

Road Safety – Engineering interventions & Black spot rectification

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Road Safety Engineering measures for enhancement of road safety

- Road safety is result of effective measures and **their integration** in the areas of
 - **Engineering (Roads)**
 - Engineering (Vehicles)
 - Enforcement
 - Education
 - Emergency
- Engineering (Roads) has more scope **to go extra mile in enhancing safety.**

Road Safety Engineering measures for enhancement of road safety (Contd..)

- Immediate requirement is to deal with Road safety Engineering measures related to roads **with the seriousness they deserve.**

Number of people killed due to different causes in India

Cause of deaths	No of people killed	Year	Remarks /Source
Malaria	535	2014	Ministry of Health & Family Welfare
Tuberculosis	1,50,000	2014	Estimate of World Health Organization
HIV	1,30,000	2014	Estimate of World Health Organization
<u>Road Crashes</u>	<u>1,39,671</u>	<u>2014</u>	Ministry of Road Transport & Highways

Road Safety Engineering measures for enhancement of road safety (Contd..)

Key requirements for bringing about enhancement of road safety through engineering measures

- A **planned approach** based on assessment of the **ground conditions**
- **Measurement & documentation of road and traffic environment** as a basis for design and implementation of rectification measures
- Holistic approach duly taking into account the **conditions in sufficient length of the stretch** in both directions.
- As we are working with very limited data base on road accidents, other supplementations are required till a more elaborate & reliable data base is created.
- Balancing between bringing about **safety improvement in near future & minimizing wastage.**
- Documenting the Feed back on the **effectiveness of the measures.**
- **Collective actions** by all the stake holders.

Road Safety Engineering measures for enhancement of road safety (Contd..)

A Logo has been designed for Road Safety Cell (Engineering) **in house** for motivating and galvanizing all the stake-holders



Road Safety Engineering measures for enhancement of road safety (Contd..)

Different messages were intended to be given through this logo:

- Correlation of horizontal and vertical geometry in the highway planning
- Prominent and adequate road markings
- Specific measures for vulnerable road users (like footpaths and Zebra crossings for pedestrians)
- Children to be allowed to cross roads always under the guidance of elders
- Establishing and maintaining traffic signals wherever appropriate and also respecting them
- A Resolution to save lives through road safety engineering.
- A Motto to achieve, **“Safety through Safe Roads”**

Road Crashes & Injuries – What are the factors responsible



- Road user education
- Enforcement
- Road and Road environment
- Vehicle parameters
- Climate & weather conditions

What are the **contributions** of different factors to the crashes & Injuries

○ **Is it worth arguing about which factors contribute more to the crashes ?** In fact

➤ Road user education 100%

➤ Enforcement 100%

➤ Vehicle Parameters 100%

➤ Road & Road side environment 100%

What does this mean ? Each of the above factors to a greater or lesser extent contributes to most of the crashes and their outcomes

Road Safety Engineering measures for enhancement of road safety

- Safety aspect of Engineering measures related to roads is more misunderstood than it is understood.
- Road safety through engineering measures is not 'Removing congestion on roads'.
- Road safety through engineering measures demands holistic approach and balancing in every step.
- Road safety through engineering measures has close linkage to road user psychology and socio economic / cultural milieu of the region.
- An inspired and motivated approach by all stake holders is required to bring about road safety through engineering measures

Coordinated efforts by agencies responsible for managing **different factors**

- Road user **education** should make users aware of and skilled enough to use the road infrastructure appropriately with due consideration to fellow road users
- Enforcement should provide enough **deterrence** against irresponsible use of road infrastructure and negligent use of road to the detriment of fellow users.
- Road infrastructure and **road side environment** should guide the users into desirable paths, should prevent undesirable movements and be forgiving in case of unintentional mistakes.
- Vehicle **should facilitate safe movement** and protect the inmates in case of any crash.

Policy measures Initiated Black spots

- A definition is established for designating an accident prone location as "Black Spot" based on combined criteria of **number of fatalities and accidents**.
- An outline stepwise procedure is incorporated in the guidelines for rectifying the black spot once it is identified.
- A **workable time schedule** is made part of guidelines
- Requirement of **feed back monitoring** is specified in the guidelines before we could take the black spot out of the list.

