

Capacity Building for Urban Tourism Development of Ayodhya Municipal Limits

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Abstract

Tourism is a prime economy globally and is a pillar of the Make in India Programme since the Indus valley civilization India has been a focal point of attraction. The regions in India vary in geography, topography, reach, and attraction. The city of Ayodhya in Uttar Pradesh is situated on the banks of the holy river Saryu, this makes Ayodhya a part of the seven holy cities among Mathura, Maya, Kashi (Varanasi), Kanchi (Kanchipuram), Avantika (Ujjain) and Dwaravati (Dwaraka). The river Saryu (a tributary of river Ghaghra), holds a significant position in Hindu mythology, which is represented as the forehead of Lord Vishnu. The city of Ayodhya consists of several temples, bathing ghats, and kunds which is a prime attraction for tourism and pilgrimage. Ayodhya being an old city catering huge volume of inbound tourism, infrastructure improvisation and upgradation is of prime importance. This paper focuses on issues of Solid waste management and Transportation in the region of Ayodhya under a delineated study area that accommodates the religious and historical tourist destinations. Thus, there is a need for capacity building for the infrastructure impacted by tourism, which also shall result in the upgradation of the lifestyle of the urban/ peri-urban area residents. The outcome of the paper is to put forward the implementation model suggested above and possible recommendations for policy formulation focusing on the urban area to support the tourism potential of the region of Ayodhya.

Keywords: Capacity Building, Tourism, Inclusive Development, Infrastructure, Transportation.

1. Introduction

Ayodhya is one of the oldest religious sites in India. The historic significance can be traced back to the birthplace of Lord Rama which is located 130 km from the Capital city of Lucknow. The city is well connected with roadways through NH-27, which connects Lucknow to Gorakhpur through the central spine of Ayodhya. Being an old and religiously important town Ayodhya marks a significant position in Hindu pilgrimage destinations. Situated on the Banks of the Holy River Saryu, makes Ayodhya a part of the Seven Holiest Cities among Mathura, Maya, Kashi (Varanasi), Kanchi (Kanchipuram), Avantika

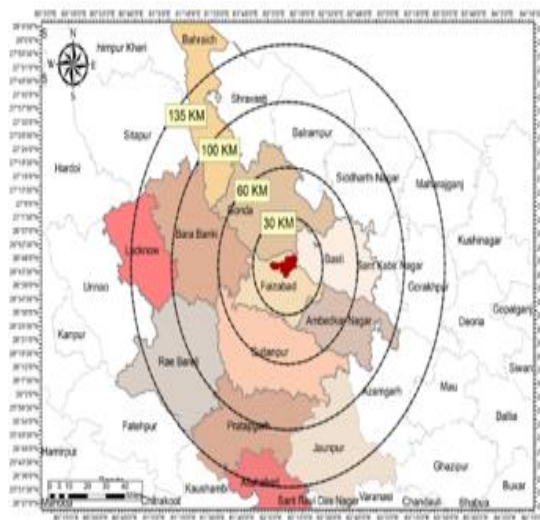
(Ujjain), and Dwaravati (Dwaraka). The river Saryu (a tributary of river Ghaghra), holds a significant position in Hindu mythology, which is represented as the forehead of Lord Vishnu.[1] The city of Ayodhya consists of several temples, bathing ghats, and Kunds (108 numbers) as destinations for tourists and Pilgrims. The most famous ghats of Ayodhya are Ranughat, Golaghat, Laxmanghat, Jankighat, Rajghat, and Ram Ki Pairi. Ayodhya is famous for Ram Janma-Bhoomi, Kanak Bhawan Hanuman Garhi, Nageshwar Nath temple, Kalenath temple, and Mani Parvat as the major tourist destinations. The city also houses Jain shrines, mosques, and tombs which

mark a part of its heritage. Buddhism holds a significant role in Ayodhya's pilgrimage as Gautam Buddha spent sixteen summers after attaining enlightenment. The city shows its growth in the secondary economy which includes sugar processing and oilseed mills, and it is a trade Centre for agricultural produce.

