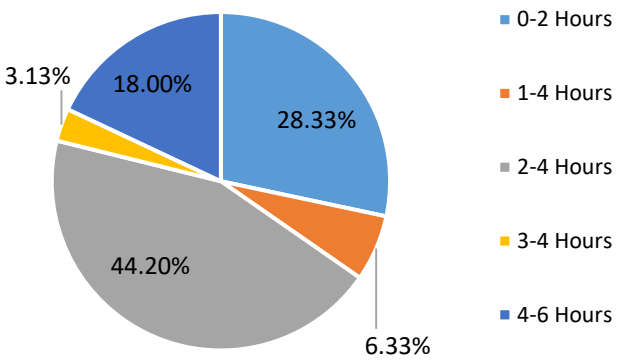


FIGURE 11-8 FREQUENCY OF POWER CUT DAILY EXPERIENCED BY THE SURVEYED HOUSEHOLDS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

11.5.1.1.2 ELECTRICITY BILL

Most of the surveyed households have moderate electricity consumption. 56.95% of households fall in the below 500 INR range, followed by 42.90% in the 500 - 1,500 INR category. A very less portion of households (0.14%) pay between 1501 - 2500 INR.

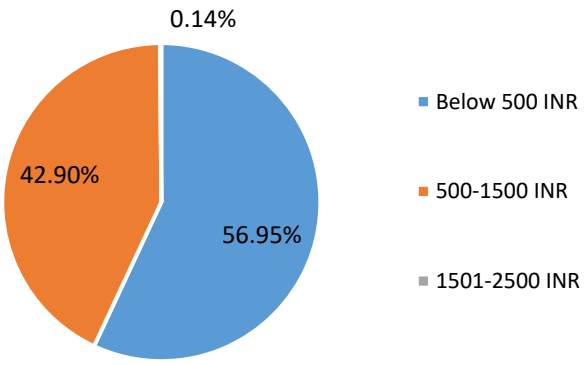


FIGURE 11-9 AVERAGE MONTHLY ELECTRICITY BILL OF THE SURVEYED HOUSEHOLDS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

TABLE 11-24 MAIN SOURCE OF LIGHTING IN GAYA JI PLANNING AREA, CENSUS OF INDIA, 2011

Area	Total Households	Electricity	Kerosene	Solar energy	Other oil	Any other	No lighting
Rural Area (162 villages)	52,515	*13.7%*	*85.0%*	*0.4%*	*0.5%*	*0.2%*	*0.07%*
		7212	44636	245	265	121	36
Gaya Ji Municipal Corporation	72,974	*87.3%*	*11.2%*	*0.2%*	*0.3%*	*0.1%*	*0.8%*
		63718	8185	158	231	85	596
Gaya Ji Planning Area (162Villages+ 1Municipal Corporation)	**1,25,489**	**70930**	**52822**	**403**	**496**	**206**	**632**

Source: Census of India, 2011

11.5.2 EXISTING POWER SUPPLY SYSTEM IN GAYA JI PLANNING AREA

TABLE 11-25 CONSUMER DETAILS OF GAYA JI PLANNING AREA

Year	Registered Consumer	Total no. of Effective Consumers	Total no of Active Consumers	Metered Consumers
2020	1,17,091	1,14,085	1,11,685	1,07,061
2021	1,25,146	1,21,362	1,15,524	1,12,176
2022	1,34,928	1,29,617	1,23,983	1,19,845
2023	1,45,640	1,39,324	1,30,389	1,28,580
2024	1,54,748	1,47,230	1,33,320	1,31,489

Source: Electricity department, Gaya Ji, 2024

Over the years from 2020 to 2024, the number of registered consumers has steadily increased, indicating a growing demand for services. In 2020, there were 1,17,091 registered consumers, which grew to 1,54,748 by 2024. Similarly, the number of effective consumers, who are actively being billed, rose from 1,14,085 in 2020 to 1,47,230 in 2024. The count of active consumers, those utilizing services, also showed a consistent rise from 1,11,685 in 2020 to 1,33,320 in 2024. Notably, metered consumers, those with measurable consumption, increased from 107,061 in 2020 to 131,489 by 2024, reflecting efforts toward improved service metering and coverage. This overall growth highlights expanding consumer engagement and service utilization.

TABLE 11-26 SECTOR-WISE ELECTRICITY DETAILS

Sector	2022 (Till Date)	2021-22	2020-21	2019-20	2018-19	2017-18
Domestic	1,16,789	1,09,291	99,614	95,719	91,740	81,699
Commercial	9,638	8,005	6,725	5,438	4,096	3,788
Industrial	1,124	956	852	620	546	476
Agriculture	10,813	9,822	5,680	5,293	3,270	2,963
Street Lighting	4	4	4	4	4	4
Water Works	12	13	13	11	11	11
Traction & Railways	NIL	NIL	NIL	NIL	NIL	NIL
Total	**1,38,380**	**1,28,091**	**1,12,888**	**1,07,085**	**99,667**	**88,941**

Source: Electricity department, Gaya Ji, 2024

The data reflects a consistent growth across various sectors from 2017-18 to 2022. In the domestic sector, the number of consumers has increased steadily from 81,699 in 2017-18 to 1,16,789 by 2022, showing the highest level of consumption. The commercial sector also saw growth, expanding from 3,788 consumers in 2017-18 to 9,638 by 2022, indicating increased commercial activity. The industrial sector had a modest increase from 476 in 2017-18 to 1,124 by 2022, while the agriculture sector showed substantial growth from 2,963 in 2017-18 to 10,813 by 2022, likely due to increased agricultural operations and irrigation needs. The street lighting sector remained stable at 4 consumers across all years, and waterworks showed minimal fluctuation, maintaining around 11 to 13 consumers. There were no consumers in the traction and railways sector during this period. Overall, the total number of consumers grew significantly from 88,941 in 2017-18 to 138,380 by 2022, reflecting expanding energy demand across various sectors.

11.5.3 AVAILABILITY OF KITCHEN FACILITY

The households of the Gaya Ji Planning Area have kitchen facilities both outside and inside the dwelling units. As per Census data 2011, 92.6% of households in rural areas undertake cooking inside the house. Out of the total households undertaking cooking facilities inside homes, 17.6% have a demarcated kitchen area while the rest 74.9% do not have any demarcated kitchen area. 7.3% of the total households undertake cooking outside their home. Out of the total households that undertake cooking outside their home, 2.4% have a separate kitchen area and the rest 4.8% do not have any demarcated kitchen area.

11.5.3.1.1 COOKING FUEL

Most of the surveyed households (95.50%) in urban areas use LPG as their primary cooking fuel while 3.44% still use wood, and 1.06% depends on other fuels for their cooking.

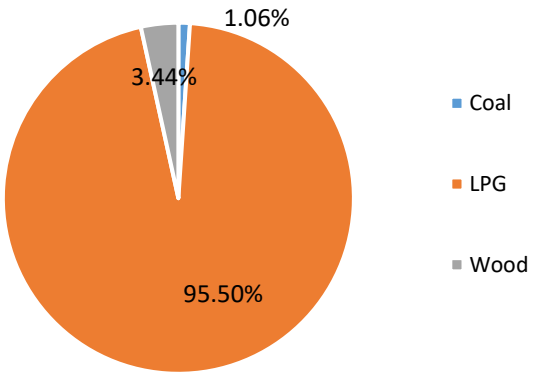


FIGURE 11-10 FUEL USED FOR COOKING BY THE SURVEYED HOUSEHOLDS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

Further, 96.6% of households in urban areas undertake cooking inside the house. Out of the total households undertaking cooking facilities inside homes, 62% have a demarcated kitchen area while the rest 34.6% do not have any demarcated kitchen area. 3.1% of the total households undertake cooking outside their home. Out of the total households that undertake cooking outside their home, 1% have a separate kitchen area and the rest 2.1% do not have any demarcated kitchen area.

TABLE 11-27 AVAILABILITY OF KITCHEN FACILITY IN GAYA JI PLANNING AREA, CENSUS OF INDIA,2011

Area	Total Households	Cooking inside house:	Has Kitchen	Does not have a kitchen	Cooking outside house:	Has Kitchen	Does not have a kitchen	No Cooking
Rural Area (162 villages)	52,515	*92.6%*	*17.6%*	*74.9%*	*7.3%*	*2.4%*	*4.8%*	*0.07%*
		48640	9282	39358	3841	1282	2561	36
Gaya Ji Municipal Corporation	72,974	*96.6%*	*62%*	*34.6%*	*3.1%*	*1%*	*2.1%*	*0.3%*
		70493	45244	25249	2262	730	1532	219
Gaya Ji Planning Area (162Villages + 1Municipal Corporation)	**1,25,489**	**119133**	**54525**	**64607**	**6103**	**2012**	**4093**	**255**

Source: Census of India, 2011

11.5.4 TYPES OF COOKING FUEL USED

Rural households in India use traditional fuels like firewood, dung, crop residue, and coal or modern fuels like liquefied petroleum gas (LPG) and kerosene, or a combination of both traditional and modern fuels. The Indian government has

prioritized increasing the use of clean cooking fuels to improve public health According to the India Residential Energy Survey 2020 report, almost 80% of rural households have access to either LPG or PNG. Despite that, two-thirds of rural households in India still use firewood for cooking.

Various types of fuels, ranging from cow dung cake to crop residue, and firewood are used by the people of Gaya Ji Planning Area for cooking. Though in less percentage biogas is also used as a fuel for cooking. In rural areas, 48.99% of the total households use cow dung cakes as a source of fuel. Merely, 2.37% of the total households use LPG/PNG as fuel for cooking purposes. In urban areas, the majority of the homes i.e. 57.7% of the total households use LPG/PNG. A very small percentage of households (2.9% of the total households) use crop residue as a source of fuel.

TABLE 11-28 TYPES OF FUEL USED FOR COOKING, CENSUS OF INDIA,2011

Area	Total Households	Fire-wood	Crop Residue	Cowdung cake	Coal, Lignite, Charcoal	Kerosene	LPG/PNG	Electricity	Biogas	Any other	No cooking
Rural Area (162 villages)	52,515	*21.6%*	*18.94%*	*48.99%*	*4.07%*	*0.16%*	*2.37%*	*0.13%*	*0.40%*	*3.19%*	*0.07%*
		11387	9943	25726	2135	85	1246	69	211	1676	36
Gaya Ji Municipal Corporation	72974	*10.6%*	*2.9%*	*6.2%*	*19.7%*	*1.3%*	*57.7%*	*0.1%*	*0.7%*	*0.4%*	*0.3%*
		7743	2124	4532	14383	956	42113	80	518	299	226
Gaya Ji Planning Area (162Villages+ 1Municipal Corporation)	**1,25,489**	**19130**	**12067**	**30258**	**16518**	**1041**	**43359**	**150**	**729**	**1975**	**262**

Note: Includes rounding error

Source: Census of India, 2011

11.6 EXISTING DEMAND GAP AND FUTURE REQUIREMENTS

11.6.1.1 WATER SUPPLY

According to the URDPFI Guidelines and the CPHEEO Manual 1999, the maximum amount of water supply required for a city is shown below.

TABLE 11-29 WATER SUPPLY STANDARD AS PER URDPFI

Sl.no.	Classification of Town/Cities	Recommended maximum water supply levels (lpcd)
1	Towns provides with piped water supply but without sewerage system	70
2	Cities provides with piped water supply where sewerage system is existing/ contemplated	135
3	Metropolitan and Megacities provides with piped water supply where sewerage system is existing/ contemplated	150

For the future requirements and designing of the demand-based system, the following considerations have been made the design considerations kept in mind are the following

1. The resident population of the planning area; growth is depicted in the Population projection.
2. 5% of the existing population has been taken as the floating population of the planning area.
3. Urbanisable Area
   a) outside current city limits where there may be any existing proposals for extension of the city
   b) outside current city limits where there may be an extension proposed for city limits under DDP

Future water requirements were calculated based on the above guidelines in the Gaya Ji Planning area according to the horizon year of 2047.

TABLE 11-30 PROJECTED WATER REQUIREMENT FOR THE RESIDENTIAL POPULATION

Year	Residential Population	Water demand considering 135lpcd per capita per day	UFW @ 15%	Fire Fighting demand	Total Water Requirement as per URDPFI guideline (ML)	Existing water supply in MLD	Gap
2025	1063024	143.51	21.53	0.003	165.04	85	80.04
2030	1177058	158.90	23.84	0.003	182.74	85	97.74
2035	1301088	175.65	26.35	0.004	202.00	85	117.00
2040	1436355	193.91	29.09	0.004	223.00	85	138.00
2047	1584250	213.87	32.08	0.004	245.96	85	160.96

Source: Computed from URDPFI Guideline 2015 and CPHEEO guidelines, 1999 (3rd Edition)

TABLE 11-31 PROJECTED WATER REQUIREMENT FOR FLOATING POPULATION

Year	Floating Population	Water demand considering 45lpcd per capita per day	UFW @ 15%	Fire Fighting demand	Total Water Requirement as per URDPFI guideline (MLD)
2025	53151	2.39	0.36	0.001	2.75
2030	58853	2.65	0.40	0.001	3.05
2035	65054	2.93	0.44	0.001	3.37
2040	71818	3.23	0.48	0.001	3.72
2047	79212	3.56	0.53	0.001	4.10

Source: Computed from URDPFI Guideline 2015 and CPHEEO guidelines, 1999 (3rd Edition)

TABLE 11-32 PROJECTED WATER REQUIREMENT FOR TOTAL POPULATION

Year	Total Population (Residential + Floating population)	Total Water Requirement as per URDPFI guideline (MLD)	Existing quantity of water supplied (MLD)	Gap (MLD)
2025	1116175	167.79	85	82.79
2030	1235911	185.79	85	100.79
2035	1366143	205.36	85	120.36
2040	1508172	226.72	85	141.72
2047	1663462	250.06	85	165.06

Source: Computed from URDPFI Guideline 2015 and CPHEEO guidelines, 1999 (3rd Edition)

11.6.1.2 SEWERAGE

Anticipating the increasing density of the population following the urbanization pressures, there is an immediate need for a sewerage system covering the whole of the municipal area. With increasing population density, it will get more and more difficult to lay a sewerage line in the planning area.

Even though there is no existing operational sewerage system in the area, based on the existing population probable sewerage generation has been computed in the table below.

80% of the total water requirement has been considered as generated sewerage.

TABLE 11-33 ESTIMATED SEWERAGE GENERATION

Year	Water Requirement as per URDPFI guideline (MLD)			Sewage Generation (MLD)		
	Residential Population	Floating Population	Total Water Requirement as per URDPFI guideline (MLD)	Residential Sewage Generation (MLD)	Floating Population Sewage Generation (MLD)	Total Sewerage Generation (MLD)
2025	1063024	53151	167.79	132.03	2.20	134.23

Year	Water Requirement as per URDPFI guideline (MLD)			Sewage Generation (MLD)		
	Residential Population	Floating Population	Total Water Requirement as per URDPFI guideline (MLD)	Residential Sewage Generation (MLD)	Floating Population Sewage Generation (MLD)	Total Sewerage Generation (MLD)
2030	1177058	58853	185.79	146.19	2.44	148.63
2035	1301088	65054	205.36	161.60	2.69	164.29
2040	1436355	71818	226.72	178.40	2.97	181.37
2047	1584250	79212	250.06	196.77	3.28	200.05

Source: Computed from URDPFI Guideline 2015 and CPHEEO guidelines, 1999 (3rd Edition)

11.6.1.3 SOLID WASTE MANAGEMENT

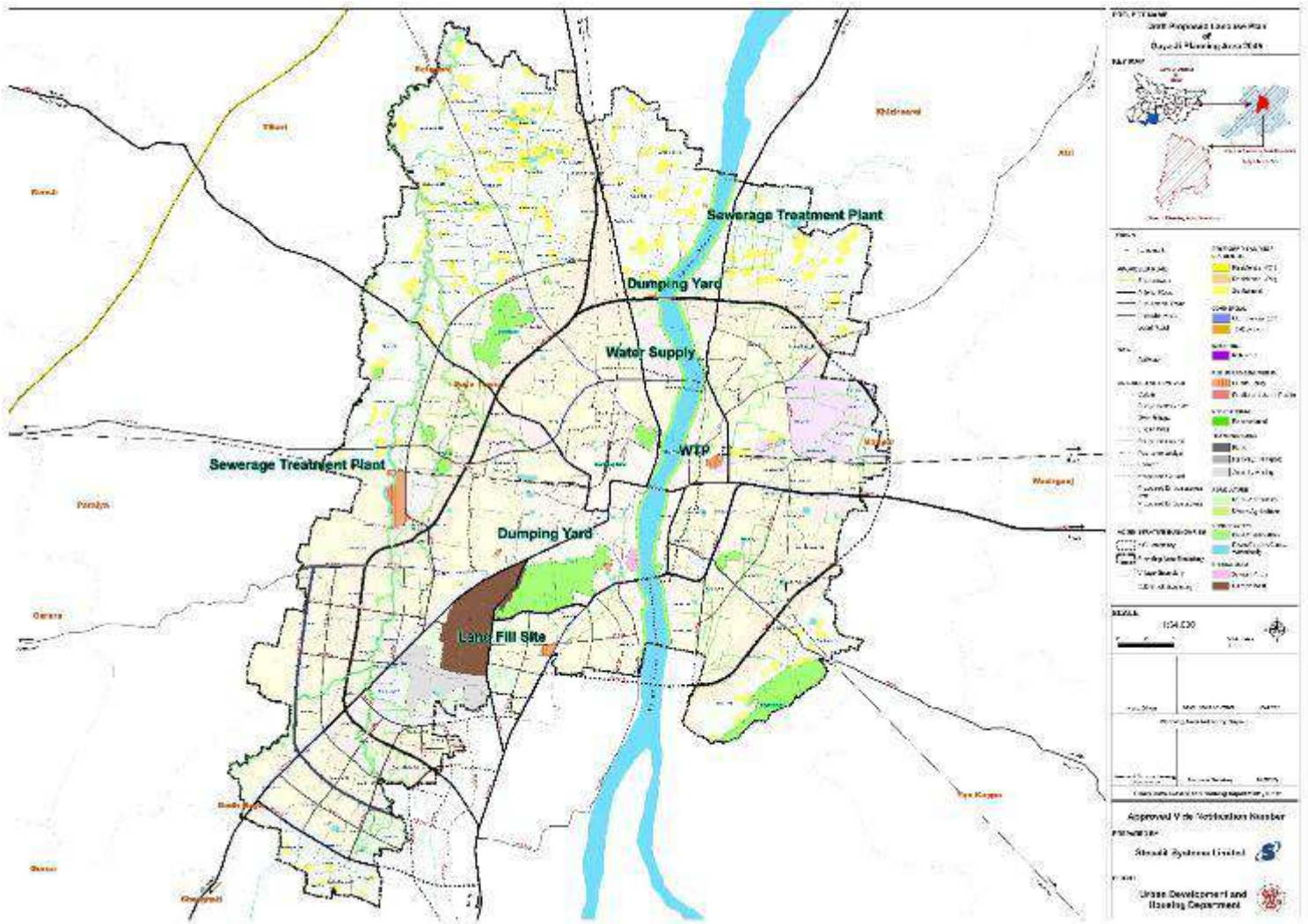
Solid waste management, or SWM, is the most important service for preserving the standard of life in both urban and rural regions and ensuring better sanitation and health. Currently, the urban local body is in charge of the garbage collection and transportation systems in the Gaya Ji Planning region. While there is a scientifically managed sanitary in the region under a Nagar Nigam, garbage is either burned or disposed of in vacant lands in rural areas.

TABLE 11-34 SOLID WASTE GENERATION PROJECTION IN GAYA JI PLANNING AREA

Year	Population	Floating Population	Waste generation (gram/capita)	Total waste generation (TPD)
2025	1063024	53151	301.017	335.99
2030	1177058	58853	301.017	372.03
2035	1301088	65054	301.017	411.23
2040	1436355	71818	301.017	453.99
2047	1584250	79212	301.017	500.73

Note: The Solid waste generation projection has been undertaken considering 300 grams per capita per day as per the CPHEEO manual

Source: Computed value as per CPHEEO Manual for Solid Waste Management



MAP 11-6 PROPOSED PUBLIC UTILITY OF GAYA JI PLANNING AREA

Source: map prepared by Stesalit System Ltd.

12 SOCIAL INFRASTRUCTURE

Social infrastructure includes assets that accommodate social services which include schools, hospitals, community housing etc. Social infrastructure is exclusively provided by Central or Local Government and with related entities.

According to the URDPFI, social infrastructure consists of education, health, socio-cultural facilities, distributive services, and other different facilities like bus stops, cremation grounds, and other facilities including communication, postal services, security forces and fire protection services, commercial and recreational services. URDPFI guidelines play a pivotal role as it is used as a benchmark to understand where the services are properly available and where there are gaps.

Social infrastructure like schools and hospitals are the most important requirements of human life which will improve the standard of living and affordability levels of the people.

This chapter will deal with the availability of social infrastructure facilities focusing on health care, education, recreation, religion and socio-cultural facilities. An overall analysis is made of the existing situation to identify the loopholes that will later turn into feasible proposals.

12.1 EDUCATIONAL FACILITIES

Education is considered a proper investment in personality development. Education plays a pivotal role in the planned development of the state. A high quality of social life can be created by teaching and training society. Education has always been a significant part of society's development as the changing factor in a civilization. Furthermore, the development of various education facilities contributes sustainability to the development of an area.

12.1.1 EDUCATIONAL FACILITIES ACCORDING TO THE 2011 CENSUS

According to the 2011 Census of India, the rural areas (162 villages) had 58 private pre-primary schools, 147 Government Primary Schools, 17 Private Primary Schools, 80 Govt. Middle School, 7 Private middle schools, 9 Govt. Secondary Schools, 2 private secondary schools, 6 Govt. Senior Secondary School, 1 private senior secondary school with 1 each Govt. and Private Arts and Science Degree college. Gaya Ji Municipal Corporation had 37 Govt. Primary School, 40 Private Primary School, 30 Govt. Middle School, 31 Private Middle School, 6 Govt. Secondary Schools, 12 Private Secondary Schools, 4 Govt. senior Secondary Schools, and 20 private senior secondary schools, with various Govt. Colleges viz., 5 Govt. Degree College (Art, Science and Commerce), 1 Govt. Degree College – Law, 1 Medical College, 1 Engineering College, 1 Management College, 1 Govt. Polytechnic, 1 Non-Formal Education and 1 Special School for the Disabled, along with 16 Private

Degree Colleges (Art, Science and Commerce) and 1 Private Special School for the Disabled.

TABLE 12-1 EDUCATIONAL FACILITIES (2011 CENSUS)

Area	Category	Numbers	
		Government	Private
Rural Areas (162 villages)	Pre-Primary School	0	58
	Primary School	147	17
	Middle School	80	7
	Secondary School	9	2
	Senior Secondary School	6	1
	Arts and Science Degree College	1	1
Gaya Ji Municipal Corporation	Primary School	37	40
	Middle School	30	31
	Secondary School	6	12
	Senior Secondary School	4	20
	Degree college - Art, Science and Commerce	5	16
	Degree college - Law	1	0
	Medical College	1	0
	Engineering College	1	0
	Management Institute	1	0
	Polytechnic	1	0
	Non-Formal Education	1	0
	Special School for Disabled	1	1

Source: Census of India, 2011

12.1.2 EXISTING EDUCATIONAL FACILITIES

Municipalities play a crucial role in ensuring access to basic primary education for all children residing within their jurisdiction. This responsibility includes establishing and managing primary schools, as well as non-formal and adult education centres to address the diverse educational needs of the population. By doing so, municipalities contribute significantly to promoting literacy, skill development, and overall social welfare within their communities.

The assessment of educational facilities indicates that the planning area has a relatively adequate number of primary schools, with 286 existing institutions against a projected requirement of 317, resulting in a gap of 31 schools. The requirement is comparatively higher for senior secondary education, where 211 institutions are required against 57 existing facilities, indicating a significant gap of 154 institutions. At the higher education level, 13 colleges are required as per the projected population, compared to 12 existing colleges, resulting in a marginal gap of one institution. Overall, the analysis highlights that while primary and higher education facilities are relatively closer to the projected requirement, **senior secondary education has a substantial infrastructure deficit**. Therefore, priority should be given to establishing additional senior secondary schools, while the gaps in primary

schools and colleges should also be addressed to ensure adequate educational infrastructure for the projected population.

TABLE 12-2 EXISTING EDUCATION FACILITIES IN THE GAYA JI PLANNING AREA

Category	Existing	URDPFI Guideline	Requirement as per projected population	Gap
Primary	286	5000	317	31
Senior Secondary	57	7500	211	154
College	12	125000	13	1

Source: District Education Department, Gaya

*Note: Required Number of facilities are calculated as per URDPFI Guideline 2015 according to estimated population of planning area in 2025 (1018697)

Buffer analysis of school facilities shows that an 800 m walking distance covers about **220 sq km**, which is **81.48% of the total 273 sq km planning area**. This indicates that a major portion of the area is well-served by educational facilities within accessible walking distance, reflecting good spatial coverage of schools across the planning area.

For Primary Education:

In Urban areas, access to primary schools in urban areas is generally strong. Nearly **84% of urban households** access primary education within 1 km. That indicates a good spatial distribution of primary schools across urban neighbourhoods.

Rural areas show even stronger proximity for primary schools. More than **89% of rural households** access primary schools within 1 km. This suggests that primary education facilities are well distributed at the village level.

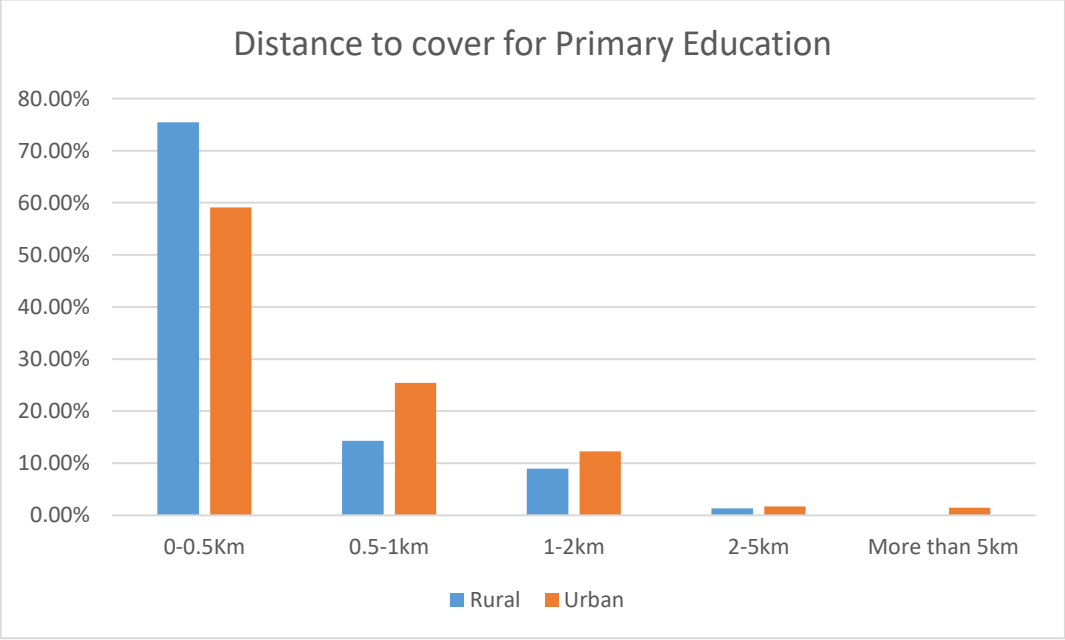


FIGURE 12-1 DISTANCE COVERED BY THE SURVEYED HOUSEHOLDS FOR PRIMARY EDUCATION FACILITIES IN GAYAJI PLANNING AREA

Source: Socio-Economic Survey,2023, Stesalit Systems Limited

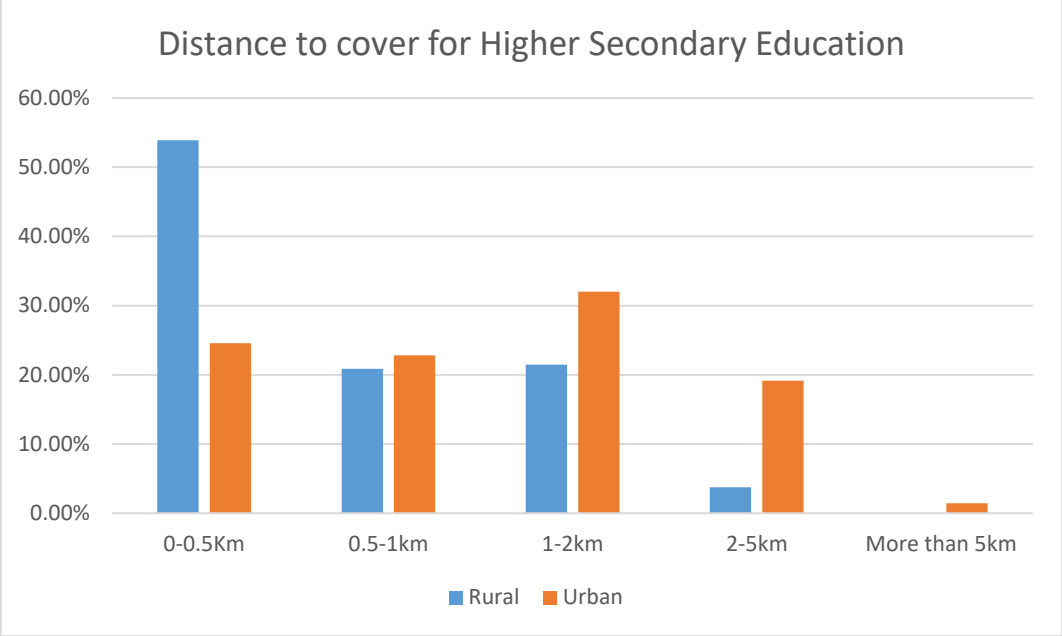
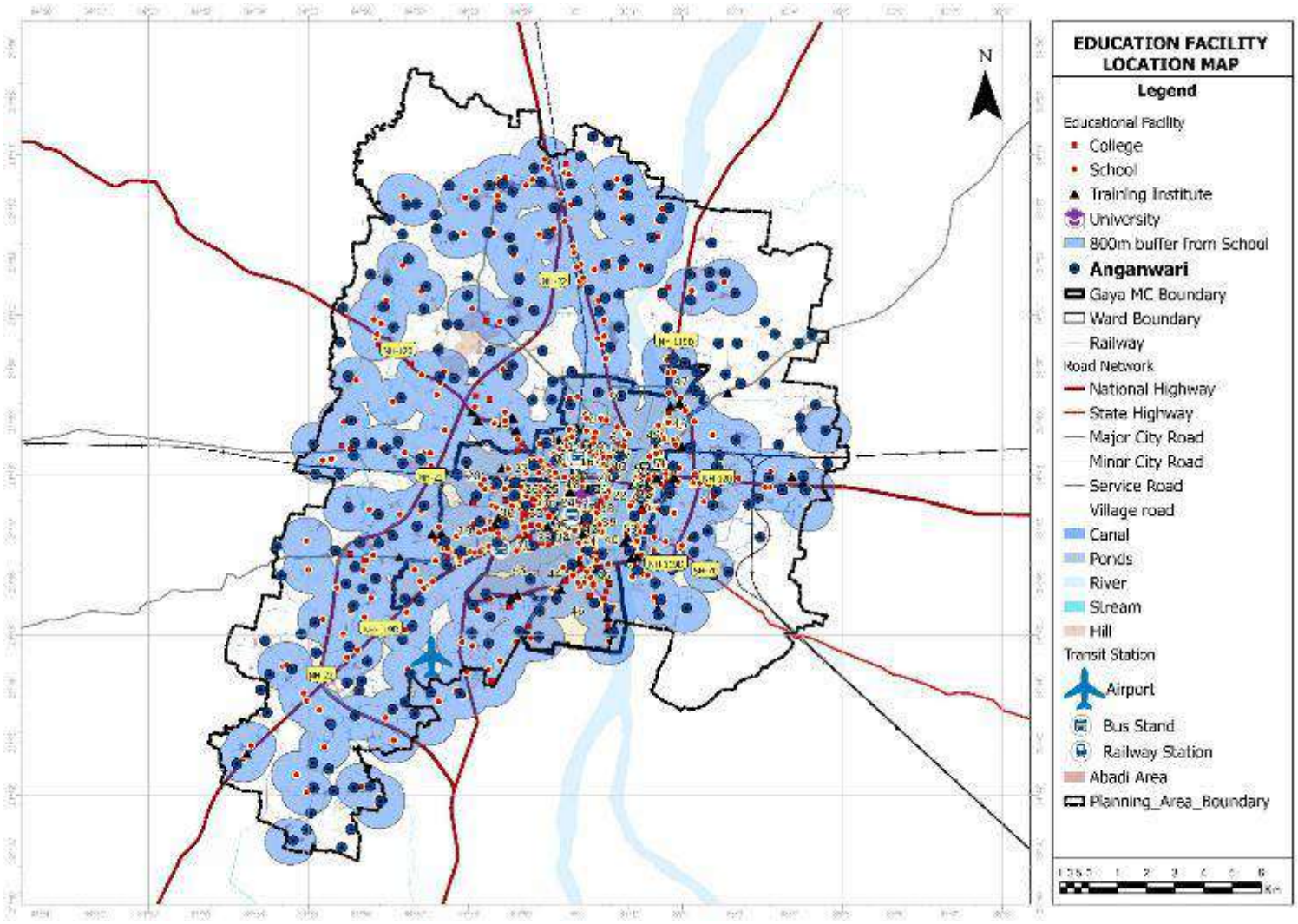


FIGURE 12-2 DISTANCE COVERED BY THE SURVEYED HOUSEHOLDS FOR HIGHER SECONDARY EDUCATION FACILITIES IN GAYAJI PLANNING AREAS

Source: Socio-Economic Survey,2023, Stesalit Systems Limited



MAP 12-1 EXISTING EDUCATION FACILITIES MAP OF GAYA JI PLANNING AREA

Source: Land Use Survey 2024, Stesalit Systems Ltd.

12.2 HEALTHCARE FACILITIES

Health systems and policies have a critical role in determining the manner in which health services are delivered, utilised and affect health outcomes. The objective of the National Health Policy is to Strengthen and prioritize the health systems in all its dimensions- investments in health, organization of healthcare services, prevention of diseases and promotion of good health through cross-sectorial actions, access to technologies, developing human resources, encouraging medical pluralism, building a knowledge base, developing better financial protection strategies, strengthening regulation and health assurance. The government health care system is designed as a three-tier structure comprising primary, secondary, and tertiary facilities. In rural areas, primary health care services are provided through a network of sub-centres, primary health centres, and community health centres.

12.2.1 HEALTHCARE FACILITIES ACCORDING TO THE 2011 CENSUS

According to the 2011 Census of India, the all total 162 villages had 2 primary health centres, 38 primary health sub-centres, 3 Maternity and child welfare centres, 3 TB Clinic, 4 Dispensaries, 3 Veterinary Hospital, 2 Family Welfare Centre, 14 Non-Government Medical facilities out-patient, 12 Non- Government Medical facilities in and out-patie1nt- 14 Non-Government Medical facilities Charitable, 33 Non-Government Medical facilities Medicine shops and 29 other Non-Government Medical facilities. Gaya Ji Municipal Corporation had 3 Allopathic hospitals, 1 Alternative Medicine hospital, 1 Dispensary, 3 Family Welfare Centre, 3 Maternity and child welfare centres, 3 Maternity homes, 1 T.B. clinic, 8 Nursing homes, 1 veterinary hospital, 250 non-government medical facilities out-patient, 60 non-Government in and out-patient, 10 Non-Government Charitable hospital and 1000 non-Government medical shops.

TABLE 12-3 HEALTHCARE FACILITIES (2011 CENSUS)

Area	Category	Numbers
Rural Areas (162 villages)	Primary Health Centre	2
	Primary Health Sub Centre	38
	Maternity And Child Welfare Centre	3
	TB Clinic	3
	Dispensary	4
	Veterinary Hospital	3
	Family Welfare Centre	2
	Non-Government Medical Facilities Out-Patient	14
	Non-Government Medical Facilities in And Out-Patient	12
	Non-Government Medical facilities Charitable	14
	Non-Government Medical Facilities Medicine Shop	33
	Non-Government Medical Facilities Others	29

Gaya Ji Municipal Corporation	Allopathic Hospital	3
	Hospital Alternative Medicine	1
	Dispensary/Health Centre	1
	Family Welfare Centre	3
	Maternity and Child Welfare Centre	3
	Maternity Home	3
	T.B. Hospital / Clinic	1
	Nursing Home	8
	Veterinary Hospital	1
	Non-Government Out-Patient	250
	Non-Government In and Out Patient	60
	Non-Government Charitable-Hospital/Nursing Home	10
	Non-Government Medicine Shop	1000

Source: Census of India, 2011

12.2.2 EXISTING HEALTHCARE FACILITIES

Based on the current land use survey, the Gaya Ji Planning Area is home to a total of 89 clinics or dispensaries and one diagnostic centre. The public healthcare infrastructure includes 13 government hospitals, which provide essential medical services to the broader community, alongside two primary or community health centres that focus on primary healthcare and preventive services. In addition to public health facilities, the private healthcare sector plays a significant role, with 71 private hospitals operating in the region, offering a range of medical services to those who can afford private care. Furthermore, there are 21 nursing homes, which cater primarily to maternity, post-operative care, and elderly patients.

TABLE 12-4 EXISTING HEALTHCARE FACILITIES IN THE GAYA JI PLANNING AREA

Type of Facility	Category	Required Number (URDPFI)	Existing Numbers	Gap
Health Services	Clinic/Dispensary	68	89	No gap
	Govt. Hospital	4	13	No gap
	Private Hospital	-	71	-
	Primary/Community Health Centre	34	2	32
	Diagnostic Centre	20	1	19
	Nursing Home	23	21	2

Source: Land Use Survey 2024, Stesalit Systems Ltd.

*Note: Required Number of facilities is calculated as per the URDPFI Guideline 2015 according to the estimated population of the planning area in 2025 (1018697)

Buffer analysis of healthcare facilities shows that within a **1000 m buffer**, about **111 sq km**, accounting for **41.11% of the total 273 sq km planning area**, is serviceable. This indicates that less than half of the area has adequate access to healthcare facilities within a reasonable walking distance, highlighting the need for improved spatial distribution of health services.

PRIMARY SURVEY FINDINGS ON HEALTHCARE FACILITIES:

HEALTH FACILITY

41.75% of the households surveyed in urban areas have to cover about 0.5 km distance for the primary health center, 2.18% cover 0.5 to 1 km, 27.53% cover 1 to 2 km, 23.64% cover 2 to 5 km and the rest 4.91% are used to go above 5 km for the primary health center.

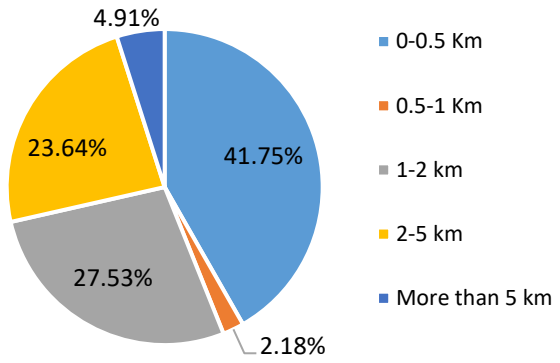


FIGURE 12-3 DISTANCE COVERED BY THE SURVEYED HOUSEHOLDS FOR PRIMARY HEALTH CENTRE

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

9.97% of the households surveyed in urban areas have to cover about 0.5 km distance for the hospital, 13.23% cover 0.5 to 1 km, 38.55% cover 1 to 2 km, 23.29% cover 2 to 5 km and the rest 14.96% are used to go above 5 km for the hospital.

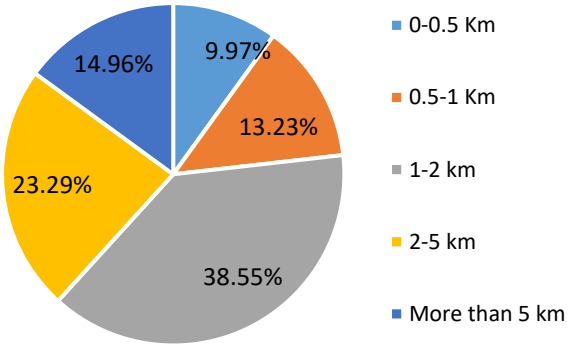
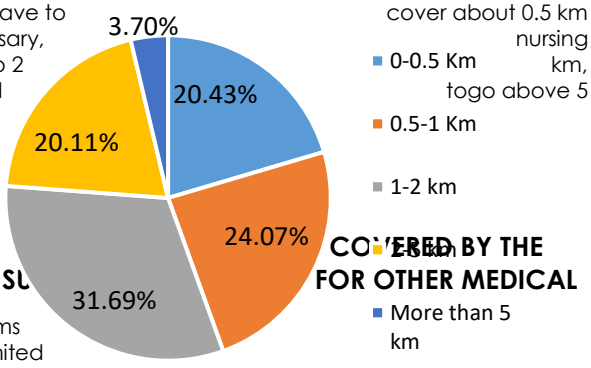


FIGURE 12-4 DISTANCE COVERED BY THE SURVEYED HOUSEHOLDS FOR HOSPITAL

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

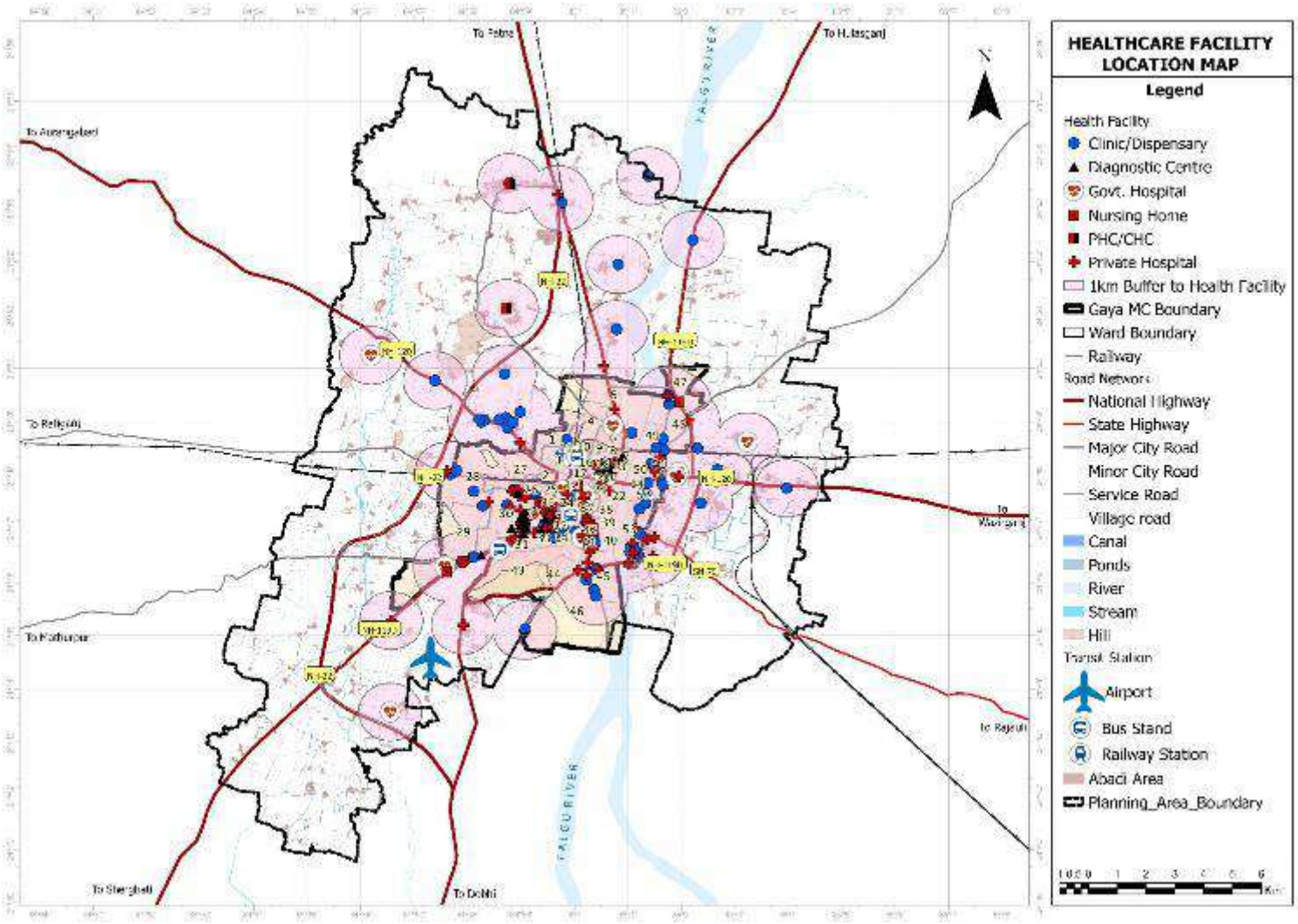
20.43% of the households surveyed inurban areas have to distance to use other medical facilities like dispensary, home etc. 24.07% cover 0.5 to 1 km, 31.69% cover 1 to 2 20.11% cover 2 to 5 km and the rest 3.70% are used km for the other medical facilities.



cover about 0.5 km nursing km, togo above 5

SU… CO…ERED BY THE … FOR OTHER MEDICAL

Source: Socio-Economic Survey 2023, Stesalit Systems Limited



MAP 12-2 EXISTING HEALTHCARE FACILITIES MAP OF GAYA JI PLANNING AREA

Source: Land Use Survey 2024, Stesalit Systems Ltd.

12.3 PUBLIC AND SEMI-PUBLIC FACILITIES

12.3.1 PUBLIC AND SEMI-PUBLIC FACILITIES ACCORDING TO THE 2011 CENSUS

As per the 2011 Census of India, the Gaya Ji planning area only has public and semi-public facilities in its urban areas (Gaya Ji Municipal Corporation), while its 162 rural villages do not have any public or semi-public facilities. Gaya Ji Municipal Corporation is listed to have 1 private orphanage, 1 government stadium, 4 private theatres, 5 government auditoriums/community halls, 1 public library, 30 nationalized banks, 25 private commercial banks, 32 agricultural credit societies, and 26 non-agricultural credit societies.

TABLE 12-5 PUBLIC & SEMI-PUBLIC FACILITIES (2011 CENSUS)

Area	Category	Numbers
Gaya Ji Municipal Corporation	Private Orphanage Home	1
	Govt. Stadium	1
	Private Cinema Theatre	4
	Govt. Auditorium / Community Hall	5
	Govt. Public Library	1
	Nationalized Bank	30
	Private Commercial Bank	25
	Co-operative Bank	4
	Agricultural Credit Society	32
	Non-Agricultural Credit Society	26

Source: Census of India, 2011

12.3.2 EXISTING PUBLIC AND SEMI-PUBLIC FACILITIES

The Gaya Ji Planning Area is equipped with a range of public and semi-public facilities, essential for community welfare and public administration. The area hosts 115 banks, ensuring extensive financial services for residents, along with 10 ATMs for convenient access to cash. Law enforcement is supported by 20 police stations, and there is 1 jail for corrections and detention purposes. For last rites and cultural practices, there are 30 crematoriums and burial grounds/graveyards.

Community services are also available, with 10 community halls, 4 dharmshalas, and 1 convention Centre supporting social gatherings and events. The area's 50 private offices and 5 LPG/CNG gas booking offices, while public welfare is facilitated through 3 social welfare centres and 12 public or community toilets. Cultural and educational resources include 1 museum and 76 public libraries, providing cultural enrichment and knowledge resources. Additionally, the area has 1 fire station for emergency services and 2 ticket booking/reservation offices for travel needs.

TABLE 12-6 EXISTING PUBLIC AND SEMI-PUBLIC FACILITIES IN THE GAYA JI PLANNING AREA

Type of Facility	Category	Required Number (URDPFI)	Existing Numbers	Gap

Public& Semi-public	Banks	68	115	No gap
	Police Station	11	20	No gap
	Jail	1	1	No gap
	Crematorium Burial Ground /Grave Yard	2	30	No gap
	Community hall	68	10	58
	Dharamshala	-	4	-
	Ticket Booking and Reservation Office	-	2	-
	Social Welfare Center	-	3	-
	Guesthouse	-	4	-
	Private Office	-	50	-
	Museum	-	1	-
	Public Library	68	76	No gap
	LPG/CNG Gas Booking Office	26	5	21
	Public / Community Toilet	-	12	-
	Convention Center	10	1	9
	Fire Station	5	1	4
	ATM	68	10	58

Source: Land Use Survey 2024, Stesalit Systems Ltd.

*Note: Required Number of facilities are calculated as per URDPFI Guideline 2015 according to estimated population of planning area in 2025 (101869)

PUBLIC AMENITIES

Analyzing the proximity of public amenities in the urban areas provides insights into households' accessibility to essential services within convenient distances, highlighting whether residents benefit from the ease of access to these amenities.

PROXIMITY TO PUBLIC AMENITIES WITHIN THE urban AREA

Within the 0 - 0.5 km range, some facilities such as parks (20.24% of household), Banks (30.48% of household), playgrounds (22.32% of the household), ATMs (32.34% of the household), markets (51.46% of the household), police station (19.96% of household), post office (12.82% of household), and community (19.53% of household) are available. As the distance increases to 0.5 -1 km, access improves for parks (22.05% households), post office (26.4% households), police station (25.31% households) and community halls (27.33% of the household) and other services, but beyond 2 km, there is a marked decrease in accessibility, particularly for playground (17.86% of the household), markets (3.6% of the household), banks (11.79% households), and post office (13.73% of the household). Community halls become more accessible beyond 1 km, peaking at 27.68% of households in the 1-2 km range.

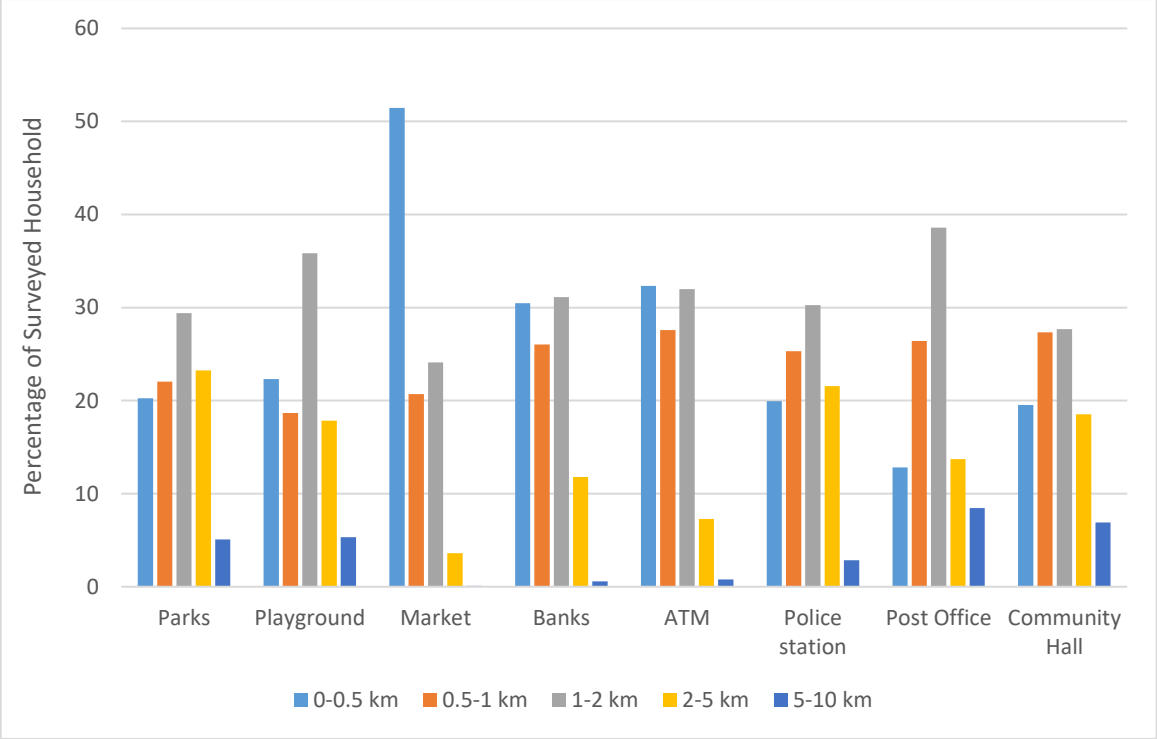


FIGURE 12-6 PROXIMITY TO PUBLIC AMENITIES IN PLANNING AREA

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

The Gaya Ji Planning Area has a range of recreational facilities for its residents, for community engagement and healthy lifestyle. These include 9 recreational clubs, 3 gardens, 15 parks, and 12 playgrounds, providing ample space for outdoor activities and relaxation. Additionally, the area features 8 gymnasiums, 1 sports centre, and 2 stadiums, catering to fitness enthusiasts and sports events. This network of facilities contributes to the overall well-being of the community and enhances urban livability.

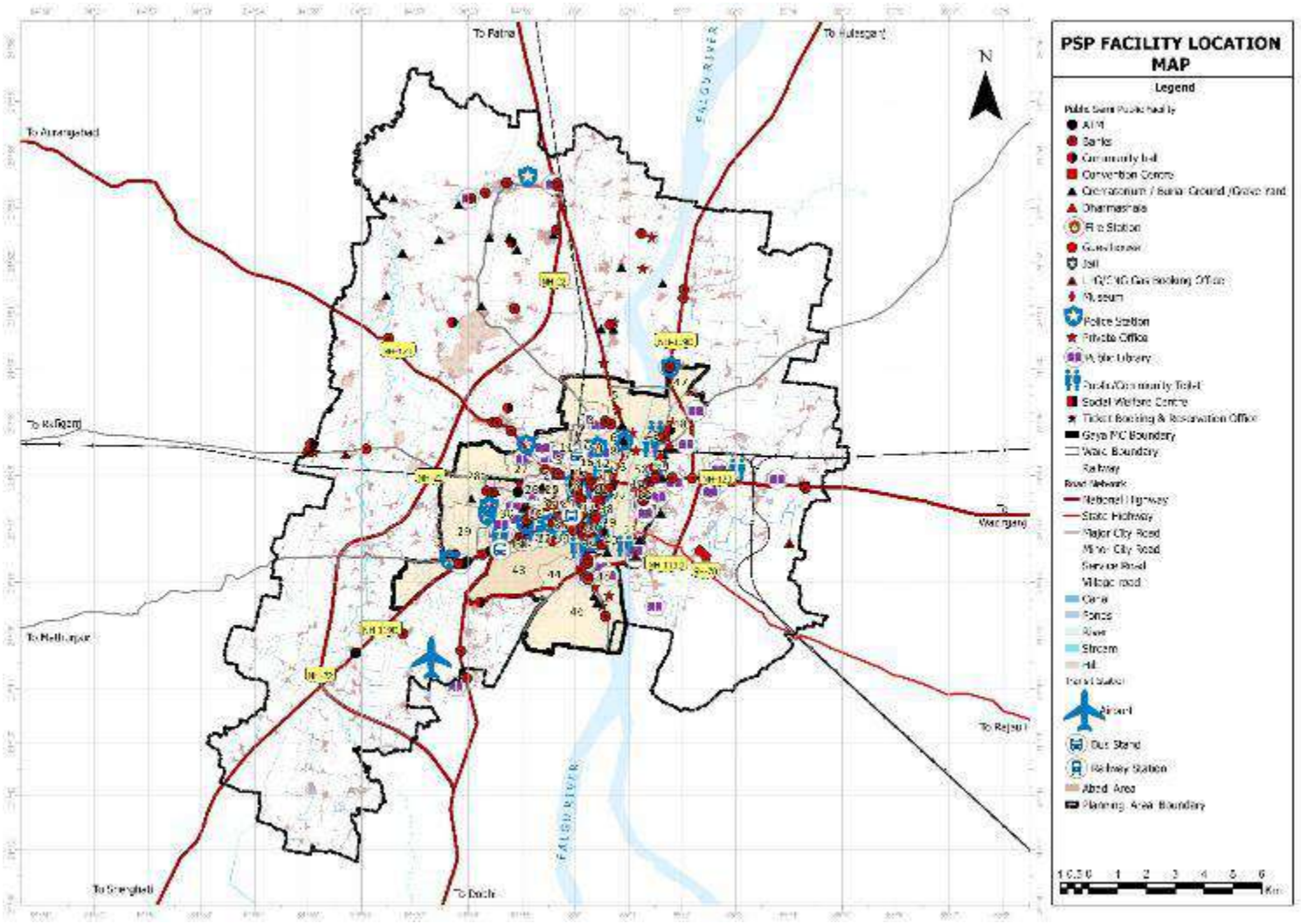
TABLE 12-7 DESCRIPTION OF EXISTING RECREATIONAL FACILITIES IN THE GAYA JI PLANNING AREA

Type of Facility	Category	Required Number (URDPFI)	Existing Numbers	Gap
Recreational	Club	10	9	1
	Garden	-	3	-
	Neighborhood Park	102	25	87
	Community Level Play Ground	20	12	8
	District Sports Centre	10	1	9
	Gymnasium	-	8	-
	Stadium	1	2	1

Source: Land Use Survey 2024, Stesalit Systems Ltd.

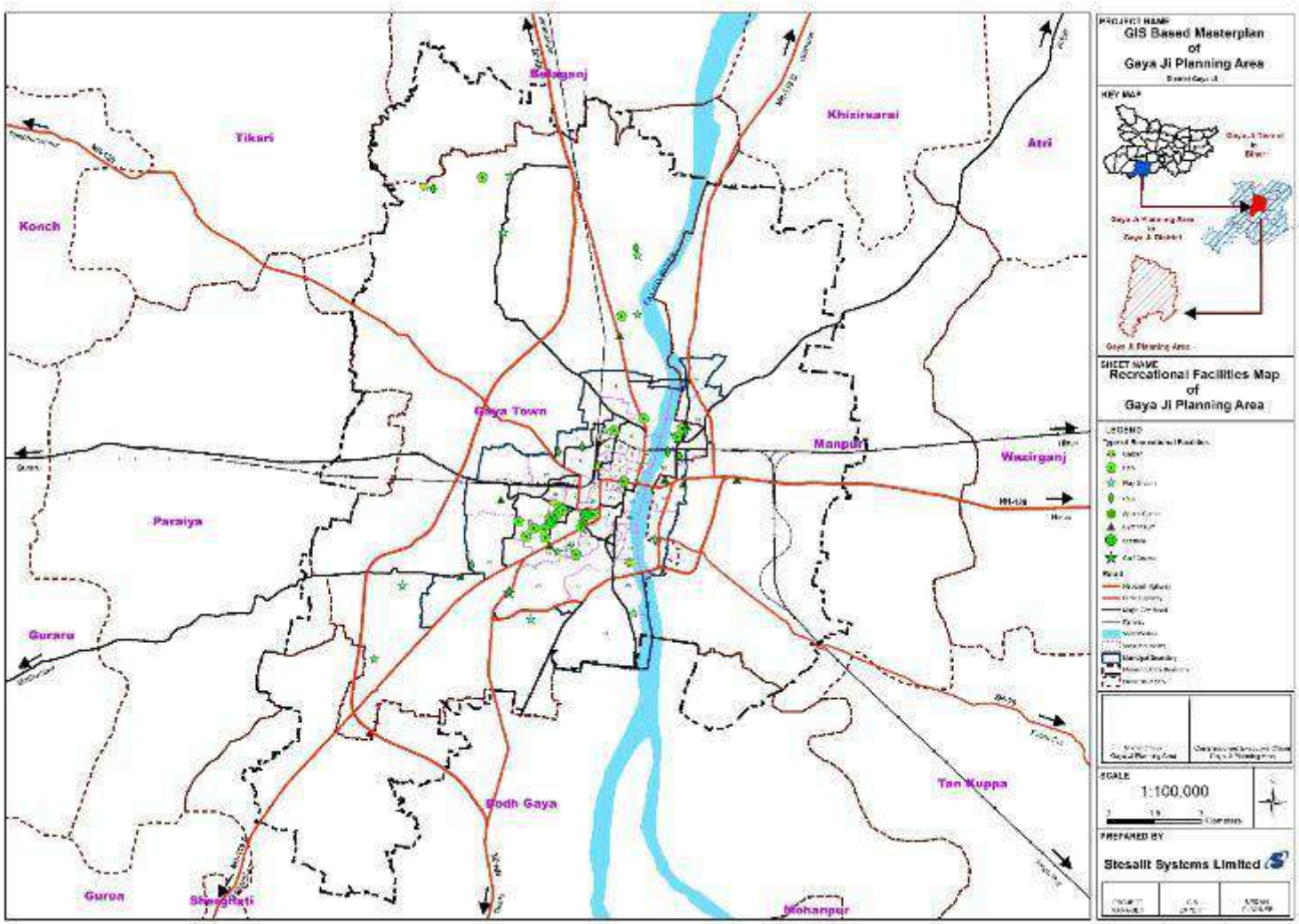
*Note: Required Number of facilities are calculated as per URDPFI Guideline 2015 according to estimated population of planning area in 2025 (101869)

Buffer analysis of recreational facilities reveals that within an **800 m buffer**, only **38 sq km**, constituting **14.07% of the total 273 sq km planning area**, is serviceable. This indicates a significant shortfall in the accessibility of recreational spaces, suggesting the need for additional parks and open spaces to enhance community well-being and liveability



MAP 12-3 EXISTING PUBLIC AND SEMI-PUBLIC FACILITIES MAP OF GAYA JI PLANNING AREA

Source: Land Use Survey 2024, Stesalit Systems Ltd.



MAP 12-4 EXISTING RECREATIONAL FACILITIES MAP OF GAYA JI PLANNING AREA

Source: Land Use Survey 2024, Stesalit Systems Ltd.

12.3.3 EXISTING DEMAND GAP AND FUTURE REQUIREMENTS

The provision of adequate social infrastructure is essential for ensuring a high quality of life and fostering inclusive urban development. As urban populations grow, the demand for educational, healthcare, and socio-cultural facilities also increases, necessitating careful planning and timely intervention. These facilities play a critical role in meeting the everyday needs of citizens, supporting community well-being, and promoting social cohesion. With the projected population expected to reach approximately 15.84 lakh by 2047, it becomes imperative to assess existing service levels, identify infrastructure gaps, and plan for future requirements to create a sustainable and liveable urban environment.

12.3.3.1 EDUCATION

The following table shows the requirement analysis for educational facilities as per the URDPFI guidelines.

TABLE 12-8 REQUIREMENT ANALYSIS OF EDUCATIONAL FACILITIES AS PER URDPFI GUIDELINES (BASED ON A PROJECTED POPULATION OF 2047)

Category	Need according to URDPFI Guideline	Area Requirement each unit (URDPFI)	Total Area Requirement each unit (URDPFI)	Existing Facility	Future Requirement for 2047
School (Primary/Secondary)	317	0.4 Ha	-	609	No gap
College	13	5 Ha	-	70	No gap
University	2	2 Ha	2 Ha	1	1
Anganwadi/ ICDS	317	200 Sqm	6.2 Ha	6	311
Training Institute	2	2 Ha	-	65	No gap

Source: Education department gaya Ji, 2024, computed as per URDPFI Guideline 2015

*Note: Required Number of facilities are calculated as per URDPFI Guideline 2015 according to estimated population of planning area in 2025 (15,84,250)

As per the analysis of educational facilities based on the URDPFI Guidelines, the existing infrastructure in Gaya Ji Planning Area is largely adequate for schools, colleges, and training institutes, with no significant gap observed in these categories. The planning standards indicate that the number of primary and secondary schools (317 existing, 609 required) meets the projected need, showing good educational coverage at the basic level. Similarly, the availability of colleges (13 existing, 70 required) and training institutes (2 existing, 65 required) is sufficient as per future demand projections. However, there is a noticeable deficiency in Anganwadi/ICDS centers, where only 6 units exist against a requirement of 317, indicating a major gap in early childhood care and pre-primary education facilities. The university-level infrastructure shows a minor shortfall, with one existing

university and one more required by 2047. Overall, while higher and secondary education facilities are satisfactory, there is a strong need to expand Anganwadi centers and university infrastructure to ensure balanced educational development across all levels.

12.3.3.2 HEALTHCARE

The following table shows the requirement analysis for healthcare facilities as per the URDPFI guidelines.

TABLE 12-9 REQUIREMENT ANALYSIS OF HEALTHCARE FACILITIES AS PER URDPFI GUIDELINES (BASED ON A PROJECTED POPULATION OF 2047)

Category	Need according to URDPFI Guideline	Area Requirement each unit (URDPFI)	Total Area Requirement each unit (URDPFI)	Existing Facility	Future Requirement for 2047
Clinic/Dispensary	106	0.8 Ha	16.8 Ha	89	No gap
Diagnostic Centre	32	500 Sqm	1.6 Ha	1	31
Govt. Hospital	6	6 Ha	-	13	No gap
Nursing Home	35	0.2 Ha	2.8 Ha	21	14
Primary/Community Health Centre	53	0.5 Ha	25.5 Ha	2	51
Private Hospital	-	-	-	71	-

Source: Healthcare department Gaya Ji, 2024, computed as per URDPFI Guideline 2015

*Note: Required Number of facilities are calculated as per URDPFI Guideline 2015 according to estimated population of planning area in 2025 (15,84,250)

As per the assessment of healthcare facilities based on URDPFI Guidelines, the existing infrastructure in Gaya Planning Area shows a mixed pattern of adequacy and shortfall. The availability of clinics and dispensaries (89 existing against 106 required) is satisfactory, indicating no major gap in primary-level healthcare. Similarly, the number of government hospitals (13 existing against 6 required) exceeds the standard requirement, ensuring sufficient coverage for tertiary healthcare services. However, there are significant deficiencies in diagnostic centres and primary/community health centres, where only 1 diagnostic centre exists against a need of 32, and only 2 PHCs/CHCs are available against a requirement of 53. This indicates a shortage of essential diagnostic and community-level healthcare infrastructure. The nursing homes also show a moderate shortfall, with 21 existing against 35 required, suggesting a need for expansion to support secondary healthcare services. The presence of 71 private hospitals complements public healthcare, helping to meet part of the community's medical needs. Overall, while higher-level healthcare infrastructure is adequate, substantial improvement is needed in diagnostic facilities, nursing homes, and community health centres to ensure equitable access to medical services by 2047.

12.3.3.3 SOCIO-CULTURAL FACILITIES

The following table shows the requirement analysis for socio-cultural facilities as per the URDPFI guidelines.

TABLE 12-10 REQUIREMENT ANALYSIS OF SOCIO-CULTURAL FACILITIES AS PER URDPFI GUIDELINES (BASED ON A PROJECTED POPULATION OF 2047)

Category	Need according to URDPFI Guideline	Area Requirement each unit (URDPFI)	Total Area Requirement each unit (URDPFI)	Existing Facility	Future Requirement for 2047
ATM	106	6 Sqm	0.06 Ha	10	96
Banks	106	85 Sqm	0.4 Ha	115	No gap
Community hall	106	0.2 Ha	19.2 Ha	10	96
Crematorium Burial Ground /Grave Yard	3	2.5 Ha	-	30	No gap
Dharamshala	-	-	-	4	-
Guesthouse	-	-	-	4	-
Jail	2	10 Ha	-	1	1
LPG/CNG Gas Booking Office	40	0.1 Ha	3.5 Ha	5	35
Police Station	18	1.5 Ha	-	20	No gap
Private Office	-	-	-	50	-
Public Library	106	0.2 Ha	6.0 Ha	76	30
Public/Community Toilet	-	-	-	12	175
Fire Station	8	0.8 Ha	5.6 Ha	1	7
Social Welfare Centre	-	-	-	3	-

Source: Requirement Analysis as per URDPFI Guideline

*Note: Required Number of facilities are calculated as per URDPFI Guideline 2015 according to estimated population of planning area in 2025 (15,84,250)

Based on the assessment of public and semi-public facilities as per URDPFI Guidelines, Gaya Planning Area shows an overall adequate provision of essential services, though certain civic and community facilities require significant enhancement. The number of banks (115 existing against 106 required), crematoriums/burial grounds (30 existing against 3 required), and police stations (20 existing against 18 required) indicates that the city is well-served in these categories, showing no major gap. However, there is a considerable shortfall in ATMs, with only 10 existing against a requirement of 106, reflecting the need for improved financial accessibility at the neighbourhood level.

Similarly, community halls (10 existing against 106 required) and public libraries (76 existing against 106 required) show notable deficiencies, suggesting the need for more spaces dedicated to social, cultural, and educational activities. The fire safety infrastructure is critically inadequate, with only 1 fire station against a requirement of 8, highlighting the need for urgent expansion to ensure urban safety and disaster preparedness. The LPG/CNG booking offices also show a large

gap, with only 5 available against 40 required, indicating limited accessibility to essential utility services.

On the other hand, facilities like Dharamshala, guesthouses, private offices, and social welfare centers exist but are not governed by fixed standards in the guidelines. The public/community toilets (12 existing) also need a substantial increase to meet hygiene standards, especially with growing urban populations. In conclusion, while core services like banking, policing, and cremation facilities are sufficient, there is a critical need to strengthen financial outreach (ATMs), community amenities, fire safety, sanitation, and gas supply infrastructure to achieve balanced and inclusive urban development by 2047.

12.3.3.4 RECREATIONAL FACILITIES

TABLE 12-11 REQUIREMENT ANALYSIS OF RECREATIONAL FACILITIES AS PER URDPFI GUIDELINES (BASED ON A PROJECTED POPULATION OF 2047)

Category	Need according to URDPFI Guideline	Area Requirement each unit (URDPFI)	Total Area Requirement each unit (URDPFI)	Existing Facility	Future Requirement for 2047
Club	16	-	-	9	7
Garden	-	-	-	3	-
Gymnasium	-	-	-	8	-
Neighborhood Park	158	2 Ha	286 Ha	15	143
Community level Playground	16	5 Ha	-	12	No gap
District Sports Centre	16	8 Ha	40 Ha	1	15
Stadium	1	-	-	2	No gap

Source: Requirement Analysis as per URDPFI Guideline

*Note: Required Number of facilities are calculated as per URDPFI Guideline 2015 according to estimated population of planning area in 2025 (15,84,250)

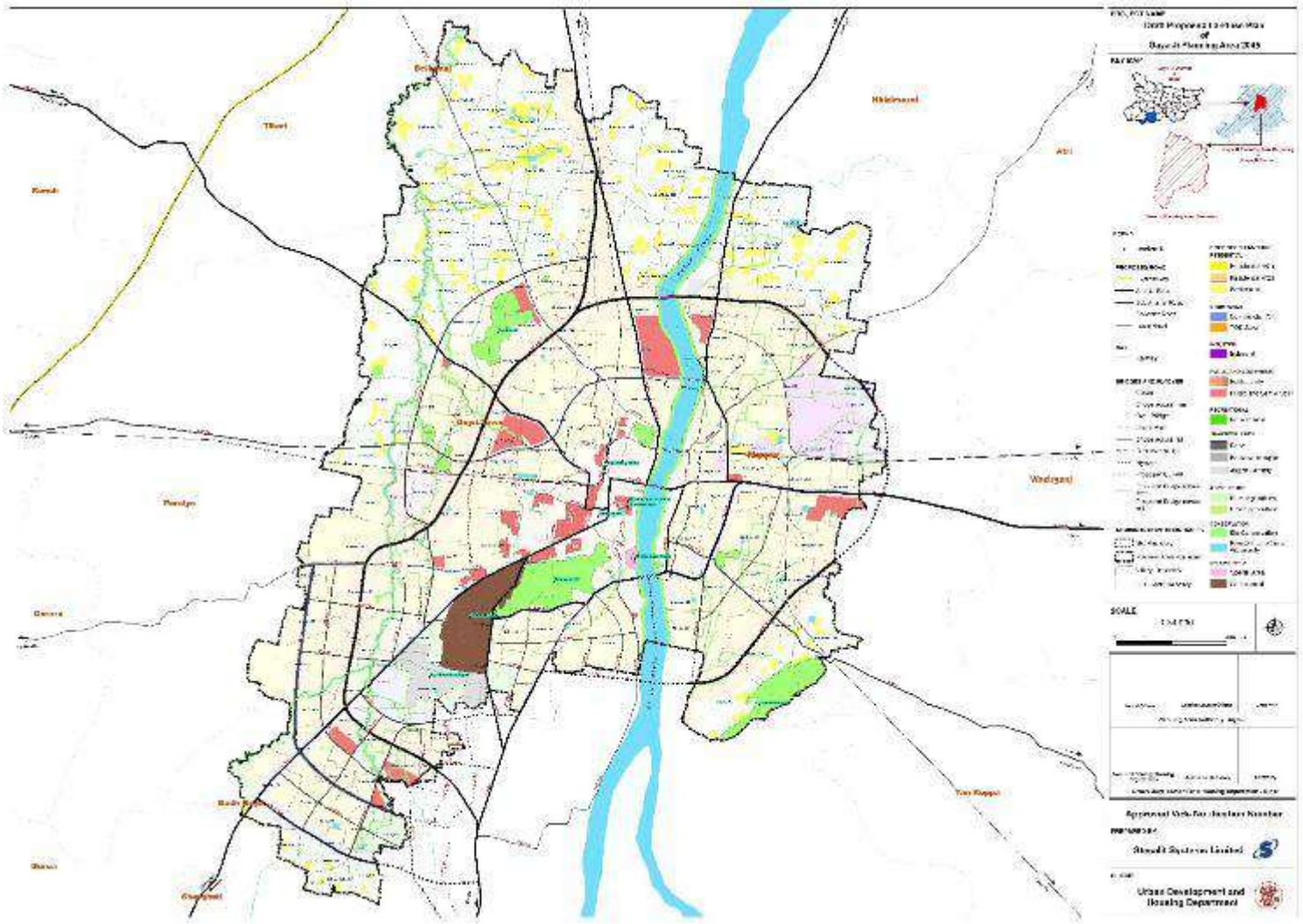
As per URDPFI Guidelines, Gaya Planning Area has moderate recreational infrastructure but significant gaps in neighbourhood-level facilities. Clubs (9 existing vs. 16 required) and district sports centres (1 vs. 16) show notable shortfalls, while community playgrounds (12 vs. 16) and stadiums (2 vs. 1) are adequate. The major deficiency lies in neighbourhood parks, with only 15 available against 158 required, indicating a severe lack of open green spaces. Overall, Gaya needs to strengthen its parks, clubs, and sports centres to promote recreation, health, and environmental balance by 2047.

12.4 ISSUES & POTENTIALS

TABLE 12-12 SWOT OF INFRASTRUCTURE IN GAYA JI PLANNING AREA

Strength	Weakness	Opportunity	Threat
WATER SUPPLY • The ULB supplies a total of 85 million litres of water for residential purposes, including slum households. Each resident is provided with 135 LPCD (litres per capita per day) of water. The ULB has a total of 80,869 household connections • The Gaya Ji Water Supply Scheme, led by Gaya Ji Nagar Nigam and executed by BUDICO, aims to improve water infrastructure across 53 wards, covering 71,000 households—58,250 through new connections and 12,750 existing ones. Infrastructure has been completed in 33 priority and 20 randomly selected wards, reaching 47,860 new houses. • There is one WTP, located in Manpur Block, with a capacity of 186 million liters, ensuring treated good quality water to residents. **SOLID WASTE MANAGEMNET** The Urban Local Bodies (ULB) undertake a comprehensive daily collection of waste	**GROUNDWATER DEPENDENCE** • High dependence on groundwater can lead to its depletion and have severe environmental impacts. • Despite several schemes like "***Har Ghar Nal Ka Jal***" only **18.3%** have access to treated tap water in urban and **1.09%** in rural area **OPEN DRAINAGE** • The high dependence on open drainage (54.3% in Gaya Ji Municipal Corporation and 35.8% in rural areas) contributes to environmental pollution, foul odors, and	**SMART WASTE MANAGEMENTS TECHNIQUES** • Gaya Ji should be adopting smart waste management techniques, including waste-to-energy technique while promoting renewable energy sources like solar power to reduce kerosene dependency. **STRENGTHENING HEALTHCARE SYSTEMS** • Establishment of new district-level hospitals with multispecialty care. Expansion of Ayushman Bharat Health & Wellness Centers for primary care	**RAPID URBANIZATION** • Rapid urbanization without proper planning can exacerbate water and sanitation challenges, while poor drainage infrastructure increases the risk of waterlogging and flooding during heavy rains. **LACK OF GREEN SPACE** The absence of green spaces may exacerbate the urban heat island effect, leading to increased temperatures

Strength	Weakness	Opportunity	Threat
through a door-to-door service within urban areas. Within the jurisdiction of the Municipal Council in Bawasar, there is presently one ISWPP plant of 600 TPD, one MRF plant of 100 TPD and wet waste plant of 20 MT capacity, generates and collects 7.5 tons of waste per day **SANITATION** More than 65% utilize septic tank for sewage disposal, shows awareness of hygienic sanitation. **PRESENCE OF UNIVERSITY** • The presence of Central University of South Bihar (CUSB) and Gaya Ji Engineering College (GEC) enhances the region's educational reputation, attracting students and contributing to higher education development, research opportunities, and skilled workforce generation. • The presence of Anugrah Narayan Magadh Medical College & Hospital in planning area, strengthens the health infrastructure by providing accessible medical care and advanced healthcare facilities for residents.	health risks from stagnant water, highlighting the urgent need for improved wastewater management and closed drainage systems.		and diminished air quality.



MAP 12-5 PROPOSED PUBLIC SEMI-PUBLIC AND RECREATIONAL LANDUSE OF GAYA JI PLANNING AREA

Source: map prepared by Stesalit System Ltd.

13 TRAFFIC AND TRANSPORT

13.1 INTRODUCTION

13.2 REGIONAL CONNECTIVITY

13.2.1 PRIMARY ROAD NETWORK

Gaya Ji has a well-connected road network linking it with major centres such as Patna, Jehanabad and Bodhgaya.
The Planning Area is served by **NH-22 and NH-120**, along with **SH-4, SH-7 and SH-70**, ensuring strong regional connectivity.
NH-22 (Patna–Gaya Ji–Dobhi Road) serves as a major regional corridor for passenger and freight movement.
NH-120 (Gaya Ji–Nawada Road) provides an important alternative route and helps decongest the city roads.
The transport system is dominated by two-wheelers, four-wheelers, auto-rickshaws, e-rickshaws, bicycles and freight vehicles.
Commercial activities generate significant freight movement, contributing to traffic congestion within the town.
Key structures such as **Manpur Bridge and Bypass Bridge** further support regional connectivity.
Overall, integrated transport planning, improved mobility and efficient traffic management are essential for sustainable growth of the Gaya Ji Planning Area.
Connection between Gaya Ji and Patna: The Patna Gaya Ji Dobhi Road, also lovingly referred to as NH-22, is the lifeblood of Gaya Ji's road system. This essential route runs around 100 km north and connects Gaya Ji to Patna, the vibrant city of Bihar. The NH-22 serves as a significant route for trade and transport, facilitating the efficient exchange of products and services between the two cities.

- **Patna-Gaya Ji Dobhi Road (NH-22)**
  NH-22 provides an important and less-congested link between Gaya Ji and Patna.
  Integrated traffic management, clear signage, synchronized signals, and dedicated through lanes can improve traffic flow, reduce congestion, and enhance regional mobility.

- **Gaya Ji-Panchananpur-Daud Nagar Road (NH-120)**

  NH-120 forms a key transport corridor through Gaya Ji, connecting it with Nawada, Daud Nagar and Panchananpur.
  Effective traffic management, well-maintained junctions and clear signage are essential to ensure safe and smooth movement of commuters, commercial vehicles and pedestrians.

- **Fatuha-Gaya Ji Road (SH-4)**

  SH-4 provides an important regional connection between Gaya Ji and Fatuha, supporting urban and economic linkages.
  Its integration with **NH-120** requires coordinated planning, junction improvements, and effective traffic management to ensure smooth and safe movement.

- **Gaya Ji-Daud Nagar Road (SH-7)**

  SH-7 provides an important regional connection between **Gaya Ji and Daud Nagar**, supporting economic and social linkages.
  Its integration with **NH-22** requires coordinated planning, improved junction management, and stakeholder coordination to ensure smooth and safe traffic movement.

- **Gaya Ji-Rajauli Road (SH-70)**
  Rajauli and Gaya Ji are seamlessly integrated into the metropolitan landscape of Gaya Ji by SH-70, which serves as a vital conduit. By linking Gaya Ji's strategic regions with these nearby towns, this important intersection within the regional network promotes social and economic interaction. If SH-70 intersects the current NH-22 network, careful planning and cooperation among parties are crucial.

13.2.2 SECONDARY ROAD NETWORK

The elaborate system of defined roads plays a significant role in enhancing connectivity, managing traffic, and facilitating mobility inside and around Gaya Ji. Efficient planning and coordination are necessary to provide smooth urban travel for residents and commuters while also making the best use of these routes.

- **Sherghati-Cherki-Gaya Ji Road**

  The **Sherghati–Cherki–Gaya Ji Road** provides a strategic southern connection, diverting long-distance and commuter traffic from NH-22 and NH-120.
  It helps reduce congestion, improve travel efficiency, and enhance connectivity to southern Gaya Ji.

- **Gaya Ji-Rafiganj Road**
  The Gaya Ji-Rafiganj Road is a crucial secondary road connecting Gaya Ji to Rafiganj. This strategic corridor plays a vital role in the movement of people between the two locations. It likely serves as a primary route for commuters traveling for work, education, or personal reasons.

- **Manpur-Sarbahda Road**

  The **Manpur–Sarbahda Road** is an important secondary link connecting Manpur and Sarbahda with **NH-120**.
  It supports daily commuting, educational and employment-related travel, strengthening local connectivity.

- **Gautam Buddha Road**

  The **Gautam Buddha Road** is an important secondary corridor connecting Gaya Ji with Panchati Akhara.
  It facilitates daily commuter movement and improves local accessibility for work, education and other activities.

- **Pretshila Road**
  An important secondary route that connects Gaya Ji to Neyazipur and Pretshila Mountain is the Pretshila Road. The flow of people between the two sites is greatly aided by this tactical corridor. It is probably the main route used by commuters going somewhere for business, school, or pleasure.

- **Tikuna Bypass Road**
  An important secondary route that links Ashok Vihar Colony with Musatpura is the Tikuna Bypass Road. It meets up with NH-22 close to Mustapura. The flow of people between the two sites is greatly aided by this tactical corridor. It is probably the main route used by commuters going somewhere for business, school, or pleasure.

- **Godawari Road**
  One of the most important secondary roads that connects Gaya Ji with Kolhaura is the Godawari Road, also called Gaya Ji Bodhgaya Road. The flow of people between the two sites is greatly aided by this tactical corridor. It is probably the main route used by commuters going somewhere for business, school, or pleasure. Everyone on the road benefits from this since it not only shortens travel times for individuals utilizing the road but also facilitates traffic flow on the major thoroughfares.

- **Nauranga Road**
  An important secondary route that links Lakhibag with Manpur is the Nauranga Road. It meets up with NH-120 close to Manpur. The flow of people between the two sites is greatly aided by this tactical corridor. It is probably the main route used by commuters going somewhere for business, school, or pleasure.

- **Police Line Road**
  The Police Line Road is a crucial secondary road connecting Magadh Colony to Gewal Bigha. This strategic corridor plays a vital role in the movement of people between the two locations. It likely serves as a primary route for commuters travelling for work, education, or personal reasons.

Gaya Ji Planning Area's secondary road network is comprised primarily of undivided two-lane two-way roads. These roads offer increased capacity for traffic flow compared to single-lane roads. However, their width varies throughout the network, so it is important to be aware of potential changes in lane size while driving. The bitumen surface, a common asphalt material, provides a durable and relatively smooth driving experience. Some of these secondary roads are additionally equipped with appropriate road markings, which play a vital role in promoting safe and organized traffic flow.

13.2.3 CONDITION OF ROAD

Most roads within Gaya Ji Nagar Nigam are **bitumen/asphalt surfaced**, including the major highways.
However, **on-street parking, roadside encroachments, poor lane discipline and weak traffic enforcement** reduce road capacity, causing congestion, bottlenecks and increased accident risks.

- **Bottlenecks at Junctions:** The presence of bottlenecks at various junctions significantly hampers traffic flow. These congested points often lead to delays as vehicles struggle to navigate through intersections, causing disruptions in the overall movement within the planning area. Addressing these bottlenecks is crucial to ensuring smoother traffic flow.
- **Insufficient Right of Way (ROW) and Carriageway Width (COW**): The roads' limited ROW and COW contribute to congestion and reduced comfort for road users. Narrow roads or insufficient space for vehicles affect traffic capacity, leading to congestion during peak hours. Expanding ROW and widening carriageways could help alleviate this issue by allowing for smoother traffic movement and accommodating a higher volume of vehicles.
- **Lack of Infrastructure Development:** Inadequate infrastructure development, such as outdated or insufficient road designs, absence of proper signage, inadequate lighting, and poor road maintenance, can collectively impact the overall level of service and comfort for commuters. Upgrading infrastructure and ensuring proper maintenance can significantly enhance the road network's efficiency and user experience.

The analysis aims to provide critical insights into the community's connectivity, economic opportunities, and overall quality of life by examining transportation patterns and potential challenges. Understanding transportation dynamics not only informs urban planning and development strategies but also helps to shape sustainable and inclusive mobility solutions, enriching the overall socioeconomic profile of the surveyed community.

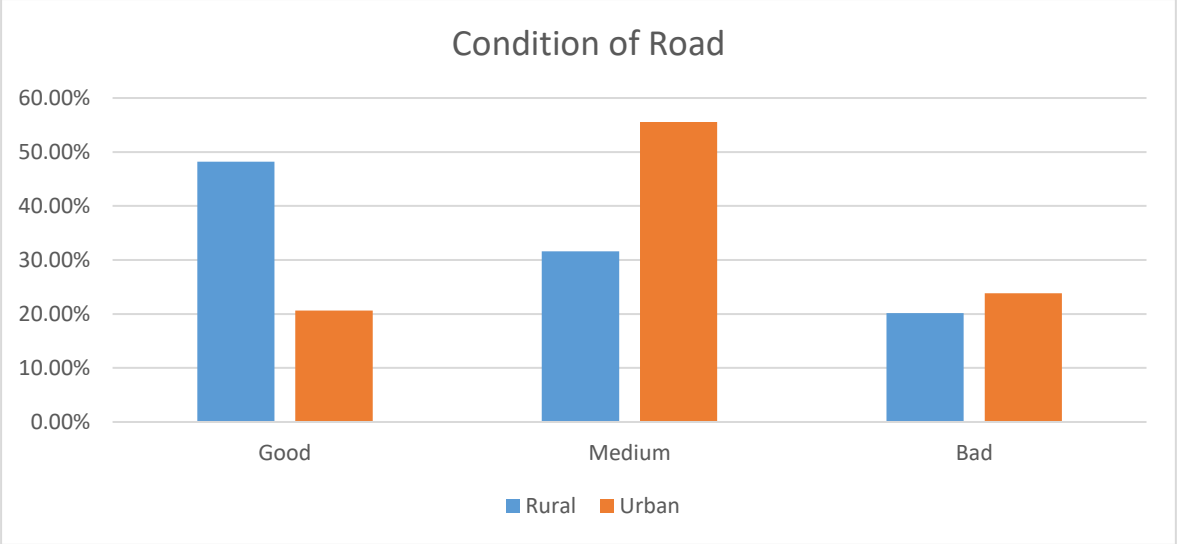


FIGURE 13-1 TYPE OF ACCESS ROAD CONNECTING THE SURVEYED HOUSEHOLDS IN GAYA JI PLANNING AREA

Source: Socio-Economic Survey,2023, Stesalit Systems Limited

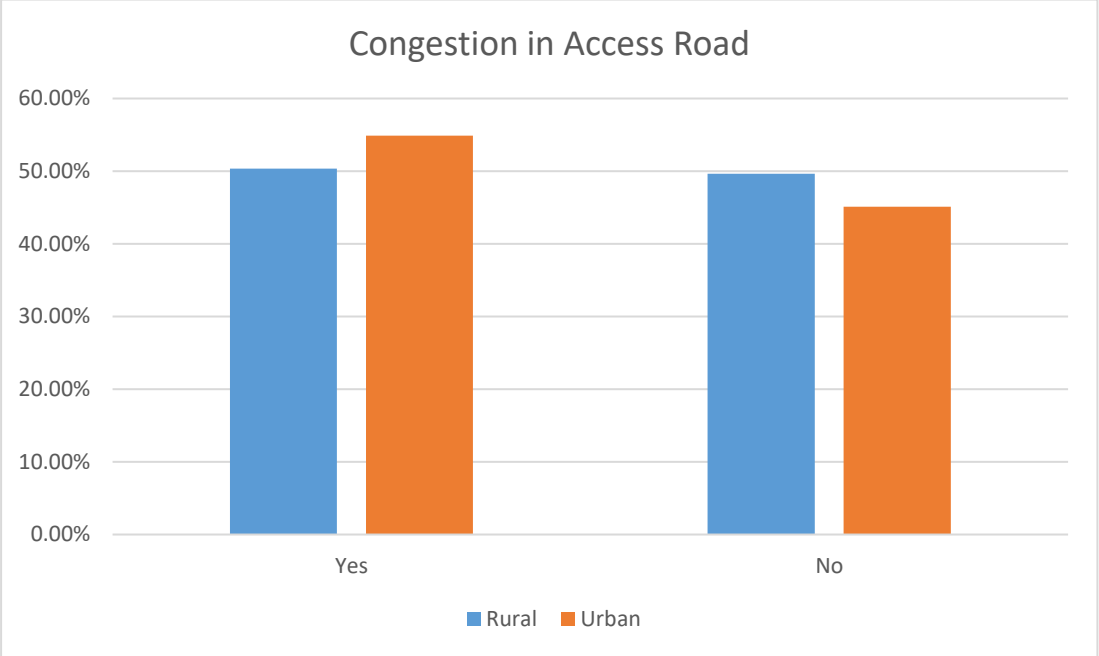


FIGURE 13-2 CONGESTION IN ACCESS ROAD IN GAYAJI PLANNING AREAS

Across the Gaya Ji Planning Area, access roads are generally available but not consistently satisfactory in quality. The data reflect a clear need for **systematic upgradation, improved maintenance, and quality control**, especially in areas with high levels of dissatisfaction. Strengthening last-mile and internal road networks should be treated as a priority infrastructure intervention.

Congestion on access roads is a serious structural issue across both urban and rural areas of the Gaya Ji Planning Area. With more than half of urban households and nearly half of rural households reporting congestion, transport infrastructure upgradation and traffic management reforms should be treated as priority interventions in the development planning framework.

13.2.3.1.1 VEHICLE OWNERSHIP

Among the households surveyed in urban areas, 194 households have cars, 394 households have two-wheelers and 324 households have cycles in their house. Very few surveyed households (1.47%) own car.

TABLE 13-1 VEHICLE OWNERSHIP OF THE SURVEYED HOUSEHOLDS

Vehicle Ownership		
Car	2-Wheeler	Cycle
194	394	324

Source: Socio-Economic Survey, 2023, Stesalit Systems Ltd.

The majority of households surveyed in urban areas (98.90%) who have two-wheelers in their house own 1 two-wheeler while a few (1.10%) of them own 2 two-wheelers and no households have more than 2 two-wheelers.

94.95% of surveyed households in urban areas who have cycles in their house own 1 cycle, 2.84% own 2 cycles while only 2.21% own 3 cycles.

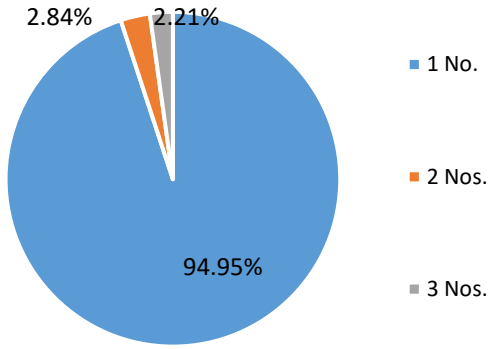


FIGURE 13-3 CYCLE OWNERSHIP OF THE SURVEYED HOUSEHOLDS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

There are a few surveyed households possessing tractors or three-wheelers, while very few surveyed households don't possess any vehicles.

13.2.3.1.2 TRAVEL PURPOSE

The purpose of each trip, such as commuting to work or school, shopping, recreation, social activities, etc. Understanding the reasons for travel is crucial for planning and policy decisions. It is observed that 50.26% of the trips in urban areas are reported for work purpose.

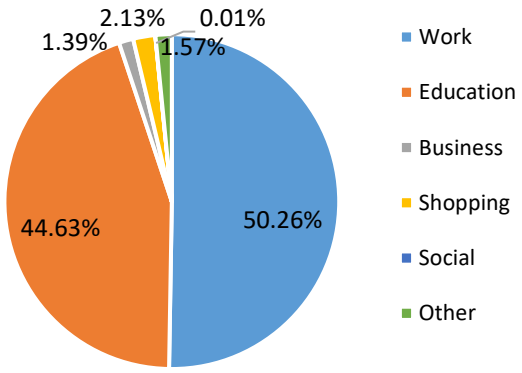


FIGURE 13-4 PURPOSE OF TRAVEL IN URBAN AREAS

Source: Socio-economic Survey 2023, Stesalit Systems Ltd.

13.2.3.1.3 MODE OF TRANSPORTATION

The mode of transportation used for each trip, whether it is by car, public transit, walking, biking, or other means. This helps in assessing the transportation infrastructure needs and the sustainability of travel modes. More than 20 percent of the trips are made by public transportation, such as bus, train and auto/toto etc.

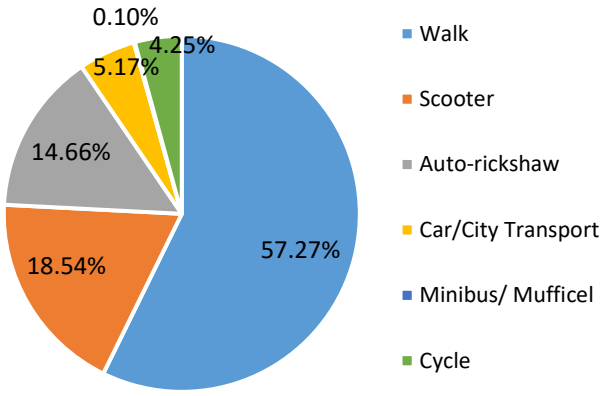


FIGURE 13-5 MODE OF TRANSPORTAION IN URBAN AREAS

Source: Socio-economic Survey 2023, Stesalit Systems Ltd.

13.2.3.1.4 TRAVEL DISTANCE

The distance covered during each trip. This information is essential for assessing the efficiency of transportation systems and planning for future infrastructure development. More than 80 percent of trips are less than 20 km.

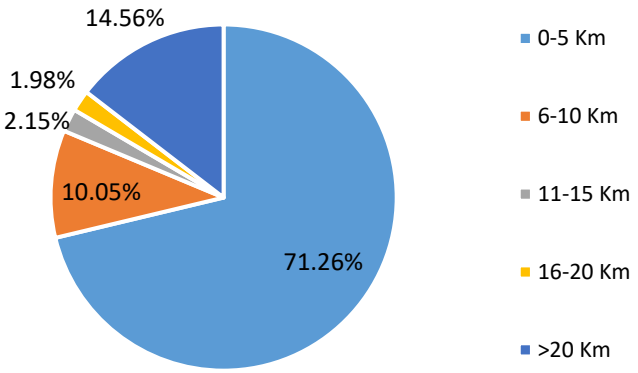


FIGURE 13-6 TRAVEL DISTANCE IN URBAN AREAS

Source: Socio-economic Survey 2023, Stesalit Systems Ltd.

13.2.3.1.5TRAVEL COST

The travel cost during each trip. This information is essential for assessing the efficiency of transportation systems and planning for future infrastructure development. More than 30 percent of trips cost less than INR 20.

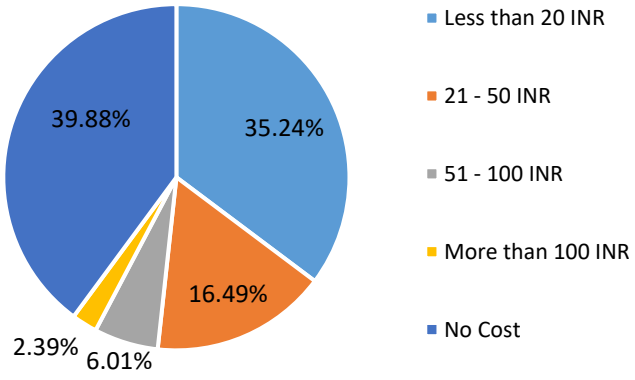


FIGURE 13-7 TRAVEL COST BY REPORTED TRIPS IN URBAN AREAS

Source: Socio-economic Survey 2023, Stesalit Systems Ltd.

13.2.3.1.6 TRAVEL TIME

The time taken during each trip. This information is essential for assessing the efficiency of transportation systems and planning for future infrastructure development. More than 60 percent of trips made are less than 15 minutes.

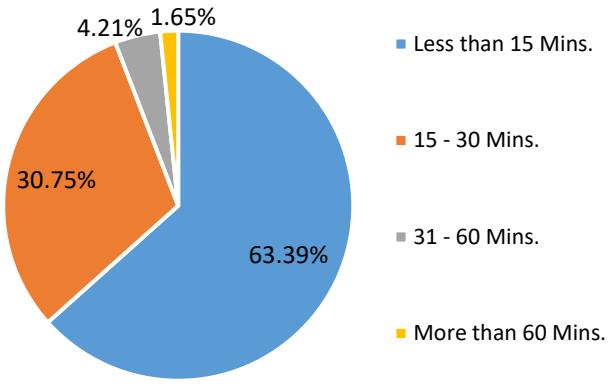
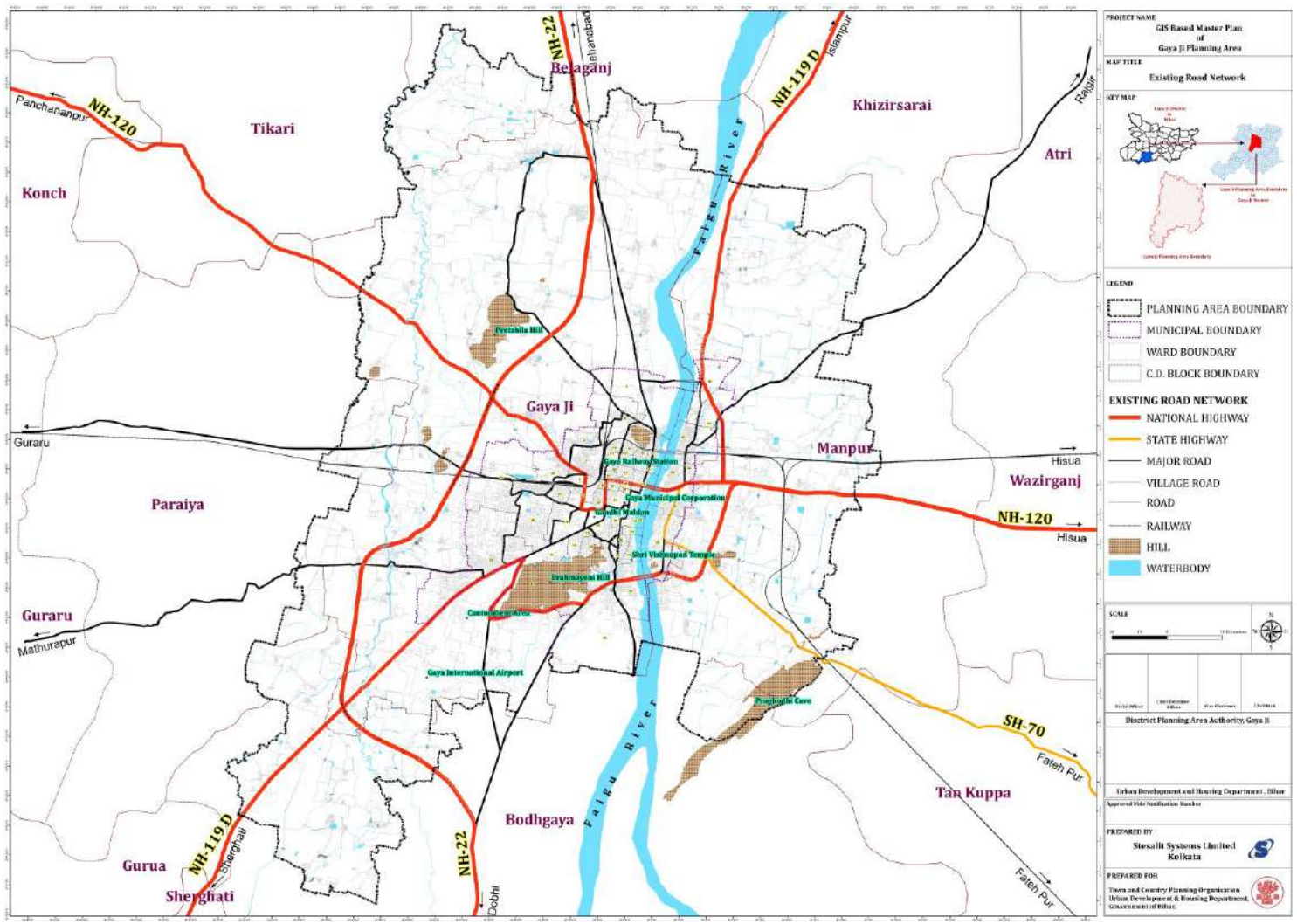
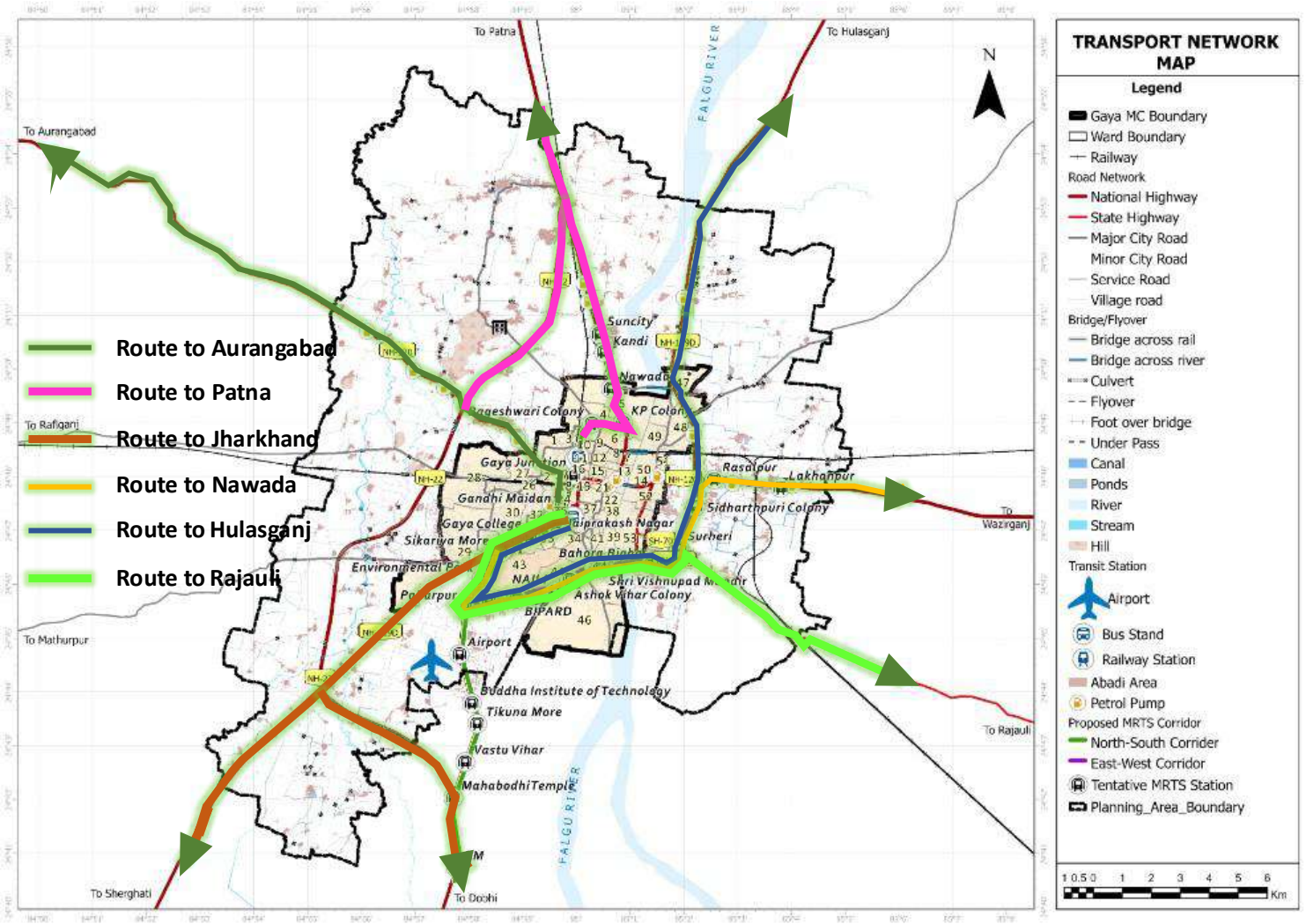


FIGURE 13-8 TRAVEL TIME BY REPORTED TRIPS IN URBAN AREAS

Source: Socio-economic Survey 2023, Stesalit Systems Ltd.

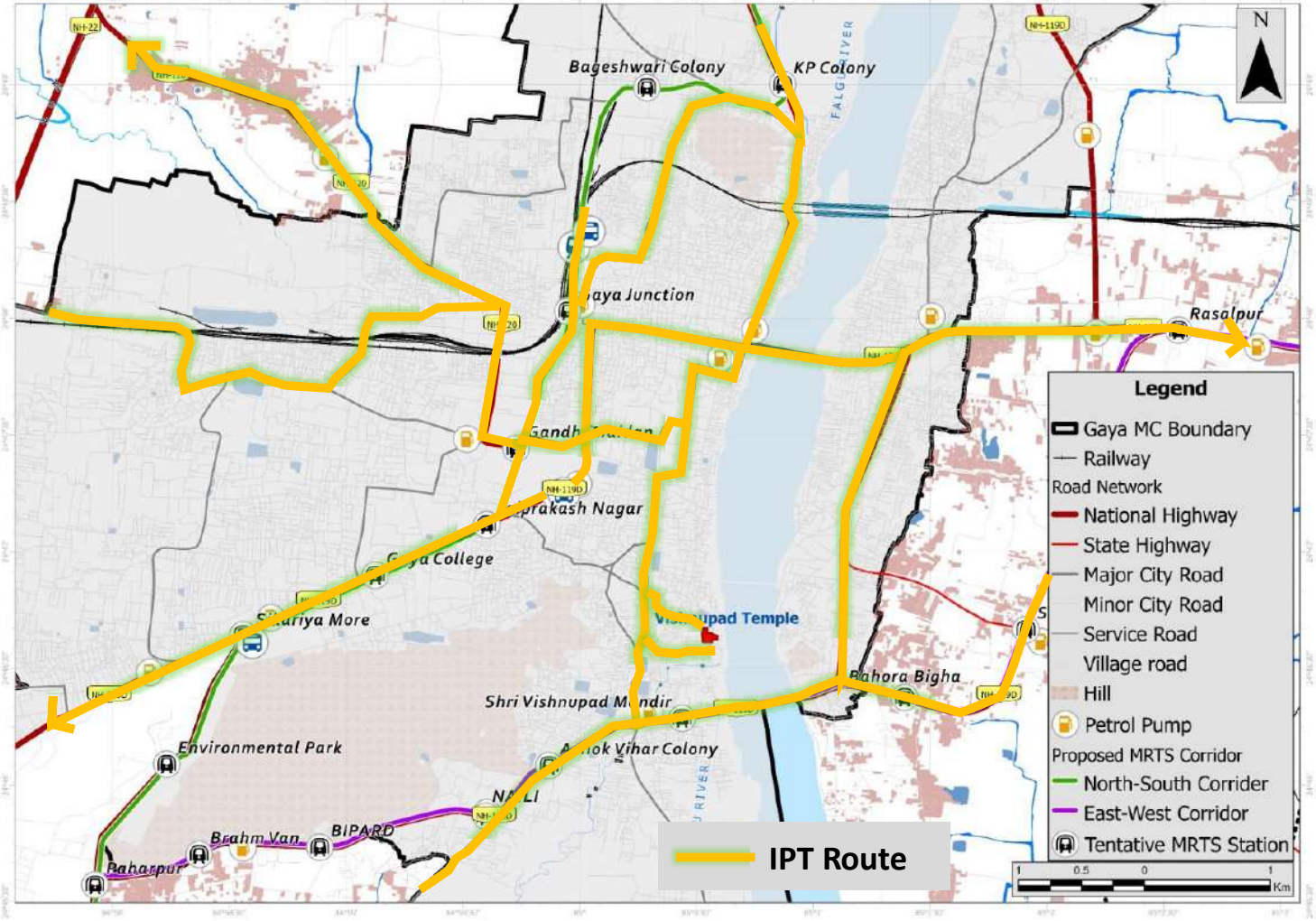


MAP 13-1 ROAD NETWORK MAP OF GAYA JI PLANNING AREA



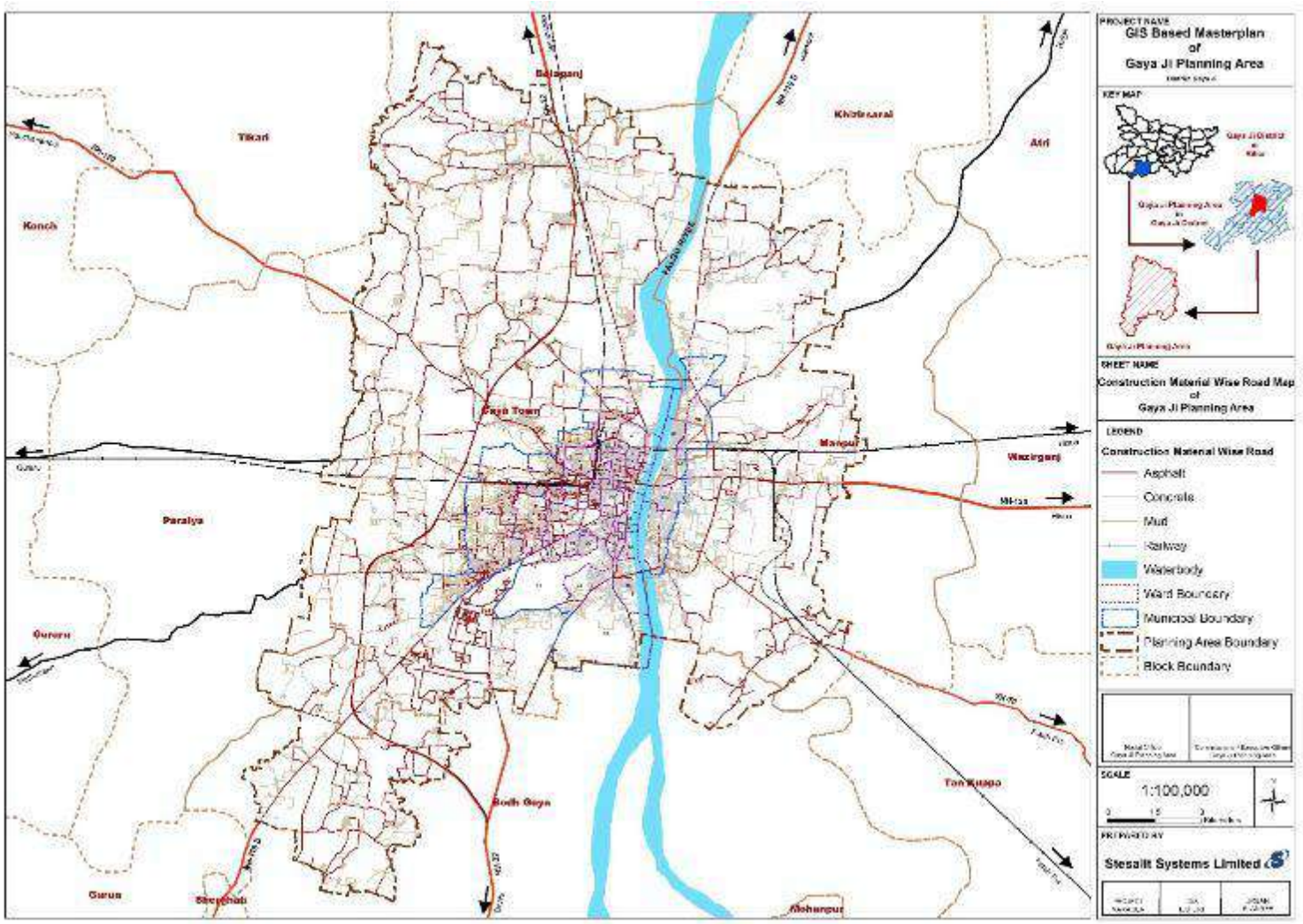
MAP 13-2 BUS ROUTE MAP OF GAYA JI

Source: Transportation Survey, 2024



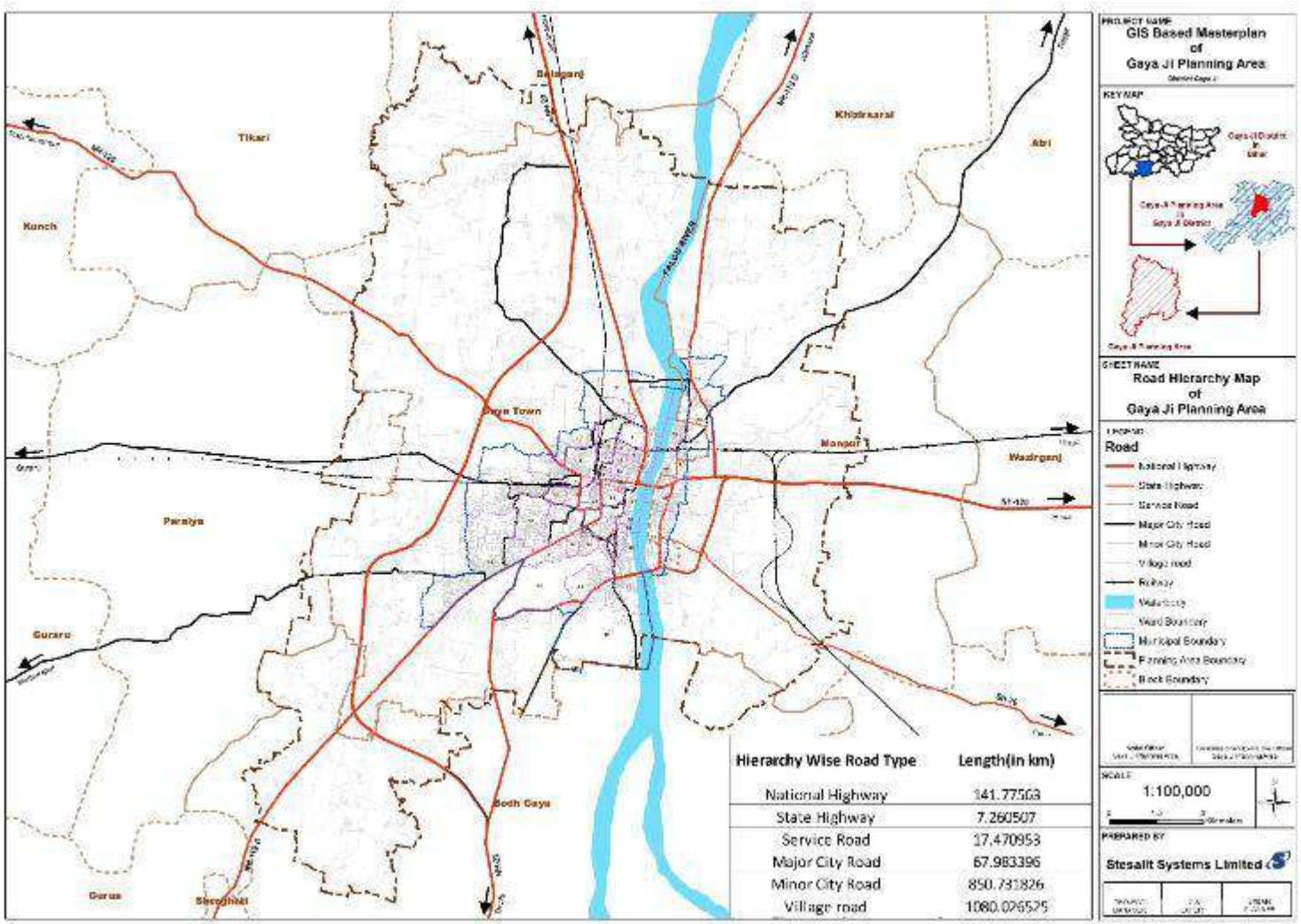
MAP 13-3 IPT ROUTE MAP OF GAYA JI

Source: Transportation Survey, 2024



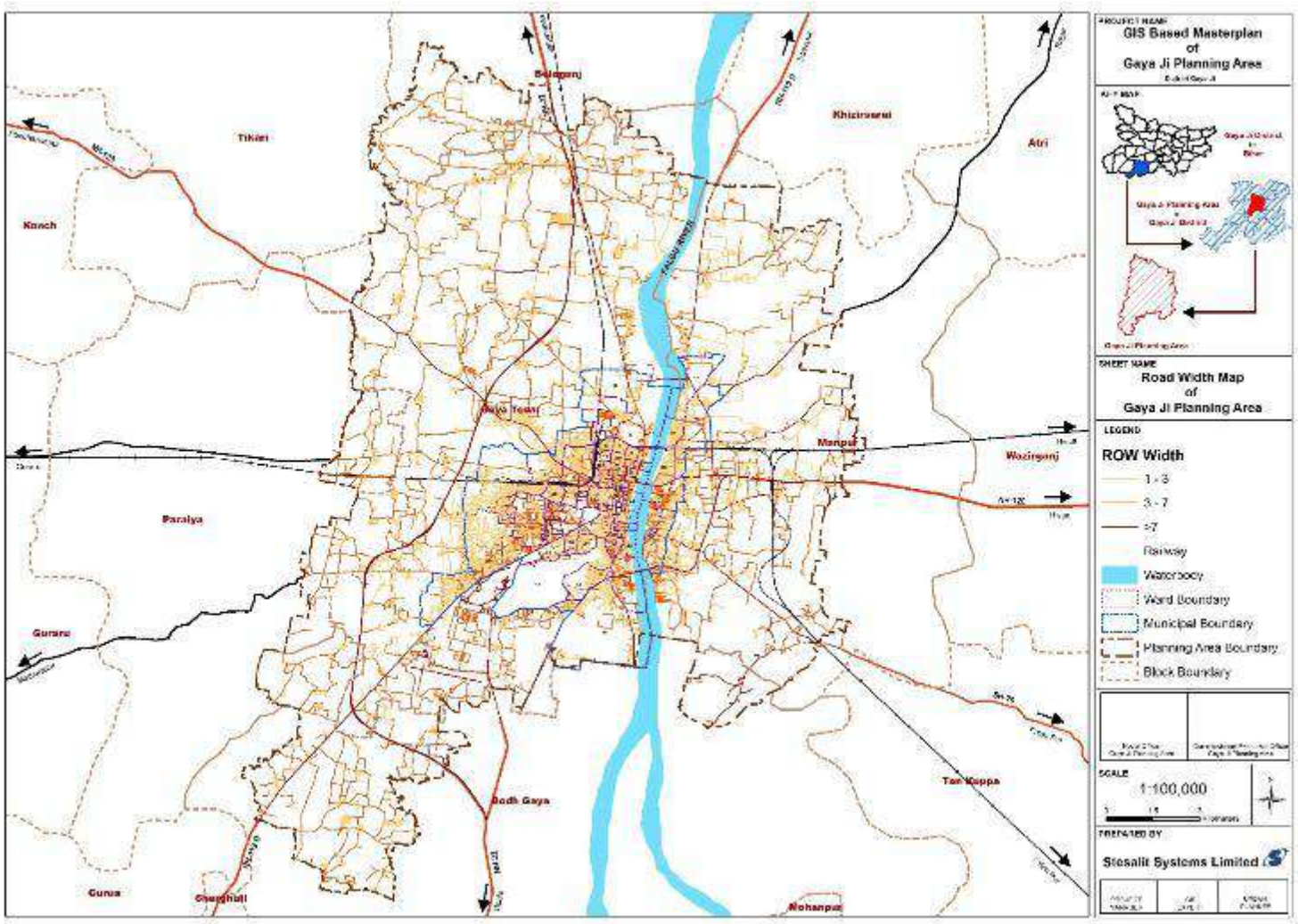
MAP 13-4 TYPE OF ROAD BY CONSTRUCTION MATERIAL

Source: Transportation Survey, 2024



MAP 13-5 ROAD HIERARCHY MAP OF GAYA JI PLANNING AREA

Source: Transportation Survey, 2024



MAP 13-6 ROAD WIDTH MAP OF GAYA JI PLANNING AREA

Source: Transportation Survey, 2024

13.2.4 RAIL CONNECTIVITY

Gaya Ji has strong railway connectivity through the **East Central Railway network**, with Gaya Ji Junction serving as a major regional hub.
The railway network provides **affordable and reliable passenger and freight services**, supporting regional accessibility, trade and economic development.

- **South Eastward Connectivity:** Gaya Ji Junction provides an important southeastern rail connection to Koderma, linking Gaya Ji with major towns and cities. The route supports passenger movement, trade and regional connectivity.

- **Northward Connectivity:** The **Gaya Ji–Patna railway line** provides an important northward connection for passenger and freight movement.
  It supports **regional trade, commuting and economic integration** between Gaya Ji and Patna.

- **Westward Connectivity:** The **Gaya Ji–Dehri-on-Sone railway line** provides an important westward connection for passenger and freight movement.
  It supports **regional trade, travel and economic connectivity** between Gaya Ji and western Bihar.

- **North Eastward Connectivity:** The Gaya Ji–Munger railway connection provides an important regional link, connecting Gaya Ji with Munger and other major towns.
  It supports passenger movement, trade and regional connectivity, strengthening economic and social linkages.

Connection to Patna via Arrah: The Gaya Ji–Patna railway connection supports efficient passenger and freight movement between the two cities.
The well-connected railway network strengthens regional accessibility, economic development and integration, while providing an affordable and reliable mode of transport.

13.2.5 AIR CONNECTIVITY

The air connectivity of Gaya Ji is served by one airport, providing both domestic and international options for travellers within a reasonable distance from the planning area.

Gaya Ji International Airport: Gaya Ji International Airport permits flights into and out of the region, and it is located around 10 kms from Gaya Ji Junction Railway Station. For businesses and residents in the planned area, it is a convenient option because of its proximity to Gaya Ji. This airport probably serves a variety of domestic and international destinations both inside and beyond the nation, improving connection for travellers in need of air transportation for domestic and international travel.

13.2.6 PUBLIC TRANSPORT

Gaya Ji's public transport system faces last-mile connectivity gaps and inadequate local transport services.
The existing bus stand also lacks basic amenities such as cleanliness and adequate seating.
Strengthening public transport, last-mile connectivity and bus-stop infrastructure is essential to meet the city's growing mobility needs.

- **Improve Last-Mile Connectivity:** Identify underserved areas and introduce feeder services and alternative local transport in coordination with local authorities and BSRTC.
- **Optimize Bus Stop Operations:** Introduce route-wise bus bays, designated pick-up/drop-off areas, clear signage and display of schedules to improve efficiency and reduce congestion.
- **Improve Bus Stop Amenities:** Provide shelters, seating, cleanliness and proper maintenance to enhance passenger comfort and safety.
- **Streamline Bus Services:** Coordinate with BSRTC and private operators to improve bus frequency and align schedules with local commuting demand.

13.3 PARKING

Gaya Ji faces significant **parking shortages near bus stands, markets and commercial areas**, causing roadside parking and traffic congestion. Provision of **designated parking areas away from major roads and commercial zones** can improve traffic flow, reduce congestion and enhance road safety.

13.4 TRAFFIC & TRANSPORTATION (SURVEYS, ANALYSIS & INFERENCE)

13.4.1 GROUND SURVEY ANALYSIS

Conducting a ground survey is a fundamental step for transport planners to gather accurate, real-world data that informs evidence-based decision-making. The survey encompasses various aspects, including speed and delay analysis, traffic volume count, and other transportation survey analyses. Here is an in-depth description of each component:

13.4.2 SPEED AND DELAY ANALYSIS

Analysing speed and delay on roads is essential for optimizing transportation systems, improving safety, and enhancing the overall efficiency of road networks. Data collection through technologies like traffic sensors, GPS, and surveillance cameras facilitates accurate and real-time analysis for better decision-making in transportation planning and management.

13.4.2.1 OBJECTIVE

Assess the efficiency of the transportation network and identify areas prone to congestion or delays.

13.4.2.2 DATA COLLECTION TECHNIQUES

Utilize traffic cameras, or manual observations to record vehicle speeds and identify areas of traffic congestion.

Gather information on peak traffic hours, average speeds, and delays experienced by commuters.

13.4.2.3 ANALYSIS PROCESS

Analyze speed data to identify bottlenecks, congestion hotspots, and areas with recurring delays.

Assess the impact of traffic signals, intersections, and road design on overall travel time.

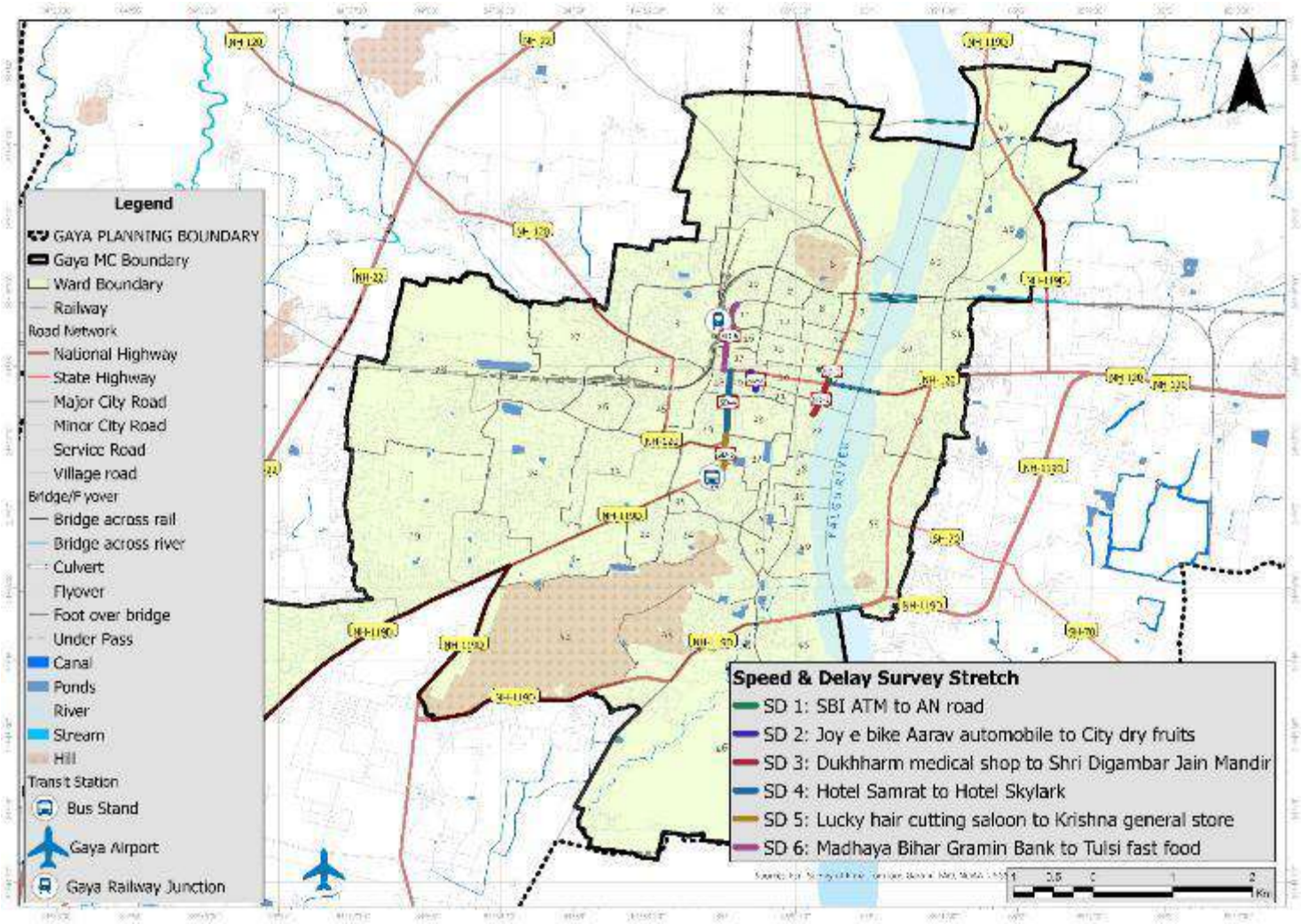
13.4.2.4 KEY CONSIDERATIONS

Prioritize areas for potential infrastructure improvements based on identified congestion points.

Consider implementing traffic management solutions to alleviate delays and enhance overall traffic flow.

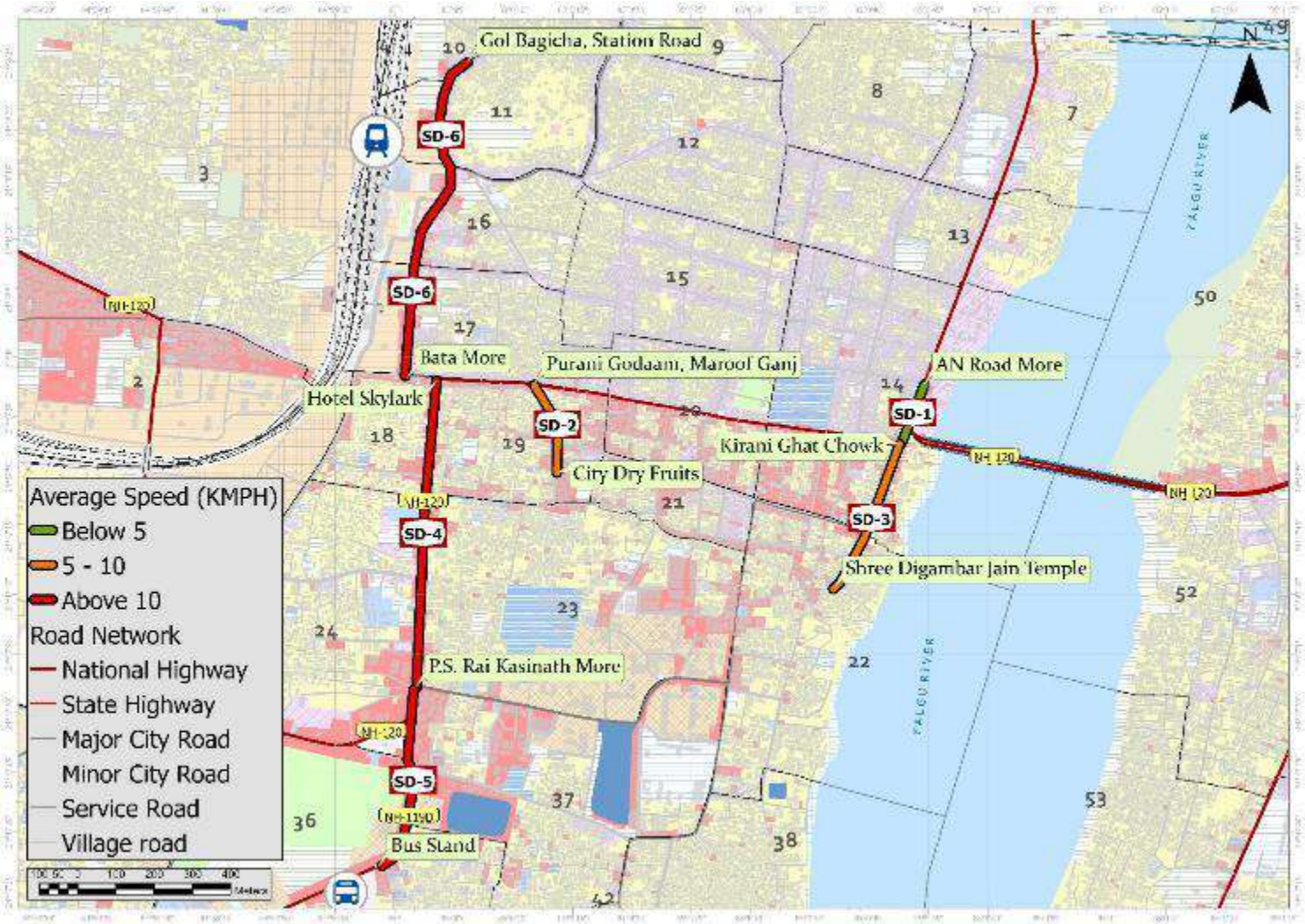
13.4.2.4.1 DETAILS ABOUT STRETCHES

- SBI ATM to AN road
- AN road to SBI ATM
- Joy e-bike Aarav automobile to city dry fruits
- city dry fruits to Joy e-bike Aarav automobile
- Dukhram medical shop to Shri Digambar Jain Mandir
- Shri Digambar Jain Mandir to Dukhram medical shop
- Hotel Samrat to Hotel Skylark
- Hotel Skylark to Hotel Samrat
- Lucky hair cutting saloon to Krishna general store
- Krishna general store to Lucky hair cutting saloon
- Madhya Bihar Gramin Bank to Tulsi fast food
- Tulsi fast food to Madhya Bihar Gramin Bank



MAP 13-7 SPEED DELAY SURVEY MAP OF GAYA JI PLANNING AREA

Source: Transportation Survey 2024, Stesalit Systems Ltd.



MAP 13-8 AVERAGE SPEED MAP

Source: Transportation Survey 2024, Stesalit Systems Ltd.

TABLE 13-2 SPEED AND DELAY ANALYSIS TABLE

Trip no.	Direction of Trip	Total Journey time in mins.	Average Volume (q)	Total Stopped delay in mins.	Average Journey time (t)	Average Journey Speed (Kmph)
1	SBI ATM to AN road	3.29	1.68	0.11	5.66	4.24
2	AN road to SBI ATM	3.24	2.73	0	5.44	4.41
3	Joy e-bike Aarav automobile to City dry fruits	3.5	0.14	0.05	39.45	0.49
4	City dry fruits to Joy e-bike Aarav automobile	3.6	1.40	0.09	3.60	5.42
5	Dukhharm Medical Shop to Shri Digambar Jain Mandir	2.17	6.38	0.07	3.58	7.54
6	Shri Digambar Jain Mandir to Dukhharm medical shop	4.52	5.84	2.21	6.06	4.46
7	Hotel Samrat to Hotel Skylark	4.54	14.95	0.23	5.34	10.11
8	Hotel Skylark to hotel Samrat	3.54	16.49	0.55	4.51	11.97
9	Lucky hair cutting saloon to Krishna general store	3.3	7.50	0	4.63	10.36
10	Krishna General Store to Lucky hair cutting saloon	3.5	4.41	0	4.63	10.36
11	Madhaya bihar gramin bank to Tulsi fast food	2.51	3.63	0	3.89	12.67
12	Tulsi fast food to Madhya Bihar Gramin bank	2.45	4.03	0	3.44	14.31

Source: Transportation Survey 2024, Stesalit Systems Ltd.

13.4.2.5 GAYA JI NAGAR NIGAM

Speed and delay analysis in the Gaya Ji Nagar Nigam area is crucial for understanding the efficiency of traffic flow and identifying areas that require infrastructure improvements. This analysis involves collecting data on Journey times, vehicle speeds, and delays at various stretches within the area to assess the performance of the transportation network.

13.4.2.5.1 SBI ATM TO AN ROAD

The current average journey speed between SBI ATM to AN road crawl at a dismal 4.41 km/hr. This slow pace is likely caused by the narrow carriageway, which restricts the flow of traffic. To improve travel times and expedite traffic flow along this route, widening the road is a viable solution. By expanding the road, there would be more space for vehicles, reducing congestion and allowing traffic to move more freely.

13.4.2.5.2 JOY E-BIKE AARAV AUTOMOBILE TO CITY DRY FRUITS

The sluggish 5.42 Km/Hr journey speed on Joy E-bike Aarav Automobile to city dry fruits stretch can be attributed to the narrow road and on-street parking. To improve traffic flow, a winning solution would be to widen the road to

accommodate more vehicles, and implementing parking pricing would discourage on-street parking. This would free up vital space for moving vehicles, alleviating congestion, and allowing traffic to circulate freely.

13.4.2.5.3 DUKHHARM MEDICAL SHOP TO SHRI DIGAMBAR JAIN MANDIR

The sluggish journey speed on the Dukhhram medical shop to Shri Digambar Jain Mandir stretch at 7.54 Km/Hr can be attributed to the narrow road and uncontrolled intersections. To improve traffic flow, a winning solution would be to widen the road to accommodate more vehicles and implement signalized intersections to regulate traffic and prevent congestion.

13.4.3 CLASSIFIED TRAFFIC VOLUME COUNT

Traffic Volume Count Analysis is foundational for evidence-based decision-making in transportation planning. It provides the necessary data to optimize road networks, enhance traffic management strategies, and ensure the development of resilient and efficient transportation systems that meet the evolving needs of communities.

In the subsequent sections, this analysis will delve into specific methodologies, data collection techniques, and tools employed in obtaining and interpreting traffic volume data, offering actionable insights for planners and policymakers alike.

13.4.3.1 OBJECTIVE

To understand the volume of vehicular movement on specific roads and intersections.

13.4.3.2 DATA COLLECTION TECHNIQUES

Use automated traffic counters, manual counts, or video analytics to record the number of vehicles passing through selected points.

Conduct 24-hour counts to capture variations in traffic volume throughout two days which includes one weekday and one weekend.

13.4.3.3 ANALYSIS PROCESS

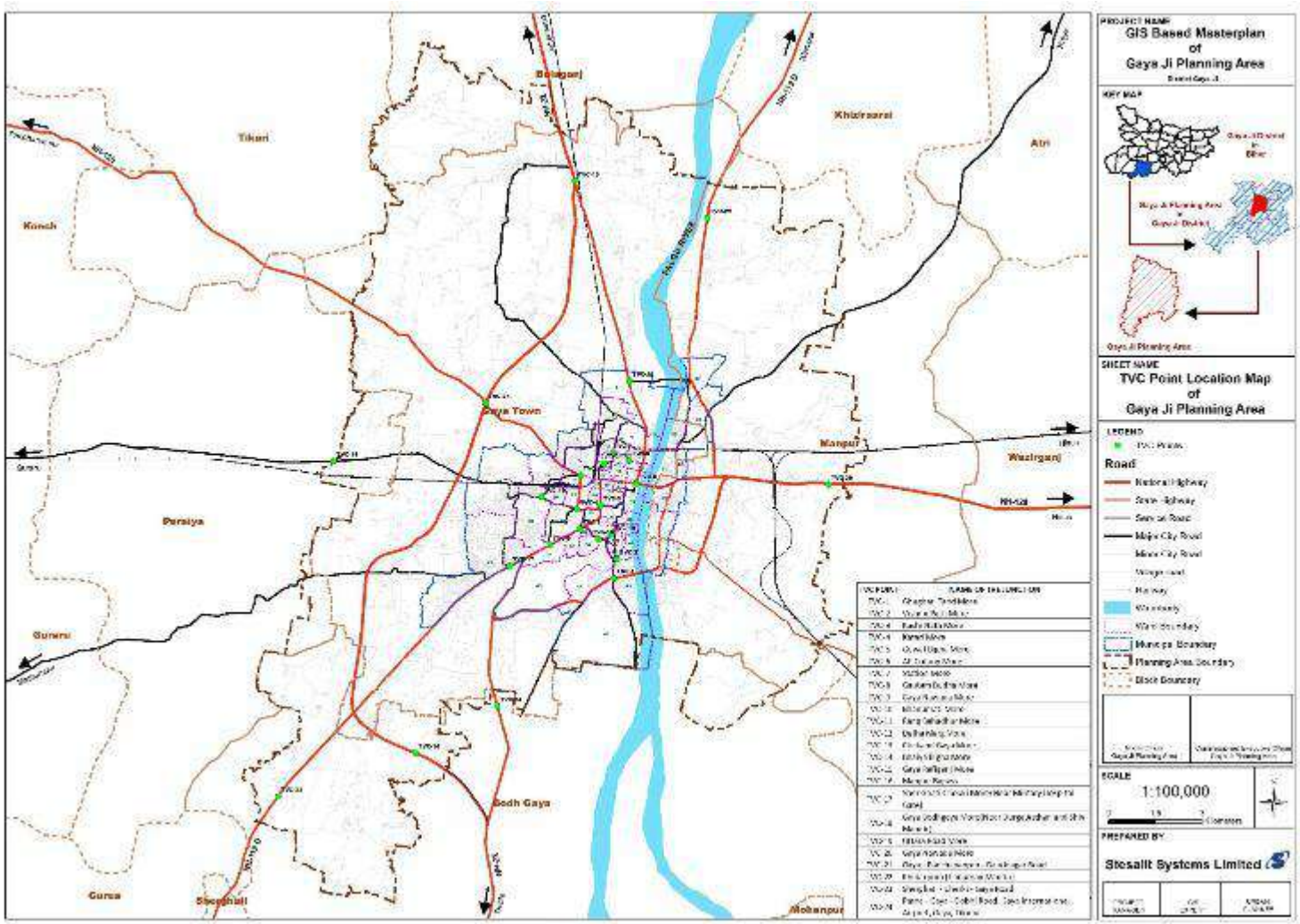
Categorize traffic counts based on vehicle types (cars, trucks, buses). Analyze peak hours and daily patterns to identify trends and assess road capacity. The average of two days of data collected has been used to analyze the classified traffic volume count of the Gaya Ji Planning Area.

13.4.3.4 KEY CONSIDERATIONS

- Utilize traffic volume data for capacity planning and to identify areas requiring infrastructure upgrades.
- Assess the impact of land use changes on traffic patterns and adjust planning accordingly.

13.4.3.5 DETAILS ABOUT LOCATION

- Ghughari Tand More
- Vishnu Path More
- Kashi Nath More
- Katari More
- Gewal Bigha More
- AP Colony More
- Station More
- Gautam Budha More
- Gaya Ji Nawada More
- Bhanumati More
- Rang Bahadhur More
- Delha Marg More
- Chakand Gaya Ji More
- Bhaiya Bigha More
- Gaya Ji Rafiganj More
- Manpur Bypass
- Sher Ghati Chouki More (Near the Military Hospital Gate)
- Gaya Ji - Bodhgaya More (Near Durga Asthan and Shiv Mandir)
- Uttara Road More
- Gaya Ji Nawada Road
- Gaya Ji-Panchananpur-Daudnagar Road
- Khidarpura (Hanuman Mandir)
- Sherghati-Cherki-Gaya Ji Road
- Patna-Gaya Ji-Dobhi Road, Gaya Ji International Airport, Gaya Ji, Tikuna



MAP 13-9 TVC SURVEY MAP OF GAYA JI PLANNING AREA

Source: Transportation Survey 2024, Stesalit Systems Ltd.

TABLE 13-3 TRAFFIC COMPOSITION AT DIFFERENT AREAS OF GAYA JI PLANNING BOUNDARY

TVC Junctions	Direction of Stretch	Motorized Two wheeler	Four Wheelers (Car)	Auto Rickshaw	Shuttle Vehicles	Bus	Truck (LCV)	Truck (HCV)	E-Rickshaw	Others
GHUGHARI TAND MORE	TO DOBHI ROAD	7310	1727	1283	0	116	160	183	1969	0
		57.34%	13.55%	10.06%	0.00%	0.91%	1.26%	1.44%	15.45%	0.00%
	TO GODAWARI ROAD	4589	774	755	0	27	25	98	4455	0
		42.80%	7.22%	7.04%	0.00%	0.25%	0.23%	0.91%	41.55%	0.00%
VISHUNU PATH MORE	TO CHAND CHORA	2402	595	881	0	12	0	0	964	0
		49.48%	12.26%	18.15%	0.00%	0.25%	0.00%	0.00%	19.86%	0.00%
KASHI NATH MORE	TO STATION ROAD	4060	958	1729	0	35	167	49	2081	0
		44.72%	10.55%	19.04%	0.00%	0.39%	1.84%	0.54%	22.92%	0.00%
KATARI MORE	TO CHURCH ROAD	10762	2061	5336	0	42	82	0	5146	0
		45.93%	8.80%	22.78%	0.00%	0.18%	0.35%	0.00%	21.96%	0.00%
	TO DELHA BRIDGE	8078	1907	3525	0	55	57	0	5613	0
		42.00%	9.91%	18.33%	0.00%	0.29%	0.30%	0.00%	29.18%	0.00%
	TO KATARI HILL ROAD	9860	2100	1806	0	155	160	314	2929	0
		56.92%	12.12%	10.42%	0.00%	0.89%	0.92%	1.81%	16.91%	0.00%
GEWAL BIGHA MORE	TO CHURCH ROAD	2109	30	59	0	0	0	33	37	0
		92.99%	1.32%	2.60%	0.00%	0.00%	0.00%	1.46%	1.63%	0.00%
	TO JAIL ROAD	10734	3498	1675	0	86	186	144	5129	0
		50.04%	16.31%	7.81%	0.00%	0.40%	0.87%	0.67%	23.91%	0.00%
AP COLONY MORE	TO ASHA SINGH MORE	6639	2279	4455	0	0	70	0	6272	0
		33.67%	11.56%	22.60%	0.00%	0.00%	0.36%	0.00%	31.81%	0.00%
	TO SIKARIYA MORE	9077	2759	3219	0	61	124	0	4918	0
		45.03%	13.69%	15.97%	0.00%	0.30%	0.62%	0.00%	24.40%	0.00%
STATION MORE	TO BAIRAGI MORE	5243	867	2096	0	12	37	0	2089	0
		50.69%	8.38%	20.26%	0.00%	0.12%	0.36%	0.00%	20.20%	0.00%
GAUTAM BUDHA MORE	TO GOLPATHAR	3874	83	110	0	22	27	13	2466	0
		58.74%	1.26%	1.67%	0.00%	0.33%	0.41%	0.20%	37.39%	0.00%
	TO PANCHAYAT KHADA	4070	268	460	1	25	105	0	663	0
		72.78%	4.79%	8.23%	0.02%	0.45%	1.88%	0.00%	11.86%	0.00%

TVC Junctions	Direction of Stretch	Motorized Two wheeler	Four Wheelers (Car)	Auto Rickshaw	Shuttle Vehicles	Bus	Truck (LCV)	Truck (HCV)	E-Rickshaw	Others
GAYA JI NAWADA MORE	TO BELA CHAKANAD ROAD	7696	377	78	0	0	15	0	209	0
		91.89%	4.50%	0.93%	0.00%	0.00%	0.18%	0.00%	2.50%	0.00%
BHANUMATI MORE	TO DELHA	6398	546	596	0	2	83	63	824	0
		75.16%	6.41%	7.00%	0.00%	0.02%	0.98%	0.74%	9.68%	0.00%
	TO MIRZA GALIB	7853	818	1147	0	6	129	10	2303	0
		64.02%	6.67%	9.35%	0.00%	0.05%	1.05%	0.08%	18.78%	0.00%
	TO CHANDOUTI	6820	692	814	0	10	148	66	1823	1
		65.74%	6.67%	7.85%	0.00%	0.10%	1.43%	0.64%	17.57%	0.01%
RANG BAHADUR MORE	TO STATION ROAD	2661	234	364	0	2	236	8	1064	1
		58.23%	5.12%	7.96%	0.00%	0.04%	5.16%	0.18%	23.28%	0.02%
	TO GURUDUARA ROAD	1245	33	33	0	0	30	4	147	0
		83.45%	2.21%	2.21%	0.00%	0.00%	2.01%	0.27%	9.85%	0.00%
DELHA MARG ROAD	TO MIRZA GALIB	4163	1348	1248	0	97	235	29	1438	1
		48.64%	15.75%	14.58%	0.00%	1.13%	2.75%	0.34%	16.80%	0.01%
	RAILWAY GUMTI	10885	881	759	0	7	188	18	881	1
		79.92%	6.47%	5.57%	0.00%	0.05%	1.38%	0.13%	6.47%	0.01%
	TO TEKARI	3274	269	936	0	6	41	0	1313	1
		56.06%	4.61%	16.03%	0.00%	0.10%	0.70%	0.00%	22.48%	0.02%
CHAKAND GAYA JI MORE	TO GAYA JI ROAD	2864	1479	1390	0	4	1124	164	30	1
		40.59%	20.96%	19.70%	0.00%	0.06%	15.93%	2.32%	0.43%	0.01%
BHAIYA BIGHA MORE	TO BHAIYA BIGHA ROAD	1580	514	80	0	0	126	172	45	1
		62.75%	20.41%	3.18%	0.00%	0.00%	5.00%	6.83%	1.79%	0.04%
RAFIGANJ MORE	TO GAYA JI	3015	739	585	0	7	150	376	265	0
		58.69%	14.39%	11.39%	0.00%	0.14%	2.92%	7.32%	5.16%	0.00%
MANPUR BYPASS	TO PATNA	5413	1371	1358	0	8	578	328	412	0
		57.17%	14.48%	14.34%	0.00%	0.08%	6.10%	3.46%	4.35%	0.00%
	TO GAYA JI	3886	932	840	0	5	683	888	382	0
		51.02%	12.24%	11.03%	0.00%	0.07%	8.97%	11.66%	5.02%	0.00%

TVC Junctions	Direction of Stretch	Motorized Two wheeler	Four Wheelers (Car)	Auto Rickshaw	Shuttle Vehicles	Bus	Truck (LCV)	Truck (HCV)	E-Rickshaw	Others
SHERGHATI CHOWKI MORE (NEAR MILITARY HOSPITAL GATE)	TO GAYA JI SHERGHATI ROAD	12103	1673	2972	0	3	358	186	1189	9
		65.45%	9.05%	16.07%	0.00%	0.02%	1.94%	1.01%	6.43%	0.05%
GAYA JI BODHGAYA MORE	TO POLICE LINE	4988	405	1765	0	0	163	124	2984	0
		47.83%	3.88%	16.92%	0.00%	0.00%	1.56%	1.19%	28.61%	0.00%
	TO VISHNUPURA	6786	546	889	0	1	329	66	2472	0
		61.20%	4.92%	8.02%	0.00%	0.01%	2.97%	0.60%	22.29%	0.00%
UTTARA ROAD MORE	TO GHUGHARI TAND MORE	2091	63	131	0	0	23	24	103	0
		85.87%	2.59%	5.38%	0.00%	0.00%	0.94%	0.99%	4.23%	0.00%
GAYA JI NAWADA ROAD	TO NAWADA	6182	1187	1535	0	124	490	288	865	0
		57.93%	11.12%	14.38%	0.00%	1.16%	4.59%	2.70%	8.11%	0.00%
GAYA JI PANCHANANPUR DAUDNAGAR ROAD	TO NIYAZIPUR	1369	207	24	0	0	57	148	10	0
		75.43%	11.40%	1.32%	0.00%	0.00%	3.14%	8.15%	0.55%	0.00%
KHIDARPURA	TO ALIPUR MANPUR	2142	227	415	0	25	97	110	57	0
		69.70%	7.39%	13.50%	0.00%	0.81%	3.16%	3.58%	1.85%	0.00%
SHERGHATI CHERKI GAYA JI ROAD	TO GAYA JI ROAD	2213	577	942	0	0	44	13	964	0
		46.56%	12.14%	19.82%	0.00%	0.00%	0.93%	0.27%	20.28%	0.00%

TVC Junctions	Direction of Stretch	Motorized Two wheeler	Four Wheelers (Car)	Auto Rickshaw	Shuttle Vehicles	Bus	Truck (LCV)	Truck (HCV)	E-Rickshaw	Others
PATNA GAYA JI DOBHI ROAD	TO DOBHI MARG	4693	3555	2684	0	404	1227	1242	8	4
		33.97%	25.73%	19.43%	0.00%	2.92%	8.88%	8.99%	0.06%	0.03%
	TO TIKUNA MORE	9	0	0	0	0	14	0	0	0
		39.13%	0.00%	0.00%	0.00%	0.00%	60.87%	0.00%	0.00%	0.00%

Source: Transportation Survey 2024, Stesalit Systems Ltd.

13.4.3.6 TRAFFIC COMPOSITION

Traffic composition the modes of travelling taken into consideration here are

- Motorized two-wheelers
- Four wheelers
- Auto Rickshaws
- Shuttle vehicles
- Bus
- Light Commercial Vehicles (LCV)
- Heavy Commercial Vehicles (HCV)
- E-Rickshaws
- Others (Handcarts)

TABLE 13-4 TRAFFIC COMPOSITION OF THE GAYA JI PLANNING AREA

Type of Vehicles on The Road Along the Major Stretches in Percentage									
	Motorized Two wheeler	Four Wheelers (Car)	Auto Rickshaw	Shuttle Vehicles	Bus	Truck (LCV)	Truck (HCV)	E-Rickshaw	Others (Handcarts)
Vehicle Composition	54.48%	10.55%	13.40%	0.00%	0.37%	2.13%	1.41%	17.65%	0.01%
PCU factor	0.75	1	1.5	3	2.2	2	2.2	1.5	3

Source: Transportation Survey 2024, Stesalit Systems Ltd.

TABLE 13-5 CALCULATED LOS OF THE ROAD STRETCHES

TVC Junctions	Direction of stretch	Time of Day	Peak Hour Timings	Peak Hour Factor (PHF)	V/C Ratio	Actual Flow rate (PCU)	Level of Service (LoS)	Remarks
GHUGHARI – [illegible]	TO DOBHI ROAD	Morning	10:45 AM - 11:45 AM	0.98	0.63	2330.4	C	Near Free Flow
		Evening	02:00 PM - 03:00 PM	0.94	0.59	2284		

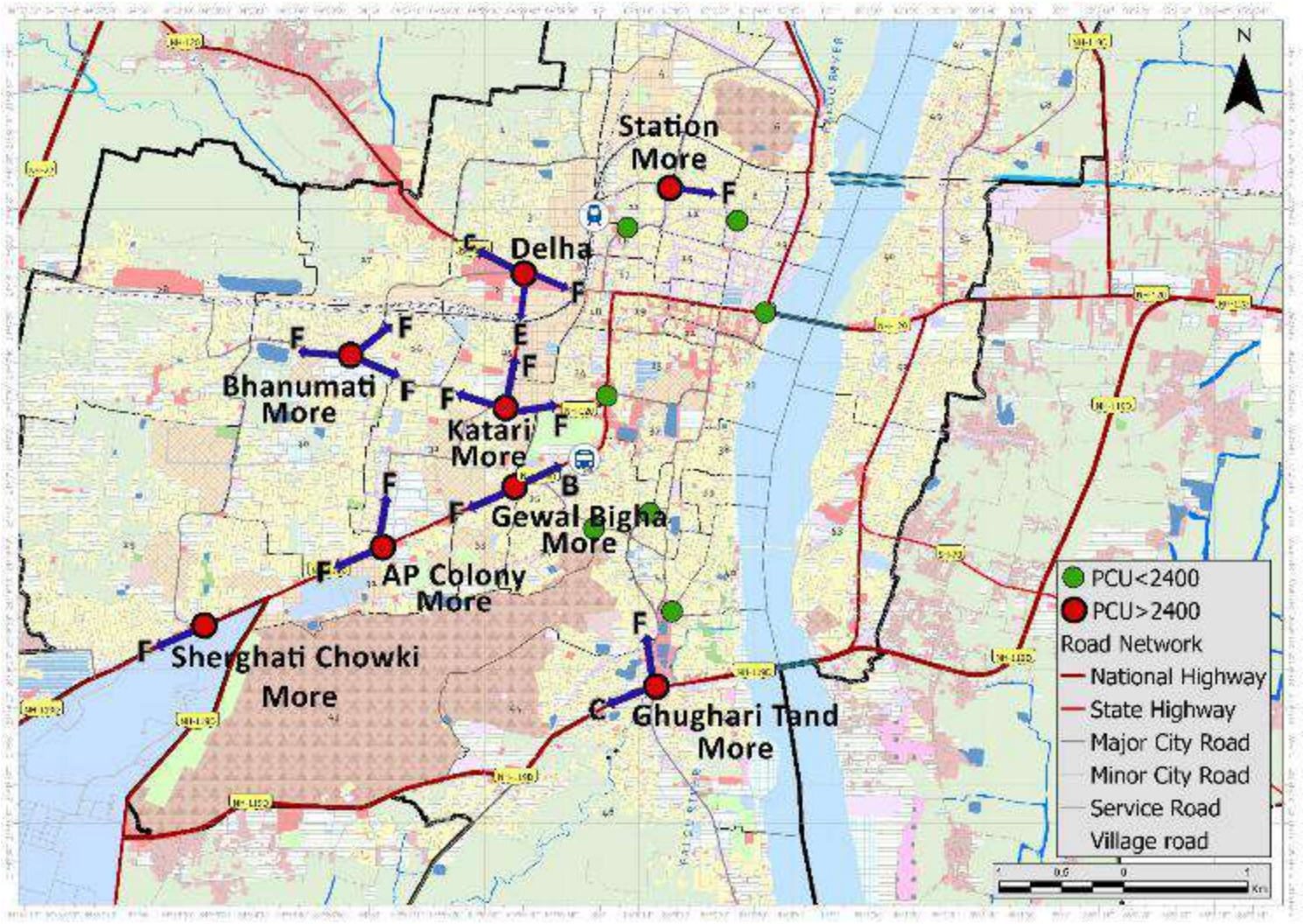
TVC Junctions	Direction of stretch	Time of Day	Peak Hour Timings	Peak Hour Factor (PHF)	V/C Ratio	Actual Flow rate (PCU)	Level of Service (LoS)	Remarks
	TO GODAWARI ROAD	Morning	11:00 AM - 12:00 PM	0.91	1.87	2452	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.93	1.9	2452		
VISHUNU PATH MORE	TO CHAND CHORA	Morning	11:00 AM - 12:00 PM	0.98	0.81	746.4	E	At Capacity Flow
		Evening	03:00 PM - 04:00 PM	0.94	0.9	860		
KASHI NATH MORE	TO STATION ROAD	Morning	11:00 AM - 12:00 PM	0.96	1.44	1786	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.94	1.41	1786		
KATARI MORE	TO CHURCH ROAD	Morning	11:00 AM - 12:00 PM	0.94	2.81	4459.6	F	Congested Flow
		Evening	02:30 PM - 03:30 PM	0.98	2.92	4459.6		
	TO DELHA BRIDGE	Morning	11:00 AM - 12:00 PM	0.93	2.62	4187.6	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.8	2.24	4187.6		
	TO KATARI HILL ROAD	Morning	10:45 AM - 11:45 AM	0.98	2.03	2474.2	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.97	2	2474.2		
GEWAL BIGHA MORE	TO CHURCH ROAD	Morning	11:00 AM - 12:00 PM	0.84	0.34	366.2	B	Reasonable Free Flow
		Evening	05:00 PM - 06:00 PM	0.91	0.37	363.8		
	TO JAIL ROAD	Morning	11:00 AM - 12:00 PM	0.91	4.1	4036	F	Congested Flow
		Evening	05:00 PM - 06:00 PM	0.94	4.29	4071		
AP COLONY MORE	TO ASHA SINGH MORE	Morning	10:30 AM - 11:30 AM	0.98	4.06	3702	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.94	3.86	3702		
	TO SIKARIYA MORE	Morning	10:45 AM - 11:45 AM	0.98	3.94	3593	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.93	3.72	3572.4		
STATION MORE	TO BAIRAGI MORE	Morning	11:00 AM - 12:00 PM	0.91	1.92	2518.8	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.84	1.76	2518.8		
GAUTAM BUDHA MORE	TO GOLPATHAR	Morning	11:00 AM - 12:00 PM	0.91	1.66	1644	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.84	1.54	1644		
	TO PANCHAYAT KHADA	Morning	10:00 AM - 11:00 AM	0.93	0.53	687.4	D	Medium Flow
		Evening	04:45 PM - 05:45 PM	0.9	0.78	1047		
GAYA JI		Morning	11:00 AM - 12:00 PM	0.96	0.69	1071	C	Near Free Flow

TVC Junctions	Direction of stretch	Time of Day	Peak Hour Timings	Peak Hour Factor (PHF)	V/C Ratio	Actual Flow rate (PCU)	Level of Service (LoS)	Remarks
	TO BELA CHAKANAD ROAD	Evening	02:00 PM - 03:00 PM	0.94	0.67	1071		
BHANUMATI MORE	**TO DELHA**	Morning	11:00 AM - 12:00 PM	0.95	1.19	1493.6	F	Congested Flow
		Evening	05:00 PM - 06:00 PM	0.96	1.07	1335		
	TO MIRZA GALIB	Morning	11:00 AM - 12:00 PM	0.95	1.93	2473	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.78	1.62	2473		
	TO CHANDOUTI	Morning	11:00 AM - 12:00 PM	0.9	1.64	2193.6	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.75	1.37	2193.6		
RANG BAHADUR MORE	**TO STATION ROAD**	Morning	11:00 AM - 12:00 PM	0.97	0.92	854.8	E	At Capacity Flow
		Evening	05:00 PM - 06:00 PM	0.88	0.97	997		
	TO GURUDUARA ROAD	Morning	11:00 AM - 12:00 PM	0.92	0.35	345	B	Reasonable Free Flow
		Evening	02:00 PM - 03:00 PM	0.74	0.28	345		
DELHA MARG ROAD	**TO MIRZA GALIB**	Morning	10:15 AM - 11:15 AM	0.93	0.95	1544.8	E	At Capacity Flow
		Evening	04:15 PM - 05:15 PM	0.96	0.99	1553		
	RAILWAY GUMTI	Morning	11:00 AM - 12:00 PM	0.94	2.57	2442	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.77	2.1	2442		
	TO TEKARI	Morning	10:00 AM - 11:00 AM	0.87	0.6	1033.8	C	Near Free Flow
		Evening	05:00 PM - 06:00 PM	0.88	0.64	1093		
CHAKAND GAYA JI MORE	**TO GAYA JI ROAD**	Morning	10:30 AM - 11:30 AM	0.97	0.23	1299.2	A	Free Flow
		Evening	05:00 PM - 06:00 PM	0.93	0.25	1444.6		
BHAIYA BIGHA MORE	**TO BHAIYA BIGHA ROAD**	Morning	10:45 AM - 11:45 AM	0.92	0.1	494.6	A	Free Flow
		Evening	02:00 PM - 03:00 PM	0.88	0.09	459		
RAFIGANJ MORE	**TO GAYA JI**	Morning	11:00 AM - 12:00 PM	0.84	0.45	1582.8	B	Reasonable Free Flow
		Evening	02:00 PM - 03:00 PM	0.73	0.4	1582.8		
MANPUR BYPASS	**TO PATNA**	Morning	11:00 AM - 12:00 PM	0.96	0.51	1921.6	C	Near Free Flow
		Evening	02:00 PM - 03:00 PM	0.94	0.5	1921.6		
	TO GAYA JI	Morning	11:00 AM - 12:00 PM	0.94	1.34	1717	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.81	1.28	1717		

TVC Junctions	Direction of stretch	Time of Day	Peak Hour Timings	Peak Hour Factor (PHF)	V/C Ratio	Actual Flow rate (PCU)	Level of Service (LoS)	Remarks
SHERGHATI CHOWKI MORE (NEAR MILITARY HOSPITAL GATE)	TO GAYA JI SHERGHATI ROAD	Morning	11:00 AM - 12:00 PM	0.99	2.55	3099.6	F	Congested Flow
		Evening	05:00 PM - 06:00 PM	0.98	2.18	2670.4		
GAYA JI BODHGAYA MORE	TO POLICE LINE	Morning	11:00 AM - 12:00 PM	0.92	2.2	2153.8	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.83	2	2153.8		
	TO VISHNUPURA	Morning	11:00 AM - 12:00 PM	0.95	1.88	2380.4	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.82	1.62	2380.4		
UTTARA ROAD MORE	TO GHUGHARI TAND MORE	Morning	11:00 AM - 12:00 PM	0.88	0.48	496.6	C	Near Free Flow
		Evening	02:00 PM - 03:00 PM	0.8	0.44	496.6		
GAYA JI NAWADA ROAD	TO NAWADA	Morning	11:00 AM - 12:00 PM	0.88	0.42	2562	B	Reasonable Free Flow
		Evening	02:00 PM - 03:00 PM	0.85	0.4	2562		
GAYA JI PANCHANANPUR DAUDNAGAR ROAD	TO NIYAZIPUR	Morning	10:45 AM - 11:45 AM	0.86	0.25	442.8	A	Free Flow
		Evening	02:00 PM - 03:00 PM	0.75	0.18	375.2		
KHIDARPURA	TO ALIPUR MANPUR	Morning	11:00 AM - 12:00 PM	0.93	0.44	717	B	Reasonable Free Flow
		Evening	02:00 PM - 03:00 PM	0.74	0.35	717		
SHERGHATI CHERKI GAYA JI ROAD	TO GAYA JI ROAD	Morning	10:30 AM - 11:30 AM	0.95	0.85	1080	D	Medium Flow
		Evening	02:00 PM - 03:00 PM	0.91	0.81	1062		

TVC Junctions	Direction of stretch	Time of Day	Peak Hour Timings	Peak Hour Factor (PHF)	V/C Ratio	Actual Flow rate (PCU)	Level of Service (LoS)	Remarks
PATNA GAYA JI DOBHI ROAD	TO DOBHI MARG	Morning	11:00 AM - 12:00 PM	0.93	2.3	3699.2	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.9	2.23	3699.2		
	TO TIKUNA MORE	Morning	08:15 AM - 09:15 AM	0.54	0.009	16	A	Free Flow
		Evening	03:30 PM - 04:30 PM	0.5	0.01	19		

Source: Transportation Survey 2024, Stesalit Systems Ltd.



