

Ecocity Development Plan

For Vrindavan Ecozone

Uttar Pradesh, India

Sponsored By

GTZ - ASEM

German Technical Collaboration -
Advisory Services in Environmental Management

Central Pollution Control Board
under Ministry of Environment & Forest
Govt. Of India



Consultant

Dr. Uttam Banerjee

Department of Architecture & Regional Planning
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1.0 INTRODUCTION

1.1 Background

The Ecocity project at Vrindavan has been launched, on the initiative of the members of the Vrindavan Municipal Board, with the objective of improving the environmental condition for the town which has strong historic and religious significance related with Lord Krishna. The town is visited by large number of tourists and pilgrims, throughout the year, attracted by the religious beliefs and functions. The nature of functions of the town and its existing environmental problems has caused a great concern to the health and sanitation qualities of the inhabitants as well as the visitors to the town.

The ecocity programme is being coordinated by the Central Pollution Control Board, Delhi (CPCB) under the Ministry of Environment and Forest, Govt. of India, and the technical support is being provided by the GTZ under the 'Advisory Services in Environmental Management Project' (ASEM). The responsibility of the execution of the ecocity project lies on the Vrindavan Municipal Board.

The GTZ-ASEM (German Technical Cooperation – Advisory Services in Environmental Management) has assigned the task to the Department of Architecture & Regional Planning, I.I.T. Kharagpur (vide agreement dated 21.09.2004) for the preparation of 'Ecocity Development Plan for Vrindavan Ecozone'.

The scope of the work has been limited to identification of Ecozone core area, which is a part of the Vrindavan town,

preparation of the Detailed Project Report (DPR) for the delineated ecozone, and identification of individual projects which should be taken for the accomplishment of the objective ecocity programme, within the framework of the proposed Terms of Reference stated in the above agreement.

1.2 The Ecocity Project : Overview

The ecocity programme is an on-going process, and implementation of the project is undertaken through preparation of sector-specific DPRs for each project.

The project is expected to be the following :

- Sustainable, Innovative and practicable
- Cost-effective using locally available material and artwork
- Easily maintainable
- Simple in design and Replicable
- Create visible impact
- Provide multiplier effect
- Provide catalyzing or demonstrating effect to suite the local people, culture, traditions and art through the state-of-the-art design solutions.

1.2.1 Vrindavan : Spiritual Vision

Mathura and Vrindavan were the playing grounds of Lord Krishna & his friends and thus bears great religious significance. It is mentioned in the Bhagavad Gita that : *Whenever the Supreme Personality appears, He appears in Mathura ... Although Mathura and Vrindavana are situated on this planet earth, they are transcendental abodes of the Lord.*" (Srimad Bhagavatam 10.1.28 Purport).

People solemnly believe that Krishna is history, not mythology. There are more than 5,500 temples in Vrindavan, mainly of Lord Krishna and Radha, most of which were built during the 16th – 17th century. Chaitanya Mahaprabhu visited Vrindavan around this time, and that was followed by the six Goswamis (including Sanatan and Jeev). Much later in the 20th century the city regained prominence after the visit of Prabhupada, the founder of the Iskcon movement.

'Vrinda' means tulasi (basil), the sacred plant. Thus it is apparent that by its very name Vrindavan was traditionally an ecologically sensitive area.

This spiritual vision will serve as a guiding principle in the planning strategy to be employed. Reviving the historic ambience of Vrindavan is one of the prime objectives of the project.

1.2.2 Vrindavan Town and the Core Area

Vrindavan has an area of 4.56 sq.km. and is divided into 8 sanitation zones. The urban population of Vrindavan is 56,618, as per the 2001 Census.

The delineated core area, under study, is limited to approximately 1.0 sq.km. accommodating about 15,000 population. But the issue of concern is the large amount of floating population, in the form of pilgrims and tourist, who visit the town everyday and during specific religious festivals that range between 10,000 and 25,000 daily.

The delineated ecozone is broadly divided into three zones I, II and III, as would be discussed later in Section 1.8. A general idea of physical condition of the roads is also provided based on the Road identity numbers assigned for the present study.

1.2.3 Historical-Environmental Significance

Vrindavan being one of the historical towns in India, with strong religious significance, has gained importance among the people of the country as well as the spiritually conscious people throughout the world.

The town has grown organically, through the history, and in the absence of specific urban planning in the past, is not free from environmental degeneration which is a natural phenomenon all over the world.



Madan Mohan Temple



Govindji Temple



Ranganathji Temple



Kesi Ghat Temples



Shahji Temple



Goda Vihar Temple



Nidhi Van



Lalababu Temple

Major Temples



Hanuman Temple



Ranganathji Temple

1.2.4 The Stakeholders

The ecocity project is aimed to address the needs of the local people in terms of local tradition, historical heritage, culture, religious sentiments, and socioeconomic character of the people living in Vrindavan.

The **stakeholders**, as identified in the study, comprise the inhabitants of Vrindavan, public administration, temple and ashram trustees, traders and business persons, private

entrepreneurs and investors, health and education providers, NGOs involved in the development activities, tourists and pilgrims, various government departments, individual or organised monetary donors.

The issue of Ecocity planning needs to address objectives of the variety of interest groups so as to demonstrate a successful result once the project is implemented.

1.3 Objective of the Study

The overall objective of the project is to improve the environment and bring in visible results through implementation of identified environmental improvement projects.

The programme is expected to bring visible environmental improvement through demonstrative projects that are remunerative and more importantly a multiplier effect for the rest of the city over time.

The programme in the long-run, is expected to help create the needed **awareness** and local dynamics for decreasing environmental burden / stress, improving living conditions and help in achieving sustainable development through an integrated planning and management of and its resources and implementation of environmental improvement measures.

1.4 Scope of the Project

The scope of the project as per the Terms of Reference (ToR) consists the following :

- a) Defining the project area, collection of data / information and undertaking field surveys. (Refer details as presented in the Annexure 1).
- b) Preparation of the Ecocity Development Plan as per the 'objective of the task' mentioned above.
- c) Identification and prioritisation of projects along with preliminary cost estimate that are to be implemented, for fulfilling the proposed Ecocity Development Plan.
- d) To suggest guidelines for preparation of DPRs for the identified priority projects.

DPR= detailed project report

The impact of the proposed ecocity attempts can only be visible when the entire town conforms to the guidelines as stipulated by the planned proposal. However, this may demand preparation of a comprehensive plan for the entire town which is currently absent.

The scope of this project is limited to planning only within the ambit of identified Ecozone core area. Preparation of the comprehensive plan or suggesting detail guidelines for the **entire town is not** within the scope of this study.

The town level guidelines have been provided only to that extent, which affect the development of the core area under study.

However, the policies and guidelines stipulated at the core area level would have flowing effect to the adjoining areas and finally to the entire town in the long-run.

1.5 Reference to the TOR

The scope of the proposed project as stipulated in the Terms of Reference has been presented in the Annexure 1.

1.6 Methodology

The methodology adopted for the study is discussed below.

Understanding the Tasks

The tasks, as mentioned in the ToR, have been studied in detail. Further discussion has been held with the experts of CPCB and GTZ-ASEM to delineate the precise scope of work.

Literature Review

An extensive available literature on Vrindavan and its history have been reviewed. These include the reports on the earlier planning attempts for Vrindavan, Development Master Plan

prepared by the town planning department for the Mathura-Vrindavan Greater Area. In addition the relevant literature on environmental issues, architecture, transportation and other relevant issues have been referred to.

In addition to the above, a study has been conducted to review the approaches and the outcomes, in similar attempts in the other countries.

Survey

Detailed surveys have been conducted by the expert survey team on various issues studies as mentioned in section 1.7. The survey comprised both primary as well as secondary sources of information.

Indicator Identification

Based on the literature and the understanding of the issues, relevant to Vrindavan, a set of 'indicators' and their corresponding 'subindicators' has been identified. The recording of information on various aspects have been made within the framework of the selected indicators (refer Annexure 2) under the broad categories as mentioned below.

- Road
- Sewerage / Drains
- Garbage Disposal
- Public Utilities

- Other Environmental Quality Factors
- General

Analyses of the surveys

Based on all the survey data, as collected by the experts for various aspects, a set of detail technical analyses has been performed. The result of the analyses guided the planning team to comprehend the problems and issues to be addressed for the ecozone, and to arrive at the planning decisions.

Expert-group interaction

On completion of the analyses and at the preliminary decision level, an audio-visual presentation has been made in presence of the various heads of the departments under Central Pollution Control Board on 3rd January, 2005. The experts opined on the approach, issues, considerations, and domain of the ecocity project. This guided the preparation of the final proposal.

Public Participation Workshop

At the final stage of the progress on the planning for the selected ecozone a Public Participation Workshop has been conducted at Vrindavan on 4th January, 2005.

Various stakeholders and experts in Vrindavan had been invited by the local administration. An audiovisual

presentation was made by the planning team in presence of the administration of Vrindavan and the participating members, to deliberate on the outcome of the study.

Following the presentation the participants of the workshop were handed over a brief feedback form to express their opinion on the study, consultants' approach to the appropriate issues, as well as to prioritise the list of proposed projects envisaged by the planning team, to accomplish the objective of the Ecocity project. The workshop resulted into an extremely meaningful outcome with active participation of the stakeholders of Vrindavan.

Identification and Prioritisation of Projects

Based on the understanding developed from the survey, analyses, and the participatory feedback from the stakeholders, the plan has been finally prepared for the selected Ecocity, and prioritisation of the projects has been formulated which could be undertaken for the preparation of DPR in the later stage.

1.7 Survey Techniques adopted

To comprehend the nature of the problems and the relevant issues of the historic holy town, various surveys have been conducted extensively in different phases. The map of Vrindavan has been digitised from the Survey of India Map and the all the road segments in the delineated ecozone have been designated by ID (Figure 1.1).

Reconnaissance Survey

Firstly, reconnaissance survey has been conducted by the survey team for the entire town. All the segments of the roads bounded by the Parikrama Marg have been traversed. This survey has been helpful to understand the nature of development, condition of the roads, drains, structures and the behaviour of the inhabitants and tourists of Vrindavan.

Through this stage of survey an initial attempt has been to identify the ecozone within which the study and planning could be focussed.

Video and Still Photo Survey

An initial selection of a larger zone has been made ranging from Kesi Ghat on the north, Sudama Kutir on the east, Banke Bihari temple on the west and Nagarpalika on the south. This area has been considered for broad survey to comprehend the problems and issues of ecozone planning.



Video Recording of the streets

Extensive photo recording has been done both in the form of still photography as well as video photography for the major roads, temple areas, ghats and any area that could be identified of serious planning concern. These photographs and videos have been referred to frequently while performing analyses and during planning decision making.

Traffic Survey

Vrindavan is a small scale town with more pedestrian and slow-moving oriented traffic that motorised vehicles. However, a large number of pilgrims visit the town and the religious places in cars, and buses which creates a heterogeneous mix of motorised and slow-moving vehicles, such as 'tanga', 'rickshaws' and bicycles. Moreover a significant amount of road occupancy has been observed due to movement of pilgrims in groups in some selected routes which link the major temple complexes.

Hence traffic surveys at selected peak hours have been conducted to assess the vehicle / capacity ratio on some selected roads. The important junctions near the Ranganathji, Shahji and Banke Bihari temples have been selected for the survey.

Road Width and Surface Condition Survey

Vrindavan being a old historic town has grown organically over several hundred years. There is no clear evidence of earlier planning of this nature. Hence the pattern of the road layouts and the corresponding width of the roads reflect

significant variation, often being extremely narrow. The widths of each of the segments along with the widths of the existing surfaces have been recorded meticulously on the preformatted data sheet (refer Annexure 3).

The measurements of the widths have been recorded through measuring tape and a 'digital distometer' (Promeasur+).



Distance being measured



Digital Distometre

Drainage and sewerage network survey

While recording the condition of the roads, simultaneous observation has been made for the location, condition and width of the drains, and their discharge points.

In addition, information has been collected from the local municipality on the newly laid-out sewer network.

Public utilities survey

Within the probable ecozone all the public utility facilities, such as water points (hand pumps, water stand posts, 'pyao'), public toilets and solid waste dumps have been recorded.

Noise Survey

In general the noise levels in most of the areas, within the ecozone as well as the entire town, do not seem to pose any significant threat. However, at some of the nodes near the important temple complexes the noise levels have been identified to be highly alarming. Hence in such selected zones as well as some of the interior areas within the selected zones noise level survey have been conducted. A digital Sound level metre (Lutron SL-4001) has been used for the measurement of the noise level at the peak hours of its increase and recorded accordingly.



Digital Sound Level Metre



Sound Level Recorded

Illumination Survey

During reconnaissance in the evening and night it has been observed that a significant portion of the proposed ecozone has extremely low illumination level. This may pose problems in regard to safety of the inhabitants as well as the tourists and pilgrims.

A digital 'illuminometer' has been used at selected nodes and the interior roads to record the illumination levels at an height of 0.9 metre above the ground.



Illuminometer used



Illumination Level Measured

Water Quality Survey

On learning from the appropriate authority and medical experts at Vrindavan that majority of the inhabitants suffer from gastro-enteric problems, a set of water samples have been collected in sterile bottles from different sources, as discussed in detail in Section 4.3.2.2.9, and water quality

testing has been done through 'Ion-chromatography system' to assess the quality of waters available to the inhabitants and the tourists in Vrindavan.



Water Samples



Ion-Chromatography System



Collection of Water Samples

Questionnaire survey of the Tourists and Pilgrims

A questionnaire survey has been conducted for a limited number of tourist and pilgrims visiting Vrindavan in groups. The format has been presented in the Annexure 4.

Public Participation Feedback

On progressing to a significant level in terms of identification of ecozones, focussing on a selected ecozone for detail action, and identification of probable projects to be undertaken in the further stages, a participatory workshop has been conducted at Vrindavan, inviting the different stakeholders of Vrindavan.

The entire study has been presented publicly in front of the stakeholders, and the feed back on the approach to the study, selection of ecozone, identification of the detail projects to be undertaken has been obtained (refer Annexure 5).

1.8 Delineation of the Eco-Zones

Based on the study, survey and analyses initially 3 (three) zones have been identified as the core areas of the Eco-City development, as indicated in the Figure 1.2.

Road identities have been assigned to the road stretches within these zones and a brief discussion of physical conditions provided herewith.

Zone One is the oldest area of the town consisting mainly of sanitation wards 1 & 2, and also includes the Shahji temple precincts on its western fringe. It has an area of 0.645 sq.km. This zone is the oldest and most heritage-rich zone in the town, with predominantly narrow congested roads and significant degrees of environmental pollution.

The main approach road to this zone is Road ID 1, from Nagarpalika to the Rangji temple western entrance. Road IDs 2, 3 and 4 is the commercial strip that runs through Gopinath Bazar and leads to the Kesi Ghat. Broadly speaking, road IDs 5 – 35 have been assigned to road stretches to the east (right) of this axial road, while the roads to the west (left) of this road are assigned IDs between 36 – 51, forming the western border of ecozone I.

Towards the eastern side of this said axial road, the road IDs 5 - 7 depict the area around the Brahma Kund, while IDs 8 and 9 are the roads to the north of Lalababu temple leading to the Gyan Gudri. The roads surrounding Gyan Gudri are assigned IDs 9a through 13, while IDs 14, 15 and 15a lead northwards towards Sudama Kutir.

Road IDs 16-18 run north of Goda Vihar and South of Mahadeve Temple, while road IDs 19 – 23 run southwards along the eastern fringe of Bansivat and Radha Gopal Temple. The area north of Radha Gopal temple and Bansivat with roads leading to Gopinath Bazar are represented by road IDs 24 –28. The extreme eastern fringe of ecozone I, through Laxman Sahid, Tatia Sthan and Tikari Ghat (along the river) are assigned ID's 29 – 34, while ID 35 runs between Rangji and Lalababu temple.

Towards the western side of the said axial road, IDs 36 – 37 run north of Radha Gopinath Temple and 38 - 39 to the south of the same temple. Road IDs 40 – 41a form the south western boundary of ecozone 1. Road IDs 42 –44 lead northwards from Nidhi Van, while ID 45 runs along the river Yamuna near Chir Ghat. The roads leading southwards from

Chir Ghat and surrounding Shahji temple are assigned Road IDs 46 – 51, forming the western boundary of ecozone I.

Zone Two consists mainly of sanitation ward 5 and has an area of 0.371 sq.km. It is situated around the Banke Bihari Temple, with road stretches assigned IDs 57 – 70. The road running via Athkhamba and Goverdhan is assigned ID 58, and IDs 59 –60 lead westward past Banke Bihari temple to Suraj Ghat. Road ID 61 runs along the river from Suraj Ghat to Kalia Ghat and ID 62 runs eastward from Kalia Ghat forming the southern boundary of ecozone II. The approach road to Madan Mohan temple is assigned ID 63, while Road IDs 64 – 67 form the road stretch to the west and south of the Banke Bihari temple. The southern boundary of ecozone II is assigned ID's 68 –70.

Finally, ecozone III Three is located in between the first two zones, consisting mainly of sanitation ward 3 and has an area of 0.318 sq.km. The spinal road stretch in this zone runs through Loi Bazar and Bankhandi (Road ID's 54 and 55), while the road stretch along the river from Govind Ghat to Jugal Ghat is assigned ID 56. Road IDs 52 and 53 form the south-eastern portion of ecozone III leading westward from Road ID 1.

The area from Atallachungi to Nagarpalikam though not directly a part of the ecozone, serves as the approach to ecozone I – hence road IDs 71 – 73 are assigned to this area. The total area that has been identified as the Ecocity Zone (including all three said zones) has an area of about 1.33 sq.km.

Justification of Selection of Ecozone 1

The ecozone 1 has been identified as the area where the immediate actions of the Ecocity plan will be carried out as shown in Figure 1.3. The experts at Vrindavan have ratified this. This is the oldest part of the city developed on riverbank with famous ghats and has the maximum number of heritage structures of the town. It is a multi-centred pilgrim attraction zone. Maximum architectural degeneration has been observed in this area and it is in dire need for upliftment, maintenance and architectural conservation. The socio-economic character of people living here is significantly similar, mostly comprising economically challenged and elderly people.

PART A



SURVEY & ANALYSES

2.0 PROFILE OF VRINDAVAN & HISTORIC PRECEDENTS

2.1 Regional Significance

Vrindavan is a holy town associated with Lord Krishna, situated on the banks of the River Yamuna. It is situated at Latitude 27°34'N - Longitude 77°41' N. It is situated in Uttar Pradesh on the direct road link from Delhi to Agra (NH-2), about 145 kms south of Delhi and 55 kms north of Agra. Vrindavan is closely associated with Mathura (14 kms away) and is well connected by rail and bus services.

The region around Vrindavan has other places of religious significance associated with Lord Krishna – such as Goverdhana, Nandagram, Varsana, Radhakunda, Dig, Gokula and Dauji (refer Figure 2.1).

2.2 Site Context : Vrindavan Riverfront

The sacred and once-beautiful River Yamuna, one of India's most sacred rivers, flows through the transcendental land of Vrindavana and Mathura. It originates from Yamunotri, about 240 km north of Hardwar. It is considered sacred as it is intimately connected to Lord Krishna's pastimes.

The ghats at Yamuna were the playing fields of Lord Krishna Himself along with his friends. A dip in this river is said to be very purifying for all humans. The ghats were mostly built during 16th – 17th centuries. The most famous ghats are Keshi Ghat and Chir Ghat, which are constructed in yellow sandstone and show superb architectural character.

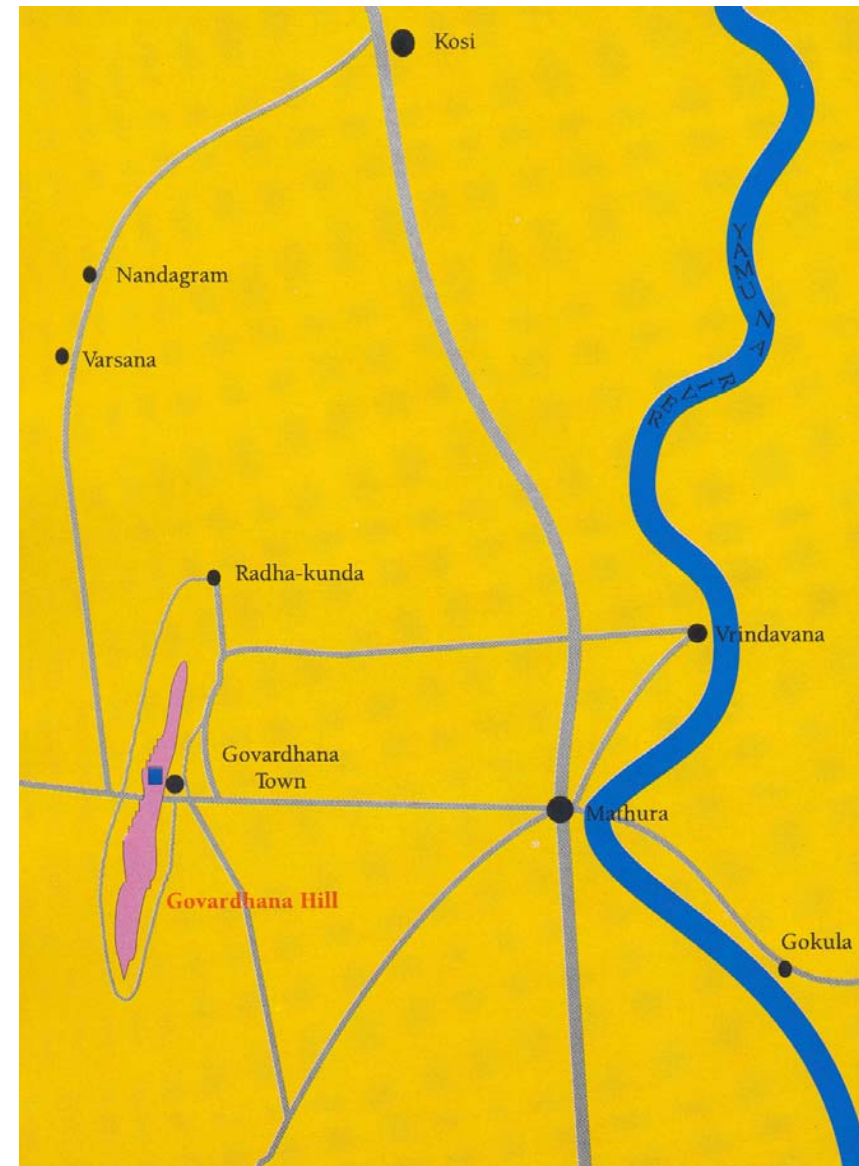


Figure 2.1

Presently, due to indiscriminate construction down stream, the river is much polluted. It has moved away from the original position due to silting, making some old ghats inaccessible to the river. The dry ghats at Vrindavan are: Kaliadaha Ghat, Virah Ghat, Jugal Ghat, Korla Ghat and Suraj Ghat. The condition of most of these ghats is very poor due to indiscriminate garbage dumping. The red sandstone ghats have great architectural heritage value and could be made as successful as Varanasi ghats.

Boating is carried on presently at the Keshi and the Cheer ghats. This is a private unorganized activity, but has the potential to be made into an international standard level tourism activity.

2.3 Historic Precedents : The Temples and Religious Institutions

Vrindavan has more than 5500 temples, mostly dedicated to Lord Krishna, Radha and Lord Balaram. They show a varied admixture of architectural styles, mostly built in the 16th to 17th century. Some of the notable temples are Banke Bihari temple, Govinda Dev temple, Shahji temple, Rangnathji temple, Madan Mohan temple, Isckon temple, etc. (refer Figure 2.2).

Apart from the temples, there are samadhis of famous religious personalities in Vrindavan, ghats along the River Yamuna, sacred 'kunjas' (gardens) and trees, 'kundas' (lakes), 'bhajan-kutirs', and institutes of religious and cultural education.

A chronology by approximate dates of construction of temples has been attempted during the study:

Kaliya Mardana	before 16 th century
Madan Mohana	1516
Radha Damodara	1542
Radha Ramana	1542
Radha Vallabha	1570
Govindji	1570 – 1590
Gopinath	1627
Jugal Kishore	1627
Ashta Sakhi	16 th century
Radha Shyamsundar	16 th century
Band Khandi Mahadev	16 th century
Lalababu	1810
Rangnathji	1851
Radha Gopal	1860
Banke Bihari	1864
Tikari Rani	1871
Shahji	1876
Jaipur	1917

The Parikrama Marg (Figure 2.3) is a circumambulatory road around the town that goes around the town, and is about 10 kms in length. Devotees walk barefoot all around the Parikrama Marg especially on Ekadasi (11th day of the waxing and waning moon). However it lacks an integrated

urban design character to unify the entire stretch. It needs an augmentation of pilgrim facilities – proper signage, more trees, shelter, water facilities at some stretches.

2.4 Vernacular Landscape

The landscape of Vrindavan is largely natural with some existing open spaces and water bodies. The predominant landscape is of flowering trees, shrubs and bushes. Some of the notable species are tulsi, tamal, kadamba, banyan, etc. The water bodies, gardens and ghats are symbolic to the religious essence of Vrindavan. No organized roadside planting along major roads was observed.

3.0 CRITICAL PLANNING ISSUES

Temples, gardens and ghats are major elements in Vrindavan connected with the Parikrama Marg – an important symbolic feature. The harmony of these important features with each other and with newer developments is presently lacking. The present day haphazard development is spoiling the environmental quality of the religious towns. Road condition and traffic congestion, air and water pollution are creating adverse conditions for tourists and pilgrims.

This section highlights and briefly discusses such critical issues that form the basic planning parameters for a cleaner and greener Vrindavan.

3.1 Physical Issues

It is observed that Vrindavan primarily has low-rise residential development interspersed with large chunks of religious land use. The ownership of most of these religious areas, both built up and open spaces rests with temples trustees and not the Nagarpalika. This acts as a critical issue while planning for future development.

As the map of Vrindavan will suggest, the northern and north-eastern boundary of the municipal area is wholly bounded by the River Yamuna. Thus, no possibility of extension exists in these directions.

Within the core area, the configuration and geometry of roads suggest that they have grown organically, thus being narrow and congested in the core area of the town. Gradual

densification of the area now exerts severe pressure on the carrying capacity of these roads. It is observed that in later developments, the roads are wider and less densely placed.

Within the oldest part of the town, road width inventories reveal that IDs 1a, 2 and 4 (around Gopinath Bazar) are very narrow with no space available for widening. Similar situations are seen in the older roads leading from the Kesi Ghat, surrounding Shahji temple and forming the western boundary of ecozone 1.

The road IDs 5 – 9b (i.e. around Brahma Kund, Lalababu temple and Gyan Gudri) are moderate in width, but need widening to avoid vehicular and pedestrian conflicts. In general most of the other road stretches are moderate in width and need no immediate widening.

The Parikrama Marg circum-ambulates the major part of the town and earlier served only as fringe areas of Vrindavan. However due to the growth of the town towards the south, this character of the Parikrama Marg has changed, and the southern portion of the path actually traverses through the dense developments of Vrindavan. The road stretches passing through the ghats (IDs 34, 45, 56, 61) form a large portion of the Parikrama Marg that falls within the study area.

3.2 Circulation & Transportation Issues

The older core area of the town has narrow congested roads with very little on-street parking space. Shops have come up in the areas close to the entrances of important temples, creating major conflicts between the predominantly

pedestrian traffic, other slow-moving modes and automobile traffic.

Shopping encroachments cause problems in Road IDs 2, 3 (Gopinath Bazar), and IDs 41, 41a, 49, 50, 51 (around Shahji temple). Also, road IDs 54, 55, 58 to 60, which pass through Loi Bazar, Bankhandi, Goverdhan and Banke Bihari temple area, are encroached and thus chaotic and conflicting from the circulation point of view.

A few road stretches have been identified that are congested as well as narrow, and should receive critical importance regarding traffic control and other planning interventions. These road IDs are 1a, 2, 36, 37, 41a, 49a and 51. Some road IDs are identified as congested stretches with moderate width that need widening. They include IDs 5 to 7 (around Brahm Kund), ID 8 (North of Lalababu temple), 42, 48 and 49 (around Nidhi Van and Shahji temple). Road IDs 43 to 47 (around the Shahji temple area) are moderately wide roads that are chaotic but not very congested, and has to be freed from traffic impediments and encroachments. (Refer Table A – 2.2)

The absence of footpath or sidewalks, coupled with absolute lack of any traffic management practices, make these mentioned road stretches really unsafe for pilgrims and other pedestrians. (Refer Tables A – 2.3, 2.4)

Traffic mode suitability indicates (refer Table A – 2.3) that most road stretches in the ecozone 1 core area, have a mix of slow moving modes such as pedestrians, cycles, rickshaw, tanga and also animal drawn carriages. Special

attention may be given to road IDs 1 to 3 (Nagarpalika to Gopinath Bazar) and IDs 25 to 28 (North of Radha Gopal temple) where automated two-wheelers are prevalent too, leading to unsafe, congested and environmentally polluted conditions.

Since animal-drawn carts are closely linked with the religious and historical character of the town, they cannot be avoided or easily restricted. However, it should be noted that these transportation issues directly lead to environmental pollution such as air pollution (dust) and noise pollution.

3.3 Environmental and Hygiene Issues

Vrindavan is historically perceived as a pristine settlement on the banks of the beautiful River Yamuna. However presently it presents a sorry picture of environmental degradation in general. The River Yamuna is very polluted and has also shifted its course making many of the western side ghats dry and defunct. Not only is the river water polluted due to indiscriminate garbage disposal and sewerage discharge, but the ground water is also contaminated.

Within the study area, road ID 34 is situated to the extreme east near Tikari Ghat, Road ID 45 runs from Kesi Ghat via Chir Ghat to Govind Ghat, ID 56 from Govind Ghat to Jugal Ghat and finally ID 61 from Jugal Ghat to Kalia Ghat.

Many of these road stretches along the river exhibit fantastic architectural character in yellow sandstone, but need urgent architectural conservation since they are in precarious

condition. Waste dumps have sprouted up along the river and many ghats are unsafe for public entry due to broken fences and guard walls.

Apart from water pollution, Vrindavan also faces air and noise pollution due to dust and congestion of roads, indiscriminate admixture of various modes of traffic and also due to the noise generated by commercial establishments. The road IDs facing such problems are 1, 2, 41, 41a, 49 (along the road from the western entrance of Rangji temple to the Shahji temple).

One major concern is that open storm water drains are at times used to dump sullage, sewerage and even solid wastes. This results in choked drains causing severe health and hygiene hazards. Many vacant plots have been used as garbage dump-yards for many years on end, causing visual eyesores and malodorous situations. These issues create critical illnesses among the residents, most of which are water-borne diseases.

Some of the road stretches identified with such environmental problems are IDs 2 and 3 (Gopinath Bazar), 36 and 37 (south of Kesi ghat), 41,42, 49 (around Nidhi Van and Shahji temple) in ecozone I. In ecozones II and III, road IDs 54, 55 and 58 (along Loi Bazar, Bankhandi and Goverdhan) exhibit similar environmental hazards.

3.4 Tourism and Pilgrim Issues

The significant part of the population analysis is that there is a daily floating population of about 25,000 of pilgrims and

religious tourists. The peak population for festivals like Janmashtami sometimes rises to as high as 10 lakhs.



Pilgrims movements around temples

Some data on tourist flow in the year 2001 is provided herewith in Table 3.1.

Table 3.1
Existing Tourist Flow Data (2001) (in thousands)

Year	Domestic	International
2000	3119	15.7
2001	3220	15.0
2002	3301	16.1
2003	3314	16.2

There is a dire lack of basic tourism infrastructure, though Vrindavan is a pilgrim and tourist intensive town. There is inadequate boarding and lodging accommodation for various economic classes. Vrindavan also lacks in definitive pro-active promotion strategy.



Guided Pilgrims



Old ladies busy in Bhajan

passing through ecozones III and II consist of road IDs 54, 55, 58, 67 and 62. The stretch north of the congested Banke Bihari temple area is assigned IDs 59 and 60. Besides these mentioned pilgrim routes, the Parikrama Marg stretch from Kesi Ghat in the north-east to the Kalia ghat in the south-west forms an important pilgrim route (road IDs 45, 56 and 61).

There is a greater possibility of public-private interface, with added thrust to tourism by augmenting facilities. Underdeveloped tourist spots and undefined interconnectivity are some major areas of possible improvement. Boating is presently an unregulated under-explored activity that promises a lot of tourism potential.

The prime road stretches with heavy tourist traffic flow have been identified in Figure 4.27. It is observed that tourists, primarily pedestrian, frequent some road stretches in the study area. One such stretch leads from the Nagarpalika to Kesi ghat via Gopinath Bazar (IDs 73 and 1 to 4), another stretch passing through Brahm Kund, Lalababu temple and Gyan Gudri (IDs 5, 6, 8, 9 to 13). Two other road stretches, one to the west of Goda Vihar and Mahadev Temple (IDs 19 to 23) and the other to the north of the Radha Gopal temple (ID's 24 and 26) form important pilgrim routes too.

Within ecozone I, both the road stretches, one leading from Rangji temple to Shahji temple (IDs 41, 41a, 49, 47, 46) and the other to the north of Nidhi Van (IDs 38 and 42) are frequented by pilgrims too. The other main pilgrim route

4.0 EXISTING PROFILE

This section deals with the existing status of the social, cultural, religious profiles, the physical profile, environmental profile, traffic and transportation profile, sewerage drainage and water supply profile, solid waste management profile, recreation and landscape profile and finally the urban design and conservation profile.

4.1 SOCIAL, CULTURAL AND RELIGIOUS PROFILE

4.1.1 Demography

Vrindavan has an area of 4.56 sq.km. and is divided into 8 sanitation wards. The urban Population of Vrindavan is 56,618 (2001 Census), while it was 47,746 (1991 Census). Thus the projected urban population of Vrindavan is 81,818 (by the year 2021).

The significant part of the population analysis is that there is a daily floating population of about 25,000 of pilgrims and religious tourists. The peak population for festivals like Janmashtami is as high as 10 lakhs.

The town has been divided into eight sanitation wards as shown in Figure 4.1. The ward-wise population and population density have been presented herewith in Table 4.1.

Table 4.1
Ward* Wise Population Density (* Sanitation wards)

Ward No.	Population (2001)	Ward Area (sqkm)	Density (Persons/sqkm)
1	11088	0.793510	13973
2	4843	0.141633	34196
3	8351	0.321081	26009
4	6308	1.105644	5705
5	15640	0.299259	52262
6	2995	0.149075	20091
7	5835	1.107084	5271
8	1558	0.641611	2428
Total	56618	4.558897	

There seems to be an absence of village development programmes.

No proper training and marketing cooperative for promoting traditional crafts were identified during the study. There is thus a need for more pro-active citizen participation and public awareness of the value of heritage in Vrindavan

4.1.2 Public rituals and festivals

Many religious festivals are held in Vrindavan all around the year, when a large number of pilgrims and tourists visit the town for short periods. The major festival is Krishna Janmashtami (3 days in August) when the average tourist

inflow exceeds 2.5 lakhs. Radha Ashtami is celebrated a fortnight later for one day. Holi, the festival of colour is celebrated in the month of March.

The other auspicious occasions are Vasant Panchami (February), Ramnavami (April), Ratha mela (10 days in April), Shravan mela or Jhulan utsav (July), Navratri (10 days in October), Deepavali (1 week in October-November) and Raspujima (3 days in November).

4.1.3 Health Condition

The prevalent diseases in Vrindavan are primarily water-borne such as jaundice, hepatitis, cholera and amoebic dysentery. Poor sanitary conditions and stagnant sewage water are observed throughout the town and hence malaria is very common. The other common ailments are tuberculosis and leukoderma. In general, malnutrition has been reported among the lower income groups and economically weaker sections of the population.

The residents of Vrindavan depend upon the following major health facilities: Ramkrishna Mission Hospital (150 beds), T.B. sanatorium, Arogyadeep Hospital, P.L.Saraf Charitable Hospital, Women's Hospital (20 beds), Municipal Prasuti Griha and Eye Hospital.

4.1.4 Observations, Issues, Concerns

Existing utility services, health facilities and other infrastructure is presently not able to cope up with the

increase in urban population and floating population during fairs and festivals. Well planned programmes of these facilities are urgently required to prevent ill-health and diseases as well as to achieve greater satisfaction among citizens regarding civic amenities. Proper maintenance and utilisation of gardens, water bodies and proper maintenance and cleaning of roads and drains are serious concerns in Vrindavan.

4.2 PHYSICAL PROFILE

4.2.1 Administrative Setup

The town of Vrindavan is defined by the Parikrama Marg that runs around the town.

The municipal Board of Vrindavan was created as early as 1866, one of the oldest in Uttar Pradesh. The Nagar Parishad area is divided into eight sanitation wards. It is presided over by the Adhyaksha, under whom 25 elected and 5 nominated members serve a five-year term. The Executive Officer, on behalf of the Nagar Parishad oversees the various departments of health, education, water, engineering, finance, taxation, mutation and construction.

4.2.2 Land Area

The area of Vrindavan is about 4.56 sq.km. and is divided into eight sanitation wards as presented in Table 4.1 earlier.

The topography of Vrindavan is generally flat with a gradual slope towards the River Yamuna. An earthen mound of about 10 metres height, exists towards the north-west side of the town, close to the Suraj Ghat, on which the Madan Mohan temple was built.

The climate of Vrindavan varies from hot in summer to cold in winter, with a maximum of 42 - 45°C in May-June and with a minimum of 5-10°C in December-January. The average annual rainfall is about 800 mm (August - September).

4.2.3 Existing Land use

Vrindavan has predominantly residential and institutional land uses and open spaces (primarily used for religious purposes). Small pockets of commercial land use are found in the markets and near major temples. No major industrial development exists in the town (refer Figure 4.2).

4.2.4 Built Form

Recent construction of residential buildings mainly without proper building regulations is a major cause responsible for the degradation of visual environmental quality as well as unsafe living conditions. High boundary walls of gardens create visual barriers at imageable vistas and are damaged at many places. The built vis-à-vis unbuilt spaces of the town has been shown in Figure 4.3.

4.2.4.1 Height of Buildings

The general characteristic of built form presents low rise and development, mostly with two-storied buildings with little or no side or joint open spaces. These are dominated by the towering features of temples.

Good panoramic views of the town may be seen from the temple tower next to the Brahma Kund and the water tank in Gandhi Park.

4.2.4.2 Age of Buildings

Many of the major temples of Vrindavan are about 300 – 400 years old and are made of good quality red sandstone. Some old brick structures were observed where smaller bricks were laid in lime-surkhi mortar. However many of these old structures are presently in a dilapidated condition and pose safety hazards to their occupants and passers-by.

4.2.5 Open Spaces and Greens

It is observed that there is very little open space for public use in the core area of Vrindavan (refer Figure 4.4). The few existing open spaces provide breathing space to the otherwise congested town. Some notable parks and open spaces include the Rangnathji ka Bara Bagichi, Gandhi Park, Nidhi Van, Gyan Gudri, Kishore Van, Brahm Kund and Ram Bagichi. There are some notable paved plazas too mostly around temples that are used to pilgrims to relax.



Gyan Gudri



Gadela bag

4.2.6 Riverfront

It may be appreciated that essentially Vrindavan is a river-front development, where the entire northern and north-eastern periphery is bounded by the River Yamuna. This restricts the possibility of any growth of the town in these directions.

Since the residents of Vrindavan always depended on the river for drinking water, sanitation and transportation, the current scenario of a polluted riverfront has posed severe threats to the well-being of the residents. Many of the ghats are now defunct and dry due to the shifting of Yamuna's course, as has been discussed earlier (refer Figure 4.5).

The sanctity and purity of the riverfront is presently under great threat since a lot of the dirty storm-water drains directly discharge into the river. There is a large amount of silting and contamination of water due to this. Some unauthorised constructions have taken place on the riverside since it is not directly under the jurisdiction of the Nagarpalika Parishad. A

burning ghat and a sewage treatment plant have also been erected on the riverfront which may have adverse impact on the environmental quality of the river.

4.2.7 Related Indicators

The following are the related indicators by which meaningful actions in related sectors would ensure a better physical environment in the identified ecozone as well as the entire town.

- Planned development
- Intrinsic religious / cultural character
- Employment condition
- Revenue generation
- Land under encroachments
- Protection of natural resources
- Area under maintained public open spaces
- Amount of Degraded land
- Proportion of Green areas

4.2.8 Problems, Issues and Concerns

There is a serious lack of open spaces and cultural congregation spaces, such as 'mela grounds', museums, cultural or community centres, especially in the ecozone area.

Existing open spaces are not properly maintained and there is a lack of local regulations or enforcement mechanisms. This results in encroachments by other land uses, damaging the environmental quality of the area. Other pressing needs are maintenance of water bodies and dust and noise control.

Commercial establishments encroach upon roads and do not maintain safety and hygiene standards in crowded market places.

4.2.9 Planning and Design Guidelines

The approach to planning addressing the prevalent problems and physical issues need to be dealt through preparation of a comprehensive plan for the entire town which would have bearing with the regional context and economy.

This is beyond the scope of this project. However, any attempt within this project domain will have positive impact and make significant improvement to the physical profile of Vrindavan town.

4.3 ENVIRONMENTAL PROFILE

The analyses on the environmental profile, within the purview of the eco-city project, have been focussed into four major domains.

- Traffic and Transportation
- Sewerage, Drainage and Water supply

- Solid Waste
- Urban Design, Conservation and Landscape

The individual observations and results have been discussed hereunder.

4.3.1 Traffic and Transportation

4.3.1.1 Existing Traffic and Transportation Scenario

Vehicular traffic within the Eco-Zone largely consists of a mixture of many slow moving modes, including camel, horse and cow-carts. Most roads are very narrow and inadequate in capacity for vehicular movement (refer Figure 4.6). Some roads are wider but have inadequate access width for the traffic that flows through them. The predominant mode however is pedestrian, especially in the region surveyed. The most heavily congested traffic nodes have been identified (refer Figure 4.7).

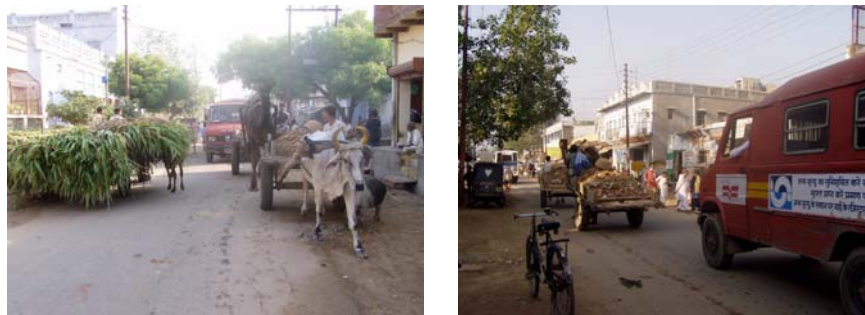
4.3.1.2 Related Indicators

4.3.1.2.1 Traffic Condition

The prevalent traffic condition in general, throughout the town, is a reflection of laissez-faire without the existence or adherence to traffic rules, traffic management enforcement, inadequate road capacity.

The problem is more acute in the historic part of the ecozone where the roads are narrow, without any scope for physically widening. These roads are coupled with other grave concerns, such as adjoining dense building development, abutting shops and commercial establishments, encroachment by the public utilities (such as, water points and electric posts), ground-floor level overhangs (typical feature of Vrindavan old town), open drains and the absence of parking areas for vehicles.

The road stretches suffering from such traffic concerns within ecozone I, include the stretch along Gopinath Bazar (IDs 2, 3), from Rangji temple to Shahji temple (41, 41a, 49 and 47), and the area around Brahm Kund and Goda Vihar (IDs 5, 6, 22 and 23). In ecozone II, such traffic conditions are observed on the roads through Loi Bazar, Bankhandi, Goverdhan and around Banke Bihari temple (IDs 54, 55, 58 and 59).



Multimodal behaviour on roads

In totality this may offer an excellent historic character, typical of any religious town in the country, but results in significant traffic impedance, decreasing flow rate, causing congestion and severe bottlenecks at peak hours, as seen in road IDs 73, 1 and 2.

Dynamic photo surveys indicate the critical locations and junctions, which are prone to frequent occurrence and severity of such traffic conditions.

Indicators for traffic conditions on the identified road ID's are presented in Table A – 2.2. The road stretches that fall in the 'congested' category include those with IDs 1a, 2, 5 – 7, 36 – 37, 40 – 42, 48 – 53, 64 – 68 and 72. Other important stretches which are 'chaotic, but not congested', include IDs 1, 3, 8 – 9b, 25 – 28, 44, 46, 50, 54 – 63, 69 – 71 and 73.

All other road IDs fall within the categories 'smooth flowing', 'little or very little traffic', as indicated in Table A – 2.2.

4.3.1.2.2 Width Characteristics

Widths of all the roads within the delineated ecozone have been measured, along with the information on corresponding surface conditions. A summary of the observation has been presented in Table 4.2. Computation of the road width has been done especially for the delineated ecozone 1 and 2. Ecozone 3 is situated in between these two zones but contain not much significant importance. Hence it has been excluded from the list.

Table No. 4.2
Percentage Share of Road Width in the Ecozone

Road Width	Zone 1		Zone 2	
	Total Length (approx.)		Total Length (approx.)	
	Metre	%	Metre	%
Up to 3 meter	1,812	20.34	338	4.33
3 - 6 meter	4,493	50.43	3,199	40.97
6 – 9 meter	1,531	17.19	3,197	40.95
Above 9 meter	1,073	12.04	1,073	13.75
Total	8,909		7,807	

It is observed that the effective width of the roads gets reduced significantly due to the existence of adjoining open drains, and the ground floor level overhangs

The physical limit of the right-of-way and the abutting developed properties offers no scope for road widening. The solution has to be evolved through design of the road sections by covering drains and clearing the overhangs.

Indicators for road widths characteristics of the identified road ID's are presented in Table A – 2.2.

Only a few roads have been identified as 'adequately wide' such as 1, 13 – 18, 29 – 30, 56, and 69 –73. The roads falling under category 'moderately wide, needing no further widening' are IDs 3, 10 – 12, 19 – 28, 31 – 33, 39 – 41, 45, 47, 52 – 55, 58, 61, 67 and 68. However many stretches though 'moderately wide, need widening'. The road IDs under this category are 5 – 9b, 15a, 34, 35, 38, 42, 48 and 49.

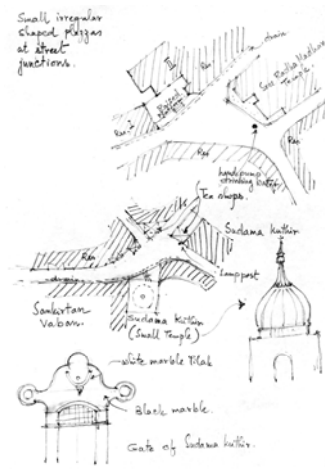
All other road are 'narrow and need widening'. Space for widening is available only in road IDs 64 to 66. The remaining roads are cause for concern since no space is available for widening of these roads.

4.3.1.2.3 Surface Condition

Observations reveal that the general condition of roads is average to good. Roads are narrow but are paved with cement concrete. The concrete roads mostly have 0.45 to



Overhangs over the open drains



Sketch of Nodes

0.60 m brick shoulders & surface drain on both side of the road.

Indicators for surface condition of roads are also presented in Table A – 2.2.

The majority of road stretches surveyed are in poor condition, with cement concrete surfacing and brick shouldering – as seen in road IDs 2, 3, 5 – 9b, 13 – 18, 27, 28, 40, 42, 44, 45, 49 – 54 and 58. Many other roads have similar poor conditions, cement concrete finish, but are without any shouldering – as seen in road IDs 1a, 41a, 50, 55, 59, 61 and 64 – 66. All other roads surveyed have satisfactory cement concrete surface conditions.

