सत्यमेव जयते

Government of Rajasthan

DETAILED PROJECT REPORT

CONSTRUCTION OF BYPASS ROAD FROM NH-8 TO KOTHARIYA LINK ROAD

AUGUST, 2022

MUNICIPAL BOARD, NATHDWARA

EXECUTIVE SUMMARY

GENERAL

The project "Construction of Bye-pass Road from National Highway 8 (new 58) to Kothariya Link Road" is proposed for critical needs to have a better connectivity to nearby surrounding villages such as Kothariya, Ulpura Nadwala, Kochli etc. National Highway 8 (new 58) is a 4-lane highway and connects major cities such as Gurgaon, Jaipur, Ajmer, Nathdwara, Udaipur, Ahmedabad, Vadodara, Surat, Nadiad, Anand and Kehda. It is also one of the busiest highways in the subcontinent. Due to rise in traffic within the city of Nathdwara, there have been need of a by-pass which connects via NH8 to Kothariya Link Road to reduce the traffic within the city. Figure 1 shows the location of the proposed bye-pass road from National Highway 8 to Kothariya Link Road.

Figure 1 Location of Project Bypass Road

NECESSITY OF BYE-PASS

There is a critical need for the bypass from NH8 to Kothariya Link Road to have a better connectivity to nearby villages and to reduce the traffic congestion within the city of Nathdwara. To resolve the aforementioned issues, Municipal Board, Nathdwara has a strong view that a new alignment is required and needs to be proposed considering the natural features with a four-lane bypass and in an economically and environmentally viable manner.

OBJECTIVES

While carrying out any project it is very important to frame our objective which helps to achieve the vision and aim of the project. For construction of bypass road, following objectives are kept in mind: -

i. To reduce road accidents and injuries;
ii. To reduce travel times;
iii. To provide equity and balance for all modes;
iv. To develop a route that involves the community and considers their interests;
v. To provide a route that supports economic development;
vi. To provide the best value for money and create cost effective improvements;
vii. To minimize direct and indirect impacts on quality of life and the Environment.

GEOLOGY

A site visit has been conducted between 12th June 2021 to 20th June 2021 for appreciation of the proposed alignment, different project components, topographic survey, traffic survey and general understanding of surrounding geology.

The project area is mainly comprised of dolomite and gritty quartzite of Debari group, basal quartzite, ultrabasics with carbonates of Delwara group and Aravalli super group.

TRAFFIC DEMAND

Traffic volume survey was also conducted to calculate the future demand and have been worked out by different vehicle types presented in later chapters. This data will provide us ADT value, PCU Value and percentage of each categorisation of vehicles occupying in the existing road.

CHAPTER 1 PROJECT DESCRIPTION

1.1. GENERAL

Nathdwara City is location in southern part of Rajasthan in the Aravalli Hills, on the banks of the Banas River in Rajsamand District and 48 Kilometres north-eat of the city of Udaipur. National Highway 8 (new 58) passes through the city. The project construction of bypass road will pass through National Highway 8 to Kothariya Link Road.

The Municipal Board, Nathdwara intends to apply a portion of the financial assistance for providing consultancy services for construction of Bypass Road from National Highway 8 to Kothariya Link Road. In pursuant of the above, R-Tech Infra Associates, Jaipur has been appointed as consultants to provide Consultancy Services for the project.

1.2. SCOPE OF SERVICES

In developing the Work Plan for completing the assignment, the activities have been categorized under stages as follows:

- Project Preliminary and Survey Report
- Detailed Project Report (Draft) with Design Consideration and Estimation
- Detailed Project Report (Final) with Design Consideration and Estimation

These stages will generally follow a sequence, though each stage is inter-related and inter-dependent on each other. The related deliverables for each stage will be submitted to the Commissioner, Municipal Board, Nathdwara.

SEQUENCE FOLLOWED FOR PAYMENT APPROVAL:

- Submission of Survey Report
- Submission of Draft DPR
- Approval of DPR from any IIT/NIT
- Last payment at work order of road

1.3. PROPOSED ALIGNMENT SITE DESCRIPTION

The terrain of the proposed road alignment can be termed as hilly. The abutting land use pattern varies from agricultural to forest area. Barren land can also be observed along the road alignment. The bypass alignment has been fixed and required land for the bypass will be acquired by competent authorities. The alignment starts at near Bus Stand, Nathdwara

and passes through forest land and few agricultural lands to Kothariya Link Road near Shreejee Public School. This bypass will be well connected with four lanes to National Highway 8 and Kothariya Link Road.

CHAPTER 2 SOCIO-ECONOMIC PROFILE

2.1. INTRODUCTION

The socio-economic profile helps in making project implementation decisions. A survey of historical, economic and demographic activity can help to explain current social status distribution among the society, the living standards, the quality of life, general awareness, maturity levels, in turn the reflection on the growth of traffic. Etc.

This chapter endeavours to provide socio-economic profile at city level and project influence area. Socio-economic and demographic data of the project area – population & density, employment, poverty levels, industry, agriculture, literacy, health, transport, tourism potential and related aspects. Socio-economic profile has been prepared to provide a quantitative framework against which qualitative socio-economic impacts of any of the development initiative can be assessed and evaluated.

The socio-economic profile is discussed in terms of a few selected indicators, which are broadly categorized in to the following and hence together are termed as Socio Economic Indicators.

2.2. PROJECT INFLUENCE AREA

A project influence area is the zone that fall in the near vicinity of the project corridor, to which the project investments induce a catalytic development resulting in additional generation of traffic other than normal. The proposed road alignment passes through two revenue villages – Nathdwara and Vadlawala.

Index Map given in figure 2 refers to the location of the Project stretch of bypass.

A detailed accosting of the socio-economic profile of the major Project Influence Area i.e. Nathdwara has been prepared which traces the economic performance of the pat and established the like growth prospects of the future. The output of this Chapter is the economic growth prospects of the influence area with respect to certain economic variables and serves as the basis for arriving at a realistic traffic growth rate, for different vehicle categories.

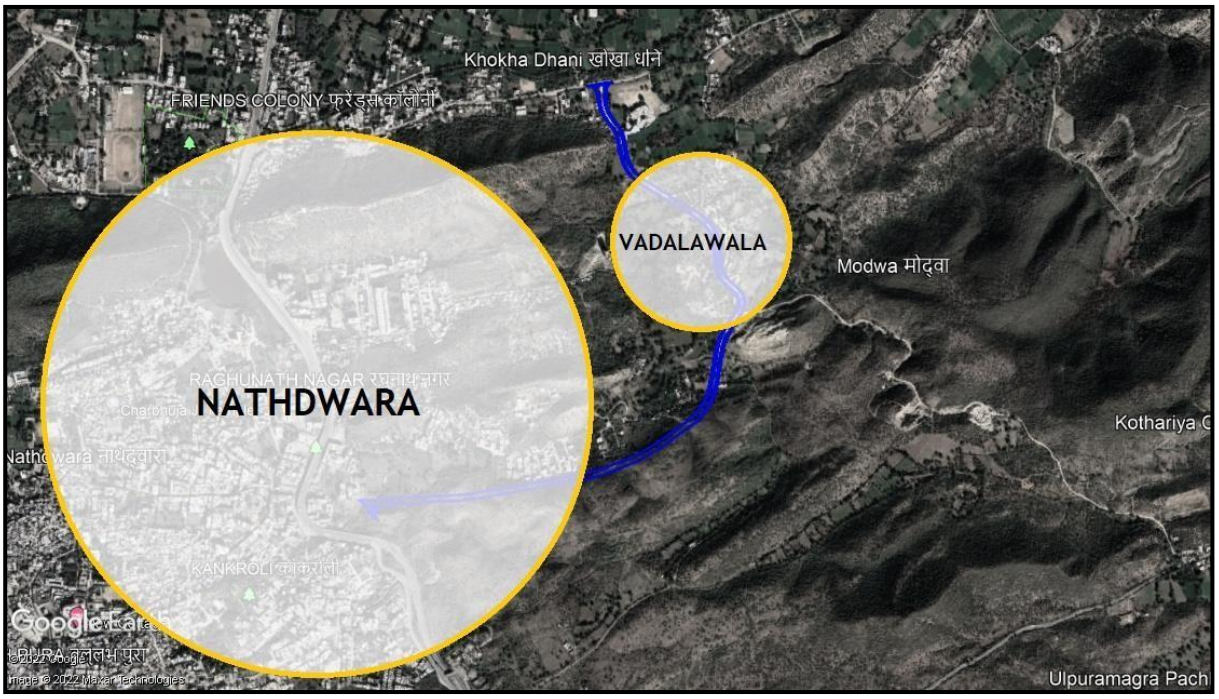


Figure 2 Project Influence area of the bypass road from NH8 to Kothariya Link Road

2.3. PROFILE OF NATHDWARA CITY

Nathdwara is the main pilgrimage place in Rajsamand district of Rajasthan and it is a well-reputed Peeth of Vallabh sect. Nathdwara City is located 48 km north of the zonal headquarter Udaipur, 15 km south of the district headquarter Rajsamand, 376 km from the state capital Jaipur and 597 km from the national capital Delhi at the confluence of NH-8 and state highway 49. Nathdwara had the status of a city since 1901. The population of the city in the year 1901 was 8,591. There was a period of ups and downs in the population of the town. The highest growth rate of 36.02 percent was recorded in the town in the year 1971. By the year 2011, with only 4 times increase, the population was 42,016 persons. The area of the city is 18.16 km and the population density of the city is 2,322 persons per sq. km.