MAP 13-10 LEVEL OF SERVICE AT SURVEYED TVC LOCATIONS

Source: Transportation Survey 2024, Stesalit Systems Ltd.

13.4.4 PARKING DEMAND ANALYSIS

In urban and suburban environments, the efficient management of parking infrastructure is a critical component of sustainable transportation planning. Parking Demand Analysis serves as a systematic and data-driven approach to understanding the demand for parking spaces, assessing current utilization, and forecasting future requirements. As urban areas continue to experience population growth and increased vehicular ownership, the effective allocation and management of parking resources become paramount for ensuring smooth traffic flow, reducing congestion, and enhancing overall urban mobility.

13.4.4.1 OBJECTIVE

- **Understanding User Behavior:**

Parking Demand Analysis seeks to comprehend the behavior of drivers regarding parking choices. This includes factors such as preferred locations, duration of parking, and willingness to use alternative modes of transportation.

- **Utilization and Occupancy Assessment:**

The analysis aims to quantify the utilization and occupancy rates of existing parking facilities. This involves studying peak hours, weekdays versus weekends, and variations in demand based on proximity to key destinations.

- **Forecasting Future Demand:**

Projecting future parking demand is crucial for planning and designing sustainable parking infrastructure. This involves considering factors like population growth, economic development, and changes in transportation modes.

- **Optimizing Existing Infrastructure:**

Understanding current parking demand allows planners to optimize the use of existing facilities. This may involve implementing technologies for real-time monitoring, dynamic pricing, and smart parking solutions to enhance efficiency.

13.4.4.2 DATA COLLECTION TECHNIQUES

Conduct surveys and observations to understand parking behaviors, including duration and occupancy rates.

Use parking sensors or smart parking technologies for real-time data collection.

13.4.4.3 ANALYSIS PROCESS

Evaluate the utilization of existing parking spaces and identify peak demand periods.

Analyze the relationship between parking demand and nearby land uses.

13.4.4.4 KEY CONSIDERATIONS

Propose enhancements to existing parking facilities based on observed demand.

Integrate smart parking solutions to optimize space utilization and improve user experience.

13.4.4.5 LOCATION DETAILS

- Karbala Road (On-Street Parking)
- Near Mahadev Mandir Gali (On-Street Parking)
- Child Care Public School (On-Street Parking)
- Bata More (On-Street Parking)
- Tower Chowk Gaya Ji (On-Street Parking)
- Powerganj Railway Crossing (On-Street Parking)
- Near Satgatham Samiti (On-Street Parking)

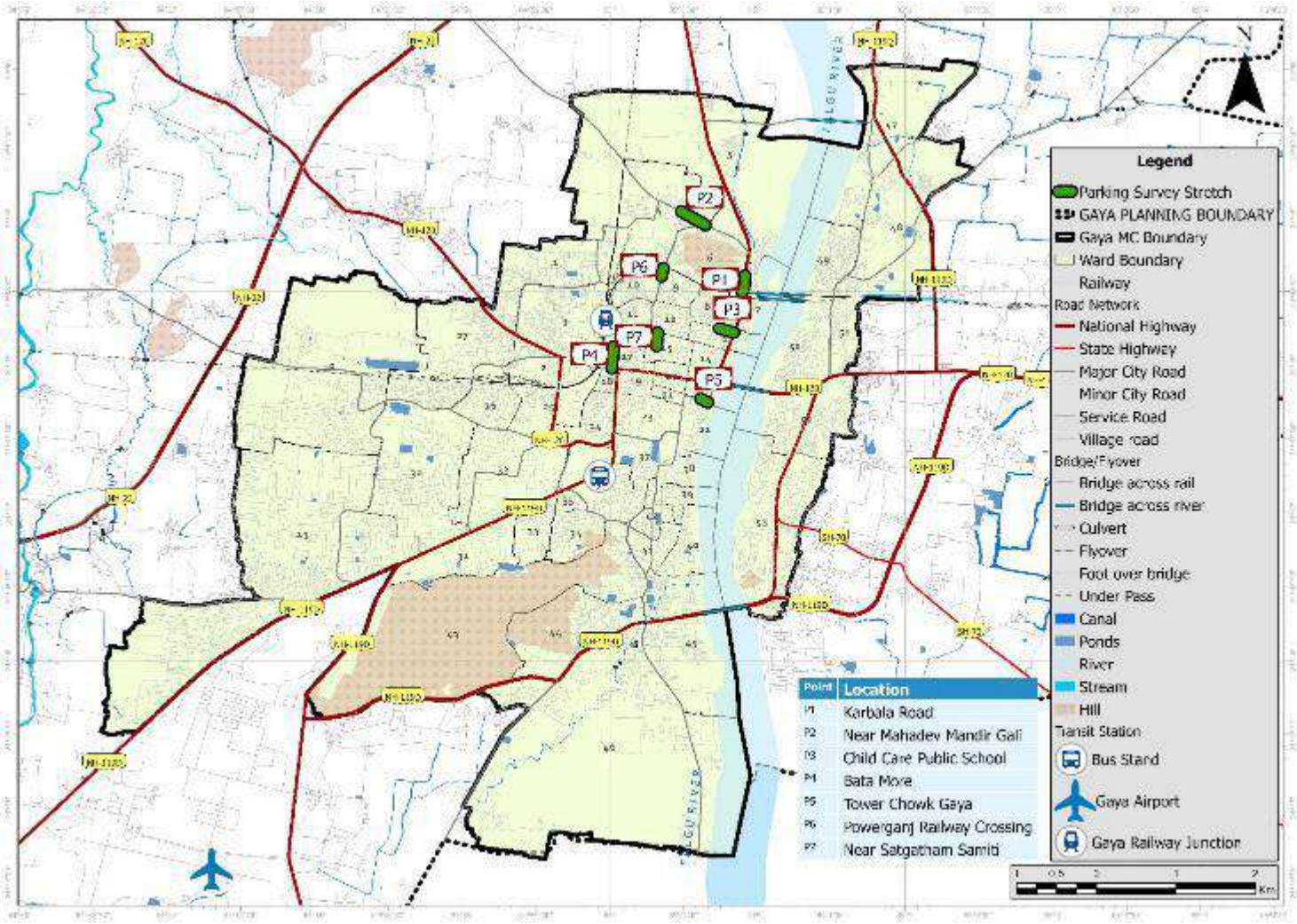
13.4.4.5.1 ANALYSIS OF PARKING DEMAND SURVEY

As per **IRC SP:102** (Guidelines for Parking Facilities in Urban Areas)

The ECS values for different modes

TABLE 13-6 ECS VALUE AS PER IRC SP:102

Category	ECS
Bicycle	**0.1**
2 Wheelers	**0.25**
3- Wheelers	**0.6**
Cars	**1**
LCV	**1.5**
HCV	**2.5**



MAP 13-11 PARKING SURVEY LOCATION MAP OF GAYA JI PLANNING AREA

Source: Transportation Survey 2024, Stesalit Systems Ltd.

13.4.4.5.1.1 LOCATION 1: KARBALA ROAD

Parking Type: On- Street Parking

Ward No: 7

TABLE 13-7 HOURLY PARKING DEMAND

Karbala Road (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	6	27	11	2	1	0
10:00-11:00	7	32	13	4	1	0
11:00-12:00	9	44	15	3	2	0
12:00-13:00	10	47	14	4	0	0
16:00-17:00	6	43	14	2	1	0
17:00-18:00	5	47	16	3	2	0
18:00-19:00	9	53	19	3	3	0
19:00-20:00	7	44	11	2	1	0

Source: Stesalit Systems Limited, Transportation Survey 2024

TABLE 13-8 HOURLY ECS DEMAND

ECS	**0.1**	**0.25**	**0.6**	**1**	**1.5**	**2.5**
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	0.6	6.75	6.6	2	1.5	0
10:00-11:00	0.7	8	7.8	4	1.5	0
11:00-12:00	0.9	11	9	3	3	0
12:00-13:00	1	11.75	8.4	4	0	0
16:00-17:00	0.6	10.75	8.4	2	1.5	0
17:00-18:00	0.5	11.75	9.6	3	3	0
18:00-19:00	0.9	13.25	11.4	3	4.5	0
19:00-20:00	0.7	11	6.6	2	1.5	0
Total ECS	**5.9**	**84.25**	**67.8**	**23**	**16.5**	**0**
MAX ECS	**1**	**13.25**	**11.4**	**4**	**4.5**	**0**

Source: Stesalit Systems Limited, Transportation Survey 2024

Total Equivalent Car Space required: 34 ECS

Equivalent Card Space Requirements considering a 20 percent increase in demand: 41 ECS

Parking Space requirements: 943 sq. m.

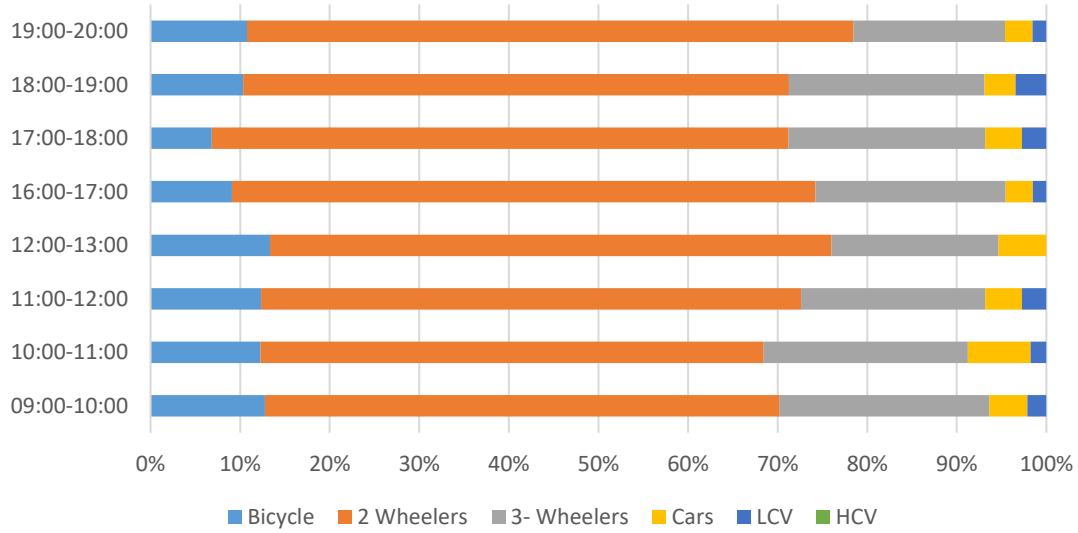


FIGURE 13-9 MODE WISE HOURLY DEMAND

Source: Stesalit Systems Limited, Transportation Survey 2024

13.4.4.5.1.2 LOCATION 2: NEAR MAHADEV MANDIR GALI

Parking Type: On-Street Parking

Ward No: 6

TABLE 13-9 HOURLY PARKING DEMAND

Near Mahadev Mandir Gali (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	7	14	4	1	4	0
10:00-11:00	11	17	7	0	3	0
11:00-12:00	14	11	9	1	2	0
12:00-13:00	8	13	6	0	4	0
16:00-17:00	8	12	7	0	4	0
17:00-18:00	12	14	10	0	6	0
18:00-19:00	11	13	11	0	3	0
19:00-20:00	6	8	3	0	2	0

Source: Stesalit Systems Limited, Transportation Survey 2024

TABLE 13-10 HOURLY ECS DEMAND

ECS	**0.1**	**0.25**	**0.6**	**1**	**1.5**	**2.5**
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	0.7	3.5	2.4	1	6	0
10:00-11:00	1.1	4.25	4.2	0	4.5	0
11:00-12:00	1.4	2.75	5.4	1	3	0

ECS	0.1	0.25	0.6	1	1.5	2.5
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
12:00-13:00	0.8	3.25	3.6	0	6	0
16:00-17:00	0.8	3	4.2	0	6	0
17:00-18:00	1.2	3.5	6	0	9	0
18:00-19:00	1.1	3.25	6.6	0	4.5	0
19:00-20:00	0.6	2	1.8	0	3	0
Total ECS	**7.7**	**25.5**	**34.2**	**2**	**42**	**0**
MAX ECS	**1.4**	**4.25**	**6.6**	**1**	**9**	**0**

Source: Stesalit Systems Limited, Transportation Survey 2024

Total Equivalent Car Space required: 22 ECS

Equivalent Card Space Requirements considering a 20 percent increase in demand: 27 ECS

Parking Space requirements: 614 sq. m.

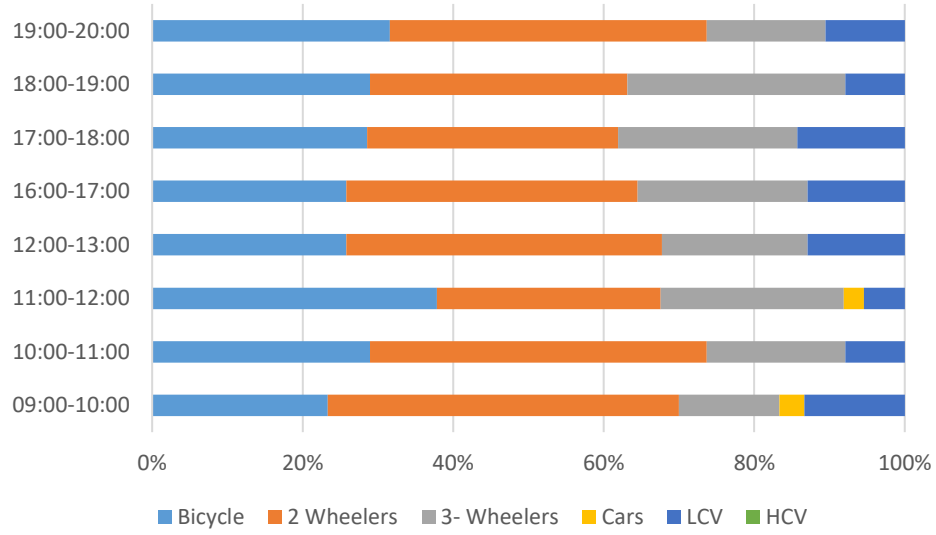


FIGURE 13-10 MODE WISE HOURLY DEMAND

Source: Stesalit Systems Limited, Transportation Survey 2024

13.4.4.5.1.3 LOCATION 3: CHILD CARE PUBLIC SCHOOL

Parking Type: On-Street

Ward No: 13

TABLE 13-11 HOURLY PARKING DEMAND

Child Care Public School (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	11	21	7	4	1	1
10:00-11:00	16	27	10	6	0	1
11:00-12:00	19	33	6	6	0	1
12:00-13:00	14	28	3	5	2	1
16:00-17:00	18	36	2	7	1	1
17:00-18:00	17	42	3	8	1	1
18:00-19:00	21	46	5	7	1	1
19:00-20:00	19	49	7	6	2	1

Source: Stesalit Systems Limited, Transportation Survey 2024

TABLE 13-12 HOURLY ECS DEMAND

ECS	**0.1**	**0.25**	**0.6**	**1**	**1.5**	**2.5**
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	1.1	5.25	4.2	4	1.5	2.5
10:00-11:00	1.6	6.75	6	6	0	2.5
11:00-12:00	1.9	8.25	3.6	6	0	2.5
12:00-13:00	1.4	7	1.8	5	3	2.5
16:00-17:00	1.8	9	1.2	7	1.5	2.5
17:00-18:00	1.7	10.5	1.8	8	1.5	2.5
18:00-19:00	2.1	11.5	3	7	1.5	2.5
19:00-20:00	1.9	12.25	4.2	6	3	2.5
Total ECS	**13.5**	**70.5**	**25.8**	**49**	**12**	**20**
MAX ECS	**2.1**	**12.25**	**6**	**8**	**3**	**2.5**

Source: Stesalit Systems Limited, Transportation Survey 2024

Total Equivalent Car Space required: 34 ECS

Equivalent Card Space Requirements considering a 20 percent increase in demand: 41 ECS

Parking Space requirements: 935 sq. m.

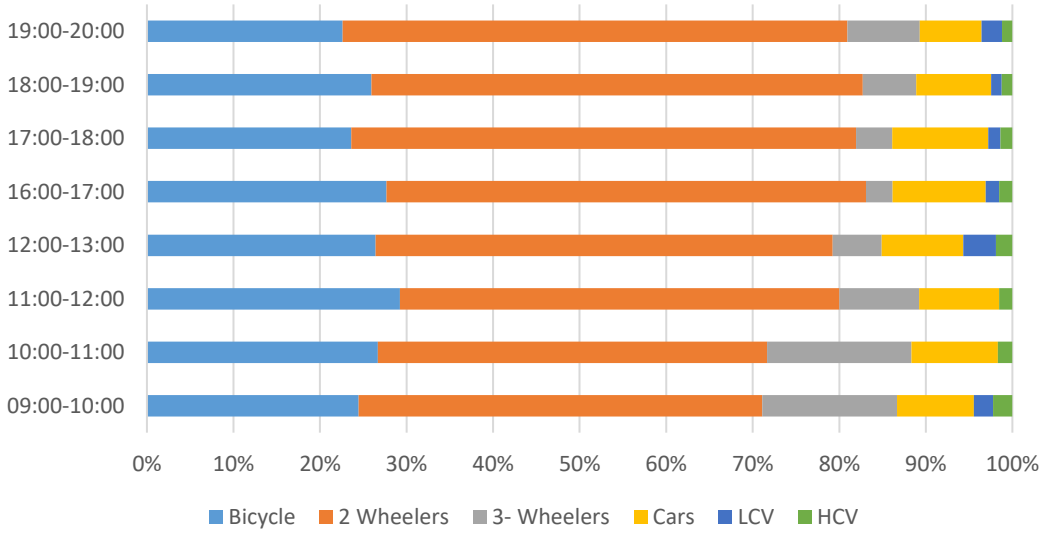


FIGURE 13-11 MODE WISE HOURLY DEMAND

Source: Stesalit Systems Limited, Transportation Survey 2024

13.4.4.5.1.4 LOCATION 4: BATA MORE

Parking Type: On-Street Parking

Ward No: 17

TABLE 13-13 HOURLY PARKING DEMAND

Bata More (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	7	49	12	8	2	0
10:00-11:00	9	62	8	11	4	0
11:00-12:00	7	43	11	10	3	0
12:00-13:00	13	59	13	12	4	0
16:00-17:00	8	54	10	13	4	0
17:00-18:00	7	49	9	12	3	0
18:00-19:00	9	44	8	10	3	0
19:00-20:00	7	44	7	12	2	0

Source: Stesalit Systems Limited, Transportation Survey 2024

TABLE 13-14 HOURLY ECS DEMAND

ECS	**0.1**	**0.25**	**0.6**	**1**	**1.5**	**2.5**
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	0.7	12.25	7.2	8	3	0
10:00-11:00	0.9	15.5	4.8	11	6	0
11:00-12:00	0.7	10.75	6.6	10	4.5	0

ECS	0.1	0.25	0.6	1	1.5	2.5
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
12:00-13:00	1.3	14.75	7.8	12	6	0
16:00-17:00	0.8	13.5	6	13	6	0
17:00-18:00	0.7	12.25	5.4	12	4.5	0
18:00-19:00	0.9	11	4.8	10	4.5	0
19:00-20:00	0.7	11	4.2	12	3	0
Total ECS	**6.7**	**101**	**46.8**	**88**	**37.5**	**0**
MAX ECS	**1.3**	**15.5**	**7.8**	**13**	**6**	**0**

Source: Stesalit Systems Limited, Transportation Survey 2024

Total Equivalent Car Space required: 44 ECS

Equivalent Card Space Requirements considering a 20 percent increase in demand: 52 ECS

Parking Space requirements: 1204 sq. m.

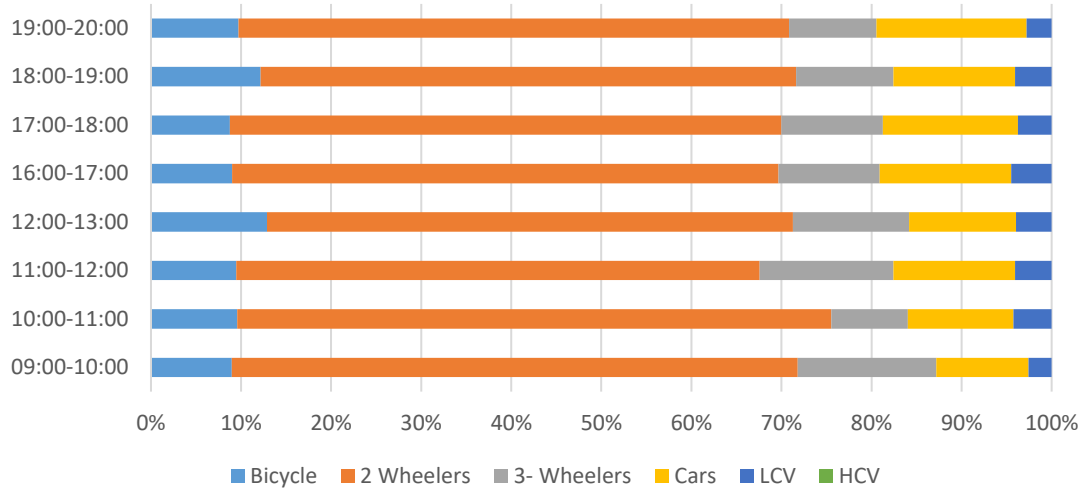


FIGURE 13-12 MODE WISE HOURLY DEMAND

Source: Stesalit Systems Limited, Transportation Survey 2024

13.4.4.5.1.5 LOCATION 5: TOWER CHOWK GAYA JI

Parking Type: On- Street Parking

Ward No: 22

TABLE 13-15 HOURLY PARKING DEMAND

Tower Chowk Gaya Ji (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	4	31	28	4	2	0
10:00-11:00	6	38	32	3	1	0

Tower Chowk Gaya Ji (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
11:00-12:00	6	42	29	4	2	0
12:00-13:00	7	40	26	3	1	0
16:00-17:00	6	47	30	3	1	0
17:00-18:00	7	57	32	2	0	0
18:00-19:00	9	53	38	4	2	0
19:00-20:00	7	39	25	3	1	0

Source: Stesalit Systems Limited, Transportation Survey 2024

TABLE 13-16 HOURLY ECS DEMAND

ECS	**0.1**	**0.25**	**0.6**	**1**	**1.5**	**2.5**
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	0.4	7.75	16.8	4	3	0
10:00-11:00	0.6	9.5	19.2	3	1.5	0
11:00-12:00	0.6	10.5	17.4	4	3	0
12:00-13:00	0.7	10	15.6	3	1.5	0
16:00-17:00	0.6	11.75	18	3	1.5	0
17:00-18:00	0.7	14.25	19.2	2	0	0
18:00-19:00	0.9	13.25	22.8	4	3	0
19:00-20:00	0.7	9.75	15	3	1.5	0
Total ECS	**5.2**	**86.75**	**144**	**26**	**15**	**0**
MAX ECS	**0.9**	**14.25**	**22.8**	**4**	**3**	**0**

Source: Stesalit Systems Limited, Transportation Survey 2024

Total Equivalent Car Space required: 45 ECS

Equivalent Card Space Requirements considering a 20 percent increase in demand: 54 ECS

Parking Space requirements: 1241 sq. m.

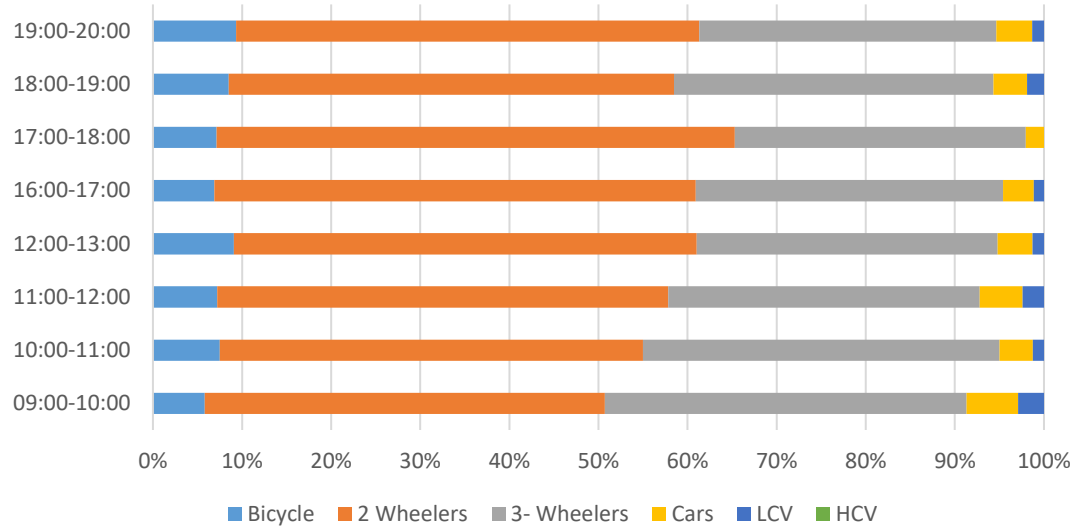


FIGURE 13-13 MODE WISE HOURLY DEMAND

Source: Stesalit Systems Limited, Transportation Survey 2024

13.4.4.5.1.6 LOCATION 6: POWERGANJ RAILWAY CROSSING

Parking Type: On- Street Parking

Ward No: 10

TABLE 13-17 HOURLY PARKING DEMAND

Powerganj Railway Crossing (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	4	5	6	0	0	0
10:00-11:00	7	7	4	0	0	0
11:00-12:00	10	8	6	0	0	0
12:00-13:00	6	11	8	0	0	0
16:00-17:00	4	5	4	0	0	0
17:00-18:00	5	11	5	0	0	0
18:00-19:00	7	12	4	0	0	0
19:00-20:00	5	9	4	0	0	0

Source: Stesalit Systems Limited, Transportation Survey 2024

TABLE 13-18 HOURLY ECS DEMAND

ECS	**0.1**	**0.25**	**0.6**	**1**	**1.5**	**2.5**
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	0.4	1.25	3.6	0	0	0
10:00-11:00	0.7	1.75	2.4	0	0	0
11:00-12:00	1	2	3.6	0	0	0

ECS	0.1	0.25	0.6	1	1.5	2.5
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
12:00-13:00	0.6	2.75	4.8	0	0	0
16:00-17:00	0.4	1.25	2.4	0	0	0
17:00-18:00	0.5	2.75	3	0	0	0
18:00-19:00	0.7	3	2.4	0	0	0
19:00-20:00	0.5	2.25	2.4	0	0	0
Total ECS	**4.8**	**17**	**24.6**	**0**	**0**	**0**
MAX ECS	**1**	**3**	**4.8**	**0**	**0**	**0**

Source: Stesalit Systems Limited, Transportation Survey 2024

Total Equivalent Car Space required: 9 ECS

Equivalent Card Space Requirements considering a 20 percent increase in demand: 11 ECS

Parking Space requirements: 243 sq. m.

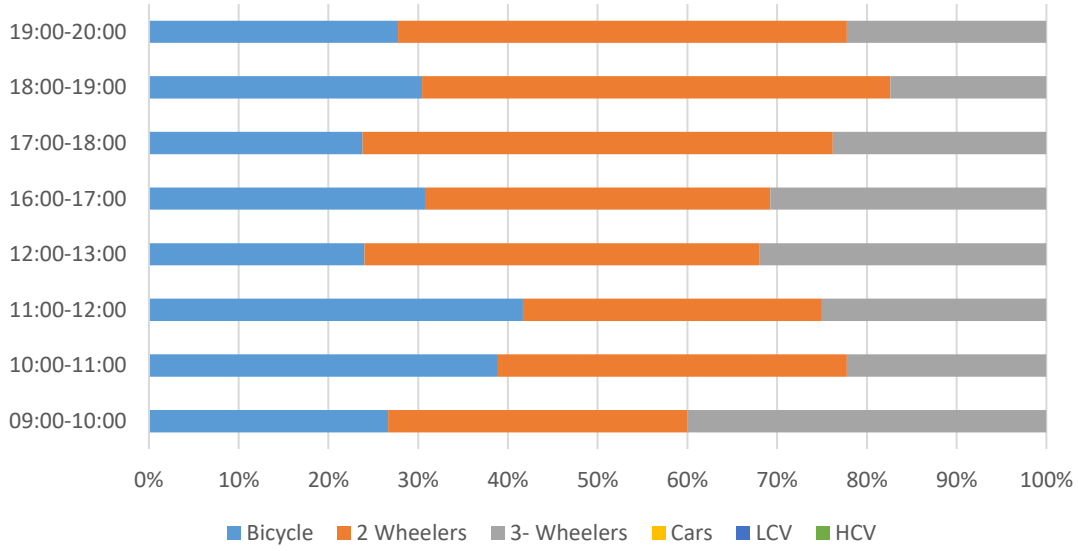


FIGURE 13-14 MODE WISE HOURLY DEMAND

Source: Stesalit Systems Limited, Transportation Survey 2024

13.4.4.5.1.7 LOCATION 7: NEAR SATGATHAM SAMITI

Parking Type: On- Street Parking

Ward No: 16

TABLE 13-19 HOURLY PARKING DEMAND

Near Satgatham Samiti (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	10	22	8	4	2	1
10:00-11:00	13	22	7	3	2	2
11:00-12:00	11	26	8	3	4	2
12:00-13:00	11	25	6	2	2	2
16:00-17:00	6	21	6	3	1	1
17:00-18:00	9	25	9	3	1	1
18:00-19:00	14	27	11	4	2	1
19:00-20:00	13	30	12	3	2	1

Source: Stesalit Systems Limited, Transportation Survey 2024

TABLE 13-20 HOURLY ECS DEMAND

ECS	**0.1**	**0.25**	**0.6**	**1**	**1.5**	**2.5**
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**HCV**
09:00-10:00	1	5.5	4.8	4	3	2.5
10:00-11:00	1.3	5.5	4.2	3	3	5
11:00-12:00	1.1	6.5	4.8	3	6	5
12:00-13:00	1.1	6.25	3.6	2	3	5
16:00-17:00	0.6	5.25	3.6	3	1.5	2.5
17:00-18:00	0.9	6.25	5.4	3	1.5	2.5
18:00-19:00	1.4	6.75	6.6	4	3	2.5
19:00-20:00	1.3	7.5	7.2	3	3	2.5
Total ECS	**8.7**	**49.5**	**40.2**	**25**	**24**	**27.5**
MAX ECS	**1.4**	**7.5**	**7.2**	**4**	**6**	**5**

Source: Stesalit Systems Limited, Transportation Survey 2024

Total Equivalent Car Space required: 31 ECS

Equivalent Card Space Requirements considering a 20 percent increase in demand: 37 ECS

Parking Space requirements: 859 sq. m.

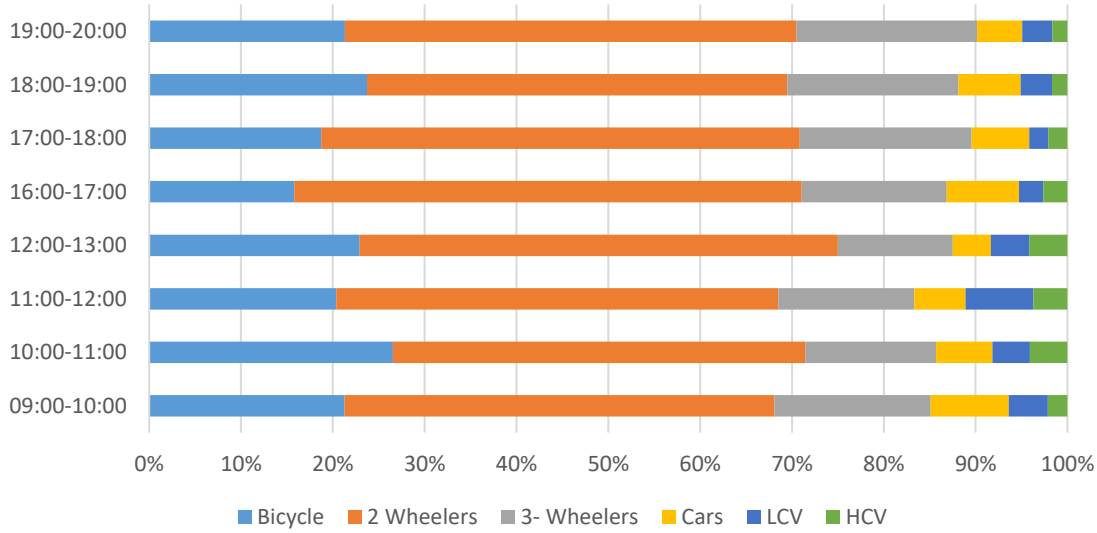
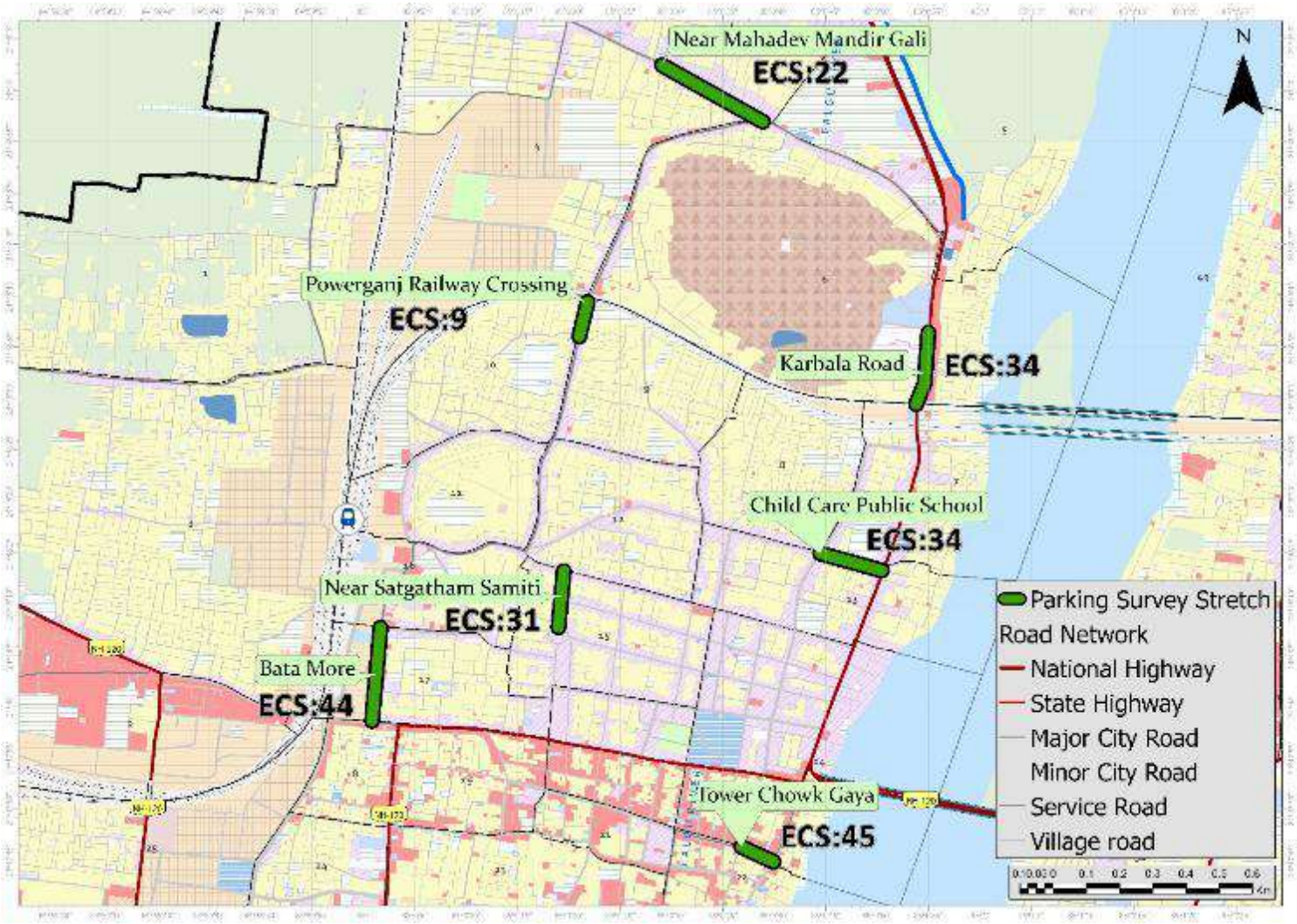


FIGURE 13-15 MODE WISE HOURLY DEMAND

Source: Stesalit Systems Limited, Transportation Survey 2024



MAP 13-12 PARKING SURVEY ANALYSIS- ECS MAPSOURCE: TRANSPORTATION SURVEY 2024, STESALIT SYSTEMS LTD.

13.5 INFERENCE

- **Infrastructure Optimization**

Prioritize the optimization of existing road infrastructure, considering traffic volume patterns and potential congestion points. Implement smart traffic management solutions to enhance efficiency and reduce travel times.

- **Public Transport Optimization**

Public transport optimization involves strategically planning and adjusting various aspects of a network to improve efficiency and ridership. This can encompass designing routes with minimal travel times, setting bus or train frequencies based on real-time demand, and even utilizing different vehicle sizes on routes depending on passenger volume. Ultimately, the goal is to create a system that minimizes wait times, travel durations, and operational costs, while maximizing passenger convenience and ridership.

- **Community Engagement and Education**

To create a public transport system that truly serves the community, open communication is key. Public forums can gather resident feedback on pain points and preferences, while educational campaigns can raise awareness about sustainable options like cycling and buses. By promoting these alternatives and fostering a culture of public transit use, communities can work together towards a more efficient and eco-friendly transportation network.

13.5.1 CONCLUSION

In conclusion, the transport analysis for Gaya Ji provides a holistic understanding of the current transportation landscape and sets the stage for strategic interventions. By leveraging these insights and implementing the recommended measures, Gaya Ji Planning Area can develop a resilient and sustainable transportation infrastructure that caters to the evolving needs of its residents while fostering a safe, efficient, and accessible urban environment. The success of these initiatives hinges on ongoing collaboration between stakeholders, effective community engagement, and a commitment to prioritizing sustainable transportation solutions.

13.6 EXISTING VEHICULAR GROWTH

TABLE 13-21 DETAILS OF VEHICLE REGISTRATION IN GAYA JI AREA WITH PERCENTAGE GROWTH IN TERMS OF PCU

Sl. No.	Vehicle Class	2018	2019	2020	2021	2022	2023	2024	Total Vehicle
1	AGRICULTURAL TRACTOR	1149	620	842	778	1623	1048	888	6948
2	AMBULANCE	2	8		27	18	16	21	92
3	ARTICULATED VEHICLE		1		1	1	1	1	5
4	BUS	139	186	76	85	94	162	147	889
5	DUMPER	1					4		5
6	CONSTRUCTION EQUIPMENT VEHICLE		1	74	104	68	62	59	368
7	EARTH MOVING EQUIPMENT						2		2
8	E-RICKSHAW(P)	77	497	418	1045	2702	3813	4367	12919
9	E-RICKSHAW WITH CART (G)	2	2	5	23	23	32	52	139
10	GOODS CARRIER	1472	1137	690	540	855	949	945	6588
11	Harvester				1	6	27	24	58
12	MAXI CAB	40	44	8		2	16	33	143
13	M-CYCLE/SCOOTER	46652	43781	31896	33450	36039	38735	40673	271226
14	M-CYCLE/SCOOTER-WITH SIDE CAR	13	18	71	36	19	28	34	219
15	MOPED	7	1667	1489	1235	1322	1,379	1,324	8423
16	MOTOR CAB	279	214	79	67	64	80	66	849
17	MOTOR CAR	2132	2197	2696	3435	3854	3828	3905	22047
18	MOTORISED CYCLE (CC > 25CC)		2	1	4	21	3	3	34
19	OMNI BUS	19	29	21	7	2	13	19	110
20	OMNI BUS (PRIVATE USE)	_	_	_	_	_	2		2
21	THREE-WHEELER (GOODS)	631	627	549	400	373	338	254	3172

22	THREE-WHEELER (PASSENGER)	2166	3043	1379	785	1195	1483	1159	11210
23	TRACTOR (COMMERCIAL)	756	862	921	794	829	867	847	5876
24	TRAILER (AGRICULTURAL)	603	231	125	87	232	83	46	1407
25	TRAILER (COMMERCIAL)	357	412	163	264	403	331	456	2386
	Total Vehicle (Year Wise)	56497	55579	41503	43168	49745	53302	55323	355117
	Traffic Growth rate (Year wise)		-1.62	-25.33	4.01	15.24	7.15	3.79	
	Average Growth rate	7.55							

SOURCE: VAHAN.PARIVAHAN.GOV

13.7 FUTURE VEHICULAR PROJECTION

To estimate the projected number of vehicles by 2047, the average annual growth rate is first calculated for the total number of registered vehicles. This growth rate is multiplied by the current vehicle count to determine the yearly increase, which is then multiplied by the number of years leading up to 2047. The resulting cumulative increase is added to the present vehicle count to obtain the approximate projected vehicular registration. Additionally, individual projections are made for different vehicle categories such as two-wheelers, cars, and commercial vehicles by using their respective average annual growth rates. The average growth rate has been calculated for 2021 to 2024 because in 2020 because of Covid Pandemic, there was a huge decline in vehicular registration. The growth rate used for cars is 10.2%, while two-wheelers are projected with a growth rate of 6.3%. Buses are estimated using a growth rate of 21.4%, and e-rickshaws show a significantly high growth trend with a rate of 91.1%, reflecting their rapid adoption in recent years. In contrast, three-wheelers exhibit a negative growth rate of 2.9%, indicating increasing craze of E-Vehicles. This allows for a more detailed and category-wise estimation, supporting more accurate transport planning and infrastructure development.

TABLE 13-22 FUTURE PROJECTION OF VEHICULAR REGISTRATION

Year	Total Vehicle	Car	Two Wheelers	Bus	E-Rickshaw (P+G)	Three-Wheeler (P+G)
Growth Rate	**7.55**	**10.2**	**6.3**	**21.4**	**91.1**	**2.9**
2025	59499	4305	43225	178	5082	1192
2030	79599	6357	55137	387	7942	1334

Year	Total Vehicle	Car	Two Wheelers	Bus	E-Rickshaw (P+G)	Three-Wheeler (P+G)
Growth Rate	**7.55**	**10.2**	**6.3**	**21.4**	**91.1**	**2.9**
2035	114527	10348	74744	1020	11517	1535
2040	164782	16846	101324	2688	15092	1767
2047	237089	27424	137356	7081	18667	2034

Source: Stesalit System LTD.

13.8 ISSUES & POTENTIAL

Strength	Weakness	Opportunity	Threat
GOOD ROADWAY, RAILWAY AND AIR CONNECTIVITY • **Gaya Ji International Airport** is located within planning area, providing crucial air connectivity, especially for international tourists. • **Gaya Ji Railway Junction** in the heart of Gaya Ji city connect major cities such as Patna in North; Dhanbad in	**POOR TRANSPORT INFRASTRUCTURE AND LEVEL OF SERVICE** • Inadequate traffic management, poor signage, insufficient lighting, and lack of enforcement worsen road conditions and safety. • Parking infrastructure is lacking, particularly near commercial areas, railway station and bus stands, increasing traffic chaos.	**AVAILABILITY OF LAND FOR FUTURE EXPANSION** • With available land along highways and other major roads will enable future expansion and road widening. **DEVELOPMENT OF PUBLIC TRANSPORT SYSTEMS** • Development of an organized public transport system, such as city buses service or electric rickshaws.	**UNORGANISED IPT STANDS** • The unorganized Intermediate Public Transport (IPT) system in Gaya Ji operates without structured planning, causing traffic congestion, inefficient space use, and commuter inconvenience. Auto-rickshaws, e-rickshaws, &

Strength	Weakness	Opportunity	Threat
South; Lakhisarai in east; Dehri, Sasaram, Varanasi in West enhancing connectivity for social services, trade, tourism, and daily commuting. • **NH-22**, connect Gaya Ji planning area to Patna in the North and Dobhi, Chatra in the South, and **NH-120** connect to Aurangabad, Buxar in West and Bihar Sharif in East, facilitates seamless roadway access, enhancing connectivity for social services, trade, tourism, and daily commuting. **TRANSPORTATION SERVICE** • Well-established local transport options, including	• The presence of bottlenecks at various junctions significantly hampers traffic flow. These congested points often lead to delays as vehicles struggle to navigate through intersections, causing disruptions in the overall movement within the planning area, Ex. Delha, Railway station road, etc. • Despite increasing number of EV Vehicles, charging infrastructure is very limited **ROAD ENCROACHMENT** Encroachment of roads and footpaths by street vendors and illegal parking, restricting movement and causing traffic bottlenecks. **LACK OF BUS STAND INFRASTRUCTURE AND SERVICES**	**UPCOMING TRANSPORT CORRIDORS** • The development of metro line connecting different parts of planning area and nearby cities will significantly improve the level of transport infrastructure and services. • The upcoming Gaya Ji Chatra Rail line will boost the rail connectivity of region with Jharkhand in the South. **DEVELOPMENT OF EV INFRASTRUCTURE** • **E-Rickshaw:** As per data provided by RTO Gaya Ji on Vehicular registration, Passenger E-rickshaw is increasing with average rate of 91.1% per year (715 vehicle per year) • The development of EV charging infrastructure in planning area will facilitate the transition to electric mobility and reduce carbon emissions.	cycle rickshaws frequently cluster around key junctions, markets, obstructing smooth traffic flow. **ABSENCE OF NMT LANES AND CYCLE TRACKS** • The lack of Non-Motorized Transport (NMT) lanes and cycle tracks in Gaya Ji forces cyclists and pedestrians to share congested roads with motorized vehicles, increasing accident risks and hindering sustainable mobility. **TRAFFIC REGULATIONS** • Unchecked growth can lead to traffic congestion,

Strength	Weakness	Opportunity	Threat
bus services (to and from cities) and auto-rickshaws, battery rickshaws ensure last-mile connectivity and ease of travel within the city. • **Passenger and local trains** serve as essential modes of daily transportation between Gaya Ji and nearby cities, particularly Patna, the state capital and PD. Dindayal railway station. This facilitates work and education trips, contributing to workforce mobility and enhancing the district's administrative and commercial activities.	• The Gaya Ji Bus Stand suffers from a lack of basic amenities, making travel inconvenient for passengers. • The facility has poor sanitation, with unclean surroundings, inadequate waste disposal, and foul odors due to irregular cleaning. • Seating areas are either insufficient or damaged, forcing passengers to stand for long durations, especially during peak hours.		parking shortages, and increased pollution. • Encroachments on roads and footpaths worsen pedestrian and vehicular movement.

13.9 TRANSPORT PROPOSAL

13.9.1 PROPOSED RING ROAD

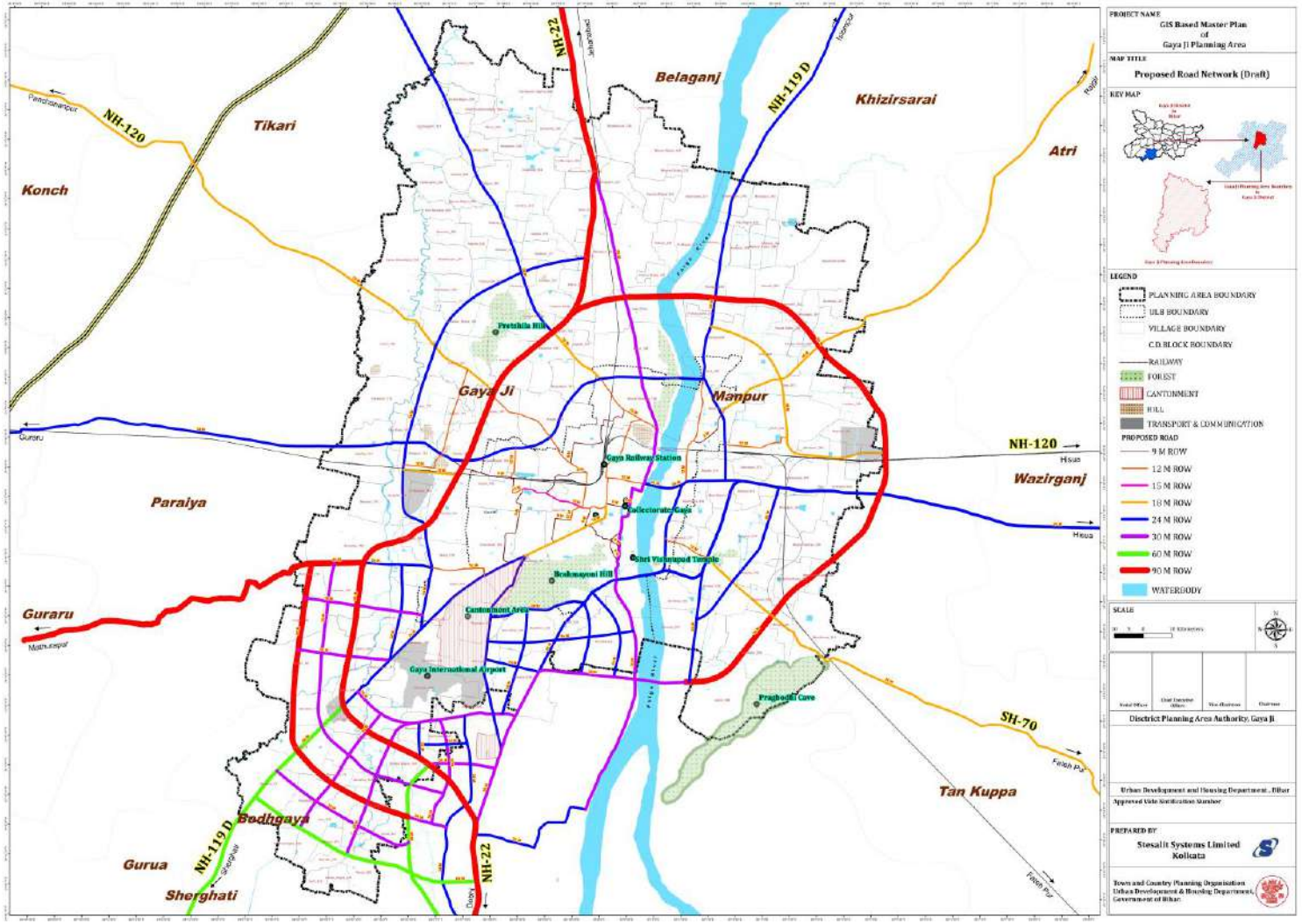
The proposed Ring Road (Peripheral Road along Planning Boundary) is envisioned as a strategic mobility corridor that will function as a peripheral distributor road, diverting regional and through-traffic away from the congested urban core while enhancing overall traffic efficiency. By providing an alternative high-capacity route around the city, it will reduce travel time, minimize heavy vehicle movement within built-up areas, and support improved regional connectivity with surrounding settlements and highways. Additionally, the ring road will act as a clear urban growth boundary, helping to guide structured and planned expansion of the city while preventing unplanned sprawl.

The proposal is aligned with URDPFI Guidelines 2014, which recommend ring or peripheral roads for cities with future expansion potential to manage growth and traffic efficiently. Design standards will follow MoRTH and IRC guidelines, ensuring safety, capacity, and sustainability. Similar successful implementations in cities such as Jaipur, Indore, and Lucknow demonstrate the effectiveness of ring roads in supporting urban mobility, reducing congestion, and enabling balanced spatial development.

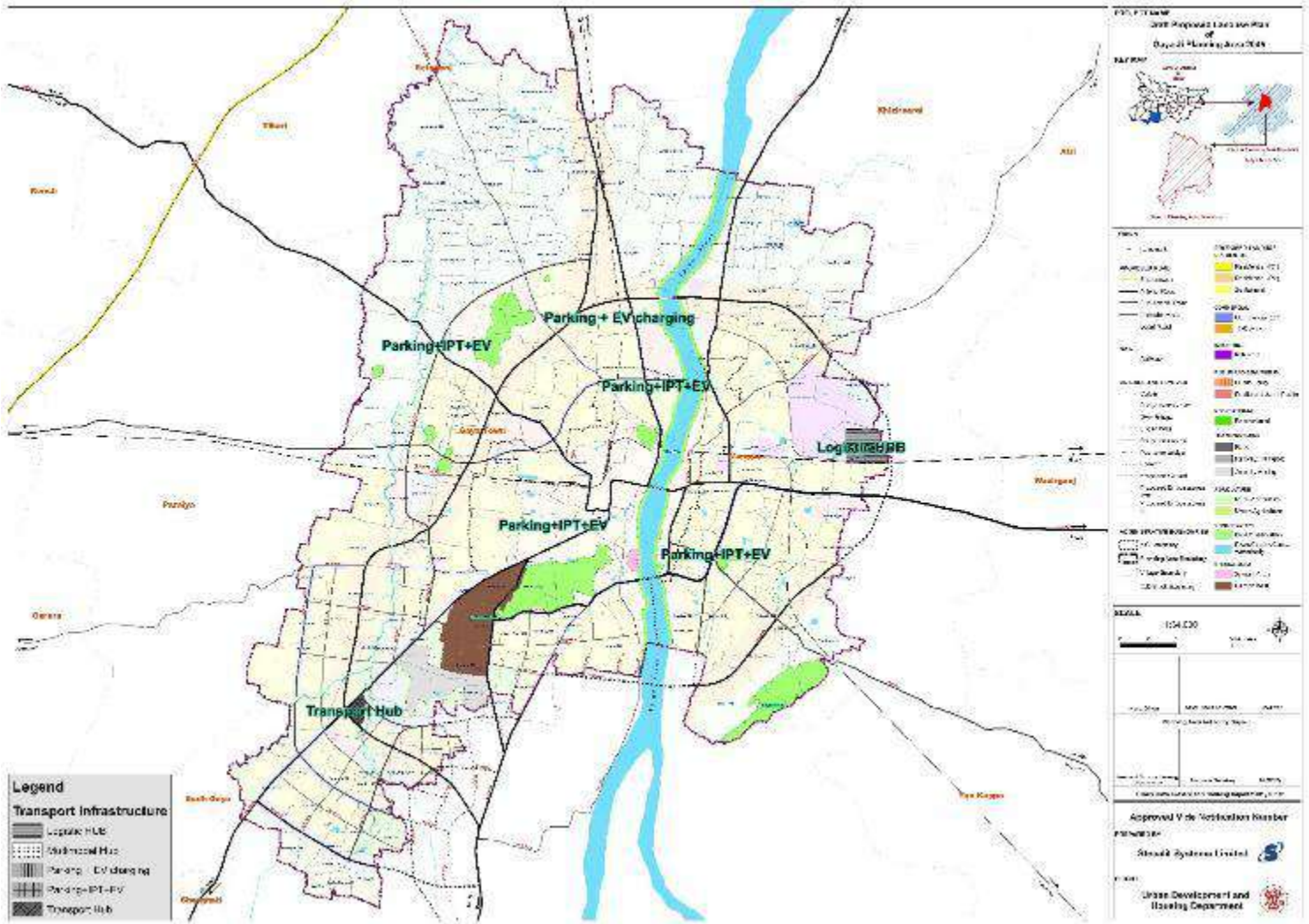
13.9.2 INTERMODAL TRANSIT HUB AND TRANSPORT ROUTE

Intermodal Transit Hubs are proposed to improve mobility efficiency by enabling seamless interchange between different modes of transport such as buses, intermediate public transport (IPT), para-transit systems, non-motorised transport (NMT), and private vehicles. Efficient integration of multiple transport modes is essential for successful implementation of sustainable urban mobility systems, reducing transfer time and enhancing commuter convenience. Within the planning area, dedicated intermodal hubs are proposed over approximately 10–15 hectares, designed to accommodate organised bus bays, IPT stands, pedestrian-friendly access, cycling infrastructure, parking management systems, and well-planned last-mile connectivity solutions. These hubs will function as key mobility nodes, improving accessibility, reducing congestion, and encouraging a modal shift towards public transport. The proposal aligns with recommendations under the National Urban Transport Policy (NUTP) and URDPFI Guidelines, with successful examples seen in multimodal interchange facilities such as BRT–Metro interchanges in Ahmedabad and Pune.

Public and IPT Transport Routes are proposed with clearly defined alignments to streamline traffic flow, reduce conflicts between transport modes, and enhance operational efficiency. Establishing fixed routes and designated stops for public transport and IPT services will help minimise random stopping, improve reliability, and ensure safer road usage. Effective implementation will require strict regulatory frameworks, route management systems, enforcement mechanisms, and coordination among transport authorities. Case studies from cities like Pune and Kerala demonstrate that structured route planning combined with strong operational management can significantly reduce congestion and improve public transport performance.



MAP 13-13 PROPOSED ROAD NETWORK OF GAYA JI PLANNING AREA



MAP 13-14 PROPOSED TRANSPORT INFRASTRUCTURE OF GAYA JI PLANNING AREA

13.9.3 PROPOSED ROAD NETWORK

The proposed road network for the Gaya Ji planning area comprises a total road length of 435.07 km, aimed at improving mobility, connectivity, and future traffic capacity. Of the total network, approximately 8 km involves widening and upgradation of existing roads, while 427 km comprises newly proposed roads to support planned urban expansion, townships, and emerging activity corridors.

TABLE 13-23 PROPOSED ROAD NETWORK AS PER STATUS OF WORK

S.N.	Road Type	Road Length (Km)
1	Road Widening	7.71
2	New Road	427.36
3	**Total**	**435.07**

Source: Stesalit System Ltd.

The road network has been planned with a clear hierarchy of right-of-way (ROW) widths to accommodate varying traffic volumes and functional roles. The distribution of road widths includes 34.69 km of 12 m wide roads, primarily serving local access; 118.06 km of 18 m wide roads catering to neighbourhood and street-level movement; 119.33 km of 24 m wide roads supporting secondary traffic flows; 79.5 km of 30 m wide roads functioning as major collectors and sub-arterials; 30.5 km of 60 m wide roads and 52.99m of 90m wide road at strategic locations, which constitute the proposed ring road. The ring road is a key infrastructure element designed to divert through-traffic, particularly heavy vehicles, away from the urban core and improve regional connectivity.

TABLE 13-24 PROPOSED ROAD NETWORK AS PER ROAD WIDTH

S.N.	Road Type	Road Length (Km)
1	12m wide road	34.69
2	18m wide road	118.06
3	24m wide road	119.33
4	30m wide road	79.5
5	60m wide road	30.5
6	90m wide road	52.99
	Total	**435.07**

13.9.4 PROPOSED ROAD CROSS SECTION

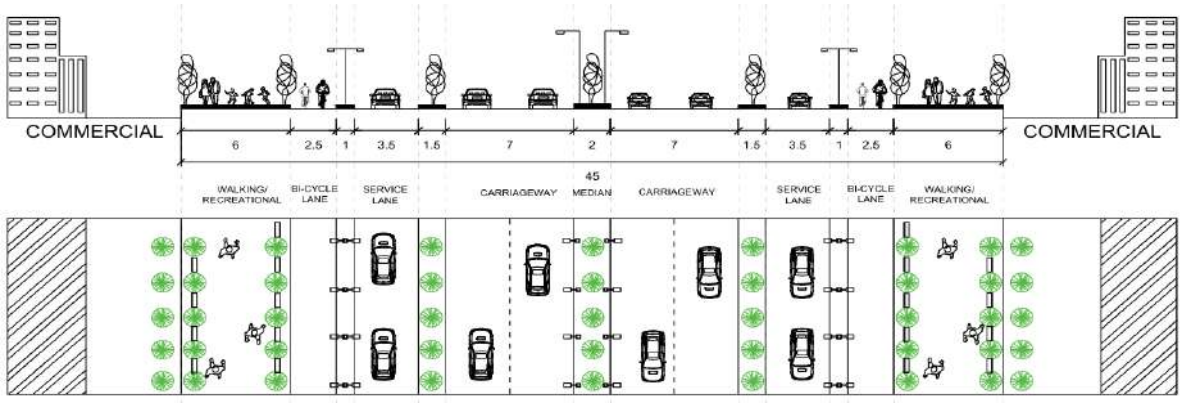


FIGURE 13-16 45M WIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed road cross-section presents a balanced, complete-street design with a total right-of-way of about 45 m, integrating mobility, safety, and urban livability. Flanked by commercial land use on both sides, the section prioritizes pedestrians and non-motorized transport through generously sized walking and recreational zones (about 6 m) with landscaping and seating, followed by dedicated bicycle lanes (2.5 m) to encourage sustainable mobility. Service lanes (3.5 m) on either side ensure smooth access to commercial activities without disturbing through traffic. The central portion consists of dual carriageways (7 m each) separated by a landscaped median (2 m), which enhances safety, traffic management, and visual quality while also accommodating lighting and greenery. Overall, the cross-section reflects a people-oriented, multimodal urban street that supports commercial vibrancy, efficient traffic flow, and a high-quality public realm.

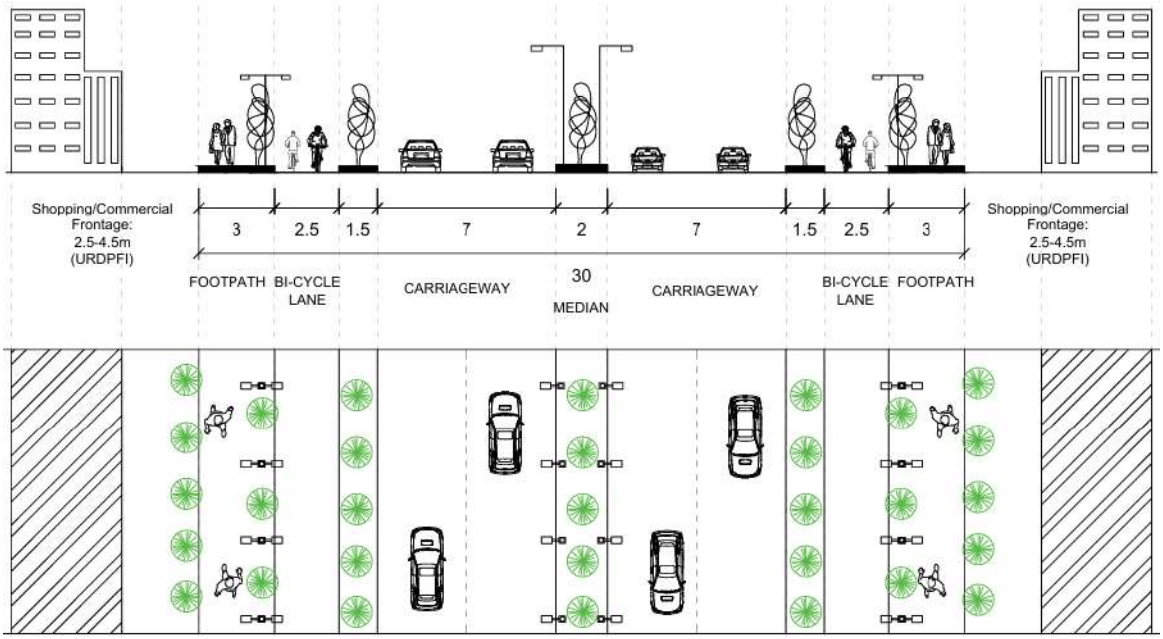


FIGURE 13-17 30M WIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed road cross-section illustrates a compact yet efficient 30 m right-of-way designed to support a shopping and commercial frontage on both sides in accordance with URDPFI guidelines. The section ensures strong pedestrian priority through well-defined 3.0 m footpaths integrated with street furniture and landscaping, creating an active and comfortable public realm along commercial edges. Dedicated 2.5 m bi-cycle lanes on either side promote non-motorized transport and safe last-mile connectivity. The central roadway comprises dual 7.0 m carriageways separated by a 2.0 m landscaped median, which improves traffic safety, provides space for utilities and lighting, and enhances the visual character of the street. Overall, the cross-section reflects a people-centric, multimodal urban commercial street that balances vehicular movement with walkability, cycling, and vibrant street activity.

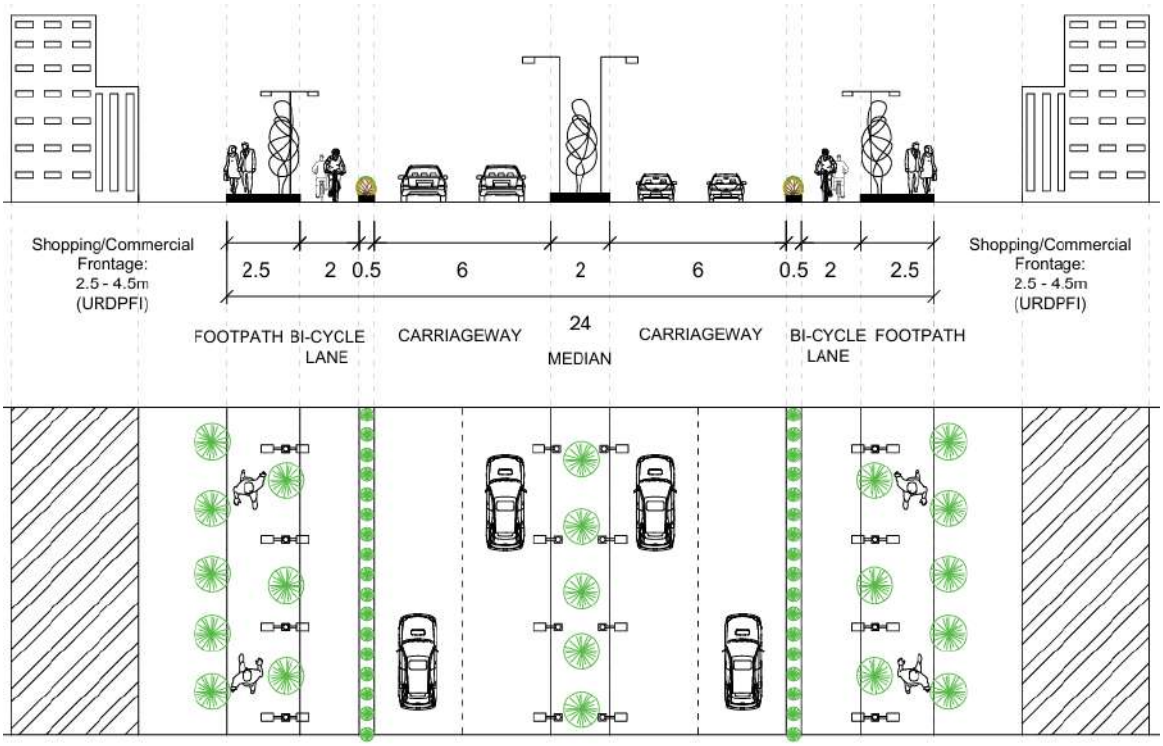


FIGURE 13-18 24M WIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed 24 m wide commercial street cross-section is designed as a compact, people-friendly corridor supporting active shopping frontage on both sides as per URDPFI norms. It provides 2.5 m wide footpaths with integrated landscaping and street furniture, along with dedicated bi-cycle lanes to promote safe non-motorized movement. The central roadway consists of dual 6.0 m carriageways separated by a 2.0 m median, ensuring efficient vehicular flow while accommodating lighting and greenery. Overall, the section balances commercial activity, walkability, cycling, and traffic movement, creating a vibrant and functional urban street.

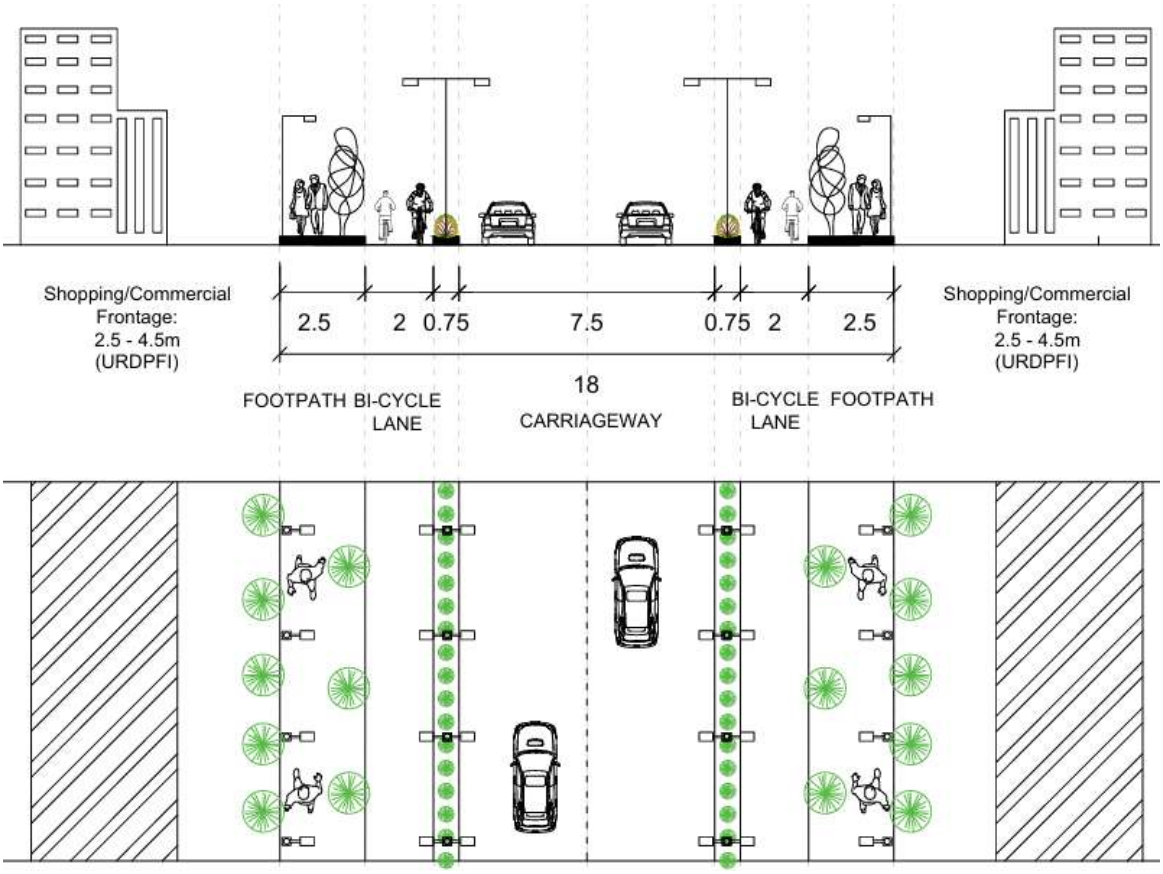


FIGURE 13-19 18M WIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed 18 m wide commercial street cross-section is a compact, pedestrian-oriented design catering to shopping and mixed commercial frontage on both sides as per URDPFI guidelines. It provides 2.5 m wide footpaths with seating and plantation, complemented by 2.0 m dedicated bi-cycle lanes to encourage non-motorized transport. The central 7.5 m carriageway ensures smooth vehicular movement while traffic-calming elements and street lighting enhance safety. Overall, the section balances commercial activity, walkability, cycling, and vehicular access, creating a lively and human-scaled urban street.

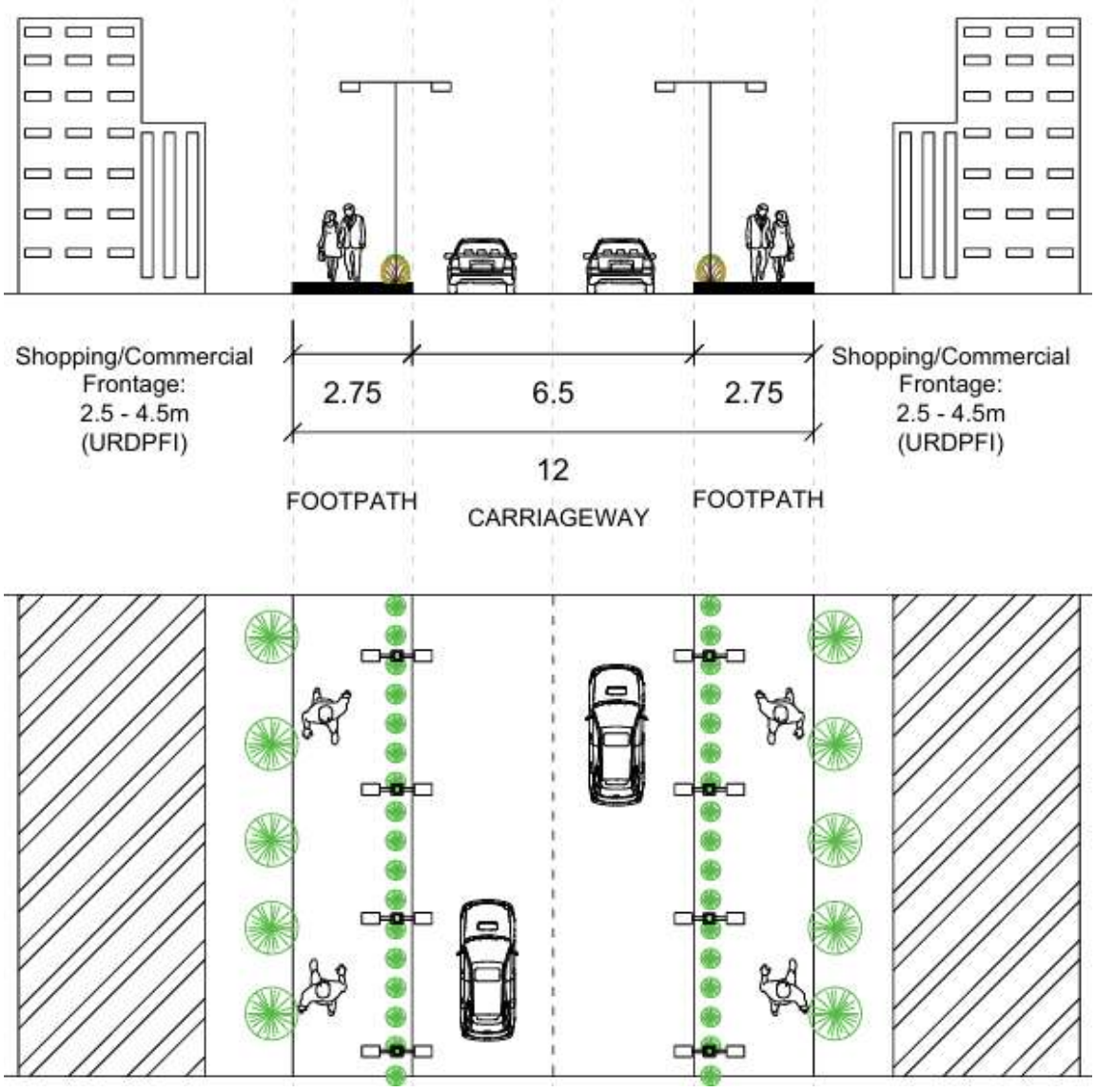


FIGURE 13-20 12M WIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed 12 m wide commercial street cross-section is conceived as a human-scaled, pedestrian-priority street well suited for local shopping and mixed-use areas, in line with URDPFI guidelines. On both sides, 2.75 m wide footpaths are provided to comfortably accommodate pedestrian movement, informal activities, street vending, and spill-over commercial uses, while integrated plantation and street furniture enhance microclimate, visual quality, and user comfort. The central 6.5 m carriageway supports two-way vehicular movement at controlled speeds, making it appropriate for local access traffic rather than through traffic, thereby improving safety for pedestrians. The compact right-of-way encourages active street frontage, close interaction between shops and pedestrians, and efficient land utilization. Overall, the cross-section promotes walkability, liveliness, and commercial vibrancy while maintaining necessary vehicular access, making it ideal for neighbourhood-level commercial streets.

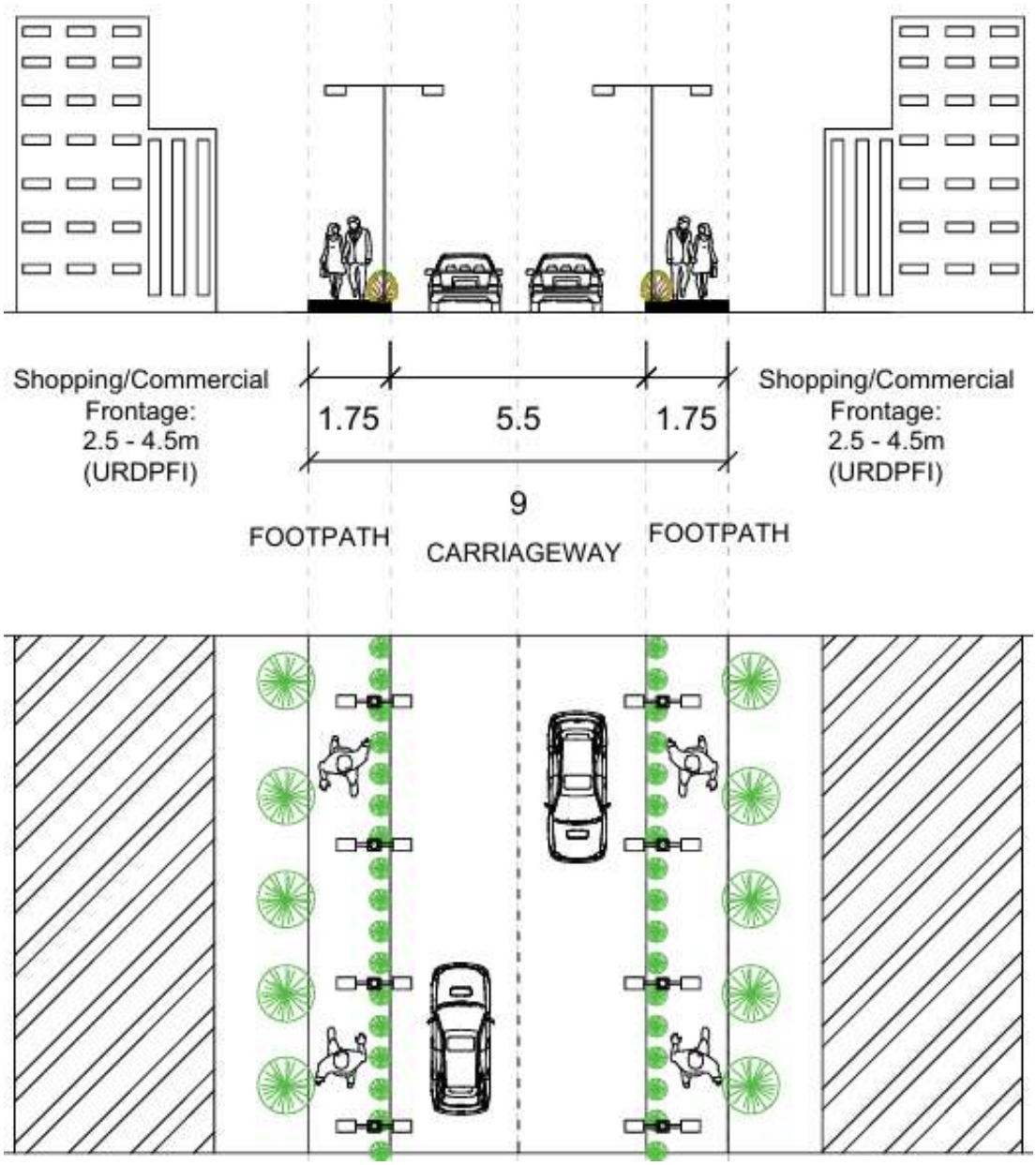


FIGURE 13-21 9M WIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed 9 m wide commercial street cross-section represents a very compact, low-speed urban street designed primarily for local access within shopping and mixed-use areas, in line with URDPFI norms. It provides 1.75 m wide footpaths on both sides, which are adequate for basic pedestrian movement and direct access to commercial frontages, while also allowing limited space for plantation and street utilities. The central 5.5 m carriageway supports two-way vehicular movement at slow speeds, making it suitable for internal commercial streets with limited traffic volumes. Due to its narrow right-of-way, the section naturally encourages traffic calming, enhances pedestrian safety, and supports an intimate street character. Overall, this cross-section prioritizes walkability, efficient land use, and active commercial edges while maintaining essential vehicular access.

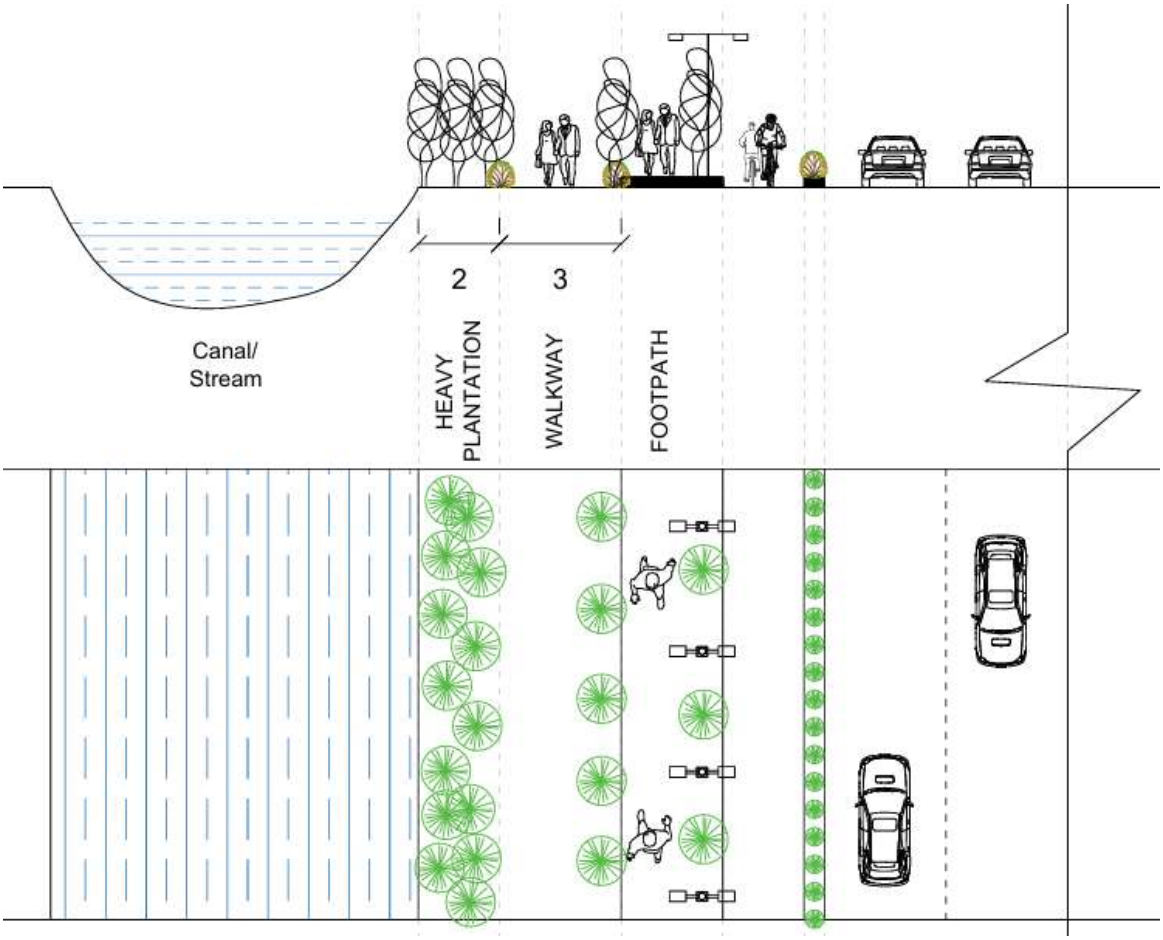


FIGURE 13-22 RIVER SIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed canal-edge road cross-section emphasizes environmental sensitivity and public accessibility by integrating mobility infrastructure with a strong landscape buffer. Along the canal/stream edge, a 2.0 m heavy plantation zone acts as an ecological buffer for bank protection, micro-climate regulation, and visual screening, followed by a 3.0 m dedicated walkway designed for leisure and recreational movement. A clearly defined footpath ensures safe pedestrian circulation, separated from vehicular traffic by landscaping and street furniture. On the road side, the carriageway accommodates smooth vehicular movement while maintaining adequate setbacks from the canal edge. Overall, the section promotes a people-oriented waterfront corridor that balances flood safety, environmental conservation, and active public use, transforming the canal edge into a safe, green, and vibrant urban space.

14 PROPOSED LAND USE

14.1 PROPOSED LAND USE

Gaya Ji holds significant religious, cultural, historical, and tourism importance, particularly due to the Vishnupad Temple and associated pilgrimage activities. The land use strategy for the Gaya Ji Planning Area therefore focuses on balancing heritage conservation, residential growth, tourism, economic development, environmental protection, and infrastructure requirements.

Heritage and Cultural Conservation: The Vishnupad Temple precinct and other culturally significant areas shall be protected through controlled development, appropriate building regulations, heritage-sensitive land uses, and landscaped buffers. Development around heritage corridors shall maintain the visual character and religious ambience of the city.

Residential and Mixed-Use Development: Existing residential areas shall be strengthened while planned residential sectors shall accommodate future population growth. Mixed-use development may be promoted along major roads, activity corridors, and identified urban centres to support local commerce, improve accessibility, and encourage efficient land utilization.

Commercial and Tourism Development: Commercial activities shall be concentrated along major roads, market areas, pilgrimage routes, and designated activity centres. Tourism-oriented uses such as hotels, guest houses, restaurants, cultural facilities, and visitor services shall be encouraged at suitable locations while avoiding pressure on sensitive heritage areas.

Environmental Conservation: The Falgu River, flood-prone areas, water bodies, drainage channels, and other environmentally sensitive areas shall be protected through appropriate zoning and green buffers. Parks, open spaces, recreational areas, and urban green networks shall be integrated into the land use structure to improve ecological resilience and urban livability.

Transportation and Mobility: Land shall be reserved for road widening, public transport, pedestrian facilities, parking, and mobility infrastructure. Peripheral and designated parking facilities shall be promoted near major pilgrimage and commercial areas to reduce congestion within the core city and improve pedestrian movement.

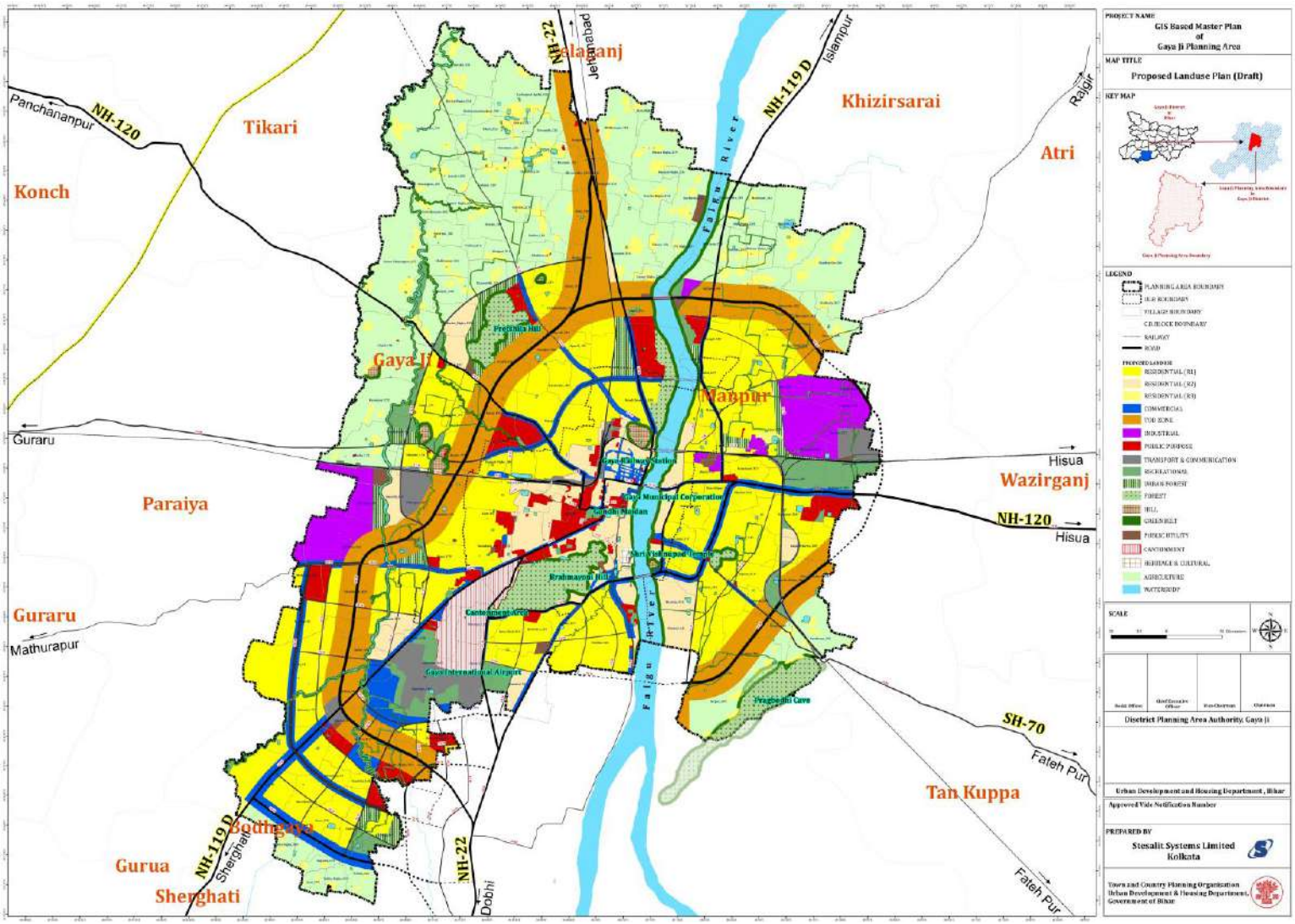
Infrastructure and Public Facilities: Adequate land shall be provided for water supply, sewerage, solid waste management, healthcare, education, community facilities, and other public utilities. Infrastructure provision shall be aligned with projected population growth and future development requirements.

14.2 LAND USE DISTRIBUTION

TABLE 14-1 PROPOSED LAND USE -2047 GAYA JI PLANNING AREA

S.No	Land Use	Sq. Km	Hectare	Acres	%
1	**Residential Zone**	94.64	9464.48	23387.24	30.93
2	**Commercial Zone**	14.60	1460.33	3608.54	4.77
3	**TOD Zone**	34.89	3488.60	8620.51	11.40
4	**Industrial Zone**	9.80	979.73	2420.97	3.20
5	**Public Purpose**	14.69	1469.05	3630.10	4.80
6	**Recreational**	8.53	852.56	2106.71	2.79
7	**Green Area**	11.34	1133.95	2802.04	3.71
8	**Urban Forest**	13.57	1356.75	3352.61	4.43
9	**Hills/Mountain**	0.78	77.59	191.74	0.25
10	**Transportation & Communication**	18.35	1834.76	4533.77	6.00
11	**Public Utilities**	0.95	95.42	235.77	0.31
12	**Agriculture**	72.58	7258.11	17935.19	23.72
13	**Water Body**	11.10	1109.64	2741.98	3.63
14	**Heritage & Cultural**	0.22	22.12	54.66	0.07
Total		**306.03**	**30603.09**	**75621.88**	**100**

The proposed land use distribution demonstrates a **mixed and diversified spatial development strategy**. The allocation of **11.40% for TOD** is particularly significant. It provides an opportunity to shift from conventional low-density development towards a more compact, accessible and transit-supportive urban structure. Similarly, the combined allocation for **green areas, urban forests, recreation areas and water bodies** create an important green-blue infrastructure framework. These areas should be treated as an integrated ecological network rather than isolated parcels. The allocation of **commercial, industrial and public-purpose areas** also establishes the basis for employment generation, economic activity and provision of essential services. The proposed land use distribution provides a comprehensive spatial framework for guiding future development. The dominance of **residential use (30.93%)** is supported by substantial allocations for **agriculture (23.72%)**, **TOD (11.40%)**, **transportation (6.00%)**, public purposes, commercial and industrial activities, as well as green and ecological areas. The proposed framework can support **planned urbanization, economic development, improved mobility, environmental sustainability and protection of agricultural and heritage resources**. Effective implementation, however, will require phased infrastructure development, development-control regulations, land-use monitoring and coordination among the concerned departments and local authorities.



MAP 14-1 PROPOSED LAND USE PLAN- 2047

15 LAND USE ZONING & DEVELOPMENT CONTROL REGULATIONS

These Development Control Regulations (DCRs) establish the statutory framework for regulating development within the Gaya Ji Planning Area. These regulations are intended to ensure orderly, sustainable and high-quality urban development in conformity with the objectives of the Master Plan–2047. Unless specifically provided otherwise in this Master Plan, all development within the Planning Area shall be governed by the provisions of the Bihar Building Bye-Laws, 2014, as amended from time to time, and other applicable laws, rules and regulations.

The provisions contained in this Chapter shall form part of the Development Control Regulations for the Planning Area and to the extent of any inconsistency, shall prevail over the corresponding provisions of the Bihar Building Bye-Laws, 2014.

15.1 Introduction & General Guidelines

The Development Control Regulations (DCRs) are intended to guide and regulate the future growth of Gaya Ji town. These regulations aim to ensure that development is carried out in an orderly manner, balancing the needs for housing, commerce, industry, infrastructure, and environment. The purpose is to promote sustainable, inclusive and resilient urban development in line with URDPFI Guidelines, Bihar Building Bye-laws, and the vision for Gaya Ji Master Plan.

The DCRs provide a framework for land use, permissible activities, building controls, and environmental safeguards. They shall be applicable to all types of development, redevelopment, and construction activities within the notified planning area of Gaya Ji. No development or redevelopment shall be permitted unless it conforms to these regulations.

15.1.1 GENERAL GUIDELINES

- The provisions of the Bihar Building Bye-Laws, 2014, as amended from time to time, shall govern development within the Special Area.
- The applicable zoning regulations, building standards, fire safety requirements, accessibility norms, structural safety provisions and environmental safeguards prescribed under the Bihar Building Bye-Laws shall continue to apply.
- No development shall be permitted in environmentally sensitive zones such as riverbeds, wetlands, forest land, or green belts except for activities specifically permitted.
- In case of any conflict between these DCRs and other state/national level regulations, the more restrictive provision shall prevail.

- Special areas like Transit Oriented Development (TOD) corridors, industrial estates, heritage precincts, and eco-sensitive zones shall be governed by additional regulations as provided in the relevant sections.
- Provisions for affordable housing, EWS/LIG categories, and green building norms shall be mandatory in line with the Bihar Building Bye-Laws, affordable housing and slum rehabilitation & redevelopment housing policy and National Housing Policies.
- Parking norms, fire safety clearances, environmental impact assessment (EIA) requirements, and barrier-free accessibility shall be integral to the development approval process.
- Development along Ghats, Public Amenities and eco-tourism shall maintain a mandatory green buffer restricted to soft landscaping and permeable pathways.
- The Competent Authority reserves the right to modify or relax certain provisions in exceptional cases in the public interest, subject to adequate justification and approval.

15.1.2 SPECIAL REGULATIONS FOR INDUSTRIAL ESTATES

Industrial Estates are designated areas for organized industrial development. The following regulations shall apply to all notified industrial estates in Bodhgaya:

- Land Use: Only industrial activities as per CPCB classification (Green, Orange, and White categories) shall be permitted. Red category industries shall not be allowed within city limits except in specifically designated heavy industrial zones outside residential influence.
- Plot Sizes: Minimum plot size for industrial plots shall be 1000 sq.m. For MSME clusters, plots of 300–500 sq.m may be permitted.
- FAR and Ground Coverage: As guided by Bihar Building Bye-laws, 2014, as amended from time to time, depending on the industry type.
- Setbacks: Minimum 9m front setback and 6m side and rear setbacks shall be maintained to allow movement of fire tenders and utility vehicles.
- Environmental Buffer: A minimum green buffer of 30m with tree plantation shall be maintained between industrial areas and adjacent residential zones.
- Infrastructure: Internal roads of minimum 18m ROW, provision for storm water drainage, effluent treatment, solid waste disposal, and fire safety infrastructure shall be mandatory.
- Worker Facilities: Provision for canteens, rest sheds, sanitation blocks, and health facilities shall be mandatory in estates above 10 hectares.

15.1.3 Special Regulations For Transit Oriented Development (TOD) Zone

The Transit-Oriented Development (TOD) Zone is intended to promote compact, mixed-use and transit-supportive urban development around the proposed MRTS corridors. Within the TOD Zone, all land uses permissible under the applicable land use zone shall generally be permitted, except the following activities, which shall not be allowed:

- Hazardous industries.
- Heavy industries.
- Red-category industries.
- Highly polluting industries.
- Obnoxious and nuisance-generating activities.
- Tanneries.
- Slaughterhouses.
- Meat processing units.
- Fish processing units.
- Bulk storage of hazardous chemicals, petroleum products or explosives.
- Solid waste processing or disposal facilities, except those specifically approved as public utilities.
- Any other activity that, in the opinion of the Competent Authority, is incompatible with the objectives of Transit-Oriented Development or adversely affects public health, safety or the urban environment.

15.1.4 SPECIAL REGULATIONS FOR TRANSIT HUBS

Transit Hubs (bus terminals, railway stations, metro stations, and multi-modal hubs) shall be developed as high-intensity activity centres ensuring accessibility and seamless connectivity. The following regulations shall apply:

- Land Use: Mixed-use development comprising commercial, public/semi-public facilities, offices, hotels, and residential components (affordable housing and rental housing) shall be permitted.
- Parking: Multi-level car parking and shared parking facilities shall be encouraged. No surface parking shall be permitted within 200m of the transit hub.
- Pedestrianisation: Priority shall be given to pedestrian movement, non-motorised transport (NMT) infrastructure, and barrier-free universal accessibility.
- Setbacks: Flexible building setbacks may be allowed to create public plazas, concourses, and intermodal transfer spaces.
- Environmental Considerations: Energy-efficient design, green building norms, and integration of renewable energy sources (solar rooftops, rainwater harvesting) shall be mandatory.
- Commercial Development: Retail, food courts, entertainment, and service apartments shall be permitted to enhance the economic viability of the transit hub.
- Public Safety: Adequate fire safety measures, CCTV surveillance, and disaster management provisions shall be mandatory.

15.1.5 PROPOSED DCR PROVISIONS – HOUSING, TDR & REDEVELOPMENT

TABLE 15-1 PROPOSED DCR PROVISIONS – HOUSING, TDR & REDEVELOPMENT

Sl. No.	DCR Provision	Proposed Regulation / Guideline	Suggested Figure

1	**TDR Incentive**	TDR may be granted for land surrendered for road widening, public infrastructure, parks and other notified public purposes. TDR may also be used to encourage redevelopment of congested/old areas.	**Up to 1.5–2.0 times** the surrendered land's permissible development potential, subject to infrastructure capacity
2	**Non-Permitted Land Uses**	Uses not permissible in a designated zone shall not be regularised merely through normal permission. Where legally regularizable under applicable provisions, an additional **impact/penalty charge** may be imposed.	**2–3 times** applicable development/permission fee, subject to State regulations
3	**Affordable Housing near TOD/Transit**	Affordable/EWS-LIG housing should be promoted within walking distance of TOD nodes, major bus stands and public transport corridors.	**Minimum 15% of FAR** for affordable housing in eligible TOD projects; TOD guidance also recommends **15% FAR for units ≤40 m²**.
4	**Additional FAR for Affordable Housing**	Additional FAR may be permitted where developers provide qualifying EWS/LIG housing beyond the mandatory requirement.	**Up to 50% additional FAR** may be considered for qualifying affordable rental housing, consistent with Affordable Rental Housing Complexes (ARHC) incentives.
5	**Airport Height Restriction**	All developments within the applicable airport safeguarding zone shall comply with AAI height-clearance requirements and the **Colour Coded Zoning Map (CCZM)**, wherever applicable.	Height to be determined **plot-wise as per permissible top elevation (AMSL)**; AAI NOC required where applicable.
6	**Rental Housing Promotion**	Rental housing/ARHC projects should be	Minimum **40 dwelling units/dormitory equivalent**

		encouraged near employment centres, TOD nodes, railway stations, bus stands and institutional areas.	for an ARHC project; single-bedroom units up to **30 m²**, double-bedroom units up to **60 m²**, and dormitory beds up to **10 m²**.
7	**Rental Housing Incentives**	Provide fast-track approval, reduced/waived development charges, trunk infrastructure support and additional FAR for qualifying rental housing.	**50% additional FAR/FSI** may be considered for ARHCs; municipal charges may be levied at residential rates.
8	**Old Area Redevelopment**	Promote planned redevelopment of the existing/ core city through plot amalgamation, infrastructure upgrading and incentives for reconstruction while protecting heritage-sensitive areas.	**10–20% additional FAR** may be considered as a redevelopment incentive, subject to road width and infrastructure capacity
9	**New Area Development**	In newly developing areas, redevelopment should be linked with planned roads, public transport, drainage, parking, open spaces and utility infrastructure before higher FAR is permitted.	Higher FAR to be linked with **road width, infrastructure capacity and TOD location**
10	**Redevelopment Subsidy/Incentives**	Provide incentives for redevelopment incorporating affordable housing, heritage conservation, infrastructure improvement and green building measures.	**10–15% FAR incentive** or partial waiver/reduction of development charges, subject to project eligibility

Affordable Housing & TOD:

In designated TOD influence zones around major transit nodes, railway stations and bus terminals, affordable housing shall be promoted through mandatory housing provisions and FAR incentives. A minimum **15% of FAR** may be reserved for affordable housing, with additional FAR incentives for qualifying EWS/LIG and rental housing projects. The TOD Guidance Document recommends 15% of FAR for affordable housing in TOD projects.

Rental Housing:

Affordable Rental Housing Complexes (ARHC) may be promoted near employment centres, TOD nodes and major transport terminals. Projects may follow ARHC parameters, including a minimum **40 dwelling units/dormitory equivalent**, with single-bedroom units up to **30 m²** and double-bedroom units up to **60 m²**. Qualifying projects may be considered for **up to 50% additional FAR**, subject to applicable regulations.

Airport Height Restriction:

All buildings and structures within the applicable airport safeguarding area shall comply with AAI height-clearance provisions. The permissible building height shall be determined based on the applicable **CCZM/permissible top elevation (AMSL)**, site elevation and aerodrome safeguarding requirements. Where applicable, construction shall not commence without the required AAI NOC through NOCAS.

Redevelopment of Old/Core Urban Area:

Redevelopment of the old/core urban area shall be encouraged through plot amalgamation, infrastructure upgradation, TDR/FAR incentives and development-charge concessions. Additional development potential may be permitted subject to minimum road width, parking, fire safety, infrastructure capacity and heritage considerations.

15.1.6 RESIDENTIAL ZONES

To guide balanced urban growth and ensure compatibility of land uses, the Master Plan defines Five residential development categories for Gaya Ji —R-1 (High Density Residential), R-2 (Medium Density Residential), R-3 (Low Density Residential), TS-1 (High Density Township) and TS-2 (Low Density Township). These zones have been designed in line with URDPFI Guidelines and the Bihar Building Byelaws, taking into account road width, FAR norms, and service infrastructure capacity. Permitted, restricted, and prohibited activities have been clearly demarcated to safeguard residential quality of life while allowing for compatible mixed uses and community facilities.

TABLE 15-2 PERMITTED USES OF RESIDENTIAL LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	R-1 Residential Zone (High Density – EWS/LIG Housing)	Plotted housing, apartments, group housing, row housing; rental/work-cum residential; hostels & boarding houses; night shelters & dharamshalas; nursery & primary schools; neighborhood retail; community centers; libraries; clinics & PHC; parks; bus stops/IPT stands; small household services; public utilities (excluding heavy infrastructure) Places of worship; small shopping centres; municipal/government offices; petrol pumps (subject to norms); IT/ITES services; tourism-related services; burial grounds; small non-perishable godowns; household industries (limited scale)	Heavy or hazardous industries; wholesale mandis; workshops for buses; slaughterhouses; contagious disease hospitals; sewage treatment or waste disposal sites; stadiums/shooting ranges
2	R-2 Residential Zone (Medium Density Residential)	Colleges and research institutions; cinema halls/restaurants; IT offices; tourism facilities; bus depots without workshop; small warehousing (non-perishable goods), cottage Industry (non-polluting)	Heavy industry; hazardous storage; solid waste dumping grounds; large logistics yards; polluting industrial uses
3	R-3 Residential Zone (Low Density Residential)	Detached/semi-detached housing; villas; plotted housing; neighborhood retail; clinics; parks & green areas; community facilities; libraries; clubs, EV charging stations Places of worship; guest houses; homestays; small institutional uses; IT home offices; tourism-related activities (low intensity), cottage Industry (nonpolluting)	High-density commercial complexes; warehousing/logistics hubs; industrial activities; waste treatment facilities
4	R-4 Residential Zone (Existing Village / Abadi Area)	Existing residential settlements; incremental housing; mixed residential with local retail; traditional village activities; small shops; community facilities; schools; religious buildings; health clinics; local markets; parks & open spaces, EV charging stations, cottage Industry (nonpolluting) Small commercial establishments; community halls; IT-enabled services; guest houses; tourism homestays; small god owns (non-	Heavy industry; hazardous storage; large commercial malls; waste disposal sites; large institutional complexes incompatible with village character

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
		hazardous); printing presses (small scale)	
5	TS-1 Township Zone (Integrated Township / Mixed Housing)	Integrated residential development (EWS to HIG); apartments & plotted housing; schools/colleges; health facilities; retail & commercial centers; community & cultural facilities; parks & sports areas; IT parks/co-working; transit facilities, EV charging stations, Hotels; entertainment complexes; convention halls; fuel stations; tourism facilities; institutional campuses	Heavy industries; hazardous activities; solid waste dumping grounds; large logistics yards
6	TS-2 Township Zone (Low Density Township – HIG Plotted)	Low density plotted housing; villas/row housing; recreational greens; clubhouse/community facilities; local retail; wellness/yoga centres; eco-tourism uses; EV charging stations, Resorts; guest houses; small institutional uses; tourism-related accommodation	High-density apartments; industrial activities; warehousing/logistics; large commercial complexes

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

15.1.7 COMMERCIAL ZONES

Commercial activities in Gaya Ji are a critical driver of economic vitality and employment, but they must be organised to reduce congestion in the old core while supporting growth along emerging corridors. The Master Plan identifies two distinct commercial zones—C1 (Core Area) and C2 (Growth Corridors)—based on road hierarchy, land availability, and functional intensity. While C1 is intended to strengthen traditional bazaars and neighbourhood-scale commerce, C2 corridors will accommodate modern retail, offices, and large-scale mixed-use functions. Clear demarcation of permitted and restricted uses ensures compatibility with surrounding land uses and prevents environmentally harmful or traffic-intensive activities.

TABLE 15-3 PERMITTED USES OF COMMERCIAL LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	Commercial C-1 (Low Density Linear Commercial)	Retail shops; convenience shopping; banks & financial institutions; restaurants & cafés; small offices; informal shops/street vending areas; local markets/mandi; EV charging stations; clinics; religious places; service establishments (salons, repair shops, etc.) Shopping centres; petrol pumps; small hotels/lodges; cinema halls (small scale); IT/ITES offices; tourism services; public utility installations; neighborhood entertainment uses	Heavy warehousing; large wholesale yards; transport nagar; hazardous storage; large logistics hubs; industrial manufacturing; high nuisance activities
2	Commercial C-2 (High Density Concentrated Commercial Area)	Shopping malls; multiplex cinemas; hotels & lodges; corporate offices; commercial complexes; restaurants & food courts; financial institutions; business centres; EV charging stations; IT parks and office complexes, Convention centres; entertainment complexes; exhibition halls; large institutional commercial uses; structured parking facilities; integrated commercial plazas	Petrol pumps; residential use; sports complexes; heavy industrial activities; hazardous storage; large freight/logistics yards incompatible with commercial core
3	Commercial C-3 (Low Density Special Commercial – Resort/Function/Peripheral Commercial)	Marriage halls; banquet/function halls; resorts; event venues; recreational commercial uses; non-hazardous warehouses; storage godowns; tourism facilities; eco-resorts; food courts, Farm resorts; amusement-related commercial uses; logistics support (limited); guest houses; convention/event spaces (subject to traffic/environment clearance)	High-density retail malls; dense commercial complexes; heavy industrial uses; hazardous warehousing; polluting activities; residential apartments

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

15.1.8 PUBLIC & SEMI-PUBLIC (PSP)

The Public/Semi-Public (PSP) Zone is designated to accommodate essential community, institutional, and civic functions that directly support the city's social and administrative infrastructure. This zone includes educational institutions, healthcare facilities, government offices, religious establishments, and public open spaces, which form the backbone of inclusive urban development. To maintain the integrity of this zone, incompatible land uses such as industries, large commercial complexes, and warehouses are strictly prohibited, ensuring that PSP areas remain accessible, functional, and people-oriented.

TABLE 15-4 PERMITTED USES OF PUBLIC & SEMI-PUBLIC LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	PSP-1 (Decentralized Public & Semi-Public within Residential Areas)	Schools, anganwadi, colleges (small scale); libraries; health centres, clinics, nursing homes; religious buildings; community halls; marriage halls; social & cultural centres; post offices; local govt offices; welfare centres; training centres; small educational institutes, Hostels; transit accommodation; guest houses; IT services; small office spaces; recreational/community clubs; small commercial support facilities (canteen, book shops, etc.)	Heavy institutional complexes; large stadiums; transport terminals; industrial activities; hazardous storage; high traffic generating uses incompatible with residential character
2	PSP-2 (Major Institutional / Concentrated PSP Zone)	Universities; large educational campuses; research & development centres; hospitals (large scale); auditoriums; conference centres; police station; jail; large govt offices; training institutes; welfare institutions; district-level public facilities, Defence quarters; hostels; guest houses; institutional residential facilities; specialised research facilities; public utility installations linked to institutional use	Hazardous industries; wholesale markets; heavy commercial uses; polluting activities; high noise generating industrial operations
3	PSP-3 (Existing Public & Semi-Public Uses)	All existing educational institutions, hospitals, govt offices, religious places, community facilities and public services as per current land use, Redevelopment, expansion, modernization, vertical extension subject to planning	Change of use to incompatible industrial or hazardous commercial activities

		authority approval and infrastructure capacity	

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

15.1.9 INDUSTRIAL ZONES

TABLE 15-5: PERMITTED USES OF INDUSTRIAL LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	Industrial I-1 (Green / Non-Polluting Industries)	Non-polluting industries; agro-processing units; food processing; cold storage; warehouses; logistics facilities; workshops; repair units; assembly units; loading/unloading areas; petrol pumps; public utilities; staff/worker residential quarters; small industrial offices, Industrial research institutes; technical educational institutes; business offices; service industries; electric substations (PSS); training centres; support commercial facilities	Heavy industries; hazardous chemical processing; polluting industries (red category); large thermal plants; activities causing excessive noise, air or water pollution
2	Industrial I-2 (Agro-Based SEZ / Agro-Industrial Zone)	Agro-processing industries; food parks; mega food park; agro-based SEZ units; cold chain infrastructure; storage and packaging facilities; food manufacturing units; common infrastructure (ETP, logistics yards); helipad; export-oriented processing units, Research labs; training centres; logistics hubs; specialised processing infrastructure; institutional facilities linked with agro-industry	Non-agro heavy industries; hazardous chemical industries; residential development (except essential staff housing); polluting manufacturing unrelated to agro-processing

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
3	Industrial I-3 (Existing Industrial Area)	All existing industries; industrial utilities; warehouses; workshops; service facilities; existing support infrastructure, Expansion, modernization, redevelopment, or change of industrial category subject to environmental norms and planning authority approval	New hazardous or incompatible industries without clearance; conversion to incompatible land use affecting industrial operations

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

For the **Gaya Ji Planning Area**, the proposed industrial land use may be categorized as follows:

I-1: Green / Non-Polluting Industries

These industries shall have minimal environmental impact, low emissions, low water consumption, and no hazardous waste generation.

Permissible Industries:

- IT/ITES parks and software development centers
- Electronics assembly and light engineering units
- Handicrafts, stone carving, terracotta and artisan-based industries
- Textile stitching, garment manufacturing and handloom units
- Printing and packaging industries
- Educational and research-based industrial activities
- Renewable energy equipment assembly
- Incense stick (Agarbatti), Tilkut, Lai and other local product manufacturing
- Warehousing, logistics and cold storage facilities
- Tourism-support industries, souvenir and handicraft production
- Bamboo, cane and eco-friendly product manufacturing
- Repair and maintenance workshops (non-polluting)

I-2: Agro-Based SEZ / Agro-Industrial Zone

Considering Gaya's agricultural economy and the availability of paddy, wheat, pulses, oilseeds, fruits, vegetables, dairy and livestock products, the following industries may be permitted:

Food Processing & Value Addition

- Rice mills and modern grain processing units
- Flour mills and cereal processing units
- Pulse (Dal) processing units
- Edible oil extraction and refining units
- Sattu processing and value-added food products
- Fruit and vegetable processing (juice, pulp, jam, pickle, dehydrated products)
- Spice processing and packaging units
- Bakery and confectionery units
- Ready-to-eat and ready-to-cook food manufacturing

Dairy & Livestock-Based Industries

- Milk processing plants
- Dairy products (paneer, cheese, butter, ghee, ice cream)
- Meat processing and packaging units (subject to environmental norms)
- Poultry and fish feed manufacturing
- Animal feed production units

Agricultural Support Industries

- Seed processing and storage units
- Cold chain and refrigerated storage facilities
- Agro-logistics hubs
- Agricultural equipment assembly and servicing
- Bio-fertilizer, organic manure and vermicompost units

Export-Oriented Agro Industries (SEZ Component)

- Organic food processing and export units
- Packaged agricultural products for domestic and international markets
- Herbal and medicinal plant processing
- Makhana, honey and millet-based product processing
- Food testing, grading and packaging centers
- Agro-export warehouses and distribution centers

These industries align with Bihar's agro-industrial development strategy and leverage Gaya's strong agricultural base, food processing potential, and tourism-driven market demand.

15.1.10 PUBLIC UTILITIES AND SERVICES

TABLE 15-6: PERMITTED USES OF PUBLIC UTILITIES AND SERVICES LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	PU-1 (Major Utility & Treatment Infrastructure – Peripheral Location)	Water Treatment Plant (WTP); Sewage Treatment Plant (STP); Faecal Sludge Treatment Plant (FSTP); Solid Waste Treatment Plant (SWTP); sanitary landfill; waste processing facilities; bulk water supply installations; pumping stations; power substations; major utility infrastructure, Service industries linked to utilities; warehouses; administrative offices; staff residential quarters; recycling facilities; renewable energy installations	Residential housing (general); schools; hospitals; commercial complexes; recreational areas; polluting industries beyond permitted infrastructure; incompatible public gathering uses
2	PU-2 (Decentralized Utilities within/near Residential Areas)	OHT/reservoir; local water supply installations; decentralized waste processing (MCC/MRF small scale); electric substation; fire station; post office; telecommunication towers/services; utility kiosks; local infrastructure facilities, Small commercial support uses; low-rise residential (staff housing); community service facilities subject to approval; EV charging infrastructure	Large treatment plants; sanitary landfill; hazardous waste facilities; heavy industrial uses; high nuisance activities causing noise, smell or traffic conflicts

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

15.1.11 AGRICULTURE USE ZONES

TABLE 15-7: PERMITTED USES OF AGRICULTURE LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited

1	Agriculture Zone (AG)	Crop cultivation; horticulture; plantations; agro-forestry; organic farming; dairy farming; livestock rearing; fisheries; farm ponds; irrigation infrastructure; farmhouses; rural storage structures; agricultural sheds; nurseries; greenhouses; agri-based activities, cottage Industry (non polluting), Agro-processing units (small scale); agrotourism facilities; farmer markets; rural homestays; low-rise residential; renewable energy installations (agrivoltaics/solar pumps); research and training centres related to agriculture; cold storage (small scale)	Non-agricultural plotting; high-density residential development; heavy commercial complexes; large industries (non-agro); hazardous storage; polluting industries; large malls or multiplexes; high-rise development incompatible with agricultural character

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

15.1.12 GREEN AREA / BUFFER

Green buffers serve as vital ecological and protective zones, designed to mitigate the adverse impacts of industrial activity on surrounding environments and settlements. In line with **URDPFI Guidelines** and **CPCB norms**, a minimum width of **30 m to 50 m** shall be maintained around industrial zones, developed with dense plantations at a minimum density of **1,000 trees per acre**. These buffers will function as **environmental shields**, supporting air purification, noise reduction, groundwater recharge, and recreational green spaces, while strictly excluding incompatible uses such as residential, industrial, or commercial development.

TABLE 15-8: PERMITTED USES OF GREEN AREA LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	Green Area G-1 (Sensitive Green Buffer – Water Bodies & Industrial Areas)	Heavy plantation; ecological restoration; horticulture; biodiversity conservation; green belts; soil conservation; landscape development; environmental protection works; river/canal edge plantation, walking trails; nature parks; eco-recreation (low impact); environmental education spaces; plantation-based activities; buffer infrastructure related to water body protection	Residential development; commercial complexes; industrial buildings; permanent structures (except essential ecological infrastructure); storage yards; polluting activities; tree cutting without approval

2	Green Area G-2 (General Green Buffer – Around Public Utilities & Other Areas)	Plantation; horticulture; agriculture; green buffers; urban forestry; landscaping; open green areas; passive recreation spaces	High-density development; industrial activities; hazardous storage; large commercial buildings; permanent residential construction (except utility-related structures if approved)

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

15.1.13 ENVIRONMENTALLY SENSITIVE ZONE

The Environmentally Sensitive Zone establishes a controlled 100-metre buffer along river edges to protect natural hydrology, reduce flood risk, conserve biodiversity, and prevent encroachment. Low-impact recreational and ecological activities are encouraged to enhance public access while maintaining environmental integrity. Development within this zone shall follow strict environmental safeguards, ensuring preservation of river ecology and natural drainage systems while enabling sustainable riverfront enhancement.

TABLE 15-9: PERMITTED USES OF ENVIRONMENTALLY SENSITIVE ZONE LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	Environmentally Sensitive Zone (ESZ) – 100 m Buffer along River	Recreational open spaces (parks, yoga parks, gardens); walking/cycling trails; plantation and afforestation; organic farming; fish farming; nurseries; ecological restoration; riverfront green development; existing village settlements (regulated, Food courts; music pavilion; picnic huts; eco-resorts; EV charging stations; controlled riverfront development; Water Treatment Plant (WTP); Sewage Treatment Plant (STP) subject to environmental clearance and flood safety norms	Permanent high-density residential; commercial complexes; industrial development; land filling; encroachment; hazardous storage; activities obstructing natural drainage or flood flow; tree cutting without approval

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

15.1.14 URBAN AGRICULTURE ZONE

The Urban Agriculture Zone promotes preservation of agricultural activity within and around urban areas while supporting livelihood diversification through cottage industries and small-scale value-added activities. This zone strengthens local food systems, encourages sustainable land use, and provides economic opportunities without triggering uncontrolled urbanisation. Controlled

development ensures compatibility with surrounding residential and ecological areas while maintaining green character and environmental balance.

TABLE 15-10: PERMITTED USES OF URBAN AGRICULTURE LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	Urban Agriculture Zone (UA)	Crop cultivation; horticulture; vegetable farming; floriculture; agro-forestry; organic farming; nurseries; community farming; dairy and small livestock; fisheries; farm ponds; irrigation infrastructure; cottage industries; farm sheds and storage structures, Independent residence, guest houses, educational building (up to high school), neighbourhood level social/cultural and recreational facilities, Marriage and community hall, Public utilities and buildings except services and storage yards, Agrotourism activities; farmer markets; farm-based homestays; small agro-processing units; renewable energy installations (solar pumps, agrivoltaics); training centres; rural skill development units; low-rise farm-linked residential structures, STP, WTP, Solid waste dumping ground, PSS, GSS	High-density residential development; large commercial complexes; heavy industries; hazardous storage; large warehouses unrelated to agriculture; polluting manufacturing; land subdivision for urban plotting

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

15.1.15 RECREATIONAL ZONE

TABLE 15-11: PERMITTED USES OF RECREATIONAL LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	RC-1 (Neighbourhood / Residential Recreational Area)	Parks; playgrounds; open green spaces; children's play areas; jogging tracks; yoga parks; community gardens; open lawns; sports courts; urban greens; seating areas; landscape features, Small kiosks; public toilets; community halls; fitness centres; open-air cultural activities; EV charging stations (small scale)	Amusement parks; large commercial development; high-noise activities; heavy traffic-generating uses; industrial activities

2	RC-2 (Regional / Destination Recreational Area – Away from Residential Zones)	Water parks; amusement parks; picnic resorts; theme parks; eco-tourism facilities; recreational resorts; adventure activities; large event lawns; landscaped recreational areas, Stadium, Food courts; parking areas; accommodation (resort-type); convention/event spaces; recreational retail; renewable energy installations; supporting commercial uses	High-density residential development; heavy industries; hazardous storage; polluting activities; incompatible public utilities
3	RC-3 (Riverfront Development Zone)	Riverfront promenades; parks; walking and cycling tracks; river-view seating; landscape development; ecological restoration; public plazas; cultural spaces; recreational lawns, Food courts; music pavilion; picnic huts; eco-resorts; water treatment infrastructure (if required); controlled commercial kiosks; tourism facilities subject to environmental clearance	Permanent structures obstructing river flow; high-rise development; heavy commercial complexes; polluting industries; land filling or activities affecting floodplain ecology

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

15.1.16 AGRO-TOURISM ZONE

TABLE 15-12: PERMITTED USE OF AGRO-TOURISM LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited

1	Agro-Tourism Zone	Agricultural farming; organic farming; plantation and horticulture; agro-forestry; farm tourism activities; pick-your-own farm market; traditional rural huts; eco-friendly tourist accommodation (low rise); nurseries; demonstration farms; agri education and training activities, Resort-type tourist accommodation (low density); food courts/local restaurants; cottage industries (food processing, handicrafts, agro-based MSME); EV charging station; eco-recreational facilities; picnic huts; farm cafés; renewable energy installations (solar/agri-voltaic); parking areas; homestay development; agro-processing units (small scale, non-polluting)	Heavy industries; polluting manufacturing units; high-rise buildings; large commercial malls/multiplex; hazardous storage; large warehouses/logistics hubs; slaughterhouses; intensive urban residential colonies; petrol pumps (unless specifically approved); activities causing ecological damage

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

15.1.17 MIXED USE ZONE

TABLE 15-13: PERMITTED USES OF MIXED LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	M-1 (Mixed Use Corridor – 100 m Buffer along Major Roads)	Residential; retail shops; commercial offices; banks; restaurants; clinics; coaching centres; service establishments; small hotels; mixed-use buildings; EV charging stations; local markets; professional services, Institutional uses; co-working spaces; small-scale hospitality; public/semi-public facilities; parking structures; transit-support facilities	Heavy industries; hazardous storage; high-pollution activities; large warehousing; activities generating excessive noise or traffic incompatible with mixed-use character
2	M-2 (Neighbourhood Mixed Use – 50 m Buffer along Internal Roads within Residential Areas)	Small retail shops; neighbourhood commercial; clinics; pharmacies; small offices; local services; home-based enterprises; small eateries; residential above commercial, Coaching centres; community facilities; small guest houses; low-intensity service establishments subject to approval	Large malls; multiplexes; heavy commercial traffic generators; industrial activities; high-noise entertainment uses

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

15.1.18 TRANSPORTATION USE ZONE

TABLE 15-14: PERMITTED USES OF TRANSPORTATION LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	Transportation Use	All types of Roads, Bus stops and Bus and Truck terminals, Taxi Stands, Auto Stands, Rickshaw stands, Parking area, Multi-level parking, filling station, transport office, booking office, night shelter, banks, restaurants, workshop and garage, Automobile spares and services, godown, loading and unloading platform, weight bridges, ware houses, storage depots, utility networks (drainage, sewage, power, tele-communication), Way side shop and restaurants, Authorized/planned vending areas, Incidental/ancillary residential use, emergency health care centre,	Use/Activity not specifically related to transport and communication permitted herein.

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

15.1.19 COMMUNITY-BASED TOURISM AND TOURISM DEVELOPMENT REGULATIONS

1. Objective

To promote sustainable tourism, enhance local livelihoods, preserve cultural and natural heritage, and facilitate tourism-related infrastructure and activities in the Gaya Ji Planning Area while ensuring environmental conservation and community participation.

2. Community-Based Tourism (CBT) Zone

Community-Based Tourism shall be encouraged in villages and settlements having cultural, religious, ecological, agricultural, riverfront, or heritage significance. Tourism development shall be undertaken with active participation of local communities to generate employment and strengthen the local economy.

Permissible Activities:

- Homestays, guest houses, and village tourism facilities.
- Local handicrafts, handloom, and souvenir production and sales.
- Agro-tourism, eco-tourism, farm stays, and nature-based tourism activities.
- Cultural centers, folk art performance spaces, and interpretation centers.
- Traditional food courts, local markets, and tourism information centers.
- River-based tourism, nature trails, cycling tracks, and walking trails.
- Skill development and tourism training centers for local communities.

Development Guidelines:

- New developments shall be compatible with the local architectural character and cultural heritage.
- Existing natural features, water bodies, forests, and agricultural lands shall be conserved.
- Community participation shall be ensured in planning, operation, and management of tourism facilities.
- Adequate sanitation, solid waste management, drinking water supply, and parking facilities shall be provided.
- Renewable energy and environmentally sustainable practices shall be encouraged.

3. Tourism Development Zone

Tourism Development Zones may be designated around major religious, cultural, heritage, ecological, and recreational destinations to support tourism growth and visitor facilities.

Permissible Uses:

- Hotels, resorts, guest houses, dharamshalas, and convention facilities.
- Tourism plazas, visitor centers, museums, interpretation centers, and cultural complexes.
- Commercial activities supporting tourism, including restaurants, retail outlets, and souvenir markets.
- Recreational facilities, wellness centers, meditation centers, and pilgrimage support infrastructure.
- Transport terminals, parking facilities, way-side amenities, and tourist information facilities.
- Riverfront development, eco-tourism facilities, and tourism-oriented public open spaces.

Development Guidelines:

- Tourism projects shall preserve and enhance the spiritual, cultural, and heritage character of the area.
- Development near protected monuments, heritage sites, rivers, hills, forests, and environmentally sensitive areas shall comply with applicable statutory regulations.

- Adequate pedestrian infrastructure, universal accessibility, public amenities, landscaping, and signage shall be provided.
- Large-scale tourism projects shall incorporate environmental management measures and adequate infrastructure provision.
- Mixed-use tourism corridors may be developed along major tourism routes, pilgrimage circuits, and transportation corridors to facilitate tourism-related economic activities.

4. Special Provisions for Gaya Ji Planning Area

Considering the international importance of Gaya Ji as a religious and pilgrimage destination, community-based tourism and tourism development projects shall be promoted along identified pilgrimage circuits, riverfront areas, cultural heritage zones, eco-tourism destinations, and rural tourism clusters. Priority shall be given to projects generating local employment, preserving cultural heritage, promoting traditional crafts, and enhancing visitor experience while maintaining environmental sustainability.

5. Bihar Tourism Policy Compliance

All tourism projects shall conform to the objectives and guiding principles of the Bihar Tourism Policy 2023, emphasizing environmental sustainability, promotion of Bihar's cultural and spiritual heritage, tourism-led livelihood generation, tourist safety and comfort, private sector participation, and inclusive tourism development.

15.1.20 DEVELOPMENT CONTROLS (FAR, GROUND COVERAGE, SETBACKS, HEIGHT)

The following development controls apply to different land-use zones in Gaya Ji, as per the URDPFI Guidelines and the Bihar Building Bye-Laws (2014, amended 2016/2020).

TABLE 15-15: DCR TABLE FOR GAYA JI PLANNING AREA

Zone	Description	FAR (Max)	Ground Coverage	Setbacks (Min)	Height
Residential Zone					
R-1	High-density residential / apartments	2.5–3.0	35–40%	Front 6m, Side 3m, Rear 4.5m	24 m (subject to road width)
R-2	Medium-density residential	2	40–45%	Front 3m, Side 1.5–3m	15 m
R-3	Low-density residential	1.5	35–40%	Front 3m, Side 1.5m, Rear 3m	12 m (G+3 approx.)
R-4	Existing village/Abadi area	Existing norms (relaxed)	As per the existing pattern	Flexible	As per the BBL village norms

TS-1	Integrated township / TOD-type	3.0–3.5	30–35%	As per the integrated layout	30 m (subject to approvals)
TS-2	Township (Plotted/Mixed residential)	2.5	35%	As per group housing norms	24 m
Commercial Zone					
C-1	Linear low-density commercial (along roads)	2.0–2.5	50–60%	Front 3–6m (road dependent)	18 m
C-2	High-density commercial / CBD / malls	3.0–4.0	40–50%	Front 6–9m	30 m+ (fire norms applicable)
C-3	Resort / Function Hall / peripheral commercial	1.5	30–35%	Large setbacks (min 6m)	12–15 m
Public & Semi-Public Zone					
PSP-1	Decentralized PSP in residential areas	1.5–2.0	30–40%	Front 6m	18 m
PSP-2	Large institutional PSP zone	2.0–2.5	30–35%	Front 9m	24 m
PSP-3	Existing PSP	Existing pattern	Existing	Existing	Existing
Industrial Zone					
I-1	Green industries / non-polluting	1.5	40–50%	Front 6–9m	As per industrial safety norms
I-2	Agro-based SEZ / industrial park	2	40%	Front 9m + buffer	As per SEZ norms
I-3	Existing industries	Existing	Existing	Existing	Existing
Public Utilities and Services					
PU-1	Treatment plants (WTP, STP, landfill etc.)	0.5–1.0	25–30%	Large buffer 15–30m	Functional structures
PU-2	Decentralized utilities within residential	1	30–35%	Front 6m	12–15 m
Agriculture Zone					
Agriculture		0.1-0.2	10%	Large open margins	Low-rise only
Green Area / Buffer					
G-1	Waterbody & Industrial Buffer	0.05	Minimal	NA	Temporary structures only

G-2	General green buffer	0.1	Low	NA	Low structures only
Environmentally Sensitive Zone					
Environmentally Sensitive Area		0.1	Max 10%	As per river regulation	Low-rise (≤9m preferred)
Urban Agriculture Zone					
Urban Agriculture		0.3	15-20%	Large Setback	Low-rise rural structure
Recreational Zone					
RC-1	Neighborhood recreation	0.2	10–15%	Open landscape priority	Low-rise
RC-2	Water/amusement park /resort	0.5	20–25%	Large setbacks	15 m
RC-3	Riverfront development	0.3	15%	As per river buffer rules	Low-rise
Mixed Use					
M-1	(100m along major roads)	3	40–50%	Front 6m	24–30 m
M-2	(50m internal residential roads)	2	40%	Front 3m	15–18 m
Agro-Tourism Zone					
Agro-Tourism		0.3	15-20%	Large Setback	Low-rise rural structure
Heritage Buffer Zone					
Heritage Buffer Zone (0–1 km)		0.25	20% Max	Front: 9 m Side: 6 m Rear: 6 m	Ground Floor Only (7 m Max)
Heritage Buffer Zone (1–2 km) (R-3)		1	35% Max	Front: 6 m Side: 3 m Rear: 3 m	Max 44 ft (13.5 m)

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

15.1.21 DEVELOPMENT CONTROL REGULATIONS CROSS TABULATION

The cross-tabulation of the Development Control Regulations for Gaya Ji outlines the relationship between land use classes and the proposed zoning framework, which has been categorized into three types: Permitted, Regulated, and Prohibited. This classification has been designed considering feasibility, environmental sensitivity, and the need to prevent unwanted congestion and incompatible land uses within specific zones. Permitted uses represent activities that are fully compatible with the proposed land use and can be undertaken without restrictions. Regulated uses, on the other hand, may be allowed but only under specific conditions to ensure adherence to environmental norms, sustainable practices, and traffic management requirements. Prohibited uses are

strictly disallowed as they may pose environmental risks, compromise feasibility, or disrupt the functionality of adjoining areas.

In cases where cadastral plots fall under more than one proposed land use, the dominant proposed use will be considered for approval to maintain clarity and avoid conflicting developments. Within regulated uses, special conditions have been prescribed. For instance, warehouses and certain commercial activities within residential zones are allowed only if they provide adequate parking facilities and do not disrupt internal circulation. Similarly, weekly markets in residential areas are permitted under regulation, provided they do not obstruct traffic flow. In industrial zones, junkyards are regulated and must comply with the Hazardous Waste Management Rules, 2016. Low-order commercial areas (C1) are designated only for small-scale activities, while large commercial centres are not permitted. Weekly markets in such zones are also regulated to prevent traffic interruptions. Furthermore, commercial activities within recreational areas and urban forests may be considered only if they adopt eco-friendly practices that safeguard the integrity of green spaces. The land conversion allowed only if compatible with zoning regulations and Bihar Agriculture Land (Conversion for Non-Agriculture Purposes) Act, 2010.

This regulatory framework establishes a balanced approach to land use planning in Gaya Ji by allowing flexibility where feasible while prioritizing environmental protection, traffic management, and community well-being. It ensures that growth and development are facilitated in a structured manner without compromising the ecological and social fabric of the city.

			Permissible				Regulated																							
S. No.	Land use Categories/ Proposed Zones	R1	R2	R-4 (Village/Abadi)	TS-1	TS-2	Industry-I1	Industry-I2	Industry-I3	Mixed-M1	Mixed-M2	C1	C2	C3	PSP-1	PSP-2	PSP-3	Green Area-G-1	Green Area-G-2	Transportation	Recreational-1	Recreational-2	Recreational-3	Urban Agriculture	Agriculture	Agro-Tourism	Water Bodies	Public Utility-1	Public Utility-2
1	Residential																												
2	Warehousing/storage go-downs of perishable																												
3	Inflammable goods																												
4	Coal,																												
5	Wood,																												
6	Timber yards,																												
7	Bus and truck depots,																												
8	Gas installation and gas works,																												
9	Poly-techniques and higher technical institutes,																												
10	Junk yards,																												
11	Water treatment plant,																												
12	Sports/stadium																												
13	public utility installation																												
14	Hotel and transient visitor's homes,																												
15	Religious buildings,																												
16	Hospitals and nursing homes.																												
17	Old age home																												
18	Non-hazardous industries except storage of perishable and inflammable goods,																												
19	Milk chilling stations and pasteurization plants.																												
20	Sewage disposal works,																												
21	Electric power plants,																												
22	Service stations,																												
23	Cemeteries,																												
24	Dharmashala																												
25	Night shelters,																												
26	Petrol pumps,																												
27	EV Charging Station																												
28	Motor vehicle repairing workshop/garages,																												
29	Household industry,																												
30	Bakeries and confectionaries,																												
31	Storage of LPG gas cylinders,																												
32	Restaurants & other hotels																												

33	Go- downs/warehousing,																												
34	Bus depots without workshop,																												
35	Cinema hall,																												
36	Auditoriums																												
37	Markets for retail goods,																												
38	Weekly markets (if not obstructing traffic circulation and open during non-working hours),																												
39	Multipurpose or junior technical shops,																												
40	Atm																												
41	State and central government offices.																												
42	Non pollution, Non-obnoxious light industries,																												
43	Bank & financial institutions.																												
44	Taxi stands,																												
45	Dairy and farming,																												
46	Hostels,																												
47	Bus and truck terminals																												
48	Commercial centres,																												
49	facilities with police check post																												
50	fire post																												
51	Post and telegraph office,																												
52	public assembly hall,																												
53	Sports,																												
54	any other activity incidental to transportation																												
55	residential dwelling units for essential staff and watch and ward personnel																												
56	Farm houses,																												
57	Extensive industry,																												
58	library																												
59	Heritage Buffer Zone-0-1km																												
60	Heritage Buffer Zone-1-2km																												
61	Eco-Tourism																												

15.2 DELINEATION OF OLD AND NEW AREA

The **Bihar Building Bye-Laws, 2014 amendment in 2022** classify areas as **"Old Areas" and "New Areas,"** as notified by the Competent Authority with approval from the Urban Development & Housing Department. This classification helps regulate development, control the expansion of existing built-up areas, preserve their character, promote efficient land utilization, and provide flexibility in implementing the Master Plan. In this regard, the Gaya Ji Planning Area has been classified in Old and New Area.

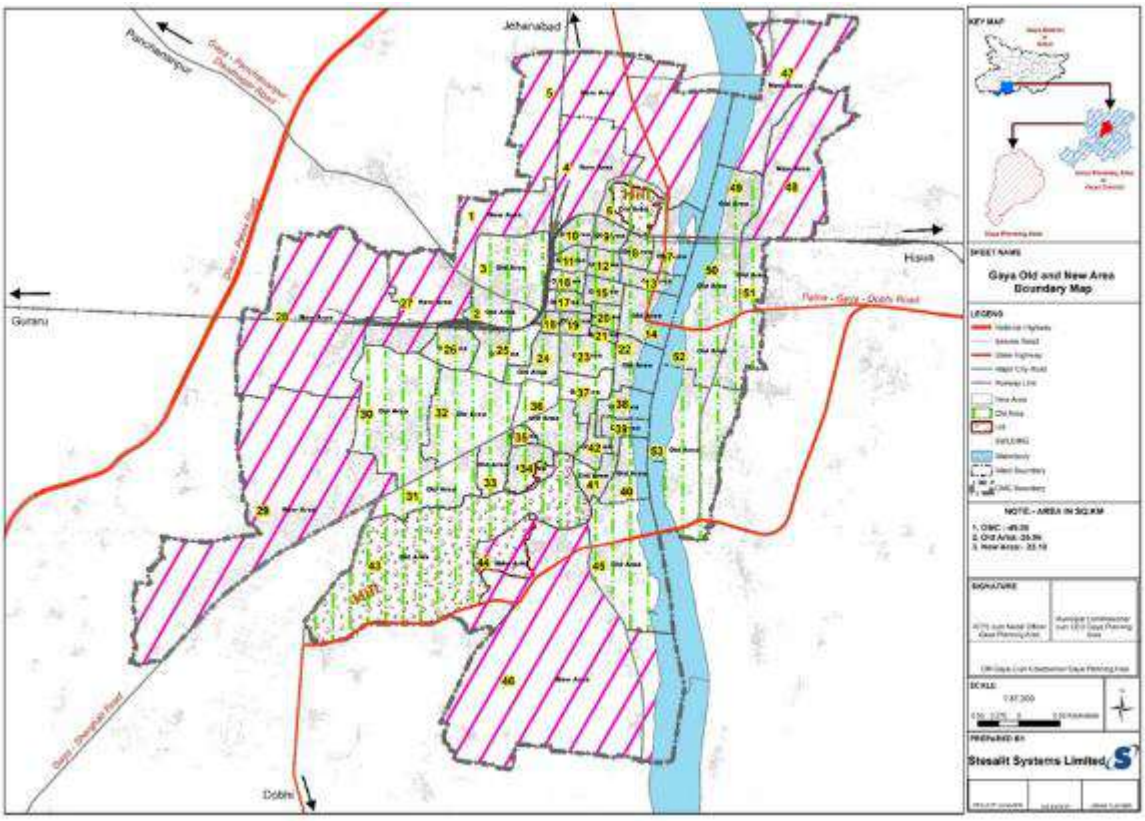
The Old Area has been demarcated based on the analysis of following factors:

- Housing Density
- Population Density
- Narrow roads and streets having width equals to 6 meters and below
- Old Parts of Town/City.

New Areas are newly developed or less densely populated regions that do no conform to the above-mentioned factors.

15.3 OLD & NEW AREA IN GAYA JI URBAN AREA

Gaya Municipal Corporation covers approximately 49.08 sq. km, comprising 25.95 sq. km of Old Area and 23.10 sq. km of New Area. The Old Area represents the established and historically significant urban core, while the New Area accommodates planned expansion and future development. This classification supports balanced growth while preserving Gaya's heritage and guiding planned urban development.



MAP 15-1 DELINATION OF OLD AND NEW AREA IN GAYA URBAN AREA

TABLE 15-16 WARD WISE DELINATION OF OLD AND NEW AREA IN GAYA JI URBAN AREA

Ward No	Area (sq km)	Building Footprint	Built Up Density	Population 2011	Population Denisty	Old/New	Remarks
1	0.8726	118285.7	13.55554	8749	10026.35	New Area	Builtup density less than 20%
2	0.387105	94493.79	24.4104	11423	29508.82	Old Area	Delha Railway Line Area
3	0.852743	218279.5	25.59734	8997	10550.66	Old Area	Gaya Railway Station Delha Side Entry
4	1.134702	117762.9	10.3783	10642	9378.671	New Area	Builtup density less than 20%
5	3.821675	92750.01	2.426946	6377	1668.64	New Area	Builtup density less than 20%
6	0.762308	86226.51	11.31125	16545	21703.83	Old Area	Ramshila Hill
7	0.269105	50906.35	18.9169	5760	21404.27	Old Area	Falgu River Bed
8	0.174308	68277.01	39.17024	10734	61580.52	Old Area	Railway Land and Government Lands
9	0.172052	73913.81	42.96023	5738	33350.44	Old Area	Temples
10	0.212683	67047.76	31.52474	9543	44869.6	Old Area	Railway Land and

							Government Lands
11	0.14717	43493.99	29.5535	6868	46667	Old Area	Gaya Railway Station Area, Railway Land
12	0.173137	96418.69	55.68937	10859	62719.26	Old Area	Builtup density more than 50%
13	0.214961	72492.02	33.72328	4141	19263.92	Old Area	Falgu River Bed
14	0.492897	132365.6	26.85461	10630	21566.37	Old Area	Falgu River Bed
15	0.179422	102675.3	57.22568	7098	39560.44	Old Area	Builtup density more than 50%
16	0.134696	53850.12	39.97904	9600	71271.67	Old Area	Gaya Railway Station Main Entrance
17	0.153101	77117.18	50.37019	6527	42632.04	Old Area	Builtup density more than 50%
18	0.066538	40434.88	60.76973	4365	65601.75	Old Area	Builtup density more than 50%
19	0.125466	66339.16	52.8741	5012	39946.99	Old Area	Builtup density more than 50%
20	0.127299	70326.04	55.24464	4570	35899.64	Old Area	Builtup density more than 50%
21	0.056391	31870.17	56.51633	2683	47578.44	Old Area	Builtup density more than 50%
22	0.399152	87508.43	21.92361	8583	21503.11	Old Area	Falgu River Bed
23	0.364194	141825.5	38.94228	7277	19981.11	Old Area	Gaya Nagar Nigam and Kendarnath Market area with SBI Parking and Commissinoer Office, Zila Parisahd and Residence of BAS officer
24	0.320929	97886.04	30.50079	6630	20658.75	Old Area	Government Land Opposite of Gandhi Maidan
25	0.488857	105009.4	21.4806	10179	20822.04	Old Area	Nazareth Academy Ground and Railway Land
26	0.331226	106676.3	32.20654	6893	20810.6	Old Area	Sudha Plant Area along with Major

							schools and Banquet Hall
27	1.270107	200835.2	15.81246	15569	12258.02	New Area	Builtup density less than 20%
28	3.427298	189502.3	5.529203	9155	2671.2	New Area	Builtup density less than 20%
29	4.872565	508477.1	10.43551	11918	2445.939	New Area	Builtup density less than 20%
30	1.627185	308639.5	18.96769	15502	9526.88	Old Area	AM College, MSY College
31	0.659534	98532.14	14.93965	4693	7115.626	Old Area	Gaya College Khel Parisar
32	1.147539	270736.1	23.59276	8998	7841.128	Old Area	DM Kothi and SPY College and Gaya College
33	0.310543	74655.12	24.04015	5170	16648.23	Old Area	Police Line
34	0.340252	99438.3	29.22492	10965	32226.14	Old Area	Some part of Brahmauoni Hills
35	0.0753	33775.15	44.85393	4969	65989.09	Old Area	Builtup density more than 50%
36	0.63802	154712	24.24876	12592	19736.05	Old Area	Gandhi Maidan
37	0.329146	97223.63	29.53811	3612	10973.84	Old Area	Dighi Tank, Bishar Tank, Zila School Ground and Civil Court, Civil Line and Police Station and Income Tax office along with several other Government Offices like DM Office
38	0.274288	73847.03	26.9232	9921	36170.05	Old Area	Falgu River Bed
39	0.186623	53619.14	28.73122	5515	29551.52	Old Area	Falgu River Bed
40	0.406014	78121.89	19.24117	9593	23627.25	Old Area	Falgu River Bed
41	0.224271	84981.71	37.89244	7496	33423.86	Old Area	Cholra Hospital Ground
42	0.174127	70456.04	40.46255	5857	33636.46	Old Area	Builtup density more than 50%
43	3.737847	90560.06	2.422787	10014	2679.082	Old Area	Brahmauoni Hills

44	1.250053	120568.1	9.645045	6310	5047.788	New Area	Builtup density less than 20%
45	1.542474	174922.1	11.34036	11536	7478.896	Old Area	Falgu River Bed
46	6.044621	201747.7	3.337641	7842	1297.352	New Area	Builtup density less than 20%
47	1.622912	79381.99	4.89133	7133	4395.186	New Area	Builtup density less than 20%
48	1.647119	161628.3	9.812792	11613	7050.494	New Area	Builtup density less than 20%
49	0.606552	158031.2	26.05401	16493	27191.39	Old Area	Falgu River Bed
50	0.885341	182039	20.56145	15572	17588.7	Old Area	Falgu River Bed
51	0.302445	85296.45	28.20233	8379	27704.24	Old Area	Ishwar Chowdhary Railway Hall
52	0.914397	228198.6	23.76648	11379	11851.03	Old Area	Falgu River Bed
						New Area	4.76% Comes under New Area and the road width of the Area more than 6 meters
53	1.985582 /2.07389	1,27,055.5	15.627736	11710	169.56	Old Area	Falgu River Bed
						New Area	4.44 % Comes under New Area and the road width of the Area more than 6 metres

PART B

BODHGAYA PLANNING AREA

MASTER PLAN 2047 (DRAFT)

1 INTRODUCTION

1.1 NEED OF THE PROJECT

The Government of India took the initiative to transform Indian cities to provide basic infrastructure and service delivery to each individual. The objective of the scheme focuses on the following

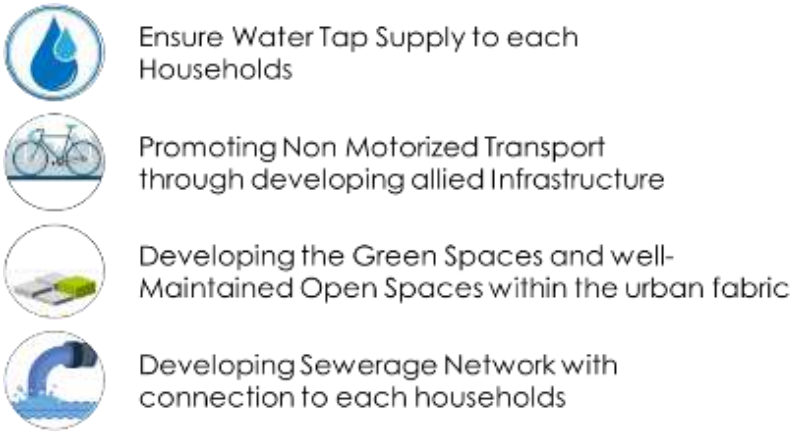


FIGURE 1-1: OBJECTIVES OF THE AMRUT SCHEME

5. **Water Supply:** Water being one of the Basic amenities required, the scheme aims to provide water supply to each household within the urban area.
6. **Sewerage System:** Developing the sewerage network for the urban areas to connect every household and scientific segregation of the Grey Water and Black Water and Scientific Treatment of the generated wastewater.
7. **Introducing Non-Motorized Transport:** Promoting the Non-Motorized Infrastructure (NMT) use for First-Last Mile Connectivity through developing allied infrastructure. The Pro-NMT Development of the urban area is to be ensured.
8. **Green Space Development:** Developing the Urban Green Patches within the whole area and developing open space for recreational facilities.

Considering the objectives, the overall development of the ULB is to cater to rapid urbanization and its respective needs. Hence the rejuvenation of the urban area with thorough development of the infrastructure and service delivery.

The urbanization rate of Bihar, as per the 2011 Census of India, is at a mere 11.3%, which is much lower than the national average of 31.2%. Though the state constitutes 8.6% of India's overall population, its urban population is only 3.1% of the nation's total urban population. The current total urban population is concentrated within 142 Urban Local Bodies in the state encompassing 12 Nagar Nigams, 49 Nagar Parishad, and 81 Nagar Parishad. 44% of the state's urban

population dwells in Nagar Nigams (towns characterized by population exceeding 2,00,000), 32% is located in Nagar Parishads (towns with population ranging between 40,000 and 2,00,000) and 24% lives in Nagar Parishads (towns with population ranging between 12,000 and 40,000)(Census, 2011).

To ensure the development of the Bodhgaya Nagar Parishad and its adjacent areas, the **Bodhgaya Planning Area** was delineated by the Urban Development and Housing Department, Government of Bihar based on the powers invested by the Bihar Urban Planning and Development Act 2012 and the Bihar Urban Planning and Development Rules, 2014 (Government of Bihar, 2017).

The **Bodhgaya Planning Area** located in the Gaya District of Bihar was declared a Planning Area on 21 August 2017, under Section 11 of the Bihar Planning and Development Act 2012. The total area of Bodhgaya Planning Area is (83.75 sq.km.) there is one urban administrative unit and 33 revenue villages in this Planning Area, which includes all areas of Bodhgaya Nagar Parishad, 30 revenue villages of Bodhgaya Block and 3 rural revenue villages of Gaya Block.

However, as per the administrative reclassification (2021) The total area of **Bodhgaya Planning Area** is (86.65 sq.km.) there is one urban administrative unit and 19 revenue villages in this Planning Area, which includes all areas of Bodhgaya Nagar Parishad (as per 2021 reclassified Nagar Parishad boundary), 16 revenue villages of Bodhgaya Block and 3 rural revenue villages of Gaya Block.

******* *Please note that the* ***Bodhgaya urban area has achieved the status of Nagar Parishad in 2020.*** *However, in alignment with the terminology used in the latest published document, i.e. the* ***Census of India 2011****, the* ***Bodhgaya urban area in this report has been referred to as Bodhgaya Nagar Parishad****, regardless of the year of analysis. This decision is made to avoid confusion that may arise from alternating between the terms Bodhgaya Nagar Panchayat and Bodhgaya Nagar Parishad.* ********

1.1.1 SCOPE OF WORK

- Initiation of the project: The collection of data from the stakeholders and undertaking stakeholder discussions.
- GIS Base Map updation: Procurement of satellite images of the planning area and procurement of the cadastral maps of the planning area.
- Seminar and Workshop: Organization of seminars and workshops with the stakeholders for their feedback.
- Preparation of Master Plan: Preparation of Master Plan under the provisions made in Bihar Urban Planning and Development Rule 2014.
- Contents of Master Plan: The Proposal of the Master Plan must include reports, maps and Development Control Regulations (DCR).
- Implementation of building bylaws.
- Zonal Development Plan.
- Area Development Scheme.
- Investment and Implementation Strategies.
- Notification of Draft Master Plan for inviting objections and suggestions.
- Finalization of Draft Master Plan.

- Final GIS data.

1.1.2 OBJECTIVE OF THE STUDY

The prime objective of the Master Plan is to ensure an improved quality of life for the population residing in the Planning Area at present and in the future mainly through all locations of land for various uses, specifying demands for various physical and social infrastructure. Considering the extended limit of the Planning Area beyond the urban and rural settlements, a conservative approach will be followed thus ensuring adequate availability of land for agriculture and future development.

The prime objectives of the Master Plan preparation are as below:

- An analysis and review of Bodhgaya's current situation.
- Identifying existing gaps in physical and social infrastructure and bridging those gaps.
- Minimizing haphazard and uncontrolled growth of towns/cities and achieving planned growth and development in order to provide a healthy living environment.
- Establishing baseline data and formulating Master Plan objectives.
- Preparing an integrated geospatial database collecting and collating appropriate data.
- Ensuring systematic, balanced and integrated development.
- Rationalizing the orderly movement of traffic and transportation within the town.
- Formulating strategies for solving the core area problems.
- Skill, Knowledge Transfer and Dissemination through consultations and workshops.
- For better implementation of the Master Plan, involvement of identified key stakeholders and the public at various stages of Master Plan Preparation.

The main objective as addressed above can be assigned as the creation of the following: -

d) Base Map and Thematic Maps: Final base maps in the form of user-friendly spatial products at the functional scale of 1:4000 having defined layers as per Design & Standards of AMRUT Guideline. City/town base map and thematic maps including existing land-use map which is a prerequisite for the formulation of the master plan and other plan.

e) Urban Database Creation: Sector-wise data collection and data analysis report of 25 aspects as per the 'Design & Standards' manual for AMRUT sub-scheme

f) GIS-based Master Plan: These GIS-based Master Plans will help in different types of urban planning exercises, e.g. preparation of master plan, development plan, zonal plan, utility plan, infrastructure plan etc.

Bodhgaya Planning Area located in the Gaya District of Bihar was declared a Planning Area on 21 August 2017, under Section 11 of the Bihar Planning and Development Act 2012. The total area of Bodhgaya Planning Area is (83.75 sq.km.) there is one urban administrative unit and 33 revenue villages in this Planning Area, which includes all areas of Bodhgaya Nagar Parishad, 30 revenue villages of Bodhgaya Block and 3 rural revenue villages of Gaya Block.

However, as per the administrative reclassification (2021) The total area of Bodhgaya Planning Area is (86.65 sq.km.) There is one urban administrative unit and 19 revenue villages in this Planning Area, which includes all areas of Bodhgaya Nagar Parishad (as per 2021 reclassified Nagar Parishad boundary), 16 revenue villages of Bodhgaya Block and 3 rural revenue villages of Gaya Block.

The districts of Jehanabad in the north, BodhGaya in the west, Hazaribaghand Chatra in the south, and Nawada and Koderma (Jharkhand) in the east are the shared borders of Bodhgaya. It is around 125 kilometers from Patna, the state capital, and 13 kilometers south of Gaya, the sizable district seat and pilgrimage town.

With roots in the era of Emperor Ashoka, Bodhgaya is a modest but highly respected town with a vast religious and cultural legacy. Here, in the year 260 BCE, the first tree shrine was constructed by the devoted Buddhist patron Ashoka. Its main claim to fame is that it was under the Bodhi tree, more than 2500 years ago, that Lord Buddha obtained enlightenment. As a result, Buddhists all over the world see it as the geographic core of the Buddhist world. It is a very significant hub for both domestic and foreign travel because of its profound cultural significance.

1.2 LOCATION AND SIZE OF THE CITY

The Bodhgaya Planning Area is situated within the Gaya district, located centrally in the state of Bihar. Gaya was established as an independent district in 1865, having previously been part of the Behar and Ramgarh districts. The district is composed of four sub-divisions—Sadar, Tekari, Neemchak Bathani, and Sherghati—and 24 Community Development Blocks. It shares its northern boundary with the districts of Arwal, Jehanabad, and Nalanda; its eastern boundary with Nawada district; its southern boundary with the state of Jharkhand; and its western boundary with BodhGaya district.

The city of Bodhgaya is located within the Bodhgaya Block of Gaya district. Geographically, Bodhgaya is positioned to the west of the Falgu River and lies along the Kaimur hill range, which serves as the eastern extension of the Vindhya Range. This area features a varied landscape, including several waterfalls. The city is situated at coordinates 4.69°N and 84.99°E, encompassing a planning area of approximately 86.65 square km, of which 52.96 square km are urban and 33.69 square km are rural. Bodhgaya has an average elevation of 113 meters (371 feet). The following table provides the administrative details of the planning area.

TABLE 1-1 ADMINISTRATIVE DETAILS OF THE PLANNING AREA

Sl. No.	C.D. Block	Rural Area		Urban Area		Area (sq. km)
		Rural Number of revenue units	Area (sq. km)	Number of urban administrative units	Area (sq. km)	
1	Bodhgaya	16	30.31	01	52.23	82.54

2	Gaya	03	3.38	-	0.73	4.11
Total Planning Area		**19**	**33.69**	**01**	**52.96**	**86.65**

Source: Bodhgaya Nagar Parishad, Calculated by Stesalit system Ltd.., (As per the administrative reclassification 2021).

*Note: In accordance with **Section 11** of the **Bihar Urban Planning and Development Act, 2012**, and **Rule 11** of the **Bihar Urban Planning and Development Rules, 2014**, the Bihar Urban Planning and Development Authority (BUPDA) issued Notification No. U.O. 11/01/2013 on February 21, 2017, formally declaring the **Bodhgaya Planning Area** for urban development purposes. Subsequently, through detailed consultations with BUPDA, the boundaries of the Bodhgaya Planning Area were delineated and finalized.*

As per the Gazette Notification, the Bodhgaya Planning Area comprised the Bodhgaya Nagar Parishad and 33 adjoining census villages, based on the Census of India 2011. For the purpose of demographic, socio-economic, and housing analysis, Census 2011 continues to serve as the most recent official dataset. However, significant changes in administrative boundaries have occurred since 2011.

In a subsequent administrative reclassification (2021), the Bodhgaya Nagar Parishad, along with 18 surrounding villages—14 fully and 4 partially (Dubahal, Parariya, Mocharim, and Dhandhawa)—was upgraded to the status of **Bodhgaya Nagar Parishad in 2022**. A comparison between the current Nagar Parishad boundaries and the 2011 Census boundaries reveals that the upgraded Nagar Parishad encompasses the former Nagar Parishad area in addition to these 18 census villages, both in full and in part.

Given the generally dispersed settlement patterns of rural villages, population estimates for the partially included villages have been derived proportionally, based on the extent of residential area falling within urban jurisdiction. As per the Land Use Plan, the residential distribution for the four partially included villages is as follows:

Dubahal: 0% of the residential area falls under urban jurisdiction; 100% remains rural.

Parariya: 73% of the residential area falls under urban jurisdiction; 27% remains rural.

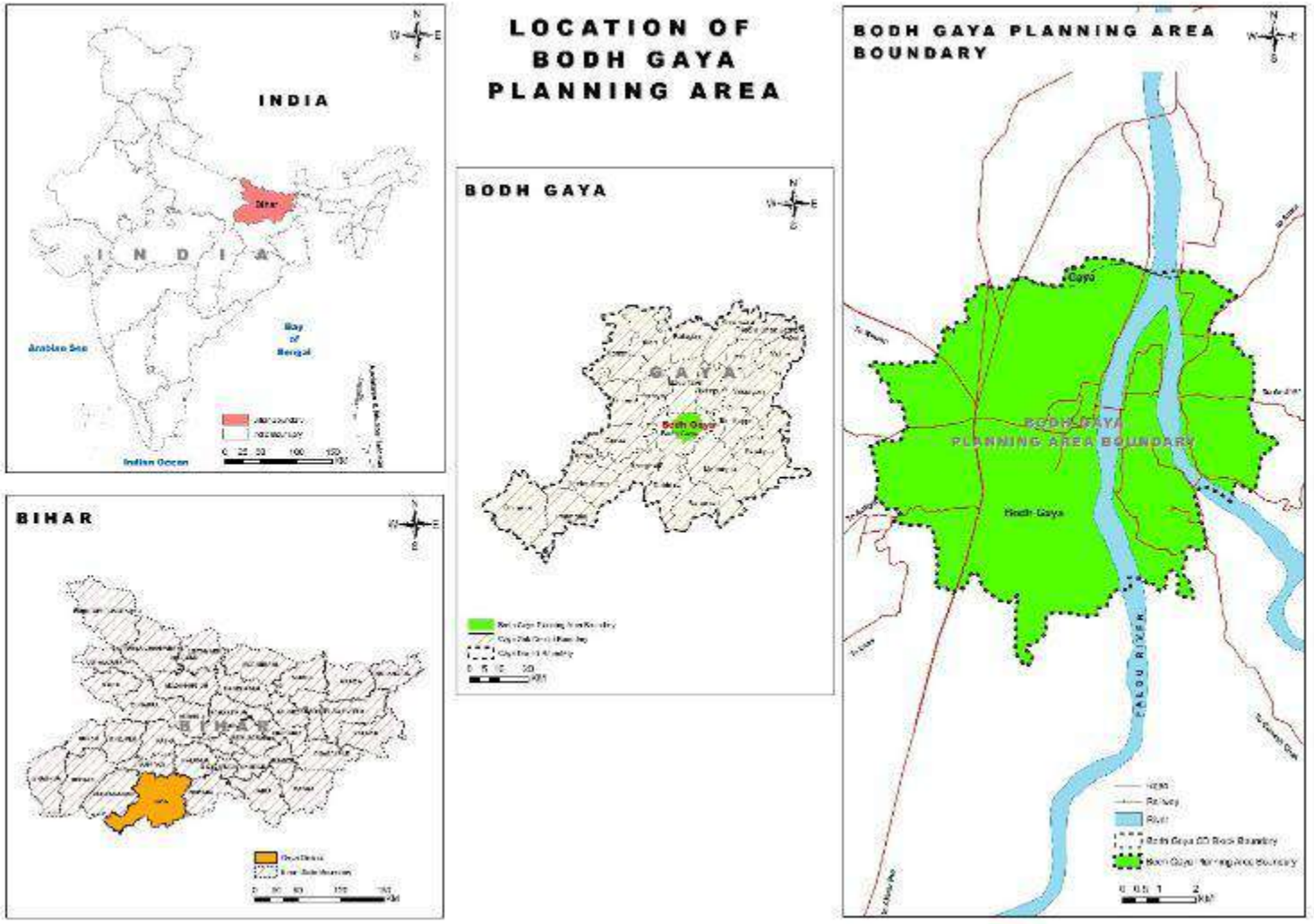
Mocharim: 64% of the residential area falls under urban jurisdiction; 36% remains rural.