Shouldering is paved with bricks, but they are usually of poor quality. No waterlogging problem has been reported or observed during the study period. But overflowing water from surface drains causes degradation of the road surface. Some roads are encroached by shops or agricultural land owners, the shops having cantilever projections (upto 300 mm) over the drains, as seen predominantly in road IDs 2, 3, 41, 41a, 49, and 47.



Irregular paving on roads



No drains along the narrow road

4.3.1.2.4 Mode Characteristics

The town being old and organically growing, with strong regional linkages, invites all kinds of modes ranging from slow moving (horse rider, bicycle, cycle-rickshaw, rickshaw van, hand cart, bullock cart, camel cart) to the fast moving (automated two wheeler, cars, mini van, buses and trucks).

Simultaneous presence of all the modes on the roads causes a significant travel impedance and reduction in travel time. The severity of the impedance increases when the goods carried by the vehicles overhang extensively along the width beyond the allowable limit, thus occupying additional road space with the result of reduction in passenger car unit.

Indicators for traffic mode suitability for the roads are presented in tabular form in Table A – 2.3.

It is revealed that most road stretches are suitable for slow moving vehicles like bicycles, rickshaws and targas. Many stretches have been identified to be suitable for only pedestrian movement, though in reality all types of slow modes are allowed in these stretches – as seen in road IDs 41a, 42, 47 to 51, 59 and 64 to 68. The only road ID's where four wheelers seem suitable from the Indicator study are IDs 69 to 73.



Narrow roads



Multiple modes

4.3.1.2.5 Traffic Volume vis-a-vis Road Capacity

The major vehicular as well as the major pilgrim routes have been identified and shown in Figures 4.8 and 4.9 respectively. The traffic survey has been conducted (refer Annexure 6) in five important locations as elaborated below. The surveys have been conducted for a span of 30 minutes each, once in the morning and once in the evening, during the peak hour when both pilgrim movement and other vehicular movement are high.

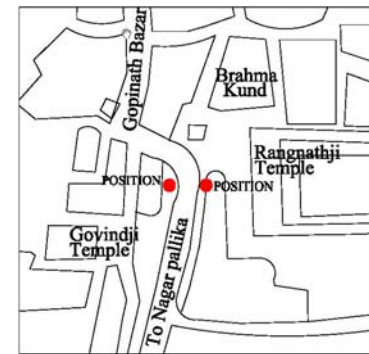


Pedestrian movement using full capacity of roads

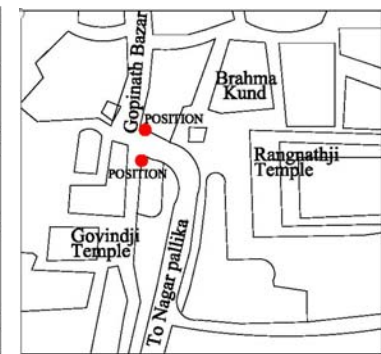


Location 1- Entry point to Ranganathji Temple. From this point majority of the pilgrims and tourists enter ecozone 1 and go to the various other religious places. Till this point the motorised vehicular access (bus, cars etc.) is prevalent.

Location 2 - Patharpura Tiraha. From here the traffic splits into two direction, one towards the Kesi ghat and the other towards the Shahji temple.

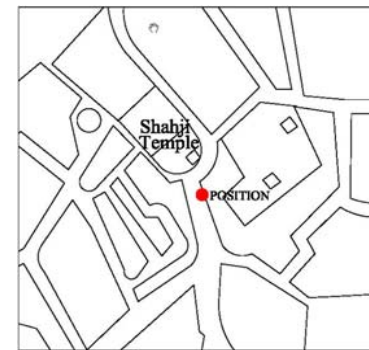


Location 1

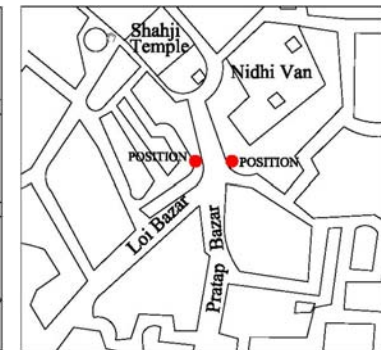


Location 2

Location 3- Retiya Bajar (near Shahji Temple)



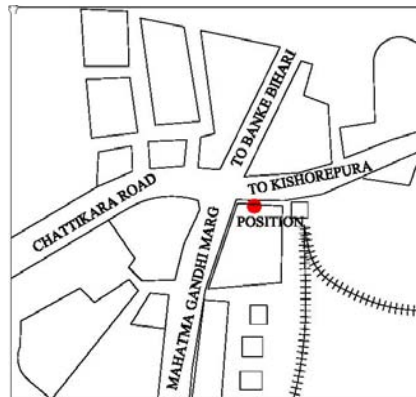
Location 3



Location 4

Location 4 - Shahji Mandir Road, where the traffic is divided for the movement towards Gopinath bazaar, Loi bazaar and Pratap bazaar.

Location 5 - Intersection at Ahirpura, where roads are leading to Banke Bihari Temple, Kishorpura and Gandhi Marg.



Location 5



Traffic surveys in progress

The general observation derived from the survey reveals that pedestrians, cycles, rickshaws and two wheelers primarily occupy the roads. There is extremely low frequency of traffic in terms of tangas, auto and cars on these roads. Buses are allowed to enter into these intersections. The road IDs showing such characteristics have been identified as 2, 3, 41, 41a, 49, 54, 55, 58.

In general, most of the roads within ecozone 1 are narrow. The capacities of the roads are insufficient for the vehicular movements. Slow-moving vehicles and pedestrians are predominant. The capacity of the roads seem to be adequate for two-way rickshaw movements, but effective capacity of the roads often reduce due to the intrusion of the 'tangas' or animal carts.

The pilgrims moving in groups cause the major impedance to the traffic movement. However, pilgrims are the lifeline of the religious activities as well as source of economy of Vrindavan. Hence, designating the pilgrim routes and time-specific restrictions of vehicular movements may solve the traffic problems on these roads.

4.3.1.2.6 Footpaths and Sidewalks

At most places there is no footpath along the road for safety of pedestrians. There is also a dearth of trees making it unbearable for pilgrims during summer and monsoons. There are no proper tourist information booths.

Indicators for footpaths and sidewalks along roads are presented in Table A – 2.3. Quite notably almost all the road ID's do not have sidewalks or footpaths, which is a matter of serious concern for pedestrian safety and convenience. Only three road IDs – 1, 29 and 29a (in front of Nagarpalika and Laxman Sahid Marg) have sidewalks, but they are presently either encroached or blocked by obstructions.

4.3.1.2.7 Traffic Intersections and Islands

There seems to be a general lack of organized roadside parking and parking spaces in the core area of Vrindavan.

Some narrow roads with turns and bends present excellent imageable vistas and visual potential. Some of these road intersections possess the potential to provide for an interesting and pleasant experience, if designed sensitively. Some specific stretches need improvement. Tea stalls and shops in small sheds have cropped up at some corners, dumping waste and thus spoiling the environmental quality, as observed near Sudama Kutir.

4.3.1.2.8 Parking Facility

There is severe scarcity of parking for the tourist vehicles (bus, cars, tanga and rickshaws). Both off-street and on-street parking spaces are in short supply at crowded nodes. Many locations have parking demand but the supply is haphazard and thus insufficient. On-street parking observed at congested areas cause impediment of traffic flow. The temporary parking areas are not paved, causing dust

pollution. There is a serious need for off-street parking of para-transit near pilgrim intensive areas.

Indicators for parking facilities along roads are presented in Table A – 2.3.

It is observed that a significant majority of the road ID's do not have any kind of parking facility whatsoever. The notable exceptions are IDs 1, 29, 29a, 34, 44, 55, 56, 61 and 73, where some parking space is available and should be put to use effectively. Road IDs 39 and 52 have some parking space available, but they are chaotic and cannot be used effectively. The only stretches where parking is provided presently in a somewhat systematic fashion are IDs 69 – 72, all of which are situated to the southern fringe of ecozone II.

4.3.1.2.9 Traffic Management

There is total absence of enforcement of traffic management and traffic safety. The absence of road dividers, proper traffic engineering of the junctions and intersections, uniform road width, designated pedestrian zones and signalling system lead to extremely inefficient traffic scenario.

Indicators for traffic management practices along roads are presented in tabular form in Table A – 2.4.

It is observed that a large majority of the roads surveyed have no traffic management whatsoever. Road IDs 15 and 16 have painted lanes, while signage is observed in road ID 56. The notable exceptions to the absence of traffic

management are road IDs 64 to 68 (all in ecozone II) where traffic signals and traffic police are observed.

4.3.1.2.10 Traffic Signage

In the absence of traffic management mechanism, there is almost no existence of traffic signage. At some important locations, directional signage does exist. However, due to the encroachment and overhang by building elements from abutting properties they are often invisible to the people.

4.3.1.2.11 Traffic Visibility

Traffic visibility is one of the important factors in terms of reduction of occurrence of road accidents. The traffic visibility in most of the roads, within the ecozone is highly impeded with unplanned billboards, hoardings and the overhanging awnings of abutting shops. In general, the narrow and winding roads are the major causes of traffic visual impedance.



Encroachment on road by the overhangs of the adjoining shops

4.3.1.2.12 Air Quality

The town does not contain any major industry or such other establishments which could contribute air pollution to the environment. The general condition of the air quality is good.

The major contributor to the poor air quality is the dust. Most of the narrow roads are paved with cement concrete and brick pavers. The major roads, e.g. near Ranganathji temple, along Parikrama Marg, along the river front, Mathura Road and especially the wider roads do not have paved shoulders or foot-walks. During the movement of the fast moving vehicles the road-tyre interaction creates a draft which propels the air dragged into the wheel level and dispersed around the speeding vehicle. These dusts disperse to the adjoining areas along the roads, or precipitates on the roads.

Absence of road-side plantations, which could have intercepted the dust from reaching the adjoining properties or commercial establishments, adds to the severity of the dust pollution all along the major roads.

As per the general observation, the level of dust pollution in the narrower roads is significantly low compared to the wider roads with vehicular access.

4.3.1.2.13 Noise Level

Noise levels have been recorded with a digital sound level metre at a height of 1.0 metre above the road level.

In general, the observed noise level in most of the roads and the interior areas is well within the recommended acceptable noise level.

It is observed that the main source of noise contribution is audio cassette shops near the entry points of the famous temples. As per general rule, occasional high noise level may be acceptable causing no aural health hazard. Hence even though it is disturbing, the visitors are less liable to be affected by these high dB level sources. However, continuous high frequency high pitch sound is a serious threat to the local residents in the long run, which may cause mental stress and aural disorder.

The recorded noise levels, at selected nodes, are presented in Figure 4.13.

4.3.1.2.14 Illumination Level

The survey indicates that the overall illumination on the roads during night is extremely poor. There are some roads where the street lights are not working. Street lights are provided on most of the roads. But improper locations and poor quality of lamps reduces the effectiveness of street lamps significantly. In many roads, proper receptacles for the street lights are absent, where a single bulb may be seen hanging from a holder in a precarious manner. As per the feedback of the local residents, monkeys are the major cause of vandalism to the street lamps.

The lamp posts are erratically located encroaching on the roads and overhead cables are irregularly connected creating a risky maze awaiting electrical disaster, and also creating visual nuisance.

The major portion of the ambient light on the roads may be attributed to the overflowing illumination from the abutting shops. Hence, after the shopping hours most of the roads have extremely poor illumination.

The illumination level has been measured at 1.0 metre height from the ground. The observed illumination levels in some selective roads vary between 30 – 120 lux. But the majority of the roads showed a value between 1 – 10 lux, and some of the roads can be qualitatively stated as almost dark. The data on the illumination is provided in Annexure 3.

4.3.1.2.15 Non-automotive Vehicles

The presence of non-automotive (slow-moving) vehicles on the narrow roads, as mentioned earlier in Section 4.3.1.2.4, needs regulation along the selected stretches, especially along the routes where the flow of pilgrim tourists are significant.

4.3.1.2.15 Animals on Roads

Animals have the freedom to move within the zone as per the religious beliefs. Cows, pigs and monkeys are common sights on the roads of Vrindavan. Cattle rarely create much nuisance, but stray pigs cause visual nuisance as well as

environmental hazard, as they wade through drains and public thoroughfares. Interestingly though, most areas surveyed are free from any animal droppings.



Animals on the roads

Monkeys are a real menace at some places as they snatch food, spectacles and hand-purses, but since they contribute to the character of the town, the residents take lightly to the menace of monkeys.

4.3.1.3 Problems, Issues and Concerns

Most of the roads are narrow and encroached indiscriminately. The mixed mode of slow traffic and encroachments reduce effective speed of traffic. Some important road junctions are very congested and are conflict zones between pedestrians and vehicular traffic. An efficient bus service is needed after demand survey of the area. There is not enough parking space for private vehicles.

4.3.1.4 Planning and Design Guidelines

On the whole it may be stated that, a detailed study and planning approach is required at the entire town level to solve the traffic and transportation related problems.

However, based on the observed condition through extensive aspect-wise surveys, a set of guidelines have been evolved for the improvement of the existing conditions as stated below.

- Delineation of pilgrim travel routes
- Restriction on the movement of wider vehicle on some specific roads to improve the effective capacity of the roads.
- Restriction on access to 4 wheeled motorised vehicles on some roads.
- Increase of effective capacity of narrow roads by covering adjoining drains with load-bearing concrete covers, removing the ground floor level overhangs from abutting buildings, restriction on the awning overhangs, removal of encroaching lamp posts and hand pumps.
- Improvement of the surface condition of the existing roads by repairing the marginally damaged cement concrete roads in some cases, and relaying new concrete pavements where the damages are extensive.

- Replacement of brick shoulders on the roads by precast flyash-concrete blocks, which is cheaper, durable and pleasant looking. Some of the road ID's that can be easily identified for such work are 3, 38 42, 49, 41, 41a.
- Construction of precast fly ash-concrete shouldering on those roads where no such thing exists.
- Construction of raised paved foot-walks to provide safe and designated pedestrian facilities to the pilgrims and the residents. Road ID's where such works may be undertaken are 1, 1a, 73, 62 and 67.
- Pedestrianisation of some roads: Even though it is desirable, principally there is almost no possibility of designating absolutely dedicated pedestrianised routes, in a town like Vrindavan, where the percentage of road spaces is significantly low within highly dense built development. Therefore, cycles would be permitted along those designated routes along with pedestrians, and a restricted access would be provided to two-wheelers for the residents residing along those roads.

A detailed inventory of hierarchies of traffic mode suitability has been discussed earlier. Some of the road ID's where pedestrianisation efforts may be implemented are 1, 5, 6, 47, 46, 59, 60, 38, 42, 14 and 15a.
- Cars, animal carts and service vehicles would be restricted from plying along those narrow routes where

the pilgrim movements are predominant. Such movements may be permitted during the off-peak pilgrim movement hours (such as 12.30 - 3.30 pm, and 9 pm - 8 am). Enforcement of this mechanism has to be ensured by the local authorities, as well as temple authorities.

- Traffic islands, intersections and junctions are to be designed with appropriate engineering details, ensuring ease of vehicle manoeuvrability, visual clearance, traffic signage and illumination level.
- Short-term parking near the temples and long-term parking at a convenient distance to be provided. Parking areas are to be specifically designated for the slow-moving and fast-moving vehicles. Fast-moving vehicles may be parked at a distance from the destinations, and the intermediate distance may be covered on foot or by slow-moving vehicles. Proper signage is to be provided to the vehicle owners at the entry points in order to guide them to right locations without any confusion of movement.
- Air quality would be improved by provision of appropriate rechargeable paving on plaza and roadsides.
- Decibel zoning is to be enforced on the residents and the commercial establishments as proposed.

- Detailed illumination level at all the stretches need to be noted to assess the deficiency and recommend the actual location of the street lamps and lighting fixtures.
- The existing street lamps are to be removed and the ornamental hanging brackets are to be placed along the abutting building at appropriate locations.
- Electrical cables are to be laid underground, so that no unauthorised / irregular connections can be taken by the local users indiscriminately.
- Animals, especially cows and monkeys are the holy animals symbolic to the history of Vrindavan. Therefore, no suggestion is made for their removal from the road. They are the part of the town's life. However, some organised locations may be specified for feeding them by the NGOs or temple authorities which can reduce straying of the animals in search of food along the eating places and shops along the roads.

4.3.2 SEWERAGE, DRAINAGE AND WATER SUPPLY

This section deals with the basic infrastructure requirement for the eco-zone, in particular, as well as the town of Vrindavan, in general, on issues related to sanitation, sewerage, drainage and water supply.



Road-side Public Urinal



Toilet wastes discharged directly on the roadside drain

4.3.2.1 Existing Sanitation Condition

Not long back, the town of Vrindavan was used to the conservancy system. However, gradually, many households converted to the septic tank system. Very recently, a sewer network has been laid in the town to which most of the houses are connected. However, it is seen that the effluents from the septic tanks from many houses and *ashrams* are still directly being discharged into the street-side drains.

The city of Vrindavan has a well laid-out system of surface drains along street and roadsides, which carry storm-water from rooftops and open places during the rains apart from conveying waste water from kitchens and bathrooms. As mentioned earlier, it appears that, some of the large drains do convey effluents from septic tanks. Location of these drains as well as the general slopes of the surface drains have been shown in Figures 4.14 and 4.15 respectively.

4.3.2.2 Related Indicators

4.3.2.2.1 Hygiene Level

Prevalent diseases in Vrindavan are primarily water borne, such as jaundice, hepatitis, cholera and amoebic dysentery. Poor sanitary conditions and stagnant sewage water are observed throughout the town and hence disease such as malaria is also very common. Other common ailments found are tuberculosis, leukoderma and other skin diseases.

4.3.2.2.2 Sewerage System

A sewer network has been laid in the town over the past couple of years and, in general, it is found to function satisfactorily except at certain places mostly due to improper maintenance. The sewer network, as shown in Figure 4.16, are laid on the road IDs 1, 3, 4, 5, 6, 7, 9, 9a, 9b, 10, 11, 11a, 13, 14, 15, 16, 17, 18, 23, 24, 25, 29, 29a, 31, 32, 33, 35, 36, 37, 41, 41a, 45, 46, 47, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 72, 73,

4.3.2.2.3 Waste Water Drainage system

The waste water drainage system consists of small channels emanating from houses carrying kitchen and bathroom water. They discharge into the storm water drainage system. The road side drains have been identified on the roads identified through IDs 2, 3, 4, 5, 6, 7, 8, 9, 9a, 9b, 10, 11, 11a, 12, 15, 16, 17, 22, 23, 24, 25, 26, 30, 31, 32, 33, 35, 36, 37, 41, 41a, 45, 46, 47, 49, 49a, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, as shown in Figure 4.14.

4.3.2.2.4 Storm Water Drainage system

This consists of the street and road-side drains.



Stagnant Water Puddle



Kutcha Drain



Drains with Metal Gratings



Open House-drains
reducing road width



Kutcha Drains on road ID 15



Dumping in Drains running
between narrow stretches

4.3.2.2.5 Flow Condition

The flow condition in the drains is generally good except for the places, where, due to lack of enough slope or flow section there are clogging mostly due to accumulation of solid waste and garbage such as stray plastic bags. There are problems of foul odour due to stagnation of discharged waste from the milk product especially on road IDs 2, 3, 49, 59.

4.3.2.2.6 Public Toilets (Urinals and W.C.)

The public toilets (urinals and W.C.) operating under the Sulabh Shauchalay scheme or otherwise in Vrindavan eco-zone has been indicated in Figure 4.17. Tourists and pilgrims appear not to use these frequently due to lack of proper signage indicating their locations.

4.3.2.2.7 Open Defecation

In general, the practice of open defecation is not prevalent in Vrindavan. However, certain areas are used intermittently for defecation which includes places like the north edge of Ranganathji Temple wall, Brahma Kund, Keshi Ghat and also on the dry riverbed of Yamuna.

4.3.2.2.8 Water Supply System

The major source of drinking water for the residents of Vrindavan is the municipality operated deep tube wells, numbering about 25, which draw water from a depth of 50 to 55 meters. This water is supplied to the town using a network

of pipelines and balanced through four overhead tanks as indicated below and shown in Figure 4.18.

1. Gandhi Park (50,000 gallons)
2. Mukherji Park (1,00,000 gallons)
3. Attalla Chungi (50,000 gallons)
4. Kaliadah Temple (75,000 gallons)



Public Water Taps



Public Water taps and Hand pump encroaching on the road ID 6

It is assessed that the water demand for the town is 7.5 MLD, whereas the supply at present is about 4.0 MLD. It is reported that an arrangement for conveying water of the river Yamuna from Agra barrage is in progress and the total water supplied to the town would increase once the projects are complete. At present, the timing of water supply is restricted between 6 am to 7 am and 6 pm to 7 pm. Though no filtration is carried out, the water in the overhead tanks is chlorine treated before supply. The tanks are cleaned every three months. In some areas of the town, water is supplied directly from the tube-wells and some houses and 'ashrams' have their own wells or shallow tube-wells.

Ground water table

The shallow ground water table feeding the hand-pump tube-wells and dug wells is seen to be about 9 to 10 meters in the dry weather. Possibly the water table rises during the monsoon months. The city water supply, however, is presently being fed from deep tube wells from strata about 50 to 55 meters deep.

Water in Yamuna

The water of Yamuna flows barely enough, except for the monsoon months. The reason for this is the withdrawals upstream, notably at Delhi. Hence the flow in Yamuna during the drier months is sustained mostly by the return flow from ground or the water discharged as effluents from towns and villages along its banks. The high drains, contaminated with sewage effluents from septic tanks, are seen to discharge directly at different points (refer location at Chir Ghat) along the river at Vrindavan, thus degrading the water quality for downstream users.

4.3.2.2.9 Water Quality

In order to assess the quality of water in and around Vrindavan, samples were collected from the following sources:

1. River Yamuna
2. Public hand pumps connected to shallow tube-wells

3. Public water fountains or 'pyaos'

The locations, where the water samples have been collected are shown in Figure 4.19.

The results of water quality tests performed on the samples are presented in Annexure 7. The inferences that may be drawn from the results are presented as under:

1. Calcium, Sodium and Potassium content is generally high at most of the locations sampled.
2. The sample of ground water near Shahji Temple is seen to be excessively loaded with Fluoride.
3. Nitrate content at two ground water points (one near Shahji Temple and the other near Brahma Kund) show excess concentrations.
4. Phosphate content of water from Yamuna is seen to be excessively high (nearly 300 times higher than normal).
5. The quantities of dissolved oxygen as observed are higher than the WHO recommended level in the locations 2, 3, 4 and 6.
6. As observed the iron (Fe) content in the water samples collected from different sources are within the allowable limit. However the data obtained for the sample collected from the hand pump near Kesi Ghat shows the level marginally higher than the limit. This may be attributed to the corrosion in the underground pipes due to aging.



Yamuna River Water Pollution at Chir Ghat & at At Kesi Ghat

4.3.2.2.10 Public Drinking Water facility

Drinking water sources for the public in the town of Vrindavan is found to be of different types. There is one that is fed by municipal water lines, while another is built and maintained exclusively by charitable trusts. Apart from these, there are a large number of hand pumps connected to shallow tube-wells located all over the town. Figure 4.20 indicates the locations of the municipal water points and hand operated pumps in the town. It is observed that the water points maintained by the charitable trusts, locally called 'pyaos', are attached to small water tanks, which might probably be fed from municipal water source or separate ground water source. However, these water fountains built by the charitable trusts were not found to be operational in most cases, indicating a lack of initiative of the organizations in maintaining the system. Apart from human consumption, water troughs for animals are also noticed within the town at many places. However, here too, most of these are maintained by charitable trusts and a visual observation shows that many are not filled up with water indicating lack of maintenance.



Public Drinking Water Points and animal drinking water at the rear



Road-side Water Points



Drinking water facility without drainage



Dry Handpump



Active Handpump

Encroachment of road space by Water Points

4.3.2.2.11 Water borne diseases

As indicated earlier that, predominantly, the residents suffer from water-borne diseases. It may be inferred that this may be due to the use of ground water by the residents to supplement the water supplied by the municipal water supply network as mentioned in the preceding paragraphs. In fact, the ground water sources, like wells and tube-wells, being mostly confined to shallow water strata, is prone to contamination since the shallow ground water table is presumably contaminated due to the seepage of effluents from septic tanks. The bacteria count (refer Annexure 7) is very low in all the sample locations except location 8, where the count is alarmingly high.

4.3.2.2.12 Storm Water Harvesting

There is no conscious effort on the part of the residents of Vrindavan for water harvesting. However, the ground water table, apparently, is not very deep even during the drier months because of the town's proximity to the river. Though few, the unpaved spaces act as natural water harvesting areas.

4.3.2.3 Problems, Issues and Concerns

In general, the sewerage and drainage aspects of Vrindavan suffer from certain drawbacks, the discussion of which is arranged in the subsequent paragraphs according to the list of indicators mentioned in section 4.3.2.2.

The public toilets are not evenly distributed from accessibility point of view. Refer Figure 21 for the existing locations of water points, public toilets and solid waste dump yards. Most of these do not have any proper signage posted at prominent locations for the ease of tourists, pilgrims, or a casual visitor to the town. The local residents, especially traders and labourers, appear to frequent these facilities as many of them do not have access to a decent lavatory at their respective workplaces. However, one of the toilets was found to be constructed much away from the public thoroughfare and rather within the premises of a school and hence not used even by the locals. In fact, it appears to remain under lock and key mostly.

The public toilets that are operated and maintained under a self-sustaining mode with the help of a non-governmental organization like the Sulabh Shauchalaya, run well but require good patronization for proper upkeep as the revenue generated would be sufficient for sustenance. Toilets, which are left open to public without a self-sustainable scheme for maintenance and cleaning, are invariably found to be littered with human excreta. Infrastructure like toilet doors or water taps is also vandalized.

Open defecation is a malady that is associated with the non-availability of proper toilet space and also the willingness to use the available facility on payment. The varying disparity in the socio-economic condition of the country perhaps leads to apparently errant behaviour like open defecation and may only be stopped through social consciousness. Open defecation has been reported to be practised by a certain section of pilgrims and the open areas near river Yamuna is

seen to be frequented even by some locals residing in nearby areas.

Surface drains, generally, have adequate slopes but the sections are found not to be sufficient enough and result in choking due to indiscriminate dumping of solid wastes like plastic bags. The location of the drains in some places is also such that it is difficult for the municipal workers to clean. For example, in the commercial areas, most shops have an overhang projecting out from the shop floor at the plinth level over the street drains. The littering of the drains with solid waste is more common in these areas. In the residential areas, it is apparent that the household effluents from kitchens and bathrooms are discharged into the surface drains, which result in degrading the quality of flowing water. The smaller drains discharge into the larger “high-drains” which also seem to convey the overflowing effluent from the septic tanks. These drains, therefore, generate a lot of foul odour spoiling the aesthetic ambience of the place through which they flow. It is also common to see pigs wading through these large-sized drains, and at the same time moving unrestricted through the commercial and residential areas. Apart from their unsightly appearance, these animals have the potential to spread disease amongst humans.

The municipal water supplied through pipelines is not adequate. The supply at present is just more than half the demand. Also, the number of public stand posts is not enough.

Water harvesting has not been a major issue for Vrindavan as the seeping waters of the Yamuna apparently amply

recharge the ground. Of course, the quality of Yamuna water being not very good for most parts of the year probably leads to a degraded quality of shallow ground water table.

The sewer network has purportedly been laid to convey the sewage of houses directly. However, it is apparent that since the network was laid just a few years back, those using septic tanks might not have stopped using them altogether. As a result, the effluents from the septic tanks are probably being discharged into the sewer network. Those houses practicing the conservancy system earlier might have probably connected the sewage outlet directly to the sewer network.

4.3.2.4 Planning and Design Guidelines

This section briefly outlines certain salient strategies for improving the quality of the indicators which, if adopted, is likely increase the living-index standard for the town of Vrindavan.

Hygiene Level

In general, the residents should be educated about the problems arising out of using contaminated water, especially water from shallow ground water table. The residents of Vrindavan may be advised to use ground water for purposes other than drinking or cooking. For drinking purpose water may be used from municipal supplies. Those who do not have house connection may meet their requirement from municipal stand posts.



Open drain with stagnant



Open roadside Garbage dumping

Sewerage System

Presently, the sewer network conveys the household sewage and effluents either directly or through the septic tanks. It must be ensured that all the houses do so, which would make the surface water drains much cleaner. From the layout of sewer network in the town of Vrindavan, as presented earlier in Figure 4.16, it is observed that though the network is extensive, the sewer lines are possibly heavily loaded due to smaller diameter of the pipes. Secondly, it is observed that the high drains are probably conveying domestic sewage, which means that all houses are not connected to the sewer system. It is advised that the discharge of the high drains, too, may be channelled to one point and treated in a small-capacity sewage treatment plant before being discharged into the river Yamuna.

Waste Water Drainage system

In order to clean the water of the street and road side drains, it is advisable to avoid discharging waste water into the

storm water drains. Instead, the waste water from the kitchens and bathrooms may be discharged into the sewer line. However, it has to be ascertained for each section of sewer pipe, whether it would be capable of carrying the extra discharge at the time of detailed planning.

Storm Water Drainage system

It is recommended that the street and road-side surface drains only convey the storm-water of the town during the monsoon months.

Flow Condition

The flow condition of the surface drains would automatically improve once they stop conveying sewage effluents, probably overflowing discharges of septic tanks. The condition of sewer network would improve if proper maintenance is carried out by the municipality. Further, the elimination of plastic bags from the town may vastly improve the drainage condition as these have been observed to block the open surface drains at many places.

Public toilets

A plan showing the proposed public toilets apart from the existing ones is shown in Figure 4.22. The proposed sites, as may be observed, have been kept close to the Parikrama Marg for the convenience of the circum-ambulating pilgrims. It is necessary to maintain these toilets through the involvement of voluntary organizations or non-governmental organizations by adopting the pay-and-use style of

functioning. Proper signage is also required to guide the average tourist or pilgrim to these facilities.

Open defecation

This practice cannot be eliminated without a proper social consciousness. Hence, the civic authorities and related non-governmental organizations may adopt a campaign to educate the public, mostly the residents, in this regard. As for open defecation by visitors, it is necessary for the local public to be aware and resist such activity. This may be done by emphasizing the school children of Vrindavan as well as the general public through seminars and awareness campaigns about personal hygiene and instruct them to be vigilant and forbid defecation by tourists and pilgrims in the open.

Open drains

The open drains may be made modular in order to enhance the aesthetic appearance as well as increasing the ease of cleaning. Figure 4.23 shows three typical drain sections that may be adopted uniformly throughout the town. As may be observed, the larger drains are proposed to be covered either with grills, perforated slabs or solid slabs with intermittent vents / man-holes.

Water Supply System

The water supply system maintained by the municipality has to be augmented with further supplies, either from ground water or using the Yamuna water as being planned through the Agra barrage.

Water Quality of ground water table and river Yamuna

The ground water table suffers from contamination possibly due to seepage of effluents from septic tanks as well from the water of Yamuna which itself is contaminated during the drier seasons. The quality of water in Yamuna may improve drastically if the water from the high-drains are treated before being discharged into the Yamuna.

Public Drinking Water facility

As may be seen from the location of existing posts (Figure 4.20), they are too few in number. The number of stand posts should be increased, especially near the temples and some near the Parikrama Marg. Since the ground water sources from shallow water tables is contaminated, it is recommended that the shallow tube-wells operated by hand pumps may gradually be phased out and be replaced with stand posts supplied with municipal water.

Water borne diseases

Once the residents and visitors get access to municipal water at all times, especially for drinking, the reports of water-borne diseases would reduce drastically.

Storm Water harvesting

Though there is not much of open space left in the town, some areas like Gyan Gudri, Vrinda Kuthj, etc. may be developed for ground water recharge. The storm water drains from nearby building rooftops may be channelled to a

detention pond that would connect to a recharge pit or well. However, the expected amount of recharge may have to be estimated first and compared with the corresponding investment to evaluate the benefit-cost ratio. It is possible that the shallow ground water table recharge from the nearby Yamuna may be substantial compared to any artificial recharge. As for storing of rainwater, it is difficult for the houses, as most of the dwelling units do not have sufficient vacant land.

4.3.3 SOLID WASTE

The solid waste generated in the town from residential as well as commercial, religious, educational, and other institutions has to be dealt with effectively in order to provide a clean environment. This section deals with the issue, starting with the existing scenario and going on to the proposals.

4.3.3.1 Existing Solid Waste Management system

The solid waste generated in the town of Vrindavan is found to be deposited either in authorized dumping vats and trailers or unauthorized vacant (perhaps unclaimed) plots of land. From a visual survey it is observed that the unofficial dumping stacks might have been the consequence of many years of garbage deposition, which was perhaps practiced before the introduction of a formal solid waste management system of the Municipality. Figure 4.24 shows the location of all kinds of dumping spots, of which the unauthorized stacks of accumulated solid waste is not only aesthetically

unpleasant, but also a source of potential breeding place of disease carrying vectors. These age old stacks of solid waste appear no longer to grow, indicating that they are not being used as places for dumping right now. In fact, it appears that there have been attempts to clean up these dumps at many places. However, most of these dumps still exist, having being compacted by the overburden of many years of trash and, by their very nature, may be termed as a kind of “Static Waste Dumps”.



Stagnant drain with Garbage



Unattended premises used for indiscriminate Garbage disposal



Unauthorised Garbage Dump



Roadside Garbage Dump

On the other hand, the official garbage collection sites may be termed as the “Dynamic Waste Dumps” as these are cleared from time to time by the Municipal authorities.

4.3.3.2 Related Indicators

There are a lot of indicators relating to the proper handling, transportation and disposal of various types of solid wastes of a town and are discussed in this section. It may be pertinent to mention that we have drawn heavily from the report “DPR for management of municipal solid waste for Vrindavan” [Bhide 2003].

4.3.3.2.1 Generation, Collection and Handling of Wastes

This section deals with the present situation existing for the various types of solid wastes that is being generated in the town of Vrindavan and their subsequent disposal.

Domestic / Residential waste

The residents are observed to store their wastes in various types of receptacles that is readily available. It is seen that the household wastes are deposited by the roadside just outside the respective houses. It is then collected by the street sweeping staff. House to house collection is not carried out in the town. As such, the town of Vrindavan has nearly five hundred *ashrams*, some of which house a large number of inmates. The total number of persons residing in these *ashrams* is estimated to be 15,000. Majority of these *ashrams* have their own *goshalas* housing cattle. The wastes

generated from these *goshalas* attached to the major *ashrams* is properly collected and managed by the respective *ashrams* authorities. Some of the larger *ashrams* are equipped with dung digestion plants (*gobar*-gas plants) and the generated bio-gas is usefully utilised. The digested solids is then converted into dung-cakes and used as fuel. However, the liquid effluent is let-off through the street-side surface drains. In case of smaller *goshalas* as well as the stray cattle the waste is deposited haphazardly and even on the streets which is cleaned by the municipal sweepers or even discharged in the open surface drains. The disposal of dead animals is carried out by the concerned *goshalas*.



Private Attempts Garbage Disposal

Waste from market, trade and institutions

The waste from shops and market areas as well as from the educational institutions is observed to be stored in simple containers. The waste from the market is commonly

collected by the sweeping staff every day and taken to the collection point. The street vendors who sell vegetables and other eatables are observed to follow similar methods and the waste generated is disposed off in the municipal collection trailers. Vrindavan has been declared as a town and hence does not have any slaughterhouse as well as fish and meat market.

Hospitals and nursing homes

The wastes from clinics, smaller dispensaries and hospitals are seen to be deposited in the municipal collection trailers. There are four major hospitals in the town but though none of them are located in zone-I of eco-city and one each are located in zones-II and III, the waste nevertheless affects the quality of the municipal waste with which it gets completely mixed up while being dumped in the municipal collection trailers. The Rama Krishna Mission hospital has its own properly operated incinerator while other hospitals neither have an incinerator nor use proper disposal methods.

Hotels and restaurant waste

The wastes from the hotels and restaurants are disposed off in the municipal collection trailers either by their own staff or through the municipal sweeping staff.

Industries

The town does not have any industries and only small garages and workshops are located within the town. These

units are observed to dispose off their wastes in the municipal containers.

Construction waste

The collection and disposal of construction and demolition waste is the responsibility of the house owners / contractors. However, it is observed that in majority of the cases the waste is allowed to remain where it is generated and from there it gets carried away or strewn all over haphazardly.

4.3.3.2.2 Garbage on Streets and Open / Unattended Areas

The waste deposited by the side of the roads is normally swept by the municipal workers. The workers use a short-handled broom and a cane basket. They are also provided with a small shovel for cleaning of the roadside drains. Normally the female sweepers are assigned the work of sweeping of the roads while the collection of waste in handcarts and its transfer to community bins is the responsibility of the male sweepers. The major roads are swept every day while the smaller roads are swept once every two to three days.

The smaller street side surface drains discharge into four major drains (or high-drains) which have approximately total *length of about five kilometres. The wastewater from these drains is finally discharged into the river Yamuna. Private contractors under the supervision of the municipality carry out de-silting of the major drains before the monsoon in May-June.

The cleaning of the smaller drains is carried out by the sweeping staff and every male worker is assigned to clear about half a kilometre length of the drain by using the small shovels provided to them. The removed silt is deposited just by the side of the drain and after a few days when the excess moisture has drained off, the dry silt is removed and taken in a handcart to the same container as the municipal solid waste.

4.3.3.2.3 Disposal and Treatment of Waste

Presently, a large portion of the waste, which is mainly inorganic in nature, is transported to a site located at about three kilometres along the Mathura Road near Kailash Nagar. This site is adjacent to the municipal sewage treatment plant and sewage farm. This area, measuring more than 100 acres, consists of a large number of three to four meters deep depressions that can be land filled. The site is nearly a kilometre and half from the river Yamuna. As of now, there are no workers at the site for doing the needful actions on waste processing. Burning of waste is not carried out at the site and no rag pickers are present to collect recyclable waste. The site is adjacent to the farms and two vermi-composting units are also located near it.

4.3.3.2.4 Recycling of Waste

The residents who are observed to sell the old newspapers to the street vendors for recycling carry out source separation of mainly paper. The separation of glass, metals and plastics is carried out only when they are in large quantities or of large sizes. Smaller and spoiled papers,

plastics, glass and metal find their way into the municipal waste.

4.3.3.3 Problems, Issues and Concerns

As is obvious from the current situation discussed in section 4.3.3.2, the entire cycle of solid waste generation, collection, transportation and finally disposal suffer from a few drawbacks at each stage which, if removed, would make an ideal system of solid waste management plan. Some of these issues are discussed in this section and recommendations are suggested in section 4.3.3.4.

At the waste generation level, the household wastes are not stored in proper containers. Of course, inclination to do so comes from social consciousness of the individual. All residents of the town may not be aware enough about the implications of disposing organic and non-organic wastes together. The same applies to the wastes generated from hotels and restaurants. The waste generated from vegetable markets is generally organic and the vendors and dealers should be conscious about its proper and timely disposal. Organizers of marriage and community functions must take the responsibility of quickly disposing the generated wastes (which would be mostly organic in nature) before it degrades the environment. As for the hospitals, nursing homes, pathological laboratories and health care centres, the concerned authorities should be aware of the necessity to dispose the generated waste strictly according to norms. However, there is a tendency of both the government as well as the private health institutions to disregard the seriousness of medical waste disposal. As discussed in section 4.3.3.2,

only the charitable hospital run by the Rama Krishna Mission does have a proper medical-waste disposal system. This indicates that the social consciousness of the management is a major factor in proper waste management in these cases.

It is observed for the construction sites that the owner or the contractor is not sensitive to the difficulties caused to the public in dumping demolition waste just outside the premises on public ground. The waste gets strewn about choking drains and littering the streets.

As for recycling of wastes, the town people are not accustomed to storing recyclable wastes separately except paper. There is not proper collection system for household wastes though some system exists for the commercial establishments. The disposal of wastes, at present, is also not being followed in a proper scientific manner.

4.3.3.4 Planning and Design Guidelines

4.3.3.4.1 Storage of waste at Source

It is observed that the storage of waste at different generation points are rather handled arbitrarily. As per norms, the solid waste has to be stored at the source in containers of adequate capacity, with a proper lid and handle. This issue has been discussed in this section for various waste generation sources.

Households

For individual houses, it is desirable to provide containers of standard design. However, the socio-economic conditions of the residents would largely dictate the affordability of such properly designed containers. The storage containers are supposed to be made of impervious material having a tight fitting lid and a handle for lifting it. In general, a five-litre container would be adequate for an average family of five persons. It would be desirable to provide two separate containers – one for inorganic and the other for organic wastes.

Shops, Offices, Institutions, Workshops

The waste produced at shops, offices, institutions and workshops is mostly inorganic and does not degrade quickly. They should hence be required to provide larger HDPE containers of 110 litres capacity of standardized design. In case of larger quantities multiple units can be used.

Hotels and restaurants

Hotels and restaurants generate a large amount of biodegradable waste. In case of large establishments such biodegradable waste can be stored in larger 4.5 cu. m. containers. However, in case of smaller establishments the organic waste can be stored in smaller containers of 110 litres capacity. The inorganic waste such as paper, plastics and sweepings can be collected in separate small sized containers.

Vegetable markets

The vegetable markets generate a large quantity of organic waste which decomposes at a very fast rate due to its high moisture content and the higher ambient temperatures encountered in the country. Hence, it should be collected in large sized 4.5 cu. m. containers and quickly taken away for disposal.

Street food vendors

The street food vendors commonly sell fruits as well as in some cases eatable items and the waste are mostly organic in nature. However, the waste generated is not large and it should be made compulsory for the vendors to store it in proper bags and deposit their contents in the nearest municipal 4.5 cu. m. bins.

Marriage and community halls

Whenever functions are held at the marriage and community halls a large number of organic wastes is generated. However, the quantities of such waste are not so large. Hence, commonly, 110 litres bins should be provided. These bins should be made of HDPE with a cover and should be transported every day to the disposal site.

Biomedical Waste

The biomedical wastes generated from Hospitals, Nursing homes, Pathological laboratories, Health care centres, etc. can be grouped into mainly five categories: Sharps, Glass,

Chemicals, Organic waste and inorganic waste. These different types of wastes should be collected separately and stored in separate containers. Organic waste, especially from operation theatres, is likely to be infectious and should be separately stored with airtight lids for proper disposal. All these containers should have covers which can be opened by a foot operated lever. The organic waste should be put in a plastic bag, which should be closed and then only stored. Proper care has to be taken during transportation of the waste to designated incineration sites to avoid any intermixing of wastes. Finally these wastes have to be sterilised through autoclaves and incineration process, which would result in significant reduction of mass and could later be disposed along with the general municipal solid wastes.

Construction and demolition wastes

The waste remaining after construction as well as after demolition of the old structures is mostly inorganic and can be stored in large sized 4.5 cu. m. containers which can be taken away as and when it is full.

4.3.3.4.2 Segregation of recyclable and non-biodegradable wastes

It is desirable to store the recyclable waste separately from the remaining wastes. Common examples of recyclable waste are paper, plastics, glass and metals. Most of these materials are inorganic in nature and hence do not degrade. Further, these can be utilised and hence sold in a market. The inorganic fraction which cannot be recycled will not degrade and hence can be taken away for disposal at a

lesser frequency. The organic waste on the other hand degrades quickly and hence should be quickly removed. Presently, the residents of Vrindavan are not accustomed to separately store these individual constituents and it will be desirable to mount a sustained campaign by the use of various audio and visual media to ensure that the citizens adopt the practice. It will also be desirable to modify the by laws and provide for imposition of a fine on defaulters and the recalcitrant who may not be amenable to persuasion.

4.3.3.4.3 Primary collection of waste

At present, there is no system of collection of waste directly from individual generators. It is desirable to collect the waste from individual generators at their door steps by introducing the door step collection system which will be cleaner and would also reduce handling steps.

Door step collection through container handcarts

A system may be evolved in which the municipal workers are provided with containerized handcarts (with four containers each of 30 litres capacity) and a bell. It is desirable to have separate containers for biodegradable, non- biodegradable waste and recyclable waste. The workers can move along a street using a bell or a whistle to indicate their arrival that will enable the house owners to bring their waste for deposition in their handcart. The municipal worker should help the residents in depositing the waste from their containers in appropriate containers in the handcarts.

Role of the sweeper

The municipal sweeper should be required to move with handcarts with containers and collect waste. He should also sweep the streets to remove any waste that may continue to be deposited by the non-cooperating citizens. For sweeping of the streets he should be provided with a long handled broom and a cane basket and the collected waste should be deposited in a containerized handcart.

Collection of wastes from shops and establishments

The shops and establishments should be required to keep their storage containers just outside their shops at the time of collection and the waste should be collected in containerized handcarts by the municipal workers.

Collection of bio-medical waste

The bio-medical waste should be collected in separate vehicles which should satisfy the requirements laid down in the Bio-medical Waste (Management and Handling) Rules, 1998.

Collection of wastes from hotels and restaurants

The wastes from hotels and restaurants should be stored in 4.5 cu. m. containers, which can be removed at specific frequency preferably every day.

Vegetable and fruit market waste

The organic waste from vegetable and fruit markets should be collected in 4.5 cu. m. containers, which should be collected every day.

Collection of wastes from marriage and community halls

Wastes from marriage and community halls should be stored in 110-litre bins and can be collected directly from the premises.

Collection of construction and demolition waste

The construction and demolition waste should be stored in 4.5 cu. m. bins and removed as and when full.

Dairy and cattle-shed waste

Various *goshalas* and dairies that exist in Vrindavan generate a lot of waste that is mostly organic in nature and hence has to be deposited in individual containers either of 110 litre capacity or a 4.5 cu.m. capacity depending on the quantity of waste.

4.3.3.4.4 Sweeping of streets and public places

Street sweeping to be done daily since the waste is produced everyday, and since a part of it is deposited on the streets it is desirable to remove it on the same day. This shall ensure proper environmental conditions and also protect the

health of the residents. The collected waste should be transported and taken away for disposal every day.

All solid waste management system practices should be functional on holidays too. Instead of providing the solid waste management service on six days a week with a holiday on one day it would be desirable to provide the services on all days and provide half a closed day on every Wednesday and Sunday.

Substitution of sanitation workers

It is observed that a large portion of the solid waste management budget is spent on salaries of the staff. It is also observed that a fairly large proportion of the staff is often on leave for various reasons. This results in provision of inadequate services to the citizens. To overcome this problem additional sanitation workers commonly termed as reserve etc. are provided.

Prevent burning waste

Prevent burning waste by sweepers and the public. It is commonly observed that the sweeping staff / individual residents instead of transporting the waste into the community bin often set it on fire after collecting it in heaps. This has to be avoided by educating the public about the ill effects like emission of gases harmful to health.

Tools for sweepers

Presently, the sweeping staffs are observed to use brooms with short handles and cane baskets. It is desirable to use long handled brooms instead, which would increase the efficiency of the workers. It also ensures that the airborne dust also does not affect the health of the sanitation worker.

Cycle-rickshaw carts and large bins

The sweepers presently use 2 cu. ft. handcarts, which are primarily meant for transporting heavy building materials. Since the municipal solid waste is lighter a person can transport larger volume of such material. In the present type of handcarts the waste has to be handled a number of times like while filling in the handcart, emptying at the community bin and again while transferring the waste from bin to the vehicle. Provision of large sized containers would reduce the handling steps and increase efficiency. It is proposed that at major street crossings or plazas 4.5 cu. m. bins have to be provided. Cycle-rickshaw carts with four containers each of 30 litre capacity may be used for door-to-door collection of solid wastes and emptied into the wheeled bins. These bins shall be carried away by the municipal tractor-trailers for final disposal.