It was the first duty of his descendant Goswami's children to protect the Deity of Shrinathji, the dearest of Brij people of Mahaprabhu Shri Vallabhacharyaji. In this view, the grandson of Shri Vitthalnathji, Shri Damodarji himself, his uncle Govindji, Balkrishnaji and Shri Vallabhji, considered it appropriate to leave the Deity of Shrinathji by the permission of the Lord and leave all the wealth etc. In, 1726 Asvin Shukla 15 Friday night arrived in the last Prahar chariot and left Brij. In the end, after reaching a place called Sinhad in the Mewar state, he sat permanently. Raja Raj Singh of Mewar was the most powerful Hindu king during that period. He neglected Aurangzeb and provided shelter and protection to the

Goswamis of the Pushti sect. In the month of Kartik, Samvat 1728, Shrinathji reached Sinhad, after the temple was built there, his Patotsav was performed on Falgun Krishna Saptami Saturday. Because of Shrinathji, that famous village Singhad of Mewar is still famous not only in India but in the world by the name of Shri Nathdwara. Inspired the special form of service spirit. He provided the service of Kirtan to the devotee of his Ashta Chhapa for Ashtayam Darshan.

During the lifetime of Shri Gunsaiji, the order of Shrinathji's Ashtyam Seva spirit kept on increasing progressively. Accordingly, after living in Ghasiyar for six years, V.S. In 1864, Lord Shrinathji along with many devotees, including his ten forces, returned to Nathdwara again via Khamnore through the road of Haldighati, the battle ground. Since then the service of Chitra ji is still being done in Ghasiyar. There are fun festivals. There is a replica of the Nathdwara temple. At that time this area was under the princely state of Mewar. Maharana Raj Singh (Udaipur), the ruler of Mewar, deployed soldiers along the four walls for the protection of Shrinathji. Due to strict security arrangements, this city continued to develop over a period of time. Nathdwara city is one of the main Vaishnava centers of India, in which the main temple is of Lord Shri Krishna. Which is famous by the name of Shrinathji. Devotees from all over the country and abroad come here for darshan throughout the year.

Figure 3 Shrinathji Temple, Nathdwara

Mewar in India is full of pilgrim sites as well as the tales of historical bravery. Haldighati, the battlefield of Rana Pratap in Rajasthan, bordering the picturesque valleys of the Aravalli, is 16 km away from Nathdwara. In view of the increasing activities of the temple,

after the attainment of independence by the state government, the temple board was established by issuing the Nathdwara Temple Act 1959 for management and operation. Chief Executive Officer was appointed for the administrative system. Under Nathdwara Mandal, 14 Dharamshala's were constructed for the convenience of the travellers. Along with these other facilities were also made available.

2.3.1. Physical features and Climate

Nathdwara is surrounded by Banas river on one side and hills on other side. It is situated on high-low rocky land. The river Banas, a tributary of Chambal originating from the mountain ranges of Kumbhalgarh, revolves around Nathdwara in a crescent shape. Due to the flat land on the banks of the river, agriculture is cultivated here. Rabi, Kharif and Zaid crops are prepared in agriculture, mainly barley, gram, wheat, mustard, jowar, maize, millet, sesame, urad, groundnut, cotton, sugarcane and watermelon and cucumber etc. Apart from these vegetables are also prepared.

The soil here is fertile for the crop due to availability of Black Clay. The town surrounded by rocky soil. 12 KM from Nathdwara, In the far west is the Nand Samand Dam on the Banas River, due to which agricultural production has increased significantly. Due to temperate zone, climate of Nathdwara is healthy. The maximum temperature is 45 °C in summer and the minimum temperature is 1.8 °C in winter. Being a mountainous region, it remains very hot in the summer season and the weather becomes unbearable due to the dry winds blowing in this season. This dry temperature sometimes reaches above 45 °C. The humidity during this period is 20 percent or less. In the last weeks of June, the region receives rainfall due to the south-west monsoon. Due to this, the period of fall in temperature starts. The humidity in the air is 70 percent or more during the monsoon period, during the rest of the period the air is generally dry. In summer the winds blow from south-west to north-east. The average annual rainfall of the town in last five years was 728.8 mm. The rainy season usually lasts from June to September.

Table 1 Average monthly rainfall in Nathdwara (in mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	0.0	0.0	0.0	0.0	6.0	112.0	199.0	297.0	0.0	26.0	0.0	0.0
2017	0.0	0.0	0.0	0.0	22.0	120.0	591.0	158.0	103.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0	0.0	47.0	219.0	138.0	48.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	15.0	5.0	75.0	158.0	326.0	130.0	41.0	0.0	0.0
2020	0.0	0.0	39.0	15.0	15.0	121.0	159.0	328.0	108.0	23.0	0.0	0.0

SOURCE: WATER RESOURCE DEPARTMENT, RAJASTHAN

2.3.2. Regional Setting

Nathdwara town is situated in southern Rajasthan in the middle of the picturesque hills of Aravalli, on the banks of river Banas at 24°56' north latitude and 74°50' east longitude and 585 meters above mean sea level at the confluence of National Highway-8 and State Highway 49.

Nathdwara has good connectivity by road with Udaipur, Mathura, Ahmedabad, Delhi, Ajmer, Jaipur and other cities of the country and the state. It is 15 km from district headquarter. And 376 km from the state capital Jaipur. Far south and 48 km from Udaipur. It is located in the far north. Rail service to Nathdwara is at a distance of 11 km to Mandiana city in far east direction.

2.3.3. Demography

The Nathdwara town has population of 42016, male population is 21695 and female population is 20321 as per the Census 2011 data. Population of Children under the age of 0-6 is 4954, male child population under the age of six is 2628 and female child population under the age of six is 2326. Total literacy rate of Nathdwara city is 86.97%, male literacy rate is 93% and female literacy rate is 80.58%. In Nathdwara Female Sex Ratio is 937 per 1000 male persons. Child sex ratio is 885 per 1000 male child under the age of six. Total number of house hold in Nathdwara is 8422.

The population of Nathdwara was 8591 in the year 1901. Till the year 1941, there was a period of ups and downs in the population of this city. From the year 1951 to the year 2011, there was a continuous increase in the population. In the last six decades, the highest growth rate was found between the decade 1961-1971 at 36.02 percent and the lowest rate of 14.04 percent during the decade 1941-1951, which is less than the growth rate of 17.89 percent at the district level. Since 1961, only about 6000 people per decade are increasing in Nathdwara, but there is a steady decline in the growth rate.

Table 2 Population Growth in Nathdwara 1901-2011

Year	Population	Difference	Growth Rate
1901	8,591	-	-
1911	5,425	-3,166	-36.85%
1921	8,524	3,099	57.12%
1931	8,506	-18	-0.21%
1941	9,704	1,198	14.08%
1951	12,341	2,637	27.17%
1961	13,890	1,549	12.55%
1971	18,893	5,003	36.02%

Year	Population	Difference	Growth Rate
1981	24,856	5,963	31.56%
1991	30,878	6,022	24.23%
2001	37,026	6,148	19.91%
2011	42,016	4,990	13.48%

SOURCE: CENSUS OF INDIA, 1901-2011

2.3.4. Occupational Structure

Total working population of Nathdwara is 15005 which are either main or marginal workers. Total workers in the town/city are 15005 out of which 12116 are male and 2889 are female. Total main workers are 13474 out of which male main workers are 11407 and female main workers are 2067. Total marginal workers of Nathdwara are 1531.