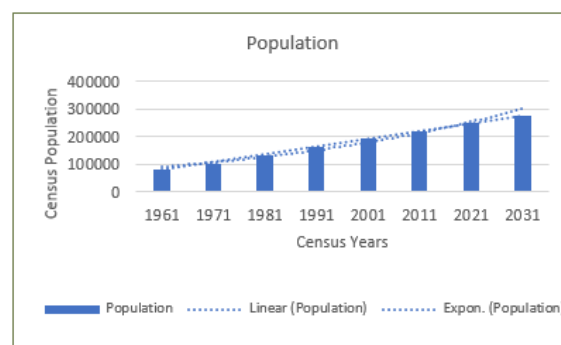
2. History and Tourism

Ayodhya is regarded as one of the seven sacred cities in India because of its linkages with the one of the great Indian epic poem Ramayana with the birth of Lord Rama and the ruling of king Dasharatha. Ayodhya developed as the Khosla Dynasty's capital with 125 monarchs until dissolving with 90 kings at the conclusion of the Mahabharata. Later, during the Buddhist period, 6th -5th Century BCE the shift of power was observed in Shravasti. According to scholarly literature, Ayodhya is akin to Saketa, the town where Buddha resided. The town witnessed the growth of 100 monasteries in the fifth century CE. The town (Saketa) developed during this time as a market center at the intersection of the Rajagriha-Varanasi-Shravasti-Taxila east-west road and the Shravasti-Pratishthana north-south road. The ancient town of Saketa was considered the legendary city and the capital of the Ikshvanku dynasty after Ayodhya town came under the influence of the Gupta Dynasty. The city became the commercial capital and center of pilgrimage. The Nawabs' influence on the Ayodhya region by 1226 BC resulted in the creation of monumental structures including Gulab Bari, Moti Mahal, and the tomb of Bahu Begum. However, during the reign of the emperors, the development of Ayodhya extended to Golaghat, Laxman killa, Swargdawar, Tulsi Chauraha, Hanuman Gadhi, and Katra. In the British era, Ayodhya was developed till Ramganj, Shringar hat, Ayodhya railway station, Pramod Van, Tulsi bagh, Chhoti Chhavni, etc. British rule began in 1856 after Mughal power faded, and the Babri Mosque site was split between Hindus and Muslims in 1950. Ayodhya's development progressed at a fairly slow and steady rate. The developments were seen in areas such as Ramcharit Manas, Janki Mahal, Shri ram chikitsalaya, Saket Mahavidyalaya, Valmiki Bhavan, Saket pathik Nivas, and in 1965 bridge was developed on Saryu River.[1][21]

3. Present Urban Character of Ayodhya



Ayodhya is the present administrative headquarters of Ayodhya (formerly Faizabad) district in the State of Uttar Pradesh. The major river is Saryu passing on north of Ayodhya at an elevation of 93 m. The topography of Ayodhya is comprised of alluvial soil, sand, and gravel. The Ayodhya district is a stretch of the Ghaghra River's flood plain, which extends for around 130 km and generally slopes from west to east. The city experiences long, hot, dry summers that span from late March to mid-June, with daily average temperatures of about 32 C. The monsoons bring an average of 1067mm (42.0 inches) of precipitation. Early November marks the start of winter, which lasts until the end of January. February and early March mark the beginning of spring.[1]



Ayodhya Nagar Palika Parishad (NPP) presently Ayodhya Municipal corporation census data collection started in the Year 1981. As per the Census 2011, the Ayodhya Urban Area of ADA (Ayodhya Development Authority) constitutes a population of 2, 21,118 Persons. Presently, the Ayodhya (M. Corp)

population is 55,890 Persons with an Average Decadal growth rate of 22.6%. [11]

Ayodhya being one of the major tourist destinations in Uttar Pradesh, the tourism-influenced market sector provides the sale of local goods. Apart from religious products, the market of Ayodhya provides essential Agri-goods to the nearby markets. Restaurants and hotels play an important role in accommodation and F&B sector which accounts for a major share of the Economic Generation. [1]

3.1. Tourism in Ayodhya

Tourism develops an association with industries like the Hotel industry, transport, and handicraft. Additionally, it lays a framework for employment in the tourism-related service sector of the economy. Ayodhya receives a large number of tourists every year and some major attraction like The Ram Janma-Bhoomi Temple, Hanuman Garhi, Kanak Bhawan Temple, Mani Parvat, Nageshwarnath Temple, Ram ki Paidi, etc marks the focal point. The region of Ayodhya marks an incremental trend of tourist footfall which recorded 2.16 Crore tourists in the Year 2016, which trends to 3.02 Crores in the Year of 2019.[3] The estimated Projection indicates a growth of 3.30 Crores in the year 2031 (a growth of 282% from the benchmark year 2016) with an average footfall of 70000 persons per day in peak season is expected. Major tourist activities around Ayodhya involve religious walks (Parikramas) like the Mokshdayni walk, Antargrahi Parikrama, Panchkoshi Parikrama, and Chaturdashi Koshi Parikrama. Annual events like the Ramanavami Festival, which commemorates the birth of Lord Rama, attracted 48 lakh pilgrims [3][21] and tourists in 2018, and that number is projected to increase to 60 lakhs in 2025, the same year that the Ram Mandir is proposed to be inaugurated. The peak period of the year that tends to place stress on the infrastructure is between September and April when Parikramas, as well as major fairs and festivals, are held in the region.[1][3][22][23]