Dhandhawa: 100% of the residential area falls under urban jurisdiction; 0% remains rural.

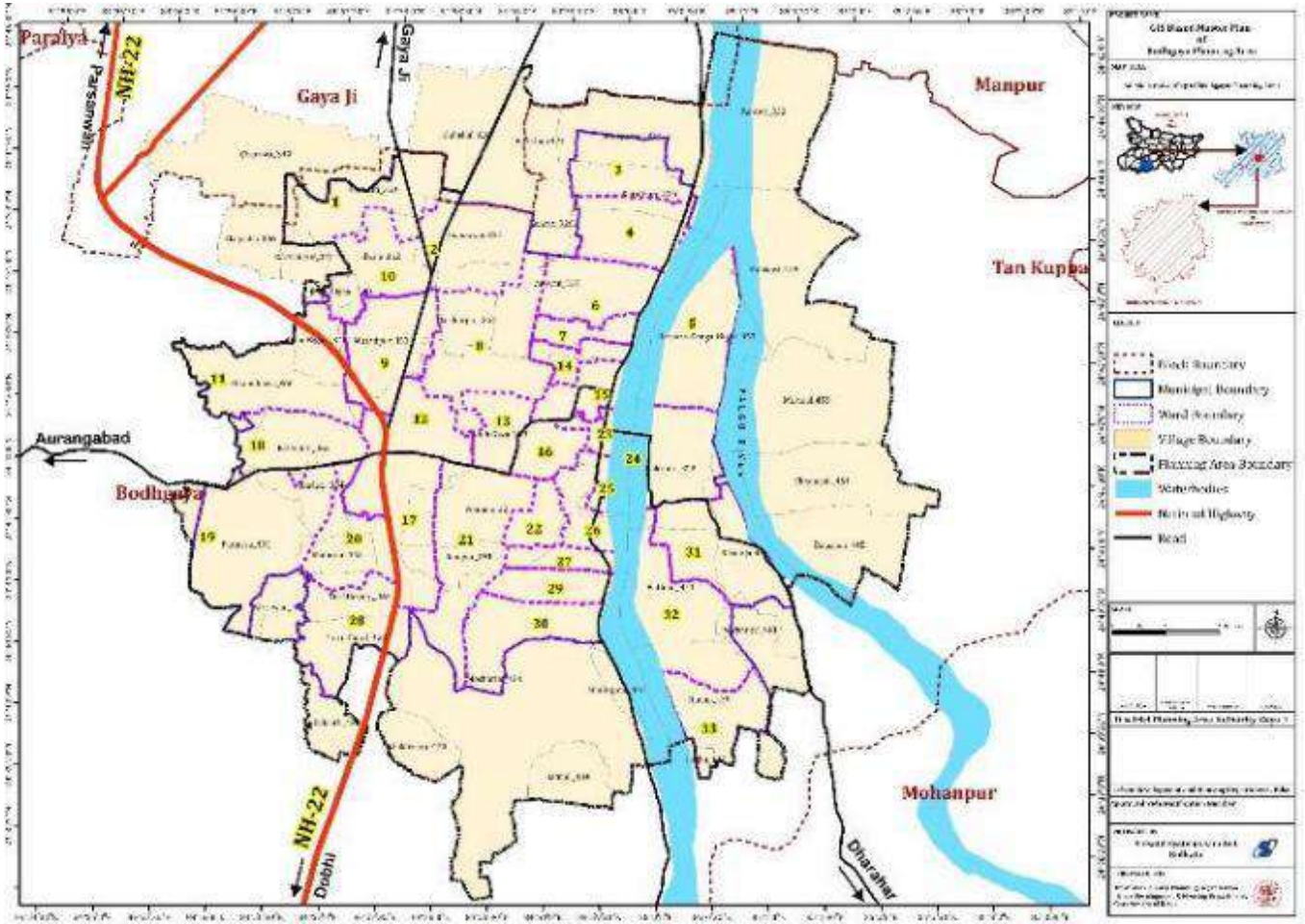
In total, 14 additional villages—namely Tikuna, Jahan Bigha, Amar Bigha, Musatpura, Kolhaura, Mahurar, Turi Buzurg, Bhalua, Niman, Hathiar, Silunja, Bakraur, Ratanara Ganga Bigha, and Dhanawan—along with portions of Dubahal, Parariya, Mocharim, and Dhandhawa, have been newly incorporated within the expanded limits of the Bodhgaya Nagar Parishad.

The revised population distribution of the Bodhgaya Planning Area is presented below, based on the administrative boundaries as they exist today, but utilizing population data from the Census of India 2011, which remains the most recent official dataset.

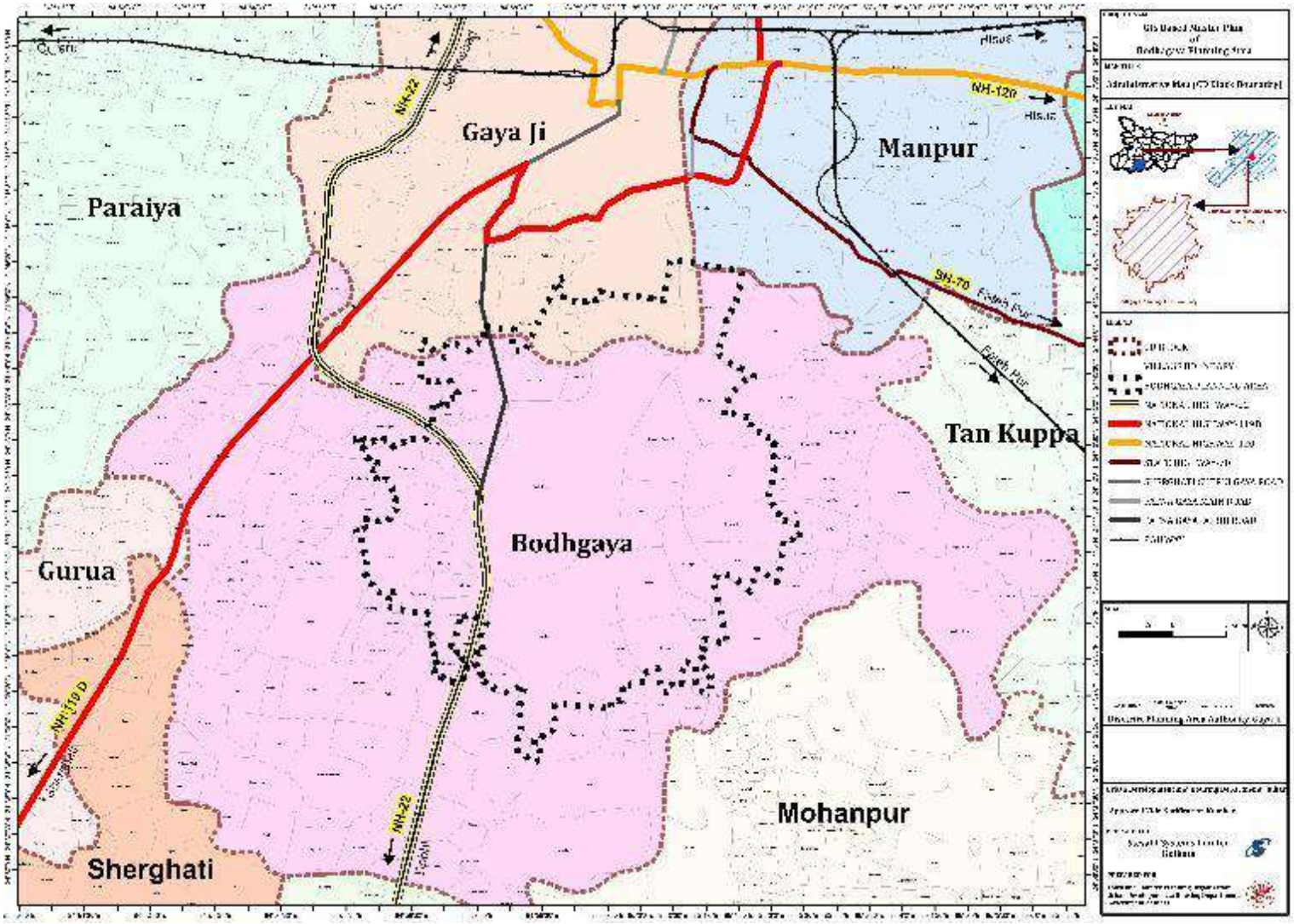
For the purposes of this document, *Bodhgaya Nagar Parishad* refers to the area comprising the erstwhile Bodhgaya Nagar Parishad along with 18 surrounding villages—14 fully and 4 partially included (Dubahal, Parariya, Mocharim, and Dhandhawa). Accordingly, the *Bodhgaya Planning Area* is defined as encompassing the Bodhgaya Nagar Parishad along with an additional 18 villages, including the four that are only partially within the urban jurisdiction.



MAP 1-1LOCATION MAP OF BODHGAYA PLANNING AREA



Map 1-2 ADMINISTRATIVE MAP OF BODHGAYA PLANNING AREA



MAP 1-3 DISTRICTS SURROUNDING BODHGAYA MAP

1.3 HISTORICAL BACKGROUND

Originally called Uruvela, Bodhgaya is located on the banks of the Nilanjana, or Phalgu River as it is more commonly known.

Bodhgaya's history dates back to the distant past. ongoing archaeological studies suggest that the earliest evidence of human existence in Bodhgaya dates back to at least 1100 BC.



FIGURE 1-2 BODHI TREE IN BODHGAYA

Source: Times of India & Bodhgaya Tourism

It is believed to be the place where Prince Siddhartha Gautama achieved enlightenment and became the Buddha in the 6th century BCE. After many years of searching for truth and practicing severe meditation, Siddhartha sat under a sacred fig tree now known as the Bodhi Tree near the banks of the Niranjana River or Phalgu River. Through deep meditation, he gained supreme wisdom and insight. This moment marked the birth of Buddhism and turned Bodhgaya into a holy site visited by spiritual seekers for more than two thousand years.

The historical importance of this place was first officially recognized in the 3rd century BCE, when Emperor Ashoka, a great supporter of Buddhism, visited Bodhgaya. Ashoka built the Vajrasana a Diamond Throne, to mark the exact spot where the Buddha meditated. He also built the first temple here, starting a long tradition of religious and architectural development at the site. The Mahabodhi Temple is one of the holiest sites of Buddhism and marks the spot of Buddha's Enlightenment. It is one of the shrines out of the 84,000 shrines erected by King Ashoka the Great in the 3rd century BC.

The Mahabodhi Temple, which still stands today, was constructed during the Gupta period between the 5th and 6th centuries CE. Made mainly of bricks, it is one of the oldest surviving brick temples in India. Its elegant design and detailed craftsmanship reflect the rich cultural heritage of that time. The temple complex includes the Bodhi Tree, the Vajrasana, a sacred lotus pond, and many small stupas and shrines. Over the centuries, the Mahabodhi Temple became a model for Buddhist architecture in other countries like Sri Lanka, Nepal, Tibet, China, and across Southeast Asia.

In 2002, UNESCO recognized the global value of this sacred place and declared the Mahabodhi Temple Complex a World Heritage Site. It was honoured for its

unique architecture, deep spiritual meaning, and historical connection to the life of the Buddha. Today, the site is protected under the Bodhgaya Temple Act of 1949, which ensures shared management between Buddhist and Hindu communities, with guidance from the Archaeological Survey of India.

Bodhgaya remains a living symbol of peace, wisdom, and spiritual awakening. Every year, millions of pilgrims and visitors from all over the world come here to meditate, pray, and connect with the teachings of the Buddha. Its timeless message of compassion and enlightenment continues to inspire people across cultures and generations.

1.4 REGIONAL SETTINGS

Bodhgaya is a village in the northeast Indian state of Bihar. Bodhgaya Block covers an area of over 96 square miles (249 sq. km) and it is divided into 19 wards and contains 139 villages. Bodhgaya has boundaries with the districts of Jehanabad in the north, BodhGaya in the west, Hazaribaghand Chatra in the south, and Nawada and Koderma (Jharkhand) in the east. The state capital, Patna, is around 125 kilometers away, while Gaya, a major district headquarters and pilgrimage town, lies 13 km south. Its geographical location is (24° 41' 45" N). latitude and (85° 2' 22" E) longitudes. It is situated west of the Phalgu River, a tributary of the Ganges River.

According to the 2011 census Gaya district has a population of 4.3 million. As per the Census of India – 2011, the total human population of the district was 4,391,418 of which male and female were 2,266,566 and 2,124,852 respectively. Gaya being surrounded by hills from three sides and one side by a river makes the region experience seasonal temperatures.

Gaya is the second-largest contributor to the economy of Bihar, after Patna. The population of Bodhgaya Block is predominately rural, Agriculture is the main occupation of the people of the district and also the main source of livelihood of the people. Rainfall still controls the agricultural economy of the Gaya district. Crops in the surrounding region include grains, oilseeds, and sugarcane, aided through irrigation from four nearby rivers: the Sone, Pūnpūn, and Morhar in addition to the Phalgu.

Most of the money that comes into the area, however, comes from the tourism trade. Bodhgaya was designated as one of the four official pilgrimage sites by Gautama Buddha. For this reason, many devout Buddhists travel to the city as part of their religious development. The city plays host not only to the religiously devout but also to those who travel to the city for its historic and cultural significance.

The Mahabodhi Temple (Literally: "Great Awakening Temple"), a UNESCO World Heritage Site, is a Buddhist temple in Bodhgaya, marking the location where Siddhartha Gautama, the Buddha, is said to have attained enlightenment. Bodhgaya (located in Gaya district) is located about 96 km (60 mi) from Patna, Bihar state, India. Next to the temple, on its western side, is the holy Bodhi tree. In the Pali Canon, the site is called Bodhimanda, and the monastery there is the Bodhimanda Vihara. The tallest tower is 55 meters (180 ft) tall. The Vault of Mahabodhi Temple is being coated with gold plates weighing 290 kg by the Government of Thailand.

Gaya district experiences hot, dry summers and mild winters. Winter begins in mid-October, with temperatures dropping to around 8°C in January, the coldest month. The hot season starts in mid-March, with May being the hottest month at 46°C. Summer continues until late June, when the rainy season brings relief, though high humidity can intensify the heat. The climate is most pleasant from November to February, with occasional winter rainfall.

Bodhgaya is well-connected to other cities and regions through a robust road network, including National Highway 22 (NH-22), which facilitates travel across Bihar and beyond. Although Bodhgaya lacks its own railway station, Gaya Junction, about 15-17 km away, serves as the nearest station, making road travel essential for long-distance journeys. Additionally, the closest airport, Gaya International Airport, is 12 km from Bodhgaya. The absence of a local airport necessitates reliance on road and rail transport, which, while cost-effective, is less convenient and time-consuming compared to air travel, posing challenges for urgent or business-related travel.

1.5 LINKAGES AND CONNECTIVITY

1.5.1 ROAD CONNECTIVITY

The Buddhist sacred town of Bodhgaya is effectively connected to other cities and regions through a comprehensive road network, which includes National Highway 22 (NH-22). This highway traverses or passes near the town, facilitating travel across Bihar and beyond. NH-22 is integral to the transport planning and infrastructure development of the Bodhgaya Planning Area, enhancing both local and regional connectivity. As a vital route for trade and transportation, NH-22 significantly improves travel efficiency and supports the exchange of goods and services, benefiting both visitors from Patna and residents of Bodhgaya.

1.5.2 RAIL CONNECTIVITY

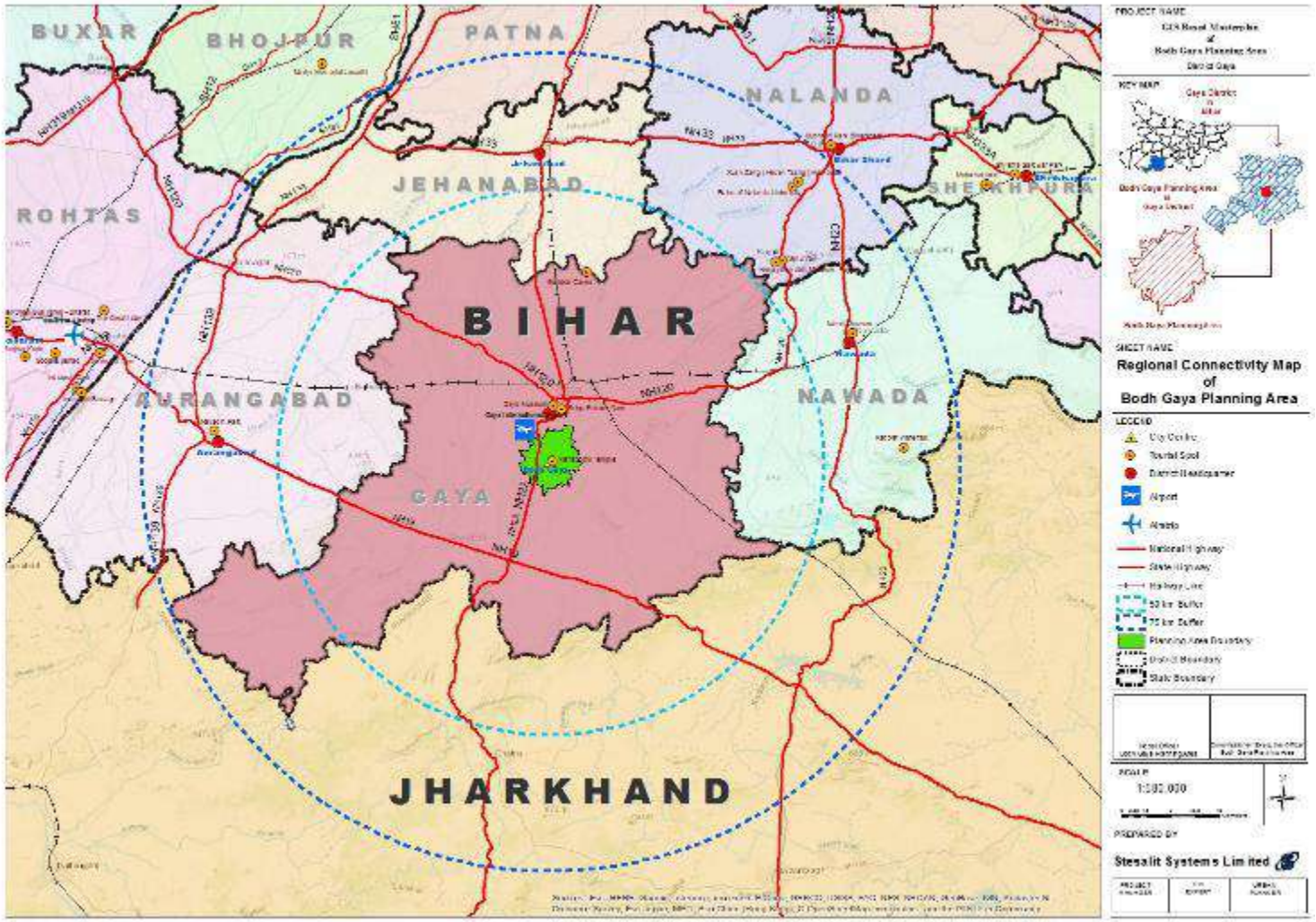
Gaya is a major Railway junction on the Grand Chord line served by express, superfast and Rajdhani express trains. The nearest railway station is Gaya (17km).

Bodhgaya's absence of a railway station limits its ability to be connected by road to other areas. Residents and visitors need to travel to Gaya Junction Railway Station, which is roughly 15 kilometers distant, is the closest train station to Bodhgaya.

1.5.3 AIR CONNECTIVITY

Bodhgaya does not have its own airport; however, the nearest airport, Gaya International Airport, is located approximately 12 kilometres away.

While the presence of airports within reachable distances augments the overall connectivity of Bodhgaya, these airports play crucial roles in accommodating the varying travel needs of the residents, businesses, and tourists within the planning area. The accessibility of an international airport within reasonable proximity ensures a comprehensive air connectivity network, facilitating both domestic and international travel requirements for the region.



MAP 1-4 REGIONAL CONNECTIVITY MAP OF BODHGAYA PLANNING AREA

1.6 PHYSICAL SETTING OF THE CITY

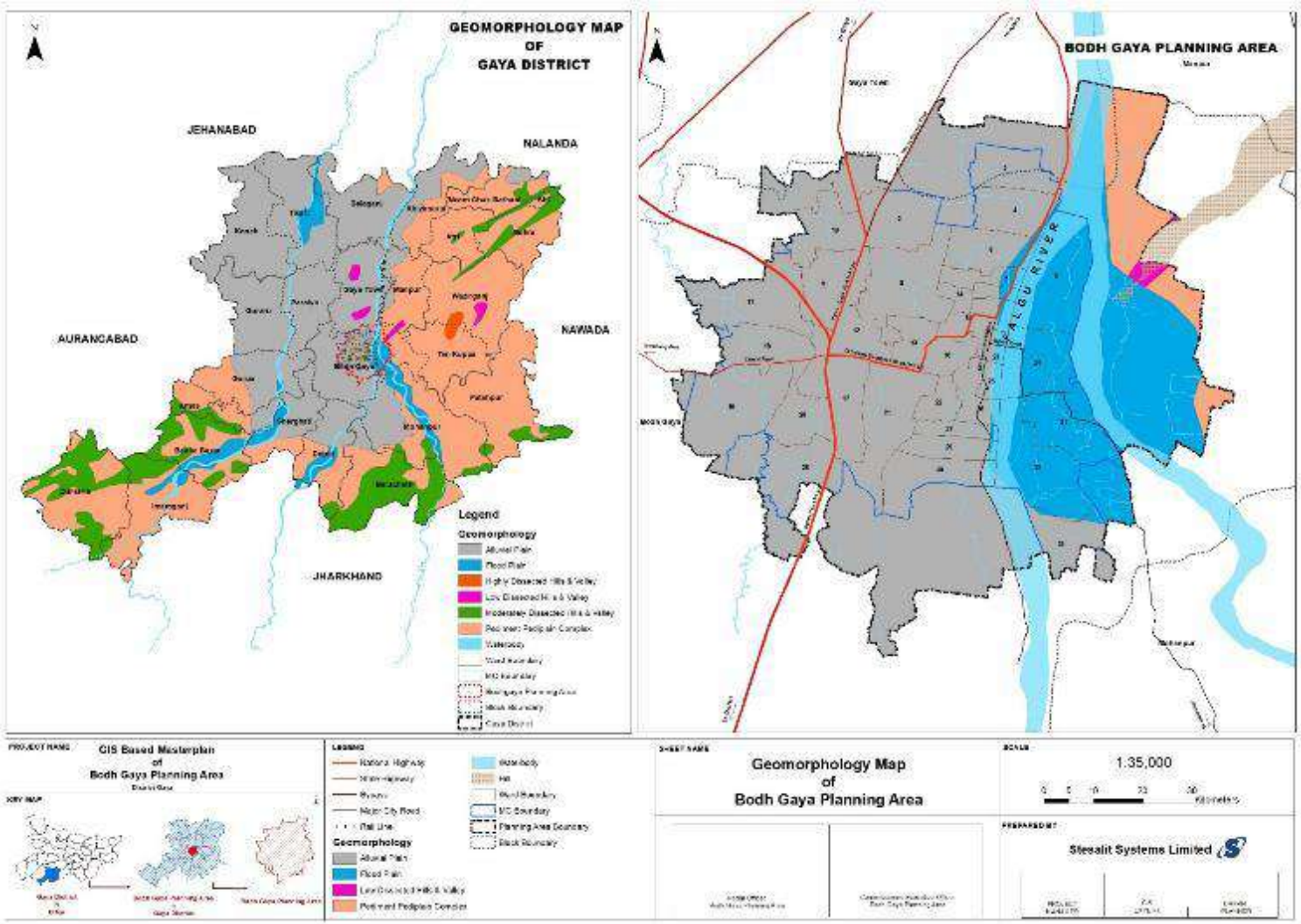
1.6.1 TOPOGRAPHY

The eastern and central parts of Gaya district consist of fertile alluvial plains. The southern and western parts of Gaya district have hilly terrain and plateaus. The region is part of the Chota Nagpur Plateau, and there are hills and elevated areas. The Gaya town is surrounded by Ramshila Hill (218 m height) on the northern side, Katari Hill (130 m height) towards the west, and Brahma-yoni Hill on the southern side (266 m height). The southern plateau represents the oldest table land having mature, dissected and rolling topography. The peneplain is covered by residual soil and slope and sheetwash deposits from bordering hills and inliers.

Bihar is divided into three agroclimatic zones and Bodhgaya lies in Zone III. It is the highest and oldest alluvial plain and always lies above the flood level of the present-day river because it is the highest and the oldest alluvial plain, made up of the sediments brought by the erosion of the hills.

1.6.1.1 GEOMORPHOLOGY

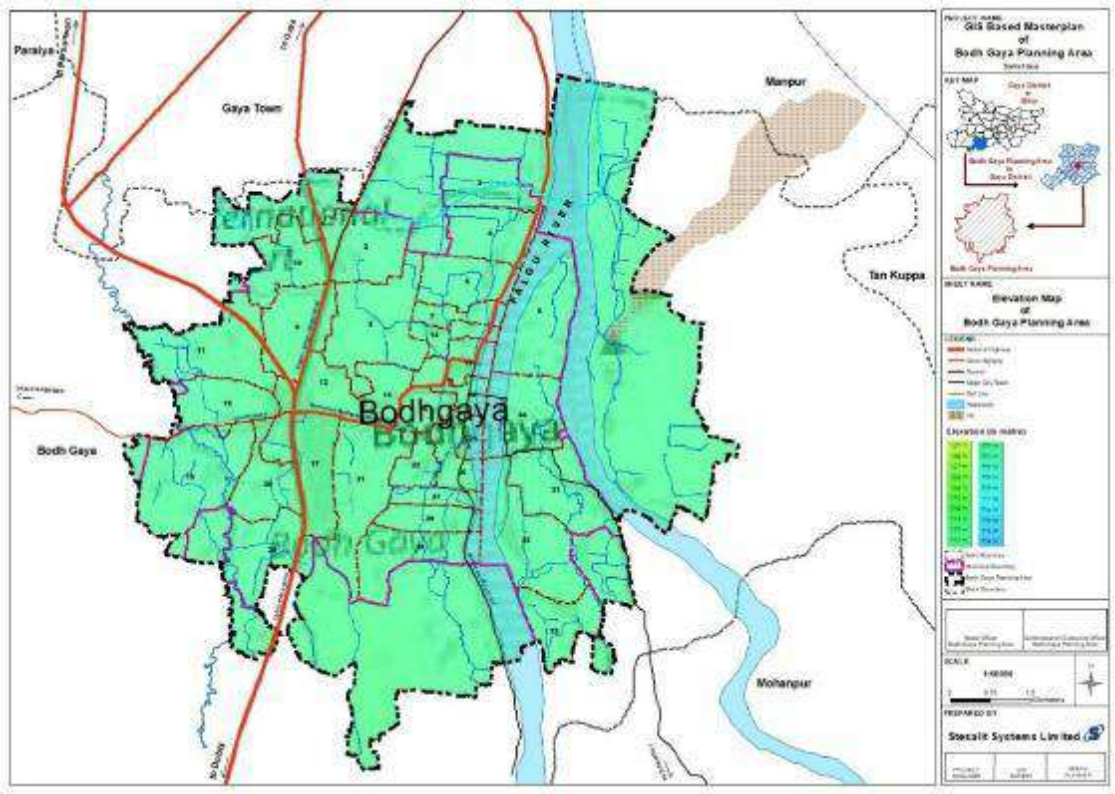
Bodhgaya is located in the transit region between the Chota Nagpur plateau and the alluvial Gangetic plains of South Bihar. Topographically, Bodhgaya lies on the western bank of the river Niranjana at an average altitude of 113 meters above sea level. The Falgu River, a tributary of the Son River, flows through the Gaya district. River valleys and associated floodplains are characteristic features in certain areas. Alluvial plains, formed by river-deposited sediments, offer significant potential for agriculture, groundwater recharge.



MAP 1-5 GEOMORPHOLOGICAL MAP OF BODHGAYA PLANNING AREA

1.6.1.2 ELEVATION

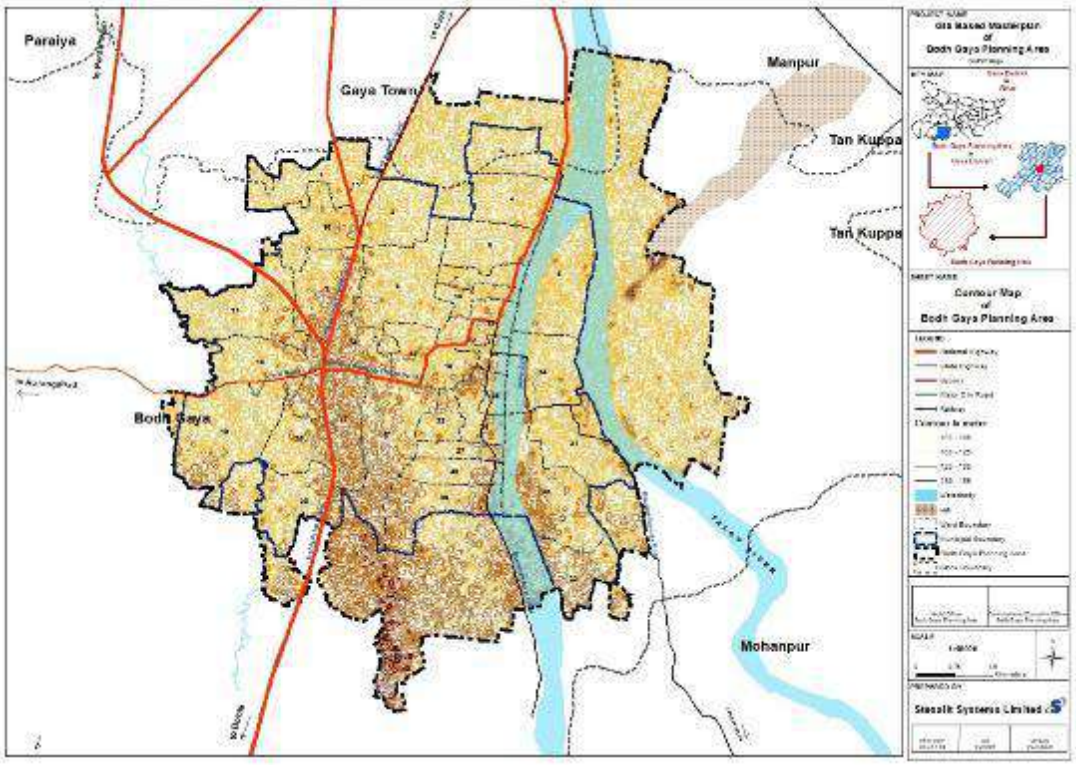
The Bodhgaya Plain is an alluvial plain characterized by a gradual descent towards the northeast. Its elevation varies, with the minimum at 121.61 meters above sea level in the northern regions and the maximum reaching 128.29 meters in the south-western areas, illustrating a gentle topographic gradient.



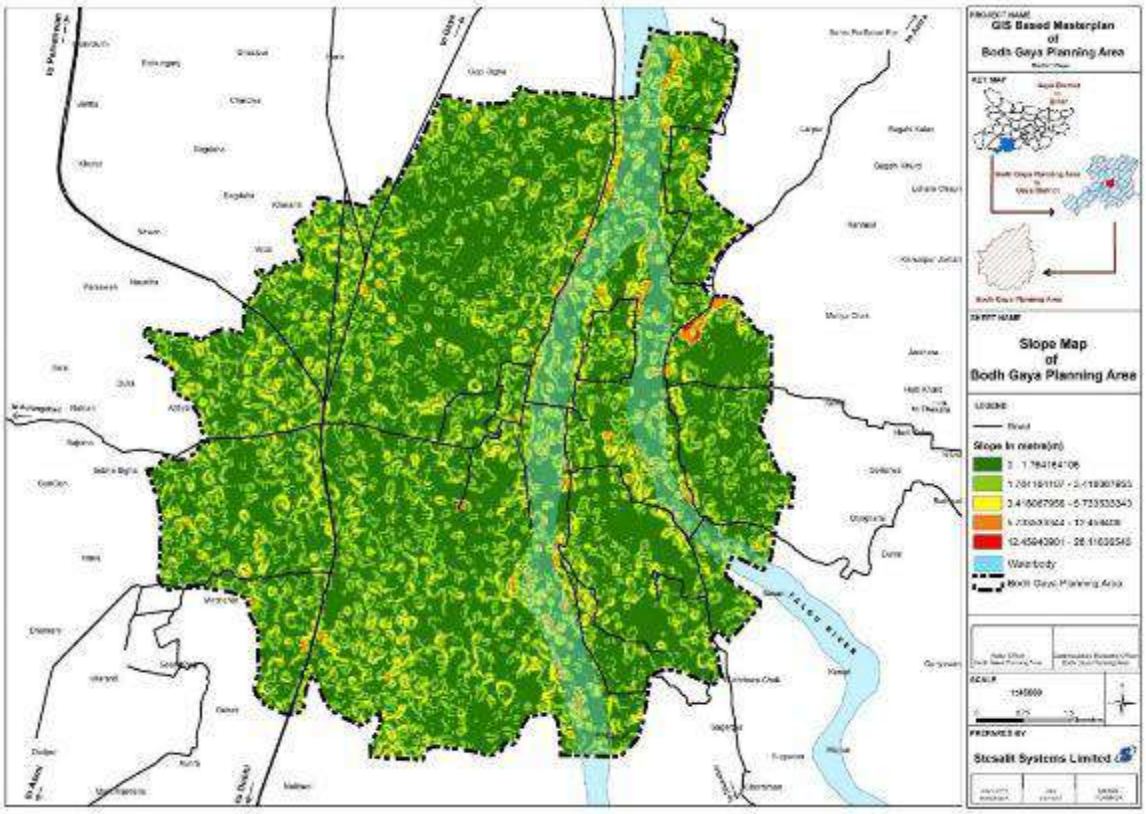
MAP 1-6 ELEVATION MAP OF BODHGAYA PLANNING AREA

1.6.1.3 SLOPE AND CONTOUR

The slope map of the Bodhgaya Planning Area, shown below, reveals that the region is primarily characterized by moderately flat terrain with little undulation. The slope direction is utilised to plan Physical infrastructure.



MAP 1-7 SLOPE MAP OF BODHGAYA PLANNING AREA



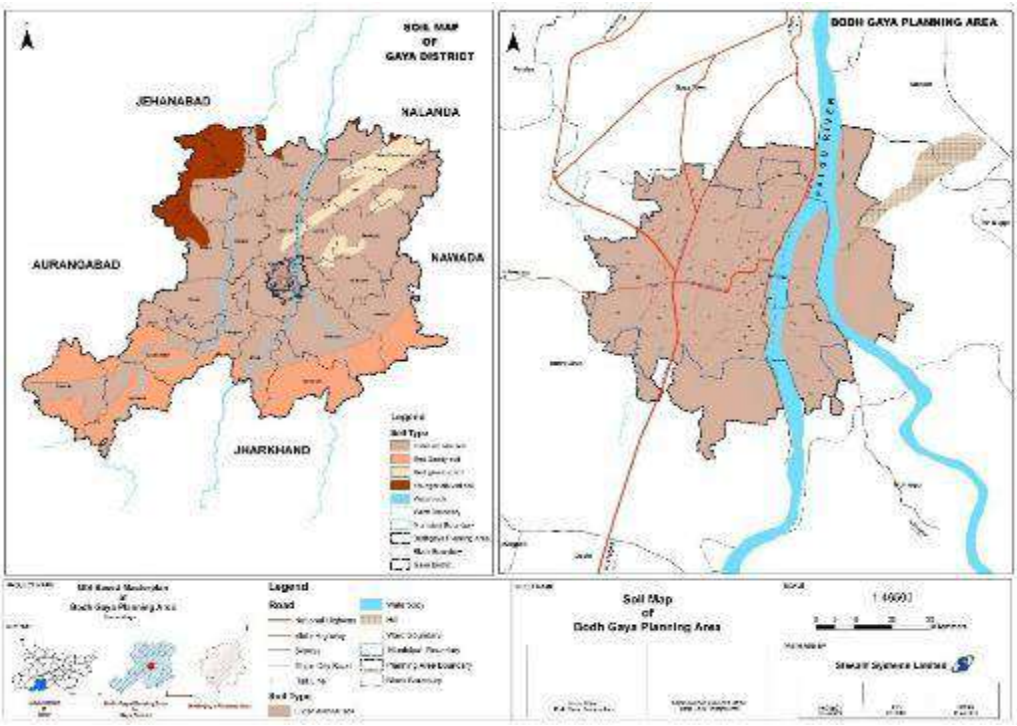
MAP 1-8 CONTOUR MAP OF BODHGAYA PLANNING AREA

1.6.1.4 SOIL

Sandy soil, red and yellow soil and younger alluvial soil are the important soil types in the area. The Sandy soil, and red and yellow soil are restricted to the southern and northeastern parts of the area occupied by the plateau, the pediplain and the high-level marginal alluvial plain (terrace). These soils are locally called balwat, and balmator balsundri, which are extremely deficient in nitrogen and organic matter and hence infertile. Younger alluvial soil is restricted to the Sone-Ganga plain. The soil consists chiefly of loam with a small proportion of sand and clay (kewal). The soils of this tract are rich in nitrogen and calcium and thus are fertile.

There is one type of soil found in the Bodhgaya planning area.

- **Old Alluvial Soil:**
  These soils are a landform created by the deposition of river sediments over a long period, resulting in higher terraces above the active floodplains.
  Old alluvial plains, also known as Bhangar in some regions, possess significant potential for agriculture, groundwater resources, and even archaeological insights. While they are older and less prone to flooding than newer alluvial plains, they offer a stable base for vegetation and can be productive agricultural areas.



MAP 1-9 SOIL MAP OF BODHGAYA PLANNING AREA

1.6.2 CLIMATE

1.6.2.1 TEMPERATURE

The climate in Bodhgaya varies throughout the year. Summer temperatures may soar to 42ºC or higher, while winters are relatively mild, with temperatures dropping to approximately 15ºC in December. From November to February, the region experiences a cooler and more pleasant climate. Monsoon rains, occurring between late June and September, offer temporary relief from the heat but increase humidity levels. Overall, Bodhgaya's temperatures illustrate a transition from a hot, dry summer to a milder, more temperate winter.

TABLE 1-2 CLIMATE DATA OF BODHGAYA

Climate Data of Bodhgaya over the Year													
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Average high in °C (°F)	23.27	27.72	34.09	39.8	**42.41**	39.98	35.54	34.28	33.14	31.19	29.42	24.61	32.95
	73.83	*81.9*	*93.36*	*103.64*	***108.34***	*103.96*	*95.97*	*93.7*	*91.65*	*88.14*	*84.96*	*76.3*	*91.31*
Daily mean in °C (°F)	19.58	23.78	30.39	36.39	39.26	37.53	33.41	32.24	30.77	28.37	26.02	21.12	29.91
	67.24	74.8	86.7	97.5	102.67	99.55	92.14	90.03	87.39	83.07	78.84	70.02	85.84
Average low in °C (°F)	13.61	16.72	22.38	27.83	31.12	31.4	28.84	27.74	26.19	22.94	19.77	15.05	23.63
	56.5	62.1	72.28	82.09	88.02	88.52	83.91	81.93	79.14	73.29	67.59	59.09	74.53
Average rainfall in mm *(inches)*	2.85	10.4	3.16	3.99	3.88	16.51	58.21	60.36	70.67	14.23	0.05	3.34	20.64
	0.11	0.41	0.12	0.16	0.15	0.65	2.29	2.38	2.78	0.56	0	0.13	0.81
Average rainy days	0.55	1	0.55	0.64	0.64	3.36	5.45	6.36	5.27	1.55	0	0.45	2.15

Source: Weather & Climate 2023

It usually brings rain and thunderstorms in the early summer. The summer season lasts from the middle of April to the middle of June, with minimum and maximum temperatures ranging from 34.09°C to 42.41°C. The largest average amount of rainfall in September is 70.67 mm.

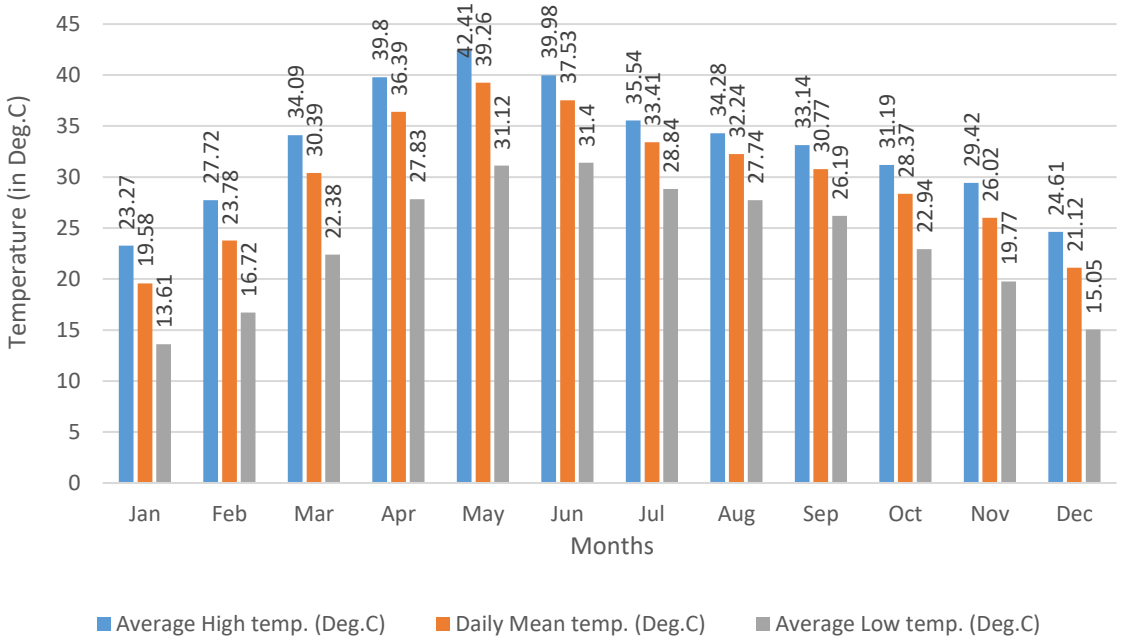
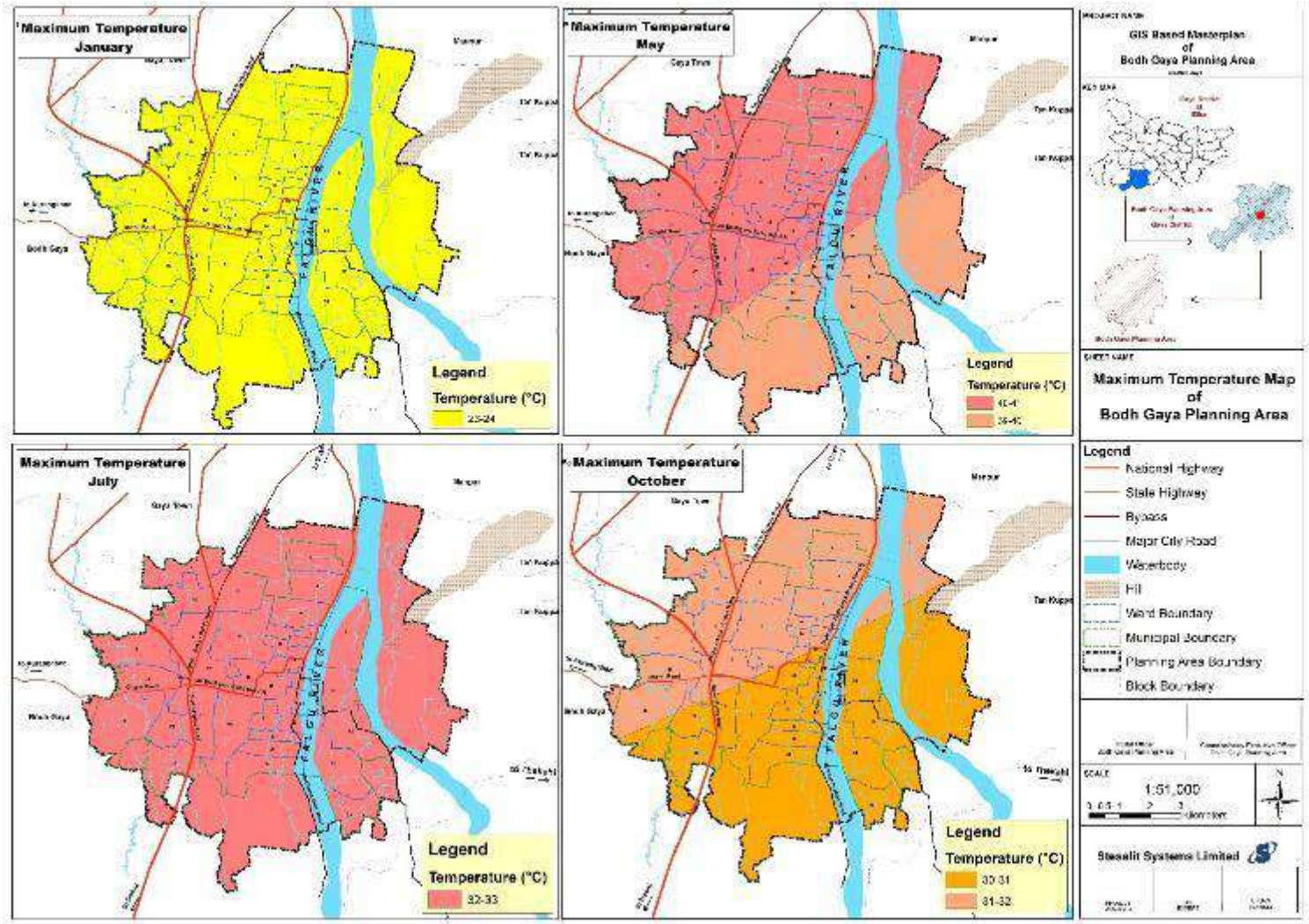


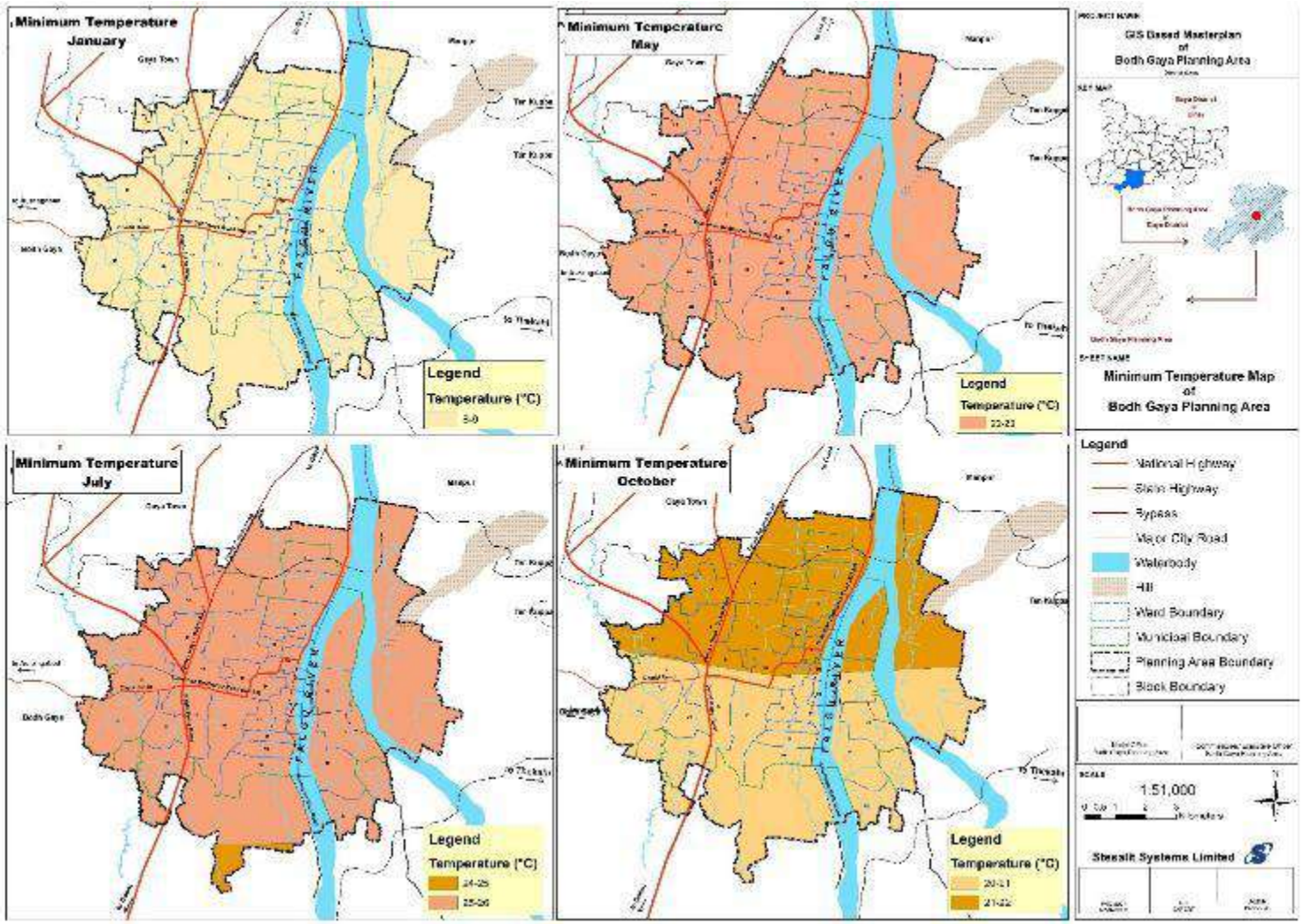
FIGURE 1-3 TEMPERATURE STATISTICS OF BODHGAYA

Source: Weather & Climate 2023

The following maps show the maximum and minimum temperature map of the Bodhgaya Planning Area.



MAP 1-10 MAXIMUM TEMPERATURE MAP OF BODHGAYA PLANNING AREA



MAP 1-11 MINIMUM TEMPERATURE MAP OF BODHGAYA PLANNING AREA

1.6.2.2 RAINFALL

According to data from the State Directorate of Statistics and Evaluation, the district's average annual rainfall from 2006 to 2009 ranged between 702.8 and 1,133.4 mm. The highest rainfall occurs from June to September, accounting for approximately eighty per cent of the annual total. December records the lowest rainfall. The rainy season is characterized by hot and humid conditions. From 2006 to 2009, the district experienced an average of 35.6 to 54.9 rainy days annually.

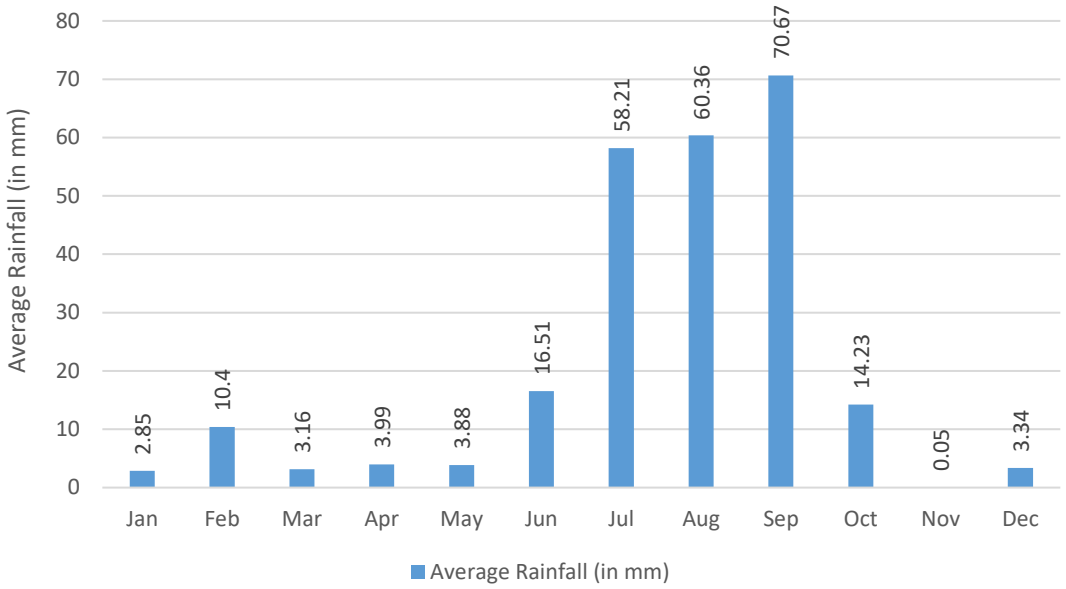
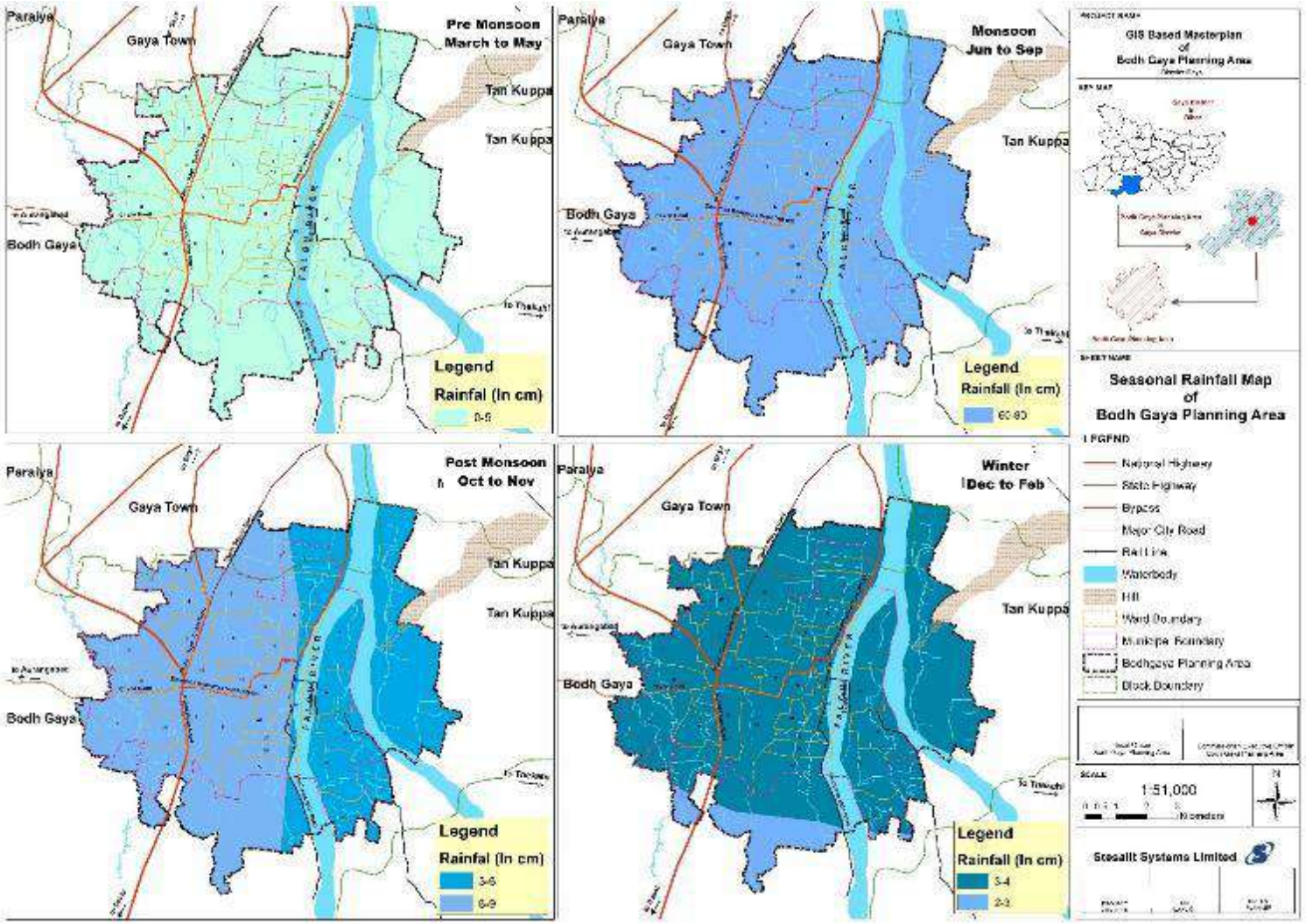


FIGURE 1-4 RAINFALL DATA OF BODHGAYA PLANNING AREA

Source: Weather & Climate 2023

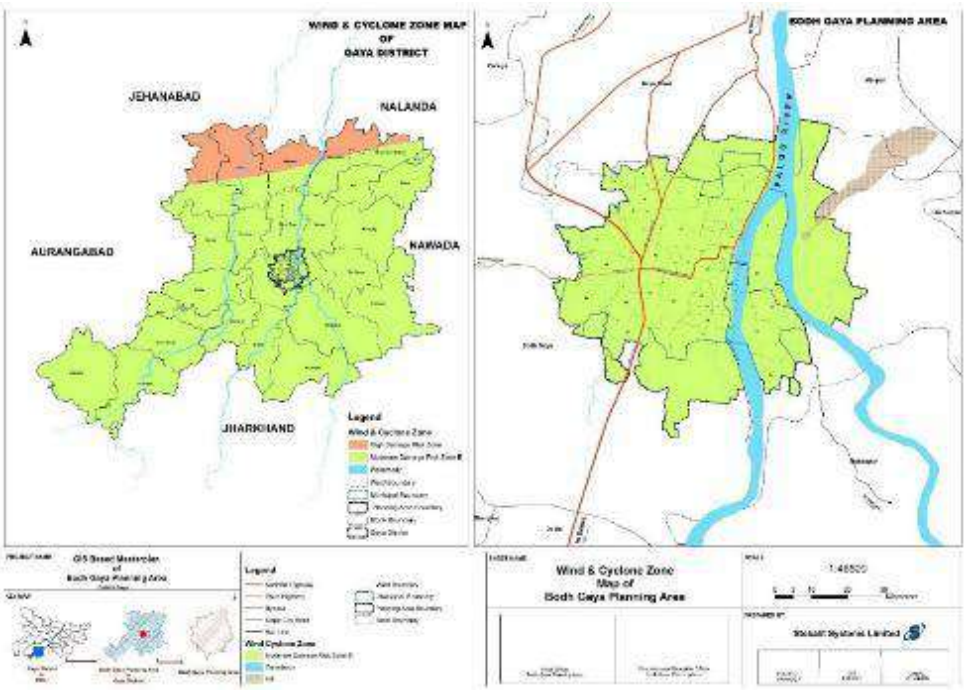
Bodhgaya receives about 20.64 mm of average precipitation annually, with September experiencing the maximum average rainfall of 70.67 mm, while November receives the minimum average rainfall of 0.05 mm. The above figure shows rainfall data of the Bodhgaya Planning Area.



MAP 1-12 SEASONAL RAINFALL MAP OF BODHGAYA PLANNING AREA

1.6.2.3 WIND

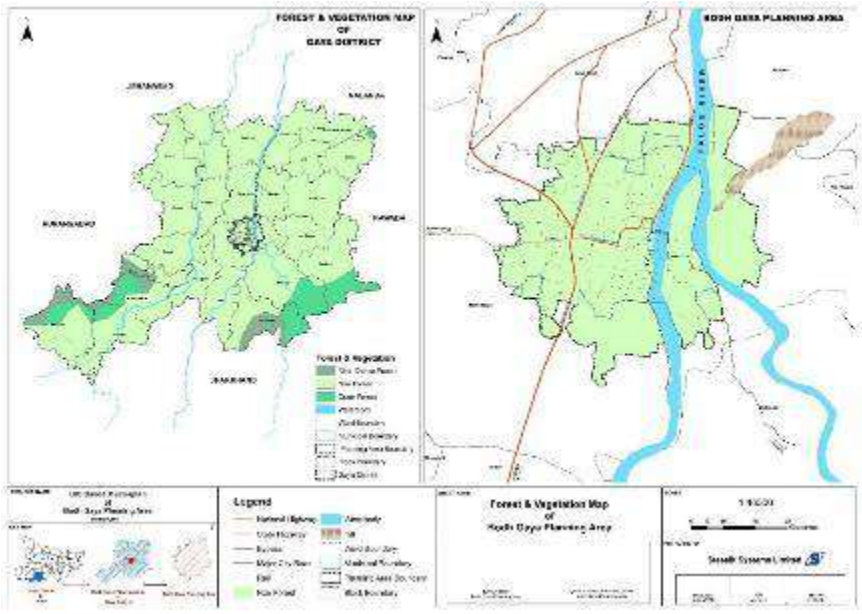
Although from the below Wind and Cyclone map, it is evident that the city lies under the moderate damage risk zone-B, all year long, winds are typically low to moderate.



MAP 1-13 WIND & CYCLONE ZONE MAP OF BODHGAYA PLANNING AREA

1.6.3 FOREST AND VEGETATION

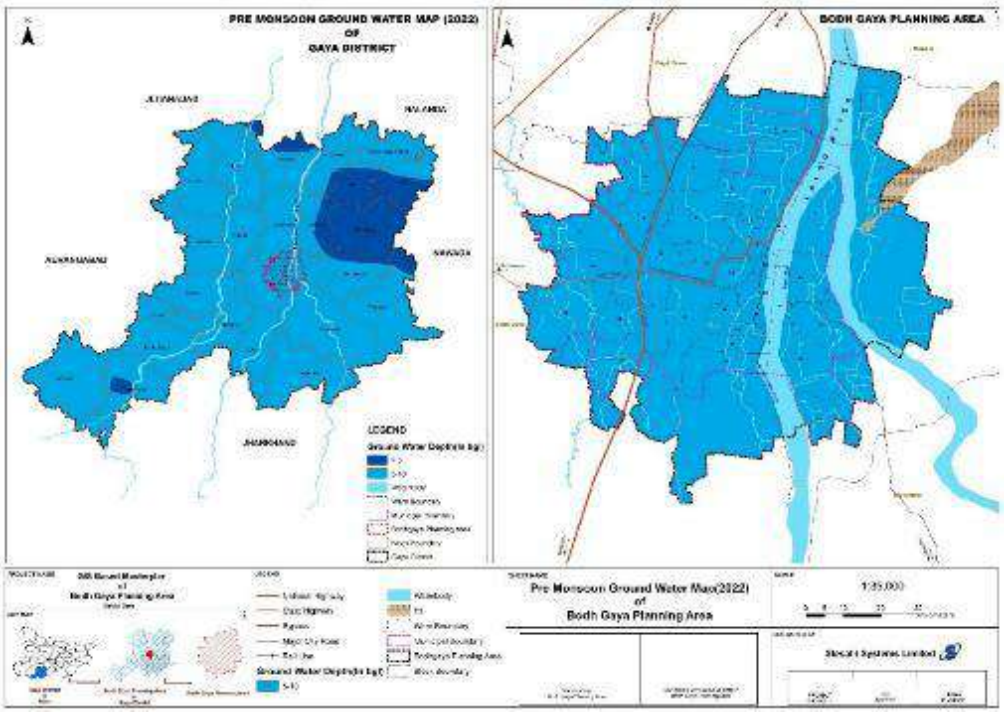
The Gaya district is classified as a non-forest territory. However, sparse vegetation is found in the southern parts of the planning area.



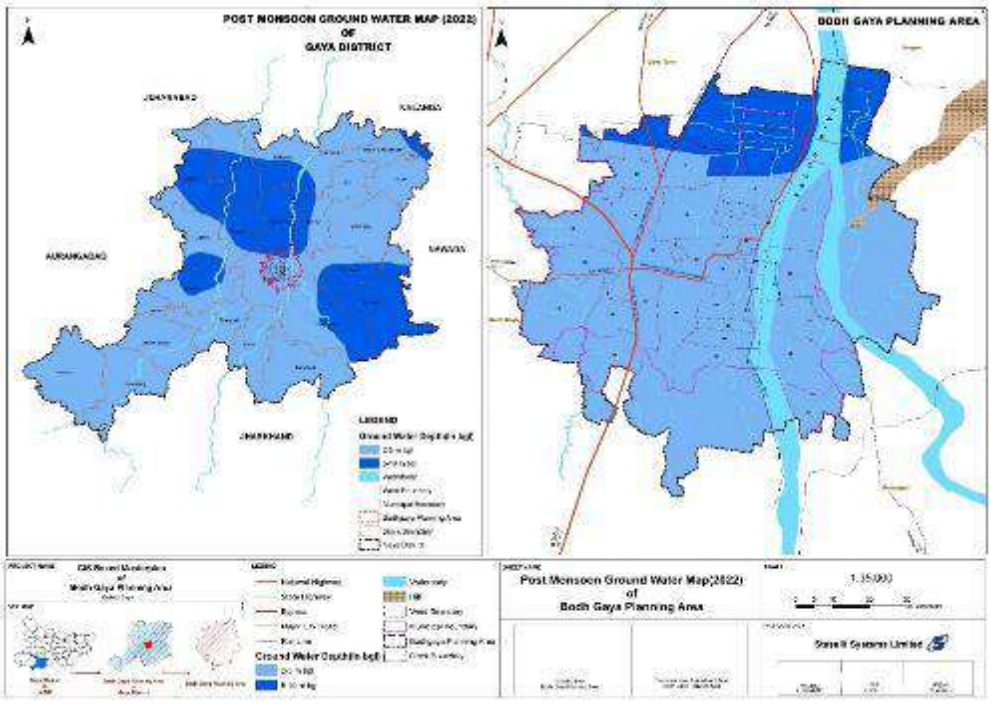
MAP 1-14 FOREST AND VEGETATION MAP OF BODHGAYA PLANNING AREA

1.6.4 GEOHYDROLOGY

From the groundwater map of the Bodhgaya Planning area, we can see that in the pre-monsoon period, the groundwater depth ranges from 5-10 billion cubic meters. Conversely, though in the post-monsoon period, the groundwater depth ranges from 2-5 billion per cubic meter.



MAP 1-15 PRE-MONSOON GROUNDWATER MAP OF BODHGAYA PLANNING AREA

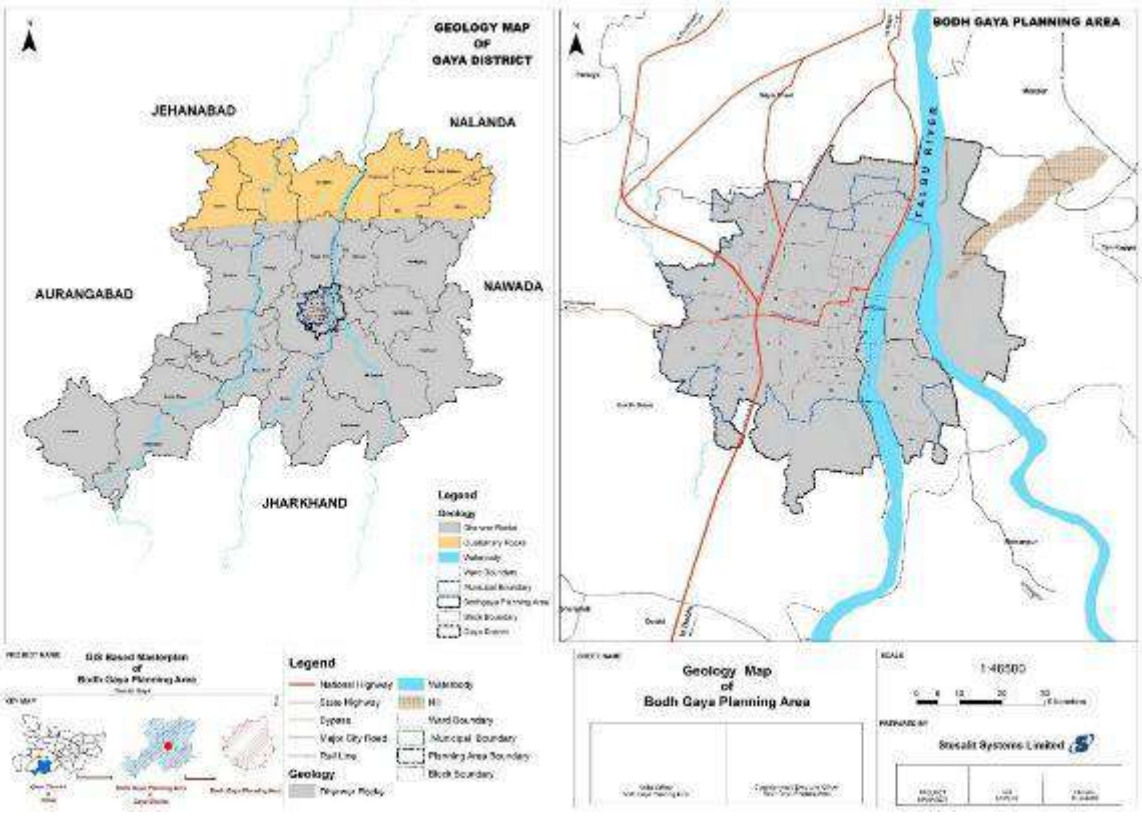


MAP 1-16 POST-MONSOON GROUNDWATERMAP OF BODHGAYA PLANNING AREA

1.6.5 GEOLOGY AND NATURAL RESOURCES

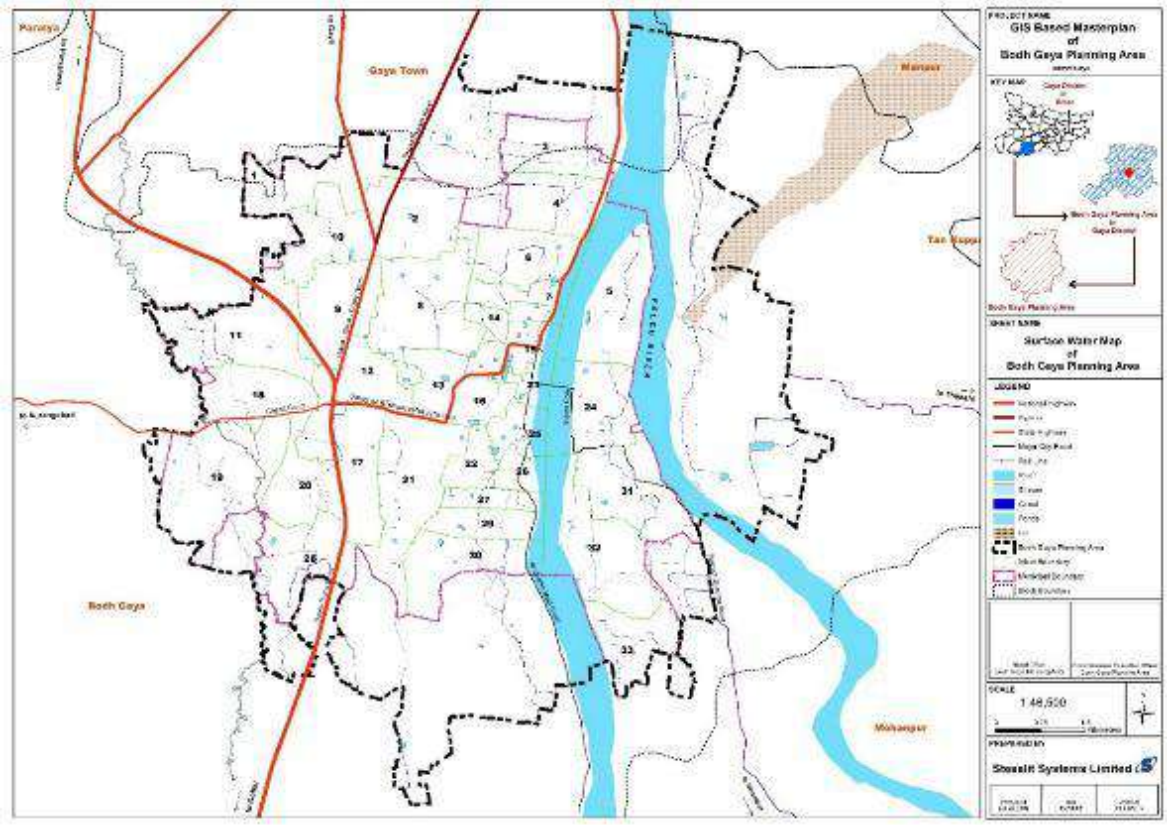
The geology of Gaya district is categorized into two main groups: pre-Cambrian rock formations, including the Chhota Nagpur granite gneiss complex and meta-sedimentary rocks, and Quaternary sediments, which feature both younger and older alluvium. The oldest rocks are metamorphosed sediments, such as mica schist, phyllite, and quartzite. Notably, mica schist in this area includes types with staurolite and sillimanite. The quartzite forms long, linear ridges due to folding into synclines and anticlines, while the southern region contains calc-silicate rocks. The geological formations between Bodhgaya and Rajgir in the Nalanda district are predominantly quartzite, with significant granite and slate deposits in the southern hills. The region's granite is characterized by its fine grain and homogeneity. In Bodhgaya Planning area the majority of the Natural resources are alluvium, Alluvial deposits can contain valuable heavy minerals like ilmenite, rutile, and zircon, which are used in various industrial applications

Map 1-17 GEOLOGY MAP OF BODHGAYA PLANNING AREA



1.6.6 SURFACE WATER

Surface waters encompass all inland waters that exist on the Earth's surface, either continuously or intermittently, in a liquid state (such as rivers, temporary streams, lakes, reservoirs, and bogs) or a solid state (like glaciers and snow cover). The ponds are observed to be more in Bodhgaya Nagar parishad than rural areas. Falgu river passing through the Planning area which is a potential for agricultural and domestic use.



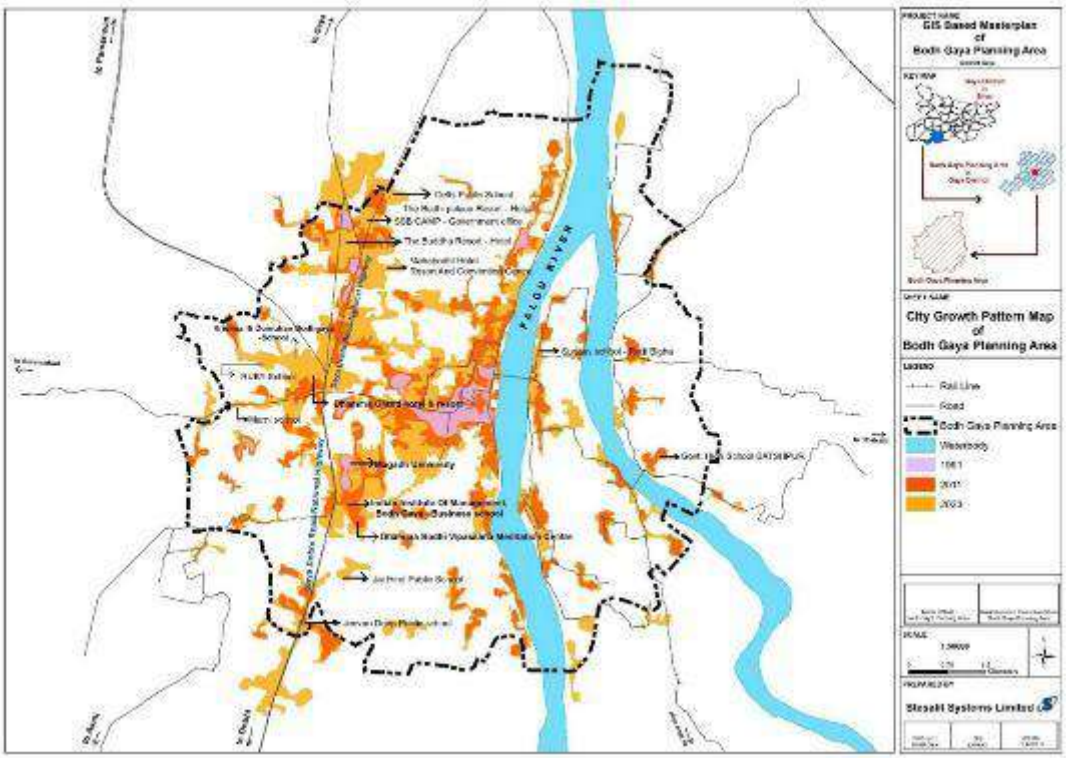
MAP 1-18 SURFACE WATER MAP

1.7 DEVELOPMENT STRATEGIES

1.7.1 GROWTH PATTERN AND INFLUENCE ZONE

Bodhgaya is situated in the Gaya district of Bihar, India, around 96 km south of Patna, the capital of the state. It is situated in a primarily rural region with a significant cultural and historical background. Bodhgaya has been a historically important site, especially in relation to Buddhism. Emperor Ashoka, who ruled in the 3rd century BC, is credited for constructing the original Mahabodhi Temple and erecting a commemorative pillar, which is thought to have played a significant influence in the development of the site. The area has been influenced by various Buddhist traditions over the centuries, which is evident in the diverse architectural styles of the monasteries and temples present. Bodhgaya is easily accessible from several towns and regions due to its well-developed road network, which includes NH-22, enabling convenient travel within Bihar and to other destinations. The closest railway station, Gaya Junction, is around 15-17 km away. Furthermore, the nearest airport, Gaya International Airport, is about 12 km from Bodhgaya.

Over the past 15 years, investments in hotels and resorts, as well as the establishment of numerous organizations, have played a central role in driving urban expansion. Moreover, the transit corridors have been the primary sites for urban growth in the Bodhgaya Planning Area. The National Highway that traverses the western half of the planning area exhibits significant urban expansion in a north-south direction. The existence of transportation infrastructure, as well as recent investments in facilities including hotels, resorts, and educational institutions like Magadh University and IIM-Bodhgaya, have led to the growth and development of these places.



Map 1-19 Growth MAP OF BODHGAYA PLANNING ARE

2 THE PLANNING PROCESS

2.1 LITERATURE REVIEW

TABLE 2-1 LITERATURE REVIEW MATRIX

Document / Source	Year	Issuing Agency	Relevance to Gaya Ji Planning Area	Key Provisions / Focus Areas	Implications for Master Plan
Bihar Urban Planning & Development Act (BUPD Act)	2012	Government of Bihar	Provides the statutory framework for urban planning and development in Bihar	Planning areas, preparation and implementation of Master Plans, development control and land-use regulation	Forms the **primary statutory basis** for preparation, approval and implementation of the Gaya Ji Master Plan
Bihar Urban Planning & Development Rules	2014	Government of Bihar	Provides procedural requirements under the BUPD Act	Planning procedure, development permissions, planning authorities and implementation mechanisms	Guides the **planning process, development control and statutory implementation**
Bihar Building Bye-Laws	2014, amended 2022	Government of Bihar / Urban Development & Housing Department	Applicable to building and development activities within the planning area	FAR, setbacks, height, coverage, parking, building safety, fire safety and other development controls	Provides the basis for **DCR provisions**, building controls and development permissions

Bihar Municipal Act	2007	Government of Bihar	Relevant for municipal governance and service delivery in Gaya Ji	Municipal functions, infrastructure, sanitation, roads, public services and development management	Supports proposals related to **municipal infrastructure, service delivery and institutional responsibilities**
URDPFI Guidelines	2014	MoHUA, Government of India	Provides national planning standards for preparation of Master Plans	Land-use planning, population projections, housing, transportation, infrastructure, environment and development control	Provides the **planning standards and methodology** for land use, infrastructure, housing and spatial development
AMRUT Mission Guidelines	2015	MoHUA, Government of India	Relevant to urban infrastructure and service improvement	Water supply, sewerage, drainage, urban transport, green spaces and institutional reforms	Helps integrate **water supply, sewerage, drainage, mobility and green infrastructure proposals**
Harmonised Guidelines & Standards for Universal Accessibility	2021	MoHUA / Government of India	Important for creating an inclusive and accessible Gaya Ji	Barrier-free access, pedestrian infrastructure, public buildings, streets and universal design	Incorporation of **universal accessibility and inclusive mobility** in public spaces, streets and infrastructure
National Building Code of India (NBC)	2016	Bureau of Indian Standards (BIS)	Provides technical standards for building	Building safety, fire protection, structural safety,	Supports preparation of **safe and technically compliant**

			developm ent	services, accessibility and occupancy	**building regulations**
IRC Guidelines / IRC:103 – Guidelines for Pedestrian Facilities	2012	Indian Roads Congress	Relevant to Gaya Ji's pilgrimage and pedestrian movement	Footpaths, pedestrian crossings, accessibility, pedestrian safety and street design	Supports **pedestrian-oriented streets, pilgrimage routes and improved walkability**
Street Design Guidelines	2010	UTTIPEC / applicable urban planning agencies	Relevant for redesign of streets and public realm	Street hierarchy, pedestrian facilities, carriageway s, cycle facilities and street furniture	Guides **complete-street and pedestrian-friendly street proposals**, particularly in the Core/Old City
Mahabodhi Temple Complex – UNESCO World Heritage Documentat ion	2002	UNESCO World Heritage Centre	Critical for Bodhgaya' s internation al heritage significanc e	Outstanding Universal Value, conservation , authenticity, integrity and manageme nt	Requires **heritage-sensitive spatial planning, controlled developmen t and protection of the setting** around the World Heritage property. (UNESCO World Heritage Centre)
UNESCO Conservatio n / State of Conservatio n Decisions – Mahabodhi Temple	2005–2012	UNESCO World Heritage Committe e	Addresses developm ent pressure around Mahabod hi Temple	Site manageme nt, buffer/perip hery controls, conservation and integration	Supports preparation of **heritage buffer/contr ol zones, visual protection and tourism manageme**

				of pilgrimage and community development	**nt strategies**. (UNESCO World Heritage Centre)
Heritage-led Perspective Development Plan for Bodhgaya – Vision 2005–2031	2005	Government of Bihar / Heritage Planning framework	Provides an important previous planning reference for Bodhgaya	Heritage conservation, development controls, pilgrimage, tourism and spatial development	Existing proposals should be **reviewed, updated and integrated** with the Gaya Ji Planning Area Master Plan. UNESCO records its adoption and relevance to the development planning framework. (UNESCO World Heritage Centre)
Bodhgaya Site Management Plan	2005	Government of Bihar / Heritage Management framework	Important for management of the Mahabodhi Temple and its surroundings	Conservation, site management, visitor management and protection of heritage values	Should be considered while preparing **heritage zones, tourism facilities, circulation and development controls**
Government Tourism Schemes and Projects	Ongoing	Ministry of Tourism / Government of Bihar	Tourism and pilgrimage are major economic drivers of Gaya–Bodhgaya	Pilgrimage infrastructure, tourism circuits, visitor facilities and destination	Supports development of a **pilgrimage and tourism-led spatial development strategy**

				developmen t	
Sustainable Developme nt Goals (SDGs)	2015	United Nations	Provides a broader sustainabili ty framework	SDG 6, 8, 9, 10, 11, 13 and 15 relating to water, economy, infrastructure , inclusion, sustainable cities, climate and ecosystems	Helps establish **sustainable, inclusive, resilient and environment ally sensitive planning objectives**

The literature review establishes the statutory, policy, technical, heritage and development framework for preparation of the Gaya Ji Planning Area Master Plan. The review of national guidelines, Bihar State Acts and Rules, building regulations, technical standards, heritage management documents, previous planning studies and ongoing development schemes provides the basis for formulating appropriate land-use, transportation, infrastructure, environmental, tourism, heritage conservation and development control proposals. Particular emphasis shall be given to conservation of the cultural and spiritual identity of Gaya Ji and Bodhgaya, protection of the Mahabodhi Temple World Heritage property and its setting, sustainable management of pilgrimage and tourism, universal accessibility, infrastructure adequacy and climate-resilient urban development.

The BUPD Act, BUPD Rules and Bihar Building Bye-Laws are currently listed by the Bihar planning authority, including the 2022 Building Bye-Laws amendment, so these should be treated as core statutory references in the final report.

2.2 STAKEHOLDER ENGNGMENT

2.2.1 STAKEHOLDER ENGAGEMENT FOR GAYA JI MASTER PLAN PREPARATION

Stakeholder engagement is a critical component of the **Gaya Ji Master Plan preparation process**, as it ensures that the planning proposals reflect the needs, aspirations, concerns, and development priorities of government departments, local institutions, elected representatives, citizens, businesses, tourism stakeholders, and other relevant agencies. Considering the **religious, cultural, heritage and tourism significance of Gaya Ji**, an inclusive and participatory approach is essential for preparing a practical, implementable and sustainable Master Plan up to 2047.

2.2.2 OBJECTIVES OF STAKEHOLDER ENGAGEMENT

The major objectives of stakeholder engagement for the Gaya Ji Master Plan are:

- To understand the existing development issues, opportunities and constraints within the Gaya Ji Planning Area.
- To obtain inputs from key government departments and line agencies regarding ongoing and proposed projects.
- To identify infrastructure and service delivery gaps related to water supply, sewerage, drainage, solid waste management, transportation, housing and social infrastructure.
- To understand the requirements of **pilgrims, tourists, local residents and the business community**.
- To incorporate heritage conservation and tourism-development requirements into spatial planning.
- To obtain inputs regarding proposed land-use changes, transportation networks, infrastructure corridors and development areas.
- To identify environmentally sensitive areas, flood-prone areas and areas requiring development restrictions.
- To build consensus among stakeholders regarding the proposed development vision, strategies and Master Plan proposals.
- To facilitate coordination between different departments for effective implementation of the Master Plan.



FIGURE 2-1 STAKEHOLDERS MEETING FOR DRAFT MASTER

2.3 VISION

Located in the southern part of Bihar, the Bodhgaya Planning Area holds significant regional and international importance as one of the most prominent spiritual and cultural destinations in the world. The town is globally renowned for the Mahabodhi Temple Complex, the sacred site where Lord Buddha attained enlightenment under the Bodhi Tree. Recognized as a UNESCO World Heritage Site, the Mahabodhi Temple Complex attracts millions of pilgrims, monks, and tourists from across the world, making Bodhgaya a major centre of international Buddhist pilgrimage and cultural exchange.

The planning area is well connected through regional and national transport networks. It is located near Gaya, which serves as the primary urban centre and transport hub for the region. Road connectivity is facilitated through National and State Highways linking Bodhgaya to Patna, Varanasi, Ranchi, and other major cities in eastern and northern India. The presence of Gaya International Airport, which handles direct international flights particularly from Southeast Asian Buddhist countries, significantly strengthens Bodhgaya's global accessibility and reinforces its role as an international pilgrimage destination.

The surrounding region is characterized by a predominantly agrarian landscape supported by fertile alluvial plains and traditional irrigation systems. Agriculture and allied activities remain important sources of livelihood for the local population, while the growing tourism economy has generated opportunities in hospitality, local crafts, retail, and cultural services. Numerous international monasteries, cultural centres, and educational institutions established by Buddhist communities from countries such as Thailand, Japan, Bhutan, and Sri Lanka further enhance Bodhgaya's multicultural identity. Together, these factors position the Bodhgaya Planning Area as a unique spiritual, cultural, and tourism-driven growth centre with strong potential for sustainable urban development and international connectivity in southern Bihar.

TABLE 2-2KEY ATTRIBUTES

Attribute	Strength
Location	Strategically located in southern part of Bihar; holds significant regional and international importance as one of the most prominent spiritual and cultural destinations in the world
Connectivity	Situated on NH-22 and NH-119; located near Gaya Ji International Airport connect it internationally
Agrarian Base	Fertile alluvial plains supported by the Falgu River system; high agricultural productivity (paddy, wheat, pulses, oilseeds); canal and groundwater-based irrigation supporting agro-based economy
Tourism Base	UNESCO World Heritage site- Mahabodhi Complex attracts millions of pilgrims, monks, and tourists from across the world, making Bodhgaya a major centre of international Buddhist pilgrimage and cultural exchange
Economic Potential	Tourism Based economy, Agriculture based industry, Hospitality
Policy Support	Bihar Tourism Policy, Bihar Industrial Policy, PMKSY, Gati Shakti, and Agro Export Policy

Source: Stesalit Systems Ltd

"To develop the Bodhgaya Planning Area into a globally recognized spiritual, cultural, and sustainable urban center by 2047 — leveraging its status as the home of the sacred Mahabodhi Temple Complex, strengthening pilgrimage and heritage tourism, enhancing regional and international connectivity, and promoting environmentally sensitive, inclusive, and well-managed urban development that supports local livelihoods while preserving the town's unique spiritual character and cultural landscape."

The vision, as supported by and derived from the various guiding principles, is further elaborated as goals and strategies in the table below:

TABLE 2-3 GUIDING PRINCIPLES FOR THE VISION

GUIDING PRINCIPLE	OBJECTIVES	STRATEGIES / FOCUS AREAS
ECONOMIC DIVERSIFICATION	Heritage Zone	- Heritage Corridor, Hospitality, Exhibitions, Conventions, etc.
	Higher Education Facility	- Colleges, Library and Coaching center - Integration with Education Policy, National Mission on Libraries (NML), Skill India Mission
	Skill Development Hub	- District Skill & Livelihood Centre with labs in food tech, aquaculture, and renewables - Hostel, digital learning, and placement facilities
	MSMEs and SHG-led rural enterprises	- NTFP clusters, eco-labelling, micro-packaging - Van Dhan Yojana convergence and financial linkage with SHGs
SUSTAINABLE & BALANCED DEVELOPMENT	Circular economy practices and climate-smart production	- Solar tunnel dryers, biodegradable packaging, organic compost units - Promote rainwater harvesting
	Agricultural resilience and water-based livelihood systems	- Falgu River Aqua-Agri Zone (cage culture, hatchery, feed units) - Alignment with PMMSY, fisheries value chain, and seed banks - Promote irrigation-linked fish farming and mixed cropping
	Access to treated water and sanitation systems	- Water Treatment Plants, Overhead Reservoirs (OHR)/Underground Reservoirs (UGR), dual-piping planning - Sewage Treatment Plants (STPs), Faecal Sludge Treatment Plants (FSTPs), CETP in food park, and decentralized wastewater reuse
	Sustainable Waste Management	- Material Recovery Facility (MRF), Material Collection Centres (MCC) for source segregation - Waste-to-compost and organic fertilizer linkage
	Integrated urban–rural development	- Phased land allocation for education, R&D, and industry till 2047- multi-sector synergy in land zoning
	Integrated green and blue infrastructure	- Green buffers and biodiversity belts along the Falgu River, Ahar, Pyne, Pond and canals - Urban forests and env. sensitive zones - Riverfront beautification and ecological restoration
ECO-TOURISM	Wellness and eco-tourism	- AYUSH Cluster with GMP-certified processing - Medicinal plantation with health trails, yoga zones, and interpretation centres

GUIDING PRINCIPLE	OBJECTIVES	STRATEGIES / FOCUS AREAS
IMPROVED QUALITY OF LIFE & INNOVATION	Education, healthcare, and urban amenities	- Higher Education and Innovation Hub with biotech, IoT, and agri-sensor labs - R&D centres, incubation, and university-industry linkages - Healthcare integration via AYUSH and mobile clinics
	Inclusive learning and digital empowerment	- Hostel and smart classroom infrastructure for rural youth - E-learning zones, library, AV studio, and remote access labs
	Strengthen social and physical infrastructure for inclusive service delivery	- Schools, libraries, remote education centers in rural nodes - Gender-safe public spaces, sports infrastructure, and Wi-Fi-enabled public libraries - Urban design with inclusive access to green, cultural, and recreational spaces - Public amenities integrated with solid waste management (MCC, MRF, composting)
	Improve urban sanitation, livability, and water security	- Modern public toilets, covered drains, faecal sludge reuse - Smart water metering, treated water reuse for green spaces
TRANSPORT & FREIGHT INTEGRATION	Logistics and Export Hub	- Logistics Hub with access to high-speed road, and customs facilities - Export yard, packhouse, auction yard, and customs nodal cell
	Trade corridors	- NH 22 and 119 link to Patna, Dobhi,; integration with rail and airplane freight terminals

3 DEMOGRAPHY

3.1 POPULATION AS PER CENSUS OF INDIA 2011

The development of a particular city, town or region is contingent upon a combination of natural, physical, and socio-economic elements. Among these factors, the population plays a pivotal role in defining the future trajectory of progress and development of the area.

As per the Census of India, the population of Bodhgaya Planning Area in 2011 was 102672 people, of which 52811 (51.44%) were male and 49861 (48.56%) were female. Around 18.40% of the total population of the area is child population belonging to the age group of 0-6 years.

*Note: In accordance with **Section 11** of the **Bihar Urban Planning and Development Act, 2012**, and **Rule 11** of the **Bihar Urban Planning and Development Rules, 2014**, the Bihar Urban Planning and Development Authority (BUPDA) issued Notification No. U.O. 11/01/2013 on February 21, 2017, formally declaring the **Bodhgaya Planning Area** for urban development purposes. Subsequently, through detailed consultations with BUPDA, the boundaries of the Bodhgaya Planning Area were delineated and finalized.*

As per the Gazette Notification, the Bodhgaya Planning Area comprised the Bodhgaya Nagar Parishad and 33 adjoining census villages, based on the Census of India 2011. For the purpose of demographic, socio-economic, and housing analysis, Census 2011 continues to serve as the most recent official dataset. However, significant changes in administrative boundaries have occurred since 2011.

*In a subsequent administrative reclassification (2021), the Bodhgaya Nagar Parishad, along with 18 surrounding villages—14 fully and 4 partially (Dubahal, Parariya, Mocharim, and Dhandhawa)—was upgraded to the status of **Bodhgaya Nagar Parishad** in 2022. A comparison between the current Nagar Parishad boundaries and the 2011 Census boundaries reveals that the upgraded Nagar Parishad encompasses the former Nagar Parishad area in addition to these 18 census villages, both in full and in part.*

Given the generally dispersed settlement patterns of rural villages, population estimates for the partially included villages have been derived proportionally, based on the extent of residential area falling within urban jurisdiction. As per the Land Use Plan, the residential distribution for the four partially included villages is as follows:

***Dubahal**: 0% of the residential area falls under urban jurisdiction; 100% remains rural.*

***Parariya**: 73% of the residential area falls under urban jurisdiction; 27% remains rural.*

***Mocharim**: 64% of the residential area falls under urban jurisdiction; 36% remains rural.*

***Dhandhawa**: 100% of the residential area falls under urban jurisdiction; 0% remains rural.*

In total, 14 additional villages—namely Tikuna, Jahan Bigha, Amar Bigha, Musatpura, Kolhaura, Mahurar, Turi Buzurg, Bhalua, Niman, Hathiar, Silunja, Bakraur, Ratanara Ganga Bigha, and Dhanawan—along with portions of Dubahal, Parariya, Mocharim, and Dhandhawa, have been newly incorporated within the expanded limits of the Bodhgaya Nagar Parishad.

The revised population distribution of the Bodhgaya Planning Area is presented below, based on the administrative boundaries as they exist today, but utilizing population data from the Census of India 2011, which remains the most recent official dataset.

For the purposes of this document, Bodhgaya Nagar Parishad *refers to the area comprising the erstwhile Bodhgaya Nagar Parishad along with 19 surrounding villages—14 fully and 4 partially included (Dubahal, Parariya, Mocharim, and Dhandhawa). Accordingly, the* Bodhgaya Planning Area *is defined as encompassing the Bodhgaya Nagar Parishad along with an additional 18 villages, including the four that are only partially within the urban jurisdiction.*

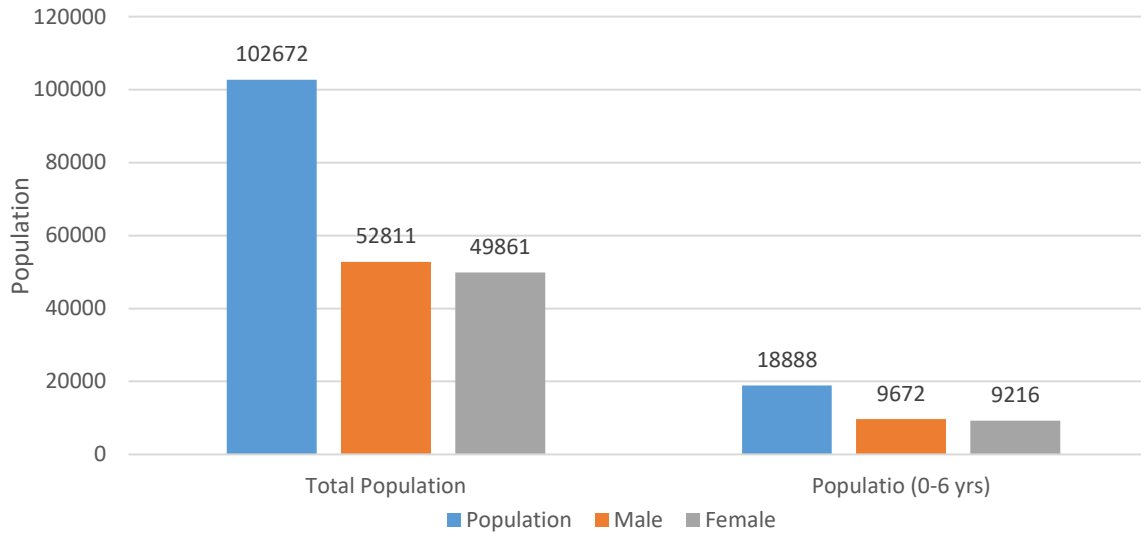


FIGURE 3-1 POPULATION DETAILS OF BODHGAYA PLANNING AREA

Source: Census of India, 2011

TABLE 3-1 POPULATION DETAILS OF BODHGAYA PLANNING AREA

Name	Total Population	Male	Female
Bodhgaya Nagar Parishad	73908	38143	35765
Rural Areas (19 Villages)	28764	14668	14096
Bodhgaya Planning Area	102672	52811	49861

Source: Census of India, 2011

3.2 POPULATION DISTRIBUTION

The spatial distribution of the population has been examined, based on the ward population and rural-urban distribution.

3.2.1 WARD-WISE POPULATION OF BODHGAYA NAGAR PARISHAD

According to Census 2011, Bodhgaya Nagar Parishad has 19 wards with a total population of 38439 and a total number of 6303 households. Ward number 17 has the highest population of 3386 whereas ward number 4 has the lowest population of 1229. Only two wards i.e., ward number 17 and 6 have populations above 3,000 with the rest of the wards having populations ranging between 1000 to 2000.

TABLE 3-2 WARD-WISE HOUSEHOLD AND POPULATION DISTRIBUTION IN BODHGAYA (CENSUS, 2011)

BODHGAYA NAGAR PARISHAD		
Ward Number	**Total Population**	**Number of Households**
Ward 1	1764	259
Ward 2	2195	385
Ward 3	1862	304
Ward 4	1229	187
Ward 5	2346	398
Ward 6	3188	489
Ward 7	1493	235
Ward 8	1658	286
Ward 9	2300	377
Ward 10	2304	413
Ward 11	1928	297
Ward 12	1641	244
Ward 13	2143	355
Ward 14	1485	219
Ward 15	1700	259
Ward 16	2123	386
Ward 17	3386	603
Ward 18	1758	273
Ward 19	1936	334

Source: Census of India, 2011

Note: The present Bodhgaya Nagar Parishad has been upgraded, and 18 villages have been included within the Nagar Parishad boundary. As a result, its jurisdiction has changed, and the ward-wise population of Bodhgaya has also changed.

Earlier, there were 19 wards within the planning area; however, after the changes, there are now 33 wards. Since updated population and household data for the newly formed wards is not available, the population and household data from Census 2011, corresponding to the earlier 19 wards, has been used.

3.2.1.1 URBAN RURAL DISTRIBUTION OF POPULATION ACCORDING TO CENSUS OF INDIA 2011.

The Bodhgaya Planning Area comprises 1 ULB and 19 revenue villages spread over 2 blocks—Bodhgaya and Gaya. The Bodhgaya planning area constitutes the total urban population, i.e., 73908. The total rural population comprises 16 villages from the Bodhgaya Block and the remaining 3 villages from the Gaya Block, i.e., 28764.

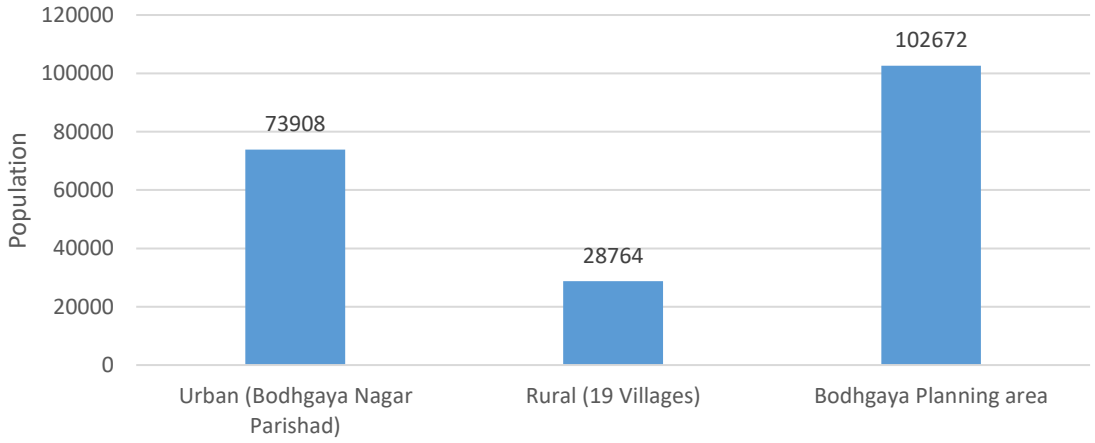


FIGURE 3-2 DISTRIBUTION OF URBAN-RURAL POPULATION OF THE BODHGAYA PLANNING AREA FOR 2011

Source: Census of India, 2011

3.2.1.2 URBAN RURAL DISTRIBUTION OF POPULATION ACCORDING TO CENSUS OF INDIA 2001.

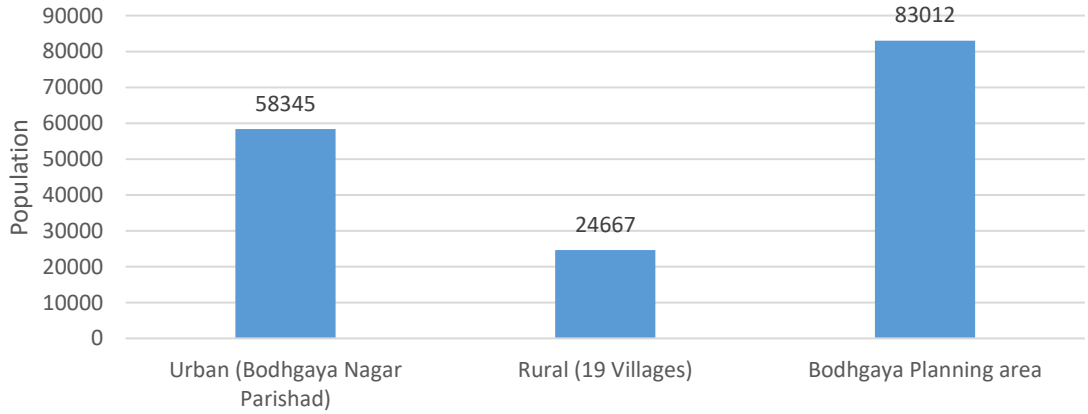


FIGURE 3-3 DISTRIBUTION OF URBAN-RURAL POPULATION OF THE BODHGAYA PLANNING AREA FOR 2001

Source: Census of India, 2001

3.2.1.3 URBAN RURAL DISTRIBUTION OF POPULATION ACCORDING TO CENSUS OF INDIA 1991.

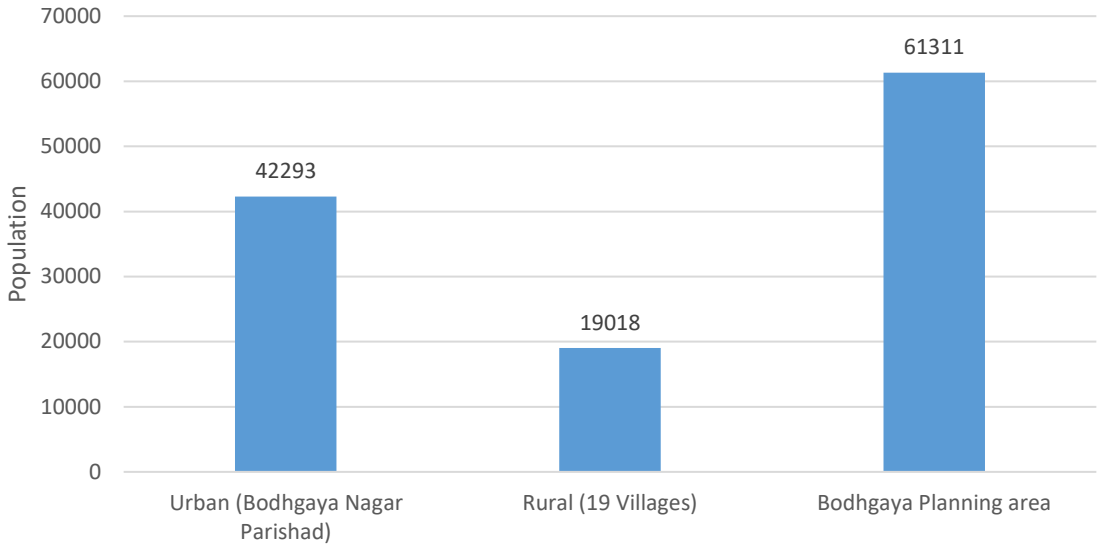


FIGURE 3-4 DISTRIBUTION OF URBAN-RURAL POPULATION OF THE BODHGAYA PLANNING AREA FOR 1991

Source: Census of India, 1991

3.3 GROWTH RATE

In order to anticipate future population growth, it is crucial to examine the rate of population increase in cities due to their rapid urbanization. The likelihood of improved resource and capacity allocation to support future development increases with increasing population prediction accuracy.

TABLE 3-3 DECADAL POPULATION GROWTH RATE IN BODHGAYA PLANNING AREA

Area Name	1991	2001	2011
Bodhgaya Planning area	**61311**	**83012**	**102672**
Growth (%)		**35.39%**	**23.68%**
Bodhgaya Nagar Parishads	42293	58345	73908
Growth (%)		37.95%	26.67%
Rural areas (19 Villages)	19018	24667	28764
Growth (%)		29.70%	16.61%

Source: Computed from Census of India, 1991-2011

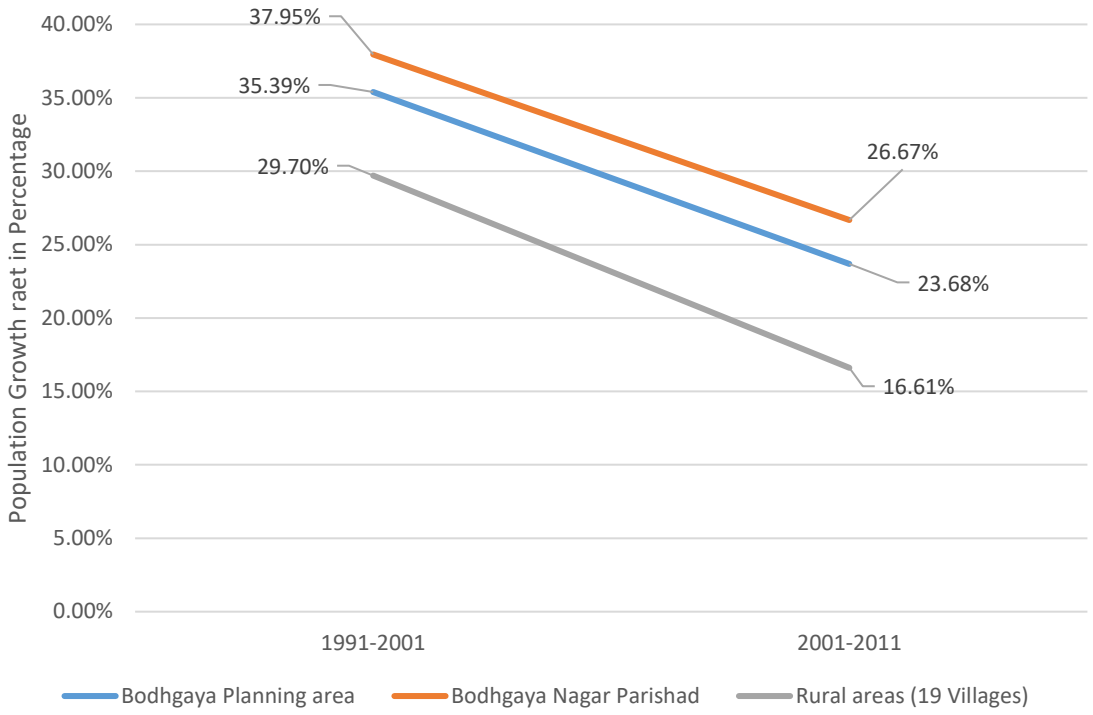


FIGURE 3-5 DECADAL POPULATION GROWTH RATE OF BODHGAYA PLANNING AREA

Source Computed from Census of India, 1991-2011

According to the 2011 Indian Census, Bodhgaya Nagar Parishad had 73,908 residents. The overall population growth rate in the urban area has generally declined from 37.95% in 1991-2001 to 26.67% in 2001-2011. For rural areas with 19 villages, the population as per Census 2011 is 28,764. The population growth rate in the rural area also experienced a decline from 29.70% in 1991-2001 to 16.61% in 2001-2011, whereas the population growth rate in the entire Bodhgaya Planning Area decreased partially from 35.39% in 1991-2001 to 23.68% in 2001-2011. The cause can be Tourism-related jobs here are often seasonal, so workers move elsewhere during off-seasons for full time employment.

3.4 HOUSEHOLD SIZE

The calculation of the average household size involves dividing the total population by the total number of households. According to the 2011 Census, the average household size in the Bodhgaya Planning Area is 6.12. The high average household size in these areas can be attributed to the fact that residents have more children and prefer to live with their extended families.

TABLE 3-4 AREA-WISE DISTRIBUTION OF TOTAL HOUSEHOLDS AND AVERAGE HOUSEHOLD SIZE IN BODHGAYA PLANNING AREA (CENSUS, 2011)

Name	Total Population	Number of Households	Average Household Size
Bodhgaya Nagar Parishad	73908	12101	6.11
Rural Areas (19 villages)	28764	4677	6.15
Bodhgaya Planning Area (19 villages, 1ULB)	102672	16778	6.12

Source: Census of India, 2011

3.5 POPULATION DENSITY

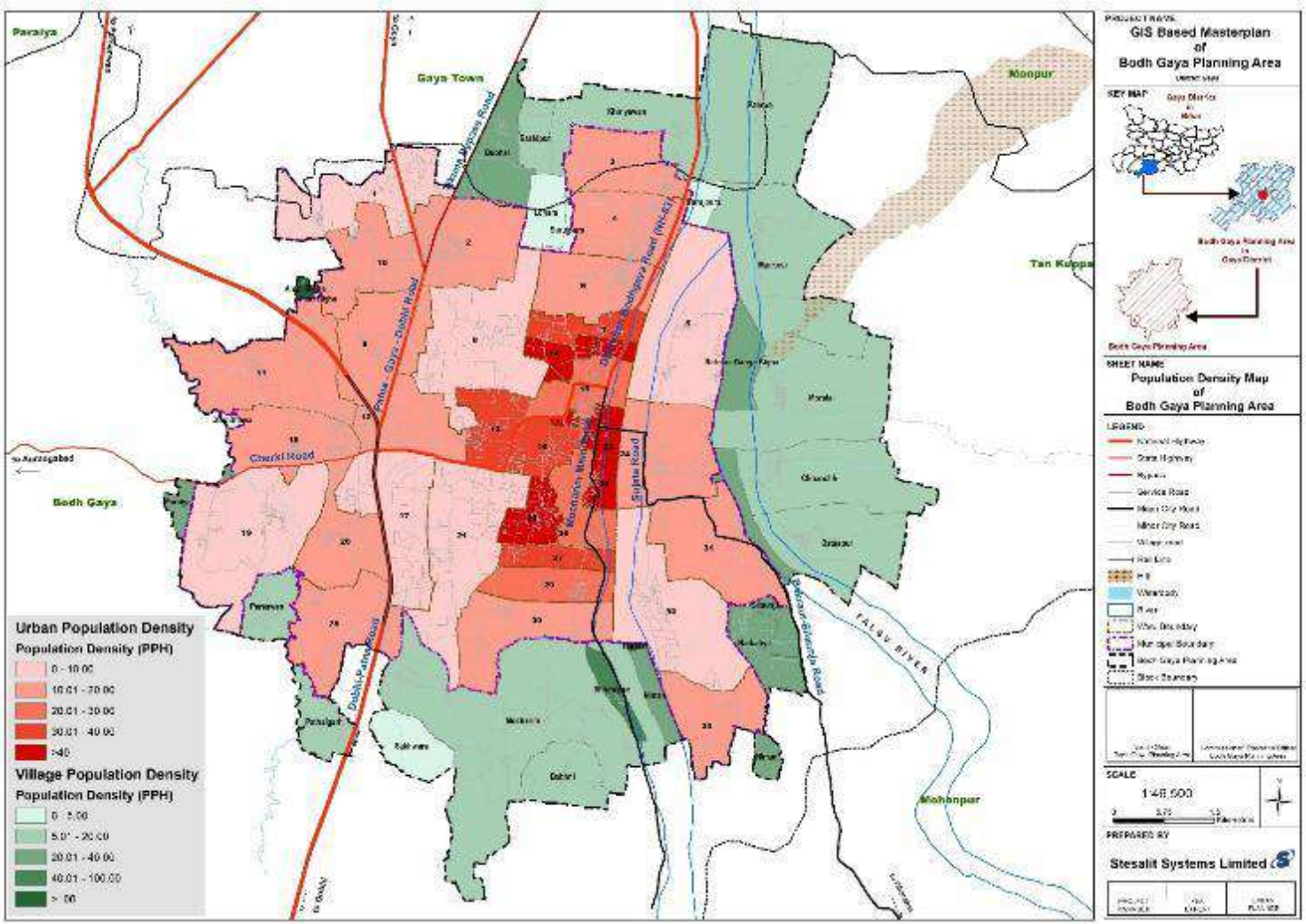
Population density is defined as the number of persons per hectare (PPH). As per the 2011 Census report, the population of the Bodhgaya planning area is 102672, and the total area is 8657 hectares. The estimated population density of the area is 12 pph for 2011. Bodhgaya Planning area's population density is higher than that of the district and the state. The Bodhgaya nagar parishad population density as per 2011 census is 11 pph and Rural areas population density is 7 pph.

TABLE 3-5 VARIATION IN DENSITIES IN DIFFERENT AREAS OF THE BODHGAYA PLANNING AREA

Name	Area (in Ha)	Population		Density (PPH)	
		2011	2001	2011	2001
Bihar State	9416300	104099452	82998509	11	9
Gaya District	497600	4391418	3473428	9	7
Bodhgaya Planning Area	8665	102672	83012	12	10
Bodhgaya Nagar Parishad	5296	73908	58345	14	11
Rural areas (19 Villages)	3369	28764	24667	9	7

Source: Census of India, 2011 and 2001

As per URDPFI guidelines, cities with a population between 1 lakh and 5 lakhs are classified as medium towns (Category Medium Town II). The ideal density for a medium town, as per URDPFI guidelines, can be 100 to 150 pph. Though, as per population, the Bodhgaya planning area is a medium town, its population density is much lower than the suggested standard.



MAP 3-1 POPULATION DENSITY MAP OF BODHGAYA PLANNING AREA

Source: Stesalit Systems Ltd.

3.6 SEX-RATIO

As of the 2011 census, in the Bodhgaya planning area, there are 944 females per 1000 males, which is higher than the Gaya district average of 937 females per 1000 males. There are 953 girls under 6 years of age per 1,000 boys of the same age in the planning area, which is lower than the district average of 960 girls per 1000 boys as per the Census of India, 2011.The sex ratio of Bodhgaya Nagar parishad is 938 females per 1000 males and in rural areas is 961 females per 1000 males. It is observed that the rural sex ratio is higher in comparison with urban area.

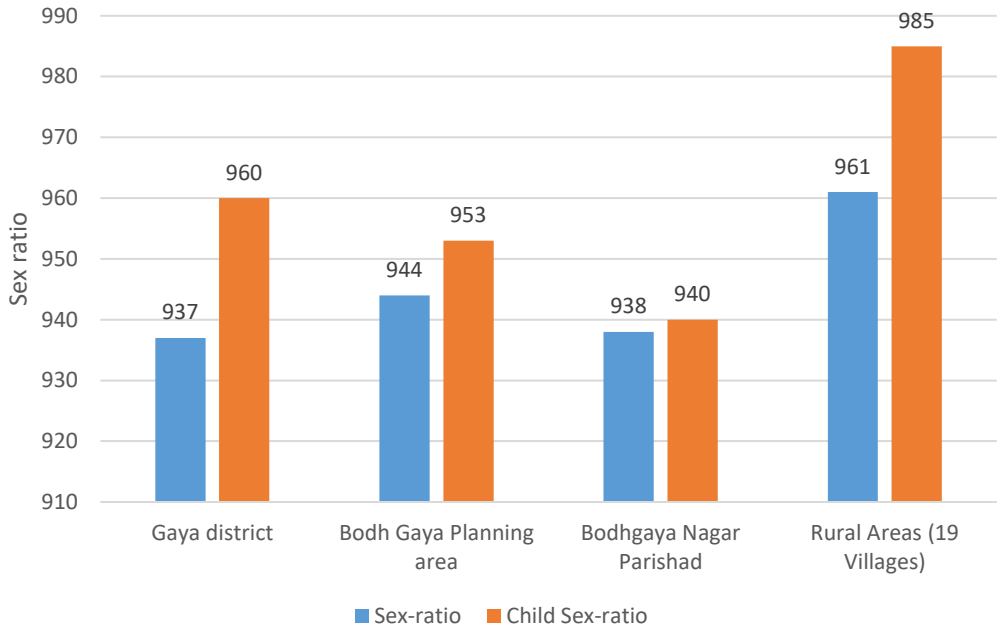
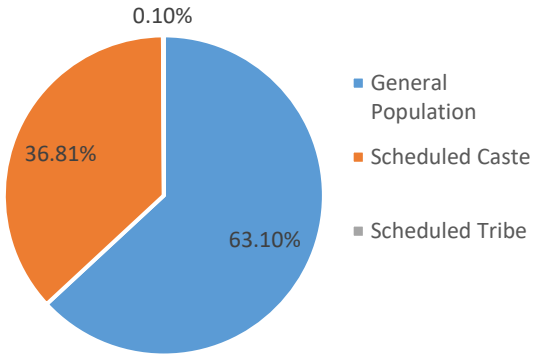


FIGURE 3-6 COMPARISON OF SEX-RATIO AND CHILD-RATIO IN BODHGAYA, 2011

Source: Census of India, 2011

3.7 SC/ST RATIO

As per Census 2011, out of 102672 people, 37789 (36.81%) belong to the scheduled caste category, and 98 (0.10%) belong to the scheduled tribe category. General categories contribute to the rest 63.10% (64785) of the population.



Source: Census of India, 2011

TABLE 3-6 SCHEDULE CASTE (SC) AND SCHEDULE TRIBE (ST) COMPOSITION (CENSUS, 2011)

Name	Category	2001		2011	
		Total	Percentage Distribution	Total	Percentage Distribution
Bihar State	Total Population	82998509		104099452	
	SC Population	13048608	15.72%	16567325	15.91%
	ST Population	758351	0.91%	1336573	1.28%
Gaya District	Total Population	34,73,428		43,91,418	
	SC Population	10,29,675	29.64%	13,34,351	30.39%
	ST Population	2,945	0.08%	3,098	0.07%
Bodhgaya Planning Area	Total Population	83012		102672	
	SC Population	29089	35.04%	37789	36.81%
	ST Population	67	0.08%	98	0.10%
Bodhgaya Nagar Parishad	Total Population	58345		73908	
	SC Population	19516	33.45%	26522	35.88%
	ST Population	67	0.11%	91	0.12%
Rural area (19 Villages)	Total Population	24667		28764	
	SC Population	9573	38.81%	11267	39.17%
	ST Population	0	0.00%	7	0.02%

Source: Census of India, 2011

Between 2001 and 2011, Bihar's total population increased significantly, with the SC population rising from 15.72% to 15.91% and the ST population from 0.91% to 1.28%. In Gaya district, the SC share also grew slightly from 29.64% to 30.39%, while the ST share declined marginally from 0.08% to 0.07%. In the Bodhgaya Planning Area, SC population saw a notable rise from 35.04% to 36.81%, indicating high concentration, while the ST population remained very low, increasing only from 0.08% to 0.10%. The percentage of SC and ST population is observed higher in rural areas comparatively with the urban areas in the Bodhgaya planning area.

3.8 LITERACY RATE

As per Census 2011, the literacy rate for the Bodhgaya planning area is 66.51%, higher than the state average of 61.80%. Among the total literates in the Planning area, 58.57% are male, while the rest, 41.43%, are female. Literacy rate In the Bodhgaya Nagar parishad area is 67.27%, Among the total literates in the Bodhgaya Nagar parishad 58.55% are males and 41.45% are females. The literacy rate in the rural areas is 64.56%, among the total literates in the rural areas 58.63% are males and 41.37% are females.

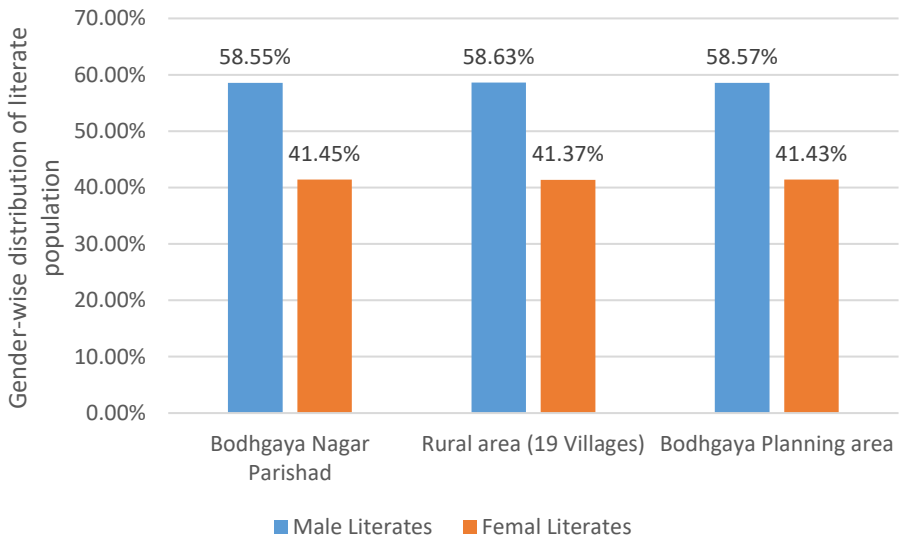


FIGURE 3-7 GENDER-WISE DISTRIBUTION OF LITERATE POPULATION IN BODHGAYA PLANNING AREA, 2011

Source: Census of India, 2011

TABLE 3-7 AREA-WISE LITERACY RATE IN THE BODHGAYA PLANNING AREA (CENSUS, 2011)

Name	2001		2011	
	Total Population	Literacy Rate	Total Population	Literacy Rate
Bihar State	82998509	47.00%	10,40,99,452	61.80%
Gaya District	34,73,428	50.45%	43,91,418	63.67%
Bodhgaya Planning Area	83012	53.71%	102672	66.51%
Bodhgaya Nagar Parishad	58345	55.67%	73908	67.27%
Rural (19 Villages)	24667	49.06%	28764	64.56%

Source: Census of India, 2011

Between 2001 and 2011, literacy rates improved significantly across all levels. Bihar's literacy rate rose from 47.00% to 61.80%, while Gaya district saw an increase from 50.45% to 63.67%. The Bodhgaya Planning Area recorded the highest growth among the three, with literacy rising from 53.71% to 66.51%, indicating steady progress in educational attainment in the region. The literacy rate in the rural areas of the planning area is observed increase from 49.06% in 2001to 64.56% in 2011.

3.9 SOCIO ECONOMIC SURVEY ANALYSIS

3.9.1 DEMOGRAPHIC PROFILE URBAN

The demographic characteristics provide crucial insights into age distributions, gender dynamics, educational attainments, and occupational structures. By investigating these demographic details, the analysis acquires a more nuanced knowledge of the diverse and dynamic makeup of the questioned community. Such insights not only guide targeted policy initiatives but also contribute to a

broader socioeconomic story, offering light on the interconnected variables that shape the community's fabric.

As discussed in the sample size distribution section of Chapter 4.1, the sample size for Bodhgaya Planning Area is considered as 5% of the total households as per the Census of India, 2011. According to it, the required sample size of 315 households for the urban area consisting of the Bodhgaya Nagar Panchayat was collected. Apart from the urban area to understand the rural fabric, 524 households were surveyed in the 33 villages which is further elaborated in Chapter 11.3. The table below describes the distribution of the total number of members from surveyed households.

TABLE 3-8 NUMBER OF SURVEYED HOUSEHOLDS OF URBAN AREAS OF BODHGAYA PLANNING AREA

Ward No.	No. of Surveyed Households	Ward No.	No. of Surveyed Households
1	8	18	9
2	9	19	8
3	9	20	8
4	10	21	11
5	10	22	11
6	9	23	10
7	10	24	11
8	10	25	9
9	9	26	10
10	8	27	9
11	11	28	9
12	10	29	9
13	11	30	11
14	10	31	11
15	9	32	8
16	10	33	10
17	8		
Bodhgaya Nagar Panchayat			**315**

Source: Census of India, 2011 and Socio-Economic Survey, 2023, Stesalit Systems Limited

3.9.1.1 GENDER

The surveyed 315 urban households constitute 1684 people. Among this total surveyed population of 1684 people, 53.38% are male while 46.62% are female.

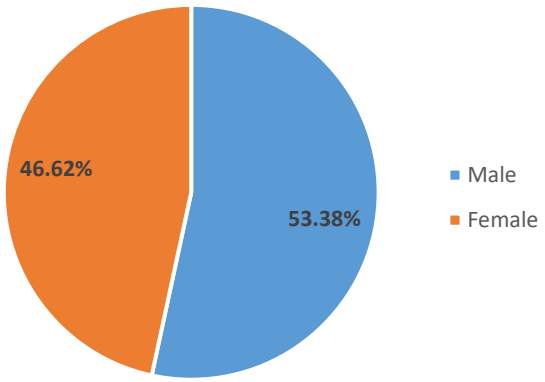


FIGURE 3-8 MALE-FEMALE DISTRIBUTION IN URBAN AREAS OF BODHGAYA PLANNING AREA

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

3.9.1.2 AGE

Among the surveyed population of urban areas, 7.42% belong to the age group 0-6 years, 22.86% are 7-17 years, and 65.44% are 18-60 years, while 4.28% are above 60 years of age.

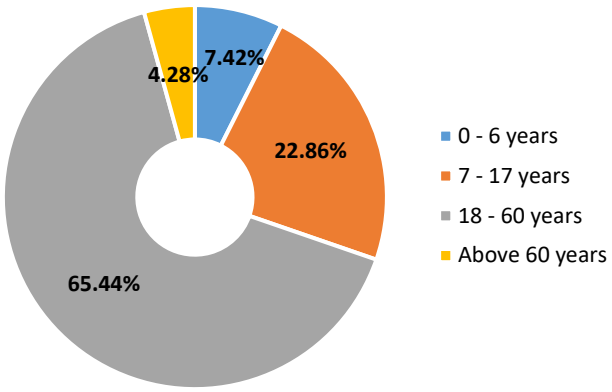


FIGURE 3-9 AGE OF THE SURVEYED POPULATION OF URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

3.9.1.3 HOUSEHOLD SIZE

Among the total households surveyed in urban areas, the average household size is 5.35. People in these areas prefer to live with their extended relatives and have more children, which accounts for the high average household size. The maximum number of households (73.33%) responded to have more than 4 members in their house. The average household size is 5 for about 36.19% of households while household size is 1 for only 0.32% households.

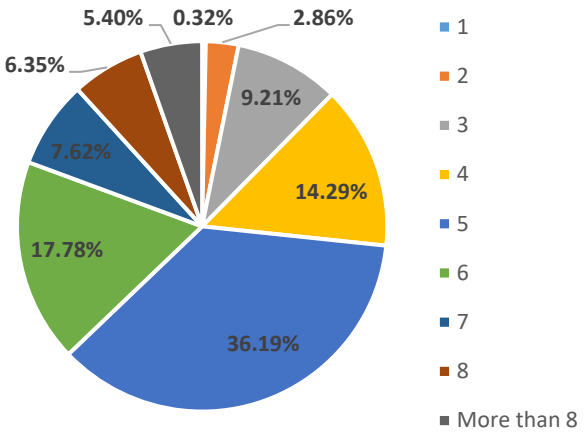


FIGURE 3-10 AVERAGE HOUSEHOLD SIZE OF THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

3.9.1.4 CASTE

The caste analysis highlights the need for tailored support to marginalized groups in both urban and rural areas.

In the urban areas of Bodhgaya planning area, 17.46% of the population is general, while 20% belongs to Scheduled Caste (SC) and 62.54% hail from Other Backward Castes (OBC).

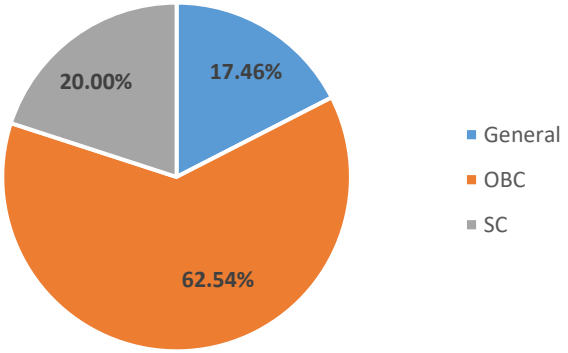


FIGURE 3-11 CASTE COMPOSITION OF URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

3.9.1.5 RELIGION

In the urban areas, the majority of residents (97.05%) belong to the Hindu religion, while a smaller segment (2.95%) identifies themselves as Muslim.

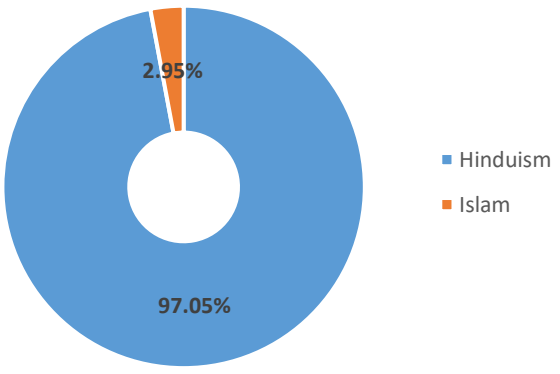


FIGURE 3-12 RELIGIOUS GROUP OF URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

3.9.1.6 LITERACY

The literacy rate among the surveyed population in the urban and rural areas of Bodhgaya Planning Area shows that the majority of residents are literate. In the urban areas, the literacy rate is 77.23%, while in the rural areas it is 70.70%. Both of these figures reflect the average literacy rate of 72.98% in the Bodhgaya Planning Area, as per the socio-economic survey.

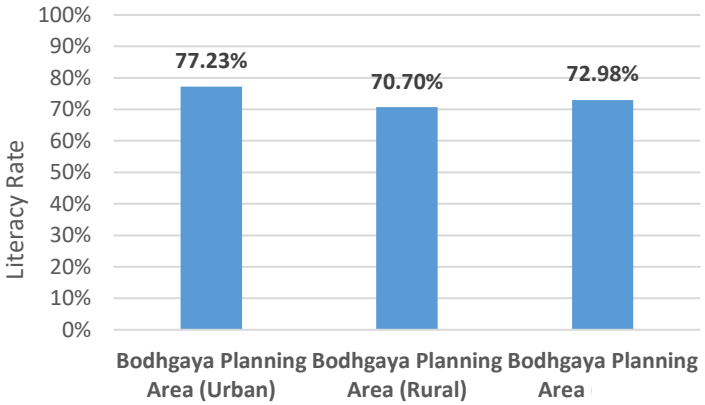


FIGURE 3-13 LITERACY RATES OF THE SURVEYED POPULATION IN THE BODHGAYA PLANNING AREA

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

The literacy rate among the surveyed population of urban area shows that the maximum residents of the surveyed population, that is 71.50% are literate while 28.50% are illiterate.

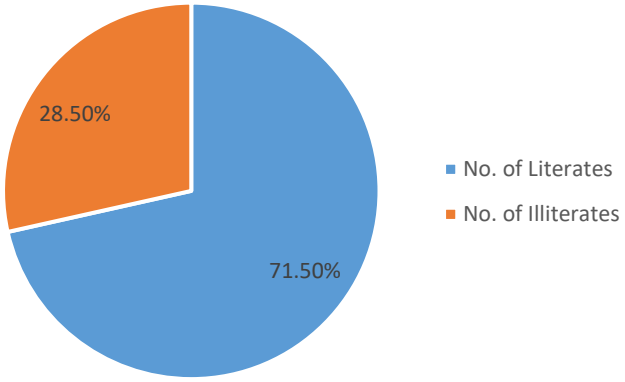


FIGURE 3-14 PERCENTAGE OF LITERATES AND ILLITERATES IN THE SURVEYED POPULATION IN URBAN AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

Among the maximum numbers surveyed residents within the urban areas, 46.96% of the literates are literate through Informal Education. 24.15% have an educational qualification of Secondary Education (10th standard). Whereas 9.20% are literate through primary education, 6.26% through higher secondary education, & 3.45% are post-graduate. Around 9.97% of the population are graduates.

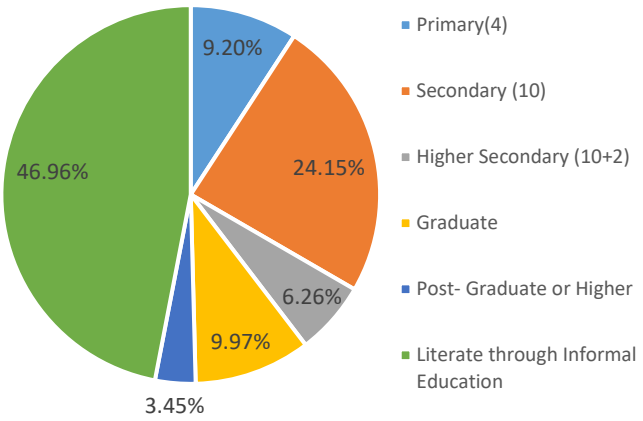


FIGURE 3-15 EDUCATIONAL QUALIFICATION OF SURVEYED POPULATION IN URBAN AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

3.9.2 DEMOGRAPHIC PROFILE RURAL

3.9.2.1 GENDER

The surveyed 524 rural households constitute 3159 people. Among this total surveyed population of 3159 people, 54.50% (1722 people) are male while 45.50% (1437 people) are female.

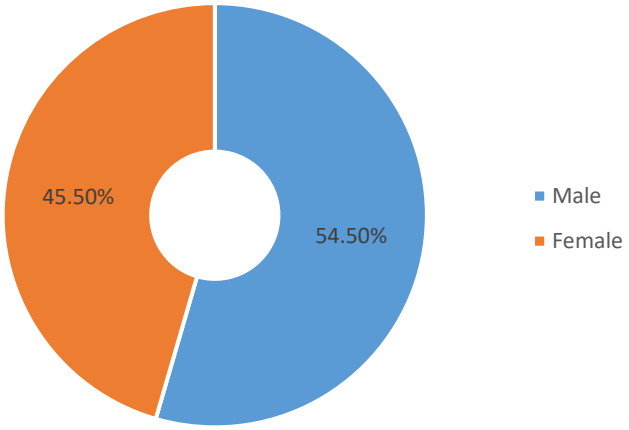


FIGURE 3-16 MALE-FEMALE DISTRIBUTION IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

3.9.2.2 AGE

Among the surveyed population of rural areas, 8.10% belong to the age group 0-6 years, 17.63% are 7-17 years, and 69.47% are 18-60 years, while 4.80% are above 60 years of age.

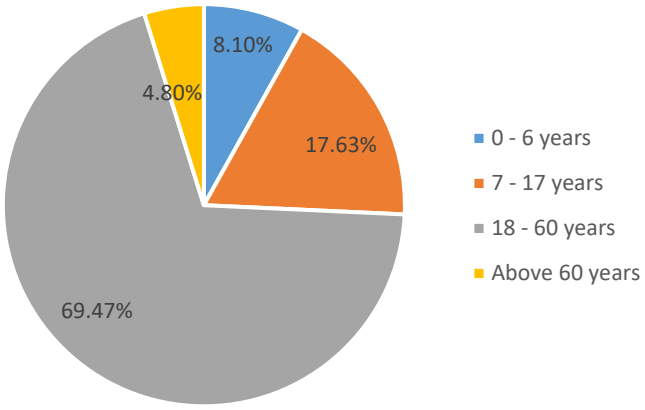


FIGURE 3-17 AGE OF THE SURVEYED POPULATION IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

3.9.2.3 HOUSEHOLD SIZE

Among the total households surveyed in rural areas, the average household size is 6.03. People in these areas prefer to live with their extended relatives and have more children, which accounts for the high average household size. The maximum number of households (76.32%) responded to have more than 4 members in their house. The average household size is 6 for about 21.56% of households while household size is 1 for only 2.14% households.

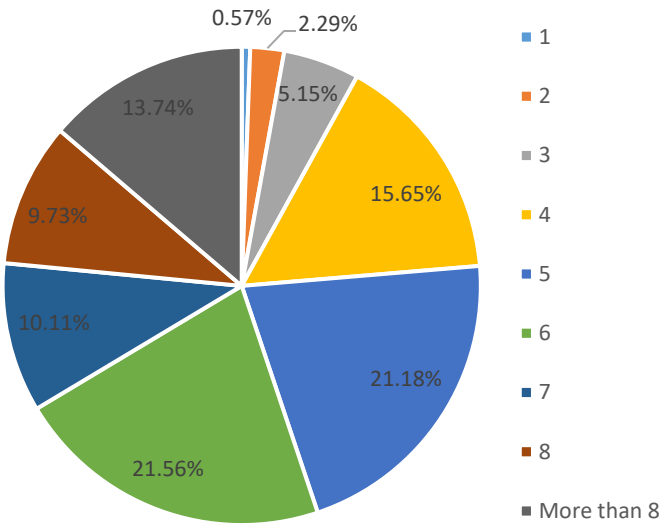


FIGURE 3-18 AVERAGE HOUSEHOLD SIZE OF THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited.

3.9.2.4 CASTE

The caste analysis highlights the need for tailored support to marginalized groups in both urban and rural areas. In the rural areas of Bodhgaya planning area, 8.78% of the population is general while 53.05% belongs to Other Backward Castes (OBC) and 38.17% hail from Scheduled Caste (SC).

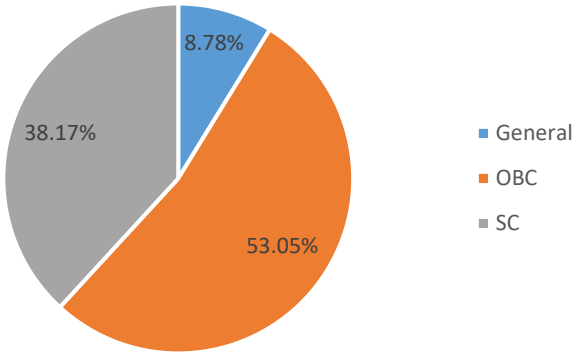


FIGURE 3-19 CASTE COMPOSITION OF RURAL AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

3.9.2.5 RELIGION

In the rural areas, the majority of residents, which is approx. 97% of the surveyed households belong to the Hindu religion, while a very little segment of around 3% identifies themselves as Muslim.

3.9.2.6 LITERACY

The literacy rate among the surveyed population of rural areas shows that the maximum residents of the surveyed population, 64.97% are literate while 35.03% are illiterate.

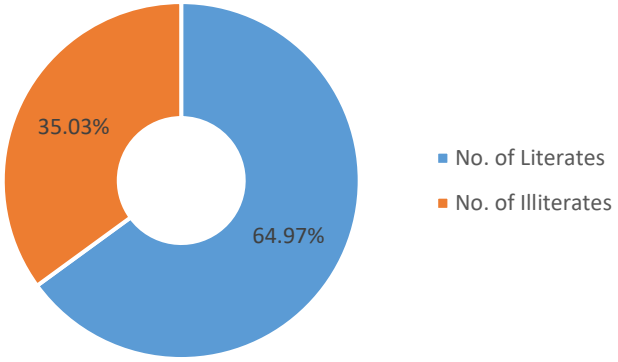


FIGURE 3-20 PERCENTAGE OF LITERATES AND ILLITERATES IN THE SURVEYED POPULATION IN RURAL AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

Among the maximum surveyed residents within the rural areas 39.70%) of the literates are literate through informal education, (30.19%) of the literates have an educational qualification of up to Secondary Education (10th standard). Whereas 15.15% are literate through primary education, 5.98% through higher secondary education, & 2.25% are post-graduate. About 6.74% of the population are graduates.

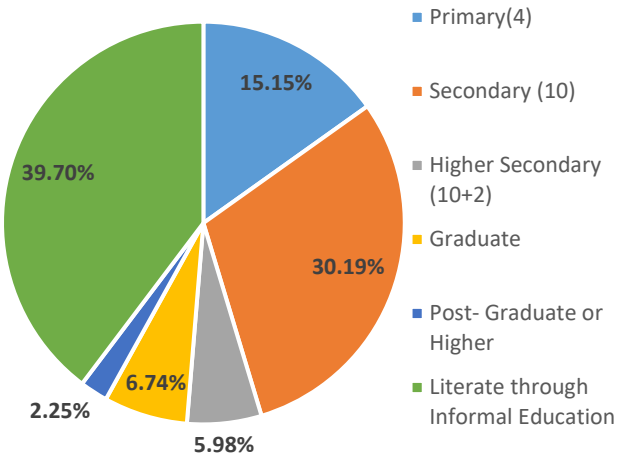


FIGURE 3-21 EDUCATIONAL QUALIFICATION OF SURVEYED POPULATION IN RURAL AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

3.10 POPULATION PROJECTION

Population is the basis for determining existing and future infrastructure requirements also. Thus, it is necessary to forecast the anticipatory future population and its characteristics, in order to undertake adequate and appropriate measurements. Thus, based on the trend of population growth in the target area in the last few years, the population of the Bodhgaya Planning Area has been projected for the future planning years.

Bodhgaya Planning Area consist of one ULB, namely Bodhgaya Nagar Parishad and 19 villages. Therefore, the population projection of these villages also needs to be done, in order to estimate the increase requirements in 2047.

The existing population scenario for the Bodhgaya Planning Area is as follows:

Name	Total Population	Male	Female
Bodhgaya Nagar Parishad	73908	38143	35765
Rural Areas (19 Villages)	28764	14668	14096
Bodhgaya Planning Area	102672	52811	49861

Source – census 2011

3.2.1 ARITHMETIC POPULATION PROJECTION METHOD

Arithmetic projection assumes the continuation of the amount of population change observed in what is defined as the base period, the period from which the projection is started, through successive equal intervals of time. The major drawback of this method is its tendency to under-estimate population growth.

The formula used for this method is as follows

$Pf=Pp+(Ia\times N)$

Where,

Pf = Future population.

Pp = Population of previous decade.

Ia=Average increase in population per decade.

N = No of decades

TABLE 3-9 POPULATION PROJECTION OF BODHGAYA PLANNING AREA BASED ON ARITHMATIC PROGRESSION METHOD

	Bodhgaya Nagar Parishad	Rural Area (19 Villages)	Bodhgaya Planning Area
2021	98544	38352	136896
2025	108398	42187	150586
2030	120716	46981	167698
2035	133034	51775	184810
2040	120716	56569	177286

2047	157670	61363	219034

Source – Computed value

3.10.1 GEOMETRIC INCREASE METHOD

Geometric projection method determines population changes in terms of percentage changes rather than numerical changes. Geometric mean increase is used to find out the future increment in population. Since this method gives higher value and hence should be applied for a new industrial town at the beginning of development for only a few decades.

The population at the end of nth decade 'Pn' can be estimated as: Pn = P (1+ IG/100) n

Where, IG = geometric mean (%) P = Present population N = no. of decades. (Source: M.M. Ghangrekar, IIT Kharagpur)

A major criticism to this projection of population at a fixed rate is the fact that an increase in population may affect the future rate of growth of population, a factor overlooked by using rigid increments.

The formula used for this method is as follows

Pf=Pp1+RaN

Where,

Pf Future population.

Pp = Pp=Population of previous decade.

N = No. of the decade.

Ra = Average rate of increase in population per decade

TABLE 3-10 POPULATION PROJECTION OF BODHGAYA PLANNING AREA BASED ON GEOMETRIC PROGRESSION METHOD

Years	**GEOMETRIC**		
	Bodh Nagar Parishad	Rural Area (19 Villages)	Bodhgaya Planning Area
2021	97424.17	35152.92	132577.1
2025	108807	38089.59	146896.6
2030	124923.6	42107.78	167031.4
2035	143427.4	46549.86	189977.3
2040	164672	51460.55	216132.5
2047	189063.4	56889.29	245952.6

Source – Computed value

3.10.2 INCREMENTAL INCREASE METHOD

The incremental increase is determined for each decade from the past population and the average value is added to the present population along with the average rate of increase.

Hence, population after nth decade is Pn = P+ n.X + {n (n+1)/2}.Y

Where, Pn = Population after nth decade X = Average increase Y = Incremental increase. (Source: M.M. Ghangrekar, IIT Kharagpur).

The incremental increase method is based on the assumption that the growth rate progressively either increases or decreases. However, a major criticism is its over-estimation of the projected population.

TABLE 3-11 POPULATION PROJECTION OF BODHGAYA PLANNING AREA BASED ON INCREMENTAL PROGRESSION METHOD

Years	INCREMENTAL		
	Bodh Nagar Parishad	Rural Area (19 Villages)	Bodhgaya Planning Area
2021	85179	30891.5	116070.5
2025	85945.2	29653.56	115598.76
2030	83895.83	26427.52	110323.3475
2035	78505.2	21336.36	99841.56
2040	69773.33	14380.07	84153.3975
2047	57700.2	5558.66	63258.86

Source – Computed value

3.10.3 TOTAL PROJECTED POPULATION

Accurate population forecasting is essential for informed planning and infrastructure development within the Arrah Planning Area. The choice of projection method must reflect the unique growth patterns, economic context, and development potential of each settlement, ranging from rapidly urbanizing zones to stable rural areas.

This section outlines the rationale behind the selection of appropriate projection methods for different pockets within the planning area based on their respective stages of urbanization. By aligning demographic trends with economic indicators and spatial characteristics, a balanced and location-specific approach has been adopted to estimate future population across Bodhgaya Nagar Parishad and the surrounding 33 villages.

3.10.3.1 BODHGAYA NAGAR PARISHAD

Bodhgaya Nagar Parishad, the spiritual and cultural heart of Gaya district, is globally renowned as a Buddhist pilgrimage destination, attracting visitors, monks, and tourists throughout the year. This inflow of people contributes to steady demographic and economic growth, with a significant share of the population linked to tourism, hospitality, and allied services. The town's growth is influenced by seasonal migration, religious activities, and expanding service-based industries, establishing Bodhgaya as a key regional and cultural center.

Based on current trends, Bodhgaya is projected to witness moderate to high population growth supported by stable in-migration and tourism-driven activities. The town's economy revolves around pilgrimage circuits, hospitality clusters, handicrafts, agro-based units, and educational and meditation centres. Proposed infrastructure initiatives, including improved regional connectivity, tourism corridor development, and service hubs, are expected to enhance Bodhgaya's economic importance.

Population forecasts indicate growth from about 98,500 in 2021 to nearly 157,700 by 2047 (arithmetic method), while the geometric method suggests an accelerated rise to nearly 189,000, underscoring its potential as a growing urban

and cultural node. These factors highlight Bodhgaya's role as a strategic spiritual and economic hub for the region.

TABLE 3-12 DESIGN POPULATION FOR BODHGAYA NAGAR PARISHAD

Years	Bodhgaya Nagar Parishad		
	ARITHMETIC	INCREMENTAL	GEOMETRIC
2021	98544	85179	97424.17136
2025	108398.4	85945.2	108806.9981
2030	120716.4	83895.825	124923.5922
2035	133034.4	78505.2	143427.3912
2040	120716.4	69773.325	164671.9902
2045	157670.4	57700.2	189063.359

Source – Computed value

Rural areas (33 Villages)

Villages comprise the rural hinterland surrounding the Bodhgaya Nagar Parishad, including multiple small settlements that support the town's economy through agriculture, livestock rearing, and small-scale traditional occupations. Unlike the urban core, these areas experience minimal impact from tourism-led growth and urban expansion, maintaining a largely agrarian character.

Population trends in these villages show slow but steady linear growth, primarily driven by natural increase rather than migration. Infrastructure development and industrial activities remain limited, and in-migration is low compared to the town area. Birth and death rates have remained relatively stable over the years, with little fluctuation.

Given the rural nature of these settlements and the absence of major economic or infrastructural drivers of change, the Arithmetic Increase Method is considered most appropriate for projecting future population. This approach reflects the consistent but moderate rise in population and provides a realistic basis for planning rural services and amenities.

TABLE 3-13 DESIGN POPULATION FOR RURAL AREA (33 VILLAGES)

Years	Rural area		
	ARITHMETIC	INCREMENTAL	GEOMETRIC
2021	38352	30891.5	35152.92016
2025	42187.2	29653.56	38089.58658
2030	46981.2	26427.5225	42107.77782
2035	51775.2	21336.36	46549.86079
2040	56569.2	14380.0725	51460.55319
2045	61363.2	5558.66	56889.29009

Source – Computed value

3.11 FINAL DESIGN POPULATION

The Bodhgaya Planning Area includes a mix of urban, peri-urban, and rural settlements, comprising Bodhgaya Nagar Parishad as the core town and surrounding villages. This diversity means a single uniform growth model cannot be applied.

For Bodhgaya Nagar Parishad, being a major religious and tourism hub, growth is influenced by tourism inflows, service industries, and proposed infrastructure development. Here, Geometric method is better suited, capturing moderate to high growth potential due to pilgrimage-driven migration and expanding services.

For rural areas, including the surrounding villages, growth has historically been stable and linear, driven mainly by natural increase. Hence, the Arithmetic Increase Method is most appropriate, reflecting slow and consistent growth with minimal migration influence.

TABLE 3-14 FINAL DESIGN POPULATION FOR BODHGAYA PLANNING AREA

Years	Bodhgaya Nagar Parishad	Rural Area (19 Villages)	Bodhgaya Planning Area
2021	97424	33637	**131061**
2022	100153	34124	**134277**
2025	108807	35586	**144393**
2030	124924	38023	**162946**
2035	143427	40459	**183887**
2040	164672	42896	**207568**
2045	189063	45332	**234396**

Source – Computed value

The Bodhgaya Master Plan is being prepared for a 20-year planning horizon, with 2025 adopted as the base/analysis year, thereby establishing 2045 as the original horizon year. However, in alignment with the long-term national vision of Viksit Bharat @2047, the planning horizon has been extended to 2047 to ensure that the development framework remains responsive to the broader national aspirations and long-term transformation goals.

The projected population of the Bodhgaya Planning Area is estimated at approximately 2.34 lakh by 2045. Considering negligible net population growth during the additional two-year period up to 2047, a rounded design population of approximately 2.5 lakh has been adopted for the 2047 planning horizon.

Considering Bodhgaya's significance as a globally renowned international Buddhist pilgrimage and tourism centre, 50% of the total projected population, which is approximately 1.17 lakhs, has been considered as floating population to account for the substantial influx of pilgrims, tourists and visitors. Accordingly, the infrastructure, land, utilities and service requirements will be assessed for the 2047 planning horizon considering the floating population.

4 EXISTING LAND USE

4.1 LAND USE INTRODUCTION

Land use refers to the manner in which human activities are conducted on, or modify, the natural environment to meet various needs such as agriculture, residential settlements, industrial development, recreation, and conservation. It involves the management and allocation of land resources to maximize their utility while balancing environmental, economic, and social considerations.

Importance of Land Use

- **Economic Development:** Land use planning facilitates infrastructure development, agricultural productivity, and industrial growth.
- **Environmental Sustainability:** Proper land use ensures conservation of natural resources, biodiversity, and ecosystem services.
- **Social Needs:** Effective land use planning addresses housing, public spaces, and transportation for growing populations.

Major Categories of Land Use

- **Residential:** Areas allocated for housing and human habitation.
- **Agricultural:** Lands used for farming, livestock rearing, and food production.
- **Industrial:** Zones for manufacturing, energy production, and factories.
- **Commercial:** Areas designated for business activities, including markets and offices.
- **Recreational:** Spaces for parks, sports facilities, and entertainment.
- **Conservation:** Land preserved for ecological protection, such as forests and wetlands.

4.2 LAND USE PATTERN OF PLANNING AREA

As per the existing situation, out of the Total Planning Area of Bodhgaya, 6.77% is under residential use and 1.13% is under commercial. 0.15% of the total planning land is used for industrial purposes, 0.70% under mixed uses, 0.18% under public utilities, and 3.96% is under public-semi-public uses. 2.84% is used for transportation & communication purposes. Agriculture continues to prevail as the major land use, with 64.48% of the total Planning Area being under agricultural use. 11.03% & 7.86% of the total planning area are currently under Waterbody and Vacant land/wasteland/wetland, and 0.26% of the total planning land is used for specific land use purposes respectively.

TABLE 4-1 EXISTING LAND USE OF BODHGAYA PLANNING AREA

Sl. No.	Land use Category	Area (Ha) of Existing Land use 2020	Percentage w.r.t. Total Area (%)

1	Residential	586.13	6.77%
2	Commercial	98.14	1.13%
3	Mixed	60.35	0.70%
4	Industry	13.17	0.15%
5	Public & Semi-Public facilities	343.12	3.96%
6	Public Utilities	16.01	0.18%
7	Transport & Communication	246.13	2.84%
8	Recreational	46.26	0.53%
9	Others	7.39	0.09%
	Total Developed Area	1416.7	
10	Agricultural Land	5582.39	64.48%
11	Water Body	955.37	11.03%
12	Vacant Land/Wasteland/Wetland	680.72	7.86%
13	Specific Land use	22.73	0.26%
	Total Undeveloped Area	7241.21	
	Total Area	**8657.91**	**100.00%**

Source: Land Use Survey 2024, Stesalit Systems Ltd.

Note:

- *Public & Semi-Public Category includes activities under health Facilities, Educational Facilities, Central & State Govt. properties and PSP category as per AMRUT guidelines.*
- *Residential category includes residential and rural abadi areas.*
- *Transport & Communication includes activities under the Transportation Category, Railway Property, activities under Traffic related category, and Communication, respectively.*
- *Agricultural Category includes activities under Agricultural and Green Areas as per AMRUT guidelines.*
- *Other Category includes activities under others as per AMRUT guidelines.*

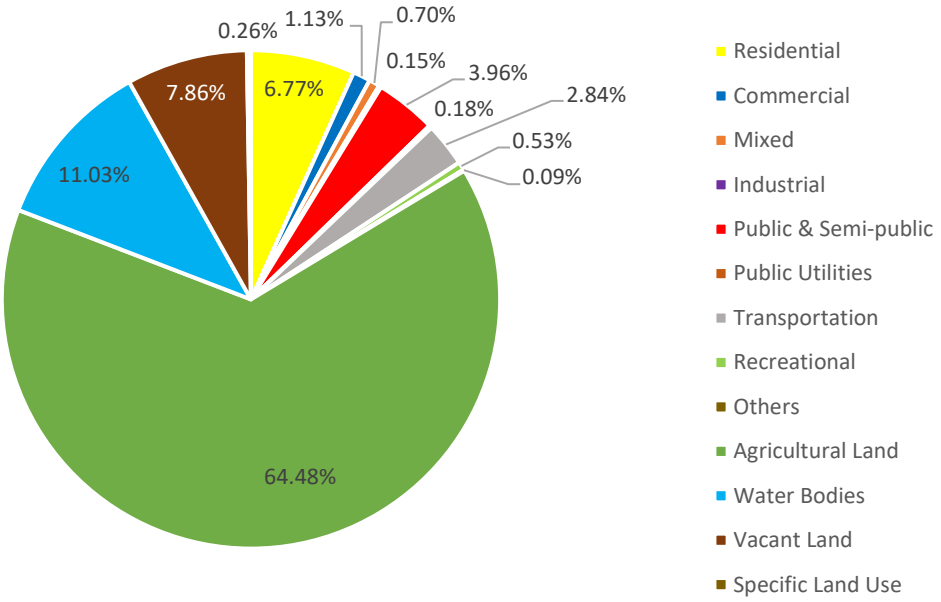


FIGURE 4-1 DISTRIBUTION OF EXISTING LANDUSE W.R.T TOTAL PLANNING AREA

Source: Land Use Survey 2024, Stesalit Systems Ltd.

4.2.1 RESIDENTIAL

Residential land use covers 6.77% of the total planning area, which includes the rural abadi area along with residential area colonies and group housing. The rural Abadi area covers 118.06 hectares of land.

4.2.2 COMMERCIAL

The commercial area covers 1.13% of the total planning area. Out of the total Commercial area, around 41.20% is under Hotel / Lodge / Restaurant, 18.28% of the area is under the general business category and 8.65% of the total commercial area is under storage godowns. The commercial area distribution is shown in the table below.

TABLE 4-2 COMMERCIAL AREA DISTRIBUTION

Sl. No.	Sub-Category	Area (in Ha)	Percentage (%)
1	Function Hall / Marriage Garden	0.76	0.77%
2	General Business	17.95	18.28%
3	Hotel / Lodge / Restaurant	40.46	41.20%
4	Market (Daily & Weekly) / Mandi	2.48	2.53%
5	Petrol Pump / LPG filling station	1.34	1.36%
6	Resort	5.34	5.44%
7	Retail	2.98	3.03%
8	Storage Godown	8.49	8.65%
9	Warehouse	14.32	14.58%
10	Wholesale	4.08	4.15%
TOTAL		**98.2**	**100.00%**

Source: Land Use Survey 2024, Stesalit Systems Ltd.

4.2.3 MIXED LAND USE

Out of the total planning Area, 0.70% (60.35 ha) of the area is under Mixed Use. Out of the total Mixed land use, 93.94% comes under the Residential & Commercial category. The Mixed land use distribution is shown in the table below.

TABLE 4-3 MIXED LAND USE DISTRIBUTION

Sl. No	Sub-Category	Area(ha)	Percentage (%)
1	Commercial & Industrial	2.17	3.59%
2	Residential & Commercial	56.71	93.94%
3	Residential & Educational	1.49	2.47%
TOTAL		**60.37**	**100.00%**

Source: Land Use Survey 2024, Stesalit Systems Ltd.

4.2.4 INDUSTRY

Out of the total planning area, 0.15% (13.17 ha) area is under industrial use. Around 12.28% comes under manufacturing industries and 83.70% comes under other industries. The industrial land use distribution is shown in the table below.

TABLE 4-4 INDUSTRIAL AREA DISTRIBUTION

S. No	Sub- Classes	Area(ha)	Percentage (%)
1	Agro based & Food Processing	0.17	1.29%
2	Manufacturing	1.62	12.28%
3	Other Industries	11.04	83.70%
4	Service	0.36	2.73%
TOTAL		**13.19**	**100%**

Source: Land Use Survey 2024, Stesalit Systems Ltd.

4.2.5 PUBLIC AND SEMI-PUBLIC

With respect to planning area, around 343.28 ha area comes under Public & Semi-Public Use which is 3.96% of the total developed area. Public & Semi-Public uses consist of use under educational facilities, health facilities, religious facilities, offices and uses under PSP as per Amrut guidelines. The land use distribution under Public and Semi-public use is shown in the table below.

TABLE 4-5 PUBLIC & SEMI-PUBLIC AREA DISTRIBUTION

Sl. No.	Category	Area (in Ha)	Percentage (%)
1	CG_Office	50.07	14.59%
2	College	30.01	8.74%
3	School	28.45	8.29%
4	Training Institute	1.32	0.38%
5	University	114.18	33.26%
6	Clinic/Dispensary	0.31	0.09%
7	Diagnostic Centre	0.1	0.03%
8	Nursing Home	0.06	0.02%

Sl. No.	Category	Area (in Ha)	Percentage (%)
9	Primary/Community Health Centre	0.13	0.04%
10	Private Hospital	1.41	0.41%
11	Banks	0.22	0.06%
12	Community hall	0.06	0.02%
13	Convention Centre	9.17	2.67%
14	Crematorium / Burial Ground /Grave Yard	1.21	0.35%
15	Guesthouse	3.57	1.04%
16	LPG/CNG Gas Booking Office	0.36	0.10%
17	Museum	6.14	1.79%
18	Orphanage	0.06	0.02%
19	Police Station	0.92	0.27%
20	Private Office	1.59	0.46%
21	Public Library	0.13	0.04%
22	Public/Community Toilet	0.05	0.01%
23	Social Welfare Centre	0.83	0.24%
24	Aashram/Math/Bhojan Shala	4.72	1.37%
25	Monastery	63.86	18.60%
26	Mosque	0.7	0.20%
27	Temple	7.02	2.04%
28	SG_Office	16.63	4.84%
TOTAL		**343.28**	**100.00%**

Source: Land Use Survey 2024, Stesalit Systems Ltd.

4.2.6 RECREATIONAL

Out of the total planning area, around 0.53% of the area is under recreational facilities. This includes areas under Parks and Open spaces, playgrounds, and stadiums. The area distribution under recreational land use is shown in the table below. 32.50% of the area is under Park and 21.65% under the Playground category.

TABLE 4-6 RECREATIONAL AREA DISTRIBUTION

S. No	Sub- Classes	Area(ha)	Percentage (%)
1	Tree Clad Area	19.59	42.33%
2	Garden	1.24	2.68%
3	Gymnasium	0.02	0.04%
4	Park	15.04	32.50%
5	Play Ground	10.02	21.65%
6	Sports Centre	0.37	0.80%
TOTAL		**46.28**	**100.00%**

Source: Land Use Survey 2024, Stesalit Systems Ltd.

4.2.7 PUBLIC UTILITIES

Out of the total Planning area, around 0.18% of the area is under Public Utilities. Public Utilities include the area under the Water supply system, the electricity distribution system, and the telecommunication system. The area distribution under this land use is shown below.

TABLE 4-7 PUBLIC UTILITY AREA DISTRIBUTION

S. No	Sub-Classes	Area(ha)	Percentage (%)
1	Post/Telegraph Office	0.04	0.25%
2	Electric Sub-Station	13.28	82.79%
3	Sewage Treatment Plant	0.34	2.12%
4	Water Pumping Station	1.05	6.55%
5	Water Treatment Plant	1.33	8.29%
TOTAL		**16.04**	**100.00%**

Source: Land Use Survey 2024, Stesalit Systems Ltd.