Table 3 Nathdwara Town Working Population

	Total	Male	Female
Total Workers	15,005	12,116	2,889
Main Workers	13,474	11,407	2,067
Main Workers Cultivators	332	161	171
Agriculture Labourer	124	72	52
Household Industries	963	800	163
Other Workers	12,055	10,374	1,681
Marginal Workers	1,531	709	822
Non-Working Persons	27,011	9,579	17,432

SOURCE: CENSUS OF INDIA, 2011

2.3.5. Transportation

Nathdwara is connected to Udaipur in the south and Ajmer city in the north. The vehicular traffic is increasing continuously on Nathdwara-Udaipur and Nathdwara-Rajsamand National Highway No.8. Bus stand is situated near Lalbagh on Rajsamand Marg, which has been developed as a complex under the Integrated Development Plan of Centrally Sponsored Small and Medium Towns. Accommodation for private vehicles is located near Chungi Naka in the old bus stand area. This area is very congested from the point of view of traffic. The number of trucks passing through Nathdwara is very high because being situated on the Nathdwara National Highway No. 8, the traffic going to Delhi, Mumbai passes through here and the trucks are parked on the main road itself. There is no fixed road system in the old population. The roads in the newly developed population area are of relatively good quality as compared to the old population. The width of the roads in the old population is between 10 feet to 15 feet.

2.3.6. Tourism

Nathdwara is situated in the middle of golden quadrangle of Chittor, Ajmer, Mount Abu and the city of lakes Udaipur from the point of view of tourism. Nathdwara has seen many ups and downs in about 350 years.

Haldighati, the battlefield of Rana Pratap, the Dharmasthali of Rajasthan, bordering the picturesque valleys of the Aravalli's, is 16 km from here. Tourists visiting major tourist places like Kirti Stambh of Chittor, Vijay Stambh, Mount Abu, temples of Delwara, lakes and palaces of Udaipur, Dargah of Khwajamuinuddin Chishti in Ajmer etc. go through Nathdwara only.

Due to the abundance of resources in the modern physical age, about 2.50 lakh tourists visit the city every year. Apart from the temple of Shrinathji in Nathdwara, there are other temples which are visible to the devotees, mainly Shri Kalyan Rai Ji, Shri Navneet Priya Ji, Shri Bitthal Nathji, Shri Vanmali Lal Ji, and Shri Kalyan Rai Ji come.

Figure 4 Shrinathji Idol, Nathdwara

CHAPTER 3 SURVEYS

3.1. TOPOGRAPHICAL SURVEY

Topographical survey include survey of topographic features which are true to ground realties have been done using various methods involving precision instruments like total stations and auto levels, and bringing out data in digital form (x,y,z format) for developing digital terrain model (DTM) or plane table survey and using dumpy level for levelling survey}.

The in-house standards, work procedures and quality plan prepared with reference to IRC: SP 19-2001, IRC: SP 20, IRC: SP 13 (in respect of surveys for rivers/streams) and current international practices have been followed during the above survey. Traverse has been done by total station having angular measurement accuracy of ± 1 sec and DGPS. Levelling is also done by taking accurate data through bench marks. Cross Section & Detailing Cross sections were taken at 10 m interval and at closer interval in curved portion of the existing road. All physical features of the road were recorded. {Generally, cross section will be taken at every 10m interval. In case of any major variation in the long section cross sections have to be taken irrespective of the 10m interval. The cross-section details are to be taken fora further distance of half the formation width beyond the shoulders on either side of the road}. Data Processing included all data from topographic survey recorded by total station were downloaded and final alignment, plan, profile is prepared and presented in AutoCAD Format.

Checklists

- Reference pillars given - Yes
- TBM with northing-easting given - Yes
- Traverse survey carried out - Yes
- Cross section and detailing carried out - Yes

3.2. SOIL TEST FOR CALIFORNIA BEARING RATIO

The California Bearing Ratio test is penetration test meant for the evaluation of strength of soil. The results obtained by these tests are used with the empirical curves to determine the thickness of pavement and its component layers. This is the most widely used method for the design of flexible pavement.

Figure 5 Collection of Soil Sample at various points of proposed road alignment

The CBR Soil test with Modified Proctor Test was done using IS 2720 P—8, IS 2720 P-16 and other relevant IS code. The potential source of borrow areas for soil sites were identified. Soil samples are collected along the road alignment at three identified locations. Test results are mentioned in table 4.[1]

Table 4 CBR Test Result at three location at proposed road alignment

Sr. No.	Location	Modified Proctor Test IS 2720 P-8		California Bearing Ratio at 98% of MDD IS 2720 P-16
		MDD (gm/cc)	OMC (%)	
1	Location 1	2.040	6.8	22.3 %
2	Location 2	1.980	6.7	14.1 %
3	Location 3	2.010	7.6	14.5 %

3.3. HYDROLOGICAL SURVEY

Hydrological survey is necessary for design of adequate and safe Cross Drainage Structures so that the rain water can pass as per natural slope. Hydrological survey of the proposed road is based on the following observations:

- Rainfall Data
- Catchments Area
- Time of Concentration

Rainfall Data as applicable for the project road are collected with maximum rainfall occurring in the months of June- august.

[1] *Soil Investigation Test (California Bearing Ratio Test) Results has been attached in Annexure 2*

The Catchments area is calculated by gathering local information and topographical survey data as it was not possible to calculate from topographical sheets due to their unavailability.

Time of concentration (tc) in hours is calculated from the formula of (0.87 x L3/H)0.385, where L is distance from the critical point to the structure site in km and H is the difference in elevation between the critical point and the structure site in meters.

3.4. TRAFFIC COUNT SURVEY

Road development projects are meant for achieving multi-objectives while meeting the basic needs of the road user - Mobility and Accessibility. Key functionalities and upcoming utilization of the project corridor in years to come is the essential task for which the road facility needs to be upgraded or improved. All proposed solutions from traffic point of view have appropriately to be incorporated with respect to issues related to geometry, environmental and social.

The primary step for carrying out any kind of development of the road is to conduct various kinds of surveys like Traffic count, origin-destination, road condition, traffic speed etc. all these surveys describe the exact condition and scenario which helps in proposing futuristic development of the road.

As far as development in the given project corridor is concerned there was a need to conduct traffic count survey so that the exact count and type of all the vehicles can be known so that strength and width of road can be proposed accordingly. This survey was carried out by the team of surveyors who stood on various corners and counted manually all the vehicles which passed in different time intervals. There was a time format of 12 hours starting from early 8 am in the morning and ending up at 8 pm in the evening. The survey was carried out in from 14th June 2021 to 20th June 2021.

All the vehicles passing through these time intervals are counted manually with their details such as their type and are then compiled by categorizing them.[2]

[2] *All the categorization of vehicles that is sort out after conducting the survey is shown in Annexure 1 and detailed out in Chapter 5*

3.5. TOTAL STATION SURVEY AND DGPS SURVEY

Total station survey and DGPS is also done in order to find out all the detailed features that are present at the site. The features such as buildings, electric poles and trees are shown along with levels so that better accuracy can be carved out. TSS is showing a centre line road with outside markings and things coming in that portion are shown which helps to eliminate existing features which acts as a hindrance and to keep all those features which can be used in providing a sustainable development.

Figure 6 TSS Survey on the site

CHAPTER 4 STAKEHOLDER VIEWS

Stakeholders are the most important part while carrying out any kind of development in any area or a region. Stakeholder engagement is the process by which an organization involves people who may be affected by the decisions it makes or can influence the implementation of its decisions. They may support or oppose the decisions, be influential in the organization or within the community in which it operates, hold relevant official positions or be affected in the long term. Stakeholder engagement is a key part of corporate social responsibility (CSR) and achieving the triple bottom line. Companies engage their stakeholders in dialogue to find out what social and environmental issues matter most to them about their performance in order to improve decision-making and accountability. Engaging stakeholders is a requirement of the Global Reporting Initiative, a network-based organization with sustainability reporting framework that is widely used around the world. The International Organization for Standardization (ISO) requires stakeholder engagement for all their new standards. Stakeholder meetings and site inspections were carried out on the following day of the traffic volume count. While carrying out the surveys and inspections we met various stake holders who had their shops on the project corridor and some of the stakeholders were the owners of the vehicles who gave their views as they had to regularly pass through the corridor.

Local people were informed about the project and its activities and they were consulted in the project related decisions. This helped in understanding not only their perceptions about the project but also seek their opinion about the project, their preferences/options and their input in the project designs. These consultations were two-way communication where relevant information was shared with the project stakeholders.