Metal tray and metal plate

The sweepers have to be provided with long handled brooms, a metal tray and plate for cleaning up of the drains and also for lifting of the material from the road surface. The life of the brooms and cane baskets is normally taken as 3 months and they will have to be replaced accordingly. The

life of metal tray, plate and the handcart is taken as one year and provision for their annual replacement has to be made.

Norms of work for street sweepers

The street sweepers will be required to sweep 300 meters of road length in congested areas, markets and commercial areas while in residential areas it may be 500 meters.

4.3.3.4.5 Cleaning of the surface drains

It is observed that the sweepers and the citizens often dispose the waste illegally into the surface drains provided at the edge of the roads. These drains normally carry rainwater as well as wastewater from some areas and hence should regularly be cleaned to permit a free flow of water. It is also desirable that the citizens and sweepers are prohibited from depositing the waste in such drains, for which a sustained educational campaign may have to be launched.

Removal of silt from underground drains and manholes

Commonly shallow surface drains upto 60 cm. in diameter are cleaned by the drain cleaners in the solid waste management department. These workers should be assigned to clean 500 meters of drain length every day for which they may be provided with 2 cu. ft. handcarts. The waste removed from the drain should not be allowed to remain there for drying and should immediately be transferred to a handcart for onward deposition in a storage bin. Alternative mechanized system may be suggested but owing to the economic sustainability, it is proposed to

continue with this manual method of cleaning the surface drains.

4.3.3.4.6 Provision of litter bins

These are to be provided to enable citizens to deposit their wastes while moving along the streets and at public places. The bins may be about 30 to 50 litre capacity and may be designed in such a way that it may be easily detachable from its stand and cleaned onto the handcarts.

4.3.3.4.7 Need of containers for hazardous wastes

In addition to organic and inorganic waste generated at the residences a small amount of hazardous waste such as batteries, discarded pesticides, insecticides are also produced. Presently, the quantity of such waste is quite small and hence the municipal worker will be encouraged to collect such waste from individual premises in one of the containers in their cycle-rickshaw based containerized cart. This waste can then be transferred to a separate small container located at specific points. Such hazardous waste will be disposed of as laid down in the hazardous waste disposal rules.

4.3.3.4.8 Transportation of waste

Domestic / trade / institutional waste

These wastes collected by the cycle-rickshaw based containerized carts and deposited in the wheeled bins at specific street corners or plazas, would have cleaned before

they are completely filled. The frequency at which the waste will have to be collected and taken away depends upon the quantities generated by the contributing area. Hence, the waste may have to be cleared from the wheeled bins every day, once in two days or once in three days, as the case may be. It is desirable that the waste is cleared at least twice a week. In case of market, the waste is mainly organic in nature and should be removed at least once a day.

Bio-medical waste

This has to be done in conformation to the rules laid down in the Bio-Medical Waste (Management and Handling) Rules, 1998.

Transportation of waste from hotels and restaurants

Hotels and restaurants generate a large proportion of organic waste which will have to be collected either once or twice a day. The municipal authorities can carry out this collection and transportation directly and the hotels and restaurants charged for the facilities provided. Alternately, the municipality can give a contract and the contractor permitted to charge the hotels at predetermined rates.

Transportation of construction waste and debris

The disposal of construction and demolition waste is the responsibility of the waste producer. If the contractor does not transport the waste within a month on completion of work, the municipality should remove it and recover the charges from the contractor.

Transportation of waste from narrow lanes

In the case of narrow lanes, the transportation will be carried out by using the cycle-rickshaw based containerized carts.

4.3.3.4.9 Processing and disposal of waste

The large amount of waste collected from urban areas has to be ultimately disposed of. However, to reduce the requirement of land or water for post-processing disposal, various options have to be considered. As observed in the report [Bhide 2003], the final disposal of municipal wastes has to be carried out either through aerobic microbial composting or vermi-composting. The remaining non-compostables and the inorganic fraction of municipal solid waste will have to be disposed of by sanitary land filling. Here again, on comparison of the two alternatives, it is suggested that the method of aerobic microbial composting for the organic municipal solid wastes is the most preferred method for the town depending on the composition of the waste and the quality of environment available for disposal. Presently, about a hundred acres of land is available at a site located at a distance of 3 kms. along the Mathura road near Kailash Nagar. The site is adjacent to the sewage treatment plant and sewage farm on the Mathura road. It is proposed to utilize the same site for locating both the composting as well as land filling.

Disposal of bio-medical waste

The waste from smaller hospitals and clinics should be disposed of using the incineration facility available at the

Rama Krishna Mission Sewashram. A private agency will have to be entrusted with work of making necessary arrangements for collection and transportation of the bio-medical waste from individual generators and its incineration. The company may enter into a contract with the generators as well as the Rama Krishna Mission Sevashram and charge the generators for the services provided and pay the necessary charges to the Rama Krishna Mission Sevashram for utilization of their incinerators.

Disposal of domestic hazardous waste

The municipal workers while moving through the various streets should collect the domestic hazardous wastes such as batteries, pesticides, insecticides, etc. in separate containers in the containerized handcarts. The material, after its collection, should be disposed of along with the industrial solid waste at the specific site in the land fill site following the standard procedures for disposal of hazardous waste on land.

4.3.3.4.10 Institutional aspects

An improvement in institutional capacity has to be carried out for a proper solid waste management. This section deals with some of these suggestions as discussed in “DPR for management of municipal solid waste for Vrindavan”.

It is advised that the administration at the ward level should be fully responsible for ensuring proper storage of segregated waste at source, primary collection of waste, sweeping of streets, cleaning of surface drains and public

places and transfer of waste to intermediate storage containers. To ensure that all these activities occur efficiently the officials at ward level will have to supervise the work in the field during morning hours. They should also interact with the citizens and ensure that all grievances of the citizens are promptly redressed.

The municipality should be responsible for procurement and upkeep of vehicles and for setting up and maintaining processing and disposal sites in an environmentally compatible manner. The town level administration will also be responsible for the procurement of necessary land, planning of the system on a long-term basis.

A Health Officer, who is a medical doctor by profession, presently manages the work of solid waste management in the town of Vrindavan. Perhaps a better management may be ensured if a suitably trained Environmental or Public Health engineer. Of course, since the town is small, even a sanitation officer with suitable training in solid waste management may be able to manage things. He should be supported by at least 1 no. sanitary inspector, 2 nos. assistant sanitary inspectors and 4 nos. sanitary supervisors. Presently, the municipality has only 1 no. sanitary inspector. The recruited staff shall be trained and given every opportunity to improve their knowledge and also aspire for higher positions in the organization. The staff will also have to be provided with necessary training to make them conversant with the new developments and new technologies, and especially new concepts like that of ecocity and its implications.

At present, there is no workshop for maintaining the vehicles used for solid waste management but a garage having facilities for routine maintenance may be established under the municipality.

Non-governmental organizations (NGOs) may be encouraged to actively participate in waste collection and its processing. Presently, two NGOs are working in the town of Vrindavan for solid waste collection and transport. The municipality should also encourage other NGOs to participate. The waste collectors are also very few in number and are not organized. In case they form their cooperatives they can be entrusted with responsibilities for recovering recyclable materials at the trailer sites. Though there is reluctance in the private sector to get involved in solid waste management practices because of uncertain financial benefits, incentives may be provided in the form of long-term lease of land and equipments at a nominal rate, entering into long-term contract and tax benefits.

Those citizens, who instead of depositing their waste in designated containers throw the waste on the streets or on open spaces, should be penalized as additional work has to be carried out by the municipal workers.

4.3.4 URBAN DESIGN, CONSERVATION AND LANDSCAPE

In general the ecozone contains no specific recreational areas for the local residents. The areas being congested and occupied by the residential units and the religious the zone has

There are few gardens and open spaces viz. Nidhi Van, Vamsi Vat, Kishore Van which are exclusively used for the religious purposes. The open area along the major road leading from Nagarpalika to Rangnathji Temple is used for parking but suffers from absence of planned greenery.

4.3.4.1 Related Indicators

The following related indicators are identified regarding urban design, conservation and landscaping.

- Religious and Cultural Heritage Values
- Architectural Character
- Streetscape Quality
- Street Furniture
- Signage, Billboards and Banners
- Riverfront Potential
- Urban design elements
- Open Space, Parks and Gardens
- Roadside plantation
- Resting and Eating Places

The observations on the related indicators have been dealt in detail below.

4.3.4.1.1 Religious and Cultural Heritage Values

The religious functions related to Vedic philosophy and Krishna consciousness are embedded in the cultural life of the Vrindavan town since ages. The reflection of the history and religious facts are evident from the existence of various

historic buildings and temples within the town, and more specifically along the river Yamuna. Though significant degeneration of the built form and environmental standards have taken place, the religious and cultural heritage values are kept alive by the people of the region. They realise that the essence of conservation and development of Vrindavan can only happen if these intangible values are strongly maintained. Remnants of these values are still reflected in temples and gardens. Efforts at architectural conservation have also been made by the Archaeological Survey of India in the Madan Mohan temple and other buildings. They only reiterate the national and international importance of the built form in Vrindavan.

4.3.4.1.2 Architectural Character

The architectural character reveals, that in Vrindavan, the builders acquired an entirely new orientation in the field of temple architecture, owing to the conditions brought about by Islamic domination – a change in case of building art from the aesthetically natural to the ordered conventional form.

One noticeable fact in these temples is the total absence of figure carvings that was strictly prohibited by Islam. The use of pointed arches and multi-foil arches to support the fluted domes are very much evident. Typical Hindu shikharas of the Nagara style and stratified towering roof of the Dravidian style (gopurams) are adopted in many temples. Serpentine bracket forms of the Jain temples and simplified stalactite bracketing of Fatehpur Sikri, both appeared side by side. The jharokhas of Rajasthan style with curved cornices create an interesting appeal of light and shades.

The most predominant building material used is red sandstone. Decorative motifs are mainly of floral or plant forms. As discussed, there are isolated examples of many differing architectural styles – namely Indo-Aryan, Jain, Dravidian, Rajasthan, Indo-Islamic, Bengal Hut, Colonial and contemporary. Thus the overall architectural style of Vrindavan may only be termed as 'eclectic'.

It is observed that some of the more recent residential developments and urban in-fills are coming up with present-day bricks and cement mortar with RCC work. Many of these developments often ignore or pay little respect to the rich architectural character of the area.

The existing architectural features, identified in the ecozone, are represented in Figure 4.25. The major building of rich architectural excellence are primarily of religious type, e.g. Govindji temple, Rangji temple, Bramha kund, Lalababu, Glass temple, Tulsi kutir, Goda Vihar, Mahadev temple, Kesi Ghat, Bhamar Ghat, Chir Ghat, Shahji temple, Nidhi Van,, Madan Mohan temple, Jugl Ghat, Kalyia Ghat, Banke bihari temple. However, there are some historic residential buildings which possess excellent architectural features.

Based on the architectural treasure, a route has been delineated as shown in Figure 4.26, comprising road IDs 1, 1a, 4, 5, 6, 8, 9, 10, 11, 22, 23, 24, 26, 42, 45, 46, 47, 49,, 56, 59, 61, 73, which contains the major buildings of architectural importance. This route can provide educational value to the tourists and connoisseur of architectural examples.



Indo-Aryan Style



Dravidian Style



Jaina Style



Bengal Hut Style



Rajasthan Style



Indo-Islamic Style



Colonial Style



Eclectic Style



Contemporary Style

4.3.4.1.3 Streetscape Quality

The quality of the streetscape represents an organic mix of various styles of architecture ranging from historic to modern. There exists no harmony in the façade styles or height control. The only common element that is visible is the adherence to the front building line which is just at the edge of the road without any setbacks. The general pattern of house cluster is that the irrespective of the size, frontage or depth of the plots the building would start on the front line,

and may contain large, medium or small courtyards in the centre of the house. On several cases the entrance gate is highly ornamental reflecting the taste of the owner.

Most of the major roads, especially in near the temple areas are occupied by the small shops serving the necessities of the pilgrims, tourists as well as the locals. Irregular shop frontage, uneven maintenance conditions and the poorly designed or fabricated awnings overhanging at unequal heights (especially for the shops on the eastern side of the road, to protect the shops from the sun) creates a visual blight.

Encroachment by street lampposts, water stand posts, hand pumps, and cattle water bins on the roads are the regular features of a typical streetscape in Vrindavan. To add to the ugliness to the above, electrical wires crisscrossing the road often jumbled up at the road intersections or the lamppost locations are the significance visual nuisance.

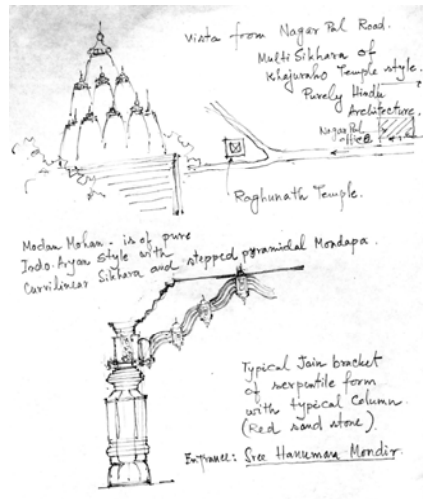


Indiscriminate Overhead Electrical Cable Lines
Creating Hazards and Visual Nuisance

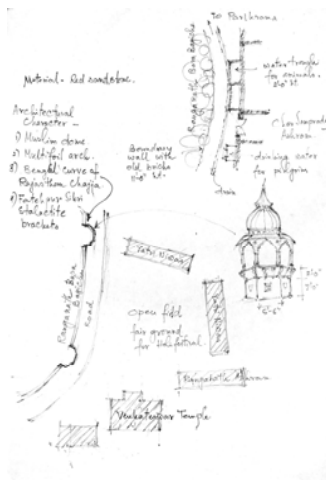
4.3.4.1.4 Street Furniture

Organised street furniture such as resting benches or traditional notice boards is conspicuously absent. The only features seen are hand-pumps and street lamp posts. Lampposts sometimes exist without any light points or source, resulting in poor illumination, as has been discussed earlier. At some road intersections halogen lights used for illumination. In many stretches there is no provision of streetlights at all. Sometimes only a small electric bulb is fitted to the electric wire posts. Monkeys reportedly play about with bulbs in the daytime and damage them. The electric overhead wires and cables make a chaotic jumble along with TV wires, and are physically very unsafe.

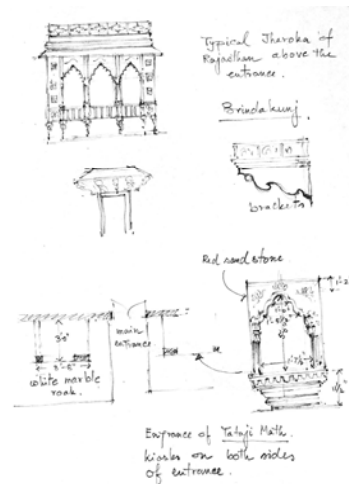
Urban design solutions conforming to the architectural character for such street furniture may be sought. Street furniture coupled with innovative paving and landscaping can effectively determine the aesthetic character of a place. The Parikrama Marg is a perfect example where street furniture can be placed to give it a sense of place and a homogeneous pleasing look.



Jaina Style Flying Brackets in Temples



Rajasthan Architectural Style



Jharoka Style Ornamentation

4.3.4.1.5 Signage, Billboards and Banners

Though there are isolated efforts by the Archaeological Survey of India to provide some signage, there seems to be an overall lack of such signage to help pilgrims and tourists find their way around. There is also a lack of organized trails that are indicated by the authorities for first time tourists to traverse on, so that they can enjoy the maximum exposure to all famous temples and places in Vrindavan.



Visual obstructions by Utility lines and High walls



Undesirable location of Signage

4.3.4.1.6 Riverfront Potential

Yamuna riverfront in Vrindavan, along which the town has historically grown, is considered to be one of the strongest assets which can compete with any other potential riverfronts in the world.

The river on the northern edge has nearly --- historic ghats starting from Kaliadaha Ghat on the Northwest to Kesi Ghat on the Northeast. From literature it is learnt that each of the

ghats bears some historic saga associated with the Lord Krishna and other gods and goddesses.

Reviewing the patterns of the flow of water in the river Yamuna, it is observed that the river has changed its course of flow of water over the years leaving the majority of the ghats almost out of contact with the water. Siltation has resulted in growth of unauthorised habitation on or beside the river edge. This deprives the public to enjoy and utilize the river edge potential, which is a highly valuable asset for any urban area.

Though the river water comes almost up to the brim of the Parikrama Marg, which is aligned along the river edge, during monsoon, in the lean period the water is directly accessible only along the extent from Chir ghat to Kesi ghat and some of its adjoining stretches.

Exploitation of the river water by unauthorised boating, albeit apparently very colourful, is a regular feature which attracts the tourists to the river edge.



Misfit modern signage in historic town



Absence of signage resulting in less attraction

In general, there is dearth of organised infrastructure in terms of resting places, eating kiosks, boat-jetty, public toilets, illumination level, security measures and parking facilities, which need to be addressed within the proposed ecocity project. Safety of the tourist in the context of unorganised boating is very alarming. Any accident, due to untrained boatmen, may result in death toll at any point of time.

The buildings along the designated edge of the river are also the testimony of excellent, heterogeneous historic architectural styles which can be a matter of great interest to any connoisseur of architecture and historians. The development the buildings at different period of time and different styles makes a wonderful palette of riverscape, which can compete with any famous example in the world.

The visual quality of Kesi and Chir ghat, experienced from the floating boat along the river Yamuna can be an ethereal experience. This may be acknowledged as a great potential as an international quality son-et-luminaire, the technical feasibility of which should be explored in detail.

4.3.4.1.7 Urban design elements

Rich urban design elements are observed in the earlier developments of Vrindavan. Even today, some plazas, nodes, vistas, landmarks and edges exist, which define and preserve the imageability of the religious town. Brick paving, textures and finishes, ornamental facades and some street furniture show a rich legacy of the past.

4.3.4.1.8 Open Space, Parks and Gardens

Historical references state that the original core area of Vrindavan (the delineated ecozone) was full of vegetation, in which many of the trees, viz. tulsi, kadamba and tamaal have gained historic identity and religious significance.

Unfortunately the percentage of vegetation in the ecozone is negligible now, with built up space occupying major share of the land. There are some pockets, such as Gandhi park, Kishore Van, Vamsivat, Nidhi van etc. which are large chunks of green areas. But none of them are presently functioning as a public park (except Gandhi Park) or even been used by children for play. Most of these open are closely guarded as religious venues, keeping them inaccessible for daily public use.

4.3.4.1.9 Roadside Plantation

Road side plantation is almost nonexistent in the ecozone, due to non-availability of adequate easement on the right-of-way. New initiatives may be taken in this regard with the aim of reducing dust pollution as well as recreating the historical green ambience of the town.



Appreciable attempts of landscaping along road ID 8 and 15a

4.3.4.1.10 Resting and Eating Places

The prime visitors to the town are the religious tourists, commonly termed as pilgrims, who visit the town for a short duration, ranging between one to three days. Their movement is centred around the major temples and shrines. Their travel behaviour reflects movement in groups, guided by a tourist guide, generally known as 'panda'. It is observed that the major share of these tourists belongs to middle income to lower-middle income groups. The itinerary of these groups comprises visits to the temple from one point and making continuous travel from one to the other temples throughout the day.

The common operating time schedule for the temples is restricted to 8 am - 12 am and 4 pm - 8 pm. The pilgrims are compelled to take a break during the temple closing period without going back to their place of stay. This strongly necessitates availability of resting places and proper eating places during the lunch hour.

There is a serious lack of open areas, gardens or shaded places where they could relax and spend a few hours during mid-day. The problem becomes more severe during the inclement weather, such as mid-summer and monsoon.

4.3.4.2 Problems, Issues and Concerns

Urban design, conservation and landscaping are the major elements that need to be augmented in order to revive the historic ambience of Vrindavan. It is observed that the residents have a strong feeling about the religious and

cultural values of the historic town and realise the need to uphold and maintain these values, customs and rituals, for Vrindavan to be projected as a famous religious and tourist destination.

The architectural character of Vrindavan is unique and very rich in aesthetic value. In few places of India, there exists such a perfect harmonious blend of architectural styles and building materials, making Vrindavan an ideal example of eclectic manifestation of architectural and artistic research.

Presently, very few urban design elements are observed in Vrindavan that would embellish the streetscape quality of this historic town. Street furniture, signage, roadside plantations are significantly absent now and thus need to be augmented for aesthetic quality upgradation. There is an absence of proper signage system for appropriate orientation. The entrance to Vrindavan is not properly defined resulting in improper visual appeal at visiting spots. This speaks of the inability to uplift the feel of approaching to heritage wonder. The riverside potential of the ghats along River Yamuna is enormous and presently in neglected and unutilised condition. Architectural preservation and conservation along the river front and innovative sympathetic riverfront development, would immensely improve the visual ambience of the place, in addition to reducing environmental pollution and generating increased revenue generation.

Finally, there is severe dearth of open spaces and parks for active and passive recreation of the residents and tourists, and especially for children. Large open spaces have

traditionally been used for religious functions but is not effectively utilised to serve the inhabitants more effectively.

4.3.4.3 Planning and Design Guidelines

Religious and cultural heritage values have to be maintained and further revived through appropriate urban design solutions. Some of the possible policies and design strategies have been discussed in this section.

Adequate visual and media publicity should be done, highlighting the ecocity attempts. This is expected to benefit the inhabitants and also to attract domestic and international tourists. However these developments should be designed in an eco-sensitive and traditional way to avoid rampant commercialisation of a historically sensitive town.

The existing buildings with architectural excellence, which are the testimony of historic art and architecture, should be protected from further destruction and decay. The minimal restoration and face lifting of the building is an essential component of the ecocity actions.

Improvement of road conditions within the purview of the ecocity project would certainly improve the streetscape quality significantly. However, the traditional character of the streets should be preserved – and not be replaced by harsh modernity. Wherever the road is wide enough, proper paving and plantation has to be integrally designed. This would improve the microclimatic condition as well reduce the dust pollution.

Street furniture, such as water stand posts, pyaos, water troughs, building signage, notice boards, lighting fixtures etc., should be designed very sensitively to reflect the art and tradition of the town. Modern gadgets or visually loud elements should not dominate the eco-scale traditional features of the rich past of Vrindavan. The design of street furniture and other artefacts would be simple, with minimum maintenance complexity, using local materials and traditional designs, involving the local artisans.

The involvement of local artisans would be encouraged to regenerate the traditional arts and crafts as well as for economic benefit.

Special attention is to be paid to the recreation of the riverfront replicating the historic saga, which would be accessible to the tourists, pilgrims and the local residents. Improvement of the hydrological condition of the Yamuna along the town should also be looked into in order to properly utilize and exploit this natural treasure.

The large open areas under the jurisdiction of the individual owners may be brought under a common policy of design elements, and requests be made for its implementation.

There is a strong need to develop and improve the Gandhi Park (located at the entry to the ecozone), since it is the only designated public park for passive recreation, but is currently in deplorable condition. The Gadela Bag is strategically located in close proximity of the Brahma Kund, Lalababu Mandir, Rangnathji and Hanuman temples. Thus it should be effectively improved in order to serve important public functions that are social and cultural in nature.

Many other under-utilized open spaces should be conceived and used to function as resting areas for the pilgrims during mid-day, when temple doors are closed. Proper shades, seats, benches, drinking water and toilet facilities, as well as appropriate illumination and security facilities should be provided in these open spaces. In order to reduce the misuse and vandalism of such public parks, and to recover operating and maintenance costs, a few good quality shops of religious relevance may be allowed inside them.

4.3.4.4 Proposed Tourist Circuits

Based on the overall religious, environmental and visual potential a comprehensive tourist route has been proposed comprising the road IDs 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 14, 15, 15a, 19, 20, 21, 22, 23, 33, 32, 29a, 29, 41, 41a, 49, 47, 42, 38, 46, 45, 54, 55, 56, 58, 59, 60, 61, 62, 67, 72, 73 as shown Figure 4.27. Three possible circuits depending on the time availability of the tourists have been proposed (refer Figures 4.10, 4.11 and 4.12).

5.0 ECOCITY PROJECT OUTCOME

The impact of the ecocity project can be best assessed from the resulting benefits in the following aspects.

- Environmental Benefit
- Economic Impact
- Social Benefit
- Architecture & Heritage Benefit
- Sustainability

The benefits of the proposals on the whole, both direct and indirect, are discussed in this section. Many of the benefits are tangible and some intangible. But it is evident that the benefits are enormous and in general far outweigh the cumulative cost of the proposed projects.

The entire ecocity project proposal and execution is conceived strictly according to the principles of cultural and religious heritage, guided closely by planning policies that are socially responsible, environmentally sensitive, sustainable, and at the same time economically remunerative.

5.1 Environmental Benefit

The environmental benefits to be achieved through the overall ecocity project actions may simply be stated as “the creation of a clean and green Vrindavan, offering improved hygiene condition, living quality and a visually pleasing ambience.” This in fact, is the vision for ecocity Vrindavan,

as conceived by the planning team. This would serve as the mandate of the ecocity plan as desired by the stakeholders.

Improved road conditions, surfacing, and plantation would enhance the environment and streetscape quality.

Enforcement of a complete ban on the use of plastics would ensure improved health condition of the people, smooth flowing of water in drains and clean water conditions in the river Yamuna.

A town level policy taken in terms of enforcement on usage of heavy metal free fuel use by the vehicles, and restriction on indiscriminate burning of wood or coal and burning of dead leaves would ensure better air quality.

Fully covered drains and safe drinking water at the public water points and ‘pyaos’, would ensure the reduction of health risks.

Integration and augmentation of sewer lines, collecting the sullage from households, would improve the flow condition of the storm drains, and also reduce chances of nuisance created by pigs and other hazard-spreading animals. It would also ensure non-discharge of untreated water to the drainage outfalls and the river.

Provision of additional public toilets and low user charges would minimise open defecation. Public toilets should be located strategically and the awareness of its presence should to be highlighted to tourists.

The proposed solid waste management system, de-siltation of drains, discharge of clean and treated water to the Yamuna and other regional water channels, would help to improve the quality and flow condition of the river.

5.2 Economic Impact

The ecocity project, throughout its implementation and operation stages, will generate additional employment and means of livelihood to many people living in Vrindavan. It will have a strong positive impact on the economy, both directly and indirectly. Since the present situation reveals a relatively under-privileged population of the country, the impact will be very significant and easily perceptible.

The ecocity project will be a catalyst for the improvement of physical infrastructure, which will ensure greater inflow of pilgrims and tourists, thereby boosting the economy. Provision of social infrastructure such as facilities for education, healthcare and recreation, especially open parks and gardens, will immensely benefit the residents of Vrindavan and also the state, not only socially but also in terms of positive economic impact.

Economic benefits arising from infrastructure development, employment generation, commerce and tourism aspects, have been discussed in this section.

5.2.1 Infrastructure Development

The Vrindavan ecocity project will accomplish the primary objective of capacity building in civic infrastructure in the core

area of the town. More importantly, it will eventually have a multiplier effect, by which this initial developmental impetus will flow out to the entire town.

The physical infrastructure – roads, drainage, water supply, solid waste – will be improved and augmented, resulting in better living conditions in the town. The broad aim is to help all these aspects reach recommended adequacy levels. Transport and traffic related infrastructure will enhance the quantum of mobility for tourists and pilgrims.

5.2.2 Employment Generation & Commerce

Once the ball is set rolling, the ecocity project would draw qualified architects, engineers, technicians and other professionals for technical consultancy of many of the projects outlined later. The project's construction phase will directly employ a significant number of skilled, semi-skilled and unskilled workers from Vrindavan as well the vicinity. Additionally, many people will be indirectly employed by commercial establishments and industries which supply building material and services.

On completion of the first phase of the project, several people will be employed to maintain the infrastructure and provide direct services to the visitors all round the year. The project will attract new investments and entrepreneurs within the town and the larger region, thus generating opportunities for more employment of staff and personnel.

5.2.3 Tourism

The Government of India has designated tourism as a key to regional development plans. The ecocity project, with its improved environmental quality and sanitary conditions, will attract a larger inflow of foreign and domestic funding into the town, which is now inconceivable. Presently most of the tourists are attracted to Vrindavan only for religious and spiritual reasons, and they may be indifferent to the degenerated environmental conditions of the town. In future, improved amenities and environmental quality of the town will attract general tourism for sight-seeing and short-term holidaying as well.

The possible improved transportation linkages would enhance the scope for visits to the nearby holy sites and shrines, providing a powerful additional attraction for foreign and domestic tourists. It would redefine Vrindavan as a unique site of environmentally conducive pilgrimage site in the world, inspiring more tourist inflow, investments and employment.

5.3 Social Benefit

Environmental improvement and economic development envisaged through ecocity programme would bring stability and satisfaction to the residents of Vrindavan. This would reduce the tensions of survivability and ensure improved social conditions and quality of life for the people and also the floating pilgrims.

5.4 Architectural & Heritage Benefit

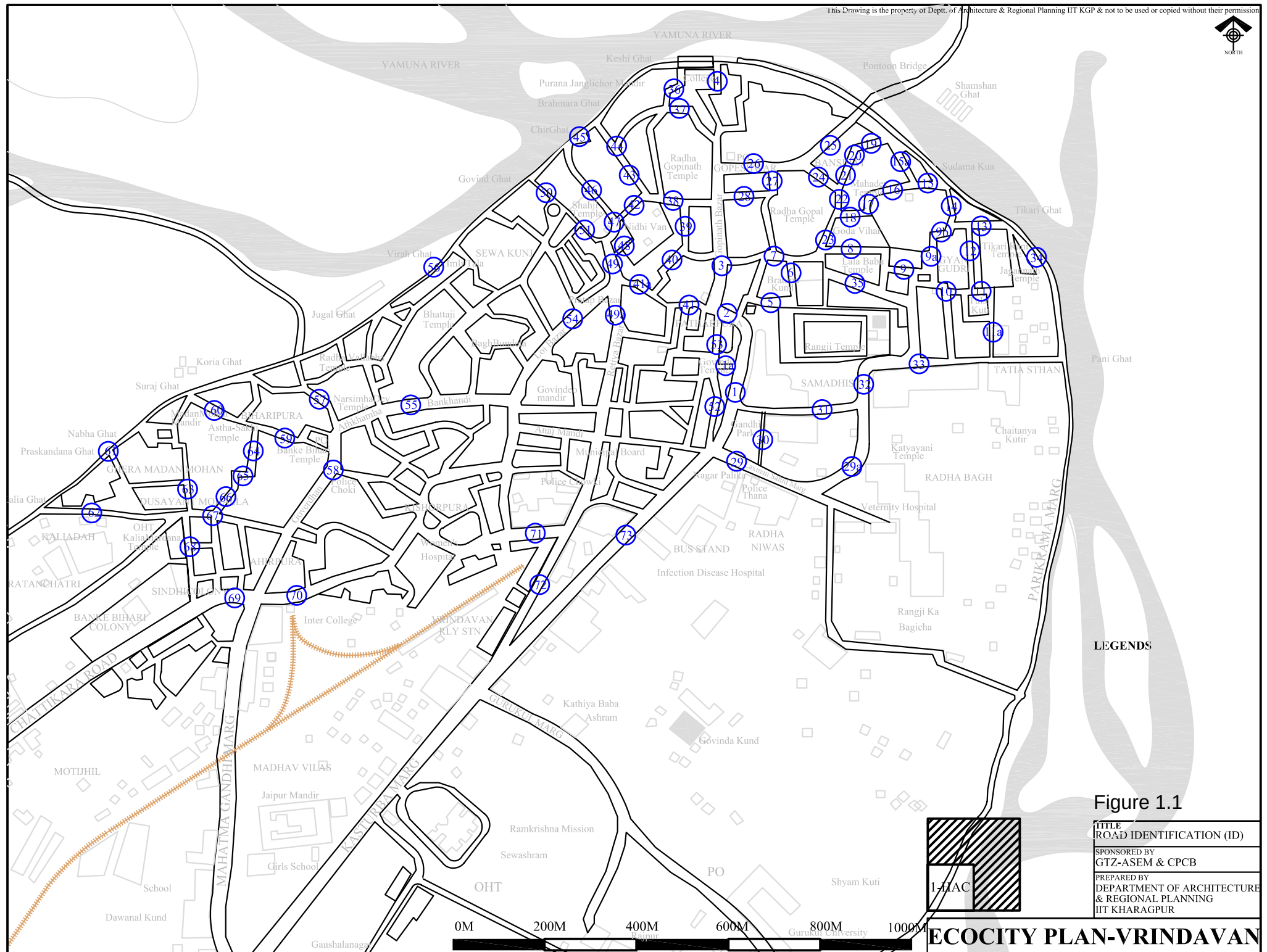
Conservation and restoration of the historic temples, monuments and ghats in the ecozone would enhance the safety and beauty of the overall environment. Involvement of the local artisans in the development would enhance pride and economic boost.

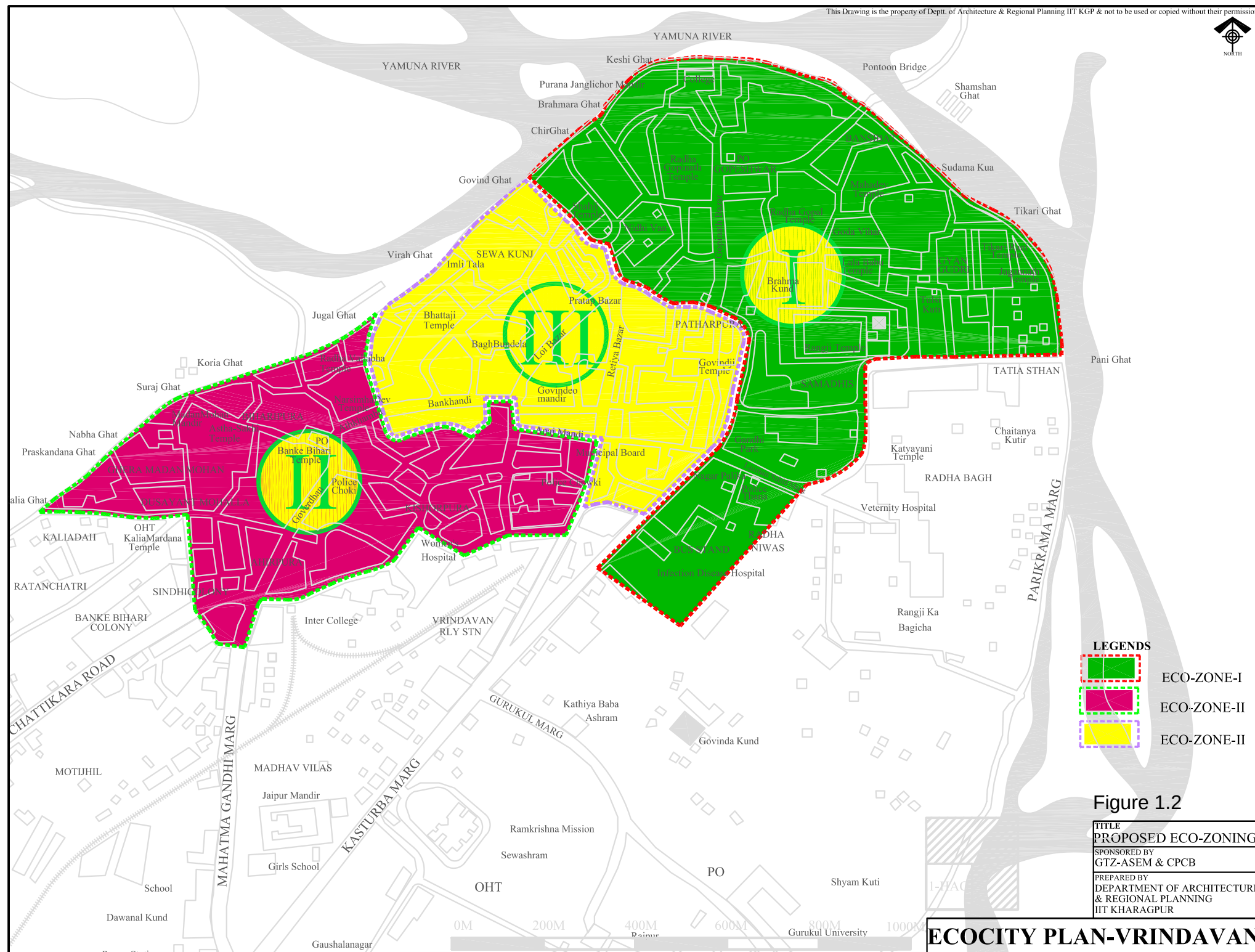
5.5 Sustainability

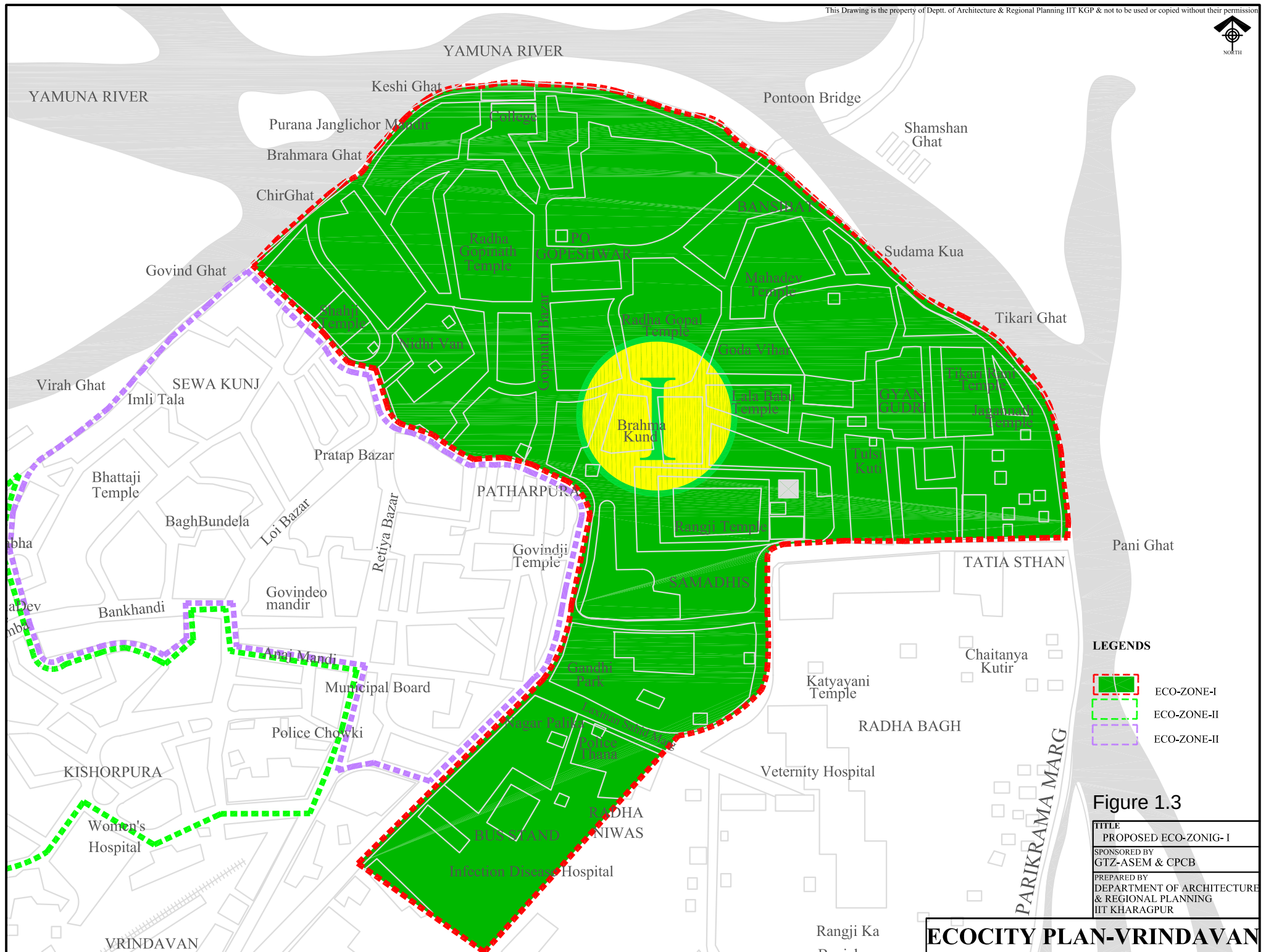
Quite often development appears to bring depreciation of indigenous cultures in the process. This project has been envisaged with full respect to sustainability, based on the respect for tradition, culture and heritage, which would enhance local self-esteem, confidence and human resource. The project would promote development centred on the recognition of Vrindavan's cultural importance, religious values and traditional handicrafts.

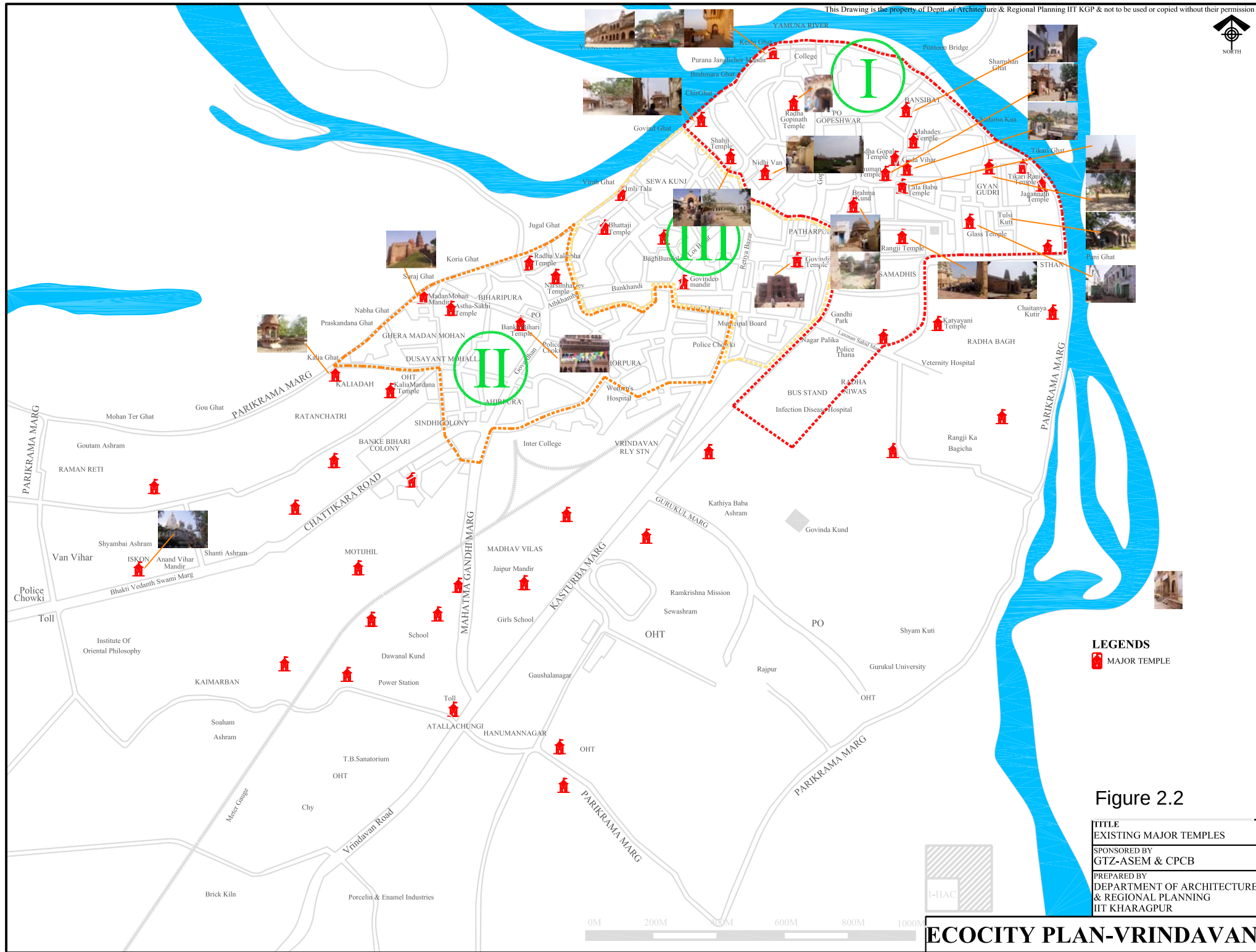
The attempts by the Ministry of Environment, Central Pollution Control Board, State Pollution Control Board and the Vrindavan Nagarpalika, would encourage the local residents and the NGOs to work together and help revive the historic and religious ambience of the town.

The demonstrable success of the ecocity project, if implemented adequately, closely coupled with the enforcement of regulation, will imbibe the sustainability of interest among the residents. In the long run the Vrijvasis (residents of Vrindavan) will be able to internalise the system in their lifestyles and regain the pride for their hometown which bears the historic tradition and identity.