4.2.8 TRAFFIC & COMMUNICATION

Under this land use distribution, areas under Major city roads, Minor city roads, State Highways and National highways are marked as Transportation Areas. This also includes areas under Railways, Bus, and Truck terminals. Out of the total planning area around 2.84% of the area i.e. 246.13 ha of land is under the traffic & Transportation Category.

TABLE 4-8 TRAFFIC AND COMMUNICATION AREA DISTRIBUTION

S. No	Sub- Classes	Area(ha)	Percentage (%)
1	Road	237.37	96.43%
2	Median / Divider	4.35	1.77%
3	Parking Space / Area	2.93	1.19%
4	Traffic Island	0.21	0.09%
5	Airport / Airstrip	0.23	0.09%
6	Bus stand /Terminus	1.07	0.43%
TOTAL		**246.16**	**100.00%**

Source: Land Use Survey 2024, Stesalit Systems Ltd.

4.3 ISSUES AND POTENTIAL

The Bodhgaya planning area has 3.96% of Public and semi-public places which has religious tourist places which enhance economy in Bodhgaya, the mixed land use is 0.70% which needs to be promoted further to enhance the Business activities like hotels, restaurants, and artifacts shops in Bodhgaya to support tourism.

4.4 COMPARITIVE ANALYSIS OF LAND USE WITH URDPFI

TABLE 4-9 COMPARISION OF EXISTING LAND USE WITH URDPFI STANDARD, 2014

Sl. No.	Landuse Category	Land Area (in Ha)	Percentage w.r.t. Total Area (%)	Percentage of developed are as per URDPFI
1	Residential	586.13	6.77%	43-48
2	Commercial	98.14	1.13%	4-6
4	Industry	13.17	0.15%	7-9
5	Public & Semi-Public facilities	343.12	3.96%	6-8
7	Transport & Communication	246.13	2.84%	10-12
8	Recreational	46.26	0.53%	12-14
10	Agricultural	5582.39	64.48%	Balance
11	Water Body	955.37	11.03%	
12	Vacant Land/Wasteland/Wetland	680.72	7.86%	

Source: Land Use Survey 2024, Stesalit System Ltd., URDPFI Guidelines 2014

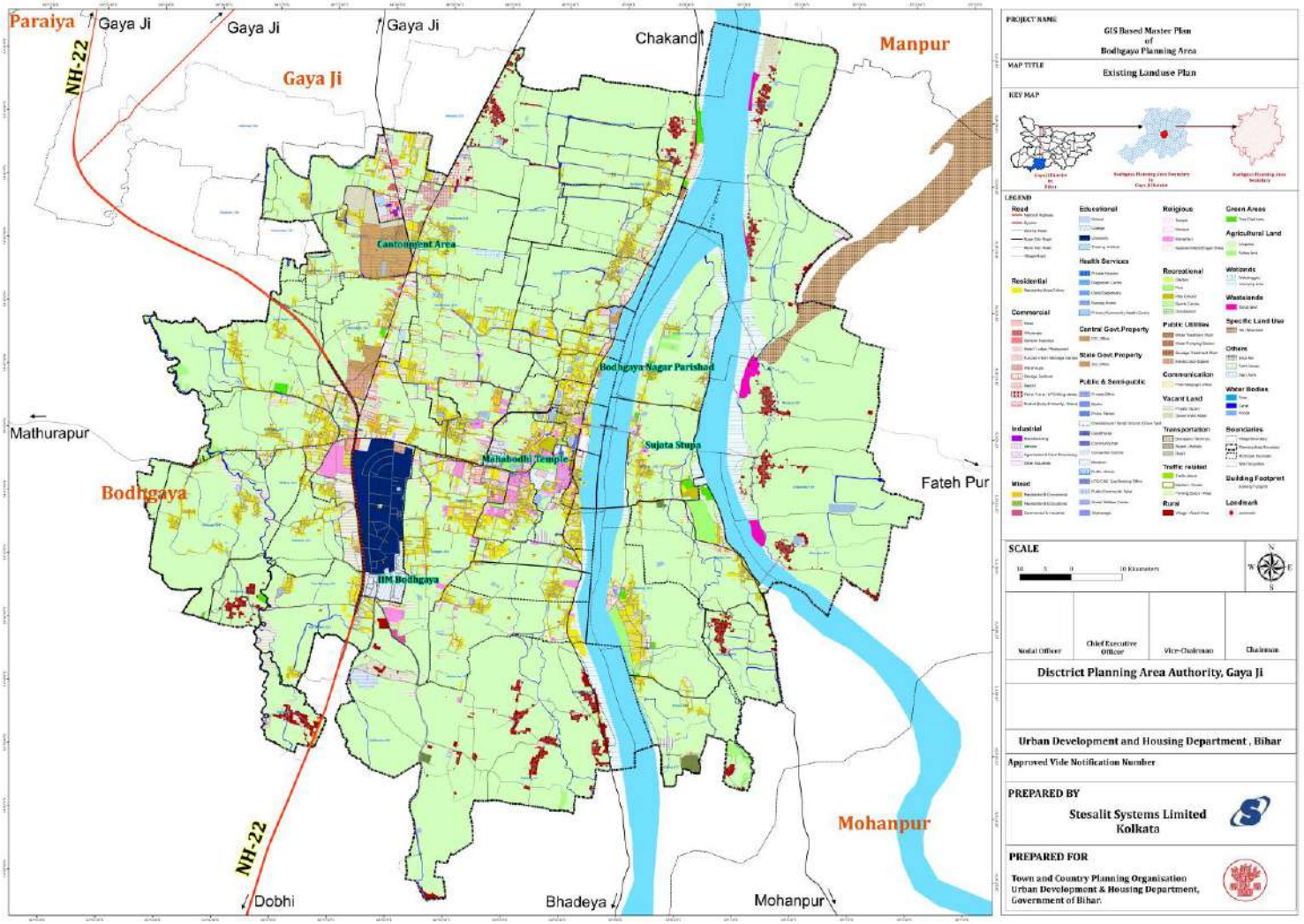
The comparative analysis of the existing land use distribution in the Bodhgaya Planning Area against the URDPFI Guidelines for medium towns (Population is between 1 to 4 lakhs, medium town-II) reveals a significant mismatch in several key sectors. The residential land use in Bodhgaya stands at only 6.77% of the total area, which is considerably lower than the URDPFI recommended range of 43–48%. This under-allocation suggests a predominance of rural or low-density settlements and highlights a critical gap in planned housing infrastructure. Similarly, commercial land use is just 1.13%, far below the 4–6% recommended, indicating limited space for markets, trade, and economic activities. Industrial areas occupy merely 0.15%, compared to the suggested 7–9%, reflecting the absence of a strong industrial base or designated zones for manufacturing and production.

Public and semi-public facilities, which are essential for delivering services like education, healthcare, and administration, constitute only 3.96% of the land—well under the 6–8% benchmark set by URDPFI. Transport and communication infrastructure also lags behind, covering only 2.84% of the area against the 10–12% norm, which points to inadequate roads, transit systems, and related facilities. Recreational spaces are critically low at 0.53%, far below the expected 12–14%, indicating a severe shortage of parks, playgrounds, and open areas that are vital for the quality of urban life.

In contrast, agricultural land dominates the planning area, accounting for 64.48% of the total area. While URDPFI allows for agricultural land to occupy the balance area not taken up by urban uses, such a high percentage reflects the semi-rural character of the region and highlights the need for gradual urban expansion. Water bodies (11.03%) and vacant/wasteland/wetlands (7.86%) are not regulated by fixed norms but represent potential ecological assets or areas for future development, subject to environmental considerations.

Overall, the existing land use pattern in Bodhgaya suggests that the town is still in the early stages of urbanization. There is an urgent need for land use reallocation

in line with URDPFI norms, especially in residential, commercial, Public and semi-public, recreational, and transport sectors. Strategic planning interventions are necessary to transform the predominantly agricultural landscape into a well-balanced urban environment, supported by adequate infrastructure and amenities.



MAP 4-1 EXISTING LAND USE OF THE BODHGAYA PLANNING AREA

Source: Land use Survey 2023, Stesalit Systems Ltd.

5 HOUSING AND SLUM

5.1 ANALYSIS OF EXISTING HOUSING STOCK

Housing and shelter in Indian cities present a diverse array of living conditions, reflecting a blend of traditional and modern architectural styles. The housing landscape includes various options, from detached houses and small apartments to semi-urban villages and informal settlements. Some areas feature well-planned residential colonies equipped with essential amenities, while others may consist of informal settlements or slums characterized by substandard housing conditions.

Local governments, alongside various government programs, strive to enhance housing conditions by promoting affordable housing and improving urban infrastructure. Despite these efforts, several challenges persist, such as limited access to formal housing finance, rapid urbanization leading to increased housing demand, and the necessity for sustainable urban planning to ensure adequate and equitable housing for all residents. Addressing these issues requires a concerted effort to develop comprehensive strategies that balance growth with the provision of quality living environments.

5.1.1 HOUSING CONDITIONS

The housing situation in Bodhgaya exhibits considerable variation across different areas. Some neighborhoods feature well-constructed houses with access to essential services, while others face challenges due to inadequate housing infrastructure. The region displays a mix of traditional mud houses and older structures alongside new developments and planned residential communities. According to the 2011 Census of India data, in rural areas comprising 19 villages, 38.10% of households are classified as being in good condition, 55.64% are in livable condition, and 6.26% are dilapidated. In urban areas 43.30% of households are in good condition, 50.17% are in livable condition, and 6.53% are in dilapidated condition. The following table provides a detailed overview of the housing conditions as reported in the 2011 Census of India.

TABLE 5-1 CONDITION OF CENSUS HOUSEHOLDS IN THE BODHGAYA PLANNING AREA

Area Name	Number of households with the condition of Census House as											
	Total				Residence				Residence-cum-other use			
	Total	Good	Livable	Dilapidated	Total	Good	Livable	Dilapidated	Total	Good	Livable	Dilapidated
Bodhgaya Nagar Parishad	**12101**	5240	6071	790	11369	4693	5911	765	732	543	162	27
		43.30%	50.17%	6.53%	93.95%	38.78%	48.85%	6.32%	6.05%	4.49%	1.34%	0.22%
Rural areas (19 villages)	**4677**	1,782	2,602	293	4,293	1,572	2,446	275	384	210	156	18
		38.10%	55.64%	6.26%	91.79%	33.62%	52.29%	5.88%	8.21%	4.49%	3.34%	0.38%
Bodhgaya Planning area	**16778**	**7,022**	**8,673**	**1,083**	**15,662**	**6,265**	**8,357**	**1,040**	**1,116**	**753**	**318**	**45**

Source: Census of India, 2011

As per the Census of India, 2011, in the Bodhgaya planning area, 40.70% of the total households are in good condition while 52.91 % of the total households are in livable condition and 6.40% are in dilapidated condition which is concerning.

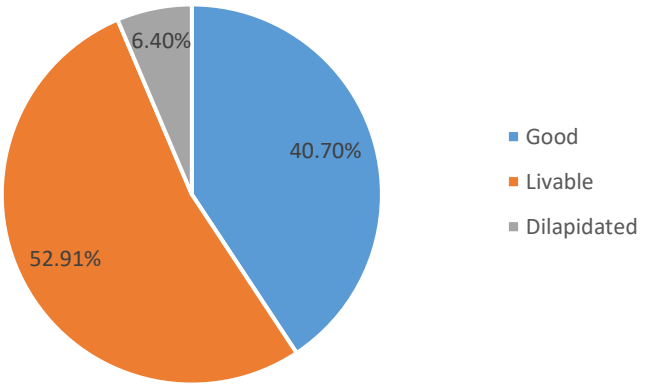


FIGURE 5-1 HOUSING CONDITION OF BODHGAYA

Source: Census of India, 2011

5.1.2 HOUSING STRUCTURE

Bodhgaya has a variety of dwelling types, ranging from traditional mud homes in some places to concrete constructions and multi-story buildings in others. Bodhgaya's housing structure is a combination of ancient and modern

components, with continual efforts to meet the housing demands of its diverse population. The following figure shows the types of houses in the Bodhgaya planning area.

TABLE 5-2 TYPE OF HOUSES IN THE BODHGAYA PLANNING AREA

Area Name	Total no. of households	Type of Census Houses					
		Permanent	Semi-permanent	Temporary			Unclassifiable
				Total	Serviceable	Non-Serviceable	
Bodhgaya Nagar Parishad	**12101**	6278	2945	2869	2495	374	9
		51.88%	24.34%	23.71%	20.62%	3.09%	0.07%
Rural areas (19 villages)	**4677**	1,564	975	2,133	2,087	46	5
		33.45%	20.84%	45.61%	44.62%	0.99%	0.10%
Bodhgaya Planning Area	**16778**	**7,842**	**3,920**	**5,002**	**4,582**	**420**	**14**

Source: Census of India, 2011

As per the Census of India, 2011, Bodhgaya Planning area has 42.67% of the houses as permanent structures, while 22.59% of houses are semi-permanent and 34.66% of houses are temporary structures where 0.08% of houses are unclassifiable.

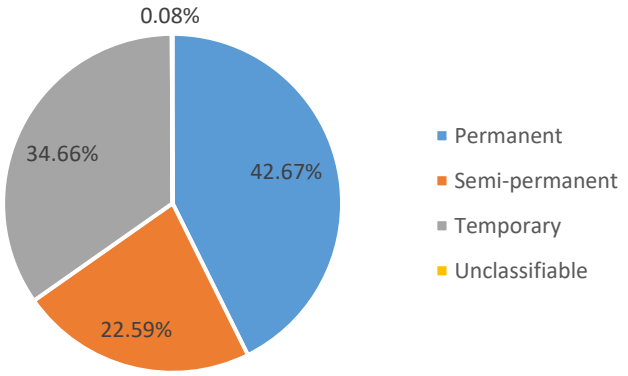


FIGURE 5-2 HOUSING STRUCTURE OF BODHGAYA

Source: Census of India, 2011

5.1.3 HOUSEHOLDS BY PREDOMINANT MATERIAL OF THE WALL AND ROOF

5.1.3.1 MATERIAL OF THE WALL

The materials used to make walls in Bodhgaya vary based on the type of construction and budget. Traditional dwellings frequently include walls composed of locally produced materials such as mud, clay bricks, or wood, which provide enough insulation but may necessitate regular upkeep. For building walls, modern projects in Bodhgaya mostly use materials such as bricks, cement blocks, and concrete. These materials, which are often found in residential and commercial buildings around the city, provide durability and stability. As per Census of India

2011, in the Bodhgaya Planning Area 7912 households have walls made of burnt bricks while 8078 houses have walls made of mud or unburnt bricks. The following table shows the material of the walls.

TABLE 5-3 MATERIAL OF WALLS IN THE BODHGAYA PLANNING AREA

Area Name	Total number of households	Material of Wall									
		Grass/ Thatch/ Bamboo etc.	Plastic/ Polythene	Mud/Unburnt brick	Wood	Stone not packed with mortar	Stone packed with mortar	G.I./ Metal/ Asbestos sheets	Burnt brick	Concrete	other material
Bodhgaya Nagar Parishad	**12101**	308	87	5206	0	70	182	5	6198	45	0
		2.55%	0.72%	43.02%	0.00%	0.58%	2%	0.04%	51.22%	0.37%	0.00%
Rural areas (19 villages)	**4677**	40	17	2,872	0	19	5	0	1,714	7	3
		0.87%	0.37%	61.40%	0.00%	0.40%	0.10%	0.00%	36.64%	0.15%	0.07%
Bodhgaya Planning Area	**16778**	**348**	**104**	**8,078**	**0**	**89**	**187**	**5**	**7,912**	**52**	**3**

Source: Census of India, 2011

5.1.3.2 MATERIAL OF ROOF

Roofing materials in Bodhgaya vary according to traditional practices, availability, and pricing. Roofs on traditional dwellings are frequently built of thatch, straw, or corrugated metal sheets. Thatched roofs, made of locally accessible materials, provide natural insulation but may necessitate regular maintenance. For roofing, modern Bodhgaya structures often use reinforced concrete, metal sheets, tiles, or asbestos sheets. These materials, which are extensively used in urban residential and commercial buildings, provide durability, weather resistance, and endurance. As per the Census of India 2011, in urban areas 24.76% of the households have

roofs made with grass, thatch, wood or mud while 24.32% have roofs made with handmade tiles, 4.22% with burnt brick, 5.25% with stone or slates and 39.62% with concrete roofs. In rural areas (19 villages) of Bodhgaya planning area 48.74% of the households have roofs made with grass, thatch, wood or mud, 17.34% have roofs made with handmade tiles, 2.64% with burnt brick, 4.48% with stone or slates and 25.64% with concrete roofs.

TABLE 5-4 MATERIAL OF ROOF IN THE BODHGAYA PLANNING AREA

Area Name	Total number of households	Material of Roof								
		Grass/Thatch/ Wood/Mud etc.	Plastic/ Polythene	Handmade Tiles	Machine-made Tiles	Burnt Brick	Stone/ Slate	G.I./ Metal/ Asbestos Sheets	Concrete	Any other material
Bodhgaya Nagar Parishad	**12101**	2997	83	2943	47	511	635	84	4794	7
		24.76%	0.69%	24.32%	0.39%	4.22%	5.25%	0.69%	39.62%	0.06%
Rural areas (19 villages)	**4677**	2,280	29	811	9	123	210	14	1,199	2
		48.74%	**0.62%**	**17.34%**	**0.20%**	**2.64%**	**4.48%**	**0.30%**	**25.64%**	**0.04%**
Bodhgaya Planning Area	**16778**	**5,277**	**112**	**3,754**	**56**	**634**	**845**	**98**	**5,993**	**9**

Source: Census of India, 2011

5.1.4 OWNERSHIP STATUS OF HOUSE

The ownership status of houses in Bodhgaya varies greatly, reflecting a combination of ownership patterns and socioeconomic considerations. Many residents are homeowners, either outright or through mortgage arrangements with banking organizations. This ownership is frequently passed down over generations,

with properties being passed down within families. However, there are sections of the population who live in rented housing, notably in cities, where individuals or families lease houses or apartments from landlords or property owners. This arrangement allows for flexibility but lacks the long-term security that comes with ownership. The following table shows the ownership status.

TABLE 5-5 OWNERSHIP STATUS IN THE BODHGAYA PLANNING AREA

Area Name	Total number of households	Ownership status		
		Owned	Rented	Any other
Bodhgaya Nagar Parishad	**12101**	11655	215	231
		96.31%	1.78%	1.91%
Rural areas (19 villages)	**4677**	4,629	21	27
		98.98%	0.44%	0.58%
Bodhgaya Planning Area	**16778**	**16,284**	**236**	**258**

Source: Census of India, 2011

As per the Census of India, 2011, 97.65% of the households own the property where they stay while only 1.11s% of the total households stay in rented properties.

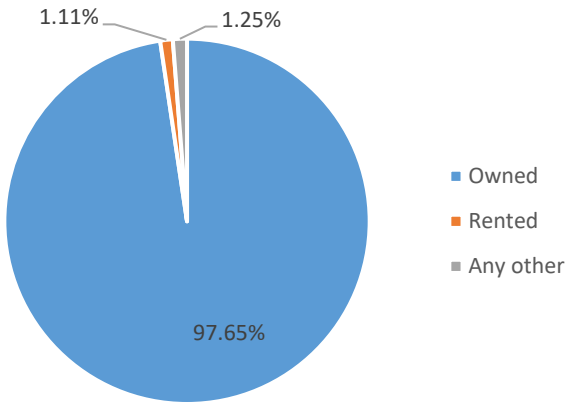


FIGURE 5-3 OWNERSHIP STATUS OF BODHGAYA

Source: Census of India, 2011

5.1.5 HOUSEHOLD SIZE

Traditionally, large extended families living together in a single household were more typical in the past, resulting in greater household sizes. However, due to urbanization, changing lifestyles, and economic prospects, there has been a shift towards smaller nuclear families in recent years. Although there are wide variations, the average household size in Bodhgaya ranges from four to six individuals. Variations in household sizes are influenced by factors such as migration, employment opportunities, and education. Both in rural and urban areas of Bodhgaya planning areas average household size is from four to more than 9 individuals. The following figure shows household size.

TABLE 5-6 HOUSEHOLD SIZE

Area Name	Total number of households	Household size						
		1	2	3	4	5	6-8	9+
Bodhgaya Nagar Parishad	**12101**	189	722	879	1461	2061	5013	1776
		1.56%	5.97%	7.26%	12.07%	17.03%	41.43%	14.68%
Rural areas (19 villages)	**4677**	58	261	325	645	788	1,906	694
		1.24%	5.59%	6.94%	13.79%	16.85%	40.75%	14.84%
Bodhgaya Planning Area	**16778**	247	983	1,204	2,106	2,849	6,919	2,470

Source: Census of India, 2011

5.1.6 DWELLING ROOMS IN THE HOUSE

The number of dwelling rooms within a home in Bodhgaya varies depending on factors such as family size, economic level, and available living space. Traditional homes contain fewer rooms and are frequently intended to meet the fundamental necessities of the family. In Bodhgaya, modern buildings and urban residences often have many rooms, with separate sections designated for living, dining, bedrooms, and kitchen areas. This tendency corresponds to changing lifestyle preferences as well as a demand for more defined and effective living areas.

However, there are differences amongst households, with some families living in smaller accommodations, particularly in densely crowded areas or informal settlements where the number of rooms is limited. As per the Census of India 2011, in rural areas 17.02% of households have one room, 34.24% have two rooms, 18.80% have three rooms, and 13.34% have four rooms while 1.13% of the households have no exclusive rooms while in urban areas 0.52% of the households have no exclusive rooms, 15.16% of households have one room, 29.58 % have two rooms, 19.68% have three rooms, and 14.38% have four rooms.

TABLE 5-7 NUMBER OF DWELLING ROOMS

Area Name	Total number of households	Households with a number of dwelling rooms						
		No exclusive room	One room	Two rooms	Three rooms	Four rooms	Five rooms	Six rooms and above
Bodhgaya Nagar Parishad	**12101**	64	1835	3579	2381	1740	1096	1406
		0.52%	15.16%	29.58%	19.68%	14.38%	9.06%	11.62%
Rural areas (19 villages)	**4677**	54	796	1,601	879	624	299	424
		1.13%	17.02%	34.24%	18.80%	13.34%	6.40%	9.07%

Area Name	Total number of households	Households with a number of dwelling rooms						
		No exclusive room	One room	Two rooms	Three rooms	Four rooms	Five rooms	Six rooms and above
Bodhgaya Planning Area	16778	118	2,631	5,180	3,260	2,364	1,395	1,830

Source: Census of India, 2011

5.2 CURRENTLY PROPOSED/ONGOING HOUSING PROJECTS

5.2.1 PMAY

The Pradhan Mantri Awas Yojana (PMAY) is a flagship affordable housing plan introduced by the Indian government with the goal of achieving "Housing for All". This ambitious effort addresses the housing needs of many socioeconomic categories, including both urban and rural locations. PMAY includes two key components: Pradhan Mantri Awas Yojana (Urban) and Pradhan Mantri Awaas Yojana (Gramin), which target the urban and rural populations, respectively. The initiative offers eligible recipients financial help and incentives, such as interest subsidies on house loans, to encourage the development and improvement of affordable dwellings. PMAY plays an important role in fostering sustainable urban development and improving the living conditions of millions of inhabitants across the country.

5.2.1.1 TARGET GROUPS

The Pradhan Mantri Awas Yojana (PMAY) primarily targets individuals and families from the economically weaker sections (EWS), low-income group (LIG), and middle-income group (MIG) groups. The programme aspires to give cheap housing alternatives to these sectors while taking into account the population's different socioeconomic origins in both urban and rural settings.

5.2.1.2 PROVISION OF PMAY

Credit-Linked Subsidy Scheme (CLSS): PMAY provides interest subsidies on housing loans to eligible beneficiaries. This subsidy greatly lessens the financial strain on anyone looking to buy a home.

Affordable Housing Construction: The programme encourages the construction of affordable homes, with a focus on upgrading housing infrastructure for the targeted groups. It promotes the creation of sustainable and cost-effective housing projects.

Inclusive Urban Development: PMAY prioritizes inclusive urban development by addressing the housing requirements of the urban poor, slum dwellers, and people living in informal settlements. It helps to create well-planned, resilient urban settings.

Rural Housing Support: The Pradhan Mantri Awaas Yojana (Gramin) component aims to provide financial help for the construction of pucca dwellings in rural areas. This improves the quality of life for rural residents.

5.2.1.3 CLAUSES OF PMAY

Eligibility Criteria: The plan defines certain eligibility criteria based on income and other socioeconomic considerations.

Ownership of Land: In some circumstances, beneficiaries may be required to own land in order to receive PMAY benefits. However, the government has also launched measures to help those without land.

Construction Criteria: The dwellings built under PMAY must meet certain quality and safety criteria. This ensures that the beneficiaries obtain dwellings that suit their basic living needs.

Loan Disbursement Criteria: Under the Credit-Linked Subsidy Scheme, interest subsidies are disbursed subject to particular home loan criteria that ensure compliance with the scheme's guidelines.

Timely Completion: There may be stipulations relating to the timely completion of housing projects to ensure that benefits are delivered to beneficiaries within a reasonable timeframe.

TABLE 5-8 PMAY GRAMIN DATA

Name of Project	No of sanctioned DUs	No of Surrender DUs	No of workorder given to Beneficiaries	No of Beneficiaries 1st instalment given through RTGS	No of Beneficiaries 2nd instalment given through RTGS	No of Beneficiaries 3rd installment given through RTGS	No of Beneficiaries 4th installment given through RTGS
HFA PHASE-1	110	13	97	96	87	77	74
HFA PHASE-2	627	58	569	468	437	291	281
HFA PHASE-3	629	69	560	341	235	115	30
HFA PHASE-4	1329	578	751	619	220	49	30
HFA PHASE-5	376	205	171	150	87	12	3
HFA PHASE-6	884	0	883	106	7	0	0
Total	**3955**	**923**	**3031**	**1780**	**1073**	**544**	**418**

Source: Housing for All (Government of Bihar Urban Development and Housing Department an urban sanctioned projects progress report December 2023)

5.3 SLUMS

Cities are on the frontlines of this crisis, with dwindling economic activity, high rates of infection and inadequate resources. The slums of cities are the most vulnerable due to their unhygienic environment and high population density which requires an urgent implementation of public healthcare measures.

In addition to its expanding infrastructure, Sasaram has a complex urban fabric that highlights the difficulties associated with urban development. Slums are a

harsh reminder of this. These slums, which are frequently marked by poor sanitation, overcrowding, and restricted access to essential services, are a reflection of the socioeconomic differences that exist in the area. Slums are a stark reminder of the shortcomings in urban planning and the urgent need for inclusive policies targeted at uplifting marginalized populations. Addressing the complex problems these slums face and promoting sustainable urban development in Bodhgaya requires an understanding of their dynamics.

5.3.1 SLUM STATUS IN BODHGAYA

As per Bodhgaya Nagar Parishad, there are 17 Slums are present in Nagar Parishad area. It is observed that there are 17,430 Sum population in Bodhgaya Nagar parishad with highest population in Mastipur Slum with 2,650 Population. The reason for slum dwelling in Bodhgaya is due to seasonal tourism offering opportunities in informal business, which attracts temporary slum dwellers which gradually turned into permanent slum dwellers.

TABLE 5-9 SLUM POPULATION IN BODHGAYA NAGAR PARISHAD

S.No	SLUM NAME	POPULATION
1	Sidhart Nagar Miya Bigha	1015
2	Jaunpur Mahadalit Tola	1070
3	Rampur	800
4	Magadh University	550
5	Mastipur	2650
6	Sujata Nagar Baiju Bigha	600
7	Bhagwanpur harijan Tola	600
8	Belwa Taar	400
9	Sevdhar Bigha	600
10	Amawa South	2120
11	Newatapur	1100
12	Bhatbigha	1100
13	Rajapur Dehria Bigha	1600
14	Purani Taridih	945
15	Baghha Per	510
16	Pachhati Pasi Tola	1170
17	Bapunagar	600
	TOTAL	**17430**

Source: Bodhgaya Nagar Parishad, Stesalit Systems Ltd

The Beneficiaries from of slums in Bodhgaya is as follows Under BSUP (Basic Services for the Urban Poor):

TABLE 5-10 SLUM BENEFICIARIES DETAILS

S. No	Name of Slum	Total Beneficiaries
1	Amwan North	42
2	Rajapur Dahariya Bigha	132
3	Rampur	229
4	Sewdhar Bigha	156
5	Janpur	117
6	Suryapura	68

S. No	Name of Slum	Total Beneficiaries
7	Bapunagar	71
8	Bhagwanpur	23
9	Hariharpur	31
10	Durgapur	99
11	South Amwan	239
12	Bhat Bigha	57
13	Newtapur	47
14	M.U	22
15	Taridih Dilha Par	77
16	New Taridih	208
17	Mastipur	83
18	Baiju Bigha (Sujata Nagar)	56
19	Bagha (Pachhatti)	40
TOTAL		**1797**

Source: BSUP, Avidya Vimukti Sansthan, Bodh-Gaya

TABLE 5-11 SLUM DETAILS IN BODHGAYA NAGAR PARISHAD

Sl.No.	Name of Slums	Access/ Availability of Safe drinking Water	Sanitation /Gray water disposal /availability of Housing	Security of Tenure /availability of housing	Availability of medical Facility	Condition of road and drains	Availability of School and Anganwadi	Livelihood Aspects	Interaction with government officials
1	JANPUR	There are No of Handpumps and One summer sable pump available for safe drinking water	There is no arrangement of toilet in most of the HH. Only two HH has facilities of toilet. Open defection is in practice. Recently sewerage pipe line is installing under JNURM. There is no arrangement of Solid Waste Management. Total Number of Household are 117	A habitation of Harijans, one of the most downtrodden castes in India, the slum is located donated land by Mahanth Ji and having Parcha of the land in the name of people living here. It is a medium size slum with 117 households, mostly dominated by Scheduled Castes (SCs). It was settled some 50 years ago on the parcha (donated) land. Out of 117 HH, 99 HH are kutcha and rest 18 are either pucca or semi kutcha	Medical Facilities are not available within slum. PHC Bodhgaya is about 5 km	Slum is connected with town through concrete single road and there is no drain system withing slum at present time.	No any government school and Anganwadi are operating within slum. One private school is operating with slum with support of a NGO.	Most of the family are casual labour (84 HH) and some are self-employed (2) and others are either regular labour or agriculture labour.	No such interaction with government officials with

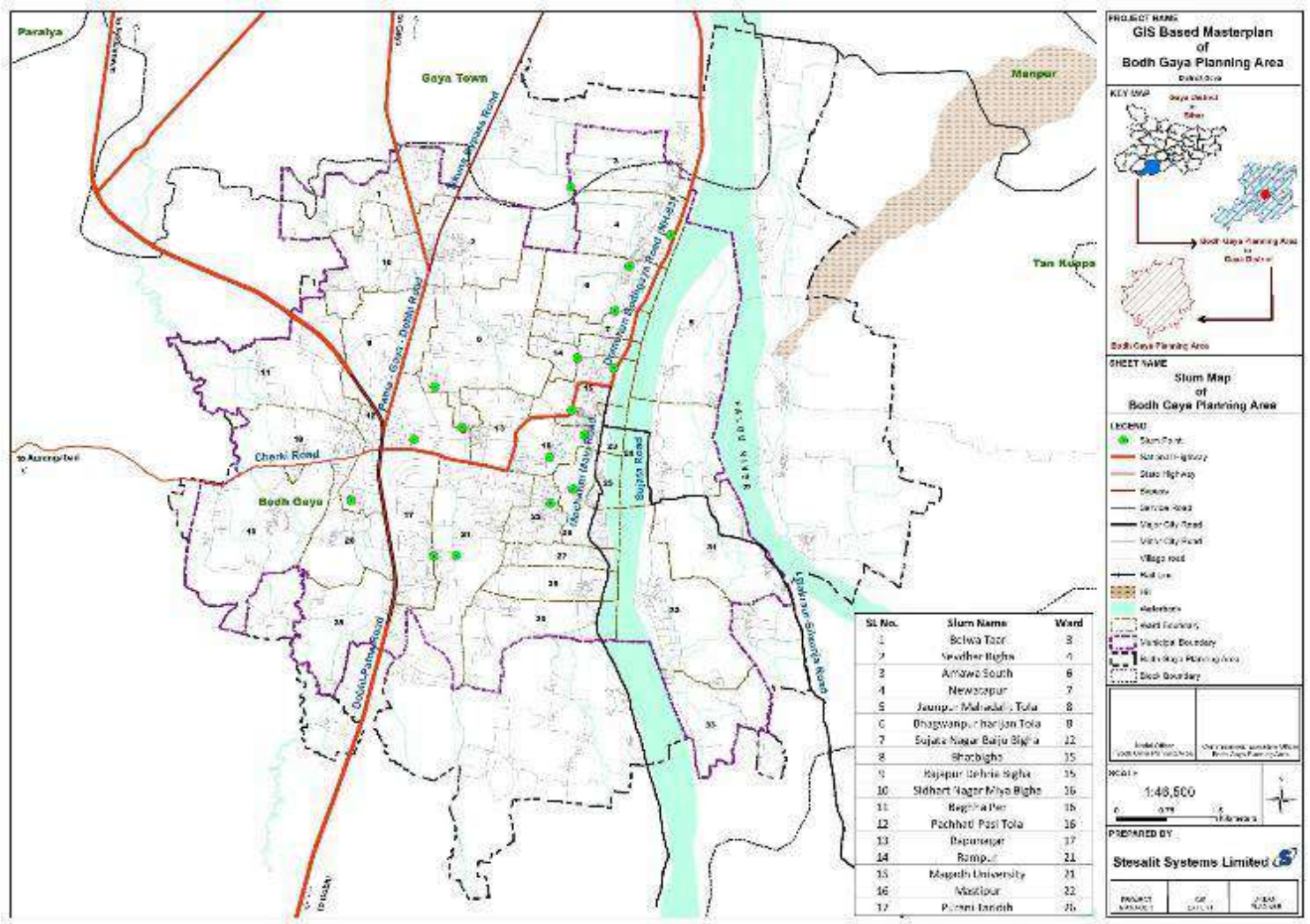
Sl.No.	Name of Slums	Access/ Availability of Safe drinking Water	Sanitation /Gray water disposal /availability of Housing	Security of Tenure /availability of housing	Availability of medical Facility	Condition of road and drains	Availability of School and Anganwadi	Livelihood Aspects	Interaction with government officials
2	**Rampur**	There are No of Handpumps are available for safe drinking water but most them are shallow bored	There is no arrangement of toilet in most of the HH. Only forty-two HH has facilities of toilet. Open defection is in practice. Recently sewerage pipe line is installing under JNURM. There is no arrangement of Solid Waste Management. Total Number of Household are 249	A habitation of Harijans, one of the most downtrodden castes in India, the slum is located below along aahar and east of magadh university with open space. It is a large size slum with 249 households, mostly dominated by OBC and Scheduled Castes (SCs). It was settled some 50 years ago on the private land.	Medical Facilities are not available within slum. PHC Bodhgaya is about 4 km	Slum is connected with town through concrete single road and there is no drain system withing slum at present time.	Government school is operating within slum.	Most of the family are farmer (205) and others are casual labour (15 HH), self-employed (25) and others are either regular labour or agriculture labour (4).	No such interaction with government officials with

Sl.No.	Name of Slums	Access/ Availability of Safe drinking Water	Sanitation /Gray water disposal /availability of Housing	Security of Tenure /availability of housing	Availability of medical Facility	Condition of road and drains	Availability of School and Anganwadi	Livelihood Aspects	Interaction with government officials
3	**Rajapur Dahariybigha**	There are No of Handpumps are available for safe drinking water but most them are shallow bored	There is no arrangement of toilet in most of the HH. Only seven HH has facilities of toilet. Open defection is in practice. Recently sewerage pipe line is installing under JNURM. There is no arrangement of Solid Waste Management. Total Number of Household are 220	A habitation of Harijans, one of the most downtrodden castes in India, the slum is located below along nallaw and the niranjana river with open space dividing it in four distinct parts. It is a large size slum with 220 households, mostly dominated by Scheduled Castes (SCs). It was settled some 50 years ago on the private land.	Medical Facilities are not available within slum. PHC Bodhgaya is about 1 km	Slum is connected with town through concrete single road and there is no drain system withing slum at present time.	Government school and Anganwadi are operating within slum.	Most of the family have no specific source of livelihood and others are casual labour (28 HH) regular labour or agriculture labour (02).	No such interaction with government officials with

Sl.No.	Name of Slums	Access/ Availability of Safe drinking Water	Sanitation /Gray water disposal /availability of Housing	Security of Tenure /availability of housing	Availability of medical Facility	Condition of road and drains	Availability of School and Anganwadi	Livelihood Aspects	Interaction with government officials
4	**North Part of SuryapuraSewdharbigha and Amawa**	There are No of Handpumps are available for safe drinking water but most them are shallow bored	There is no arrangement of toilet in most of the HH. Only two HH has facilities of toilet. Open defection is in practice. Recently sewerage pipe line is installing under JNURM. There is no arrangement of Solid Waste Management. Total Number of Household are 117	A habitation of Harijans, one of the most downtrodden castes in India, the slum is located in open space and near the niranjana river with open space dividing it in four distinct parts. It is a large size slum with 220 households, mostly dominated by Scheduled Castes (SCs). It was settled some 50 years ago on the private land.	Medical Facilities are not available within slum. PHC Bodhgaya is about 3 km	Slum is connected with town through concrete single road and there is no drain system withing slum at present time.	Government school and Anganwadi are operating within slum.	Most of the family are farmer (206) and others are casual labour (63 HH), self-employed (01) and others are either regular labour or agriculture labour (4).	No such interaction with government officals with

Sl.No.	Name of Slums	Access/ Availability of Safe drinking Water	Sanitation /Gray water disposal /availability of Housing	Security of Tenure /availability of housing	Availability of medical Facility	Condition of road and drains	Availability of School and Anganwadi	Livelihood Aspects	Interaction with government officials
5	**Tikabigha**	There are No of Handpumps are available for safe drinking water but most them are shallow bored	There is no arrangement of toilet in most of the HH. Only two HH has facilities of toilet. Open defection is in practice. Recently sewerage pipe line is installing under JNURM. There is no arrangement of Solid Waste Management. Total Number of Household are 66	A habitation of Harijans, one of the most downtrodden castes in India, the slum is located in open space with open space dividing it in two distinct parts. It is a small size slum with 66 households, mostly dominated by Scheduled Castes (SCs). It was settled some 50 years ago on the private land.	Medical Facilities are not available within slum. PHC Bodhgaya is about 1 km	Slum is connected with town through concrete single road and there is no drain system withing slum at present time.	Government Anganwadi are operating within slum. One	Most of the family casual labour (48 HH) others are self-employed.	No such interaction with government officals with

Source: Bodhgaya Nagar Parishad



MAP 5-1 SLUM MAP OF BODHGAYA PLANNING AREA

Source: Stesalit Systems Ltd.

5.4 SOCIO ECONOMIC SURVEY ANALYSIS

5.4.1 HOUSING ANALYSIS URBAN

5.4.1.1 LIVING CONDITIONS

Living Conditions examines issues such as housing quality and access to basic amenities. By scrutinizing these key indicators, the analysis hopes to reveal disparities, identify areas for improvement, and provide insights into the overall well-being of the surveyed population. Understanding the complexities of living conditions not only informs urban planning initiatives but also helps to provide a comprehensive understanding of the socioeconomic context in which individuals and families live. This research is critical for developing targeted interventions that improve the overall quality of life in the community.

5.4.1.1.1 HOUSING STRUCTURE

61.59% of the surveyed households in urban areas live in pucca houses, 18.41% still live in kuccha houses, and 20% in semi-pucca houses which is a matter of concern.

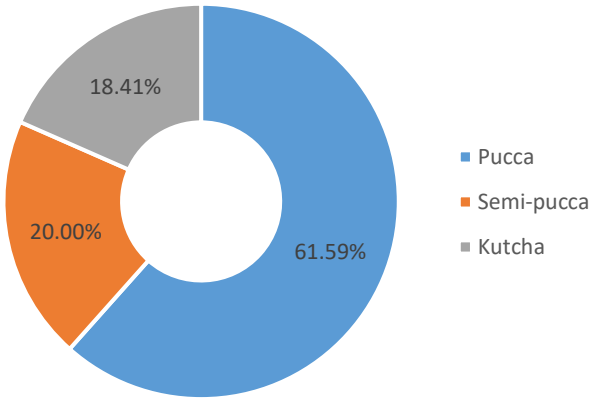


FIGURE 5-4 HOUSING STRUCTURE OF THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

As per 7.92% of the households surveyed in urban areas, their houses are in bad condition, 30.52% are in average condition while 5.32% have no response in terms of housing condition.

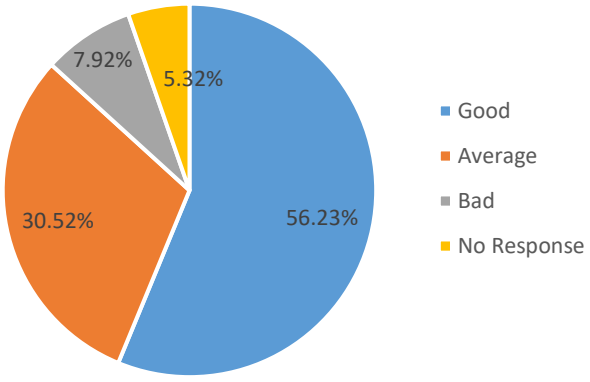


FIGURE 5-5 HOUSING CONDITION OF THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

5.4.1.1.2 ACCOMMODATION

As per the households surveyed in urban areas, 10.16% have only 1 room, 25.40% have 2 rooms, 14.92% have 3 rooms, 18.10% have 4 rooms, 12.70% have 5 rooms and the rest of 18.73% have either 6 or more than 6 rooms in their house.

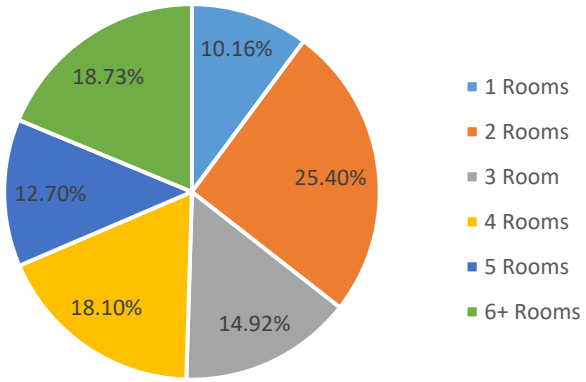


FIGURE 5-6 REPORTED NUMBER OF ROOMS IN THE HOUSE OF THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

5.4.1.1.3 OWNERSHIP OF THE PROPERTY

Among the households surveyed in urban areas, almost all the households (98%) own the property where they live while only 7 households reported to live on rented property.

5.4.2 HOUSING ANALYSIS RURAL

5.4.2.1 LIVING CONDITIONS

5.4.2.1.1 HOUSING STRUCTURE

57.82% of the surveyed households in rural areas live in pucca houses, 22.71% still live in kuccha houses while 19.47% in semi-pucca houses which is a matter of concern.

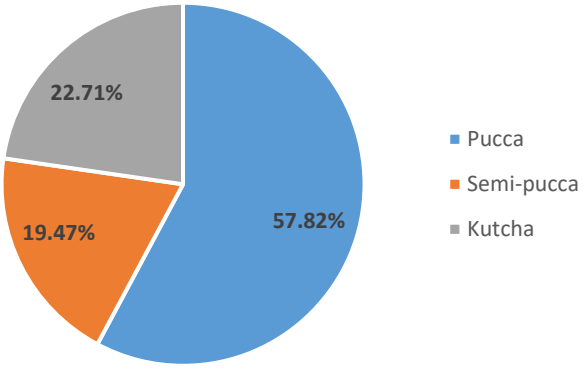


FIGURE 5-7 HOUSING STRUCTURE OF THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

As per 16.84% of the households surveyed in rural areas, their houses are in bad condition while 29.18% are in average condition.

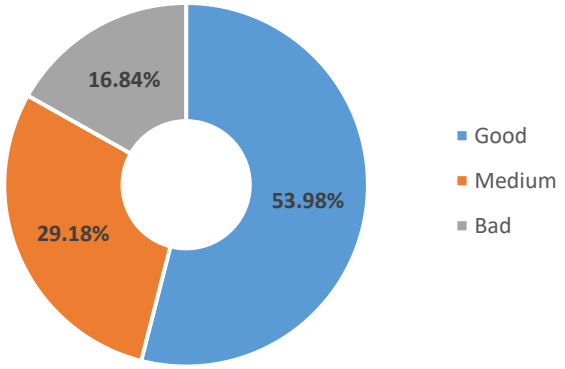


FIGURE 5-8 HOUSING CONDITION OF THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

5.4.2.1.2 ACCOMMODATION

As per the households surveyed in rural areas, 6.49% have only 1 room, 28.24% have 2 rooms, 18.32% have 3 rooms, 19.85% have 4 rooms, 7.44% have 5 rooms in their house, and the rest 19.66% have more than 5 rooms.

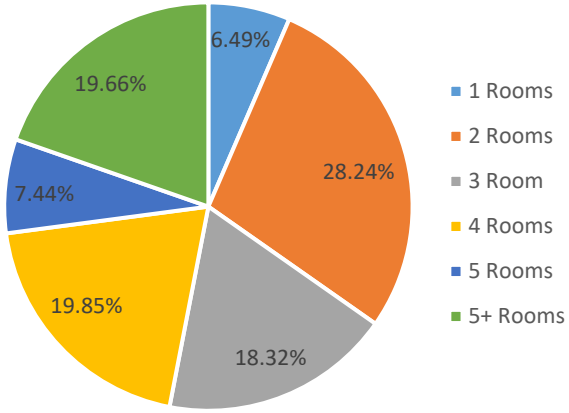


FIGURE 5-9 REPORTED NUMBER OF ROOMS IN THE HOUSE OF THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

5.4.2.1.3 OWNERSHIP OF THE PROPERTY

Among the households surveyed in rural areas, almost 100% own the property where they live.

5.5 PRESENT HOUSING GAP

As the population of cities grows, so does the number of people living in slums and squatter communities. Skyrocketing prices of land and real estate in urban regions have driven the poor and the economically weaker parts of society to occupy the marginal lands marked by bad housing stock, congestion, and obsolescence. India's urban housing deficit is mostly caused by the EWS and LIG categories. However, the majority of the housing stock built in metropolitan India is

unaffordable to the EWS and LIG segments. A significant housing shortage exists in metropolitan India, with a vast imbalance between demand and supply of housing, both in terms of number and quality.

5.5.1 CALCULATION HOUSING SHORTAGE

The housing shortage for Bodhgaya has been calculated by putting together the number of households residing in unacceptable dwelling units, including the obsolescence factor, those residing in unacceptable social and physical conditions, and houseless households. As per Census 2011, the housing shortage for Bodhgaya has been worked out based on the following components and has been summarized below:

A. Obsolescence Factor

I. Dilapidated condition of houses
II. Temporary structure of houses

B. Congestion factor

I. Households with one or more married couples with no exclusive room

C. Houselessness

I. Households living without a house

To compute the total housing shortage till 2011, the obsolescence factor is considered, which includes dilapidated houses and temporary houses as per Census 2011, the congestion factor, and the homelessness factor. The total housing shortage in 2011 was 5674 houses in the urban area, 3115 houses in the rural parts, and 8789 houses in the total planning area.

Area Name	Total Census Houses	Dilapidated Houses	Temporary Structures	One or more married couples with no exclusive room	Slum HH	Total Housing Shortage
Bodhgaya (NP)	12101	1026	2743	108	**1797**	5674
Rural Areas (19 Villages)	4677	379	2673	63	**-**	3115

Total Planning Area	16778	1405	5416	171	**1797**	8789

As per Census 2011, the total number of census houses recorded was 16778, out of which 1405 were classified as dilapidated houses. Additionally, 5416 houses were categorized as temporary structures, highlighting the prevalence of inadequate housing conditions. Furthermore, 171 households had one or more married couples without an exclusive room, indicating overcrowding and a lack of privacy. As a result, the total housing shortage was estimated to be 8789 reflecting the urgent need for sustainable and affordable housing solutions.

5.6 FUTURE HOUSING NEEDS

TABLE 5-12 HOUSING DEMAND FOR BODHGAYA FOR 2047

Name	Total Population (Census 2011)	Number of Households (Census 2011)	Average Household Size	Projected Population (2047)	Projected Household (2047)	Total Housing Shortage as per census 2011	No. of sanctioned houses through PMAY	Total household required (2047)
	A	B	C	D	E*	F	G	H*
Bodhgaya Nagar Parishad)	73908	12101	6.11	1,34,811	22,064	5674	3955	23,783
Rural Areas	28764	4677	6.15	61,363	9,977	3115	-	13,092
Total Planning Area	102672	16,778	6.12	1,96,175	32,055	8,789	3955	36,889

Calculation:

- E = D / C
- H = E + F - G

The housing projections for the Bodhgaya Planning Area, which includes Bodhgaya Nagar Parishad and 33 villages, indicate a significant housing demand by 2047. Based on Census 2011 data and future population projections, the

assessment considers household size, projected households, dilapidated houses, and existing housing shortages to estimate the total housing requirement.

In Bodhgaya Nagar Parishad, the population in 2011 was 73908 with 12101 households, having an average household size of 6.11 persons. By 2047, the population is expected to reach 1,34,811, requiring approximately 22064 households. Additionally, as per the census 2011, there was a housing shortage of 5674 houses; there are 3955 PMAY-sanctioned houses in Bodhgaya Nagar Parishad, leading to a total housing demand of 23,783 units.

Similarly, in rural areas covering 33 villages, the 2011 population stood at 28764 with 4677 households, and an average household size of 6.15 persons. The projected population for 2047 is estimated at 61363, necessitating 9977 households. the total housing requirement for rural areas is projected to be 13092 units.

For the entire Bodhgaya Planning Area, which comprises both urban and rural regions, the population in 2011 was 102672, with 16778 households and an average household size of 6.12 persons. By 2047, the projected population is 196175, requiring around 32055 households. The housing shortage is 8789 as per the census 2011. The total housing requirement for 2047 is estimated to be 36889 units.

This analysis highlights a critical need for housing development, particularly in rural areas, where the shortage is more pronounced. The current sanctioned housing under PMAY is insufficient to meet future demand. There is an urgent need for comprehensive housing policies, infrastructure development, and affordable housing programs targeting low-income groups and slum rehabilitation. Addressing these challenges will require a focused approach from both government and private stakeholders to bridge the demand-supply gap and improve living conditions in the Bodhgaya Planning Area.

Table 31: housing gap for the projected population of 2047

Required Household for 2047	Existing Households (2011)	Gap
A	**B**	**C**
32055	16,778	15277

The housing scenario in the Bodhgaya Planning Area highlights a significant gap between projected household requirements and the availability of housing. By 2047, the total projected households are estimated to be 32055. However, as per the 2011 Census, the existing number of houses stood at 16778, and the shortage as calculated is found to be 8789. This results in a substantial gap of 15277 housing units that need to be addressed through planned development and housing initiatives.

To bridge this gap, there is a critical need for strategic urban and rural housing policies, government interventions, and private sector involvement. The increasing housing demand highlights the necessity for affordable housing projects, improved infrastructure, and efficient land use planning to accommodate future population growth and prevent issues like slum proliferation and housing inadequacy.

5.7 ISSUES AND POTENTIAL

STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
POTENTIAL FOR URBAN EXPANSION Availability of land for new housing projects allows planned urban growth and development. The development of residential projects by Vastu Vihar in the northern part of the planning area strengthens the region by addressing housing shortages and enhancing infrastructure, providing better living conditions for residents.	PRESENCE OF SLUM There are 16 notified slums present in the city, which lack basic amenities such as proper roads, sanitation, water supply, and electricity, affecting the overall quality of life and urban development.	DEVELOPMENT UNDER THE HOUSING FOR ALL SCHEME Full-fledged implementation of PMAY can ensure 100% pucca housing for both urban and rural areas.	LACK OF STRICT URBAN REGULATIONS Uncontrolled and unplanned development may lead to congestion, poor sanitation, and environmental degradation.

5.8 Recommendation

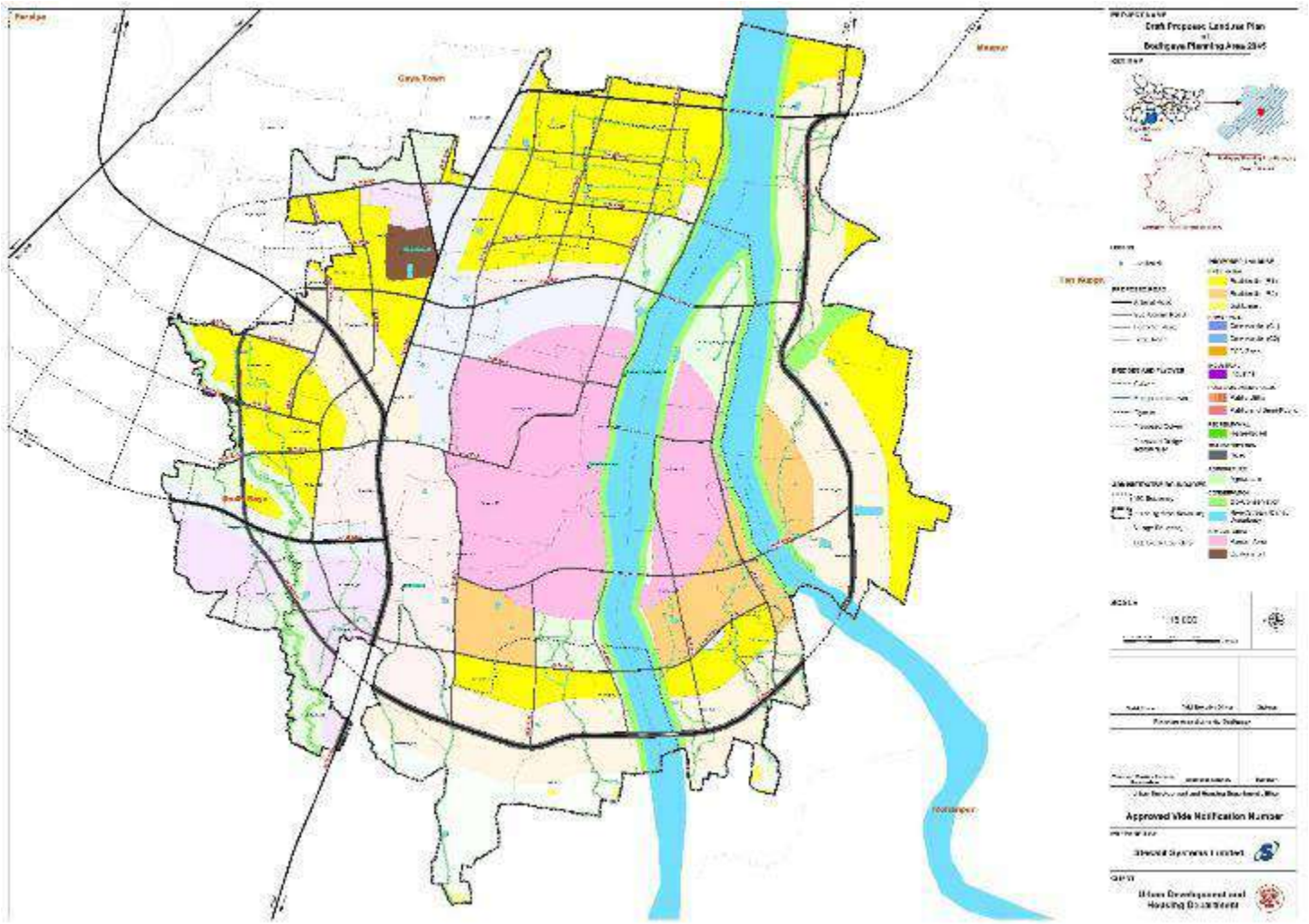
The housing strategy for the Bodhgaya Master Plan adopts an inclusive and balanced approach to accommodate diverse income groups and respond to existing housing challenges while supporting planned urban growth. The focus is on improving living conditions, increasing formal housing supply, encouraging planned real estate development, and promoting mixed-income communities to ensure social equity and sustainable urban expansion.

Slum improvement through in-situ rehabilitation and relocation prioritizes upgrading existing informal settlements by providing secure tenure, improved infrastructure, and essential services while minimizing displacement. Preference is given to on-site redevelopment, particularly on government or publicly owned land, ensuring community continuity and social stability. Relocation will be considered only where in-situ solutions are not feasible. The strategy emphasizes community participation, GIS-based identification and targeting, and implementation through schemes such as PMAY 2.0, Bihar Slum Policy, and PPP-based redevelopment models.

Affordable housing for EWS and LIG groups aims to address the shortage of formal housing options for low-income households by promoting compact and efficient group housing typologies with shared amenities. The approach encourages rental housing, rent-to-own models, and cross-subsidy mechanisms to enhance affordability. Integration with national and state housing schemes and innovative financing models will help expand access to formal housing while ensuring proximity to employment and services.

Mid-income (MIG) housing focuses on meeting the growing demand from salaried urban households seeking secure and bank-financed housing options. Development will be encouraged near employment hubs, educational institutions, and well-connected urban corridors to support transit-oriented growth and reduce commuting pressures. Mixed-income developments, subsidy-linked loan schemes, and planning incentives for developers will help promote a balanced and inclusive residential environment.

Market-led housing for HIG groups supports premium residential development driven by private investment, including plotted developments, gated communities, and vertical residential towers within planned residential zones. This segment is intended to strengthen the real estate market, attract investment, and improve overall urban quality through regulated development frameworks, zoning mechanisms, and local area planning strategies that ensure alignment with the broader master plan vision.



MAP 5-2 PROPOSED RESIDITIAL ZONE IN BODHGAYA PLANNING AREA

Source: Prepared by Stesalit Systems limited

5.8.1 PROPOSED RESIDENTIAL ZONES

5.8.1.1 RESIDENTIAL (R1)- HIGH DENSITY ZONE

The R-1 Residential Zone permits a maximum residential density of up to 600 persons per hectare (PPH). This zone is situated on the strategic proximity to high-capacity public transport corridors (Ring road), the R-1 zone is planned to accommodate high-rise, compact, and efficient residential development.

The zoning regulations encourage intensive land use, higher Floor Area utilization, and a compact urban form to optimize transit accessibility and reduce dependency on private vehicles. Mixed housing typologies, active street edges, and integration of community-level amenities are promoted to support a walkable and transit-friendly environment. Overall, the R-1 zone is envisioned as a high-density residential area that supports sustainable mobility patterns while accommodating projected population growth in a planned and efficient manner.

5.8.1.2 RESIDENTIAL (R2)- MEDIUM DENSITY ZONE

The R-2 Residential Zone, designated as a medium-density residential area, permits development up to a density of 400 persons per hectare (PPH). This zone is planned primarily as a growth extension of the existing town, accommodating future population expansion in a controlled and planned manner.

The R-2 zone plays a strategic role in guiding and regulating the direction of urban growth, ensuring that expansion occurs along planned corridors with adequate infrastructure provision. Development in this zone is intended to be predominantly residential, supported by neighbourhood-level facilities and services, thereby creating self-sufficient residential areas while maintaining a transition between high-density urban cores and lower-density peripheral zones.

5.8.1.3 RESIDENTIAL (R3)- LOW DENSITY ZONE

The R-3 Residential Zone is designated as a low-density residential area, comprising the existing core areas of the town with a present residential density is around 75 persons per hectare (PPH). This zone represents established neighbourhoods with compact urban fabric, traditional street patterns, and limited carrying capacity for additional population. This Zone will permit development between 100 PPH.

To preserve the existing character and prevent infrastructure overload, high-rise development is not permitted within the R-3 zone. All new construction, redevelopment, and additions are strictly regulated in accordance with the old area provisions of the Bihar Building Bye-Laws, including applicable norms related to plot size, ground coverage, building height, setbacks, and access. Any development for public use can be done by acquiring land by using **Transferable Development Right or by Accommodation Reservation** as per **BUPD Act, 2012, Section 67 and 68** respectively.

The planning intent of the R-3 zone is to enable controlled redevelopment and gradual upgradation while maintaining neighbourhood scale, heritage value, and

existing social structure. Emphasis is placed on improving basic services, road accessibility, and living conditions without encouraging densification beyond the area's functional capacity.

5.8.1.4 TOWNSHIP (TS1)

The Township Zone (TS-1) is designated as a high-density residential township, permitting development up to a maximum density of 600 persons per hectare (PPH). This zone is intended to accommodate large-scale, planned residential development, and therefore vertical expansion and high-rise buildings are permitted, subject to statutory approvals and safety norms.

All planning, design, and development requirements within the TS-1 zone shall strictly comply with the provisions of the Bihar Housing Policy, Bihar Affordable Housing and Slum Rehabilitation & Redevelopment Policy, New Satellite and Greenfield Township Policy, Private Residential Township policy, and the applicable Bihar Building Bye-Laws, as amended from time to time. These regulations govern parameters such as housing mix, EWS/LIG reservation, infrastructure provision, open spaces, road hierarchy, social amenities, and environmental safeguards.

The TS-1 zone is envisioned as a self-contained and integrated township, supported by adequate physical and social infrastructure, mixed land uses, and efficient internal circulation, contributing to sustainable urban growth and meeting the housing demand generated by regional economic activities.

5.8.1.5 MIXED USE (M2)

Only **low-impact commercial uses** such as shops, clinics, offices, and small eateries are permitted. Large commercial complexes and heavy traffic-generating uses are not allowed. Adequate **setbacks, parking, and pedestrian access** are required. Development should ensure compatibility with surrounding residential areas.

TABLE 5-13 COMPARATIVE ZONING TABLE OF RESIDENTIAL LANDUSE

Zone	Character & Planning Intent	Permissible Density (PPH)	Building Height / Form	Key Regulations & Controls
R-1 (High Density Residential – TOD Zone)	High-density residential zone within TOD influence area (800–1200 m from TOD nodes); supports compact, transit-oriented urban form	Up to 600 PPH	High-rise and compact development permitted	FAR, height, parking relaxation, mixed-use encouragement as per TOD guidelines and Building Bye-Laws

R-2 (Medium Density Residential)	Planned growth extension of existing town; regulates direction of urban expansion	Up to 400 PPH	Mid-rise development	Controlled densities, neighbourhood-level facilities, infrastructure-led growth
R-3 (Low Density Residential – Existing Core)	Existing core area with traditional urban fabric and infrastructure constraints	Existing density 75 PPH (permitted up to 100 PPH)	High-rise not permitted	Development strictly as per Old Area norms of Bihar Building Bye-Laws
TS-1 (High Density Township)	Planned, integrated high-density township; accommodates future population and regional housing demand	Up to 600 PPH	Vertical expansion and high-rise permitted	Mandatory EWS/LIG housing, social infrastructure, internal road hierarchy, open space norms
TS-2 (Low Density Township)	Low density Township for HIG housing	Up to 100 PPH	Maximum height 9 m only	Strict environmental controls, low ground coverage, green infrastructure, no high-density development
M-2 Neighborhood Mixed use zone)	Planned for **medium-intensity mixed residential neighborhoods** where small-scale commercial and service activities support local communities. The zone promotes **live-work environments**, neighborhood retail, and community services while maintaining residential character.	150–250 PPH	**G+2 / G+3 (max 12–15 m)** with predominantly residential building forms. Limited commercial activity permitted mainly on **ground floors along collector streets**.	Only **low-impact commercial uses** such as shops, clinics, offices, and small eateries permitted. Large commercial complexes and heavy traffic-generating uses not allowed. Adequate **setbacks, parking, and pedestrian access** required. Development should ensure compatibility with surrounding residential areas.

Source: Draft Proposed Land use Plan, Various Housing Policies

6 ECONOMIC PROFILE

6.1 DISTRICT SCENARIO

Gaya is one of the biggest districts of the state with an area of 4,976 sq. km. and the second-largest contributor to the economy of Bihar, after Patna. The district has a rich cultural heritage, primarily centred on its historical and religious significance. Gaya has good connectivity via rail, road and air, which links the district to potential markets within India and abroad, facilitating trade and commerce. The district also presents a multifaceted economic landscape shaped by agriculture, tourism and small-scale industries.

The district of Gaya occupies a portion of the south Bihar plain. As per the Second Bihar State Irrigation Commission Report, 1994, the Punpun River basin occupies the western half of the district, and the eastern half is dominated by the Kiul-Harohar River Basin. Bodhgaya falls majorly under the Kiul-Harohar basin, situated along the banks of Falgu River which is one of their many tributaries. The fertile alluvial plains make Bodhgaya suitable for cultivation. Agriculture is the primary economic activity with rice production as main crop. The district's sole cash crop is sugarcane, although other significant foodgrains produced are maize, pulses, rape and mustard.

The Gaya district's agricultural development is reliant on a vast artificial irrigation infrastructure where a system of irrigation works is installed over the majority of the district's streams with the goal of distributing water and storing it for use during prolonged periods of drought. The execution of several irrigation projects has also received a lot of attention since independence like the Lilajan Irrigation Scheme and the Mahabodhi Irrigation Scheme. Throughout the district's many plan periods, a variety of irrigation projects, including tube wells, irrigation wells, and minor irrigation schemes, have been implemented to provide a robust irrigation infrastructure.

In the whole district, Gaya town is the only manufacturing town. According to data from the Ministry of Micro, Small, and Medium Enterprises, Government of India's "Brief Industrial Profile of Gaya District," there were 6,911 small scale registered units in total in 2008–09, employing 25,339 people. Bodhgaya is an important centre for religious tourism hence prospective MSE clusters here comprise of Hotels, Restaurants and Tourism Services. Despite these developments, the district is still regarded as industrially backward and requires added impetus for the existing industries to flourish.

The district's main trading hubs are situated at Bankey Bazar, Sherghati, Tekari, and Gaya. The export trades of Gaya mainly consist of oil seeds, *gur*, stone chips and vegetables while the district's key imports include coal, cloth, kerosene oil, tea, cotton timber, tobacco, spices, dried and fresh fruits, paper and other consumer goods. Although agriculture and tourism are the mainstays of its economy, there

are opportunities for growth in small-scale industries and trade. With focused development initiatives and infrastructure improvements, Gaya can harness its resources to achieve sustainable economic growth and enhance the quality of life for its residents.

6.1.1.1 GROSS DOMESTIC PRODUCT AND NET DOMESTIC PRODUCT

The Gross Domestic Product (GDP) and Net Domestic Product (NDP) data for Gaya District ranging from 2004 to 2012, sourced from the Directorate of Economics and Statistics, Bihar, depict a progressive increase in the district's economic output. The table below accompanied by the graphical representation provides a depiction of this incremental growth trajectory observed throughout the specified duration. From the years 2010-2011, the GDDP and NDDP have taken a huge leap of approximately 20% increase.

TABLE 6-1 GROSS DISTRICT DOMESTIC PRODUCT (GDDP) AND NET DOMESTIC PRODUCT FOR GAYA DISTRICT AT CURRENT PRICE (IN LAKH)

Year	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
GDDP	2,60,080	2,85,181	3,60,071	4,09,997	4,76,165	5,42,300	6,52,871	8,12,420
% Increase	-	*9.65%*	*26.26%*	*13.87%*	*16.14%*	*13.89%*	*20.39%*	*24.44%*
NDDP	2,30,955	2,52,324	3,21,386	3,65,419	4,27,262	4,86,037	5,87,733	7,31,975
% Increase	-	*9.25%*	*27.37%*	*13.70%*	*16.92%*	*13.76%*	*20.92%*	*24.54%*

Source: Directorate of Economics and Statistics, Dept. of Planning and Development, Govt. of Bihar

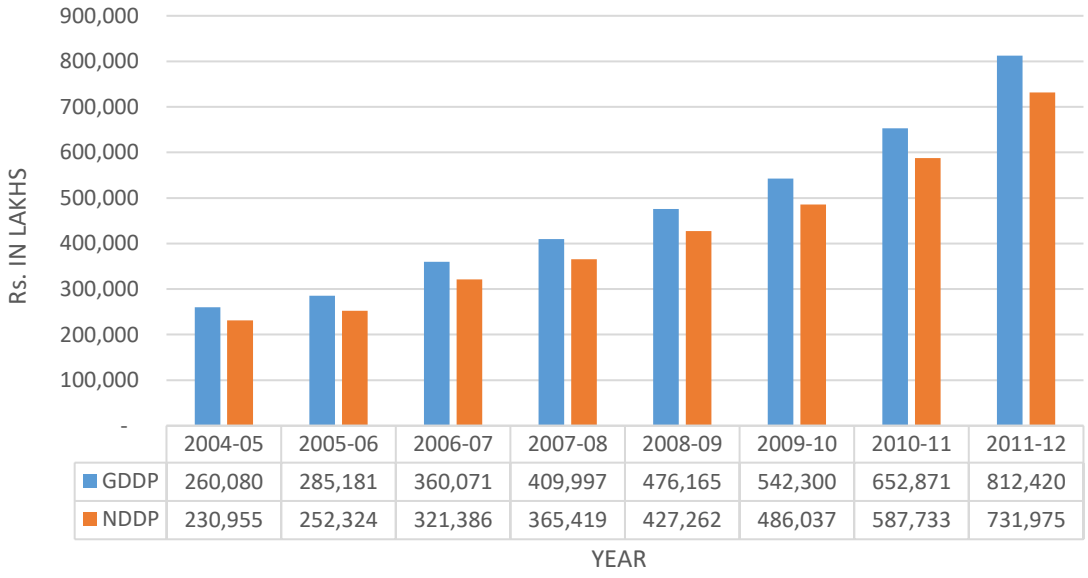


FIGURE 6-1 GROSS DISTRICT DOMESTIC PRODUCT (GDDP) AND NET DOMESTIC PRODUCT FOR GAYA DISTRICT AT CURRENT PRICE (IN LAKH)

Source: Directorate of Economics and Statistics, Dept. of Planning and Development, Govt. of Bihar

The Net Domestic Product (NDP) as given in the table below presents the contributions from each sector primary, secondary, and tertiary for the fiscal years 2004-05 and 2009-10. Analysis reveals that the service sector, representing tertiary activities, holds the largest share at 60%, followed by the primary sector, encompassing agriculture, dairy, and related activities. Conversely, industrial

endeavours exhibit limited presence within the district, resulting in the smallest contribution. A comparative examination between the two periods highlights a noteworthy 110% increase within just 5 years. The following table shows the Sector-wise Net Domestic Product in different sectors for the Gaya district at the current price (in Lakh).

TABLE 6-2 SECTOR-WISE NET DOMESTIC PRODUCT IN DIFFERENT SECTORS FOR GAYA DISTRICT AT CURRENT PRICE (IN LAKH)

Year	PRIMARY ACTIVITY		SECONDARY ACTIVITY		TERTIARY ACTIVITY		TOTAL ACTIVITY	
	NDP	% of Total	NDP	% of Total	NDP	% of Total	NDP	% Annual Increase
2004-05	67,323.38	29.15	26,929.35	11.66	1,36,702.26	59.19	2,30,955	-
2009-10	1,15,336.58	23.73	74,072.04	15.24	2,96,628.38	61.03	4,86,037	110.45%

Source: Directorate of Economics and Statistics, Dept. of Planning and Development, Govt. of Bihar

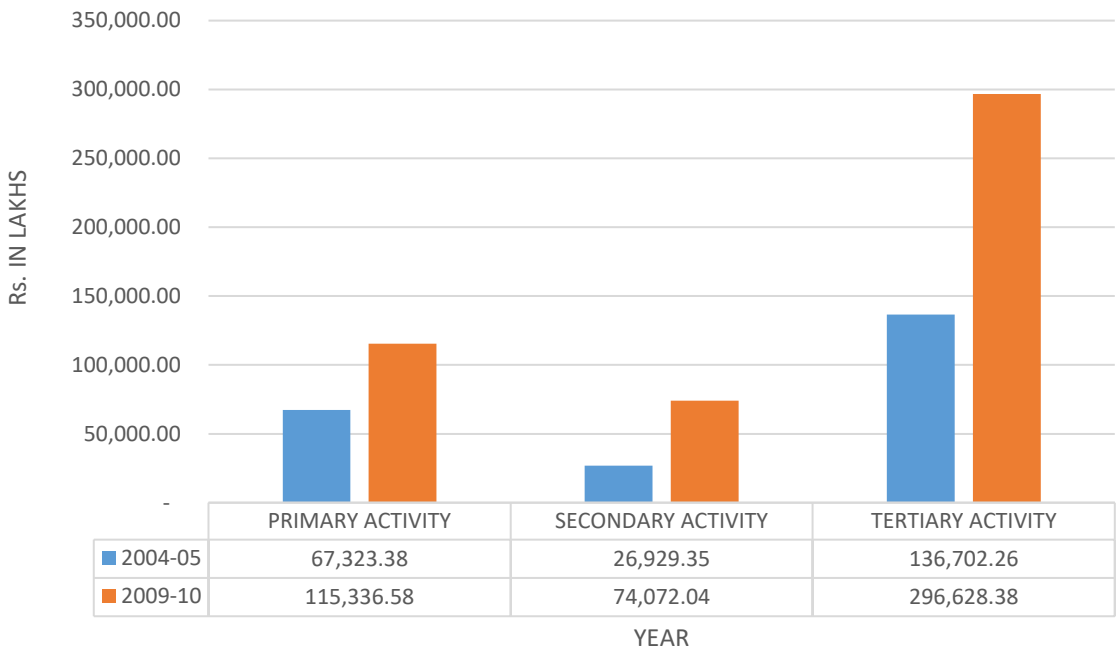


FIGURE 6-2 SECTOR-WISE NET DOMESTIC PRODUCT IN DIFFERENT SECTORS FOR GAYA DISTRICT AT CURRENT PRICE (IN LAKH)

Source: Directorate of Economics and Statistics, Dept. of Planning and Development, Govt. of Bihar

6.1.1.2 PRIMARY SECTOR

Agriculture serves as the backbone of the district's economy, with a significant portion of its residents depending on farming for their livelihoods. The fertile alluvium plains of the South Bihar Alluvial Plain provide an ideal setting for farming, placing the area within Zone III(A) of the Agro Climatic Zone (NARP). Positioned amidst these nutrient-rich alluvial plains, the district is the second-largest contributor to the economy of Bihar. Among the primary crops cultivated are rice and sugarcane, alongside other significant crops like maize, pulses, and potatoes, contributing significantly to the agricultural landscape of the region.

According to the records kept by the Department of Agriculture, Government of Bihar (NABARD, 2022-23), the district's forested area spans 77,836 hectares, which is 15.67% of the total geographical area of the district (Gaya DIPS). The gross cropped land covers 2,12,900 hectares, while the area not available for cultivation comprises 73,061 hectares within the district. The agricultural cycle traditionally starts in July and ends in June the following year, preceding the annual monsoon season. Consequently, the agricultural year is divided into four specific seasons: Bhadai, Aghani, Rabi, and Garma.

TABLE 6-3 GAYA DISTRICT LAND UTILIZATION PATTERN FOR THE YEAR 2018-19

Name of the District	Geographical Area	Area under Forest	Land not available for cultivation				Culturable Waste Land	Uncultivated land excluding fallow		Fallow Land		Total Uncultivable Land
			Barren & Unculturable land	Non-Agriculture Use								
				Land Area	Water Area			Permanent Pastures	Tree Crops	Current Fallow	Other Fallow	
					Perennial	Temporary						
Gaya	493.8	77.8	27.5	63.5	3.8	6	3.2	2	3.9	124.8	11.2	323.8

Unit: 1000 Hectares

Source: Bihar Economic Survey, 2020-21, Government of Bihar

TABLE 6-4 MAJOR CROP PRODUCTION IN GAYA DISTRICT

Year	Rice		Maize		Wheat		Barley		Gram		Tur (Arhar)		Khesari	
	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT
2018-19	94118	142546	723	2568	66839	185887	615	760	4176	4999	1447	2907	189	142
2019-20	82937	150248	3259	3546	65674	113281	180	400	3615	2494	1292	1822	172	116
2020-21	84101	222678	262	1092	66582	184099	191	220	4062	3924	1366	1847	167	194
2021-22	84474	282185	257	994	66809	183764	192	245	3913	3670	1366	2615	169	165

Year	Lentil (Masoor)		Sugarcane		Kulthi		Moong		Urad		Ragi		Rape & Mustard	
	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT	Area in Hectare	Production in MT
2018-19	6216	6210	149	10186	1106	1022	2723	1636	310	270	106	114	894	1443
2019-20	5917	3722	0	0	0	0	2600	2868	18	15	64	51	791	509
2020-21	6005	4282	0	0	942	869	1807	752	27	22	96	90	845	748
2021-22	6170	5029	0	0	790	729	1790	1359	25	24	93	91	888	803

Source: Directorate of Economics and Statistics, Dept. of Planning and Development, Govt. of Bihar

In 2019–20, food crops accounted for 91.26% of the district's agricultural production, with non-food crops coming in second with just 8.74% of the total. The most significant food crop was rice (45.86%), which was followed by wheat (36.31%) and pulses (8.06%). Fruits (1.38%) and vegetables (7.79%) stand out. The percentage of land used for non-food crops, including sugarcane, is 0.06%. The principal non-food crops were sugarcane, potatoes, and rapeseed/mustard (Gaya DIPS). The district's horticultural sector comprises a variety of fruits, vegetables, flowers, plantation crops, medicinal, and fragrant plants. The majority of the district's agricultural output is made up of fruits and vegetables. Small and marginal farmers favour horticulture since it is a labour-intensive yet very lucrative industry. For the same amount of land, a well-kept orchard yields a higher return than field crops.

TABLE 6-5 MAJOR PRODUCTION (1000 TONNES) OF FRUITS AND VEGETABLES IN GAYA DISTRICT

GAYA DISTRICT	Banana		Guava		Mango		Potato		Onion		Brinjal		Cauliflower	
	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20
Area	0.31	0.32	0.74	0.76	1.43	1.44	11.21	8.98	1.45	1.46	1.62	1.63	2.02	2.02
Production	13	13.01	5.7	5.71	14.73	14.74	11.21	10.66	28.1	26	1.62	1.63	2.02	2.02

Source: Bihar Economic Survey 2016-17 to 2020-21

Irrigation plays a vital role in the agricultural landscape of this district as it faces prolonged periods of drought during the summer seasons. The irrigation systems draw from both surface water and groundwater sources. Surface water, primarily channeled through canals, is the primary irrigation source. several physical resources, including lift irrigation projects, open wells and dug irrigation systems, watershed harvesting projects, and minor irrigation projects, have been developed in the area to increase agricultural production. Some of the major irrigation projects undertaken in the area are the Lilajan Irrigation Scheme, Lower Morhar Irrigation Scheme and Upper Morhar Irrigation Scheme.

TABLE 6-6 GROSS IRRIGATED AREAS (1000 HECTARES) IN GAYA DISTRICT

Source of Irrigation	2016-17	2017-18	2018-19
Canals	60.27	60.36	56.62
Tanks	0.13	0.13	0.15
Tube wells	125.92	126.1	118.38
Other Wells	0.00	0.00	0.00
Other Sources	2.03	2.04	1.79
Total	**188.35**	**188.63**	**176.94**

Source: Bihar Economic Survey 2016-17 to 2020-21

The Department of Fisheries, Government of Bihar, has established seven fish farms in the area, offering chances for fish farming. Although the district's production of fish is creating more opportunities for industry penetration, the government of Bihar has various programs to support fish farming throughout the state.

TABLE 6-7 FISHERIES PRODUCTION IN GAYA DISTRICT (2020-21)

S. No.	Year	Fish Production (1000 tons)	Fish Seeds (Lakhs)
1	2017-18	8.07	152.15
2	2018-19	8.10	155.00
3	2019-20	8.90	10

Source: Economic Survey 2020-21, Govt of Bihar

Livestock farming in Gaya is a significant component of the district's economy. The region supports a variety of livestock, including cattle, goats, sheep, and poultry, which are integral to the livelihoods of many rural households. These activities provide essential products such as milk, meat, wool, and eggs, contributing to both subsistence and income generation for farmers. Efforts to improve livestock health and productivity through veterinary services and modern farming techniques are ongoing, further enhancing the sector's contribution to the local economy.

TABLE 6-8 LIVESTOCK STATUS AS PER THE 19TH LIVESTOCK CENSUS OF THE GAYA DISTRICT

S. No.	Livestock	Numbers
CATTLE		
1	Goat	3,15,215
2	Buffalo	3,14,397
3	Crossbreed Cattle	44,047
POULTRY		

S. No.	Livestock	Numbers
1	Hen	1,55,656
2	Cock	1,03,694
3	Chicken	1,63,423
4	Ducks	5,048
5	Drakes	2,084
6	Duckling	2,093
7	Other poultry	8,120

Source: Directorate of Animal Husbandry, Bihar, Patna

The major mineral available in the Gaya district is Stone (Boulders). There are large stone deposits in the district, mostly in the form of boulders. Quarries are opened at various locations around the district to extract stone. An important portion of the workforce in Gaya is employed in the stone quarrying sector which includes labour-intensive tasks including extraction, transportation, and processing. The district also receives revenues and taxes from the sale and export of stone. Sand is the minor mineral available along the river beds. It is collected and transported to other parts of the district and the adjoining districts. It is used mostly for construction work. Apart from that, mica, sandstones, and quartzite are also available in the district in small proportions.

TABLE 6-9 MINING PRODUCTION OF GAYA DISTRICT (2016-2017)

Sl. No.	Name of Mineral	Production in Tones
Major Mineral		
1	Stone (Boulders)	447039.93 m

Source: Brief Industrial Profile of Gaya District, Ministry of Micro, Small & Medium Enterprises (Dept. of Mines & Geology, Govt. of Bihar)

As per the National Bank for Agriculture and Rural Development (NABARD) Area Based Plan/ Schemes for Gaya, Bihar, the block-wise Potential Linked Physical and Financial Estimate for the year 2022-23, mentions the sectoral estimate for Bodhgaya and Gaya Sadar blocks as given below.

TABLE 6-10 BLOCKWISE ESTIMATED CROPPED AREA FOR MAJOR CROPS (2022-23)

Estimated Cropped Area for 2022-23			
Sl. No.	Crop	Area in Hecter (Ha)	
		Bodhgaya	Gaya Sadar
1	Paddy	7,995.00	9,840.00
2	Wheat	3,924.12	4,829.68
3	Maize, Jowar, Bajra	337.35	415.20
4	Pulse	743.99	915.68
5	Oil Seeds	154.07	190.40
6	Vegetables	728.00	896.00
7	Potato	526.50	648.00
Total		**14,409.03**	**17,734.96**

Source: Area-Based Plan/ Schemes for Gaya district, Bihar, NABARD, 2022-23

TABLE 6-11 BLOCKWISE ESTIMATED FORESTED AREA (2022-23)

Estimated Forested Area for 2022-23			
Sl. No.	**Timber Plant**	**Area in Hecter (Ha)**	
		Bodhgaya	**Gaya Sadar**
1	Eucalyptus/Bamboo	2.00	4.00
2	Subbool	0.00	0.00
Total		**2**	**4**

Source: Area-Based Plan/ Schemes for Gaya district, Bihar, NABARD, 2022-23

TABLE 6-12 BLOCKWISE ESTIMATED DAIRY UNITS (2022-23)

Dairy Estimate for 2022-23				
Sl. No.	**Dairy**	**Unit**	**Bodhgaya**	**Gaya Sadar**
1	CB cows (2 nos. without shed) Avg. Milk yield 10 liters.	Nos.	160.00	460.00
2	Graded Murrah buffaloes (2 nos.) Avg. Milk yield 7-8 liters with Straw	Nos.	55.00	125.00
3	Working capital-KCC	Nos.	50.00	200.00
1	CB cows (2 nos. without shed) Avg. Milk yield 10 liters.	Nos.	12.00	20.00
2	Graded Murrah buffaloes (2 nos.) Avg. Milk yield 7-8 liters with Straw	Nos.	1800.00	1800.00
Total		**Nos.**	**2077**	**2605**

Source: Area-Based Plan/ Schemes for Gaya district, Bihar, NABARD, 2022-23

TABLE 6-13 BLOCKWISE ESTIMATED POULTRY UNITS (2022-23)

Poultry Estimate for 2022-23				
Sl. No.	**Poultry**	**Unit**	**Bodhgaya**	**Gaya Sadar**
1	Layer unit for 1000 Birds- with Deep Litter System	Nos.	40.00	30.00
2	Layer unit of 10000 birds with feed meal	Nos.	5.00	5.00
3	Unit Low input- SHG/JLG MODE- 500 birds- Broiler	Nos.	20.00	20.00
4	Broiler unit of 5000 birds	Nos.	12.00	20.00
Total		**Nos.**	**77**	**75**

Source: Area-Based Plan/ Schemes for Gaya district, Bihar, NABARD, 2022-23

TABLE 6-14 BLOCKWISE ESTIMATED FISHERY UNITS (2022-23)

Fishery Estimate for 2022-23				
Sl. No.	**Fishery**	**Unit**	**Bodhgaya**	**Gaya Sadar**
1	Pond Restoration	Ha.	5.00	2.00
2	Rearing Pond Construction	No.	1.00	0.00

Fishery Estimate for 2022-23				
Sl. No.	**Fishery**	**Unit**	**Bodhgaya**	**Gaya Sadar**
3	Construction of new pond for fishing - 5 feet depth	Ha.	3.00	3.00
4	KCC Fisheries	No.	300.00	300.00
Total			309	305

Source: Area-Based Plan/ Schemes for Gaya district, Bihar, NABARD, 2022-23

Agriculture and related industries continue contributing to the district's economy in the Bodhgaya Planning Area. Paddy, wheat, and maize are the primary crops produced along with pulses, potatoes, and others. To develop the agricultural economy, the Mukhye Mantri Beej Vitran Plan (State Government Scheme) and the National Mission for Sustainable Agriculture (Central Government Scheme) have been implemented in the planning area. The agricultural and related amenities are mostly concentrated in the Bodhgaya block and not uniformly spread across the entire Bodhgaya Planning Area as shown below.

TABLE 6-15 VILLAGE-WISE AGRICULTURE AND ALLIED FACILITIES AVAILABLE IN THE BODHGAYA PLANNING AREA (2020)

Sl. No.	Facility	Name of Block	Name of Village	Number of Villages
1	Government Seed Centre	Bodhgaya	Dhandhawa	1
3	Community Rain Water Harvesting System	Bodhgaya	Ratnara Ganga Bigha, Bakraur, Niman, Hathiar, Dhanawan, Parewa, Sakhwara, Pathalgarh, Turi Khurd	9
4	Farmers Collective	Bodhgaya	Parewa, Mahurar, Bhalua, Parariya, Pathalgarh, Turi Khurd	6
5	Food Grain Storage	Bodhgaya	Dhandhawa, Parewa, Bhalua	3
6	Primary Processing Facility			0
7	Custom Hiring Centre			0
8	In-Land Fishery/Coastal Fishery/Any Other	Bodhgaya	Hathiar	1
9	Community Ponds	Bodhgaya	Hathiar	1
10	Extension facilities for Aquaculture			0
11	Milk Collection Centre/ Milk routes / Chilling Centres			0
12	Poultry Development	Bodhgaya	Silaunja	1
13	Goatary Development	Bodhgaya	Dhandhawa	1
14	Veterinary Clinic or Hospital			0
15	Bee Keeping			0
16	Sericulture (Silk Production)			0
17	Handloom			0
18	Handicraft			0

Sl. No.	Facility	Name of Block	Name of Village	Number of Villages
19	Cottage and Small Scale Units			0
20	Social Forestry		Mahurat, Parsawa	2
21	Minor Forest Produce			0

Source: Sector Specific Report, Mission Antyodaya 2020

6.1.1.3 SECONDARY SECTOR

The economy of the Gaya district is enriched by the traditional crafts and small-scale enterprises which play a crucial role in the Gaya economy. The district is known for its bamboo products, handloom textiles, and stone carvings, which support local artists while simultaneously preserving the cultural past. The core industries of Gaya's industrial sector include agro-based industries, textile and clothing manufacturing, and stone-cutting and polishing facilities. However, these sectors must modernize and contend with issues like poor infrastructure and restricted financing availability.

Despite these developments, the secondary sector contributes only around 20% to the district's economy. The Bihar Industrial Area Development Authority manages a 30-acre industrial zone in Gaya, with the entire 30 acres developed. According to the MSME report on the Brief Industrial Profile of Gaya District (2017-18), there are 7,572 registered industries with a combined investment of Rs. 12595.79 Lakhs in micro and small-scale industries.

TABLE 6-16 EXISTING INDUSTRIAL AREA/CENTRE IN GAYA DISTRICT

Name of the Industrial Area/ Estate/ Growth Centre	Land Acquired (in acres)	Land Developed (in acres)	Prevailing Rate Per Sq.m. (In Rs. Lakhs)	No. of Plots	No. of the allotted Plots	No. of Vacant Plots	No. of Units in Production
Industrial Area, Gaya	30	30	15.68	51	50	1	17

Source: Brief Industrial Profile of Gaya district 2017-18, Ministry of Micro, Small & Medium Enterprises, Government of India

TABLE 6-17 DETAILS OF EXISTING MICRO & SMALL ENTERPRISES AND ARTISAN UNITS IN THE GAYA DISTRICT

Sl. No.	Type of industry	Number of units	Investment (Rs. In lakh)	Employment
1	Agro based	983	1152.97	3055
2	Soda water	34	238.66	184
3	Cotton textile	900	5670.22	4851
4	Woolen, Silk & Artificial Thread based clothes.	33	63.32	152
5	Jute & Jute based	0	0	0
6	Ready-made garments & embroidery	244	66.91	715

Sl. No.	Type of industry	Number of units	Investment (Rs. In lakh)	Employment
7	Wood/wooden based furniture	759	861.01	2534
8	Paper & Paper products	138	157.21	511
9	Leather-based	592	122.41	842
10	Chemical/chemical-based	737	658.78	2459
11	Rubber, Plastic & petrol based	115	250.73	461
12	Mineral based	380	626.38	5858
13	Metal-based (Steel Fab.)	388	373.95	1221
14	Engineering units	862	872.39	2503
15	Electrical machinery and transport equipment	18	117.3	99
16	Repairing & servicing	1021	566.78	1929
17	Others	368	796.77	1187
TOTAL		**7572**	**12595.79**	**28531**

Source: Brief Industrial Profile of Gaya District 2017-18, Ministry of Micro, Small & Medium Enterprises, Government of India

As per the National Bank for Agriculture and Rural Development (NABARD) Area Based Plan/ Schemes for Gaya, Bihar, the block-wise Potential Linked Physical and Financial Estimate for the year 2022-23, mentions the sectoral estimate for Bodhgaya and Gaya Sadar blocks as given below.

TABLE 6-18 BLOCKWISE ESTIMATED ANCILLARY ACTIVITIES (2022-23)

Ancillary Activities Estimate for 2016-17				
Ancillary Activities		**Unit**	**Bodhgaya**	**Gaya Sadar**
FOOD AND AGRO-PROCESSING	Mini Flour mill	No.	25	25
	Mini Flour + Paddy mill	No.	25	25
	Pulse Mill	No.	4	5
	Mini Pulse Mill	No.	16	16
	Gram flour/Sattu/Achar/Papad/Tilori	No.	50	60
	Tomato Processing	No.	2	2
	Milk Processing	No.	22	22
	Total Food and Agro-Processing	**No.**	**144**	**155**
OTHERS	Loan to cooperative society for sale of farmer's produce	No.	0	0
	Agri clinic/Agribusiness Unit	No.	4	3
	Loan to Lamps/ PACS as MSC	No.	1	0
	Loan to Farmer Producer Organization	No.	5	5
	Total Others	**No.**	**10**	**8**
Grand Total		**No.**	**154**	**163**

Source: Area-Based Plan/ Schemes for Gaya, Bihar, NABARD, 2022-23

6.1.1.4 TERTIARY SECTOR

In Gaya district, the tertiary or service sectors play a crucial role in the local economy, which is dynamic and diverse and makes a major contribution to the general economic growth of the region. This sector provides a wide range of services, including banking, tourism, retail, healthcare, education, and transportation. These services all function together to enhance the quality of living for the local residents of the area and stimulate economic growth.

The tourism sector is greatly developed in the district. Gaya serves as a significant pilgrimage site and receives millions of tourists every year. Bodhgaya, a UNESCO World Heritage site, draws pilgrims from around the world. The Mahabodhi Temple and the Bodhi Tree in Bodhgaya are considered very sacred by Buddhist pilgrims. Bakraur, a village in Bodhgaya block on the bank of the river Niranjana about 14 km south of Gaya, is another site of religious significance. The Buddhist Pilgrimage Circuit in Bihar is as follows: Patna – Vaishali – Rajgir – Nalanda – Bodhgaya – Patna (3 days). Bodhgaya is considered to be a major spot on that circuit, one that houses several sites of religious significance. The Gautam Buddha Sanctuary, located at a distance of 20 km from Gaya and 60 km from Bodhgaya, is a biodiversity hotspot and a popular site for adventure tourism.

Bodhgaya receives a significant tourist footfall annually. Although the tourist inflow had suffered a dip due to the COVID-19 pandemic, the year 2023 saw an all-time high in the last six years with over 20 lakh tourists visiting Bodhgaya. The tourist numbers show a rising trend in Gaya as well post-pandemic.

TABLE 6-19 DOMESTIC AND FOREIGN TOURIST VISIT

Year	Bodhgaya			Gaya		
	Domestic	***Foreign***	**Total**	***Domestic***	***Foreign***	**Total**
2016	16,94,321	2,41,514	19,35,835	28,90,268	2,88,914	31,79,182
2018	14,46,535	2,70,787	17,17,322	36,03,628	3,26,228	39,29,856
2020	3,76,233	91,469	4,67,702	7,20,176	83,339	8,03,515
2023	19,60,909	87,899	20,48,808	10,37,085	96,328	11,33,413

Source: Directorate of Tourism, Bihar

The hospitality sector, which includes lodging facilities, restaurants, motels, and local transportation services, is benefited by this influx of visitors and generates a large number of jobs and income. In 2020-21, Govt of Bihar has planned State Guest Houses in Gaya district with an estimated cost of Rs 136.15 Crores.

The district hosts a diverse range of service-oriented industries and activities, significantly contributing to its economy. The tertiary sector also includes essential services such as healthcare and education, provided by schools, colleges, hospitals, and healthcare facilities. These services enhance human capital development and the overall quality of life for the community.

Retail trade is a vital part of Gaya's tertiary sector, catering to both locals and tourists. The region is linked to a wide range of marketplaces and retail establishments selling items from handicrafts to everyday essentials. Handloom textiles, bamboo goods, and stone carvings are among the traditional crafts made by local artists that are offered to visitors and local markets. The retail industry boosts small enterprises and creates a lot of job possibilities, which helps

the local economy. The chief centres of trade in the district are located at Gaya, Tekari, Sherghati and Bankey Bazar.

6.2 OCCUPATIONAL STRUCTURE

6.2.1 WORKING POPULATION

The active workforce plays a crucial role in driving a nation's economic growth and ensuring social stability. The progress of a municipality is largely dependent on the active participation of its labour force. Therefore, bolstering the workforce in urban areas is fundamental to achieving sustainable economic development.

TABLE 6-20 NUMBER OF WORKERS AND NON-WORKERS IN BODHGAYA PLANNING AREA

Name	Total Population	Total Working Population	Total Non-working Population
Bodhgaya Nagar Parishad (Urban)	73908	24,704	49,204
19 Villages (Rural)	28764	10,857	17,907
Bodhgaya Planning Area (Total)	102672	35,561	67,111

Source: Census of India, 2011

In the Bodhgaya Planning Area, although the total working population has increased, the proportion of the working population has decreased from 35.54% (29,500 people) in 2001 to 34.64% (35,561 people) in 2011.

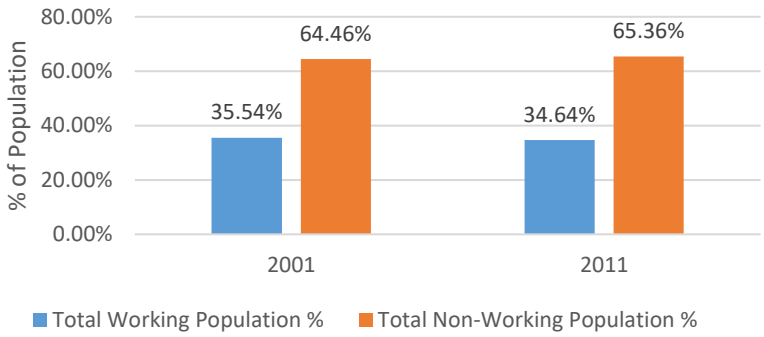


FIGURE 6-3 WORKERS AND NON-WORKERS (BODHGAYA PLANNING AREA)

Source: Census of India, 2011 and 2001

6.2.2 WORKFORCE PARTICIPATION RATE (WPR)

In comparison between 2001 and 2011 as per the Census of India, it is evident that the working population has increased in the Bodhgaya Planning Area.

TABLE 6-21 WORKFORCE PARTICIPATION RATE CHANGE FROM 2001 TO 2011

Area	2001			2011		
	Total Population	Working Population	WPR (%)	Total Population	Working Population	WPR (%)
Bodhgaya Planning Area	83,012	29,500	35.54%	1,02,672	35,561	34.64%
Male	*43,629*	*20,097*	*46.06%*	*52,811*	*24,099*	*45.63%*
Female	*39,383*	*9,403*	*23.88%*	*49,861*	*11,462*	*22.99%*

Source: Census of India 2001 and 2011

6.2.3 MAIN AND MARGINAL WORKERS

In the occupational workforce category as per the census of India, 2011 in the Bodhgaya Planning Area, the proportion of main workers to total workers is observed at 59.51%, whereas marginal workers constitute 40.85% of the total workforce. Main workers are defined as individuals involved in economically productive activities for over 183 days within a calendar year. Conversely, marginal workers are those engaged in such activities for less than 183 days annually.

TABLE 6-22 WORKFORCE CLASSIFICATION, BODHGAYA PLANNING AREA

Sl. No.	Occupation Category	Number of Workers	% of the Total Working Population
Main Workers		***21,036***	***59.51%***
1	Cultivators	4,657	13.10%
2	Agricultural Labourers	7,073	19.89%
3	Household Industry Workers	663	1.86%
4	Others	8,643	24.30%
Marginal Workers		***14,525***	***40.85%***
1	Cultivators	1,328	3.73%
2	Agricultural Labourers	8,367	23.53%
3	Household Industry Workers	432	1.21%
4	Others	4,398	12.37%

Source: Census of India, 2011

6.2.4 GENDER-WISE DISTRIBUTION OF WORKFORCE

According to the Census of India 2011, the Bodhgaya Planning Area consists of 35,561 individuals engaged in the workforce, while the remaining are categorized as non-workers. Among the total working population, 67.77% are male, with only 32.23% being female workers. The lower participation rate of women in the workforce can be attributed to various factors including educational barriers, gender-related policies, societal norms, and the nature of employment opportunities available. Addressing these challenges necessitates the development of gender-responsive policies aimed at facilitating improved access to employment opportunities for women, fostering entrepreneurship, and promoting economic growth. The overarching goal is not only to increase female labour force participation but also to create avenues for dignified employment that will contribute to the overall empowerment of women in the economy. The following figure shows the gender-wise distribution of total workers in the Bodhgaya Planning Area.

A little over one-third of the total population in the Bodhgaya Planning Area are working, with the rest classified as non-workers. The significant gender disparity in workforce participation is notable.

TABLE 6-23 GENDER-WISE DISTRIBUTION OF TOTAL WORKERS

Gender-wise distribution of Total Workers					
Name	**Total Working Population**	**Male Workers**	**% of Total**	**Female Workers**	**% of Total**
Bodhgaya Nagar Parishad (Urban)	24,704	17,170	69.50%	7,534	30.50%
19 Villages (Rural)	10, 857	6,929	63.82%	3,928	36.18%
Bodhgaya Planning Area (Total)	35,561	24,099	67.77%	11,462	32.23%

Source: Census of India, 2011

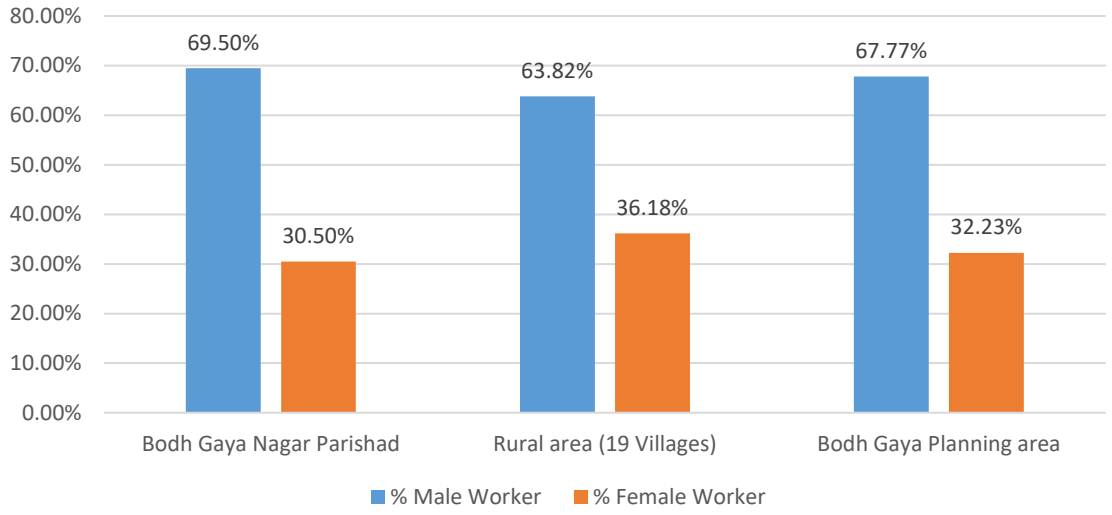


FIGURE 6-4 GENDER-WISE WORKFORCE IN THE BODHGAYA PLANNING AREA

Source: Census of India, 2011

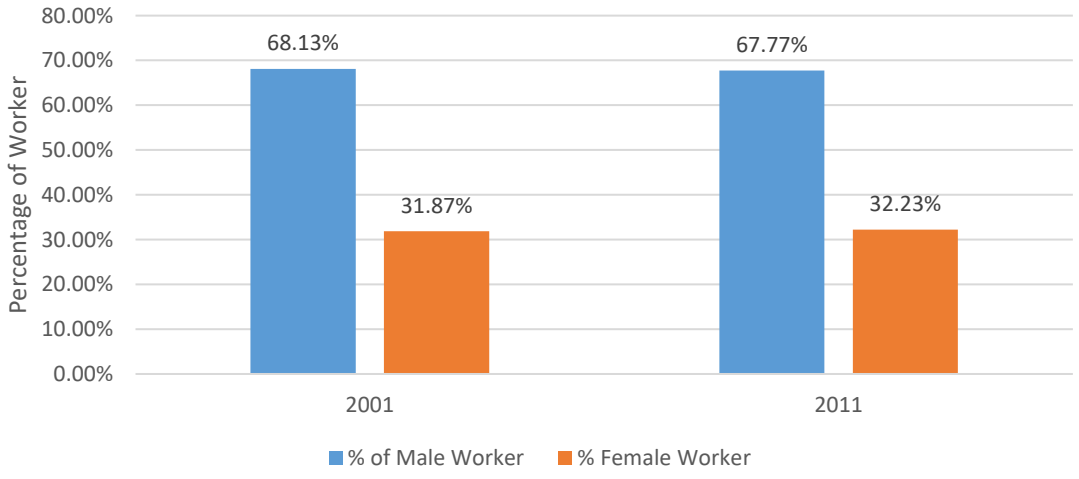


FIGURE 6-5 CHANGE IN WORKERS FROM 2001 TO 2011 (BODHGAYA PLANNING AREA)

Source: Census of India, 2001 and 2011

Women play a crucial and productive role in the Indian economy; however, their employment status remains precarious due to significantly lower participation in various economic activities compared to men. Critical factors distinguishing

women from men include inequitable work burdens and unequal access to and control over productive resources such as land, credit, technology, education, and skills, as well as unjust distribution of consumption resources within households. The foundations of women's economic empowerment lie in access to economic and other productive assets and expanding employment opportunities. The data indicates that female workforce participation in the rural area of the Bodhgaya Planning Area was higher than in Bodhgaya Nagar Parishad in 2011. The lower rate of female participation in the urban area reflects fewer opportunities for women in skilled or service sectors. Conversely, female unskilled and skilled laborers in rural areas are actively involved in agriculture and allied sectors.

6.2.5 SECTOR DISTRIBUTION

TABLE 6-24 SECTOR-WISE DISTRIBUTION OF WORKERS

Occupation Category	Main Workers	Percentage	Marginal Worker	Percentage
Primary Sector	11,730	55.76%	9,695	66.75%
Secondary Sector	663	3.15%	432	2.97%
Tertiary Sector	8,643	41.09%	4,398	30.28%

Source: Census of India 2011

The Census of India is based on working man-days the occupation structure across the different economic activities has been divided into four categories Cultivators, Agricultural labourers, Household Industry Workers, and Others.

1. **PRIMARY SECTOR**

- **Cultivators:** Cultivators are individuals designated as those actively involved in the cultivation of land, whether owned privately, held from government entities, or leased from private individuals or institutions in exchange for monetary payment, goods, or a share of the produce. This involvement encompasses direct participation in cultivation activities or overseeing and providing effective direction to such activities. It's important to note that individuals who lease out their land to others for cultivation, without engaging in direct supervision or cultivation activities themselves, are not classified as cultivators

- **Agricultural Labourers:** An agricultural labourer is defined as an individual who performs labour on another person's land in exchange for monetary compensation, goods, or a share of the produce. Such individuals bear no risk in the cultivation process but solely provide labour on land owned by others in return for wages. It's important to note that agricultural labourers do not possess any rights of lease or contractual agreements pertaining to the land on which they perform their labour.

2. **SECONDARY SECTOR**

- **Household Industry Workers:** Household Industry refers to economic activities conducted by one or more members of a household, either at home or within the village in rural areas, and strictly within the residential premises in urban areas. The majority of workers in household industries typically consist of

household members. These industries operate on a smaller scale compared to registered factories governed by the Indian Factories Act, which mandates registration for establishments employing more than 10 individuals with power or 20 individuals without power. The primary criterion for defining a household industry, even in urban settings, is the active participation of household members. While household industries in rural areas may not necessarily be located at home, there remains a significant likelihood of household members' involvement, regardless of the specific location within the village limits. In urban areas, where organized industries predominate, household industries are confined to the residential premises where the participants reside.

- **TERTIARY SECTOR**
- **Other Workers:** Individuals who do not fall under the categories of cultivators, agricultural labourers, or workers in household industries, as defined previously, are referred to as "Other Workers." This category encompasses a diverse range of occupations, including government servants, municipal employees, teachers, factory workers, plantation workers, individuals engaged in trade, commerce, business, transportation, banking, mining, construction, political or social work, priests, entertainment artists, and more.

6.2.6 CHANGE IN OCCUPATIONAL STRUCTURE

TABLE 6-25 CHANGE IN OCCUPATION STRUCTURE FROM 2001 TO 2011 AS PER CENSUS IN BOGH GAYA PLANNING AREA

Sl. No.	Occupation Category	2001		2011	
		Number of Workers	% of the Total Working Population	Number of Workers	% of the Total Working Population
	Main Workers	***22,243***	***75.40%***	***21,036***	***59.15%***
1	Cultivators	6,343	21.50%	4,657	13.10%
2	Agricultural Labourers	9,222	31.26%	7,073	19.89%
3	Household Industry Workers	902	3.06%	663	1.86%
4	Others	5,776	19.58%	8,643	24.30%
	Marginal Workers	***7,257***	***24.60%***	***14,525***	***40.85%***
1	Cultivators	932	3.16%	1,328	3.73%
2	Agricultural Labourers	4,637	15.72%	8,367	23.53%
3	Household Industry Workers	406	1.38%	432	1.21%
4	Others	1,282	4.35%	4,398	12.37%

Source: Census of India, 2001 and 2011

The shift in occupational structure indicates a general increase, however, there is a notable decrease in the number of main workers and an increase in marginal workers between 2001 and 2011. The percentage of primary main workers in 2011 was less than those in 2001 in the categories of cultivators, agricultural labourers, and home industry workers. We can also observe that there was a rise in the percentage of marginal workers in 2011.

6.3 SOCIO ECONOMIC SURVEY ANALYSIS

6.3.1 SOCIO ECONOMIC PROFILE URBAN

The socio-economic profile examines income distribution, job patterns, and financial inequities, providing a comprehensive picture of the economic landscape. By deconstructing these socioeconomic characteristics, the research hopes to reveal discrepancies, identify vulnerable populations, and provide a full knowledge of the economic forces at work. These insights not only help to inform focused policy recommendations but also enhance the overall story, promoting a more complex understanding of the socioeconomic tapestry within the surveyed community.

6.3.1.1 EMPLOYMENT STATUS

Among the surveyed population of urban areas, 71.60% are non-workers while 28.40% are working.

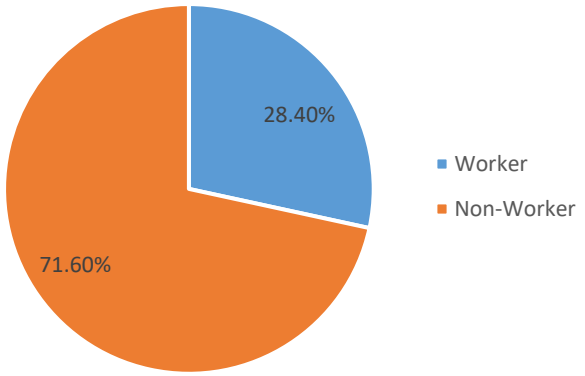


FIGURE 6-6 EMPLOYMENT STATUS OF THE SURVEYED POPULATION IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

6.3.1.2 WORK TYPE

In the urban areas, employment within the surveyed households predominantly falls under the tertiary sector, with significant variation across sub-sectors.

The majority of the population surveyed (25.85%) in urban areas are involved in the Service Sector and 21.15% work as Professionals. 17.21% are involved in business activities. Followed by 12.31% population engaged in the unorganized sector, 10.64% are skilled labours while 12.83% are unskilled labours. This distribution highlights the dominance of service-oriented and business roles in the tertiary sector, with a higher proportion engaged in skilled employment.

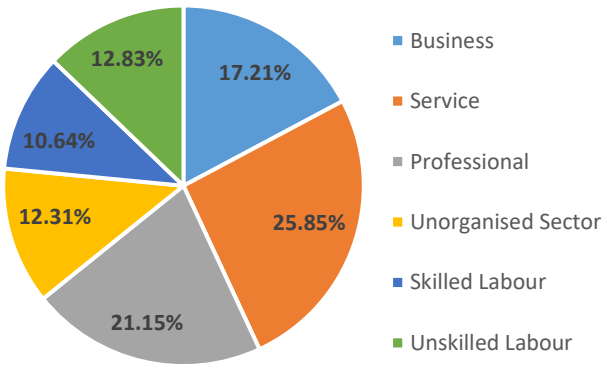


FIGURE 6-7 TYPE OF WORK OF THE SURVEYED POPULATION IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

6.3.1.3 AVERAGE MONTHLY INCOME

Among the total households surveyed in urban areas, the average monthly income of 40.32% is meagerly up to 25000 INR. About 32.95% of households surveyed earn between 25000-50000 INR, 26.73% have income between 50000-150000 INR while remaining 0.66% have income above 150000 INR.

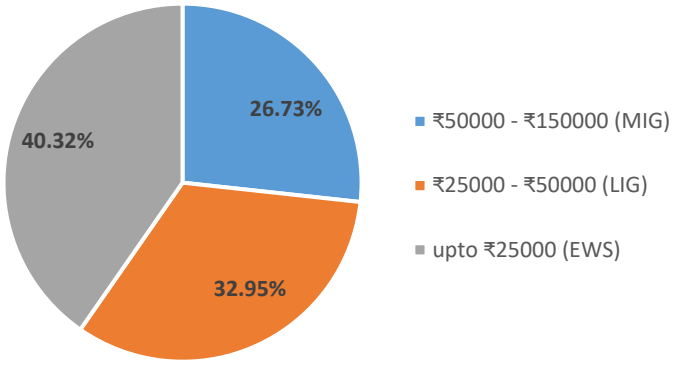


FIGURE 6-8 AVERAGE MONTHLY INCOME OF THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

6.3.1.4 POVERTY

Among the total households surveyed in urban areas, mostly (41.27%) are above the poverty line. About 58.73% of households surveyed are below the poverty line.

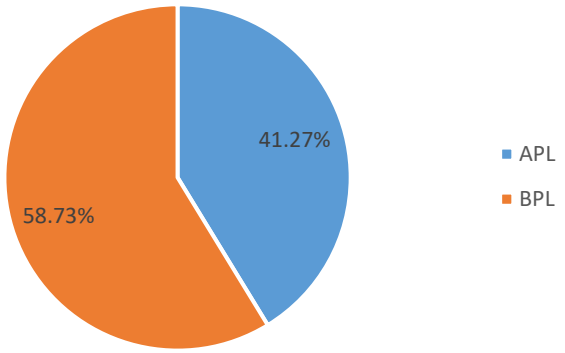


FIGURE 6-9 POVERTY LEVEL OF THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

6.3.2 SOCIO ECONOMIC PROFILE RURAL

6.3.2.1 EMPLOYMENT STATUS

Among the surveyed population of rural areas in Bodhgaya Planning Area, 28.58 are working, while 71.42% are non-workers.

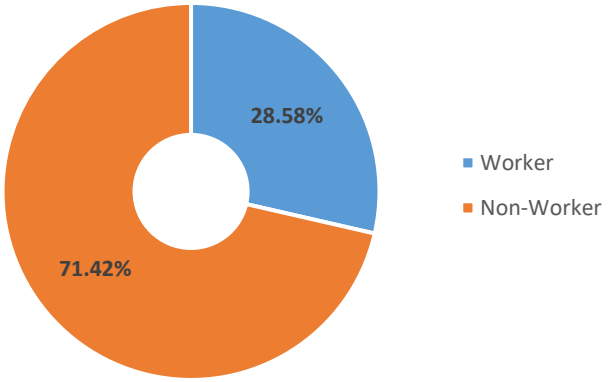


FIGURE 6-10 EMPLOYMENT STATUS OF THE SURVEYED POPULATION IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

6.3.2.2 WORK TYPE

In the rural areas, employment within the surveyed households predominantly falls under the tertiary sector, with significant variation across sub-sectors.

The majority are engaged in the Primary sector. Most of them are unskilled labours i.e. 38.62% and 31.59% are Agricultural laborers/workers. Followed by Business 6.71%, 8.64% engaged in the service sector while 4.71% work as professionals, 4.19% as skilled labours, and 5.54% are involved in the unorganized sector. This distribution highlights the dominance of agricultural sector in primary sector and informal roles in the tertiary sector, with a smaller proportion engaged in business activities.

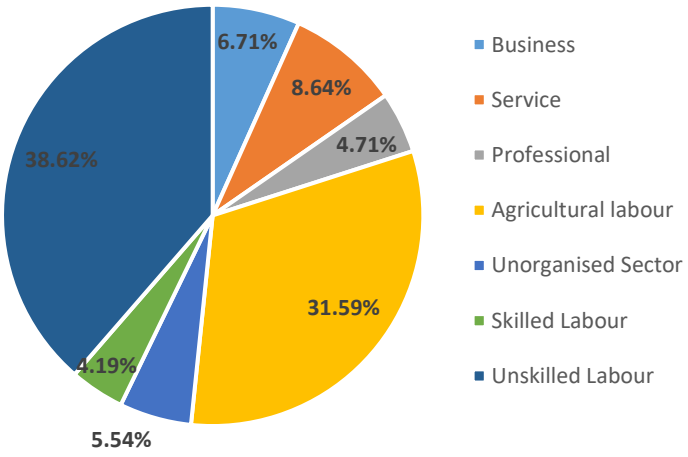


FIGURE 6-11 TYPE OF WORK OF THE SURVEYED POPULATION IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

6.3.2.3 AVERAGE MONTHLY INCOME

Among the total households surveyed in rural areas, the average monthly income of 41.22% is meagerly up to 20000 INR. About 36.68% of households surveyed earn between 20000-50000 INR while the remaining 22.10% have income above 50000 INR.

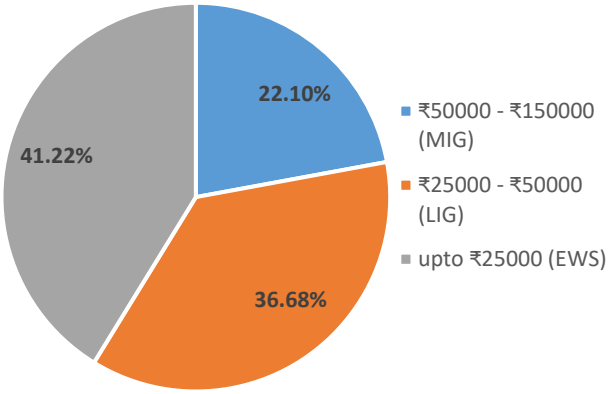


FIGURE 6-12 AVERAGE MONTHLY INCOME OF THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

6.3.2.4 POVERTY

Among the total households surveyed in rural areas, mostly (62.40%) are below the poverty line. About 37.60% of households surveyed are above the poverty line.

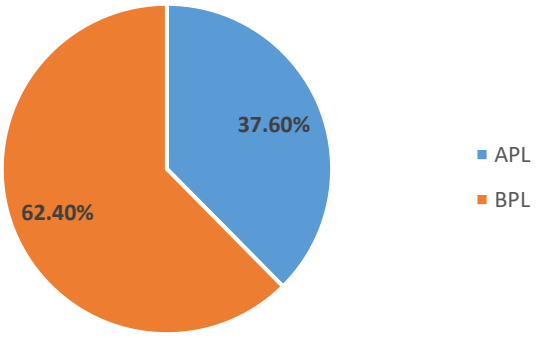


FIGURE 6-13 POVERTY LEVEL OF THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

6.4 WORKFORCE PROJECTION

Workforce projection is crucial in urban planning as it helps estimate future employment demand, guides infrastructure development, and informs policy decisions. Understanding workforce trends allows planners to allocate land for industrial, commercial, and service sectors, ensuring balanced economic growth. It aids in designing efficient transportation networks, optimizing housing and public services, and forecasting migration patterns. Workforce projections also support labor market planning, skill development programs, and sustainable urban expansion by aligning job opportunities with population growth. To project the workforce using Primary Census Abstract (PCA) data, the Workforce Participation Rate (WPR) is first calculated as the total number of workers divided by the total

working age population, expressed as a percentage, and then disaggregated by marginal and main worker categories.

$$WPR = \left(\frac{Total\ Workers}{Total\ Working\ Age\ Population\ (15-59)}\right)\times 100$$

Next, the future population is projected using a suitable method. The projected working-age population (typically 15-59 years) is then used to estimate the future workforce by applying the corresponding Workforce Participation Rate (WPR). To ensure accuracy, the WPR is also projected for each decade based on historical trends, capturing shifts in labor force participation over time. This approach ensures that workforce projections remain aligned with demographic dynamics and provide actionable insights for informed urban development planning.

Table 25: TOTAL WORKFORCE PROJECTION OF BODHGAYA PLANNING AREA

Year	Decades	Design Population	15–59-year population	Projected WPR	Projected Workforce
2025	1.4	143,237	256223	35.21%	90222
2035	2.4	170,098	304272	35.30%	107416
2047	3.4	196,175	350918	35.39%	124200

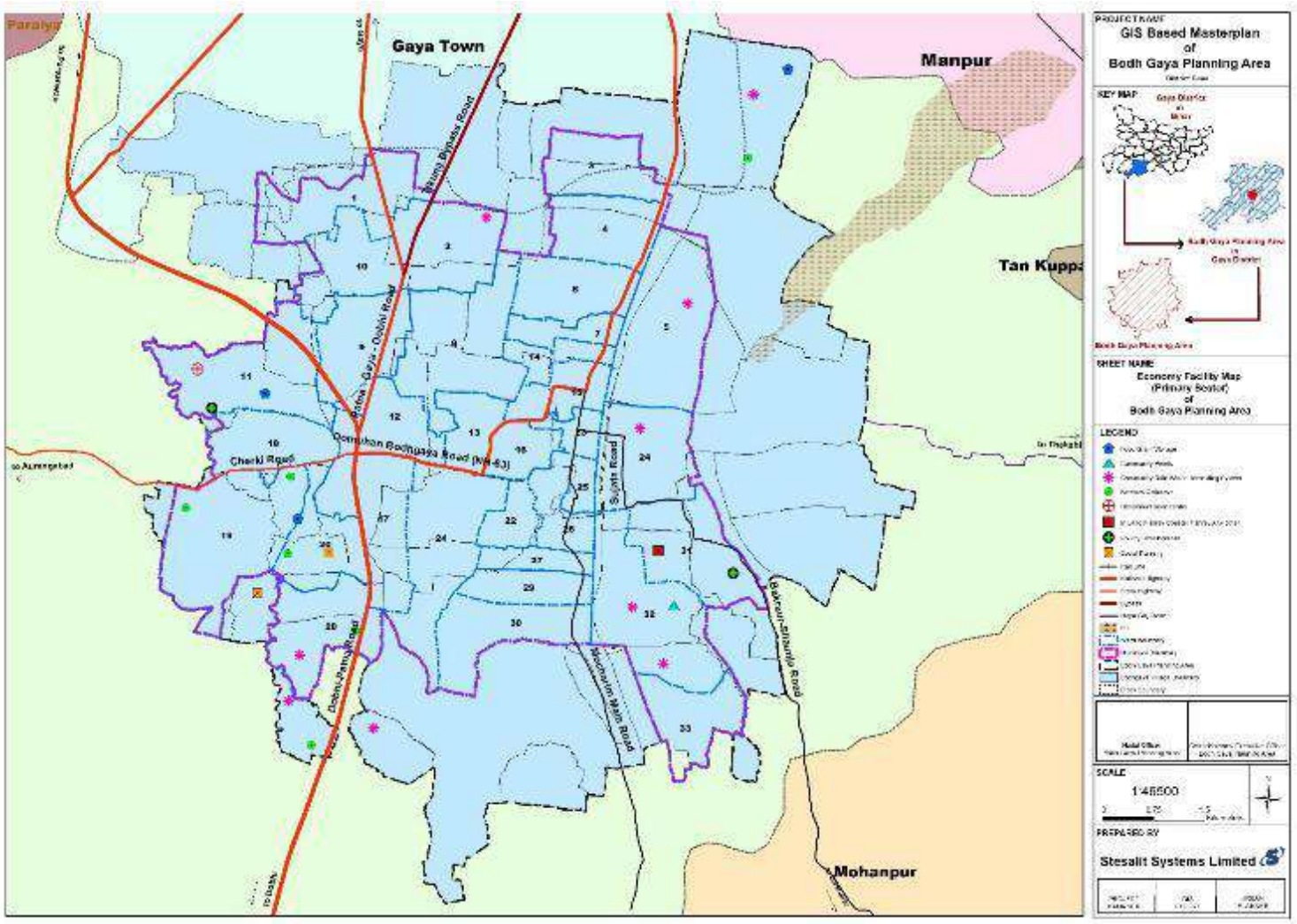
The total workforce projection for the Bodhgaya Planning Area shows a steady and significant rise over the coming decades, reflecting both population growth and expanding economic activities. In 2025, the total projected workforce across the Bodhgaya planning area is 90222. This figure is projected to increase to 107416 by 2035, and 124200 by the vision year 2047.

The consistent upward trend is driven by a rising working-age population across all regions within the planning area. This growth trajectory highlights the need for proactive planning in terms of employment generation, skill development, and infrastructure expansion to accommodate the future labour force efficiently.

6.5 ISSUES AND POTENTIAL

STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
GAYA INDUSTRIAL AREA The existing Industrial Area of (BIADA) offers a strategic advantage for industrial growth,	**LOW FEMALE WORKFORCE** Female workforce participation remains low at	**AGRO-BASED INDUSTRIES** Expansion of agro-based industries can boost employment and the economy. Potential Agro-based industries are:	

facilitating the development of shared industrial infrastructure and facilities in its vicinity. NH 22 serves as a vital freight and logistics corridor for the Gaya Industrial Area, linking it to major cities like Patna in north and NH 19 in south connecting Varanasi, and Kolkata, thereby exhibiting potential for future industrial growth. HIGH PRODUCTION OF RICE AND WHEAT Bodhgaya and its surrounding areas produce rice and wheat in high quantities, making agriculture the primary economic driver and the main livelihood source for a significant section of the population.	32.23%, highlighting gender disparity in employment.	• Bread: Made from wheat • Noodles: Made from wheat • Pasta: Made from wheat • Biscuits: Made from wheat • Cakes: Made from wheat • Puffed-rice snacks: Made from rice • Rice flour: Used to make cakes, puddings, and baked goods • Rice starch: Used in many products • (Rice and Wheat is the main produce)	



MAP 6-1 ECONOMY FACILITY MAP

Source: Stesalit Systems Lt

6.6 Recommendation

6.6.1 AGRO-BASED & FOOD PROCESSING INDUSTRIES

The economic strategy for Bodhgaya emphasizes strengthening its agrarian economy through the development of agro-based and food processing industries. Given the significant production of crops such as rice, wheat, pulses, potato, onion, and cauliflower, the establishment of primary processing units including rice mills, flour mills, pulse processing units, and mustard oil extraction facilities will promote local value addition and reduce post-harvest losses. In addition, secondary processing and value-added industries such as fruit and vegetable processing, pickle and ready-to-eat food production, and dehydration units are proposed to diversify agricultural outputs and enhance market potential. The agro-processing zone will be supported by common infrastructure including internal roads, power supply, water, and waste management systems to ensure efficient operations. This approach aligns with URDPFI guidelines and national initiatives promoting agro-industries, while also creating local employment opportunities and improving farmers' income through integrated supply chains.

6.6.2 STORAGE & LOGISTICS-BASED INDUSTRIES

The development of storage and logistics-based industries is proposed to strengthen the agricultural supply chain and support the seasonal nature of agricultural production in Bodhgaya. Establishing cold storage facilities, controlled atmosphere storage, warehouses, and godowns will help reduce post-harvest losses, maintain product quality, and stabilize market prices for farmers. These facilities are planned near major transport corridors and mandi areas to improve connectivity and ensure efficient movement of agricultural produce. The initiative aligns with national programs such as the Agriculture Infrastructure Fund (AIF) and PMKSY Integrated Cold Chain scheme, promoting modern, energy-efficient storage solutions and enhancing overall agri-marketing systems.

6.6.3 AGRO-INPUT & SUPPORT INDUSTRIES

The development of agro-input and support industries is proposed to enhance agricultural productivity and strengthen the local agricultural ecosystem in Bodhgaya. Facilities such as seed processing and packaging units, bio-fertilizer and organic manure production units, and farm or irrigation equipment repair and assembly centers will help reduce dependency on external markets while supporting farmers with timely access to essential inputs and services. These industries will promote sustainable farming practices, improve efficiency in agricultural operations, and generate local employment opportunities. The proposal aligns with the National Mission on Sustainable Agriculture (NMSA) and follows URDPFI industrial zoning norms to ensure planned and environmentally responsible development.

6.6.4 LIVESTOCK-BASED INDUSTRIES

The development of livestock-based industries is proposed to leverage the strong presence of dairy and animal husbandry activities in the surrounding rural areas of

Bodhgaya. Establishment of dairy processing plants for products such as milk, paneer, and ghee, along with poultry processing units and feed and fodder manufacturing facilities, will support value addition within the livestock sector. These industries will enhance rural income, create local employment opportunities, and strengthen the agricultural economy through integrated supply chains. The initiative aligns with programmes such as the National Dairy Development Programme (NDDB) and will follow environmental clearance and pollution control norms as per CPCB guidelines to ensure sustainable and responsible development.

6.6.5 BIO-ENERGY & WASTE-BASED INDUSTRIES

The promotion of bio-energy and waste-based industries is proposed to utilize agricultural residues such as paddy straw, wheat waste, and rice husk, transforming agricultural by-products into valuable resources. Establishment of biogas plants, agri-waste composting units, and rice husk-based product industries will support renewable energy generation, reduce waste, and encourage sustainable resource management. This approach promotes a circular economy by converting agricultural waste into energy and organic inputs, thereby reducing environmental impact while creating additional income opportunities and local employment. The initiative aligns with the National Bio-Energy Mission and URDPFI sustainability principles, ensuring environmentally responsible and resource-efficient development.

6.6.6 AGRO-BASED SEZ / CLUSTERS

The development of Agro-Based Special Economic Zones (SEZs) and Agro-Processing Clusters (APCs) is proposed to leverage Bodhgaya's strong agricultural resource base and promote integrated agro-industrial growth. The strategy includes establishing an agro-processing cluster, agro-based SEZ, and a Mega Food Park with shared infrastructure and modern facilities to support efficient food processing and value addition. Key components will include basic enabling infrastructure such as internal roads, power supply, water systems, and effluent treatment plants, along with core shared facilities like specialized cold storage, IQF units, testing laboratories, and sorting and grading lines. The cluster-based approach will allow multiple food processing units to operate within a plug-and-play environment, reducing investment costs for small and medium entrepreneurs while improving efficiency. Inspired by successful models such as the Srini Food Park in Chittoor, Andhra Pradesh, this approach aims to reduce post-harvest losses, create direct market linkages for farmers, generate employment, and strengthen the rural economy. The proposal aligns with national initiatives such as PMKSY and the SEZ Act, 2005, supporting sustainable agro-industrial development.

6.6.7 AGROTOURISM

Agrotourism is proposed as a specialized development zone located outside the urban core to promote rural-based economic activities while preserving the agricultural character of the region. The agrotourism zone aims to integrate farming practices with tourism experiences, offering activities such as farm visits, "pick-your-own" farmer markets, plantation activities, and immersive rural experiences that connect visitors with local agricultural traditions. Tourist accommodation in the form of traditional buildings, huts, cottages, or eco-friendly

structures will be encouraged to reflect local architectural identity and support rural livelihoods. Low-rise residential development up to a height of 9 meters is permissible to maintain the rural landscape and low-density character of the area, along with supporting infrastructure such as EV charging stations to promote sustainable mobility. The proposal draws inspiration from successful models such as Mahabaleshwar's agritourism stays, where farming has evolved into experiential tourism, and aligns with national initiatives like the National Strategy for Promotion of Rural Homestays (2022) under the Aatmanirbhar Bharat vision, encouraging diversification of farmer income and rural economic development.

6.6.8 LIGHT MANUFACTURING & NON-POLLUTING INDUSTRIES

The development of light manufacturing and non-polluting industries is proposed to diversify the local economy while ensuring environmentally sustainable growth. With the availability of a local workforce and improving regional connectivity, the planning area has strong potential for small-scale industries such as light engineering units, electrical goods manufacturing, assembly units, packaging industries, plastic goods production, and repair workshops. These industries will generate employment opportunities and support economic resilience without causing significant environmental impacts. Development will follow pollution control norms, include appropriate buffers, and align with URDPFI guidelines promoting non-polluting industries in peri-urban areas, along with applicable state industrial policies and MSME guidelines.

6.6.9 CONSTRUCTION MATERIAL & BUILDING COMPONENT UNITS

The development of construction material and building component units is proposed to support the growing demand arising from urbanization and infrastructure development in the region. The presence of an existing cement factory within the planning area provides a significant advantage through the availability of fly ash, encouraging the establishment of sustainable building material industries. Proposed activities include brick and block manufacturing, fly-ash brick units, precast construction components, tiles production, and stone cutting units, subject to necessary environmental clearances. The development will align with URDPFI industrial zoning norms and the National Fly Ash Utilization Policy, ensuring resource efficiency, environmental safeguards, and promotion of eco-friendly construction practices.

6.6.10 TRADE, WHOLESALE & LOGISTICS HUB

The development of a trade, wholesale, and logistics hub is proposed to capitalize on the planning area's strategic location along major transport corridors, enabling efficient movement of goods and strengthening regional supply chains. The proposal includes the establishment of wholesale markets, transport Nagar, truck terminals, logistics parks, and freight handling facilities integrated with road and rail networks to improve connectivity and reduce transportation inefficiencies. This hub will support local trade, agricultural marketing, and industrial distribution while generating employment opportunities and enhancing economic competitiveness. The initiative aligns with URDPFI guidelines that recommend locating logistics facilities near highways and is supported by national initiatives such as PM Gati Shakti and relevant state transport policies.

6.6.11 EDUCATION & KNOWLEDGE-BASED INSTITUTIONS

The development of education and knowledge-based institutions is proposed to strengthen Bodhgaya's role as an emerging learning and skill development hub. With increasing demand for competitive exam preparation, dedicated coaching centers for BPSC, SSC, Railway, Banking, and other examinations are envisioned to provide structured learning environments with classrooms, faculty spaces, and administrative facilities. In addition, online learning facilities equipped with computer labs and reliable internet infrastructure will promote digital education, enabling access to online courses, mock tests, and remote learning opportunities. This initiative supports skill development, enhances employability among youth, and aligns with national programs such as Skill India and the growing trend of digital education in India.

6.6.12 IT, OFFICE & SERVICE SECTOR DEVELOPMENT

The development of IT, office, and service sector infrastructure is proposed to support the expansion of a service-based economy and capitalize on emerging remote-working trends in Tier-II and Tier-III cities like Bodhgaya. The initiative includes establishing IT parks, office complexes, co-working spaces, and business incubation centers equipped with robust digital infrastructure to attract startups, back-office operations, and technology-enabled services. This sector will generate skilled employment opportunities, encourage entrepreneurship, and diversify the local economy beyond traditional sectors. The proposal aligns with national initiatives such as Digital India and Startup India, promoting innovation-driven and knowledge-based economic growth.

TABLE 6-26: PROPOSAL FOR ECONOMY SECTOR

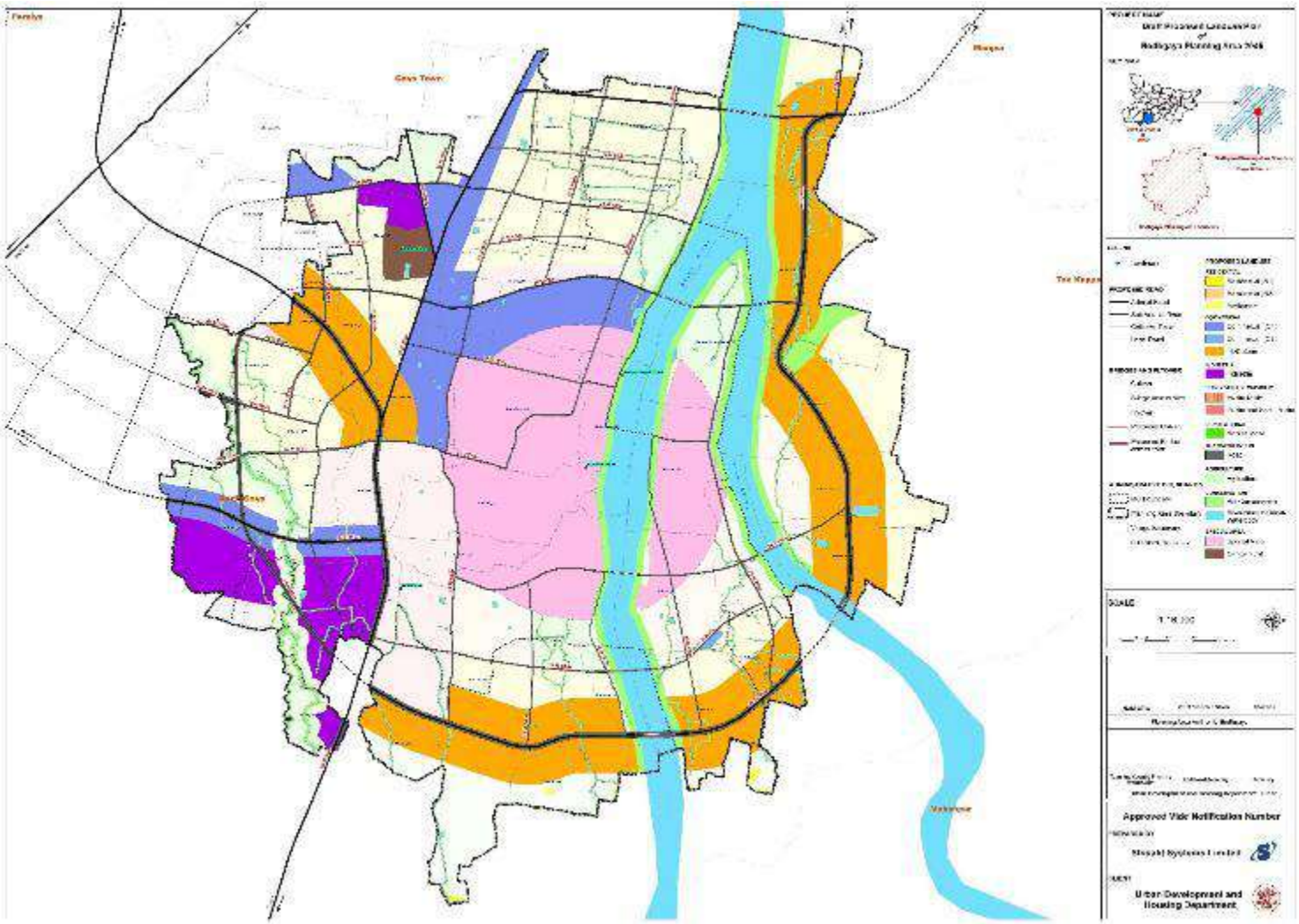
Sector	Proposal Feasibility or Rationale	Area Estimate (ha)	Description	Remarks (Source, case study, policy, schemes, rules, URDPFI, etc.)
Economy				
Agro-Based & Food Processing Industries	Agarian Economy	20-40 ha	Major Crops: Rice, Wheat, Pulse, Potato, Onion, Cauliflower	
Primary Processing • Rice Mills • Flour Mills (Wheat, Maize, Millet) • Dal/Pulse Processing mills • Oil Extraction Mills (Mustard)	The planning area has an agrarian economy with substantial production of Rice, wheat, pulses, fruits, and vegetables. Establishment of agro-processing industries will promote value addition, reduce post-harvest losses, and enhance farmers' income while generating local employment.		Includes rice mills, flour mills, dal mills, oil extraction units, fruit & vegetable processing units, and packaged food units. The zone shall be developed with common infrastructure such as internal roads, power, water supply, and waste management facilities.	URDPFI Guidelines 2014 encourage agro-based industries in rural and peri-urban areas. Supported under MoFPI schemes and PMFME. Case studies: Mega Food Parks in Bihar & MP.
Secondary/ Value Addition • Fruit & vegetable processing units • Pickles, jam, jelly, ketchup units • Dehydration units (onion, garlic, chilly) • Ready-to-cook / ready-to-eat food units				
Storage & Logistics-Based Industries				

Cold Storage & Warehousing Facilities	Seasonal agricultural production necessitates adequate storage and logistics infrastructure. Cold storage and warehousing reduce spoilage, stabilize prices, and support agri-marketing systems.	8-15 Ha	Development of cold storage units, controlled atmosphere storage, warehouses, and godowns near transport corridors and mandi areas to support agricultural supply chains.	Agri Infra Fund (AIF); PMKSY – Integrated Cold Chain; Ecozen solar cold storage
Agro-Input & Support Industries				
Seed processing & packaging units	To support agricultural productivity and reduce dependency on external markets, agro-input industries such as seed processing and bio-fertilizers are proposed.	5-10 ha		Aligned with National Mission on Sustainable Agriculture (NMSA) and URDPFI industrial zoning norms.
Bio-fertilizer & organic manure units				
Farm/ Irrigation equipment repair & assembly units				
Livestock-Based Industries				
Dairy processing plants (milk, paneer, ghee)	Presence of livestock and dairy activities in surrounding rural areas provides scope for milk processing and allied industries. These units enhance rural income and employment opportunities.	6-12 ha	Major Livestock's: Cow, Buffaloes, Goat, Poultry	Supported under National Dairy Development Programme (NDDB). Environmental clearance norms as per CPCB guidelines.
Poultry processing units				
Feed & fodder manufacturing				
Bio-Energy & Waste-Based Industries				
Biogas plants	Availability of agricultural residues such as rice husk and crop waste provide potential	5-8 ha	Major crop residues: Paddy, Wheat	Promotes sustainable development and circular economy. Aligned with National
Composting units from Agri-waste				

Rice husk-based Products	for renewable energy and waste-based industries.			Bio-Energy Mission and URDPFI sustainability principles.
Agri-Industrial Parks / Clusters				
Agro-Processing Zone Food Park / Mega Food Park MSME Agro-Industrial Cluster	Cluster-based development ensures efficient land use, shared infrastructure, and better environmental management compared to scattered industrial units.	40-60 ha	Integrated agro-industrial park with common processing facilities, cold storage, warehousing, CETP, skill development centers, and logistics support.	URDPFI recommends industrial clusters. Supported under Mega Food Park Scheme and state industrial policies.
Non-Agricultural				
Light Manufacturing & Non-Polluting Industries	The planning area has potential for small-scale, non-polluting manufacturing activities due to availability of workforce and improving regional connectivity. Such industries diversify the economy without adverse environmental impacts.	15-30 ha	Includes light engineering units, electrical goods, plastic goods, assembly units, packaging industries, and repair workshops. Industries shall follow pollution control norms with adequate buffers.	URDPFI Guidelines promote non-polluting industries in peri-urban areas. State Industrial Policy and MSME guidelines applicable.
Construction Material & Building Component Units	Growing urbanization and infrastructure development in the region increase demand for construction materials, making this sector economically viable. Existing Cement factory in planning area will deliver raw material-Fly ash	10-20 ha	Includes brick/block manufacturing units, fly-ash brick units, precast components, tiles, and stone cutting units (subject to environmental clearance).	Aligned with URDPFI industrial zoning norms and National Fly Ash Utilization Policy. Environmental safeguards mandatory.

MSME & Small Industrial Clusters	MSMEs provide employment opportunities to local youth and support entrepreneurship with relatively low capital investment.	20-35 ha	Cluster-based development for small manufacturing units, service workshops, printing, furniture making, and small fabrication units with shared facilities.	URDPFI recommends MSME clusters. Supported under MSME Cluster Development Programme (MSE-CDP).
Trade, Wholesale & Logistics Hub	Strategic location along major transport corridors support development of trade and logistics facilities, strengthening regional supply chains.	15-25 ha	Development of wholesale markets, transport Nagar, truck terminals, logistics parks, and freight handling facilities integrated with road and rail networks.	URDPFI Guidelines recommend logistics hubs near highways. Supported under Gati Shakti and State Transport Policies.
Education & Knowledge-based Institutions		15-25 ha		
Exam Coaching Centers	Bodhgaya has a growing demand for coaching in BPSC, SSC, Railway, and Banking exams. Establishing dedicated coaching centers will cater to this need.		Development of coaching centers with classrooms, faculty rooms, and administrative offices.	Inspired by Success Academy, Kerala and skill India mission
Online Learning Facilities	Incorporating digital learning platforms will provide students with access to online resources and mock tests.		Setting up computer labs with internet access for online courses and practice sessions.	Aligns with digital education trends in India
IT, Office & Service Sector Development	Expansion of service-based economy and remote-working trends create opportunities for IT, office spaces, and back-office operations in Tier-II and Tier-III cities.	5-10 ha	Development of IT parks, office complexes, co-working spaces, and business incubation centers with digital infrastructure.	Supported under Digital India and Startup India.

Source: Stesalit System Ltd.



MAP 6-2: PROPOSED INDUSTRIAL LANDUSE OF BODHGAYA PLANNING AREA

Source: Map Prepared by Stesalit System Ltd.

6.7 Proposed Commercial Zones

The proposed commercial land use is classified into three distinct zones—**C-1, C-2, and C-3**—based on intensity of development, location, and nature of permissible activities, in order to ensure functional efficiency, environmental compatibility, and orderly urban growth.

6.7.1 COMMERCIAL-C1

Commercial Zone C1 is proposed as a mixed-use commercial category primarily intended to serve daily needs and neighbourhood-level economic activities. This zone permits a range of compatible uses including retail businesses, banks and financial services, wholesale trade, restaurants, shopping centres, informal shops, EV charging stations, markets or mandis, private offices, and religious places. Typically located along major roads and within or adjacent to residential areas, C1 commercial development aims to enhance accessibility, support local economic activity, and promote walkable mixed-use environments. However, certain uses such as hostels and garages are permissible on approval to maintain compatibility with surrounding residential areas, reduce congestion, and ensure a balanced urban environment.

6.7.2 COMMERCIAL-C2

Commercial Zone C2 is designated as a large and concentrated commercial area intended to accommodate high-intensity commercial activities and major business establishments. Permitted uses include hotels, lodges, malls, multiplex cinemas, EV charging stations, and private office spaces, supporting regional-level commerce, hospitality, and organized retail development. This zone is planned to function as a major commercial hub with enhanced accessibility and infrastructure to handle higher footfall and economic activity. Certain uses such as petrol pumps, residential developments, sports complexes, entertainment venues beyond designated categories, and convention centres are permissible to maintain a clear commercial character, manage traffic impacts, and ensure efficient land use planning within the zone.

6.7.3 COMMERCIAL-C3

Commercial Zone C3 is designated for specialized commercial activities that require larger land parcels and are better suited away from residential areas due to their operational nature and potential impacts such as traffic, noise, or logistics movement. Permitted uses include function halls, marriage gardens, resorts, and similar event-based or hospitality-oriented developments that attract periodic large gatherings. In addition, non-hazardous warehouses and storage godowns are permissible, supporting logistics and commercial storage needs. Locating this zone away from residential neighbourhoods helps minimize land-use conflicts while ensuring adequate space for large-scale activities and efficient access to transport networks.

6.8 PROPOSED INDUSTRIAL LAND USE

6.8.1 INDUSTRIAL-I1

Industrial Zone I-1 is designated for non-polluting industries and compatible supporting activities to promote sustainable industrial development while minimizing environmental impacts. Permitted uses include all kinds of non-polluting industries, cold storage facilities, petrol pumps, warehouses, loading and unloading areas, and residential buildings for staff or workers to support industrial operations. Ancillary facilities such as industrial research institutes, technical educational institutions, workshop garages, power substations (PSS), and government or private business offices are also allowed to create an integrated industrial ecosystem.

6.8.2 INDUSTRIAL-I2

Industrial Zone I-2 comprises existing industrial areas within the planning region. The focus in this zone is on the consolidation, modernization, and regulation of current industrial activities, ensuring compliance with environmental norms, infrastructure upgrades, and improved operational efficiency while maintaining the established industrial character.

6.8.3 MIXED USE (M1)

Mixed use zone M-1 is proposed for Residential; retail shops; commercial offices; banks; restaurants; clinics; coaching centres; service establishments; small hotels; mixed-use buildings; EV charging stations; local markets; professional services. Institutional uses; co-working spaces; small-scale hospitality; public/semi-public facilities; parking structures; transit-support facilities.

TABLE 6-27 PERMISSIBLE, CONDITIONAL & PROHIBITED USES OF COMMERCIAL USE ZONES

Zone	Zone Description	Permissible Uses	Conditional / Restricted Uses	Prohibited Uses
Commercial C1 (Neighborhood / Roadside Commercial)	Mixed-use commercial serving daily and local needs	Retail business, banks & financial services, wholesale trade, restaurants, shopping centers, informal shops, EV charging stations, market/mandi, private offices, religious places	Hostel, garage	Located along major roads and within/adjacent to residential areas. Designed for walkable neighborhood-level commerce while maintaining residential compatibility.

Commercial C2 (Major Commercial Hub)	High-intensity, concentrated commercial zone	Hotel, lodge, mall, multiplex cinema, EV charging station, private offices	Petrol pump, residential uses, sports complex, large entertainment venues (beyond permitted), convention centers	Large commercial nodes with higher infrastructure capacity. Intended for organized retail, hospitality, and office activities with regional-level attraction.
Commercial C3 (Specialized Commercial / Event & Logistics Commercial)	Large-parcel commercial activities away from residential areas	Function hall, marriage garden, resort, non-hazardous warehouse, storage godown	Hazardous storage, residential uses (implicit restriction)	Located away from residential zones to reduce conflicts from traffic, noise, or logistics operations. Suitable near transport corridors.

Source: Stesalit System Ltd.

TABLE 6-28: PERMISSIBLE, CONDITIONAL & PROHIBITED USES OF INDUSTRIAL USE ZONES

Zone	Zone Description	Permissible Uses	Conditional / Restricted Uses	Prohibited Uses
Industrial I-1 (Non-Polluting Industrial Zone)	General industrial area for clean and non-polluting industries	All non-polluting industries, cold storage, petrol pump, warehouse, loading/unloading areas, public utilities, worker/staff housing	Industrial research institutes, technical educational institutes, workshop garages, power sub-stations (PSS), govt/private business offices	Promote sustainable industrial growth with integrated facilities while minimizing environmental impact.
Industrial I-2 (Special Industrial / Agro-Based SEZ)	Existing industries within planning area	Existing industrial activities (subject to regulation)	Upgradation, modernization, infrastructure improvements	Focus on regulation, infrastructure enhancement, environmental compliance, and consolidation of existing industries.

Source: Stesalit System Ltd.

TABLE 6-29: PERMISSIBLE, CONDITIONAL & PROHIBITED USES OF MIXED USE ZONES

Zone	Zone Description	Permissible Uses	Conditional / Restricted Uses	Prohibited Uses
Mixed Use Land Use Zone – 1 (M-1)	Intended for **high-activity mixed urban areas** along	Residential Uses, Commercial Uses, Tourism and Hospitality	Heavy or polluting industries, Warehousing	Ground floor commercial use encouraged along major

	major roads, tourism corridors, and commercial streets. The zone supports an integrated mix of **residential, retail, hospitality, offices, and small service establishments** that cater to residents, pilgrims, and tourists. The planning intent is to create **active street fronts and walkable urban environments** while strengthening local economic activity.	Uses, Institutional / Community Uses, Service and Convinience, Religious and Cultural Uses (compatible scale),	and large logistics facilities, Activities generating excessive noise, pollution, or heavy truck movement.	roads; upper floors may include residential, offices, or guest houses. Adequate **parking within plot or shared facilities** required. Noise- and pollution-generating activities prohibited. Building design should maintain **harmonious façade and skyline**, especially along major tourism corridors.

7 ENVIRONMENT

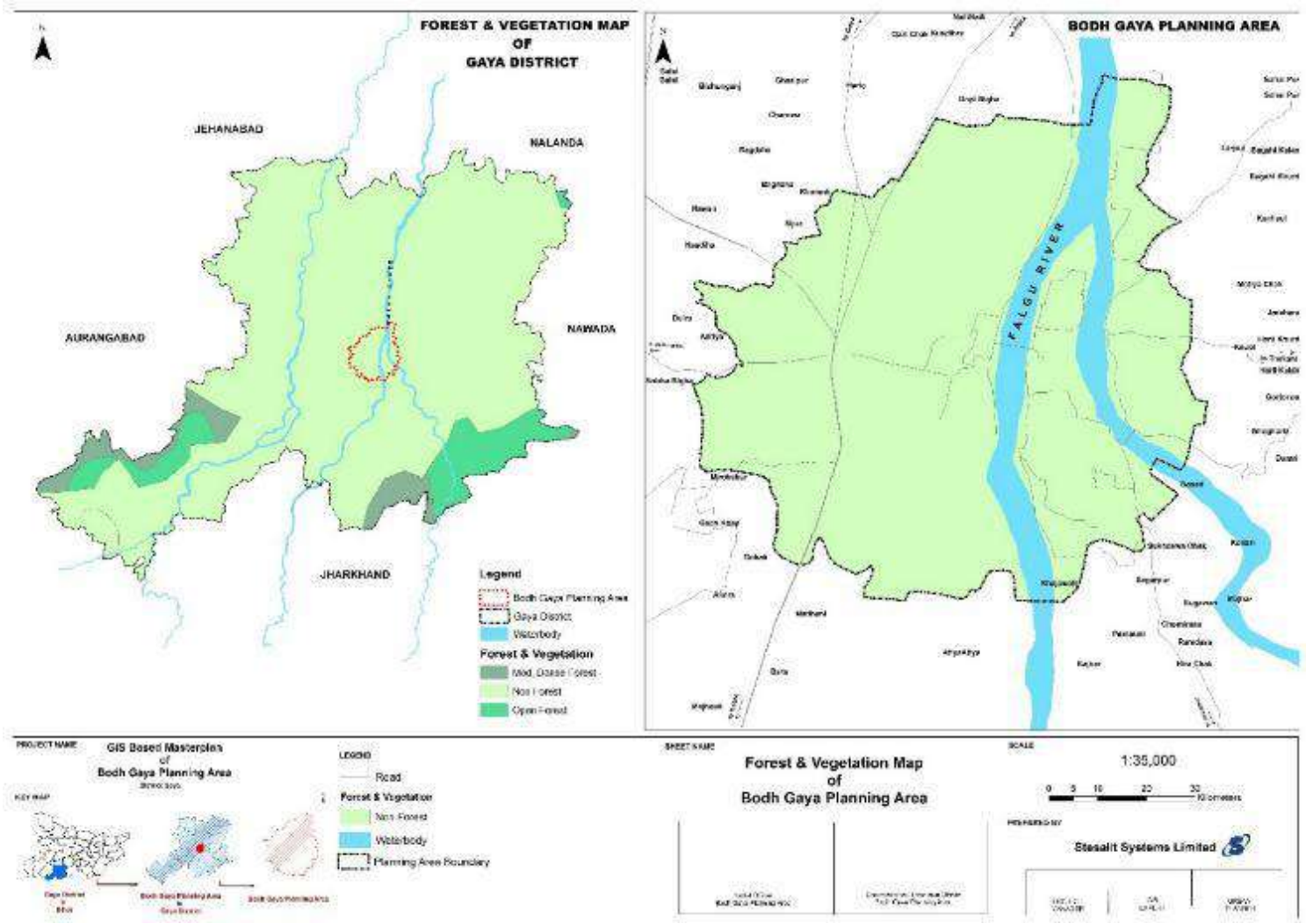
The environmental profile of an area refers to the assessment of various environmental factors that characterise that area. These factors can include the quality of air, water, and soil, the level of pollution, and the impact of human activities on the environment. Key to sustainable growth is when the development of an area happens in tandem with environment preservation and resource optimisation. It can only be achieved if existing environmental parameters are identified and analysed.

7.1 AIR ENVIRONMENT

7.1.1 FOREST COVER

Only 29.04% of the total geographical area of Gaya district comes under forest area which consists of 134.40 sq. km. of moderate dense forest area and 455.91 sq. km. of open forest area. Approximately 14.69 sq. km. of forest land in the Gaya district has decreased according to the previous assessment (2019). In Gaya district Moderate dense forest and Open Forest are located at the southern part of Gaya district.

The Bodhgaya Planning area has 100% non-forest area, there are no eco sensitive zones in Bodhgaya planning area as depicted in the map below.



MAP 7-1 FOREST AND VEGETATION MAP OF BODHGAYA PLANNING AREA

Sources- Ministry of Environment, Forest and Climate Change, New Delhi.

7.2 AIR POLLUTION

Air pollution has been widely acknowledged as a potentially lethal form of pollution. Pollutants are introduced into the atmosphere through the emission of gases or particles. Due to the ongoing transformation, mingling, and transboundary transport of air pollutants, the air quality in a given area is always unpredictable. Air pollution worsens due to improper implementation of stringent emission standards and the expansion of industry, population, and vehicles.

The analysis by climate Trends indicates that the mean yearly $PM_{2.5}$ concentration in rural India was 46.4 micrograms in 2022, which was marginally lower than the urban level of 46.8 micrograms. The national limit is 40 micrograms. $PM_{2.5}$ is an exceptionally hazardous air pollutant with the ability to deeply infiltrate the lungs and induce a variety of illnesses, some of which are potentially fatal. Since 2017, the levels of $PM_{2.5}$ in India's urban and rural areas have been virtually identical, with few distinctions between the two sets of data, according to a report by Climate Trends.

Air pollution in rural areas is primarily caused by the lack of access to pure household energy, as the majority of the rural population continues to rely on inefficient fuels for cooking, lighting, and heating. In rural India, traditional methods of brick production, waste disposal, and crop residue fire are also significant contributors to air pollution. Pollutants transported across boundaries from urban to rural regions also contribute to air pollution in rural India. Consequently, the issue of air pollution in rural India requires additional focus.

A total of 793 stations has been installed under the National Air Quality Monitoring Program (NAMP), and 274 are real-time monitoring stations (CAAQMS), as reported by the Central Pollution Control Board (CPCB). The majority of these monitoring stations are urban-only installations. In rural regions, real-time monitoring is virtually nonexistent, according to a cursory examination. Therefore, it is automatically presumed that the air quality in rural areas conforms to national ambient air quality standards in the absence of data regarding air pollution in those regions. Therefore, robust regional monitoring systems are required to evaluate the air quality in rural regions.

As the concentration of airborne pollutants increases, so does the Air Quality Index (AQI), which ranges from 0 to 500. A safety threshold for AQI is 50 or less, whereas readings exceeding 100 are considered detrimental to health. The Bihar State Pollution Control Board has identified three non-attainment districts in the state which includes Gaya district. Non- attainment cities (NAC) are those where the National Ambient Air Quality Standards (NAAQS) have not been met consistently over a 5-year period. The air pollutants of concern are PM_{10}, $PM_{2.5}$ and NO_2. Higher levels of such pollutants are usually observed during November to February. The Air Quality Index of the Bodhgaya block is 115* and 129* in the Gaya block. The air quality levels in these areas are regarded as unhealthy. The main pollutant detected in the air is $PM_{2.5}$. $PM_{2.5}$ concentration in Bodhgaya is currently 7.6 times the WHO annual air quality guideline value (2021 AQGs) and 8.8 times in Gaya.

TABLE 7-1 NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

Pollutants	Time Weighted Average	Concentration in Ambient Air	
		Industrial, Residential, Rural, and other Areas	Ecologically Sensitive Area (notified by Central Government)
SO_2 in $\mu g/m^3$	Annual	50	20
	24 Hours	*80*	*80*
NO_2 in $\mu g/m^3$	Annual	40	30
	24 Hours	*80*	*80*
$P.M_{2.5}$ ($\mu g/m^3$)	Annual	40	40
	24 Hours	*60*	*60*
$P.M_{10}$ ($\mu g/m^3$)	Annual	60	60
	24 Hours	*100*	*100*

Source: (Central Pollution Control Board, 2009)

The concentrations averaged over the Gaya district for the years 2001, 2015 and 2020 are tabulated above. There was a steady increase in $PM_{2.5}$ in Bihar from the year 2000. However, the rise accelerated after 2011, mostly in the central Bihar and southeastern districts. The rise continued till 2016 when annual $PM_{2.5}$ exceeded 84 $\mu g/m^3$ in the state. In 2017, $PM_{2.5}$ decreased before increasing again in 2018. After 2018, the levels started decreasing. The larger reduction in $PM_{2.5}$ in 2020 is attributed to the sudden stoppage of most anthropogenic emissions due to the national lockdown during the COVID-19 pandemic. However, the recent trends clearly suggest that the rising trend has perhaps stabilized. Though it would be too early to interpret it confidently, one plausible explanation could be the penetration of LPG through the Pradhan Mantri Ujjwala Yojana, which would have reduced residential emissions at a regional scale. In Gaya district, residential emissions are the largest contributor to ambient $PM_{2.5}$, accounting for approximately 60% of the total emissions. Mitigating residential emissions which would help most of the districts meet NAAQ Standards.

TABLE 7-2 STATUS OF AMBIENT AIR QUALITY (ANNUAL AVERAGE)

Location	PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)		SO_2 (µg/m3)		NO_2 (µg/m3)	
	2017	***2018***	***2017***	***2018***	***2017***	***2018***	***2017***	***2018***
Bodhgaya	77.5	90.1	-	-	11.1	11.8	21.6	21.5
Gaya	-	-	71.85	90.57	5.53	6.92	19.21	54.38
Standard value	*60*		*40*		*50*		*40*	

Source: (Bihar Pollution Control Board, Prof. Sagnik Dey, 2021)

7.3 WATER BODIES

7.3.1 FALGU RIVER

The Bodhgaya Planning Area lies on the banks of the Falgu River. The river flows through the planning area and is a major tributary of the Ganges. The river holds immense cultural and religious significance, particularly within Hinduism and Buddhism. Numerous rituals and ceremonies are conducted on its banks. Among the most notable of these is the Pind Daan ritual, performed by Hindus which

attracts countless devotees. Being a subterranean river, its riverbed appears dry for much of the year with only a sandy expanse visible on top. However, during the monsoon season, the river transforms, with visible water flows reappearing and rejuvenating the surrounding landscape.

7.3.2 SURFACE WATER QUALITY

Despite its spiritual significance, the Falgu River faces environmental challenges. The disposal of ritualistic offerings and urban waste poses a significant threat to the environmental sustainability of the river and its ecosystem. The biological water quality of the Falgu River falls under the quality of class C.

TABLE 7-3 BIOLOGICAL WATER QUALITY OF FALGU RIVER

Location Name	Month of sampling	Saprobic Score	Diversity Score	Biological Water Quality	Biological Water Quality Class
Falgu River	May, 2017	5.87	0.68	Moderate Pollution	C
	March, 2018	5.7	0.60	Moderate Pollution	C

Source: Biological Water Quality Assessment of the River Ganga (2017-18), CPCB

Biological Water Quality Assessment or Bio-monitoring is the biological surveillance of benthic macro-invertebrate (BMI) communities dwelling in freshwater bodies. Benthic macro-invertebrates are of particular interest because they are a diverse group of long-lived, sedentary species that react strongly and often, predictably to changes in water quality. Taxonomic richness (Diversity Score) and composition (Saprobic Score) characterization of benthic macro-invertebrate communities is an effective method for assessing the biological health of aquatic ecosystems. As opposed to Bio-monitoring, physicochemical and bacterial parameters (including BOD, COD, DO, temperature, pH, total coliforms, fecal coliforms etc.) provide only the momentary account of water quality i.e. water quality that prevails at that particular time of monitoring. Biological monitoring, on the other hand, has a much longer dimension since the aquatic biota can be affected by chemical and/or hydrological events that may have lasted only a few days, some months or even years before monitoring was carried out. The table below enumerates the biological water quality standards and their categorisation.