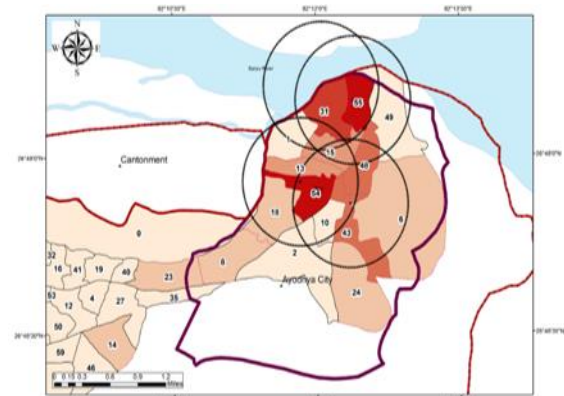


Figure 3 Study Area Delineation Map

3.2. Study Area Delineation

The study area is delineated as per the tourism character and walkability factor defined as per DLCA (under UN-HABITAT), which defines a walking distance to amenities within 30 minutes or less time frame which can be termed to be 1.6 km or 1/8th of 1 mile. This defines the study on wards 1, 2, 6, 8, 10, 15, 18, 24,31, 43, 48, 49, 54, 55 as shown in figure 3.

Wards under tourism influx account for 30% of the native population constituting 73326 persons in the ADA planning area. The average population density of the municipal area is 142 persons per hectare. The major population concentration is in and around the tourism zone, the reason can be the increased economic possibilities for the locals and the migratory population.

4. Infrastructural components

The dominance of tourism in Ayodhya leads to an increase in commercial and mixed land use properties. As well as the conversion of recreational spaces into public and semi-public spaces marks a growth of 63%, [1] Which can be considered an indicator of an increase in tourism potential. As defined as 'Infrastructure and Tourism are a subset of Economy' [17]. The infrastructure plays an important role to maintain a balance between tourism and the economy hence the upgradation and retrofitting of infrastructure is needed. The present study deals with transportation, solid waste management, and accommodation as a component of the infrastructure.

Transportation



Figure 4 Road Distribution Map

Ayodhya Municipal Corporation area is connected to several regions such as Lucknow, Varanasi, and Allahabad through major corridors such as NH27, NH330, NH330A, and a wide gauge railway connects to major cities. Due to the lack of road infrastructure within the urban limits, the region experience congestion in the peak hours of the day. The study area consists of about 15% of unsurfaced (kutchra) roads. As the CBD area is approached, narrower roads can be observed, the major congestion in the city's central spine is caused due to the 12 meters wide road. [1]

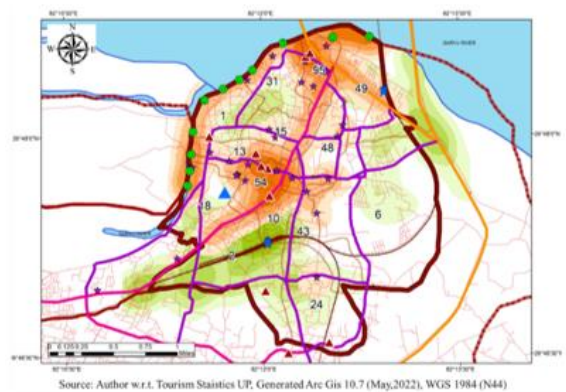


Figure 5 Tourism Vs Workforce Load on Infrastructure

NH27 on the outer fringe of the urban area serves as a peripheral route for the city. The tourism characteristics show the mix between the locals and the tourist transit mode. The central spine acts as a focal point for the tourists, while residents or the workforce can be observed on the commuters' lines such as railway stations and bus stops. Over the years, Ayodhya shows the variable character of vehicle ownership, 2-wheeler is the most convenient mode to commute due to the less available ROW (Right of way) of the existing

internal roads thus shows the maximum growth indicating affordability. Tourism-specific mode such as E-rickshaw dominates the commercial sector over maxi cabs and 3-wheeler by 91% growth between 2016-19. Growth in private car ownership shows 80%, which accounts for 5% of the number of 2-wheeler in the city. Significant modes of tourism Sector can be defined as E-rickshaw, 3-wheeler, commercial LMV, and maxi cabs. [1] [10][11] [13]

Precedence over paratransit can be observed and lower growth of privately owned vehicles. Growth rates of commercial LMV are less than E-rickshaw, which proposes environmentally friendly greener transportation. E-rickshaw on the other hand tends to reduce the design speed of a road, due to low maneuvering speed, resulting in a greater chance of congestion. E-rickshaw can easily access the narrow stretch of roads. Due to public dependency on paratransit, it can be an advantage to plan non-motorized transit corridors in tourism destination regions.

4.1.1. Analysis of Congestion

The study of congestion includes monitoring of traffic movement at different times of the day. Selection of study time includes the user mobility pattern such as 0600 hours or 9:00 am signifies the transition or delivery time for the accommodations on the destination which ranges from 0400 to 0630 hours, while 0900 Hours or 9:00 am starts the rush hours and incoming of the workforce. 1030 hours signifies the incoming of tourists and marks the start of congestion and 1900 hours or 7.00 pm signifies the evening rush hours, which is influenced by tourists as well as residents. (All time of recordings are as per the Indian Standard time 5:30 hours ahead of Coordinated Universal Time (UTC)).