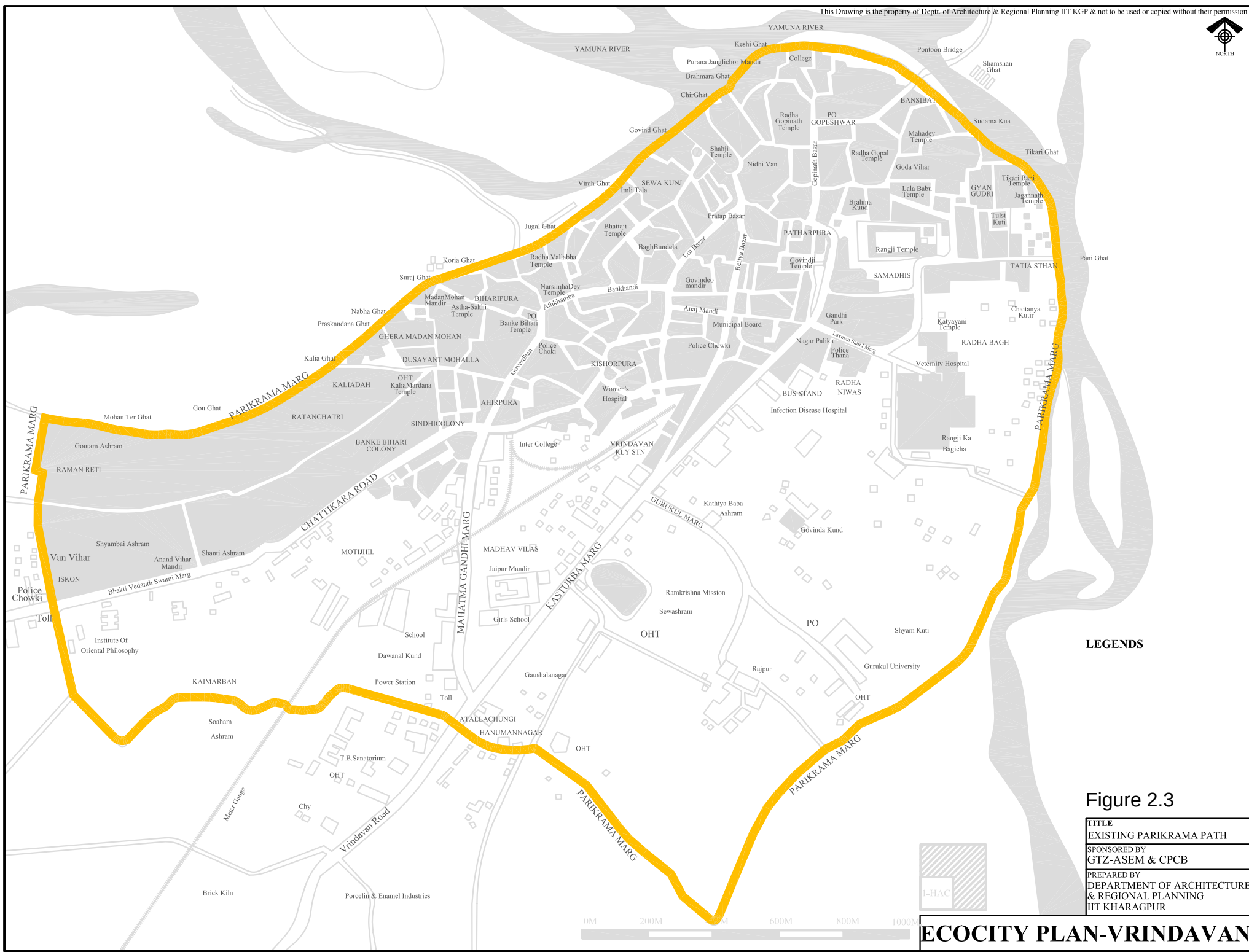
LEGENDS
MAJOR TEMPLE

Figure 2.2

TITLE
EXISTING MAJOR TEMPLES
SPONSORED BY
GTZ-ASEM & CPCB
PREPARED BY
DEPARTMENT OF ARCHITECTURE
& REGIONAL PLANNING
IIT KHARAGPUR



ECOCITY PLAN-VRINDAVAN





WARD* WISE POPULATION DENSITY	
WARD No.	POPULATION IN 2001
1	11088
2	4843
3	8351
4	6308
5	15640
6	2995
7	5835
8	1558
TOTAL TOWN	56618
* SANITATION WARD	

LEGENDS

- WARD-1
- WARD-2
- WARD-3
- WARD-4
- WARD-5
- WARD-6
- WARD-7
- WARD-8

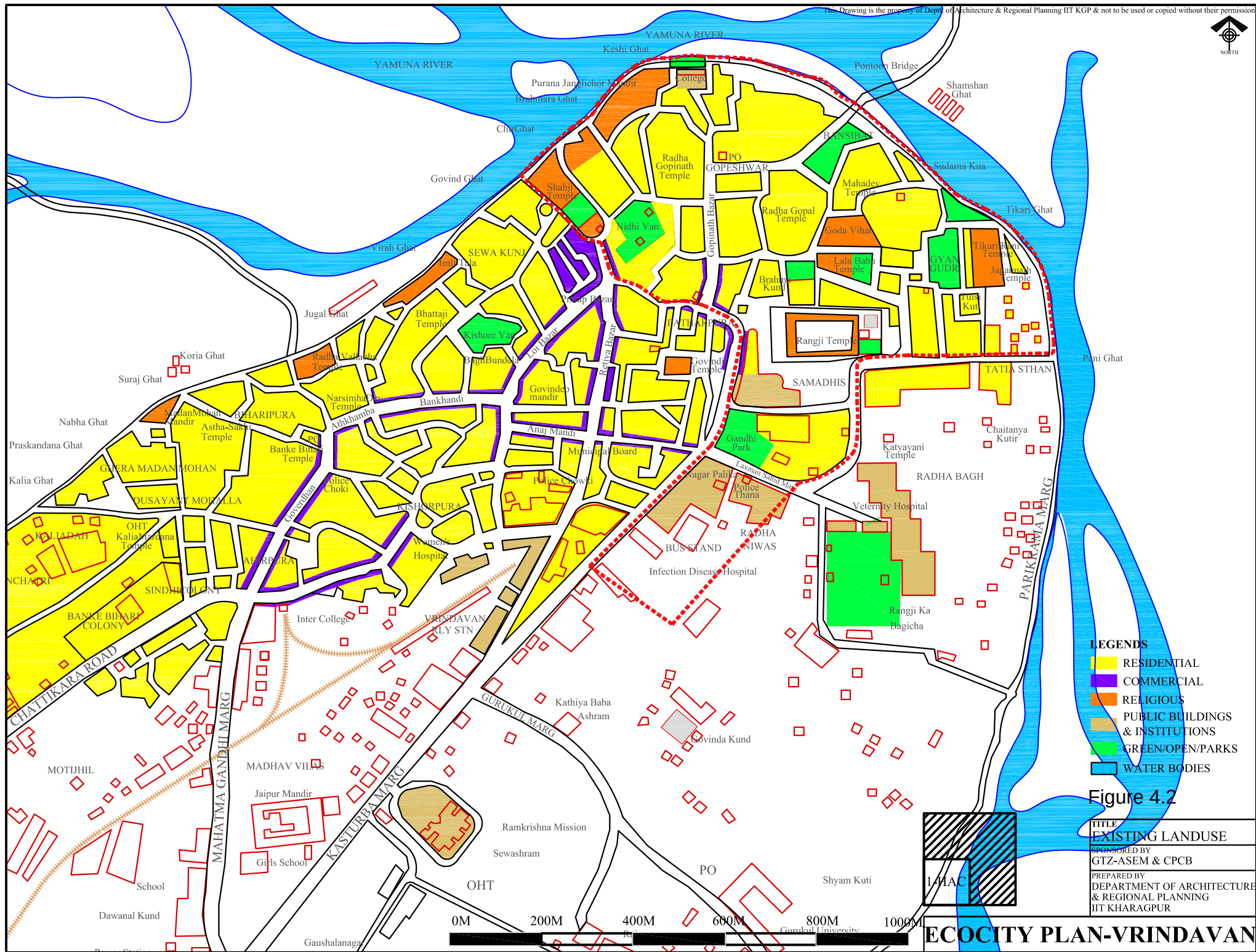
Figure 4.1

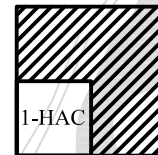
TITLE
SANITARY WARD BOUNDARIES
SPONSORED BY
GTZ-ASEM & CPCB
PREPARED BY
DEPARTMENT OF ARCHITECTURE & REGIONAL PLANNING IIT KHARAGPUR



0M 200M 400M 600M 800M 1000M

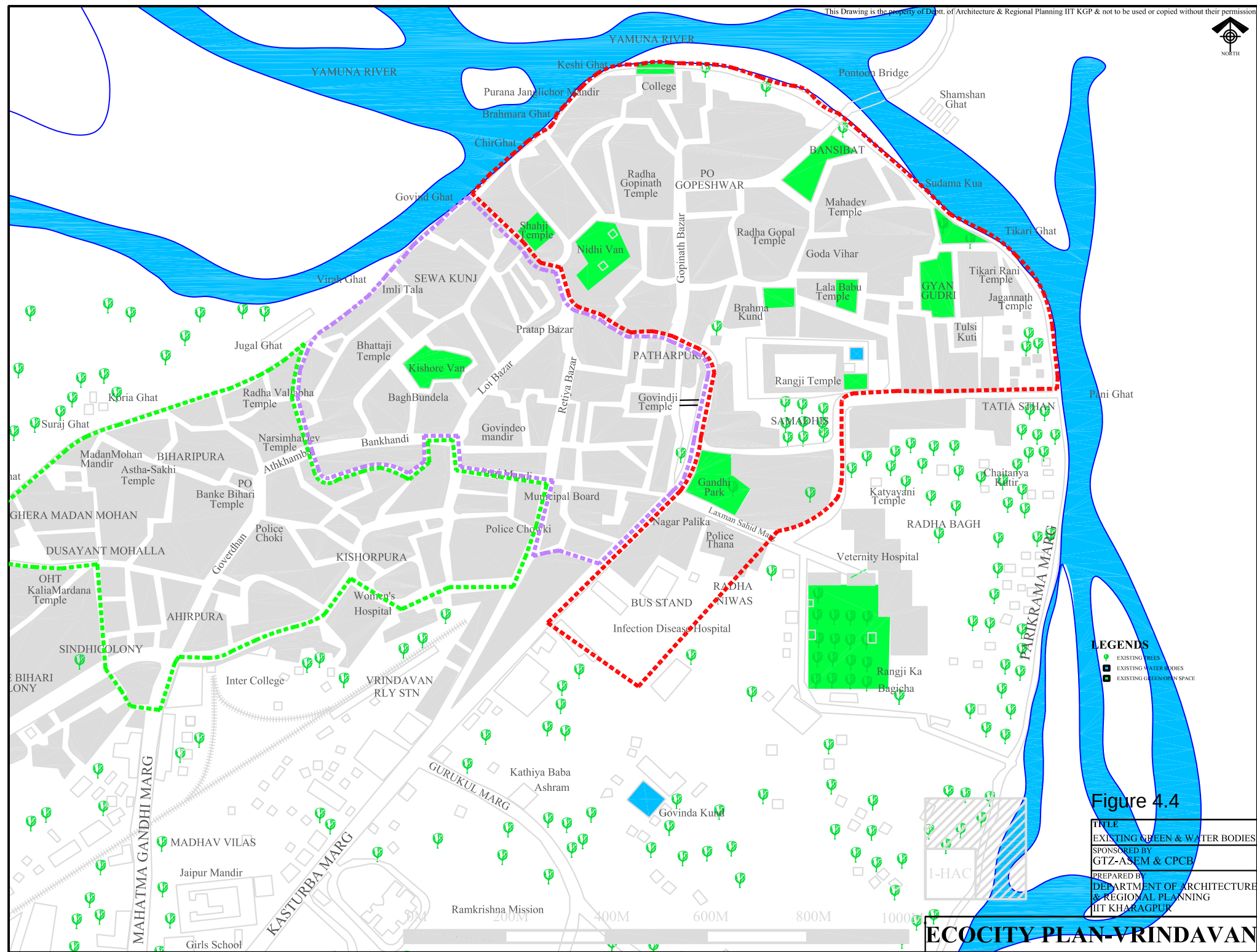
ECOCITY PLAN-VRINDAVAN

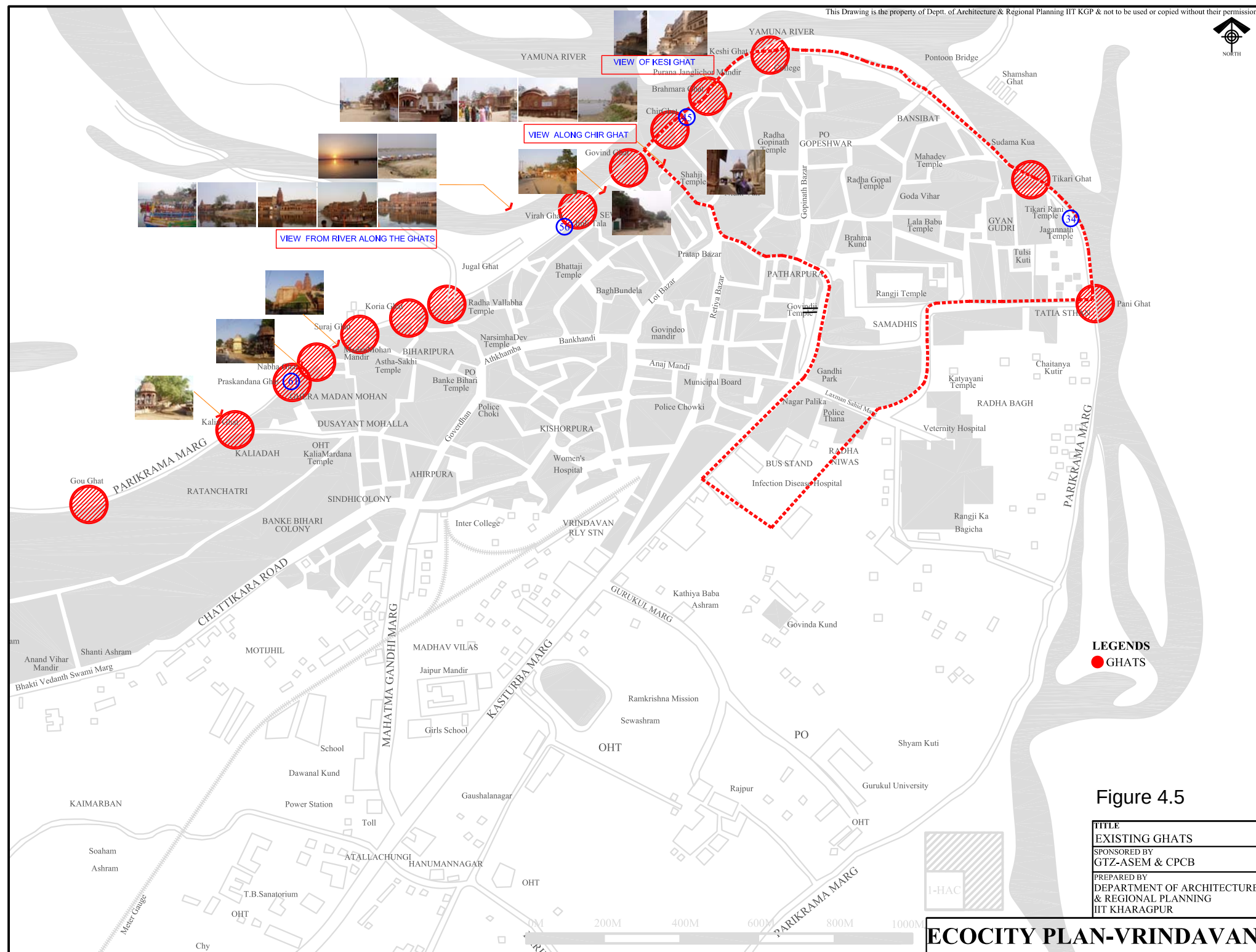


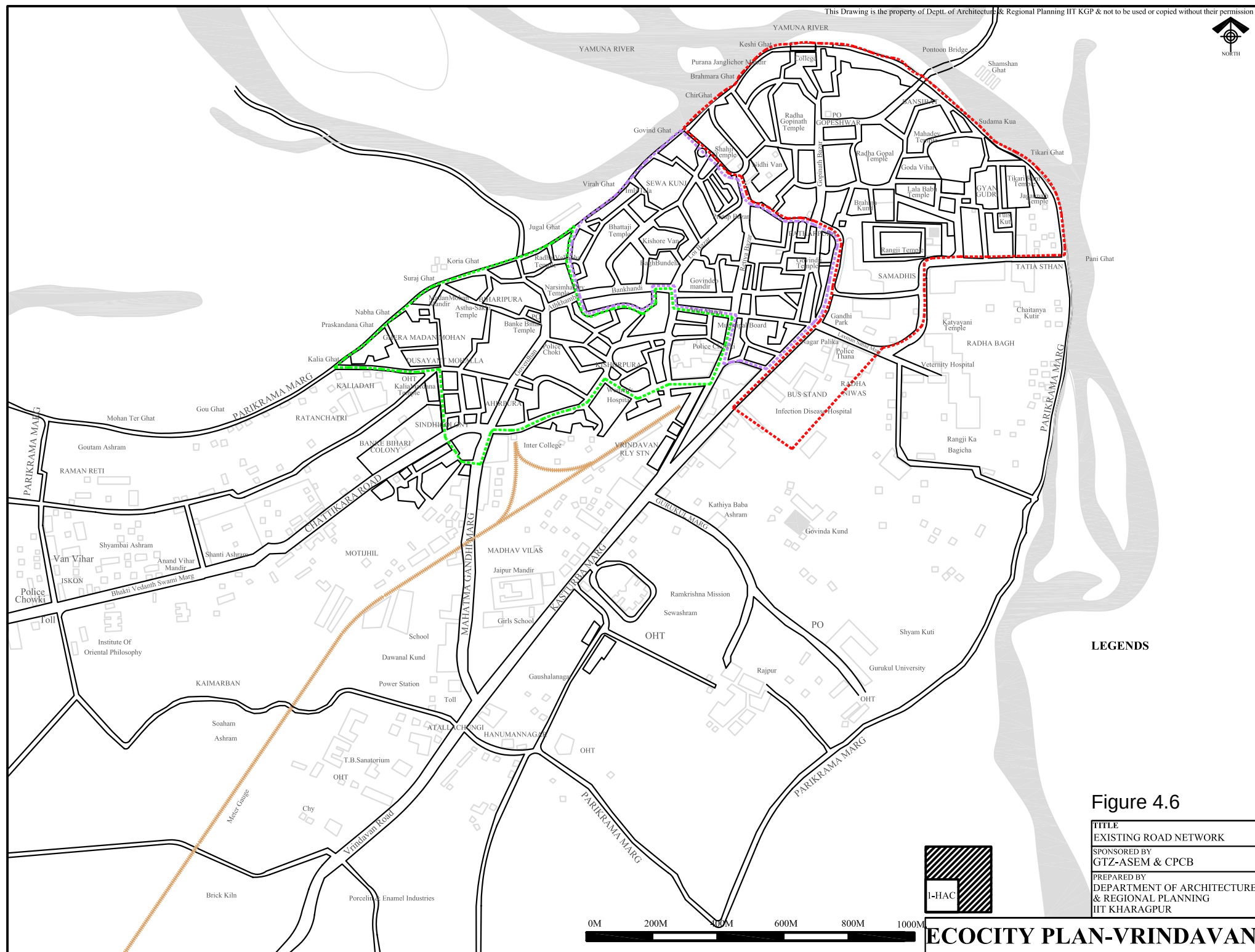


TITLE
EXISTING BUILT UP AREAS
SPONSORED BY
GTZ-ASEM & CPCB
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ECOCITY PLAN-VRINDAVAN







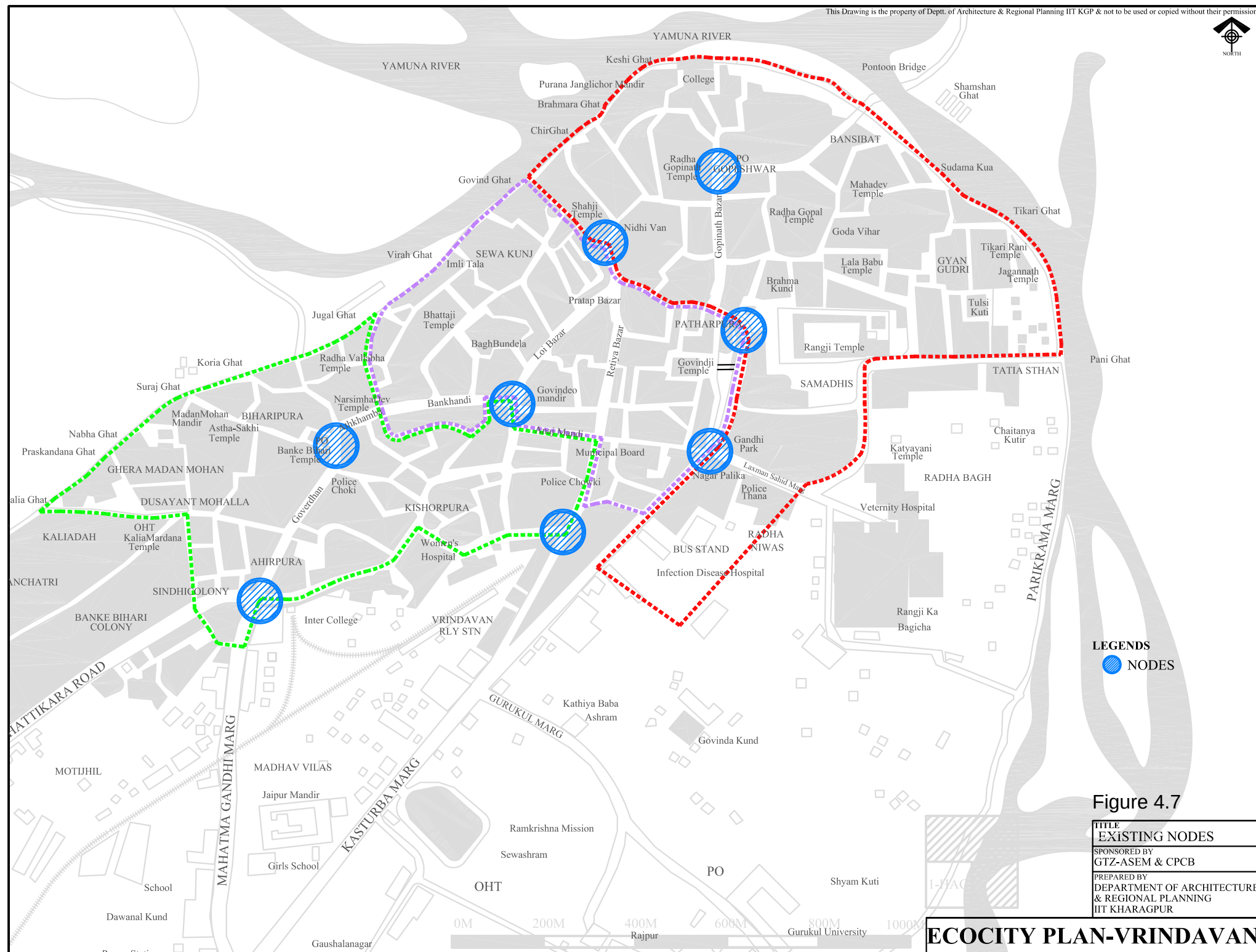
LEGENDS

Figure 4.6

TITLE
EXISTING ROAD NETWORK
SPONSORED BY
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PREPARED BY
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ECOCITY PLAN-VRINDAVAN

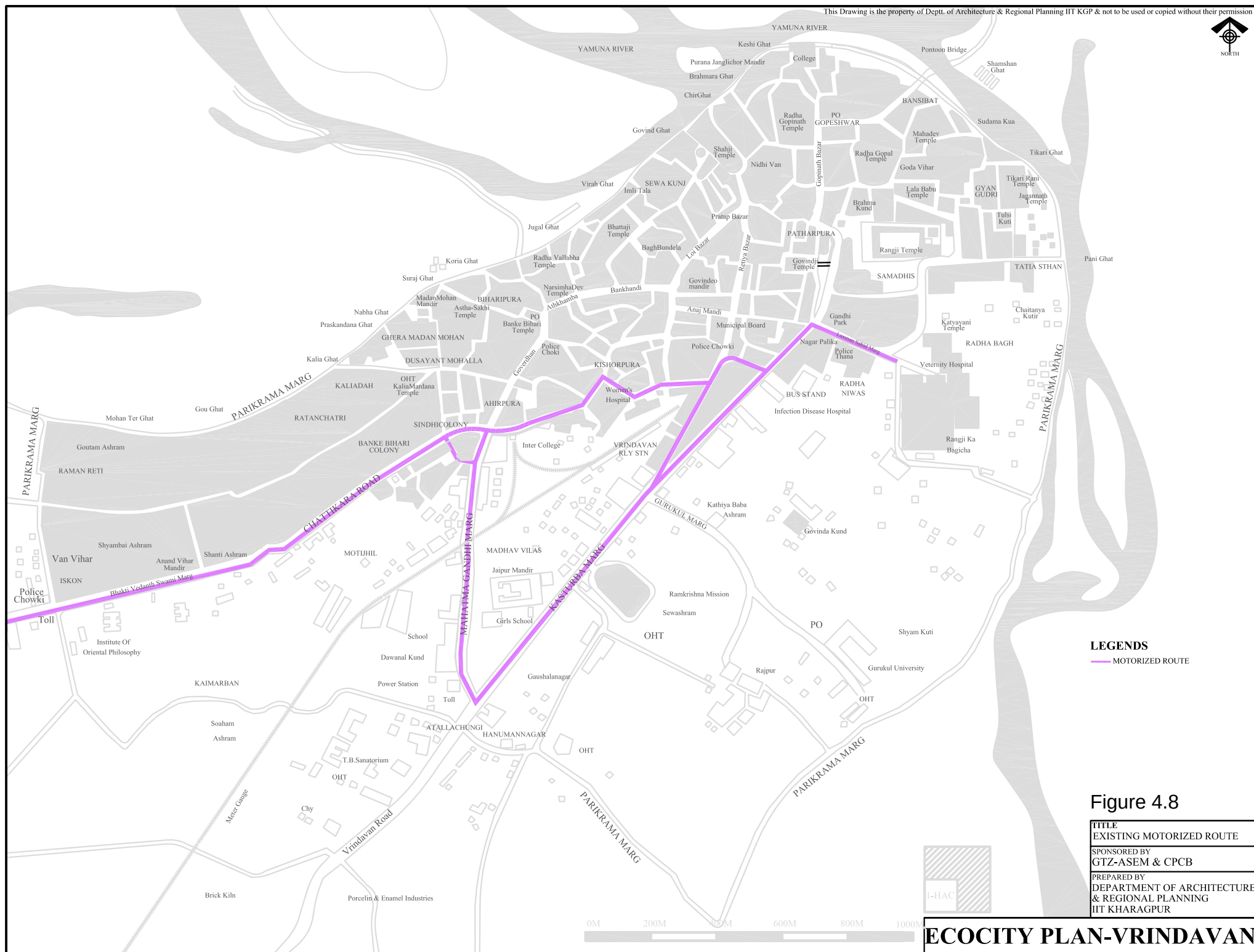


LEGENDS
● NODES

Figure 4.7

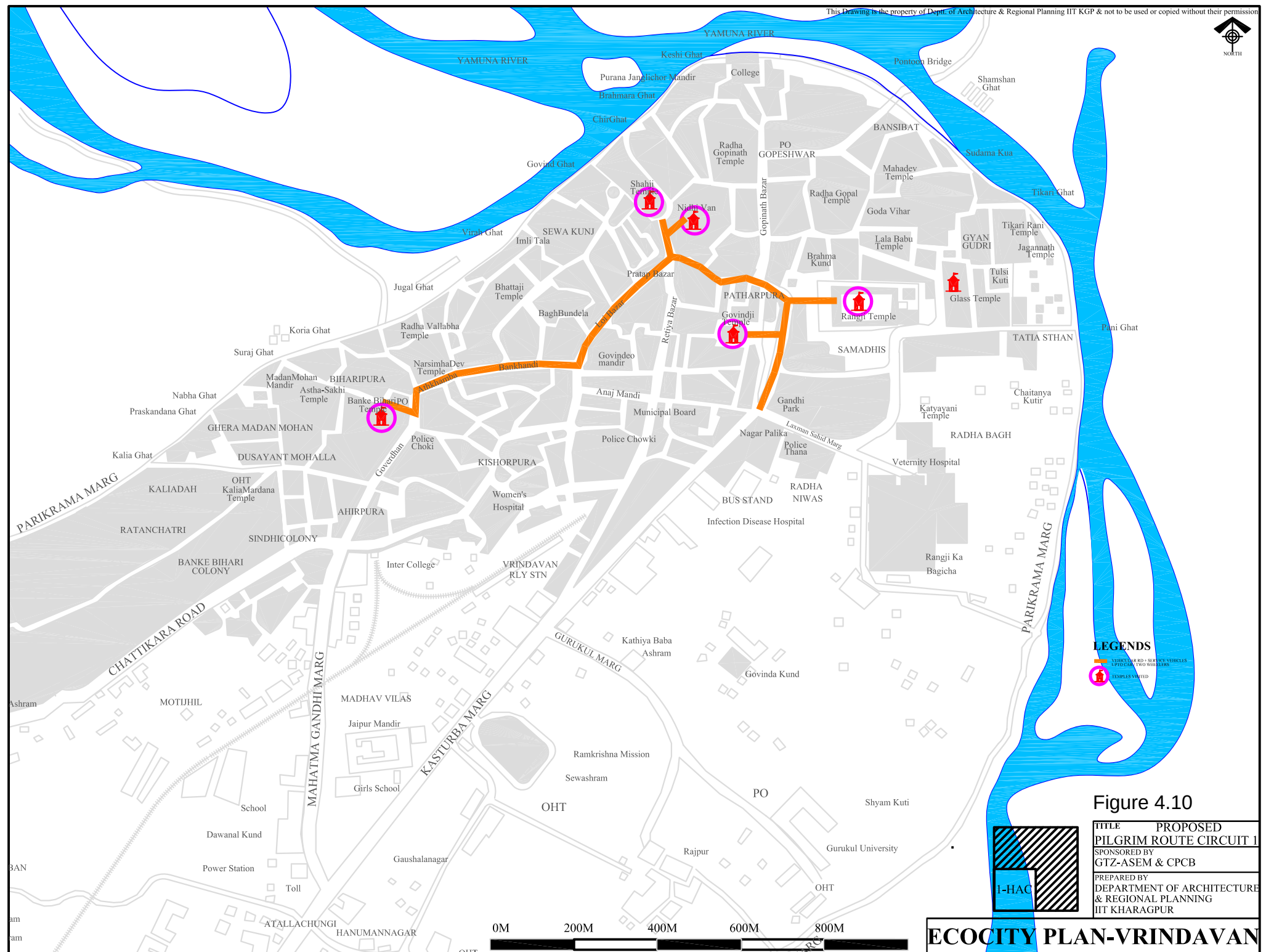
TITLE
EXISTING NODES
SPONSORED BY
GTZ-ASEM & CPCB
PREPARED BY
DEPARTMENT OF ARCHITECTURE & REGIONAL PLANNING IIT KHARAGPUR

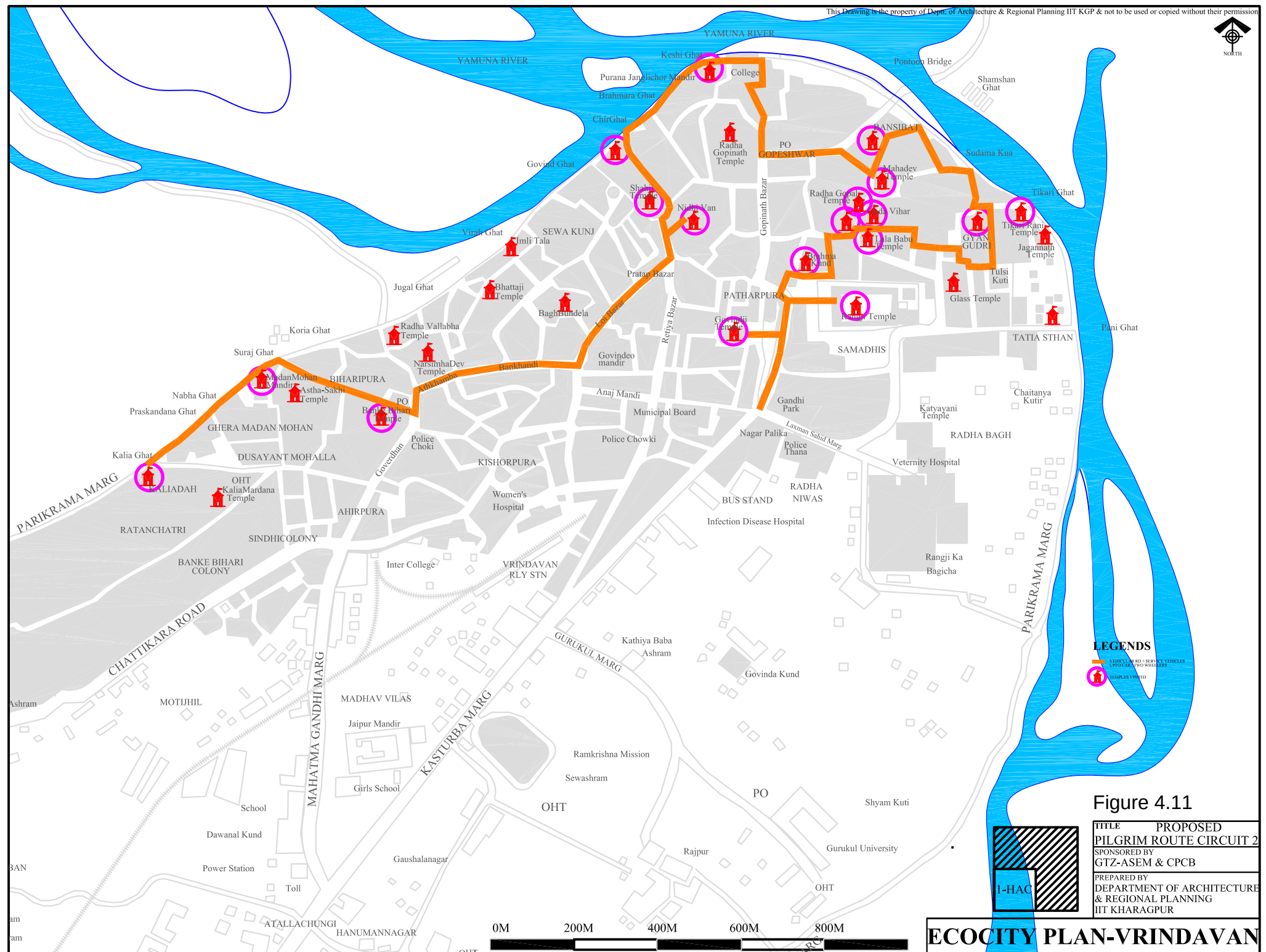
ECOCITY PLAN-VRINDAVAN





TITLE
EXISTING PILGRIMS ROUTE
SPONSORED BY
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PREPARED BY
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LEGENDS



Figure 4.11

TITLE	PROPOSED
PILGRIM ROUTE CIRCUIT 2	
SPONSORED BY	GTZ-ASEM & CPCB
PREPARED BY	DEPARTMENT OF ARCHITECTURE & REGIONAL PLANNING IIT KHARAGPUR

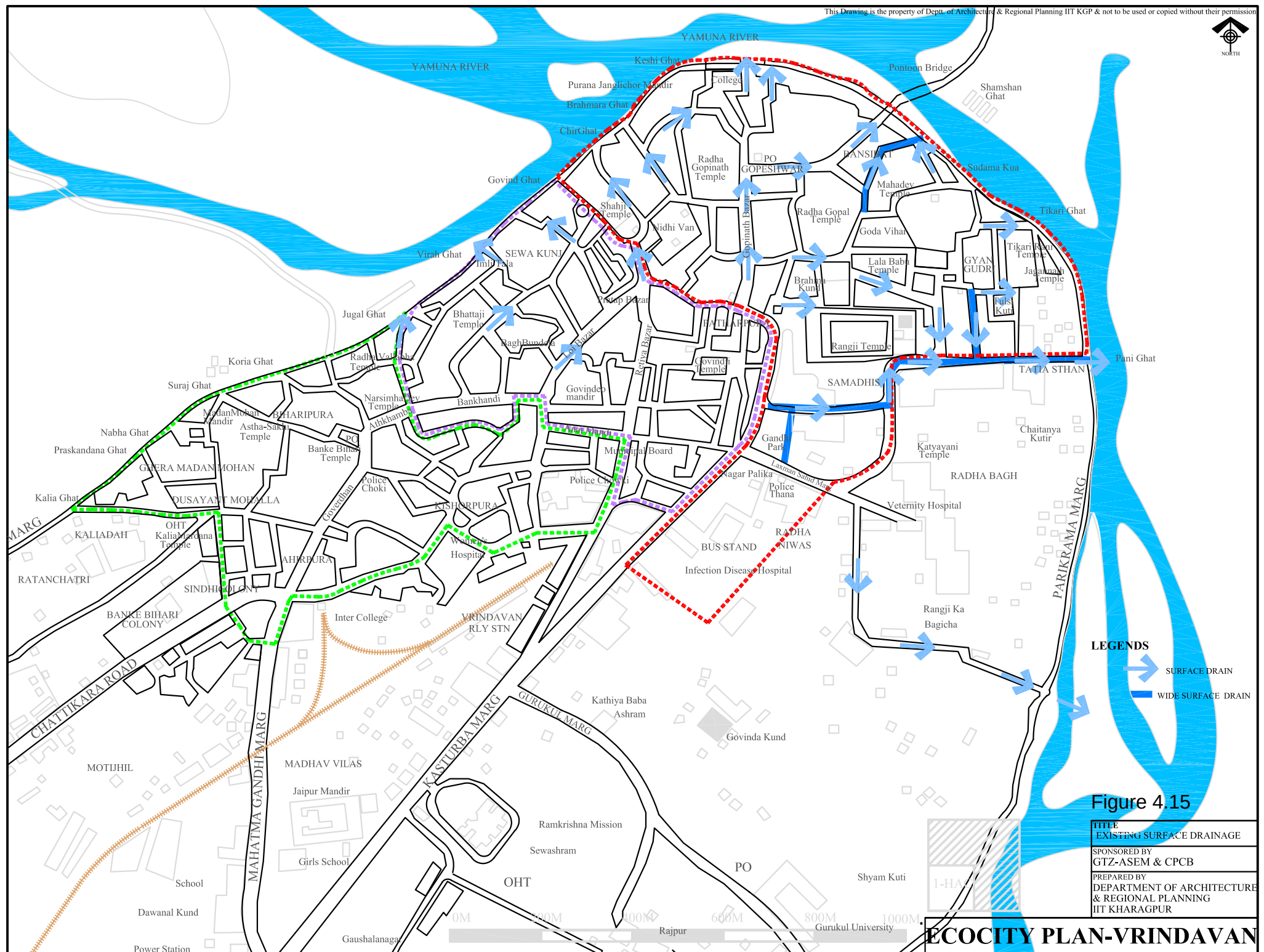


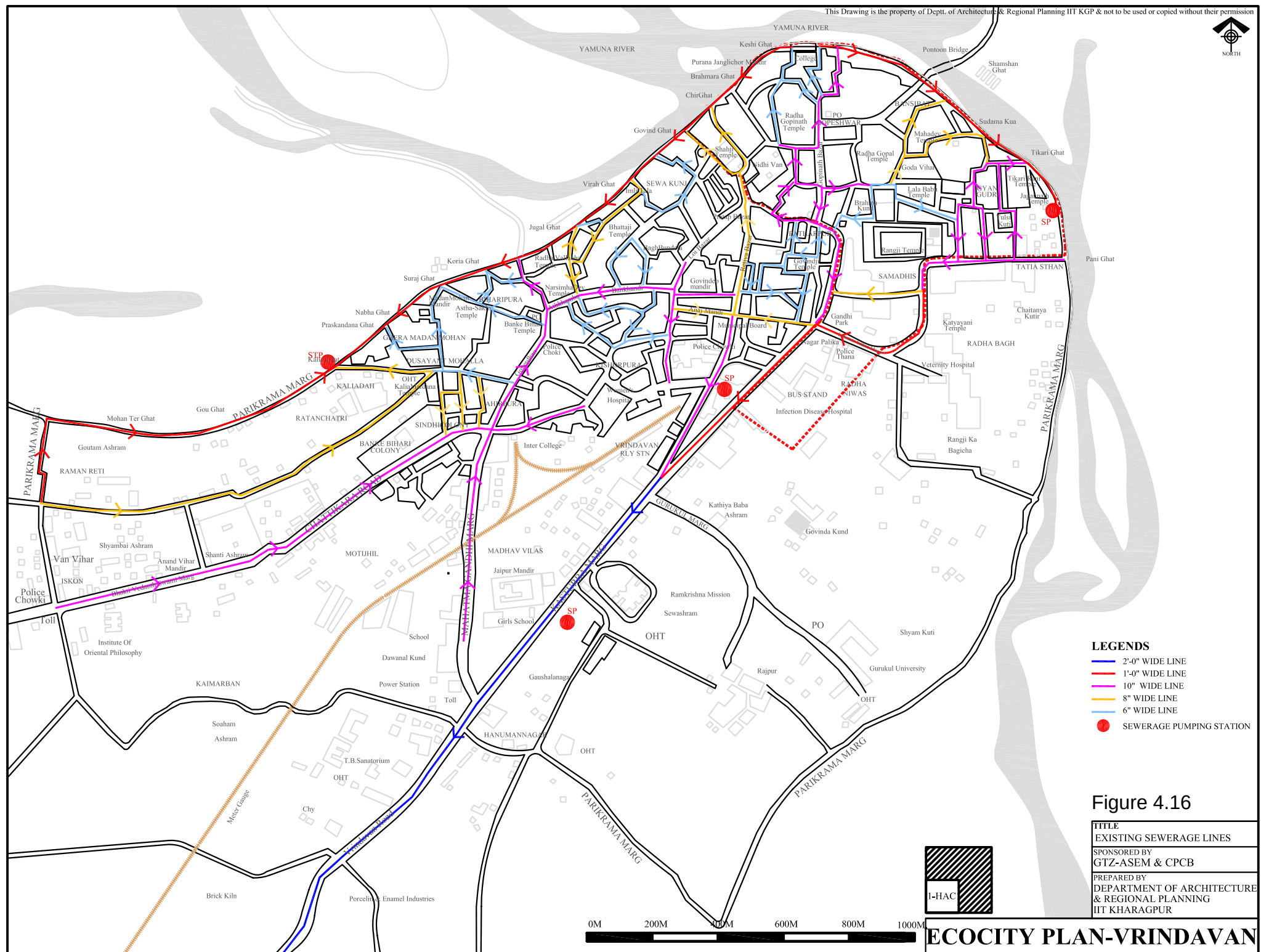


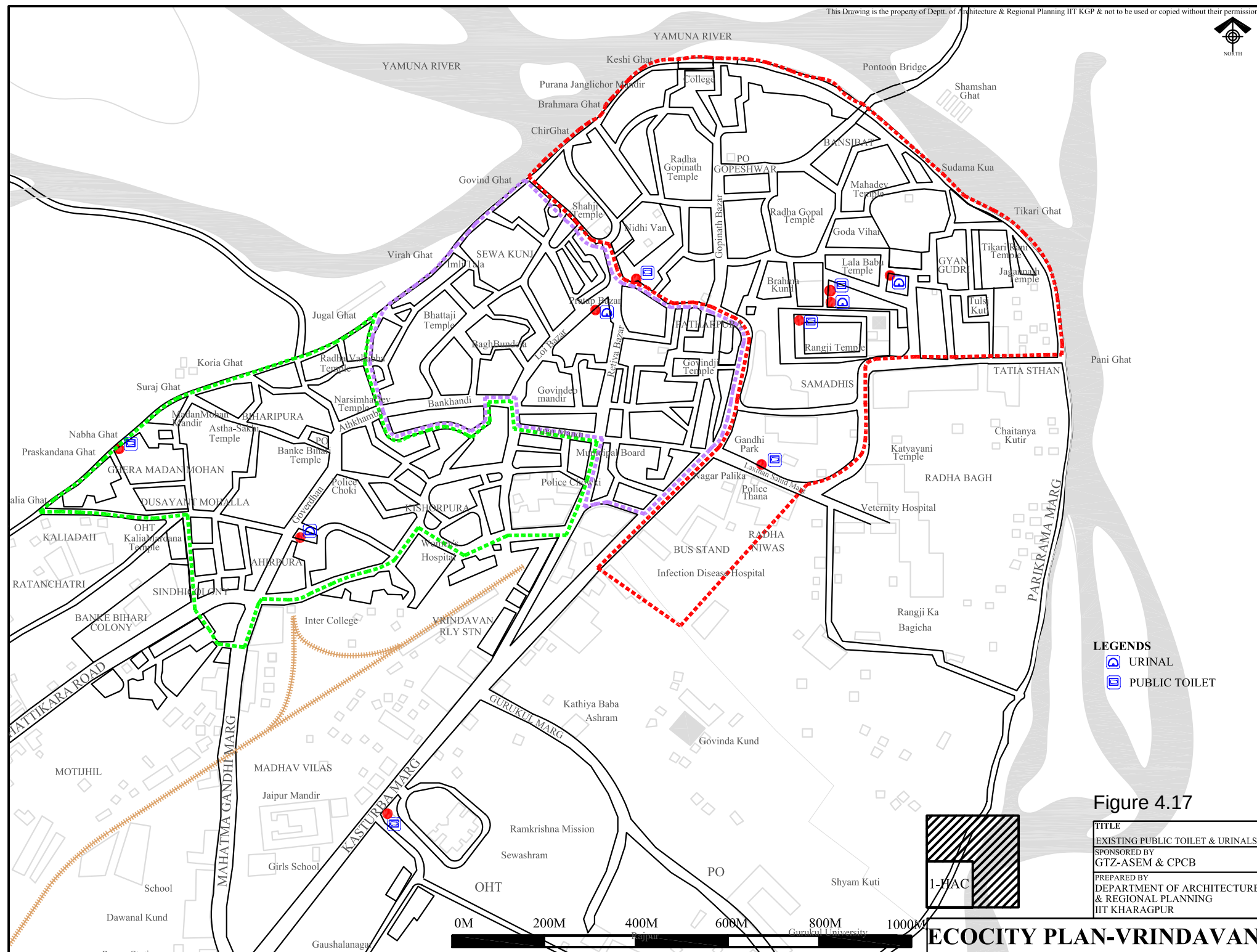
TITLE
EXISTING NOISE LEVEL
SPONSORED BY GTZ-ASEM & CPCB
PREPARED BY DEPARTMENT OF ARCHITECTURE & REGIONAL PLANNING IIT KHARAGPUR



TITLE
EXISTING ROAD SIDE DRAINAGE
SPONSORED BY
GTZ-ASEM & CPCB
PREPARED BY
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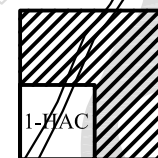