Protocol for identification & rectification of road accident Black spots is formulated and notified

Genesis of black spots

- Black spots which are short stretches where the **accidents /fatalities take place repeatedly** get created on the road network due to various reasons like
 - **Commissions & omissions in the development projects**
 - Changes in the **road side environment**
 - Changes in **developmental scenario in the region**
 - **Unplanned developments /unauthorized constructions** on/ near the roads like advertisement boards, Poles, statues, buildings, trees, bushes etc.
- Therefore rectifying the black spots **is a continuous process.**

Protocol for identification & rectification of road accident Black spots

Protocol

- A protocol has been notified for **identification of road accident black spots and their rectification** including follow up monitoring vide Ministry's OM No RW/NH-15017/109/2015-P&M (RSCE) [New No: RW/NH-29011/02/2015- P&M (RSCE) dated 28-10-2015]
- Road accident black spot is literally not a spot but is a **short stretch of road**
 - ❑ Of **about 500 m length**
 - ❑ Where Five accidents involving serious injuries/fatalities or Ten fatalities took place during the past 3 calendar years.
 - ❑ Some times single accident can have multiple fatalities. Hence **number of fatal/ grievous accidents at the same location** is better indicator of problematic road / road environment (i.e., Black spot) than the number of fatalities.

Protocol for identification & rectification of road accident Black spots (Contd.)

As per protocol

- Schedule for Actions
 - Furnishing details of road accident black spots as per above definition based on data pertaining to a calendar year (Say 2015) to Transport Research Wing of MORTH by 31st March of the subsequent calendar year (31st March 2016).
 - Analyzing and furnishing of firmed up details of the black spots to concerned authorities [to Road Safety Cell (Engineering) of MORTH in respect of NHs] by 31st May (31st May 2016 for the above example)
 - Sanction of remedial measures at the identified black spots by 31st March of next to subsequent calendar year (31st March 2017 for the example given above)

Policy measures Initiated Black spots contd..

- Scope of remedial measures under different conditions balancing the immediate safety requirements and **avoiding wastage** due to developmental projects in the pipe line are covered in the guidelines
- Provisions for meeting expenditure requirements for rectification of black spots **through contingencies** of any on-going near by projects are provided in the guidelines affording flexibility.
- **What is then required?**
 - ***Deploying fund alone can not bring about safety.***
*Sincere and detailed work on **investigating the spots** and framing of rectification solutions is required to get desired safety improvement.*

Policy measures Initiated

Road safety Audits

- Guidelines on carrying out road safety audits are notified.
- As **no mapped data** on most of the existing road network and its road side environment is available, mapping these details is **made part of the audit** to make the audit objective and result oriented.
- Surveying & mapping the road stretch besides **making the audit objective**, becomes handy in framing solutions and saves time in that activity as the recommendations would be acted upon immediately.
- Responsible and accountable two way interaction between the audit team and the Highway authorities is incorporated in the guidelines.

Policy measures Initiated Road safety Audits contd..

- Limited amount of data collection to facilitate framing of objective and reasoned recommendations is incorporated in the guidelines.
- Minimum number of audits to be carried out for different sizes of projects **at different stages** are specified in the guidelines.
- Certification by Auditors certifying **thorough investigation** of the stretch & comprehensive recommendations is incorporated in the guidelines.
- Auditing and submission of the report is made a time bound activity
- **What is required?**
 - Carrying out audits and preparation of reports in true spirit of the audit guidelines
 - **Close coordination** between audit team and road authorities to achieve safe stretch within the prevailing constraints.

Policy measures

Immediate cautioning at Black Spots

- Black Spot investigation and rectification is an involved process. Requires some time
- Till black spot is rectified, **immediate cautioning** of road user is required to save lives
- A new cautionary sign is designed and model layout incorporated in the guidelines.
- **Regional Officers are empowered** to take the above measures meeting the expenditure from contingencies of any nearby on-going Highway project.



ACCIDENT BLACKSPOT
FATALITIES IN 3 YEARS: 89

Preparation of Road Safety improvement proposals

- Prevailing **traffic and road side environment** is to be studied.
- Possible **causes of accidents and safety concerns** are to be identified.
- Detailed inspection, **preparation of base map** with road land boundary marked on it is basic requirement
- Competing requirements and priorities are to be worked out.
- **Vulnerable road user requirements** are to be given special attention
- Giving **clarity to road user and avoiding / eliminating confusion** should be given high priority.

Capacity building in the area of Road Safety Engineering

- Capacity in the field of road safety engineering is severely lacking not only in the Highway departments but also in the private sector
- Primacy to road user safety vis a vis all other functional parameters is to be the avowed principle in all the Highway development.
- Apart from **training courses** and workshops, on-job training is an important part of **capacity building** in this area
- Working in the area of Road Safety Engineering is to be made lucrative and valued to attract talent to this area
- Highway departments should make all out efforts to build capacity in this important area of Highway development.