TABLE 7-4 BIOLOGICAL WATER QUALITY STANDARDS

Water Quality Class	Criteria		
	Saprobic Score	Diversity Score	Water Quality
A	> 7	0.2 - 1.0	Clean
B	6 - 7	0.5 - 1.0	Slight Pollution
C	3 - 6	0.3 - 0.9	Moderate Pollution
D	2 - 5	0.4 - 0.2	Heavy Pollution
E	0 - 2	0 - 0.2	Severe Pollution

Source: Biological Water Quality Assessment of the River Ganga (2017-18), CPCB

7.4 GROUNDWATER

Groundwater is the subterranean water that is contained within the fissures and crevices of rock, soil, and sediment. It is contained in geologic formations of soil, sand, and rocks known as aquifers, through which it moves gradually. Groundwater resources are of the utmost importance to the agricultural sector, which provides employment and contributes significantly to the nation's economy. Groundwater is widely utilized for irrigation, especially in regions characterized by inadequate or unreliable precipitation. Furthermore, millions of people in India are dependent on them as their primary source of potable water, especially in rural regions where access to surface water sources is scarce. Groundwater resources hold significant value in supporting various industrial and commercial sectors, such as power generation, mining, and manufacturing. Therefore, the sustainability of groundwater resources in India exerts a substantial influence on numerous facets of the nation's socio-economic progress.

TABLE 7-5 GROUND WATER RESOURCE OF BODHGAYA PLANNING AREA

Block	Annual Extractable GW Resource	Annual GW allocation for domestic use (as on 2025)	Net GW availability for future use	Stage of GW Extraction (%)	Categorization
Bodhgaya	6011.91	849.19	4417.30	34.37%	safe
Gaya Sadar	3834.06	2295.41	1507.59	55.91%	safe

Source: Dynamic Ground Water Resources (2022), CGWB

In Bihar, potable water supply is predominantly sourced from groundwater. The Current Annual Ground Water Extraction for all uses has been estimated as 13.75 bcm and the Stage of Ground Water Extraction in the State is 44.76 %. Sustained groundwater extraction can lead to depleted groundwater resources in the area. Both Gaya Sadar and Bodhgaya C.D. blocks were under the 'safe' category in 2022, thus the groundwater resources of the planning area can be judiciously developed. However, at no point in time, the extraction level should exceed 70% (CGWB).

TABLE 7-6 COMPARISON OF GROUNDWATER EXTRACTION IN 2020 W.R.T. 2017

District	Block	Stage of Ground Water Extraction (%) in 2020	Stage of Ground Water Extraction (%) in 2022	Remark
Gaya	Bodhgaya	19.92	34.37	Deteriorated
	Gaya Sadar	89.80	55.91	Improved

Source: Dynamic Ground Water Resources (2022), CGWB

In 2020, the depth of the water level in Bodhgaya C.D. Block was 7.23 m during the pre-monsoon season which rose to 5.63 m in 2022. The post-monsoon water level also improved from 3.73 m in 2020 to 3.49 m in 2022. The groundwater levels in this period rose in the Gaya C.D. Block as well by a minor margin. Hence, there is no threat of apparent long-term decline of the water level and the area does not require artificial recharge.

TABLE 7-7 GROUNDWATER LEVELS OF BODHGAYA PLANNING AREA

Year	Block	Pre-Monsoon Water Level (mbgl)	Post-Monsoon Water Level (mbgl)	Fluctuation (m)
2020	Bodhgaya	7.23	3.73	3.5
	Gaya Sadar	6.47	3.38	3.69
2022	Bodhgaya	5.63	3.49	2.14
	Gaya Sadar	6.01	3.15	2.86

Source: Dynamic Ground Water Resources, CGWB

7.4.1 GROUNDWATER QUALITY

The groundwater quality in both the Bodhgaya and Gaya Sadar block is safe (CGWB, Central Ground Water Board, 2021). The pH value of groundwater in this area is around 7, which indicates a slightly alkaline nature of the overall groundwater structure of the Bodhgaya Planning area. Moreover, the pH values of the studied samples were within the permissible limits of 6.5 to 8.5 (Bureau of Indian Standard, 2012) and (World Health Organization, 2004). The pH of water primarily regulates the solubility of trace metals. Higher pH values in water can reduce the trace metals' solubility, whereas lower pH values speed up the dissolving process.

TABLE 7-8 GROUND WATER QUALITY OF BODHGAYA, 2020-22

Year	Block	pH	EC	CO3	HCO3	Cl	SO4	NO3	PO4	TH	Ca	Mg	Na	K	F	SiO2	TDS
2020	Bodhgaya	8.3	491	0	159	36	17	54.7	0	115	40	4	54	2.58	0.32	-	319
	Gaya	8.0	1340	0	384	174	61	45	0	415	52	63	94	13	0	-	-
2021	Bodhgaya	7.75	463	0	189.1	31.95	14.92	22.94	0	185	22	31.59	19.8	4.16	0.15	20.43	300.95
	Gaya	7.21	1890	0	298.9	440.2	50.13	29.35	0	680	38	142.16	95.8	28.1	0.08	14.84	1228.5
2022	Bodhgaya	7.43	321	0	140.3	17.8	10.2	7.3	0.02	125	18.0	19.4	15.3	2.9	1.01	5.4	208.65
	Gaya	7.29	2111	0	317.2	465.1	114.3	25.18	0.29	825	170	97.2	103.5	1.7	0.89	14.8	1372.15

Source: Central Ground Water Board

The ability of water to conduct electrical current is measured by its electrical conductivity (EC). The number of ions in the water has a direct bearing on this process. The conductivity of water increases with an increase in ions and vice versa. The average reading of EC of groundwater in Bodhgaya block is 321µs/cm (in 2022) which is considerably less in comparison to the standards of more than 750µs/cm (acceptable limit) and within 3000µs/cm (permissible limit in the

absence of alternate source) for different purposes of uses (Bureau of Indian Standard, 2012). The EC value of the Gaya block is 2111µs/cm, which falls well within the permissible limit.

The amount of organic and inorganic substances, such as ions, metals, and minerals, dissolved in a specific volume of water is known as total dissolved solids or TDS. Rich Ca^{2+} and Mg^{2+} ion-containing minerals and human activities such as chemical fertiliser application in agricultural runoff and industrial discharges are the main causes of high TDS in water. TDS in the Bodhgaya block was observed to be 319 mg/l (in 2020) which was reduced to 208.65 mg/l (in 2022) in the next two years, indicating that groundwater contamination has reduced considerably in recent times. The reverse is observed in the Gaya Block where the TDS value has increased to 1372.15 mg/l in 2022.

The groundwater in Gaya block is unsuitable for drinking without proper treatment as per standards. On the other hand, the groundwater in Bodhgaya block is suitable for drinking (Bureau of Indian Standard, 2012), yet it would be best to avoid using this water directly for consumption. It can however be used as drinking water in the absence of an alternate source after purification and chlorination according to Indian Standards specified in the table below.

TABLE 7-9 TDS LEVEL CHART FOR DRINKING WATER

TDS in Water (mg/L)	Suitability for Drinking Water
Between 50-150	Excellent for drinking
150-250	Good
250-300	Fair
300-500	Poor, not good for drinking
Above 1200	Unacceptable

Source: Bureau of Indian Standards, 2012

In the country, groundwater is used for domestic and drinking purposes by 85% of the rural population. High concentration of fluoride in groundwater beyond the permissible limit of 1.5 mg/L is a major health problem. The Bodhgaya C.D. block, present within the Bodhgaya Planning Area, has recorded high concentrations of fluoride in the groundwater which has increased from 0.32 mg/l to 1.01 mg/l over the years and can cross the permissible limit of 1.5 mg/l in the coming years if left unchecked. The fluoride concentration in Gaya block has also increased over the years with the current value at 0.89 mg/l, which is well within the permissible range.

Nitrate is a very common constituent in groundwater, especially in shallow aquifers. The source is mainly from anthropogenic activities. High concentration of Nitrate in water beyond the permissible limit of 45 mg/l (Bureau of Indian Standard, 2012)causes health problems. The reading of NO_3 in the Bodhgaya block was recorded as 7.3 mg/l in 2022 and 25.18 mg/l in the Gaya block, which are within the permissible range.

7.5 Recommendation

7.5.1 PROPOSED GREEN BUFFER AND ROADSIDE PLANTATION

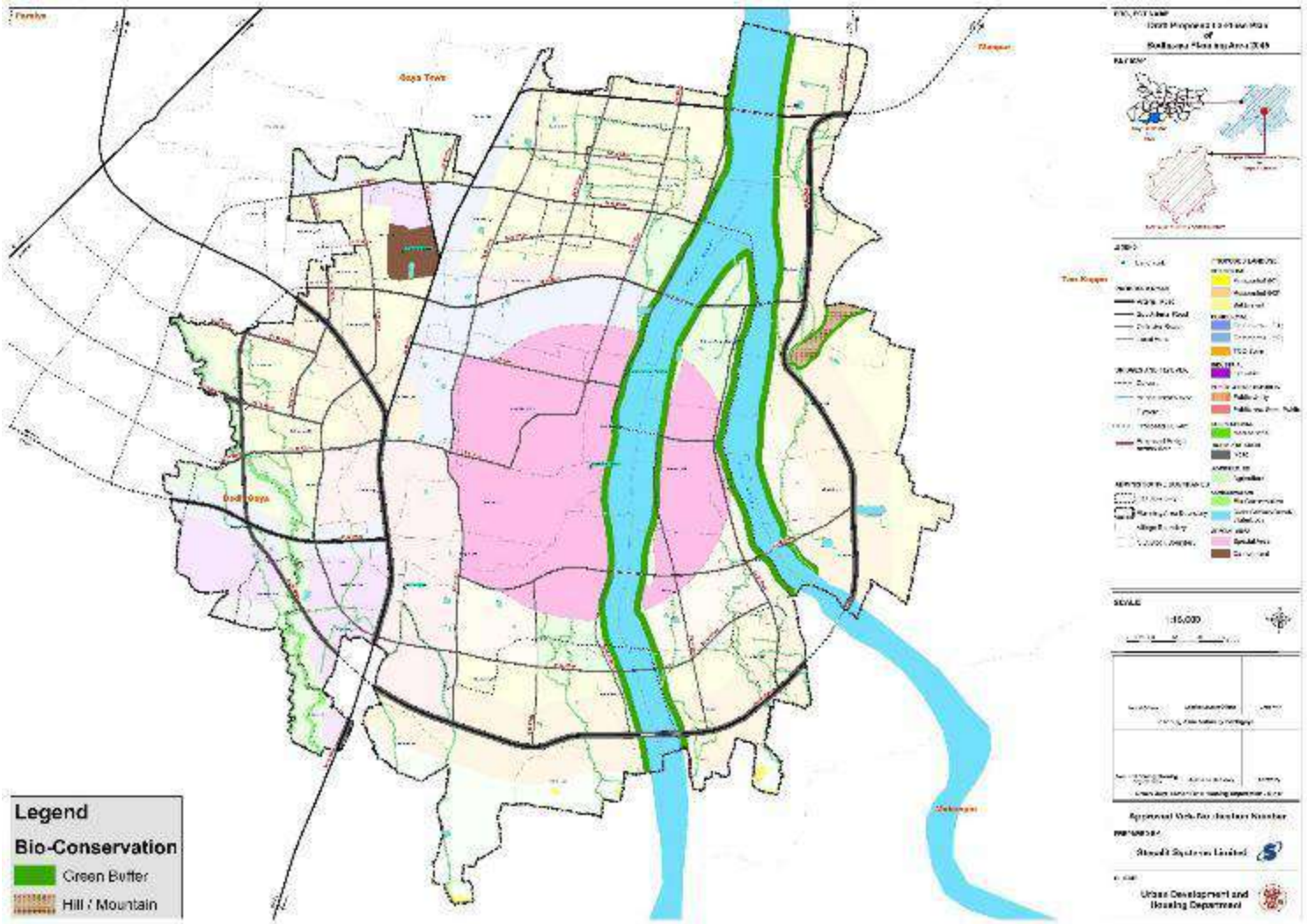
To protect the ecological character of the Bodhgaya Planning Area and ensure sustainable environmental management, a network of green buffers and plantation zones has been proposed around water bodies and along major roads. These measures aim to conserve natural resources, enhance landscape quality, and provide environmental as well as economic benefits to the local community.

A Green Buffer Zone (G-1) is proposed around all major water bodies within the planning area to safeguard them from encroachment, pollution, and unregulated development. In the case of the Falgu River, a 100-metre wide green buffer is proposed along both banks. This buffer will function as an ecological protection zone that supports riparian vegetation, stabilizes riverbanks, and improves the overall environmental quality of the river corridor. The buffer may also incorporate landscape development, walking tracks, and passive recreational spaces where appropriate, while ensuring that the natural flow and ecological functions of the river are preserved.

For other water bodies such as ponds, tanks, and smaller drainage channels, a 10-metre wide green buffer is proposed. These buffers will help protect water bodies from direct pollution, control runoff, and maintain their role in groundwater recharge and local micro-climate regulation.

In addition to the protective buffers, roadside plantation zones (G-2) are proposed along major and secondary roads throughout the planning area. These plantation corridors will not only improve the visual quality and environmental comfort of the streets but will also be designed to support economically beneficial plantations, such as fruit-bearing and other cash-yielding trees. Species selection may include trees that provide shade, enhance biodiversity, and generate livelihood opportunities through the production of fruits or other marketable products.

Together, the green buffer (G-1) and roadside plantation (G-2) proposals aim to strengthen the ecological resilience of the Bodhgaya Planning Area while integrating environmental conservation with landscape improvement and local economic benefits.



MAP 7-2: PROPOSED GREEN BUFFER AND PLANTATION IN PLANNING AREA

Source: Map Prepared by Stesalit System Ltd.

8 DISASTER RESILIENCE

8.1 VULNERABILITY OF GAYA DISTRICT

The Gaya district is vulnerable to both man-made and natural disasters. As per the Vulnerability Atlas of India, Third Edition, 2019 states that the district is vulnerable to earthquakes and droughts. As per the Gaya District Disaster Management Plan (DDMP 2022), the main issues the district is facing are drought heat waves, earthquakes, wind cyclones and cold waves. Situation control, monitoring, precise risk assessment and impact estimation, future event forecasting, and structural preparedness for disaster prevention are critical in preventing these events from happening or minimizing the harm they cause. Below is a detailed list of the various hazards that the Gaya district faces at different times of the year.

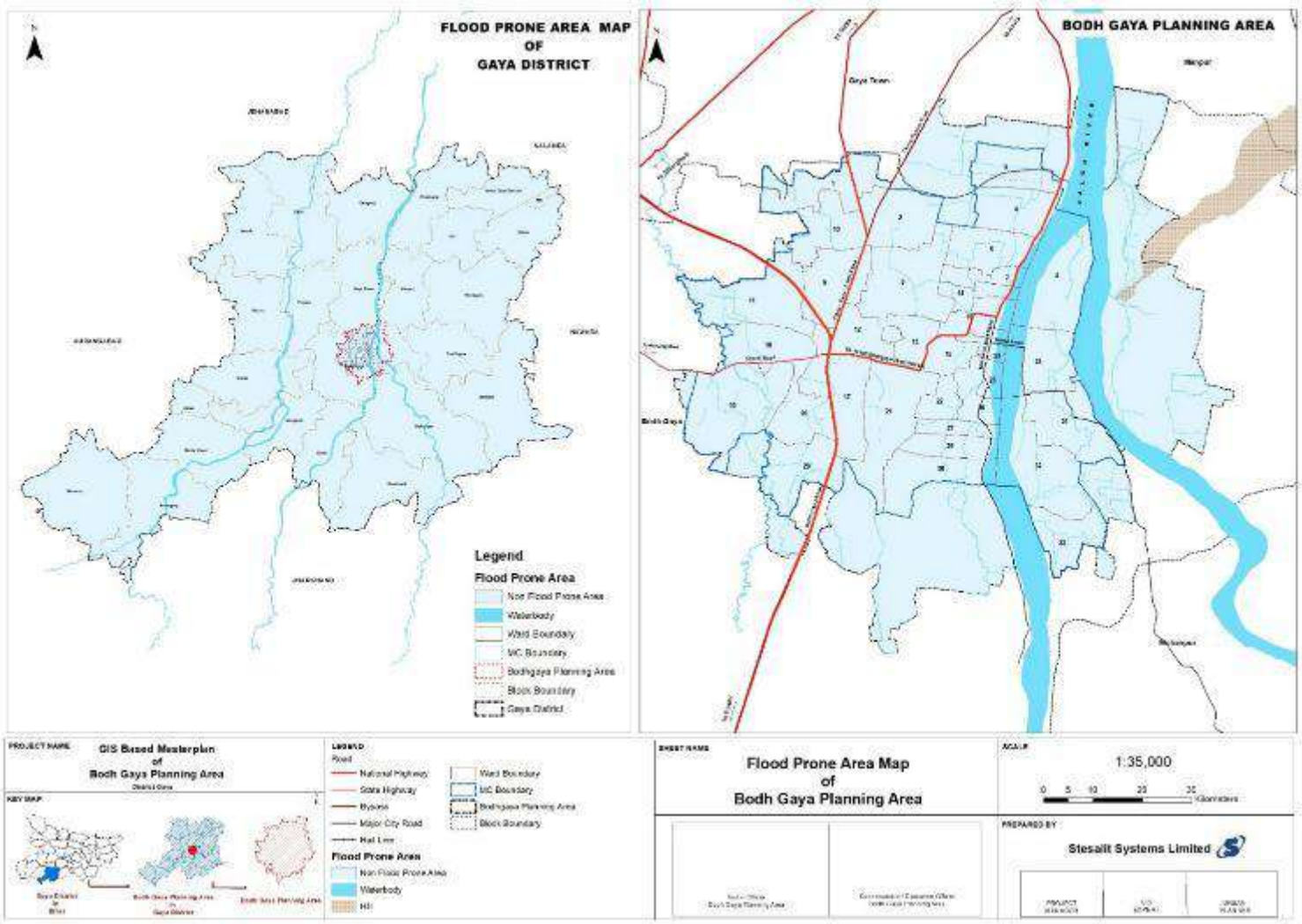
TABLE 8-1 DISASTER INTENSITY CALENDER OF GAYA DISTRICT

Disaster	January	February	March	April	May	June	July	August	September	October	November	December
Earthquake												
Drought												
Heat Wave												
Cold Wave												
Intensity	High				Moderate				Low			

Source: District Disaster Management Plan, Gaya, 2022

8.1.1 FLOOD

Every year, about 3.5 lakh people are impacted. The district's northern region experiences flooding every year. Every year, millions become homeless, a few hundred lives are lost, and several hectares of crops are damaged on average. During a short monsoon season, approximately 75% of the total rainfall occurs. (June – September) (BSDMA, Bihar State Disaster Management Authority, 2013). As per the Vulnerability Atlas of India, 2019, the district is not prone to floods. The Bodhgaya Planning area is not under Flood prone area as depicted in the map below.



MAP 8-1 FLOOD PRONE AREA MAP OF BODHGAYA

Source: Stesalit Systems Ltd.

8.1.2 DROUGHT

IMD defines drought in any area when the rainfall deficiency in that area is ≤ 26% of its long-term normal. It is further classified into moderate and severe drought depending upon whether the deficiency is between 26-50% and more than 50% respectively. The district is largely under threat from drought rather than flood because of the effects of climate change. The monsoon's dry spell has increased the severity of droughts in recent years. The effects can be felt particularly between February & May when the water table dips below particularly in Gaya town block and Bodhgaya.

TABLE 8-2 VULNERABILITY OF GAYA DISTRICT TO DROUGHTS

District	Exposure	Sensitivity	Adaptive Capacity	Vulnerability Index	Vulnerability
Gaya	0.410	0.140	0.360	0.091	Low

Source: CEEW

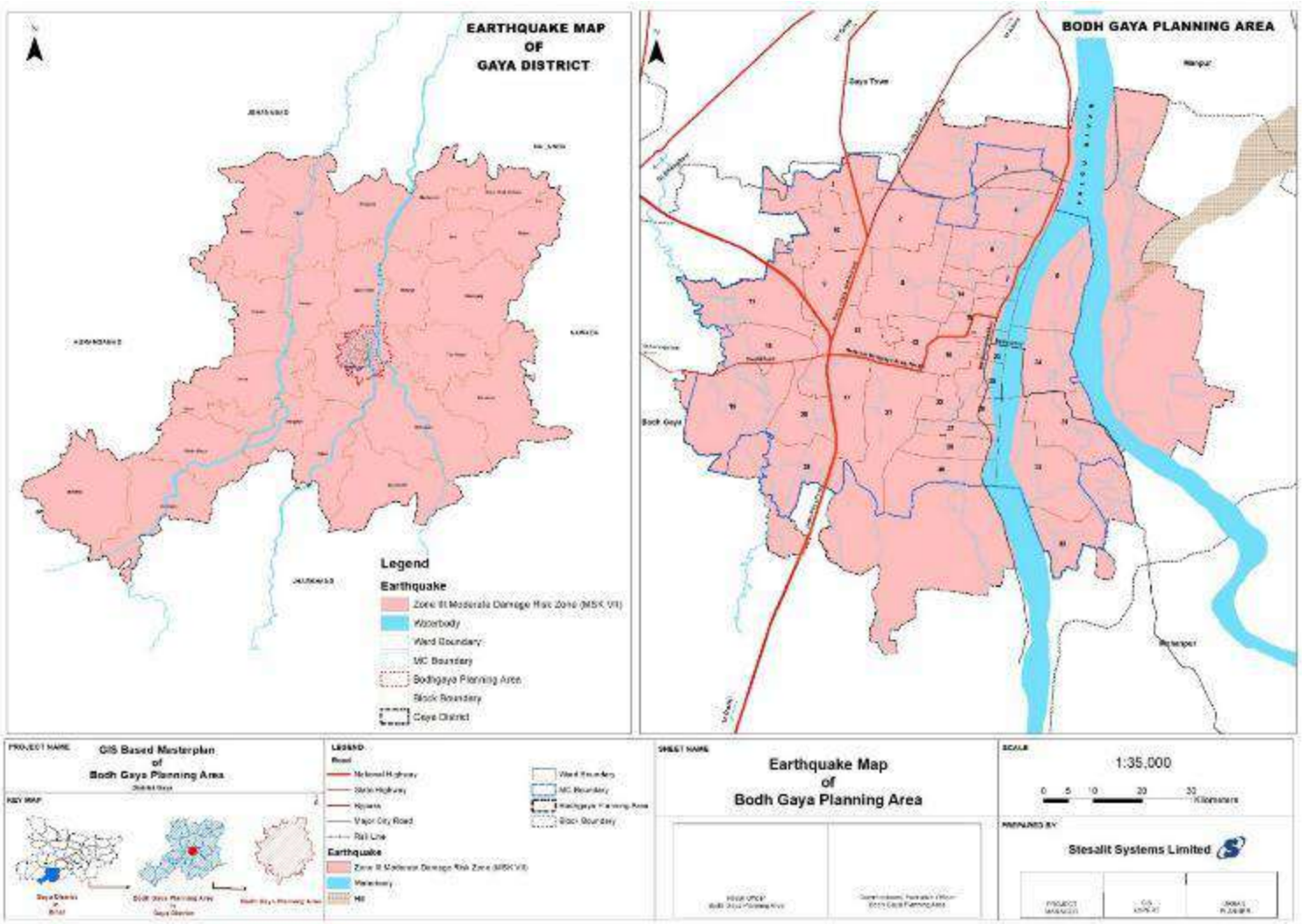
Rainfall in central Bihar has been declining over the past ten years and is still 25–45% below average, according to data collected over a century of observations. This year, 95.3 mm of rainfall was recorded in June, which is significantly less than the normal of 178.3 mm, and July saw 156.5 mm, much less than the normal of 316.6 mm. large areas of land continue to be desolate as a result. About half of the district's cropped area has not yet had paddy saplings planted, despite the fact that the Kharif crop-planting season is drawing to a close.

8.1.3 HIGH-SPEED WINDS/CYCLONIC STORM

High-speed winds are by far the most destructive of all the natural hazards associated with surface cyclones, as they can result in both fatalities and losses to socioeconomic development. Large-scale fatalities as well as destruction to property, agriculture, and human life are caused by strong tropical high-speed winds. Its three components—water, whirling, and wind speed—leave behind three-dimensional effects in the surrounding area. The only thing that saves it is that one can observe its formation from the point of depression development to the point of landfall. According to the Vulnerability Atlas of India, Gaya district is affected by high-speed winds of 47 m/s intensity in the northwest parts of the district while other areas of the district are affected by 39 m/s intensity winds.

8.1.4 EARTHQUAKE

The entire Bodhgaya planning area falls under seismically sensitive zone-III, Moderate Damage Risk Zone (MSK VII), making it susceptible to significant earthquakes, though they haven't happened often recently. There is no pattern of occurrence of earthquakes in the district. The last time any major earthquake struck this region was in the year 2015.



MAP 8-2 EARTHQUAKE ZONE MAP OF BODHGAYA PLANNING AREA

Source: Stesalit Systems Ltd

8.1.5 HEATWAVES

Bihar is also among one of heat heat-vulnerable states in India and several cases related to heat injuries have been reported in some southern districts including Gaya district. Based on the Heat Vulnerability Index (HVI) prepared by a consortium of organisations led by IIPH Gandhinagar, Gaya district falls under the "high normal" category (category 3). In recent years, the chances of heat waves have increased in the Gaya district due to the arid land belt & environmental conditions. The peak month of heatwaves in Gaya is around May when the maximum temperature rises to 48°C or more. In the year 2019, section 144 of CRPC was imposed in Gaya after the crucial impacts of the Heat Wave. In the year 2022 Gaya recorded temperatures above 45 degrees Celsius triggering a raging heat wave which led to the deaths.

8.2 MEASURES FOR DISASTER MANAGEMENT

The measures for disaster management have been classified under three categories which are as follows:

1) Prevention measures, 2) Mitigation measures, 3) Preparedness measures

Prevention measures reduce the likelihood of a disaster event occurring or the severity of an event should it eventuate. These include regulations in environmental management, site selection, urban planning and sound construction for the safety of communities, whereas socio-economic measures can be used to increase resilience, spread risk and responsibility, create redundancy and minimize the impact.

Mitigation measures encompass all actions implemented to decrease the consequences of the hazard itself with the aim of minimizing the impact of a future disaster. It is often classified into two categories, namely structural and non-structural. Structural mitigation encompasses the implementation of physical structures and engineering methods to minimize or prevent the potential consequences of hazards. This includes the development of protective structures and infrastructure that are designed to withstand and resist the effects of these hazards. Non-structural mitigation encompasses a range of measures such as legislation, awareness campaigns, knowledge building, public engagement, and operational practices. These measures, including participatory procedures and information dissemination, aim to decrease the risk and associated consequences.

Preparedness measures ensure the comprehensive state of readiness to deal with the consequences of a hazard of any degree. The DDMA is responsible for dealing with all phases (Preparedness, Prevention, Mitigation, Response and Recovery) of Disaster Management within the district. The Bodhgaya Planning Area is most prone to droughts and heatwaves. The table below enumerates the measures undertaken by the respective departments in the face of a calamity.

TABLE 8-3 MEASURES FOR DISASTER MANAGEMENT

Department	Prevention	Mitigation	Preparedness
DROUGHT			

Department	Prevention	Mitigation	Preparedness
DDMA	1) Establish infrastructure for drought warning and dissemination	3) Upgrade the existing drought forecasting system 4) Train stakeholders involved in drought management	3) Awareness of water conservation techniques 4) Arrange for electricity supply during drought situation
Agriculture Department	4) Encourage solar energy systems for irrigation and electricity generation 5) Training farmers in disaster risk reduction techniques 6) Use of technology inputs for agricultural production	5) Strengthen irrigation system 6) coordinatee with insurance companies to ease response during times of relief 7) Awareness of farmers on govt. Schemes 8) Provide cold storage	5) Identify drought-prone areas through GIS mapping 6) Crop Contingency Plan and storage of seeds 7) Develop strategies for optional cropping 8) Ensure the availability of drought-resilient crops
Animal Husbandry and Fisheries Department	1) Preparation of drinking water sources at proper locations for animals	3) adaptation of green fodder 4) capacity building and training of key line department officials on various aspects of disaster mitigation	6) storage of fodder 7) Renovate fishponds and ox-bow lakes 8) Open offices at block level to understand the ground realities 9) Training of fish farmers in aquaculture 10) Ensure recharging of various water sources
Energy Department	1) Repairing and changing damaged and burned transformers	1) Proper planning for maximum electricity supply in rural areas for irrigation during drought situation	3) Ensure electricity supply through agriculture feeders in vulnerable areas 4) Provide a minimum of 16 hr electricity to affected villages
Health Department	1) Conduct regular surveillance of public health measures	1) Capacity building and training of the community to deal with drought situations	4) Medical camps in affected areas 5) Prepare a Monitoring Cell under the chairmanship of the Civil Surgeon 6) Ensure health kit at PHC and CHC level
Irrigation Department	3) Enact laws for GW exploitation 4) Availability of water till the tail-end of canals	3) Carryout regular water audits 4) Encourage the use of drip and sprinkle irrigation	3) Availability of water resources in the area 4) Monitor watersheds in drought-prone areas

Department	Prevention	Mitigation	Preparedness
Public Health Engineering Department	3) Repair non-functional hand pumps 4) Provide water tanks where necessary	2) Encourage traditional rainwater harvesting and conservation	3) Install hand pumps 4) Conduct drinking water needs assessment
Food Corporation	1) Construct a warehouse and cold storage for the preservation/ storage of food grains	3) Conduct an assessment of required food resources 4) Under Shatabdi Ann Kalash Yojna, provide one quintal of food grains at every village	1) Setup centres for the supply of food grains at subsidized rates or for free
Water Resource Department	3) Construct dams, reservoirs, tubewells, tanks, farm ponds and canals for surface irrigation 4) Initiate rainwater harvesting	3) Strengthen water conservation techniques. 4) Ensure the supply of water in a drought situation	4) Construction of sluice gates and channels for distributing river water to ponds 5) Identify potential emergencies. 6) Prepare contingency-specific action plans
		EARTHQUAKE	
DDMA	3) Instruct the Building Department to identify weak buildings and retrofit them. 4) Ensure fire audit also	3) Provide seismic micro-zonation maps to all stakeholders 4) Training of engineers and architects to design seismically safe building	4) Training of engineers and masons for safe construction 5) Mock drill for the community 6) Follow up with departments about the safety measures under their ambit
Animal Husbandry	-	1) Sheds for animals should be earthquake-resistant or of lightweight material so that the animals remain unharmed	4) Identify animal-safe shelters for animals. 5) Arrange a vehicle for the transport of injured animals 6) Fodder storage at safe places.
Public Works Dept. (PWD)	3) Establish appropriate mechanisms for compliance review of all construction designs submitted to ULBs. 4) Slope stabilization in hilly areas	3) Assess the seismic risk and vulnerability of the existing built environment by carrying out structural safety audits 4) Develop seismic strengthening and retrofitting standards and guidelines	2) Arrange vehicles/ heavy equipment, such as front-end loaders, towing vehicles, earth-moving equipment, water tank supplies

Department	Prevention	Mitigation	Preparedness
Public Health Engineering Department	1) Construction of earthquake-resilient water supply channels	1) Repair damaged water sources on	1) Create drinking water facilities in relief camps and shelters for livestock
Health Department	1) Equip buildings with basic first aid facilities.	3) Prepare mass casualty management plans 4) Training of doctors and paramedics to meet emergences	1) The mobile unit should be ready to reach any affected places
		HEATWAVE	
DDMA	1) Provision of drinking water at all public places	2) Fixing of summer working hours in schools/colleges and other establishments.	3) Announcement of weather forecast 4) Conduct awareness campaigns
Health Department	1) To issue necessary advisories for the community to avoid heatstroke	1) Adopt heat-driven examination techniques at local hospitals and UHCs	3) Ensure sufficient availability of ORS, IV drops and medicines 4) Start mobile medical units for quicker response
Animal husbandry	1) Supply adequate drinking water for cattle during scarcity	1) Publicize protective for safeguarding poultry and cattle during heat wave	2) Ensure sufficient stock of medicine in all veterinary hospitals
Local Government	1) Promote tree plan plantation and green energy	1) Promote the schemes on non-conventional energy sources	1) Arrangements for temporary electric supply or generators

Source: District Disaster Management Plan, Gaya, 2022

9 CONSERVATION AND PRESERVATION

Conservation and preservation are essential approaches in urban planning aimed at safeguarding the cultural, natural, and built heritage of settlements while supporting sustainable growth. Conservation focuses on the careful management, restoration, and adaptive reuse of historic structures, landscapes, and ecosystems, ensuring their continued relevance in a changing urban context. Preservation emphasizes maintaining sites, buildings, and natural features in their existing state, protecting them from alteration or deterioration. Together, these principles help maintain identity, character, ecological balance and a strong sense of place for future generations.

In the Bodhgaya Planning Area, conservation assumes particular importance because of its exceptional Buddhist heritage, archaeological significance, sacred landscape and international pilgrimage value. Development planning needs to balance heritage protection with the requirements of pilgrims, tourists, local communities and the growing urban economy. The conservation approach should therefore extend beyond individual monuments to include their visual setting, movement corridors, landscape character, open spaces and associated cultural practices.

9.1 HERITAGE AND MONUMENTS

Bodhgaya, located in Gaya district of Bihar, is one of the world's most important Buddhist pilgrimage centres and holds exceptional historical, religious and cultural significance. The town is universally associated with the attainment of Enlightenment by Siddhartha Gautama, who became the Buddha under the sacred Bodhi Tree. The Mahabodhi Temple Complex is a UNESCO World Heritage Site and represents the principal heritage landmark of Bodhgaya.

The Mahabodhi Temple Complex forms the spiritual and archaeological core of the planning area. The complex comprises the approximately 50-metre-high Mahabodhi Temple, the sacred Bodhi Tree, the Vajrasana or Diamond Throne, votive stupas and other sacred locations associated with the seven weeks following Buddha's Enlightenment. The site has a long history of Buddhist worship, with the earliest major patronage traditionally associated with Emperor Ashoka.

The Bodhi Tree is one of the most important sacred natural heritage elements of Bodhgaya. It is revered as a descendant of the tree under which Buddha attained Enlightenment. Together with the Vajrasana, it forms the spiritual heart of the Mahabodhi Temple Complex and continues to attract pilgrims for prayer, meditation, chanting and circumambulation.

The Vajrasana, or Diamond Throne, is traditionally associated with the place where Buddha sat in meditation and attained Enlightenment. Other sacred locations within the complex include Animeshlochan Chaitya, Ratnachakrama, Ratnaghar Chaitya, Ajapala Nigrodh Tree, Lotus Pond and Rajayatana Tree. These elements

collectively form a sacred cultural landscape rather than a collection of isolated monuments.

Bodhgaya's heritage extends beyond the Mahabodhi Temple Complex to a network of Buddhist monasteries, temples, stupas, meditation centres and cultural institutions. International monasteries representing Tibetan, Thai, Bhutanese, Japanese, Burmese, Chinese and other Buddhist traditions contribute to the distinctive multicultural character of the town.

The 80 Feet Buddha Statue is an important contemporary landmark of Bodhgaya. Along with Sujata Stupa and the Dungeshwari Cave Temples, it contributes to the wider pilgrimage landscape associated with Buddha's spiritual journey. These locations should be considered as connected heritage resources within an integrated planning framework.

Sujata Garh/Sujata Stupa, located across the Falgu River from the Mahabodhi Temple area, is associated with Sujata, who is traditionally believed to have offered food to Siddhartha before his Enlightenment. The site represents an important stage in the narrative of Buddha's spiritual journey and strengthens the cultural relationship between the Mahabodhi Temple precinct and the wider landscape.

The Dungeshwari Hills and Cave Temples, also known as the Mahakala Caves, are associated with the period of severe ascetic practice undertaken by Siddhartha before he came to Bodhgaya. The caves and surrounding hills form an important archaeological and religious landscape and are visited by pilgrims following the spiritual journey associated with Buddha.

The heritage character of Bodhgaya is therefore not limited to individual structures. It comprises a continuous sacred landscape of temples, monasteries, archaeological remains, sacred trees, water bodies, hills, pathways and pilgrimage spaces. Conservation planning should accordingly consider the physical, visual, environmental and functional relationship between individual heritage assets and the larger landscape.

9.2 TANGIBLE CULTURAL HERITAGE

Tangible cultural heritage refers to physical objects and places that carry historical, artistic, archaeological or cultural value. This includes monuments, buildings, archaeological sites, sculptures, paintings, manuscripts, artefacts and cultural landscapes. These resources are physically identifiable and are generally protected through conservation, restoration, controlled development and appropriate adaptive reuse.

Bodhgaya possesses a rich and distinctive tangible cultural heritage reflecting its importance as a major Buddhist pilgrimage centre. The heritage resources of the planning area include ancient temples, archaeological remains, stupas, sacred trees, monasteries, sculptures, museums, water bodies and culturally significant landscapes. Collectively, these resources represent different phases of Buddhist history and the continuing evolution of Bodhgaya as a pilgrimage settlement.

The Mahabodhi Temple Complex is the principal tangible heritage asset. The complex contains the Mahabodhi Temple, Vajrasana, sacred Bodhi Tree, votive stupas, stone railings, sacred shrines and archaeological remains. These elements

provide evidence of the development of Buddhist architecture, sculpture and pilgrimage practices over several centuries. The architectural character of the temple, including its brick construction and vertical form, is an important component of India's Buddhist architectural heritage.

The Archaeological Museum at Bodhgaya provides an important repository and interpretation facility for archaeological artefacts and sculptures associated with Bodhgaya and its surrounding areas. Such facilities support heritage awareness and provide opportunities for visitors to understand the historical evolution of the site.

The international Buddhist monasteries and temples constitute another significant component of Bodhgaya's tangible cultural heritage. The Thai Temple, Tibetan Temple, Bhutanese Monastery, Japanese Temple, Burmese Temple, Chinese Temple and other establishments demonstrate the international character of the town. Their architecture, murals, religious objects, prayer wheels, sculptures and landscape features add diverse cultural expressions to the urban environment.

The 80 Feet Buddha Statue represents the modern phase of Bodhgaya's religious landscape. Although contemporary in origin, it has acquired considerable cultural and visual importance and functions as an identifiable pilgrimage and tourism landmark. Sujata Stupa and the Dungeshwari Cave Temples similarly contribute to the wider tangible heritage network and should be linked through appropriate heritage circuits.

The tangible heritage of Bodhgaya therefore represents a combination of archaeological heritage, sacred architecture, religious institutions, landscape features and contemporary pilgrimage infrastructure. Conservation and planning interventions should maintain the authenticity and visual integrity of these resources while accommodating the increasing requirements of pilgrimage and tourism.

9.3 INTANGIBLE CULTURAL HERITAGE

Intangible cultural heritage consists of non-physical traditions, practices and expressions passed down through generations. It includes oral traditions, performing arts, social practices, religious rituals, festivals, traditional knowledge, craftsmanship and community practices. Intangible heritage is particularly important in Bodhgaya because the cultural significance of the town is sustained not only by its monuments but also by the continuous religious practices associated with them.

The most important element of Bodhgaya's intangible cultural heritage is its Buddhist pilgrimage tradition. Pilgrims from different parts of India and from countries across the world visit Bodhgaya to pray, meditate, undertake religious observances and pay homage at the Mahabodhi Temple. Daily prayer, meditation, chanting, offerings and circumambulation around the sacred Bodhi Tree and Vajrasana reinforce the relationship between the physical heritage structures and living religious traditions.

Bodhgaya's cultural identity is also strongly associated with its sacred geography. The Mahabodhi Temple, Bodhi Tree, Vajrasana, Lotus Pond, Sujata Stupa, Dungeshwari Hills and other associated sites collectively form a pilgrimage

landscape related to different stages of Buddha's spiritual journey. The movement of pilgrims between these locations creates a cultural network extending beyond individual monuments.

The presence of Buddhist communities and monasteries representing different countries has created a distinctive multicultural environment. Tibetan, Thai, Bhutanese, Japanese, Burmese, Chinese and other traditions are represented through religious institutions, festivals, rituals, architecture, food, art and cultural activities. This international interaction strengthens Bodhgaya's role as a global centre of Buddhist learning, pilgrimage and spiritual exchange.

Stories and traditions associated with Buddha's Enlightenment, the Bodhi Tree, Vajrasana, Sujata, Dungeshwari and the seven weeks following Enlightenment form an important part of Bodhgaya's cultural identity. These narratives are transmitted through religious teachings, pilgrim practices, local traditions and interpretation at heritage sites.

9.4 FESTIVALS

1. Bodh Mahotsav: Bodh Mahotsav is a major cultural festival associated with Bodhgaya. It celebrates Buddhist heritage through cultural programmes, music, dance, performances and other activities. The festival has an international character and contributes to the promotion of Bodhgaya as a Buddhist cultural and pilgrimage destination. Such events also create temporary requirements for pedestrian movement, parking, sanitation, security and crowd management.

2. Buddha Purnima / Buddha Jayanti: Buddha Purnima is one of the most significant religious observances in Bodhgaya. It commemorates the life and teachings of Gautama Buddha and is especially important because Bodhgaya is associated with his Enlightenment. The occasion is marked by prayers, meditation, chanting, religious ceremonies and offerings at the Mahabodhi Temple and associated Buddhist institutions.

3. International Buddhist Gatherings: Bodhgaya hosts Buddhist teachings, meditation programmes, religious ceremonies and international pilgrimage activities throughout the year. These events are associated with the presence of Buddhist monasteries and institutions representing different countries and traditions. They contribute to Bodhgaya's international religious identity and create periodic peaks in visitor numbers and infrastructure demand.

4. Major Buddhist Ceremonies: Bodhgaya is also associated with major Buddhist teachings and ceremonies, including Kalachakra-related religious activities. Such gatherings involve prayer, meditation, chanting and other spiritual practices and demonstrate the international religious significance of the town.

9.5 Conservation and Planning Implications

The heritage and cultural resources of Bodhgaya constitute the foundation of its identity and tourism economy. Conservation planning should therefore adopt an integrated approach covering protection of the Mahabodhi Temple Complex and its wider setting; conservation of archaeological remains, stupas, sacred structures and heritage landscapes; protection of the Bodhi Tree and Vajrasana; conservation of important pilgrimage routes and movement corridors; regulation

of development around heritage structures; protection of significant open spaces and water bodies; management of pilgrim and tourist pressure; strengthening of interpretation and signage; integration of international monasteries into the broader heritage strategy; and protection of local cultural practices.

Overall, the Bodhgaya Planning Area should be planned as a heritage-led pilgrimage and cultural landscape where conservation of its historic and spiritual identity forms an integral component of future urban development. Infrastructure and economic development should support, rather than undermine, the unique cultural character, visual setting and living heritage of Bodhgaya.

10 TOURISM

Bodhgaya Planning Area located in the Gaya district of Bihar has a great historical and cultural significance. Dotted with several religious Buddhist institutions, the area holds a unique position in tourism.

Tourism refers to the act of individuals travelling from one location to another, such as historical sites, mountainous regions, or environmentally sensitive locations, for the purpose of leisure, education, sports, medical treatment, and other activities. As per the United Nations World Tourism Organization, 'Tourism' is defined as a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors (which may be either tourists or excursionists; residents or non-residents) and tourism has to do with their activities, some of which imply tourism expenditure (United Nations World Tourism Organization, 2008).

Tourism is one of the fastest-growing sectors in India today. Since the inception of the 'Incredible India' campaign in 2002, India has effectively marketed itself as a desirable tourist destination worldwide. In terms of GDP, the direct and indirect contribution of tourism and travel was nearly 1.77% during 2021-2022 (India Tourism Statistics 2023). It fosters the growth of related sectors such as the hotel business, transportation, handicrafts, and travel agencies. Tourism generates substantial revenue for a local economy through the purchase of goods and services required by tourists. Additionally, the sector contributes immensely to foreign exchange reserves in the country and provides significant employment opportunities, both in the formal and informal sectors. establishes a foundation for job opportunities in the service industry of the economy. It is also instrumental in bringing about economic development, particularly in remote and backward areas. The money spent by the tourists in an area is circulated back into the local economy, which thereby generates more income and employment. Thus, the actual economic benefit to the area is much greater than the original amount spent by the tourists.

10.1 BRIEF TOURISM PROFILE OF BIHAR

Bihar has got its name from the word 'Vihara' or the place where monks live. In the past, it was the focal point of knowledge and culture in India. It is from here that Buddhism emerged as a major religion. The Magadha and the Licchavi kingdoms which thrived during the 7th and 8th BC have left behind a rich legacy of art and architecture. The state has immense potential for tourism, especially religious tourism, heritage tourism and eco-tourism. However, its tourism potential for generating much-needed income and employment remains greatly underutilized.

Every rupee spent by a tourist in the state changes hands thirteen times. Every hotel room generates direct employment for three persons and indirect employment opportunities for eight persons (Bihar Tourism Policy 2009). But despite innumerable tourist attractions and an unbounded potential for tourism, Bihar is yet to flourish as a

major tourist spot in India. In 2022, the state has been able to attract only 1.46% of domestic tourists and a mere 1.01% of foreign tourists (India Tourism Statistics 2023). The underdevelopment of the tourism sector in Bihar can be primarily attributed to poor tourist infrastructure and a low budget for tourism development.

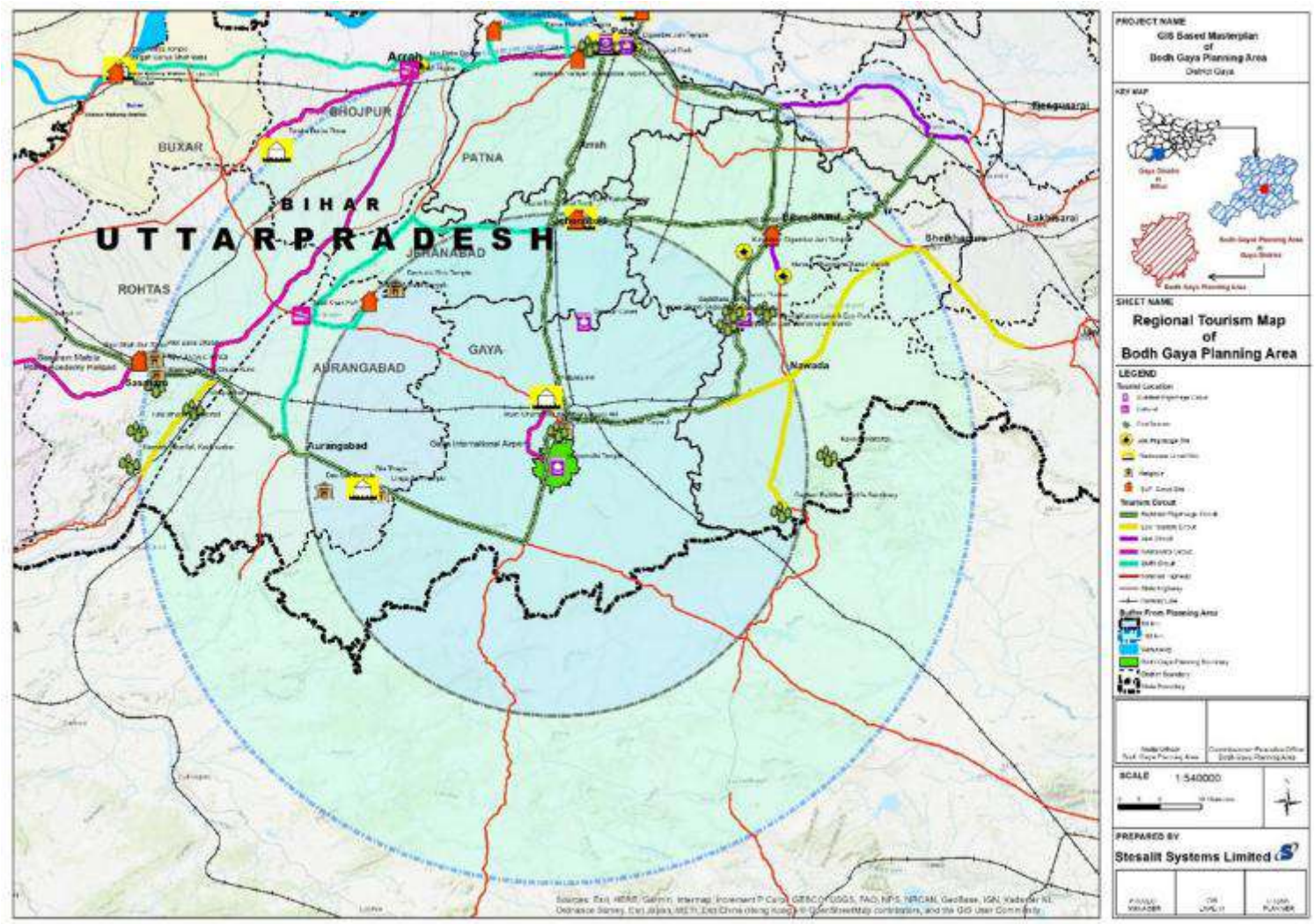
10.2 BRIEF TOURISM PROFILE OF BODHGAYA

Bodhgaya is a prominent tourist hotspot in the state of Bihar, attracting nearly 3.5% of the tourist traffic in the state. Considered as one of the sacred places for Buddhism, the town is one of the few spots in Bihar that records a considerably high number of foreign tourist footfalls. It is here that Gautama Buddha is believed to have attained enlightenment under the Bodhi Tree. The central attraction of Bodhgaya is the Mahabodhi Temple Complex which was declared a UNESCO World Heritage Site in 2002 considering its historical, cultural, and religious significance. This makes the town a profound spiritual destination for Buddhists worldwide. The town is also home to various monasteries and temples reflecting the art, culture, and architecture of Buddhism.

Tourism is the lifeblood of Bodhgaya's economy. Despite being a highly significant pilgrimage destination, the town is still struggling to fully leverage its tourism potential. It lacks adequate infrastructure, facilities, and connectivity to cater to the large number of pilgrims who arrive throughout the year. Improving amenities and developing a "Buddhist corridor" to link Bodhgaya with other important sites, coupled with a better branding and marketing strategy could help the town attract more visitors and boost its overall economic contribution.

10.3 TOURIST CIRCUITS

A ‘tourist circuit’ is defined as a trail or route comprising at least three major tourist destinations which have distinct locations and are situated far apart from one another in different towns and villages. A circuit can be confined to a single state or have a regional spread spanning across multiple states and union territories. The aim is to encourage visitors to explore each of the destinations along the circuit, often in a predefined order, offering a seamless experience. Circuits usually have defined entry and exit points and may have a dominant theme and sub-themes. The centrally funded Swadesh Darshan Scheme has identified 15 circuits nationwide. The development of the Buddhist Circuit is a major project under this scheme.



MAP 10-1 REGIONAL TOURISM CIRCUIT IN BODHGAYA

Source: Stesalit Systems Limited

10.3.1 THE BUDDHIST CIRCUIT

The Buddhist Circuit is a route that follows in the footsteps of the Buddha from Lumbini in Nepal where he was born, through Bihar in India where he attained enlightenment, to Sarnath and Kushinagar in Uttar Pradesh, where he gave his first sermons. This iconic route includes sites which are over 2500 years old and are among the most revered by Buddhists worldwide. The Buddhist Circuit is an important pilgrimage route for Buddhists as well as travellers interested in history, culture, or religion.

The three predominant routes followed by a majority of tourists are:

- **Bodhgaya – Rajgir – Nalanda – Kushinagar – Sarnath – Bodhgaya**
- **Bodhgaya – Rajgi – Nalanda – Sarnath – Kushinagar – Varanasi**
- **Varanasi/Sarnath – Kushinagar – Bodhgaya – Varanasi.**

Apart from this, a sub-circuit exists in Bihar which passes through the following locations: Bodhgaya – Rajgir – Nalanda – Patna – Vaishali – Lauriya Nandangarh – Lauriya Areraj - Kesariya – Vikramsil. Most tourists cover Bodhgaya – Rajgir – Nalanda in one stretch. Other sites are largely used as middle-of-the-trip centres.

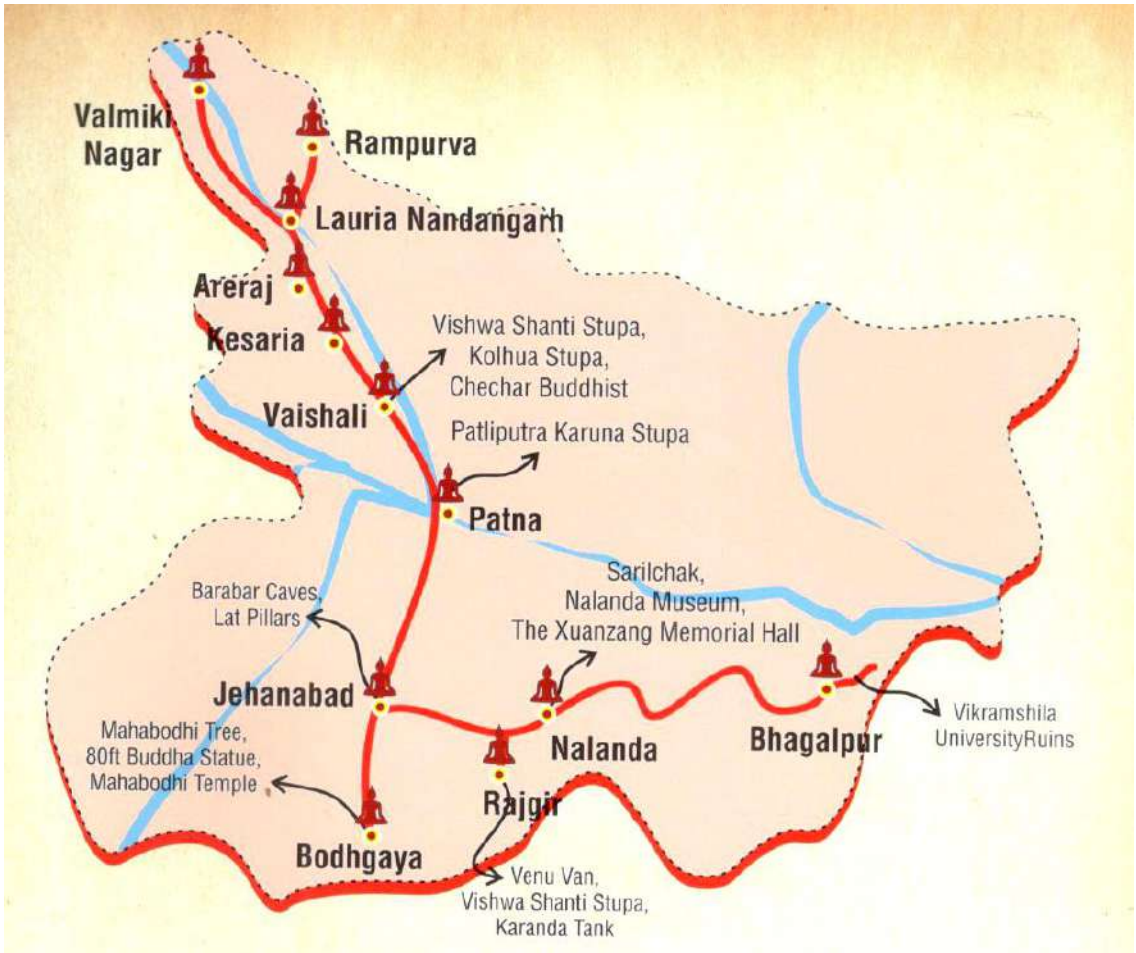


FIGURE 10-1 BUDDHIST CIRCUIT OF BIHAR

Source: Bihar Tourism

The Bodhgaya planning boundary serves as the central hub for tourism and pilgrimage, embodying profound spiritual and cultural significance. At its heart lies the Mahabodhi Temple Complex, a UNESCO World Heritage Site renowned as the sacred location where Lord Buddha attained enlightenment under the Bodhi tree. This ancient temple is not only an architectural marvel but also a pilgrimage destination that attracts millions of devotees and tourists from around the globe each year. Surrounding this sacred site, a network of monasteries and meditation centres has emerged, developed by various Buddhist countries, including Thailand, Japan, Myanmar, Bhutan, and Sri Lanka. Each monastery reflects its respective culture and architectural style, contributing to the diverse spiritual atmosphere of Bodhgaya. These establishments provide spaces for meditation, learning, and community gatherings, fostering a sense of unity among pilgrims of different nationalities.

In addition to these spiritual landmarks, the area is equipped with essential amenities designed to enhance the experience of both pilgrims and tourists. Cultural interpretation centers offer informative exhibits and educational programs about Buddhism's history and teachings. Rest zones provide respite for travelers, while landscaped areas invite visitors to relax and reflect amid the beauty of nature. Bodhgaya stands as a vital node within the broader Buddhist circuit, connecting to other significant destinations throughout India and beyond. Its rich cultural heritage, combined with its role as a spiritual center, makes Bodhgaya an indispensable part of the Buddhist pilgrimage experience and a cornerstone for understanding the teachings of Buddhism.

10.3.1.1 TOURIST INFLOW IN BUDDHIST SITE ON THE BUDDHIST CIRCUIT

The Buddhist Circuit is one of the most popular tourist circuits in Bihar and Bodhgaya is a prominent attraction spot on the route. As per a study conducted by the World Bank in 2012, Bodhgaya alone attracted nearly 14.7% of footfall recorded at all the Buddhist sites on the circuit. Almost all the Buddhist countries have their own monasteries in Bodhgaya - Tibetan, Chinese, Thai, Bhutan, Japan, Myanmar, Sri Lanka, Vietnam, Nepal, and Laos. The Buddhist followers of Assam and Arunachal also have their own independent monasteries.

TABLE 10-1 NUMBER AND SHARE OF VISITORS AT BUDDHIST SITES ON THE CIRCUIT, 2012

Location	Number of visitors			Percentage share of total (%)		
	Indian	Foreign	Total	Indian	Foreign	Total
Kaushambi	146,131	8,401	154,532	2.2	0.7	2
Sarnath	833,500	355,294	1,188,794	12.4	29.6	15.3
Sankisa	77,620	11,700	89,320	1.2	1	1.1
Shravasti	113,965	113,538	227,503	1.7	9.5	2.9
Kushinagar	736,763	61,032	797,795	10.9	5.1	10.3
Kapilvastu	153,359	29,971	18,330	2.3	2.5	0.2
Bodhgaya	***933,153***	***207,933***	***1,141,086***	***13.8***	***17.3***	***14.7***
Rajgir	3,700,446	373,186	4,073,632	54.8	31.1	52.3

Location	Number of visitors			Percentage share of total (%)		
	Indian	Foreign	Total	Indian	Foreign	Total
Vaishali	53,276	37,533	90,809	0.8	3.1	1.2
Total	**6,748,213**	**1,198,588**	**7,781,801**	**100**	**100**	**100**

Source: Investing in the Buddhist Circuit, World Bank

Since the Action Plan for the Development of the Buddhist Circuit was launched in 1986, there have been fragmented efforts to develop and promote the Buddhist Circuit as a mainstream tourism product. Various tourism master plans, and investment projects by the states and the Government of India have targeted to fully reap the tourism potential of this important historic and heritage trail.

TABLE 10-2 CENTRAL FUNDING UNDER SWADESH DARSHAN SCHEME FOR BUDDHIST CIRCUIT IN BIHAR

State	Name of the Project/Circuits	Year of Sanction	Amount Sanctioned (Rs. Crore)	Amount Released (Rs. Crore)
Bihar	Bodhgaya-Rajgir-Nalanda-Circuit	2006-07	19.2242	9.6121
	Construction of the Convention Centre at Bodhgaya	2016-17	95.18	93.22

Source: Ministry of Tourism, India



More than two lakh people from across the globe are attending the 32nd Kalachakra puja led by exiled Tibetan spiritual leader the Dalai Lama.(January)

Mahabodhi Temple during festival days(Buddha Jayanti in may)

FIGURE 10-2 TOURIST INFLOW IN DIFFERENT MONASTRIES IN DIFFERENT FESTIVALS, BODHGAYA

Source: CDP

10.4 TOURISM IN BODHGAYA

Bodhgaya offers a diverse range of tourist experiences catering to various interests and preferences. It is renowned for both its rich historical legacy and religious significance. Although there are not many natural features in Bodhgaya itself, there can be chances to go on nature walks along the Flagu River and experience scenic beauty from the nearby hillside.

10.4.1 RELIGIOUS TOURISM

As the site where Buddha attained enlightenment, it is a major pilgrimage destination for Buddhists from around the world. Bodhgaya is thus the epicentre of religious and spiritual tourism in India. The Mahabodhi Temple Complex, Sujata Kuti, Monasteries, and Animesh Lochan Chaitya are some of the sites that come under the Religious and cultural category of tourism in Bodhgaya. There are also different types of monasteries in Bodhgaya like the Buddhist Monasteries, Tibetan Monasteries, Royal Bhutan Monasteries, Japanese Monasteries, Thai Monasteries, and other International Monasteries. The government is currently working on linking Bodhgaya with other important Buddhist sites in the region, such as Rajgir and Nalanda, to create a comprehensive 'Buddhist circuit' for pilgrims.

10.4.2 ECO-TOURISM

Eco-tourism refers to a form of sustainable tourism that focuses on experiencing and appreciating natural environments and local cultures with minimal impact on the environment. Some of the important attraction spots for ecotourism in Bodhgaya are Dungeshwari Hills (Pragbodhi), Rajgir Hill, and Falgu River. The government has taken up the initiative to develop ecotourism activities and infrastructure in the areas surrounding Bodhgaya to help diversify the town's tourism sector and extend it beyond just the religious sites.

10.4.3 HISTORICAL TOURISM

Historical tourism refers to the practice of travelling to sites, landmarks, and destinations that have significant historical, cultural, or archaeological importance. Some of the important historical spots are Sujata Garh, Muchalinda Lake and Ratnagarh.

10.5 EXISTING AND IDENTIFIED TOURIST SPOTS/CIRCUITS IN AND AROUND BODHGAYA PLANNING AREA

10.5.1 RELIGIOUS TOURISM SPOTS

10.5.1.1 THE MAHABODHI TEMPLE (BODHI TREE)

Complex in Bodhgaya marks the site of Buddha's enlightenment, featuring the historic Mahabodhi Temple and the sacred Bodhi Tree.
Ticket price - No Entry fee
Daily peak season footfall - 5,000 to 10,000 visitors
Peak hours - Early Morning (6:00 am - 9:00 am) and Late Afternoon (4:00 pm - 6:00 pm)
Ownership - Bodhgaya Temple Management Committee (BTMC)



FIGURE 10-3 THE MAHABODHI TEMPLE (BODHI TREE)

Source: Bihar Tourism.



MAP 10-2 MAHABODHI COMPLEX LANDUSE SCENARIO, BODHGAYA

Source: CDP

10.5.1.1.1 UNESCO AND MINISTRY OF TOURISM, INDIA - BUFFER ZONE REGULATIONS

As buildings were being constructed haphazardly in Bodhgaya, which adversely affecting the urban aesthetics of the city of historical and international importance. Keeping this in view, any type of building construction and permission in Bodhgaya Nagar Panchayat area was restricted (letter No – 87, Dated- 29-01-2020, UDHD).

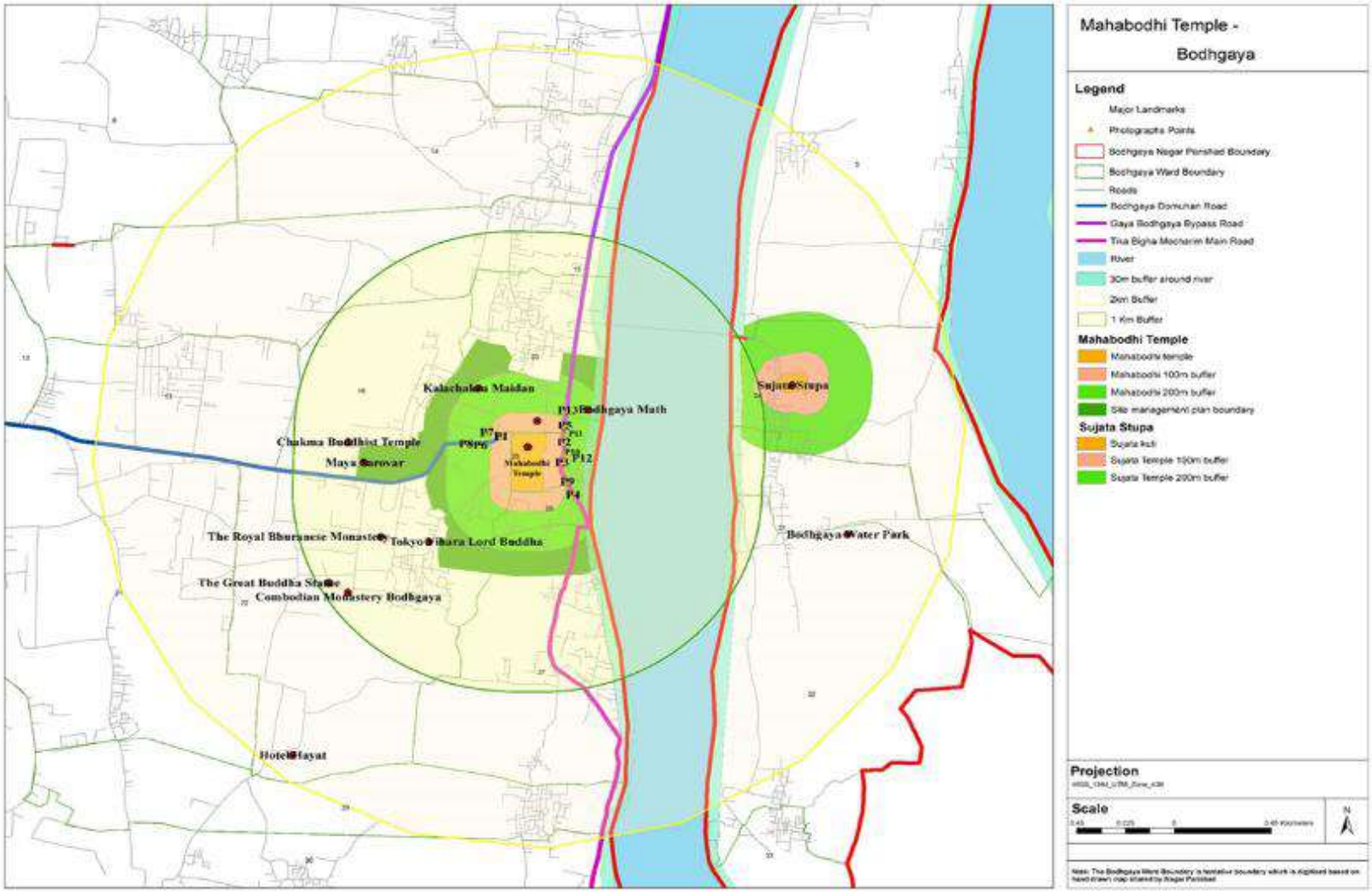
BUFFER ZONE:

There is a buffer zone beyond the boundary walls of the temple of 2 kms radius from the Mahabodhi Temple. This includes an area where a little excavation has been carried out by the Department of Archaeology of the State Government of Bihar.

1 Km Buffer Zone: Beyond the boundary walls, the Bodhgaya Regional Development Authority has declared an area of 1 km from the boundary wall of the temple to be a protected buffer zone wherein no new structures shall be permitted in future except those vital for religious usage and designed sympathetically to the site and are only ground floor structures.

2 Km Buffer Zone: It has also been decided that within an area of 2 km from the temple boundary wall, no building shall be permitted to exceed a height of 44 ft, and these buildings shall be designed in a character similar to those traditional to Bodhgaya monument times.

These Buffer Zone regulations are enforced by the Gaya Regional Development Authority, of which the District Magistrate & Collector of Gaya who is also the Chairman of Bodhgaya Temple Management Committee, is a member. The legal instrument for implementation is the Bihar Public Land Encroachment Act.



MAP 10-3 MAHABODHI COMPLEX ENCROACHMENT SCENARIO, BODHGAYA

Source: CDP

10.5.2 ECO-TOURISM SPOTS

10.5.2.1 FALGU RIVER

The river is called sacred and according to Hindu and Buddhist traditions, the river is closely associated with important events such as important rituals like *pind daan* (offerings to ancestors) on its banks, while the latter consider it a holy site of spiritual significance. It is a popular spot for boat rides.
Ticket price - No Entry fee
Daily peak season footfall - 500 to 1,500 visitors
Peak hours - Morning (7:00 am - 10:00 am) and Evening (4:00 pm - 6:00 pm



FIGURE 10-4 FALGU RIVER
Source: Bihar Tourism

10.5.3 HISTORICAL TOURISM SPOTS

10.5.3.1 SUJATA GARH

It is a Buddhist stupa where the milkmaid Sujata is said to have offered milk-rice to the Buddha, ending his six years of asceticism and allowing him to attain enlightenment.
Ticket price - No Entry fee
Daily peak season footfall - 500 to 1,500 visitors
Peak hours - Morning (8:00 am - 11:00 am) and Evening (3:00 pm - 5:00 pm)
Ownership - Archaeological Survey of India (ASI)



FIGURE 10-5 SUJATA GARH
Source: Bihar Tourism

10.5.3.2 MUCHALINDA LAKE

Muchalinda Lake is a peaceful pond located next to the Mahabodhi Temple in Bodhgaya. According to legend, it is the place where the serpent king Muchalinda sheltered the Buddha from a storm while he was meditating after attaining enlightenment.
Ticket price - No Entry fee
Daily peak season footfall - 300 to 800 visitors
Peak hours- Morning (8:00 am - 11:00 am) and Late Afternoon (3:00 pm - 5:00 pm)
Ownership - Bodhgaya Temple Management Committee (BTMC).



FIGURE 10-6 MUCHALINDA LAKE
Source: Bihar Tourism

10.5.3.3 RATANGARH

Ratangarh is a small hill located near the Mahabodhi Temple complex in Bodhgaya. According to legend, it is the site where Buddha is said to have meditated after attaining enlightenment under the Bodhi Tree.
Ticket price - No Entry fee
Daily peak season footfall - 200 to 500 visitors
Peak hours - Morning (7:00 am - 10:00 am) and Late Afternoon (4:00 pm - 6:00 pm)



FIGURE 10-7 RATANGARH
Source: Bihar Tourism

10.5.3.4 BODHGAYA MULTIMEDIA MUSEUM

Located right next to the Mahabodhi Temple, this museum provides a multimedia and 3D animation overview of the historical life of Gautam Buddha from childhood to enlightenment.
Ticket price - Rs. 10 per person
Daily peak season footfall - 200 to 500 visitors
Peak hours - Late Morning (10:00 am - 12:00 pm) and Early Afternoon (2:00 pm - 4:00 pm)
Ownership - Archaeological Survey of India (ASI)



FIGURE 10-8 BODHGAYA MULTIMEDIA MUSEUM

Source: Bihar Tourism

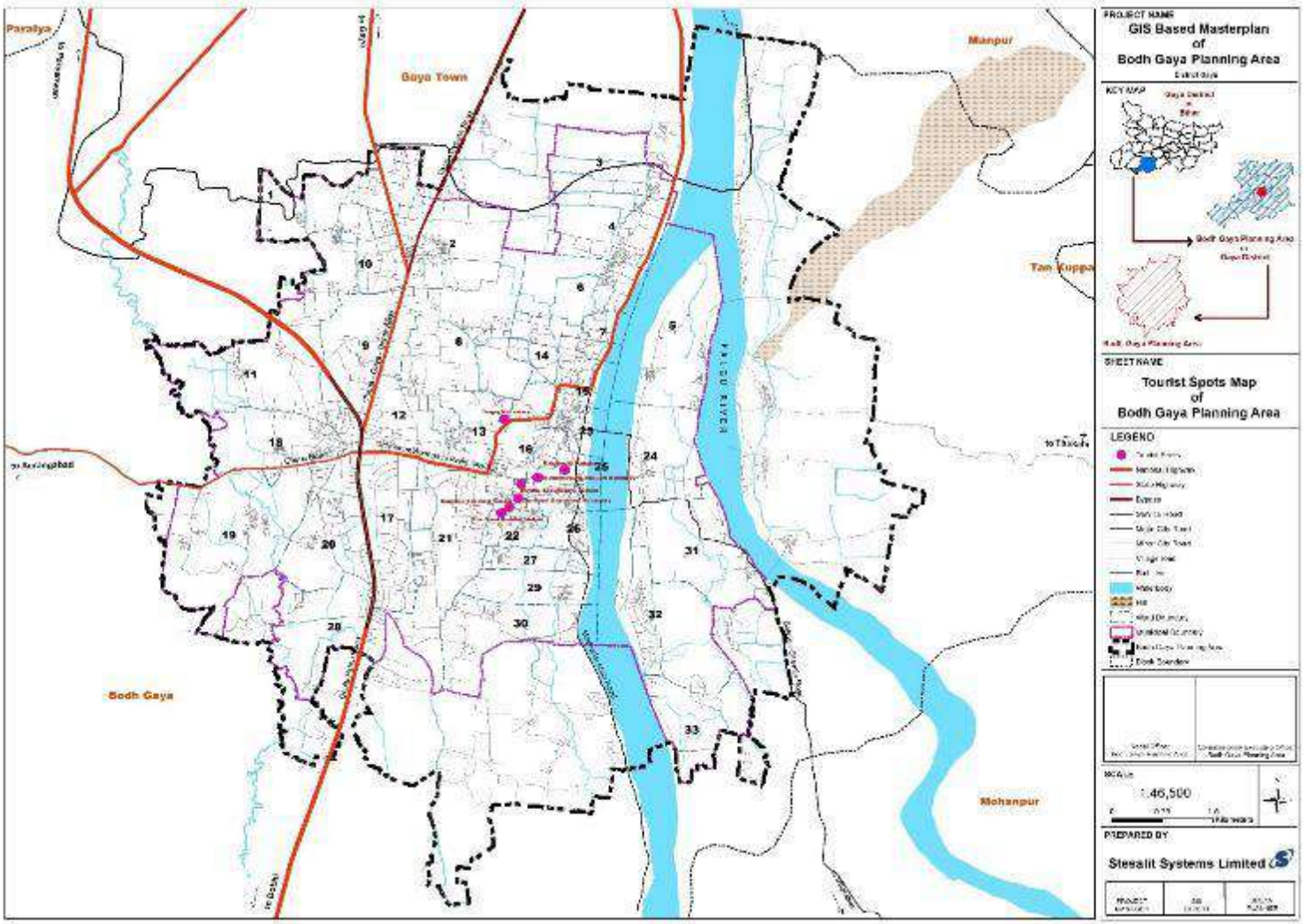
10.5.3.5 THE ARCHAEOLOGICAL MUSEUM

It was established by the Archaeological Survey of India in 1956, and features sculptures, artefacts and antiquities from the 2nd century BC to the 11th century CE, including objects and coins from the Mauryan, Gupta and Mughal periods.
Ticket price - Rs. 10 per person
Daily peak season footfall - 300 to 700 visitors.
Peak hours - Morning (10:00 am - 12:00 pm) and Evening (2:00 pm - 4:00 pm)
Ownership- Archaeological Survey of India (ASI)



FIGURE 10-9 THE ARCHAEOLOGICAL MUSEUM

Source: Bihar Tourism



MAP 10-4 TOURIST TRAFFIC IN BODHGAYA

Source: Stesalit Systems Ltd.

10.6 TOURIST TRAFFIC

The term "tourist traffic" generally denotes the number of tourists or visitors who visit a specific area or destination in a given time frame. The number of tourists visiting a place can be influenced by a variety of factors, such as accessibility, marketing initiatives, weather, events, and economic situations. While a high volume of visitors is often viewed as advantageous to the local economy, it can also present problems including congestion and environmental effects.

Bodhgaya's significance as a Buddhist religious spot has a great impact on the number of tourists that visit the place. The town tends to draw a considerable number of foreign tourists, especially from countries like Japan and Nepal which have a sizeable number of Buddhist population.

10.6.1 ANNUAL INFLOW OF TOURISTS

The tourist inflow to Bodhgaya has exhibited a consistent upward trend from 2012 to 2023, encompassing both domestic and foreign visitors. In 2015, the total tourist inflow reached was 19,88,141 with foreign tourists comprising nearly 12% of the total inflow. However, the data suggests a notable decline in tourist footfall during 2020 and 2021, which can be attributed to the impact of the COVID-19 pandemic. Since then, the number of tourists has rebounded strongly.

In 2023, Bodhgaya had received the highest number of tourists in the last eight years with 19,60,909 domestic tourists and 87,899 foreign tourists. Although the number of domestic visitors had peaked, the number of foreign visitors was still low, making up a mere 4.3% of the total inflow which is very low compared to the 12% recorded in 2015.

TABLE 10-3 TOURIST INFLOW OF BODHGAYA

BODHGAYA			
Year	**Domestic**	**Foreign**	**Total**
2015	17,51,602	2,36,539	19,88,141
2016	16,94,321	2,41,514	19,35,835
2017	17,57,509	2,83,116	20,40,625
2018	14,46,535	2,70,787	17,17,322
2019	13,70,709	2,53,788	16,24,497
2020	3,76,233	91,469	4,67,702
2021	3,51,372	46	3,51,418
2022	11,26,433	23,248	11,49,681
2023	19,60,909	87,899	20,48,808

Source: Tourism Department, Govt. of Bihar

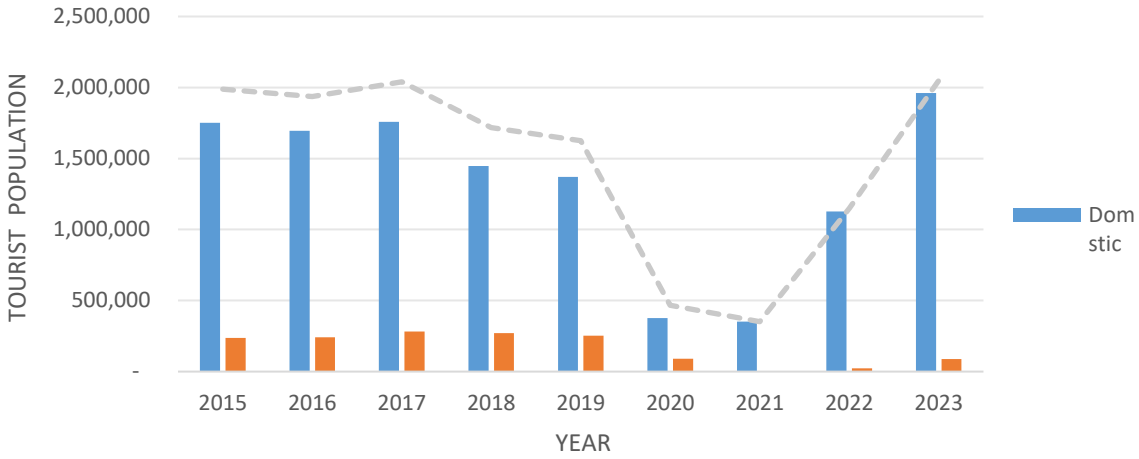


FIGURE 10-10 TOURIST TRAFFIC IN BODHGAYA

Source: Tourism Department, Govt. of Bihar

10.6.2 MONTHLY INFLOW OF TOURISTS

The peak in tourist traffic is mostly seen in the fourth quarter. This rise can be attributed to the numerous Buddhist festivals observed during this time. The Kalchakra Puja is held around January and February. The Mahayana New Year, which marks the beginning of the lunar calendar, is observed in the month of January and is celebrated in Bodhgaya through cultural performances and parades. Nirvana Day, which falls in the month of February, is another prominent day for Buddhists worldwide. The two Bodhi Day celebrations are held in December and January respectively. All these festivals attract a considerable number of international tourists. The Siddhartha Festival, which commemorates the teachings and lessons of Buddha, is organised around October and is a major event that draws the maximum number of domestic tourists. The tourist inflow is particularly low in the summer months from April to September mostly due to high temperatures.

TABLE 10-4 MONTHLY TOURIST INFLOW OF BODHGAYA

PLACE	TOURIST	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	TOTAL
Bodh Gaya	Domestic	1,97,274	1,72,813	1,89,079	1,62,854	1,47,642	88,284	1,00,798	1,05,239	1,18,709	3,11,917	1,39,396	2,26,904	**19,60,909**
	Foreign	7,589	12,750	9,704	3,491	1,234	1,045	1,784	2,581	3,343	7,442	15,198	21,738	**87,899**
	TOTAL	2,04,863	1,85,563	1,98,783	1,66,345	1,48,876	89,329	1,02,582	1,07,820	1,22,052	3,19,359	1,54,594	2,48,642	**20,48,808**

Source: Tourism Department, Govt. of Bihar.

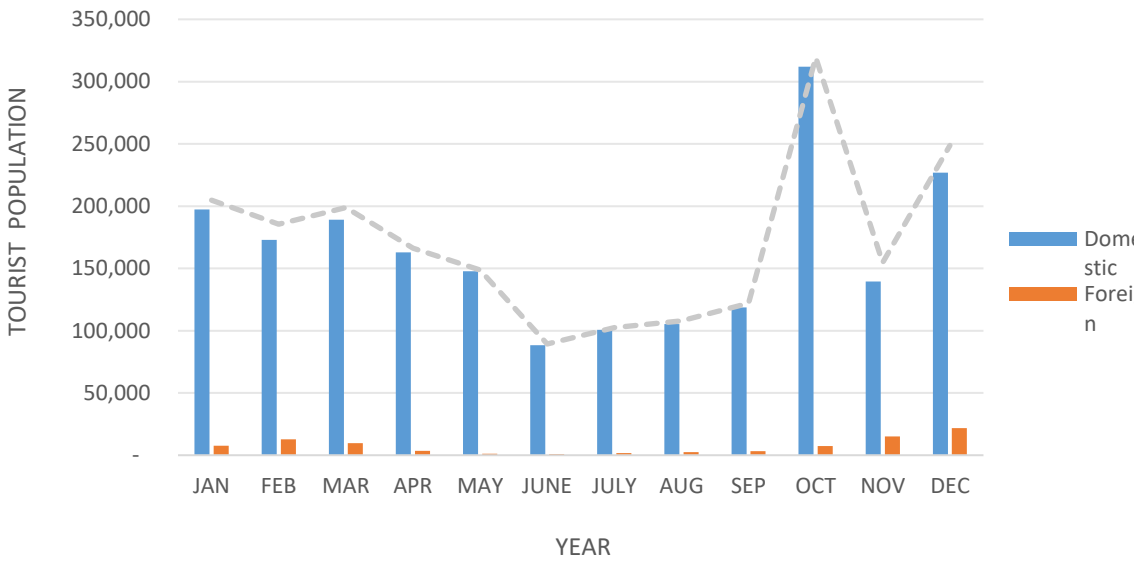


FIGURE 10-11 TOURIST TRAFFIC IN BODHGAYA

Source: Tourism Department, Govt. of Bihar

10.7 TOURISM CONNECTIVITY AND INFRASTRUCTURE

Easy mobility and connectivity are an absolute necessity to foster tourism. In the case of circuit tourism, seamless entry and movement for tourists between various locations encourages them to cover the entire Circuit, and has a major effect on the length of stay and dispersion of travellers across the various locations.

Bodhgaya is the most common entry/exit point to the Buddhist Circuit. While rail and air services bring tourists up to certain key points, full-circuit travellers rely on road transport for large sections of their journeys. Most domestic travellers arrive by road (in personal/rented cars) and rail whereas international tourists utilize a combination of transport modes.

Air: The nearest airports are Gaya (10 km) and Patna (135 km).

Rail: The nearest airport is at Gaya (15 km).

Road: It is well connected with Gaya (17 km), Nalanda (101 km), Rajgir (78 km) and Patna (135 km) via national highways.

10.7.1 AIR

There is a tendency among international travellers to begin and conclude their trips at Bodhgaya because of the close proximity of Gaya airport (Investing in the Buddhist Circuit, World Bank, 2018). Unfortunately, flights to Gaya remain seasonal and the majority of these flights are discontinued during the off-season.

The footfall of foreign tourists and the frequency of flights have increased significantly. The availability of charter flights from Vietnam and other international flights is expected to boost tourist traffic.

10.7.2 RAIL

Rail connectivity can play an important role in improving access through the Circuit. Due to its proximity to Gaya railway station, at least 30 per cent of international visitors to Bodhgaya arrive by train (Investing in the Buddhist Circuit, World Bank, 2018).

10.7.3 ROADS

Road transport is utilized by the tourist to cover large sections of the Buddhist Circuits. The road infrastructure is constantly improving and most state-level roads are in fair, if not good, condition. A planned JICA-financed road improvement project from Rajgir to Bodhgaya will upgrade another state-level road link (Investing in the Buddhist Circuit, World Bank, 2018).

10.8 GOVERNMENT SCHEMES AND INITIATIVES

The great potential for tourism in Bodhgaya remains impeded by issues like poor infrastructure, lack of tourism amenities, and inadequate protection of archaeological sites. These challenges need to be addressed and resolved to realize its potential and attract more tourists both domestic and international. Both the state and the central government have undertaken the following initiatives to reinstate Bodhgaya as a prime tourist destination:

- The Swadesh Darshan Scheme has identified Bodhgaya as one of the "Iconic Tourist Sites" under this scheme, which aims to develop it as a world-class tourist destination.
- The PRASHAD Scheme focuses on developing and identifying pilgrimage sites across India, including Bodhgaya, to enrich the religious tourism experience.
- Since 2004, the central government has been organizing the International Buddhist Conclave (IBC) to showcase Buddhist heritage in India, boost tourism to Buddhist sites in the country, and cultivate friendly ties with countries interested in Buddhism (ORF Special Report, 2019). It is a biennial event organized to promote India, including Bodhgaya, as a Buddhist destination to global markets.
- Dekho Apna Desh Initiative was launched to encourage domestic tourism; this initiative helps develop tourist facilities and infrastructure in destinations like Bodhgaya.
- There are plans made by the Bihar state government to link Bodhgaya with other important Buddhist sites like Rajgir and Vaishali in Bihar to provide a complete religious tourism experience.
- The Ministry of Tourism Govt of India extends financial assistance to States/UTs for the augmentation of tourist infrastructure facilities, production of publicity material and the celebration of certain identified fairs & festivals that are important from the tourist interest point of view. Assistance is provided every year based on specific proposals received from the State/UT Govts., and in respect of the projects that are short-listed for consideration during that particular year.

- The Union Ministry of Tourism plans to develop Bodhgaya a major Buddhist pilgrimage site, as a round-the-year tourist destination and is making efforts to set up required infrastructure and facilities.

Development of infrastructure development and boosting air, rail and road connectivity. The Ministry of Tourism, in collaboration with various central ministries and the State governments of Bihar and Uttar Pradesh, is developing Bodhgaya as a major Buddhist tourism circuit.

10.9 ISSUSES AND POTENTIAL

STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
HISTORICAL AND RELIGIOUS SIGNIFICANCE • The Mahabodhi Temple Complex in Bodhgaya was declared as a UNESCO World Heritage Site in 2002. As the site where Buddha attained enlightenment, it is a globally recognized Buddhist pilgrimage destination. TOURIST CIRCUIT AND TOURISM PROMOTION • The development of a Buddhist Corridor under the Swadesh Darshan Scheme (2016-17) and PRASAD (Pilgrimage Rejuvenation and Spiritual Augmentation Drive, 2014-15), linking Bodhgaya with other sites has enhanced tourist footfall over the years. • International collaborations with Buddhist-	TOURIST TRANSPORT INFRASTRUCTURE • Despite attracting a significant influx of domestic and international tourists, Bodhgaya's transport infrastructure remains inadequate for ensuring seamless accessibility. • The nearest railway station is Gaya Junction, which presents challenges for domestic tourists due to connectivity and public transport service constraints	DEVELOPMENT UNDER TOURISM OR INFRASTRUCTURE SCHEMES • Government initiatives such as AMRUT and Swadesh Darshan continue to support in enhancing Bodhgaya's transport and overall infrastructure, improving accessibility for pilgrims and tourists. • Furthermore, eco and cultural tourism can be fostered by developing sites like the Niranjana River, Dungeshwari Hills, and heritage walks, enriching the visitor experience beyond religious tourism. • Upgrading tourism infrastructure—including transport, accommodation, visitor services, and promotional efforts—to international standards can significantly boost revenue and	ENVIRONMENTAL CHALLENGES • Increased tourist footfall will lead to increased pollution, waste generation and infrastructure service demands. • Unless the city is equipped to tackle the demand, it will pose a serious threat to the environment and quality of life. SEASONAL EMPLOYMENT • Seasonal employment in the tourism industry is highly vulnerable, as job opportunities for guides, street vendors, and other local workers are largely dependent on the peak tourist season from October to March. • Any disruptions during this period—such as economic downturns, travel restrictions, or climate changes—can severely impact livelihoods, leaving many without income for the rest of the year.

majority countries like Japan, Sri Lanka, and Thailand have significantly contributed to heritage conservation and tourism promotion. TOURIST FOOTFALL • It attracts the highest number of foreign tourists in Bihar among the Buddhist circuit sites, mostly from Thailand and Sri Lanka. TOURIST INFRASTRUCTURE • The development of Tourist Infrastructure in terms of accommodation and tourist services has also increased the tourist footfall many folds.		elevate the overall travel experience.	ENCHORACHMENT NEAR HERITAGE STRUCTURE • Encroachment near heritage structures will a significant threat, as the influx of street vendors can lead to overcrowding, obstructed views, and damage to the historical site.

10.10 Recommendation

10.10.1 PROPOSED MAHABODHI CORRIDOR

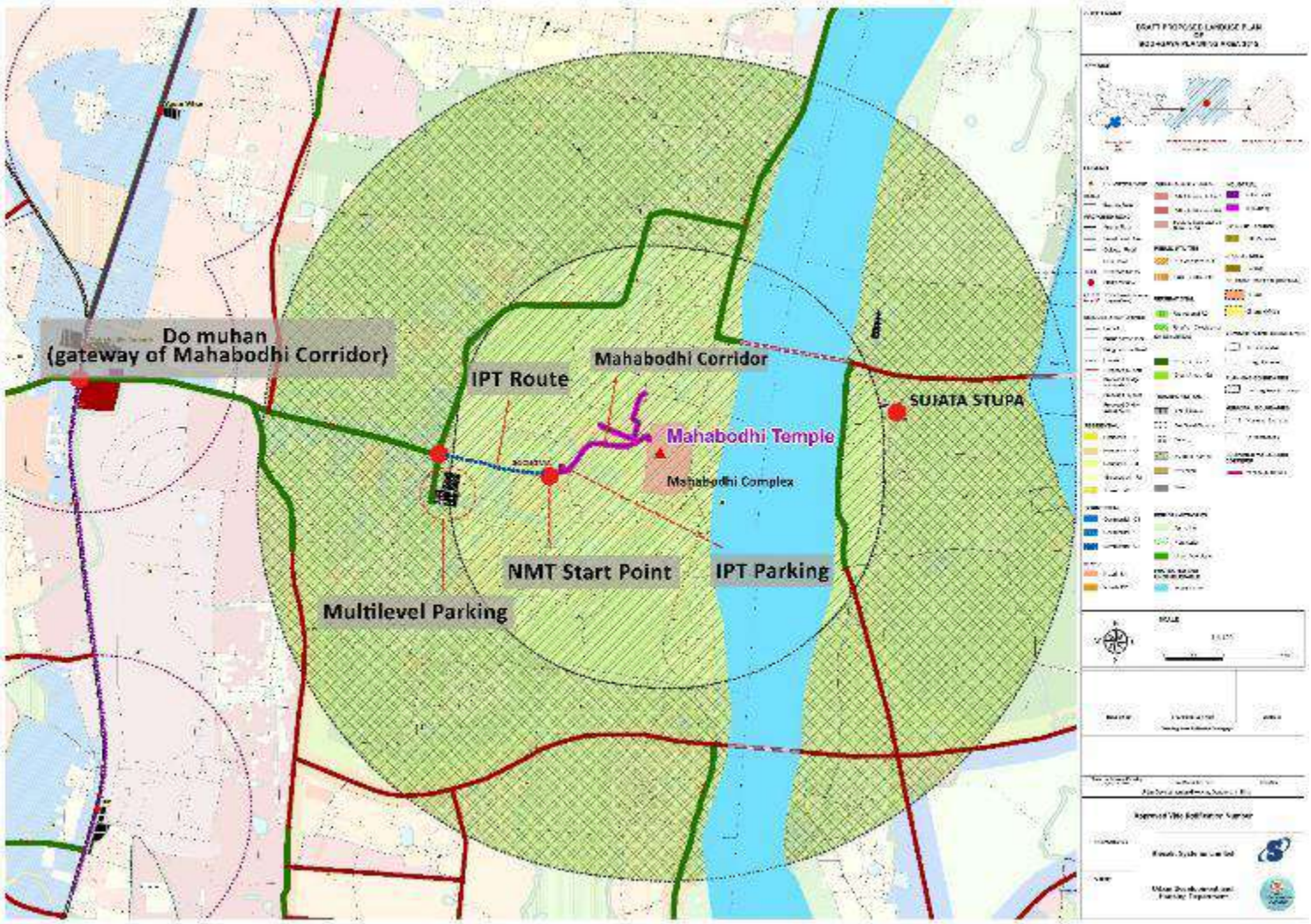
The Proposed Mahabodhi Corridor is envisioned as a dedicated heritage and pedestrian-oriented movement corridor aimed at improving the pilgrim experience, reducing congestion, and preserving the sanctity of the area surrounding the Mahabodhi Temple Complex. Considering the immense international pilgrimage footfall and the cultural sensitivity of the site, a 500-metre controlled mobility corridor is proposed to regulate vehicular access and promote sustainable modes of transport.

Under the proposal, vehicular traffic will be restricted up to Gouri Road, where a Multi-Level Parking (MLP) facility is planned. This parking facility will function as the primary vehicle holding area for private vehicles, tourist buses, and taxis, thereby preventing congestion in the immediate temple precinct and maintaining a controlled environment around the heritage zone.

From Gouri Road to Hotel Embassy, covering a stretch of approximately 600 metres, only Intermediate Public Transport (IPT) such as e-rickshaws and similar low-emission shared mobility options will be permitted. This section of the corridor will act as a transition mobility zone, ensuring efficient last-mile connectivity for pilgrims while limiting the movement of larger motorized vehicles. To support this system, a designated IPT parking and holding area is proposed near Hotel Embassy, enabling organized circulation and passenger transfer.

Beyond Hotel Embassy up to the Mahabodhi Temple Complex, the corridor will be developed as a **Non-Motorized Transport (NMT) zone**, allowing only walking and other non-motorized modes such as bicycles or hand drawn vehicle. This pedestrian-priority stretch is intended to enhance the spiritual and cultural experience of pilgrims approaching the temple, while also improving safety, reducing noise and air pollution, and preserving the serene character of the sacred precinct.

Overall, the Mahabodhi Corridor will function as a structured mobility management system integrating vehicular restriction, organized parking, IPT-based last-mile connectivity, and pedestrian-friendly infrastructure, thereby ensuring sustainable access and protection of the heritage environment around the Mahabodhi Temple Complex.



MAP 10-5: PROPOSED MAHABODHI CORRIDOR

Source: Map Prepared by Stesalit System Ltd.

11 PHYSICAL INFRASTRUCTURE

India has a dynamic yet ever-changing physical infrastructure. Local commuting is typically served by public transportation services such as buses and auto-rickshaws. Healthcare and educational services, while not as numerous as in larger cities, are present and serve the population. However, both urban and rural areas frequently suffer issues with the quality and accessibility of amenities like water supply, sanitation, and electricity. As these towns expand, there is a drive towards infrastructure development, to close gaps and improve general living standards for their citizens. The Water and Sanitation Sustainable Development Goals (SDGs) offer a more expansive agenda: By 2030, all people ought to have equitable access to affordable, suitable sanitation and hygiene, as well as reasonably priced drinking water. Efforts are being made to strengthen the infrastructure, allowing it to support a growing population and meet the increasing needs of urban life.

11.1 WATER SUPPLY

Rapid urbanization exacerbates the imbalance between the demand and supply of water leading to water shortage conditions. One of the most fundamental needs in every civilization is a reliable supply of potable water. Potable water shortage demonstrates sincere and careful management of the water supply. Water supply and management for every household must be handled effectively and efficiently by the concerned Urban Local Body (ULB)s.

11.1.1 SOURCE OF WATER

The Niranjana River, also known as the Falgu River, is the primary source of water for the Bodhgaya Planning Area and is vital for the region's survival. However, many people still rely on other sources of water. According to the 2011 Census of India, only 0.51% of the total rural households have access to treated tap water, indicating that only a small percentage of the population has access to an organized water supply system. The majority of households 94.17% depend on hand pumps for their daily water needs. This reflects a level of infrastructural development in certain locations for delivering treated or managed water directly to households.

In the Bodhgaya Nagar Parishad area, 2.10% of urban households have access to treated sources of water. Approximately 91.38% of the total urban households rely on water obtained from handpumps.

TABLE 11-1 SOURCES OF DRINKING WATER IN BODHGAYA PLANNING AREA, CENSUS OF INDIA,2011

Area	Total Households	Tap water from a treated source	Tap water from un-treated source	Covered well	Un-covered well	Handpump	Tubewell/ Borehole	Spring	River/ Canal	Tank/ Pond/ Lake	Other sources
Bodhgaya Nagar Parishad	**12101**	253	205	38	17	11058	428	0	15	0	87
		2.10%	1.69%	0.31%	0.14%	91.38%	3.54%	0.00%	0.12%	0.00%	0.72%
Rural Area (19 villages)	**4677**	25	33	60	85	4404	7	0	0	7	56
		0.51%	0.70%	1.29%	1.82%	94.17%	0.16%	0.00%	0.01%	0.15%	1.19%
Bodhgaya Planning Area	**16778**	**278**	**238**	**98**	**102**	**15462**	**435**	**0**	**15**	**7**	**143**

Source: Census of India, 2011

In rural areas, around 1.29% of households, which equals approximately 60 homes, still use covered wells as their primary source of water. This reliance on covered wells may be due to traditional practices or lack of access to piped water. Additionally, 0.16% of households use tubewells, which shows that decentralized water sourcing is prevalent in these areas.

11.1.2 LOCATION OF DRINKING WATER SOURCE

By the Census of India, 2011, a household's location is classified as "near the premises" if it is less than 100 meters away, and as "away from the premise" if it is more than 100 meters away.

In rural areas, 41.74% of households (1952 homes) have water sources within their premises, while 49.69% (2324 households) have water sources near their premises. Approximately 8.57% (401 homes) of rural households have to travel a distance to access water. In the Bodhgaya Nagar Parishad area, 48.57% of households have water supply connections within their premises. However, 13.30% (approximately 1609 homes) have to access water from a distance away.

TABLE 11-2 LOCATION OF DRINKING WATER SOURCE, CENSUS OF INDIA,2011

Area	Total Households	Within premises	Near premises	Away
Bodhgaya Nagar Parishad	**12101**	5878	4614	1609
		48.57%	38.13%	13.30%
Rural Area (19 villages)	**4677**	1952	2324	401
		41.74%	49.69%	8.57%
Bodhgaya Planning Area (19 Villages+ 1 Nagar Parishad)	**16778**	7830	6938	2010

Source: Census of India, 2011

11.1.3 EXISTING WATER SUPPLY SYSTEM

Water supply refers to providing clean water to individuals, communities, or cities. This is done through a comprehensive water supply scheme that includes water collection, treatment, storage, and distribution. The process involves various components such as intake wells, borewells, water treatment plants (WTPs), underground storage reservoirs (UGSRs), overhead reservoirs (OHRs), pumps, motors, and a network of pipes. Urban local bodies (ULBs), government organizations, community arrangements, or individuals can be responsible for providing water supply services. Currently there are 5399 Tap connections in Bodhgaya Nagar parishad which are managed by BUIDCO. Whereas the total households in Bodhgaya Nagar parishad is 12101 which shows there is significant gap in the tap water connections and this needs to be Prioritized.

TABLE 11-3 EXISTING TAP WATER CONNECTIONS IN BODHGAYA NAGAR PARISHAD

S. No	Area Name	Tap Connection	Present existence
1	Suryapura	98	Water supply is completely disrupted. Main pipeline is installing.
2	Sewdhar Bigha	174	
3	Amwa	102	60% Work done
4	Amwa	178	Water connections have not been made in 50-60 houses of Mahadalit Tola.
5	Newatapur and Muaniya	286	Pressure loss due to leakage
6	Dahriya bigha and Rajapur	633	Water supply is being done regularly.

S. No	Area Name	Tap Connection	Present existence
7	Sonu Bigha	274	Work is done and work is going according to Rules
8	Durgapur, Hariharpur and Janpur	311	The pipeline is being repaired. Water supply work is being done regularly in all the houses. But due to low pressure, water is not being supplied to about 20 percent of the houses.
9	Baijubigha, Bhagwanpur, and Sujata Nagar mahatola	350	Connection has not been given in Mahadalit Tola and water supply is being provided to 90% of the houses in Bhagwanpur. Connections have been given to some houses in Baijubigh but water is not available. Transformer has been installed on the pipeline. Due to which water supply is disrupted.
10	Bapunagar	145	Is completely disrupted. No work has been done there.
11	Rampur	126	Water supply is being done regularly in 50 percent houses. Work is being done on rest.
12	Nutaridih	325	Water is available in only 80 percent of the houses. There is no water supply in the remaining houses due to low pressure.
13	Nutaridih	326	The connection is complete but water is not available due to low pressure.
14	Pachhati	275	Water supply is being done regularly
15	Pachhati	296	Water supply is being done regularly
16	Miyabigha	209	Water supply is being done regularly
17	Mastipur	774	Water is being supplied to 80 percent of the houses only. Water is not being supplied due to low pressure in Mahadalit Tola.
18	Bazar and Godam Road	142	In South water supply work is done from Mocharim Nala in 15 to 20 minutes and distribution pipe has not been laid in Sadiya Ghat locality.
19	Puranitaridih	375	Water supply is being done regularly in Ural and Tikabigha and work of laying pipeline is being done in Old Taridih.

Source: Water Supply Department, BUIDCO

As per the Jal jeevan mission in rural areas the data suggest that the rural areas in Bodhgaya planning area have 100% Household Tap connection.

TABLE 11-4 EXISTING WATER SUPPLY DETAILS OF BODHGAYA RURAL

S. No	Village Name	Total HH	Tap Connection Status
1	Parsawan	138	100%
2	Turi Khurd	129	100%
3	Pathalgarh	153	100%
4	Sakhwara	680	100%
5	Babhni	245	100%
6	Shivrajpur	266	100%
7	Narkatiya	375	100%

S. No	Village Name	Total HH	Tap Connection Status
8	Bataspur	289	100%
9	Chhanchh	337	100%
10	Moratal	345	100%
11	Mankosi	536	100%
12	Parewa	356	100%
13	Khiriyawan	440	100%
14	Bazidpur	58	100%
15	Lohara	58	100%
16	Dubahal(100%)	219	100%
17	Parariya(27%)	76	100%
18	Mocharim(36%)	722	100%
19	Dhandhawa (0%)	0	

Source: Jal Jeevan Mission Rural, Bihar

11.1.3.1 RESERVOIRS

The Overhead Reservoir (OHR) is a water storage tank that holds a specific amount of water. This collected water is used for various domestic and commercial purposes. There are total of 31 overhead water tanks in the Bodhgaya Planning Area. The details of the OHRs are listed below. 47 Handpumps all of them are in Rural areas.

TABLE 11-5 EXISTING OVERHEAD TANKS IN BODHGAYA PLANNING AREA

S. No	Name	Number
1	Bodhgaya Nagar Parishad	15
2	Rural areas 19 Villages	16
	Bodhgaya Planning Area	**31**

Source: Bodhgaya Nagar Parishad

11.1.3.2 TREATMENT PLANTS

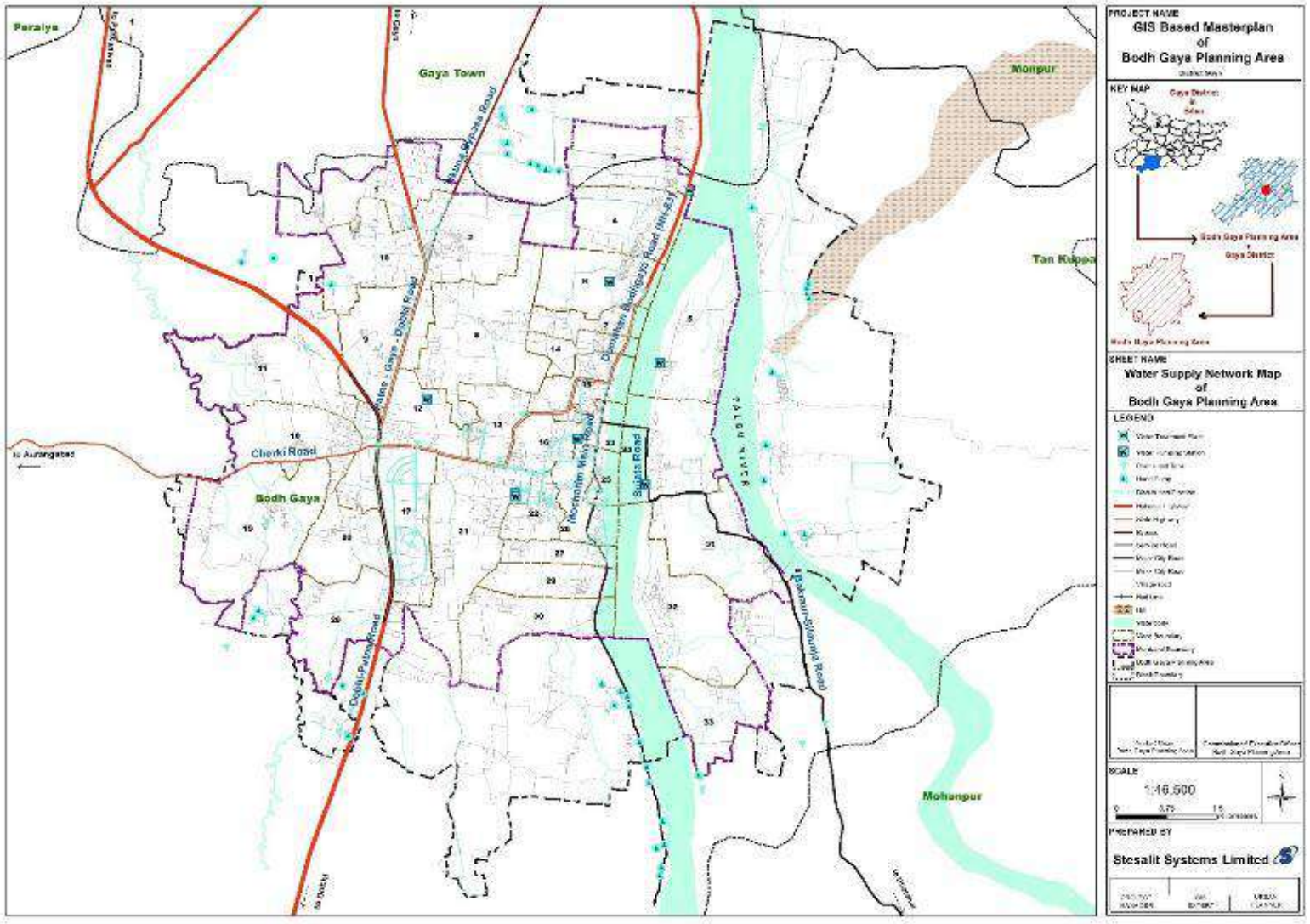
A water treatment plant (WTP) is an essential component of the public water supply system. It treats water to enhance its physical, chemical, or biological quality. Currently, there is 1 water treatment plant is available in the Bodhgaya Planning area. Located at ward 4. The water that is supplied through the pipeline undergoes chlorine treatment.

11.1.3.3 PUMPING FACILITIES

According to the data collected from the Bodhgaya Nagar Parishad, currently, there are 6 pumping stations available in wards 5,6,12,16,21 and 24.

11.1.3.4 SITUATION ANALYSIS

It is difficult to ensure sufficient clean and potable water for the rising population while maintaining water quality in the planning area. Uneven distribution and occasional leaks in the ageing pipeline network are challenges that need to be addressed.



MAP 11-1 WATER SUPPLY NETWORK MAP

Source: Stesalit Systems Ltd.

11.2 SEWERAGE AND SANITATION

Nowadays, the social advancement of a city, town or area may be gauged by its sanitation. In urban areas, unregulated growth, urban sprawl, rapidly increasing population, and inadequate or badly designed and broken sewage treatment systems all contribute to the problem of untreated sewage being disposed of into rivers or nearest water bodies. Significant effects of this practice include harm to human health, aquatic systems in rivers, ecosystems etc. Because wastewater treatment in urban areas is now far below acceptable standards, there is an urgent need to improve it. Better sanitation enhances public health, lowers child mortality and morbidity, and benefits an area's ecology, economy, and water quality.

11.2.1 TOILET FACILITY

One of the development goals for India is to make sure that everyone has access to clean sanitation by the year 2030. It is possible that doing so can assure improved outcomes for both physical and mental health. Therefore, it becomes pertinent to understand the toilet facilities available to the households in the Bodhgaya Planning Area.

In rural areas, only 12.10% of households or approximately 566 homes have toilet facilities within the premises. Out of these, 0.41% of the homes (19 households) are equipped with a piped sewer network, and 8.29% or 388 homes have septic tank facilities. In the Bodhgaya Nagar Parishad Area, 14.93% of households i.e. 1807 homes have individual household latrine facilities. Out of these, 2.80% of the homes (339 homes) are equipped with a piped sewer system network, and 9.78% or 1183 households have septic tank facilities.

TABLE 11-6 AVAILABILITY OF TOILET FACILITY IN BODHGAYA PLANNING AREA, CENSUS OF INDIA,2011

Area	Number of Households	Percentage of households having latrine facility within the premises	Flush/pour flush latrine connected to			Pit latrine		Night soil disposed into open drain	Service Latrine		Percentage of households not having latrine facility within the premises
			Piped sewer system	Septic tank	Other system	With slab/ ventilated improved pit	Without slab/ open pit		Night soil removed by human	Night soil serviced by animal	
Bodhgaya Nagar Parishad	**12101**	1807	339	1183	73	136	40	18	0	18	10294
		14.93%	2.80%	9.78%	0.60%	1.12%	0.33%	0.15%	0.00%	0.15%	85.07%
Rural Area (19 villages)	**4677**	566	19	388	26	111	8	10	0	4	4111
		12.10%	0.41%	8.29%	0.55%	2.37%	0.17%	0.22%	0.00%	0.09%	87.90%
Bodhgaya Planning Area (19 Villages+ 1 Nagar Parishad)	**16778**	2373	358	1571	99	247	48	28	0	22	14405

Source: Census of India, 2011

11.2.1.1 EXISTING INDIVIDUAL HOUSEHOLD LATRINE (IHHL) FACILITIES IN BODHGAYA PLANNING AREA

Based on the secondary data obtained from the Office of Bodhgaya Nagar Parishad, it has been observed that approximately one-third of the total households in the region are equipped with individual toilets that provide adequate sanitation facilities. At present, the total number of individual toilets in the area stands at 1,629. It is noteworthy that the majority of these toilets are connected to septic tanks, which underscores the prevalent mode of sewage management within the community. This data highlights both the progress made in sanitation infrastructure and the need for continued efforts to expand access to such facilities.

TABLE 11-7 WARD-WISE AVAILABILITY OF IHHL FACILITIES IN THE BODHGAYA PLANNING AREA

Wards no.	Number of Individual Toilet
1	100
2	81
3	227
4	56
5	20
6	158
7	77
8	213
9	89
10	50
11	90
13	174
14	41
16	29
17	130
19	94
Total	**1629**

Source: Bodhgaya Nagar Parishad Office

11.2.1.2 PUBLIC TOILET FACILITY IN BODHGAYA PLANNING AREA

To abolish open defecation nationwide and equip every home with a toilet that has access to water and sewage, Prime Minister Shri Narendra Modi announced the Swachh Bharat Mission (Gramin) in 2014. The different sanitation components are Individual Household Toilets (IHHL), Public Toilets (PT), Community Toilets (CT), and Open defecation-free areas.

According to the Census of India, 2011, In the rural area, 79.24% of the total households do not have individual household latrine facilities. Out of the total households not having toilet facilities within their premises, 0.31% of the total households i.e. 20 homes use public latrine facilities and the rest defecate in the open. This indicates poor planning of the drainage and sewage systems in rural areas, particularly inside of homes.

TABLE 11-8 AVAILABILITY OF PUBLIC LATRINE FACILITY IN BODHGAYA PLANNING AREA, CENSUS OF INDIA,2011

Area	Number of households not having latrine facility within the premises	Alternative source	
		Public latrine	Open
Bodhgaya Nagar Parishad	68.89%	1.87%	67.02%
	8336	226	8110
Rural Area (19 villages)	79.24%	0.31%	78.93%
	5103	20	5083
Bodhgaya Planning Area (19 Villages+ 1 Nagar Parishad)	**13439**	**246**	**13192**

Source: Census of India, 2011

In the Bodhgaya Nagar Parishad Area, 68.89% of the total households do not have a latrine facility within their premises. Out of this, only 1.87% of the total households i.e. 226 homes use public latrines and the rest defecate in the open. The data points to the fact that there is a lack of improved public toilet facilities in Bodhgaya Planning Area thus resulting in the increased practice of open defecation.

11.2.1.3 EXISTING PUBLIC AND COMMUNITY TOILET FACILITIES AVAILABLE IN BODHGAYA PLANNING AREA

Community toilets are shared sanitation facilities designed to serve a specific group of residents or an entire settlement. These facilities are predominantly found in low-income areas, informal settlements, or slums where space constraints and limited land availability make the construction of individual household toilets impractical. Community toilets are essential in such contexts, providing basic sanitation to residents who might otherwise lack access to proper facilities.

In contrast, public toilets are sanitation facilities intended for the transient population in public areas such as bus stands, markets, and other communal spaces. These toilets cater to the needs of individuals who are passing through or temporarily occupying public spaces, rather than being associated with any specific residential group. Public toilets play a crucial role in maintaining hygiene and sanitation standards in places frequented by large numbers of people, ensuring that everyone, regardless of their residential status, has access to proper sanitation.

TABLE 11-9 DETAILS OF PUBLIC TOILETS IN BODHGAYA

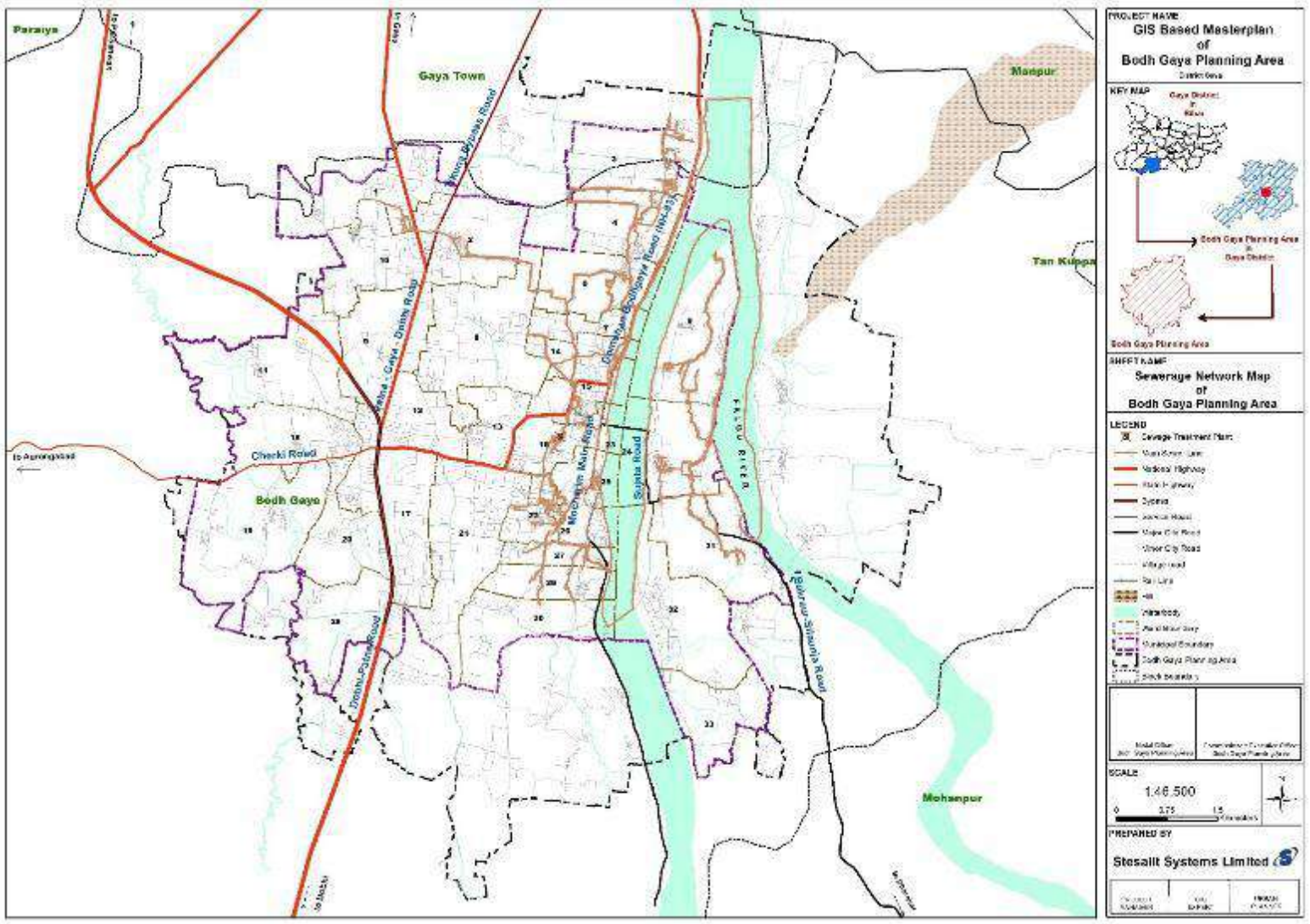
Sl. No	Location	Wards no	Type of Monetization
1	Tempo Stand Near Kabristan	18	Contract
2	Bus Stand, Birla Dharmshala	16	Contract
3	Node-01	17	Contract
4	Bus Stand Node-1	17	User Charges
5	Bakraur More	14	Contract
6	Opp Jay Prakash Udyaan	17	Contract
7	B.T.M.C	18	Contract

Source: Bodhgaya Municipality, 2024

TABLE 11-10 DETAILS OF COMMUNITY TOILETS FACILITIES IN BODHGAYA

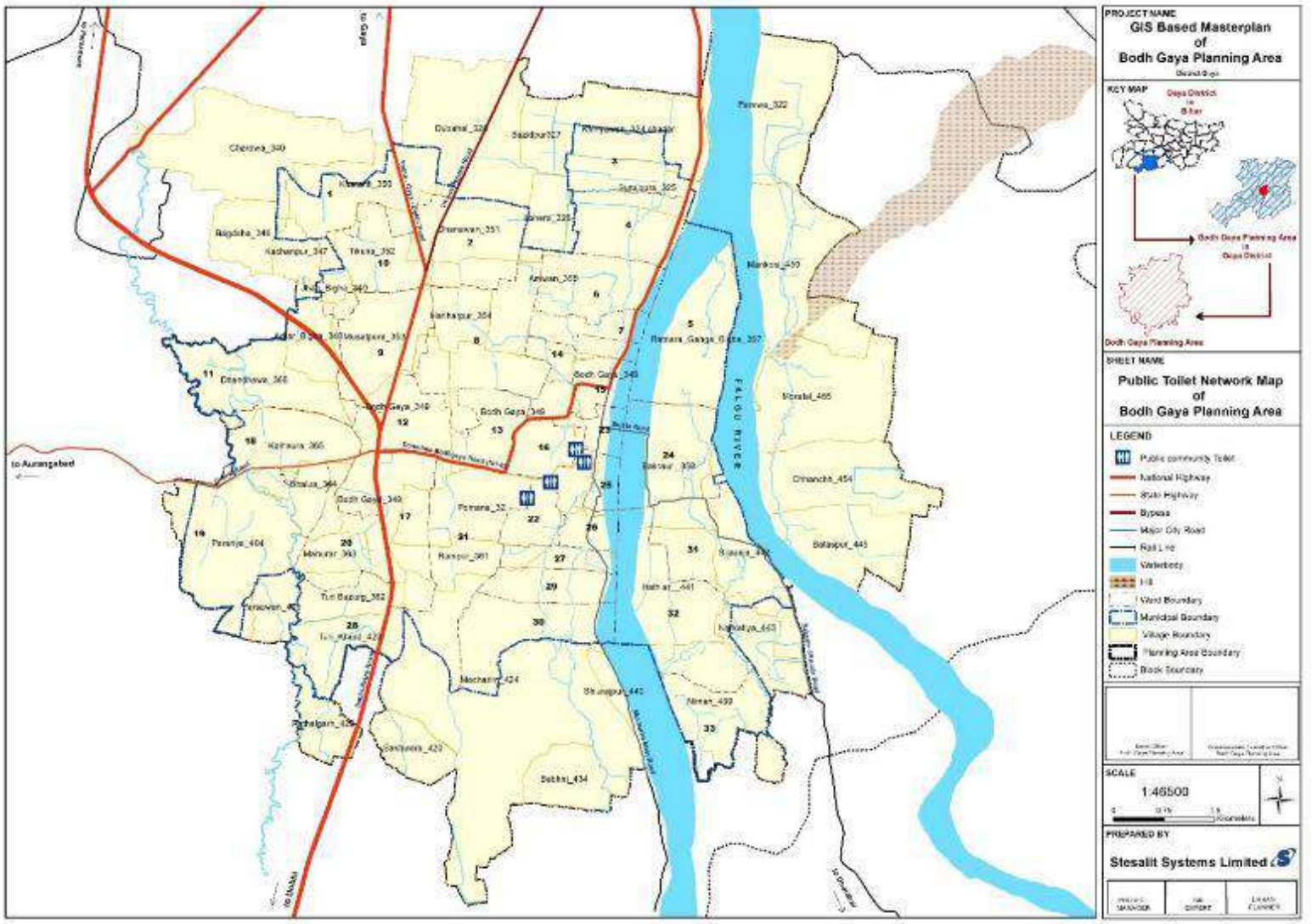
Sl. No	Location	Wards no
1	BELWATAND	1
2	NEAR PANI TANKI AMWAA	4
3	NEWTAPUR	5
4	MAUNIYA	5
5	UPADHYAAY BIGAHA	6
6	RAJAPUR	6
7	JANPUR	8
8	DURGA PUR	8
9	RAMPUR BEHIND THE UNIVERSITY CAMPUS	11
10	BAPU NAGAR MAHADALIT TOLA	10
11	BAPUNAGAR NEAR AARA MACHINE	10
12	VIETNAM TEMPLE	13
13	PROJECT KANYA SCHOOL	14
14	NEAR MANDAL JEE HOUSE MIYA BIGHA	16
15	NEAR PULIYA MIYA BIGHA	16
16	PIPARPANTI MAHADALIT TOLA KE PAAS	17
17	MASTIPUR NEAR MOCHARIM PAN	17
18	SIDHIYA GHAT	18
19	TIKABIGHA MAHADALIT TOLA	19
20	URAIL MAHADALIT TOLA	19
21	BUS STAND, BIRLA DHARMSHALA	16
22	80 FEET ROAD	17
23	PRIMARY HEALTH CENTRE	18

Source: Bodhgaya Municipality, 2024



MAP 11-2 SEWERAGE NETWORK MAP

Source: Stesalit Systems Ltd.



MAP 11-3 PUBLIC TOILET LOCATION MAP

Source: Stesalit Systems Ltd.

11.3 DRAINAGE

The environmental state of a city or town is impacted by the quality of its physical infrastructure, particularly the sewer system, which calls for careful planning, building, and maintenance. The system that moves sewage via a sewer network and additional pumping apparatus is called a sewerage system. Sewage is transported to the sewage treatment facility by a network of pipes, manholes, chambers, a sewage pumping station, and pumping equipment. It is essential to construct a suitable sewage infrastructure with efficient sewage treatment to encourage balanced and harmonic development.

In the Bodhgaya Planning Area, no integrated sewerage system has been established. There is no drainage system beneath the surface. As a result, the wastewater does not undergo any additional treatment. The area's surface drainage system is not entirely reliable. However, the lack of a well-established sewerage system prevents safe sanitation facilities from covering the slum areas.

Approximately 42.86% of the total households in rural areas lack drainage systems. Merely 424 households are comprised of a closed drainage system. The majority of the area, approximately 48.07% of the total rural households are served by an open drainage system. In the Bodhgaya Nagar Parishad area, 44.02% of the total households do not have any drainage network and 11.25% of the total households are comprised of a covered drainage system. 44.73% of the total households i.e. 5413 homes in the Nagar parishad area are served by an open drainage system.

TABLE 11-11 CONNECTION OF WASTEWATER OUTLET, CENSUS OF INDIA,2011

Area	Closed Drainage	Open Drainage	No Drainage
Bodhgaya Nagar Parishad	1361	5413	5327
	11.25%	44.73%	44.02%
Rural Area (19 villages)	424	2248	2005
	9.07%	48.07%	42.86%
Bodhgaya Planning Area (19 Villages+ 1 Nagar Parishad)	1785	7661	7332

Source: Census of India, 2011

11.3.1 EXISTING DRAINAGE FACILITIES AVAILABLE IN BODHGAYA PLANNING AREA

According to secondary data obtained from the Solid Waste Management Department of Bodhgaya Nagar Parishad, network design and drawing have been approved for Zone 1,2,5 and 6.230 manhole construction has been undertaken.6 IPS and STP have already been completed.

TABLE 11-12 DETAILS OF RCC HUME PIPE LAYING IN DIFFERENT ZONES

Zone	Proposed (Length in m)	Completed (Length in m)
1	4855	3550
2	23323	3907
5	1929	600

Zone	Proposed (Length in m)	Completed (Length in m)
6	10391	1991

Source: Urban Infrastructure Development Corporation Ltd., Bihar

11.4 SOLID WASTE MANAGEMENT

Solid waste management (SWM) is essential for maintaining living standards and ensuring sanitation and health in urban areas. According to Swachh Bharat Mission guidelines, SWM involves a systematic process including waste segregation, storage, collection, transportation, secondary segregation, resource recovery, processing, treatment, and final disposal of residual waste.

11.4.1 EXISTING SCENARIO

With the accelerating pace of urbanization and the evolving nature of lifestyle and dietary practices, there has been a significant and rapid increase in the volume of municipal solid waste (MSW). Municipal solid waste encompasses a broad array of waste materials, including household refuse, construction and demolition debris, sanitation residues, street sweepings, commercial waste, and institutional waste, among others. Presently, the total generation of solid waste is estimated to be approximately 22 tons per day (TPD). However, the existing capacity of the solid waste processing facility stands at around 7 tons per day. This disparity highlights a pressing need for enhanced waste management infrastructure to accommodate the growing demand and to mitigate potential environmental and public health concerns.

11.4.2 GENERATION AND COLLECTION SYSTEM

The Urban Local Body (ULB) offers a comprehensive door-to-door collection service for the daily retrieval of domestic waste. This waste is meticulously gathered by manual means, utilizing tippers and tricycles to ensure efficiency in the collection process. During the course of these door-to-door pickups, approximately 80-90% of the waste is effectively segregated at the source. Both dry and wet waste streams are collected separately to maintain the integrity of the waste management process. The collected waste is then transported to the sanitary landfill site situated in Rajapur, Ward Number 06, where it is appropriately processed and disposed of. Six bulk garbage generators have been identified by the Bodhgaya Nagar Parishad authority.

TABLE 11-13 DETAILS OF BULK WASTE GENERATORS

Ward No.	Name of Bulk Garbage Generators (>100kgs per day)	Type of Bulk Garbage Generator	Whether, On-site composting is being practiced?	Exact Location of on-site composting	Name of the Person in charge of the on-site composting facility	Contact details of the Person in charge. (Mobile + Office)	Whether the Bulk Generator has IEC Messaging (Amitabh Bachchan - Composting) of MoHUA in place?
18	MAHABODHI MAHAVIHAR	Religious place	Yes	MAHABODHI MAHAVIHAR	DINANATH BHANTE	9934351615	Yes
8	MAHABODHI HOTEL	Hotels	Yes	HOTEL PREMISES	NA	NA	Yes
10	Hotel Delta	Hotels	Yes	HOTEL PREMISES	NA	NA	Yes
11	Hotel Royal Residency	Hotels	Yes	BESIDES HOTEL PREMISES	NA	NA	Yes
17	Royal Wat Thai	Religious place	No	NA	NA	NA	Yes
11	Root Institute for Wisdom & Culture	Religious place	No	NA	NA	NA	Yes

Source: Solid Waste Management, Bodhgaya Nagar Parishad

11.4.3 TRANSPORTATION OF SOLID WASTE

The Bodhgaya Nagar Parishad is presently well-equipped with adequate facilities for the transportation of waste. The system relies on the use of bulk waste vehicles, effectively managing the collection and transport of trash without the need for transfer stations. In areas characterized by narrow lanes, tricycles are employed to facilitate waste collection, ensuring accessibility in confined spaces. In contrast, broader lanes see the utilization of Tippers, which are more suited for these environments. Furthermore, the Urban Local Body (ULB) supplements its waste collection operations with the deployment of e-rickshaws, mini tipper trucks, JCBs, and other equipment on a daily basis, ensuring comprehensive and efficient waste management across the municipality.

TABLE 11-14 SUMMARY OF WASTE COLLECTION VEHICLES

Type of Vehicles	Numbers
e-Rickshaw for waste collection	5
Tipper in ULB waste collection	3
Tractor for waste collection	3
Refuse Compactor	NA
dumper placers	3
Number of Hand Carts	125
Number of Mini tipper trucks	2
Number of Tipper trucks	10
Number of Back hoe (JCB)	1
secondary collection bins in your ULB	225

Source: Solid Waste Management, Bodhgaya Nagar Parishad

11.4.4 WASTE DISPOSAL AND TREATMENT

For the treatment and processing of wet waste, the waste was systematically deposited in compost pits. According to secondary data obtained from the Solid Waste Management Department of Bodhgaya Nagar Parishad, the facility is capable of processing a total of 7 tonnes of waste per day. The wet waste was methodically layered within the pits to ensure optimal composting, thereby maximizing the production of high-quality fertilizers. The entire operation is conducted within a scientifically managed sanitary landfill, which encompasses an area of approximately 300 square meters.

11.5 POWER

To ensure the smooth operation of any city, town, or area, power supply plays a vital role in physical infrastructure. All other infrastructural facilities, including the market, business space, sewage system, and water supply, function well and in order only if there is adequate electricity supply. The power services include the production, transmission, and distribution of electricity to a town, city or a particular area. A town or city cannot develop better without sufficient electrical infrastructure.

11.5.1 POWER SUPPLY IN BODHGAYA (AS PER 2011 CENSUS)

In rural households, the majority of the homes i.e. 79.96% of the total households use kerosene as a source of power. Only 19.17% of the total households have access to electricity. In the Bodhgaya Nagar Parishad area, 49.78% of the total households have electricity and 48.67% of the households use kerosene as a source of power.

TABLE 11-15 MAIN SOURCE OF LIGHTING IN BODHGAYA PLANNING AREA, CENSUS OF INDIA, 2011

Area	Total Households	Electricity	Kerosene	Solar energy	Other oil	Any other	No lighting
Bodhgaya Nagar Parishad	12,101	6023	5890	21	99	63	5
		49.78%	48.67%	0.17%	0.82%	0.52%	0.04%
Rural Area (19 villages)	4677	896	3740	25	9	7	0
		19.17%	79.96%	0.54%	0.19%	0.14%	0.00%
Bodhgaya Planning Area (19 Villages+ 1 Nagar Parishad)	**16778**	6919	9630	46	108	70	5

Source: Census of India, 2011

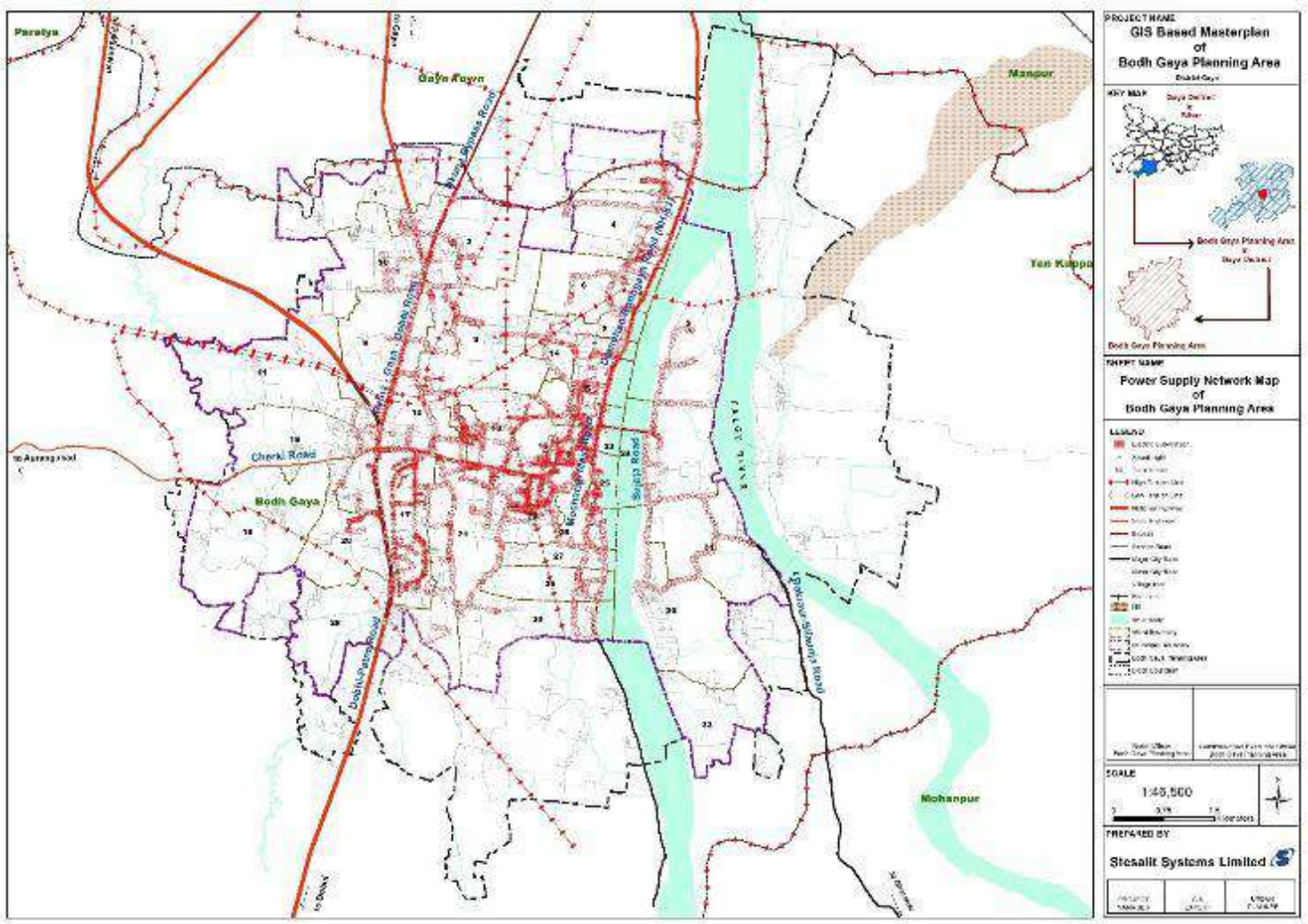
11.5.1.1 EXISTING POWER SUPPLY SYSTEM IN BODHGAYA

In the Bodhgaya Planning area, there are a total of 11,881 active consumers in urban regions and 20,939 in rural regions. Among these active consumers, 96.92% of those in urban areas and 95.91% of those in rural areas have been equipped with metered connections. The overall connected electrical load provided to these consumers amounts to 23,664.58 kW in urban areas and 9,460.45 kW in rural areas, respectively. This indicates a significant level of metering coverage across both urban and rural sectors, ensuring accurate measurement and billing of electricity consumption.

TABLE 11-16 DETAILS OF EXISTING ELECTRICITY CONNECTIONS IN BODHGAYA PLANNING AREA

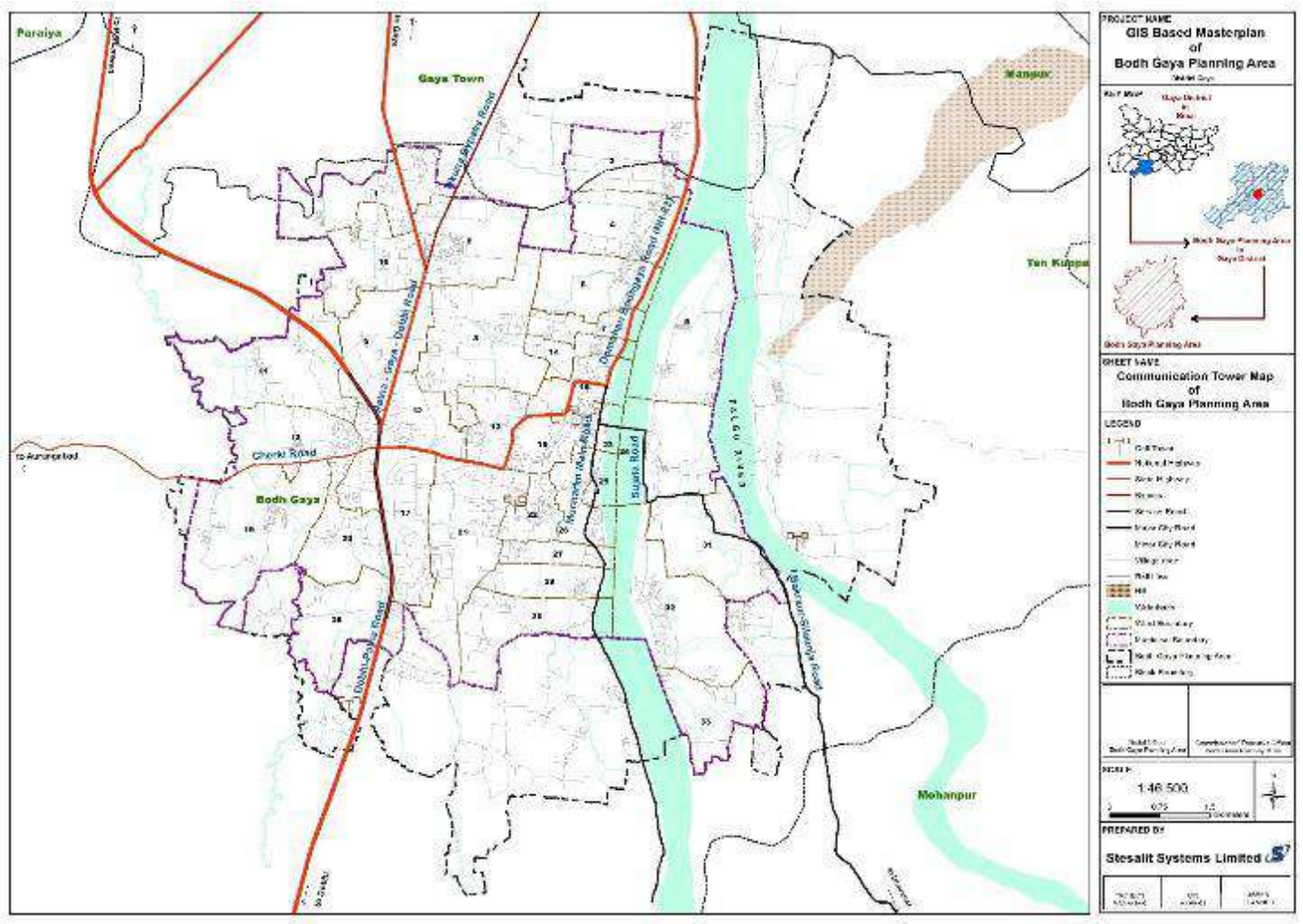
Area Name	Total Number of Active Consumers	Total Number of Metered Consumers	Percentage of Metering Achieved	Sum of connected load (in kw)
Bodhgaya (Urban)	11881	11516	96.92%	23664.58
Bodhgaya (Rural)	20939	20084	95.91%	9460.45

Source: Electricity Department, Bodhgaya,2023



MAP 11-4 POWER SUPPLY NETWORK MAP

Source: Stesalit Systems Ltd.



MAP 11-5 COMMUNICATION NETWORK MAP

Source: Stesalit Systems Ltd

11.5.2 COOKING FUEL

Rural households in India use traditional fuels like firewood, dung, crop residue, and coal or modern fuels like liquefied petroleum gas (LPG) and kerosene, or a combination of both traditional and modern fuels. The Indian government has prioritized increasing the use of clean cooking fuels to improve public health According to the India Residential Energy Survey 2020 report, almost 80% of rural households have access to either LPG or PNG. Despite that, two-thirds of rural households in India still use firewood for cooking.

Various types of fuels, ranging from cow dung cake to crop residue, and firewood are used by the people of Bodhgaya Planning Area for cooking. Though in less percentage biogas is also used as a fuel for cooking. In rural areas, 51% of the total households use cow dung cakes as a source of fuel. Merely,1.44% of the total households use LPG/PNG as fuel for cooking purposes. In urban areas, 6.61% of the total households use LPG/PNG. 22.46% of the total households or approximately 2719 homes use firewood as a source of fuel.

TABLE 11-17 TYPES OF FUEL USED FOR COOKING, CENSUS OF INDIA,2011

Area	Total House holds	Fire-wood	Crop residue	Cow dung cake	Coal, Lignite, Charcoal	Kerosene	LPG/PNG	Electricity	Biogas	Any other	No cooking
Bodhgaya Nagar Parishad	12,101	2719	883	7176	139	8	800	5	12	317	42
		22.46 %	7.30%	59.30 %	1.15 %	0.07 %	6.61%	0.04 %	0.10 %	2.62 %	0.35 %
Rural Area (19 villages)	4,677	707	1284	2385	77	6	67	7	140	2	2
		15.10 %	27.45 %	51.00 %	1.64 %	0.13 %	1.44%	0.15 %	2.99 %	0.05 %	0.05 %
Bodhgaya Planning Area (19 Villages+ 1 Nagar Parishad)	**16,778**	**3426**	**2167**	**9561**	**216**	**14**	**867**	**12**	**152**	**319**	**44**

Source: Census of India, 2011

11.6 Socio-Economic Survey Analysis

11.6.1 INFRASTRUCTURE URBAN

11.6.1.1 WATER SUPPLY

The water supply study examines the accessibility, quality, and reliability of water supplies in the survey region. The investigation aims to find critical insights regarding the community's health, sanitation, and overall quality of life by examining water

supply patterns, usage habits, and potential concerns. Understanding the dynamics of water supply not only addresses immediate concerns but also informs sustainable development policies and public health measures, resulting in a more complete socioeconomic profile of the studied population.

11.6.1.1.1 SOURCE OF WATER

33.97% of the households surveyed have access to individual tap water supplied by ULB while 35.56% use bore wells, 13.33% use private tubewells, 5.40% use community sources of water, 1.59% use individual wells and 10.16% use other sources for their primary source of water.

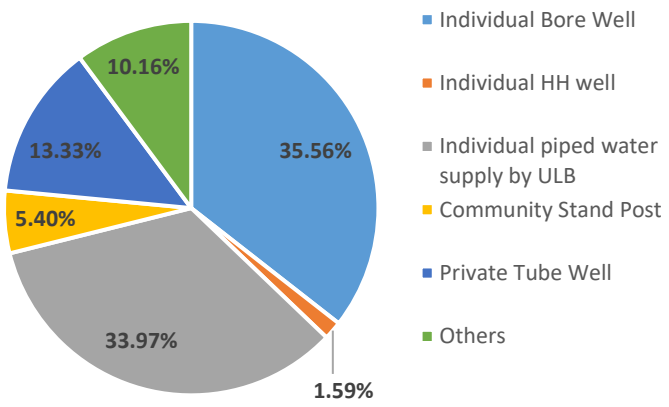


FIGURE 11-1 SOURCE OF WATER SUPPLY IN THE HOUSE OF THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

11.6.1.1.2 DURATION OF SUPPLY

Among the households surveyed who received tap water in urban areas, most (71.08%) receive it for less than 2 hours, while the rest 28.92% for 2 hours to 4 hours daily.

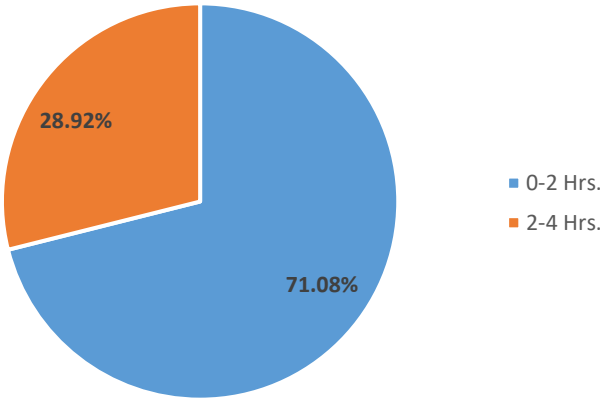


FIGURE 11-2 DURATION OF WATER SUPPLY OF TAP WATER REPORTED BY THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

11.6.1.1.3 LEVEL OF SATISFACTION

The households surveyed connected to tap water in urban areas are found to be not satisfied with the water quality and quantity. 73.65% of them have answered unsatisfied with the water quality while 26.35% have said that they are satisfied with the water quality. This indicates that there are some issues with the tap water services.

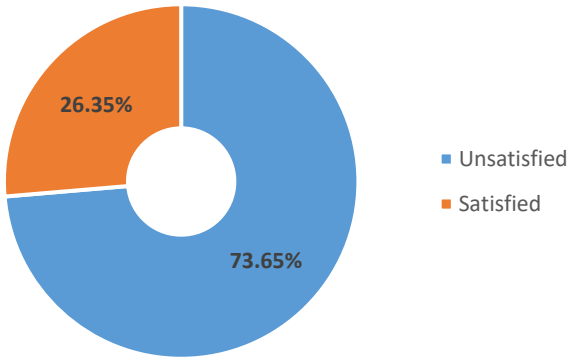


FIGURE 11-3 WATER QUALITY OF TAP WATER IN THE SURVEYED HOUSEHOLDS OF URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

11.6.1.2 SEWERAGE AND SANITATION

The majority of the households surveyed (48.89%) have septic tanks for sanitation, 0.63% use piped sewerage systems and 7.94% have other systems for sanitation while 32.70% do not have any toilets in their house. Furthermore, 9.84% of households have pit latrines, which may pose sanitation and health risks if not properly managed.

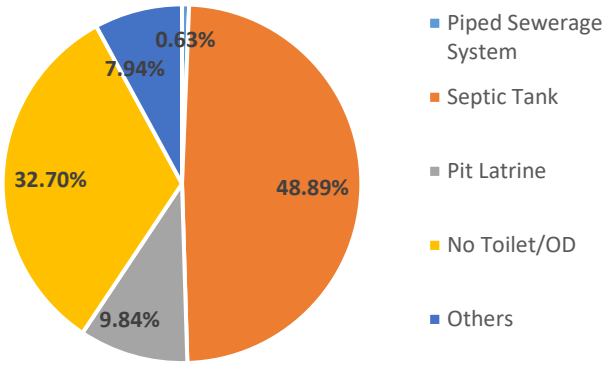


FIGURE 11-4 SANITATION SYSTEM IN THE HOUSE OF THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

The majority of the households surveyed (56.51%) have individual household latrines in their houses while only 0.95% use community toilets, 5.71% use public toilets and 36.83% defecate openly which is a serious matter of concern. Based on the surveyed data, in most of the wards of Bodhgaya Nagar Panchayat, maximum households defecate openly.

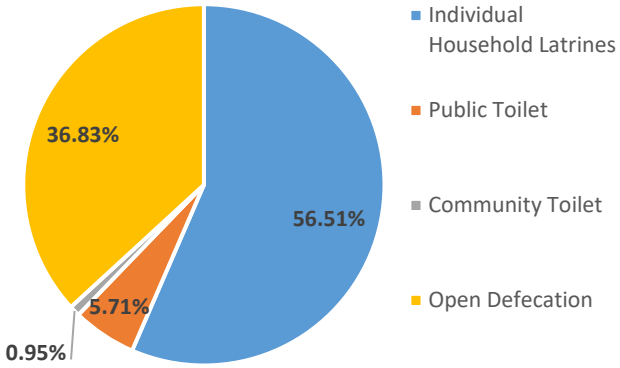


FIGURE 11-5 TYPE OF TOILET USED IN THE HOUSE OF THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

11.6.1.3 INTEGRATED WASTE MANAGEMENT

The maximum number of households surveyed (56.47%) has a door-to-door collection system, 8.99% of surveyed households use community dustbins, 3.96% have a home composting system while 30.58% of surveyed households dispose waste openly, either at a nearby vacant land or road-side disposal, which is a serious matter of concern.

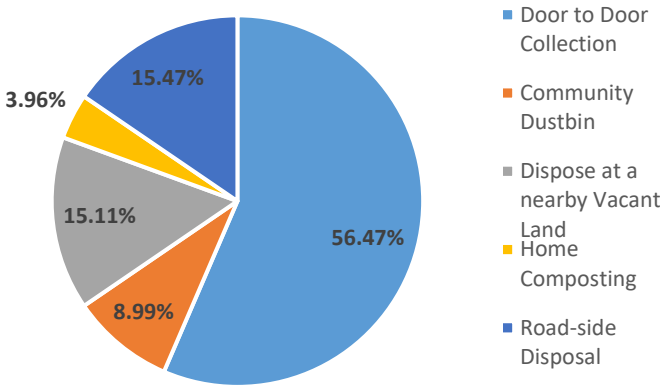


FIGURE 11-6 SOLID WASTE DISPOSAL SYSTEM BY THE SURVEYED HOUSEHOLDS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

The maximum number of households that is more than 90% surveyed segregate the dry and wet waste in household level while only few people around 8% responded that they do not practice the segregation of dry and wet waste.

11.6.1.4 ROADS AND PAVEMENTS

11.6.1.4.1 CONDITION OF ACCESS ROAD

This analysis examines the condition of access roads among surveyed households, revealing insights into road infrastructure across urban areas of Bodhgaya Planning Area.

Based on the data, the respondents seem to be satisfied with the conditions of access roads. 49.84% of them have given an average rating, 38.41% rated good, while only 11.75% feel the conditions of the road are bad and need improvement.

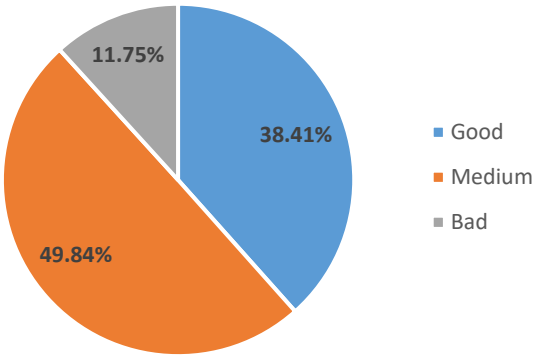


FIGURE 11-7 CONDITION OF ACCESS ROAD CONNECTING THE SURVEYED HOUSEHOLDS IN URBAN AREA

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited.

11.6.1.4.2 AVAILABILITY OF FOOTPATH

Among all the surveyed households, 35.56% of the respondents reported not having footpaths along the access roads in urban areas of Bodhgaya Planning Area. Whereas 64.44% of the respondents from the households said that there are footpaths.

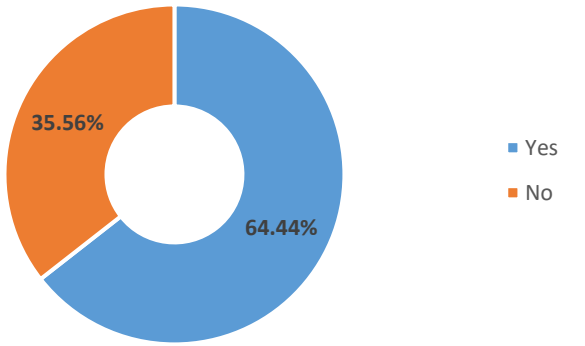


FIGURE 11-8 AVAILABILITY OF FOOTPATHS REPORTED BY THE SURVEYED HOUSEHOLDS IN URBAN AREA

11.6.1.4.3 CONGESTION ON ACCESS ROAD

About half of the surveyed population (52.13%) in urban areas faced problems about the congestion on access roads that is a serious concern for transportation system present in the urban areas of planning area.

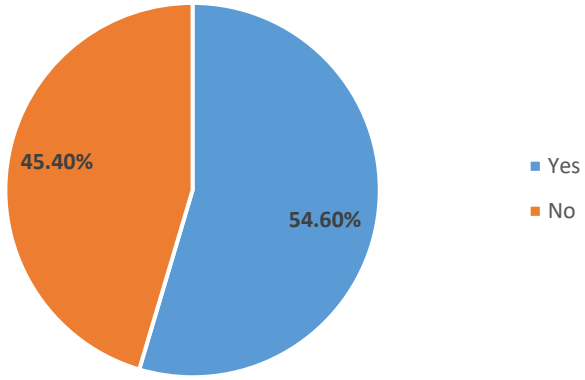


FIGURE 11-9 CONGESTION ON ACCESS ROADS REPORTED BY THE SURVEYED HOUSEHOLDS IN URBAN AREA

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

11.6.1.5 ELECTRICITY

11.6.1.5.1 ELECTRICITY SUPPLIER

In all the households surveyed in the urban area, the electricity is supplied by the government.

Additionally, among the households connected to electricity, 380 households (approx. 88%) have a metered connection. The remaining 39 households (around 12%) do not have a metered connection.

11.6.1.5.2 POWER CUT

Among the surveyed households in urban areas, the majority (37.14%) experience power cuts for 0-2 hours, 18.41% face 2-4 hours of outages, 32.70% face 4-6 hours of power cut daily, 2.86% reported 6-8 hours of daily power cut, while 8.89% experiences 8-12 hours of power cut. Majority of the households faces 0-6 hrs of power cut daily (almost 90%).

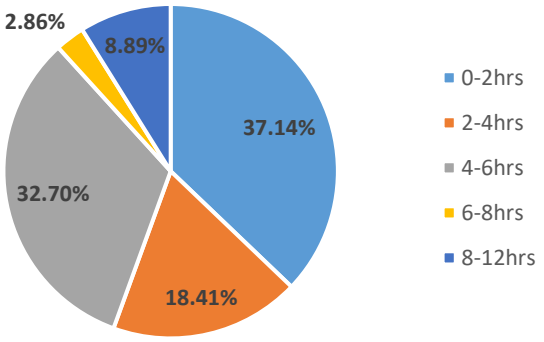


FIGURE 11-10 FREQUENCY OF POWER CUT DAILY EXPERIENCED BY THE SURVEYED HOUSEHOLDS IN URBAN AREA

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

11.6.1.5.3 ELECTRICITY BILL

Most of the surveyed households in urban areas have moderate electricity consumption. Maximum (42.86%) households fall in the 500 - 1000 INR range, followed by 38.10% in up to 500 INR category. High bills, above 1,000 INR, are representing 19.05% of the households.

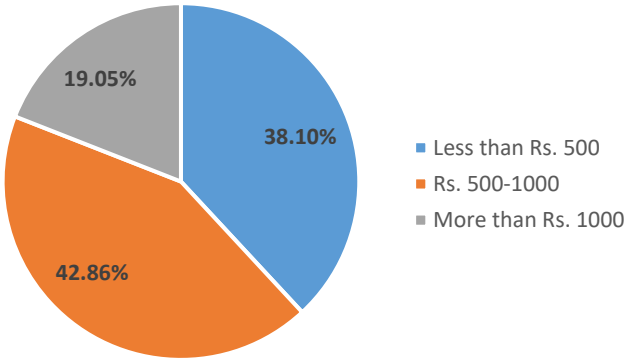


FIGURE 11-11 AVERAGE MONTHLY ELECTRICITY BILL OF THE SURVEYED HOUSEHOLDS IN URBAN AREA

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

11.6.1.5.4 COOKING FUEL

Most of the surveyed households (38.41%) in urban areas use LPG as their primary cooking fuel while 49.21% still use wood, 7.30% rely on electricity for their cooking and 5.08% depends on other fuels for their cooking.

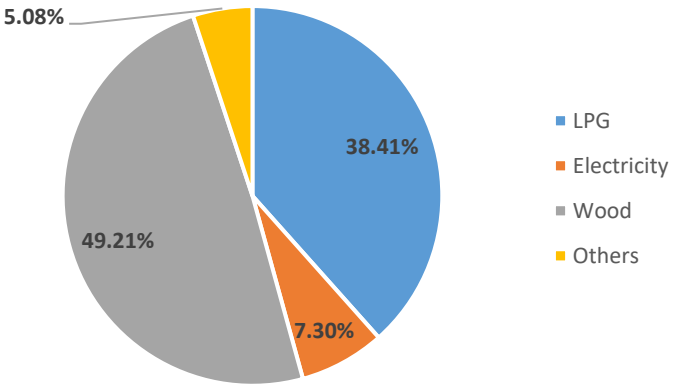


FIGURE 11-12 FUEL USED FOR COOKING BY THE SURVEYED HOUSEHOLDS IN URBAN AREA

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

11.6.1.6 STREET LIGHT

The analysis of the availability of streetlights in the area provides insights into the safety and security of the urban areas.
Among the surveyed households in urban areas, 87.94% reported having streetlights along their access roads, while 12.06% indicated a lack of streetlights.

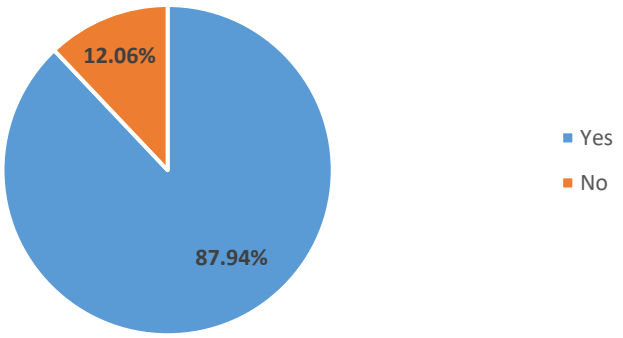


FIGURE 11-13 PRESENCE OF STREET LIGHTS IN THE ACCESS ROADS REPORTED BY THE SURVEYED HOUSEHOLDS IN URBAN AREA

Source: Socio – Economic Survey 2023, Stesalit System Limited

In the surveyed households of the urban area, 85.82% of those with streetlights along their access roads reported that the lights are in working condition, indicating a relatively well-maintained lighting infrastructure. However, 14.18% reported non-functional streetlights, primarily due to maintenance issues, suggesting a need for more consistent repair services.

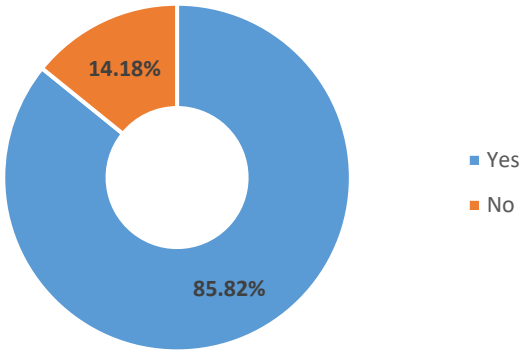


FIGURE 11-14 WORKING CONDITION OF THE STREET LIGHTS REPORTED BY THE SURVEYED HOUSEHOLDS IN URBAN AREA

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

11.6.2 INFRASTRUCTURE RURAL

11.6.2.1 WATER SUPPLY

11.6.2.1.1 SOURCE OF WATER

Only 17.37% of the households surveyed have access to individual tap water supplied by ULB while the maximum number of households (37.60%) use bore wells, 5.15% use community sources of water, 28.24% use individual private tubewells for their primary source of water, and 11.26% use other sources.

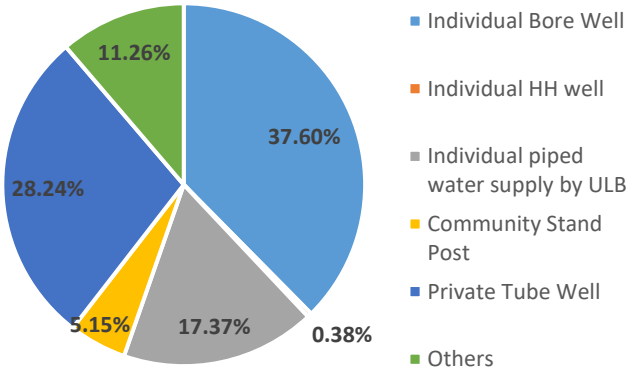


FIGURE 11-15 SOURCE OF WATER SUPPLY IN THE HOUSE OF THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

11.6.2.1.2 DURATION OF SUPPLY

Among the households surveyed who received tap water in rural areas, mostly (77.78%) receive tap water for less than 2 hours daily, and the rest 22.22% for 2 hours to 4 hours.

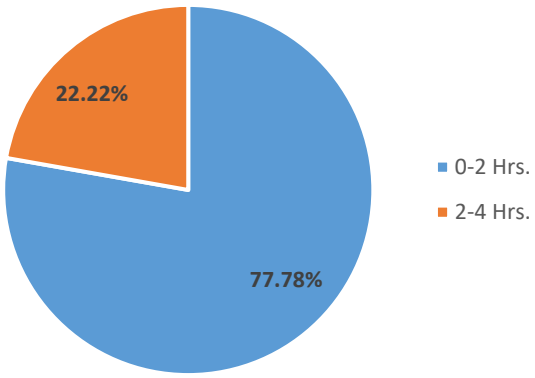


FIGURE 11-16 DURATION OF WATER SUPPLY OF TAP WATER REPORTED BY THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited.

11.6.2.1.3 LEVEL OF SATISFACTION

The households surveyed connected to tap water in rural areas are found to be very much unsatisfied with the water quality and quantity. 86.07% of them have given a bad rating and are not satisfied with the water quality, while 13.93% have given an average rating to the water supply. This indicates that there are some serious issues with the tap water services.

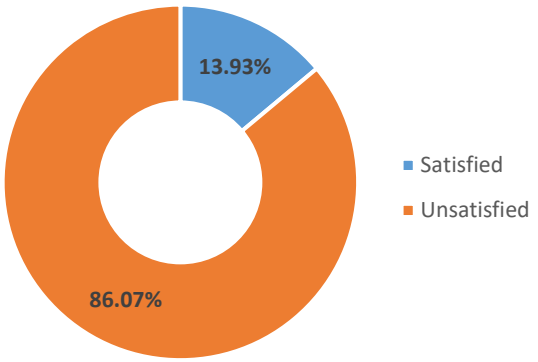


FIGURE 11-17 WATER QUALITY OF TAP WATER IN THE SURVEYED HOUSEHOLDS OF RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited.

11.6.2.2 SEWERAGE AND SANITATION

The majority of the households surveyed (32.82%) in rural areas have septic tanks for sanitation and 13.17% have other systems for sanitation while 37.60% responded positively towards open defecation, which is a serious issue. Furthermore, 16.03% of households have pit latrines, which may pose sanitation and health risks if not managed properly. Also, a minor percentage of the respondents have Piped Sewerage System installed.

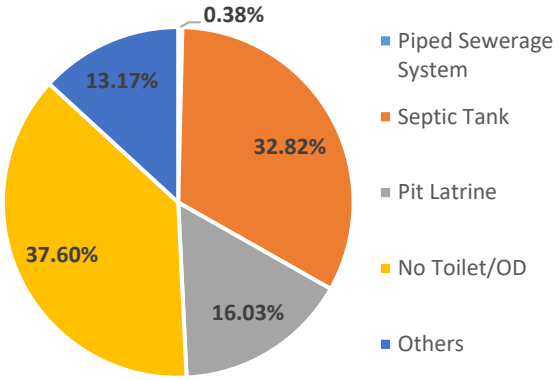


FIGURE 11-18 SANITATION SYSTEM IN THE HOUSE OF THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited.