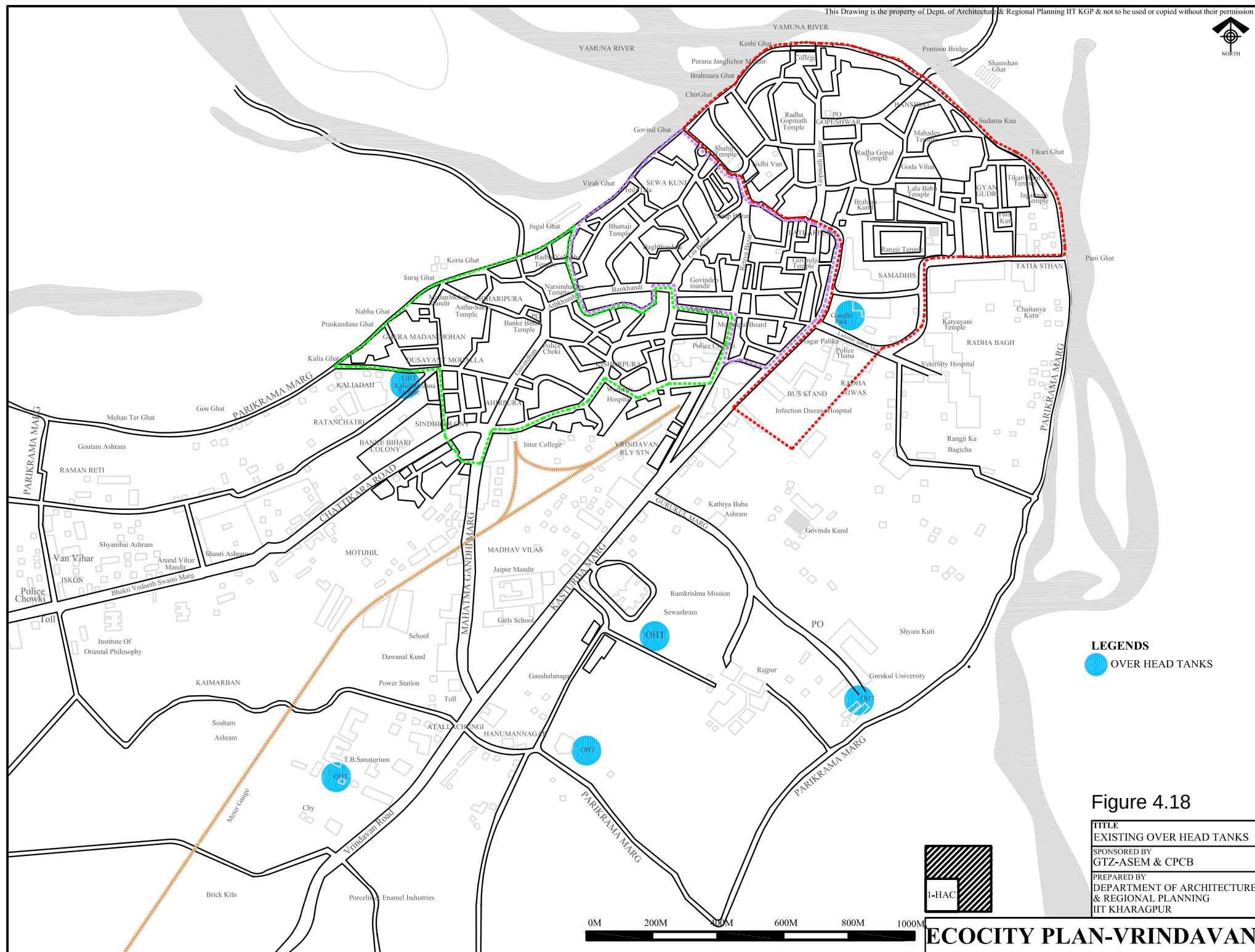


LEGENDS
URINAL
PUBLIC TOILET

Figure 4.17

TITLE
EXISTING PUBLIC TOILET & URINALS
SPONSORED BY
GTZ-ASEM & CPCB
PREPARED BY
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& REGIONAL PLANNING
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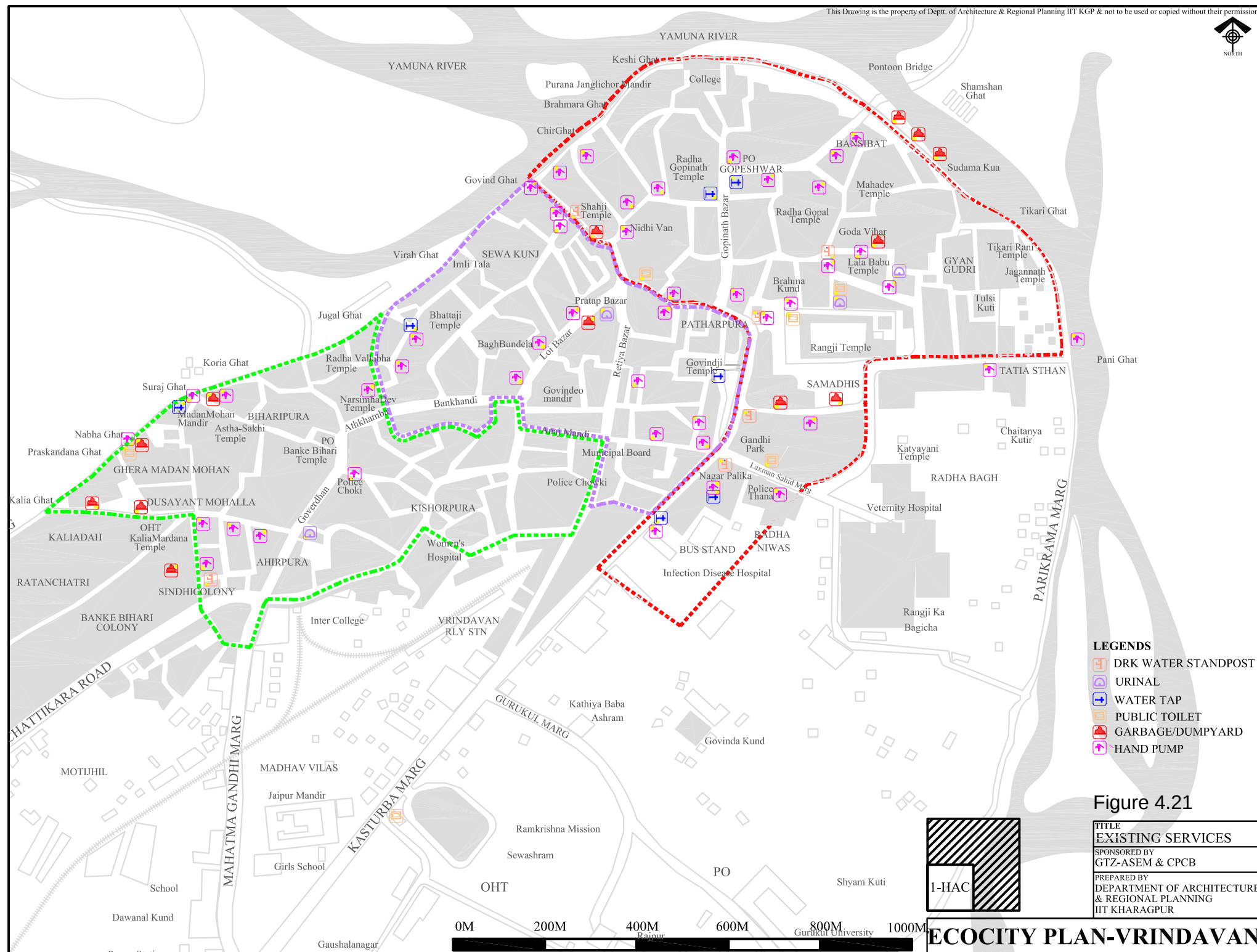








TITLE
EXISTING DRINKING WATER FACILITY
SPONSORED BY GTZ-ASEM & CPCB
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- LEGENDS**
- DRK WATER STANDPOST
 - URINAL
 - WATER TAP
 - PUBLIC TOILET
 - GARBAGE/DUMPYARD
 - HAND PUMP

Figure 4.21

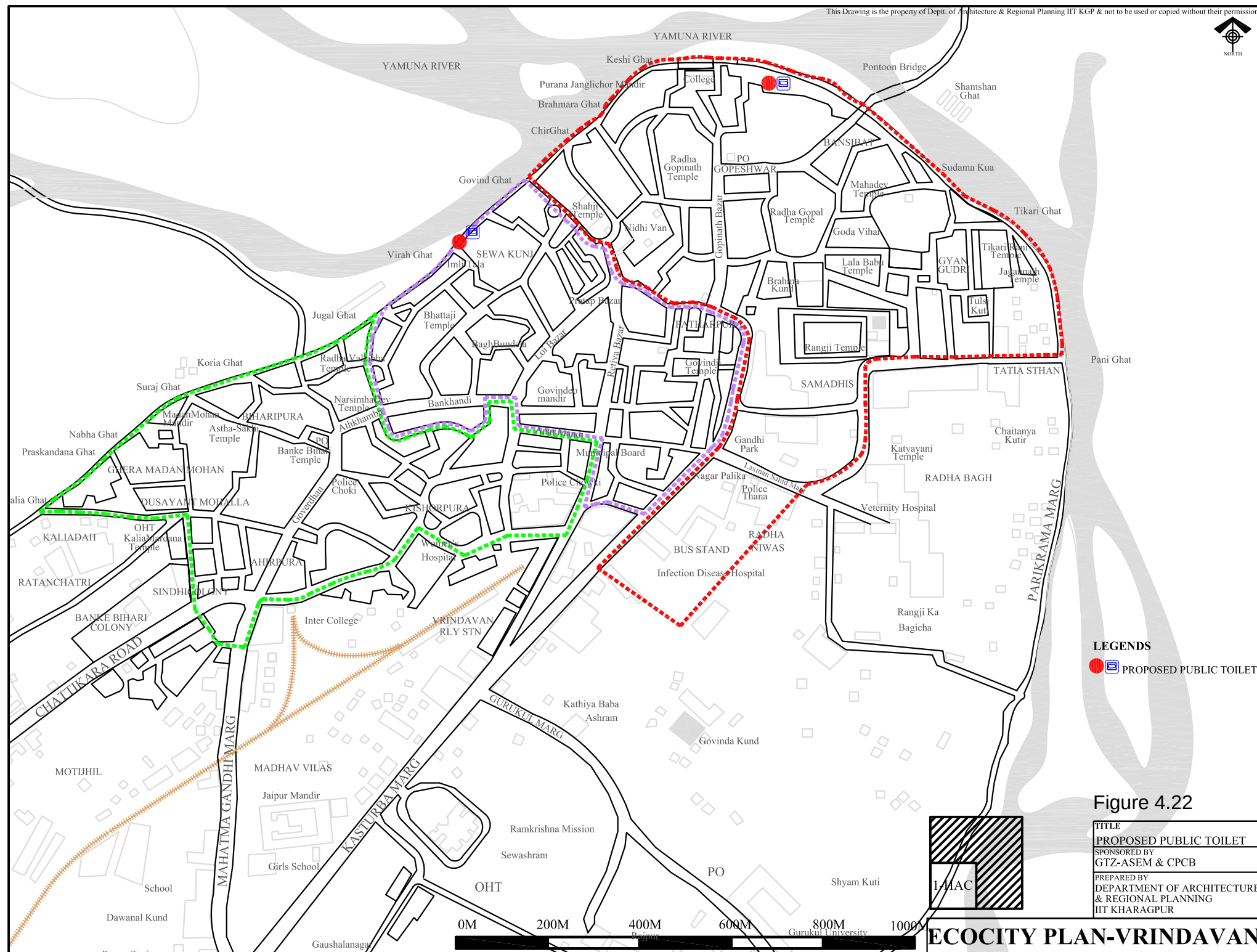


TITLE
EXISTING SERVICES

SPONSORED BY
GTZ-ASEM & CPCB

PREPARED BY
DEPARTMENT OF ARCHITECTURE
& REGIONAL PLANNING
IIT KHARAGPUR

ECOCITY PLAN-VRINDAVAN

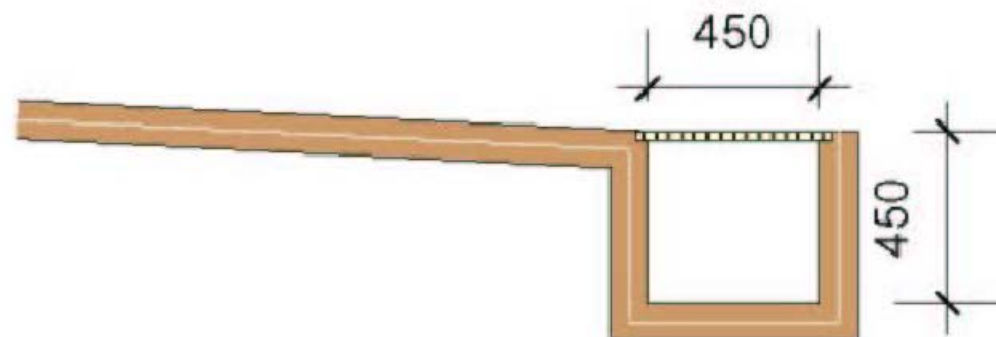




STREET WIDTH < 3 METRES



STREET WIDTH 3 TO 6 METRES



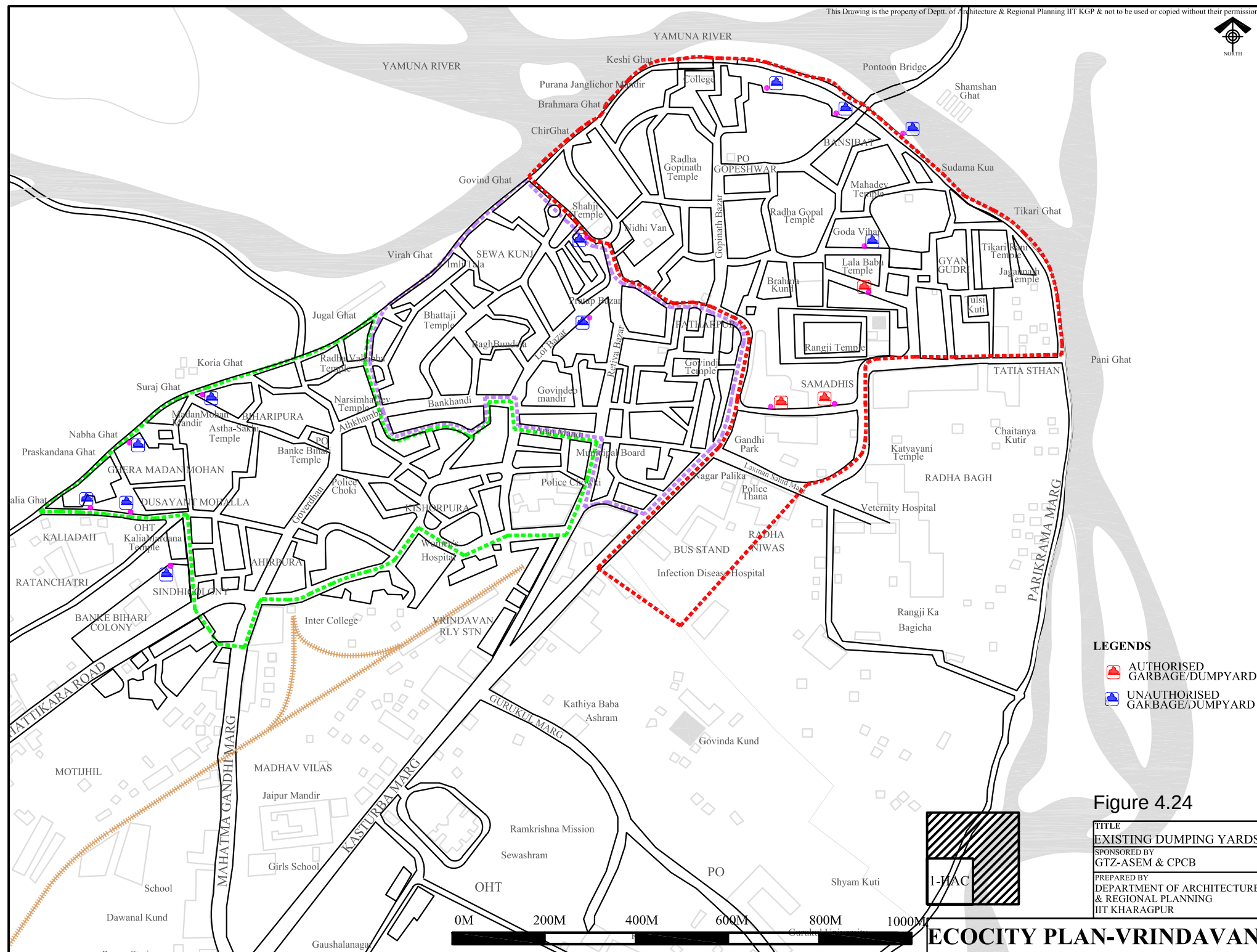
STREET WIDTH > 6 METRES

TYPICAL DRAIN SECTIONS

LEGENDS

Figure 4.23

TITLE	PROPOSED ROAD SIDE DRAIN SECTIONS
SPONSORED BY	GTZ-ASEM & CPCB
PREPARED BY	DEPARTMENT OF ARCHITECTURE & REGIONAL PLANNING IIT KHARAGPUR



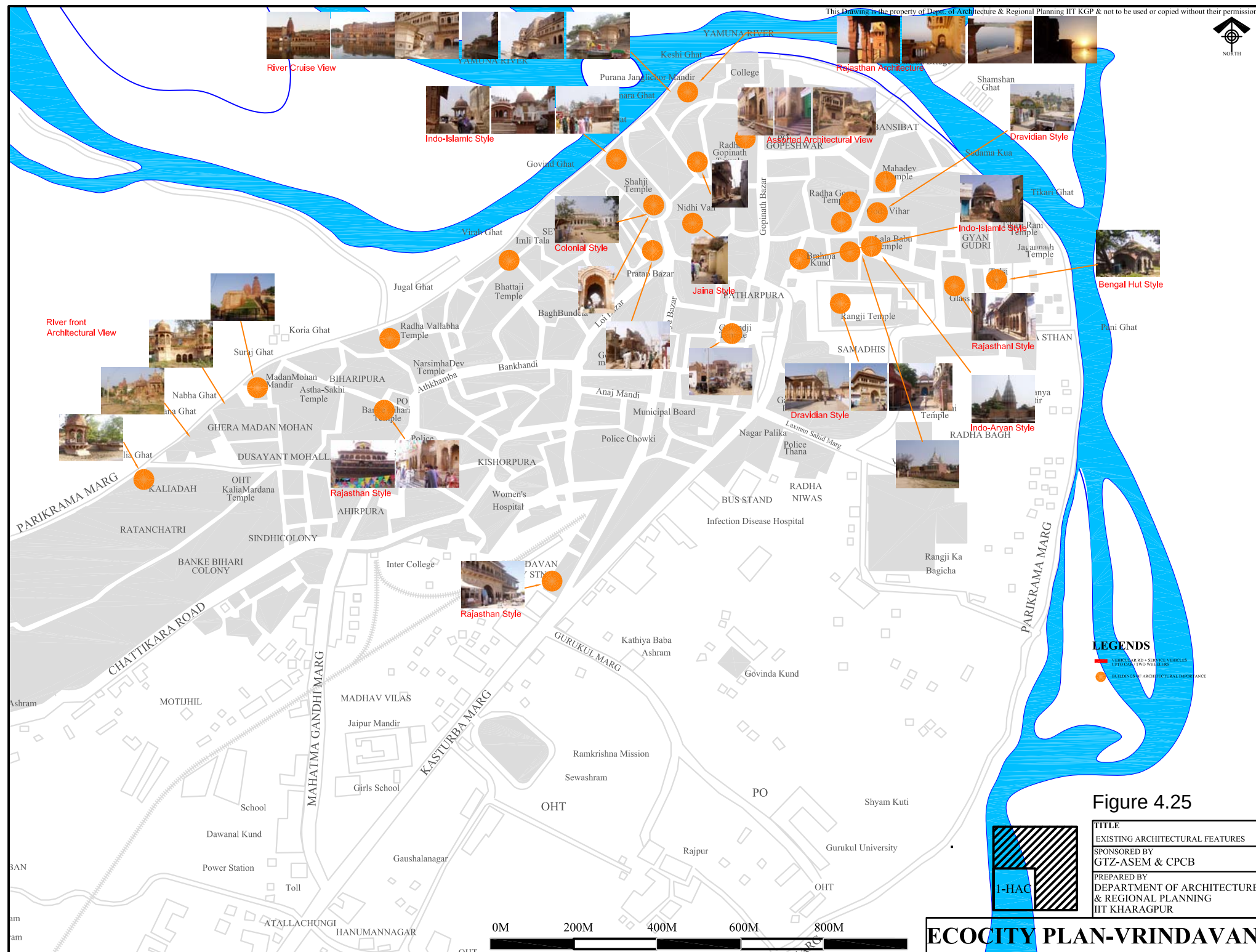
LEGENDS

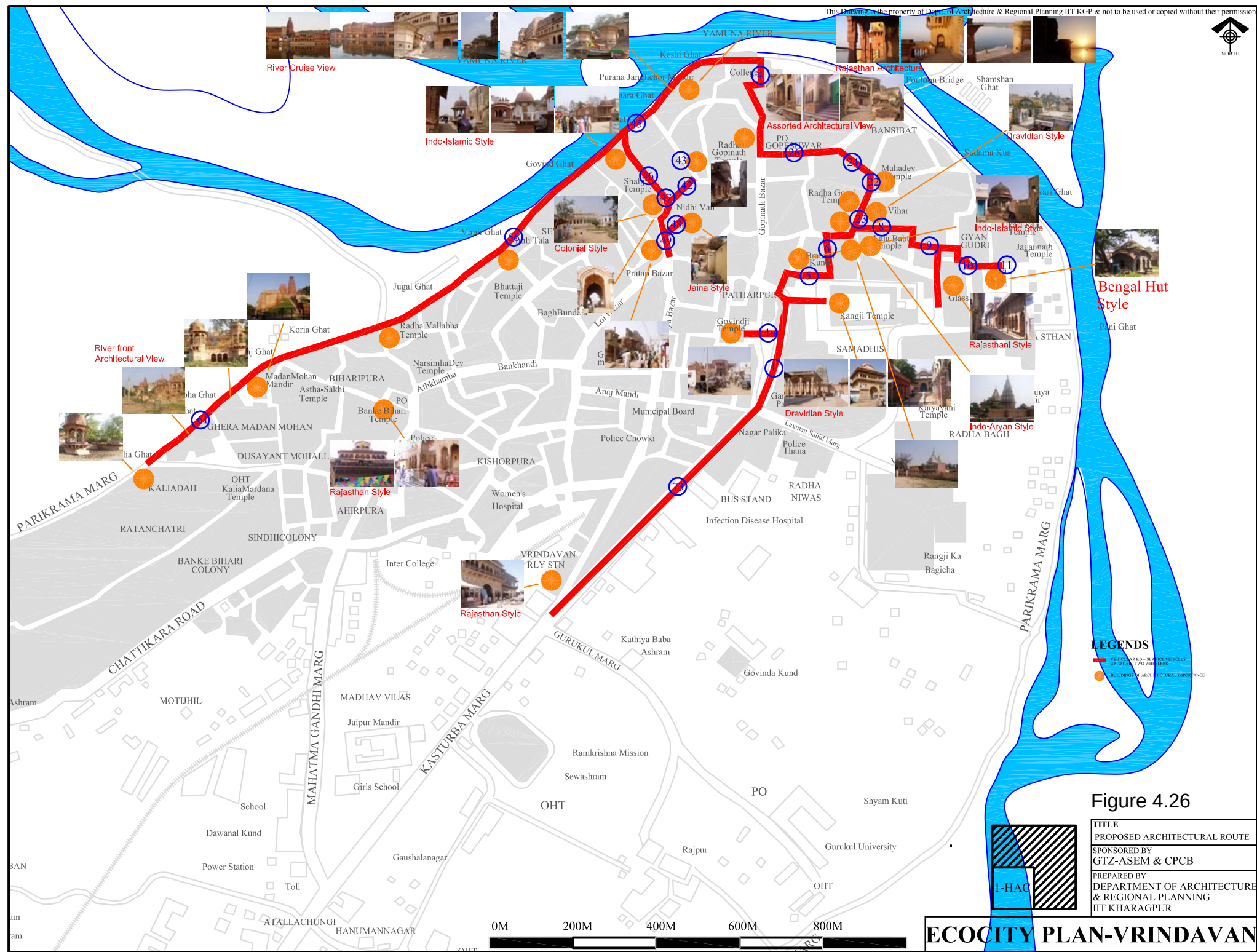
-  AUTHORISED GARBAGE/DUMPYARD
-  UNAUTHORISED GARBAGE/DUMPYARD

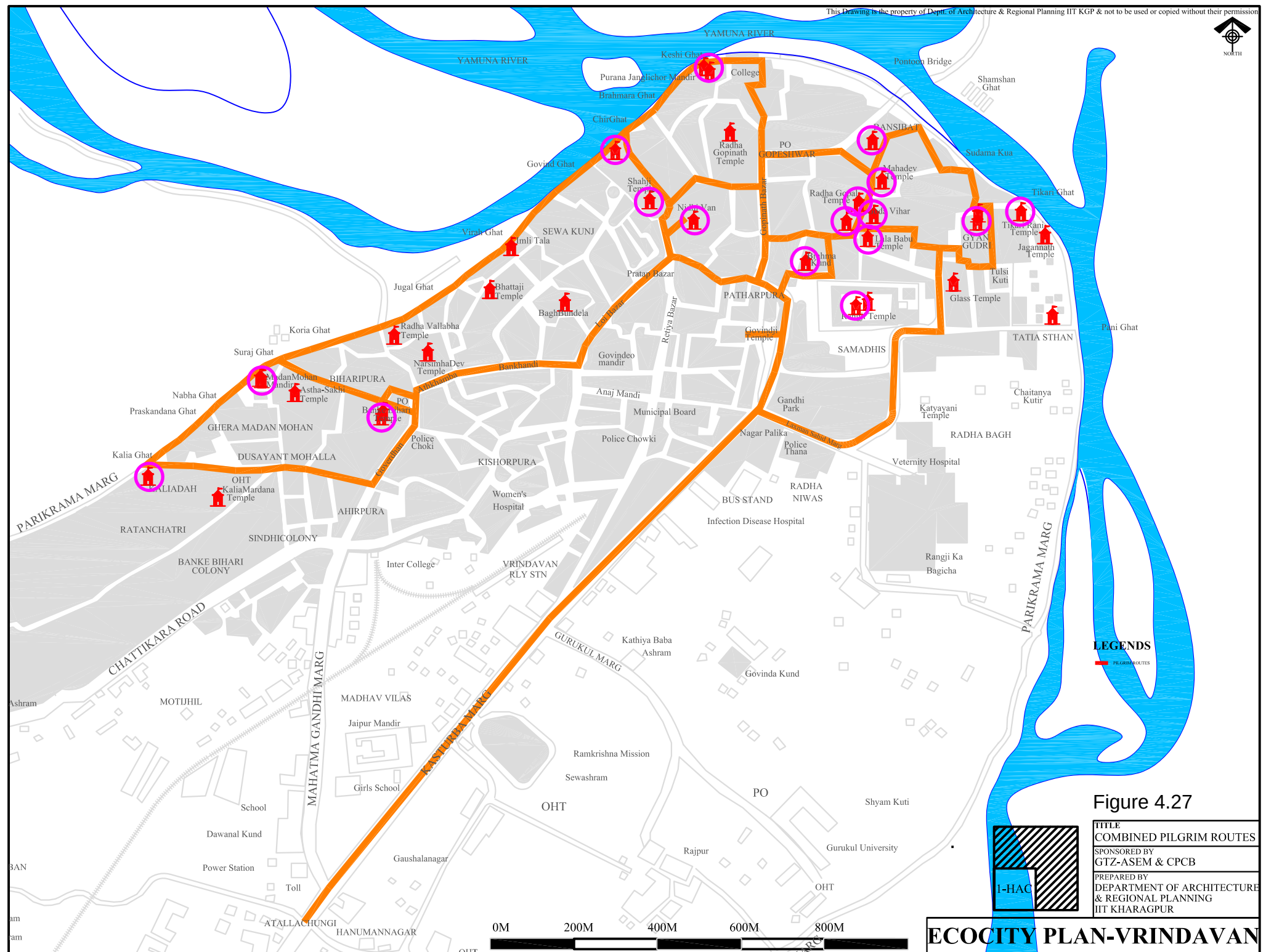
Figure 4.24

TITLE
EXISTING DUMPING YARDS
SPONSORED BY
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PART B



PROPOSALS

6.0 ECOCITY TARGETS

Based on the detail survey and analyses conducted on various issues in respect of Vrindavan town the targets, as presented below, have been formulated. These targets would act as the overall guideline in the development process over a stipulated timeline for the accomplishment of the goal towards achieving a Clean and Green Vrindavan environmentally.

Target 1

Environmental Improvement (Clean Vrindavan)

- Air Quality
- Water Quality
- Sound Quality
- Visual Quality
- Solid Waste Disposal
- Hygiene and Health condition

Target 2

Green Corridors (Green Vrindavan)

- Pedestrian Paths
- Landscaped Promenade
- Developed Parks and Gardens

Target 3

Enhancement of Public Physical Infrastructure

- Appropriate surface of the roads
- Roadside Drainage
- Drinking Water
- Public Toilet (Urinal, W.C.)
- Signage
- Street Lighting

Target 4

Revival of the historic ambience

6.1 PROPOSED PROJECTS

The proposals have been made in two stages. One at the comprehensive Ecozone level comprising all the three designated zones (I, II and III), which dwells on the issues which have direct relevance to the entire town and the impacts of the actions would be at the broader level. The other proposals are for the detail projects at the zone level, which is focused primarily within the domain of the 'Ecozone I' as identified as per the scope under this project.

Each project task has been elaborated through five factors, viz. Actions, Outcomes, Partners, Cost, and cost Recovery and Maintenance. Based on the set of anticipated actions a preliminary design has been prepared and the approximate

cost has been worked out for each project as per the current PWD Schedule of Rates of UP.

The detail design and the detail cost estimated are not within the purview of this project. Project-specific 'Detail Project Report (DPR)' need to be undertaken through the next stages of the tasks.

6.2 Prioritisation of Projects

Initially a draft prioritisation has been prepared based on the feedback obtained through the public participation organised through workshop conducted at Vrindavan.

Finally the prioritisation has been revised based on the comprehensive approach required for the development, both at the macro level as well as the designated ecozone level.

For each of the projects, mentioned at town or ecozone level, detail survey and analyses would be required to be undertaken to arrive at the design solutions. In this phase DPR would be prepared for each project which would contain the working details and cost estimates.

The list of the prioritised projects has been presented in the following sections.

6.2.1 Comprehensive Planning at the macro level

The comprehensive planning approach, comprising following actions, need to be undertaken within the designated Ecozones I, II and III, which would have significance at the

entire town level in terms of transportation, utilities, services, recreation, and overall environment.

This would cover the prominent tourist / pilgrim sites in the above zones and improve the overall conditions of the areas frequented by the visitors to the town.

The designated roads along which the comprehensive planning action would be undertaken are marked with various IDs are shown in Figures 6.1 and 6.2.

A1a Traffic Engineering and Management

A1b Surfacing and general improvement of the Roads

Sub-projects

A1b(i) Road surfacing

A1b(ii) Improvement of Road between Nagarpalika and Ranganathji Temple

A1b(iii) Improvement of rotary in front of Nagarpalika

A1c Parking Planning for vehicles on all the designated roads

Sub-projects

A1c(i) Parking Planning for vehicles on all the designated roads

A1c(ii) Parking Plan in front of Laxman Sahid Bhawan

A1c(iii) Parking Plan in front of Cholera Hospital

- A1d** Drainage and Sewerage Planning
- A1e** Street Lighting along the roads
- A1f** Landscape Planning
- A1g** Signage Planning
- A1h** Solid Waste management
- A1i** Public Toilets and Roadside Drinking Water facility
- A1j** Environmental Noise Zoning
- A1k** Architectural and Aesthetic Environment Control along the designated roads

- A2** Restoration / development of Gandhi Park

6.2.2 Detail Project Level

The ecozone level functions are those which would require focussed attention to serve primarily the designated zone. However these would also have bearing with the town level environmental significance because of the restricted scale of the town. The locations of the following projects are presented in Figure 6.2.

The following Projects to be undertaken with the 100% participation and funding from temple trusts, voluntary organisations, private entrepreneurs under the guidance of Vrindavan Municipal Board.

- B1** Improvement of condition of Parikrama Marg
- B2** Restoration of Bramha Kund
- B3** Improvement of Banke Bihari temple area
- B4** Entry point & visitor centre at Atallachungi and Chattikara
- B5** Improvement of Entrance Node to Shahji Temple
- B6** Adaptive Reuse of Laxman Sahid Bhawan
- B7** Improvement of Gadela Bagh
- B8** Improvement of Gyan Gudri Park

The following projects should be attempted with funding from UPSIDC who has already expressed the intention of sponsoring similar projects. Vrindavan Municipal Board needs to coordinate the projects.

- C1** River front development from Kaliyadaha Ghat to Kesi Ghat
- C2** Light & Sound Show in Kesi Ghat

6.2.3 Expected Post Project Outcome

The indicators through which the success of the project is to be evaluated are listed below.

- Proper Hygiene condition
- Improved Health condition
- Clean environment
- Better air quality
- Low noise level
- Pleasing aesthetic streetscape
- Safe travel for the pedestrians
- Suitable microclimate
- Higher physical safety and Security
- No water pollution
- Improved sewerage and drainage system
- Revival of religious tradition
- Revival of Architectural Tradition
- International standard Recreational facilities

6.2.4 Guidelines for Proposals related to Comprehensive Project

Project A1a

TRAFFIC ENGINEERING AND MANAGEMENT

Actions and Guidelines for DPR

- Categorisation of road as per permissible modes of transport along with pedestrian routes has been shown in Figure 6.3. However, bicycle would be allowed on the routes marked as pedestrian.
- In general the roads, with widths between 3.0-6.0 meters, would be restricted to time specific vehicular (4 wheelers) access only for the local residents.
- Goods carriage by cycle vans in the roads having commercial functions would be allowed service and supplies. The limiting width of the
- Mini vans would be allowed in such areas only in the night after 9 pm
- Designation of roads based on Category of traffic
 - o Pure pedestrian
 - o Pedestrian + cycle (non motorized vehicles)
 - o Bicycle + Rickshaw (motorized 2 wheelers only for residents)
 - o Rickshaw + Tanga

- o Vehicular (4 wheeler)
- Pedestrian sidewalks made for the pilgrims on the roads below
 - o Parikrama Marg
 - o Road from Nagarpalika to Ranganathji temple
 - o Road in front of Laxman Sahid Bhawan
- Restricted access to motorized vehicles in between Kaliyadaha Ghat to Kesi Ghat which is to be developed as Riverfront promenade. Motorised access is to be provided only for the local residents and the service vehicles for building materials and commercial goods.
- Movement of Tanga, being a wide, slow moving vehicle would be restricted along the entire ecozone I, II, and III, except the movement along road ID 1, 56 and 61.
- Organised Parking lot is to be provided at the entry to the Kaliyadaha and Kesi Ghat.
- Traffic island design in front of Nagarpalika
- Urban design solutions for control of the undesirable vehicles accessibility
- Obstruction of undesirable large vehicles with decorative bollards and chains

Project Outcome

- Hazard-free movement of pilgrims and tourists
- No conflict of slow-moving and fast-moving vehicles
- Less pollution on the high pedestrian volume roads
- Less traffic congestion

Partners In Development & Investment

- Nagarpalika, PWD, Tourism Department, Local Trustees, Temple Authorities, Commercial Organisations, Local Traders, Private Entrepreneurs, NGOs

Approximate Cost No cost involved.

Only the policy decisions would be required.

Cost Recovery and Management System

- One-time Entry fee charged to the pilgrims and tourists entering the Ecozone at the hotel / ashrams
- Yearly / daily charges from the rickshaw, Tanga, tourist car and bus operators to operate within the ecozone
- Betterment charge from the temples and trustees with ecozone

Project A1b

SURFACING AND GENERAL IMPROVEMENT OF ROADS

This set of projects comprise general improvement of designated roads in terms of i) surfacing with cement concrete / asphalt as well as flyash paver block shouldering wherever necessary; ii) improvement of road between Nagarpalika and Ranganathji temple; and iii) improvement of traffic island in front of Nagar palika.

Project A1b(I)

ROAD SURFACING

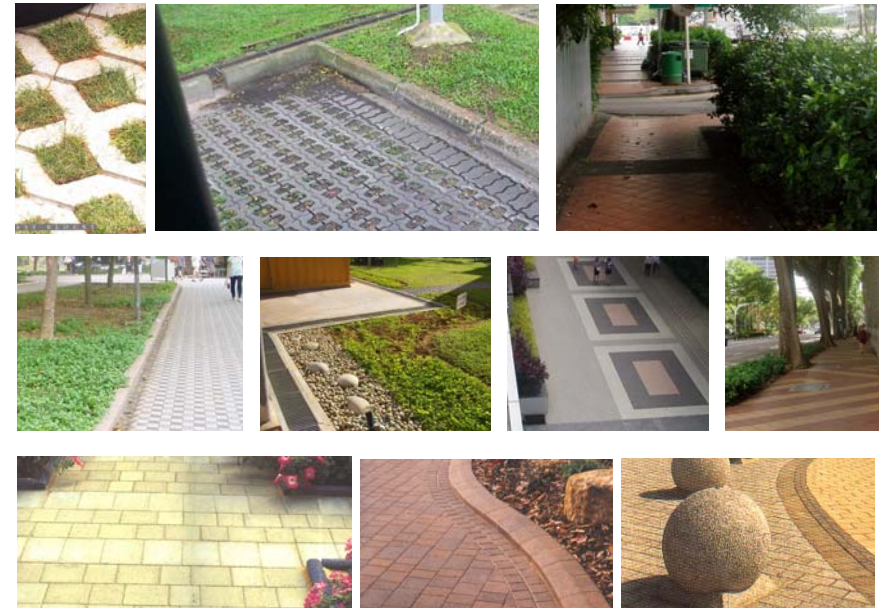
Actions and Guidelines for DPR

- Delineation of roads to be improved
- Appropriate Pavement design based on the loads of the vehicles and users.
- Category of surfacing
- Cement concrete (CC) Pavement + fly ash cement interlocking blocks as Shoulders
- Patterned CC tiles for pedestrians
- Grass Crete water recharging blocks for parking areas
- Pedestrian sidewalks made for the pilgrims on the roads below

- Road Surfacing and flyash-paving block shouldering required in Road IDs - 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 15, 15a, 19, 20, 21, 22, 23, 24, 26, 29a, 32, 33, 38, 41, 41a, 42, 46, 47, 48, 49, 54, 55, 58, 59, 60, 62, 67

Project Outcome

- Improvement of life on roads
- Integrated visual quality improvement
- Effective increase of width of roads



Suggested Road finishes with cement / flyash concrete pavers

Partners In Development & Investment

- Nagarpalika, PWD, Local Trustees, Temple Authorities, Commercial Organisations, Local Traders, Private Entrepreneurs

Approximate Cost Rs. 75 lakhs

Cost Recovery and Management System

- Betterment charge from the temples and trustees with ecozone
- Municipal Taxes

Project A1b(ii)

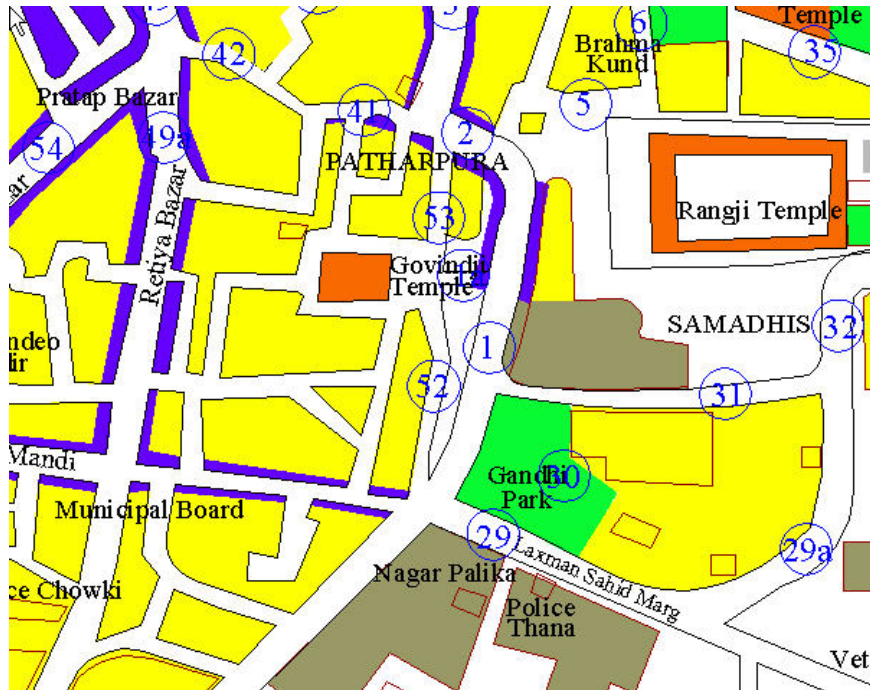
IMPROVEMENT OF ROAD BETWEEN NAGAR PALIKA AND RANGANATHJI TEMPLE



Road from Nagarpalika to Ranganathji Temple



Bird's Eye View of the Road from Nagarpalika to Ranganathji Temple



Actions and Guidelines for DPR

- The development of this stretch ranging from the traffic island in front of Nagarpalika and the Ranganathji temple, marked as road ID 1 and 1a, would be developed with comprehensive approach comprising road surfacing, pedestrian pavements, plantation, drainage, signage etc.
- Restriction on vehicular movement along the stretch
- CC pavement for the movement of Tanga, Rickshaw

- Separate raised pedestrian pavements on both sides, with interlocking pavers
- Plantation at regular intervals on the pedestrian zone, with clear trunk height above man height
- Providing decorative metal gabions for the protection from cattle
- Providing decorative seats / benches for the pilgrims to rest
- Ornamental street lighting with solar panels
- Information kiosk for guiding the tourists through Regulated Guide service
- Camel ride and Elephant ride for the children and tourists
- Improvement of access to the Govindji temple

Project Outcome

- Reduction of dust level
- Improved ambience and Vista
- Employment opportunity
- Increased entrepreneurship opportunity

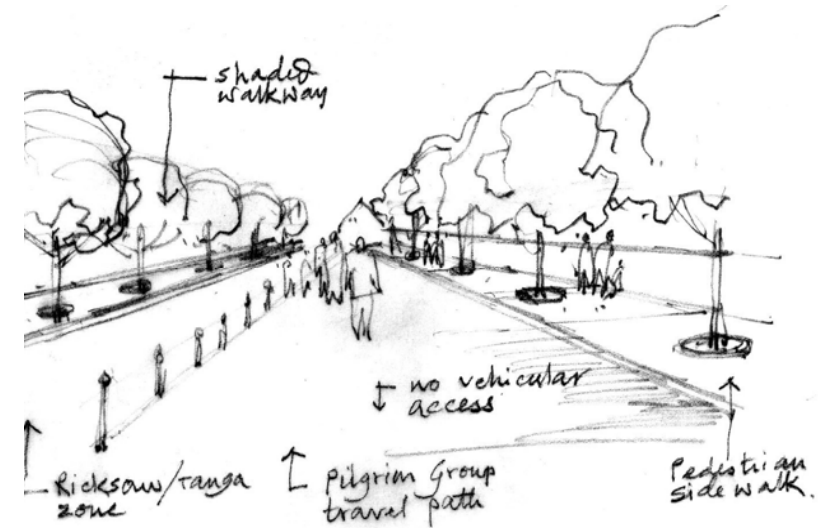
Partners In Development & Investment

- Nagarpalika, PWD, Temple Authorities, Commercial Organisations

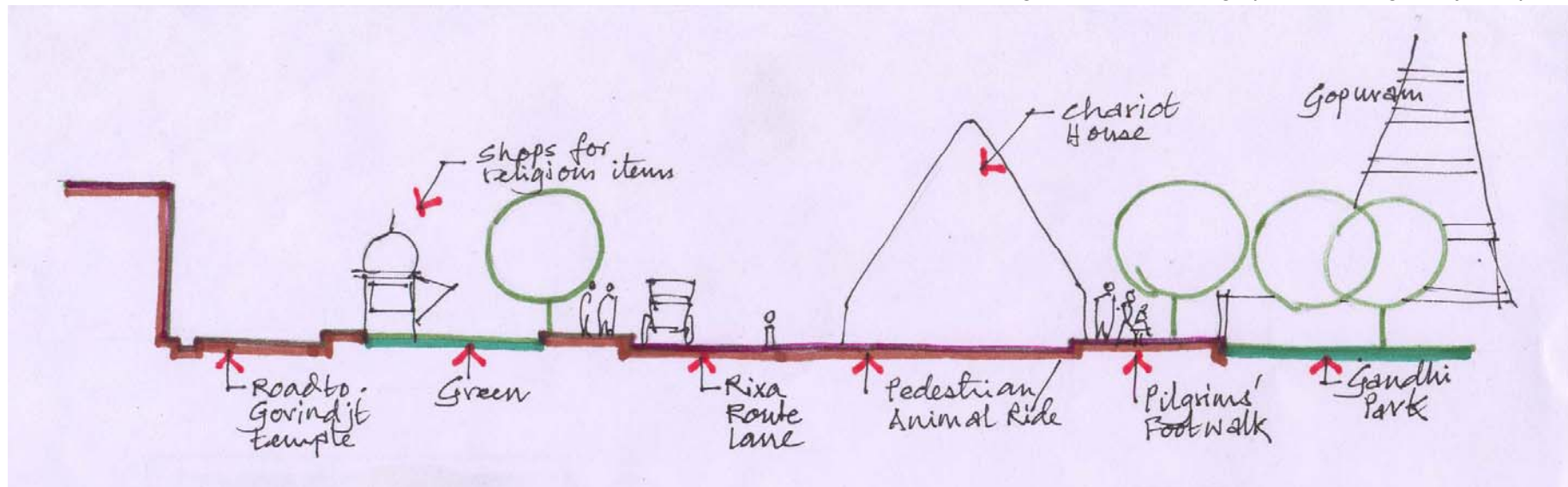
Approximate Cost Rs. 40 lakhs

Cost Recovery and Management System

- Share from the charges for animal rides, share from the guidance charges, local commercial agencies sponsoring for the maintenance (through publicity), One-time entry fees



Schematic Design of Road from Nagarpalika to Ranganathji Temple



Schematic Section of Road from Nagarpalika to Ranganathji Temple

Project A1b(iii)

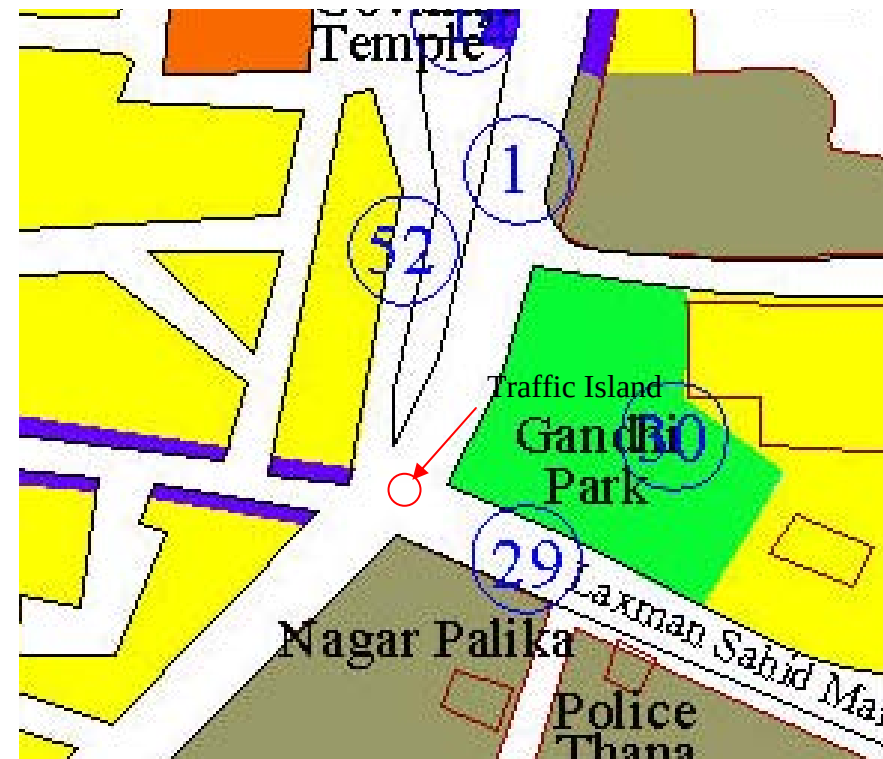
IMPROVEMENT OF TRAFFIC ISLAND IN FRONT OF NAGAR PALIKA PARISHAD

Actions and Guidelines for DPR

- The location of the proposed traffic island is at the intersection of roads marked with ID 1, 29 and 73.
- Designing the traffic island and the junctions as per appropriate traffic engineering
- Design of landscape on the traffic island
- Design of religious / ornamental sculpture / fountains on the island
- Better illumination level
- Posting of traffic police to ensure adherence to traffic rules

Project Outcome

- Smooth vehicular movement
- Improved aesthetic quality
- Least accident



Partners In Development & Investment

- Nagarpalika, PWD, Commercial Organisations, Local Traders, Private Entrepreneurs, NGOs, Unemployed youths



Existing Traffic Island and Road intersection in front of Nagarpalika

Approximate Cost Rs. 8 lakhs

Cost Recovery and Management System

- Nagarpalika Tax
- Penalty from the offenders

Project A1c

PARKING PLANNING

This set of project comprise i) general parking plan on designated zones; ii) improvement of road between Nagarpalika and Ranganathji temple; and iii) improvement of traffic island in front of Nagar palika.