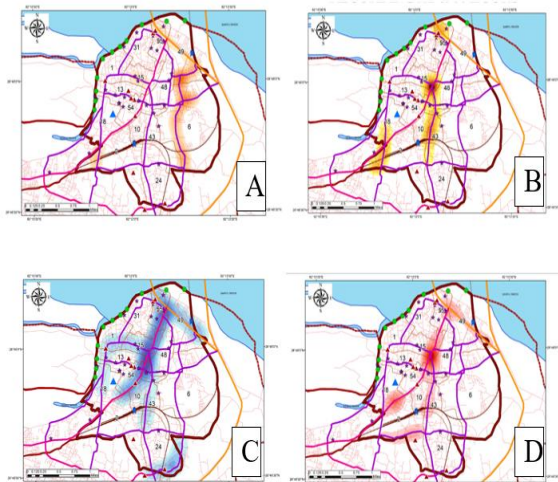


Figure 6 Traffic Study at 0600h(A), (0900h(B), 1030h(C), 1900h(D),



Source: Author w.r.t. OPENSTREETMAP, Author, Mosaic, London, Copernicus Technology, Generated Arc GIs 10.7 (May 2022), WGS 1984 (NAD)

Figure 7 Traffic volume study locations

Tourist influenced road stretch width ranges from a high of 9 to 12 meters as low as 3 meters which becomes a major issue in the study area. Rush hours majorly impact the core of the study area which includes destinations like Kanak Bhawan, Hanuman Garhi, Ram Janam Bhoomi, Dashrat Bhawan, and Ram Ki Pairi. Vehicle Category segregation as per the URDPFI or Urban and Regional Development Plans Formulation and Implementation Guidelines of 2014 signifies Two-wheelers, auto-rickshaw, car/jeep/van, and LCV (Light Commercial Vehicles) / minibus as fast-moving vehicles while bicycle, cycle-rickshaw, animal-drawn tractor-trailer, E-rickshaw, truck, and multi axles are considered as slow-moving vehicles. [1][2][7][14][20]

The traffic volume survey conducted over the central spine shows a high mixed volume traffic of the 2-wheeler, along with influx of buses and E-rickshaw which are slow-moving vehicles. A significant bicycle user are seen in the central spine accounting 30% of pedestrian. E-rickshaw is observed on the major spine which is a prominent reason for slow traffic.

The part of the study established a major connection with the solid waste management collection vehicles which includes tractor-trailers, which are under slow-moving vehicles under URDPFI.[10][15]

4.1.2. Parking Analysis

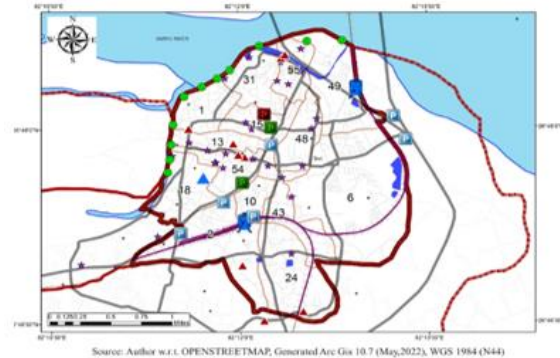


Figure 8 Public parking map

Parking zone plays a major role in road decongestion. On-road parking issues can be served through the creation of parking facilities which create a source of revenue generation for the local government. The present-day study suggests the city has a capacity of 5 government parking facilities, 1 private parking facility, and 2 proposed parking zone. Which caters to the inbound traffic, but the lack of a parking facility contributes to large-scale on-road parking which reduces the usable ROW of the major streets under commercialization and street vending.[1][10][12][13]

4.1.3. Analysis of Railways

The city of Ayodhya has one primary junction and a halt station. The study area comprises 8 kilometers of railway line out of the 124 kilometers stretch in the planning area. The primary junction is provided with three platforms and one yard. In the study region, the railway's distribution network consists of six underpasses, one overpass, two crossings, and a bridge. As per the reports of the Ministry of Railway. A forecasted footfall of a railway estimates 70000 persons per day which overshoots the present footfall by 17%.

4.1.4. Analysis of Waterways

Waterways are known as an alternate Transportation mode as per the case study of Lagos, which helps to reduce the load of transit from the existing road infrastructure. The present geomorphology and topography of the river Saryu marks a maximum depth of 8 feet

which is capable to handle water modes such as sailboat, day sailers, catamarans, motor yacht and dinghy which is capable to row with a minimum depth of 7 ft.[8][16]