There is a dire need for the bypass from NH8 to Kothariya Link Road to have a better connectivity to nearby villages and to reduce the traffic congestion within the city of Nathdwara. To resolve these issues, various meetings and discussion happened with Municipal Board of Nathdwara. They have a strong view that a new alignment is required and needs to be proposed considering the natural features with a four-lane bypass and in an economically and environmentally viable manner.

CHAPTER 5 TRAFFIC ANALYSIS AND FORECAST

5.1 INTODUCTION

Road development projects are meant for achieving multi-objectives while meeting the basic needs of the road user - Mobility and Accessibility. Key functionalities and upcoming utilization of the project corridor in years to come is the essential task for which the road facility needs to be upgraded or improved.

Traffic surveys and analyses will be carried out for addressing various objectives and issues pertaining to lane configuration of the project stretch. The surveys will be conducted include seven days' volume counts, 12 hrs intersection, at two locations during dry season. The study aims at obtaining the existing traffic and travel characteristics on the project corridor and forecasting for project horizon year considering various constituent streams and for various scenarios

Transportation forecasting is the attempt of estimating the number of vehicles or people that will use a specific transportation facility in the future. For instance, aforecast may estimate the number of vehicles on a planned road or bridge, the ridership on a railway line, the number of passengers visiting an airport, or the number of ships calling on a seaport. Traffic forecasting begins with the collection of data on current traffic. This traffic data is combined with other known data, such as population, employment, trip rates, travel costs, etc., to develop a traffic demand model for the current situation. Feeding it with predicted data for population, employment, etc. results in estimates of future traffic, typically estimated for each segment of the transportation infrastructure in question, e.g., for each roadway segment or railway station. Any firm or organization which works for the development of any road portion always keeping in mind about the traffic forecasting concept as they plan for better future and hence to carry our sustainable development.

5.2 TRAFFIC SURVEY

The feasibility and design of any highway facility (or a corridor) basically depends on the volume and intensity of traffic likely to flow on it in the design year. The estimation of the likely traffic scenario in the design year on the highway/corridor proposed for improvement, with an optimal lane configuration as in the present case, requires basic information regarding the current level of traffic and its characteristics on it. Thus, the

collection of basic data on the nature and extent at present of different traffic parameters assumes greater significance. The traffic on the Project corridor is characterized by a high degree of motorized vehicles which consist of passenger vehicles such as cars, two wheelers, LCVs, Trucks. The non-motorized vehicles comprise mostly of bicycles. Traffic studies detail mode wise traffic estimates, travel pattern of passenger and freight (goods) vehicles, speed and delay (travel time) characteristics and axle load characteristics. Traffic surveys will be conducted as per the guidelines given in IRC: SP-19 2001. The locations and type of various traffic surveys have been carefully finalized on the basis of a reconnaissance survey.

The traffic surveys have been undertaken for the project include:

- 7-day, 12 hours' continuous traffic volume counts. (2 locations)

5.3 TRAFFIC ANALYSIS

5.3.1 Traffic Volume Counts

Traffic Volume counts were conducted manually for 7 continuous days for 12 hours at 2 locations. The analysis of the same will be done as below:

- Average Daily Traffic (ADT)
- PCU Factor
- Traffic Forecast

5.3.2 PCU Factor

The traffic volumes counted in will be aggregated to one-hour volumes. The hourly volumes will be aggregated into daily volumes for the entire survey period (7-days). The daily volumes will then be averaged for ADT. To express the vehicular count in terms of PCUs, the PCU factors as given in IRC-64: 1990 have been considered. For ready reference, the PCU Factors considered in the analysis are given in Table 5.

Table 5 PCU Factor

VEHICLE	PCU FACTOR
Car	1.0
Taxi	1.0
Three Wheelers	1.0
Two Wheelers	0.5
Mini Bus	1.5

VEHICLE	PCU FACTOR
Bus	3.0
LCV (3T)	1.0
LCV (4T)	1.5
2 Axle	3.0
3 Axle	3.0
Tractor	1.5
Tractor with trailer	4.5
Cycle	0.5
Cycle Rickshaw	2.0
Hand cart	3.0
Animal Drawn	6.0

SOURCE: IRC:106-1990

5.4 EXISTING TRAFFIC CHARACTERISTICS

5.4.1 Average Daily Traffic (ADT)

The analysis of Traffic Volume data indicates the total numbers of approximate vehicles are 36830 per week, which gives us the ADT of 5261 vehicles, equivalent to 3297 PCU/Day at Nathdwara to Kothariya Road. 2 Wheelers comprise the maximum share of vehicular traffic of about 78.13%, followed by 4 wheelers of about 13.82% and 3 wheelers (Auto-rickshaw) of about 6.96% at Nathdwara to Kothariya Road. This road experiences more concentration of 2 wheelers as the road passes through the core city area which paves way for more traffic of local vehicle.

The total numbers of vehicles are 27997 which gives us the ADT of 4000 vehicles, equivalent to 2476 PCU/Day at Nathdwara Bus Stand to Kothariya Bus Stand. 2 Wheelers comprise the maximum share of vehicular traffic of about 79%, followed by 4 wheelers of about 13.68% and 3 wheelers (Auto-rickshaw) of about 6.96% at Nathdwara Bus Stand to Kothariya Bus Stand. This road experiences more concentration of 2 wheelers as the road connects 2 major points which is, Nathdwara Bus Stand to Kothariya Bus Stand.

The passenger and goods traffic characteristics indicate that most of the trips are made for shorter duration inside the city area. It is because of the concentration of 2 wheelers which is prevalently used for private usage. The analysis indicates around 99.25% and 0.75% of the passenger and goods trips, respectively for Nathdwara road to

Kothariya Road ; 99.54% and 0.46% of the passenger and goods trips for Nathdwara Bus Stand to Kothariya Bus Stand.

All the categorization of vehicles with values of PCU and ADT has been shown in the following Tables 7 and 8.

Table 6 Average Daily Traffic (ADT) of NH-8 to Kothariya Link Road

Average Daily traffic (ADT) NH-8 to Kothariya Link Road		
Vehicle	Kothariya Road to Nathdwara Road	Kothariya Bus Stand to Nathdwara Bus Stand
2-Wheeler	4111	3141
3-Wheeler	366	278
4-Wheeler	727	547
Magic/Taxi	12	10
Mini Bus	0	0
Bus	6	5
Truck	39	18
Push Carts	0	0
Bicycle	0	0
Other	0	0
Total ADT	5261	4000