Road accident data base

- Comprehensive **road accident data base** is a pre-requisite for any result oriented strategic road safety improvement programme
- Presently data furnished by **police authorities is the only source.**
- Present data is not collected by trained persons and the data is highly inadequate. Even basic details of **exact location of accident is missing.**
- There are huge **delays in transmitting the data.**
- As per experience in other developing countries the data captured is **only a fraction of the total incidents.**

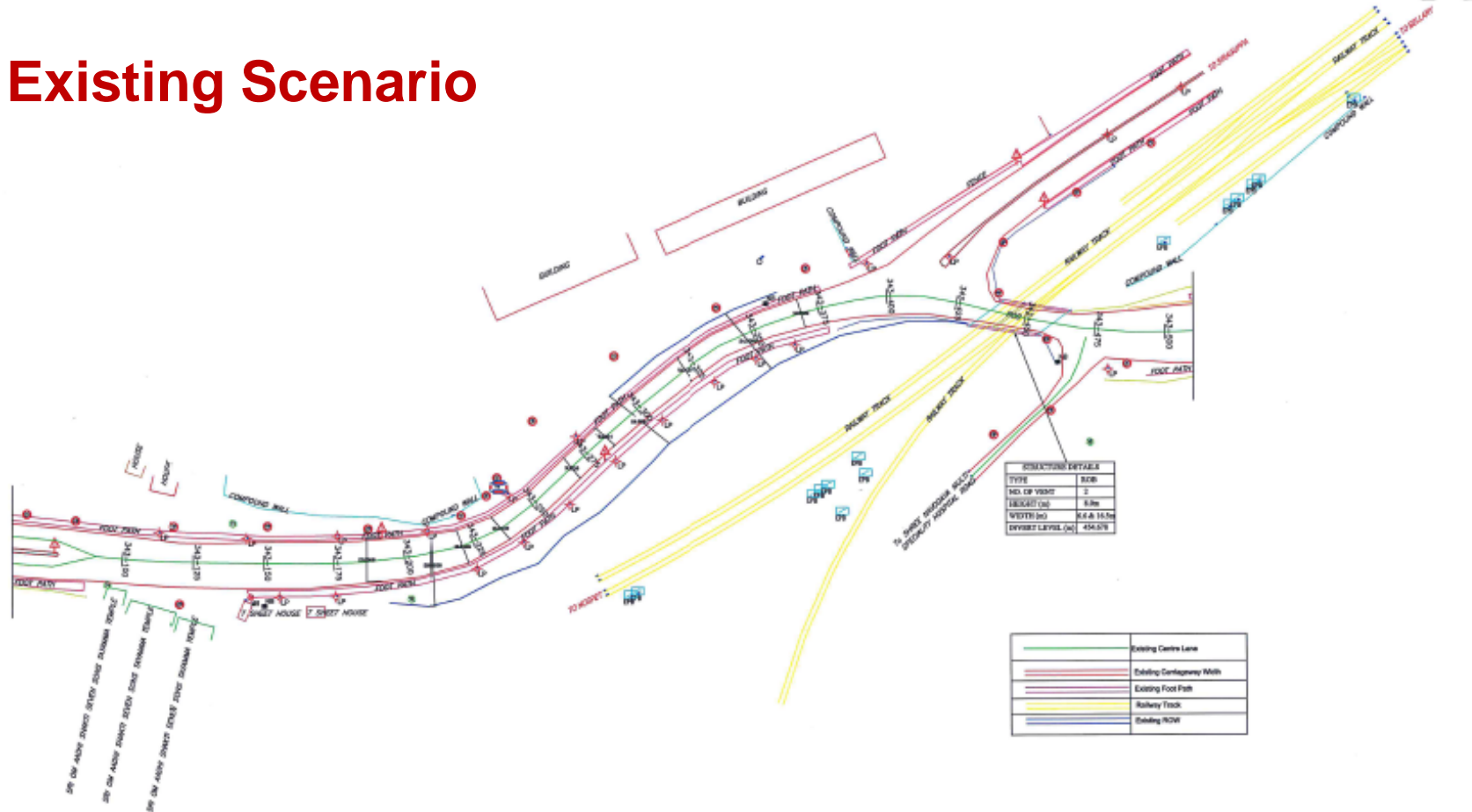
Policy initiatives in Road Accident data

- Practice of assigning **unique ID numbers** to identified black spots is initiated to facilitate their **monitoring and tracking**
- Efforts are being made to work out **a web based software for capturing road accident data** and its automated transmission.
- Crowd sourcing and mobile application technologies are being explored to collect road accident data.
- All the states and UTs have to take active interest in establishing state level **road safety engineering cells** to work exclusively in this area.