The majority of the households surveyed (49.24%) rural areas defecate openly, which is a serious matter of concern. On the other hand, 48.28% of the households have their individual household latrines, and only 2.48% use public toilets in the rural areas.

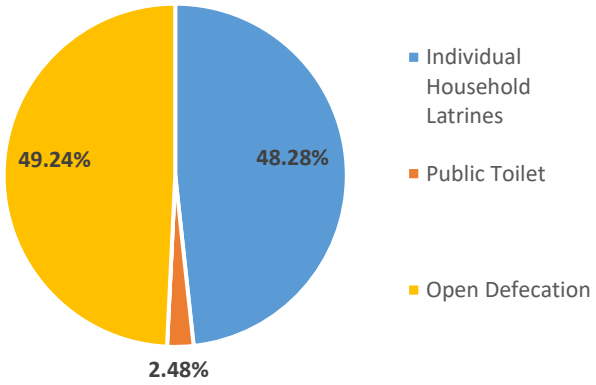


FIGURE 11-19 TYPE OF TOILET USED IN THE HOUSE OF THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited.

11.6.2.3 INTEGRATED WASTE MANAGEMENT

The maximum number of households surveyed (53.83%) in rural areas have a door-to-door collection system. Whereas the rest 46.17% do not have any collection system, as a result they dispose of the waste openly, which is a serious matter of concern.

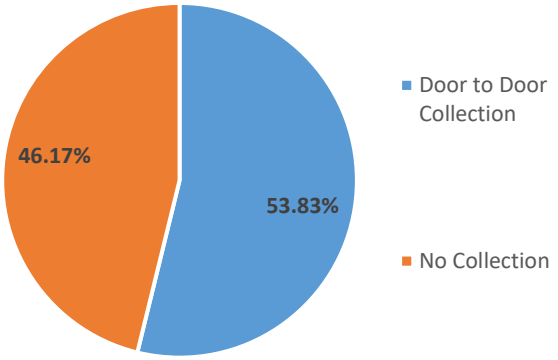


FIGURE 11-20 SOLID WASTE DISPOSAL SYSTEM BY THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

11.6.2.4 ROADS AND PAVEMENTS

11.6.2.4.1 CONDITION OF ACCESS ROAD

This analysis examines the condition of access roads among surveyed households, revealing insights into road infrastructure across rural areas of Bodhgaya Planning Area. The majority of them don't have any problems with the access roads. 30.92% of them have given good rating, 43.32% have given average while only 25.76% feel the conditions of the road are bad and need improvement.

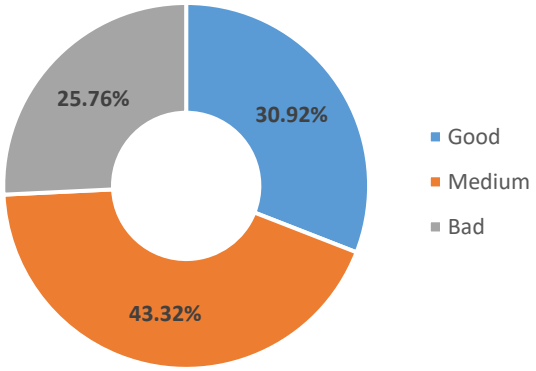


FIGURE 11-21 TYPE OF ACCESS ROAD CONNECTING THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

11.6.2.4.2 AVAILABILITY OF FOOTPATH

There are mostly no footpaths along the access roads in rural areas of Bodhgaya Planning Area. Almost all the surveyed households reported not having footpaths along the roads.

11.6.2.4.3 CONGESTION ON ACCESS ROAD

About the maximum of the surveyed population (82.45%) in rural areas faced problems with congestion on access roads which is a serious concern for the transportation system present in the rural areas of the planning area.

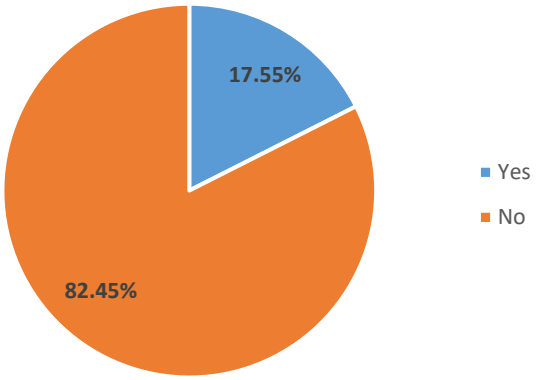


FIGURE 11-22 CONGESTION ON ACCESS ROADS REPORTED BY THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

11.6.2.5 ELECTRICITY

11.6.2.5.1 ELECTRICITY SUPPLIER

This analysis investigates electricity supply sources among surveyed households across rural areas of the planning area. All the surveyed households, electricity is supplied by the government.

Additionally, among the households connected to electricity in rural areas, most households (85.88%) have a metered connection. The remaining 14.12% of households do not have a metered connection.

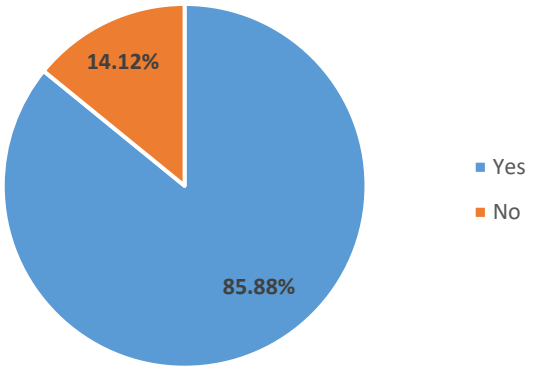


FIGURE 11-23 AVAILABILITY OF METERED CONNECTION IN THE HOUSE OF SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

11.6.2.5.2 POWER CUT

Among the surveyed households in rural areas, the majority (51.68%) experience power cuts for 4 to 6 hours, while 26.04% face 2 to 4 hours of outages. About 21.50% households face electricity outage for 0 to 2 hours daily. Very few households report longer durations, with less than 1% experiencing cuts of around 6-8 hours.

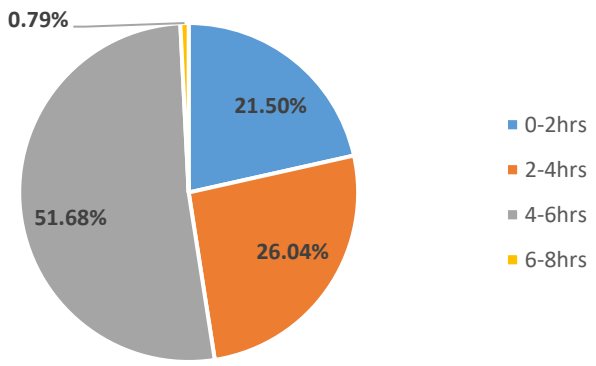


FIGURE 11-24 FREQUENCY OF POWER CUT DAILY EXPERIENCED BY THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

11.6.2.5.3 ELECTRICITY BILL

Most of the surveyed households in rural households have moderate electricity consumption. 49.81% of households fall in the below 500 INR range, followed by 35.11% in the 500 - 1,000 INR category. Bills exceeding 1,000 INR are much less common, with only 15.08% paying 1,000 – 1,500 INR.

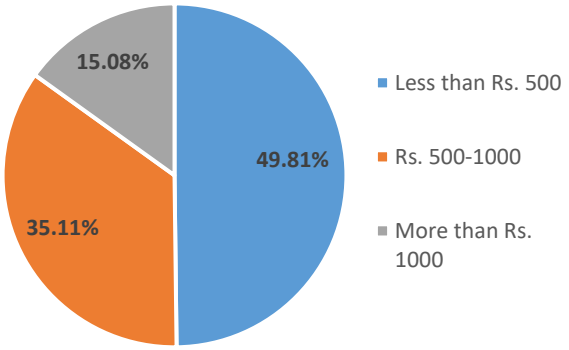


FIGURE 11-25 AVERAGE MONTHLY ELECTRICITY BILL OF THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

11.6.2.5.4 COOKING FUEL

Most of the surveyed households (78.24% in rural areas still use wood as their primary cooking fuel while 16.98% use LPG, and 4.77% depend on electricity for their cooking purposes.

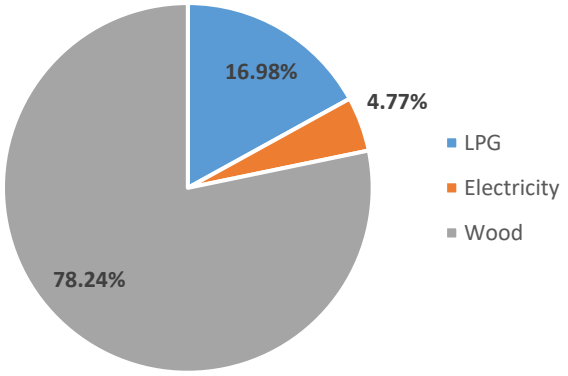


FIGURE 11-26 FUEL USED FOR COOKING BY THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

11.6.2.6 STREET LIGHT

The analysis of the availability of streetlights in the area provides insights into the safety and security of the rural areas of Bodhgaya Planning Area.
Among the surveyed households in rural areas, 15.13% reported having streetlights along their access roads, while 81.87% indicated a lack of streetlights.

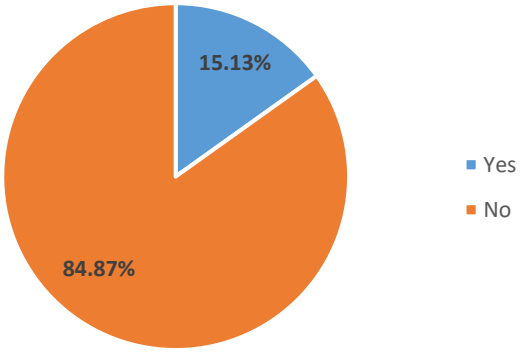


FIGURE 11-27 PRESENCE OF STREET LIGHTS IN THE ACCESS ROADS REPORTED BY THE SURVEYED HOUSEHOLDS IN RURAL AREA

Source: Socio – Economic Survey 2023, Stesalit System Limited

In the surveyed households of the rural area, 46.85% of those with streetlights along their access roads reported that the lights are in working condition, indicating a relatively well-maintained lighting infrastructure. However, 53.15% reported non-functional streetlights, primarily due to maintenance issues, suggesting a need for more consistent repair services.

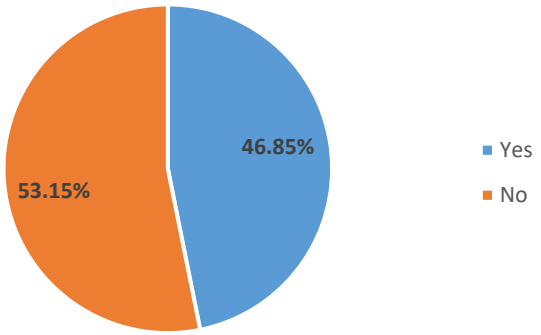


FIGURE 11-28 WORKING CONDITION OF THE STREET LIGHTS REPORTED BY THE SURVEYED HOUSEHOLDS IN RURAL AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

11.7 DEMAND SUPPLY

11.7.1 WATER SUPPLY

According to the URDPFI guideline, Towns provided with piped water supply but without sewerage system require 70 LPCD water supply, towns provided with piped water supply where sewerage system is present require 135 lpcd supply and Metropolitan and Megacities provided with piped water supply require 150-200 lpcd.

TABLE 11-18 WATER REQUIREMENTS

City Types	Requirement
Towns provided with piped water supply but without a sewerage system (lpcd)	70
Cities provided with piped water supply where a sewerage system is present (lpcd)	135
Metropolitan and Megacities are provided with a piped water supply where (lpcd)	150
Firefighting (for cities with more than 50,000 population) (Kilo Liters/Day) (where P= population in thousands)	100√P
UFW - 15%	15% of total demand

Source: URDPFI Guideline 2015 and CPHEEO guidelines, 1999 (3rd Edition)

For the future requirements and designing of the demand-based system, the following considerations have been made the design considerations kept in mind are the following

The resident population of the planning area; growth is depicted in the Population projection.

5% of the existing population has been taken as the floating population of the planning area.

Urbanisable Area

outside current city limits where there may be any existing proposals for extension of the city

outside current city limits where there may be an extension proposed for city limits under DDP

Future water requirements were calculated based on the above guidelines in the Bodhgaya Planning area according to the horizon year of 2047.

TABLE 11-19PROJECTED WATER REQUIREMENT FOR THE BODHGAYA MUNICIPAL COUNCIL AREA

Year	Residential Population	Floating Population	Total Population (Residential+ Floating)	Total Water Requirement as per URDPFI guideline (ML)	Gap
2021	93715.	4685	98401	15.97	15.97
2025	101050.	5052	106102	17.17	17.17
2030	109845	5492	115337	18.62	18.62
2035	118322	5916	124238	20.00	20.00
2040	118387	5919	124306	20.01	20.017
2047	134811	6740	141551	22.69	22.69

Source: Computed from URDPFI Guideline 2015 and CPHEEO guidelines, 1999 (3rd Edition)

TABLE 11-20 PROJECTED WATER REQUIREMENT FOR RURAL AREA

Year	Residential Population	Floating Population	Total Population (Residential+ Floating)	Gap
2021	38352	1917	40269	6.81
2025	42187	2109	44296	7.45
2030	46981	2349	49330	8.25
2035	51775	2588	54363	9.05
2040	56569	2828	59397	9.84
2047	61363	3068	64431	10.64

Source: Computed from URDPFI Guideline 2015 and CPHEEO guidelines, 1999 (3rd Edition)

TABLE 11-21 PROJECTED WATER REQUIREMENT FOR THE BODHGAYA PLANNING AREA

Year	Residential Population	Floating Population	Total Population (Residential+ Floating)	Total Water Requirement as per URDPFI guideline (ML)	Gap
2021	132067.7238	6603	138671	22.25	22.25
2025	143237	7161	150399	24.07	24.07
2030	156826	7841	164667	26.29	26.28
2035	170097	8504	178602	28.44	28.44

2040	174956	8747	183704	29.23	29.23
2047	196174	9808	205983	32.68	32.67

Source: Computed from URDPFI Guideline 2015 and CPHEEO guidelines, 1999 (3rd Edition)

With water demand projected to rise to 32.68 million liters per day (MLD) by the horizon year 2047, there is an urgent need to plan, expand, and implement a robust water supply infrastructure for the entire Bodhgaya planning area.

11.7.2 SEWERAGE AND SANITATION

Anticipating the increasing density of the population following the urbanization pressures, there is an immediate need for a sewerage system covering the whole of the municipal area. With increasing population density, it will get more and more difficult to lay a sewerage line in the planning area.

Even though there is no existing operational sewerage system in the area, based on the existing population, probable sewerage generation has been computed in the table below.

80% of the total water requirement has been considered as generated sewerage.

TABLE 11-22 PROJECTED WATER REQUIREMENT FOR THE BODHGAYA NAGAR PARISHAD

For Designed Population				
Year	**Residential Population**	**Floating Population**	**Total Water Requirement as per URDPFI guideline (ML)**	**Total SEWERAGE GENERATION**
2021	93716	4686	22.25	17.80
2025	101050	5053	24.07	19.26
2030	109845	5492	26.29	21.03
2035	118322	5916	28.44	22.75
2040	118387	5919	29.23	23.39
2047	134811	6741	32.68	26.14

For Designed Population				
Year	**Residential Population**	**Floating Population**	**Total Water Requirement as per URDPFI guideline (ML)**	**Total SEWERAGE GENERATION**
2021	38352	1918	22.25	17.80
2025	42187	2109	24.07	19.26
2030	46981	2349	26.29	21.03
2035	51775	2589	28.44	22.75
2040	56569	2828	29.23	23.39
2047	61363	3068	32.68	26.14

TABLE 11-23 PROJECTED WATER REQUIREMENT FOR THE BODHGAYA PLANNING AREA

Year	Residential Population	Floating Population	Total Water Requirement as per URDPFI guideline (ML)	Total SEWERAGE GENERATION
2021	132068	6603	22.25	17.80
2025	143237	7162	24.07	19.26
2030	156826	7841	26.29	21.03
2035	170098	8505	28.44	22.75
2040	174956	8748	29.23	23.39
2047	196175	9809	32.68	26.14

The estimated sewerage generation data indicates a steady increase over the years, correlating with population growth and rising water demand. In 2021, the total water requirement was 22.25 million liters (ML), resulting in a sewage generation of 17.80 ML. By 2035, as the residential population is projected to increase to 170098 and the floating population to 8505, . This trend continues in 2047, with an estimated residential population of 196175 and a floating population of 9809, increasing the total water demand to 32.68 ML and sewage generation to 26.14 ML.

The data reflects a proportional rise in sewage generation, highlighting the need for enhanced sewerage infrastructure to accommodate future demand. These estimates, derived from URDPFI and CPHEEO guidelines, emphasize the importance of proactive planning in wastewater management to prevent environmental and public health concerns.

11.7.3 DRAINAGE

Within the municipal limits of Arrah, only 30.5% of households are connected to a closed drainage system, while 58.5% depend on open drains and 11.1% lack any drainage access. In Koilwar, the situation is more critical, with 49% of households having no drainage system and only 6.9% connected to closed drains. Rural areas, comprising 68 villages, show similar deficiencies—69.4% of households are connected to open drains, only 8.5% to closed drains, and 22.2% remain unserved.

This scenario highlights the urgent need for an integrated and climate-resilient drainage strategy for the Arrah Planning Area. Emphasis must be placed on expanding closed drainage networks, creating separate systems for stormwater and sewage, and upgrading drainage infrastructure in rural and peri-urban areas to support sustainable urban development.

TABLE 11-24 ESTIMATION OF THE DRAINAGE REQUIREMENT BASED ON THE ROAD LENGTH, TOTAL PLANNING AREA

Road Type	Road Length (KM)	Estimated Drainage Length (Km)
Arterial Road	7.903062	15.806124
Collector Road	6.55755	9.836325
Local Road	75.005752	112.508628
Sub-Arterial Road	2.659659	5.319318
Total	92.126023	143.470395

Source- computed value

Based on the existing road network, the total estimated drainage requirement is 143.470395 km, including 7.90 along arterial roads, 6.55 km along collector roads, 75.00 km for local roads, and 2.65 km along sub-arterial roads. this estimation provides a benchmark to bridge the infrastructure gap and guide future investment and implementation.

11.7.4 SOLID WASTE MANAGEMENT

Solid waste management or SWM, is the most important service for preserving the standard of living in both urban and rural regions and ensuring better sanitation and health. Solid waste management, or SWM, is an essential service in Bodhgaya for maintaining sanitation and protecting the environment in this important religious and tourist town. The Nagar Panchayat is responsible for waste collection and transportation, but the system is still limited in coverage and scientific management. The waste is often dumped in open areas, water bodies, or low-lying lands, leading to pollution and health risks.

Most of the waste is organic in nature, offering scope for composting and recycling. The City Development Plan for Bodhgaya has therefore proposed source segregation, decentralized composting of biodegradable waste, recycling of dry waste, and scientific disposal through sanitary landfills. Recent initiatives such as making the Mahabodhi Temple premises a plastic-free and waste-free zone, and school-led programs that recycle plastic waste, reflect positive steps towards better management. However, with increasing population and tourist inflow, strengthening infrastructure, improving collection, and promoting public awareness are key for sustainable solid waste management in Bodhgaya.

The estimation of solid waste generation for Bodhgaya has been carried out based on the revised CPHEEO Manual on Municipal Solid Waste Management (2016).

TABLE 11-25 PROJECTED SOLID WASTE GENERATION IN BODHGAYA MUNICIPAL CORPORATION`

Year	Population	Floating Population	Total Waste Generation (in gms)	Waste generation (gram/capita)	Total waste generation (TPD)
2021	93716	6603	14000000	301.017	30.20
2025	101050	7162	14000000	301.017	32.57
2030	109845	7841	14000000	301.017	35.43
2035	118322	8505	14000000	301.017	38.18
2040	118387	8748	14000000	301.017	38.27
2047	134811	9809	14000000	301.017	43.53

Source: Computed value as per CPHEEO Manual for Municipal Solid Waste Management and MSW Rules,2016

As per the Municipal Solid Waste Rules, 2016, towns and cities with populations of 2 to 5 lakhs generate 300 to 350 grams of waste per capita daily. Bodhgaya Nagar Parishad Solid Waste Management Department reports a per capita waste generation of approximately 300 grams per day, which is as per the standard mentioned in the MSW Rules, 2016.

TABLE 11-26 PROJECTED SOLID WASTE GENERATION IN BODHGAYA RURAL AREA

Year	Population	Floating Population	Total Waste Generation (in gms)	Waste generation (gram/capita)	Total waste generation (TPD)
2021	38352	6603	14000000	301.017	13.53
2025	42187	7162	14000000	301.017	14.85
2030	46981	7841	14000000	301.017	16.50
2035	51775	8505	14000000	301.017	18.15
2040	56569	8748	14000000	301.017	19.66
2047	61363	9809	14000000	301.017	21.42

Source: Computed value as per CPHEEO Manual for Municipal Solid Waste Management and MSW Rules,2016

As per the Municipal Solid Waste Rules, 2016, towns and cities with populations of 2 to 5 lakhs generate 300 to 350 grams of waste per capita daily. Due to the unavailability of rural area data, the per capita daily waste generation was estimated based on MSW 2016 guidelines in relation to the projected population.

TABLE 11-27 PROJECTED SOLID WASTE GENERATION IN ARRAH MUNICIPAL CORPORATION

Year	Population	Floating Population	Total Waste Generation (in gms)	Waste generation (gram/capita)	Total waste generation (TPD)
2021	132068	6603	14000000	301.017	41.74
2025	143237	7162	14000000	301.017	45.27
2030	156826	7841	14000000	301.017	49.57
2035	170098	8505	14000000	301.017	53.76
2040	174956	8748	14000000	301.017	55.30
2047	196175	9809	14000000	301.017	62.00

Source: Computed value as per CPHEEO Manual for Municipal Solid Waste Management and MSW Rules,2016

As per the Municipal Solid Waste Rules, 2016, towns and cities with populations of 2 to 5 lakhs generate 300 to 350 grams of waste per capita daily. The per capita daily waste generation was estimated based on MSW 2016 guidelines in relation to the projected population.

At the present scenario, there is an absence of community waste disposal systems in most rural areas and limited access to recycling facilities. There is an urgent need to expand and strengthen the solid waste management infrastructure across the Bodhgaya planning area.

With waste generation projected to increase significantly, Bodhgaya Nagar Parishad is projected to reach 43.53 tpd by 2047, and Rural Areas 21.42 TPD. Future planning should aim to expand waste collection and disposal systems to ensure full coverage, including in currently underserved villages. It is important to develop basic infrastructure such as segregation units, community bins, and recycling facilities, especially in areas that currently lack these services. Bodhgaya Nagar

Parishad has already achieved full door-to-door collection and should continue strengthening source segregation and collection efficiency.

11.7.5 STREET LIGHT

According to the URDPFI Guideline, the recommended ratio for the height to distance of streetlights ranges from 1:2.5 to 1:3. The typical height of streetlights is 7.5 m on average. Bodhgaya Nagar Parishad has 44 high-mast street lights presently. The table below shows the required number of street lights and the gap.

Table 30 PROJECTED SOLID WASTE GENERATION IN ARRAH Municipal Corporation

Total road length (m)	Existing light pole	No of light pole required considering Height to distance ratio is 1:2.5	No of light pole required considering Height to distance ratio is 1:3	Gap considering Height to distance ratio as 1:2.5	Gap considering Height to distance ratio as 1:3
92126.023	44	4913.387893	4094.489911	4869	4050

11.8 ISSUSES AND POTENTIAL

STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
WATER SUPPLY Authorities have constructed several bore wells as only 14% have access to treated water supply to provide residents with an alternate source of clean and safe water. DRAINAGE NETWORK Bodhgaya benefits from a natural drainage system that supports basic water management. Ongoing infrastructure upgrades, including RCC HUME pipe installation across multiple zones, further strengthen	GROUNDWATER DEPENDENCE High dependence on groundwater can lead to its depletion and have severe environmental impacts. Despite several schemes like "Har Ghar Nal Ka Jal" only 14 % have access to treated tap water. OPEN DRAINAGE The high dependence on open drainage (51% in rural areas and 43.6% in urban areas), contributes to environmental pollution, foul odors, and health risks from stagnant water, highlighting the urgent need for	SMART WASTE MANAGEMENTS TECHNIQUES Bodhgaya is adopting smart waste management techniques, including waste-to-energy projects while promoting renewable energy sources like solar power to reduce kerosene dependency.	RAPID URBANIZATION Rapid urbanization without proper planning can exacerbate water and sanitation challenges, while poor drainage infrastructure increases the risk of waterlogging and flooding during heavy rains.

the city's drainage capacity. PRESENCE OF UNIVERSITY The presence of Magadh University and IIM Bodhgaya enhances the region's educational reputation, attracting students and contributing to higher education development, research opportunities, and skilled workforce generation. The presence of Anugrah Narayan Magadh Medical College & Hospital, located just 15 km from the city centre, strengthens the health infrastructure by providing accessible medical care and advanced healthcare facilities for residents.	improved wastewater management and closed drainage systems.		

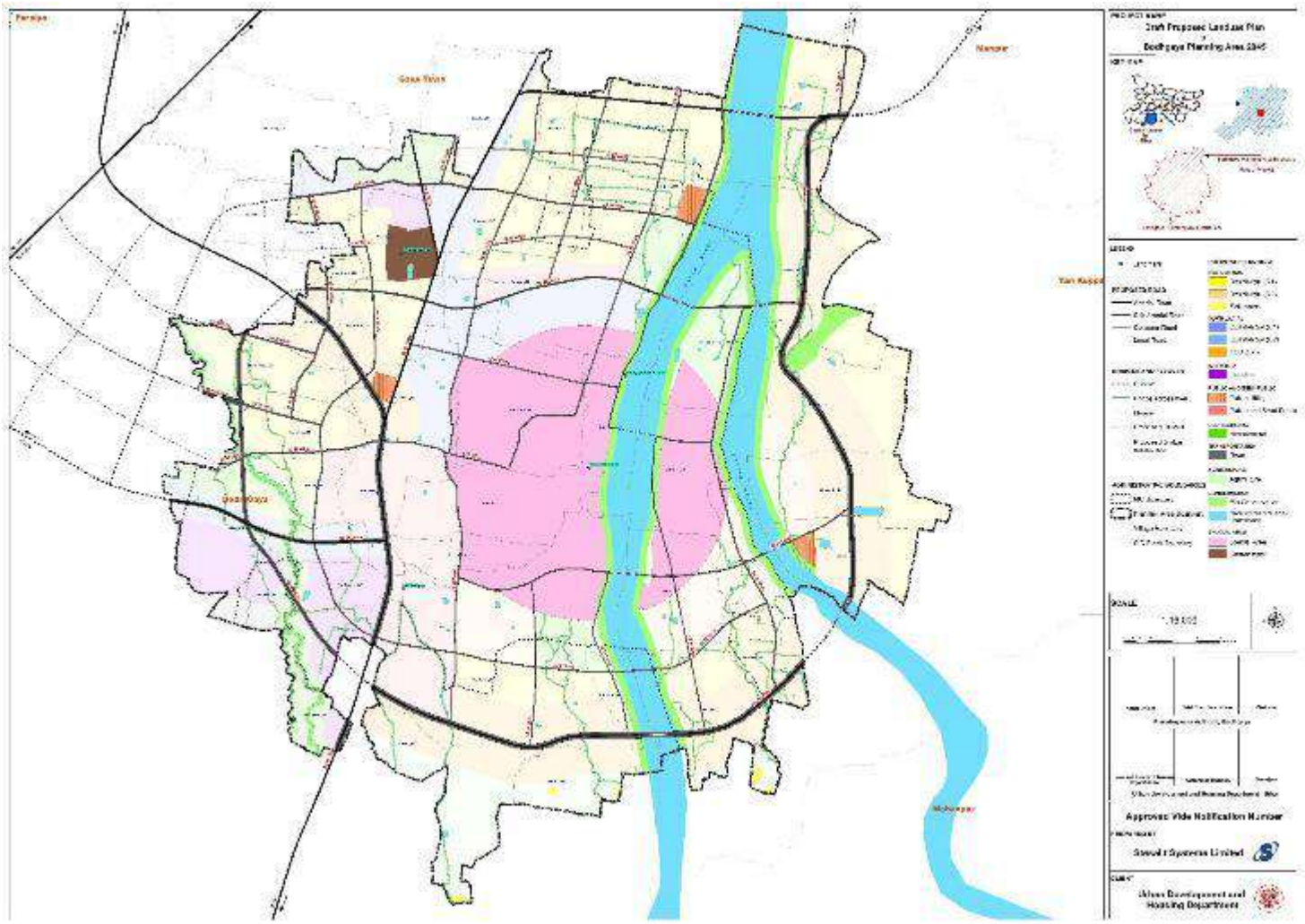
11.9 Proposed Public Utilities Landuse

11.9.1 PUBLIC UTILITIES-PU1

The **PU-1 (Major Public Utility Zone)** is designated for essential city-level infrastructure and large-scale utility services required for urban functioning. Permitted uses within this zone include Water Treatment Plants (WTP), Sewage Treatment Plants (STP), Solid Waste Treatment Plants (SWTP), solid waste dumping grounds, and major water supply installations along with associated infrastructure. These areas are intended to accommodate critical public utility facilities that may require larger land parcels, buffer spaces, and controlled access. Additionally, service industries, warehouses, and residential accommodation for operational staff may be allowed as permissible uses to support the functioning and maintenance of such facilities.

11.9.2 PUBLIC UTILITIES-PU2

The **PU-2 (Local or Neighbourhood Public Utility Zone)** is intended for decentralized and community-level infrastructure services that support local populations. Permitted uses include water supply installations, overhead tanks (OHT) or reservoirs, post offices, telecommunication services, decentralized solid waste treatment facilities, electric substations, fire stations, and other similar utility infrastructure. Certain complementary uses such as limited commercial activities and low-rise residential development may be allowed subject to approval by the competent authority, ensuring compatibility with surrounding land uses and minimizing adverse impacts on nearby residential or public areas.



MAP 11-6 PROPOSED PUBLIC UTILITIES IN BODHGAYA PLANNING AREA

12 SOCIAL INFRASTRUCTURE

Social infrastructure includes assets that accommodate social services which include schools, hospitals, community housing etc. Social infrastructure is exclusively provided by Central or Local Government and with related entities.

According to the URDPFI, social infrastructure consists of education, health, socio-cultural facilities, distributive services, and other different facilities like bus stops, cremation grounds, and other facilities including communication, postal services, security forces and fire protection services, commercial and recreational services. URDPFI guidelines play a pivotal role as it is used as a benchmark to understand where the services are properly available and where there are gaps.

Social infrastructure like schools and hospitals are the most important requirements of human life which will improve the standard of living and affordability levels of the people.

This chapter will deal with the availability of social infrastructure facilities focusing on health care, education, recreation, religion and socio-cultural facilities. An overall analysis is made of the existing situation to identify the loopholes that will later turn into feasible proposals.

12.1 EDUCATIONAL FACILITIES

Education is considered a proper investment in personality development. Education plays a pivotal role in the planned development of the state. A high quality of social life can be created by teaching and training society. Education has always been a significant part of society's development as the changing factor in a civilization. Furthermore, the development of various education facilities contributes sustainability to the development of an area.

12.1.1 EDUCATIONAL FACILITIES ACCORDING TO THE 2011 CENSUS OF INDIA

According to the 2011 Census of India, the rural areas (19 villages) had 2 private pre-primary schools, 12 Government Primary Schools, 2 Private Primary Schools, 6 Govt. Middle School and 2 Govt. Secondary School. Bodhgaya Nagar Parishad had 21 Govt. Primary School, 9 Private Primary School, 13 Govt. Middle School, 8 Private Middle School, 3 Govt. Secondary Schools, 3 Govt. senior Secondary Schools and 4 private Senior Secondary Schools, with few Govt. Colleges viz., 1 Govt. Degree College (Art, Science and Commerce).

TABLE 12-1 EDUCATIONAL FACILITIES (2011 CENSUS OF INDIA)

Name	Category	Numbers	
		Govt.	Private
Rural Areas (19 villages)	Pre-Primary School	0	2

Name	Category	Numbers	
		Govt.	Private
	Primary School	12	2
	Middle School	6	0
	Secondary School	2	0
	Senior Secondary School	0	0
	Arts and Science Degree College	0	0
	Vocational Training Centre	0	0
	Non-formal training Centre	0	0
Bodhgaya Nagar Parishad	Pre-Primary School	0	2
	Primary School	21	9
	Middle School	13	8
	Secondary School	3	0
	Senior Secondary School	3	4
	Degree college Art only	0	0
	Degree College Art and Science only	0	0
	Degree college - Art, Science and Commerce	1	0
	Vocational Training Centre	0	0
	Non-Formal Education	0	0
Bodhgaya Planning area	Pre-Primary School	0	4
	Primary School	33	11
	Middle School	19	8
	Secondary School	5	0
	Senior Secondary School	3	4
	Degree college Art only	0	0
	Degree college - Art, Science and Commerce	1	0
	Vocational Training Centre	0	0
	Non-Formal Education	0	0

Source: Census of India, 2011

12.1.2 EXISTING EDUCATIONAL FACILITIES (2024)

The Bodhgaya Planning Area hosts a total of 138 schools, encompassing all levels from pre-primary to senior secondary. Higher education is supported by 9 colleges, 1 university, currently there is no vocational institutes operating in the area.

Early childhood care is absent with 0 Anganwadi's. Additionally, the planning area has 10 training institutes, which likely include government or private centres offering skill development or teacher training programs.

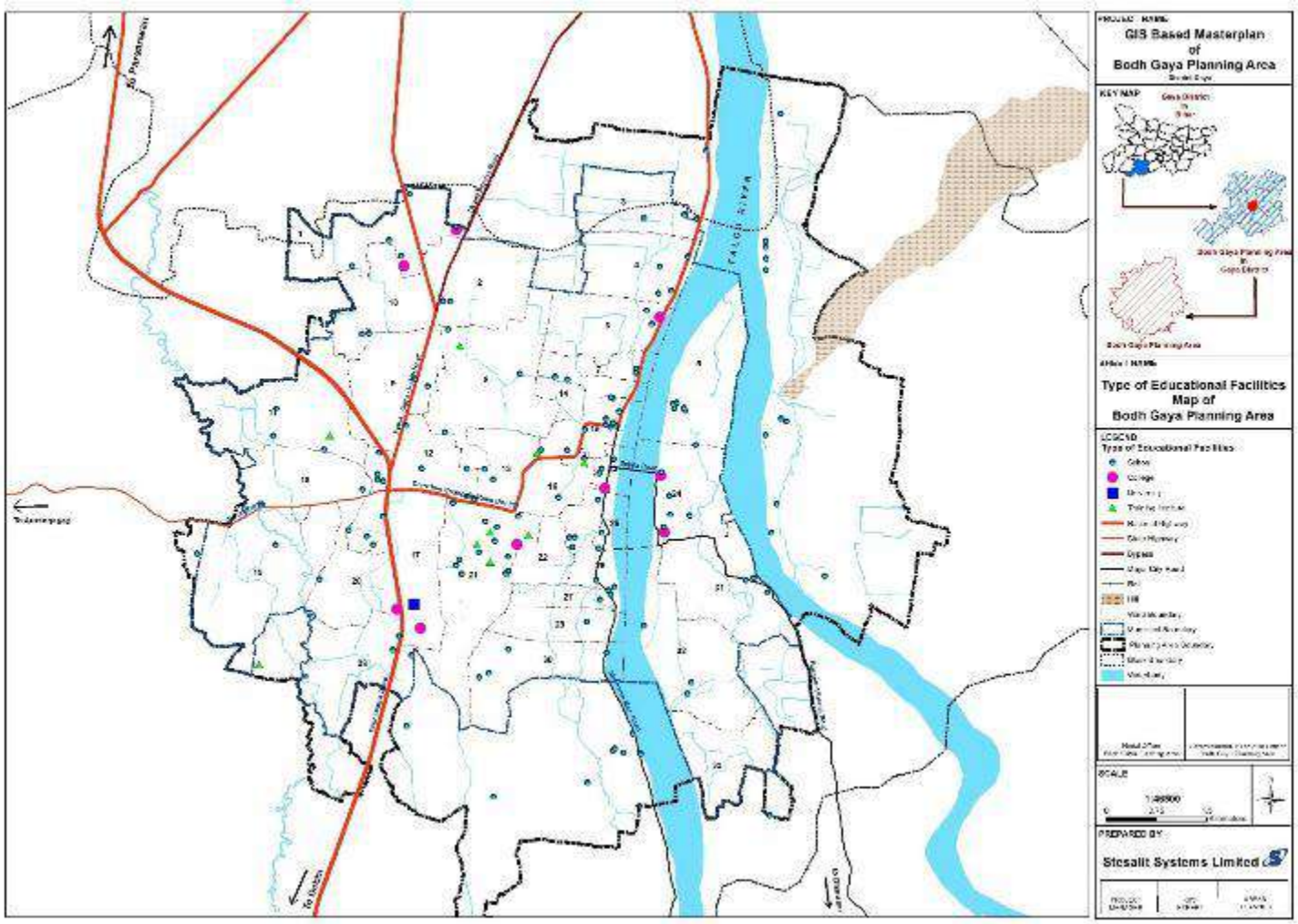
This distribution highlights a relatively strong presence of school-level and college-level education infrastructure, but also indicates clear gaps in vocational

education, which may need to be addressed to support long-term educational and employment goals. Early childhood care needs to be addressed.

TABLE 12-2 EXISTING EDUCATIONAL FACILITIES

Name	Category	Numbers
Bodhgaya Nagar Parishad	School	115
	College	9
	University	1
	Vocational Institute	0
	Anganwadi	0
	Training Institute	9
Rural areas (19 Villages)	School	23
	College	0
	University	0
	Vocational Institute	0
	Anganwadi	0
	Training Institute	1
Bodhgaya Planning area	School	138
	College	9
	University	1
	Vocational Institute	0
	Anganwadi	0
	Training Institute	10

Source: Land Use Survey 2024, Stesalit Systems Ltd.



MAP 12-1 EDUCATIONAL FACILITIES MAP OF BODHGAYA

12.2 HEALTHCARE FACILITIES

Health systems and policies have a critical role in determining the manner of how health services are delivered, utilized and affect health outcomes. The objective of the National Health Policy is to Strengthen and prioritize the health systems in all its dimensions- investments in health, organization of healthcare services, prevention of diseases and promotion of good health through cross-sectorial actions, access to technologies, developing human resources, encouraging medical pluralism, building a knowledge base, developing better financial protection strategies, strengthening regulation and health assurance. The government health care system is designed as a three-tier structure comprising primary, secondary, and tertiary facilities. In rural areas, primary health care services are provided through a network of sub-centres, primary health centres, and community health centres.

12.2.1 HEALTHCARE FACILITIES ACCORDING TO THE 2011 CENSUS OF INDIA

According to the 2011 Census of India, all 19 Villages had 3 primary health sub-centres, 2 Non-Government Medical facilities out-patient. Bodhgaya Nagar Parishad has 1 Dispensary / Health centre, 1 Family Welfare Centre, 1 Maternity and child welfare centre, 1 Maternity home, 1 veterinary hospital, 6 Primary Health Sub Centre.

TABLE 12-3 HEALTHCARE FACILITIES (2011 CENSUS OF INDIA)

Area Name	Facility Description	Number
Rural Areas (19 villages)	Community Health Centres	0
	Primary Health Centre	0
	Primary Health Sub Centre	3
	Maternity And Child Welfare Centre	0
	TB Clinic	0
	Allopathic Hospital	0
	Dispensary	0
	Veterinary Hospital	0
	Family Welfare centres	0
	Non-Government Medical facilities Out Patient	2
Bodhgaya Nagar Parishad	Community Health Centres	0
	Primary Health Centre	0
	Primary Health Sub Centre	6
	Maternity And Child Welfare Centre	1
	TB Clinic	0
	Allopathic Hospital	0
	Dispensary	1
	Veterinary Hospital	1
	Family Welfare centres	1
	Non-Government Medical facilities Outpatient	0

Bodhgaya Planning area	**Community Health Centres**	**0**
	Primary Health Centre	**0**
	Primary Health Sub Centre	**9**
	Maternity And Child Welfare Centre	**1**
	TB Clinic	**0**
	Allopathic Hospital	**0**
	Dispensary	**1**
	Veterinary Hospital	**1**
	Family Welfare centres	**1**
	Non-Government Medical facilities Outpatient	**2**

Source: Census of India, 2011

12.2.2 EXISTING HEALTHCARE FACILITIES (2024)

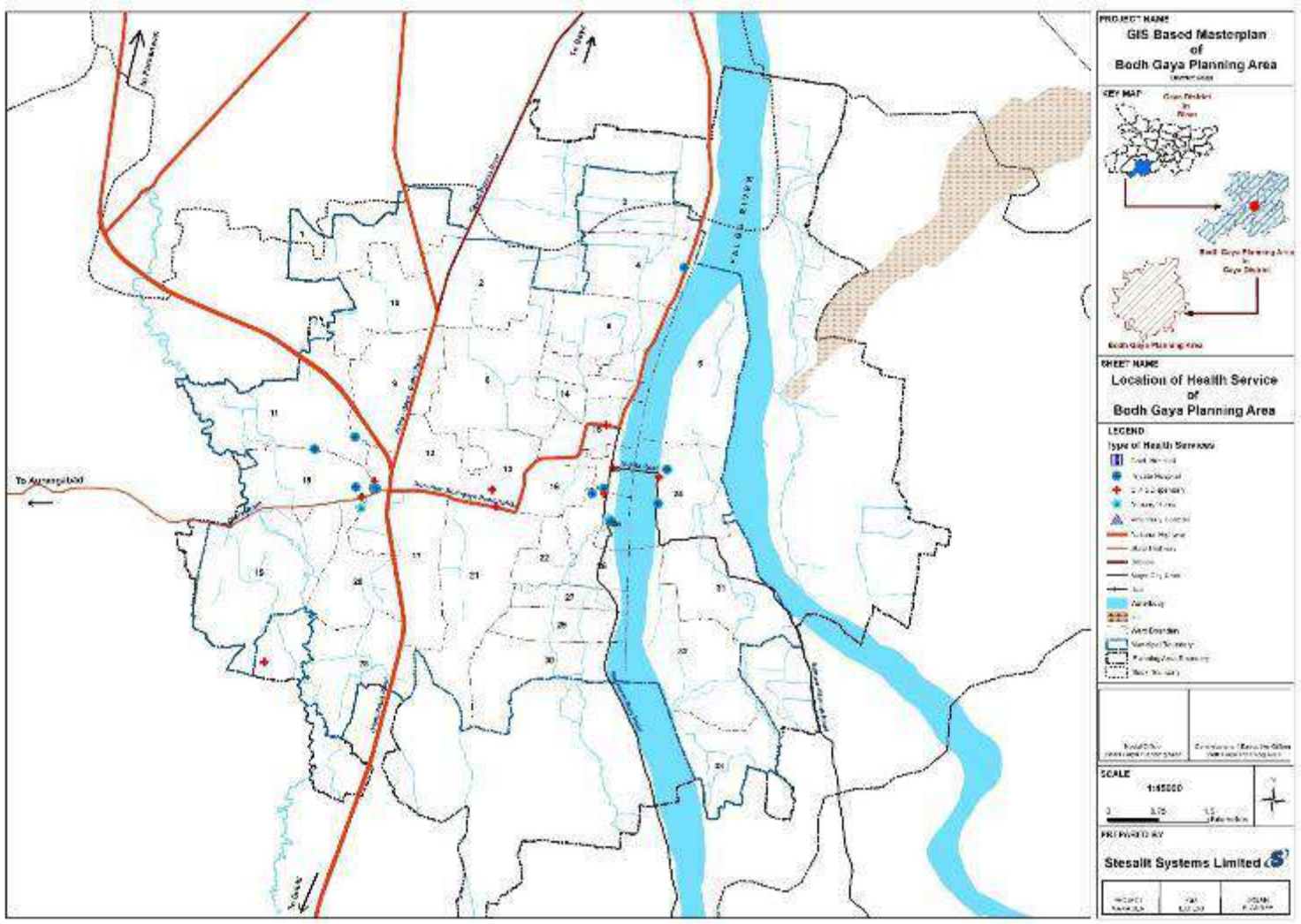
Bodhgaya Planning area has 9 Clinic/Dispensary, 1 Diagnostic Centre, 0 Govt. Hospital, 2 Nursing Home, 1 Primary/Community Health Centre, 11 Private Hospital, 0 Veterinary Hospital/Clinic.

It is observed that the health infrastructure in urban area is significant comparatively with rural areas where Private hospitals and veterinary hospitals are absent, and the only 1 dispensary is available in 19 villages.

TABLE 12-4 EXISTING HEALTHCARE FACILITIES

Area Name	Facility Description	Number
Bodhgaya Nagar Parishad	Clinic/Dispensary	8
	Diagnostic Centre	1
	Govt. Hospital	0
	Nursing Home	2
	Primary/Community Health Centre	1
	Private Hospital	11
	Veterinary Hospital/Clinic	0
Rural areas 19 Villages)	Clinic/Dispensary	1
	Diagnostic Centre	0
	Govt. Hospital	0
	Nursing Home	0
	Primary/Community Health Centre	0
	Private Hospital	0
	Veterinary Hospital/Clinic	0
Bodhgaya Planning area	Clinic/Dispensary	9
	Diagnostic Centre	1
	Govt. Hospital	0
	Nursing Home	2
	Primary/Community Health Centre	1
	Private Hospital	11
	Veterinary Hospital/Clinic	0

Source: Land Use Survey 2024, Stesalit Systems Ltd.



MAP 12-2 HEALTH SERVICES MAP OF BODHGAYA

12.3 SOCIO-CULTURAL AND OTHER FACILITIES

As per the 2011 Census of India, the Bodhgaya planning area only has public and semi-public facilities in its urban areas (Bodhgaya Nagar Parishad), while its 19 rural villages do not have any public or semi-public facilities. Bodhgaya Nagar Parishad is listed to have 1 government stadium, 19 government auditoriums/community halls, 3 Govt. public libraries and 5 Nationalized banks.

12.3.1 PUBLIC AND SEMI-PUBLIC FACILITIES AS PER CENSUS 2011

TABLE 12-5 PUBLIC & SEMI-PUBLIC FACILITIES (2011 CENSUS OF INDIA)

Name	Category	Numbers
Bodhgaya Nagar Parishad	Govt. Stadium	1
	Private Cinema Theatre	0
	Govt. Auditorium / Community Hall	19
	Govt. Public Library	3
	Nationalized Bank	5
	Agricultural Credit Society	0
	Non-Agricultural Credit Society	0

Source: Census of India, 2011

12.3.2 EXISTING SOCIO-CULTURAL FACILITIES (2024)

The land use validation indicates that, in Bodhgaya Nagar Parishad, there are 6 Function Hall / Marriage Garden, 163 General Business, no Hostel, 132 Hotel / Lodge / Restaurant, no Multiplex / Cinema, 6 Petrol Pump / LPG filling station, 5 Resort, no Shopping Centre / Mall, 31 Storage Godown, 10 Warehouse, 3 Market (Daily & Weekly), 7 Wholesale. In Public and semi-public there are 10 ATMs, 7 banks, 4 Community Hall, 2 crematorium, no Dharamshala, 54 guesthouse, no jail, 3 LPG/CNG Gas booking office, 1 museums, 1 orphanage, 1 police stations, 24 private office, 5 public library, 4 public and community toilet, no fire station, 6 social welfare centre, In recreational there are no clubs, 2 garden, 1 gymnasium, 8 parks, 8 Playground, 1 sports centre, no stadiums, In communication Infrastructure there are 1 post/telegraph offices, no radio/TV station, no telephone exchange, no satellite & telecommunication centres, In Public utilities there are 6 Electric Sub-Station, no Ground Level Resorver, 1 Sewage Treatment Plant,1 Water Treatment Plant, no Electric Power Plant, In religious establishments there are 7 Aashram/Math/Bhojan Shala, no Church, no Gurudwara, 90 monastery, 9 Mosque, 89 Temple. Additionally, there are no Aquaculture, 3 Brick kiln, 1 Dairy farm, 1 Farm house, no Poultry farm. It is observed that the Bodhgaya Nagar parishad has an efficient Socio-Cultural facility distributed across the town, although there is requirement of certain facilities i.e., Fire station.

TABLE 12-6 EXISTING SOCIO-CULTURAL FACILITIES IN BODHGAYA NAGAR PARISHAD

Name	Category	Sub-Category	Number
Bodhgaya NP	Commercial	Function Hall / Marriage Garden	6
		General Business	163
		Hostel	0

		Hotel / Lodge / Restaurant	132
		Multiplex / Cinema	0
		Petrol Pump / LPG filling station	6
		Resort	5
		Retail	3
		Shopping Centre / Mall	0
		Storage Godown	31
		Warehouse	10
		Market (Daily & Weekly)	3
		Wholesale	7
	Communication	Post/Telegraph Office	1
		Radio/TV Station	0
		Telephone Exchange	0
		Satellite & Telecommunication Centre	0
	Heritage	Monument	0
	Others	Aquaculture	0
		Brick kiln	3
		Dairy farm	1
		Farm house	1
		Poultry farm	0
	Public Utilities	Electric Sub-Station	6
		Sewage Treatment Plant	1
		Water Treatment Plant	1
		Ground Level Resorver	0
		Water Pumping Station	7
		Electric Power Plant	0
	Public & Semi-public	ATM	10
		Banks	7
		Community hall	4
		Convention Centre	2
		Crematorium Burial Groun /Grave Yard	2
		Dharmashala	0
		Dhobi Ghat	0
		Guesthouse	54
		Jail	0
		LPG/CNG Gas Booking Office	3
		Museum	1
		Orphanage	1
		Police Station	1

		Private Office	24
		Public Library	5
		Public/Community Toilet	4
		Fire Station	0
		Social Welfare Centre	6
	Recreational	Club	0
		Garden	2
		Gymnasium	1
		Park	8
		Play Ground	8
		Sports Centre	1
		Stadium	0
	Religious	Aashram/Math/Bhojan Shala	7
		Church	0
		Gurudwara	0
		Monastery	90
		Mosque	9
		Temple	89
	State Govt. Property	Office	13
		Quarter	1
	Central Govt. Property	Quarter	0
		Office	3

Source: Land Use Survey 2024, Stesalit Systems Ltd.

12.3.3 RURAL AREAS

The land use validation indicates that, in Rural areas in Bodhgaya Planning area, there are no Function Hall / Marriage Garden, 30 General Business, no Hostel, 2 Hotel / Lodge / Restaurant, no Multiplex / Cinema, no Petrol Pump / LPG filling station, no Resort, no Shopping Centre / Mall, 6 Storage Godown, no Warehouse, no Market (Daily & Weekly), no Wholesale. In Public and semi-public there are 0 ATMs, 1 banks, no Community Hall, no crematorium, no Dharamshala, 1 guesthouse, no jail, 1 LPG/CNG Gas booking office, no museums, no orphanage, no police stations, no private office, no public library, no public and community toilet, no fire station, 1 social welfare centre, In recreational there are no clubs, no garden, no gymnasium, 1 parks, no Playground, no sports centre, no stadiums, In communication Infrastructure there are no post/telegraph offices, no radio/TV station, no telephone exchange, no satellite & telecommunication centres, In Public utilities there are no Electric Sub-Station, no Ground Level Resorver, no Sewage Treatment Plant, no Water Treatment Plant, no Electric Power Plant, In religious establishments there are no Aashram/Math/Bhojan Shala, no Church, no Gurudwara, 1 monastery, 1 Mosque, 14 Temple. Additionally, there are no Aquaculture, no Brick kiln, no Dairy farm, no Farm house, no Poultry farm. It is observed that the Rural areas in the Bodhgaya Planning area is lacking most basic

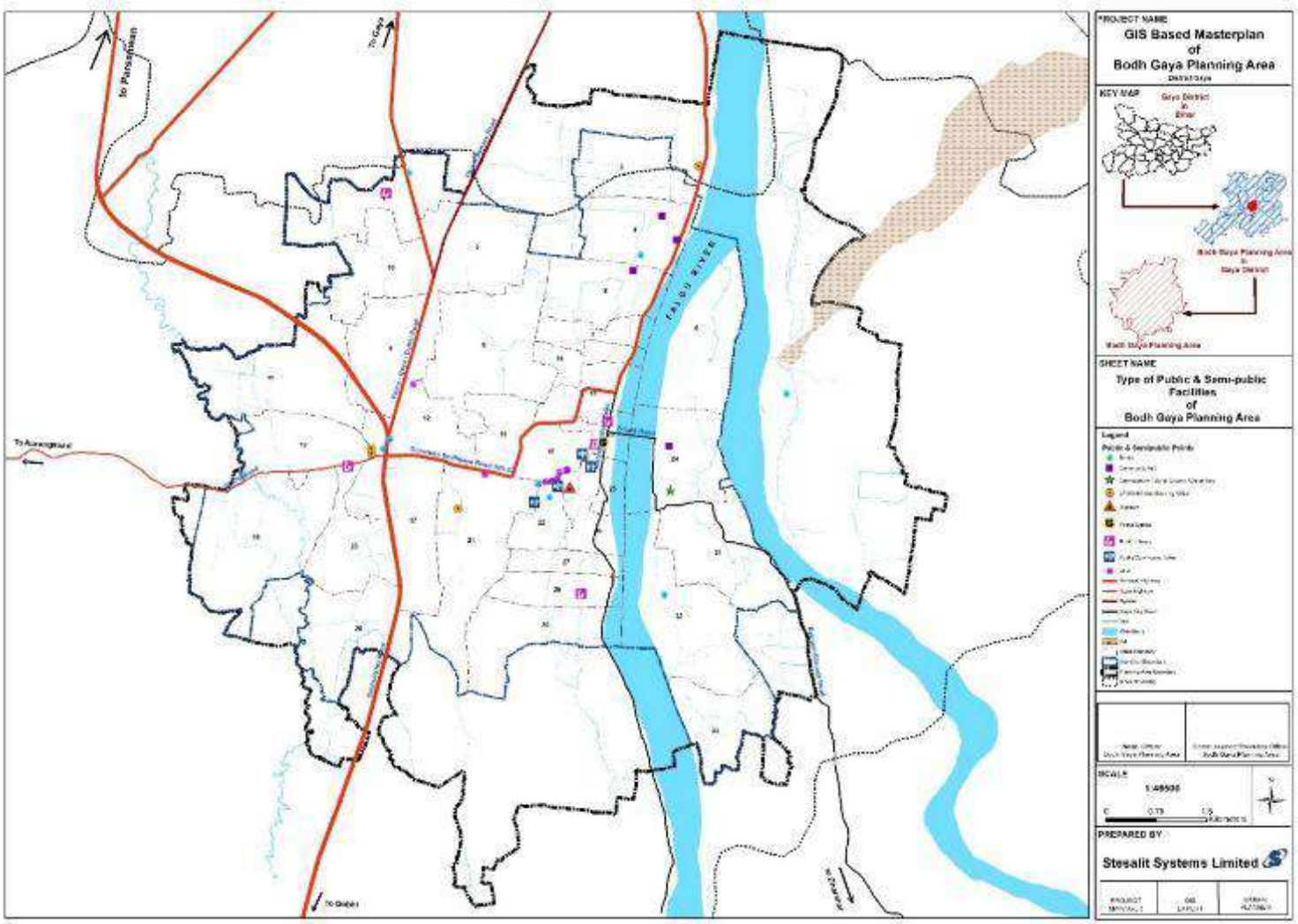
Socio Culture facilities like, ATM's, Banks, Community toilets, Police station, recreational facilities which needs to be addressed.

TABLE 12-7 EXISTING SOCIO-CULTURAL FACILITIES IN RURAL AREAS

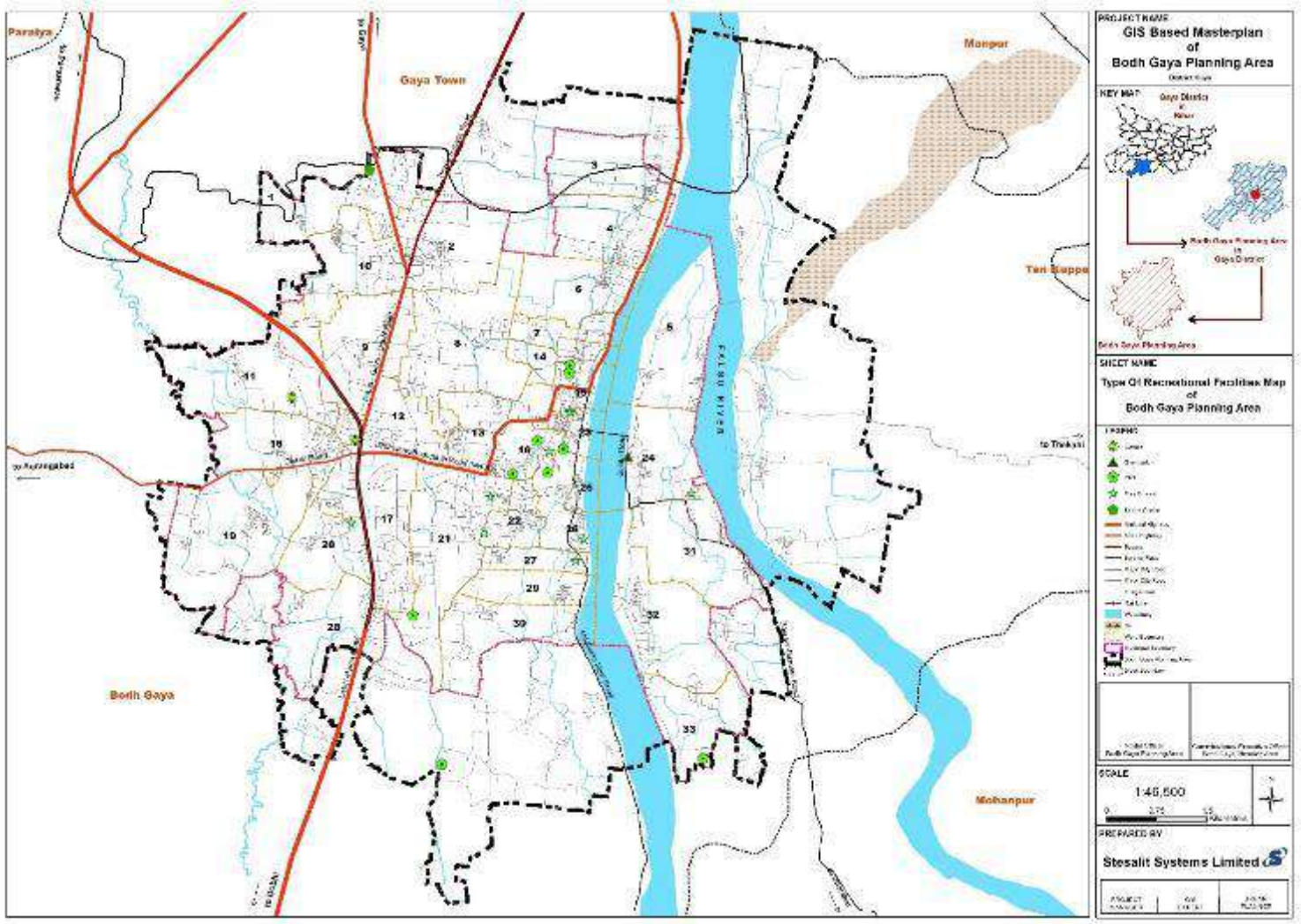
Name	Category	Sub-Category	Number
RURAL AREAS	Commercial	Function Hall / Marriage Garden	0
		General Business	30
		Hostel	0
		Hotel / Lodge / Restaurant	2
		Multiplex / Cinema	0
		Petrol Pump / LPG filling station	0
		Resort	0
		Retail	0
		Shopping Centre / Mall	0
		Storage Godown	6
		Warehouse	0
		Market (Daily & Weekly)	0
		Wholesale	0
	Communication	Post/Telegraph Office	0
		Radio/TV Station	0
		Telephone Exchange	0
		Satellite & Telecommunication Centre	0
	Others	Aquaculture	0
		Brick kiln	0
		Dairy farm	0
		Farm house	0
		Poultry farm	0
	Public Utilities	Electric Sub-Station	0
		Sewage Treatment Plant	0
		Water Treatment Plant	0
		Ground Level Resorver	0
		Water Pumping Station	0
		Electric Power Plant	0
	Public & Semi-public	ATM	0
		Banks	1
		Community hall	0
		Convention Centre	0
		Crematorium Burial Groun /Grave Yard	0
		Dharmashala	0
		Dhobi Ghat	0

		Guesthouse	1
		Jail	0
		LPG/CNG Gas Booking Office	1
		Museum	0
		Orphanage	0
		Police Station	0
		Private Office	0
		Public Library	0
		Public/Community Toilet	0
		Fire Station	0
		Social Welfare Centre	1
	Recreational	Club	0
		Garden	0
		Gymnasium	0
		Park	1
		Play Ground	0
		Sports Centre	0
		Stadium	0
	Religious	Aashram/Math/Bhojan Shala	0
		Church	0
		Gurudwara	0
		Monastery	1
		Mosque	1
		Temple	14
	State Govt. Property	Office	0
		Quarter	0
	Central Govt. Property	Quarter	0
		Office	0

Source: Land Use Survey 2024, Stesalit Systems Ltd.



MAP 12-3 PUBLIC AND SEMI PUBLIC MAP.



MAP 12-4 RECREATIONAL FACITIES MAP

12.4 SOCIO-ECONOMIC SURVEY ANALYSIS

12.4.1 SOCIAL INFRASTRUCTURE (URBAN)

12.4.1.1 EDUCATION

In urban areas of Bodhgaya Planning Area, 57.96% of the households surveyed have to cover about 0.5 km of distance to use primary education facilities. 28.34% households cover 0.5 to 1 km, 12.10% cover 1 to 2 km, 1.27% cover 2 to 5 km and the rest 0.32% are used to going above 5 km for using primary education facilities.

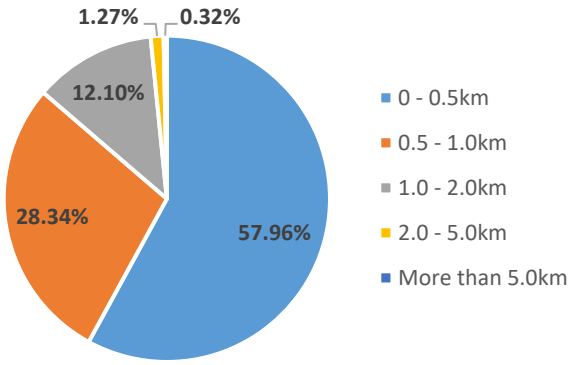


FIGURE 12-1 DISTANCE COVERED BY THE SURVEYED HOUSEHOLDS FOR PRIMARY EDUCATION FACILITIES IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

11.18% of the surveyed households in urban areas have to cover about 0.5 km of distance to use secondary education facilities. Most (41.21%) households cover 2 to 5 km while 10.86% cover 0.5 to 1 km, 28.75% cover 1 to 2 km and the rest 7.99% are used to going above 5 km for using secondary education facilities.

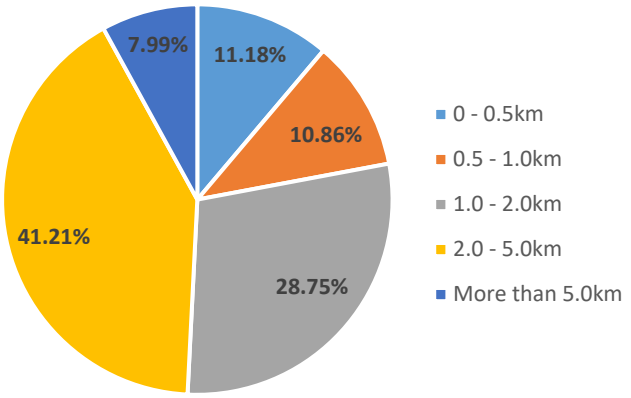


FIGURE 12-2 DISTANCE COVERED BY THE SURVEYED HOUSEHOLDS FOR SECONDARY EDUCATION FACILITIES IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

10.19% of the households surveyed in urban areas have to cover about 0.5 km of distance to use higher secondary education facilities. Most (50.32%) households cover 2 to 5 km while 20.70% cover 1 to 2 km, 7.64% cover 0.5 to 1 km, and the rest 11.15% used to go above 5 km in order to access higher secondary education facilities.

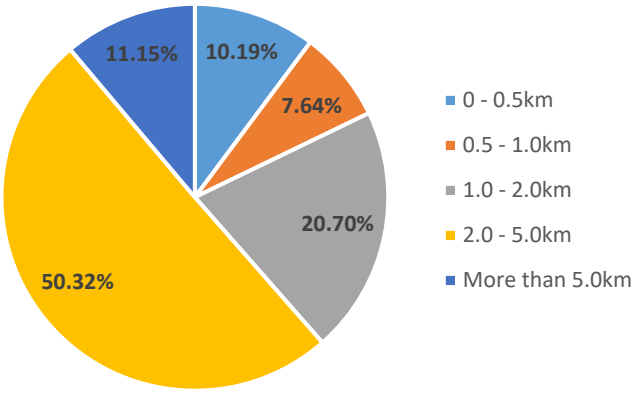


FIGURE 12-3 DISTANCE COVERED BY THE SURVEYED HOUSEHOLDS FOR HIGHER SECONDARY EDUCATION FACILITIES IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

0.32% of the households surveyed in urban areas have to cover about 0.5 km of distance to use higher education facilities. Most (51.36%) households cover more than 5 km while 3.04% cover 0.5 to 1 km and 8.64% cover 1 to 2 km. The rest 36.64% used to cover 2 to 5km in order to access higher education facilities like universities, colleges etc.

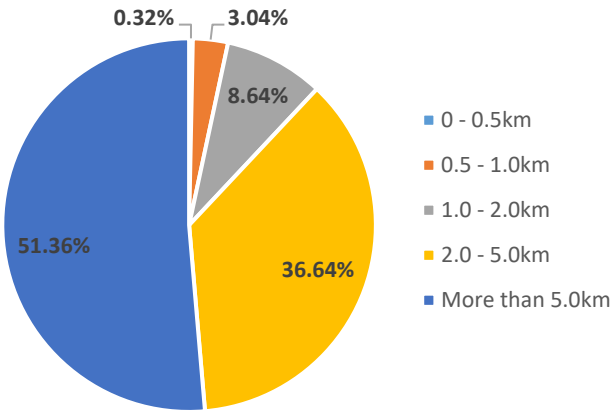


FIGURE 12-4 DISTANCE COVERED BY THE SURVEYED HOUSEHOLDS FOR HIGHER EDUCATION FACILITIES IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

It is observed that in the Primary education major part of the households have access to the within 1 km, although there are certain households which are traveling more than 1-2 km which needs to be addressed, The higher education and secondary education in the urban areas are observed that the major part of the households are traveling more than 2 km this could be due to unavailability of Higher education facilities nearby.

12.4.1.2 HEALTH FACILITY

9.87% of the households surveyed in urban areas have to cover about 0.5 km distance for the primary health centre, 10.19% cover 0.5 to 1 km, 17.83% cover 1 to 2 km, 35.67% cover 2 to 5 km and the rest 26.43% are used to go above 5 km for primary health centre.

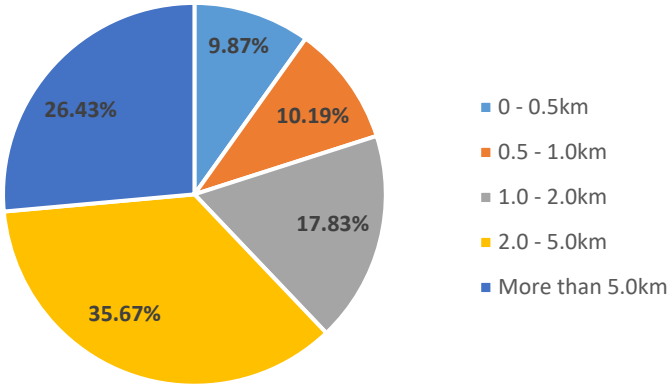


FIGURE 12-5 DISTANCE COVERED BY THE SURVEYED HOUSEHOLDS FOR PRIMARY HEALTH CENTRE IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

9.55% of the households surveyed in urban areas have to cover about 0.5 km distance for the hospital, 6.05% cover 0.5 to 1 km, 8.28% cover 1 to 2 km, 9.87% cover 2 to 5 km and the rest 66.24% used to go above 5 km to reach the Hospital.

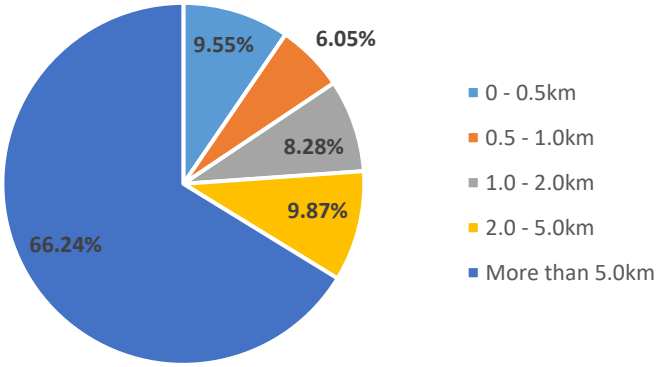


FIGURE 12-6 DISTANCE COVERED BY THE SURVEYED HOUSEHOLDS FOR HOSPITAL IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

6.43% of the households surveyed in urban areas have to cover about 0.5 km distance to use other medical facilities like dispensary, nursing home etc. 15.43% cover 0.5 to 1 km, 4.82% cover 1 to 2 km, 45.02% cover 2 to 5 km and the rest 28.30% are used to go above 5 km for the other medical facilities.

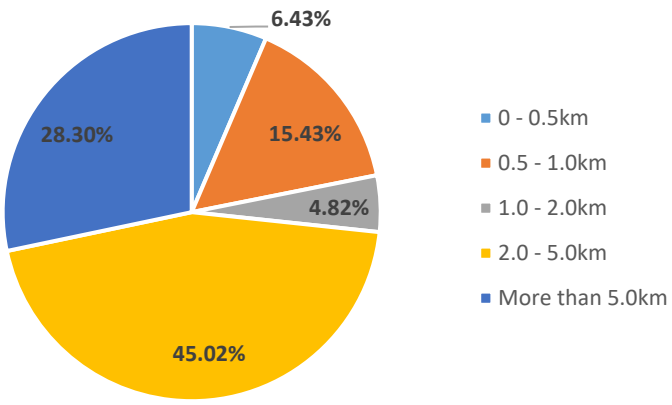


FIGURE 12-7 DISTANCE COVERED BY THE SURVEYED HOUSEHOLDS FOR OTHER MEDICAL FACILITIES IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

It is observed that the Major Households travel more than 2km to access primary health care. Hospitals are accessible within 1 km, where as other facilities like nursing homes, dispensaries are accessible within 2-5km.

12.4.1.3 PUBLIC AMENITIES

Analysing the proximity of public amenities in the urban areas provides insights into households' accessibility to essential services within convenient distances, highlighting whether residents benefit from the ease of access to these amenities.

12.4.1.3.1 PROXIMITY TO PUBLIC AMENITIES WITHIN THE URBAN AREA

Within the 0 - 0.5 km range, some facilities such as Banks (10.83% of the household), post office (23.57% of the household) and community halls (46.50% of the household) are available. However, parks & playgrounds, markets, ATMs, and Police Station facilities are notably absent within the range of 0 - 0.5 km. As the distance increases to 0.5 -1 km, the access improves for playgrounds (15.29% households), markets (16.88% households), police station (11.15% households) and parks (8.28% of the household) and other services, but beyond 1 km, there is a marked increase in accessibility for all services. Parks & playgrounds, markets, banks & ATMs has become more accessible beyond 1 km. The access of police stations & post offices has improved beyond the radius of 2km.

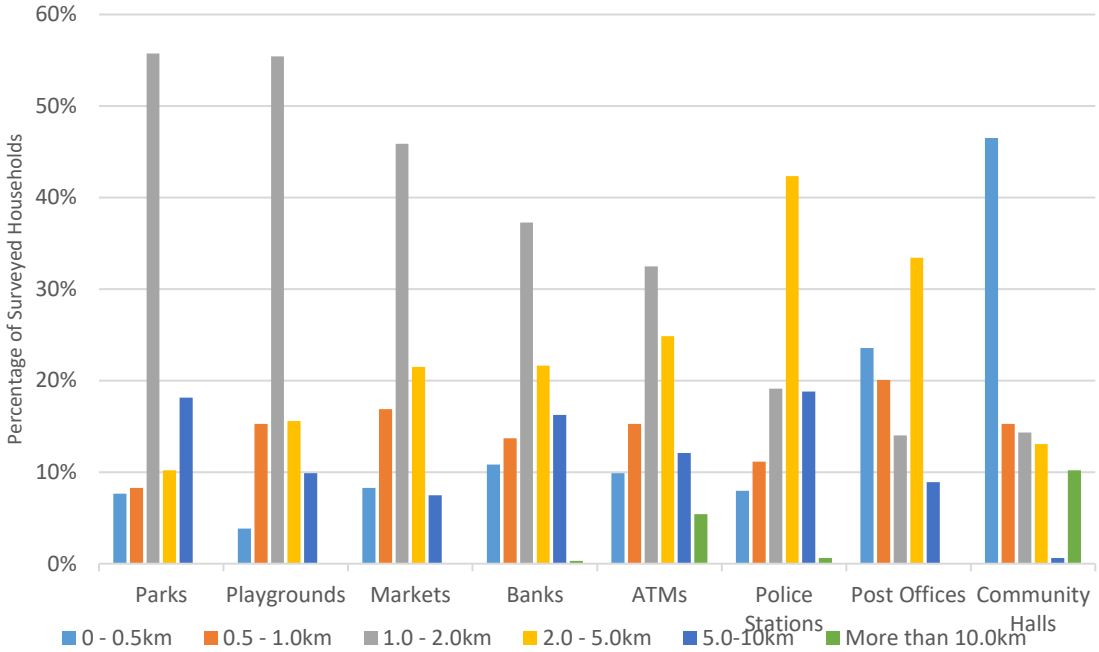


FIGURE 12-8 PROXIMITY TO PUBLIC AMENITIES IN URBAN AREA

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

12.4.2 SOCIAL INFRASTRUCTURE (RURAL)

12.4.2.1 EDUCATION

65.65% of the households surveyed in rural areas have to cover about 0.5 km distance to use primary education facilities, 31.30% cover 0.5 to 1.0km, 2.29% cover 1.0 to 2.0 km and the rest go above 2 km for using primary education facilities.

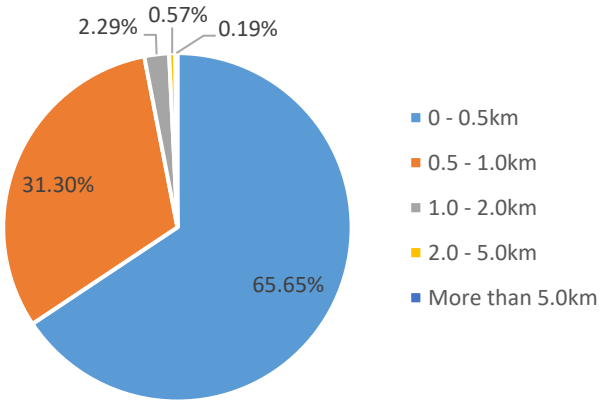


FIGURE 12-9 DISTANCE COVERED BY THE SURVEYED HOUSEHOLDS FOR PRIMARY EDUCATION FACILITIES IN RURAL AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

14.12% of the households surveyed in rural areas have to cover about a 0.5 km distance to avail higher secondary education facilities, 16.03% cover 0.5 to 1.0 km, 20.23% cover 1.0 to 2.0 km, 28.82% cover 2-5km and the rest 20.80% go above 5km for using higher secondary education facilities.

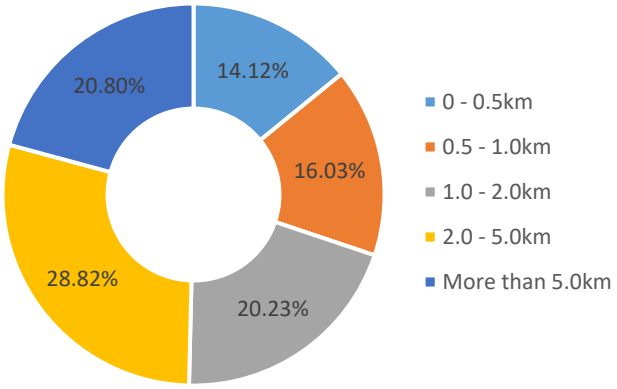


FIGURE 12-10 DISTANCE COVERED BY THE SURVEYED HOUSEHOLDS FOR HIGHER SECONDARY EDUCATION FACILITIES IN RURAL AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

Most of the surveyed households have to cover more than 5 km distance to use higher education facilities such as colleges and universities. People from the rural areas typically travel to Bodhgaya town to use the facilities for higher education.

12.4.2.2 HEALTH FACILITY

Same as higher education, almost all the surveyed households have to cover about more than 5 km distance to use government hospital facilities. People from the rural areas typically travel to Bodhgaya town to use the health facilities. There are some dispensaries and primary health centres which are mostly availed by the all the people.

12.4.2.3 PUBLIC AMENITIES

Analysing the proximity of public amenities in the rural areas provides insights into households' accessibility to essential services within convenient distances, highlighting whether residents benefit from the ease of access to these amenities.

12.4.2.3.1 PROXIMITY TO PUBLIC AMENITIES WITHIN THE RURAL AREAS

Within the range of 0-0.5km, most facilities such as parks, playground, markets, banks, ATMs, and police stations are not available except post office and community halls. For amenities within 1–2 km, a certain proportion of households can reach parks (25%), playgrounds (63.55%), markets (22.90%), post office (17.75%), and community halls (10.31%). As the distance increases beyond 2 km, the accessibility of certain amenities rises significantly. Almost all the amenities are more or less accessible within the radius of 5 km for the higher portion of households. Whereas 54.58% of households can access Banks, 53.82% can access ATMs and 45.42% can access Police Stations after 5 km range.

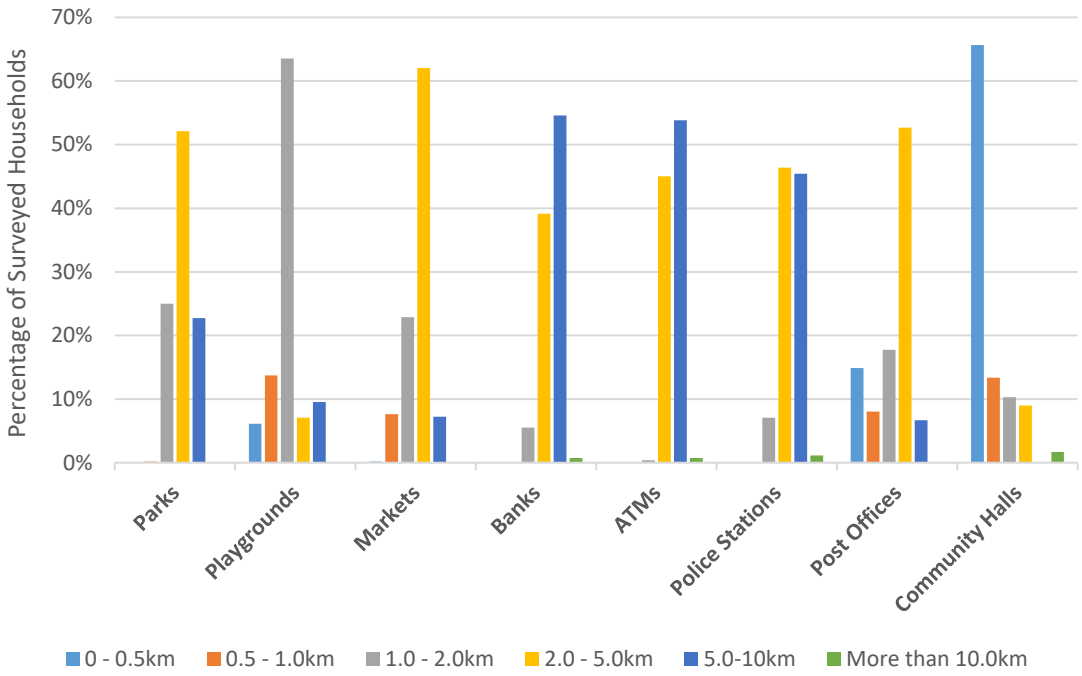


FIGURE 12-11 PROXIMITY TO PUBLIC AMENITIES IN THE RURAL AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

12.5 GAP ANALYSIS OF SOCIO-CULTURAL FACILITIES

12.5.1 GAP ANALYSIS FOR EDUCATIONAL FACIITIES

Area	Category	Existing Numbers	Requirements	URDPFI	Gap
Bodhgaya (NP)	School	115	20	5000	+95
	University	1	1	1-10 Lakh	No
	College	9	1	1-1.25lakh	+8
	Training Institute	9	1	1-1.25lakh	+8
Rural Areas	School	23	7	5000	+16
	Training Institute	1	1	1-1.25lakh	No
	Total	158			

Overall, the gap analysis reveals that Bodhgaya does not face any deficit in terms of educational facilities as per URDPFI standards. In fact, there is a surplus in almost all categories, including schools, colleges, and training institutes. The priority, therefore, should not be on increasing the number of institutions but on improving the quality of education, strengthening infrastructure, ensuring equitable access, and aligning vocational training with local employment opportunities.

12.5.2 GAP ANALYSIS FOR HEALTH SECTOR

Area	Category	Existing No.	Requirements	URDPFI	Gap
Bodhgaya (PA)	Clinic/Dispensary	9	9	15000	No
	Diagnostic Centre	1	3	50000	-2
	Govt. Hospital	0	1	1.25 Lakh	-1
	Nursing Home	2	3	45000-1 Lakh	-1
	Primary/Community Health Centre	1	5	30000	-4
	Veterinary Hospital	1	1	1-5 Lakh	No
	Private Hospital	11	2	1 Lakh	+9
	Total	**24**			

In contrast, the health sector reflects a more critical situation. While clinics/dispensaries and veterinary hospitals are adequate, and private hospitals are found in surplus, there are glaring deficiencies in essential public health infrastructure. The absence of a government hospital and the shortage of diagnostic centres, nursing homes, and primary/community health centres highlight the imbalance between private and public healthcare facilities. This imbalance poses challenges of accessibility and affordability, particularly for economically weaker populations who may not be able to rely on private health services.

12.5.3 GAP ANALYSIS FOR PUBLIC AND SEMI PUBLIC

Area	Category	Existing No.	Requirements	URDPFI	Gap
Bodhgaya (PA)	Bank	7	2	90000	+5
	Community Hall	4	3	60000	+1
	Crematorium/ Burial ground	2	2	1 Lakh	No
	Gas Booking Office	5	2	1 Lakh	+3
	Museum	1	1	5 Lakh	No
	Police Station	1	2	90000	-1
	Public Library	4	2	1 Lakh	+2
	ATM Service	20			
	CT/PT	23	3	50000	+20
Total		**67**			

Bodhgaya has a strong base of public and semi-public facilities, with a surplus in banks, ATMs, community halls, libraries, and sanitation facilities. Essential civic and cultural requirements such as crematoriums and museums are also adequately provided. However, the shortfall in police stations highlights the need for

strengthening law and order infrastructure. Moving forward, planning should focus on improving quality, maintenance, and accessibility of existing facilities while addressing the shortage in critical services like police stations to ensure balanced urban development.

12.5.4 GAP ANALYSIS FOR RECREATIONAL FACILITIES

	Existing No.	Requirements	URDPFI	Gap
Garden	2	14	10000	-12
Park	6	2	1 Lakh	+4
Play Ground	9	14	10000	-5
Water Park	3			

Bodhgaya demonstrates adequate recreational opportunities in some areas but faces serious shortfalls in others. While parks and water parks are well provided, there is a pressing need to expand gardens and playgrounds to meet both the URDPFI standards and the recreational needs of the local population. Addressing these gaps will ensure a healthier urban environment, promote community well-being, and enhance Bodhgaya's image as a balanced and sustainable tourist and pilgrimage destination.

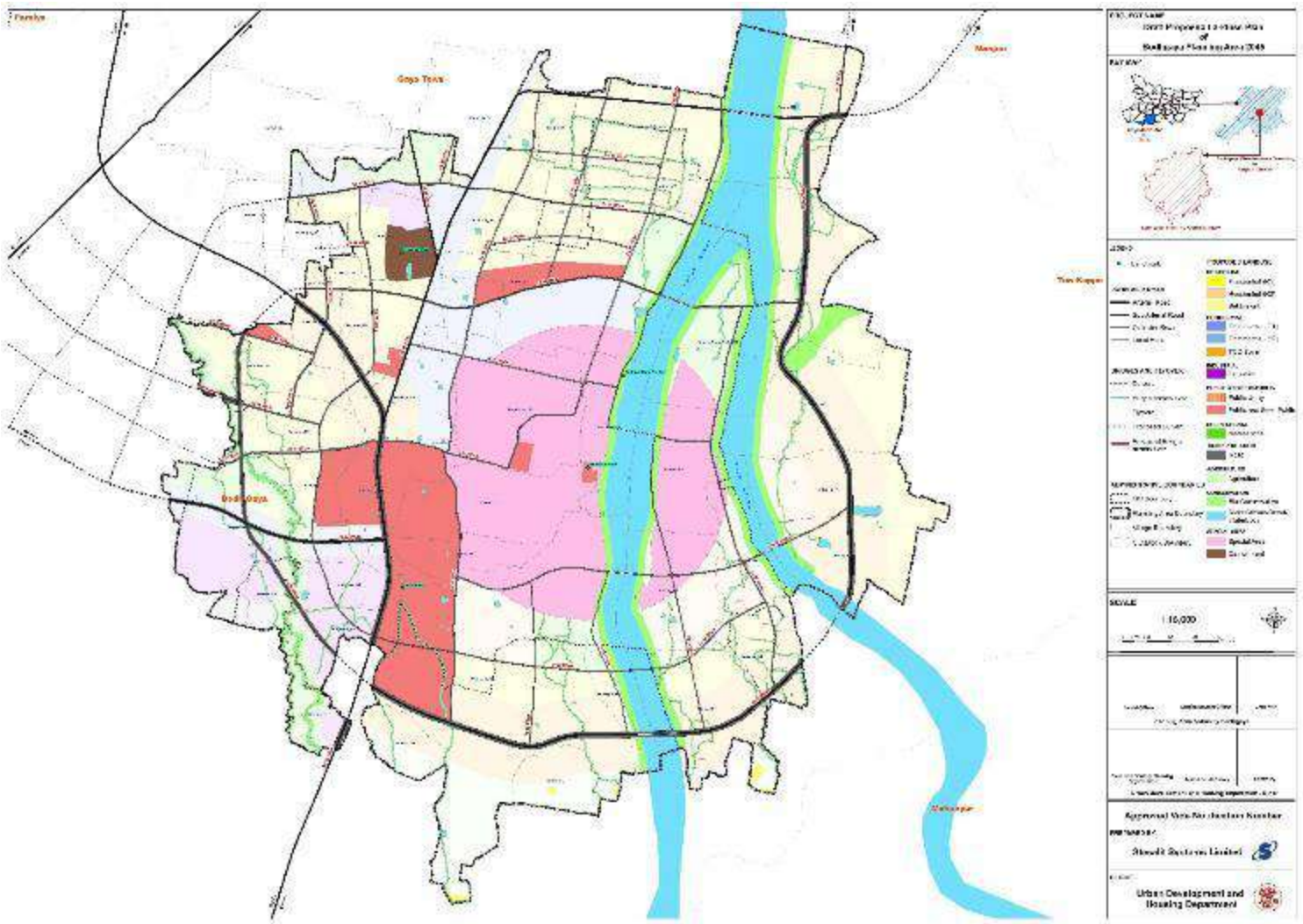
The comprehensive gap analysis of Bodhgaya, undertaken in line with URDPFI guidelines, highlights a mixed picture of infrastructure availability across the sectors of education, health, public and semi-public services, and recreation. While certain sectors demonstrate a surplus in facilities, others reflect critical shortages that require immediate planning intervention. Overall analysis shows that Bodhgaya's strengths lie in its surplus of educational institutions, private healthcare, financial services, and select recreational facilities, while the key gaps exist in public healthcare, safety infrastructure, and open green spaces. Moving forward, the emphasis of planning should be on improving the quality of education, addressing healthcare deficiencies through stronger public facilities, strengthening law and order services, and expanding gardens and playgrounds to ensure a healthy and sustainable environment for residents and visitors alike. Addressing these gaps will be essential for strengthening public amenities and enhancing the quality of life in Bodhgaya.

12.5.5 RECREATIONAL

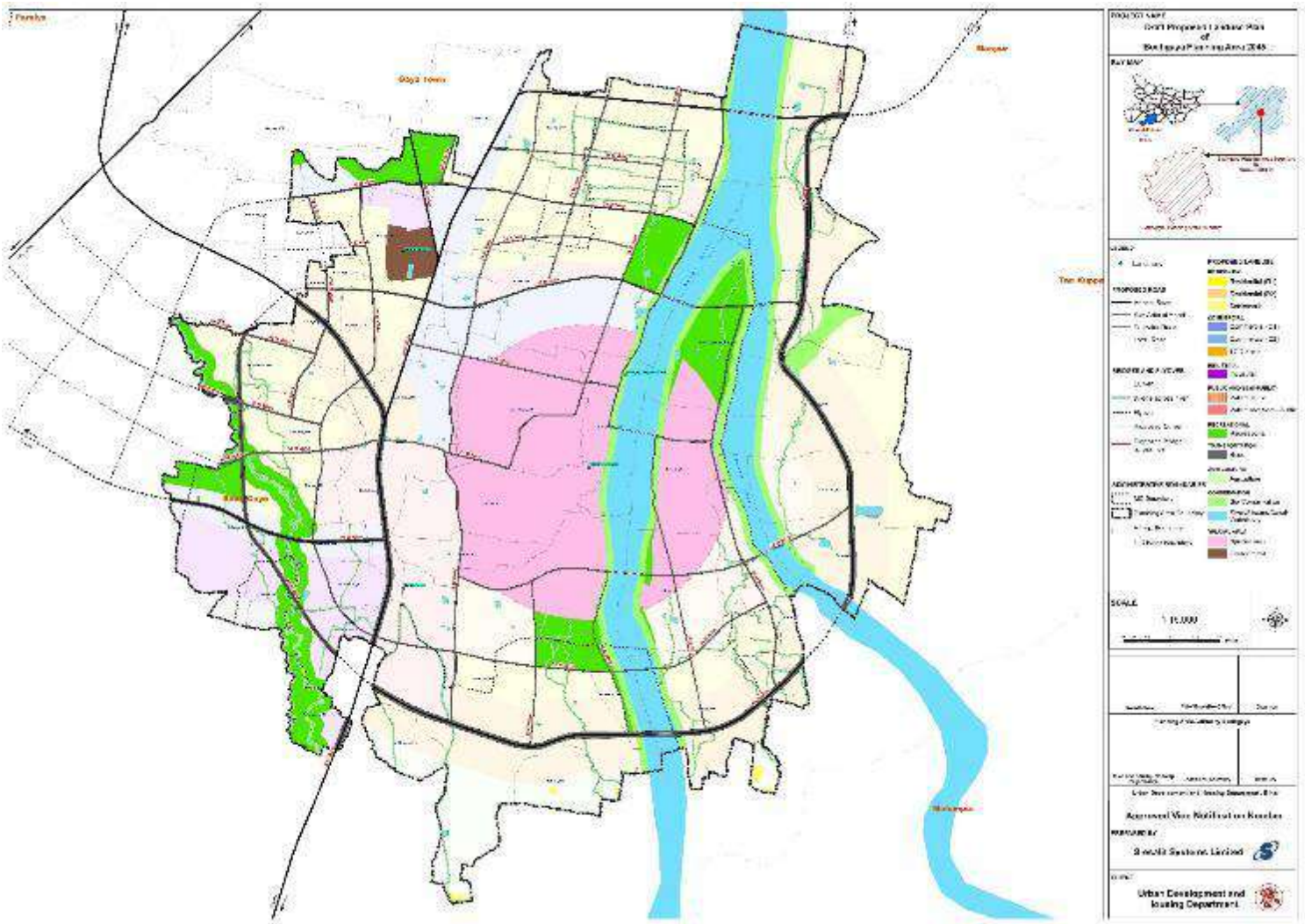
The development of Integrated Urban Parks (Recreational Spaces) is proposed to address the significant gap in organised green and recreational areas within the planning area, particularly for youth, children, and elderly residents. A cumulative area of approximately 10–12 hectares is recommended to be developed as integrated parks that serve multiple recreational and social functions. Each park should include a multi-use playfield (1.5–2 ha) to support sports and community events, open lawns and children's play areas (2–3 ha) for informal recreation and family activities, and a jogging track with green buffers (3–4 ha) to promote health, walking, and ecological benefits. Additionally, parking and service areas (0.5–1 ha) should be incorporated to ensure accessibility and operational efficiency.

The proposal aligns with URDPFI guidelines, which recommend provision of 10–12 sq.m of recreational open space per capita, and supports initiatives such as AMRUT Urban Greens and Khelo India, encouraging active lifestyles and inclusive public spaces. These integrated parks will enhance urban livability, improve environmental quality, and create accessible recreational hubs contributing to physical well-being and social interaction.

A stadium is proposed as a major recreational and sports infrastructure to promote physical activity, community engagement, and regional-level events. Strategically located with good accessibility and adequate supporting facilities, it will serve as a multi-purpose venue for sports, cultural programs, and public gatherings, contributing to social development and enhancing the city's recreational network.



MAP 12-5: PROPOSED PUBLIC-SEMI PUBLIC ZONE



MAP 12-6: PROPOSED RECREATIONAL ZONE

12.6 Public & Semi-Public Land use

Public Semi-Public (PSP) Zones are designated to accommodate institutional, social, cultural, educational, and community-oriented facilities that support public services and collective urban functions. These zones ensure planned development of essential infrastructure while allowing compatible ancillary uses to enhance functionality and accessibility.

12.6.1 PUBLI & SEMI-PUBLIC-PSP1

PSP-1 zones include a wide range of institutional and community facilities such as government, private, and semi-government offices, educational institutions (colleges, schools, libraries), hospitals and health centres, social and cultural institutions, religious buildings, conference and community halls, marriage halls, Dharamshala's, museums, art galleries, exhibition halls, auditoriums, and post offices. In addition to these permitted uses, certain supportive developments are permissible, including residential apartments, group housing, IT services, hostels, transit accommodations, entertainment and recreational complexes, residential clubs, and guest houses, ensuring mixed institutional environments. Planning and development in this zone follow provisions of the Bihar Building Bye-laws (BBL) 2014 and relevant AMRUT design and infrastructure standards.

12.6.2 PUBLI & SEMI-PUBLIC-PSP2

PSP-2 zones are primarily intended for specialised institutional uses such as research and development centres, conference and community halls, auditoriums, post offices, jails, police stations, guest houses, credit societies, and educational facilities. Permissible ancillary uses include defence quarters, hostels, welfare centres, and guest houses that support institutional operations and personnel requirements.

12.6.3 PUBLI & SEMI-PUBLIC-PSP3

PSP-3 zones represent all existing Public Semi-Public uses within the planning area, ensuring their recognition and continued functioning within the proposed land-use framework while allowing for upgrades and improvements as per planning norms and regulatory guidelines.

12.7 Recreational Landuse

12.7.1 RECREATIONAL-RC

RC-1 (Neighbourhood/Residential Recreational Area) refers to recreational spaces planned within or near residential areas to enhance community well-being, environmental quality, and everyday social interaction. These areas primarily include parks, playgrounds, open green spaces, children's play areas, jogging tracks, yoga parks, community gardens, open lawns, sports courts, and landscaped urban greens with seating and relaxation spaces. Limited supportive facilities such as small kiosks, public toilets, community halls, fitness centres, open-air cultural activity spaces, and small-scale EV charging stations may be permitted

to improve usability and accessibility. However, large commercial developments, amusement parks, high-noise activities, heavy traffic-generating uses, and industrial activities are generally restricted to maintain the peaceful character and safety of residential neighbourhoods.

12.7.2 RIVERFRONT DEVELOPMENT:

The riverfront will serve as an important cultural and recreational corridor, providing spaces for leisure activities, community gatherings, and tourism-related amenities. Careful planning will ensure that development remains environmentally sensitive, with adequate green buffers, stormwater management measures, and preservation of natural riverine features. The proposed riverfront development is expected to strengthen the town's visual character, improve the urban environment, and create a vibrant public realm for both residents and visitors.

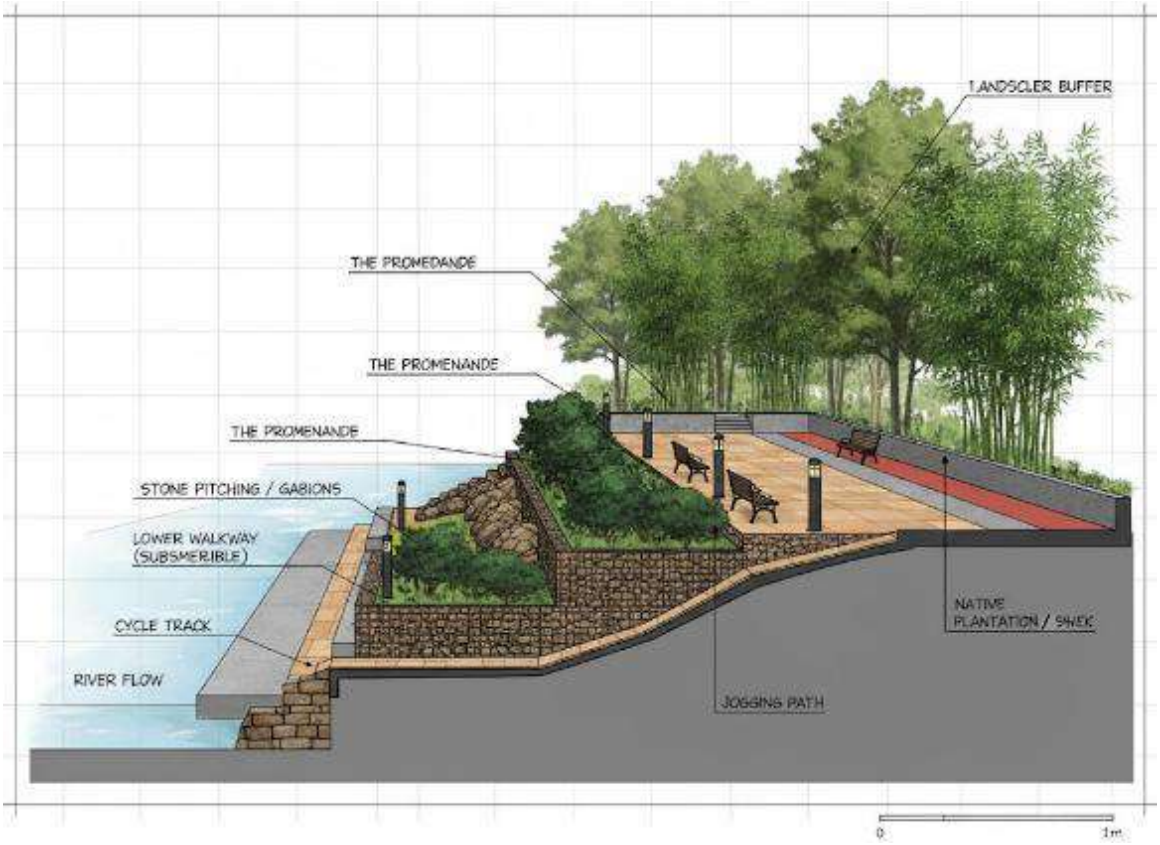


FIGURE 12-12: CONCPTUAL SECTION OF PROPOSED RIVER FRONT AT FALGU RIVER

Source: AI Generated Image, Gemini-Google

13 TRAFFIC AND TRANSPORT

13.1 REGIONAL CONNECTIVITY

A town thrives on a well-planned transport and communication network, just like a body relies on a healthy circulatory system. Roads of various classifications, from National highways, and other district roads acting as major arteries to local streets serving as capillaries, form the veins of this network. These routes keep the town connected to the outside world through railways and major highways, enabling the flow of goods and people. Internally, a well-designed network ensures efficient movement within the town, minimizing travel times and costs.

Transport & communications play a dynamic role in stimulating the development of a town or a region. It is therefore necessary that transportation facilities are planned well in advance. External communication generally includes railway & road systems starting from minor village roads to arterial roads & expressways.

13.1.1 RAIL TRANSPORT

Regrettably, Bodhgaya's absence of a railway station limits its ability to be connected by road to other areas. Gaya Junction Railway Station, which is roughly 15 kilometers distant, is the closest railway station to Bodhgaya. For long-distance travel, this absence forces travellers to rely mostly on roadways.

13.1.2 AIR TRANSPORT

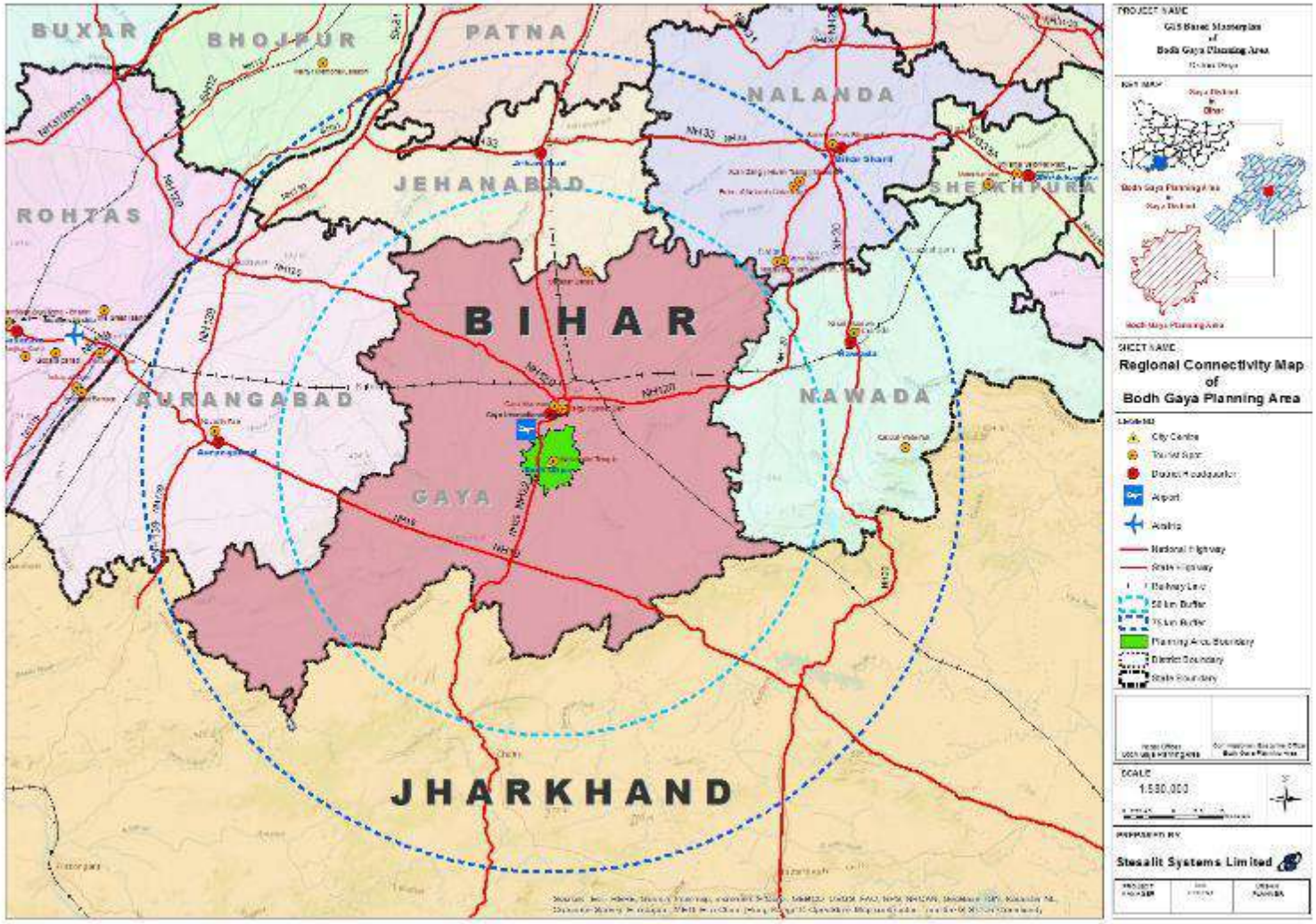
The closest airport to Bodhgaya is Gaya International Airport which is about 12 kilometers away. This absence forces travellers to rely primarily on railways and roads for long-distance journeys. While these options offer affordability and reach a wider range of destinations, they can be time-consuming and less convenient compared to air travel. This limited air connectivity might pose a challenge for business trips, urgent travel needs, or those seeking faster connections.

13.1.3 ROAD TRANSPORT

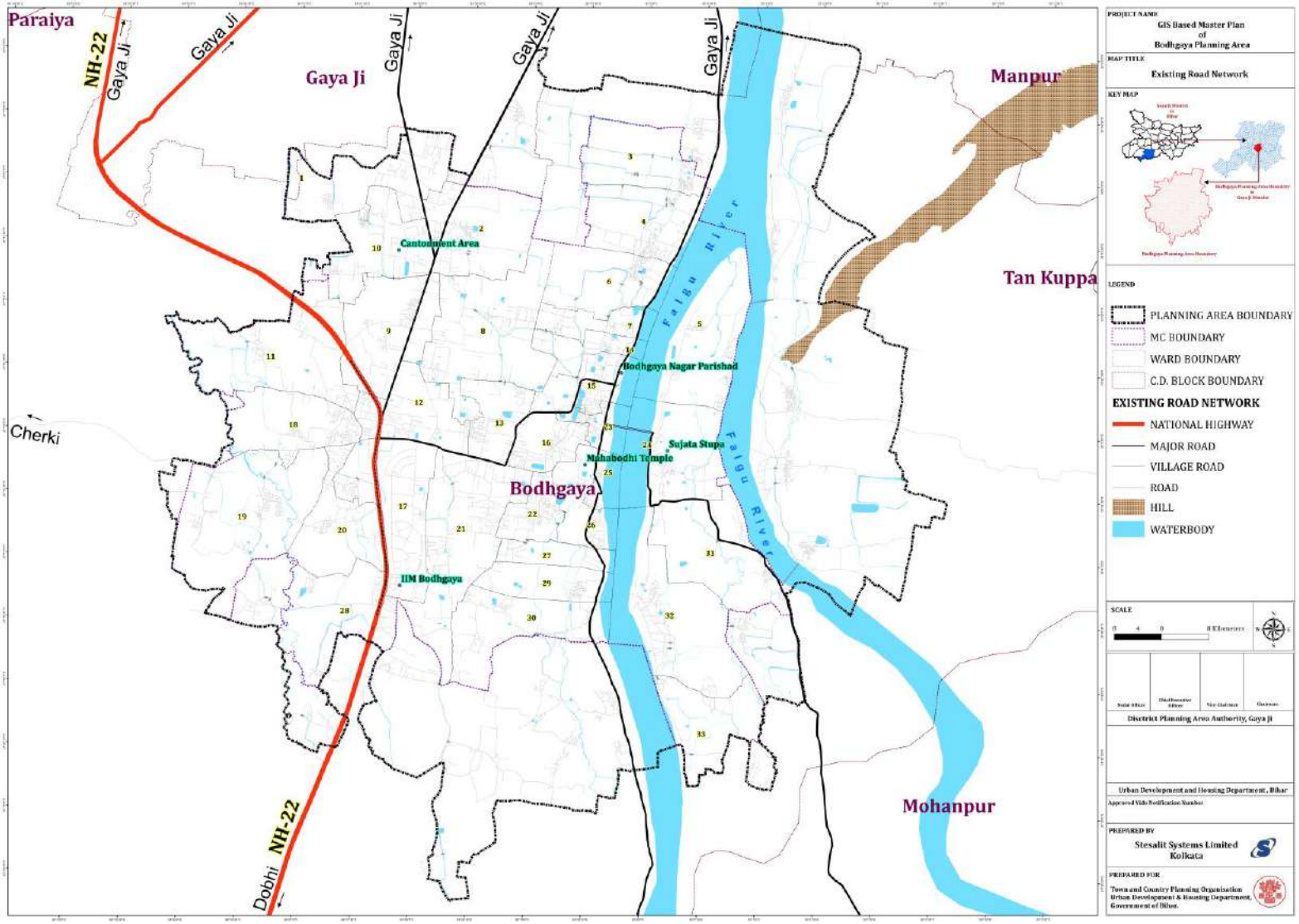
Bodhgaya, being an internationally significant religious and cultural destination, is well-connected regionally through a network of National Highways (NH), State Highways (SH), and major district roads. The planning area benefits from its strategic location, linking it effectively with key urban centers in Bihar and beyond.

The major spine of connectivity is National Highway-22 (NH-22), which connects Bodhgaya to Gaya city (12 km north) and extends further to Patna, facilitating smooth movement of pilgrims, tourists, and goods. This corridor also acts as the primary link between Bodhgaya and the Gaya Airport, which is located in close proximity. Another important linkage is NH-2 (Grand Trunk Road), accessed via Gaya, which provides long-distance regional connectivity to metropolitan regions such as Kolkata and Delhi.

Additionally, State Highway-4 (SH-4) provides vital east–west connectivity, linking Bodhgaya with Nawada and Rajgir, further integrating it into the Buddhist tourism circuit. Secondary roads and district roads connect smaller settlements and rural hinterlands around the Bodhgaya Planning Area, ensuring accessibility to nearby towns and villages.



MAP 13-1 REGIONAL CONNECTIVITY MAP OF BODHGAYA PLANNING AREA



MAP 13-2 EXISTING ROAD NETWORK OF BODHGAYA PLANNING AREA

13.2 EXISTING TRANSPORT INFRASTRCUTURE

13.2.1 PRIMARY ROAD NETWORK

The Buddhist sacred town of Bodhgaya is connected to other cities and areas by a road system. Major highways like National Highway 22 probably run close to or through the town, making it possible to travel to other parts of Bihar and beyond, even though the precise details of local streets are harder to find. In addition, Bodhgaya probably uses a combination of minor roads and state highways to handle traffic in the town, accommodating pilgrims and visitors to the Mahabodhi Temple Complex and other holy locations. The primary modes of transport include motorized two wheelers, four wheelers, auto-rickshaws, bicycles, E-rickshaws, and trucks (HCV) with limited public transportation options. The influx of goods vehicles, due to the town's commercial activities, adds to the traffic woes.

The NH 22 via Bodhgaya planning zone emphasizes the importance of integrated transport planning and infrastructure development. Bodhgaya and the neighboring areas' sustainable growth and urban fabric are largely influenced by the effective management of traffic flow, enhanced connectivity, and optimized urban mobility.

The connectivity within the Bodhgaya Planning Area seems quite robust and diverse, with multiple key road networks facilitating both intra and inter-regional movement. The presence of one National Highway (NH) — NH-22 makes the area highly accessible.

The Patna Gaya Dobhi Road, also known as NH-22, is the region's lifeline because it connects many important towns and has a major positive impact on their economic health. It acts as the principal route that makes it easier for goods and people to go from Patna to the Bodhgaya Planning Area. All the associated centres' economic development is aided by this effective traffic flow. All things considered, NH-22 is an important transit route, and the region's economic health depends on its ability to relieve traffic on the Bodhgaya Road network.

Connection between Bodhgaya and Patna: The Patna-Gaya-Dobhi Road, usually referred to as NH-22, is the main thoroughfare in Bodhgaya. The NH-22 serves as a significant route for trade and transport, facilitating the efficient exchange of products and services between the two cities. The NH-22 is expected to expedite travel times and enhance traffic efficiency for both Patna visitors and Bodhgaya locals.

- **Patna-Gaya-Dobhi Road (NH-22)**
  NH-22 is an essential route that offers long-distance drivers, especially those going from Bodhgaya to Patna, a less congested option. Integrated planning is essential to maximising efficiency within the Bodhgaya planning boundary. To guarantee good traffic flow on NH-22, this could entail implementing strategies like synchronised traffic lights, clear signs directing drivers to the proper route, and dedicated lanes for through traffic. Planners can improve traffic flow throughout the area and help both locals and long-distance commuters by carefully regulating this crossroads.

13.2.2 SECONDARY ROAD NETWORK

The elaborate system of defined roads plays a significant role in enhancing connectivity, managing traffic, and facilitating mobility inside and around Bodhgaya. Efficient planning and coordination are necessary to provide smooth urban travel for residents and commuters while also making the best use of these routes.

- **Gaya-Bodhgaya Road**
  By connecting Ashok Vihar Colony, the Gaya-Bodhgaya Road serves as a vital route that reduces traffic in the city centre. It redirects traffic, especially long-haul cars and commuters going to Bodhgaya's western areas, by connecting to NH 22. Everyone on the road benefits from this since it not only shortens travel times for individuals utilising the road but also facilitates traffic flow on the major thoroughfares. Because of its ability to facilitate the flow of goods and services between these areas, this connectedness promotes economic activity.

- **Cherki Road**
  An important secondary route that links Shekhar Bigha with Bodhgaya is the Cherki Road. The flow of people between the two sites is greatly aided by this tactical corridor. It is probably the main route used by commuters who are going somewhere for business, school, or pleasure.

- **Tikuna Bypass Road**
  The Tikuna Bypass Road winds across the terrain and is an essential bypass road that connects Ashok Vihar Colony to NH-22. This key secondary road provides homeowners and commuters with a vital route by serving as a major bypass link to NH-22. Most likely, those who are travelling for work or school choose this important route as their main route.

- **Sujata Road**
  The Sujata Road is a crucial secondary road connecting Bodhgaya to Sujata and Bakraour. This strategic corridor plays a vital role in the movement of people between the two locations. It likely serves as a primary route for commuters traveling for work, education, or personal reasons.

- **Mocharim Kosla Road**
  An important secondary route that connects Bodhgaya to Mocharim and Bhojawar is the Mocharim Kosla Road. The flow of people between the two sites is greatly aided by this tactical corridor. It is probably the main route used by commuters going somewhere for business, school, or pleasure.

- **Godown Road**
  The Godown Road is a crucial secondary road connecting Verma more to Mausa more. This strategic corridor plays a vital role in the movement of people between the two locations. It likely serves as a primary route for commuters traveling for work, education, or personal reasons.

- **Domuhan Bodhgaya Road**
  An important secondary route that links Domuhan with Bodhgaya is the Domuhan Bodhgaya Road. It meets up with NH-22 close to Domuhan Bazaar. The flow of people between the two sites is greatly aided by this tactical

corridor. It is probably the main route used by commuters going somewhere for business, school, or pleasure.

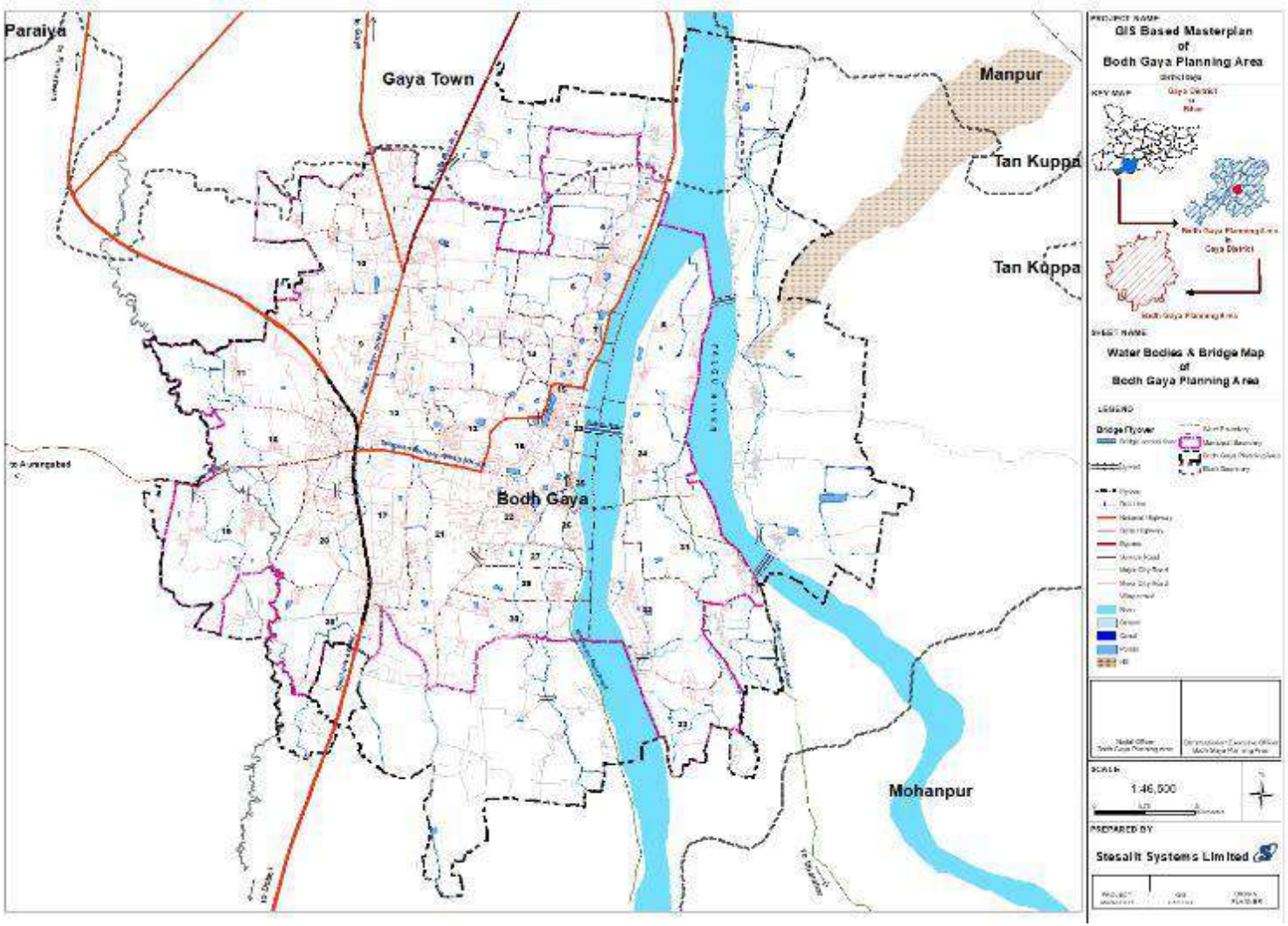
The secondary road network in the Bodhgaya Planning Area is mainly made up of undivided two-lane, two-way roads. When it comes to traffic flow, these highways are more capable than single-lane roads. But because of the variations in their width across the network, it is crucial to be mindful of any lane size changes when driving. One typical asphalt material that offers a long-lasting and somewhat smooth driving experience is bitumen. In addition, some of these secondary roads have the proper road markings installed, which are essential for encouraging orderly and safe traffic flow. Lane dividers, stop lines, and directional arrows are probably among these markings; they all work together to improve driver awareness and lower the number of accidents.

13.2.3 CONDITION OF ROAD

Mostly the roads in the Bodhgaya Nagar Panchayat area are a combination of Bitumen roads and Asphalt roads. Also, the Highways passing through the city are made from bitumen.

The Bodhgaya's Road network confronts many obstacles despite its secondary network and strategic bypass. The main offenders that reduce the amount of useable roadway are unmanaged roadside encroachments and uncontrolled on-street parking. This results in traffic jams and bottlenecks, along with careless parking practices and a general disregard for lane discipline. Moreover, the issue is made worse by the lack of enforcement of traffic laws, which encourages cars to break the law and add to the general pandemonium.

- **Bottlenecks at Junctions:** The presence of bottlenecks at various junctions significantly hampers traffic flow. These congested points often lead to delays as vehicles struggle to navigate through intersections, causing disruptions in the overall movement within the Bodhgaya planning area. Addressing these bottlenecks is crucial to ensuring smoother traffic flow.
- **Insufficient Right of Way (ROW) and Carriageway Width (COW**): The roads' limited ROW and COW contribute to congestion and reduced comfort for road users. Narrow roads or insufficient space for vehicles affect traffic capacity, leading to congestion during peak hours. Expanding ROW and widening carriageways could help alleviate this issue by allowing for smoother traffic movement and accommodating a higher volume of vehicles.
- **Lack of Infrastructure Development:** Inadequate infrastructure development, such as outdated or insufficient road designs, absence of proper signage, inadequate lighting, and poor road maintenance, can collectively impact the overall level of service and comfort for commuters. Upgrading infrastructure and ensuring proper maintenance can significantly enhance the road network's efficiency and user experience.



MAP 13-3 FLYOVER CULVERTS AND FOOTOVER BRIDGE MAP OF BODHGAYA PLANNING AREA

Source: Transportation Survey, 2024, Stesalit Systems Ltd.

13.2.4 PUBLIC TRANSPORT

Bodhgaya's Road network serves as its sole lifeline for communication and transportation. However, the system struggles with last-mile connectivity, leaving commuters to navigate potentially inadequate local transport options to reach their final destinations. Adding to the inconvenience, the bus stand itself lacks basic amenities like proper cleaning and seating areas. While private developers offer some relief with bus services to nearby towns and cities, a more comprehensive public transport system with improved last-mile connectivity and well-maintained bus stands is likely necessary to address Bodhgaya's growing needs.

Public transport in Bodhgaya faces challenges that need strategic interventions for improvement.

1. Last-Mile Connectivity Improvement:

Collaborate with local authorities and the Bihar State Road Transport Corporation (BSRTC) to enhance last-mile connectivity within Bodhgaya town.

Identify key areas where last-mile connectivity is lacking and work towards establishing feeder services or alternative transport options.

2. Optimize Bus Stop Utilization:

To maximize the efficiency of the new bus stop and combat congestion, collaboration with the Bihar State Road Transport Corporation (BSRTC) is crucial. By working together, a designated pick-up and drop-off system for different routes can be established. This would involve clear signage and markings strategically placed within the bus stop, directing buses to specific bays or zones. This organized approach will minimize confusion and manoeuvring, ensuring a smooth flow of incoming and departing buses.

3. Enhance Bus Stop Amenities:

Advocate for the installation of benches, shelters, and other amenities at the Bus Stop to enhance the comfort of passengers waiting for buses. Collaborate with local authorities to ensure proper maintenance and cleanliness of the Bus Stop and its surroundings.

4. Streamline Bus Schedules:

Work with BSRTC and private bus operators to streamline schedules and increase the frequency of buses to nearby cities. Align bus schedules with the commuting patterns and demands of the residents.

13.2.5 PARKING

The lack of parking area in Bodhgaya, particularly near bus stands and markets, creates a frustrating experience for drivers and contributes to traffic congestion. Since these areas naturally attract a high volume of vehicles, the current absence of designated parking forces cars to circle around searching for open spots, further adding to the chaos. To improve traffic flow and convenience, establishing dedicated parking areas near bus stands would be a critical step. This would not

only provide a safe and organized space for drivers to leave their vehicles but also free up traffic flow on the main roads.

Due to shops and other commercial activities like weekly markets, the road is always facing crowds. The unplanned road section creates more parking issues due to heavy traffic near the shopping Centre. People Park their vehicles on the road and reduce road width. It is therefore necessary to provide adequate space for parking at some distance from town.

13.3 TRAFFIC & TRANSPORTATION (SURVEYS, ANALYSIS & INFERENCE)

Conducting a ground survey is a fundamental step for transport planners to gather accurate, real-world data that informs evidence-based decision-making. The survey encompasses various aspects, including speed and delay analysis, traffic volume count, and other transportation survey analyses. Here is an in-depth description of each component:

13.3.1 ROAD NETWORK INVENTORY ANALYSIS

Road network inventory analysis is the process of methodically classifying and evaluating a road network's constituent parts in order to enable efficient administration and upkeep. Data collection on a variety of topics, including drainage systems, traffic control devices, pavement conditions, road geometry, and signage, is part of this investigation. Transportation planners and engineers may assess the existing condition of the infrastructure, pinpoint areas in need of maintenance, and plan for future development by compiling a thorough inventory.

13.3.1.1 OBJECTIVE

The study's objective is to evaluate the physical attributes of the designated road network, including right-of-way, carriageways, access points, surface type, and so forth.

13.3.1.2 DATA COLLECTION TECHNIQUES

Road network inventory survey was conducted to collect information related to physical characteristics of the identified road network, to understand existing transport situation.

13.3.1.3 ANALYSIS PROCESS

Several methodical procedures are used in the road network inventory analysis process to collect, evaluate, and manage data about the various road network components. Beginning with data gathering, information about road characteristics, pavement conditions, signage, drainage, and other infrastructure aspects are gathered by field surveys, remote sensing, and the use of geographic information systems (GIS).

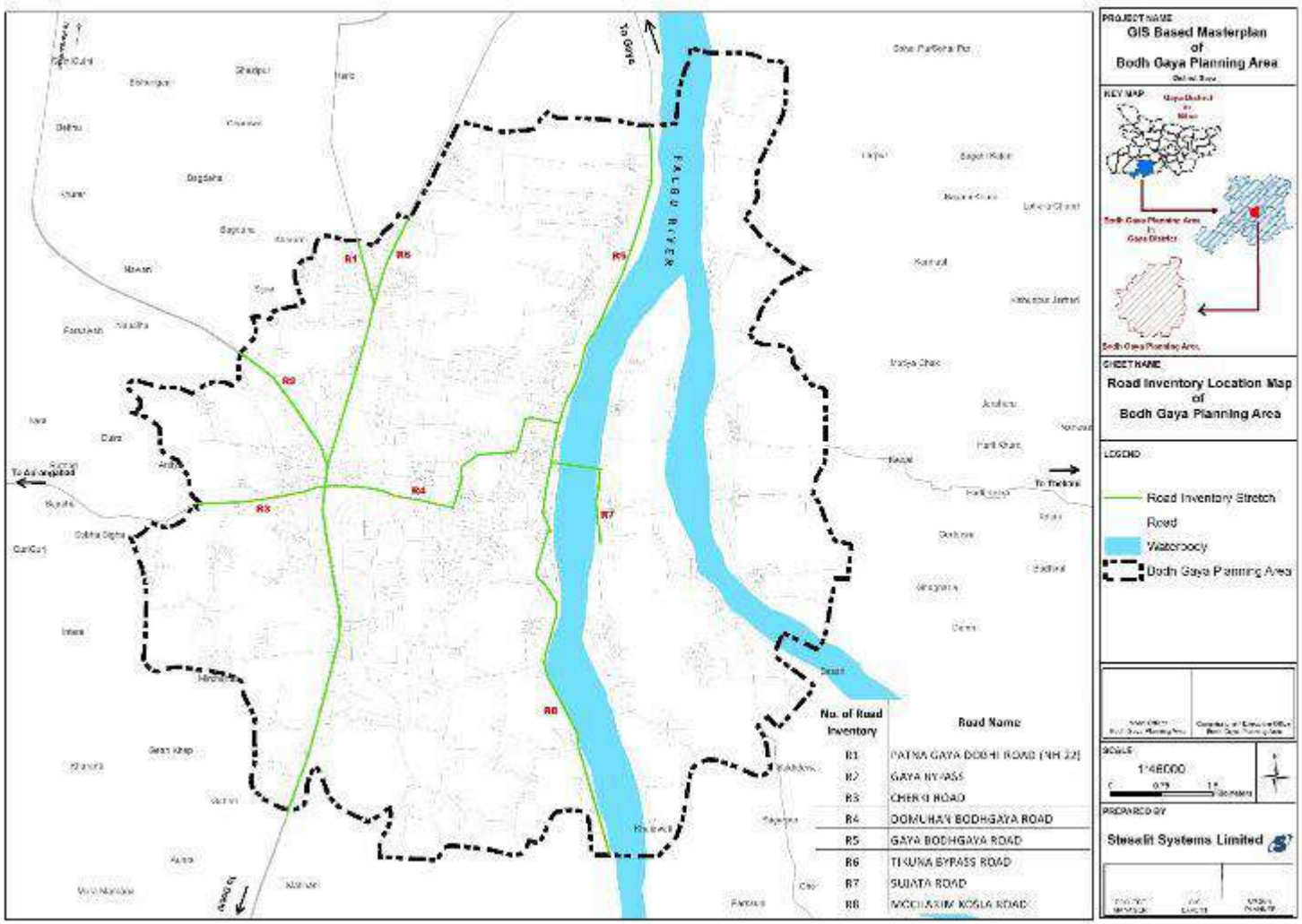
13.3.1.4 KEY CONSIDERATIONS

Prioritize areas for potential infrastructure improvements based on identified road stretches.

Consider implementing traffic management solutions to alleviate road network improvements.

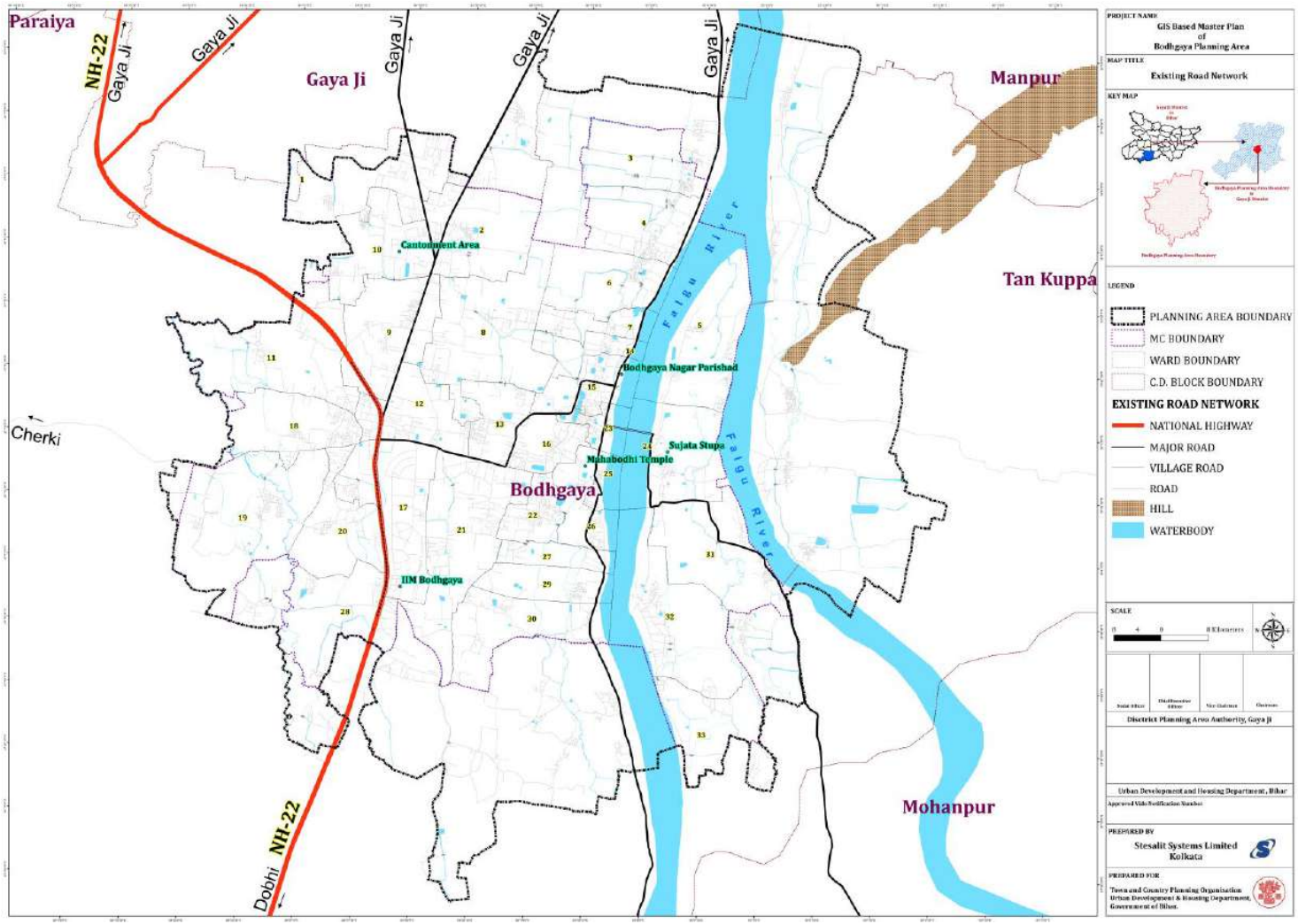
13.3.1.4.1 LOCATIONS OF SURVEY

- The roadside manual survey for Road network inventory surveys were conducted on the
    - Patna Gaya Dobhi Road (NH 22)
    - Gaya Bypass
    - Cherki Road
    - Domuhan Bodhgaya Road
    - Gaya Bodhgaya Road
    - Tikuna Bypass Road
    - Sujata Road
    - Mocharim Kosla Road



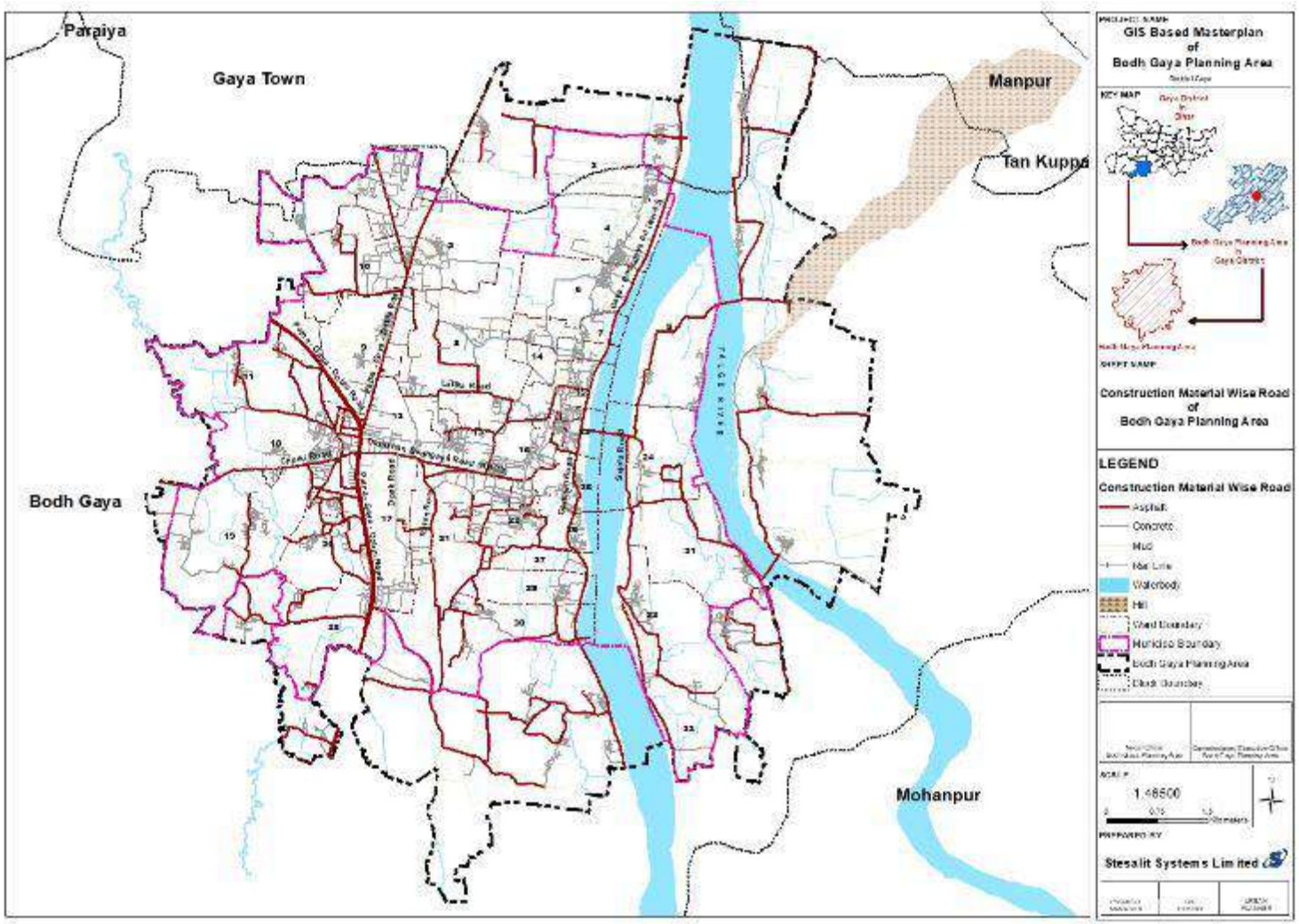
MAP 13-4 ROAD INVENTORY SURVEY MAP OF BODHGAYA PLANNING AREA

Source: Transportation Survey, 2024, Stesalit Systems Ltd.



MAP 13-5 ROAD NETWORK HIERARCHY MAP OF BODHGAYA PLANNING AREA

Source: Ground Truthing Survey, Transportation Survey, 2024, Stesalit Systems Ltd.



MAP 13-6 ROAD CONSTRUCTION MATERIAL MAP OF BODHGAYA PLANNING AREA

Source: Ground Truthing Survey, Transportation Survey, 2024, Stesalit Systems Ltd.

13.3.1.5 ROAD TYPES IN BODHGAYA PLANNING AREA

Existing road length within the Planning Area is 535.44 Km. these roads can be classified in following 2 categories.

- Classification based on construction Material.
- Classification based on Road Hierarchy.

13.3.1.5.1 CONSTRUCTION MATERIAL

Based on the construction material, three types of roads are present in the Bodhgaya Planning area. Details of these roads are given in table below.

TABLE 13-1 ROAD CLASSIFICATION BASED ON THE CONSTRUCTION MATERIAL

Sl. No.	Road Construction Materials	Running Length (in Km)
1	Asphalt	332.13
2	Concrete	116.06
3	Mud	87.25
Total		**535.44**

Source: Ground Truthing Survey

13.3.1.5.2 HIERARCHY OF ROADS

Based on the subclass, again five types of roads are present in the Bodhgaya Planning area. Details of these roads are given in table below.

TABLE 13-2 ROAD CLASSIFICATION BASED ON THE HIERARCHY OF ROAD

Sl. No.	Hierarchy Wise Road Types	Running Length (in Km)
1	National Highway	28.22
2	State Highway	3.08
3	Bypass Road	3.39
4	Service Road	7.8
5	Major City Road	12.35
6	Minor City Road	402.78
	Village Road	104.68
Total		**535.44**

Source: Ground Truthing Survey

13.3.1.5.3 ROAD STRETCH DETAILS

The road stretch specifications cover several important factors, including the physical attributes, traffic patterns, and infrastructure components of a particular section of the road. This comprises the road's width, length, and kind of surface as well as any medians or dividers, lanes, and their markings.

13.3.1.5.3.1 PATNA GAYA DOBHI ROAD (NH 22)

This Road is a four-lane Two-Way divided road; its road surface material is asphalt carriageway with a ROW 21 m. Street light facility is not available in this road stretch. Bus route facility is available in this stretch.

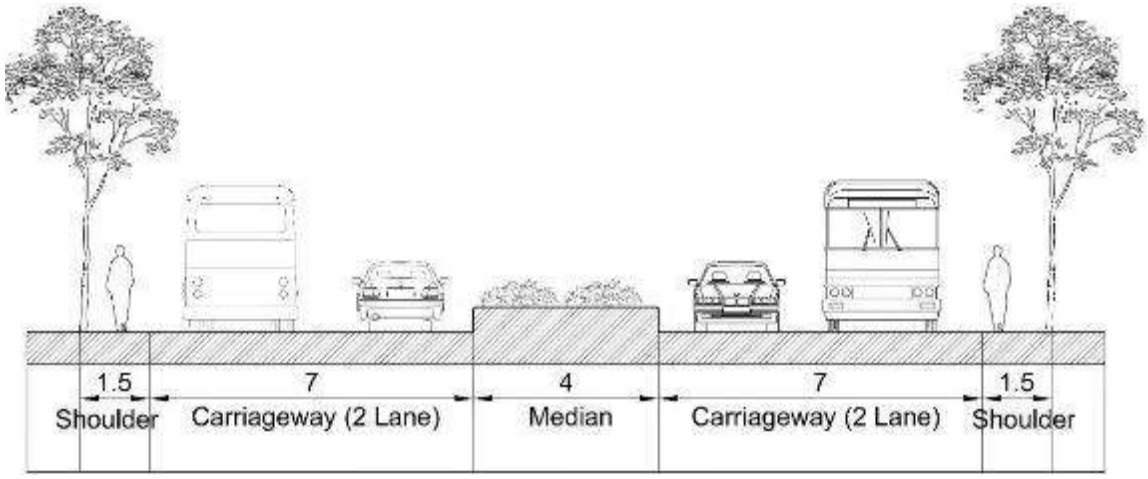


FIGURE 13-1 LANE DISTRIBUTION OF THE STRETCH

Source: Transportation Survey, 2024, Stesalit Systems Ltd.

13.3.1.5.3.2 GAYA BYPASS ROAD

This road is also known as Dobhi Patna road. It is a four-lane Two-Way divided road; its road surface material is asphalt carriageway with a ROW 21 m. Street light facility is not available in the stretch.

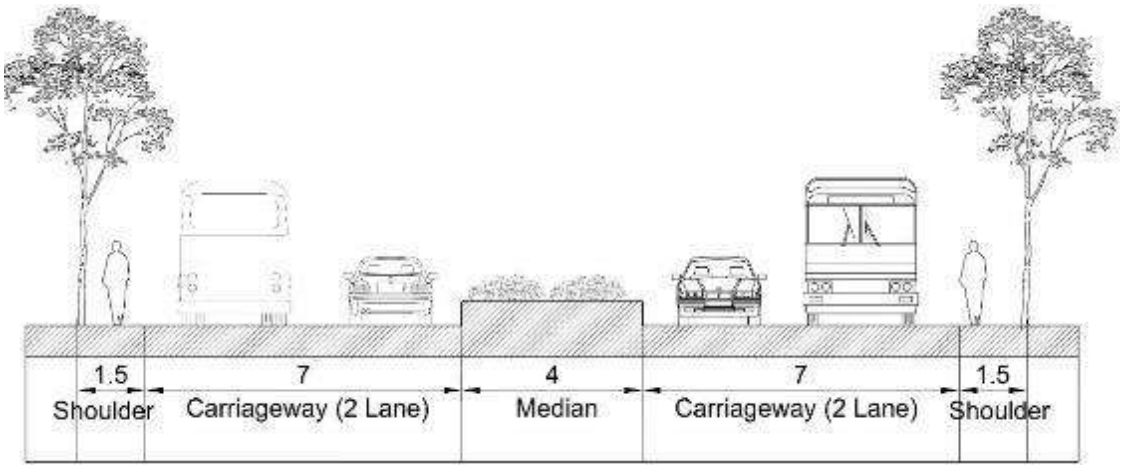


FIGURE 13-2 LANE DISTRIBUTION OF THE STRETCH

Source: Transportation Survey, 2024, Stesalit Systems Ltd.

13.3.1.5.3.3 CHERKI ROAD

This road is a two-lane Two-Way undivided road; its road surface material is an asphalt carriageway with a ROW of 9 m. Street light facility is not available on the road stretch.

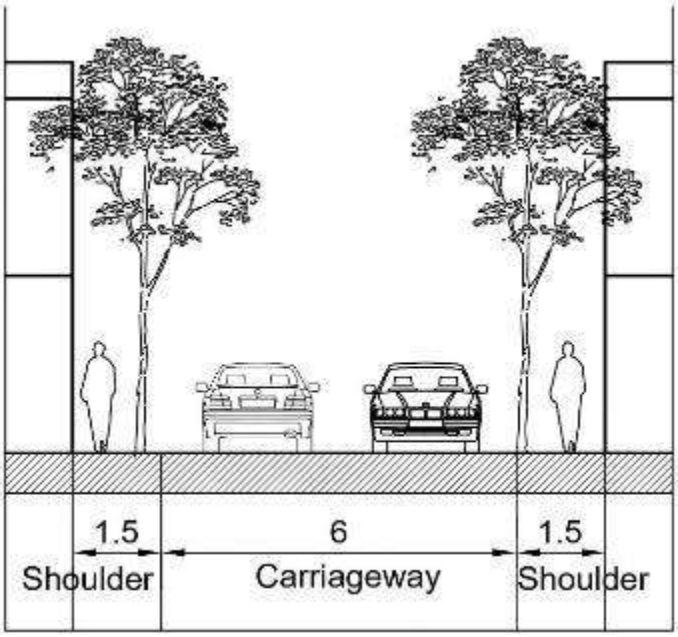


FIGURE 13-3 LANE DISTRIBUTION OF THE STRETCH

Source: Transportation Survey, 2024, Stesalit Systems Ltd.

13.3.1.5.3.4 DOMUHAN BODHGAYA ROAD

This road is a two-lane Two-Way undivided road; its road surface material is asphalt carriageway with a ROW 15 m. Street light facility is available in this road stretch. Bus route facility is not available in this stretch.

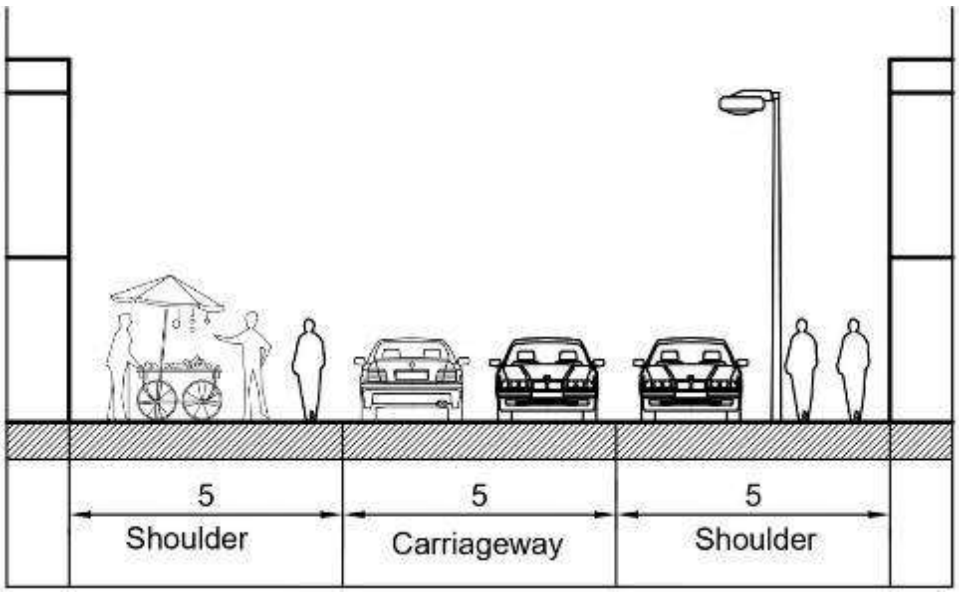


FIGURE 13-4 LANE DISTRIBUTION OF THE STRETCH

Source: Transportation Survey, 2024, Stesalit Systems Ltd.

13.3.1.5.3.5 GAYA BODHGAYA ROAD

This road is two-lane Two-Way undivided road; its road surface material is asphalt carriageway with a ROW 9 mts. Street light facility is not available in this road stretch.

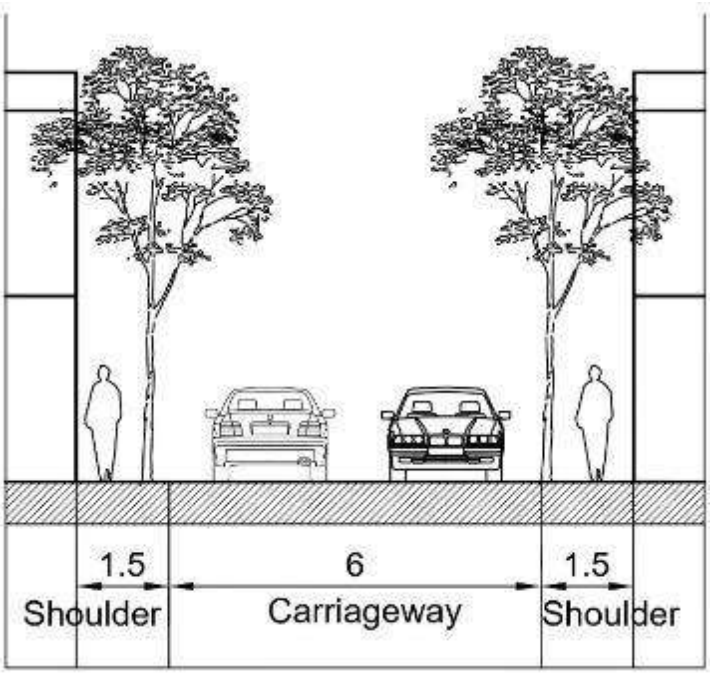


FIGURE 13-5 LANE DISTRIBUTION OF THE STRETCH

Source: Transportation Survey, 2024, Stesalit Systems Ltd.

13.3.1.5.3.6 TIKUNA BYPASS ROAD

This road is a two-lane Two-Way undivided road; its road surface material is asphalt carriageway with a ROW of 7 m. Street light facility is not available in this road stretch. Bus route facility is not available in this stretch.

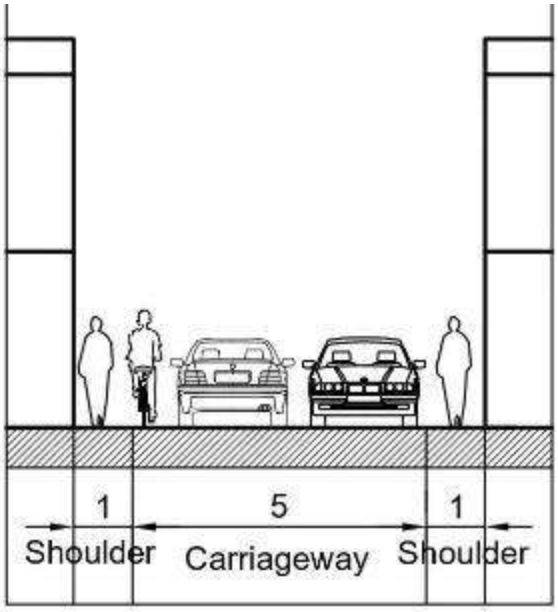


FIGURE 13-6 LANE DISTRIBUTION OF THE STRETCH

Source: Transportation Survey, 2024, Stesalit Systems Ltd.

13.3.1.5.3.7 SUJATA ROAD

This road is a two-lane Two-Way undivided road; its road surface material is asphalt carriageway with a ROW 9 m. Street light facility is not available on the road stretch.

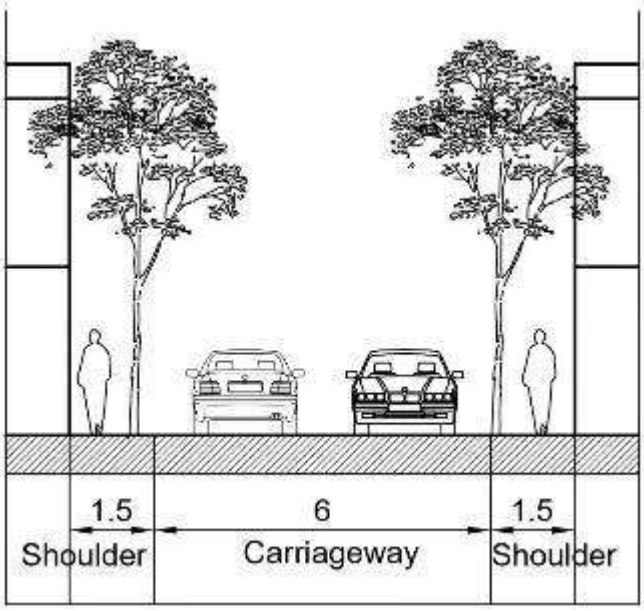


FIGURE 13-7 LANE DISTRIBUTION OF THE STRETCH

Source: Transportation Survey, 2024, Stesalit Systems Ltd.

13.3.1.5.3.8 MOCHARIM KOSLA ROAD

This road is two-lane Two-Way undivided road; its road surface material is asphalt carriageway with a ROW 7 m. Street light facility is not available in this road stretch.

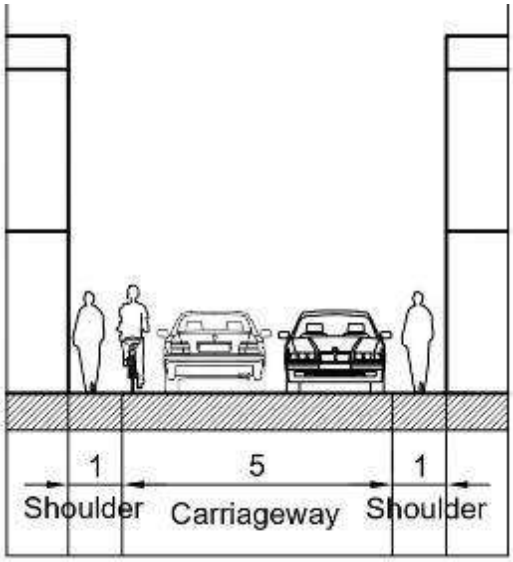


FIGURE 13-8 LANE DISTRIBUTION OF THE STRETCH

Source: Transportation Survey, 2024, Stesalit Systems Ltd.

13.3.2 CLASSIFIED TRAFFIC VOLUME COUNT

Traffic Volume Count Analysis is foundational for evidence-based decision-making in transportation planning. It provides the necessary data to optimize road networks, enhance traffic management strategies, and ensure the development of resilient and efficient transportation systems that meet the evolving needs of communities.

In the subsequent sections, this analysis will delve into specific methodologies, data collection techniques, and tools employed in obtaining and interpreting traffic volume data, offering actionable insights for planners and policymakers alike.

13.3.2.1 OBJECTIVE

To understand the volume of vehicular movement on specific roads and intersections.

13.3.2.2 DATA COLLECTION TECHNIQUES

Use automated traffic counters, manual counts, or video analytics to record the number of vehicles passing through selected points.

Conduct 24-hour counts to capture variations in traffic volume throughout two days which includes one weekday and one weekend.

13.3.2.3 ANALYSIS PROCESS

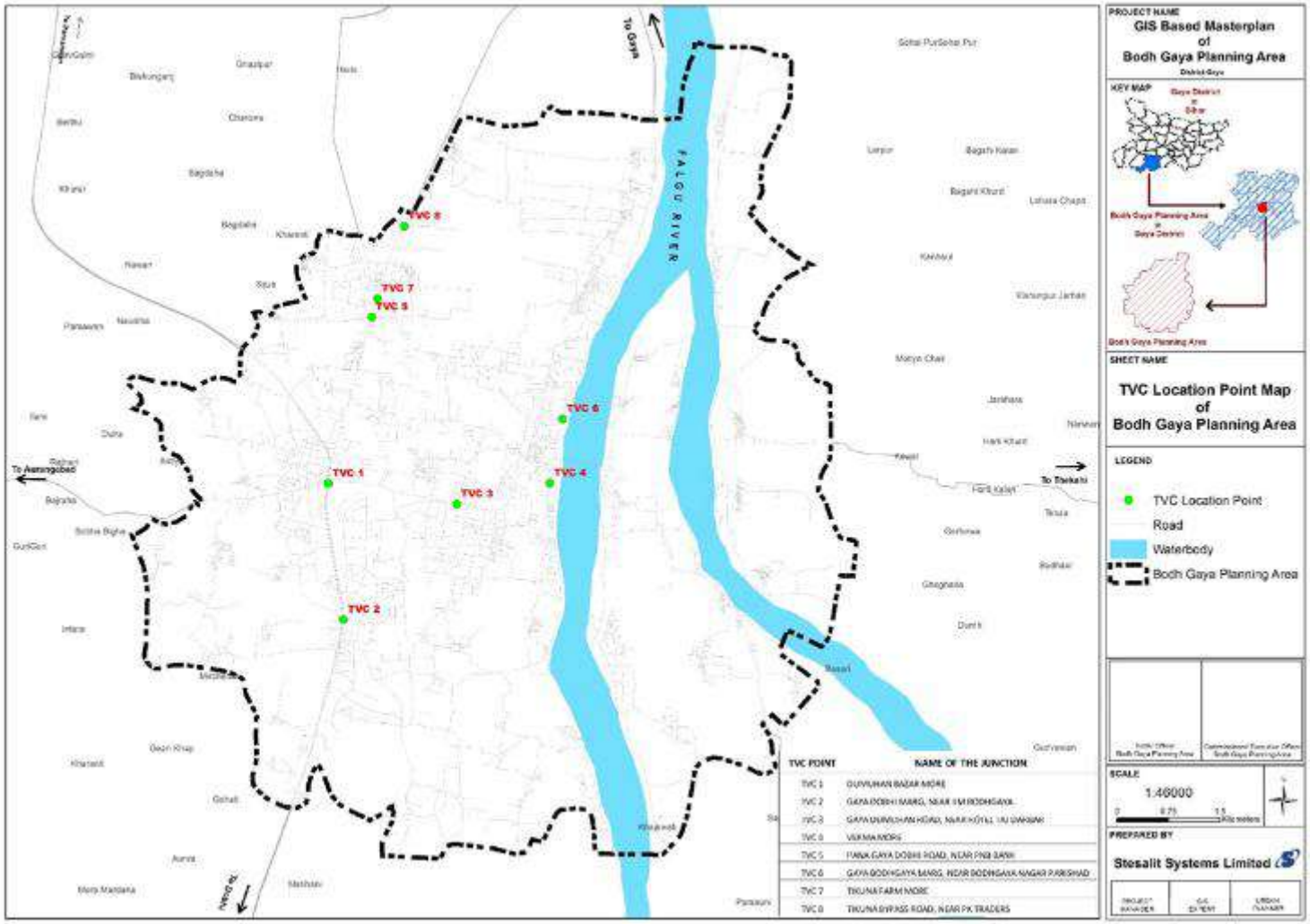
Categorize traffic counts based on vehicle types (cars, trucks, buses). Analyze peak hours and daily patterns to identify trends and assess road capacity. The average of two-days data collected has been used to analyze the classified traffic volume count of the Bodhgaya Planning Area.

13.3.2.4 KEY CONSIDERATIONS

- Utilize traffic volume data for capacity planning and to identify areas requiring infrastructure upgrades.
- Assess the impact of land use changes on traffic patterns and adjust planning accordingly.

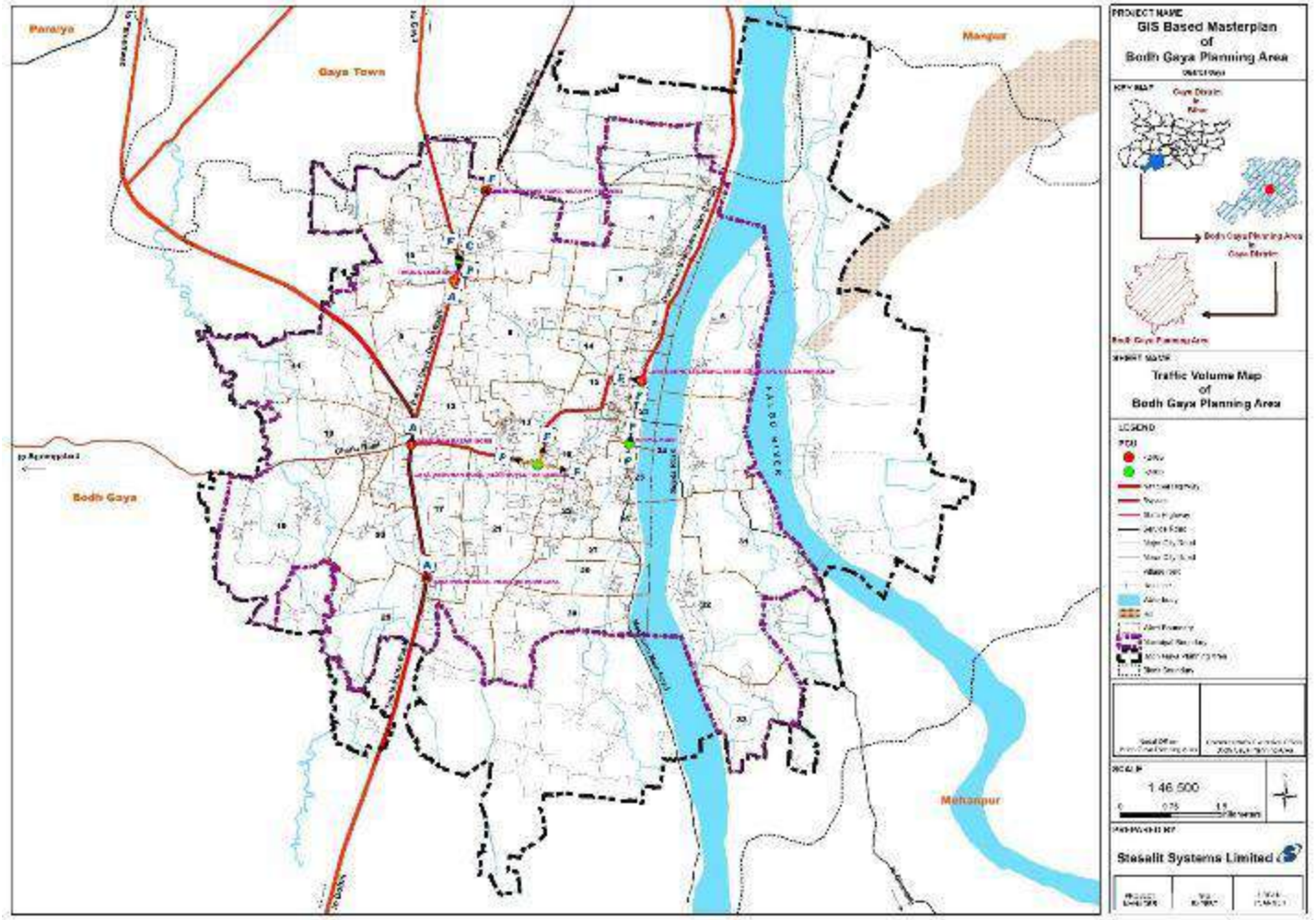
13.3.2.5 DETAILS ABOUT LOCATION

- Domuhan Bazar More
- Gaya Dhobi Marg, Near IIM Bodhgaya
- Gaya Domuhan Road, Near Hotel Taj Darabar
- Verma More
- Patna Gaya Dhobi Road, Near PNB Bank
- Gaya Bodhgaya Marg, Near Bodhgaya Nagar Panchayat
- Tikuna Farm More
- Tikuna Bypass Road, Near PK Traders



MAP 13-7 TVC SURVEY MAP OF BODHGAYA PLANNING AREA

Source: Transportation Survey 2024, Stesalit Systems Ltd.