SOURCE: TRAFFIC VOLUME SURVEY, 2021

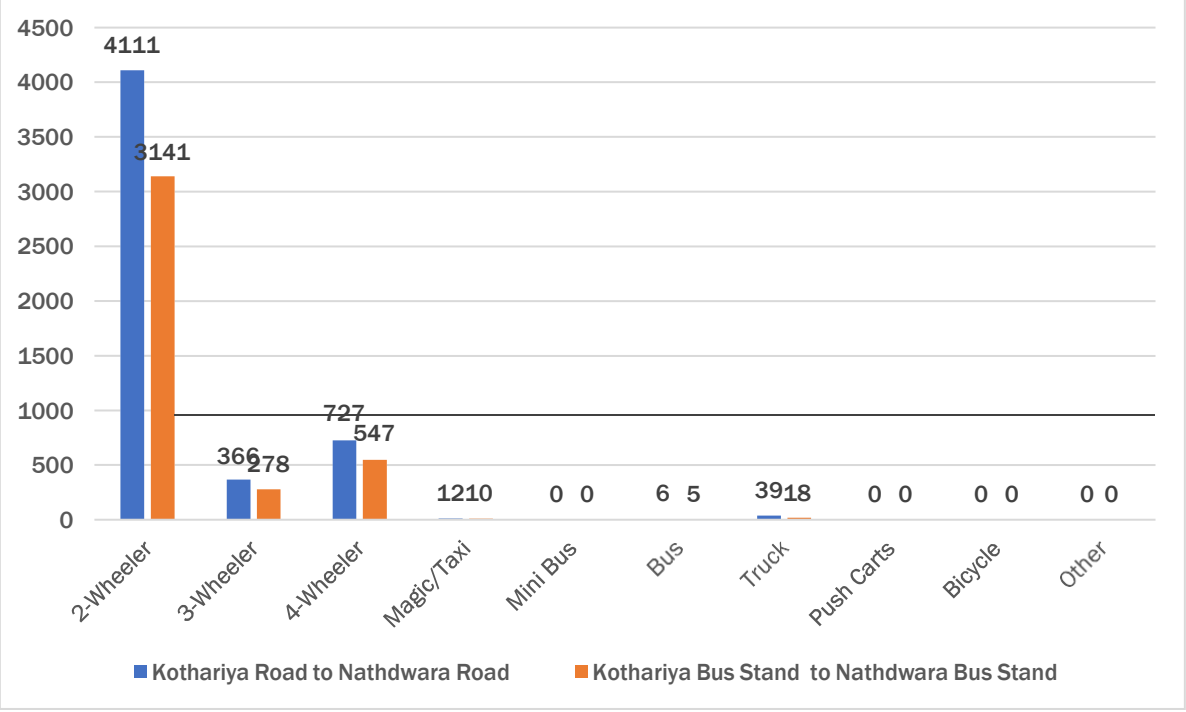


Figure 7 Comparison of 2 points of Trafic Volume Count

Comparison of these 2 points where Traffic Volume Count happened shows that Nathdwara to Kothariya Road experiences more traffic in comparison with Nathdwara Bus Stand to Kothariya Bus Stand road. Kothariya road has the Average Daily traffic of 5261, with the concentration of 2 wheelers with the ADT of 4111. Meanwhile, Nathdwara Bus Stand to Kothariya Bus Stand road experiences Average Daily Traffic of 4000, with the ADT of 3141 for 2 Wheelers.

Kothariya Bus Stand road comprises of about 76.40% coverage of 2 wheelers when compared to Kothariya Road. Truck Movement is slightly higher with ADT of 39 for Kothariya Road and 18 for Kothariya Bus Stand Road, with the coverage of 45% compared to Kothariya Road. The movement is almost similar with the exception of number of vehicles using those roads. The Coverage is of 75%, which kothariya road experiences in relation to Bus Stand road.

5.4.2 Modal Split of Total Traffic Volume

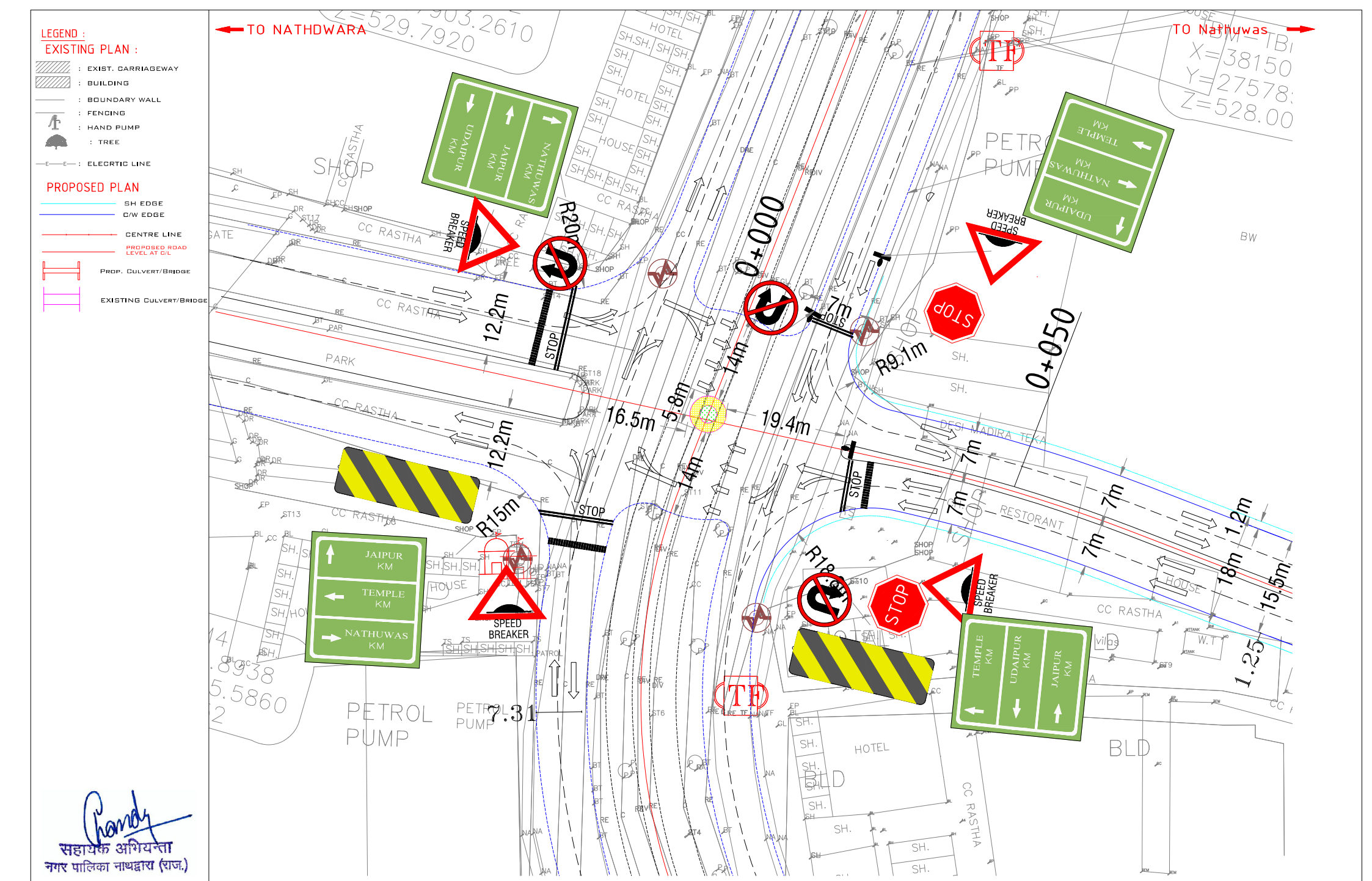
Nathdwara Road to Kothariya Road

Car and 2 Wheeler Traffic is about 13.82% and 78.13% respectively in the total traffic along the corridor at this location, as project Highway has a fair proportion of local traffic at some locations due to the presence of hamlets and towns as shown in Figure 8. The share of non-motorized vehicles is almost negligible. The commercial vehicles contribute less than 1% and buses constitute only 0.11% of the total vehicles using the corridor at this location. The share of 3 Wheelers is 6.96% in the total traffic and it represents the local traffic is significantly higher in this corridor.

Nathdwara Bus Stand to Kothariya Bus Stand road

Car Traffic is about 13.68% in the total traffic along the corridor at this location. The share of non-motorized vehicles is almost negligible. The commercial vehicles contribute less than 1% and buses constitute 0.13% of the total vehicles using the corridor. Two wheelers constitute 79% of the total traffic as shown in Figure 9. The share of 3 Wheelers is almost 7% paving way for proportion of local traffic at some locations.

Modal split of total traffic volume shows that the concentration of 2 wheelers is higher with the coverage of around 80%, suggest that the local traffic is more in these roads. Commercial Vehicles are mostly not entering the city, entering and exiting on the National



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नगर पालिका नाथद्वारा (राज.)

REV.	DATE	DESCRIPTION

CLIENT :-

NAGAR PALIKA, NATHDWARA

DESIGN CONSULTANT:

R-TECH INFRA ASSOCIATES

204- 2ND FLOOR, SUN N MOON BUILDING, BELVEDERE PARK , SWAGE FARM ROAD, GOVINDPURI
PIN- 302019 JAIPUR (RAJ)