4.1.5. Analysis of Airways

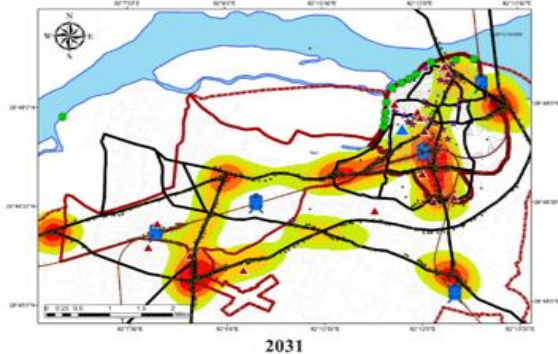


Figure 9 Projected Areas under Impact

Ayodhya airport, officially known as Maryada Purushottam Shriram International Airport, is an international airport being proposed in Ayodhya. The existing government airstrip is situated between NH 27 and NH 330 at Sultanpur Naka, Faizabad. The airport construction is proposed in 3 phases which will incorporate passenger aircraft of ATR Q400 type till 2025 and the extended project will be capable to operate A321 out of Ayodhya airport by 2031 with a forecasted Arrival Passenger of 11.64 Lakh per year. The forecasted traffic load can be experienced near the airport, railway station, and bus stands, which will create a surplus load on the existing infrastructure.

The estimated load can be experienced as central spine congestion, congestion of major corridors, lower level of service and high congestion near the public transport terminals, Ribbon development, high encroachment due to commercialization, increase in service corridor demand, and religious route congestion.[1][2]

4.2. Solid Waste Management

Municipal solid waste (MSW) is the trash or garbage that is discarded day to day in a human settlement. As per MSW rules, 2000, Garbage includes commercial and residential waste generated in municipal or notified areas in either solid or semi-solid form excluding industrial hazardous waste and bio-medical waste.[15]



Figure 10 Distribution of SWM Collection (Dark-Primary, Light-Secondary)

4.2.1. Standard MSW Generation

As per the solid waste and management rules of 2000, the residential refuse is defined as 0.3 to 0.6 kg per capita per day, the commercial refuse is defined as 0.1 to 0.2 kg per capita per day, street sweeping generates a refuse of 0.05 to 0.2 kg per capita per day and institutional refuse is standardized as 0.05 to 0.2 kg per capita per day. The MSW generation in Ayodhya is 100 tons per day, which is managed by the local government through primary and secondary collection mechanisms through private organization. [11][15]

4.2.2. Collection Mechanism

The collection process is done by a private company under Ayodhya Nagar Nigam. 35 wards out of 60 Wards are under 100% door-to-door collection (Primary). 25 wards out of 60 wards are under 50% manual collection (Secondary).[1]

4.2.3. Quantum of waste Generation



Figure 11 Quantum of Waste Produced

The high quantum of waste generation in the study area is estimated in the ghat area and the newly developed residential areas which are

under mixed-use conversion due to the introduction of air, bed, and breakfast facilities.

The major zones under the influence of tourist-related waste generation are ward no. 1,2,6,18, and 31. which marks a generation of 33.9 tons per day of waste in the study area which marks 34% of total waste generation in the urban area under Ayodhya Nagar Nigam.

4.2.4 Economic Linkages with Waste Generation

The lowest income group produces 0.39 kg per capita per day during winter months which is the minimum of MSW generated as compared to the high-income group with the production of 1.1 kg per capita per day and the middle (0.56 kg per capita per day) income groups in the same season. The super-imposed maps show a trend of high waste generation in the areas with high land rates, which established the fact of waste generation based on the socio-economic group. The catalyst for change in waste generation changes in socio-economic status, change in the number of generators (user), change in user volume (0.4 – 1.6 kg/cap/day), peak season augmentation, and socio-economy mix. [4] [5] [11]

4.3 Accommodation

At present the study area accounts 17 hotels for accommodation with 592 total rooms and around 70 dharmshalas. Ayodhya city accommodates 5500-bed facilities. Formal accommodations are located along the central spine while informal accommodations are distributed through the region, as per the land rates and mixed-use. As per ADA (Ayodhya Development Authority), phase B the development of hotels and guest houses will be proposed to develop on the bypass road and the north side after the Saryu River it can be located. In the present scenario, only redevelopment of old dharmshalas and a few guest houses will be possible. For the accommodation of foreign tourists and domestic tourists, around 25000 rooms will be required in different categories of hotels. As per the primary survey in 2022, 46% of the inbound tourist prefers to stay 1 – 2 days. While 25-28% of the inbound prefer a stay of 2-8 days. With most hotels located in the core, 48% of the tourists concentrate in the core and prefers hotels in the range of 1-2 km. Projections for the year 2025, Ayodhya with

inbound tourists of 70000 per day, accommodates 5500 persons as per ADA reports.[1][21][22][23]

5. Structural Equation Implementation in Present-day Study area

As per the continuation of the study on the Ayodhya region through the derived structural equation in “Capacity Building for Tourism Infrastructure: A case of tourism influenced regions in Uttar Pradesh” (Munshi et al, 2022). The following equation suggests the relationship between transportation, solid waste management, and accommodation as a part of the infrastructure to define the tourism potential of a region.

$$\sum Y = 0.33 (R_con) + 3.578 (P_Float) - 0.30 (W_Disp) + 2.675 (D_Stay) + 0.239 (N_des) \pm 11.752...(i)$$