MAP 13-8 V/C RATIO AND CONGESTION MAP OF BODHGAYA PLANNING AREA

Source: Transportation Survey, 2024, Stesalit Systems Ltd

TABLE 13-3 TRAFFIC COMPOSITION AT DIFFERENT AREAS OF BODHGAYA PLANNING BOUNDARY

TVC Junctions	Direction of stretch	Motorized Two-wheeler	Four Wheelers (Car)	Auto Rickshaw	Shuttle Vehicles	Bus	Truck (LCV)	Truck (HCV)	E-Rickshaw	Others
DOMUHAN BAZAR MORE	TO GAYA	470	96	223	0	47	40	45	215	0
		41.37%	8.45%	19.63%	0.00%	4.14%	3.52%	3.96%	18.93%	0.00%
GAYA DOBHI MARG, NEAR IIM BODHGAYA	TO DOBHI ROAD	515	55	173	0	11	15	20	218	0
		51.14%	5.46%	17.18%	0.00%	1.09%	1.49%	1.99%	21.65%	0.00%
GAYA DOMUHAN ROAD, NEAR HOTEL TAJ DARWAR	TO DUMUHAN	6976	1852	1870	0	115	878	79	1886	0
		51.08%	13.56%	13.69%	0.00%	0.84%	6.43%	0.58%	13.81%	0.00%
	TO GAYA ROAD	7080	1641	1942	0	70	811	86	1911	0
		52.29%	12.12%	14.34%	0.00%	0.52%	5.99%	0.64%	14.11%	0.00%
	TO MAHABODHI TEMPLE	6732	1592	1867	0	75	743	114	1889	0
		51.74%	12.23%	14.35%	0.00%	0.58%	5.71%	0.88%	14.52%	0.00%
VERMA MORE	TO GAYA	6816	1282	1911	0	359	704	50	1915	0
		52.28%	9.83%	14.66%	0.00%	2.75%	5.40%	0.38%	14.69%	0.00%
	TO MOHANPUR	7157	1924	1903	0	82	953	88	1832	0
		51.35%	13.80%	13.65%	0.00%	0.59%	6.84%	0.63%	13.14%	0.00%
	TO BAKRAOUR MORE	6855	1958	2025	0	152	850	72	2017	0
		49.21%	14.06%	14.54%	0.00%	1.09%	6.10%	0.52%	14.48%	0.00%
GAYA DOBHI ROAD, NEAR PNB BANK	TO TIKUNA FARM MORE	6633	1563	1004	0	140	89	28	451	0
		66.95%	15.78%	10.13%	0.00%	1.41%	0.90%	0.28%	4.55%	0.00%
	TO GAYA ROAD	6786	1618	1216	0	79	36	26	454	0
		66.43%	15.84%	11.90%	0.00%	0.77%	0.35%	0.25%	4.44%	0.00%
	TO VISHNUGANJ BAZAR	605	60	190	0	0	0	0	167	0
		59.20%	5.87%	18.59%	0.00%	0.00%	0.00%	0.00%	16.34%	0.00%
GAYA BODHGAYA MARG,	TO RAJPUR	3773	570	2231	0	80	123	62	1835	0
		43.50%	6.57%	25.72%	0.00%	0.92%	1.42%	0.71%	21.16%	0.00%
		4216	581	2373	0	90	223	103	2347	0

TVC Junctions	Direction of stretch	Motorized Two-wheeler	Four Wheelers (Car)	Auto Rickshaw	Shuttle Vehicles	Bus	Truck (LCV)	Truck (HCV)	E-Rickshaw	Others
NEAR BODHGAYA NAGAR PANCHAYAT	TO RAJPUR MORE	42.44 %	5.85%	23.89 %	0.00%	0.91%	2.25%	1.04%	23.63 %	0.00 %
	TO SUJATA BYPASS	2542	343	1446	0	60	109	58	1578	0
		41.43 %	5.59%	23.57 %	0.00%	0.98%	1.78%	0.95%	25.72 %	0.00 %
TIKUNA FARM MORE	TO GAYA	8180	1990	1982	0	299	529	1158	383	0
		56.33 %	13.70 %	13.65 %	0.00%	2.06%	3.64%	7.97%	2.64%	0.00 %
	TO DOBHI	7005	1697	1620	0	346	381	427	265	0
		59.66 %	14.45 %	13.80 %	0.00%	2.95%	3.25%	3.64%	2.26%	0.00 %
	TO KHATKACHAK	2252	582	598	0	23	228	81	319	0
		55.16 %	14.25 %	14.65 %	0.00%	0.56%	5.58%	1.98%	7.81%	0.00 %
TIKUNA BYPASS ROAD	TO DHANWA MORE	6587	1643	1311	0	115	43	12	510	0
		64.45 %	16.07 %	12.83 %	0.00%	1.13%	0.42%	0.12%	4.99%	0.00 %

Source: Transportation Survey 2024, Stesalit Systems Ltd.

13.3.2.6 TRAFFIC COMPOSITION

Traffic composition the modes of travelling taken into consideration here are

- Motorized two-wheelers
- Four wheelers
- Auto Rickshaws
- Shuttle vehicles
- Bus
- Light Commercial Vehicles (LCV)
- Heavy Commercial Vehicles (HCV)
- E-Rickshaws
- Others (Handcart)

TABLE 13-4 TRAFFIC COMPOSITION OF BODHGAYA PLANNING AREA

Type of vehicles on the road along the major stretches in Percentage									
	Motorized Two-wheeler	Four Wheelers (Car)	Auto Rickshaw	Shuttle Vehicles	Bus	Truck (LCV)	Truck (HCV)	E-Rickshaw	Others (Handcarts)
Vehicle Composition	**53.73%**	**12.40 %**	**15.25%**	**0.00%**	**1.26%**	**3.98 %**	**1.48%**	**11.90%**	**0.00%**
PCU Factor	**0.75**	**1**	**1.5**	**3**	**2.2**	**2**	**2.2**	**1.5**	**3**

Source: Transportation Survey 2024, Stesalit Systems Ltd.

TABLE 13-5 CALCULATED LOS OF THE ROAD STRETCHES

TVC Junctions	Direction of stretch	Time of Day	Peak Hour Timings	Peak Hour Factor (PHF)	V/C Ratio	Actual Flow rate (PCU)	Level of Service (LoS)	Remarks
DUMUHAN BAZAR MORE	TO GAYA	Morning	10:00 AM - 11:00 AM	0.85	0.05	227.2	A	Free Flow
		Evening	04:45 PM - 05:45 PM	0.90	0.06	250.6		
GAYA DOBHI MARG, NEAR IIM BODHGAYA	TO DOBHI ROAD	Morning	09:15 AM - 10:15 PM	0.91	0.04	167.6	A	Free Flow
		Evening	05:00 PM - 06:00 PM	0.86	0.05	226		
GAYA DUMUHAN ROAD, NEAR HOTEL TAJ DARWAR	TO DUMUHAN	Morning	11:00 AM - 12:00 PM	0.96	2.02	2523	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.89	1.87	2523		
	TO GAYA ROAD	Morning	11:00 AM - 12:00 PM	0.93	1.94	2493.4	F	Congested Flow
		Evening	05:00 PM - 06:00 PM	0.93	1.86	2397.4		
	TO MAHABODHI TEMPLE	Morning	11:00 AM - 12:00 PM	0.92	2.00	2609.4	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.85	1.85	2609.4		
VERMA MORE	TO GAYA	Morning	11:00 AM - 12:00 PM	0.92	1.98	2588.2	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.85	1.84	2588.2		
	TO MOHANPUR	Morning	11:00 AM - 12:00 PM	0.93	2.03	2610.8	F	Congested Flow
		Evening	05:00 PM - 06:00 PM	0.93	1.99	2575		
	TO BAKRAOUR MORE	Morning	11:00 AM - 12:00 PM	0.91	2.08	2743.6	F	Congested Flow
		Evening	05:00 PM - 06:00 PM	0.93	2.12	2747.2		
GAYA DOBHI ROAD, NEAR PNB BANK	TO TIKUNA FARM MORE	Morning	11:00 AM - 12:00 PM	0.95	1.17	1836	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.80	0.98	1836		
	TO GAYA ROAD	Morning	11:00 AM - 12:00 PM	0.93	1.21	1951	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.79	1.02	1951		
	TO VISHNUGANJ BAZAR	Morning	11:00 AM - 12:00 PM	0.78	0.20	235	A	Free Flow
		Evening	05:00 PM - 06:00 PM	0.83	0.25	272		

TVC Junctions	Direction of stretch	Time of Day	Peak Hour Timings	Peak Hour Factor (PHF)	V/C Ratio	Actual Flow rate (PCU)	Level of Service (LoS)	Remarks
GAYA BODHGAYA MARG, NEAR BODHGAYA NAGAR PANCHAYAT	TO RAJPUR	Morning	10:30 AM - 11:30 PM	0.90	1.10	1473.6	F	Congested Flow
		Evening	05:00 PM - 06:00 PM	0.97	1.42	1765.4		
	TO RAJPUR MORE	Morning	10:00 AM - 11:00 AM	0.96	1.49	1854	F	Congested Flow
		Evening	05:00 PM - 06:00 PM	0.97	1.53	1879		
	TO SUJATA BYPASS	Morning	11:00 AM - 12:00 PM	0.99	0.98	1195	E	At Capacity Flow
		Evening	05:00 PM - 06:00 PM	0.93	0.98	1265.4		
TIKUNA FARM MORE	TO GAYA	Morning	11:00 AM - 12:00 PM	0.92	1.73	2820.4	F	Congested Flow
		Evening	05:00 PM - 06:00 PM	0.91	1.76	2907.2		
	TO DOBHI	Morning	10:00 AM - 11:00 AM	0.95	1.22	1924	F	Congested Flow
		Evening	04:00 PM - 05:00 PM	0.99	1.33	2022.6		
	TO KHATKACHAK	Morning	10:00 AM - 11:00 AM	0.88	0.58	792.8	C	Near Free Flow
		Evening	04:00 PM - 05:00 PM	0.98	0.62	753.6		
TIKUNA BYPASS ROAD	TO DHANWA MORE	Morning	11:00 AM - 12:00 PM	0.95	1.48	1870	F	Congested Flow
		Evening	02:00 PM - 03:00 PM	0.82	1.27	1870		

Source: Transportation Survey 2024, Stesalit Systems Ltd.

13.3.3 ORIGIN AND DESTINATION ANALYSIS

Origin and Destination Analysis serves as a cornerstone for evidence-based decision-making in transportation planning. The insights derived from this analysis provide a comprehensive understanding of travel patterns, allowing planners and policymakers to develop strategies that enhance mobility, reduce congestion, and promote sustainable transportation solutions.

In subsequent sections, the analysis will delve into specific methodologies, data collection techniques, and tools used in conducting Origin and Destination studies. These insights will empower planners to make informed decisions that contribute to the development of resilient and well-integrated transportation systems.

The Origin and Destination data has been obtained from

- Roadside Interview
- Household Interview

13.3.3.1 OBJECTIVE

Understand travel patterns, trip purposes, and mode choices within the study area.

13.3.3.2 DATA COLLECTION TECHNIQUES

Conduct surveys, interviews, or utilize mobile app data to collect information on trip origins and destinations.

Use GPS tracking or travel diaries to understand individual travel behavior.

13.3.3.3 ANALYSIS PROCESS

Analyze collected data to identify common trip patterns and popular destinations.

Assess the impact of transportation infrastructure on travel choices.

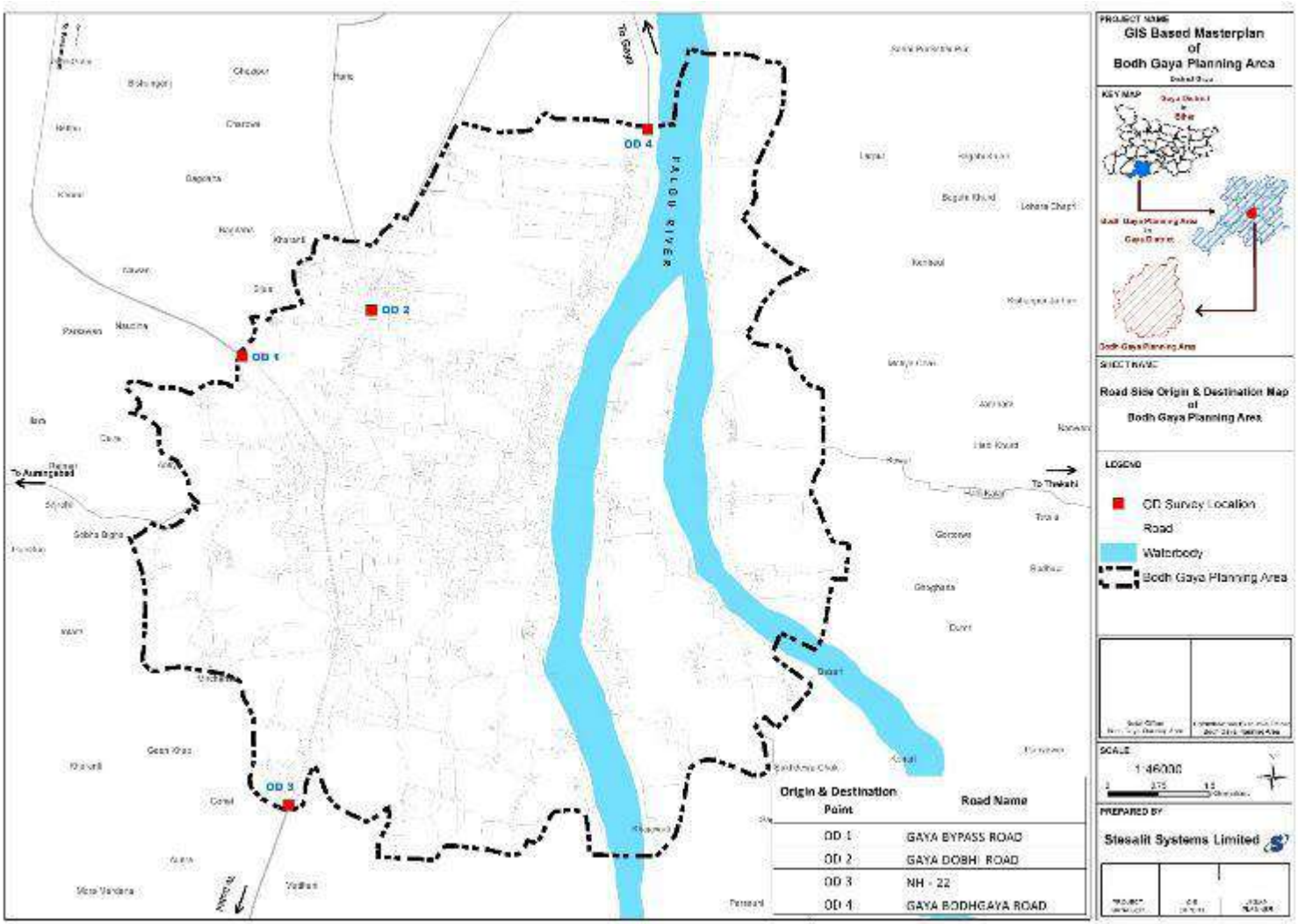
13.3.3.4 KEY CONSIDERATIONS

Integrate origin-destination insights into transit planning for optimized routes and schedules.

Consider land use changes based on observed travel patterns to improve overall urban planning.

13.3.3.5 LOCATION DETAILS:

- The roadside interview for Origin and Destination surveys were conducted on the
    - **OD 1:** Gaya Bypass Road
    - **OD 2:** Gaya Dobhi Road
    - **OD 3:** NH-22
    - **OD 4:** Gaya Bodhgaya Road
- The Household interview for Origin and Destination survey was conducted along with the socioeconomic survey with the same sample size as mentioned for the socioeconomic survey.



MAP 13-9 ROADSIDE ORIGIN-DESTINATION SURVEY MAP OF BODHGAYA PLANNING AREA

Source: Transportation Survey, 2024, Stesalit Systems Ltd.

13.3.4 PARKING DEMAND ANALYSIS

In urban and suburban environments, the efficient management of parking infrastructure is a critical component of sustainable transportation planning. Parking Demand Analysis serves as a systematic and data-driven approach to understanding the demand for parking spaces, assessing current utilization, and forecasting future requirements. As urban areas continue to experience population growth and increased vehicular ownership, the effective allocation and management of parking resources become paramount for ensuring smooth traffic flow, reducing congestion, and enhancing overall urban mobility.

13.3.4.1 OBJECTIVE

- **Understanding User Behavior:**

Parking Demand Analysis seeks to comprehend the behavior of drivers regarding parking choices. This includes factors such as preferred locations, duration of parking, and willingness to use alternative modes of transportation.

- **Utilization and Occupancy Assessment:**

The analysis aims to quantify the utilization and occupancy rates of existing parking facilities. This involves studying peak hours, weekdays versus weekends, and variations in demand based on proximity to key destinations.

- **Forecasting Future Demand:**

Projecting future parking demand is crucial for planning and designing sustainable parking infrastructure. This involves considering factors like population growth, economic development, and changes in transportation modes.

- **Optimizing Existing Infrastructure:**

Understanding current parking demand allows planners to optimize the use of existing facilities. This may involve implementing technologies for real-time monitoring, dynamic pricing, and smart parking solutions to enhance efficiency.

13.3.4.2 DATA COLLECTION TECHNIQUES

Conduct surveys and observations to understand parking behaviors, including duration and occupancy rates.

Use parking sensors or smart parking technologies for real-time data collection.

13.3.4.3 ANALYSIS PROCESS

Evaluate the utilization of existing parking spaces and identify peak demand periods.

Analyze the relationship between parking demand and nearby land uses.

13.3.4.4 KEY CONSIDERATIONS

Propose enhancements to existing parking facilities based on observed demand.

Integrate smart parking solutions to optimize space utilization and improve user experience.

13.3.4.5 LOCATION DETAILS

- Tikka Bigha Purani Taridih (On-Street Parking)
- Near Tibetan Temple Garden (On-Street Parking)
- Mastipur Pirpanti (On-Street Parking)
- Near Bodhgaya Nagar Panchayat Office (On-Street Parking)
- Mausa More (On-Street Parking)

13.3.4.5.1 ANALYSIS OF PARKING DEMAND SURVEY

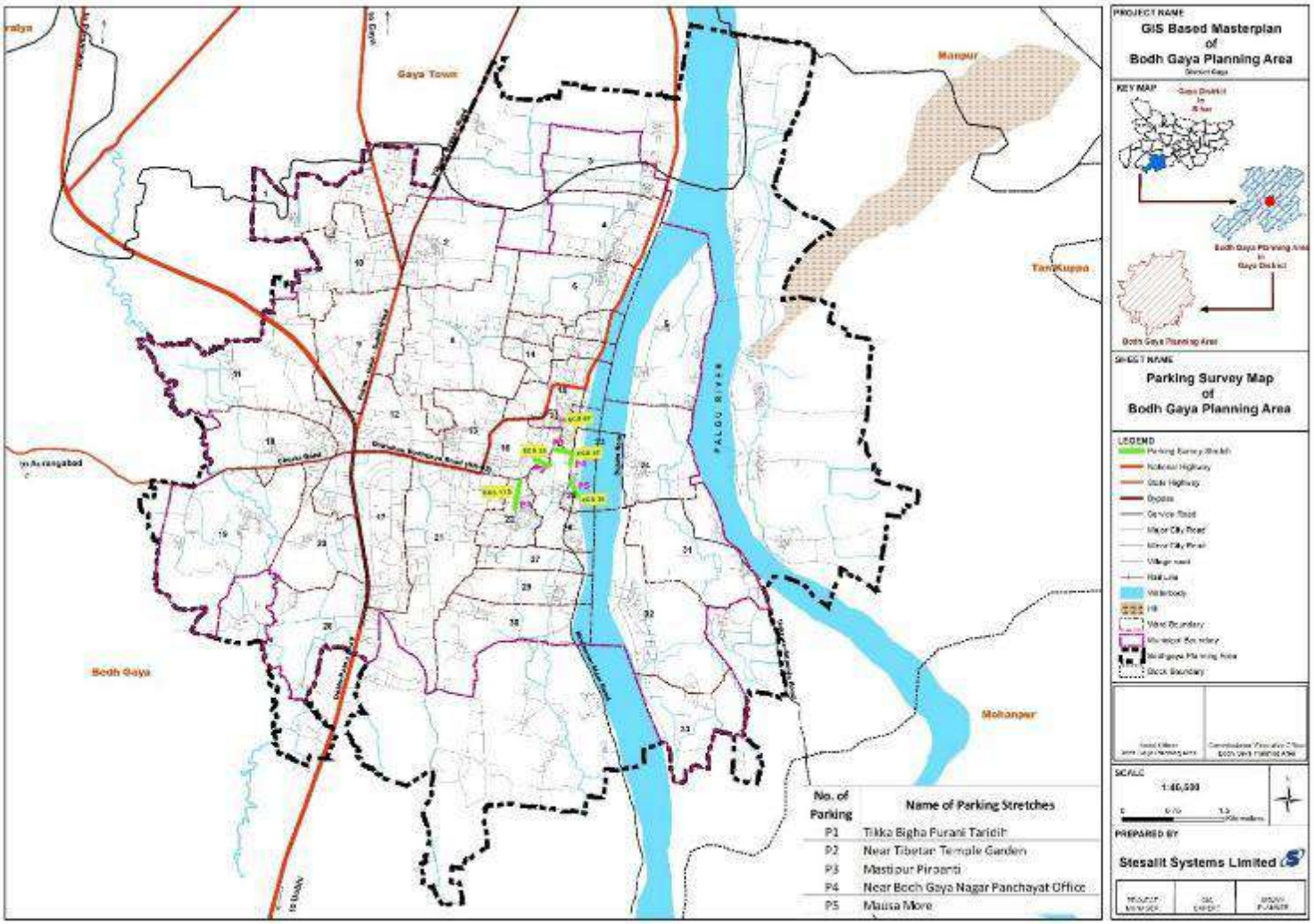
As per **IRC SP:12-2015** (Guidelines for Parking Facilities in Urban Areas)

The ECS values for different modes

TABLE 13-6 ECS VALUE AS PER IRC SP:12-2015

Category	ECS
Bicycle	**0.1**
2 Wheelers	**0.25**
3- Wheelers	**0.6**
Cars	**1**
LCV	**1.5**
Buses	**2.5**

Source: Transportation Survey 2024, Stesalit Systems Ltd.



MAP 13-10 PARKING SURVEY MAP OF BODHGAYA PLANNING AREA

Source: Transportation Survey 2024, Stesalit Systems Ltd.

13.3.4.5.1.1 LOCATION 1: TIKKA BIGHA PURANI TARIDIH

Parking Type: On- Street Parking

Ward No: 26

TABLE 13-7 HOURLY PARKING DEMAND

Tikka Bigha Purani Taridih (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**Bus**
09:00-10:00	2	28	28	10	0	1
10:00-11:00	1	30	22	7	0	0
11:00-12:00	1	20	34	20	1	0
12:00-13:00	2	30	38	15	0	0
16:00-17:00	1	27	17	9	0	0
17:00-18:00	4	34	23	14	0	0
18:00-19:00	3	22	22	20	0	0
19:00-20:00	3	30	30	15	0	0

Source: Stesalit Systems Limited. Transportation Survey 2024

TABLE 13-8 HOURLY ECS DEMAND

ECS	**0.1**	**0.25**	**0.6**	**1**	**1.5**	**2.5**
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**Bus**
09:00-10:00	0.2	7	16.8	10	0	2.5
10:00-11:00	0.1	7.5	13.2	7	0	0
11:00-12:00	0.1	5	20.4	20	1.5	0
12:00-13:00	0.2	7.5	22.8	15	0	0
16:00-17:00	0.1	6.75	10.2	9	0	0
17:00-18:00	0.4	8.5	13.8	14	0	0
18:00-19:00	0.3	5.5	13.2	20	0	0
19:00-20:00	0.3	7.5	18	15	0	0
Total ECS	**1.7**	**55.25**	**128.4**	**110**	**1.5**	**2.5**
MAX ECS	**0.4**	**8.5**	**22.8**	**20**	**1.5**	**2.5**

Source: Stesalit Systems Limited. Transportation Survey 2024

Total Equivalent Car Space required: 56 ECS

Equivalent Card Space Requirements considering a 20 percent increase in demand: 67 ECS

Parking Space requirements: 1541 sq. m.

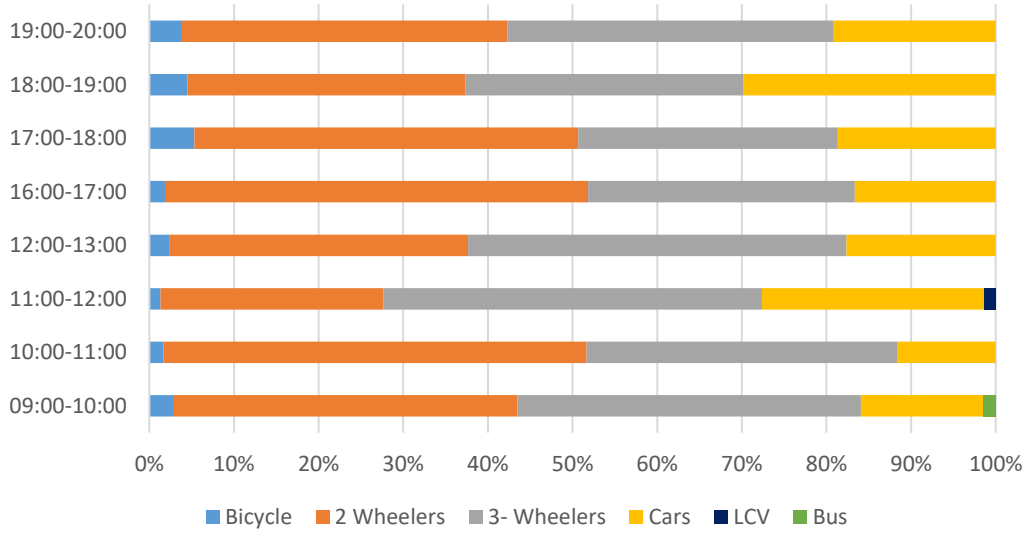


FIGURE 13-9 MODE WISE HOURLY DEMAND

Source: Stesalit Systems Limited. Transportation Survey 2024

13.3.4.5.1.2 LOCATION 2: NEAR TIBETAN TEMPLE GARDEN

Parking Type: On-Street Parking

Ward No: 26

TABLE 13-9 HOURLY PARKING DEMAND

Near Tibetan Temple Garden (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**Bus**
09:00-10:00	2	21	33	4	0	0
10:00-11:00	2	25	35	5	0	0
11:00-12:00	3	23	20	2	0	0
12:00-13:00	6	25	17	2	0	0
16:00-17:00	4	23	14	3	0	0
17:00-18:00	5	22	9	2	0	0
18:00-19:00	3	23	12	3	0	0
19:00-20:00	2	24	13	2	0	0

Source: Stesalit Systems Limited. Transportation Survey 2024

TABLE 13-10 HOURLY ECS DEMAND

ECS	**0.1**	**0.25**	**0.6**	**1**	**1.5**	**2.5**
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**Bus**
09:00-10:00	0.2	5.25	19.8	4	0	0
10:00-11:00	0.2	6.25	21	5	0	0
11:00-12:00	0.3	5.75	12	2	0	0
12:00-13:00	0.6	6.25	10.2	2	0	0
16:00-17:00	0.4	5.75	8.4	3	0	0
17:00-18:00	0.5	5.5	5.4	2	0	0

ECS	0.1	0.25	0.6	1	1.5	2.5
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**Bus**
18:00-19:00	0.3	5.75	7.2	3	0	0
19:00-20:00	0.2	6	7.8	2	0	0
Total ECS	**2.7**	**46.5**	**91.8**	**23**	**0**	**0**
MAX ECS	**0.6**	**6.25**	**21**	**5**	**0**	**0**

Source: Stesalit Systems Limited. Transportation Survey 2024

Total Equivalent Car Space required: 33 ECS

Equivalent Card Space Requirements considering a 20 percent increase in demand: 39 ECS

Parking Space requirements: 897 sq. m.

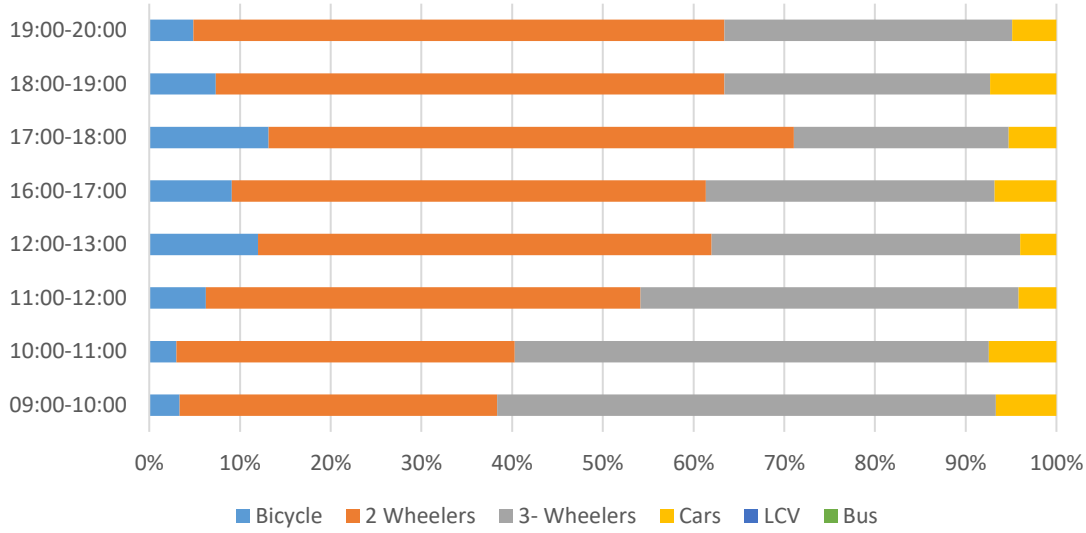


FIGURE 13-10 MODE WISE HOURLY DEMAND

Source: Stesalit Systems Limited. Transportation Survey 2024

13.3.4.5.1.3 LOCATION 3: MASTIPUR PIRPANTI

Parking Type: On-Street

Ward No: 22

TABLE 13-11 HOURLY PARKING DEMAND

Mastipur Pirpanti (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**Bus**
09:00-10:00	4	33	40	51	2	10
10:00-11:00	5	37	53	47	0	9
11:00-12:00	8	45	46	61	1	14
12:00-13:00	7	48	49	57	0	12
16:00-17:00	4	47	25	35	2	13
17:00-18:00	4	43	25	25	1	10

Mastipur Pirpanti (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**Bus**
18:00-19:00	3	28	31	22	0	7
19:00-20:00	4	45	34	18	0	6

Source: Stesalit Systems Limited. Transportation Survey 2024

TABLE 13-12 HOURLY ECS DEMAND

ECS	**0.1**	**0.25**	**0.6**	**1**	**1.5**	**2.5**
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**Bus**
09:00-10:00	0.4	8.25	24	51	3	25
10:00-11:00	0.5	9.25	31.8	47	0	22.5
11:00-12:00	0.8	11.25	27.6	61	1.5	35
12:00-13;00	0.7	12	29.4	57	0	30
16:00-17:00	0.4	11.75	15	35	3	32.5
17:00-18:00	0.4	10.75	15	25	1.5	25
18:00-19:00	0.3	7	18.6	22	0	17.5
19:00-20:00	0.4	11.25	20.4	18	0	15
Total ECS	**3.9**	**81.5**	**181.8**	**316**	**9**	**202.5**
MAX ECS	**0.8**	**12**	**31.8**	**61**	**3**	**35**

Source: Stesalit Systems Limited. Transportation Survey 2024

Total Equivalent Car Space required: 144 ECS

Equivalent Card Space Requirements considering a 20 percent increase in demand: 172 ECS

Parking Space requirements: 3956 sq. m.

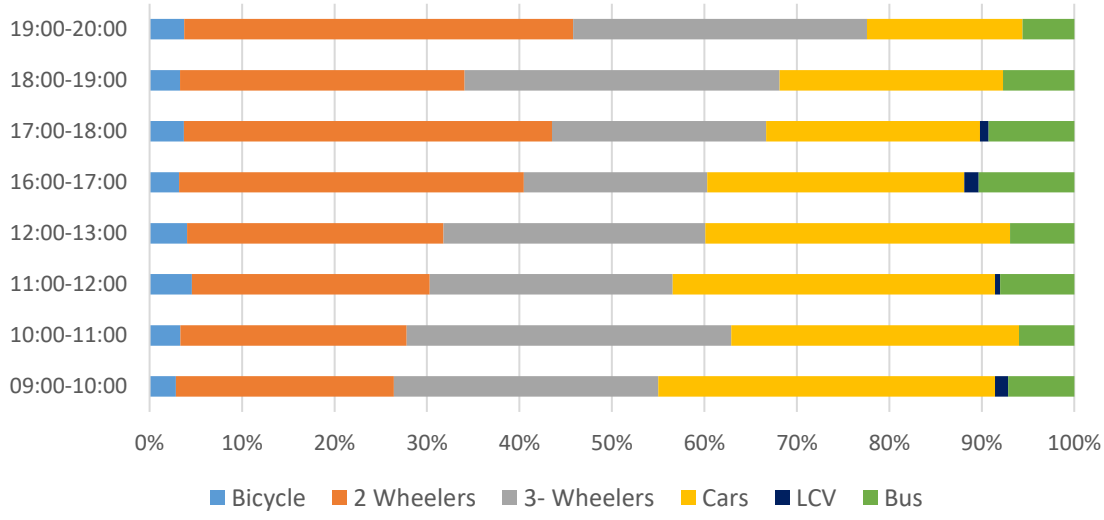


FIGURE 13-11 MODE WISE HOURLY DEMAND

Source: Stesalit Systems Limited. Transportation Survey 2024

13.3.4.5.1.4 LOCATION 4: NEAR BODHGAYA NAGAR PANCHAYAT OFFICE

Parking Type: On-Street Parking

Ward No: 26

TABLE 13-13 HOURLY PARKING DEMAND

Near Bodhgaya Nagar Panchayat Office (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**Bus**
09:00-10:00	2	41	44	1	1	0
10:00-11:00	4	40	45	2	1	0
11:00-12:00	3	35	45	1	0	0
12:00-13:00	6	40	47		2	0
16:00-17:00	8	55	34	2	0	0
17:00-18:00	6	45	20	1	0	0
18:00-19:00	7	38	30		0	0
19:00-20:00	8	44	28	1	1	0

Source: Stesalit Systems Limited. Transportation Survey 2024

TABLE 13-14 HOURLY ECS DEMAND

ECS	**0.1**	**0.25**	**0.6**	**1**	**1.5**	**2.5**
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**Bus**
09:00-10:00	0.2	10.25	26.4	1	1.5	0
10:00-11:00	0.4	10	27	2	1.5	0
11:00-12:00	0.3	8.75	27	1	0	0
12:00-13;00	0.6	10	28.2	0	3	0
16:00-17:00	0.8	13.75	20.4	2	0	0
17:00-18:00	0.6	11.25	12	1	0	0
18:00-19:00	0.7	9.5	18	0	0	0
19:00-20:00	0.8	11	16.8	1	1.5	0
Total ECS	**4.4**	**84.5**	**175.8**	**8**	**7.5**	**0**
MAX ECS	**0.8**	**13.75**	**28.2**	**2**	**3**	**0**

Source: Stesalit Systems Limited. Transportation Survey 2024

Total Equivalent Car Space required: 48 ECS

Equivalent Card Space Requirements considering a 20 percent increase in demand: 57 ECS

Parking Space requirements: 1311 sq. m.

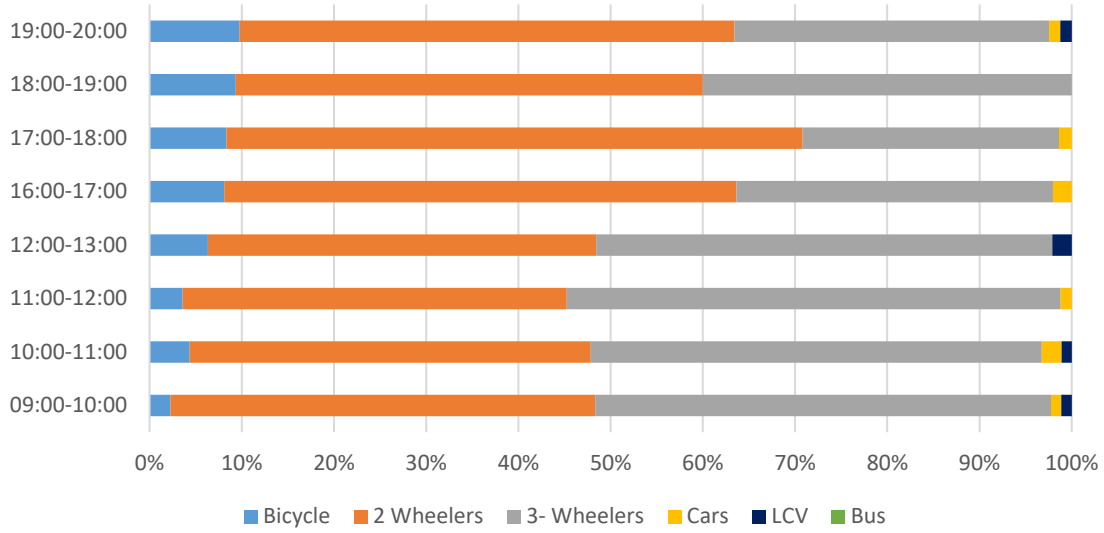


FIGURE 13-12 MODE WISE HOURLY DEMAND

Source: Stesalit Systems Limited. Transportation Survey 2024

13.3.4.5.1.5 LOCATION 5: MAUSA MORE

Parking Type: On- Street Parking

Ward No: 26

TABLE 13-15 HOURLY PARKING DEMAND

Mausa More (On-street Parking)						
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**Bus**
09:00-10:00	9	44	11	1	0	0
10:00-11:00	12	47	12	1	0	0
11:00-12:00	9	40	8	1	0	0
12:00-13:00	8	47	12	2	0	0
16:00-17:00	11	49	24	2	0	0
17:00-18:00	9	59	9	1	0	0
18:00-19:00	6	35	11	2	0	0
19:00-20:00	7	35	20	1	0	0

Source: Stesalit Systems Limited. Transportation Survey 2024

TABLE 13-16 HOURLY ECS DEAMAND

ECS	**0.1**	**0.25**	**0.6**	**1**	**1.5**	**2.5**
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**Bus**
09:00-10:00	0.9	11	6.6	1	0	0
10:00-11:00	1.2	11.75	7.2	1	0	0
11:00-12:00	0.9	10	4.8	1	0	0
12:00-13;00	0.8	11.75	7.2	2	0	0
16:00-17:00	1.1	12.25	14.4	2	0	0
17:00-18:00	0.9	14.75	5.4	1	0	0

ECS	0.1	0.25	0.6	1	1.5	2.5
Time Slot	**Bicycle**	**2 Wheelers**	**3- Wheelers**	**Cars**	**LCV**	**Bus**
18:00-19:00	0.6	8.75	6.6	2	0	0
19:00-20:00	0.7	8.75	12	1	0	0
Total ECS	**7.1**	**89**	**64.2**	**11**	**0**	**0**
MAX ECS	**1.2**	**14.75**	**14.4**	**2**	**0**	**0**

Source: Stesalit Systems Limited. Transportation Survey 2024

Total Equivalent Car Space required: 32 ECS

Equivalent Card Space Requirements considering a 20 percent increase in demand: 39 ECS

Parking Space requirements: 897 sq. m.

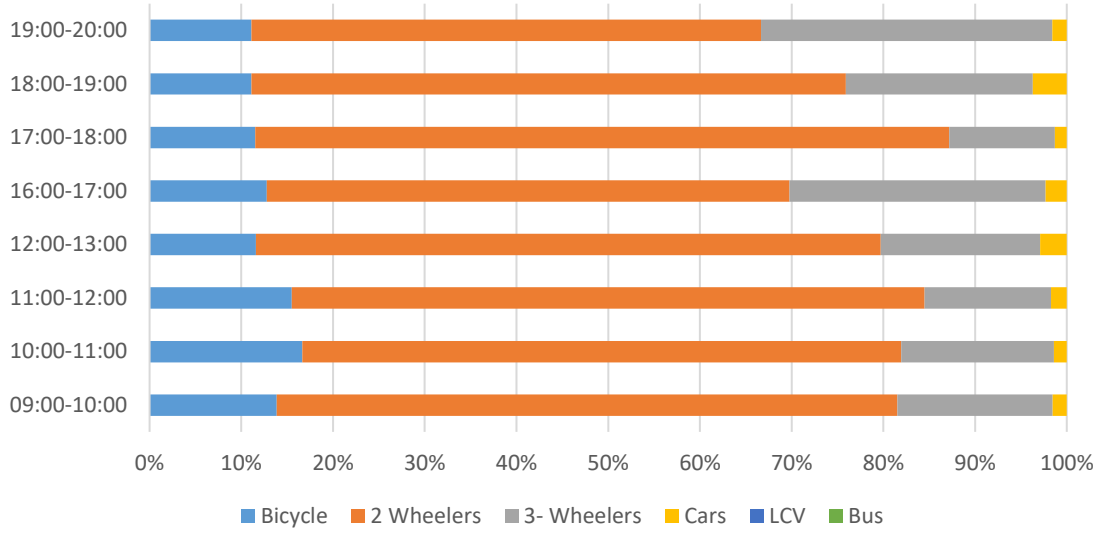


FIGURE 13-13 MODE WISE HOURLY DEMAND

Source: Stesalit Systems Limited. Transportation Survey 2024

13.3.5 SPEED AND DELAY ANALYSIS

Analysing speed and delay on roads is essential for optimizing transportation systems, improving safety, and enhancing the overall efficiency of road networks. Data collection through technologies like traffic sensors, GPS, and surveillance cameras facilitates accurate and real-time analysis for better decision-making in transportation planning and management.

13.3.5.1 OBJECTIVE

Assess the efficiency of the transportation network and identify areas prone to congestion or delays.

13.3.5.2 DATA COLLECTION TECHNIQUES

Utilize traffic cameras, or manual observations to record vehicle speeds and identify areas of traffic congestion.

Gather information on peak traffic hours, average speeds, and delays experienced by commuters.

13.3.5.3 ANALYSIS PROCESS

Analyze speed data to identify bottlenecks, congestion hotspots, and areas with recurring delays.

Assess the impact of traffic signals, intersections, and road design on overall travel time.

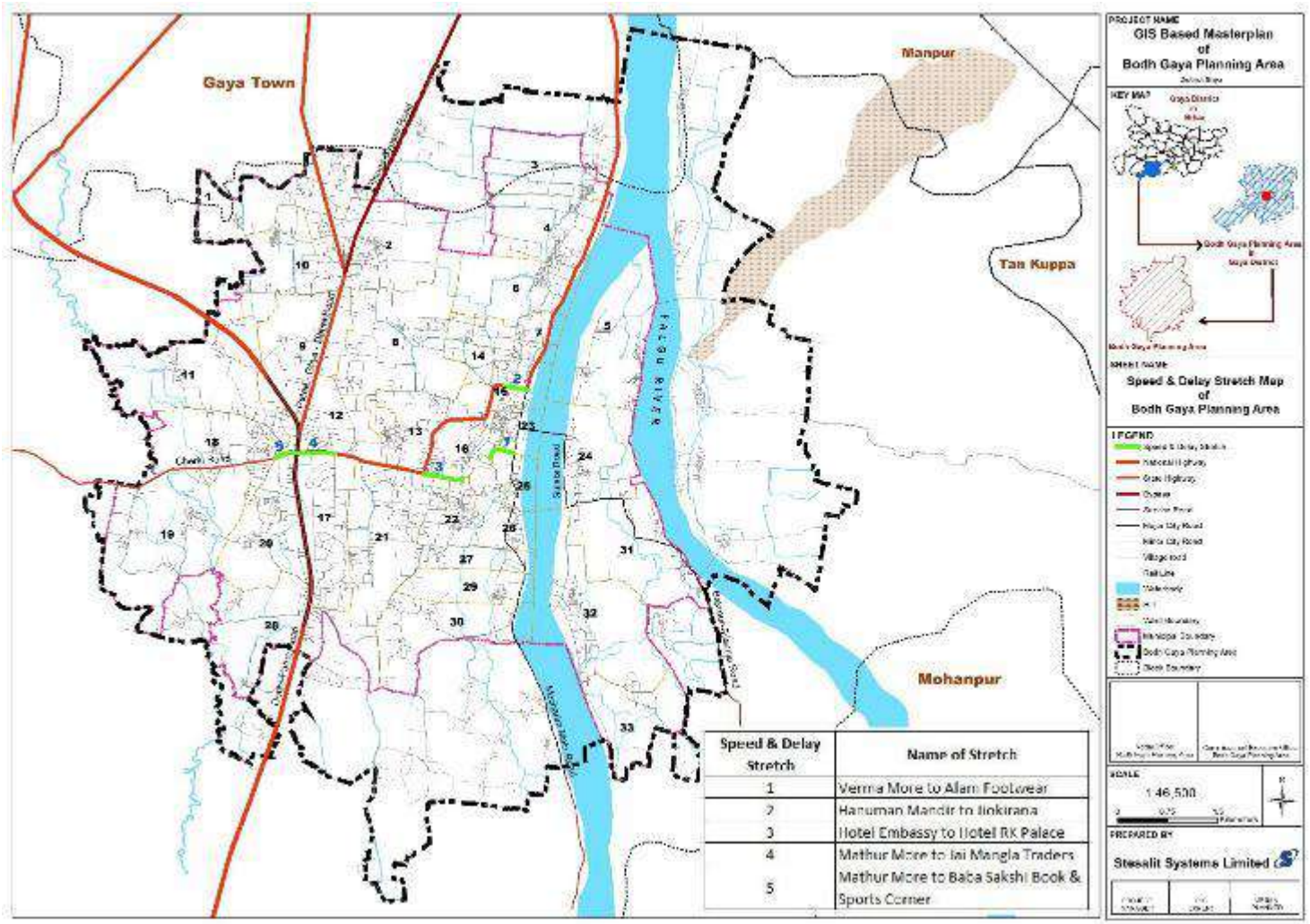
13.3.5.4 KEY CONSIDERATIONS

Prioritize areas for potential infrastructure improvements based on identified congestion points.

Consider implementing traffic management solutions to alleviate delays and enhance overall traffic flow.

13.3.5.4.1 DETAILS ABOUT STRETCHES

- Verma more to Alam Footwear
- Alam Footwear to Verma more
- Hanuman mandir to Jiokirana
- Jiokirana to Hanuman mandir
- Hotel Embassy to Hotel RK palace
- Hotel RK palace to Hotel Embassy
- Jai Mangla traders to Mathur more
- Mathur more to Jai Mangla traders
- Mathur more to Baba Sakshi book & sports corner
- Baba Sakshi book & sports corner to Mathur more



MAP 13-11 SPEED & DELAY SURVEY MAP OF BODHGAYA PLANNING AREA

Source: Transportation Survey 2024, Stesalit Systems Ltd.

TABLE 13-17 SPEED AND DELAY ANALYSIS TABLE

Trip no.	Direction of Trip	Total Journey time in mins.	Average Volume (q)	Total Stopped delay in mins.	Average Journey time (t)	Average Journey Speed (Kmph)
1	Verma more to Alam Footwear	1.47	3.93	0	2.74	9.84
2	Alam Footwear to Verma more	1.33	1.43	0	4.83	5.59
3	Hanuman mandir to Jiokirana	1.28	1.97	0	1.79	11.74
4	Jiokirana to Hanuman mandir	1.26	2.76	0	1.62	12.94
5	Hotel Embassy to Hotel RK palace	2.58	7.41	0.09	2.85	21.05
6	Hotel RK palace to Hotel Embassy	2.55	4.98	0	4.16	14.44
7	Jai Mangla traders to Mathur more	1.26	1.63	0	5.57	4.85
8	Mathur more to Jai Mangla traders	1.2	2.44	0	2.43	11.11
9	Mathur more to Baba Sakshi book & sports corner	1.2	3.25	0.06	0.89	23.53
10	Baba Sakshi book & sports corner to Mathur more	1.21	3.64	0.05	1.21	17.36

Source: Transportation Survey 2024, Stesalit Systems Ltd.

13.3.5.5 BODHGAYA NAGAR PANCHAYAT

Speed and delay analysis in the Bodhgaya Nagar Panchayat area is crucial for understanding the efficiency of traffic flow and identifying areas that require infrastructure improvements. This analysis involves collecting data on Journey times, vehicle speeds, and delays at various stretches within the area to assess the performance of the transportation network.

13.3.5.5.1 VERMA MORE TO ALAM FOOTWARE

The current average journey speed between Verma More to Alam Footware crawls at a dismal 5.59 km/hr. This slow pace is likely caused by the narrow carriageway, which restricts the flow of traffic. To improve travel times and expedite traffic flow along this route, widening the road is a viable solution. By expanding the road, there would be more space for vehicles, reducing congestion and allowing traffic to move more freely.

13.3.5.5.2 JAI MANGLA TRADERS TO MATHUR MORE

The sluggish 4.85 Km/Hr journey speed on the Jai Mangla Traders to Mathur More stretch can be attributed to the narrow road and unsignalized intersection. To improve traffic flow, a winning solution would be to widen the road to accommodate more vehicles and implementing signalised intersection. This would free up vital space for moving vehicles, alleviating congestion, and allowing traffic to circulate freely.

13.3.6 VEHICLES REGISTRATION ANALYSIS

The RTO data for Bodhgaya shows that vehicle ownership is dominated by two-wheelers, followed by private cars, commercial vehicles, and agricultural tractors. The large share of motorcycles and scooters highlights their role as the most common mode of personal mobility, while the growing number of cars indicates rising income levels and demand for comfortable travel. Registrations of tourist buses, taxis, and auto-rickshaws reflect Bodhgaya's importance as an international pilgrimage and tourism hub, requiring well-planned passenger facilities and parking. The presence of tractors and goods carriers points to the agricultural and freight needs of the region, while specialized vehicles like school buses and ambulances show attention to social services.

TABLE 13-18 VEHICLES REGISTRATION DETAILS IN BODHGAYA PLANNING AREA

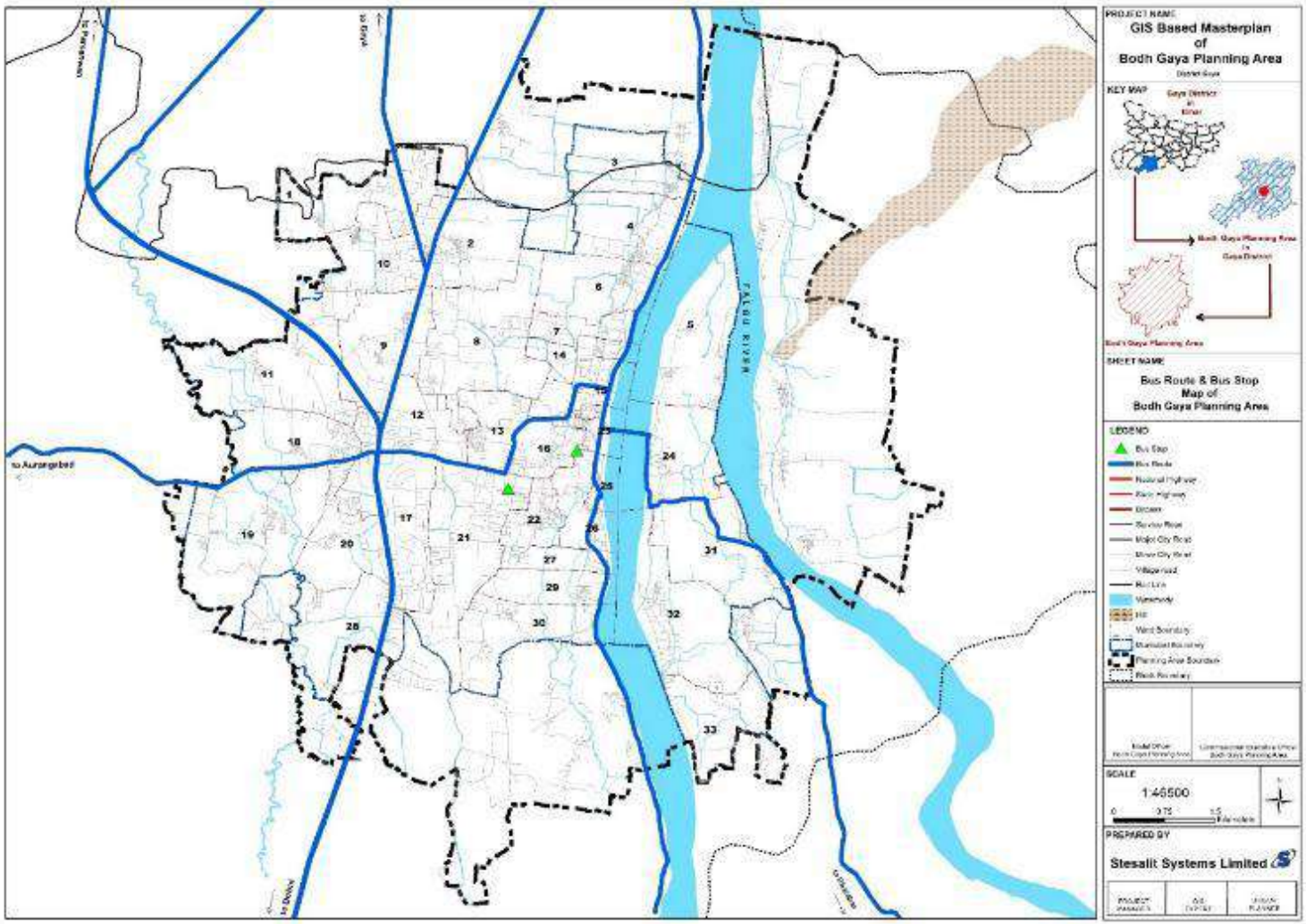
RTO DATA BODHGAYA																													
DETAILS OF VEHICLE REGISTRATION IN ARRAH AREA WITH PERCENTAGE GROWTH IN TERMS OF PCU																													
Sl. No	Year	M-Cycle/Scooter	M-	Moped	Motorised Cycle	Motor Car	Agricultural Tractor	Construction	Harvester	Trailer	E Rickshaw (P)	E Rickshaw with	Three-Wheeler (Passenger)	Three-Wheeler (Goods)	Goods Carrier	Tractor (Commercial)	Maxi Cab	Motor Cab	Bus	Ambulance	Adapted	Omni Bus	Trailer (Commercial)	Fire Fighting	Articulated	Dumper	Earth Moving	Grand Total	Traffic Growth	Traffic Growth
PCU VALUE		0.75	1	0.75	0.5	1	3	6	6	3	1.5	1.5	1.5	1.5	4	3	1	1	3	2	1	2	6	3	2	4	6			7
1	2020	31897	71	1489	1	2698	840	74	0	125	418	5	1379	549	692	923	8	77	77	0	0	21	163	0	0	0	0	41507		
2	2021	33452	36	1235	4	3434	776	104	1	87	1045	23	785	400	543	795	0	67	87	27	0	7	264	0	2	0	0	43174	4	
3	2022	36040	19	1322	21	3852	1621	68	6	232	2702	23	1195	373	853	831	2	65	97	18	0	2	403	0	1	0	0	49746	13	

4	2023	38733	28	1379	3	3827	1046	62	27	83	3813	32	1483	338	949	869	16	81	162	16	0	15	331	0	1	4	2	53294	7	
5	2024	40675	34	1324	3	3906	886	59	24	46	4376	52	1159	254	945	850	33	66	148	21	0	19	456	0	1	0	0	55337	4	
Grand Total		180797	188	6749	32	17717	5169	367	58	573	12354	135	6001	1914	3982	4268	59	356	571	82	0	64	1617	0	5	4	2	243058		

Source: Vahan.Parivahan.gov

13.3.7 BUS FACILITIES IN BODHGAYA PLANNING AREA

Bodhgaya's bus system primarily connects the pilgrimage/tourism core (Mahabodhi Temple area and Kalachakra Maidan) with Gaya city (railhead and airport), Patna (state capital), Rajgir–Nalanda (Buddhist circuit), and key NH corridors. The backbone road is NH-22 (ex-NH-83) Patna–Gaya–Dobhi, recently upgraded/four-laned to cut travel times and better handle tourist surges.



MAP 13-12 BUS ROUTES AND BUS STAND MAPS IN BODHGAYA PLANNING AREA

Source: Stesalit Systems Ltd.

13.3.8 FREIGHT CORRIDOR SURVEY

The Bodhgaya Planning Area (BPA) exhibits a growing demand for freight movement owing to its mix of urban, tourism, and peri-urban activities. The existing freight corridors in and around Bodhgaya primarily rely on the national and state highway network, with NH-22 and NH-120 serving as the key spines for long-distance goods movement. These highways connect the planning area with Gaya, Patna, BodhGaya, and further linkages to the Eastern Dedicated Freight Corridor (EDFC), thereby integrating the region into broader national logistics chains.

Within the planning area, freight transport is predominantly road-based, with trucks, mini-goods carriers, and three-wheeler cargo vehicles handling last-mile distribution. The absence of a designated freight terminal or logistics hub means that loading and unloading activities often take place informally along roadways, particularly near wholesale markets, industrial clusters, and peripheral settlements. This creates local congestion and conflicts with passenger traffic, especially in areas of high pedestrian and tourist activity.

At the regional level, freight traffic is supported by the proximity of the Gaya Railway Station, which acts as a critical multimodal node. However, the planning area itself lacks a structured integration between rail-based freight and road-based distribution networks. The absence of modern logistics facilities such as truck terminals, intermodal freight depots, and cold storage units restricts the potential for streamlined supply chains, particularly for perishable goods.

13.4 MODAL CHOICE PROJECTIONS

13.4.1 PROJECTION METHOD

The projections combine population growth with expected changes in travel behavior. Using the official population forecasts for the Bodhgaya Planning Area, the 2023 base year population was estimated from 2021–2025 trends. Two futures were modelled: Moderate Investment, with steady improvements in public transport and non-motorized transport, and Trend-based, with no major interventions. Annual changes in modal share were applied to the 2023 baseline, then multiplied by the projected population and an average of 1.2 trips per person per day to estimate future daily trips by mode. This approach captures the combined effect of demographic growth and shifting travel patterns.

Table 13-19 95PROJECTED MODAL SHARE CHANGES IN BODHGAYA UNDER INVESTMENT VS. DO-NOTHING SCENARIOS (2035 & 2047)

Year	Scenario	2W	Car	Auto	Bus	LCV+HCV	E-Rickshaw	NMT (Cycle+Walk)
2030	Trend	54%	13%	15%	1%	5%	12%	–
	Moderate	45%	10%	12%	8%	5%	12%	8%
2040	Trend	52%	14%	15%	1%	5%	13%	–
	Moderate	42%	10%	12%	12%	5%	12%	7%
2047	Trend	51%	15%	14%	1%	5%	14%	–

	Moderate	40%	9%	12%	15%	5%	12%	7%

Source: Stesalit System Ltd.

The table shows the projected modal share changes in Bodhgaya for the years 2031, 2041, and 2047 under two scenarios: Trend (Do-Nothing) and Moderate Investment. In the Trend scenario, two-wheelers continue to dominate with more than 50% share across all years, while the share of cars and autos gradually rises. However, bus usage remains very low at around 1%, indicating limited public transport reliance without intervention. E-rickshaws steadily grow to about 14% by 2047, highlighting their increasing role in local mobility. In contrast, the Moderate Investment scenario demonstrates a significant shift towards sustainable transport. Two-wheeler dependency reduces to 40–45%, while bus usage increases substantially to 8–15%, reflecting the impact of improved public transport infrastructure. Non-Motorized Transport (NMT – cycling and walking) also gains a share of 7–8%, promoting eco-friendly mobility. Overall, the comparison emphasizes that without planned investment, Bodhgaya will remain heavily dependent on two-wheelers, but with moderate investment, there is a clear potential to diversify travel modes, strengthen public transport, and enhance sustainable mobility options.

Table 13-20 MODAL CHOICE PROJECTION FOR bodhgaya PLANNING AREA

Year	Scenario	2W	Car	Auto	Bus	LCV+HCV	E-Rickshaw	NMT (Cycle + Walk)
2030	BAU	53.70%	12.40%	15.30%	1.30%	5.50%	11.80%	–
	PT	45.00%	11.00%	11.00%	10.00%	5.00%	18.00%	–
	NMT	38.00%	8.00%	12.00%	10.00%	5.00%	15.00%	12.00%
2040	BAU	52.80%	13.20%	15.00%	1.20%	5.50%	12.30%	–
	PT	42.00%	10.50%	10.50%	15.00%	5.00%	17.00%	–
	NMT	37.00%	8.00%	12.00%	10.00%	5.00%	16.00%	12.00%
2047	BAU	51.70%	14.40%	14.60%	1.10%	5.50%	12.70%	–
	PT	40.00%	10.00%	10.00%	20.00%	5.00%	15.00%	–
	NMT	35.00%	8.00%	12.00%	10.00%	5.00%	18.00%	12.00%

Source: Stesalit System Ltd.

The table presents the modal choice projection for Bodhgaya Planning Area for the years 2031, 2041, and 2047 under three scenarios: Business as Usual (BAU), Public Transport (PT), and Non-Motorized Transport (NMT). In the BAU scenario, two-wheelers remain the dominant mode, accounting for more than 50% share in all years, while cars and autos maintain a moderate share of around 12–15%. However, in the PT scenario, the share of buses increases significantly (up to 20% by 2047), accompanied by a decline in two-wheeler usage, reflecting the potential of improved public transport in reducing private vehicle dependency. The NMT scenario projects the introduction and growth of cycle and walking modes, capturing about 12% of the modal share, alongside a decline in motorized modes. E-rickshaws consistently grow across scenarios, reaching up to 18% in the NMT scenario by 2047, highlighting their role as a sustainable and affordable mobility option. Overall, the projections emphasize that without intervention, two-

wheelers will continue to dominate, but strengthening public transport and promoting non-motorized transport can significantly shift travel behavior towards more sustainable modes.

13.5 ISSUE & POTENTIAL

Table 13-21 SWOT ANALYSIS for bodhgaya planning area

Strength	Weakness	Opportunity	Threat
Strategic Regional Connectivity • Located on NH-22 (Patna–Gaya–Dobhi Road), Bodhgaya has direct access to Patna, Gaya, and the national corridor (NH-2/Grand Trunk Road), ensuring strong inter-regional connectivity. • State Highways (SH-4 and others) link Bodhgaya with Rajgir, Nawada, and other Buddhist tourism destinations. Proximity to Rail & Air Gateways • Gaya Junction (15 km) connects Bodhgaya to the Howrah–Delhi main line (Grand Chord), ensuring access to major metros. • Gaya International Airport (12 km) enables international and domestic tourist inflow, boosting global accessibility.	Absence of Dedicated Railway Station • Bodhgaya lacks its own railway station, relying on Gaya Junction, limiting direct passenger/freight connectivity. Limited Public Transport System • No structured city bus system; reliance on IPT modes (autos/e-rickshaws) creates congestion and inefficiency. Encroachment & Parking Issues • Roadside encroachments and lack of designated parking near markets and bus stands reduce effective carriageway width and worsen congestion. Poor Traffic Management • Unsignalized junctions, poor signage, and lack of enforcement reduce safety and	Development of Organized Public Transport System • Introduction of city bus/e-bus services can reduce dependence on IPT and enhance connectivity for tourists and residents. Tourism Circuit Integration • Improved regional bus/coach services connecting Bodhgaya with Rajgir, Nalanda, Varanasi, Kushinagar, and Lumbini can strengthen its role in the international Buddhist tourism circuit. Airport & Railway Shuttle Services • Dedicated high-frequency shuttle bus/e-bus services between Bodhgaya, Gaya International	Seasonal Tourist Surge & Overloading of Infrastructure • Heavy influx of domestic and international tourists during peak pilgrimage seasons overwhelms local roads, terminals, and junctions, leading to gridlocks and delays. Through Traffic on NH-22 • Continuous flow of regional and freight traffic along NH-22 mixes with local/tourist traffic, worsening congestion at critical nodes like Domuhan, Verma More, and Sujata Road junctions. Unregulated IPT Operations • Clustering of auto-rickshaws and e-rickshaws near temples, bus stands, and markets creates unsafe conditions, blocks

Tourism-Driven Mobility Demand • Being a UNESCO World Heritage site and part of the Buddhist Tourism Circuit, Bodhgaya enjoys year-round demand, supporting sustained investments in mobility infrastructure. High Availability of Intermediate Public Transport (IPT) • Extensive network of auto-rickshaws and e-rickshaws provides wide coverage and reliable last-mile connectivity within the city and to surrounding villages. Regional Road Network Diversity • Secondary and bypass roads (Cherki Road, Sujata Road, Domuhan Road, Tikuna Bypass) create multiple access routes, dispersing traffic and offering redundancy in connectivity. Existing National and State-Level Focus • Government and international	efficiency. Narrow Secondary Roads • Most secondary/local roads are 7–9 m undivided, insufficient for current traffic demand. Poor Walkability • Lack of pedestrian facilities and NMT lanes forces unsafe mixing of pedestrians/cyclists with motorized traffic.	Airport, and Gaya Junction can ensure seamless multimodal integration. Smart Traffic & Parking Management • Deployment of ITS (Intelligent Transport Systems), digital parking solutions, and traffic control systems around temple complexes and market areas can ease congestion. NMT & Pedestrian Infrastructure Development • Creation of pedestrian plazas, footpaths, and cycle tracks near temple areas can enhance safety and visitor experience while supporting sustainable mobility. EV Charging Infrastructure • Rapid electrification of auto/e-rickshaw fleets offers potential for public charging & battery swapping stations,	carriageways, and disrupts smooth traffic flow. Heritage & Environmental Sensitivity • Rising motorization and pollution (noise, air, vibrations) threaten the ambience of the Mahabodhi Temple Complex (UNESCO site) and overall visitor experience. Road Safety Risks • Absence of pedestrian crossings, sidewalks, and cycle tracks increases accident risks, particularly for pilgrims, elderly tourists, and school children. Parking Pressure in Core Areas • Lack of structured parking near temples, guest houses, and market areas results in illegal roadside parking, reducing effective carriageway width. Risk of Infrastructure Lagging Behind Demand

tourism bodies recognize Bodhgaya as a pilgrimage hub, ensuring priority investment in roads, terminals, and urban transport facilities.		positioning Bodhgaya as a green mobility hub. Logistics & Last-Mile Connectivity Hubs • Development of logistics and parking hubs outside core city areas can reduce through-traffic, especially during peak tourist seasons.	• If planned improvements in PT, EV charging, and road management are delayed, the city risks unsustainable congestion and loss of tourist appeal.

13.6 INFERENCE

- **Infrastructure Optimization**

Prioritize the optimization of existing road infrastructure, considering traffic volume patterns and potential congestion points. Implement smart traffic management solutions to enhance efficiency and reduce travel times.

- **Public Transport Optimization**

Public transport optimization involves strategically planning and adjusting various aspects of a network to improve efficiency and ridership. This can encompass designing routes with minimal travel times, setting bus or train frequencies based on real-time demand, and even utilizing different vehicle sizes on routes depending on passenger volume. Ultimately, the goal is to create a system that minimizes wait times, travel durations, and operational costs, while maximizing passenger convenience and ridership.

- **Community Engagement and Education**

To create a public transport system that truly serves the community, open communication is key. Public forums can gather resident feedback on pain points and preferences, while educational campaigns can raise awareness about sustainable options like cycling and buses. By promoting these alternatives and fostering a culture of public transit use, communities can work together towards a more efficient and eco-friendly transportation network.

13.7 SOCIO-ECONOMIC SURVEY ANALYSIS

The analysis aims to provide critical insights into the community's connectivity, economic opportunities, and overall quality of life by examining transportation

patterns and potential challenges. Understanding transportation dynamics not only informs urban planning and development strategies but also helps to shape sustainable and inclusive mobility solutions, enriching the overall socioeconomic profile of the surveyed community.

13.7.1.1.1 VEHICLE OWNERSHIP

Among the households surveyed in urban areas, 123 households have cars, 1456 households have two wheelers and 1883 households have cycles in their house. There are a few surveyed households possessing tractors or three-wheelers, while very few surveyed households don't possess any vehicles.

TABLE 13-22 VEHICLE OWNERSHIP OF THE SURVEYED HOUSEHOLDS

Car	2-Wheeler	Cycle	Other Vehicles
123	1456	1883	17

Source: Socio-Economic Survey, 2023, Stesalit Systems Ltd.

The majority of households surveyed in urban areas (67.19%) who have cars in their house own 1 car while a few (26.56%) of them own 2 cars and the rest 6.25% have more than 2 cars. Based on the data, in Bodhgaya Nagar Panchayat, the households of ward no. 1, 2, 3, 8, 9, 14, 18, 31, 32, 36, 38, 40, 42, 44, 45, 46, 47 and 48 only possess cars while in other words, they don't possess any vehicles.

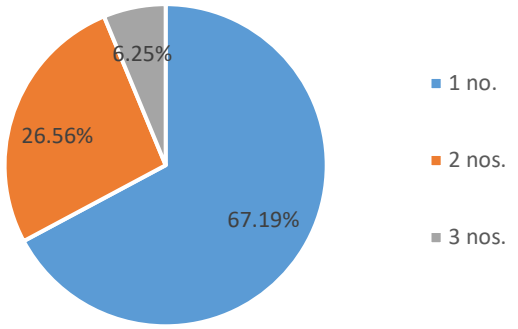


FIGURE 13-14 CAR OWNERSHIP OF THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

The majority of households surveyed in urban areas (91.96%) who have two-wheelers in their house own 1 two-wheeler while a few (5.93%) of them own 2 two-wheelers and the rest 2.11% have more than 2 two-wheelers.

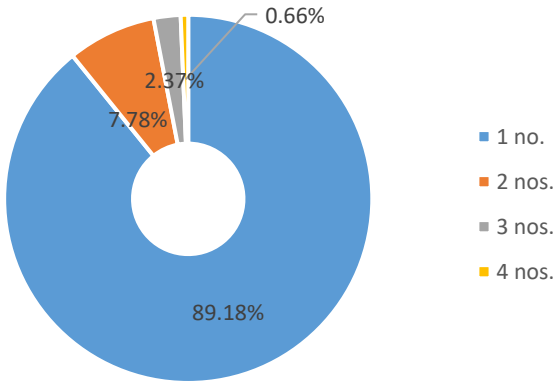


FIGURE 13-15 TWO-WHEELER OWNERSHIP OF THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

The majority of households surveyed (97.14%) in urban areas who have cycles in their house own 1 cycle, 2.65% own 2 cycles while the rest 0.20% own more than 2 cycles.

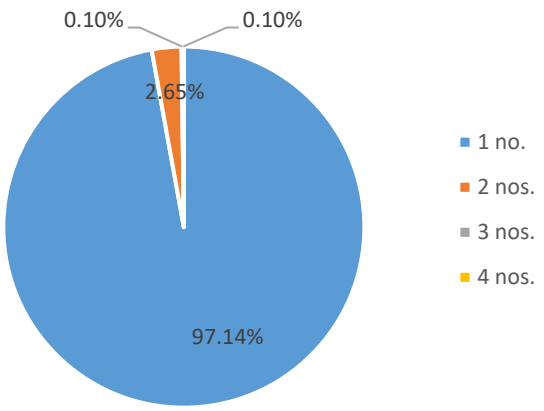


FIGURE 13-16 CYCLE OWNERSHIP OF THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

13.7.1.2 TRIP ORIGIN AND DESTINATION

Details about the starting point (origin) and the ending point (destination) of each trip made by household members. This information helps in mapping travel patterns within the community.

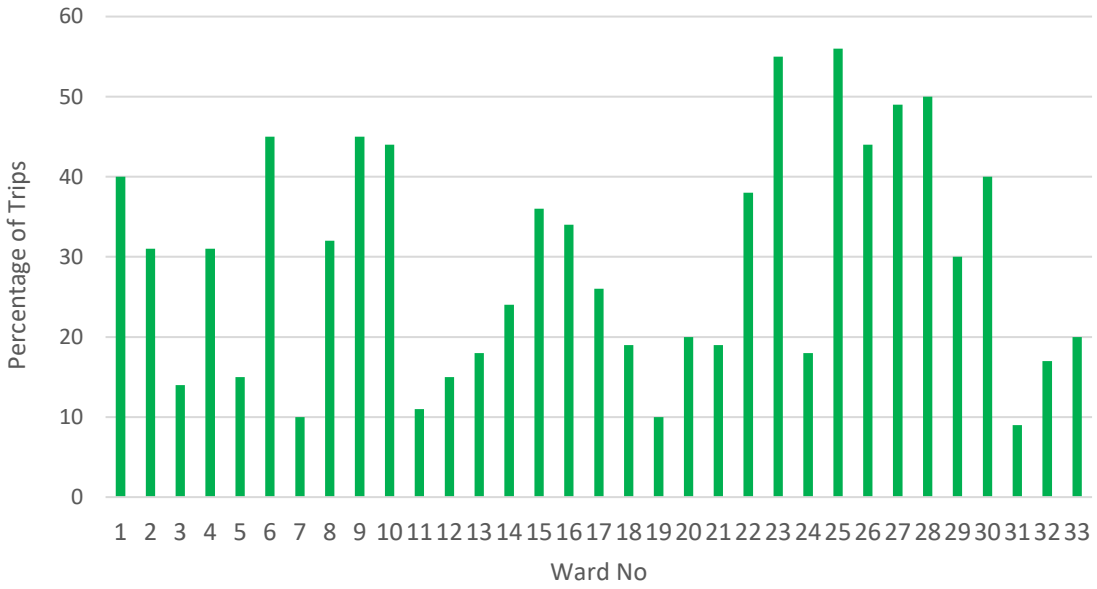


FIGURE 13-17 WARD WISE TRIP DISTRIBUTION FROM WARDS

Source: Socio-economic Survey 2023, Stesalit Systems Ltd.

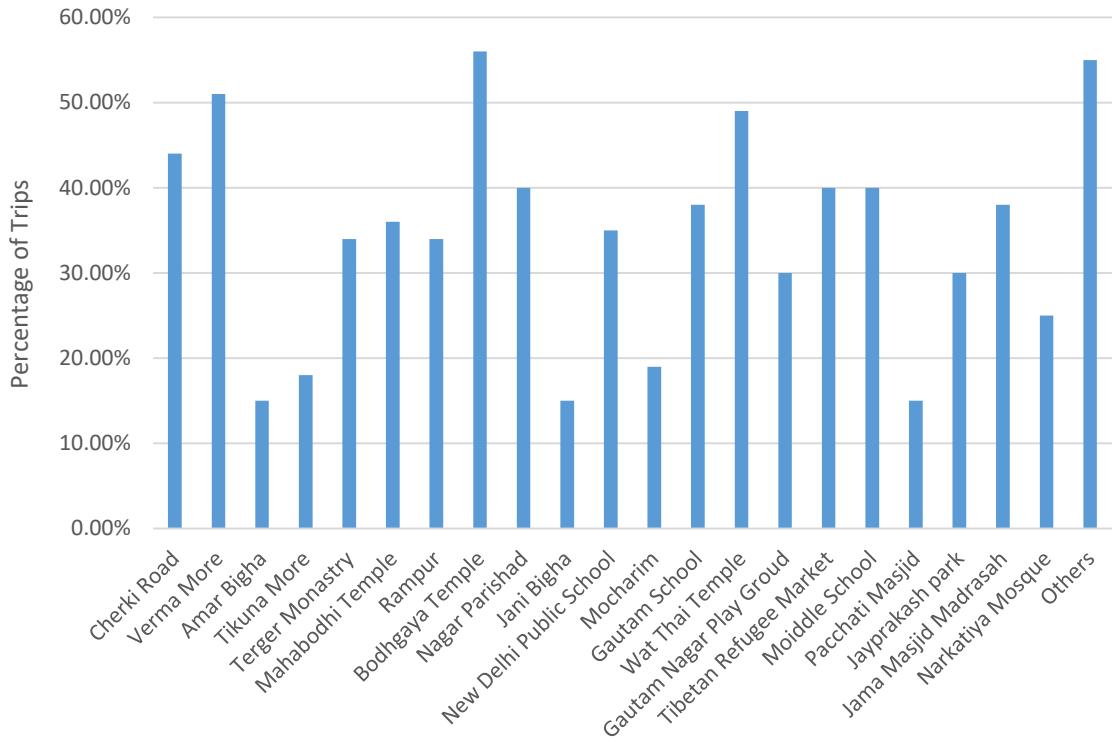


FIGURE 13-18 DESTINATION WISE TRIP DISTRIBUTION

Source: Socio-economic Survey 2023, Stesalit Systems Ltd.

13.7.1.2.1 TRAVEL PURPOSE

The purpose of each trip, such as commuting to work or school, shopping, recreation, social activities, etc. Understanding the reasons for travel is crucial for planning and policy decisions. It is observed that 58.08% of the trips to urban areas are reported for work purpose.

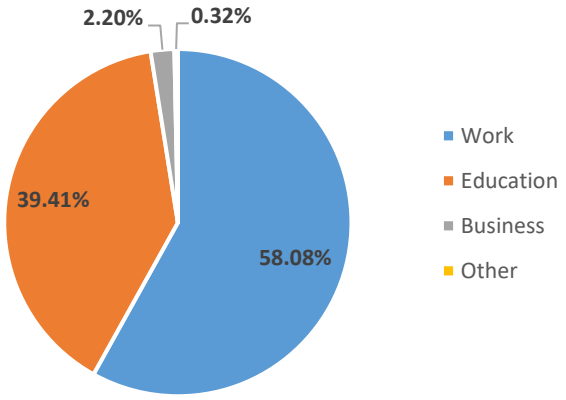


FIGURE 13-19 PURPOSE OF TRAVEL BY REPORTED TRIPS IN URBAN AREAS

Source: Socio-economic Survey 2023, Stesalit Systems Ltd.

13.7.1.2.2 MODE OF TRANSPORTATION

The mode of transportation used for each trip, whether it is by car, public transit, walking, biking, or other means. This helps in assessing the transportation infrastructure needs and the sustainability of travel modes. More than 60 percent of the trips are made by walks.

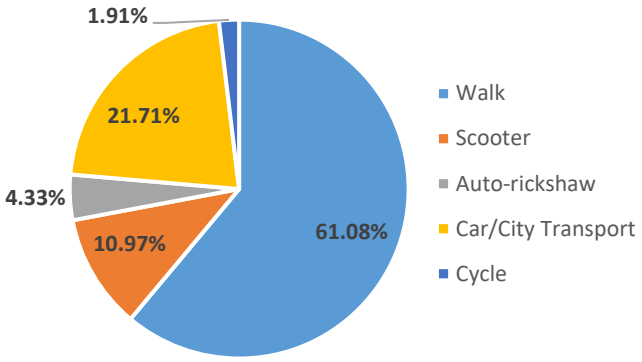


FIGURE 13-20 MODE OF TRANSPORTAION BY REPORTED TRIPS IN URBAN AREAS

Source: Socio-economic Survey 2023, Stesalit Systems Ltd.

13.7.1.2.3 TRAVEL DISTANCE

The distance covered during each trip. This information is essential for assessing the efficiency of transportation systems and planning for future infrastructure development. More than 90 percent of trips are less than or within 20 km.

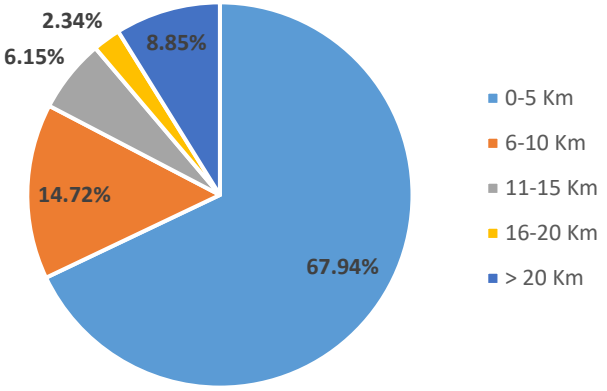


FIGURE 13-21 TRAVEL DISTANCE BY REPORTED TRIPS IN URBAN AREAS

Source: Socio-economic Survey 2023, Stesalit Systems Ltd.

13.7.1.2.4TRAVEL COST

The travel cost during each trip. This information is essential for assessing the efficiency of transportation systems and planning for future infrastructure development. More than 75 percent of trips cost less than INR 50.

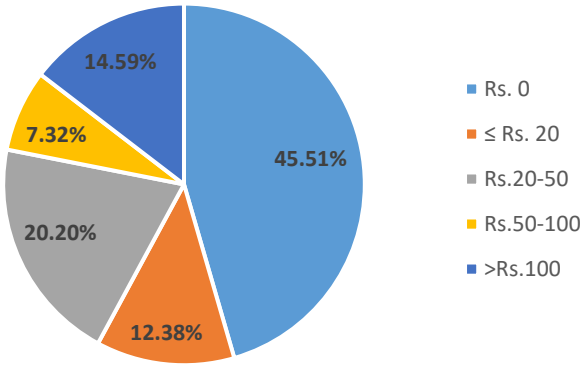


FIGURE 13-22 TRAVEL COST BY REPORTED TRIPS IN URBAN AREAS

Source: Socio-economic Survey 2023, Stesalit Systems Ltd.

13.7.1.2.5 TRAVEL TIME

The time taken during each trip. This information is essential for assessing the efficiency of transportation systems and planning for future infrastructure development. More than 85 percent of trips made, are less than 30 minutes.

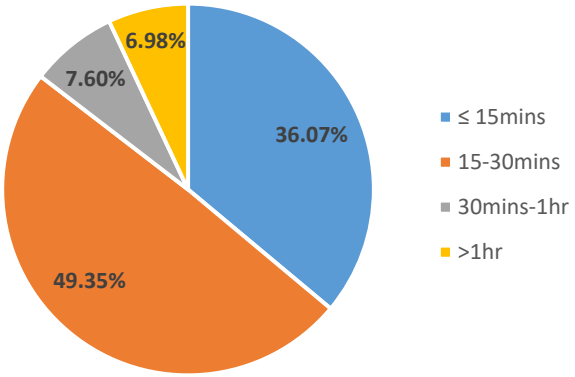


FIGURE 13-23 TRAVEL TIME BY REPORTED TRIPS IN URBAN AREAS

Source: Socio-economic Survey 2023, Stesalit Systems Ltd.

13.7.2 GRIEVANCES

64.76% of households in urban areas reported waterlogging issues during the monsoon, while 35.24% experience no waterlogging during this season. In Bodhgaya Nagar Panchayat, almost more than half of the households have reported waterlogging issues. This is a serious concern and it needs to be maintained.

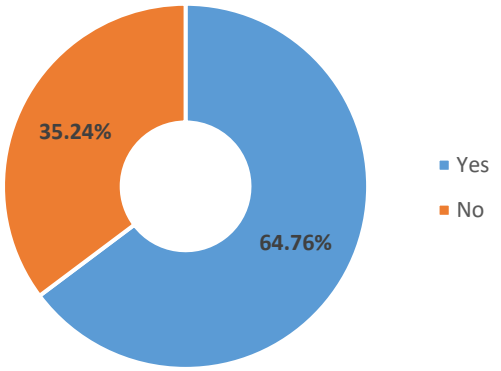


FIGURE 13-24 ISSUE OF WATER LOGGING DURING MONSOON REPORTED BY THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey, 2023, Stesalit Systems Limited

As per 3.09% of the households surveyed in urban areas, the hygiene condition seems bad, 17.94% seem medium while it's good for the rest of them.

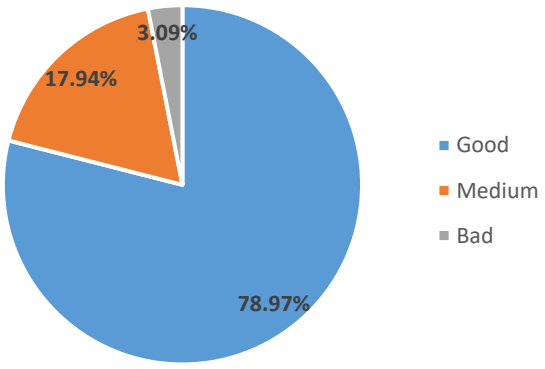


FIGURE 13-25 ISSUES WITH HYGIENE CONDITIONS FACED BY THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

49.84% of the households surveyed in urban areas get medium access to roads while 11.75% get bad access to the roads, which must be improved. On the other hand, 38.41% get good access to roads.

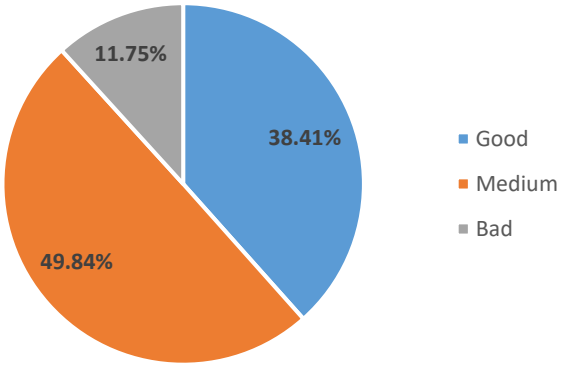


FIGURE 13-26 ISSUES WITH ROAD ACCESSIBILITY FACED BY THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited

3.64% of the households surveyed in urban areas face problems due to pollution from household industries while it's good for the rest of them.

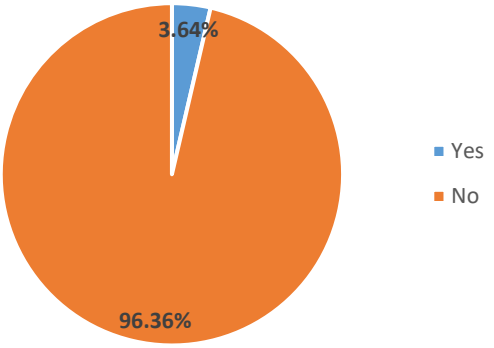


FIGURE 13-27 ISSUES WITH POLLUTION DUE TO HOUSEHOLD INDUSTRIES FACED BY THE SURVEYED HOUSEHOLDS IN URBAN AREAS

Source: Socio-Economic Survey 2023, Stesalit Systems Limited.

13.8 TRANSPORT PROPOSAL

13.8.1 PROPOSED RING ROAD

The proposed Ring Road (Peripheral Road along Planning Boundary) is envisioned as a strategic mobility corridor that will function as a peripheral distributor road, diverting regional and through-traffic away from the congested urban core while enhancing overall traffic efficiency. By providing an alternative high-capacity route around the city, it will reduce travel time, minimize heavy vehicle movement within built-up areas, and support improved regional connectivity with surrounding settlements and highways. Additionally, the ring road will act as a clear urban growth boundary, helping to guide structured and planned expansion of the city while preventing unplanned sprawl.

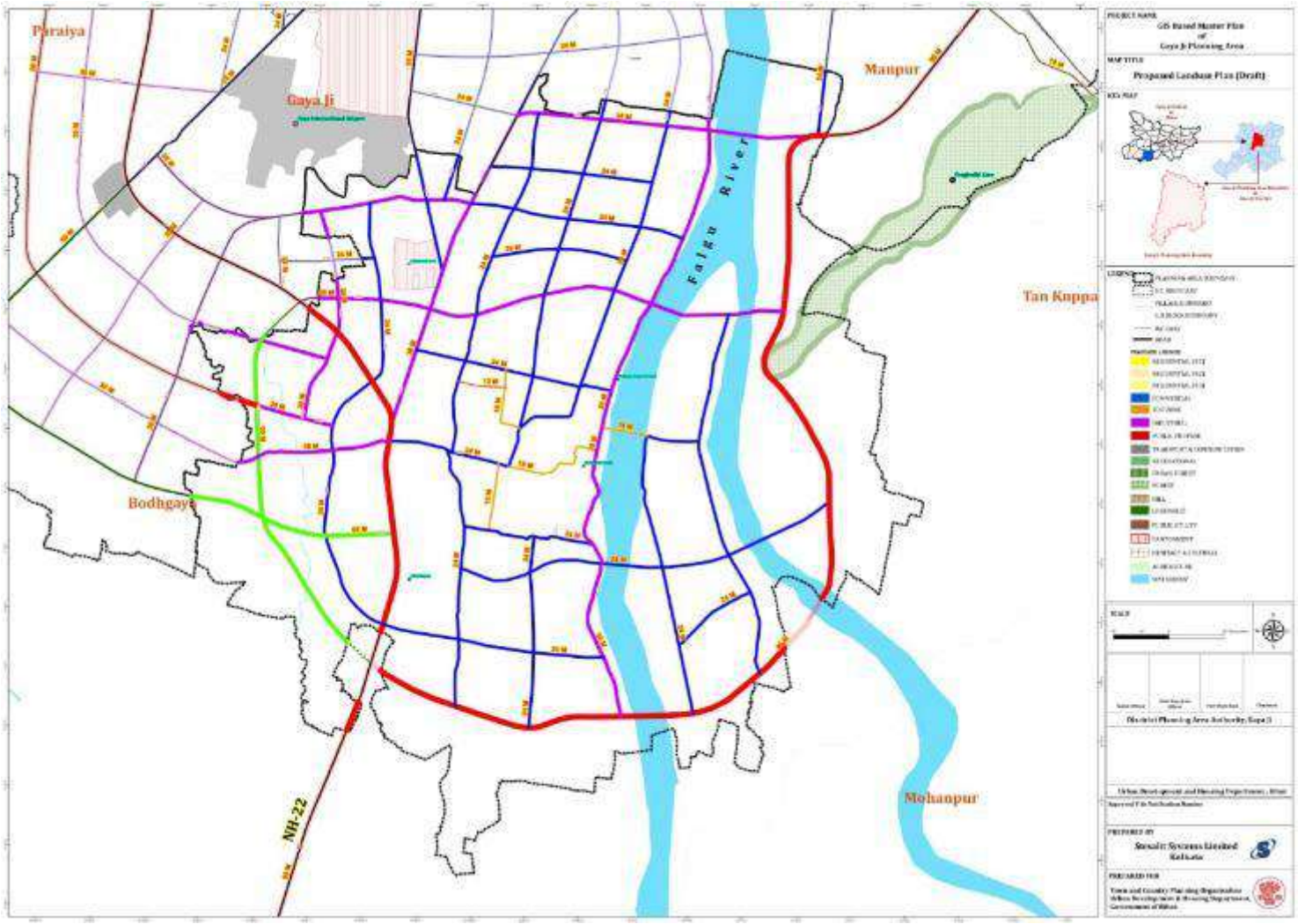
The proposed alignment has an approximate length of 32.48 km, covering nearly 150 hectares of land, and will be developed as a continuous peripheral corridor along the planning boundary. It is planned with a Right of Way (ROW) of 45–50 meters, designed to accommodate high-speed vehicular movement along with integrated infrastructure components such as service roads, stormwater drainage systems, utility corridors, and green buffers. Controlled and strategically planned access points will connect major radial and arterial roads, ensuring efficient traffic distribution and safe movement patterns.

The proposal is aligned with URDPFI Guidelines 2014, which recommend ring or peripheral roads for cities with future expansion potential to manage growth and traffic efficiently. Design standards will follow MoRTH and IRC guidelines, ensuring safety, capacity, and sustainability. Similar successful implementations in cities such as Jaipur, Indore, and Lucknow demonstrate the effectiveness of ring roads in supporting urban mobility, reducing congestion, and enabling balanced spatial development.

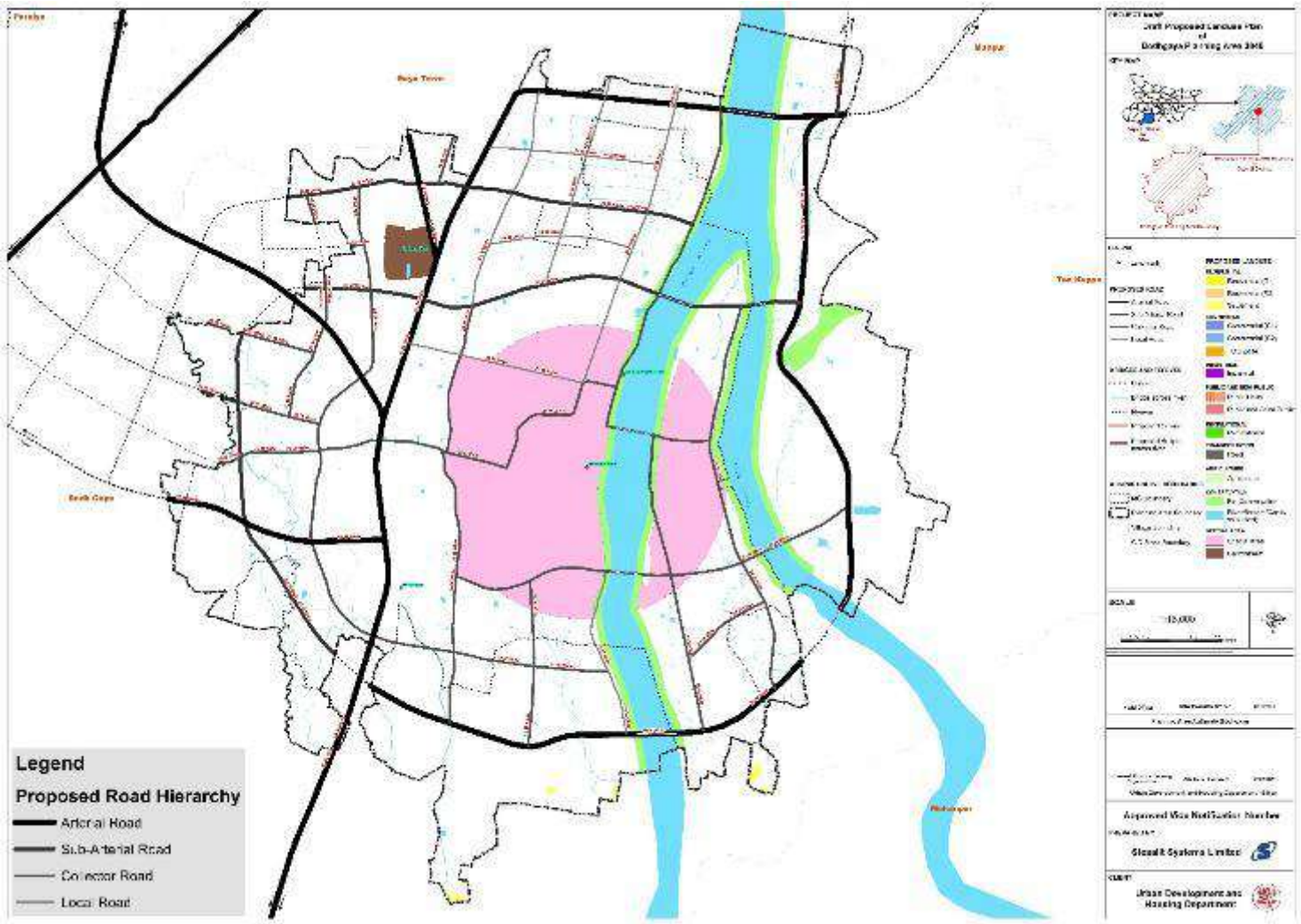
13.8.2 INTERMODAL TRANSIT HUB AND TRANSPORT ROUTE

Intermodal Transit Hubs are proposed to improve mobility efficiency by enabling seamless interchange between different modes of transport such as buses, intermediate public transport (IPT), para-transit systems, non-motorised transport (NMT), and private vehicles. Efficient integration of multiple transport modes is essential for successful implementation of sustainable urban mobility systems, reducing transfer time and enhancing commuter convenience. Within the planning area, dedicated intermodal hubs are proposed over approximately 10–15 hectares, designed to accommodate organised bus bays, IPT stands, pedestrian-friendly access, cycling infrastructure, parking management systems, and well-planned last-mile connectivity solutions. These hubs will function as key mobility nodes, improving accessibility, reducing congestion, and encouraging a modal shift towards public transport. The proposal aligns with recommendations under the National Urban Transport Policy (NUTP) and URDPFI Guidelines, with successful examples seen in multimodal interchange facilities such as BRT–Metro interchanges in Ahmedabad and Pune.

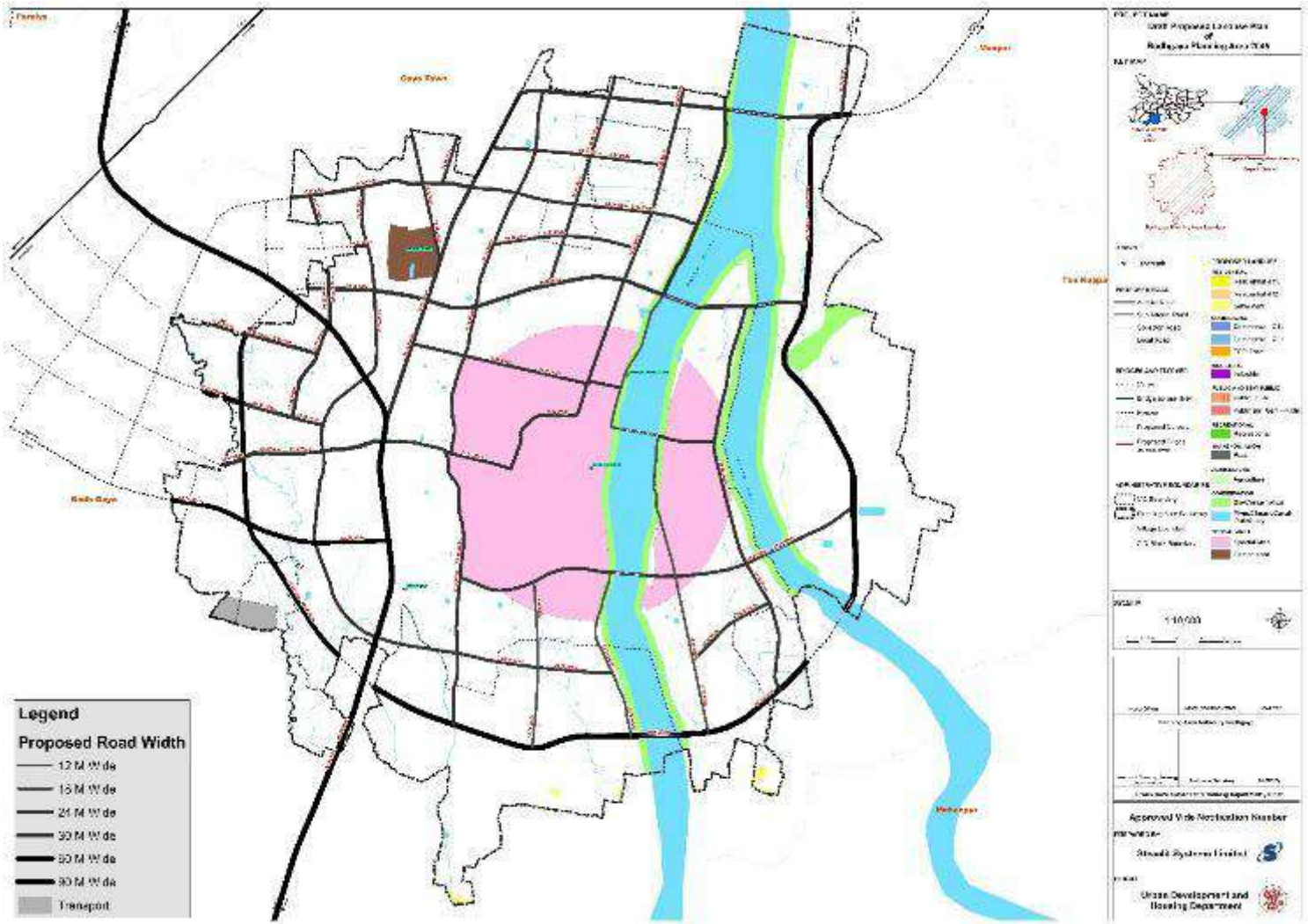
Public and IPT Transport Routes are proposed with clearly defined alignments to streamline traffic flow, reduce conflicts between transport modes, and enhance operational efficiency. Establishing fixed routes and designated stops for public transport and IPT services will help minimise random stopping, improve reliability, and ensure safer road usage. Effective implementation will require strict regulatory frameworks, route management systems, enforcement mechanisms, and coordination among transport authorities. Case studies from cities like Pune and Kerala demonstrate that structured route planning combined with strong operational management can significantly reduce congestion and improve public transport performance.



MAP 13-13: PROPOSED ROAD WIDTH FOR BODHGAYA PLANNING AREA



MAP 13-14: PROPOSED ROAD HIERARCHY FOR BODHGAYA PLANNING AREA



MAP 13-15: PROPOSED TRANSPORTATION FACILITY FOR BODHGAYA PLANNING AREA

13.8.3 PROPOSED ROAD NETWORK

The proposed road network for the Bodhgaya planning area comprises a total road length of 120.99 km, aimed at improving mobility, connectivity, and future traffic capacity. Of the total network, approximately 25 km involves widening and upgradation of existing roads, while 96 km comprises newly proposed roads to support planned urban expansion, townships, and emerging activity corridors.

TABLE 13-23 PROPOSED ROAD NETWORK AS PER STATUS OF WORK

S.N.	Road Type	Road Length (Km)
1	Road Widening	25.07
2	New Road	95.92
3	**Total**	**120.99**

Source: Stesalit System Ltd.

The road network has been planned with a clear hierarchy of right-of-way (ROW) widths to accommodate varying traffic volumes and functional roles. The distribution of road widths includes 12 km of 18 m wide roads, primarily serving local access; 61 km of 24 m wide roads supporting secondary traffic flows; 31 km of 30 m and 8 km of 60m wide roads at strategic locations, and 63km of 90m wide road which constitute the proposed ring road. The ring road is a key infrastructure element designed to divert through-traffic, particularly heavy vehicles, away from the urban core and improve regional connectivity.

TABLE 13-24 PROPOSED ROAD NETWORK AS PER ROAD WIDTH

S.N.	Road Type	Road Length (Km)
1	18m wide road	12.15
2	24m wide road	60.83
3	30m wide road	30.73
4	60m wide road	8.44
5	90m wide road	63.05
	Total	**120.99**

Source: Stesalit System Ltd.

Based on functional classification, the proposed road hierarchy includes 23 km of arterial roads, forming the primary movement corridors across the planning area; 20 km of sub-arterial roads, which distribute traffic between arterials and local networks; 57 km of collector roads, facilitating intra-area movement and access to residential and mixed-use zones; and 20 km of local roads, providing direct access to neighbourhoods and plots.

TABLE 13-25 PROPOSED ROAD NETWORK AS PER ROAD HIERARCHY

S.N.	Road Type	Road Length (Km)
1	Arterial Road	23.29
2	Collector Road	56.86
3	Sub- Arterial Road	20.08
4	Local road	20.76

S.N.	Road Type	Road Length (Km)
7	Total	120.99

Source: Stesalit System Ltd.

13.8.4 PROPOSED ROAD CROSS SECTION

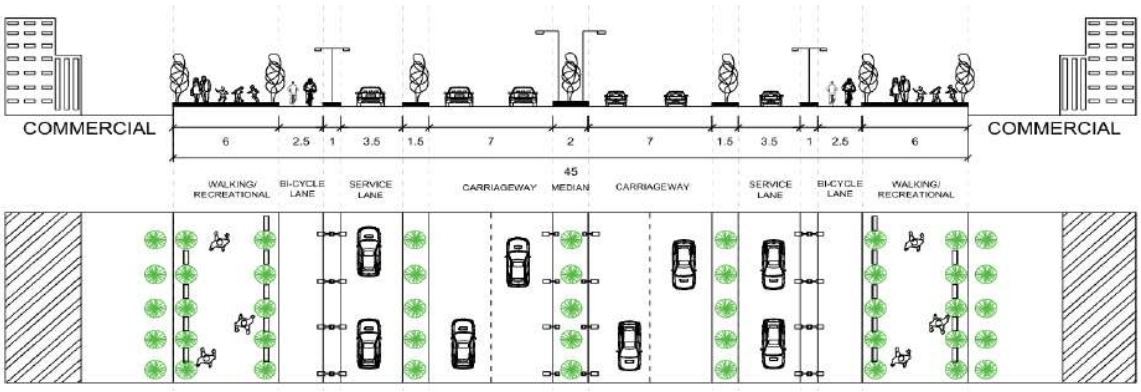


FIGURE 13-28 45M WIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed road cross-section presents a balanced, complete-street design with a total right-of-way of about 45 m, integrating mobility, safety, and urban livability. Flanked by commercial land use on both sides, the section prioritizes pedestrians and non-motorized transport through generously sized walking and recreational zones (about 6 m) with landscaping and seating, followed by dedicated bicycle lanes (2.5 m) to encourage sustainable mobility. Service lanes (3.5 m) on either side ensure smooth access to commercial activities without disturbing through traffic. The central portion consists of dual carriageways (7 m each) separated by a landscaped median (2 m), which enhances safety, traffic management, and visual quality while also accommodating lighting and greenery. Overall, the cross-section reflects a people-oriented, multimodal urban street that supports commercial vibrancy, efficient traffic flow, and a high-quality public realm.

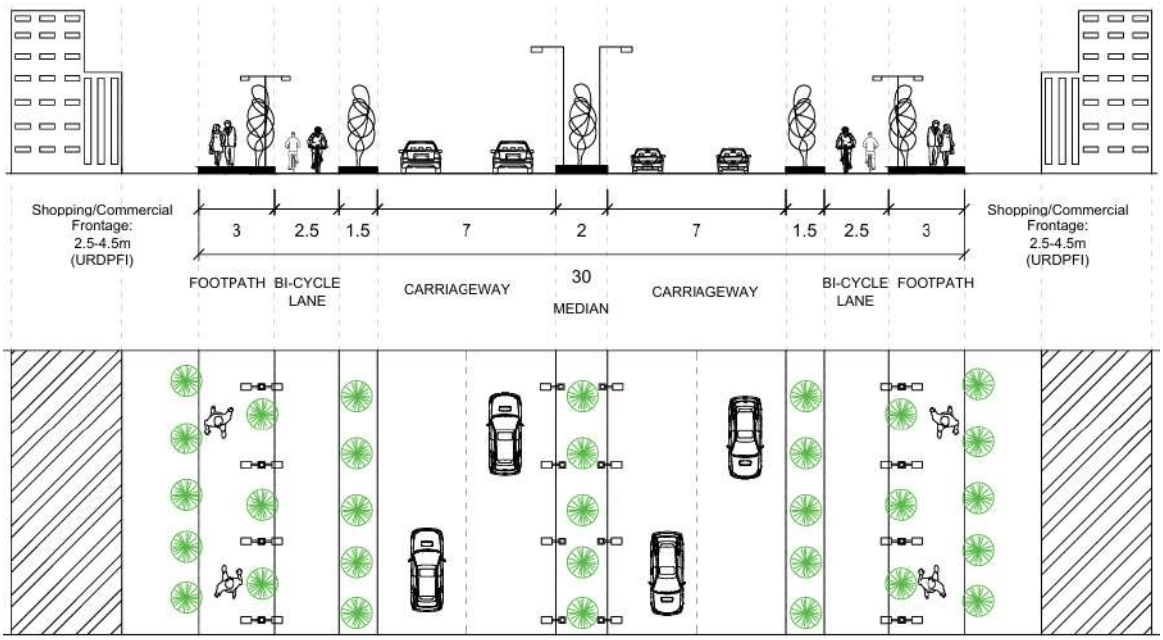


FIGURE 13-29 30M WIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed road cross-section illustrates a compact yet efficient 30 m right-of-way designed to support a shopping and commercial frontage on both sides in accordance with URDPFI guidelines. The section ensures strong pedestrian priority through well-defined 3.0 m footpaths integrated with street furniture and landscaping, creating an active and comfortable public realm along commercial edges. Dedicated 2.5 m bi-cycle lanes on either side promote non-motorized transport and safe last-mile connectivity. The central roadway comprises dual 7.0 m carriageways separated by a 2.0 m landscaped median, which improves traffic safety, provides space for utilities and lighting, and enhances the visual character of the street. Overall, the cross-section reflects a people-centric, multimodal urban commercial street that balances vehicular movement with walkability, cycling, and vibrant street activity.

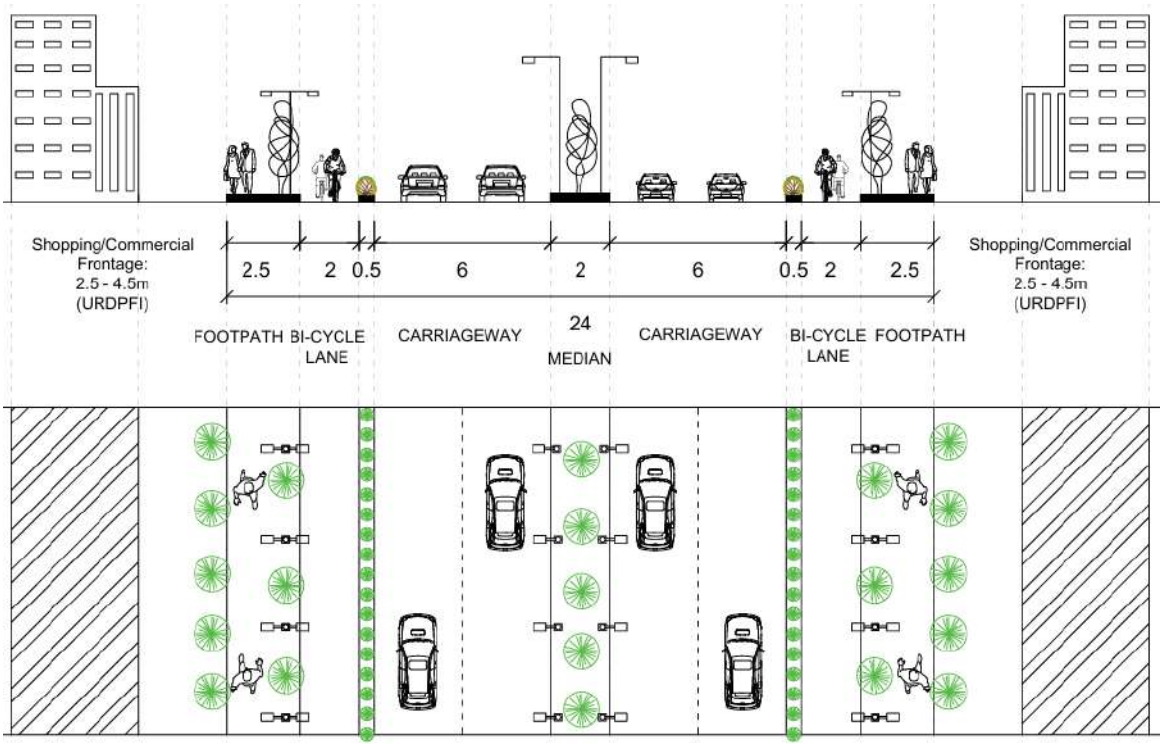


FIGURE 13-30 24M WIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed 24 m wide commercial street cross-section is designed as a compact, people-friendly corridor supporting active shopping frontage on both sides as per URDPFI norms. It provides 2.5 m wide footpaths with integrated landscaping and street furniture, along with dedicated bi-cycle lanes to promote safe non-motorized movement. The central roadway consists of dual 6.0 m carriageways separated by a 2.0 m median, ensuring efficient vehicular flow while accommodating lighting and greenery. Overall, the section balances commercial activity, walkability, cycling, and traffic movement, creating a vibrant and functional urban street.

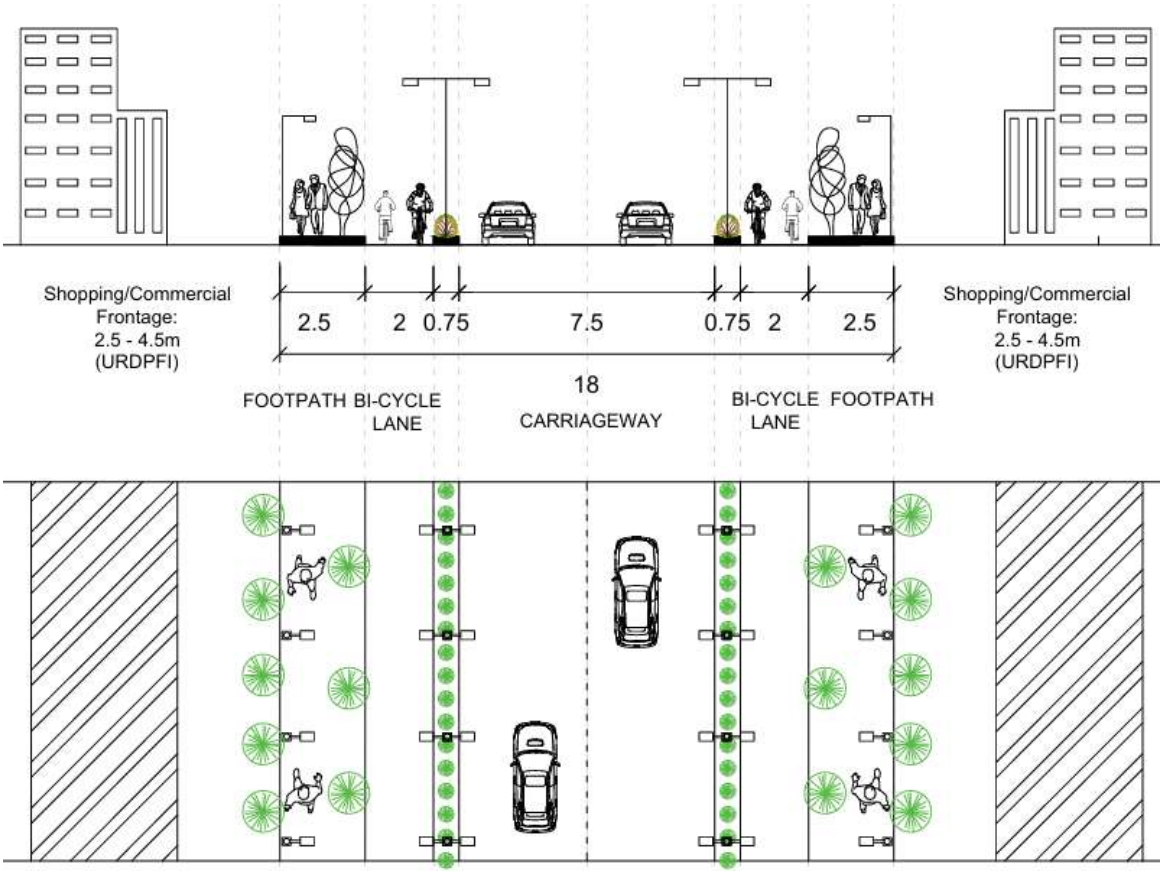


FIGURE 13-31 18M WIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed 18 m wide commercial street cross-section is a compact, pedestrian-oriented design catering to shopping and mixed commercial frontage on both sides as per URDPFI guidelines. It provides 2.5 m wide footpaths with seating and plantation, complemented by 2.0 m dedicated bi-cycle lanes to encourage non-motorized transport. The central 7.5 m carriageway ensures smooth vehicular movement while traffic-calming elements and street lighting enhance safety. Overall, the section balances commercial activity, walkability, cycling, and vehicular access, creating a lively and human-scaled urban street.

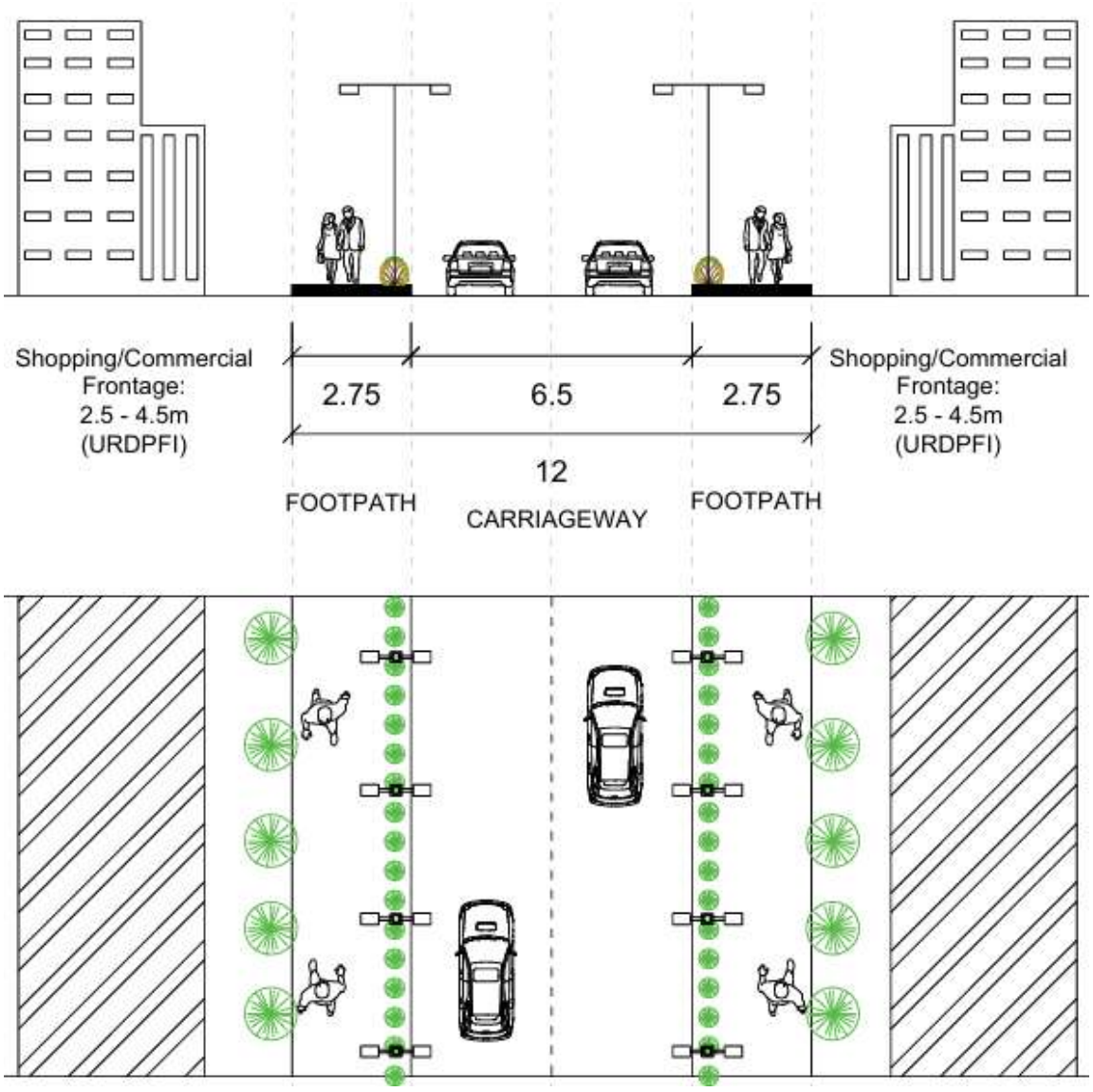


FIGURE 13-32 12M WIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed 12 m wide commercial street cross-section is conceived as a human-scaled, pedestrian-priority street well suited for local shopping and mixed-use areas, in line with URDPFI guidelines. On both sides, 2.75 m wide footpaths are provided to comfortably accommodate pedestrian movement, informal activities, street vending, and spill-over commercial uses, while integrated plantation and street furniture enhance microclimate, visual quality, and user comfort. The central 6.5 m carriageway supports two-way vehicular movement at controlled speeds, making it appropriate for local access traffic rather than through traffic, thereby improving safety for pedestrians. The compact right-of-way encourages active street frontage, close interaction between shops and pedestrians, and efficient land utilization. Overall, the cross-section promotes walkability, liveliness, and commercial vibrancy while maintaining necessary vehicular access, making it ideal for neighbourhood-level commercial streets.

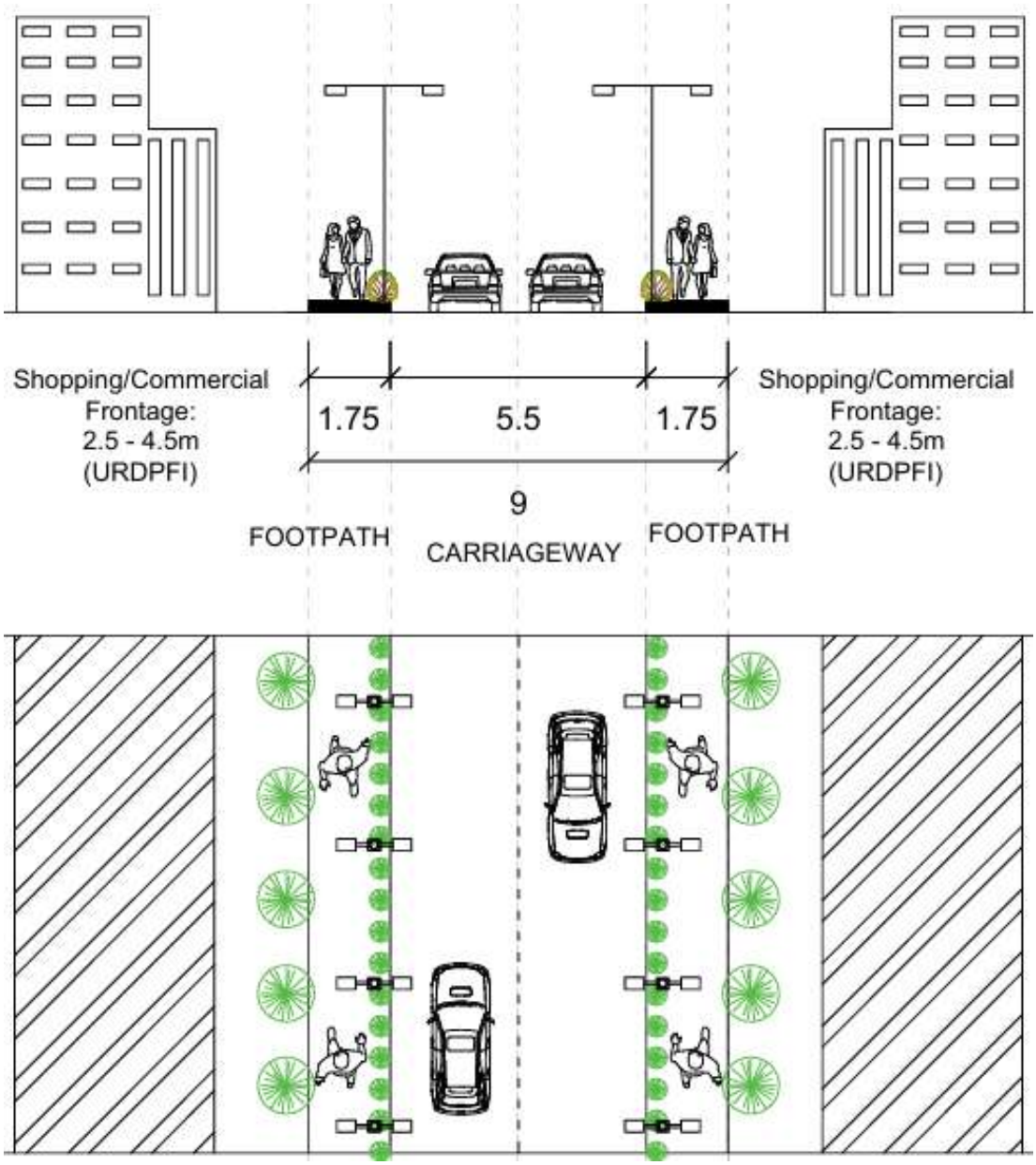


FIGURE 13-33 9M WIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed 9 m wide commercial street cross-section represents a very compact, low-speed urban street designed primarily for local access within shopping and mixed-use areas, in line with URDPFI norms. It provides 1.75 m wide footpaths on both sides, which are adequate for basic pedestrian movement and direct access to commercial frontages, while also allowing limited space for plantation and street utilities. The central 5.5 m carriageway supports two-way vehicular movement at slow speeds, making it suitable for internal commercial streets with limited traffic volumes. Due to its narrow right-of-way, the section naturally encourages traffic calming, enhances pedestrian safety, and supports an intimate street character. Overall, this cross-section prioritizes walkability, efficient land use, and active commercial edges while maintaining essential vehicular access.

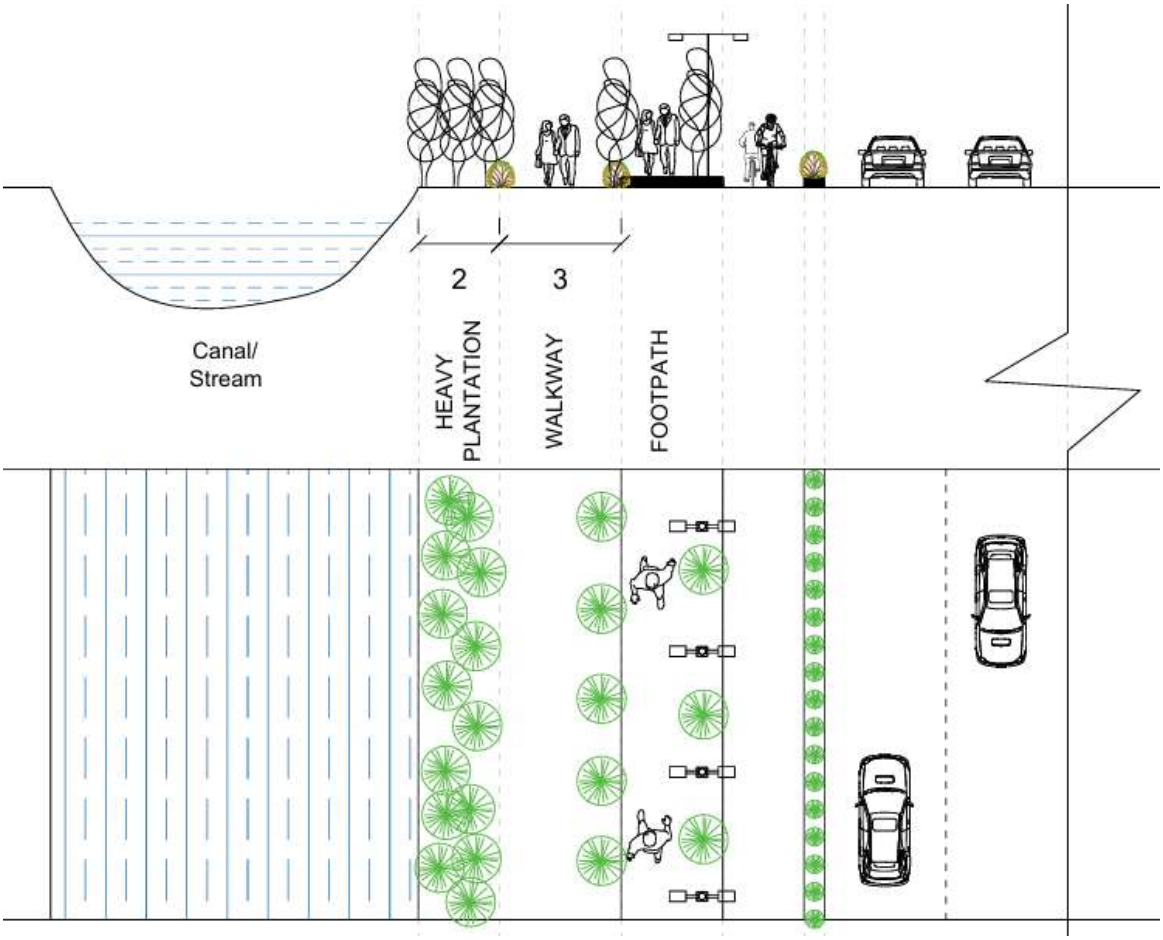


FIGURE 13-34 RIVER SIDE ROAD CROSS SECTION

Source: IRC-86-2018

The proposed canal-edge road cross-section emphasizes environmental sensitivity and public accessibility by integrating mobility infrastructure with a strong landscape buffer. Along the canal/stream edge, a 2.0 m heavy plantation zone acts as an ecological buffer for bank protection, micro-climate regulation, and visual screening, followed by a 3.0 m dedicated walkway designed for leisure and recreational movement. A clearly defined footpath ensures safe pedestrian circulation, separated from vehicular traffic by landscaping and street furniture. On the road side, the carriageway accommodates smooth vehicular movement while maintaining adequate setbacks from the canal edge. Overall, the section promotes a people-oriented waterfront corridor that balances flood safety, environmental conservation, and active public use, transforming the canal edge into a safe, green, and vibrant urban space.

13.9 Transit Oriented Development (TOD) Zone

The Transit Oriented Development (TOD) concept is proposed in the Bodhgaya Planning Area to promote compact, mixed-use, and walkable urban development around the proposed MRTS station. TOD encourages higher density development, improved public transport usage, and reduced dependency on private vehicles by integrating land use planning with transit infrastructure.

As per standard TOD planning principles, the influence area around the MRTS station is divided into two zones:

- **Standard TOD Zone (Primary Influence Zone):** An **800-metre radius** from the MRTS station, representing approximately a **10-minute walking distance**. This zone is planned for higher density development with a strong mix of residential, commercial, and public activities to encourage walking and transit usage.
- **Transition Zone (Secondary Influence Zone):** Extending up to **2000 metres from the MRTS station**, representing approximately a **10-minute cycling distance**. This area supports medium-density development and acts as a transition between the high-intensity TOD core and the surrounding urban areas.

The **total TOD influence area covers approximately 2,516 hectares**, within which a balanced distribution of land uses has been proposed to support transit-oriented growth.

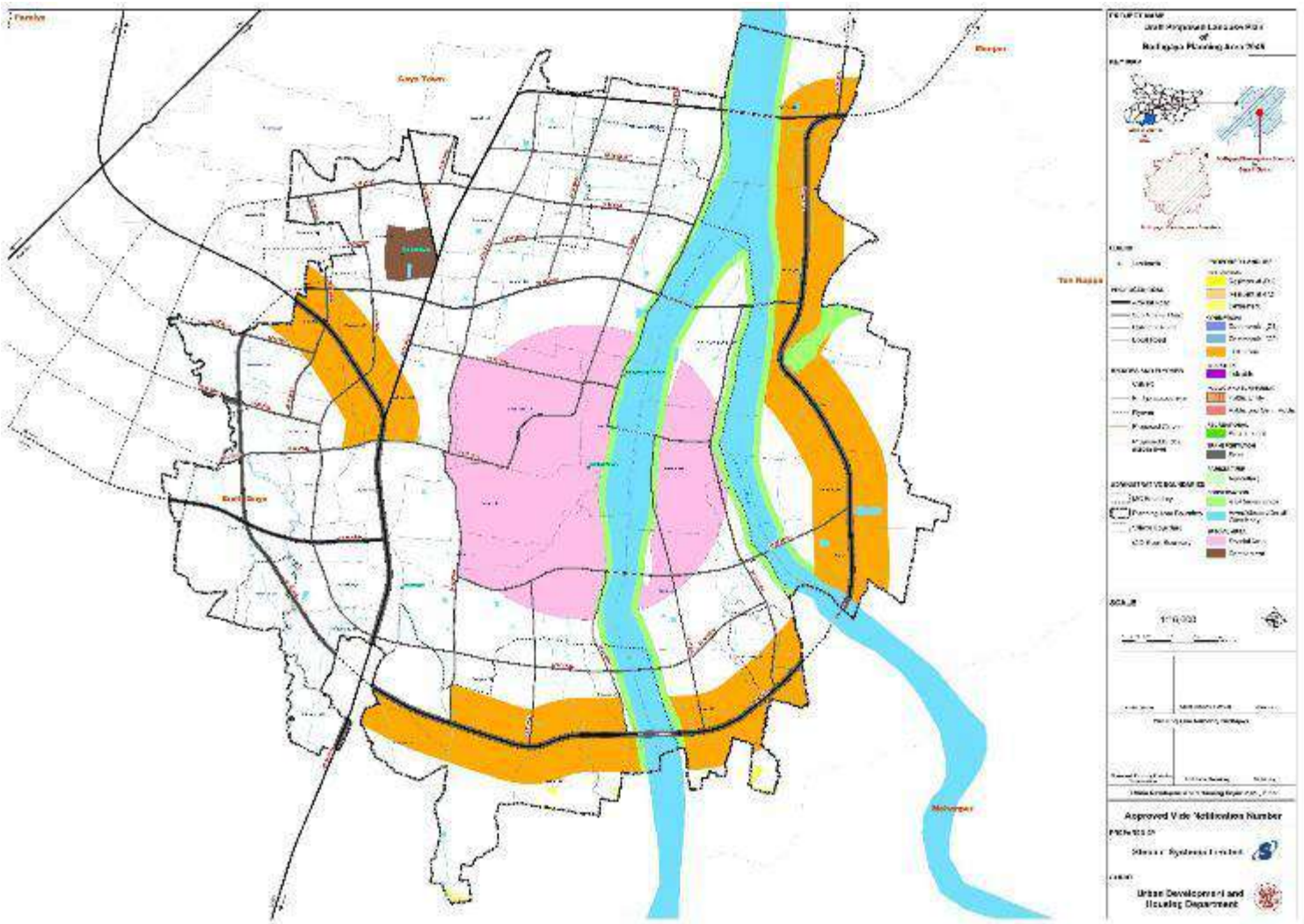
TABLE 13-26: LANDUSE CLASSIFICATION OF PROPOSED TOD ZONE

Landuse in TOD Zone	Area (Ha)	Area(SQKM)	%
Residential	1075.91	10.76	42.77%
Commercial	206.36	2.06	8.20%
Mixed	237.35	2.37	9.43%
Industrial	13.43	0.13	0.53%
PSP	394.94	3.95	15.70%
Transportation	182.08	1.82	7.24%
Recreational	32.69	0.33	1.30%
Public utilities	13.82	0.14	0.55%
Future Developable area (Agricultural)	249.70	2.50	9.93%
Non-Developable area	109.54	1.10	4.35%
	2515.82	**25.16**	

Source: Draft Proposed Bodhgaya Landuse-2047

The proposed Transit Oriented Development (TOD) zone covers a total area of 2,515.82 ha (25.16 sq. km) and is predominantly residential in character, with 42.77% of the land allocated for residential use. This indicates a strong focus on accommodating a large population within the transit influence area to support consistent ridership for the MRTS system. Commercial (8.20%) and mixed-use (9.43%) areas together constitute nearly 18% of the TOD zone, reflecting an effort to create vibrant activity centres and promote a live–work environment within walking and cycling distance of transit stations.

A significant proportion of land is also allocated for Public and Semi-Public (15.70%) uses, ensuring adequate provision of institutional and community facilities to support the residential population. Transportation infrastructure accounts for 7.24%, facilitating efficient transit integration and connectivity. Smaller proportions of land are reserved for recreational spaces, utilities, and future developable areas, while 4.35% is kept as non-developable land, helping maintain environmental balance. Overall, the land use distribution supports a compact, mixed-use, and transit-supportive urban structure, which is consistent with the objectives of TOD planning.



MAP 13-16 PROPOSED TOD ZONE IN PLANNING AREA

Source: Map prepared by Stesalit System ltd.

14 PROPOSED LAND USE

14.1 Land Use Consideration

Bodhgaya holds immense global religious and cultural significance as the place where Gautama Buddha attained enlightenment under the sacred Bodhi Tree at the Mahabodhi Temple. As a major international pilgrimage and tourism destination, the town attracts a large number of pilgrims, monks, scholars, and visitors throughout the year. Consequently, land use planning for the Bodhgaya Planning Area focuses on balancing heritage conservation, tourism management, urban growth, and environmental sustainability while maintaining the spiritual character of the town.

One of the key considerations in the land use strategy is the protection and preservation of the heritage precinct surrounding the Mahabodhi Temple Complex, which is recognized as a UNESCO World Heritage Site. Development in and around the heritage zone is carefully regulated to ensure that the visual integrity, cultural landscape, and spiritual ambience of the site remain intact. Controlled building heights, restricted land uses, and landscaped buffer zones are incorporated to protect the sanctity of the heritage core while allowing limited compatible activities that support pilgrimage and cultural tourism.

Another important planning focus is the promotion of compact and orderly urban growth to accommodate increasing numbers of residents, pilgrims, and tourism-related activities. Residential areas have been planned through a combination of existing residential zones and newly proposed residential sectors to meet the future housing demand up to 2047. Provision for different housing typologies is essential to accommodate residents, service workers, and migrant populations associated with tourism and hospitality sectors. Mixed-use zones are encouraged along major roads and activity corridors to integrate residential, commercial, and service functions, thereby promoting walkability and efficient land utilization.

Commercial land use in Bodhgaya is closely linked with pilgrimage and tourism-based economic activities, including retail markets, hospitality services, guest houses, and cultural facilities. Commercial zones are strategically located along major access routes and near pilgrimage circuits to support local livelihoods while ensuring that commercial development does not encroach upon sensitive heritage areas. The presence of numerous international monasteries and cultural institutions also contributes to the town's economic and cultural vitality.

Environmental protection forms a central component of the land use planning framework. Natural features such as the Falgu River and associated floodplains are safeguarded through appropriate zoning regulations and green buffers to prevent encroachment and mitigate flood risks. A substantial proportion of land is reserved for green areas, water bodies, and recreational spaces to maintain ecological balance, support groundwater recharge, and enhance the urban microclimate.

These areas also contribute to the creation of a serene landscape that complements the spiritual environment of the town.

Transportation and mobility planning are other important considerations, given the large influx of pilgrims and tourists during peak seasons. Land has been allocated for improved road networks, parking facilities, and transport infrastructure to manage visitor movement efficiently and reduce congestion within the core heritage area. Peripheral parking zones and improved connectivity corridors help regulate traffic while protecting pedestrian-oriented spaces around the temple complex.

Infrastructure-led development also guides the proposed land use framework. Adequate provision for public and semi-public facilities, utilities, and institutional areas ensures that the growing population and visitor base are supported by reliable urban services such as water supply, sanitation, waste management, and healthcare. Educational and cultural institutions, monasteries, and community facilities further strengthen Bodhgaya's role as a global centre for Buddhist learning and cultural exchange.

Overall, the land use strategy aims to guide Bodhgaya's development in a manner that preserves its spiritual and cultural heritage while supporting sustainable tourism, economic opportunities, and improved quality of life for residents. The planning approach emphasizes controlled urban expansion, environmental conservation, and infrastructure strengthening to ensure that Bodhgaya continues to function as a globally significant pilgrimage destination while evolving into a well-managed and livable urban centre.

14.2 Proposed Land use

TABLE 14-1 PROPOSED LANDUSE DISTRIBUTION OF BODHGAYA PLANNING AREA

Proposed Land Use -2047					
S.No	**Land Use**	**Sq. Km**	**Hectares**	**Acres**	**%**
1	**Residential Zone**	21.61	2161.19	5340.41	24.96
2	**Commercial Zone**	6.15	615.14	1520.04	7.10
3	**TOD Zone**	11.25	1124.68	2779.15	12.99
4	**Industrial Zone**	0.21	20.94	51.73	0.24
5	**Public Purpose**	9.28	928.34	2293.97	10.72
6	**Recreational**	5.22	522.18	1290.32	6.03
7	**Green Area**	4.95	494.85	1222.81	5.72
8	**Urban Forest**	0.25	25.36	62.68	0.29
9	**Hills/Mountain**	5.29	528.65	1306.32	6.11

10	**Transportation & Communication**	0.65	64.76	160.02	0.75
11	**Public Utilities**	3.16	316.07	781.019	3.65
12	**Agriculture**	8.97	896.60	2215.55	10.36
13	**Water Body**	9.59	959.15	2370.11	11.08
14	**Heritage and Cultural**	21.61	2161.19	5340.41	24.96
Total		**86.58**	**8658.91**	**21394.33**	**100**

Source: Computed as per Draft Proposed Land Use Plan, Stesalit System Ltd.

The proposed land use distribution for the Bodhgaya Planning Area reflects a balanced approach aimed at accommodating future growth while maintaining environmental sustainability and economic productivity.

Agriculture Land Use Zone occupies 22.70 sq.km (26.19%): This is the largest land use category, indicating that agriculture remains an important component of the planning area. The allocation helps preserve productive farmland, rural livelihoods, and ecological balance while preventing uncontrolled urban sprawl. From a planning perspective, agricultural land acts as a buffer between built-up zones and environmentally sensitive areas. It also supports local food production and Agro-based economic activities. The zoning allows cultivation, horticulture, and allied activities while restricting intensive urban development.

Residential Land Use Zone Occupies 25.50 Sq. Km (29.50%). This zone accommodates future housing demand projected up to 2047. It forms the largest urban land allocation after agriculture, reflecting expected population growth and urban expansion. The planning strategy aims to create well-planned residential neighbourhoods with proper road networks, open spaces, schools, healthcare facilities, and commercial support areas. The zoning primarily focuses on improving infrastructure, regulating redevelopment, and maintaining neighbourhood character. Planning interventions here may include upgrading roads, drainage, utilities, and community facilities while allowing controlled densification where appropriate.

Commercial land use occupies 4.40 sq.km (5.08%), and Commercial land is allocated to support economic activities, trade, tourism services, retail markets, and business establishments. The proportion is moderate, reflecting a strategy of compact commercial development concentrated along major roads, activity corridors, and town centres. In planning terms, this allocation supports employment generation and economic growth, especially in areas influenced by tourism, pilgrimage, and local commerce. Commercial zones are typically located near transport corridors and mixed-use areas to maximize accessibility.

Green and undevelopable areas cover 5.84 sq.km (6.74%). Green areas include urban forests, green belts, ecological buffers, and landscaped open spaces. The allocation of more than 10% of the planning area shows a strong emphasis on

environmental sustainability and ecological protection. These areas help regulate microclimate, air quality, and biodiversity, while also functioning as visual buffers around heritage and sensitive zones. In planning terms, green areas form part of the urban green network, linking parks, water bodies, and open spaces.

Industrial areas cover 0.52 sq.km (0.60%). Industrial land occupies a very small proportion of the total area, indicating that the planning approach discourages heavy industry within the region. Instead, the focus is likely on small-scale, non-polluting, or service-oriented industries. The limited allocation ensures that industrial activities do not conflict with residential areas, heritage zones, or tourism activities. These areas are generally placed along major transport routes for logistical efficiency.

Public Purpose land use accounts for 4.50 sq km (5.19%), This zone includes educational institutions, hospitals, administrative buildings, cultural institutions, and community facilities. The allocation ensures adequate provision of social infrastructure required for the population projected for 2047. In planning terms, these uses are distributed across the city to ensure equitable access to public services. They act as important community anchors within residential neighbourhoods. International Cultural Enclave of approximately 996.6 acres has been proposed as a dedicated, secure and well-managed environment for diplomats, government delegations, international dignitaries and official visitors attending religious, cultural and diplomatic programmes.

Recreational land use comprises 2.83 sq.km (3.27%). Recreational land includes parks, playgrounds, sports complexes, and leisure spaces. This allocation ensures that residents have adequate access to public open spaces and recreational amenities. In urban planning, recreational areas improve quality of life, physical health, and social interaction. These spaces are usually integrated with green areas and water bodies to create attractive public environments. World Peace Park of approximately 567.13 acres has been proposed as a Special Cultural and Recreational Landscape Zone intended to establish Bodhgaya as an international platform for peace, cultural exchange and environmental stewardship. The Park shall provide designated areas where national and international visitors, institutions and cultural groups may plant or dedicate trees representing their country, culture, heritage or message of peace.

Transportation land use occupies 4.47 sq.km (5.15%). Transportation land includes roads, bus terminals, parking areas, railway facilities, and mobility infrastructure. The allocation supports the movement of people and goods across the planning area. In planning terms, this zone forms the structural framework of the city, connecting residential areas, commercial centers, and regional transport networks.

Heritage and Cultural Zone areas cover 0.58 sq.km (0.67%), Religious land use is allocated for temples, monasteries, shrines, pilgrimage facilities, and associated activities. Though the area is relatively small, these zones hold high cultural and spiritual significance. From a planning perspective, the zoning helps manage pilgrimage flows, tourism activities, and heritage conservation, ensuring that religious sites remain protected while supporting visitor facilities.

Mixed land use accounts for 5.25 sq.km (5.90%). Mixed land use allows a combination of residential, commercial, and small institutional activities within the

same zone. The allocation supports compact urban form, walkability, and efficient land utilization. From a planning perspective, mixed-use zones reduce travel distances, encourage live-work environments, and support vibrant urban streets. These areas are usually planned around transport nodes, market centers, and major roads.

Public Utilities occupy 0.22 sq km (0.25%) Public utilities include water supply infrastructure, sewage treatment plants, electric substations, waste management facilities, and communication infrastructure. Although the land area is small, these facilities are critical for urban functioning. The allocation reflects the fact that such infrastructure requires strategic locations rather than large land areas, often placed at the city periphery or along service corridors.

Table 14-2: Comparison of the percentage of developed area land use

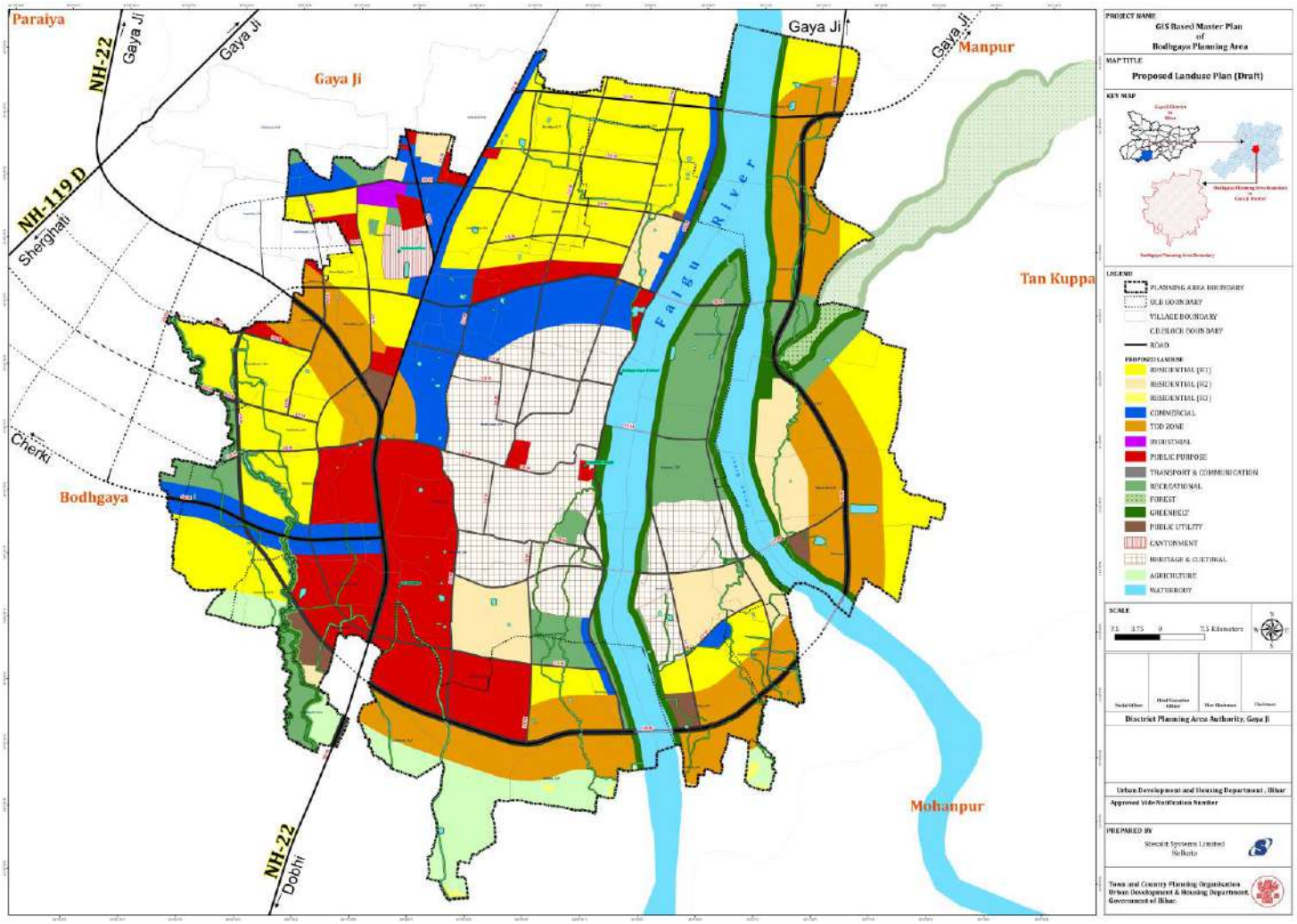
Land Use	Area (Ha)	% of Dev. Area	URDPFI
Residential	2550.20	60.40%	40–45%
Commercial	440.24	10.43%	4–5%
Industrial	51.58	1.22%	8–10%
Public & Semi-Public	449.99	10.66%	10–12%
Recreational	283.46	6.71%	18–20%
Transportation	446.54	10.58%	12–14%
Total	**4222.01**		

Source: Draft Bodhgaya PLU-2047

The proposed land use distribution for the Bodhgaya planning area presents an overview of the developable land in comparison with the recommended ranges under the URDPFI guidelines. Residential land use covers 2550 ha, constituting 60.40% of the developable area, indicating the major share of housing within the urban structure to accommodate both existing settlements and future population growth. Commercial land use occupies 440.24 ha (10.43%), reflecting the presence of markets, retail activities, hospitality services, and tourism-oriented establishments that support the local economy and visitor-related activities associated with the nearby Mahabodhi Temple.

Recreational accounts for 283.46 ha (6.71%), contributing to open spaces, landscaped areas, and environmental buffers that enhance the ecological balance and overall urban environment of the planning area. Transportation infrastructure occupies 446.54 ha (10.58%), supporting mobility, road networks, parking facilities, and connectivity across the planning area.

The total developable area considered for this distribution is 4222.01 ha, and the allocation reflects the spatial organisation of residential, commercial, institutional, recreational, industrial, and transportation uses in relation to the broader planning framework and URDPFI benchmark ranges.



MAP 14-1 DRAFT PROPOSED LAND USE PLAN OF BODHGAYA PLANNING AREA

15 LAND USE ZONING & DEVELOPMENT CONTROL REGULATIONS

These Development Control Regulations (DCRs) establish the statutory framework for regulating development within the Bodhgaya Planning Area. These regulations are intended to ensure orderly, sustainable and high-quality urban development in conformity with the objectives of the Master Plan–2047. Unless specifically provided otherwise in this Master Plan, all development within the Planning Area shall be governed by the provisions of the Bihar Building Bye-Laws, 2014, as amended from time to time, and other applicable laws, rules and regulations.

The provisions contained in this Chapter shall form part of the Development Control Regulations for the Planning Area and to the extent of any inconsistency, shall prevail over the corresponding provisions of the Bihar Building Bye-Laws, 2014.

15.1 Introduction & General Guidelines

The Development Control Regulations (DCRs) are intended to guide and regulate the future growth of Bodhgaya town. These regulations aim to ensure that development is carried out in an orderly manner, balancing the needs for housing, commerce, industry, infrastructure, and environment. The purpose is to promote sustainable, inclusive and resilient urban development in line with URDPFI Guidelines, Bihar Building Bye-laws, and the vision for Bodhgaya Master Plan.

The DCRs provide a framework for land use, permissible activities, building controls, and environmental safeguards. They shall be applicable to all types of development, redevelopment, and construction activities within the notified planning area of Bodhgaya. No development or redevelopment shall be permitted unless it conforms to these regulations.

15.1.1 GENERAL GUIDELINES

- The provisions of the Bihar Building Bye-Laws, 2014, as amended from time to time, shall govern development within the Special Area.
- The applicable zoning regulations, building standards, fire safety requirements, accessibility norms, structural safety provisions and environmental safeguards prescribed under the Bihar Building Bye-Laws shall continue to apply.
- No development shall be permitted in environmentally sensitive zones such as riverbeds, wetlands, forest land, or green belts except for activities specifically permitted.
- In case of any conflict between these DCRs and other state/national level regulations, the more restrictive provision shall prevail.

- Special areas like Transit Oriented Development (TOD) corridors, industrial estates, heritage precincts, and eco-sensitive zones shall be governed by additional regulations as provided in the relevant sections.
- Provisions for affordable housing, EWS/LIG categories, and green building norms shall be mandatory in line with the Bihar Building Bye-Laws, affordable housing and slum rehabilitation & redevelopment housing policy and National Housing Policies.
- Parking norms, fire safety clearances, environmental impact assessment (EIA) requirements, and barrier-free accessibility shall be integral to the development approval process.
- Development along Ghats, Public Amenities and eco-tourism shall maintain a mandatory green buffer restricted to soft landscaping and permeable pathways.
- The Competent Authority reserves the right to modify or relax certain provisions in exceptional cases in the public interest, subject to adequate justification and approval.

15.1.2 SPECIAL REGULATIONS FOR INDUSTRIAL ESTATES

Industrial Estates are designated areas for organized industrial development. The following regulations shall apply to all notified industrial estates in Bodhgaya:

- Land Use: Only industrial activities as per CPCB classification (Green, Orange, and White categories) shall be permitted. Red category industries shall not be allowed within city limits except in specifically designated heavy industrial zones outside residential influence.
- Plot Sizes: Minimum plot size for industrial plots shall be 1000 sq.m. For MSME clusters, plots of 300–500 sq.m may be permitted.
- FAR and Ground Coverage: As guided by Bihar Building Bye-laws, 2014, as amended from time to time, depending on the industry type.
- Setbacks: Minimum 9m front setback and 6m side and rear setbacks shall be maintained to allow movement of fire tenders and utility vehicles.
- Environmental Buffer: A minimum green buffer of 30m with tree plantation shall be maintained between industrial areas and adjacent residential zones.
- Infrastructure: Internal roads of minimum 18m ROW, provision for storm water drainage, effluent treatment, solid waste disposal, and fire safety infrastructure shall be mandatory.
- Worker Facilities: Provision for canteens, rest sheds, sanitation blocks, and health facilities shall be mandatory in estates above 10 hectares.

15.1.3 Special Regulations For Transit Oriented Development (TOD) Zone

The Transit-Oriented Development (TOD) Zone is intended to promote compact, mixed-use and transit-supportive urban development around the proposed MRTS corridors. Within the TOD Zone, all land uses permissible under the applicable land use zone shall generally be permitted, except the following activities, which shall not be allowed:

- Hazardous industries.
- Heavy industries.
- Red-category industries.
- Highly polluting industries.
- Obnoxious and nuisance-generating activities.
- Tanneries.
- Slaughterhouses.
- Meat processing units.
- Fish processing units.
- Bulk storage of hazardous chemicals, petroleum products or explosives.
- Solid waste processing or disposal facilities, except those specifically approved as public utilities.
- Any other activity that, in the opinion of the Competent Authority, is incompatible with the objectives of Transit-Oriented Development or adversely affects public health, safety or the urban environment.

15.1.4 SPECIAL REGULATIONS FOR TRANSIT HUBS

Transit Hubs (bus terminals, railway stations, metro stations, and multi-modal hubs) shall be developed as high-intensity activity centres ensuring accessibility and seamless connectivity. The following regulations shall apply:

- Land Use: Mixed-use development comprising commercial, public/semi-public facilities, offices, hotels, and residential components (affordable housing and rental housing) shall be permitted.
- Parking: Multi-level car parking and shared parking facilities shall be encouraged. No surface parking shall be permitted within 200m of the transit hub.
- Pedestrianisation: Priority shall be given to pedestrian movement, non-motorised transport (NMT) infrastructure, and barrier-free universal accessibility.
- Setbacks: Flexible building setbacks may be allowed to create public plazas, concourses, and intermodal transfer spaces.
- Environmental Considerations: Energy-efficient design, green building norms, and integration of renewable energy sources (solar rooftops, rainwater harvesting) shall be mandatory.
- Commercial Development: Retail, food courts, entertainment, and service apartments shall be permitted to enhance the economic viability of the transit hub.
- Public Safety: Adequate fire safety measures, CCTV surveillance, and disaster management provisions shall be mandatory.

15.1.5 SPECIAL REGULATION FOR INTERNATIONAL CULTURAL ENCLAVE

Developing an International Cultural Enclave can be considered as a strategic planning intervention, particularly given the international significance of Bodhgaya and its importance to Buddhist pilgrims, cultural delegations and international visitors. The enclave could accommodate facilities such as cultural

centres, international cooperation offices, liaison facilities, exhibition spaces and institutions representing participating countries or international organisations, subject to applicable approvals and agreements. It could consist of convention and cultural facilities could support international conferences, Buddhist conclaves, cultural festivals, diplomatic meetings and knowledge-sharing programmes.

- **Permitted activities:** International cultural institutions, cultural centres, international liaison facilities, diplomatic/official guest facilities, conference and convention facilities, exhibition and interpretation centres, libraries, research and knowledge centres, international hospitality facilities, prayer/meditation and cultural facilities, and associated public amenities.
- Diplomatic accommodation: Dedicated guest houses, official residences and short- to medium-term accommodation may be permitted for visiting diplomats, official delegations and international dignitaries, subject to applicable Government of India protocols and security requirements.
- **Supporting activities:** Hotels/guest houses, serviced accommodation, restaurants, cafés, tourism information centres, administrative offices, banking/ATM facilities, health and emergency facilities, retail supporting international visitors, parking and essential utility infrastructure.
- Commercial uses should remain ancillary to the primary international cultural and institutional purpose. Large-scale commercial developments, wholesale activities and incompatible uses should be prohibited.
- Eligible foreign investment may be facilitated in permitted activities in accordance with the prevailing Government of India FDI Policy and applicable laws and regulations.

15.1.6 SPECIAL REGULATION FOR WORLD PEACE PARK

Developing a **"World Peace Park"** shall be designated as a Special Cultural and Recreational Landscape Zone intended to establish Bodhgaya as an international platform for peace, cultural exchange and environmental stewardship. The Park shall provide designated areas where national and international visitors, institutions and cultural groups may plant or dedicate trees representing their country, culture, heritage or message of peace.

The concept of **"One Visitor – One Tree – One Message of Peace"** shall be promoted as a participatory visitor experience shall promote global friendship, biodiversity and sustainable tourism and strengthen Bodhgaya's identity as a global spiritual and cultural destination while respecting its heritage setting.

Permitted Uses

- Tree plantation and Country/Cultural Peace Groves,
- digital tree registry and tree-dedication facilities,
- World Peace monument,
- Peace Plaza, meditation and contemplation areas,
- environmental education centres,
- Walking trails, seating areas and open landscaped spaces,
- Supervised international tree-planting and cultural programmes,

- Nursery, composting and landscape maintenance facilities,
- Essential public amenities such as toilets, drinking water and limited visitor facilities,
- Sustainable infrastructure including rainwater harvesting, permeable paving and treated-water reuse,
- Low-rise, low-intensity structures compatible with the cultural landscape,
- Temporary structures/events subject to prior approval,
- Limited food/beverage kiosks and visitor services, subject to planning controls,
- Illumination, signage and cultural installations subject to heritage and visual-impact controls.

Prohibited Uses

- Any permanent private Residential, commercial, institutional development,
- Any high-rise structure or Large-scale development,
- Industrial, manufacturing or warehousing activities.
- Advertising hoardings and visually intrusive commercial signage.
- Any activities causing noise, pollution, ecological degradation or damage to the heritage setting.
- Planting of invasive, ecologically unsuitable or water-intensive species.
- Any activity that compromises the spiritual, cultural, visual or environmental character of Bodhgaya.

15.1.7 PROPOSED DCR PROVISIONS – HOUSING, TDR & REDEVELOPMENT

TABLE 15-1 PROPOSED DCR PROVISIONS – HOUSING, TDR & REDEVELOPMENT

Sl. No.	DCR Provision	Proposed Regulation / Guideline	Suggested Figure
1	**TDR Incentive**	TDR may be granted for land surrendered for road widening, public infrastructure, parks and other notified public purposes. TDR may also be used to encourage redevelopment of congested/old areas.	**Up to 1.5–2.0 times** the surrendered land's permissible development potential, subject to infrastructure capacity
2	**Non-Permitted Land Uses**	Uses not permissible in a designated zone shall not be regularised merely through normal permission. Where legally regularizable under applicable provisions, an additional **impact/penalty**	**2–3 times** applicable development/permission fee, subject to State regulations

		charge may be imposed.	
3	**Affordable Housing near TOD/Transit**	Affordable/EWS-LIG housing should be promoted within walking distance of TOD nodes, major bus stands and public transport corridors.	**Minimum 15% of FAR** for affordable housing in eligible TOD projects; TOD guidance also recommends **15% FAR for units ≤40 m²**.
4	**Additional FAR for Affordable Housing**	Additional FAR may be permitted where developers provide qualifying EWS/LIG housing beyond the mandatory requirement.	**Up to 50% additional FAR** may be considered for qualifying affordable rental housing, consistent with Affordable Rental Housing Complexes (ARHC) incentives.
5	**Airport Height Restriction**	All developments within the applicable airport safeguarding zone shall comply with AAI height-clearance requirements and the **Colour Coded Zoning Map (CCZM)**, wherever applicable.	Height to be determined **plot-wise as per permissible top elevation (AMSL)**; AAI NOC required where applicable.
6	**Rental Housing Promotion**	Rental housing/ARHC projects should be encouraged near employment centres, TOD nodes, railway stations, bus stands and institutional areas.	Minimum **40 dwelling units/dormitory equivalent** for an ARHC project; single-bedroom units up to **30 m²**, double-bedroom units up to **60 m²**, and dormitory beds up to **10 m²**.
7	**Rental Housing Incentives**	Provide fast-track approval, reduced/waived development charges, trunk infrastructure support and additional FAR for qualifying rental housing.	**50% additional FAR/FSI** may be considered for ARHCs; municipal charges may be levied at residential rates.
8	**Old Area Redevelopment**	Promote planned redevelopment of the existing/ core city through plot amalgamation, infrastructure upgrading and	**10–20% additional FAR** may be considered as a redevelopment incentive, subject to road width and infrastructure capacity

		incentives for reconstruction while protecting heritage-sensitive areas.	
9	**New Area Development**	In newly developing areas, redevelopment should be linked with planned roads, public transport, drainage, parking, open spaces and utility infrastructure before higher FAR is permitted.	Higher FAR to be linked with **road width, infrastructure capacity and TOD location**
10	**Redevelopment Subsidy/Incentives**	Provide incentives for redevelopment incorporating affordable housing, heritage conservation, infrastructure improvement and green building measures.	**10–15% FAR incentive** or partial waiver/reduction of development charges, subject to project eligibility

Affordable Housing & TOD:

In designated TOD influence zones around major transit nodes, railway stations and bus terminals, affordable housing shall be promoted through mandatory housing provisions and FAR incentives. A minimum **15% of FAR** may be reserved for affordable housing, with additional FAR incentives for qualifying EWS/LIG and rental housing projects. The TOD Guidance Document recommends 15% of FAR for affordable housing in TOD projects.

Rental Housing:

Affordable Rental Housing Complexes (ARHC) may be promoted near employment centres, TOD nodes and major transport terminals. Projects may follow ARHC parameters, including a minimum **40 dwelling units/dormitory equivalent**, with single-bedroom units up to **30 m²** and double-bedroom units up to **60 m²**. Qualifying projects may be considered for **up to 50% additional FAR**, subject to applicable regulations.

Airport Height Restriction:

All buildings and structures within the applicable airport safeguarding area shall comply with AAI height-clearance provisions. The permissible building height shall be determined based on the applicable **CCZM/permissible top elevation (AMSL)**,

site elevation and aerodrome safeguarding requirements. Where applicable, construction shall not commence without the required AAI NOC through NOCAS.