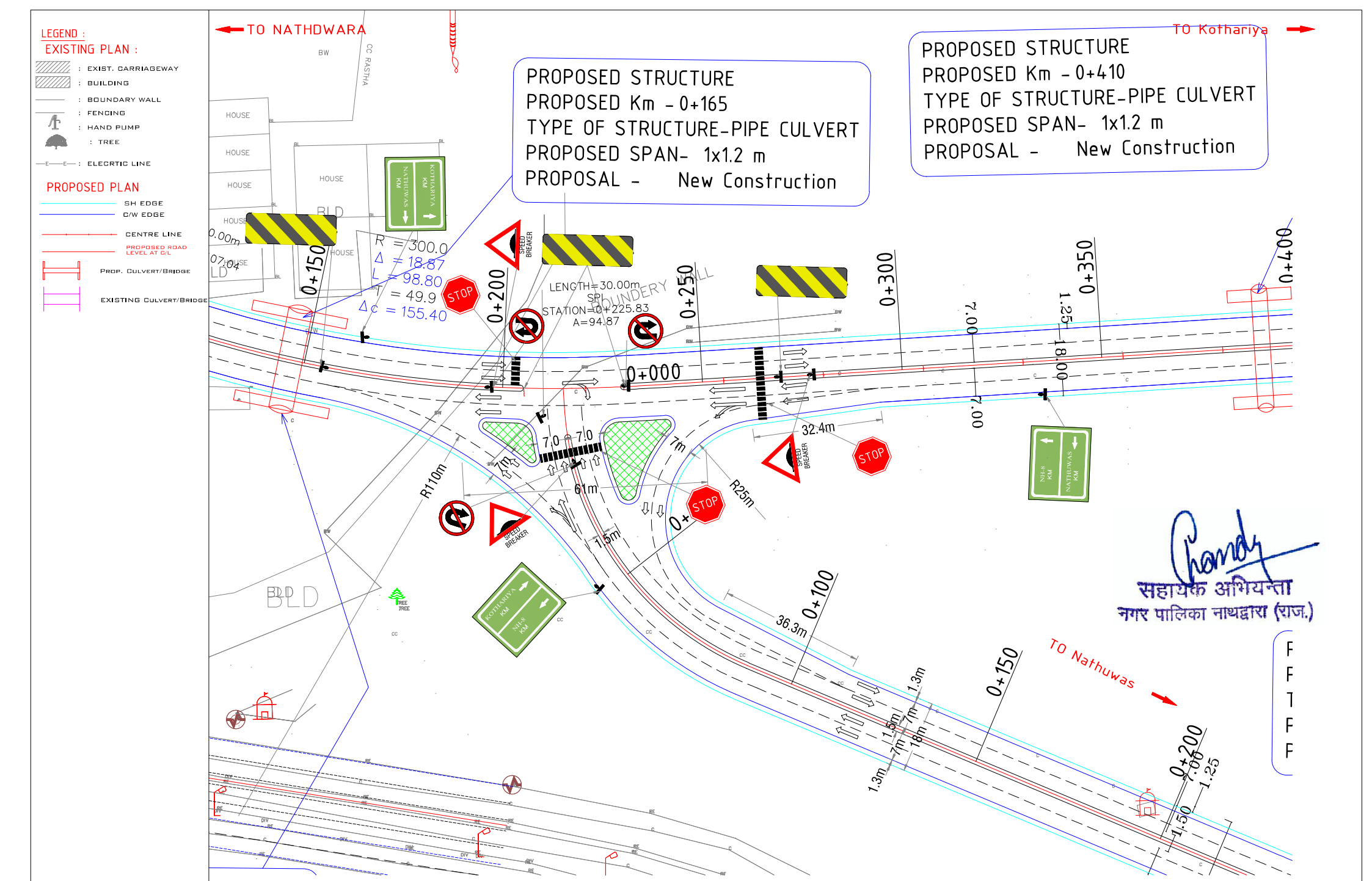
PROJECT :-

Consultancy Services for the work construction of Bye-pass road from NH8 to Kothariya Link Road in Muncipal Area Nathdwara (Dist.-Rajsamand).

DRAWN	HANUMAN	SCALE	SIZE
DESIGN	S.K. PRAJAPAT	NTS	A3
CHECKED	M.K. PRAJAPAT	REV	SHEET NO.
APPROVED	R.K. Singh	00	01

TITLE :-

Junction Drawing at NH-8



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TITLE :-

Junction Drawing at Nathuwas

LEGEND :

EXISTING PLAN :

: EXIST. CARRIAGEWAY

: BUILDING

: BOUNDARY WALL

: FENCING

: HAND PUMP

: TREE

: ELECRTIC LINE

PROPOSED PLAN

SH EDGE

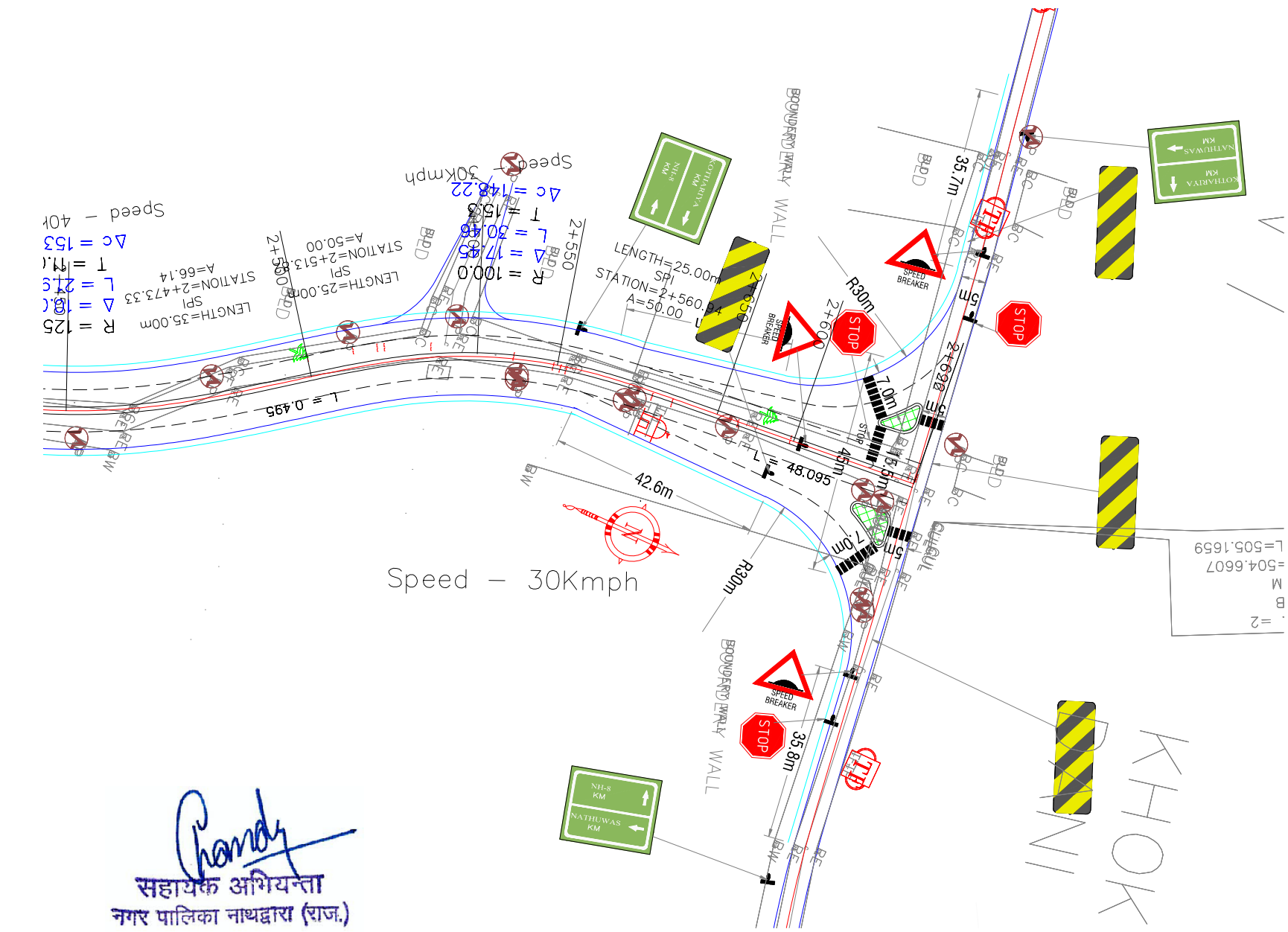
C/W EDGE

CENTRE LINE

PROPOSED ROAD LEVEL AT C/L

PROP. CULVERT/BRIDGE

EXISTING CULVERT/BRIDGE



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Government of Rajasthan

DETAILED PROJECT REPORT

CONSTRUCTION OF BYEPASS ROAD FROM NH-8 TO NATHUWAS LINK ROAD

AUGUST, 2022

MUNICIPAL BOARD, NATHDWARA

EXECUTIVE SUMMARY

GENERAL

The project "Construction of Byepass Road from National Highway 8 (new 58) to Nathuwas Link Road" is proposed for critical needs to have a better connectivity to nearby surrounding villages such as Sardarpura, Ulpuramagra Pachhla, Gupa Kuda etc. National Highway 8 (new 58) is a 4-lane highway and connects major cities such as Gurgaon, Jaipur, Ajmer, Nathdwara, Udaipur, Ahmedabad, Vadodara, Surat, Nadiad, Anand and Kehda. It is also one of the busiest highways in the subcontinent. Due to rise in traffic within the city of Nathdwara, there have been need of a byepass which connects via NH8 to Nathuwas Road to reduce the traffic within the city. Figure 1 shows the location of the proposed bye-pass road from National Highway 8 to Nathuwas Link Road.