Where, ‘Y’ represents Tourism potential, R_Con defines developed road conditions in km, W-Disp defines waste disposal in the study region in Ton, D_Stay defines the number of Days spent by tourists per visit, and N_Des defines the number of tourist destinations in the region. The present Score in consideration is 21.15, as per the criteria in the research under Potential need of Infrastructure. [17]

6. Recommendation

As per the Tourism Vision 2020,[15] Issues related to tourism are addressed under Section 5, sub section 5, Clause 4 of URDPFI 2014. Sub Clause: 1,2, 6,7, and 9 are focused. Issues identify under Tourism Vision 2020 are:

The influx of the floating population of tourists,

Assessment of areas of influence of tourism/ pilgrimage,

Transport planning issues associated with terrain, slopes, and undulated systems,

Priority for non-motorized transport and public transport.

Lack of documentation of heritage buildings and areas and application of general architectural control in historical areas,

6.1 Core Decongestion

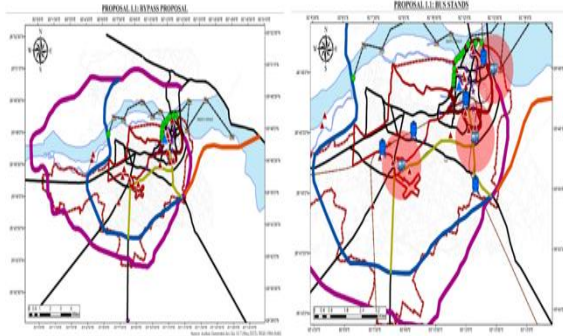


Figure 12 Core Decongestion Bypass Proposed (Left), Bus terminal Proposal (Right)

The issues under core decongestion are low level of service, location of the bus stand and railway station located in the city core, high volume of mixed volume traffic reduces design speed of the road, and improper connectivity between transit modes. The above-mentioned issues are addressed by the proposal of a peripheral bypass with a ROW of 45 meters to cater to high traffic volume and improve the level of service of the roads. The internal roads of lower width are proposed to be increased to cater to a mix of modal traffic designated under high speed. A stretch between the proposed airport and railway station is proposed as a bus rapid transit corridor. The core city of Ayodhya has bus stands located in the central core which impact the LOS of the road hence, bus terminal are proposed in conjecture to the Bypass road to reduce congestion during peak hours and during the pilgrimage seasons, The roads in Ayodhya has a lower width and caters bi-directional traffic, hence arises the need of alternate transit mode to connect the outer bound of the city and also provide a tourist transit between the core city area and the Guptar ghat located in the outer bound of the study area, but within the Planning area under ADA.

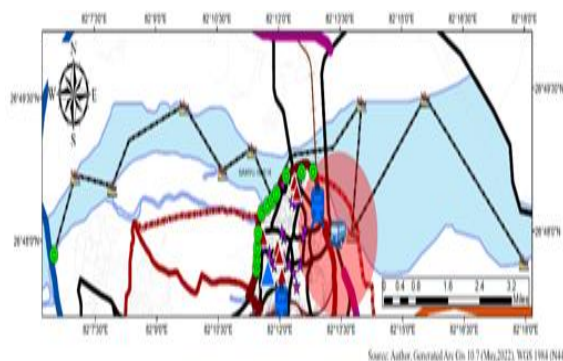


Figure 13 Waterways Proposal

A series of 9 jetties are been proposed to cater to the city-to-city traffic, city-to-region traffic, and region-to-region traffic. Thus, resulting in reducing the Load to transit on the Internal City Roads. Routing includes Guptar Ghat, Naya Ghat, and Existing Tourist Boating Jetty which will promote tourism with a system added to the revenue structure of the Local Government.

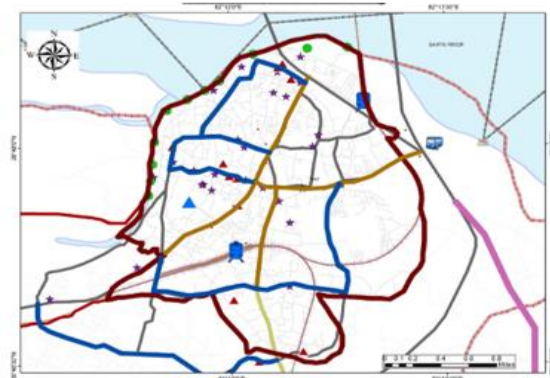


Figure 14 Potential Road for Widening

6.2. Central Spine Decongestion

The issues under central spine decongestion are low road width, slow-moving vehicles, and encroachments in the central spine, heavy influence of para transit on the major road.

The above-mentioned issues are addressed by the proposal of road widening scopes, augmentation of transit modes, and retrofitting para transit routes as well as resolving the parking issue.

The proposed road widening targets the central spine or Ayodhya Dham road with a 24meters ROW, Mat Gajendra road with a 12-meter ROW which provides tourism connectivity, Kalyan Singh Road with a 12-meter ROW which provides Ayodhya Ram Mandir connectivity, and Pramodvan Road with 12-meter ROW which provides transit corridor.