Project A1c(i)

PARKING PLANNING FOR VEHICLES ON ALL THE DESIGNATED ROADS

Actions and Guidelines for DPR

- Reserve short-term parking for the cars and tourist buses near the entry point of the ecozone in two locations one near Laxman Shahid Bhawan, road id 29, [detailed in project A1c(ii)] and the other near Banke Bihari temple near road ID 69.
- Provide long-term parking for cars and tourist buses at the location near Cholera (Haiza) hospital, 300 m south of Nagarpalika [detailed in project A1c(iii)]
- Provide short term parking for cars, rickshaws, tangas t at Kaliya Ghat (road ID 61), and on the eastern end of Kesi Ghat.
- Provide long-term parking for the rickshaws and tangas near Ranganathji temple and Banke Bihari temple

- Provide short term parking for rickshaws and tangas near Suraj Ghat, Jugal Ghat (road ID 56) and Chir Ghat (road ID 45)
- Refer Figure 6.4 for the proposed locations of the parking places in the ecozone.

Project Outcome

- No chaotic parking of vehicles
- Employment opportunity for the parking space controllers

Partners In Development & Investment

- Nagarpalika, PWD, Local Trustees, Temple Authorities, Commercial Organisations, Local Traders, Private Entrepreneurs, Private Tour Operators

Approximate Cost

- Dealt in Ecozone detail level programmes

Cost Recovery and Management System

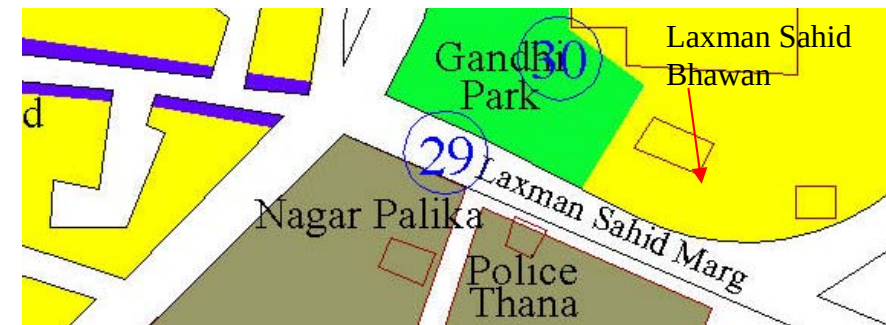
- Very nominal, one time daily, Parking fees charged to the rickshaw, Tanga and tourist car / bus operators for short-term / long-term parking

Project A1c(ii)

PARKING PLAN IN FRONT OF LAXMAN SAHID BHAWAN

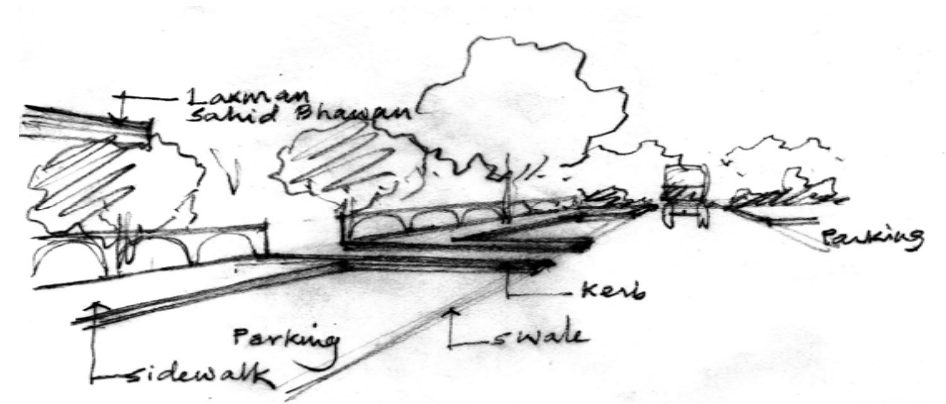
Actions and Guidelines for DPR

- Organised Parking would be developed along the road ID 29 upto the Y-junction of road ID 29a. This would comprise of the following
- Short term parking for Cars
- Short term Parking for Tangas
- Short term Parking for Rickshaw
- Dropping point for the Bus
- Design of landscape on the pavement
- Decorative Lighting
- Small kiosk for the parking control
- Better illumination level
- Parking on both sides of the road leaving the entry gates for the nearby premises



Project Outcome

- Smooth vehicular movement
- Improved aesthetic quality
- Least accident
- No vehicular pollution on the Ranganathji road
- No dust pollution
- No noise pollution
- No pollution through animal excreta



Schematic View of Parking Area



Proposed Site

Approximate Cost

Rs. 10 lakhs

Cost Recovery and Management System

- Parking fee
- Advertisement Boards

Partners In Development & Investment

- Nagarpalika, PWD, Commercial Organisations, Local Traders, Private Entrepreneurs, NGOs, Unemployed youths

Project A1c(iii)

PARKING PLAN IN FRONT OF CHOLERA HOSPITAL

Actions and Guidelines for DPR

- Long term parking for Cars, and busses
- Design of landscape on the pavement
- Decorative Lighting
- Small kiosk for the parking control
- Better illumination level
- Controlled access and accommodation for Parking
- Provision of service facilities such as telephones, drinking water, urinal and sanitation facilities



Proposed site near Cholera Hospital

Project Outcome

- Hazard-free movement of pilgrims and tourists
- No conflict of slow-moving and fast-moving vehicles
- Less pollution on the high pedestrian volume roads
- Less traffic congestion smooth vehicular movement
- Improved aesthetic quality
- Least accident
- No vehicular pollution on the Ranganathji road
- No dust pollution
- No noise pollution
- No visual blight

Partners In Development & Investment

- Nagarpalika, PWD, Commercial Organisations, Local Traders, Private Entrepreneurs, NGOs, Unemployed youths

Approximate Cost Rs. 30 lakhs

Cost Recovery and Management System

- Parking fee
- Advertisement Boards

Project A1d

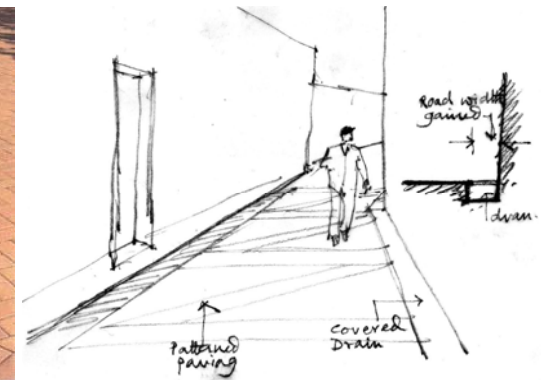
DRAINAGE AND SEWERAGE PLANNING

Actions and Guidelines for DPR

- Drains to be provided along roads wherever absent
 - Existing road specific drains to be inspected and redesigned if necessary with appropriate sections.
 - Channel sections to be designed depending on the flow volume characteristics
 - Open channels to be covered with perforated Cement Concrete covers in the entire zone
 - Drainage junctions to be specifically designed and covered as per the flow and contour of the land
 - Inspection Pit to be constructed at junctions
 - A detail drainage flow analyses to be done
 - A detail analyses to be done reviewing the existing sewerage network.
 - New network to be suggested along the road, in the areas, where they are absent.
 - Sullage and waster water from the adjoining properties to be discharged in to the newly-laid sewerage network. On inspection, if the capacity of the pipe is found to be inadequate, then parallel networks to be designed and constructed.
- Drains required on both sides of the road IDs 1, 5, 29a, 48
 - Drains required on one side of the road IDs 2, 9a, 9b, 10, 11a, 12, 13, 14, 15a, 20, 21, 23, 34, 44, 50
 - Augmentation of drains are required on road IDS - 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 15, 15a, 19, 20, 21, 22, 23, 24, 26, 29a, 32, 33, 38, 41, 41a, 42, 46, 47, 48, 49, 54, 55, 58, 59, 60, 62, 67
 - Drain cover to be provided on road IDs 2, 3, 4, 7, 9, 19, 20, 21, 22, 23, 24, 29, 30, 31, 33, 34, 42,, 44, 46, 49, 61



Swale



Schematic of Covered Drain

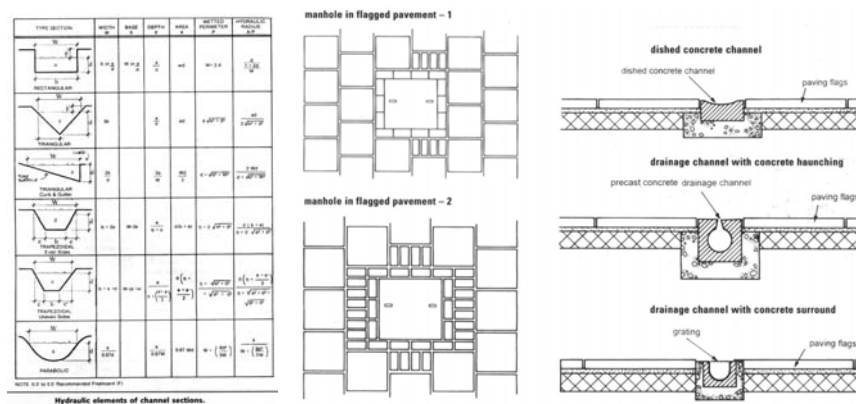
Project Outcome

- Effective segregation of sullage or garbage from storm water drains

- Increase of effective road width by covering drains
- Environmental quality improvement
- Road width would become effectively more
- No opportunity for dumping house solid waste at random
- Clean environment

Cost Recovery and Management System

- Aid from Central Govt. agencies
- Revenue from property tax



Proposed drainage sections

Partners In Development & Investment

- Nagarpalika, DFID, local trustees, temple authorities

Approximate Cost Rs. 30 lakhs

Project A1e

STREET LIGHTING

Actions and Guidelines for DPR

- Augmentation of street lighting would be required along the road IDs - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 15, 15a, 19, 20, 21, 22, 23, 24, 26, 29a, 32, 33, 38, 41, 41a, 42, 46, 47, 48, 49, 54, 55, 58, 59, 60, 62, 67
- Street lighting along the road IDs 34, 45, 56, and 61 would be included in the riverfront development project (Project C1)
- Design the street lighting systems with appropriate mounting height and distance
- Street-side electrical lines on the major pilgrim routes to be laid underground
- Remove the electrical posts on narrow streets
- Remove labyrinth of electrical lines along the roads
- Restrict crossing the electrical lines across the roads
- Mounting the street-lamps with ornamental brackets from the adjoining buildings
- Design the lamp posts and the mounting brackets with traditional artistic pattern
- Provide adequate lighting at the major nodal points

- No road must be devoid of street lighting

Project Outcome

- Increase of effective road width
- Improved illumination level at the roads and nodes
- Better visual effect
- Increased security and safety

Partners In Development & Investment

- Nagarpalika, PWD, individual residents, local trustees, temple authorities, Commercial agencies,

Approximate Cost Rs. 14 lakhs

Cost Recovery and Management System

- Aid from Central Govt. agencies, revenue from property tax.
- Provide electricity rate incentives to the owners of the buildings allowing the fixing of the gadget
- Incentives towards regularity of payment of electric bills for the properties
- Penalties and fines earned from the offenders

Project A1f

LANDSCAPE PLANNING

Actions and Guidelines for DPR

- Roadside plantation is proposed along the road IDs 1, 29, 34, 45, 56, 61 and 73
- Plantation of low height evergreen shading trees, with clear trunk height above average man height, corresponding to the width of the roads
- Plantation along the riverfront, as a part of the comprehensive urban design of the riverfront between Kaliyadaha to Bhramar Ghat, Kesi Ghat to the Pontoon bridge access road.
- Restoration of Gandhi Park, Gyan Gudri Park and Gadela Bagh in terms of landscaping. These parks would require detail study and decision making.
- Refer Figure 6.5 for the proposed locations.

Project Outcome

- Providing shade to the pilgrims and pedestrians
- Increase of evaporating vegetative volume
- Reduction in ambient temperature by evapo-transpiration cooling effect

- Less maintenance due to evergreen nature of plants
- Interception of dust (SPM)

Partners In Development & Investment

- Nagarpalika, State Horticulture department, UPSPCB, local trustees, temple authorities, Commercial agencies, local residents

Approximate Cost Rs. 3 lakhs (excluding the cost of Park landscapes and Riverfront landscape)

Cost Recovery and Management System

- State Govt. funds, CPCB aids,
- Maintenance by the adjacent temple authorities, trustees and residents
- Maintenance by NGOs, private agencies on commission

Project A1g

SIGNAGE PLANNING

Actions and Guidelines for DPR

- Information kiosks with large signage are proposed at the intersection of road IDs 1 and 29, as well as at 58 and 69.
- Route signage are proposed along roads as shown in Figure 6.6.
- Decorative signage would also be provided along the river front in Project C1.
- The signage to be categorised in terms of Primary, secondary and tertiary.
- The Primary category would correspond to the signage at the entries to the ecozone, such as gates, 'chattris' etc. They should bear the cultural and architectural heritage of the town. The Secondary signage would be placed at the site of monuments, sites etc. in the form of information boards / plaques, depicting historical / archaeological / religious significance of the object or space. The tertiary signage would consist of directions, guidance and information, such as routes, links etc.
- Signage in each category should be identical so that tourists / pilgrims once introduced a category would be able to identify the same in all the places and get guided by them.
- Identification of appropriate locations for the signage.
- Signage to be placed at the most visible positions, height and angle.
- Guiding link of the pilgrim routes through directional signage to be achieved through vertical, horizontal boards or floor patterns.
- Some of the essential signage referring to public utilities would be designed through visual graphic symbols, so that language would not be a bar in understanding the content.
- Mounting ornamental signage with brackets from the adjoining buildings wherever space is not available.
- Design the signage and the mounting brackets in conformity with the historic / traditional artistic designs.
- Providing adequate lighting on the signage during night.
- Large comprehensive signage (near Gandhi Park, Riverfront, Iskcon temple, Banke Bihari temple) to indicate the distribution of the entire temple locations selective pilgrim circuits, specific attraction nodes (riverfront, theme parks, Bramha Kund etc.) within Vrindavan.
- Ornamental Information Board with comprehensible graphics and writing.

- Involvement of local artisans for the design on payment terms.

Project Outcome

- Guiding visitors / pilgrims to the desired location.
- Reduced harassment of the visitors / pilgrims, specially the less educated persons, by the unscrupulous guides.
- Economic opportunities to the local artisans for design and construction of the objects.
- Reviving historic look to the ambience through traditional ornamental designs.

Partners In Development & Investment

- Nagarpalika, individual residents, local trustees, temple authorities, Commercial agencies

Approximate Cost Rs. 5 lakhs

Cost Recovery and Management System

- Aid from Central Govt. agencies, revenue from property tax
- Financial support from the local temple authorities and trustees
- Sponsorship from the commercial groups

Project A1h

SOLID WASTE MANAGEMENT

Actions and Guidelines for DPR

- Arrangement to be made for separation of waste at source
- Locating solid waste dump yard at suitable locations, away from houses and water sources
- Individual dumping on roads and open lands to be prohibited
- Storages of kitchen wastes from restaurants and food joints at the premises
- Collection of restaurants and shops waste by Nagarpalika
- Time-bound collection of the wastes
- Solid waste removal from Road IDs. 3, 4, 19, 35, 45

Project Outcome

- Roads would remain clean
- Achieving better hygiene condition at the eateries and food joints

Partners In Development & Investment

- Nagarpalika, DFID, local trustees, temple authorities, Commercial agencies

Approximate Cost Rs. 13 lakhs

Cost Recovery and Management System

- Aid from Central Govt. agencies, revenue from municipal tax

Project A1i

PUBLIC TOILETS AND ROADSIDE DRINKING WATER FACILITY

Actions and Guidelines for DPR

- Relocating the toilets which are located in undesirable locations on road IDs 6 (near Rangji temple) and 29 (in front of Laxman Sahid Bhawan)
- New public toilets are proposed near the college by the side of Kesi Ghat and near Virah Ghat (on ID 56) as shown in the Figure 4.22.
- Appropriate drainage discharge points and linking them with the designed drainage channel
- Introducing drinking water outlets at new areas
- Eliminating dry / abandoned water points / hand pumps
- Camouflaging the water stand pipes with decorative elements
- Ensuring smooth drainage of the waste water discharge to the nearest designed drain
- Ornamental design of the floors / thresholds at the base of the water outlets
- Relocation of the water points to the nearest wider areas, wherever encroaching on the road

- Relocating cattle drinking basin at the nearby locations wherever they are encroaching on the road

Project Outcome

- Road width would become effectively more
- Cleanliness of the road surface is ensured
- Improved hygienic condition
- No stray animals possibility

Partners In Development & Investment

- Nagarpalika, DFID, local trustees, temple authorities

Approximate Cost Rs. 7.0 lakhs

Cost Recovery and Management System

- Aid from Central Govt. agencies, revenue from property tax

Project A1 j

ENVIRONMENTAL NOISE ZONING

Actions and Guidelines for DPR

- Restriction of acceptable sound level through Decibel zoning. An iso-decibel map in Figure 6.7 indicates the road stretch along which the higher noise level (upto 70 dBA) may be accepted (road ID 73, 29, 69, 70). The remaining area must adhere to the 60 dBA or lower (IDs 2, 41, 41a, 47, 48, 49, 54, 51, 55, 58)
- Noise level control to be enforced administratively, especially in front of Ranganathji Temple and Shahji Temple, created by audio and video cassette players

Project Outcome

- Improved aural health condition of the pilgrims and the residents
- Reduced stress levels

Partners In Development & Investment

- Nagarpalika, local residents, local trustees, temple authorities, Commercial agencies, NGOs, UPSPCB, local residents

Approximate Cost - No cost, only wisdom would yield the result

Cost Recovery and Management System

- Issuance of administrative circular for the noise level adherence and Vigilance by the local residents and the public administration

Project A1 k

ARCHITECTURAL AND AESTHETIC ENVIRONMENT CONTROL

Actions and Guidelines for DPR

- A route has been proposed covering road IDs 1, 1a, 4, 5, 6, 8, 9, 10, 11, 22, 23, 24, 26, 42, 43, 45, 46, 47, 48, 49, 56, 61, 73, along which the historic buildings / temples with strong architectural characters are located. The improvement of the building conditions and the aesthetic environment along these routes would be essential
- Conservation of all the historic buildings and facades with strong architectural excellence
- Characterisation of a specific stretch of road associated with the temple zone, or architectural characters
- Restoration of partially dilapidated historic structures and temples e.g. in front of Shahji temple, buildings along the northern Ghats viz. Kaliyadaha Ghat, Cheer Ghat, Kesi Ghat)
- Use of traditional materials matching the same colour and texture.
- In Figure 4.26 the indications has been given for the proposed roads along which aesthetic environment control would be necessary.

Project Outcome

- Re-creation of the historic architectural character and ambience along the existing roads, and especially along the pilgrim routes
- Awareness development among the children about the values of the historic Vrindavan town
- Creation of aesthetic environment along the pilgrim routes
- Safety from the dwindling dilapidated structures

Partners In Development & Investment

- Nagarpalika, individual property owners, Commercial organizations, NGOs, Architects and Structural engineers, Archaeology department, local artisans

Approximate Cost To be ascertained project-wise

Cost Recovery and Management System

- Tax incentive to the property owners
- Donations from trustees and people

Project A2

RESTORATION / DEVELOPMENT OF GANDHI PARK

Actions and Guidelines for DPR

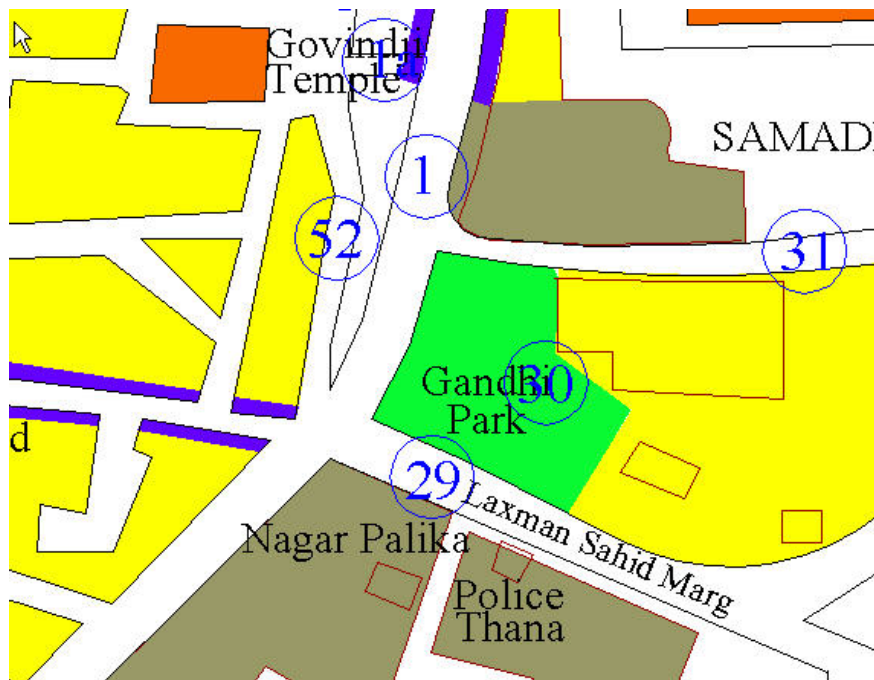
- Landscaped garden with decorative plantation
- Ornamental curio shops selling religious and tourist souvenirs and mementos
- Covering high water reservoir with display of image of Lord Krishna, over flex material, with lighting from behind
- Renovation of the existing building and arrangement for the Presentation of dynamic models (Jhanki) inside
- Rejuvenating existing vegetation and landscape through theme-based plantation
- Provision of seats, benches and small traditional decorative shelters, using local material for the pilgrims.
- The design of the park would be theme based and contain the artefacts which are environment-friendly and least maintenance requirement.
- Provision of a shallow flowing water channel for decorative as well environmental purpose



Multiple Views of Existing Park Area



Entrance Gate to Gandhi Park



Project Outcome

- Resting place for the pilgrims and tourists during lean period of the day
- Increase in evaporative surface through vegetation
- Complete surveillance of the park throughout the day reducing chances of vandalism and social nuisances.

Partners In Development & Investment

- Nagarpalika, State horticulture department, Forest department, Tourism Department, Private Entrepreneurs, NGOs

Approximate Cost Rs. 65 lakhs

Cost Recovery and Management System

- Nominal Entry fee charged to the pilgrims and tourists entering the Park
- Nominal Entry fee for the dynamic display
- local commercial agencies sponsoring for the maintenance (through publicity)

6.2.5 Guidelines for the Proposals at Ecozone Level

Project B1

IMPROVEMENT OF CONDITION OF PARIKRAMA MARG

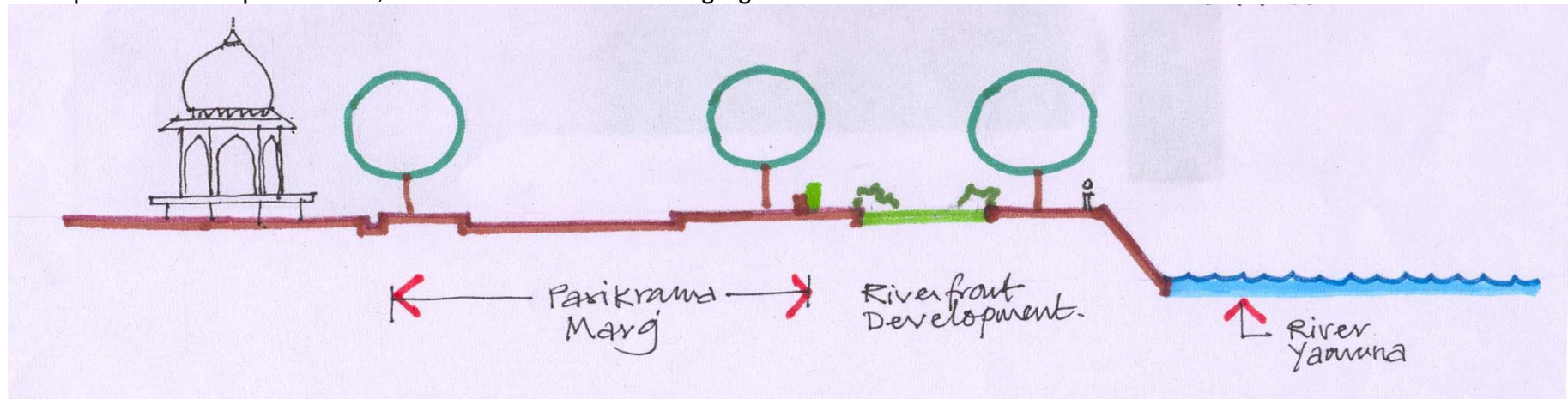
Actions and Guidelines for DPR

- The Parikrma marg is designated (refer Fig. No. 2.3) by the road IDs 34, 45, 56, 61 along the north and the eastern edge of ecoszone I, II and III.
- Wide Asphalt / CC paving carriageway with two way traffic
- Wide, raised pavements on both sides of the road for free pedestrian movement
- Plantation at uniform distance at the centre of the pedestrian pavements, with water recharging

provisions, and ornamental cattle-proof sleek metal gabions



Schematic View of Parking Area



Schematic Section through Parikrama Marg and Promenade along the River Yamuna

Project Outcome

- Hazard-free movement of pilgrims and tourists
- Comfortable walking environment and surface condition for the pilgrims who have to walk 10 km.
- No conflict of slow-moving and fast-moving vehicles
- Less pollution on the high pedestrian volume roads
- Less traffic congestion
- Improved Aesthetic quality
- Unification through urban environmental design

Cost Recovery and Management System

- Betterment charge from the adjoining properties
- Advertisements and bill boards charges
- Share of the entry fees
- share of the Commercial tax

Partners In Development & Investment

- Nagarpalika, PWD, CPCB, UPSPCB, Tourism Department, Archaeological Survey of India, Department, Local Trustees, Commercial Organisations, Local Traders, Private Entrepreneurs, NGOs, International Agencies

Approximate Cost Rs. 528 lakhs

Project B2

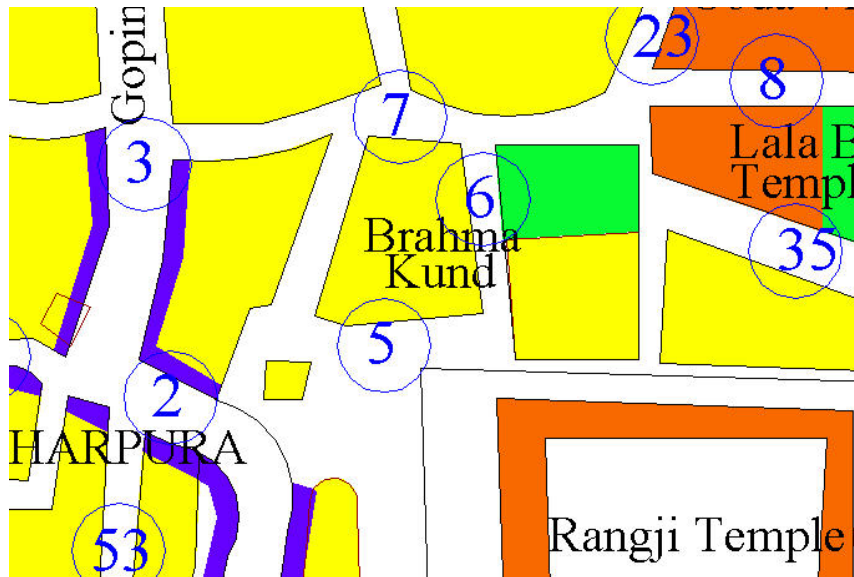
RESTORATION OF BRAMHA KUND

Actions and Guidelines for DPR

- Reconstruction of central Bramha Kund along road ID 5
- Exploration of the buried wells in the central kund
- Restoration of Bramha temple on the west
- Removal of encroachment on the northern access steps
- Reconstruction of four entrance steps to the Kund
- Recreation of the entry point through urban design solutions, along with Restoration of the dilapidated temple on the south
- Interception of the storm / waste water channels around the kund and diverting them to the nearby drainage channels
- Attractive signage at the entry point near Ranganathji temple
- Installation of Information Board
- Use of locally available materials



Existing condition of Bramha Kund Potential for Revitalisation



Project Outcome

- Restoration of Heritage and Religious values
- Better aesthetic quality
- Higher rate of pilgrim and tourist participation
- Improved sanitation and hygiene condition
- Use of water for Fire fighting purposes

Partners In Development & Investment

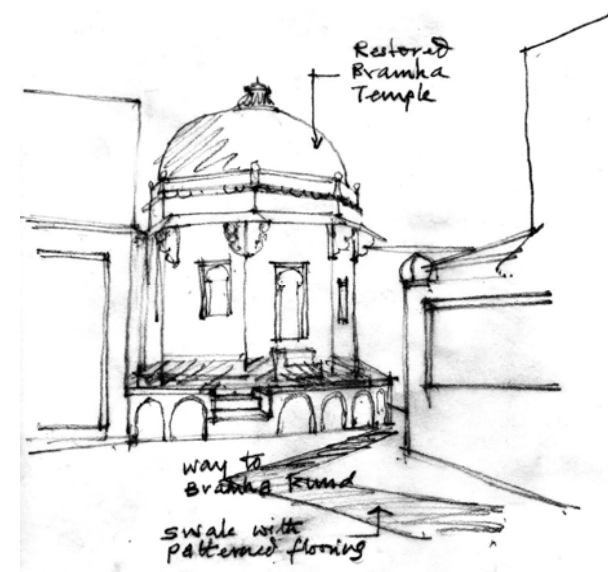
- Nagarpalika, PWD, Tourism Department, Archaeological Survey of India, Department, Local

Trustees, Temple Authorities, Commercial Organisations, Local Traders, Private Entrepreneurs, NGOs

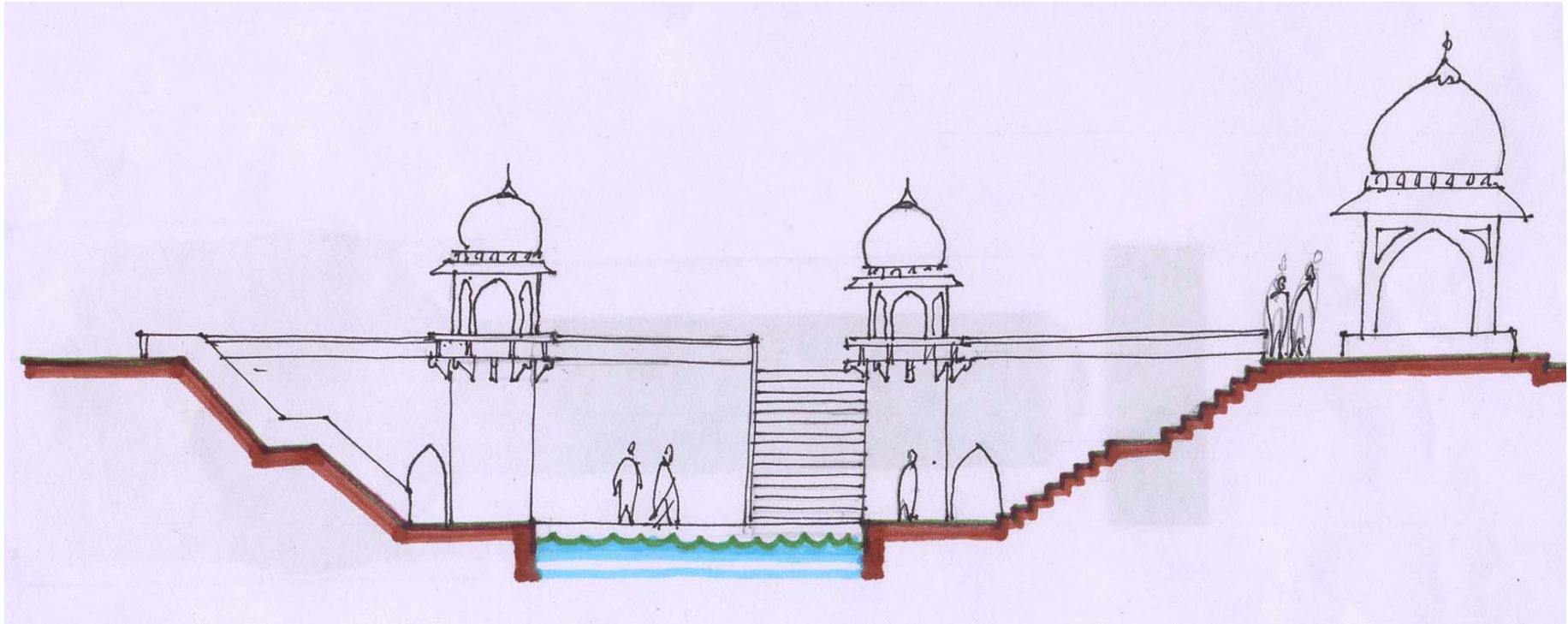
Approximate Cost Rs. 35 lakhs

Cost Recovery and Management System

- Nominal Entry fee charged to the pilgrims and tourists entering the site
- Part of the donations received from the pilgrims during puja in Bramha temple



Sketch view of ramha temple at the entry of Bramha Kund



Schematic Section of Bramha Kund

Project B3

IMPROVEMENT OF BANKE BIHARI TEMPLE AREA

Project area delineated by the road IDs 58, 59, 60, 64, 65, 66 and 67

Actions and Guidelines for DPR

- Restriction on traffic movement
- Restriction on vehicular and other wider modes
- One-way traffic movement on the two roads abutting Shahji temple
- Control on the noise level created by the audio shops
- Control on the façade treatment, overhanging awnings
- Improvement of the pedestrian pavements with decorative local materials
- Provision decorative street lighting facilities
- Improvement of directional signage, billboards, overhangs
- Restoration of buildings with architectural excellence

Project Outcome

- Hazard-free movement of pilgrims and tourists

- No conflict of slow-moving and fast-moving vehicles
- Less pollution on the high pedestrian volume roads
- Less traffic congestion smooth vehicular movement
- Improved aesthetic quality
- Least accident
- No noise pollution
- No visual blight



View towards the temple on Road ID 59

Approximate Cost Rs. 40 lakhs

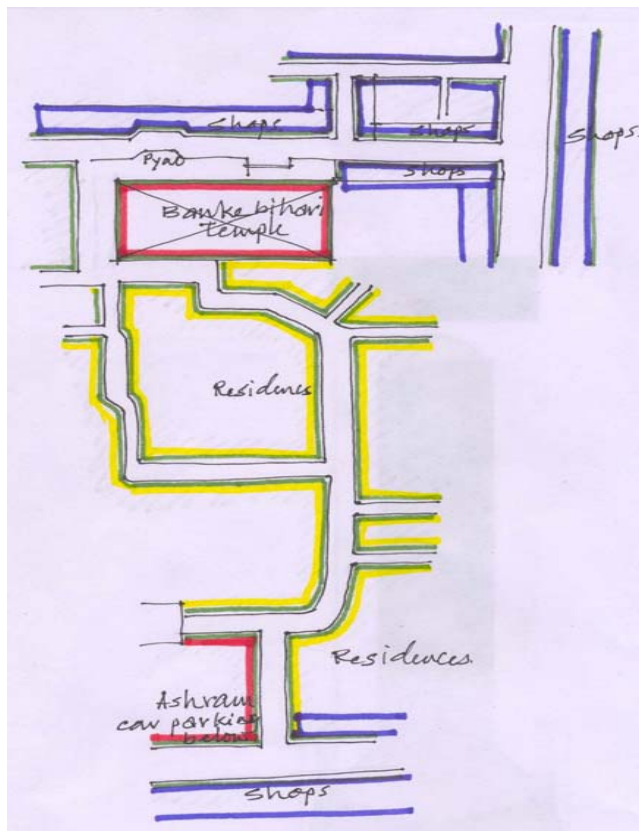
Partners In Development & Investment

- Nagarpalika, PWD, CPCB, UPSPCB, Tourism Department, Archaeological Survey of India, Department, Shahji Temple Authority, Local Traders, Private Entrepreneurs, NGOs

- (Note : Already a local agency has expressed interest in investment for this project)

Cost Recovery and Management System

- Parking fee
- Local toll from the adjoining traders
- Advertisement and Billboards



Potential Development Region of Banke Bihari Temple



Proposed Development road stretches around Banke Bihari Temple

Project B4

ENTRY POINT & VISITOR CENTRES AT ATALLA CHUNGI ON VRINDAVAN-MATHURA ROAD, AND CHATTIKARA ON DELHI-MATHURA ROAD

Atallachungi is located at the southern tip of road ID 73 on Vrindavan Mathura road, and the Chattikara is located at Delhi Mathura road, on western end of road ID 69.

Actions and Guidelines for DPR

- Creation of decorative entrance gate, designs commensurate with traditional art and architecture of Vrindavan
- Use of cheap and local materials
- Appropriate engineered road intersections with medians
- Provision of ornamental Signage with legible scripts guiding the tourists to the appropriate locations
- Creation of Information Booths, with digital touch screen kiosk, guidance facilities, multilingual printed handouts
- Facilities of drinking water, toilet, snack bars
- Authorised guide facilities
- Information on transport, accommodation, banking, health and recreational facilities



Road Junction at Chattikara on Delhi-Mathura Road

Project Outcome

- Creation of the religious ambience, right at the entry, in the minds of the visitors
- Reduced harassment of the visitors through the unscrupulous, unauthorised guides
- Provision of choice to the visitors about the destinations depending on time

Partners In Development & Investment

- Nagarpalika, Tourism Department, Local unemployed Youths, Private Entrepreneurs, NGOs, Private Tour Operators, Guide Guilds,



Entry node at Atallachungi on Vrindavan-Mathura Road

Approximate Cost Rs. 30 lakhs

Cost Recovery and Management System

- One-time per visit entry fee charged to the visiting tourist, collected by the district administration through appointed private agencies / unemployed youth Sale of printed guide books and brochures

Project B5

IMPROVEMENT OF ENTRANCE NODE OF SHAHJI TEMPLE

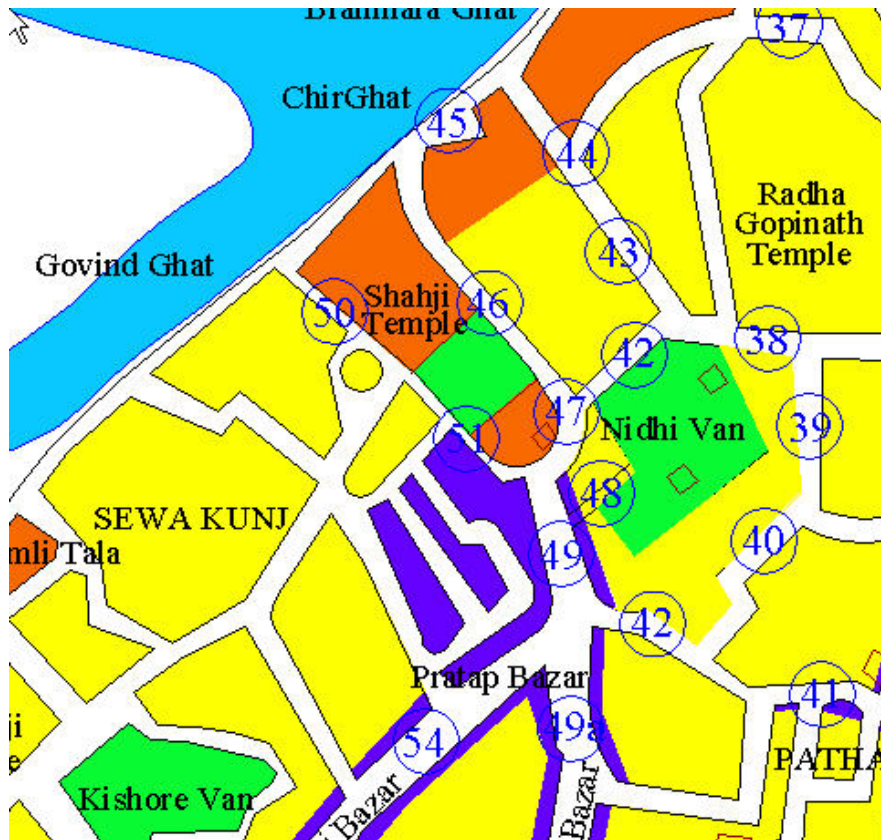
Location of Sahji temple is at the intersection of road ID, 47, 49 and 51.

Actions and Guidelines for DPR

- Control on traffic movement
- Control on vehicular and other wider modes
- One-way traffic movement on the two roads abutting Shahji temple
- Control on the noise level created by the audio shops
- Control on the façade treatment, overhanging awnings
- Improvement of signage, billboards, overhangs
- Restoration of buildings with architectural excellence



Entrance Node to Shahji



Project Outcome

- Hazard-free movement of pilgrims and tourists
- No conflict of slow-moving and fast-moving vehicles
- Less pollution on the high pedestrian volume roads

- Less traffic congestion smooth vehicular movement
- Improved aesthetic quality
- Least accident
- No noise pollution
- No visual blight

Approximate Cost Rs. 5 lakhs

Partners In Development & Investment

- Nagarpalika, PWD, CPCB, UPSPCB, Tourism Department, Archaeological Survey of India, Department, Shahji Temple Authority, Local Traders, Private Entrepreneurs, NGOs

Cost Recovery and Management System

- Parking fee
- Local toll from the adjoining traders
- Advertisement and Billboards

Project B6

ADAPTIVE REUSE OF LAXMAN SAHID BHAWAN

The location of the building proposed for development is along the road ID 29.

Actions and Guidelines for DPR

- Convert into community centre
- Rent the building for Religious discourses (Pravachans)
- Rent the hall for exhibition cum sale for the local as well as the external artists and artisans, book fair, garment fair, ornament fair etc.



Bird's Eye View and

Entrance to Laxman Sahid Bhawan

Project Outcome

- Increase social and community interaction through participation
- Boost to the local artists and artisans
- Boost to the art and culture of the society
- Increased educational value to the younger population through exposition and awareness
- Significant perceivable Revenue earning

Partners In Development & Investment

- Nagarpalika, PWD

Approximate Cost Rs. 20 lakhs

Cost Recovery and Management System

- Rental for the display and exhibitions
- Entry free from the visitors

Project B7

IMPROVEMENT OF GADELA BAGH PARK

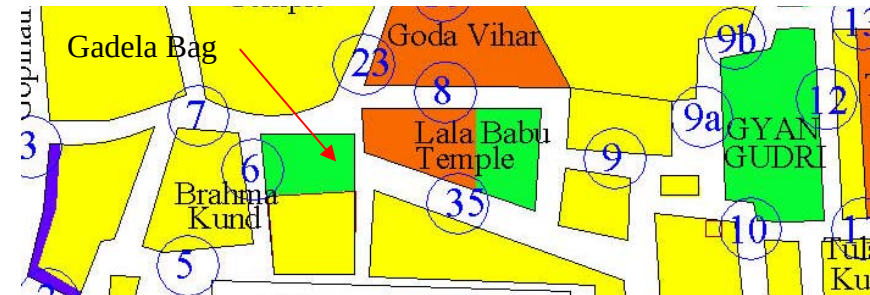
The location of the park proposed for development is along the road ID 6 and 7.

Actions and Guidelines for DPR

- Improvement of the surface condition of the park through partial paving for the community level functions, landscaping on the periphery and ground covers on the remaining areas.
- The pavements would be made with rechargeable capacity.
- Improvement of ambient lighting condition, and provision of lights for specific functions
- Improvement of the existing community building
- Improve signage and information boards
- Provide utilities, such as Public toilet and drinking water

Project Outcome

- Encouraged social functions and assembly
- Proper utilisation of, otherwise neglected potential area
- Encourage functioning as the resting places for the pilgrims and tourists



Bird's Eye view of the Open Space



Dry Dust Prone Area

Partners In Development & Investment

- Nagarpalika, Local Cultural institutions

Approximate Cost Rs. 5 lakhs

Cost Recovery and Management System

Rent from the users and organised functions. This would be self-supporting.

Project B8

IMPROVEMENT OF GYAN GUDRI PARK

The location of the park proposed for development is along the road ID 9a, 9b, 10 and 12.

Actions and Guidelines for DPR

- Improvement of the surface condition of the park through vegetation and ground covers
- Improve ambient lighting condition
- Provision of vigilance and Security (police outpost)
- Improve signage and information boards

Project Outcome

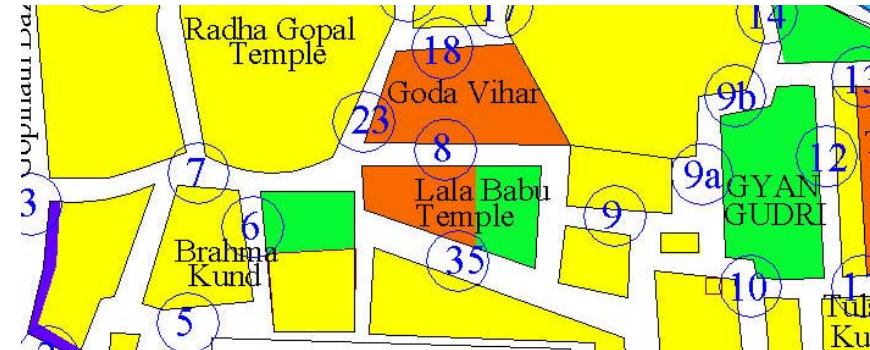
- Improved religious environment
- increased Safety



Eastern access Road to the Park



Vegetation free Bare Park



Dust prone denuded of Ground cover



Absence of Shading Vegetation

Partners In Development & Investment

- Nagarpalika, Tourism Department, Local trustees

Approximate Cost Rs. 5 lakhs

Cost Recovery and Management System

- Share of the one-time entry fee charged

Project C1

RIVER FRONT DEVELOPMENT FROM KALIYADAHA GHAT TO KESI GHAT

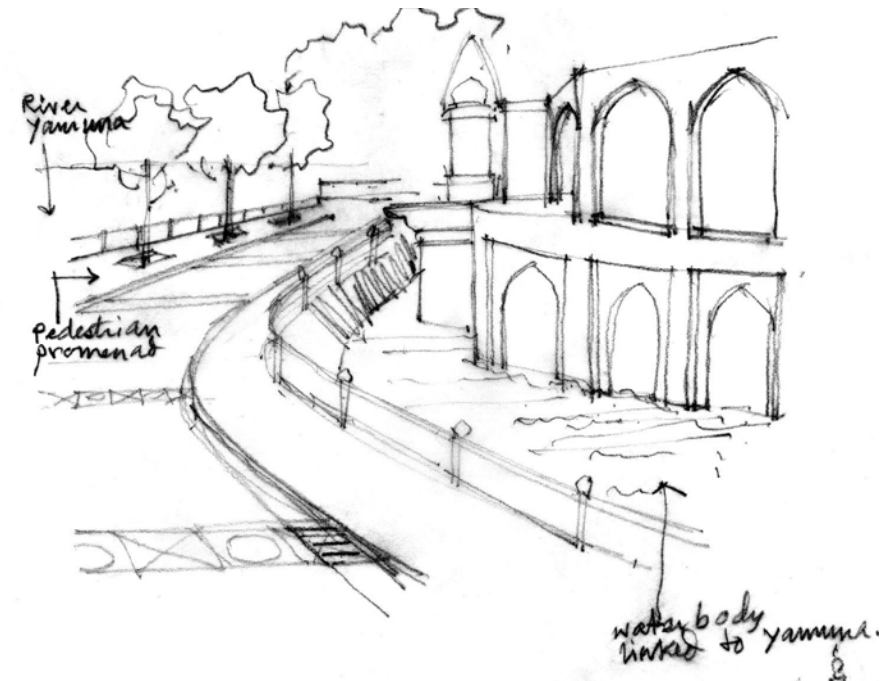
The river front proposed for development is stretched along road IDs 61, 56, 45 9refer Fig. No. 6.8).