Redevelopment of Old/Core Urban Area:

Redevelopment of the old/core urban area shall be encouraged through plot amalgamation, infrastructure upgradation, TDR/FAR incentives and development-charge concessions. Additional development potential may be permitted subject to minimum road width, parking, fire safety, infrastructure capacity and heritage considerations.

15.1.8 RESIDENTIAL ZONES

To guide balanced urban growth and ensure compatibility of land uses, the Master Plan defines Five residential development categories for Bodhgaya —R-1 (High Density Residential), R-2 (Medium Density Residential), R-3 (Low Density Residential), TS-1 (High Density Township) and TS-2 (Low Density Township). These zones have been designed in line with URDPFI Guidelines and the Bihar Building Byelaws, taking into account road width, FAR norms, and service infrastructure capacity. Permitted, restricted, and prohibited activities have been clearly demarcated to safeguard residential quality of life while allowing for compatible mixed uses and community facilities.

TABLE 15-2 PERMITTED USES OF RESIDENTIAL LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
1	R-1 Residential Zone (High Density – EWS/LIG Housing)	Plotted housing, apartments, group housing, row housing; rental/work-cum residential; hostels & boarding houses; night shelters & dharamshalas; nursery & primary schools; neighborhood retail; community centers; libraries; clinics & PHC; parks; bus stops/IPT stands; small household services; public utilities (excluding heavy infrastructure)	Places of worship; small shopping centres; municipal/government offices; petrol pumps (subject to norms); IT/ITES services; tourism-related services; burial grounds; small non-perishable godowns; household industries (limited scale)	Heavy or hazardous industries; wholesale mandis; workshops for buses; slaughterhouses; contagious disease hospitals; sewage treatment or waste disposal sites; stadiums/shooting ranges

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
2	R-2 Residential Zone (Medium Density Residential)	Plotted housing & apartments; educational institutions; nursing homes; community/marriage halls; local retail markets; banks & professional offices; libraries & recreational facilities; neighborhood parks, EV charging stations	Colleges and research institutions; cinema halls/restaurants; IT offices; tourism facilities; bus depots without workshop; small warehousing (non-perishable goods), cottage Industry (non polluting)	Heavy industry; hazardous storage; solid waste dumping grounds; large logistics yards; polluting industrial uses
3	R-3 Residential Zone (Low Density Residential)	Detached/semi-detached housing; villas; plotted housing; neighborhood retail; clinics; parks & green areas; community facilities; libraries; clubs, EV charging stations	Places of worship; guest houses; homestays; small institutional uses; IT home offices; tourism-related activities (low intensity), cottage Industry (non polluting)	High-density commercial complexes; warehousing/logistics hubs; industrial activities; waste treatment facilities
4	R-4 Residential Zone (Existing Village / Abadi Area)	Existing residential settlements; incremental housing; mixed residential with local retail; traditional village activities; small shops; community facilities; schools; religious buildings; health clinics; local markets; parks & open spaces, EV charging stations, cottage Industry (non polluting)	Small commercial establishments; community halls; IT-enabled services; guest houses; tourism homestays; small godowns (non-hazardous); printing presses (small scale)	Heavy industry; hazardous storage; large commercial malls; waste disposal sites; large institutional complexes incompatible with village character

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
5	TS-1 Township Zone (Integrated Township / Mixed Housing)	Integrated residential development (EWS to HIG); apartments & plotted housing; schools/colleges; health facilities; retail & commercial centers; community & cultural facilities; parks & sports areas; IT parks/co-working; transit facilities, EV charging stations	Hotels; entertainment complexes; convention halls; fuel stations; tourism facilities; institutional campuses	Heavy industries; hazardous activities; solid waste dumping grounds; large logistics yards
6	TS-2 Township Zone (Low Density Township – HIG Plotted)	Low density plotted housing; villas/row housing; recreational greens; clubhouse/community facilities; local retail; wellness/yoga centres; eco-tourism uses; EV charging stations	Resorts; guest houses; small institutional uses; tourism-related accommodation	High-density apartments; industrial activities; warehousing/logistics; large commercial complexes

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

15.1.9 COMMERCIAL ZONES

Commercial activities in Bodhgaya are a critical driver of economic vitality and employment, but they must be organised to reduce congestion in the old core while supporting growth along emerging corridors. The Master Plan identifies two distinct commercial zones—C1 (Core Area) and C2 (Growth Corridors)—based on road hierarchy, land availability, and functional intensity. While C1 is intended to strengthen traditional bazaars and neighbourhood-scale commerce, C2 corridors will accommodate modern retail, offices, and large-scale mixed-use functions. Clear demarcation of permitted and restricted uses ensures compatibility with surrounding land uses and prevents environmentally harmful or traffic-intensive activities.

TABLE 15-3 PERMITTED USES OF COMMERCIAL LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
1	Commercial C-1 (Low Density Linear Commercial)	Retail shops; convenience shopping; banks & financial institutions; restaurants & cafés; small offices; informal shops/street vending areas; local markets/mandi; EV charging stations; clinics; religious places; service establishments (salons, repair shops, etc.)	Shopping centres; petrol pumps; small hotels/lodges; cinema halls (small scale); IT/ITES offices; tourism services; public utility installations; neighborhood entertainment uses	Heavy warehousing; large wholesale yards; transport nagar; hazardous storage; large logistics hubs; industrial manufacturing; high nuisance activities
2	Commercial C-2 (High Density Concentrated Commercial Area)	Shopping malls; multiplex cinemas; hotels & lodges; corporate offices; commercial complexes; restaurants & food courts; financial institutions; business centres; EV charging stations; IT parks and office complexes	Convention centres; entertainment complexes; exhibition halls; large institutional commercial uses; structured parking facilities; integrated commercial plazas	Petrol pumps; residential use; sports complexes; heavy industrial activities; hazardous storage; large freight/logistics yards incompatible with commercial core
3	Commercial C-3 (Low Density Special Commercial – Resort/Function/Peripheral Commercial)	Marriage halls; banquet/function halls; resorts; event venues; recreational commercial uses; non-hazardous warehouses; storage godowns; tourism facilities; eco-resorts; food courts	Farm resorts; amusement-related commercial uses; logistics support (limited); guest houses; convention/event spaces (subject to traffic/environment clearance)	High-density retail malls; dense commercial complexes; heavy industrial uses; hazardous warehousing; polluting activities; residential apartments

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

15.1.10 PUBLIC & SEMI-PUBLIC (PSP)

The Public/Semi-Public (PSP) Zone is designated to accommodate essential community, institutional, and civic functions that directly support the city's social and administrative infrastructure. This zone includes educational institutions, healthcare facilities, government offices, religious establishments, and public open spaces, which form the backbone of inclusive urban development. To maintain the integrity of this zone, incompatible land uses such as industries, large commercial complexes, and warehouses are strictly prohibited, ensuring that PSP areas remain accessible, functional, and people-oriented.

TABLE 15-4 PERMITTED USES OF PUBLIC & SEMI-PUBLIC LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
1	PSP-1 (Decentralized Public & Semi-Public within Residential Areas)	Schools, anganwadi, colleges (small scale); libraries; health centres, clinics, nursing homes; religious buildings; community halls; marriage halls; social & cultural centres; post offices; local govt offices; welfare centres; training centres; small educational institutes	Hostels; transit accommodation; guest houses; IT services; small office spaces; recreational/community clubs; small commercial support facilities (canteen, book shops, etc.)	Heavy institutional complexes; large stadiums; transport terminals; industrial activities; hazardous storage; high traffic generating uses incompatible with residential character
2	PSP-2 (Major Institutional / Concentrated PSP Zone)	Universities; large educational campuses; research & development centres; hospitals (large scale); auditoriums; conference centres; police station; jail; large govt offices; training institutes; welfare institutions; district-level public facilities	Defence quarters; hostels; guest houses; institutional residential facilities; specialised research facilities; public utility installations linked to institutional use	Hazardous industries; wholesale markets; heavy commercial uses; polluting activities; high noise generating industrial operations
3	PSP-3 (Existing Public & Semi-Public Uses)	All existing educational institutions, hospitals, govt offices, religious places, community facilities and public services as per current land use	Redevelopment, expansion, modernization, vertical extension subject to planning authority approval and infrastructure capacity	Change of use to incompatible industrial or hazardous commercial activities

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

15.1.11 INDUSTRIAL ZONES

TABLE 15-5: PERMITTED USES OF INDUSTRIAL LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
1	Industrial I-1 (Green / Non-Polluting Industries)	Non-polluting industries; agro-processing units; food processing; cold storage; warehouses; logistics facilities; workshops; repair units; assembly units; loading/unloading areas; petrol pumps; public utilities; staff/worker residential quarters; small industrial offices	Industrial research institutes; technical educational institutes; business offices; service industries; electric substations (PSS); training centres; support commercial facilities	Heavy industries; hazardous chemical processing; polluting industries (red category); large thermal plants; activities causing excessive noise, air or water pollution
2	Industrial I-2 (Agro-Based SEZ / Agro-Industrial Zone)	Agro-processing industries; food parks; mega food park; agro-based SEZ units; cold chain infrastructure; storage and packaging facilities; food manufacturing units; common infrastructure (ETP, logistics yards); helipad; export-oriented processing units	Research labs; training centres; logistics hubs; specialised processing infrastructure; institutional facilities linked with agro-industry	Non-agro heavy industries; hazardous chemical industries; residential development (except essential staff housing); polluting manufacturing unrelated to agro-processing
3	Industrial I-3 (Existing Industrial Area)	All existing industries; industrial utilities; warehouses; workshops; service facilities; existing support infrastructure	Expansion, modernization, redevelopment, or change of industrial category subject to environmental norms and planning authority approval	New hazardous or incompatible industries without clearance; conversion to incompatible land use affecting industrial operations

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

For the **Bodhgaya Planning Area**, the proposed industrial land use may be categorized as follows:

I-1: Green / Non-Polluting Industries

These industries shall have minimal environmental impact, low emissions, low water consumption, and no hazardous waste generation.

Permissible Industries:

- IT/ITES parks and software development centers
- Electronics assembly and light engineering units
- Handicrafts, stone carving, terracotta and artisan-based industries
- Textile stitching, garment manufacturing and handloom units
- Printing and packaging industries
- Educational and research-based industrial activities
- Renewable energy equipment assembly
- Incense stick (Agarbatti), Tilkut, Lai and other local product manufacturing
- Warehousing, logistics and cold storage facilities
- Tourism-support industries, souvenir and handicraft production
- Bamboo, cane and eco-friendly product manufacturing
- Repair and maintenance workshops (non-polluting)

I-2: Agro-Based SEZ / Agro-Industrial Zone

Considering Bodhgaya's agricultural economy and the availability of paddy, wheat, pulses, oilseeds, fruits, vegetables, dairy and livestock products, the following industries may be permitted:

Food Processing & Value Addition

- Rice mills and modern grain processing units
- Flour mills and cereal processing units
- Pulse (Dal) processing units
- Edible oil extraction and refining units
- Sattu processing and value-added food products
- Fruit and vegetable processing (juice, pulp, jam, pickle, dehydrated products)
- Spice processing and packaging units
- Bakery and confectionery units
- Ready-to-eat and ready-to-cook food manufacturing

Dairy & Livestock-Based Industries

- Milk processing plants
- Dairy products (paneer, cheese, butter, ghee, ice cream)
- Meat processing and packaging units (subject to environmental norms)
- Poultry and fish feed manufacturing

- Animal feed production units

Agricultural Support Industries

- Seed processing and storage units
- Cold chain and refrigerated storage facilities
- Agro-logistics hubs
- Agricultural equipment assembly and servicing
- Bio-fertilizer, organic manure and vermicompost units

Export-Oriented Agro Industries (SEZ Component)

- Organic food processing and export units
- Packaged agricultural products for domestic and international markets
- Herbal and medicinal plant processing
- Makhana, honey and millet-based product processing
- Food testing, grading and packaging centers
- Agro-export warehouses and distribution centers

These industries align with Bihar's agro-industrial development strategy and leverage Bodhgaya's strong agricultural base, food processing potential, and tourism-driven market demand.

15.1.12 PUBLIC UTILITIES AND SERVICES

TABLE 15-6: PERMITTED USES OF PUBLIC UTILITIES AND SERVICES LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
1	PU-1 (Major Utility & Treatment Infrastructure – Peripheral Location)	Water Treatment Plant (WTP); Sewage Treatment Plant (STP); Faecal Sludge Treatment Plant (FSTP); Solid Waste Treatment Plant (SWTP); sanitary landfill; waste processing facilities; bulk water supply installations; pumping stations; power substations; major utility infrastructure	Service industries linked to utilities; warehouses; administrative offices; staff residential quarters; recycling facilities; renewable energy installations	Residential housing (general); schools; hospitals; commercial complexes; recreational areas; polluting industries beyond permitted infrastructure; incompatible public gathering uses

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
2	PU-2 (Decentralized Utilities within/near Residential Areas)	OHT/reservoir; local water supply installations; decentralized waste processing (MCC/MRF small scale); electric substation; fire station; post office; telecommunication towers/services; utility kiosks; local infrastructure facilities	Small commercial support uses; low-rise residential (staff housing); community service facilities subject to approval; EV charging infrastructure	Large treatment plants; sanitary landfill; hazardous waste facilities; heavy industrial uses; high nuisance activities causing noise, smell or traffic conflicts

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

15.1.13 AGRICULTURE USE ZONES

TABLE 15-7: PERMITTED USES OF AGRICULTURE LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
1	Agriculture Zone (AG)	Crop cultivation; horticulture; plantations; agro-forestry; organic farming; dairy farming; livestock rearing; fisheries; farm ponds; irrigation infrastructure; farmhouses; rural storage structures; agricultural sheds; nurseries; greenhouses; agri-based activities, cottage Industry (non polluting)	Agro-processing units (small scale); agrotourism facilities; farmer markets; rural homestays; low-rise residential (farm-linked); renewable energy installations (agrivoltaics/solar pumps); research and training centres related to agriculture; cold storage (small scale)	Non-agricultural plotting; high-density residential development; heavy commercial complexes; large industries (non-agro); hazardous storage; polluting industries; large malls or multiplexes; high-rise development incompatible with agricultural character

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

15.1.14 GREEN AREA / BUFFER

Green buffers serve as vital ecological and protective zones, designed to mitigate the adverse impacts of industrial activity on surrounding environments and settlements. In line with **URDPFI Guidelines** and **CPCB norms**, a minimum width of **30 m to 50 m** shall be maintained around industrial zones, developed with dense plantations at a minimum density of **1,000 trees per acre**. These buffers will function as **environmental shields**, supporting air purification, noise reduction, groundwater

recharge, and recreational green spaces, while strictly excluding incompatible uses such as residential, industrial, or commercial development.

TABLE 15-8: PERMITTED USES OF GREEN AREA LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
1	Green Area G-1 (Sensitive Green Buffer – Water Bodies & Industrial Areas)	Heavy plantation; ecological restoration; horticulture; biodiversity conservation; green belts; soil conservation; landscape development; environmental protection works; river/canal edge plantation	Walking trails; nature parks; eco-recreation (low impact); environmental education spaces; plantation-based activities; buffer infrastructure related to water body protection	Residential development; commercial complexes; industrial buildings; permanent structures (except essential ecological infrastructure); storage yards; polluting activities; tree cutting without approval
2	Green Area G-2 (General Green Buffer – Around Public Utilities & Other Areas)	Plantation; horticulture; agriculture; green buffers; urban forestry; landscaping; open green areas; passive recreation spaces	Nursery development; community parks; renewable energy installations (solar landscaping); low-impact recreational activities; environmental awareness centres	High-density development; industrial activities; hazardous storage; large commercial buildings; permanent residential construction (except utility-related structures if approved)

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

15.1.15 ENVIRONMENTALLY SENSITIVE ZONE

The Environmentally Sensitive Zone establishes a controlled 100-metre buffer along river edges to protect natural hydrology, reduce flood risk, conserve biodiversity, and prevent encroachment. Low-impact recreational and ecological activities are encouraged to enhance public access while maintaining environmental integrity. Development within this zone shall follow strict environmental safeguards, ensuring preservation of river ecology and natural drainage systems while enabling sustainable riverfront enhancement.

TABLE 15-9: PERMITTED USES OF ENVIRONMENTALLY SENSITIVE ZONE LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
1	Environmentally Sensitive Zone (ESZ) – 100 m Buffer along River	Recreational open spaces (parks, yoga parks, gardens); walking/cycling trails; plantation and afforestation; organic farming; fish farming; nurseries; ecological restoration; riverfront green development; existing village settlements (regulated)	Food courts; music pavilion; picnic huts; eco-resorts; EV charging stations; controlled riverfront development; Water Treatment Plant (WTP); Sewage Treatment Plant (STP) subject to environmental clearance and flood safety norms	Permanent high-density residential; commercial complexes; industrial development; land filling; encroachment; hazardous storage; activities obstructing natural drainage or flood flow; tree cutting without approval

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

15.1.16 URBAN AGRICULTURE ZONE

The Urban Agriculture Zone promotes preservation of agricultural activity within and around urban areas while supporting livelihood diversification through cottage industries and small-scale value-added activities. This zone strengthens local food systems, encourages sustainable land use, and provides economic opportunities without triggering uncontrolled urbanisation. Controlled development ensures compatibility with surrounding residential and ecological areas while maintaining green character and environmental balance.

TABLE 15-10: PERMITTED USES OF URBAN AGRICULTURE LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited

1	Urban Agriculture Zone (UA)	Crop cultivation; horticulture; vegetable farming; floriculture; agro-forestry; organic farming; nurseries; community farming; dairy and small livestock; fisheries; farm ponds; irrigation infrastructure; cottage industries; farm sheds and storage structures, Independent residence, guest houses, educational building (up to high school), neighbourhood level social/cultural and recreational facilities, Marriage and community hall, Public utilities and buildings except services and storage yards	Agrotourism activities; farmer markets; farm-based homestays; small agro-processing units; renewable energy installations (solar pumps, agrivoltaics); training centres; rural skill development units; low-rise farm-linked residential structures, STP, WTP, Solid waste dumping ground, PSS, GSS	High-density residential development; large commercial complexes; heavy industries; hazardous storage; large warehouses unrelated to agriculture; polluting manufacturing; land subdivision for urban plotting

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

15.1.17 RECREATIONAL ZONE

TABLE 15-11: PERMITTED USES OF RECREATIONAL LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
1	RC-1 (Neighbourhood / Residential Recreational Area)	Parks; playgrounds; open green spaces; children's play areas; jogging tracks; yoga parks; community gardens; open lawns; sports courts; urban greens; seating areas; landscape features	Small kiosks; public toilets; community halls; fitness centres; open-air cultural activities; EV charging stations (small scale)	Amusement parks; large commercial development; high-noise activities; heavy traffic-generating uses; industrial activities
2	RC-2 (Regional / Destination Recreational Area – Away from Residential Zones)	Water parks; amusement parks; picnic resorts; theme parks; eco-tourism facilities; recreational resorts; adventure activities; large event lawns; landscaped recreational areas, Stadium	Food courts; parking areas; accommodation (resort-type); convention/event spaces; recreational retail; renewable energy installations; supporting commercial uses	High-density residential development; heavy industries; hazardous storage; polluting activities; incompatible public utilities

3	RC-3 (Riverfront Development Zone)	Riverfront promenades; parks; walking and cycling tracks; river-view seating; landscape development; ecological restoration; public plazas; cultural spaces; recreational lawns	Food courts; music pavilion; picnic huts; eco-resorts; water treatment infrastructure (if required); controlled commercial kiosks; tourism facilities subject to environmental clearance	Permanent structures obstructing river flow; high-rise development; heavy commercial complexes; polluting industries; land filling or activities affecting floodplain ecology

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

15.1.18 AGRO-TOURISM ZONE

TABLE 15-12: PERMITTED USE OF AGRO-TOURISM LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
1	Agro-Tourism Zone	Agricultural farming; organic farming; plantation and horticulture; agro-forestry; farm tourism activities; pick-your-own farm market; traditional rural huts; eco-friendly tourist accommodation (low rise); nurseries; demonstration farms; agri education and training activities	Resort-type tourist accommodation (low density); food courts/local restaurants; cottage industries (food processing, handicrafts, agro-based MSME); EV charging station; eco-recreational facilities; picnic huts; farm cafés; renewable energy installations (solar/agri-voltaic); parking areas; homestay development; agro-processing units (small scale, non-polluting)	Heavy industries; polluting manufacturing units; high-rise buildings; large commercial malls/multiplex; hazardous storage; large warehouses/logistics hubs; slaughterhouses; intensive urban residential colonies; petrol pumps (unless specifically approved); activities causing ecological damage

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

15.1.19 MIXED USE ZONE

TABLE 15-13: PERMITTED USES OF MIXED LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited

1	M-1 (Mixed Use Corridor – 100 m Buffer along Major Roads)	Residential; retail shops; commercial offices; banks; restaurants; clinics; coaching centres; service establishments; small hotels; mixed-use buildings; EV charging stations; local markets; professional services	Institutional uses; co-working spaces; small-scale hospitality; public/semi-public facilities; parking structures; transit-support facilities	Heavy industries; hazardous storage; high-pollution activities; large warehousing; activities generating excessive noise or traffic incompatible with mixed-use character
2	M-2 (Neighbourhood Mixed Use – 50 m Buffer along Internal Roads within Residential Areas)	Small retail shops; neighbourhood commercial; clinics; pharmacies; small offices; local services; home-based enterprises; small eateries; residential above commercial	Coaching centres; community facilities; small guest houses; low-intensity service establishments subject to approval	Large malls; multiplexes; heavy commercial traffic generators; industrial activities; high-noise entertainment uses

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

15.1.20 TRANSPORTATION USE ZONE

TABLE 15-14: PERMITTED USES OF TRANSPORTATION LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
1	Transportation Use	All types of Roads, Bus stops and Bus and Truck terminals, Taxi Stands, Auto Stands, Rickshaw stands, Parking area, Multi-level parking, filling station, transport office, booking office, night shelter, banks, restaurants, workshop and garage, Automobile spares and services, godown, loading and unloading platform, weight bridges, ware houses, storage depots, utility networks (drainage, sewage, power, tele-communication)	Way side shop and restaurants, Authorized/planned vending areas, Incidental/ancillary residential use, emergency health care centre,	Use/Activity not specifically related to transport and communication permitted herein.

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

15.1.21 HERITAGE AND CULTURE ZONE

Using the UNESCO nomination document for the **Mahabodhi Temple Complex**, the heritage protection framework mainly defines **three spatial controls**:

- **Core Zone (Temple Complex – ~12 acres)**: Strict conservation area.
- **1 km Buffer Zone**: Highly restricted development; only limited religious uses allowed and only **ground-floor structures**.
- **2 km Buffer Zone**: Controlled development; **maximum building height 44 ft** with architecture sympathetic to the heritage character.

15.1.21.1 COMMUNITY-BASED TOURISM AND TOURISM DEVELOPMENT REGULATIONS

1. Objective

To promote sustainable tourism, enhance local livelihoods, preserve cultural and natural heritage, and facilitate tourism-related infrastructure and activities in the Bodhgaya Planning Area while ensuring environmental conservation and community participation.

2. Community-Based Tourism (CBT) Zone

Community-Based Tourism shall be encouraged in villages and settlements having cultural, religious, ecological, agricultural, riverfront, or heritage significance. Tourism development shall be undertaken with active participation of local communities to generate employment and strengthen the local economy.

Permissible Activities:

- Homestays, guest houses, and village tourism facilities.
- Local handicrafts, handloom, and souvenir production and sales.
- Agro-tourism, eco-tourism, farm stays, and nature-based tourism activities.
- Cultural centers, folk art performance spaces, and interpretation centers.
- Traditional food courts, local markets, and tourism information centers.
- River-based tourism, nature trails, cycling tracks, and walking trails.
- Skill development and tourism training centers for local communities.

Development Guidelines:

- New developments shall be compatible with the local architectural character and cultural heritage.
- Existing natural features, water bodies, forests, and agricultural lands shall be conserved.
- Community participation shall be ensured in planning, operation, and management of tourism facilities.
- Adequate sanitation, solid waste management, drinking water supply, and parking facilities shall be provided.

- Renewable energy and environmentally sustainable practices shall be encouraged.

3. Tourism Development Zone

Tourism Development Zones may be designated around major religious, cultural, heritage, ecological, and recreational destinations to support tourism growth and visitor facilities.

Permissible Uses:

- Hotels, resorts, guest houses, dharamshalas, and convention facilities.
- Tourism plazas, visitor centers, museums, interpretation centers, and cultural complexes.
- Commercial activities supporting tourism, including restaurants, retail outlets, and souvenir markets.
- Recreational facilities, wellness centers, meditation centers, and pilgrimage support infrastructure.
- Transport terminals, parking facilities, way-side amenities, and tourist information facilities.
- Riverfront development, eco-tourism facilities, and tourism-oriented public open spaces.

Development Guidelines:

- Tourism projects shall preserve and enhance the spiritual, cultural, and heritage character of the area.
- Development near protected monuments, heritage sites, rivers, hills, forests, and environmentally sensitive areas shall comply with applicable statutory regulations.
- Adequate pedestrian infrastructure, universal accessibility, public amenities, landscaping, and signage shall be provided.
- Large-scale tourism projects shall incorporate environmental management measures and adequate infrastructure provision.
- Mixed-use tourism corridors may be developed along major tourism routes, pilgrimage circuits, and transportation corridors to facilitate tourism-related economic activities.

4. Special Provisions for Bodhgaya Planning Area

Considering the international importance of Bodhgaya as a religious and pilgrimage destination, community-based tourism and tourism development projects shall be promoted along identified pilgrimage circuits, riverfront areas, cultural heritage zones, eco-tourism destinations, and rural tourism clusters. Priority shall be given to projects generating local employment, preserving cultural heritage, promoting traditional crafts, and enhancing visitor experience while maintaining environmental sustainability.

5. Bihar Tourism Policy Compliance

All tourism projects shall conform to the objectives and guiding principles of the Bihar Tourism Policy 2023, emphasizing environmental sustainability, promotion of

Bihar's cultural and spiritual heritage, tourism-led livelihood generation, tourist safety and comfort, private sector participation, and inclusive tourism development.

15.2 Additional Planning Controls (Recommended for Master Plan 2047)

1. Height Regulation

- Core Zone: No construction
- 1 km Zone: **Ground floor only**
- 2 km Zone: **Maximum 44 ft height**

2. Architectural Control

- Buildings must follow **traditional Bodhgaya architectural character** (materials, roof form, color palette).

3. Land Use Restrictions

- Heritage skyline and visual corridors toward the temple must be preserved.

4. Environmental Controls

- No polluting activities within the buffer zones.
- Strict control on lighting, signage, and noise.

5. Archaeological Protection

- Any excavation or construction must require **heritage authority clearance**.

TABLE 15-15 PERMITTED USE OF HERITAGE BUFFER ZONE

Use Zone	Uses / Activities Permitted	Uses / Activities Permissible (With Authority Approval)	Uses / Activities Prohibited
Heritage Buffer Zone – 1 km Radius	• Existing religious institutions and monasteries • Pilgrim movement routes and ceremonial activities • Public open spaces, meditation parks, and landscaped areas. • Conservation of Mahabodhi Temple and associated sacred structures • Archaeological conservation and	• Residential and commercial with symbolic facade which relate to Bodhgaya identity • Structures limited to the **ground floor only** • Heritage interpretation facilities • Small-scale pilgrim amenities such as cloak rooms, shoe houses, and information kiosks • Archaeological	• Multi-storey buildings • Commercial complexes, malls, or entertainment facilities • Industrial uses and warehouses • Large parking structures • Any development inconsistent with heritage character • Any new permanent

	restoration works • Controlled visitor movement and interpretation	excavation zones and conservation works • Conservation-based landscaping and site improvement • Heritage interpretation centres, museums and documentation centres • Security infrastructure and visitor management facilities	construction • Commercial development or shops • Hotels, guesthouses, residential buildings • Industrial or utility installations • Any activity affecting archaeological remains or sacred sites
Heritage Buffer Zone – 2 km Radius (R-3)	• Residential development with controlled density • Small-scale religious and cultural institutions • Pilgrim accommodation such as Dharamshala's and monasteries • Tourism-related services supporting pilgrimage	• Hotels, guesthouses, and tourism facilities are subject to design control • Commercial activities supporting pilgrimage and tourism • Public utilities and infrastructure • Institutional uses such as cultural centres or museums • Buildings **not exceeding 44 ft height** and designed in harmony with traditional Bodhgaya architecture	• High-rise buildings exceeding the prescribed height • Heavy commercial complexes or multiplexes • Industrial or polluting activities • Billboards, visual obstructions or structures affecting the heritage skyline • Activities causing vibration, pollution or structural risk to the monument

Source: Department of Tourism, Ministry of Tourism & Culture, Government of India

15.2.1 DEVELOPMENT CONTROLS (FAR, GROUND COVERAGE, SETBACKS, HEIGHT)

The following development controls apply to different land-use zones in Bodhgaya, as per the URDPFI Guidelines and the Bihar Building Bye-Laws (2014, amended 2016/2020).

TABLE 15-16: DCR TABLE FOR BODHGAYA PLANNING AREA

Zone	Description	FAR (Max)	Ground Coverage	Setbacks (Min)	Height
Residential Zone					

R-1	High-density residential / apartments	2.5–3.0	35–40%	Front 6m, Side 3m, Rear 4.5m	24 m (subject to road width)
R-2	Medium-density residential	2	40–45%	Front 3m, Side 1.5–3m	15 m
R-3	Low-density residential	1.5	35–40%	Front 3m, Side 1.5m, Rear 3m	12 m (G+3 approx.)
R-4	Existing village/Abadi area	Existing norms (relaxed)	As per the existing pattern	Flexible	As per the BBL village norms
TS-1	Integrated township / TOD-type	3.0–3.5	30–35%	As per the integrated layout	30 m (subject to approvals)
TS-2	Township (Plotted/Mixed residential)	2.5	35%	As per group housing norms	24 m
Commercial Zone					
C-1	Linear low-density commercial (along roads)	2.0–2.5	50–60%	Front 3–6m (road dependent)	18 m
C-2	High-density commercial / CBD / malls	3.0–4.0	40–50%	Front 6–9m	30 m+ (fire norms applicable)
C-3	Resort / Function hall / peripheral commercial	1.5	30–35%	Large setbacks (min 6m)	12–15 m
Public & Semi-Public Zone					
PSP-1	Decentralized PSP in residential areas	1.5–2.0	30–40%	Front 6m	18 m
PSP-2	Large institutional PSP zone	2.0–2.5	30–35%	Front 9m	24 m
PSP-3	Existing PSP	Existing pattern	Existing	Existing	Existing
Industrial Zone					
I-1	Green industries / non-polluting	1.5	40–50%	Front 6–9m	As per industrial safety norms
I-2	Agro-based SEZ / industrial park	2	40%	Front 9m + buffer	As per SEZ norms

I-3	Existing industries	Existing	Existing	Existing	Existing
Public Utilities and Services					
PU-1	Treatment plants (WTP, STP, landfill etc.)	0.5–1.0	25–30%	Large buffer 15–30m	Functional structures
PU-2	Decentralized utilities within residential	1	30–35%	Front 6m	12–15 m
Agriculture Zone					
Agriculture		0.1-0.2	10%	Large open margins	Low-rise only
Green Area / Buffer					
G-1	Waterbody & Industrial Buffer	0.05	Minimal	NA	Temporary structures only
G-2	General green buffer	0.1	Low	NA	Low structures only
Environmentally Sensitive Zone					
Environmentally Sensitive Area		0.1	Max 10%	As per river regulation	Low-rise (≤9m preferred)
Urban Agriculture Zone					
Urban Agriculture		0.3	15-20%	Large Setback	Low-rise rural structure
Recreational Zone					
RC-1	Neighborhood recreation	0.2	10–15%	Open landscape priority	Low-rise
RC-2	Water/amusement park /resort	0.5	20–25%	Large setbacks	15 m
RC-3	Riverfront development	0.3	15%	As per river buffer rules	Low-rise
Mixed Use					
M-1	(100m along major roads)	3	40–50%	Front 6m	24–30 m
M-2	(50m internal residential roads)	2	40%	Front 3m	15–18 m
Agro-Tourism Zone					
Agro-Tourism		0.3	15-20%	Large Setback	Low-rise rural structure
Heritage Buffer Zone					

Heritage Buffer Zone (0–1 km)	0.25	20% Max	Front: 9 m Side: 6 m Rear: 6 m	Ground Floor Only (7 m Max)
Heritage Buffer Zone (1–2 km) (R-3)	1	35% Max	Front: 6 m Side: 3 m Rear: 3 m	Max 44 ft (13.5 m)

Source: URDPFI, BBL-2014, Bodhgaya PLU-2047

15.2.2 DEVELOPMENT CONTROL REGULATIONS CROSS TABULATION

The cross-tabulation of the Development Control Regulations for Bodhgaya outlines the relationship between land use classes and the proposed zoning framework, which has been categorized into three types: Permitted, Regulated, and Prohibited. This classification has been designed considering feasibility, environmental sensitivity, and the need to prevent unwanted congestion and incompatible land uses within specific zones. Permitted uses represent activities that are fully compatible with the proposed land use and can be undertaken without restrictions. Regulated uses, on the other hand, may be allowed but only under specific conditions to ensure adherence to environmental norms, sustainable practices, and traffic management requirements. Prohibited uses are strictly disallowed as they may pose environmental risks, compromise feasibility, or disrupt the functionality of adjoining areas.

In cases where cadastral plots fall under more than one proposed land use, the dominant proposed use will be considered for approval to maintain clarity and avoid conflicting developments. Within regulated uses, special conditions have been prescribed. For instance, warehouses and certain commercial activities within residential zones are allowed only if they provide adequate parking facilities and do not disrupt internal circulation. Similarly, weekly markets in residential areas are permitted under regulation, provided they do not obstruct traffic flow. In industrial zones, junkyards are regulated and must comply with the Hazardous Waste Management Rules, 2016. Low-order commercial areas (C1) are designated only for small-scale activities, while large commercial centres are not permitted. Weekly markets in such zones are also regulated to prevent traffic interruptions. Furthermore, commercial activities within recreational areas and urban forests may be considered only if they adopt eco-friendly practices that safeguard the integrity of green spaces. The land conversion allowed only if compatible with zoning regulations and Bihar Agriculture Land (Conversion for Non-Agriculture Purposes) Act, 2010.

This regulatory framework establishes a balanced approach to land use planning in Bodhgaya by allowing flexibility where feasible while prioritizing environmental protection, traffic management, and community well-being. It ensures that growth and development are facilitated in a structured manner without compromising the ecological and social fabric of the city.

		Prohibited				Permissible			Regulated																						
S. No.	Land use Categories/ Proposed Zones	R1	R2	R3	R-4 (Village/Abadi)	TS-1	TS-2	Industry-I1	Industry-I2	Industry-I3	Mixed-M1	Mixed-M2	C1	C2	C3	PSP-1	PSP-2	PSP-3	Green Area-G-1	Green Area-G-2	Transportation	Recreational-1	Recreational-2	Recreational-3	Urban Agriculture	Agriculture	Agro-Tourism	Water Bodies	Public Utility-1	Public Utility-2
1	Residential																													
2	Warehousing/storage go-downs of perishable																													
3	Inflammable goods																													
4	Coal,																													
5	Wood,																													
6	Timber yards,																													
7	Bus and truck depots,																													
8	Gas installation and gas works,																													
9	Poly-techniques and higher technical institutes,																													
10	Junk yards,																													
11	Water treatment plant,																													
12	Sports/stadium																													
13	public utility installation																													
14	Hotel and transient visitor's homes,																													
15	Religious buildings,																													
16	Hospitals and nursing homes.																													
17	Old age home																													
18	Non-hazardous industries except storage of perishable and inflammable goods,																													
19	Milk chilling stations and pasteurization plants.																													
20	Sewage disposal works,																													
21	Electric power plants,																													
22	Service stations,																													
23	Cemeteries,																													
24	Dharmashala																													
25	Night shelters,																													
26	Petrol pumps,																													
27	EV Charging Station																													
28	Motor vehicle repairing workshop/garages,																													
29	Household industry,																													
30	Bakeries and confectionaries,																													
31	Storage of LPG gas cylinders,																													
32	Restaurants & other hotels																													

33	Go- downs/warehousing,																													
34	Bus depots without workshop,																													
35	Cinema hall,																													
36	Auditoriums																													
37	Markets for retail goods,																													
38	Weekly markets (if not obstructing traffic circulation and open during non-working hours),																													
39	Multipurpose or junior technical shops,																													
40	Atm																													
41	State and central government offices.																													
42	Non pollution, Non-obnoxious light industries,																													
43	Bank & financial institutions.																													
44	Taxi stands,																													
45	Dairy and farming,																													
46	Hostels,																													
47	Bus and truck terminals																													
48	Commercial centres,																													
49	facilities with police check post																													
50	fire post																													
51	Post and telegraph office,																													
52	public assembly hall,																													
53	Sports,																													
54	any other activity incidental to transportation																													
55	residential dwelling units for essential staff and watch and ward personnel																													
56	Farm houses,																													
57	Extensive industry,																													
58	library																													
59	Heritage Buffer Zone-0-1km																													
60	Heritage Buffer Zone-1-2km																													
61	Eco-Tourism																													

15.3 DELINEATION OF OLD AND NEW AREA

Purpose of Demarcating Old and New Areas

The Bihar Building Bye-Laws, 2014 amendment in 2022 classify areas as **"Old Areas" and "New Areas,"** as notified by the Competent Authority with approval from the Urban Development & Housing Department. This classification helps regulate development, control the expansion of existing built-up areas, preserve their character, promote efficient land utilization, and provide flexibility in implementing the Master Plan. In this regard, the Bodhgaya Planning Area has been classified in Old and New Area.

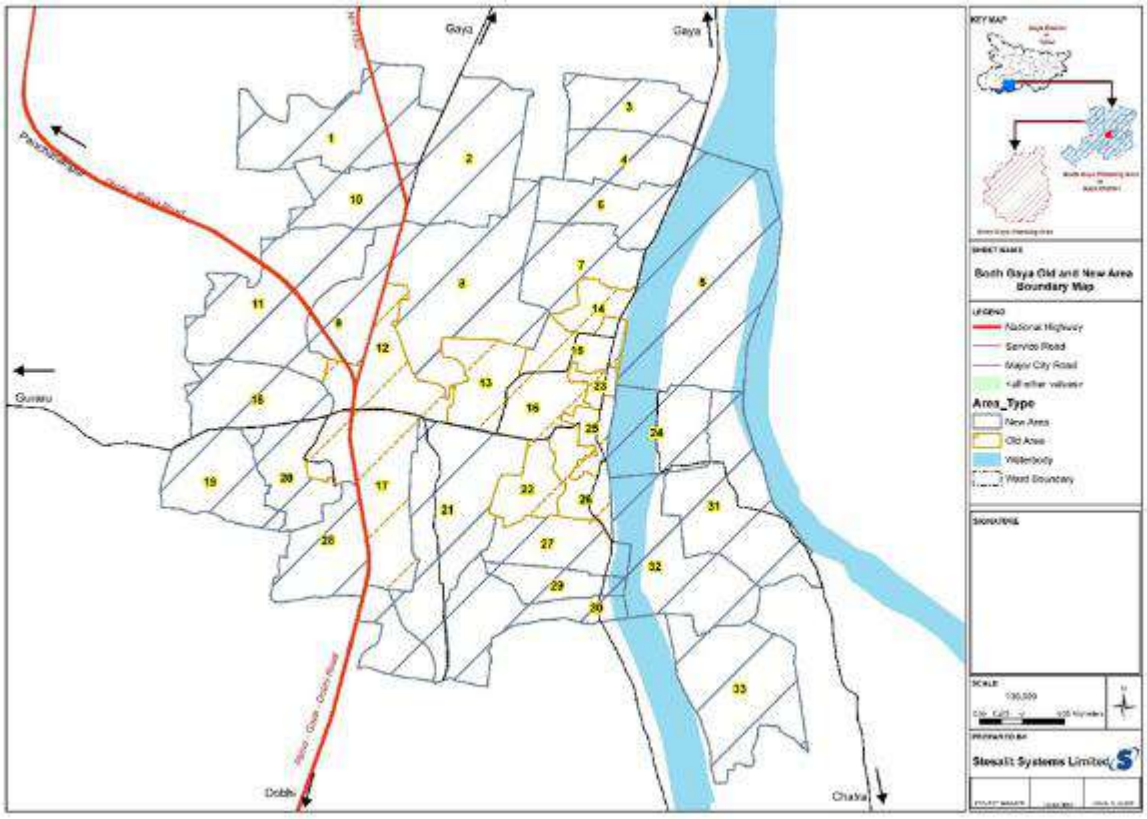
The Old Area has been demarcated based on the analysis of following factors:

- Housing Density
- Population Density
- Narrow roads and streets having width equals to 6 meters and below
- Old Parts of Town/City.

New Areas are newly developed or less densely populated regions that do no conform to the above-mentioned factors.

15.4 OLD & NEW AREA IN BODHGAYA NAGAR PARISHAD

The Bodhgaya Nagar Parishad covers a total geographical area of **50.50 sq. km**, comprising **8.07 sq. km of existing/old developed area** and **42.42 sq. km of less dense area**. The old area reflects Bodhgaya's historical and cultural character, while the less dense area provides scope for **future urban expansion, infrastructure development, and population growth**.



MAP 15-1 DELINATION OF OLD AND NEW AREA IN BODHGAYA URBAN AREA

Key Observations

- There are ten densely populated wards in Bodhgaya, identified as Wards 12, 13, 14, 15, 16, 17, 22, 23, 25 and 26 where the building density exceeds 10%. These wards are categorized as part of the city's older areas.
- There are 23 wards in Gaya where the building density ranges from 0% to 10%. This variation is influenced by factors such as the Falgu riverbed, government lands, parks, colleges, and playgrounds. Considering these factors, these areas are also classified as part of the city's older regions.

TABLE 15-17 WARD WISE DELINATION OF OLD AND NEW AREA IN BODHGAYA URBAN AREA

Ward No	Area (in sq km)	Building Footprint (in sq m)	Built Up Density	Population 2011	Population Denisty	Area Type
1	2.46	81964.20	3.33	1949	792.32	New Area
2	2.31	114575.03	4.95	2240	967.80	New Area
3	1.18	37736.50	3.19	2344	1982.70	New Area
4	1.06	32516.01	3.08	2390	2260.45	New Area
5	4.69	47379.91	1.01	2465	525.17	New Area
6	1.09	53228.82	4.90	2312	2130.42	New Area
7	1.32	58148.25	4.41	2347	1781.08	New Area
8	3.25	124719.54	3.83	2390	734.70	New Area
9	1.05	65150.83	6.19	2229	2117.39	New Area
10	1.06	61027.64	5.77	1917	1813.86	New Area

11	2.71	63760.35	2.35	2867	1056.15	New Area
12	1.31	132881.90	10.16	2520	1925.98	Old Area
13	0.91	122199.07	13.47	2825	3114.24	Old Area
14	0.43	44000.35	10.30	2424	5672.27	Old Area
15	0.71	75080.34	10.54	2254	3165.41	Old Area
16	0.76	127591.40	16.73	2591	3397.15	Old Area
17	2.06	139816.72	6.78	2013	975.75	Old Area
18	1.43	70422.09	4.92	2223	1552.51	New Area
19	1.39	36920.57	2.66	2077	1495.41	New Area
20	1.00	52041.36	5.21	2018	2021.45	New Area
21	2.78	220901.86	7.96	2732	984.07	New Area
22	0.66	126522.60	19.24	2772	4215.92	Old Area
23	0.21	55892.86	27.13	2403	11664.06	Old Area
24	1.43	46798.11	3.27	2864	2001.91	New Area
25	0.37	78842.78	21.60	2282	6251.93	Old Area
26	0.66	86820.16	13.17	2549	3865.63	Old Area
27	1.10	47629.42	4.33	2072	1882.33	New Area
28	1.95	58478.12	3.00	2176	1116.05	New Area
29	0.61	23619.20	3.86	2135	3487.95	New Area
30	1.46	62588.31	4.28	2864	1957.63	New Area
31	2.53	45557.07	1.80	2719	1075.94	New Area
32	2.17	60654.41	2.79	2053	944.81	New Area
33	2.38	50786.90	2.13	2591	1087.91	New Area

TABLE 15-18 LIST OF OLD AREAS IN BODHGAYA NAGAR PARISHAD

Sl. No	Ward No.	Name of Location/ Area Boundary
1	BNP Ward No. 12	North – The Imperial Bodhgaya South – Domuhan Bodhgaya Road East – Namita Road West – NH 22
2	BNP Ward No. 13	North – Latika Road South – Domuhan Bodhgaya Road East – Gaya Bodhgaya Road West – Namita Road
3	BNP Ward No. 14	North – BNP Ward No. (Marasa Sarovar) South – Gaya Bodhgaya Road East – Falgu River West – BNP Ward No. 7 (Maunia)
4	BNP Ward No. 15	North – Upadhayay Bigha South – Gaya Bodhgaya Road East – Falgu River West – Vijay Road

5	BNP Ward No. 16	North – Gaya Bodhgaya Road South – Domuhan Bodhgaya Road East – Pachhatti Road West – Gaya Bodhgaya Road
6	BNP Ward No. 17	North – Domuhan Bodhgaya Road South – 24.677325,84.968488 to 24.678326,84.962778 East – BNP Ward No. 21 (Rampur) West – BNP Ward No. 20 (Bhalua Road) & NH 22
7	BNP Ward No. 22	North – Domuhan Bodhgaya Road South – BNP Ward No. 27 (Bhojawar) East – BNP Ward No. 26 West – 80 Feet Statue Road
8	BNP Ward No. 23	North – BNP Ward No. 15 South – Shankar Mandal Road East – Falgu River West – Pachhatti Road
9	BNP Ward No. 25	North – Shankar Mandal Road South – Urail Road East – Falgu River West – Butter Lamp Road
10	BNP Ward No. 26	North – Domuhan Bodhgaya Road South – BNP Ward No. 27 (Mocharim) East – Butter Lamp Road & Falgu River West – BNP Ward No. 22 (Mastipur)

TABLE 15-19 LIST OF NEW AREAS IN BODHGAYA NAGAR PARISHAD

Sl. No	Ward No.	Name of Location/ Area Boundary
1	BNP Ward No. 1	North – Airport Area South – Kachanpur East – Tikuna Bypass Road West – Bagdaha
2	BNP Ward No. 2	North – Dubhal South – BNP Ward No. 8 East – Lohara West – Tikuna Bypass Road
3	BNP Ward No. 3	North – Khiriyawan South – BNP Ward No. 4 (Sevdhar Bigha) East – Falgu River West – Lohara
4	BNP Ward No. 4	North – BNP Ward No. 3 (Suryapur) South – BNP Ward No. 6 (Jani Bigha) East – Falgu River West – Lohara

5	BNP Ward No. 5	North – Falgu River South – BNP Ward No. 24 & 31 (Bakraur) East – Falgu River West – Falgu River
6	BNP Ward No. 6	North – BNP Ward No. 4 (Amwan) South – BNP Ward No. 7 (Marasa Sarovar) East – Falgu River West – BNP Ward No. 8
7	BNP Ward No. 7	North – BNP Ward No. 6 (Jani Bigha) South – BNP Ward No. 14 (Dehriya Bigha) East – Falgu River West – BNP Ward No. 8 (Durgapur)
8	BNP Ward No. 8	North – BNP Ward No. 2 South – Latika Road East – BNP Ward No. 7 (Maunia) West – NH 22
9	BNP Ward No. 9	North – BNP Ward No. 10 (Jahan Bigha) South – 24.704099,84.962817 to 24.706006,84.956272 East – NH 22 West – BNP Ward No. 11 (Dhandhwa)
10	BNP Ward No. 10	North – BNP Ward No. 1 (Kharanti) South – BNP Ward No. 11 (Amar Bigha) East – NH 22 West – Sijua
11	BNP Ward No. 11	North – BNP Ward No. 10 (Jahan Bigha) South – BNP Ward No. 18 (Kolhaura) East – BNP Ward No. 9 (Vastu Vihar) West – Parahanda
12	BNP Ward No. 18	North – BNP Ward No. 11 (Dhandhwa) South – Cherki Road East – 24.702207,84.957817 to 24.698491,84.958863 West – Antiy
13	BNP Ward No. 19	North – Cherki Road South – Parsawan East – BNP Ward No. 20 (Bhalua) West – Tirkha
14	BNP Ward No. 20	North – Cherki Road South – BNP Ward No. 28 (Turi Buzurg) East – BNP Ward No. 17 (Bhalua Road) West – BNP Ward No. 19 (Parariya)
15	BNP Ward No. 21	North – Domuhan Bodhgaya Road South – Kirtighar East – 80 Feet Statue Road & BNP Ward No. 30 (Katorawa) West – BNP Ward No. 17 & BNP Ward No. 28 (Jindapur)

16	BNP Ward No. 24	North – BNP Ward No. 5 (Bakraur) South – BNP Ward No. 31 & 32 (Hathiyar) East – BNP Ward No. 31 (Sujata Temple) West – Falgu River
17	BNP Ward No. 27	North – BNP Ward No. 22 & 26 (Bhojawar & Mastipur) South – BNP Ward No. 29 (Sirajpur) East – Falgu River West – BNP Ward No. 21 (Rampur)
18	BNP Ward No. 28	North – BNP Ward No. 20 South – Jindapur East – NH 22 West – Parsawan
19	BNP Ward No. 29	North – BNP Ward No. 27 (Mocharim) South – BNP Ward No. 30 (Sirajpur) East – Falgu River West – BNP Ward No. 30 (Kotqrawa)
20	BNP Ward No. 30	North – BNP Ward No. 29 South – Sirajpur East – Falgu River West – BNP Ward No. 21 (Sekhwara)
21	BNP Ward No. 31	North – BNP Ward No. 5 (Bakraur) South – Narkatiya East – Falgu River West – BNP Ward No. 24 (Sujata)
22	BNP Ward No. 32	North – BNP Ward No. 24 (Sujata) South – BNP Ward No. 33 (Shivrajpur) East – BNP Ward No. 31 (Silaunja) West – Falgu River
23	BNP Ward No. 33	North – BNP Ward No. 32 (Hathiyar) South – Sewa Bigha & Gothu East – Narkatiya West – Falgu River

PART C

INTEGRATED GAYA JI & BODHGAYA PLANNING AREA

MASTER PLAN - 2047 (DRAFT)

1 INTRODUCTION

1.1 PLANNING AREA PROFILE

The Gaya Ji–Bodhgaya region represents one of the most significant cultural, religious, historical and tourism-oriented urban regions of Bihar. Located in the southern part of the state, the two urban centres form a closely interconnected settlement system with complementary functions and strong socio-economic, cultural and transportation linkages. Gaya Ji functions as an important administrative, commercial, service and transportation centre, while Bodhgaya has developed as an internationally recognised centre of Buddhist pilgrimage, spirituality, culture and tourism. The close geographical proximity of the two centres, together with their shared environmental systems, transportation networks, tourism resources and economic activities, necessitates an integrated approach to spatial planning and development.

The planning context of the region extends beyond the existing municipal boundaries of the two urban centres. The notified planning areas incorporate surrounding rural settlements and agricultural areas, thereby creating an urban–rural continuum in which urban expansion, rural transformation, infrastructure provision, environmental management and economic development are closely interrelated. The integration of these areas is important for regulating future urban growth, preventing unplanned development, protecting environmentally and culturally sensitive areas, strengthening connectivity and ensuring equitable distribution of infrastructure and public facilities.

1.2 REGIONAL CONTEXT

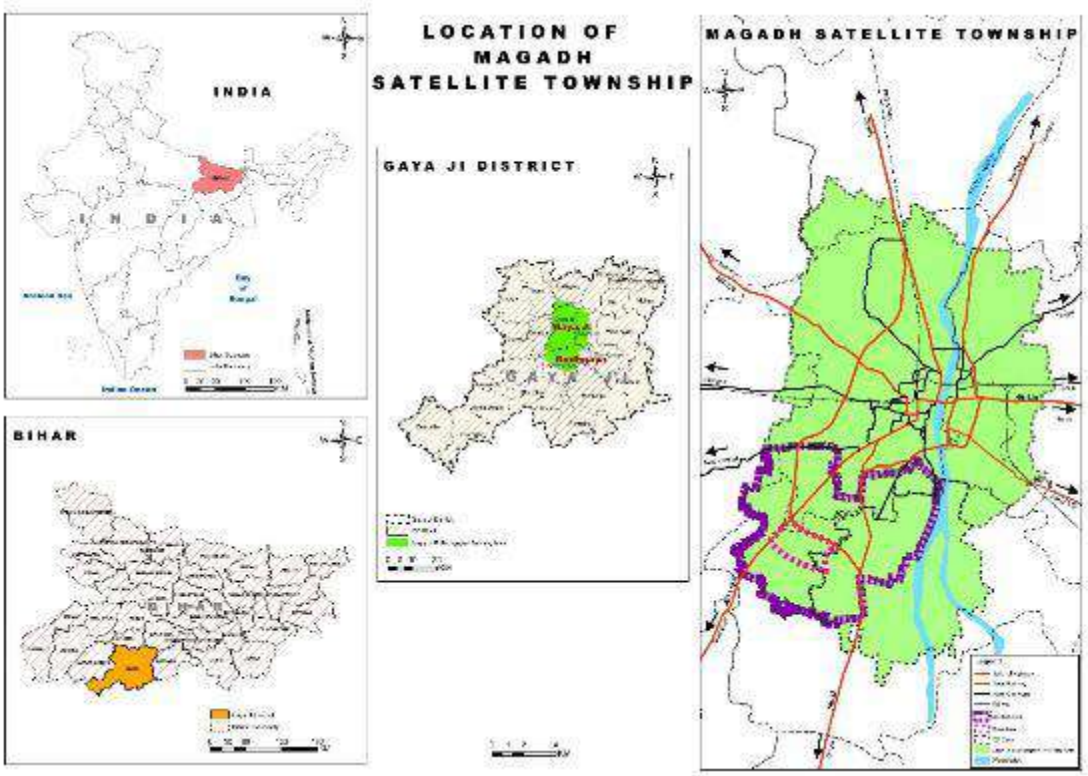
Gaya Ji district is geographically located almost at the centre of Bihar and occupies an important position within the regional structure of southern Bihar. The district covers approximately 4,976 sq. km and shares boundaries with Arwal, Jehanabad and Nalanda districts towards the north, Nawada towards the east, Jharkhand towards the south and Aurangabad towards the west. Its location provides strategic connections between the major urban centres of Bihar and the neighbouring state of Jharkhand. The district is characterised by a combination of urban settlements, rural villages, agricultural areas, hills, rivers and culturally significant places.

Within this regional setting, Gaya Ji and Bodhgaya occupy a particularly important position. Gaya Ji is an established urban centre and district headquarters with a concentration of administrative, commercial, institutional, educational, healthcare and transportation functions. Bodhgaya, located approximately 13 km south of Gaya Ji, performs a distinct but complementary role as a major international Buddhist pilgrimage and tourism destination. The short physical

distance between the two centres has resulted in considerable movement of pilgrims, tourists, workers, students, goods and local residents between them.

The functional relationship between the two cities is therefore not limited to physical proximity. Gaya Ji provides a range of regional services and transport facilities that support visitors and residents travelling towards Bodhgaya, while Bodhgaya contributes substantially to the tourism economy and cultural identity of the wider region. The two centres, along with their surrounding villages and natural systems, can consequently be viewed as components of a single interconnected regional urban system.

1.2.1 LOCATION AND SIZE GAYA JI DISTRICT AND GAYA JI – BODHGAYA PLANNING AREA



MAP 1-1 LOCATION MAP OF INTEGRATED PLANNING AREA

1.3 GAYA JI AND BODHGAYA PLANNING AREAS

The Gaya Ji Planning Area, located in the Gaya Ji District of Bihar, was declared a Planning Area on 17 May 2017, under Section 9 of the Bihar Planning and Development Act 2012. The total area of the Gaya Ji Planning Area is 308.31 sq. km. of which 50.17 sq. km. is urban and the remaining 258.14 sq. km. is rural. The urban area comprises one urban administrative unit, the Gaya Ji Municipal Corporation. The rural area has 162 revenue villages spread across five C.D. blocks - Gaya Ji Town, Belaganj, Manpur, Paraiya, and BodhGaya.

Bodhgaya Planning Area located in the Gaya District of Bihar was declared a Planning Area on 21 August 2017, under Section 11 of the Bihar Planning and

Development Act 2012. The total area of Bodhgaya Planning Area is (83.75 sq.km.) there is one urban administrative unit and 33 revenue villages in this Planning Area, which includes all areas of Bodhgaya Nagar Parishad, 30 revenue villages of Bodhgaya Block and 3 rural revenue villages of Gaya Block.

However, as per the administrative reclassification (2021) The total area of Bodhgaya Planning Area is (86.65 sq.km.) There is one urban administrative unit and 19 revenue villages in this Planning Area, which includes all areas of Bodhgaya Nagar Parishad (as per 2021 reclassified Nagar Parishad boundary), 16 revenue villages of Bodhgaya Block and 3 rural revenue villages of Gaya Block.

The districts of Jehanabad in the north, BodhGaya in the west, Hazaribaghand Chatra in the south, and Nawada and Koderma (Jharkhand) in the east are the shared borders of Bodhgaya. It is around 125 kilometers from Patna, the state capital, and 13 kilometers south of Gaya, the sizable district seat and pilgrimage town.

With roots in the era of Emperor Ashoka, Bodhgaya is a modest but highly respected town with a vast religious and cultural legacy. Here, in the year 260 BCE, the first tree shrine was constructed by the devoted Buddhist patron Ashoka. Its main claim to fame is that it was under the Bodhi tree, more than 2500 years ago, that Lord Buddha obtained enlightenment. As a result, Buddhists all over the world see it as the geographic core of the Buddhist world. It is a very significant hub for both domestic and foreign travel because of its profound cultural significance.

1.4 FUNCTIONAL RELATIONSHIP BETWEEN GAYA JI AND BODHGAYA

Although Gaya Ji and Bodhgaya possess distinct urban identities, their development is strongly interconnected. Gaya Ji acts as a major service and transportation centre, while Bodhgaya functions primarily as an international religious and cultural tourism centre. The movement of tourists and pilgrims between the two cities generates a continuous functional relationship, supported by road connectivity, tourism facilities, accommodation, commercial activities and supporting services.

Gaya Ji's religious importance is primarily associated with Hindu pilgrimage, particularly the Vishnupad Temple, Mangla Gauri Temple, Pretshila and several sites associated with Pind Daan rituals. Bodhgaya, on the other hand, is internationally recognised as the place associated with Buddha's enlightenment and contains the Mahabodhi Temple Complex, monasteries and several Buddhist heritages sites. Consequently, the two destinations offer complementary pilgrimage and cultural experiences and together form a significant religious-tourism region. This functional relationship provides an opportunity to develop a common regional tourism strategy rather than treating the two urban areas as independent destinations. Integrated planning can facilitate coordinated tourism infrastructure, public transport, pedestrian connections, visitor facilities, accommodation, parking, information systems, heritage conservation and environmental management.

2 EXISTING ROAD NETWORK

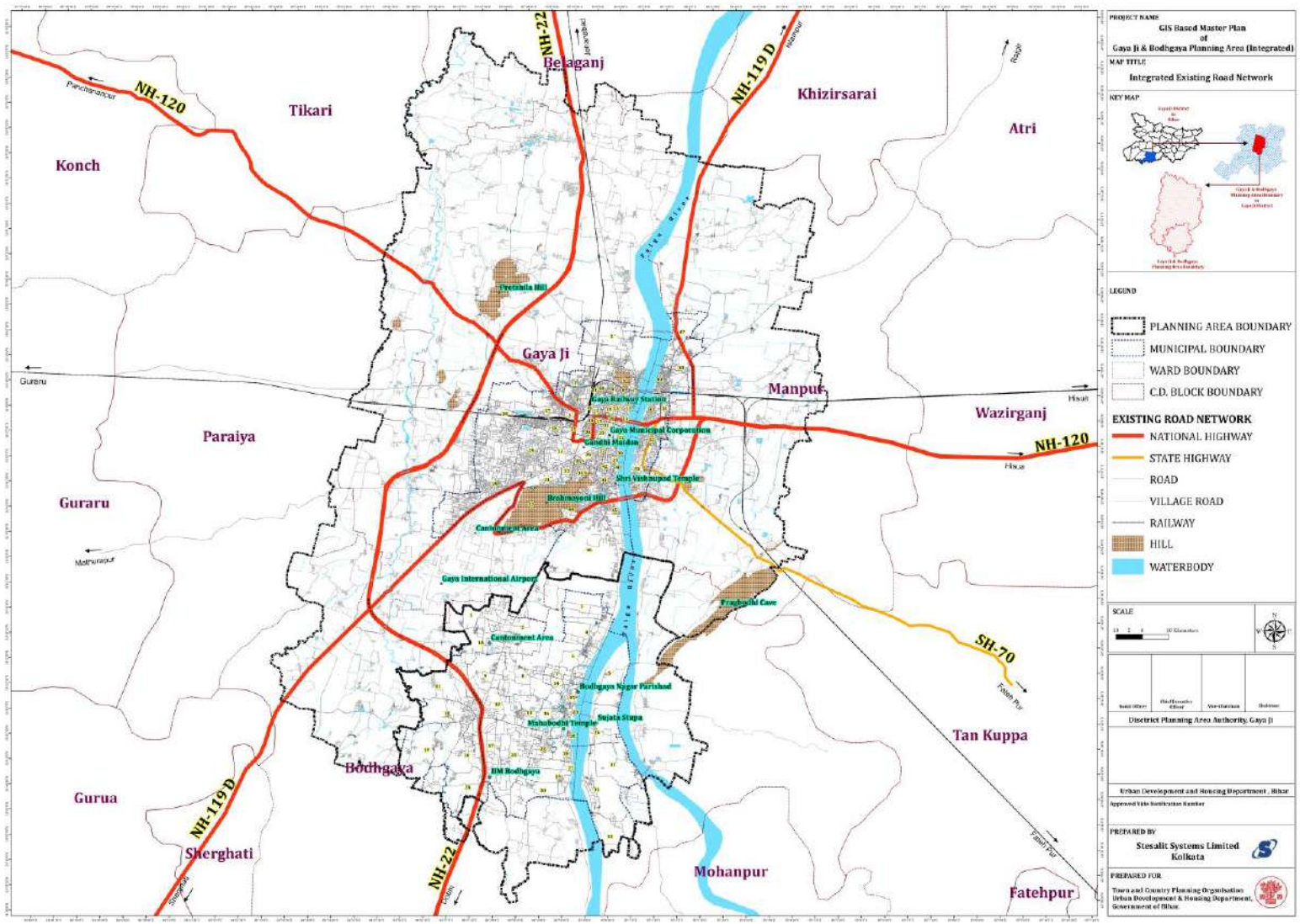
The road network of the integrated Gaya Ji–Bodhgaya Planning Area forms the principal framework for intra-urban, inter-urban and regional movement. The two planning areas are functionally interconnected through a network of National Highways, State Highways, bypass roads, major and minor city roads, service roads and village roads. This network supports the movement of residents, commuters, tourists, pilgrims, commercial vehicles and agricultural produce between Gaya Ji, Bodhgaya and the surrounding settlements.

The transportation structure is particularly significant because Gaya Ji and Bodhgaya perform complementary regional functions. Gaya Ji acts as an important administrative, commercial, institutional and transportation centre, while Bodhgaya is a major national and international pilgrimage and tourism destination. Consequently, the road network serves not only local urban trips but also substantial inter-city and tourism-related movement.

2.1 EXISTING ROAD NETWORK

The existing road network demonstrates that Gaya Ji and Bodhgaya already function as a highly interconnected transportation region. **NH-22 acts as the principal regional spine, while the Gaya–Bodhgaya Road, Domuhan–Bodhgaya Road, Gaya Bypass, Cherki Road, Tikuna Bypass and other secondary roads provide distribution within the integrated urban and rural system.**

Gaya Ji has a stronger regional road structure because of the presence of two National Highways and three State Highways, whereas Bodhgaya has a more extensive lower-order network dominated by minor city and village roads. This difference reflects their respective functions: Gaya Ji operates as a regional service and transportation centre, while Bodhgaya has a more tourism-oriented and dispersed settlement structure. The existing network therefore provides a strong foundation for integrated development; however, increasing population, urbanisation, tourism and inter-city movement will require improvement of road hierarchy, junction management, pedestrian infrastructure, public transport, parking management and peripheral connectivity.Gaya Ji is regionally connected through NH-22, NH-120, NH-119D and SH-70. The Stage-5 analysis highlights congestion, freight movement, narrow roads and uncontrolled intersections. Bodhgaya has an existing road network of approximately 535.44 km, with surveys on NH-22, Gaya Bypass, Cherki Road, Domuhan–Bodhgaya Road, Gaya–Bodhgaya Road, Tikuna Bypass, Sujata Road and Mocharim–Kosla Road.



MAP 2-1 INTEGRATED GAYA JI & BODHGAYA EXISTING ROAD NETWORK-2025

3 EXISTING LAND USE

The existing land-use pattern reflects a combination of established urban areas, rural settlements, agricultural land, water bodies, institutional uses, commercial activity and transport corridors. The assessment of existing land use is important for identifying areas of development pressure, incompatible uses and opportunities for planned expansion. Existing settlements and major movement corridors provide the structural framework for subsequent land-use and infrastructure proposals.

The existing land-use assessments identify a mixture of residential areas, commercial activity, public and semi-public uses, recreation, transportation, agriculture and water bodies. Existing settlements and major corridors provide the base structure for future development, while agricultural and environmentally sensitive areas require careful management during urban expansion.

The comparison with planning standards is important for identifying under-provision, concentration of activities and areas where future development can be accommodated. The integrated report therefore treats existing land use as the baseline against which proposed land-use changes and infrastructure requirements are assessed.

Future development should prioritise compact, connected growth and avoid fragmented expansion. Major transport corridors, existing settlements and proposed TOD areas should guide the location of higher-intensity activities, while environmentally sensitive land should remain protected.

Gaya Ji existing land use is dominated by agriculture (67.79%), followed by other uses (16.94%), transportation (4.89%), residential (4.63%) and public/semi-public uses (3.29%). Bodhgaya has agriculture at 63.63%, other uses at 20.75%, residential at 6.92%, public/semi-public at 3.28% and transportation at 2.88%. The spatial implication is to guide expansion through planned corridors while protecting agriculture, water bodies, the Falgu River and natural drainage. The proposed pattern seeks to accommodate future growth while maintaining a balanced distribution of development uses.

3.1 LAND USE DISTRIBUTION

The **Existing Land Use Distribution–2025** indicates that the planning area covers a total of **392.61 sq. km (39,261.01 hectares / 97,017.40 acres)**. The land use pattern is predominantly agricultural, with agriculture accounting for **68.04% (267.15 sq. km)** of the total area.

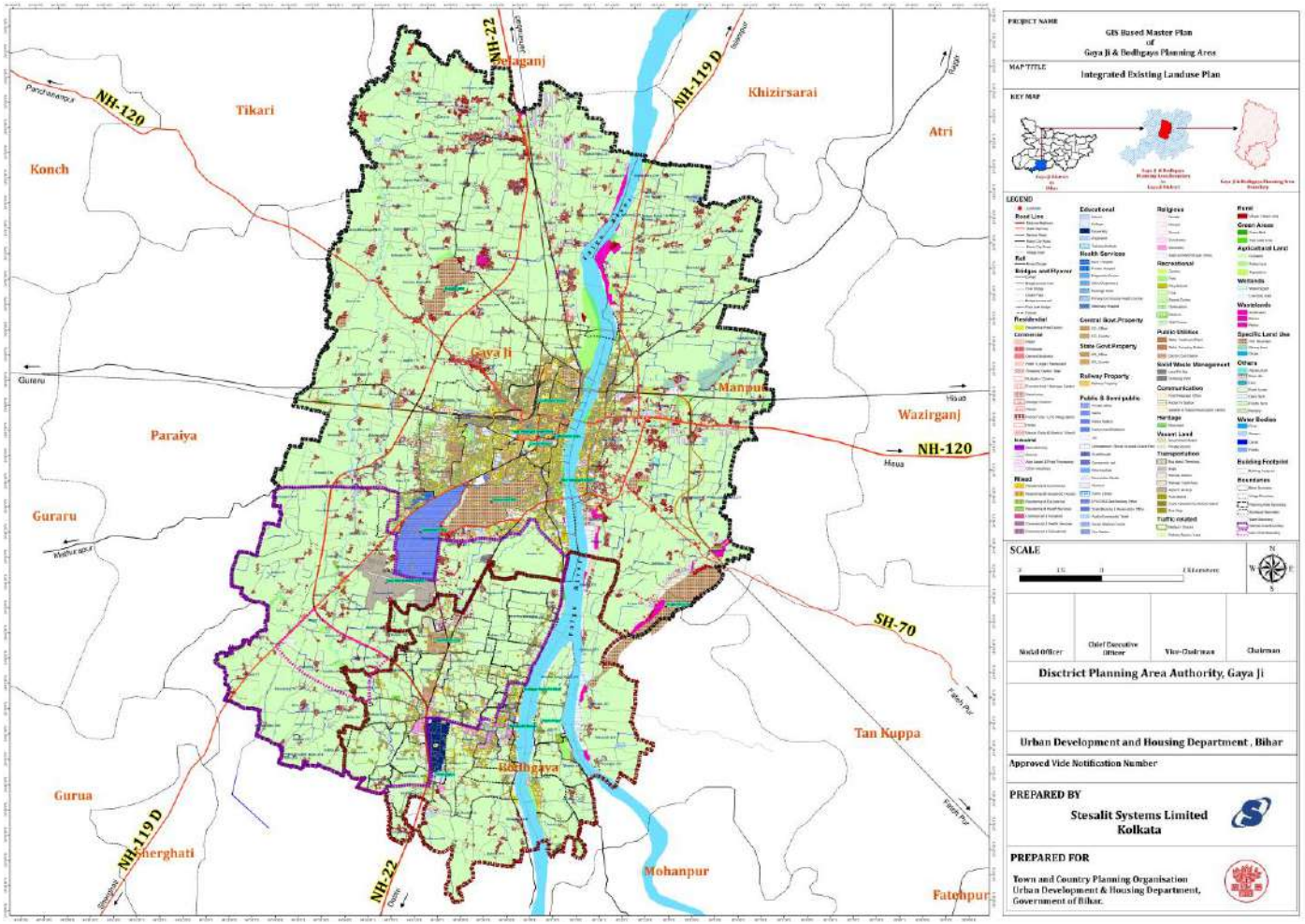
Residential use covers **17.37 sq. km (4.42%)**, while **settlement areas** account for **15.06 sq. km (3.84%)**. **Transportation and communication** occupy **16.69 sq. km (4.25%)**, reflecting the existing road and transport network. **Water bodies** constitute

22.13 sq. km (5.64%), representing a significant natural resource within the planning area.

Other land uses include **Public & Semi-Public (3.13%)**, **Commercial (0.81%)**, **Mixed Land Use (0.65%)**, **Recreational (0.29%)**, **Industrial (0.15%)**, **Public Utilities (0.13%)**, and **Green Areas (0.12%)**.

Overall, the existing pattern reflects a **predominantly rural and agriculture-oriented landscape**, with relatively limited urban and built-up uses. This provides considerable scope for planned urban expansion while ensuring the protection of agricultural land, water bodies, green spaces and other environmentally sensitive areas.

Existing Land Use Distribution -2025					
S.No	**Land Use**	**Area**			**%**
		Sq.Km.	**Hectare**	**Acre**	
1	**Residential**	17.37	1736.71	4291.50	**4.42**
2	**Commercial**	3.18	317.92	785.59	**0.81**
3	**Mixed Land Use**	2.54	253.80	627.16	**0.65**
4	**Public & Semi Public**	12.28	1227.91	3034.24	**3.13**
5	**Industrial**	0.60	59.72	147.56	**0.15**
6	**Transportation & Communication**	16.69	1669.23	4124.77	**4.25**
7	**Public Utilities**	0.50	49.85	123.19	**0.13**
8	**Recreational**	1.12	111.73	276.46	**0.29**
9	**Green Area**	0.48	47.19	117.59	**0.12**
10	**Agriculture**	267.15	26715.07	66014.31	**68.04**
11	**Settlement**	15.06	1505.74	3720.78	**3.84**
12	**Others**	33.53	3353.39	8286.39	**8.54**
13	**Water Bodies**	22.13	2212.76	5467.86	**5.64**
Total		**392.61**	**39261.01**	**97017.40**	**100**



MAP 3-1 INTEGRATED GAYA JI & BODHGAYA EXISTING LAND USE – 2025

3.2 KEY ISSUES AND PRIORITIES

The key issues and priorities vary between Gaya Ji and Bodhgaya due to their different development roles, existing conditions and future growth pressures. While both planning areas face common challenges related to population growth, infrastructure provision, mobility and environmental management, the intensity and nature of these challenges differ. Gaya Ji is expected to experience greater pressure from urban expansion, housing demand and infrastructure capacity, whereas Bodhgaya requires stronger emphasis on heritage conservation, visitor management, tourism mobility and environmentally sensitive development.

For **Gaya Ji**, the principal challenge is to accommodate future urban growth while ensuring that infrastructure and housing provision keep pace with population increase. The expansion of water supply, sewerage, drainage and solid waste management systems, together with improved transport capacity and planned housing, will be important for supporting future development. Traffic congestion and increasing movement between residential, commercial and service areas also require improvements in road hierarchy and public transport.

For **Bodhgaya**, development priorities are more strongly influenced by its international pilgrimage and heritage role. Increasing visitor numbers and tourism activity create additional pressure on mobility, public amenities, waste management and the surrounding environment. Future development therefore needs to remain controlled and compatible with the heritage character of the area, while improving tourism infrastructure and visitor circulation.

3.2.1 KEY ISSUES AND PRIORITIES FOR GAYA JI

- Accommodating future urban and population growth.
- Expanding infrastructure capacity, particularly water supply, sewerage, drainage and SWM.
- Addressing housing shortage and promoting planned residential development.
- Improving road network, public transport and traffic management.
- Strengthening commercial, institutional and employment-generating activities.

3.2.2 KEY ISSUES AND PRIORITIES FOR BODHGAYA

- Protecting heritage and pilgrimage-sensitive areas.
- Improving visitor management and tourism-related infrastructure.
- Strengthening tourism mobility, pedestrian circulation and last-mile connectivity.
- Maintaining environmental sensitivity around natural and cultural assets.
- Controlling development intensity in accordance with the area's heritage and tourism character.

At the regional level, both planning areas require stronger connectivity and coordinated infrastructure planning. The Gaya Ji–Bodhgaya relationship should be strengthened through improved transport links, tourism circuits and complementary economic functions. Basic services should be planned in

coordination with future land-use development rather than being provided after urban expansion has already occurred.

3.2.3 PRIORITIES FOR INTEGRATED MASTER PLAN

- **Regional connectivity:** Strengthening transport and functional linkages between Gaya Ji and Bodhgaya.
- **Basic infrastructure:** Coordinating water supply, sewerage, drainage and solid waste management with future growth.
- **Environmental protection:** Protecting natural drainage, water bodies, the Falgu River and connected blue-green systems.
- **Mobility:** Improving public transport, pedestrian movement and tourism-related mobility.
- **Land-use coordination:** Ensuring that future development intensity corresponds with infrastructure capacity and environmental constraints.

Overall, the priority framework should follow an **infrastructure-led but differentiated development approach**. Gaya Ji should focus on accommodating urban growth and strengthening its regional service function, while Bodhgaya should prioritise heritage-sensitive tourism development and environmental protection. At the same time, coordinated mobility, infrastructure, land use and blue-green systems should allow both planning areas to function as complementary components of a single regional urban and tourism system.

4 PROPOSED TRAFFIC & TRANSPORTATION

The integrated planning approach for the Gaya and Bodhgaya Planning Areas focuses on strengthening their physical, functional, economic and tourism linkages while ensuring that future urban expansion takes place in a planned and sustainable manner. Gaya functions as a major regional urban centre and transportation node, while Bodhgaya has a strong international tourism and religious identity. The close proximity and complementary roles of the two urban centres provide an opportunity to plan them as a coordinated and integrated urban region rather than as independent settlements.

4.1 PROPOSED RING ROAD NETWORK

To strengthen the internal and peripheral connectivity of the two planning areas, ring roads have been proposed for both Gaya and Bodhgaya. These ring roads are intended to provide an alternative movement network around the existing and proposed urban areas, thereby reducing the dependence of through and inter-sectoral traffic on the existing central road network.

The proposed ring roads will connect the major radial roads approaching Gaya and Bodhgaya from different directions. This will create an interconnected road structure in which regional traffic can enter and exit the urban areas through the peripheral network without necessarily passing through the congested urban core. The ring roads will therefore function as important components of the proposed road hierarchy and will improve overall accessibility within the planning areas.

4.1.1 RING ROADS AS GROWTH-STRUCTURING CORRIDORS

The proposed ring roads are not envisaged only as transportation infrastructure but also as major spatial growth-structuring elements. Improved accessibility along these corridors will facilitate the planned expansion of urban activities towards the identified development sectors.

The areas surrounding the ring roads can accommodate future residential, commercial, institutional, industrial and tourism-related development, subject to the proposed land-use structure and development controls. This approach will help guide urban expansion along planned corridors rather than allowing scattered and unregulated development. The ring road network will consequently provide both improved mobility and a framework for directing future sectoral growth.

4.1.2 INTEGRATION OF RADIAL AND PERIPHERAL ROADS

The existing road structure of Gaya and Bodhgaya is strongly influenced by roads connecting the urban centres with surrounding settlements and regional destinations. The proposed ring roads will provide cross-connections between

these radial corridors, creating a more complete and hierarchical transportation network.

This radial-cum-ring road structure will improve accessibility between different parts of the planning area and reduce the need for traffic to travel through the existing city centres. It will also provide better connectivity to proposed development areas and facilitate the movement of goods, passengers and tourists between different parts of the integrated planning area.

4.1.3 PROPOSED OUTER RING ROAD

In addition to the individual ring roads around Gaya and Bodhgaya, an outer ring road has been proposed to establish a higher-order connection between the two planning areas. The outer ring will function as a strategic peripheral corridor, integrating the two urban systems and providing connectivity between their respective growth areas.

The proposed outer ring road will also help accommodate regional and inter-urban traffic, particularly traffic that does not require access to the central built-up areas. By providing a peripheral alternative, it will reduce traffic pressure on existing urban roads and improve the efficiency of movement between Gaya, Bodhgaya and the surrounding settlements.

4.1.4 PROPOSED RIVER-SIDE GAYA–BODHGAYA CORRIDOR

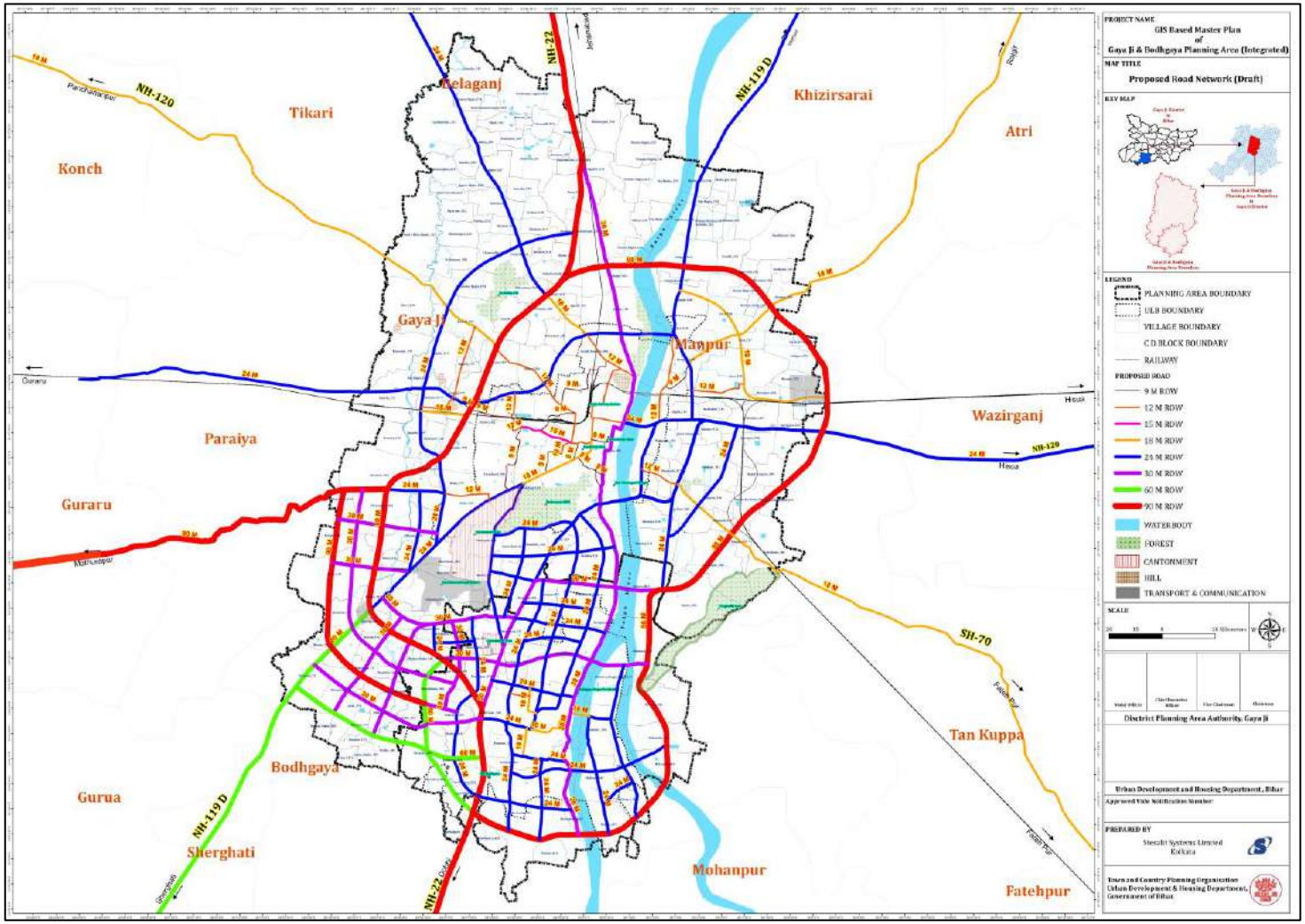
A dedicated river-side road corridor has also been proposed to strengthen the direct connectivity between Gaya and Bodhgaya. The corridor will provide an additional movement route between the two urban centres and complement the proposed ring road and outer ring road network.

The river-side corridor has the potential to function as more than a transportation link. Subject to environmental and river-buffer regulations, it can contribute to the development of a continuous river-oriented recreational and tourism corridor, connecting public spaces, recreational areas, riverfront activities and tourism destinations. Appropriate setbacks, ecological buffers and restrictions on development along the river edge will be essential to ensure that mobility improvements do not adversely affect the river environment.

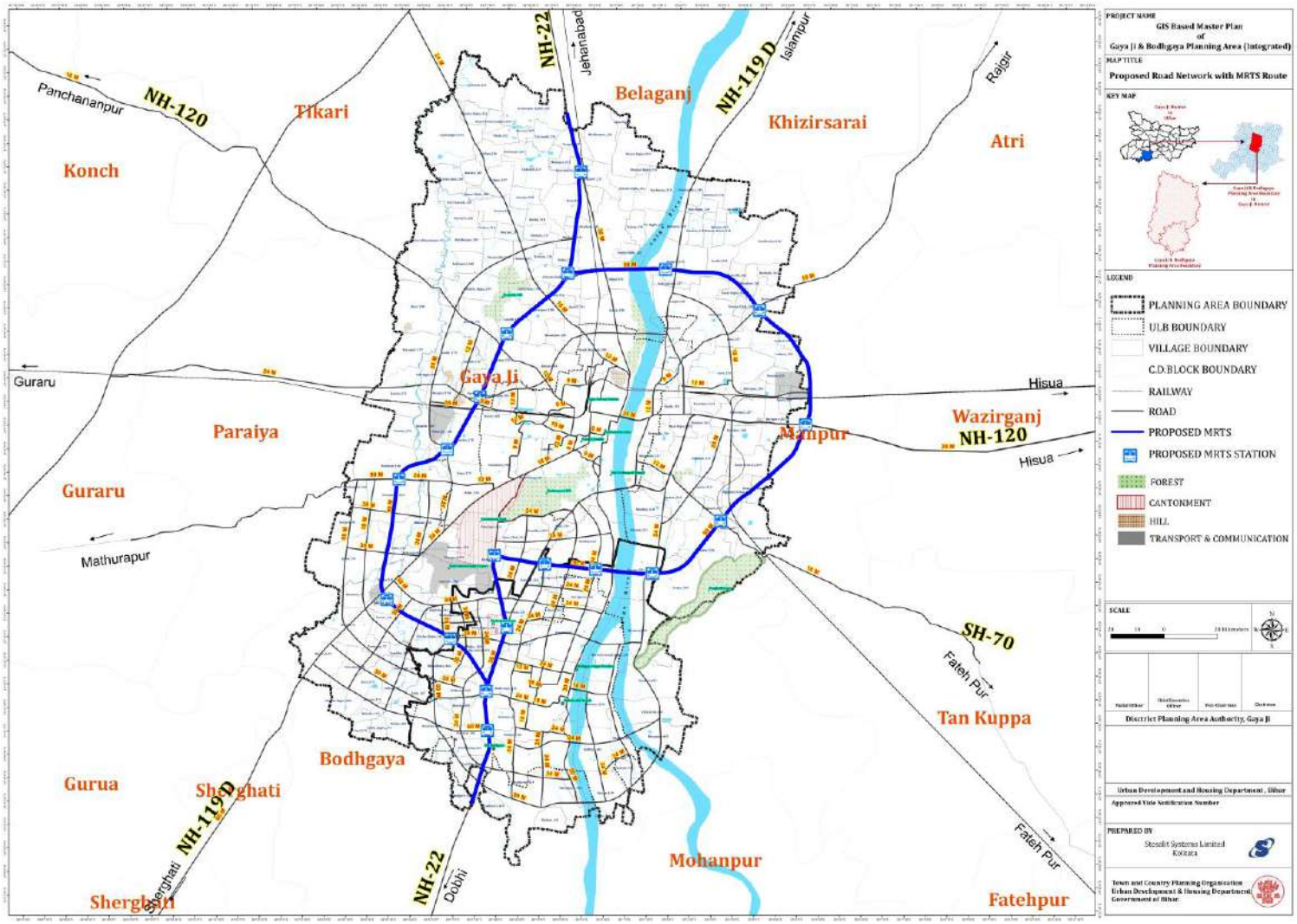
4.2 OVERALL PLANNING STRATEGY

The proposed transportation framework follows a radial–ring–outer ring approach, supported by the river-side Gaya–Bodhgaya corridor. The individual ring roads around Gaya and Bodhgaya will connect the major radial roads and facilitate peripheral circulation, while the outer ring road will integrate the two planning areas at a larger spatial scale. The river-side corridor will provide an additional direct connection and create opportunities for river-oriented public and tourism development.

Overall, the proposed network is intended to improve regional and local connectivity, distribute traffic more efficiently, reduce pressure on existing urban roads, support planned sectoral growth, and strengthen the functional integration of Gaya and Bodhgaya.



MAP 4-1 INTEGRATED ROAD NETWORK MAP



MAP 4-2 INTEGRATED MRTS NETWORK MAP

5 PROPOSED LAND USE 2047

The proposed land-use framework translates the demographic, economic, environmental and transport assessment into a coordinated spatial structure. Residential growth, commercial and institutional uses, transportation corridors, recreation, green areas and environmentally sensitive land should be distributed in a manner that supports compact and connected development. Higher-intensity uses can be directed towards suitable transport and TOD locations, while environmentally and culturally sensitive areas should remain subject to appropriate development controls.

The Gaya Ji proposed land-use framework allocates land among residential, commercial, public and semi-public, mixed, industrial, recreational, transportation and other planning categories. The latest integrated presentation reports a total planning-area extent of 306.03 sq.km. for the proposed 2047 framework, with residential use forming the largest component at 34.46%, followed by agricultural use at 24.04%, TOD at 11.14%, recreation at 9.44% and transportation and communication at 5.87%.

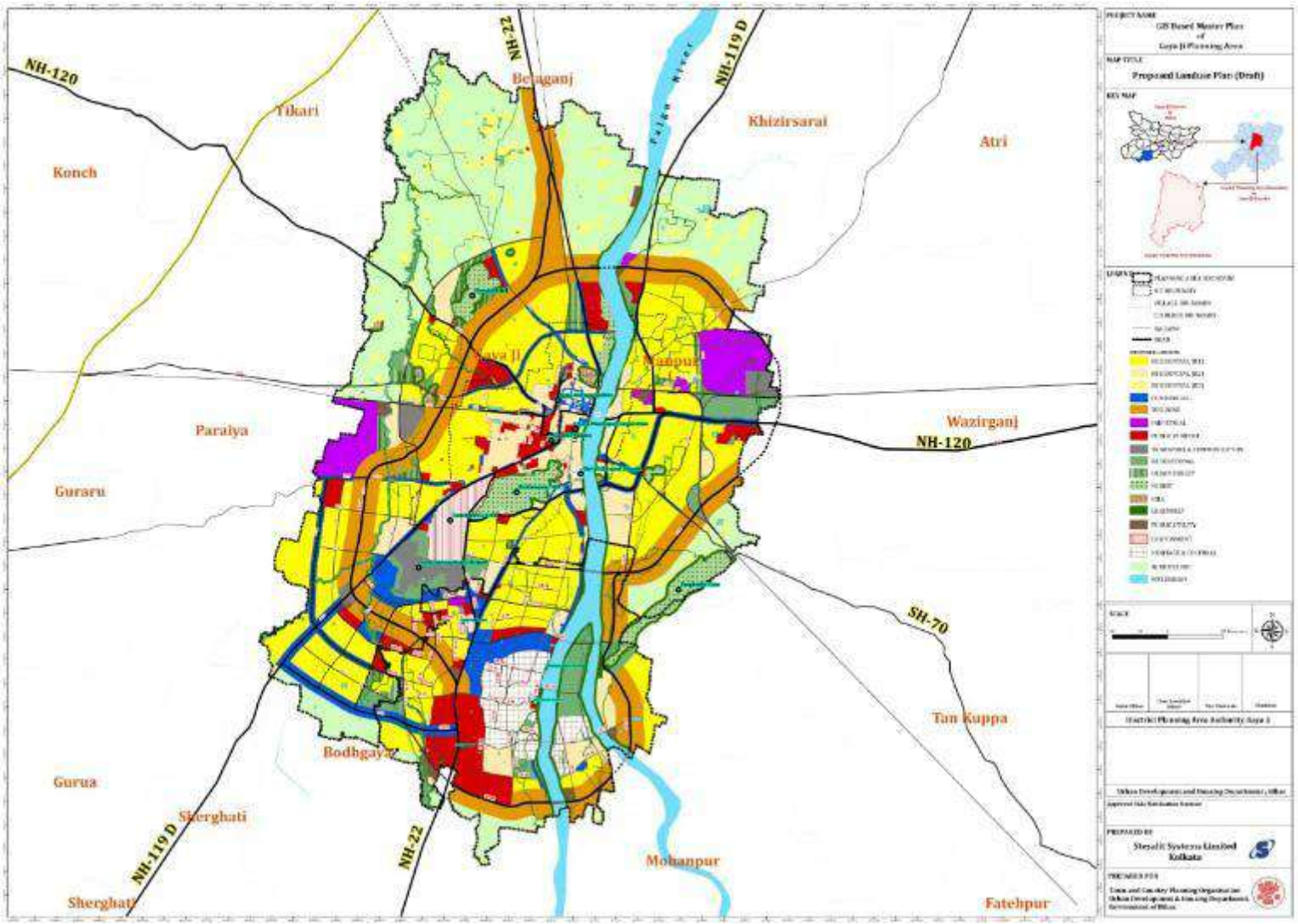
Bodhgaya's proposed framework reflects its smaller scale and tourism-sensitive character, with land-use planning oriented towards residential growth, tourism, recreation, public facilities, transportation and environmental protection. Higher-intensity development should be concentrated in appropriate corridors while heritage and environmentally sensitive areas remain subject to stronger controls.

The combined land-use strategy differentiates roles rather than applying uniform intensity. Gaya Ji can accommodate larger residential, service and employment growth, while Bodhgaya should retain a more controlled development pattern linked to pilgrimage, tourism and heritage. The integrated land-use map provides the spatial basis for connecting the two areas through transport and tourism corridors.

The proposed land use pattern seeks to accommodate future growth while maintaining a balanced distribution of development uses.

TABLE 5-1 PROPOSED LAND USE INTEGRATED GAYA JI & BODHGAYA PLANNING AREA 2047

Proposed Land Use -2047					
S.No	**Land Use**	**Sq. Km**	**Hectares**	**Acres**	**%**
1	**Residential Zone**	116.26	11625.67	28727.65	29.61
2	**Commercial Zone**	20.75	2075.47	5128.58	5.29
3	**TOD Zone**	46.13	4613.28	11399.66	11.75
4	**Industrial Zone**	10.01	1000.67	2472.7	2.55
5	**Public Purpose**	23.97	2397.39	5924.07	6.11
6	**Recreational**	13.75	1374.73	3397.03	3.50
7	**Green Area**	16.29	1628.80	4024.86	4.15
8	**Urban Forest**	13.82	1382.12	3415.29	3.52
9	**Hills/Mountain**	6.06	77.59	191.74	1.54
10	**Transportation & Communication**	18.35	2363.40	5840.09	4.67
11	**Public Utilities**	1.60	160.18	395.79	0.41
12	**Agriculture**	75.74	7574.18	18716.209	19.29
13	**Water Body**	20.06	2006.24	4957.53	5.11
14	**Heritage and Cultural**	9.81	981.27	2424.77	2.50
Total		**392.61**	**39261.01**	**97017.40**	**100**



MAP 5-1 INTEGRATED GAYA JI–BODHGAYA PROPOSED LAND USE 2047

5.1 INTEGRATED PLANNING STRATEGY

The integrated planning strategy recognizes Gaya Ji and Bodhgaya as two distinct but closely interconnected components of the regional urban, pilgrimage and tourism system. While Gaya Ji has a broader urban, administrative, commercial and service-sector role, Bodhgaya has a more specialized international pilgrimage and heritage function. The planning approach should therefore support coordinated growth while maintaining differentiated development controls according to the character, capacity and opportunities of each planning area.

Gaya Ji should accommodate a greater share of future urban growth, housing, employment-generating activities, commercial development and higher-order services. Bodhgaya, on the other hand, should follow a controlled and tourism-sensitive development pattern that protects its heritage character, pilgrimage environment and ecological resources. This differentiation will help avoid uniform development intensity across both areas and allow investments to be directed towards their respective strategic roles.

The **Gaya Ji–Bodhgaya corridor** should form one of the principal spatial and functional elements of the integrated strategy. The corridor should be strengthened through improved road connectivity, public transport, pedestrian movement, tourism circuits and last-mile connections. Better integration between the two areas can facilitate the movement of residents, pilgrims and tourists while also supporting economic linkages and employment opportunities.

Key strategic priorities should include:

- **Strengthening the Gaya Ji–Bodhgaya corridor** as an integrated urban, tourism and mobility corridor.
- **Concentrating higher-intensity development** around suitable transport corridors and TOD areas.
- **Protecting the Falgu River, drainage channels and water bodies** from incompatible development.
- **Improving public transport and last-mile connectivity** between major urban, tourism and pilgrimage destinations.
- **Supporting affordable and adequately serviced housing** in areas identified for future residential growth.

Infrastructure development should be closely linked with the projected population and proposed land-use structure. Water supply, sewerage, drainage and solid waste management systems need to be expanded in advance of major development so that new growth areas do not create additional infrastructure deficits. Social infrastructure such as schools, healthcare facilities, community facilities and recreational spaces should similarly be planned alongside residential expansion.

Environmental considerations should remain an integral part of the spatial strategy. The Falgu River and associated drainage network provide an important natural structure within the planning system and should be protected through appropriate development controls, green buffers and blue-green infrastructure. Rather than treating environmental areas as residual spaces, the strategy should use them as connected ecological, recreational and storm-water management systems.

Tourism and heritage management should receive particular attention in Bodhgaya. New development should be compatible with the area's pilgrimage and heritage character, while tourism infrastructure should be improved to accommodate visitor demand. Heritage circuits, pedestrian routes, visitor amenities, public transport, parking and last-mile connectivity should be planned as an interconnected system rather than as individual projects.

The overall development strategy should therefore be implemented through a coordinated and phased approach. Infrastructure investment, land-use development, housing expansion and transport improvements should be aligned with population growth and development intensity. This will help ensure that physical expansion is supported by adequate services and mobility infrastructure.

Overall, the integrated strategy links **land use, infrastructure, mobility, tourism, environment, housing and economic development** into a common spatial framework. Gaya Ji can function as the principal regional urban and service centre, while Bodhgaya can strengthen its role as a globally significant pilgrimage and heritage destination. Together, they can develop as a complementary regional system with coordinated infrastructure, improved accessibility and stronger environmental and cultural protection.

6 ZONING

The Integrated Gaya–Bodhgaya Planning Area has been divided into five development zones to provide a clear spatial framework for managing existing development and guiding future growth in a systematic and integrated manner. The zoning has been undertaken considering the existing settlement pattern, agricultural areas, institutional and industrial potential, tourism and pilgrimage importance, heritage resources, environmental sensitivity and future urban expansion requirements. The five zones together cover approximately 392.58 sq. km, and each zone has been assigned a specific development focus according to its spatial character and future potential. This zoning structure is intended to ensure that incompatible activities are appropriately separated while complementary activities are planned in an integrated manner.

The five zones comprise Zone 1, Zone 2, Zone 3, Zone 4 and Zone 5. Zone 1 covers 86.25 sq. km (21.97%) and focuses on residential development and agricultural infrastructure. Zone 2 is the largest zone, covering 106.21 sq. km (27.05%), with a focus on institutional development, industrial activities and planned expansion. Zone 3 covers 56.35 sq. km (14.35%) and is primarily focused on tourism, heritage, pilgrimage and environmental conservation. Zone 4 covers 52.61 sq. km (13.40%) and has been identified specifically around the Mahabodhi Temple and its associated heritage and pilgrimage significance. Zone 5 covers 91.16 sq. km (23.22%) and has been designated as the Magadh Township Zone, providing an important area for planned future urban development.

6.1 ZONE 1 – RESIDENTIAL AND AGRICULTURAL INFRASTRUCTURE ZONE

Zone 1 covers approximately 86.25 sq. km, representing 21.97% of the total integrated planning area. The zone has been identified primarily for residential development and agricultural infrastructure. It represents an important component of the existing settlement and rural–urban interface of the integrated planning area. The planning approach for this zone is focused on accommodating residential growth while retaining the importance of agricultural areas and ensuring that the necessary infrastructure is available to support existing and future settlements.

Residential development within Zone 1 is intended to be guided towards areas where development can be supported by existing or planned infrastructure and road connectivity. At the same time, uncontrolled conversion of agricultural land and scattered development should be regulated to maintain the productive agricultural character of suitable areas. Infrastructure such as roads, drainage, water supply, sanitation, electricity and community facilities should be progressively strengthened in accordance with the growth of settlements. The zone should therefore function as a balanced residential and agricultural area where urban development is consolidated and agricultural infrastructure is improved in a coordinated manner.

6.2 ZONE 2 – INSTITUTIONAL, INDUSTRIAL AND PLANNED EXPANSION ZONE

Zone 2 covers approximately 106.21 sq. km and constitutes 27.05% of the total planning area, making it the largest of the five zones. The zone has been designated with a focus on institutional development, industrial development and planned urban expansion. Its large spatial extent provides an opportunity to accommodate future development requirements of the integrated planning area while reducing pressure on the existing built-up areas and sensitive tourism and heritage zones.

The institutional component of this zone can accommodate activities such as educational, administrative, healthcare, research and other public and semi-public uses. Industrial development can also be directed towards suitable locations within this zone, particularly where adequate road connectivity and infrastructure can be provided. Industrial activities should be appropriately planned and regulated so that they do not create adverse impacts on residential areas, heritage resources, tourism areas or environmentally sensitive locations. The planned expansion component of Zone 2 is particularly important for ensuring that future development takes place in an organized manner through planned layouts and infrastructure provision rather than through fragmented and uncoordinated growth. Thus, Zone 2 is envisaged as an important area for supporting the future institutional, economic and urban expansion of the integrated planning area.

6.3 ZONE 3 – TOURISM, HERITAGE, PILGRIMAGE AND ENVIRONMENTAL ZONE

Zone 3 covers approximately 56.35 sq. km, accounting for 14.35% of the total planning area. This zone has been identified with the specific focus of tourism, heritage, pilgrimage and environmental development. The zone forms an important component of the cultural and tourism landscape of the integrated Gaya–Bodhgaya region and provides a transition between development areas and the culturally and environmentally significant areas associated with Bodhgaya.

Development within Zone 3 should primarily support tourism and pilgrimage while maintaining the heritage and environmental character of the area. Tourism-related facilities, visitor amenities, cultural spaces, interpretation facilities, pedestrian areas and appropriate recreational activities can be developed in a manner compatible with the existing character of the area. At the same time, heritage resources, natural features, water bodies and environmentally sensitive areas should be protected from incompatible development. The planning approach should therefore focus on creating a balance between tourism-led development and conservation. Improved tourist circulation, wayfinding, landscaping and public spaces can further strengthen the tourism experience while maintaining the cultural and environmental identity of the zone.

6.4 ZONE 4 – MAHABODHI TEMPLE ZONE

Zone 4 covers approximately 52.61 sq. km, accounting for 13.40% of the total integrated planning area. The defining focus of this zone is the Mahabodhi Temple, which represents the principal religious, cultural and heritage anchor of Bodhgaya. Due to the exceptional significance of the Mahabodhi Temple and its surrounding

cultural landscape, this zone requires a specialized and sensitive planning approach.

Development within Zone 4 should be primarily oriented towards heritage conservation, pilgrimage management, tourism facilities and improvement of the surrounding public realm. New development should be carefully controlled to ensure that it does not adversely affect the heritage character and visual setting of the Mahabodhi Temple. Particular attention should be given to building height, development intensity, traffic movement, parking, signage, landscaping and pedestrian circulation. Pilgrim and tourist facilities should be appropriately located and designed to accommodate visitor requirements without creating excessive pressure on the heritage precinct. The zone should therefore be developed as a heritage-sensitive area where conservation and pilgrimage requirements are given priority over intensive urban development.

6.5 ZONE 5 – MAGADH TOWNSHIP ZONE

Zone 5 covers approximately 91.16 sq. km and constitutes 23.22% of the total planning area. The zone has been identified as the Magadh Township Zone and represents one of the major areas for accommodating future planned urban growth within the integrated planning area. The relatively large area of the zone provides an opportunity to develop a structured urban extension with residential areas, supporting commercial activities, institutional facilities, community infrastructure, recreational spaces and other urban functions.

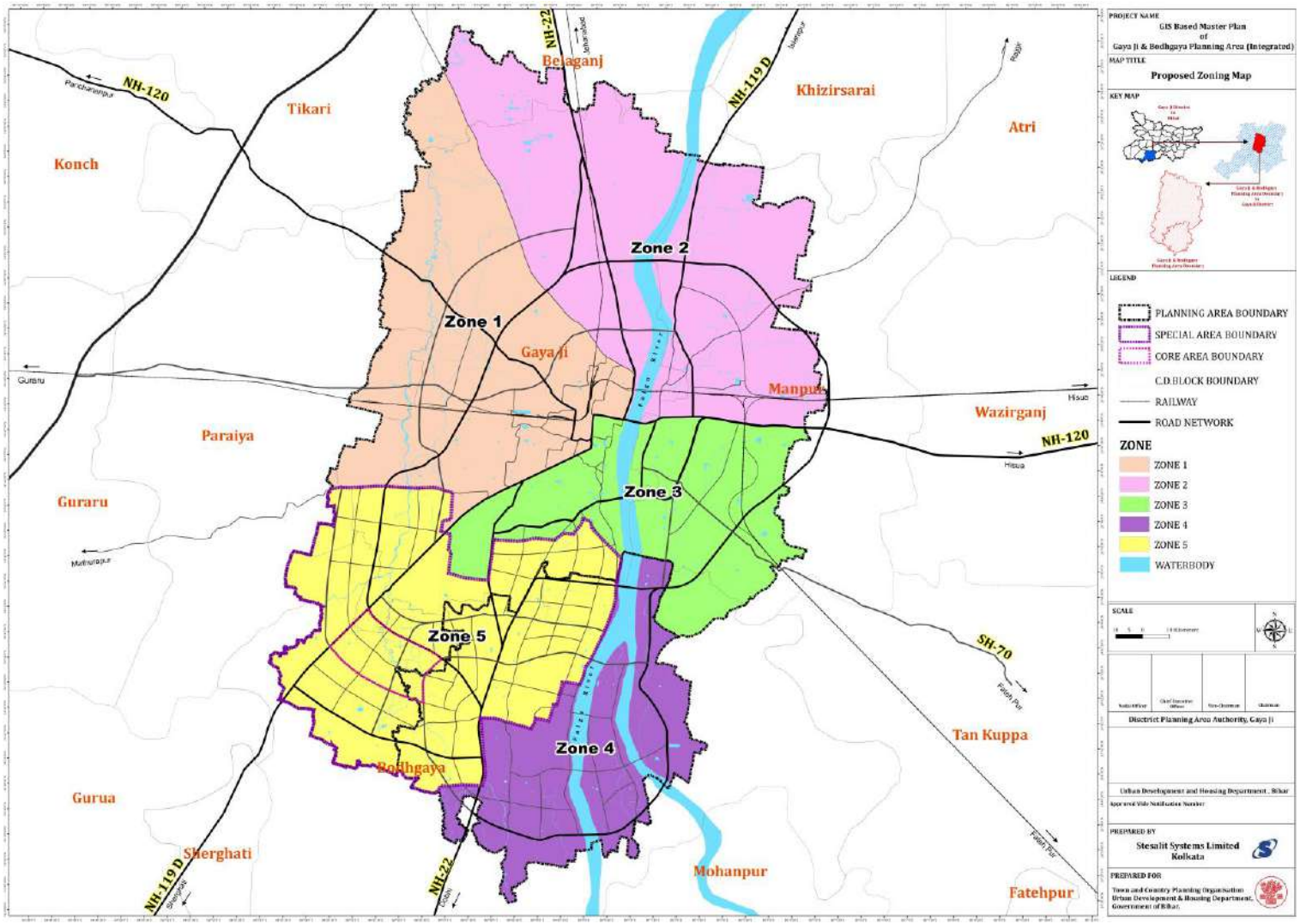
The Magadh Township should be developed through an integrated township planning approach in which land use, transportation, infrastructure and social facilities are planned together. Residential development should be supported by adequate schools, healthcare facilities, community facilities, parks, open spaces, commercial areas and utility infrastructure. A clear road hierarchy consisting of major, secondary and local roads should be established to ensure efficient movement within the township and connectivity with the wider Gaya–Bodhgaya Road network. The development of the township should also incorporate adequate green and open spaces and ensure that environmental resources are appropriately integrated into the urban structure. Zone 5 can therefore serve as a major planned growth area capable of accommodating future population and reducing pressure on the existing urban areas.

The division of the Integrated Gaya–Bodhgaya Planning Area into five zones provides a comprehensive spatial framework for managing existing development and guiding future growth. The zoning recognizes the different roles and development potentials of various parts of the planning area and seeks to establish a balance between residential development, agricultural activities, economic and institutional growth, tourism and pilgrimage, heritage conservation, environmental protection and planned urban expansion.

This zoning framework will serve as an important basis for subsequent land-use planning, infrastructure planning and development control within the Integrated Gaya–Bodhgaya Planning Area, while supporting the long-term objective of developing Gaya and Bodhgaya as an integrated, well-connected, culturally sensitive and sustainable urban region.

TABLE 6-1 DIVISION OF ZONES

Sl. No.	Zone	Area (Ha)	Area (Sq. Km)	Percentage	Key Focus
1	**Zone 1**	8,625.53	86.25	21.97%	Residential, Agricultural Infrastructure
2	**Zone 2**	10,621.82	106.21	27.05%	Institutional, Industrial & Planned Expansion
3	**Zone 3**	5,635.20	56.35	14.35%	Tourism, Heritage, Pilgrimage, Environment
4	**Zone 4**	5,261.96	52.61	13.40%	Mahabodhi Temple, Heritage and Cultural Zone
5	**Zone 5**	9,116.44	91.16	23.22%	Magadh Township



MAP 6-1 DIVISION OF ZONES OF INTEGRATED GAYA AND BODHGAYA PLANNING AREA

7 DEVELOPMENT CONTROL REGULATIONS

These Development Control Regulations (DCRs) establish the statutory framework for regulating development within the Gaya Ji and Bodhgaya Planning Area. These regulations are intended to ensure orderly, sustainable and high-quality urban development in conformity with the objectives of the Master Plan–2047. Unless specifically provided otherwise in this Master Plan, all development within the Planning Areas shall be governed by the provisions of the Bihar Building Bye-Laws, 2014, as amended from time to time, and other applicable laws, rules and regulations.

The provisions contained in this Chapter shall form part of the Development Control Regulations for the Planning Areas and to the extent of any inconsistency, shall prevail over the corresponding provisions of the Bihar Building Bye-Laws, 2014.

7.1 Introduction & General Guidelines

The Development Control Regulations (DCRs) are intended to guide and regulate the future growth of Gaya Ji and Bodhgaya town. These regulations aim to ensure that development is carried out in an orderly manner, balancing the needs for housing, commerce, industry, infrastructure, and environment. The purpose is to promote sustainable, inclusive and resilient urban development in line with URDPFI Guidelines, Bihar Building Bye-laws, and the vision for Gaya Ji and Bodhgaya Master Plan.

The DCRs provide a framework for land use, permissible activities, building controls, and environmental safeguards. They shall be applicable to all types of development, redevelopment, and construction activities within the notified Planning Areas of Gaya Ji and Bodhgaya. No development or redevelopment shall be permitted unless it conforms to these regulations.

7.1.1 GENERAL GUIDELINES

- The provisions of the Bihar Building Bye-Laws, 2014, as amended from time to time, shall govern development within the Special Area.
- The applicable zoning regulations, building standards, fire safety requirements, accessibility norms, structural safety provisions and environmental safeguards prescribed under the Bihar Building Bye-Laws shall continue to apply.
- No development shall be permitted in environmentally sensitive zones such as riverbeds, wetlands, forest land, or green belts except for activities specifically permitted.
- In case of any conflict between these DCRs and other state/national level regulations, the more restrictive provision shall prevail.
- Special areas like Transit Oriented Development (TOD) corridors, industrial estates, heritage precincts, and eco-sensitive zones shall be governed by additional regulations as provided in the relevant sections.

- Provisions for affordable housing, EWS/LIG categories, and green building norms shall be mandatory in line with the Bihar Building Bye-Laws, affordable housing and slum rehabilitation & redevelopment housing policy and National Housing Policies.
- Parking norms, fire safety clearances, environmental impact assessment (EIA) requirements, and barrier-free accessibility shall be integral to the development approval process.
- Development along Ghats, Public Amenities and eco-tourism shall maintain a mandatory green buffer restricted to soft landscaping and permeable pathways.
- The Competent Authority reserves the right to modify or relax certain provisions in exceptional cases in the public interest, subject to adequate justification and approval.

7.1.2 SPECIAL REGULATIONS FOR INDUSTRIAL ESTATES

Industrial Estates are designated areas for organized industrial development. The following regulations shall apply to all notified industrial estates in Bodhgaya:

- Land Use: Only industrial activities as per CPCB classification (Green, Orange, and White categories) shall be permitted. Red category industries shall not be allowed within city limits except in specifically designated heavy industrial zones outside residential influence.
- Plot Sizes: Minimum plot size for industrial plots shall be 1000 sq.m. For MSME clusters, plots of 300–500 sq.m may be permitted.
- FAR and Ground Coverage: As guided by Bihar Building Bye-laws, 2014, as amended from time to time, depending on the industry type.
- Setbacks: Minimum 9m front setback and 6m side and rear setbacks shall be maintained to allow movement of fire tenders and utility vehicles.
- Environmental Buffer: A minimum green buffer of 30m with tree plantation shall be maintained between industrial areas and adjacent residential zones.
- Infrastructure: Internal roads of minimum 18m ROW, provision for storm water drainage, effluent treatment, solid waste disposal, and fire safety infrastructure shall be mandatory.
- Worker Facilities: Provision for canteens, rest sheds, sanitation blocks, and health facilities shall be mandatory in estates above 10 hectares.

7.1.3 Special Regulations For Transit Oriented Development (TOD) Zone

The Transit-Oriented Development (TOD) Zone is intended to promote compact, mixed-use and transit-supportive urban development around the proposed MRTS corridors. Within the TOD Zone, all land uses permissible under the applicable land use zone shall generally be permitted, except the following activities, which shall not be allowed:

- Hazardous industries.
- Heavy industries.
- Red-category industries.
- Highly polluting industries.

- Obnoxious and nuisance-generating activities.
- Tanneries.
- Slaughterhouses.
- Meat processing units.
- Fish processing units.
- Bulk storage of hazardous chemicals, petroleum products or explosives.
- Solid waste processing or disposal facilities, except those specifically approved as public utilities.
- Any other activity that, in the opinion of the Competent Authority, is incompatible with the objectives of Transit-Oriented Development or adversely affects public health, safety or the urban environment.

7.1.4 SPECIAL REGULATIONS FOR TRANSIT HUBS

Transit Hubs (bus terminals, railway stations, metro stations, and multi-modal hubs) shall be developed as high-intensity activity centres ensuring accessibility and seamless connectivity. The following regulations shall apply:

- Land Use: Mixed-use development comprising commercial, public/semi-public facilities, offices, hotels, and residential components (affordable housing and rental housing) shall be permitted.
- Parking: Multi-level car parking and shared parking facilities shall be encouraged. No surface parking shall be permitted within 200m of the transit hub.
- Pedestrianisation: Priority shall be given to pedestrian movement, non-motorised transport (NMT) infrastructure, and barrier-free universal accessibility.
- Setbacks: Flexible building setbacks may be allowed to create public plazas, concourses, and intermodal transfer spaces.
- Environmental Considerations: Energy-efficient design, green building norms, and integration of renewable energy sources (solar rooftops, rainwater harvesting) shall be mandatory.
- Commercial Development: Retail, food courts, entertainment, and service apartments shall be permitted to enhance the economic viability of the transit hub.
- Public Safety: Adequate fire safety measures, CCTV surveillance, and disaster management provisions shall be mandatory.

7.1.5 SPECIAL REGULATION FOR INTERNATIONAL CULTURAL ENCLAVE

Developing an International Cultural Enclave can be considered as a strategic planning intervention, particularly given the international significance of Bodhgaya and its importance to Buddhist pilgrims, cultural delegations and international visitors. The enclave could accommodate facilities such as cultural centres, international cooperation offices, liaison facilities, exhibition spaces and institutions representing participating countries or international organisations, subject to applicable approvals and agreements. It could consist of convention and cultural facilities could support international conferences, Buddhist conclaves, cultural festivals, diplomatic meetings and knowledge-sharing programmes.

- **Permitted activities:** International cultural institutions, cultural centres, international liaison facilities, diplomatic/official guest facilities, conference and convention facilities, exhibition and interpretation centres, libraries, research and knowledge centres, international hospitality facilities, prayer/meditation and cultural facilities, and associated public amenities.
- Diplomatic accommodation: Dedicated guest houses, official residences and short- to medium-term accommodation may be permitted for visiting diplomats, official delegations and international dignitaries, subject to applicable Government of India protocols and security requirements.
- **Supporting activities:** Hotels/guest houses, serviced accommodation, restaurants, cafés, tourism information centres, administrative offices, banking/ATM facilities, health and emergency facilities, retail supporting international visitors, parking and essential utility infrastructure.
- Commercial uses should remain ancillary to the primary international cultural and institutional purpose. Large-scale commercial developments, wholesale activities and incompatible uses should be prohibited.
- Eligible foreign investment may be facilitated in permitted activities in accordance with the prevailing Government of India FDI Policy and applicable laws and regulations.

7.1.6 SPECIAL REGULATION FOR WORLD PEACE PARK

Developing a **"World Peace Park"** shall be designated as a Special Cultural and Recreational Landscape Zone intended to establish Bodhgaya as an international platform for peace, cultural exchange and environmental stewardship. The Park shall provide designated areas where national and international visitors, institutions and cultural groups may plant or dedicate trees representing their country, culture, heritage or message of peace.

The concept of **"One Visitor – One Tree – One Message of Peace"** shall be promoted as a participatory visitor experience shall promote global friendship, biodiversity and sustainable tourism and strengthen Bodhgaya's identity as a global spiritual and cultural destination while respecting its heritage setting.

Permitted Uses

- Tree plantation and Country/Cultural Peace Groves,
- digital tree registry and tree-dedication facilities,
- World Peace monument,
- Peace Plaza, meditation and contemplation areas,
- environmental education centres,
- Walking trails, seating areas and open landscaped spaces,
- Supervised international tree-planting and cultural programmes,
- Nursery, composting and landscape maintenance facilities,
- Essential public amenities such as toilets, drinking water and limited visitor facilities,
- Sustainable infrastructure including rainwater harvesting, permeable paving and treated-water reuse,
- Low-rise, low-intensity structures compatible with the cultural landscape,
- Temporary structures/events subject to prior approval,

- Limited food/beverage kiosks and visitor services, subject to planning controls,
- Illumination, signage and cultural installations subject to heritage and visual-impact controls.

Prohibited Uses

- Any permanent private Residential, commercial, institutional development,
- Any high-rise structure or Large-scale development,
- Industrial, manufacturing or warehousing activities.
- Advertising hoardings and visually intrusive commercial signage.
- Any activities causing noise, pollution, ecological degradation or damage to the heritage setting.
- Planting of invasive, ecologically unsuitable or water-intensive species.
- Any activity that compromises the spiritual, cultural, visual or environmental character of Bodhgaya.

7.1.7 PROPOSED DCR PROVISIONS – HOUSING, TDR & REDEVELOPMENT

TABLE 7-1 PROPOSED DCR PROVISIONS – HOUSING, TDR & REDEVELOPMENT

Sl. No.	DCR Provision	Proposed Regulation / Guideline	Suggested Figure
1	**TDR Incentive**	TDR may be granted for land surrendered for road widening, public infrastructure, parks and other notified public purposes. TDR may also be used to encourage redevelopment of congested/old areas.	**Up to 1.5–2.0 times** the surrendered land's permissible development potential, subject to infrastructure capacity
2	**Non-Permitted Land Uses**	Uses not permissible in a designated zone shall not be regularised merely through normal permission. Where legally regularizable under applicable provisions, an additional **impact/penalty charge** may be imposed.	**2–3 times** applicable development/permission fee, subject to State regulations
3	**Affordable Housing near TOD/Transit**	Affordable/EWS-LIG housing should be promoted within walking distance of TOD nodes, major bus stands and public transport corridors.	**Minimum 15% of FAR** for affordable housing in eligible TOD projects; TOD guidance also recommends **15% FAR for units ≤40 m²**.

4	**Additional FAR for Affordable Housing**	Additional FAR may be permitted where developers provide qualifying EWS/LIG housing beyond the mandatory requirement.	**Up to 50% additional FAR** may be considered for qualifying affordable rental housing, consistent with Affordable Rental Housing Complexes (ARHC) incentives.
5	**Airport Height Restriction**	All developments within the applicable airport safeguarding zone shall comply with AAI height-clearance requirements and the **Colour Coded Zoning Map (CCZM)**, wherever applicable.	Height to be determined **plot-wise as per permissible top elevation (AMSL)**; AAI NOC required where applicable.
6	**Rental Housing Promotion**	Rental housing/ARHC projects should be encouraged near employment centres, TOD nodes, railway stations, bus stands and institutional areas.	Minimum **40 dwelling units/dormitory equivalent** for an ARHC project; single-bedroom units up to **30 m²**, double-bedroom units up to **60 m²**, and dormitory beds up to **10 m²**.
7	**Rental Housing Incentives**	Provide fast-track approval, reduced/waived development charges, trunk infrastructure support and additional FAR for qualifying rental housing.	**50% additional FAR/FSI** may be considered for ARHCs; municipal charges may be levied at residential rates.
8	**Old Area Redevelopment**	Promote planned redevelopment of the existing/ core city through plot amalgamation, infrastructure upgrading and incentives for reconstruction while protecting heritage-sensitive areas.	**10–20% additional FAR** may be considered as a redevelopment incentive, subject to road width and infrastructure capacity
9	**New Area Development**	In newly developing areas, redevelopment should be linked with planned roads, public transport, drainage, parking, open spaces and utility infrastructure	Higher FAR to be linked with **road width, infrastructure capacity and TOD location**

		before higher FAR is permitted.	
10	**Redevelopment Subsidy/Incentives**	Provide incentives for redevelopment incorporating affordable housing, heritage conservation, infrastructure improvement and green building measures.	**10–15% FAR incentive** or partial waiver/reduction of development charges, subject to project eligibility

Affordable Housing & TOD:

In designated TOD influence zones around major transit nodes, railway stations and bus terminals, affordable housing shall be promoted through mandatory housing provisions and FAR incentives. A minimum **15% of FAR** may be reserved for affordable housing, with additional FAR incentives for qualifying EWS/LIG and rental housing projects. The TOD Guidance Document recommends 15% of FAR for affordable housing in TOD projects.

Rental Housing:

Affordable Rental Housing Complexes (ARHC) may be promoted near employment centres, TOD nodes and major transport terminals. Projects may follow ARHC parameters, including a minimum **40 dwelling units/dormitory equivalent**, with single-bedroom units up to **30 m²** and double-bedroom units up to **60 m²**. Qualifying projects may be considered for **up to 50% additional FAR**, subject to applicable regulations.

Airport Height Restriction:

All buildings and structures within the applicable airport safeguarding area shall comply with AAI height-clearance provisions. The permissible building height shall be determined based on the applicable **CCZM/permissible top elevation (AMSL)**, site elevation and aerodrome safeguarding requirements. Where applicable, construction shall not commence without the required AAI NOC through NOCAS.

Redevelopment of Old/Core Urban Area:

Redevelopment of the old/core urban area shall be encouraged through plot amalgamation, infrastructure upgradation, TDR/FAR incentives and development-charge concessions. Additional development potential may be permitted subject to minimum road width, parking, fire safety, infrastructure capacity and heritage considerations.

7.1.8 RESIDENTIAL ZONES

To guide balanced urban growth and ensure compatibility of land uses, the Master Plan defines Five residential development categories for Gaya Ji —R-1 (High Density Residential), R-2 (Medium Density Residential), R-3 (Low Density Residential), TS-1 (High Density Township) and TS-2 (Low Density Township). These zones have been designed

in line with URDPFI Guidelines and the Bihar Building Byelaws, taking into account road width, FAR norms, and service infrastructure capacity. Permitted, restricted, and prohibited activities have been clearly demarcated to safeguard residential quality of life while allowing for compatible mixed uses and community facilities.

TABLE 7-2 PERMITTED USES OF RESIDENTIAL LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	R-1 Residential Zone (High Density – EWS/LIG Housing)	Plotted housing, apartments, group housing, row housing; rental/work-cum residential; hostels & boarding houses; night shelters & dharamshalas; nursery & primary schools; neighborhood retail; community centers; libraries; clinics & PHC; parks; bus stops/IPT stands; small household services; public utilities (excluding heavy infrastructure) Places of worship; small shopping centres; municipal/government offices; petrol pumps (subject to norms); IT/ITES services; tourism-related services; burial grounds; small non-perishable godowns; household industries (limited scale)	Heavy or hazardous industries; wholesale mandis; workshops for buses; slaughterhouses; contagious disease hospitals; sewage treatment or waste disposal sites; stadiums/shooting ranges
2	R-2 Residential Zone (Medium Density Residential)	Colleges and research institutions; cinema halls/restaurants; IT offices; tourism facilities; bus depots without workshop; small warehousing (non-perishable goods), cottage Industry (non-polluting)	Heavy industry; hazardous storage; solid waste dumping grounds; large logistics yards; polluting industrial uses
3	R-3 Residential Zone (Low Density Residential)	Detached/semi-detached housing; villas; plotted housing; neighborhood retail; clinics; parks & green areas; community facilities; libraries; clubs, EV charging stations Places of worship; guest houses; homestays; small institutional uses; IT home offices; tourism-related activities (low intensity), cottage Industry (nonpolluting)	High-density commercial complexes; warehousing/logistics hubs; industrial activities; waste treatment facilities
4	R-4 Residential Zone (Existing	Existing residential settlements; incremental housing; mixed	Heavy industry; hazardous storage; large commercial

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
	Village / Abadi Area)	residential with local retail; traditional village activities; small shops; community facilities; schools; religious buildings; health clinics; local markets; parks & open spaces, EV charging stations, cottage Industry (nonpolluting) Small commercial establishments; community halls; IT-enabled services; guest houses; tourism homestays; small god owns (non-hazardous); printing presses (small scale)	malls; waste disposal sites; large institutional complexes incompatible with village character
5	TS-1 Township Zone (Integrated Township / Mixed Housing)	Integrated residential development (EWS to HIG); apartments & plotted housing; schools/colleges; health facilities; retail & commercial centers; community & cultural facilities; parks & sports areas; IT parks/co-working; transit facilities, EV charging stations, Hotels; entertainment complexes; convention halls; fuel stations; tourism facilities; institutional campuses	Heavy industries; hazardous activities; solid waste dumping grounds; large logistics yards
6	TS-2 Township Zone (Low Density Township – HIG Plotted)	Low density plotted housing; villas/row housing; recreational greens; clubhouse/community facilities; local retail; wellness/yoga centres; eco-tourism uses; EV charging stations, Resorts; guest houses; small institutional uses; tourism-related accommodation	High-density apartments; industrial activities; warehousing/logistics; large commercial complexes

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

7.1.9 COMMERCIAL ZONES

Commercial activities in Gaya Ji are a critical driver of economic vitality and employment, but they must be organised to reduce congestion in the old core while supporting growth along emerging corridors. The Master Plan identifies two distinct commercial zones—C1 (Core Area) and C2 (Growth Corridors)—based on road hierarchy, land availability, and functional intensity. While C1 is intended to strengthen traditional bazaars and neighbourhood-scale commerce, C2 corridors will accommodate modern retail, offices, and large-scale mixed-use functions. Clear

demarcation of permitted and restricted uses ensures compatibility with surrounding land uses and prevents environmentally harmful or traffic-intensive activities.

TABLE 7-3 PERMITTED USES OF COMMERCIAL LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	Commercial C-1 (Low Density Linear Commercial)	Retail shops; convenience shopping; banks & financial institutions; restaurants & cafés; small offices; informal shops/street vending areas; local markets/mandi; EV charging stations; clinics; religious places; service establishments (salons, repair shops, etc.) Shopping centres; petrol pumps; small hotels/lodges; cinema halls (small scale); IT/ITES offices; tourism services; public utility installations; neighborhood entertainment uses	Heavy warehousing; large wholesale yards; transport nagar; hazardous storage; large logistics hubs; industrial manufacturing; high nuisance activities
2	Commercial C-2 (High Density Concentrated Commercial Area)	Shopping malls; multiplex cinemas; hotels & lodges; corporate offices; commercial complexes; restaurants & food courts; financial institutions; business centres; EV charging stations; IT parks and office complexes, Convention centres; entertainment complexes; exhibition halls; large institutional commercial uses; structured parking facilities; integrated commercial plazas	Petrol pumps; residential use; sports complexes; heavy industrial activities; hazardous storage; large freight/logistics yards incompatible with commercial core

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
3	Commercial C-3 (Low Density Special Commercial – Resort/Function/Peripheral Commercial)	Marriage halls; banquet/function halls; resorts; event venues; recreational commercial uses; non-hazardous warehouses; storage godowns; tourism facilities; eco-resorts; food courts, Farm resorts; amusement-related commercial uses; logistics support (limited); guest houses; convention/event spaces (subject to traffic/environment clearance)	High-density retail malls; dense commercial complexes; heavy industrial uses; hazardous warehousing; polluting activities; residential apartments

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

7.1.10 PUBLIC & SEMI-PUBLIC (PSP)

The Public/Semi-Public (PSP) Zone is designated to accommodate essential community, institutional, and civic functions that directly support the city's social and administrative infrastructure. This zone includes educational institutions, healthcare facilities, government offices, religious establishments, and public open spaces, which form the backbone of inclusive urban development. To maintain the integrity of this zone, incompatible land uses such as industries, large commercial complexes, and warehouses are strictly prohibited, ensuring that PSP areas remain accessible, functional, and people-oriented.

TABLE 7-4 PERMITTED USES OF PUBLIC & SEMI-PUBLIC LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	PSP-1 (Decentralized Public & Semi-Public within Residential Areas)	Schools, anganwadi, colleges (small scale); libraries; health centres, clinics, nursing homes; religious buildings; community halls; marriage halls; social & cultural centres; post offices; local govt offices; welfare centres; training centres; small educational institutes, Hostels; transit accommodation; guest houses; IT services; small office spaces; recreational/community clubs; small commercial support facilities (canteen, book shops, etc.)	Heavy institutional complexes; large stadiums; transport terminals; industrial activities; hazardous storage; high traffic generating uses incompatible with residential character

2	PSP-2 (Major Institutional / Concentrated PSP Zone)	Universities; large educational campuses; research & development centres; hospitals (large scale); auditoriums; conference centres; police station; jail; large govt offices; training institutes; welfare institutions; district-level public facilities, Defence quarters; hostels; guest houses; institutional residential facilities; specialised research facilities; public utility installations linked to institutional use	Hazardous industries; wholesale markets; heavy commercial uses; polluting activities; high noise generating industrial operations
3	PSP-3 (Existing Public & Semi-Public Uses)	All existing educational institutions, hospitals, govt offices, religious places, community facilities and public services as per current land use, Redevelopment, expansion, modernization, vertical extension subject to planning authority approval and infrastructure capacity	Change of use to incompatible industrial or hazardous commercial activities

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

7.1.11 INDUSTRIAL ZONES

TABLE 7-5: PERMITTED USES OF INDUSTRIAL LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	Industrial I-1 (Green / Non-Polluting Industries)	Non-polluting industries; agro-processing units; food processing; cold storage; warehouses; logistics facilities; workshops; repair units; assembly units; loading/unloading areas; petrol pumps; public utilities; staff/worker residential quarters; small industrial offices, Industrial research institutes; technical educational institutes; business offices; service industries; electric substations (PSS);	Heavy industries; hazardous chemical processing; polluting industries (red category); large thermal plants; activities causing excessive noise, air or water pollution

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
		training centres; support commercial facilities	
2	Industrial I-2 (Agro-Based SEZ / Agro-Industrial Zone)	Agro-processing industries; food parks; mega food park; agro-based SEZ units; cold chain infrastructure; storage and packaging facilities; food manufacturing units; common infrastructure (ETP, logistics yards); helipad; export-oriented processing units, Research labs; training centres; logistics hubs; specialised processing infrastructure; institutional facilities linked with agro-industry	Non-agro heavy industries; hazardous chemical industries; residential development (except essential staff housing); polluting manufacturing unrelated to agro-processing
3	Industrial I-3 (Existing Industrial Area)	All existing industries; industrial utilities; warehouses; workshops; service facilities; existing support infrastructure, Expansion, modernization, redevelopment, or change of industrial category subject to environmental norms and planning authority approval	New hazardous or incompatible industries without clearance; conversion to incompatible land use affecting industrial operations

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

For the **Gaya Ji Planning Area**, the proposed industrial land use may be categorized as follows:

I-1: Green / Non-Polluting Industries

These industries shall have minimal environmental impact, low emissions, low water consumption, and no hazardous waste generation.

Permissible Industries:

- IT/ITES parks and software development centers
- Electronics assembly and light engineering units
- Handicrafts, stone carving, terracotta and artisan-based industries
- Textile stitching, garment manufacturing and handloom units
- Printing and packaging industries
- Educational and research-based industrial activities
- Renewable energy equipment assembly
- Incense stick (Agarbatti), Tilkut, Lai and other local product manufacturing
- Warehousing, logistics and cold storage facilities
- Tourism-support industries, souvenir and handicraft production
- Bamboo, cane and eco-friendly product manufacturing
- Repair and maintenance workshops (non-polluting)

I-2: Agro-Based SEZ / Agro-Industrial Zone

Considering Gaya's agricultural economy and the availability of paddy, wheat, pulses, oilseeds, fruits, vegetables, dairy and livestock products, the following industries may be permitted:

Food Processing & Value Addition

- Rice mills and modern grain processing units
- Flour mills and cereal processing units
- Pulse (Dal) processing units
- Edible oil extraction and refining units
- Sattu processing and value-added food products
- Fruit and vegetable processing (juice, pulp, jam, pickle, dehydrated products)
- Spice processing and packaging units
- Bakery and confectionery units
- Ready-to-eat and ready-to-cook food manufacturing

Dairy & Livestock-Based Industries

- Milk processing plants
- Dairy products (paneer, cheese, butter, ghee, ice cream)
- Meat processing and packaging units (subject to environmental norms)
- Poultry and fish feed manufacturing
- Animal feed production units

Agricultural Support Industries

- Seed processing and storage units
- Cold chain and refrigerated storage facilities
- Agro-logistics hubs
- Agricultural equipment assembly and servicing
- Bio-fertilizer, organic manure and vermicompost units

Export-Oriented Agro Industries (SEZ Component)

- Organic food processing and export units
- Packaged agricultural products for domestic and international markets
- Herbal and medicinal plant processing
- Makhana, honey and millet-based product processing
- Food testing, grading and packaging centers
- Agro-export warehouses and distribution centers

These industries align with Bihar's agro-industrial development strategy and leverage Gaya's strong agricultural base, food processing potential, and tourism-driven market demand.

7.1.12 PUBLIC UTILITIES AND SERVICES

TABLE 7-6: PERMITTED USES OF PUBLIC UTILITIES AND SERVICES LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	PU-1 (Major Utility & Treatment Infrastructure – Peripheral Location)	Water Treatment Plant (WTP); Sewage Treatment Plant (STP); Faecal Sludge Treatment Plant (FSTP); Solid Waste Treatment Plant (SWTP); sanitary landfill; waste processing facilities; bulk water supply installations; pumping stations; power substations; major utility infrastructure, Service industries linked to utilities; warehouses; administrative	Residential housing (general); schools; hospitals; commercial complexes; recreational areas; polluting industries beyond permitted infrastructure; incompatible public gathering uses

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
		offices; staff residential quarters; recycling facilities; renewable energy installations	
2	PU-2 (Decentralized Utilities within/near Residential Areas)	OHT/reservoir; local water supply installations; decentralized waste processing (MCC/MRF small scale); electric substation; fire station; post office; telecommunication towers/services; utility kiosks; local infrastructure facilities, Small commercial support uses; low-rise residential (staff housing); community service facilities subject to approval; EV charging infrastructure	Large treatment plants; sanitary landfill; hazardous waste facilities; heavy industrial uses; high nuisance activities causing noise, smell or traffic conflicts

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

7.1.13 AGRICULTURE USE ZONES

TABLE 7-7: PERMITTED USES OF AGRICULTURE LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited

1	Agriculture Zone (AG)	Crop cultivation; horticulture; plantations; agro-forestry; organic farming; dairy farming; livestock rearing; fisheries; farm ponds; irrigation infrastructure; farmhouses; rural storage structures; agricultural sheds; nurseries; greenhouses; agri-based activities, cottage Industry (non polluting), Agro-processing units (small scale); agrotourism facilities; farmer markets; rural homestays; low-rise residential; renewable energy installations (agrivoltaics/solar pumps); research and training centres related to agriculture; cold storage (small scale)	Non-agricultural plotting; high-density residential development; heavy commercial complexes; large industries (non-agro); hazardous storage; polluting industries; large malls or multiplexes; high-rise development incompatible with agricultural character

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

7.1.14 GREEN AREA / BUFFER

Green buffers serve as vital ecological and protective zones, designed to mitigate the adverse impacts of industrial activity on surrounding environments and settlements. In line with **URDPFI Guidelines** and **CPCB norms**, a minimum width of **30 m to 50 m** shall be maintained around industrial zones, developed with dense plantations at a minimum density of **1,000 trees per acre**. These buffers will function as **environmental shields**, supporting air purification, noise reduction, groundwater recharge, and recreational green spaces, while strictly excluding incompatible uses such as residential, industrial, or commercial development.

TABLE 7-8: PERMITTED USES OF GREEN AREA LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	Green Area G-1 (Sensitive Green Buffer – Water Bodies & Industrial Areas)	Heavy plantation; ecological restoration; horticulture; biodiversity conservation; green belts; soil conservation; landscape development; environmental protection works; river/canal edge plantation, walking trails; nature parks; eco-recreation (low impact); environmental education spaces; plantation-based activities; buffer infrastructure related to water body protection	Residential development; commercial complexes; industrial buildings; permanent structures (except essential ecological infrastructure); storage yards; polluting activities; tree cutting without approval

2	Green Area G-2 (General Green Buffer – Around Public Utilities & Other Areas)	Plantation; horticulture; agriculture; green buffers; urban forestry; landscaping; open green areas; passive recreation spaces	High-density development; industrial activities; hazardous storage; large commercial buildings; permanent residential construction (except utility-related structures if approved)

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

7.1.15 ENVIRONMENTALLY SENSITIVE ZONE

The Environmentally Sensitive Zone establishes a controlled 100-metre buffer along river edges to protect natural hydrology, reduce flood risk, conserve biodiversity, and prevent encroachment. Low-impact recreational and ecological activities are encouraged to enhance public access while maintaining environmental integrity. Development within this zone shall follow strict environmental safeguards, ensuring preservation of river ecology and natural drainage systems while enabling sustainable riverfront enhancement.

TABLE 7-9: PERMITTED USES OF ENVIRONMENTALLY SENSITIVE ZONE LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	Environmentally Sensitive Zone (ESZ) – 100 m Buffer along River	Recreational open spaces (parks, yoga parks, gardens); walking/cycling trails; plantation and afforestation; organic farming; fish farming; nurseries; ecological restoration; riverfront green development; existing village settlements (regulated, Food courts; music pavilion; picnic huts; eco-resorts; EV charging stations; controlled riverfront development; Water Treatment Plant (WTP); Sewage Treatment Plant (STP) subject to environmental clearance and flood safety norms	Permanent high-density residential; commercial complexes; industrial development; land filling; encroachment; hazardous storage; activities obstructing natural drainage or flood flow; tree cutting without approval

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

7.1.16 URBAN AGRICULTURE ZONE

The Urban Agriculture Zone promotes preservation of agricultural activity within and around urban areas while supporting livelihood diversification through cottage industries and small-scale value-added activities. This zone strengthens local food systems, encourages sustainable land use, and provides economic opportunities without triggering uncontrolled urbanisation. Controlled development ensures compatibility with surrounding residential and ecological areas while maintaining green character and environmental balance.

TABLE 7-10: PERMITTED USES OF URBAN AGRICULTURE LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	Urban Agriculture Zone (UA)	Crop cultivation; horticulture; vegetable farming; floriculture; agro-forestry; organic farming; nurseries; community farming; dairy and small livestock; fisheries; farm ponds; irrigation infrastructure; cottage industries; farm sheds and storage structures, Independent residence, guest houses, educational building (up to high school), neighbourhood level social/cultural and recreational facilities, Marriage and community hall, Public utilities and buildings except services and storage yards, Agrotourism activities; farmer markets; farm-based homestays; small agro-processing units; renewable energy installations (solar pumps, agrivoltaics); training centres; rural skill development units; low-rise farm-linked residential structures, STP, WTP, Solid waste dumping ground, PSS, GSS	High-density residential development; large commercial complexes; heavy industries; hazardous storage; large warehouses unrelated to agriculture; polluting manufacturing; land subdivision for urban plotting

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

7.1.17 RECREATIONAL ZONE

TABLE 7-11: PERMITTED USES OF RECREATIONAL LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	RC-1 (Neighbourhood / Residential Recreational Area)	Parks; playgrounds; open green spaces; children's play areas; jogging tracks; yoga parks; community gardens; open lawns; sports courts; urban greens; seating areas; landscape features,	Amusement parks; large commercial development; high-noise activities; heavy traffic-generating uses; industrial activities

		Small kiosks; public toilets; community halls; fitness centres; open-air cultural activities; EV charging stations (small scale)	
2	RC-2 (Regional / Destination Recreational Area – Away from Residential Zones)	Water parks; amusement parks; picnic resorts; theme parks; eco-tourism facilities; recreational resorts; adventure activities; large event lawns; landscaped recreational areas, Stadium, Food courts; parking areas; accommodation (resort-type); convention/event spaces; recreational retail; renewable energy installations; supporting commercial uses	High-density residential development; heavy industries; hazardous storage; polluting activities; incompatible public utilities
3	RC-3 (Riverfront Development Zone)	Riverfront promenades; parks; walking and cycling tracks; river-view seating; landscape development; ecological restoration; public plazas; cultural spaces; recreational lawns, Food courts; music pavilion; picnic huts; eco-resorts; water treatment infrastructure (if required); controlled commercial kiosks; tourism facilities subject to environmental clearance	Permanent structures obstructing river flow; high-rise development; heavy commercial complexes; polluting industries; land filling or activities affecting floodplain ecology

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

7.1.18 AGRO-TOURISM ZONE

TABLE 7-12: PERMITTED USE OF AGRO-TOURISM LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	Agro-Tourism Zone	Agricultural farming; organic farming; plantation and horticulture; agro-forestry; farm tourism activities; pick-your-own farm market; traditional rural huts; eco-friendly tourist accommodation (low rise); nurseries; demonstration farms; agri education and training activities, Resort-type tourist accommodation (low density); food courts/local restaurants; cottage industries (food processing, handicrafts, agro-based MSME); EV charging station; eco-recreational facilities; picnic huts; farm cafés; renewable energy installations (solar/agri-voltaic); parking areas; homestay development; agro-processing units (small scale, non-polluting)	Heavy industries; polluting manufacturing units; high-rise buildings; large commercial malls/multiplex; hazardous storage; large warehouses/logistics hubs; slaughterhouses; intensive urban residential colonies; petrol pumps (unless specifically approved); activities causing ecological damage

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

7.1.19 MIXED USE ZONE

TABLE 7-13: PERMITTED USES OF MIXED LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	M-1 (Mixed Use Corridor – 100 m Buffer along Major Roads)	Residential; retail shops; commercial offices; banks; restaurants; clinics; coaching centres; service establishments; small hotels; mixed-use buildings; EV charging stations; local markets; professional services, Institutional uses; co-working spaces; small-scale hospitality; public/semi-public facilities; parking structures; transit-support facilities	Heavy industries; hazardous storage; high-pollution activities; large warehousing; activities generating excessive noise or traffic incompatible with mixed-use character

2	M-2 (Neighbourhood Mixed Use – 50 m Buffer along Internal Roads within Residential Areas)	Small retail shops; neighbourhood commercial; clinics; pharmacies; small offices; local services; home-based enterprises; small eateries; residential above commercial, Coaching centres; community facilities; small guest houses; low-intensity service establishments subject to approval	Large malls; multiplexes; heavy commercial traffic generators; industrial activities; high-noise entertainment uses

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

7.1.20 TRANSPORTATION USE ZONE

TABLE 7-14: PERMITTED USES OF TRANSPORTATION LAND USE

SN	Use Zone	Uses / Activities Permitted	Uses / Activities Prohibited
1	Transportation Use	All types of Roads, Bus stops and Bus and Truck terminals, Taxi Stands, Auto Stands, Rickshaw stands, Parking area, Multi-level parking, filling station, transport office, booking office, night shelter, banks, restaurants, workshop and garage, Automobile spares and services, godown, loading and unloading platform, weight bridges, ware houses, storage depots, utility networks (drainage, sewage, power, tele-communication), Way side shop and restaurants, Authorized/planned vending areas, Incidental/ancillary residential use, emergency health care centre,	Use/Activity not specifically related to transport and communication permitted herein.

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

7.1.21 COMMUNITY-BASED TOURISM AND TOURISM DEVELOPMENT REGULATIONS

1. Objective

To promote sustainable tourism, enhance local livelihoods, preserve cultural and natural heritage, and facilitate tourism-related infrastructure and activities in the Gaya Ji Planning Area while ensuring environmental conservation and community participation.

2. Community-Based Tourism (CBT) Zone

Community-Based Tourism shall be encouraged in villages and settlements having cultural, religious, ecological, agricultural, riverfront, or heritage significance. Tourism development shall be undertaken with active participation of local communities to generate employment and strengthen the local economy.

Permissible Activities:

- Homestays, guest houses, and village tourism facilities.
- Local handicrafts, handloom, and souvenir production and sales.
- Agro-tourism, eco-tourism, farm stays, and nature-based tourism activities.
- Cultural centers, folk art performance spaces, and interpretation centers.
- Traditional food courts, local markets, and tourism information centers.
- River-based tourism, nature trails, cycling tracks, and walking trails.
- Skill development and tourism training centers for local communities.

Development Guidelines:

- New developments shall be compatible with the local architectural character and cultural heritage.
- Existing natural features, water bodies, forests, and agricultural lands shall be conserved.
- Community participation shall be ensured in planning, operation, and management of tourism facilities.
- Adequate sanitation, solid waste management, drinking water supply, and parking facilities shall be provided.
- Renewable energy and environmentally sustainable practices shall be encouraged.

3. Tourism Development Zone

Tourism Development Zones may be designated around major religious, cultural, heritage, ecological, and recreational destinations to support tourism growth and visitor facilities.

Permissible Uses:

- Hotels, resorts, guest houses, dharamshalas, and convention facilities.

- Tourism plazas, visitor centers, museums, interpretation centers, and cultural complexes.
- Commercial activities supporting tourism, including restaurants, retail outlets, and souvenir markets.
- Recreational facilities, wellness centers, meditation centers, and pilgrimage support infrastructure.
- Transport terminals, parking facilities, way-side amenities, and tourist information facilities.
- Riverfront development, eco-tourism facilities, and tourism-oriented public open spaces.

Development Guidelines:

- Tourism projects shall preserve and enhance the spiritual, cultural, and heritage character of the area.
- Development near protected monuments, heritage sites, rivers, hills, forests, and environmentally sensitive areas shall comply with applicable statutory regulations.
- Adequate pedestrian infrastructure, universal accessibility, public amenities, landscaping, and signage shall be provided.
- Large-scale tourism projects shall incorporate environmental management measures and adequate infrastructure provision.
- Mixed-use tourism corridors may be developed along major tourism routes, pilgrimage circuits, and transportation corridors to facilitate tourism-related economic activities.

4. Special Provisions for Gaya Ji Planning Area

Considering the international importance of Gaya Ji as a religious and pilgrimage destination, community-based tourism and tourism development projects shall be promoted along identified pilgrimage circuits, riverfront areas, cultural heritage zones, eco-tourism destinations, and rural tourism clusters. Priority shall be given to projects generating local employment, preserving cultural heritage, promoting traditional crafts, and enhancing visitor experience while maintaining environmental sustainability.

5. Bihar Tourism Policy Compliance

All tourism projects shall conform to the objectives and guiding principles of the Bihar Tourism Policy 2023, emphasizing environmental sustainability, promotion of Bihar's cultural and spiritual heritage, tourism-led livelihood generation, tourist safety and comfort, private sector participation, and inclusive tourism development.

7.1.22 DEVELOPMENT CONTROLS (FAR, GROUND COVERAGE, SETBACKS, HEIGHT)

The following development controls apply to different land-use zones in Gaya Ji, as per the URDPFI Guidelines and the Bihar Building Bye-Laws (2014, amended 2016/2020).

TABLE 7-15: DCR TABLE FOR GAYA JI PLANNING AREA

Zone	Description	FAR (Max)	Ground Coverage	Setbacks (Min)	Height
Residential Zone					
R-1	High-density residential / apartments	2.5–3.0	35–40%	Front 6m, Side 3m, Rear 4.5m	24 m (subject to road width)
R-2	Medium-density residential	2	40–45%	Front 3m, Side 1.5–3m	15 m
R-3	Low-density residential	1.5	35–40%	Front 3m, Side 1.5m, Rear 3m	12 m (G+3 approx.)
R-4	Existing village/Abadi area	Existing norms (relaxed)	As per the existing pattern	Flexible	As per the BBL village norms
TS-1	Integrated township / TOD-type	3.0–3.5	30–35%	As per the integrated layout	30 m (subject to approvals)
TS-2	Township (Plotted/Mixed residential)	2.5	35%	As per group housing norms	24 m
Commercial Zone					
C-1	Linear low-density commercial (along roads)	2.0–2.5	50–60%	Front 3–6m (road dependent)	18 m
C-2	High-density commercial / CBD / malls	3.0–4.0	40–50%	Front 6–9m	30 m+ (fire norms applicable)
C-3	Resort / Function Hall / peripheral commercial	1.5	30–35%	Large setbacks (min 6m)	12–15 m
Public & Semi-Public Zone					
PSP-1	Decentralized PSP in residential areas	1.5–2.0	30–40%	Front 6m	18 m
PSP-2	Large institutional PSP zone	2.0–2.5	30–35%	Front 9m	24 m
PSP-3	Existing PSP	Existing pattern	Existing	Existing	Existing
Industrial Zone					

I-1	Green industries / non-polluting	1.5	40–50%	Front 6–9m	As per industrial safety norms
I-2	Agro-based SEZ / industrial park	2	40%	Front 9m + buffer	As per SEZ norms
I-3	Existing industries	Existing	Existing	Existing	Existing
Public Utilities and Services					
PU-1	Treatment plants (WTP, STP, landfill etc.)	0.5–1.0	25–30%	Large buffer 15–30m	Functional structures
PU-2	Decentralized utilities within residential	1	30–35%	Front 6m	12–15 m
Agriculture Zone					
Agriculture		0.1-0.2	10%	Large open margins	Low-rise only
Green Area / Buffer					
G-1	Waterbody & Industrial Buffer	0.05	Minimal	NA	Temporary structures only
G-2	General green buffer	0.1	Low	NA	Low structures only
Environmentally Sensitive Zone					
Environmentally Sensitive Area		0.1	Max 10%	As per river regulation	Low-rise (≤9m preferred)
Urban Agriculture Zone					
Urban Agriculture		0.3	15-20%	Large Setback	Low-rise rural structure
Recreational Zone					
RC-1	Neighborhood recreation	0.2	10–15%	Open landscape priority	Low-rise
RC-2	Water/amusement park /resort	0.5	20–25%	Large setbacks	15 m
RC-3	Riverfront development	0.3	15%	As per river buffer rules	Low-rise
Mixed Use					
M-1	(100m along major roads)	3	40–50%	Front 6m	24–30 m
M-2	(50m internal residential roads)	2	40%	Front 3m	15–18 m

Agro-Tourism Zone				
Agro-Tourism	0.3	15-20%	Large Setback	Low-rise rural structure
Heritage Buffer Zone				
Heritage Buffer Zone (0–1 km)	0.25	20% Max	Front: 9 m Side: 6 m Rear: 6 m	Ground Floor Only (7 m Max)
Heritage Buffer Zone (1–2 km) (R-3)	1	35% Max	Front: 6 m Side: 3 m Rear: 3 m	Max 44 ft (13.5 m)

Source: URDPFI, BBL-2014, Gaya Ji PLU-2047

7.1.23 DEVELOPMENT CONTROL REGULATIONS CROSS TABULATION

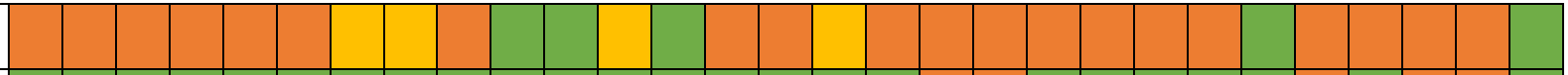
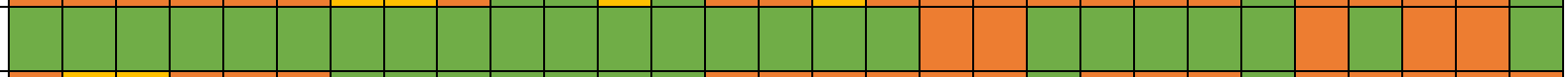
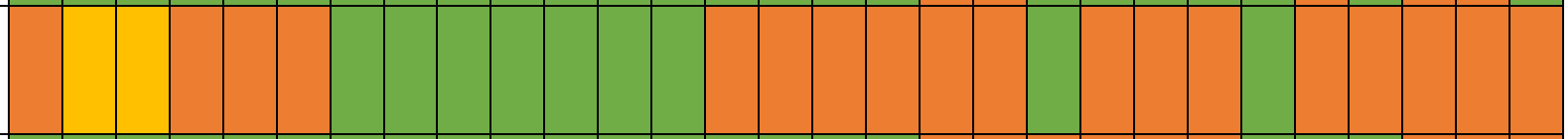
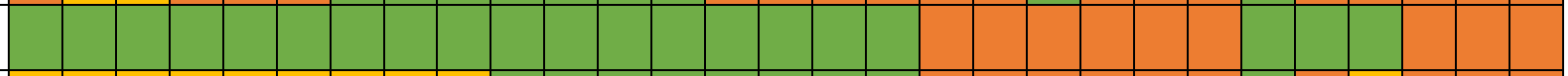
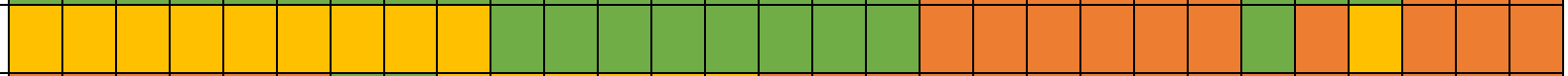
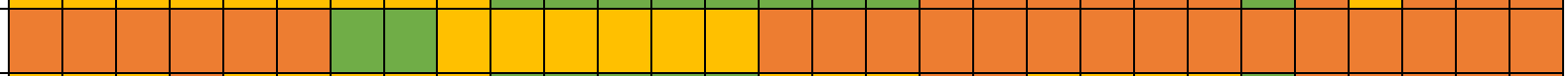
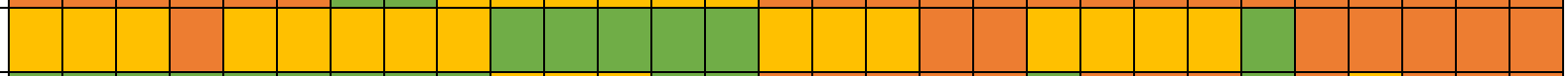
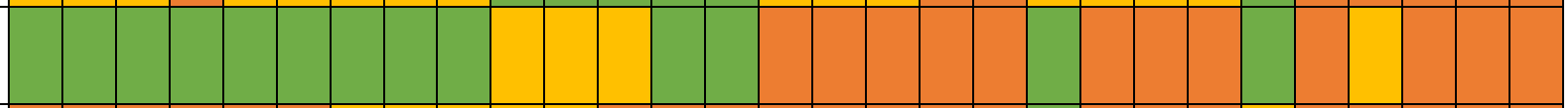
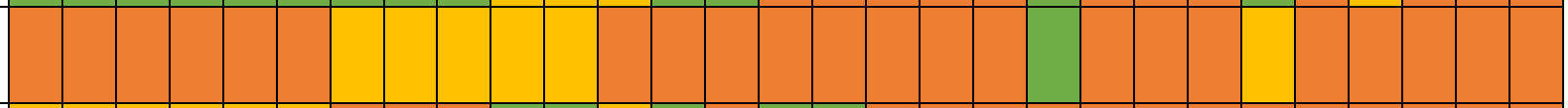
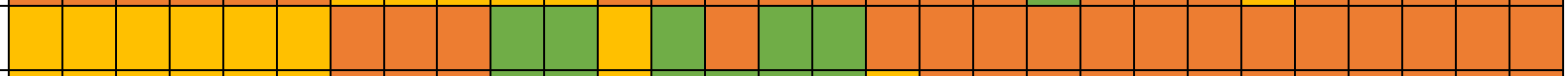
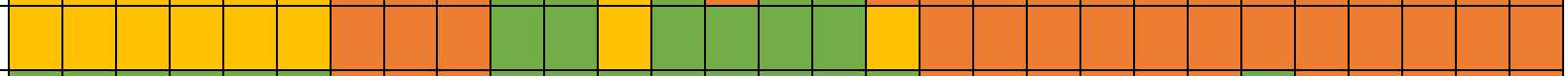
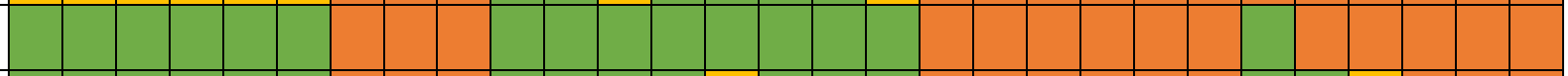
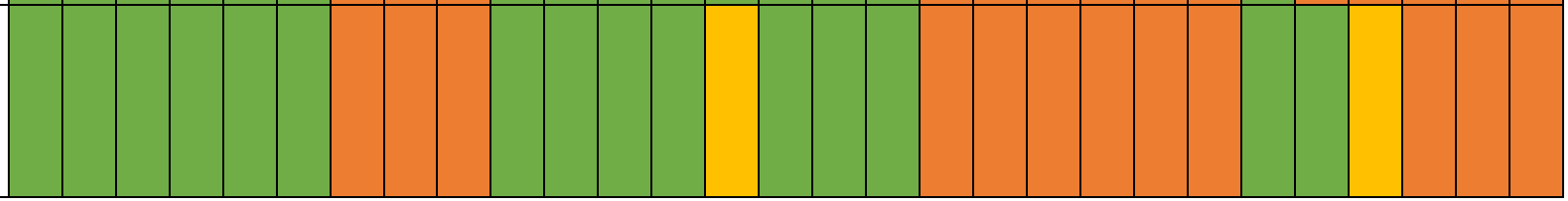
The cross-tabulation of the Development Control Regulations for Gaya Ji outlines the relationship between land use classes and the proposed zoning framework, which has been categorized into three types: Permitted, Regulated, and Prohibited. This classification has been designed considering feasibility, environmental sensitivity, and the need to prevent unwanted congestion and incompatible land uses within specific zones. Permitted uses represent activities that are fully compatible with the proposed land use and can be undertaken without restrictions. Regulated uses, on the other hand, may be allowed but only under specific conditions to ensure adherence to environmental norms, sustainable practices, and traffic management requirements. Prohibited uses are strictly disallowed as they may pose environmental risks, compromise feasibility, or disrupt the functionality of adjoining areas.

In cases where cadastral plots fall under more than one proposed land use, the dominant proposed use will be considered for approval to maintain clarity and avoid conflicting developments. Within regulated uses, special conditions have been prescribed. For instance, warehouses and certain commercial activities within residential zones are allowed only if they provide adequate parking facilities and do not disrupt internal circulation. Similarly, weekly markets in residential areas are permitted under regulation, provided they do not obstruct traffic flow. In industrial zones, junkyards are regulated and must comply with the Hazardous Waste Management Rules, 2016. Low-order commercial areas (C1) are designated only for small-scale activities, while large commercial centres are not permitted. Weekly markets in such zones are also regulated to prevent traffic interruptions. Furthermore, commercial activities within recreational areas and urban forests may be considered only if they adopt eco-friendly practices that safeguard the integrity of green spaces. The land conversion allowed only if compatible with zoning regulations and Bihar Agriculture Land (Conversion for Non-Agriculture Purposes) Act, 2010.

This regulatory framework establishes a balanced approach to land use planning in Gaya Ji by allowing flexibility where feasible while prioritizing environmental protection, traffic management, and community well-being. It ensures that growth and development are facilitated in a structured manner without compromising the ecological and social fabric of the city.

		Prohibited				Permissible				Regulated																						
S. No.	Land use Categories/ Proposed Zones	R1	R2	R3	R-4 (Village/Abadi)	TS-1	TS-2	Industry-I1	Industry-I2	Industry-I3	Mixed-M1	Mixed-M2	C1	C2	C3	PSP-1	PSP-2	PSP-3	Green Area-G-1	Green Area-G-2	Transportation	Recreational-1	Recreational-2	Recreational-3	Urban Agriculture	Agriculture	Agro-Tourism	Water Bodies	Public Utility-1	Public Utility-2
1	Residential																													
2	Warehousing/storage go-downs of perishable																													
3	Inflammable goods																													
4	Coal,																													
5	Wood,																													
6	Timber yards,																													
7	Bus and truck depots,																													
8	Gas installation and gas works,																													
9	Poly-techniques and higher technical institutes,																													
10	Junk yards,																													
11	Water treatment plant,																													
12	Sports/stadium																													

13	public utility installation																												
14	Hotel and transient visitor's homes,																												
15	Religious buildings,																												
16	Hospitals and nursing homes.																												
17	Old age home																												
18	Non-hazardous industries except storage of perishable and inflammable goods,																												
19	Milk chilling stations and pasteurization plants.																												
20	Sewage disposal works,																												
21	Electric power plants,																												
22	Service stations,																												
23	Cemeteries,																												
24	Dharmashala																												
25	Night shelters,																												

26	Petrol pumps,	
27	EV Charging Station	
28	Motor vehicle repairing workshop/garages,	
29	Household industry,	
30	Bakeries and confectionaries,	
31	Storage of LPG gas cylinders,	
32	Restaurants & other hotels	
33	Go-downs/warehousing,	
34	Bus depots without workshop,	
35	Cinema hall,	
36	Auditoriums	
37	Markets for retail goods,	
38	Weekly markets (if not obstructing traffic circulation and open during	

	non-working hours),																												
39	Multipurpose or junior technical shops,																												
40	Atm																												
41	State and central government offices.																												
42	Non pollution, Non-obnoxious light industries,																												
43	Bank & financial institutions.																												
44	Taxi stands,																												
45	Dairy and farming,																												
46	Hostels,																												
47	Bus and truck terminals																												
48	Commercial centres,																												
49	facilities with police check post																												
50	fire post																												

51	Post and telegraph office,																												
52	public assembly hall,																												
53	Sports,																												
54	any other activity incidental to transportation																												
55	residential dwelling units for essential staff and watch and ward personnel																												
56	Farm houses,																												
57	Extensive industry,																												
58	library																												
59	Heritage Buffer Zone-0-1km																												
60	Heritage Buffer Zone-1-2km																												
61	Eco-Tourism																												

8 CONCLUSION

The integrated planning approach therefore provides a common spatial direction while retaining the distinct identity and development requirements of both the Planning Areas. The effectiveness of the 2047 framework will depend on coordinated land use management, infrastructure provision, transport improvements and protection of environmental and heritage resources.

The Integrated Master Plan provides a concise framework for coordinated development of Gaya Ji and Bodhgaya. Gaya Ji requires large-scale infrastructure and housing expansion, while Bodhgaya requires heritage-sensitive, tourism-oriented and environmentally responsible growth. Together, the two areas can function as a coordinated urban–tourism system supported by integrated land use, transport, tourism circuits and blue-green infrastructure. Overall, the integrated approach provides a concise framework for guiding coordinated development towards 2047.

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