An increase in road width in case increases the capacity of the roads but also counters the effect of induced demand. Induce demand tends to alter the psychology of the users toward the high-capacity road. Hence, the need arises to augment the existing control of intersections. This can be catered by setting up of ICC (Integrated Command and control center). ICC shall be set up which will not only manage safety and surveillance of the city from a police/traffic police perspective but shall also host Smart Solutions for the city's Municipal

Corporation. This will include video walls for real-time monitoring, an emergency response system, operations planning, and manually maintained 24x7 surveillance. ICCC can be used for crowd management and the strategy for security and surveillance which will include number of people, crowd psychology, behavior pattern, risk analysis, preparedness, and management which will be a system to be used during peak tourist seasons.



Figure 15 Integrated Public Transportation

The transit modes of Ayodhya include railways, airways, waterways, and roadways as the medium of tourist and passenger carriage. Hence, combining the transit modes aimed toward last-mile connectivity will provide inter-destination connectivity.

Components such as a circulation system, same level interchange, route planning, and one ticketing system in the urban area will integrate last-mile connectivity and provide inter-destination connectivity.

Parking is a serious problem in the core city of Ayodhya, which leads to the increase in on-road parking, and due to the lack of availability of permeant parking facilities, users tend to park on-road. Hence, the proposal of new parking spaces with an Integrated parking System, which provides ai-based parking that is incorporated with parking space analyses the potential parking spaces that can be left to be occupied.

Integrated parking system will provide tourists to find viable and safe parking to utilize during their trip. the ICCC-enabled system will track and record events related to theft and security breaches, underground parking enhances the aesthetics of the city, vending zone decongests the city by reducing encroachments, parking acts as a revenue generator for the Local

Government, and Easy and accessible parking will reduce on-road parking hence ROW will not be affected.

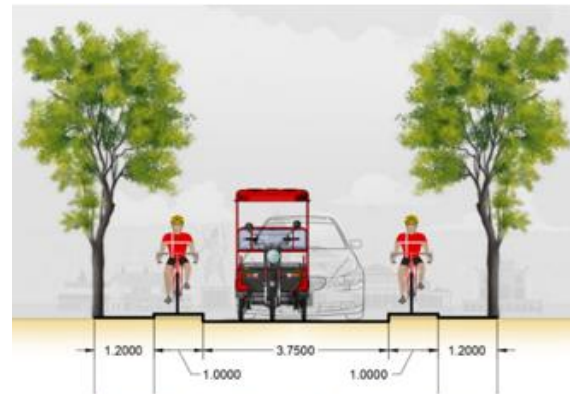


Figure 16 Road Width Configuration

Parking powered with EV charging facilities will attract EV users to park their vehicles and parking with a bicycle rental system will facilitate easy access to the destinations and reduce congestion on the narrow roads. Hence, Road configuration augmentation should be made which is defined at a maximum stretch of 8.1 meters with one-way traffic in tourist areas. with three configuration typologies such as 3.7m carriageway with one side footpath and one side cycle track, 3.7m carriageway with both side footpath and one side cycle track, and 3.7m carriageway with both side footpath and both side cycle track.

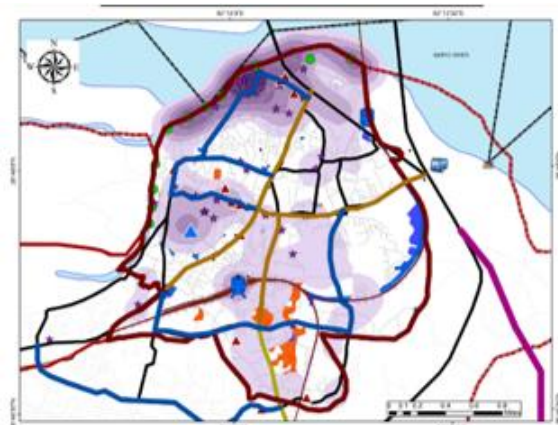


Figure 17 Waste Generation Zones

6.3. Tourism Based Collection Mechanism

The issues under collection mechanism include the commercial sector standing high in waste generation, significant areas under development lie under manual collection (secondary), areas under heavy commercialization are under manual collection, and lack of reach due to the lower width of the road. RFID waste

management utilizes the power of RFID to identify and track waste bins. When the truck empties the bin, the RFID tag is read and weighed to bill according to the amount of waste produced. The objective of the 'Integrated Control and Command Centre' is to monitor the waste collection, transportation, and remediation of the waste at ward Level. The existing mechanism incorporates vehicles like tractor trailer and TATA ace. Tractor-trailers are considered slow-moving vehicles under URDPFI guidelines and Vehicles with HP > 25 with carrying capacity > 1.8 Tons should be incorporated. The proposal aims toward south-bound mixed-use development in land use and predicts a higher production of solid waste. The mixed-use development region Near Mani Parvat is subjected to lower-width roads, which is addressed under Transportation. As per Proposal Collection Vehicle, accessibility can be possible which can increase the Door-to-Door coverage.