Actions and Guidelines for DPR

- Construction of Boat Jetty, Garden and Street Lighting, Riverside Garden, Food plaza, Garden walk, Seats benches, Parking lots
- Architectural conservation of the historic building along the project stretch
- Provision of Security facilities (police outpost)
- Restoration and construction of river edge Embankments
- Control on discharge of effluence from the drains and sewers
- Conservation of the historic buildings along the riverfront by Archaeological Survey of India.
- Maintenance of water quality by the National River Commission.
- Feasibility study for the improvement of the navigation activities along the riverfront to bring back the original history to the city.



Façade of Historic Kesi Ghat from River Yamuna



Schematic Promenade at Chir Ghat



Existing features of Riverfront from Kalyadaha Ghat to Kesi Ghat Potential for Revitalisation



Schematic Section of River front between Chir Ghat and Kesi Ghat

Project Outcome

- International quality recreation
- Less traffic congestion
- Aesthetic quality
- Unique tourism experience

Partners In Development & Investment

- Nagarpalika, PWD, CPCB, UPSPCB, Tourism Department, Archaeological Survey of India, Department, National Waterways Authority of India, Local Trustees, Temple Authorities, Commercial

Organisations, Local Traders, Private Entrepreneurs, NGOs

(Note : UPSIDC has expressed interest to the Vrindavan Municipal Board for investment in this project)

Approximate Cost Rs. 500 lakhs

Cost Recovery and Management System

- Nominal entry fee
- Rental from commercial kiosks
- Parking fee
- Penalties earned from the offenders

Project C2

LIGHT AND SOUND SHOW AT KESI GHAT



Architectural Splendour of Kesi Ghat

The light and sound show is proposed in the historic building complex with architectural splendour at the Kesi Ghat located at the tip of road ID 45.

Actions and Guidelines for DPR

- Light and sound show from the floating boats
- International technical collaboration on design and execution
- Training local manpower for the operation
- Architectural conservation
- Improvement of ambient lighting

- Provision of vigilance and Security (police outpost)
- Restoration of Building edges in contact with the river Yamuna
- Restoration of damaged Embankment
- Control on discharge from near by Drains through interception
- Improved boats
- Provision for life savers near the ghat

Project Outcome

- International quality recreational facilities
- Attraction of domestic and international tourists
- Publicity of one of the world-class architectural and urban design splendours
- Increased revenue



Parikrama Marg passing through



Sunset view point Kesi Ghat



Restoration required for the Historic buildings



Component of Kesi Ghat for Light and Sound Show

Partners in Development & Investment

- Nagarpalika, Tourism Department, Archaeological Survey of India, Department, National Waterways Authority of India, Temple Authorities, International agencies, Private Entrepreneurs, boat operators

Approximate Cost Rs. 40 lakhs

Cost Recovery and Management System

- Licence from boat operators
- Licence from tourist guides
- Entry Tickets

7.0 FINANCIAL ISSUES, DEVELOPMENT TIME LINE AND PHASING

Approximate cost estimate has been prepared for the prioritised projects both at town level as well as detail project level, to be undertaken within the designated Ecozone 1, as presented in Tables 7.1 and 7.2.

The detail estimates need to be prepared on project basis during the preparation of the DPR for each project. The sectorwise phasing and annual cash flow for the plan period has been estimated and presented through Tables 7.5 to 7.7. Tables 7.8 and 7.9 indicate the responsibilities and involvement of the various stakeholders. The proposed estimates do not contain the component of maintenance and operation cost.

The estimated budget made for the above mentioned projects indicate that the total financial involvement for the entire Ecocity project would be covered in Rs. 1548 Lakhs (approximately Rs. 15.5 crore). It is needless to say that all the projects would not be undertaken simultaneously, and hence financial stress would not be experienced at the initiation of the project. A review has been presented in Table 7.3 in the context of expenditure involved categorised in to the four aspects such as a) transportation, b) drainage, sewerage and water supply, c) solid waste management, and d) urban design, conservation and landscape which were the prime focus of this study.

Table 7.1
Financial Estimate of Town Level Projects

	List of Priority Projects	Approximate Cost
		(Rs. In Lakhs)
1.	Transportation Planning	No cost involved
2.	Road Surfacing Planning	75
3.	Solid Waste management Planning	13
4.	Utility Planning (Public Toilet & Drinking Water)	7
5.	Parking Planning	Dealt in detail level programmes
6.	Drainage & Sewerage Planning	30
7.	Street Lighting Planning	14
8.	Landscape Planning	3
9.	Signage Planning	5
10.	Aesthetic Environmental Control	To be ascertained project-wise
11.	Noise Environmental Control	No cost
	Total	147

It is recommended that, based on the fund availability, the projects could be undertaken for the essential functions such as transportation, sanitation and solid waste as the first level of actions, which would result in significant environmental improvement. The other actions related to urban design, landscape etc. can be taken up at the second phase.

Table 7.2
Financial Estimate of Ecozone Level Projects

Project	List of Priority Projects	Approximate Cost
		Rs. In Lakhs
A1a		Nil
A1b(i)	Road Surfacing	75
A1b(ii)	Improvement of Road (& intersection) between Nagarpalika and Ranganathji Temple	40
A1b(iii)	Improvement of traffic island in front of Nagarpalika	8
A1c(ii)	Parking Plan in front of Laxman Sahid Bhawan	10
A1c(iii)	Parking Plan in front of Cholera Hospital	30
A1d	Drainage and Sewerage	30
A1e	Street Lighting	14
A1f	Landscaping	3
A1g	Signage	5
A1h	Solid Waste Management	13
A1i	Public Toilets and Drinking water	7
A2	Restoration / development of Gandhi Park	65
B1.	Improvement of condition of Parikrama Marg	528
B2	Restoration of Bramha Kund	35

B3	Improvement of Banke Bihari temple area	40
B4	Entry point & visitor centre at Atallachungi and Chattikara	30
B5	Improve entry nodes to Shahji Temple	5
B6	Adaptive Reuse of Laxman Sahid Bhawan	20
B7	Improvement of Gadela Bag Park	5
B8	Improvement of Gyan Gudri Park	5
C1	River front development from Kaliyadaha Ghat to Kesi Ghat	500
C2	Light & sound show in Kesi Ghat	80
	Total	1548

Table 7.3
Proposed Estimate on
Sector-specific Expenditure in Ecozone 1

	List of Priority Projects	Approximate Cost		
		Rs. In Lakhs	Rs. In Lakhs	Rs. In Lakhs
		Phase 1	Phase 2	Phase 3
1 a	Traffic & Transportation	177	-	-
1 b	Traffic & Transportation (Parikrama Marg)	-	-	528
2	Drainage, Sewerage & Water supply	37	-	-
3	Solid waste Management	13	-	-
4 a	Urban design, Conservation and Landscape	-	213	-
4 b	Urban design, Conservation and Landscape (Riverfront development)	-	-	580
	Sub Total	227	213	1108
	Total	1548		

The scope of the work in the project level DPRs would indicate the construction schedule and the cash flow for the execution of the works.

It is envisaged that the, financial capacity of the Vrindavan Municipal board (refer Table 7.4) would not permit them to undertake such a project on their own.

Therefore, funds have to be raised through the grants and aids from various Government Agencies, donations from the private agencies, who are sympathetic and supportive to the cause of Vrindavan, and investments from the private entrepreneurs on BOT or other remunerative basis.

It may be noted, that, even if the investment seem to be significant, it is also anticipated that, the remunerativeness of the projects would make the projects viable and sustainable. This would further provide economic boost to the people of Vrindavan.

Table 7.4
Financial Capacity of Vrindavan Municipal Board

Item	Description	Amount
		Rs. In lakhs
Annual Budget of VMB (2004-2005)		450 to 500
Annual Expenditure	Salaries to Staffs	200
	Capital Expenditure	(As per the grants available)
	Maintenance and repair of Equipments and other consumables	250 - 300
Source of Revenue	Local Taxes collected by Municipal Board (2002-03)	109.57
	State Finance Commission (2002-03)	148.43
	11 th Finance Commission	(approx.) 50
	Revolving Fund	(approx.) 200
	Other Miscellaneous Grants	Not known
Other Probable Sources of Revenue	Parking Fees	

	Entry fee to the tourists and Pilgrims (one time at the entry)	This may take care of the maintenance of the public utilities (drinking water, urinal, W.C., resting places etc.)
	Entry fee to the parks	
	Entry fee to the dynamic religious displays (Jhanki)	

7.1 Responsibilities of Stakeholders

To accomplish the objective of this ecocity proposal it would be desirable to share the responsibilities by various stakeholders under the following issues.

- Land
- Capital Investment
- Operation revenue earning
- Maintenance
- Revenue Benefit
- Legal Enforcement

Table 7.8 represents the roles of the stakeholders for each of the proposed projects.

7.2 Development Timeline and Capital Outlay

Table 7.6 represents the phasing plan for the ecocity projects has been proposed under the major categories

- a) Traffic and Transportation
- b) Drainage Sewerage & Water supply
- c) Solid Waste Management
- d) Urban Design, Conservation & Landscaping

Table 7.7 represents the Sector-wise phasing of projects based on annual cash flow required for the implementation of each of the proposed projects from 2005 to 2009.

7.3 Monitoring of Development

It is envisaged that for the successful implementation of the ecocity project, the citizen participation of Vrindavan is an absolute necessity. A monitoring board should be formed by the Vrindavan Municipal Board comprising the members from administration, technical experts (in tourism, environment, urban planning, conservation), religious and cultural representatives, and other responsible citizens.

This body will monitor the progress of the project periodically and suggest necessary actions involving the people and experts from various sectors at different phases of development.

7.4 Need for Development Plan for Vrindavan

It is also proposed that a separate development plan be prepared for the entire town which would effectively integrate the specific objectives of the ecocity project which would improve the overall quality of life of the people of Vrindavan.

Table 7.5
Sector-wise expenditure based on Phasing of different identified proposals

		Town Level Actions	Ecozone project Level Actions	Phase I expenditure in Rs. lakhs		Phase II expenditure in Rs. lakhs		Phase III expenditure in Rs. lakhs	
	Sector wise			Item-wise	Sectoral Total	Item-wise	Sectoral Total	Item-wise	Sectoral Total
A	Traffic & Transportation				177				
1		Transportation planning		-					
2		Road surfacing planning		75					
3			Road from Nagarpalika -Rangji	40					
4			Rotary near Nagarpalika	8					
5		Parking planning	Parking near Laxman Sahid	10					
6			Parking near cholera hospital	30					
7		Street lighting planning		14					
8			Improve Parikrama Marg						528
B	Drainage Sewerage & Water supply				37				
1		Drainage Planning		30					
2		Utility (toilet/drinking w)		7					
C	Solid Waste Management				13				
D	Urban Design, Conservation & Landscaping						213		
1		Landscape planning				3			
2		Signage planning				5			
3		Aesthetic control				-			
4		Noise control				-			
5			Entry point at Atallachungi			30			
6			Restoration of Brahma Kund			35			
7			Improve entry nodes to Shahji			5			
8			Improvement of Banke Bihari			40			
9			Restoration of Gandhi Park			65			
10			Adaptive reuse Laxman Sahid			20			
11			Improvement of Gyan Gudri			5			
12			Improvement of Gadela Bag			5			
13			River front development					500	580
14			Light & sound show at Kesighat					80	

Table 7.6
Sector-wise phasing of projects

Sl.	Sector wise expenditure		Expected Duration	April 2005	April 2006	April 2007	April 2008	April 2009	April 2010
A	Traffic & Transportation		2 years						
		Parikrama Marg	3 years						
B	Drainage Sewerage & Water supply		1 year						
C	Solid Waste Management		1.5 years						
D	Urban Design, Conservation & Landscaping		3 years						
		Riverfront development	3 years						
	TOTAL Project		5 years	Start time: April 2005			Finish time: April 2010		

Table 7.7
Sector-Wise Phasing of Projects Based on Annual Capital Outlay

	Sector wise expenditure	Town Level Actions	Ecozone project Level Actions	Annual Cash Flow (in Rs. Lakhs)					Total (Rs. lakhs)
				2005	2006	2007	2008	2009	
A	Traffic & Transportation								
1		Town level							
2		Road surfacing		45	30				75
3			Nagarpalika - Rangji	30	10				40
4			Rotary near Nagarpalika	8					8
5		Parking planning	Laxman Sahid Bhavan	10					10
6			Cholera hospital	20	10				30
7		Street lighting		8	6				14
8			Parikrama Marg			250	200	78	528
B	Drainage Sewerage & Water supply								
1		Town level		30					30
2		Utility planning		7					7
C	Solid Waste Management			10	3				13
D	Urban Design, Conservation Landscaping								
1		Landscape			3				3
2		Signage planning			5				5
5			Entry point Atallachungi		30				30
6			Brahma Kund		25	10			35
7			Entry to Shahji Temple		5				5
8			Banke Bihari area		30	10			40
9			Gandhi Park		45	20			65
10			Adaptive reuse of Laxman Sahid		15	5			20
11			Gyan Gudri park		5				5
12			Gadela Bag park		5				5
13			River front development			250	200	50	500
14			Light and sound show				40	40	80
	TOTAL (Rs. Lakhs) by year			168	227	545	440	168	1548

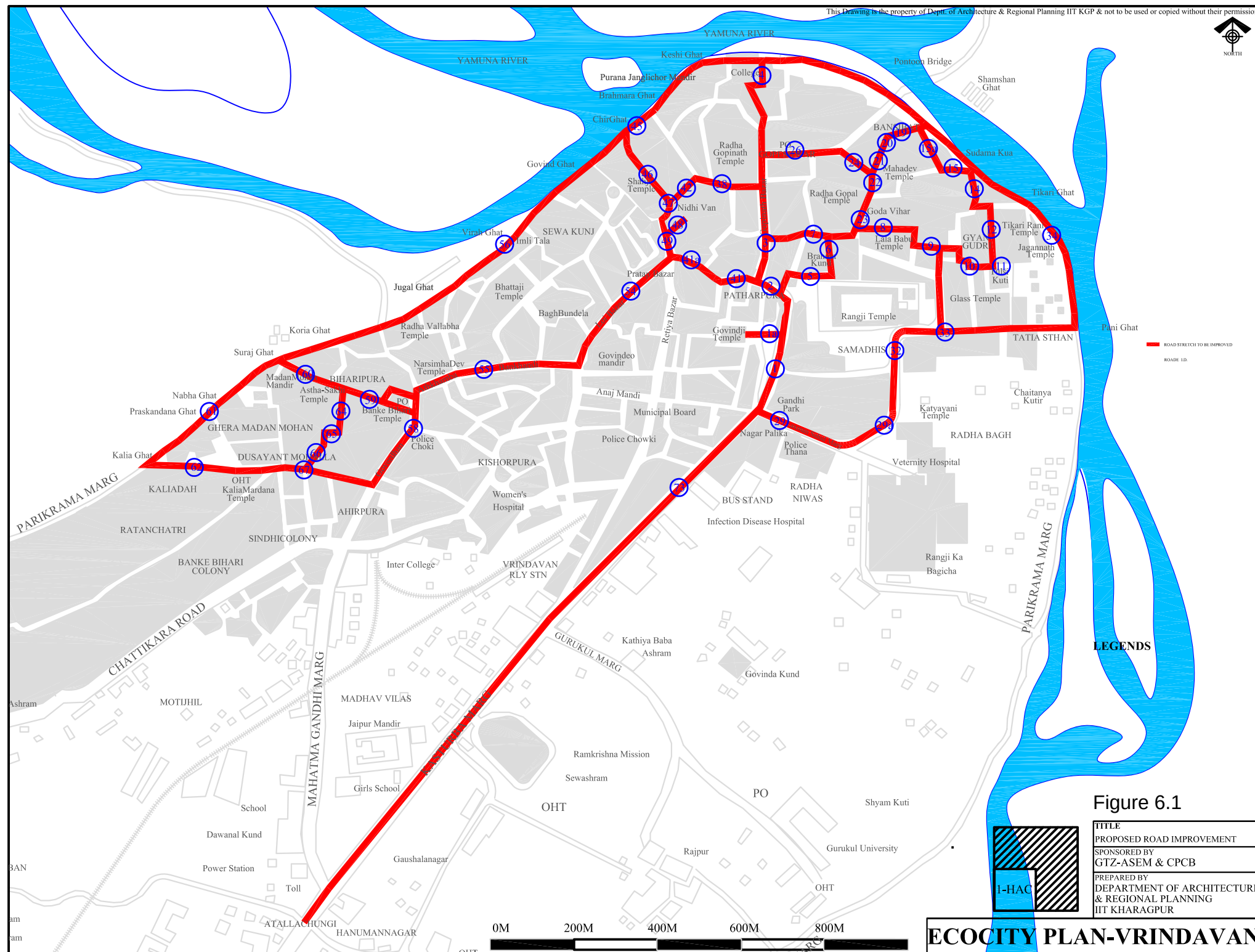
Table - 7.8
Responsibilities of Various Stakeholders in the Ecocity Projects

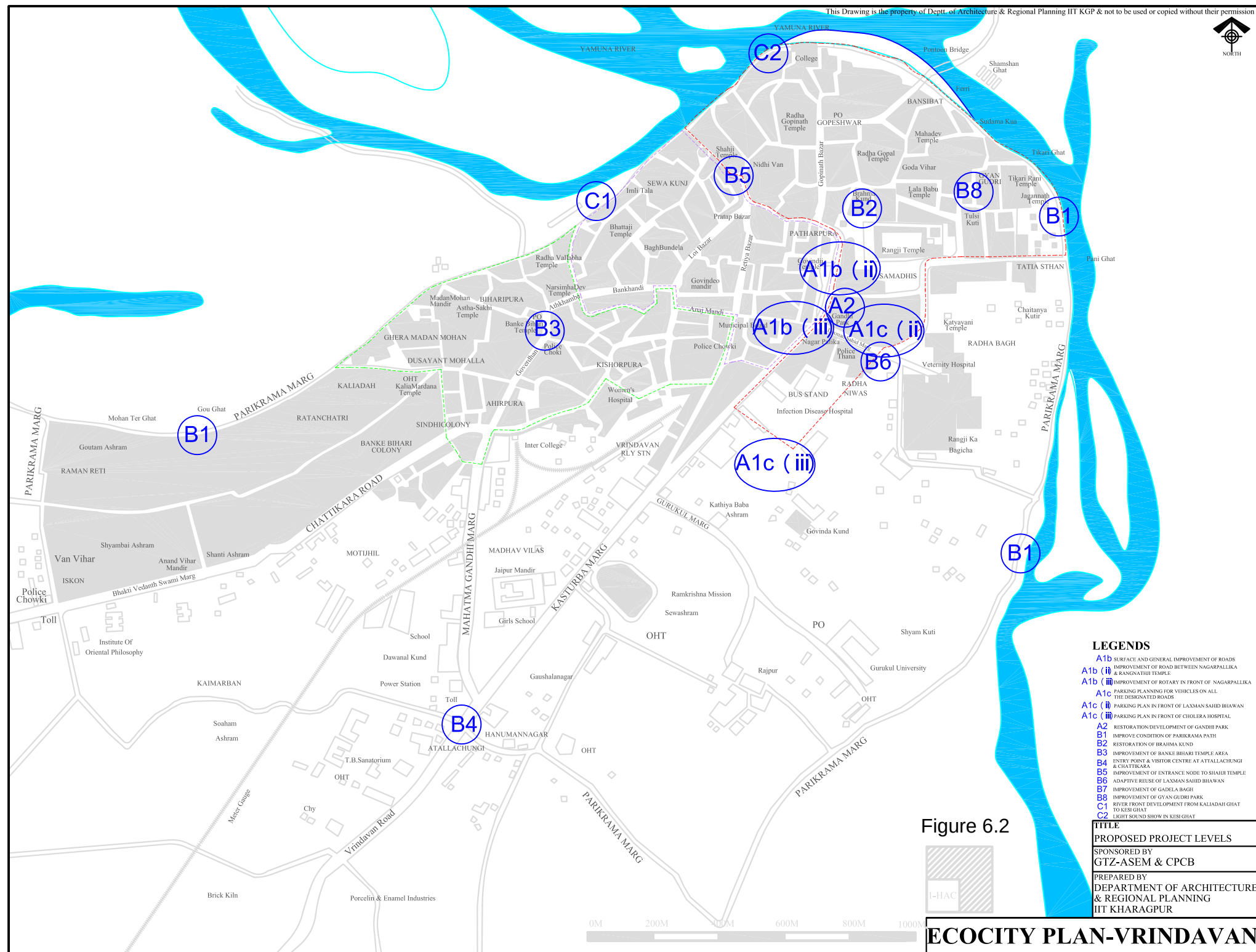
	List of Priority Projects	Responsibilities					
		Land	Capital Investment	Operation & Revenue Earning	Maintenance	Revenue Benefit	Legal enforcements
1.	Entry point & visitor centre at Atallachungi and Chattikara	• Municipality • PWD	• Municipality • Private Ent.	• Private	• Private	• Private • Municipality	• Municipality • PWD • Administration
2.	Improvement of Road (& intersection) between Nagarpalika and Ranganathji Temple	• PWD	• PWD	• PWD	• PWD • Private Ent.		• PWD • Municipality
3.	River front development from Kaliyadaha Ghat to Kesi Ghat	• National Water Resource Commission	• Municipality • Tourism dept.	• Tourism • Private	• Private	• Tourism dept. • Private	• Tourism • Municipality
4.	Restoration of Bramha Kund	• Municipality	• Municipality • Private	• Private	• Private	• Private • Municipality	• Municipality
5.	Parking Plan in front of Laxman Sahid Bhawan	• PWD	• PWD	• Private	• Private	• Private • Municipality	• Municipality • Public Admn.
6.	Improvement of	• PWD	• PWD	• Municipality	• Municipality	• Municipality	• Municipality

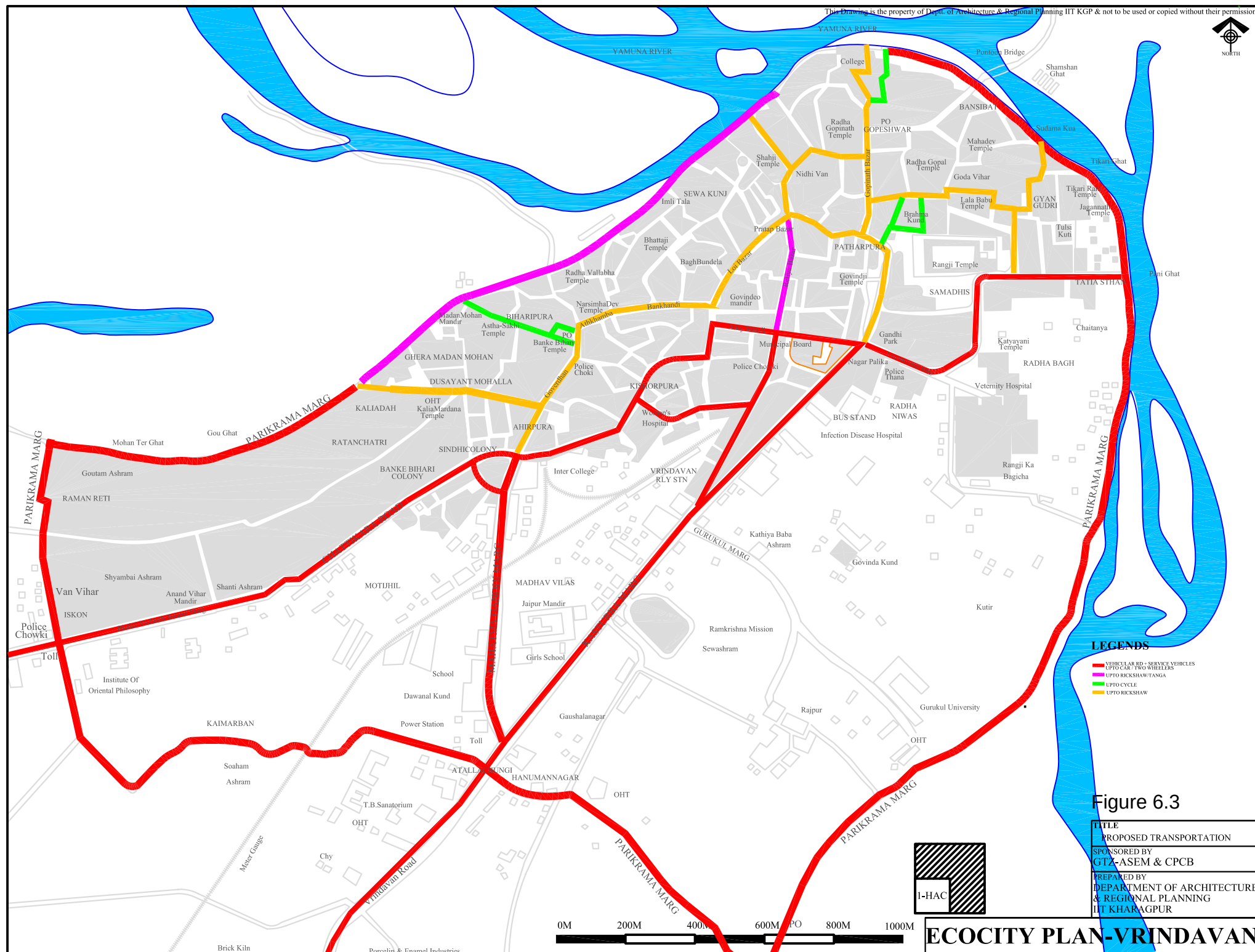
	condition of Parikrama Marg	• Municipality			y	y	
7.	Improvement of traffic Island in front of Nagarpalika	• PWD	• PWD	• Municipality	• PWD		• PWD • Municipality
8.	Parking Plan in front of Cholera Hospital	• Municipality	• Municipality	• Private	• Private	• Private Municipality	• Municipality
9.	Improve entry nodes to Shahji Temple	• Municipality • Private	• Private	• Private	• Municipality • Private	• Private Municipality	• Municipality
10.	Improvement of Banke Bihari temple area	• Municipality	• Private • Municipality	• Private	• Private	• Private	• Municipality
11.	Restoration / development of Gandhi Park	• Municipality	• Municipality • Private	• Private	• Private	• Private Municipality	• Municipality
12.	Adaptive Reuse of Laxman Sahid Bhawan	• Municipality	• Municipality	• Private	• Private	• Private Municipality	• Municipality
13.	Light & sound show in Kesi Ghat	• Municipality	• Private	• Private	• Private	• Private Municipality	• Municipality
14.	Improvement of Gyan Gudri Park	• Municipality	• Private	• Private	• Private	• Private	• Municipality

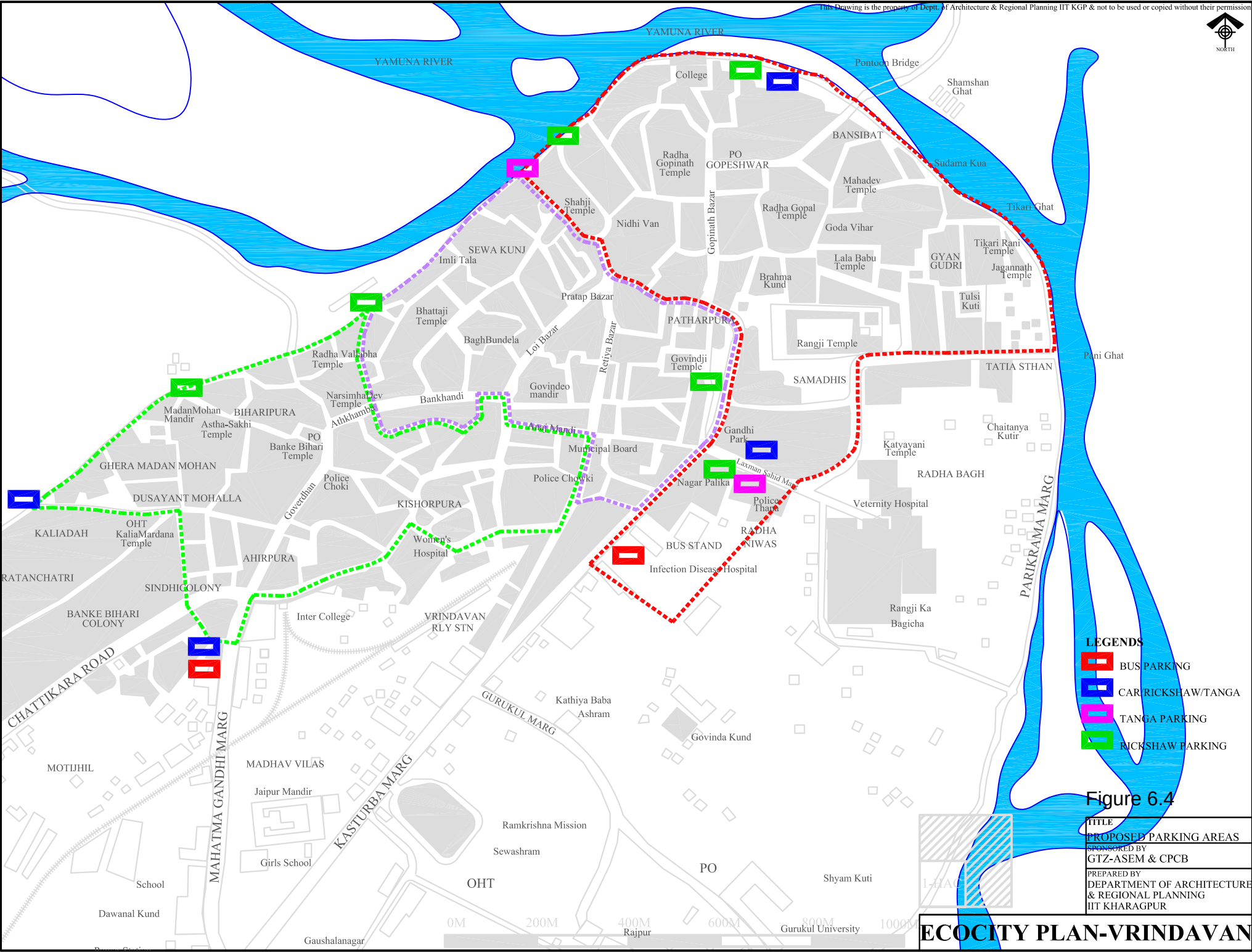
Table - 7.9
Involvement of various Stakeholders

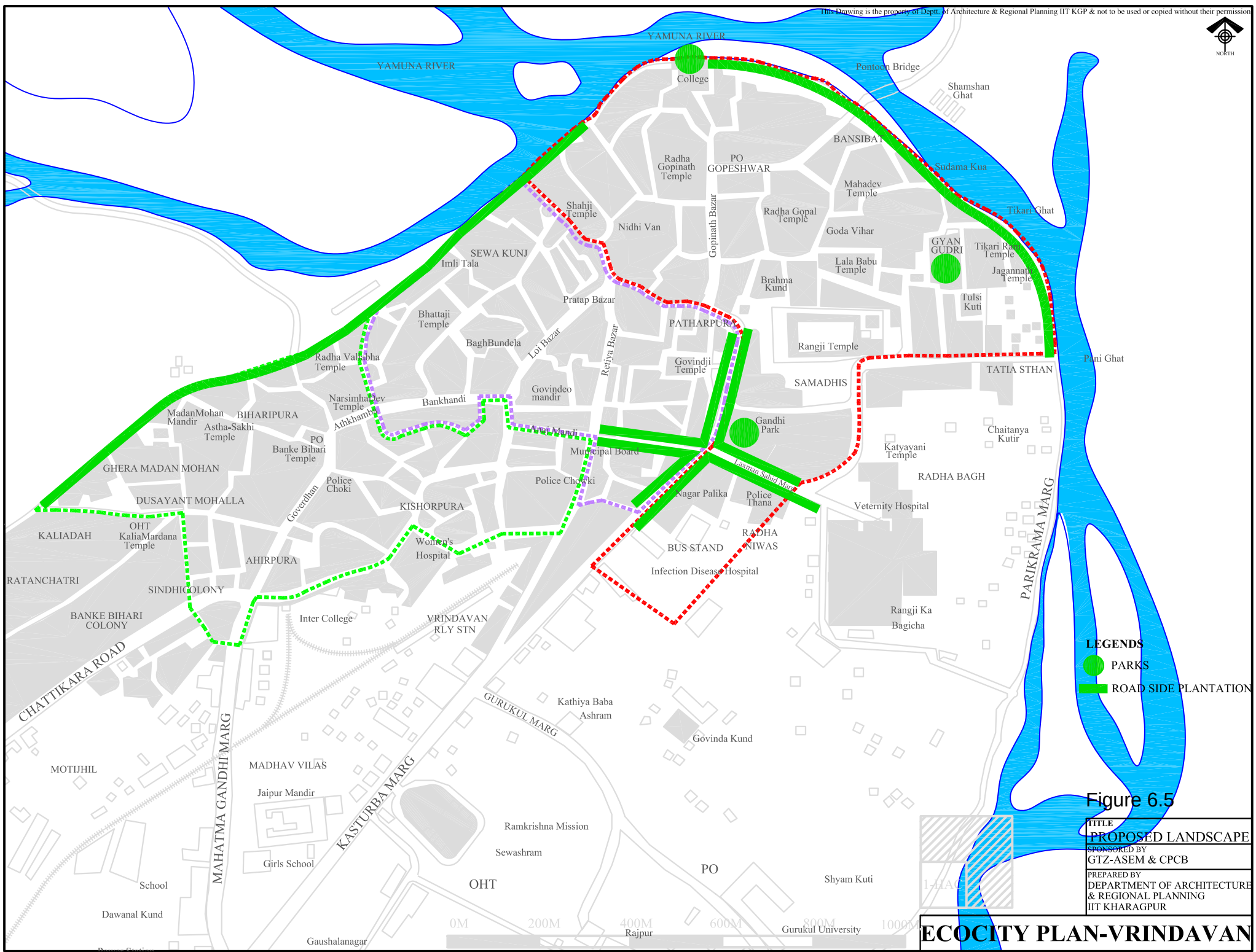
	STAKEHOLDERS										
	Municipal Corporation	PWD	Private Entrepreneurs	NGO (Non Govt. Organisation)	Temple / Ashram Trustees	Archaeology Department	Central Water resource department	Tourism department	Commercial Establishments Shops etc.	Local Residents	Tourist & Pilgrims
Property	•	•			•	•	•		•	•	
Capital Investment	•	•	•	•	•	•	•	•			
Operation & Maintenance	•	•	•	•	•	•	•		•		
Revenue Earning	•		•	•	•			•	•		
Fund Generation	•		•	•	•						
Contribution to Economy			•	•	•						•











LEGENDS

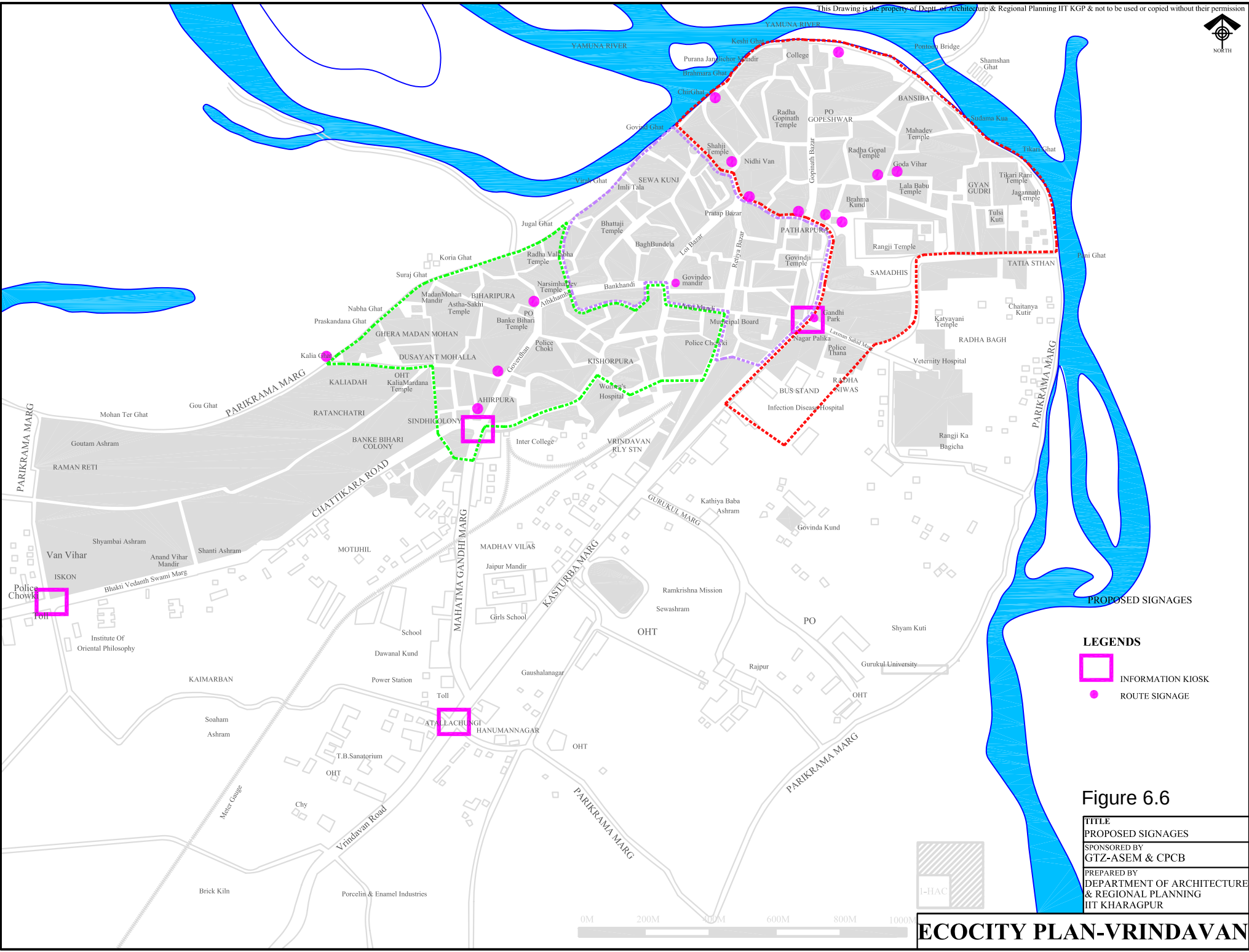
 PARKS

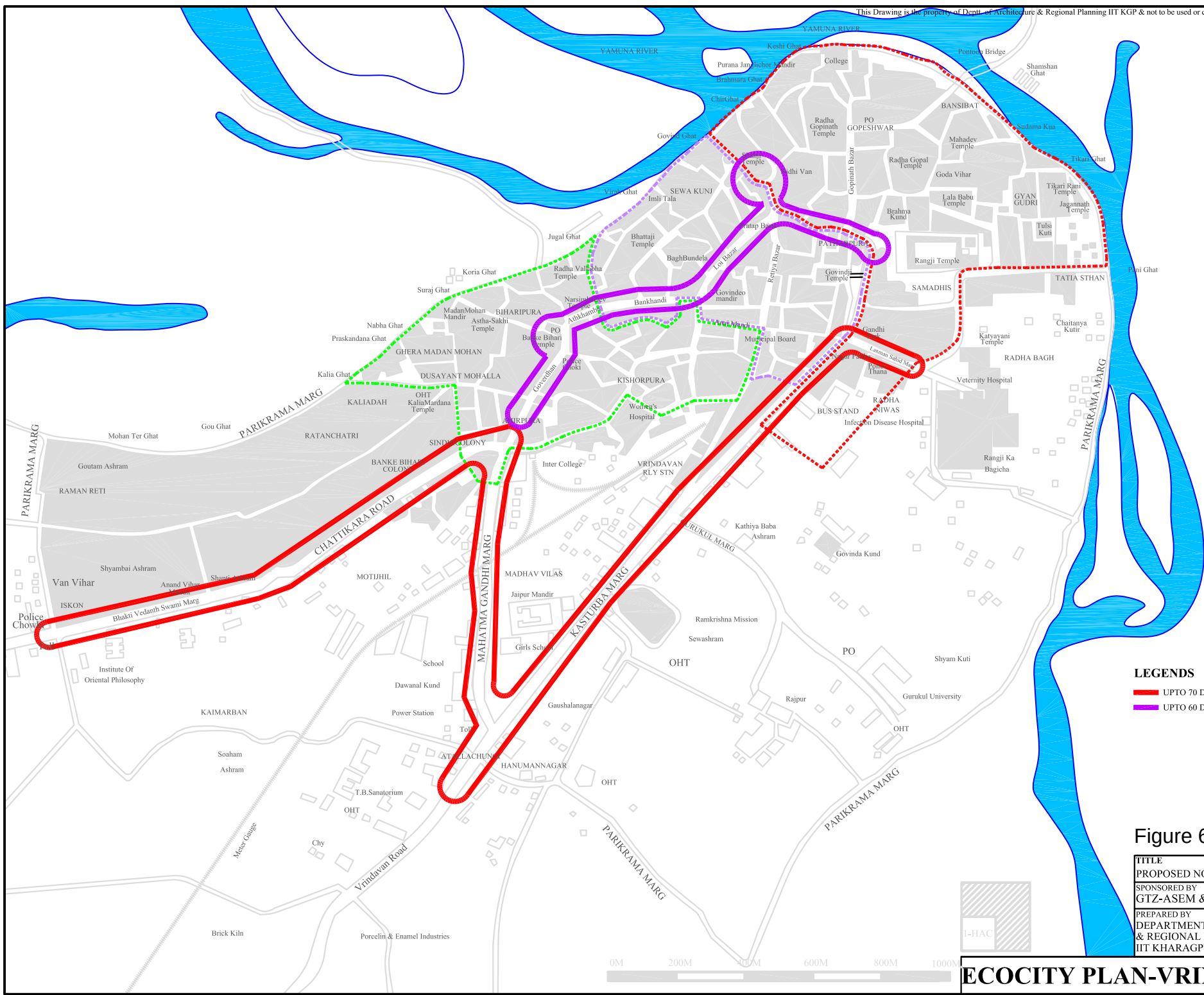
 ROAD SIDE PLANTATION

Figure 6.5

TITLE
PROPOSED LANDSCAPE
SPONSORED BY
GTZ-ASEM & CPCB
PREPARED BY
DEPARTMENT OF ARCHITECTURE & REGIONAL PLANNING IIT KHARAGPUR

ECOCITY PLAN-VRINDAVAN





LEGENDS
— UPTO 70 DECIBEL
— UPTO 60 DECIBEL

Figure 6.7

TITLE
PROPOSED NOISE LEVEL
SPONSORED BY
GTZ-ASEM & CPCB
PREPARED BY
DEPARTMENT OF ARCHITECTURE & REGIONAL PLANNING IIT KHARAGPUR



ECOCITY PLAN-VRINDAVAN

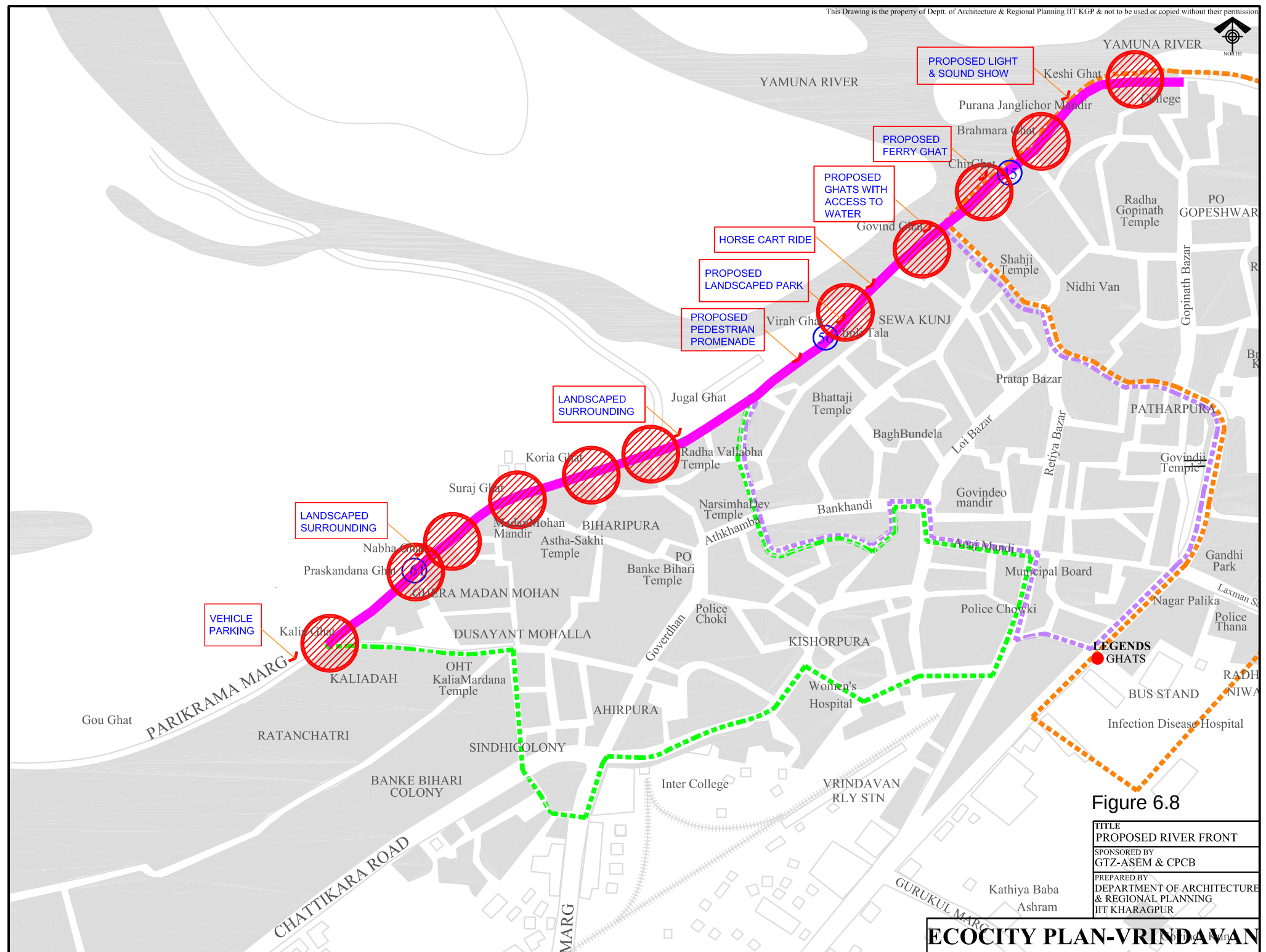


Figure 6.8

TITLE
PROPOSED RIVER FRONT
SPONSORED BY
GTZ-ASEM & CPCB
PREPARED BY
DEPARTMENT OF ARCHITECTURE & REGIONAL PLANNING IIT KHARAGPUR

PART C



ANNEXURE

Annexure - 1

Terms of Reference (ToR)

Project: Preparation of “Ecocity Development Plan for Vrindavan Ecozone”

1. Background

The Central Pollution Control Board (CPCB) is an apex body for prevention and control of pollution under the Ministry of Environment & Forests, Government of India. The German Technical Cooperation (GTZ) is providing support to CPCB under the Advisory Services in Environmental Management Programme (ASEM).

The Central Pollution Control Board has undertaken the Ecocity Programme under the X Plan (2002-03 to 2006-07). The project has been conceptualised with the overall objective of improving environment and bringing in visible results through implementation of identified environmental improvement projects. The Programme is expected to bring visible environmental improvement through demonstrative projects that are remunerative. The Programme, in the long-run, is expected to help create the needed awareness and local dynamics for decreasing environmental burden/stress, improving living conditions and helping in achieving sustainable development through an integrated planning and management of land and its resources and implementation of environmental improvement measures.