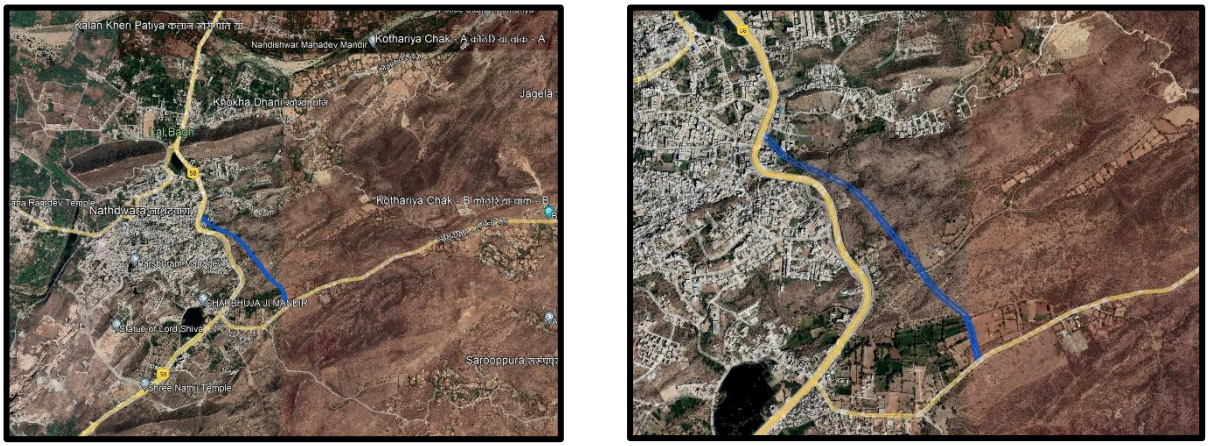

Figure 1 Location of Project Byepass Road

NECESSITY OF BYEPASS

There is a critical need for the byepass from NH8 to Nathuwas Link Road to have a better connectivity to nearby villages and to reduce the traffic congestion within the city of Nathdwara. To resolve the aforementioned issues, Municipal Board, Nathdwara has a strong view that a new alignment is required and needs to be proposed considering the natural features with a four lane byepass and in an economically and environmentally viable manner.

OBJECTIVES

While carrying out any project it is very important to frame our objective which helps to achieve the vision and aim of the project. For construction of byepass road, following objectives are kept in mind: -

i. To reduce road accidents and injuries;
ii. To reduce travel times;
iii. To provide equity and balance for all modes;
iv. To develop a route that involves the community and considers their interests;
v. To provide a route that supports economic development;
vi. To provide the best value for money and create cost effective improvements;
vii. To minimize direct and indirect impacts on quality of life and the Environment.

GEOLOGY

A site visit has been conducted between 12th June 2021 to 20th June 2021 for appreciation of the proposed alignment, different project components, topographic survey, traffic survey and general understanding of surrounding geology.

The project area is mainly comprised of dolomite and gritty quartzite of Debari group, basal quartzite, ultrabasics with carbonates of Delwara group and Aravalli supergroup.

TRAFFIC DEMAND

Traffic volume survey was also conducted to calculate the future demand and have been worked out by different vehicle types presented in later chapters.

CHAPTER 1 PROJECT DESCRIPTION

1.1. GENERAL

Nathdwara City is location in southern part of Rajasthan in the Aravalli Hills, on the banks of the Banas River in Rajsamand District and 48 Kilometres north-eat of the city of Udaipur. National Highway 8 (new 58) passes through the city. The project construction of byepass road will pass through National Highway 8 to Nathuwas Link Road.

The Municipal Board, Nathdwara intends to apply a portion of the financial assistance for providing consultancy services for construction of Byepass Road from National Highway 8 to Nathuwas Link Road. In pursuant of the above, R-Tech Infra Associates, Jaipur has been appointed as consultants to provide Consultancy Services for the project.

1.2. SCOPE OF SERVICES

In developing the Work Plan for completing the assignment, the activities have been categorized under stages as follows:

- Project Preliminary and Survey Report
- Detailed Project Report (Draft) with Design Consideration and Estimation
- Detailed Project Report (Final) with Design Consideration and Estimation

These stages will generally follow a sequence, though each stage is inter-related and inter-dependent on each other. The related deliverables for each stage will be submitted to the Commissioner, Municipal Board, Nathdwara.

SEQUENCE FOLLOWED FOR PAYMENT APPROVAL:

- Submission of Survey Report
- Submission of Draft DPR
- Approval of DPR from any IIT/NIT
- Last payment at work order of road

1.3. PROPOSED ALIGNMENT SITE DESCRIPTION

The terrain of the proposed road alignment can be termed as hilly. The abutting land use pattern varies from agricultural to forest area. Barren land can also be observed along the road alignment. The byepass alignment has been fixed and required land for the byepass will be acquired by competent authorities. The alignment starts at near Bus Stand,

Nathdwara and passes through vacant lands and few agricultural lands to Nathuwas Link Road near Nathuwas Goshala. This byepass will be well connected with four lanes to National Highway 8 and Nathuwas Link Road.

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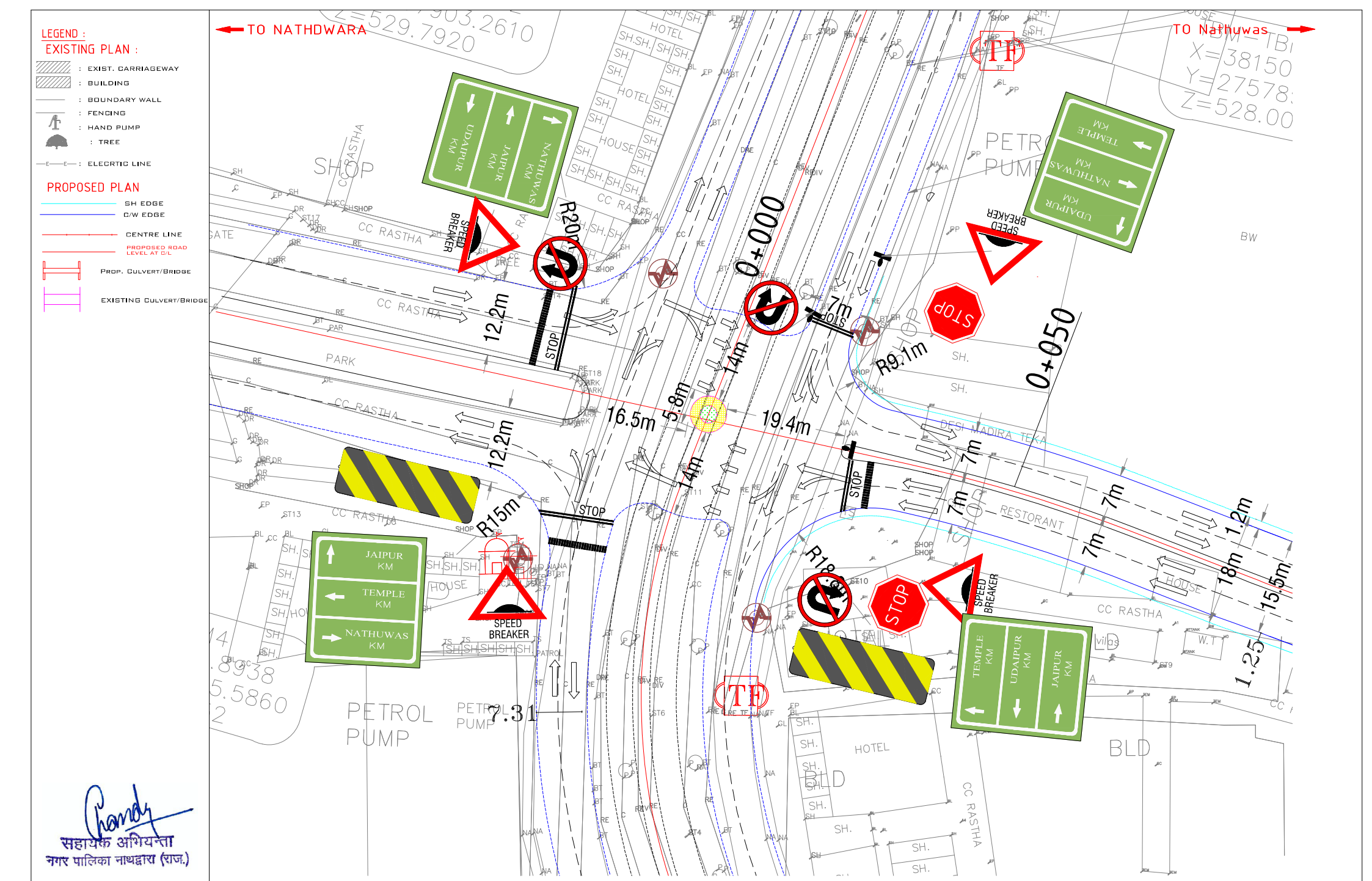