6.4. Landfill Based on Waste to Energy

The rising quantum of solid waste due to tourism led to a change in composition, Ayodhya has no designated landfill and inorganic municipal waste requires special treatment for waste disposal, unlike organic waste.

Site considerations are the most important factor in locating a landfill. The factors under consideration are ground water vicinity, surface water vicinity, land slope, flooding, land use type, protected site, wind direction, and proximity to airport.

The potential of the site is defined as it is located on the outer fringe of Municipal Limits, the site is not located on or close to any water body or hydrology lines, being on the southern fringe of Ayodhya Municipal limits is located out of 2003 flood lines. The land-use type of the site is under the category of fallow land in Ayodhya Master plan 2031. The site is in the closest range of 3 km from protected sites. The wind direction of Ayodhya is favorable for the site. The airport is located at a distance of 5km from the proposed site. The site is on direct connectivity with NH 28. The potential of the Site is defined to be producing energy on the higher limits of 2.3 Terawatt per year. With an input waste of 1500 Ton per day during high tourism season.



Figure 18 Landfill Site

6.5. New Infrastructure Zone Delineation

The issues under present accommodation are unorganized development, Impact on the peri-urban area, and infrastructure misalignment. At present, there are only 17 hotels for accommodation with 592 total rooms and around 70 dharmshalas. Around 5500-person Accommodation facilities are available in Ayodhya city. As per the URDPFI Guidelines of Sustainable tourism development, norms suggested by UNESCO define a region into the following zones where the influence can be observed as High-Value Zone, Native Zone, New Infrastructure Zone, and Networks. A high-value zone can be utilized to set up 5/4/3 Star Hotel + Cultural Accommodation + Govt. Guest Houses, while the native zone should practice Control over "Air Bed and Breakfast" and new infrastructure zone should be Controlled over the Hotel Tariff with relatively cheap prices for Electricity, Water, and Telecommunication as per Recommendation of the Parliamentary Committee to tackle Global Competitiveness.[17]

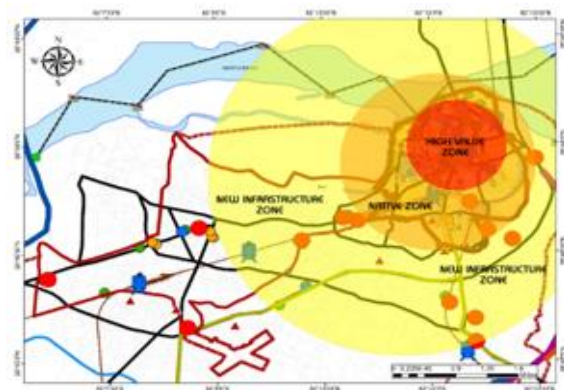


Figure 19 New Infrastructure Zone

7. Structural Equation Implementation on Augmented Study area

Table 1 Variable and Absolute Values

SL NO	DETERMINANTS	ACTUAL VALUE
1	Road condition	152
2	Population Floating	70000
3	Waste Disposal	1500
4	Duration of Stay	2
5	Number of Destination	36
6	Tourist Per Year	33628182

The ranking scores of the determinants out of 10 are fed in the Equation:

$$\sum Y = 0.33 (R_con) + 3.578 (P_Float) - 0.30 (W_Disp) + 2.675 (D_Stay) + 0.239 (N_des) \pm 11.752...[17]$$

The Score of the Augmented Study area is 27.34 exceeds the Benchmark score of 21.15.

8. Results

- i. The score of the augmented study area by 6.19 units. Hence, the equation suggests the recommendation of upgradation of tourism zone with the following recommendations:
- ii. Circuit Definition of Tourism Master Plan.
- iii. Circuit planning or Modification in CMP.
- iv. Improvisation of Tourism Cell under Local Government.
- v. Empowering Local Government with a better structure of SWM and Revenue Structure.
- vi. PPP for Accommodation infrastructure and Control over Cost Structure.
- vii. Dedicated Transport system to ensure lower congestion and Higher LOS on local roads and Increase share of Public Transportation and Concentration Towards NMT.
- viii. Action plan incorporated with Master Plan.
- ix. Policy Guidance Document that mobilizes all Municipal policies and Tourism Ecosystem across a broad circuit Upgradation of the Peri-Urban Area.

- x. Develop niche Markets and Strengthen assets.
- xi. Reinforce Emerging Sector and Digital Enterprises.

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10. Credit Authorship Statement

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript. Furthermore, each author certifies that this material or similar material has not been and will not be submitted to or published in any other publication before its appearance.

Ar. Sayan Munshi: Conceptualization, Methodology, Visualization, Formal analysis, Writing - original draft. Dr. Subrajit Banerjee: Resources, Visualization, Formal analysis, Writing - review & editing, Supervision. Dr. Indrani Chakraborty: Resources, Formal analysis, Writing - review & editing, Supervision.

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