The Eco-city Programme has been taken up for 5 towns of the country in first phase. Vrindavan, a pilgrimage town in Uttar

Pradesh is considered as one of the towns to be developed under Eco-city programme. Vrindavan is a historical temple town. The town has about 39 major temples and receives tourists ranging from 10,000 to 25,000 per day, which increases up to 10 lakhs during festivals.

Today, the town is having a number of environmental problems related to traffic and transportation, plantation and landscaping, drainage, sewerage and garbage collection and disposal system especially where the temples are concentrated. The problems are mainly due to the haphazard traffic and transportation especially due to the narrow roads in front of the railway station, lack of adequate parking facilities near the temples, mixed traffic and inconvenience for pedestrian movement, open storm water drains, solid waste, lack of landscaping and urban design element, public amenities, plantations etc. The area is having great potential for restoration, rejuvenation and improvement.

The core area of Vrindavan, consisting of 36 temples, termed as ‘Ecozone’ by the Vrindavan Nagarpalika have been taken up under the Ecocity programme. The Programme in its pilot phase is expected to help as a demonstrative project for creating multiplier effect.

The programme is being coordinated and executed by the Central Pollution Control Board, Delhi (CPCB) and would be implemented by the Vrindavan Nagarpalika with local coordination and fund management by the Uttar Pradesh

Pollution Control Board. The German Technical Co-operation (GTZ) is providing the technical support under the 'Advisory Services in Environmental Management Project' (ASEM).

It is proposed to engage the School of Planning & Architecture, IIT, Kharagpur as consultants by GTZ under ASEM Programme for undertaking a study on "Vrindavan Ecocity Development Plan". The ToR of the consultants is given below.

2. Objective of the Task of the Consultant

The overall objective of the "Ecocity Development Plan for Vrindavan Ecozone" in Vrindavan is to evolve a plan for area-wide improvements and providing infrastructure services having regard to the historical and cultural character of the town and suggest projects to be taken up for implementation of the Plan out of which priority should be identified for which detailed project reports (DPRs) would be eventually prepared.

The plan should incorporate urban planning, urban design, plantation & landscaping, sewerage & drainage, traffic & transportation system, solid waste management and other environmental management and infrastructure related aspects.

The proposed Ecocity Development Plan should provide:

Part A:

- a) Land use plan (within the scope of the existing Master plan)
- b) Traffic & Transportation Plan

- c) Sewerage & drainage plan including decentralized treatment if feasible, water harvesting etc.
- d) Solid waste management plan
- e) Plantation & landscaping plan
- f) Urban design plan
- g) Any other as relevant

Part B:

Projects needed for implementation of the Plan along with cost estimates

Part C:

Guidelines for preparation of DPRs for the identified projects

The study should look into the feasibility aspects based on detailed surveys. The study should take into consideration the monuments and structures of archaeological value, historical and cultural aspects, the environmental improvement needs, the tourism aspects, the remunerativeness and O & M aspects etc. in accordance with the objectives of the Ecocity programme. The study should be based on through surveys and proper planning so as to come up with a sound urban design solution acceptable to ASI, urban development authority, the pollution control board and the municipality.

The projects to be covered should be based on the following criteria:

- i. must address to existing environmental problems and result in verifiable environmental improvement; and

- ii. must be remunerative so as to recover costs and make the project sustainable.

The proposed Vrindavan Ecocity Development Plan should be in accordance with the Existing Master Plan of Vrindavan. Also, the proposals shall be in accordance with mandatory requirements of the Archaeological Survey of India, pollution control board, Vrindavan Municipality and other concerned departments. The proposed Plan should merge with historical, tourism and religious character of the area and adequately incorporate environmental considerations. The Plan should also incorporate sustainable development strategy through integrated approach and planning and management of land and its resources in the core area.

3. Tasks to be Performed by the Consultant

Tasks -1: Defining the project area, gathering data/information and undertaking field surveys

Sub tasks:

- i. To collect relevant information from secondary sources including those related to land use, environmental social, economic, infrastructure, archaeology, historical tourism, aspects etc.
- ii. To define the core area of Vrindavan consisting of the temples that could demonstrate visible environmental improvement and bring in remunerativeness to the implemented projects.

- iii. To undertake necessary detailed surveys in the identified core area considering the historical and cultural character of the town, planning aspects including current land use, and problems and issues concerning environmental, social, economical and infrastructure aspects. The survey should include:

- a) Landuse, existing activities and encroachments
- b) Built environment
- c) Environmental quality – air quality, water quality (surface and ground), noise etc.
- d) Historical, tourist, religious characteristics
- e) Traffic & transport system including traffic movement, accessibility/linkages, signage, parking facilities and pedestrian system
- f) Plantation, landscaping and urban design characteristics
- g) Drainage/sewerage including collection, treatment, disposal
- h) Solid waste management including collection, treatment, disposal
- i) Environmental resource zones including water bodies, ground water recharge zones etc.
- j) Any other relevant aspect

Along with the current status on the above aspects, the concerned problems and issues should be clearly brought out.

Tasks -2: Prepare the Ecocity Development Plan as per the 'objectives of the task of the Consultant' above.

Task - 3: Identify projects that are to be implemented, in the order of priority, for fulfilling proposed Ecocity Development

Plan. Also, provide preliminary cost estimates in accordance with CPWD/PWD Schedule of Rates.

Task – 4: To suggest guidelines for preparation of DPRs for the identified priority projects.

4. Requirements of the Consultant

- i. The Consultants should associate professionally qualified planners, engineers, architects and various sectoral experts including the architects with expertise in archaeological conservation. The list of empanelled architects with expertise in archaeological conservation may be obtained from the Archaeological survey of India.
- ii. The Consultants should give due regard to the policies and norms of the Archaeological Survey of India, the norms of the Vrindavan Nagarpalika and the Urban Development Authority.
- iii. The Consultants should give due regard to achieving of environmental quality standards in the area and protection of environmental resource areas.
- iv. The Consultants should closely interact with the Archaeological Survey of India (ASI), the Department of Tourism & Cultural office, Urban Development Authority, Andhra Pradesh Pollution Control Board, Vrindavan Municipality, Central Pollution Control Board.
- v. The Consultants should give due regard to the monuments and structures of archaeological value, historical and cultural aspects, the tourism aspects, the environmental improvement needs, the remunerativeness and O & M aspects and sustainable development strategies.
- vi. The Consultant should undertake consultations with the local people, elected members of the municipality and with experts.
- vii. The cost estimates prepared for the identified projects should be in accordance with the PWD/CPWD Schedule of Rates.
- viii. The Consultant take into consideration that the environmental improvement projects employed in the Ecocity Project are expected to be:
 - Innovative, practical and sustainable
 - cost effective
 - easily maintainable
 - simple in design, creating visible impact
 - replicable
 - providing multiplier effect
 - using locally available materials and artwork
 - adopting concepts and designs that appeal/suit the local people custom made with state-of-art designs to suit local conditions and play a catalyzing/demonstrating effect
- ix. **The Consultant should take into consideration that the projects implemented from the proposed Ecocity Development Plan are expected to provide:**
 - Protection to natural resources including air, water, land, flora and fauna

- Protection of monuments and historical sites
 - Bring back the historical/religious ambience
 - Provide desired environmental quality including clean air and water
 - Amenities and facilities within reach
 - Adequate and safe water supply
 - Efficient traffic and transportation system providing for smooth traffic flow, pedestrian movement, signage, parking etc.
 - Adequate and accessible greens and recreational areas etc. for accessibility to nature
 - Safety from hazards
 - Clean surroundings with efficient solid waste management
 - Energy efficiency including usage of appropriate and eco-friendly technologies
 - Planned development
 - Aesthetic quality including appropriate urban design integrated into the overall plan
- x. The Consultants should present the study report before the Expert Committee of CPCB and undertake modifications in the report, if necessary.

5. Outputs

The Ecocity Programme is on-going and implementation of the projects is required to be taken up at the earliest. The Consultant should submit sector specific fragmented deliveries so that these could be reviewed and preparation of DPRs commenced early by CPCB.

The outputs delivered from time to time should include 3 sets of the report along with all data, maps, drawings etc. in hardcopy and soft copy form.

6. Time Schedule

3 months from the date of award of work.

Annexure - 2

Table A - 2.1
List of Indicators for Documentation of Existing Conditions

Roads

Traffic Condition

RT0	Congested
RT1	chaotic, but no congestion
RT2	smooth flowing
RT3	little traffic
RT4	very little traffic

Surface Condition

RS0	no pavement, Bad condition
RS1	no pavement, Good condition
RS2	CC pavement, no shoulder, Bad condition
RS3	CC pavement, Brick shoulder, Bad condition
RS4	CC pavement, no shoulder, Good condition
RS5	CC pavement, Brick shoulder, Good condition
RS6	asphalt pavement, no shoulder, Bad condition
RS7	asphalt pavement, no shoulder, Good condition
RS8	asphalt pavement, Brick shoulder, Bad condition
RS9	asphalt pavement, Brick shoulder, Good condition
RS10	other (specify)

Traffic Modes Suitability

RM0	Pedestrian
RM1	Cycle
RM2	rickshaw, Tanga
RM3	two wheelers
RM4	four wheelers (upto car)
RM5	four wheelers (service vehicle)

Width Characteristics

RW0	excellent, adequately wide
RW1	moderate, need no widening
RW2	moderate, need widening
RW3	Narrow, need widening, space available
RW4	Narrow, need widening, space not available

Footpaths / Sidewalk

RF0	None
RF1	yes, one side
RF2	yes, both side
RF3	yes, encroached / blocked
RF4	yes, in use, convenient
RF5	extension space not available
RF6	extension space available

Parking Facility

RP0	None
RP1	available, chaotic
RP2	available, systematic
RP3	Space not available
RP4	Space available

Traffic Management

RG0	None
RG1	painted lanes
RG2	Signage
RG3	island etc.
RG4	Traffic Police, signal etc.
RG5	other (specify)

Plantation / Vegetation

RV0	None
RV1	Some
RV2	nicely done

Street Lighting

RL0	None
RL1	Sparse
RL2	Good
RL3	encroachment on the road

Overhead cables

RC0	None
RC1	yes, but no major problem
RC2	disturbing, need organisation

Sewerage / Drains**Drains**

SD0	no drains
SD1	uncovered drains
SD2	partly covered
SD3	covered with open holes
SD4	completely covered

Flow Condition

SF0	Smooth flowing
SF1	Flowing, with garbage
SF2	Stagnant
SF3	stagnant and badly polluted, smelling
SF4	Overflowing
SF5	dry, with solid deposits
SF6	dry, without solid deposits

Garbage Disposal**Collection Bins**

GC0	yes, overflowing
GC1	yes, adequate
GC2	none

Disposal Ground

GD0	Clean
GD1	little littering
GD2	Littering
GD3	open dumps
GD4	Mixed

Public Utilities

Drinking Water Facility

UW0	no supply
UW1	available, dry / unmaintained
UW2	available, need improvement
UW3	available, maintained

Seats / Benches

UB0	none
UB1	available, need improvement
UB2	available, need no improvement

Toilets

UT0	None
UT1	Urinals for gents only
UT2	Toilets for gents and ladies, unmaintained
UT3	Toilets for gents and ladies, maintained
UT4	location not appropriate
UT5	location appropriate

Water Quality

UQ0	Presence of Na, K, NH _x , Mg, Ca (Cations)
UQ1	Presence of F _i , Cl, N _x , Br _x , P _x , SO _x (Anions)
UQ2	pH Value
UQ3	Iron Content
UQ4	Colour
UQ5	Odour
UQ6	Total Dissolve solids
UQ7	Dissolved Oxygen
UQ8	Bacteria Count

OTHER ENVIRONMENTAL QUALITY FACTORS

Dust Level

ED0	High
ED1	Moderate
ED2	Low

Aesthetics Effect

EA0	Disturbing
EA1	Unappealing
EA2	Fair
EA3	Excellent

Noise Level

EN0	unbearable (above 100 dBA)
EN1	extremely high (70 - 100 dBA)
EN2	moderate (60 - 70 dBA)
EN3	low (below 60 dBA)

Hygiene Condition

EH0	Extremely poor
EH1	moderate
EH2	Good
EH3	Excellent

GENERAL

Signage

GS0	not available, not required
GS1	not available, required
GS2	available, need improvement
GS3	available, good

Snack Bars at Nodal points

GB0	Yes
GB1	None
GB2	none, to be introduced

Religious Importance

GR0	extremely high
GR1	High
GR2	Moderate
GR3	Low
GR4	Insignificant

Water Edge Potential

GW0	excellent, need improvement
GW1	excellent, need no improvement
GW2	moderate, need improvement
GW3	least, need no improvement

Heritage / Architectural Value

GH0	Excellent
GH1	moderate, need improvement
GH2	least, need no improvement

Streetscape Quality

GQ0	Excellent
GQ1	moderate, need improvement
GQ2	least, need no improvement

Note : The indicator based observation along the major areas within the delineated ecozone 1 and its adjoining areas have been presented in the following Tables.

Table A - 2.2
Indicator Based Documentation of Existing Scenario
Roads

Road ID	Traffic Conditions					Width Characteristics					Surface Conditions										
	RT0	RT1	RT2	RT3	RT4	RW0	RW1	RW2	RW3	RW4	RS0	RS1	RS2	RS3	RS4	RS5	RS6	RS7	RS8	RS9	RS10
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Road ID	Traffic Conditions					Width Characteristics					Surface Conditions										
	RT0	RT1	RT2	RT3	RT4	RW0	RW1	RW2	RW3	RW4	RS0	RS1	RS2	RS3	RS4	RS5	RS6	RS7	RS8	RS9	RS10
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Source : Primary Survey

Table A-2.3
Indicator Based Documentation of Existing Scenario
Roads

Road ID	Footpaths / Sidewalks							Traffic Modes Suitability							Parking Facility					Street Lightings			
	RF0	RF1	RF2	RF3	RF4	RF5	RF6	RM0	RM1	RM2	RM3	RM4	RM5	RP0	RP1	RP2	RP3	RP4	RL0	RL1	RL2	RL3	
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Road ID	Footpaths / Sidewalks							Traffic Modes Suitability						Parking Facility					Street Lightings			
	RF0	RF1	RF2	RF3	RF4	RF5	RF6	RM0	RM1	RM2	RM3	RM4	RM5	RP0	RP1	RP2	RP3	RP4	RL0	RL1	RL2	RL3
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Source : Primary Survey

Table A - 2.4
Indicator Based Documentation of Existing Scenario
Roads

Road ID	Traffic Management						Plantation / Greenverge			Overhead Cables		
	RG0	RG1	RG2	RG3	RG4	RG5	RV0	RV1	RV2	RC0	RC1	RC2
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Road I D	Traffic Management						Plantation / Greenverge			Overhead Cables		
	RG0	RG1	RG2	RG3	RG4	RG5	RV0	RV1	RV2	RC0	RC1	RC2
34												
35												
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Source : Primary Survey

Table A - 2.5
Indicator Based Documentation of Existing Scenario
Sewerage / Drainage and Garbage Disposal

Road ID	Sewerage / Drains												Garbage Disposal									
	Drains					Flow Condition							Collection Bins			Disposal Ground						
	SD0	SD1	SD2	SD3	SD4	SF0	SF1	SF2	SF3	SF4	SF5	SF6	GC0	GC1	GC2	GD0	GD1	GD2	GD3	GD4		
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Road ID	Sewerage / Drains												Garbage Disposal							
	Drains					Flow Condition							Collection Bins			Disposal Ground				
	SD0	SD1	SD2	SD3	SD4	SF0	SF1	SF2	SF3	SF4	SF5	SF6	GC0	GC1	GC2	GD0	GD1	GD2	GD3	GD4
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Source : Primary Survey

Table A - 2.6
Indicator Based Documentation of Existing Scenario
Public Utilities

Road	Drinking Water Facility					Toilets						Seats / Benches		
I D	UW0	UW1	UW2	UW3	UW4	UT0	UT1	UT2	UT3	UT4	UT5	UB0	UB 1	UB2
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1a														
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31														
32														
33														

Road ID	Drinking Water Facility					Toilets						Seats / Benches		
	UW0	UW1	UW2	UW3	UW4	UT0	UT1	UT2	UT3	UT4	UT5	UB0	UB1	UB2
34														
35														
36														
37														
38														
39														
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41a														
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Source : Primary Survey

Table A - 2.7
Indicator Based Documentation of Existing Scenario
Environmental Quality Factors

Road ID	Dust Level			Noise Level				Aesthetic Effect				Hygiene Condition			
	ED0	ED1	ED2	EN0	EN1	EN2	EN3	EA0	EA1	EA2	EA3	EH0	EH1	EH2	EH3
1															
1a															
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33															

Road ID	Dust Level			Noise Level				Aesthetic Effect				Hygiene Condition			
	ED0	ED1	ED2	EN0	EN1	EN2	EN3	EA0	EA1	EA2	EA3	EH0	EH1	EH2	EH3
34															
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41a															
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Table A - 2.8
Indicator Based Documentation of Existing Scenario
General Factors

Road ID	Signage				Water Edge Potential				Snacks Bar at Nodal Points			Heritage / Architectural Value			Religious Importance					Streetscape Quality		
	GS0	GS1	GS2	GS3	GW0	GW1	GW2	GW3	GB0	GB1	GB2	GH0	GH1	GH2	GR0	GR1	GR2	GR3	GR4	GQ0	GQ1	GQ2
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33																						

Road ID	Signage				Water Edge Potential				Snacks Bar at Nodal Points			Heritage / Architectural Value			Religious Importance					Streetscape Quality		
	GS0	GS1	GS2	GS3	GW0	GW1	GW2	GW3	GB0	GB1	GB2	GH0	GH1	GH2	GR0	GR1	GR2	GR3	GR4	GQ0	GQ1	GQ2
34																						
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Annexure - 3

Comprehensive Infrastructure Survey Record - Vrindavan Eco-Zone

Road ID	From	To	Width	Length	Existing Finish	Drain			Water Point	Sewer Line	Street light		Noise Level	Landuse		Solid Waste Dump on the road	Suggestion
			Meter	Meter		Left	Right	Width Meter	Y/N	Y/N	Y/N	Illumination Level (Lux)	dBA	Left	Right	Y/N	
1	Nagarpalika	Ranganathji Temple	20 5+12+3	292	C	N	N		Y	N	Y	4	73-78	Parking	Institutional/park/commercial/Religious	N	
1a	Road 1	Govindji temple	5	15	C	N	N		N	N	Y			Shops	Shops	N	
2	Ranganathji	Gopinath Bazar Road	9 1+7+1	74	C	Y	N	0.45	Y	N	Y	3	73-79	Commercial	Commercial	N	
3	Gopinath Bazar Road	Gopeshwar	6.5 0.5+5+1	294	C	Y	Y	0.45 to .60	Y	Y	Y	30-35	65-72	Commercial / Residential	Commercial / Residential	N	
4		Kesi Ghat	3 to 4	199	C	Y	Y	0.25	Y	Y	Y	40		Residential	Residential	N	
5	?	B Kund Road	3+1.5+1	156	C	N	N	-	N	N	N			R / G	R / G	N	
6	Ranganathji	Gopinath Bagh	2+1.5+1.5	93	C	Y	Y		N	N	Y	Insufficient		R	R	N	1 public toilet
7	Brahma Kund	Gopinath Bagh	3+3+3	218		Y	Y		N	N		1-2	65-70	R	R	N	
8	Lala Babu	Goda Vihar	2+1+1	232		N	Y		N	N	N			R	R	N	
9	Lala Babu	Gyan Gudri	3+3+1	111		Y	Y		N	N	Y	Insufficient		R	R	N	

Road ID	From	To	Width	Length	Existing Finish	Drain			Water Point	Sewer Line	Street light		Noise Level	Landuse		Solid Waste Dump on the road	Suggestion
						Left	Right	Width Meter			Y/N	Y/N	dBA	Left	Right		
9a	Gyan Gudri west		3+3+1.5	93		Y	N		Y	N				R	R	N	
9b	Gyan Gudri north	i	2	39	B Only	Y	N		N	N	N			R	R	N	
10	Tulasi Kutir		2+1+1	60		N	N		N	N	N			O	A / R	N	
11	Tulasi Kutir	Ram Bagh	2+1+1	41		Y	Y		N	N	N			R	R	N	
11a	Ram Bagh	Tatiya Sthan Road		152		Y	N		N	N	N			R	R	N	
12	Gyan Gudri	Tulasi Kutir	3+1+1	141		Y	N		N	N	Y	Insufficient		O	A / R	N	
13	Rani Tekari Road		5	136	A	N	N		N	N	N			G	O	N	
14	Sudama Kua		3+1.5+1.5	109		Y	N		Y	N	N			G	G	N	
15	Sudama Kua	Mahadev Temple	2+1+1	84		Y	Y		N	N	N			R	R	N	
15a	Ferry Ghat		3+1+1	115		Y	N		N	N	N			R	R	N	
16			2	82	C only	Y	Y		N	N	N			R	R	N	
17	Mahadev Temple	Goda Vihar	2	53	C only	Y	Y		N	N	N			High walls on both sides	N	Vrinda-Kunj walls on one side with overflowing bougainvillea bushes	
18	Goda Vihar north		2	73	C only	Y	Y		N	N	N			R	N		

Road ID	From	To	Width	Length	Existing Finish	Drain			Water Point	Sewer Line	Street light		Noise Level	Landuse		Solid Waste Dump on the road	Suggestion
						Left	Right	Width Meter			Y/N	Y/N	dBA	Left	Right		
19	Bansi Vat	Ferry Ghat	3+1+1	78		Y	Y		N	N	N			Ashram (A)	Ashram	N	Cable TV lines
20	Mahadev Temple	Mahadev Temple	3+6+.6	51		Y	N		N	Y	N			R	R	N	Sewer lines not functioning / overflowing
21	Mahadev Temple	Mahadev Temple	3+6+.6	48		Y	N		N	Y	N			R	R	N	Telephone lines / cable TV lines
22	Mahadev Temple	Goda Vihar	5	55	C Only	Y	Y				Y	Insufficient		R	R	N	
23	Hanuman Temple	Goda Vihar	1+1.5+1	96	A	Y	N		Y		Y	Insufficient		R / G	R / G	N	
24	Mahadev Temple	Gopeshwar Road	1+2.5+1	98	C	Y	Y		N	N	Y	Insufficient		R	R	N	Jumble of electric wires
25	Pantoon Bridhe	ID 26	1+1.5+1		C												
26	Vansi Vat	Gopeswar	1+3+1		C												
27	ID 26	Bramha Kund	1+1.5+1		C												
28	ID 27	Gopinath Bazar	1+1.5+1		C				Y								

Road ID	From	To	Width	Length	Existing Finish	Drain			Water Point	Sewer Line	Street light		Noise Level	Landuse		Solid Waste Dump on the road	Suggestion
						Left	Right	Width Meter			Y/N	Y/N		Left	Right		
29	Nagarpalika	Y- junction	5+5+5	230	A	Y	-	1.0	Y	Y	Y	Insufficient		Public Buildings (PB)		N	
29a	Y- junction	R B Bagichi	3+1.5+1.5	53	A	-	-		N	Y	N		62-65	Garden (G)	PB	N	
30	Gandhi Park east		3+1.5+1	120	A	Y	-	1.0	N	N	N			R	R	N	
31	Laxman sahid north		3+1.5+1	288	A	Y	-		Y	Y	Y	Insufficient		R / G	?	N	
32	Ranganathji Mandir wall		5+5+5	354	C	Y	-		N	Y	Y	Insufficient		?	?	N	
33	Tatiya Sthan X-ing	Ranganathji Mandir wall	3+1.2+1	410	C	Y	-	0.60	N	Y	Y	Insufficient	57-62	R	R / G	No waste dump. Sewer line reported to be not functioning.	
34	Parikrama X-ing	Tatiya Sthan X-ing	5+1.5+1	741	A	-	Y		Y	N	Y	Insufficient		R	O	Right side (river side) used for waste dump / unauthorised construction. Sewer disposing.	
35	Lalababu temple	Kanch ki mandir	3		B	N	Y	0.45	N	N	N	-	-	Rangaji temple on south	Lalababu temple on north	Y (on street)	Unused
36	Radha Gokul Mandir	Kesi Ghat	3 to 4	324	C	Y	Y	0.45	Y	Y	N			Residential	Residential	N	
37	Radha Gokul Mandir	Gopeshwar	4 to 5	291	C	Y	Y	0.45	Y	Y	Y			Religious	Residential	N	

Road ID	From	To	Width	Length	Existing Finish	Drain			Water Point	Sewer Line	Street light		Noise Level	Landuse		Solid Waste Dump on the road	Suggestion
						Left	Right	Width Meter			Y/N	Y/N		Left	Right		
			Meter	Meter					Y/N	Y/N	Y/N	Y/N	dBA			Y/N	
38	Gopinath Bazar Road	Nidhi Van north	3		C	N	Y	0.45	N	N	Y	2-3	50	Residential	Religious	N	
39	Patthar Pura	Gopinath Ghera	2.5	99	C	Y	Y	0.25	N	N	N			Residential	Residential	N	
40	Gopinath Bazar Road	Patthar Pura	3	133	C	Y	Y	0.25	N	Y	Y	2-3	65-70	Residential	Residential	N	
41	Gopinath Bazar Road	Patthar Pura	5	138	C	Y	Y	0.30	Y	Y	Y			Commercial	Residential	N	
41a	Loi Bazar	Patthar Pura	3 to 4	131	C	Y	Y	0.45	Y	Y	Y			Residential	Residential	N	Public Toilet
42	Nidhi Van (North edge)		3		B	N	N	-	N	N	N	-	50	Nidhi Van	Residential	N	
43	Nidhi Van Boundary	Bhramar Ghat (South part)	2.5 to 3	100	C	Y	N	0.25	Y	N	Y	100-120	50-95	Residential	Religious	N	
44	Nidhi Van Boundary	Bhramar Ghat (North part)	2.5	97	C	Y	N	0.25	Y	N	Y	100-120	50-95	Residential	Religious	N	
45	Chir Ghat	Kesi Ghat	5.5	499	C				Y	Y				Religious	N		
46	Shahji Temple/ Nidhi Van	Govind Ghat	3 to 4	201	C	Y	Y	0.25	Y	Y	N			Religious	Residential	N	
47		Nidhi Van	2	12	C	N	N	-	N	N	N	-	65	High wall	High Wall	N	
48	Shahji Temple	Nidhi Van	3	244	C	Y	Y	0.45	Y	Y	Y	100-112	65-70	Religious	Religious	N	
49	Shahji Temple	Saiyed Bazar	5	88	C	Y	Y	0.45	N	Y	Y	1-2	65-70	Commercial	Commercial	N	

Road ID	From	To	Width	Length	Existing Finish	Drain			Water Point	Sewer Line	Street light		Noise Level	Landuse		Solid Waste Dump on the road	Suggestion
						Left	Right	Width Meter			Y/N	Y/N		Left	Right		
49a	Loi Bazar	Retiya Bazar	3 to 5	556	C	Y	Y	0.45 to .60	Y	Y	Y			Commercial	Commercial	N	
50	Govind Ghat	Tiraha Cross Road	4 to 7	105	C	Y	N	0.25	Y	Y	Y			Religious	Residential	Y	
51	Tri-Cross Road	Shahji Temple	2.5 to 3	167	C	Y	N	0.25	N	Y	Y	3-4	55-60	Residential	Residential	N	
52	Nagarpalika Square	Govind Dev Temple	5 to 6	158	C	Y	N	0.25	N	Y	Y	1-4	70-79	Residential	Commercial	N	
53	Govind Dev Temple	Gopinath Bazar Road	6	308	C	Y	N	0.25	N	Y	N			Commercial	Commercial	N	
54	Bankhandi	Pratap Bazar	9	634	C				Y	Y				Commercial		N	
55	Athkhamba	Bankhandi	9	386	C				Y	Y		3-4	70-75	Commercial		N	
56	Koria Ghat	Chir Ghat	5.5	425	C				Y	Y				Religious		N	
57	Koria Ghat	Athkhamba	4 to 5.5	186	C				Y	Y				Residential		N	
58	Banke Bihari	Ahirpara	9	423	C	Y	Y		Y	Y	Y	5-6	65-70	Commercial		N	
59	Banke Bihari	Banke Bihari	2.5 to 3	178	C	Y	Y		Y	Y	Y	5-8	65-70	Religious		N	
60	Suraj Ghat	Bihari Pura	4 to 5.5	165	C				Y	Y				Residential		N	
61	Suraj Ghat	Kalia Ghat	5.5	861	C				Y	Y				Religious			
62	Kalia Ghat	Kalia Mardana		326	C				Y	Y				Commercial		N	
63	Dushyant Mohalla	Madan Mohan	5 to 6	279	C				Y	Y				Religious		N	
64	Back Side Banke Bihari	Back Side Banke Bihari	1.2 to 2.5	101	C	Y	Y		Y	Y	Y	3-4	65-70	Residential		N	

Road ID	From	To	Width	Length	Existing Finish	Drain			Water Point	Sewer Line	Street light		Noise Level	Landuse		Solid Waste Dump on the road	Suggestion
						Left	Right	Width Meter			Y/N	Illumination Level (Lux)		Left	Right		
65	Dushyant Mohalla	Dushyant Mohalla	2.5 to 3	59	C	Y	Y		Y	Y	Y			Residential		N	
66	Dushyant Mohalla	Dushyant Mohalla	3 to 4	78	C	Y	Y		Y	Y	Y			Residential		N	
67	Dushyant Mohalla	Dushyant Mohalla	5 to 5.5	221	C	Y	Y		Y	Y	Y			Residential		N	
68	Brajwasi Sweets	Snehbihari	6 to 9	204	C only	Y	Y		Y	Y	Y	6-10	65-70	Residential		N	
69	Sindhi Colony	Sindhi Colony	5.5 to 9	137	C				Y	Y				Residential		N	
70	Sindhi Colony chowk	Kishorepura	5 to 6	485	C				Y	Y				Residential		N	
71	Kishorepura	Railway Station	5 to 8	343	C				Y	Y				Residential		N	
72	Front Rd Rly Stn	Front Rd Rly Stn	9	370	C				Y	Y		3	65-70	Commercial		N	
73	Railway Station	Nagarpalika Chowk	9	700	C				Y	Y				Commercial		N	

Source : Primary Survey

Annexure - 4

Tourist Survey Questionnaire For Vrindavan Eco-Zone

SURVEY for Vrindavan Ecozone
October 2004

*Department of Architecture & Regional Planning
I. I. T. Kharagpur, India*

Tourist Survey For Vrindavan Eco-Zone

1. Respondent's name :
2. Age:
3. Sex : M / F
4. Place of residence : Domestic / Overseas
5. Religion : Hindu / Christian / Other
6. Name of Place :
7. Caste : Vaishnav / Shakta / Shaiba / other
8. Family size : single / 2 / 3/ 4 / more
9. Occupation : Religious / Service (Government) / Service (Private) / Business
10. Purpose of Visit : Holiday / General Exposure / Religious / Nature loving / Educational / Historical / archaeological / Architectural
11. Where do you stay here : Hotel / Dharmshala / Friend & relative / other
a) What is the hotel tariff ?
12. Duration of stay in this town :
13. How often do you visit this place ?
14. During which season you visit this place ?
15. Which is the last tourist destination ?
16. Which tourist circuit have you followed ?
17. Total Distance traveled to come here : km
18. Time taken for travel from place of stay :
19. Mode of transport to reach here : Air / Rail / Bus / Taxi / car / Tanga / other
20. If resident of this place, then, how frequently do you come to this ecozone ? Daily / Weekly / Monthly / Annually
21. How do you spend the time here ?
22. What do you like about this place?
23. Which activity do you like most here?

- Why?
24. How long do you plan to spend here?
Why?
25. Which other activities do you think could be added here ?
26. What problems did you face at this place ?
27. Is the place expensive ? Yes / No
28. On what item ? Accommodation / Food / Transport / other
29. What are your expectations from this place?
30. Things you like in this place : Temples / Parks / Ghats / Market / None
31. Things you do not like in this place : Temples / Parks / Ghats / Market / None
32. Do you think the place is losing its ambience because of overcrowding? Yes / No
33. Which other tourist places have you visited in this region?
34. Do you think certain guidelines would help in improving this place? Yes / No
Specify
35. What are your suggestions for improvement?
- Roads to be improved Yes / No
 - Drainage to be improved Yes / No
 - Street lighting improvement Yes / No
 - Improvement in piped water supply Yes / No
 - Improvement in Sanitation Yes / No
 - Facilities for outdoor recreation (park, garden etc.) Yes / No
 - Introduction of new service facilities (telephone booths, restaurants) Yes / No
 - Signage Yes / No
 - Safety & Security Yes / No
 - First aid facilities Yes / No
 - Parking Yes / No
 - Toilets (Pay / Free) Yes / No
 - Conveyance improvement (Bus, Auto, Rickshaw stand etc;) Yes / No
 - Information Booth Yes / No
36. Would you like to recommend this place to others for a holiday ?
- a) Which places ?
- b) Why ?
37. How would you rank the following for this tourist site? (1 – Best, 5 – worst)
- a) Accessibility 1 2 3 4 5
- b) Ambience of the place 1 2 3 4 5
- c) Infrastructure (utilities and services) 1 2 3 4 5
- d) Liking for the place 1 2 3 4 5
- e) Facilities for tourist help (enquiry, rest, travel agencies.) 1 2 3 4 5
- f) Food joints 1 2 3 4 5

- | | | | | | | |
|----|-------------------------|---|---|---|---|---|
| g) | Parking space | 1 | 2 | 3 | 4 | 5 |
| h) | Petrol filling stations | 1 | 2 | 3 | 4 | 5 |
| i) | Public toilets | 1 | 2 | 3 | 4 | 5 |
| j) | Pollution level | 1 | 2 | 3 | 4 | 5 |
| k) | Maintenance | 1 | 2 | 3 | 4 | 5 |
38. How would you compare this place with similar other tourist attraction ?
In U. P. : In other states :
39. Would you pay a nominal tourist tax for conservation of environmental quality of this area? Yes/
40. What is your approximate Family income :
41. How much is your approximate Expenditure
- | | | |
|----|------------------|---|
| a) | on transport | : |
| b) | on recreation | : |
| c) | on accommodation | : |
| d) | on food | : |
| e) | on Puja | : |

Thank you for cooperation.

Annexure - 5

Summary of Feedback from Various Groups in Ecocity-Workshop at Vrindavan

The feed back provided by various groups and individuals have been presented below in the form as they expressed.

During the feedback session participants have been asked to rank the proposed project (refer in Tables 1 and 2 below) and were requested express their own opinion regarding 'What Should Happen In Vrindavan Ecocity' and 'What Should Not Happen In Vrindavan Ecocity'.

What Should Happen in Vrindavan Ecocity

A.

- Entire proposal, prepared for the ecocity project is appropriate and comprehensive. We have full agreement with the proposals.
- Nothing has been left un-proposed by the planning team.
- There is agreement with the selection of the Ecozone 1.
- Thanks for the labour which the planning has put for the improvement of Vrindavan.
- Whatever has been suggested in the proposal nothing such have been done so far.
- For the last 20 yr –many planning have been done, Nothing has been implemented

B.

- The entrance to the ecocity should be located at Atallachungi on Mathura-Vrindavan road and Chattakari on Delhi-Mathura highway.
- First of all entry to the town should be made at Atallachungi.
- Beautification of Vrindavan should start from Atallachungi instead of from Nagarpalika, since the said location is

considered as the entry point on the Mathura road to the religious town Vrindavan.

- Beautify road from Chattakari Delhi-Mathura highway itself, from where the people enter the holy town.
- There should be a travel guidance office at entrance gate of ecocity approach road.
- A website to be developed in collaboration with CPCB and Municipal Corporation which would describe the entire development of Vrindavan.
- Road surface should be of stone in some areas which would be used as pedestrian paths.
- The ecocity approach for Vrindavan should be aesthetic and ancient architectural.
- Some drinking water points should be on entrance.
- Time to time Municipal Corporation along with NGOs should conduct public awareness programmes.
- The ecocity approach for Vrindavan should be aesthetic & ancient architectural
- Tourist information centre (guidance office) at entry of Vrindavan
- The entrance gate should be of architectural quality.
- Most urgently required need is to make sideline pathway on the Parikrama Marg. It is harmful, from medical point of view, to perform daily parikrama of 10 km, barefoot, on concrete road. It causes cervical problems walking on concrete road. It is painful also. Moreover it will also enhance the aesthetics of Parikrama Marg.
- Consider Multiple utility aspects (lamp post, bird feeder, dustbins at 50 to 80 metre)

- Ensure Sustainability of projects.
- Generate employment
- Provide adequate Amenities - Drinking Water / toilets / rest places
- Make strategies from tourist point of view
- TAXES at the entry to be imposed for REVENUE
- Entry taxation system for floating population (like toll on roads)
- Ensure sustainability
- It has to be funded (even if minimal) by the local people.
- Accountability of C.B.Ds / public heads (ward members)
- Stricter enforcement of environmental laws.
- Impose Sewer penalty for the offenders
- Ecocities can not remove poor / slums, but direct / indirect employment can enhance living condition improving condition in those areas. They may no longer remain 'slums'.
- Give basic amenities / security (food, water, lighting, resting places) first then talk of overall aesthetics / sound shows etc.
- Form a board of directors comprising important people of Vrindavan along with Nagarpalika members to oversee each & EVERY STEP in ecocity.
- Pilgrims and local people of Vrindavan should be taken into confidence.
- Vrindavan Vikas Sangrakshan Samiti - used to exist, may be revived.
- To clean Vrindavan, there have been great arrangement - 2 yr back
- All the proposed impacts should finally be visible in all the 7 zones as indicated.
- It should state all the actions and their corresponding costs in each zone.
- Such projects should be taken up first which can create an impact on the mind of the visiting pilgrims and tourists, and can create an impression of the religious and environmental excellence.
- River is the essence.
- Get the GHATS back.
- Bring back the ambience - What was 100 yr back, only 1/4th of the old self of Vrindavan is existing
- Those who are ready devote time to involve them
- Sustain the efforts for the world-famous significance of Vrindavan
- Travel /guide office should be provided near entry gate
- Website for municipal corporation with CPCB
- Control encroachment
- Ecocity programme should be introduced with the help of NGO & Nagarpalika for the people of Vrindavan to awareness of ecocity planning

What Should Not Happen in Vrindavan Ecocity

- Existing greeneries should not be destroyed.
- Don't tamper with environment.
- Attention should be given to all cultural, historic, traditional and other conservation aspects, and are protected from any kind of damage or destruction.
- Special attention to be given so that Heritage should not be lost.
- It should be kept in mind that the historic importance of Vrindavan should not be spoiled
- Whatever greenness is available till now should be spoiled.
- The Vrindavan has been divided into 7 segments, but some area is still not covered.
- Suggest whatever new proposal in every zones, and estimate the cost of that
- Don't suggest 5-star hotels in the ecocity
- Don't import new culture contrary to tradition of Vrindavan.
- Cultural historical importance of Vrindavan should not be destroyed.

Table A – 5.1
Rank Order of Town Level Projects based on Feedback from Respondents

	Town Level Actions	Group 1	Group 2	Group 3	Group 4	Indiv. 1	Indiv. 2	Indiv. 3	Indiv. 4	Rank (Cumulative Value)
	No. of Members in the group Total Response = 24	4	5	4	7	1	1	1	1	
1	Transportation Planning	7 (28)	1 (5)	3 (12)	5 (35)	5 (5)	6 (6)	2 (2)	1 (1)	1 (94)
3	Road surfacing planning	1 (4)	4 (20)	8 (32)	3 (21)	1 (1)	3 (3)	7 (7)	8 (8)	2 (96)
6	Solid waste management planning	3 (12)	8 (40)	5 (20)	1 (7)	10 (10)	10 (10)	8 (8)	2 (2)	3 (109)
5	Utility planning (public toilet & drinking water)	9 (36)	6 (30)	1 (4)	4 (28)	8 (8)	1 (1)	1 (1)	4 (4)	4 (112)
2	Parking planning	8 (32)	3 (15)	2 (8)	6 (42)	4 (4)	7 (7)	3 (3)	3 (3)	5 (114)
4	Drainage planning	2 (8)	11 (55)	7 (28)	2 (14)	2 (2)	2 (2)	4 (4)	11 (11)	6 (124)
9	Street lighting planning	5 (20)	5 (25)	4 (16)	8 (56)	3 (3)	8 (8)	6 (6)	6 (6)	7 (140)
7	Landscape planning	4 (16)	9 (45)	10 (40)	7 (49)	7 (7)	5 (5)	9 (9)	10 (10)	8 (181)
8	Signage planning	10 (40)	2 (10)	6 (24)	11 (77)	6 (6)	11 (11)	10 (10)	7 (7)	9 (185)
10	Aesthetic environmental control	6 (24)	10 (50)	9 (36)	10 (70)	11 (11)	4 (4)	5 (5)	5 (5)	10 (205)
11	Noise environmental control	11 (44)	7 (35)	11 (44)	9 (63)	9 (9)	9 (9)	11 (11)	9 (9)	11 (224)

Source : Primary Survey conducted by IIT Kharagpur

Table A – 5.2
Rank Order of Detail Projects based on Feedback from Respondents

	Ecozone Level Actions	Group 1	Group 2	Group 3	Group 4	Indiv. 1	Indiv. 2	Indiv. 3	Rank (Cumulative Value)
	No. of Members in the group Total Response = 23	4	5	4	7	1	1	1	
0	Entrance Gate at Atalla Chungi on Vrindavan-Mathura Road, and Chattakari on Delhi-Mathura road	1	1	1	1	1	1	1	1
		(4)	(5)	(4)	(7)	(1)	(1)	(1)	(23)
1	Improvement of road between Nagarpalika & Ranganathji temple	1	1	3	3	1	8	1	2
		(4)	(5)	(12)	(21)	(1)	(8)	(1)	(52)
9	River front development from Kaliyadaha to Kesi Ghat	4	11	2	1	11	1	11	3
		(16)	(55)	(8)	(7)	(11)	(1)	(11)	(109)
5	Restoration of Brahma Kund	3	5	12	2	5	2	5	4
		(12)	(25)	(48)	(14)	(5)	(2)	(5)	(111)
3	Parking plan in front of Laxman Sahid Bhawan	7	3	5	8	3	10	3	5
		(28)	(15)	(20)	(56)	(3)	(10)	(3)	(135)
8	Improve condition of Parikrama Marg	11	8	1	4	8	3	8	5
		(44)	(40)	(4)	(28)	(8)	(3)	(8)	(135)
2	Improvement of rotary in front of Nagarpalika	2	2	11	10	2	9	2	6
		(8)	(10)	(44)	(70)	(2)	(9)	(2)	(145)
4	Parking plan in front of cholera hospital	9	4	7	7	4	5	4	7
		(36)	(20)	(28)	(49)	(4)	(5)	(4)	(146)
12	Improve entry nodes to Shahji Temple	6	9	8	5	9	4	9	8
		(24)	(45)	(32)	(35)	(9)	(4)	(9)	(158)
11	Improvement of Banke Bihari temple area	12	10	4	6	10	12	10	9
		(48)	(50)	(16)	(42)	(10)	(12)	(10)	(188)
6	Restoration /development of Gandhi Park	10	6	6	11	6	7	6	10
		(40)	(30)	(24)	(77)	(6)	(7)	(6)	(190)
7	Adaptive reuse of Laxman Sahid Bhawan	8	7	10	12	7	11	7	11
		(32)	(35)	(40)	(84)	(7)	(11)	(7)	(216)
10	Light & sound show in Kesi Ghat	4	12	13	13	12	6	12	12
		(16)	(60)	(52)	(91)	(12)	(6)	(12)	(249)
13	Improve Gyan Gudri Park	13	13	9	9	13	13	13	13
		(52)	(65)	(36)	(63)	(13)	(13)	(13)	(255)

Source : Primary Survey conducted by IIT Kharagpur

Annexure - 6

Traffic Survey Format

Junction Diagram :

Location : _____ Name of Road : _____ Enumerator's Name : _____
 Day : _____ Sound Level : _____

Time Period	Pedestrian	Cycle	Cycle Rickshaw	Two Wheeler	Auto	Tanga	Car / Taxi	Bus / Truck	Others
From									
To									
Sub total									
From									
To									
Sub total									
From									
To									
Sub total									
From									
To									
Sub total									
Total									
Total PCU									

Annexure - 7

**Laboratory Results of the Water Quality Tests for the Samples
Collected from the selected sources at Vrindavan**

Constituents	WHO recommend d Allowable limit	S 1 Hand pump, near Kesi Ghat, ground water, Bank of Yamuna	S 2 Yamuna water near Kesi Ghat, (nearFerry)	S 3 River Yamuna near Kesi Ghat	S 4 Pyao water, from Banke Bihari Temple	S 5 Hand pump, ground water, near Chir Ghat	S 6 Ranganathji temple, public pyao, municipal water supply	S 7 Shahji Temple, Pyao, well water, ground water	S 8 Hand pump, near Bramha Kund, ground water
Cations									
Sodium (ppm)	200.00	522.07	997.710	115.14	27.910	147.570	787.270	1819.120	2427.460
Ammonium (ppm)	0.05	-	134.000	166.20	0.040	-	-	-	-
Potassium (ppm)	40.00	230.07	99.000	158.63	0.250	-	49.580	245.600	66.900
Magnesium (ppm)	No limit	177.28	151.200	12.69	321.670	171.000	233.700	593.330	766.130
Calcium (ppm)	200.00	157.56	356.040	401.43	333.980	159.110	45.750	578.000	1346.090
Anions									
Fluoride (ppm)	1.50	0.50	0.720	0.76	0.990	0.650	0.800	4.410	1.080
Chloride (ppm)	250.00	116.15	319.030	370.64	387.090	135.590	187.140	705.610	758.590
Nitrite (ppm)	10.00	3.41	1.970	10.96	11.530	4.120	5.810	1.800	-
Bromide (ppm)	No limit	0.08	0.350	0.35	0.130	0.090	0.050	108.000	1.850
Nitrate (ppm)	40.00	1.46	2.800	1.62	57.110	1.510	19.070	263.870	437.140
Phosphate (ppm)	0.03	0.01	9.930	11.77	0.540	0.540	0.110	-	0.434
Sulphate (ppm)	250.00	19.60	84.690	116.31	220.960	33.030	81.730	456.340	825.990
pH	6.5-8.50	6.73	7.320	6.85	6.950	7.090	7.170	7.340	7.470
Fe (ppm)	0.50	0.62	0.248	0.32	0.377	0.278	0.497	0.292	0.307
Colour	-	Colour less	Yellowish	Yellowish	Colourless	Colourless	Colourless	Colourless	Colourless
Odour	-	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless
Taste	-	-	-	-	-	-	-	-	-
Total dissolved solid (gram /litre)	0.5	0.60	1.1	1.3	1.2	0.49	0.8	2.0	3.2
Dissolved oxygen (mg / litre)	5	5	8.2	7.7	8.1	5.4	7.4	6.8	6.7
Bacteria Count	< 2000 colony / 100 ml	Low count 4 x 10 ² CFU/ml	Low count 7.33 x 10 ² CFU/ml	Low count 0.66 x 10 ² CFU/ml	absent	absent	absent	absent	High count 19532 x 10 ² CFU/ml

Note : The water samples have been collected from different sources, such as hand pumps, municipal water sources, river water and tested through sophisticated computerised Ion-chromatography system in the laboratory at IIT Kharagpur. It would be desirable to conduct detail water quality tests for all the water sources distributed in different ecozones.

Source : Primary Survey conducted by IIT Kharagpur

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Annexure - 12

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