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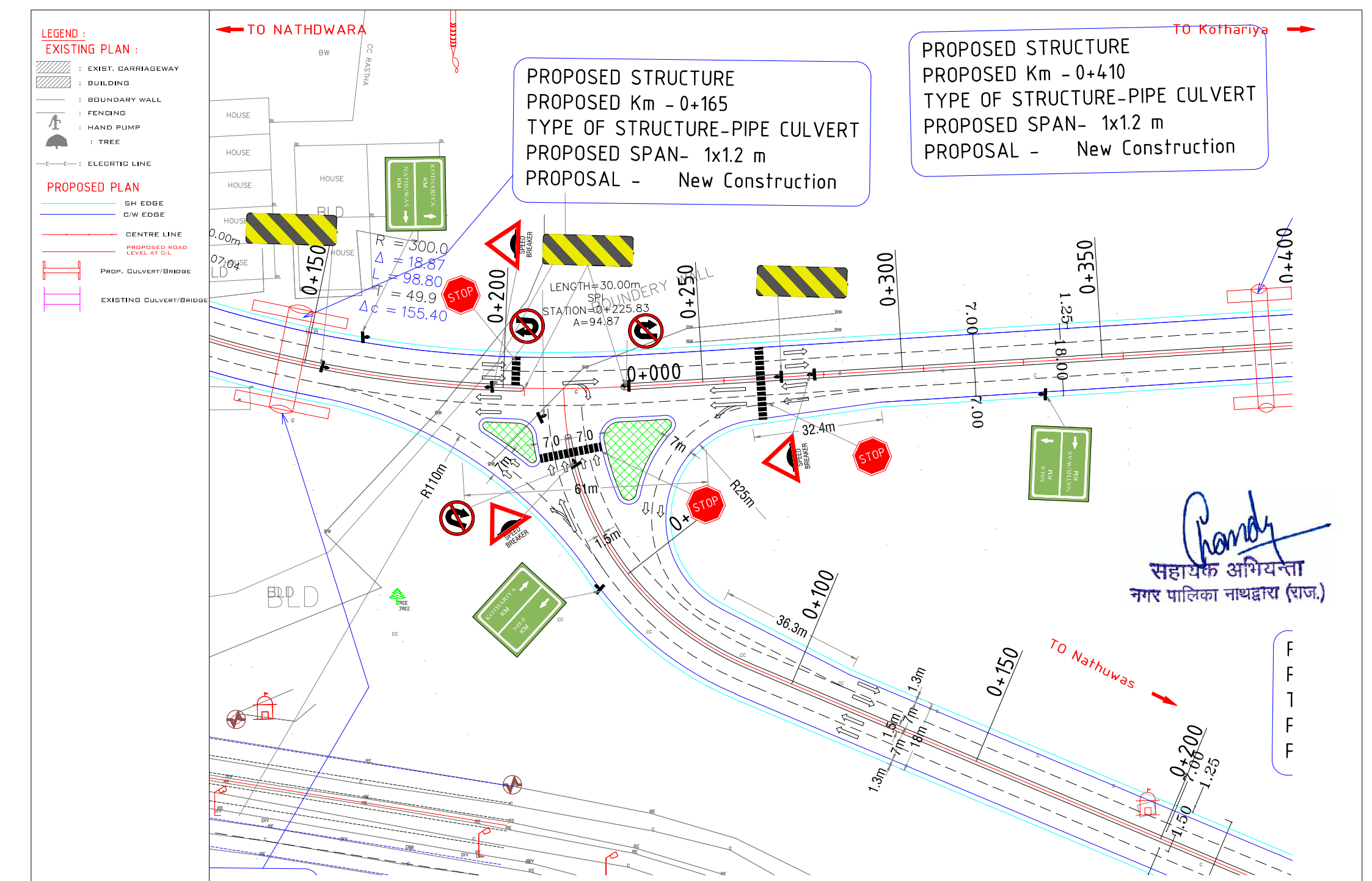

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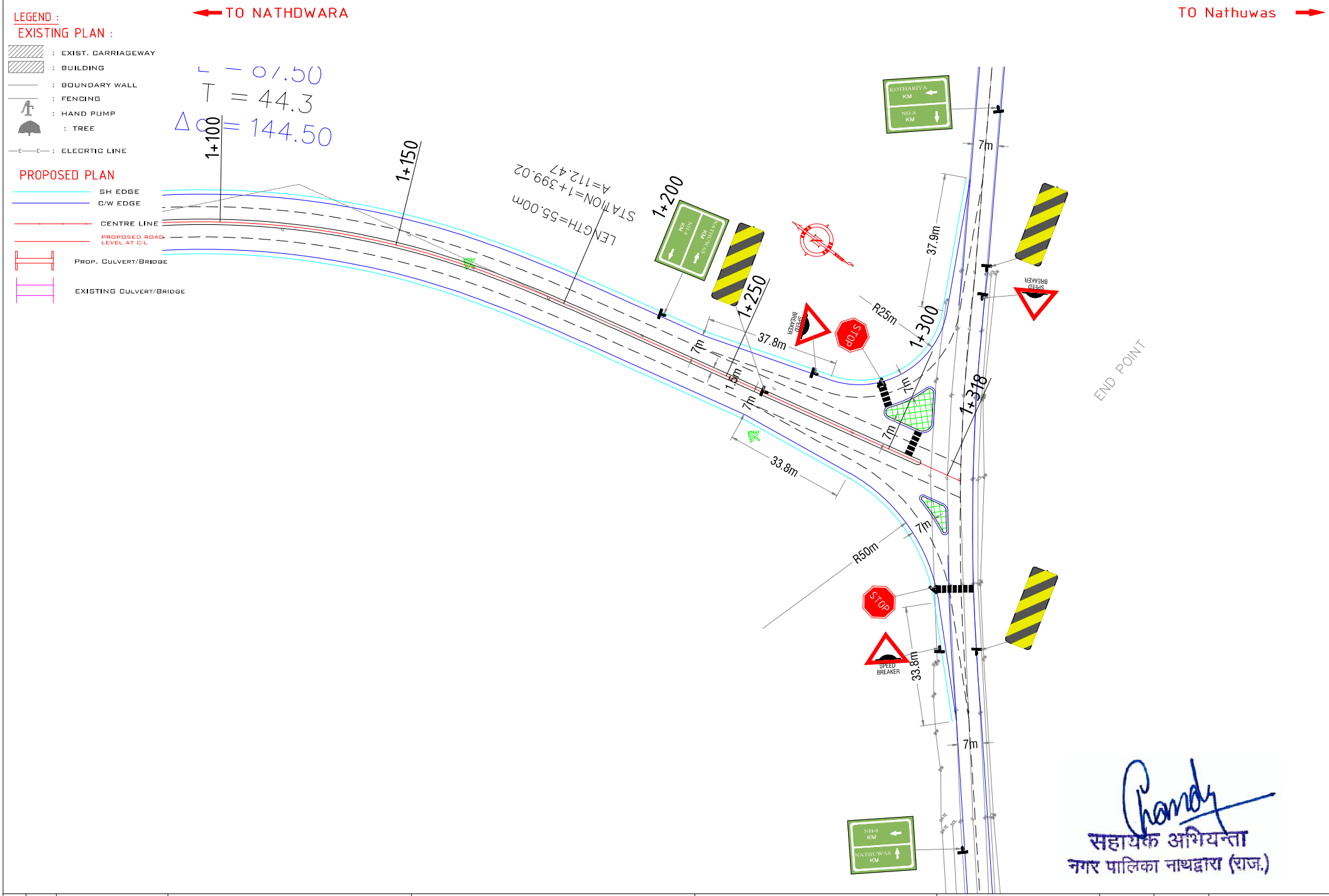

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APPROVED	R.K. Singh	00	03

TITLE :-

Junction Drawing at Nathuwas End