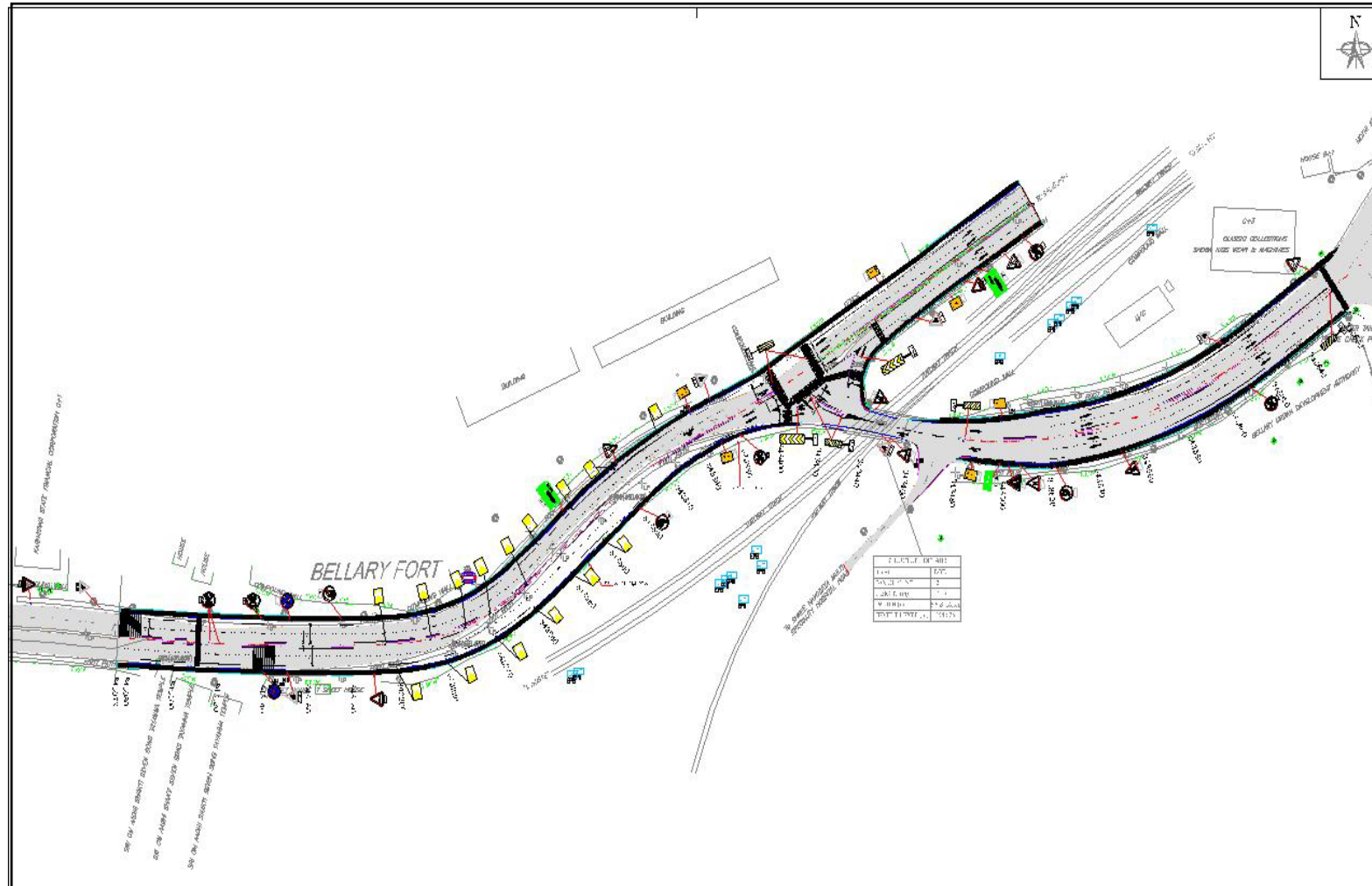
Black spot improvement proposal in Karnataka finalized in RSCE, MORTH

Plan of Black Spot Code No. KA-006 (Government Polytechnic Road) in the
city limits of Bellary on NH-63

Existing Scenario



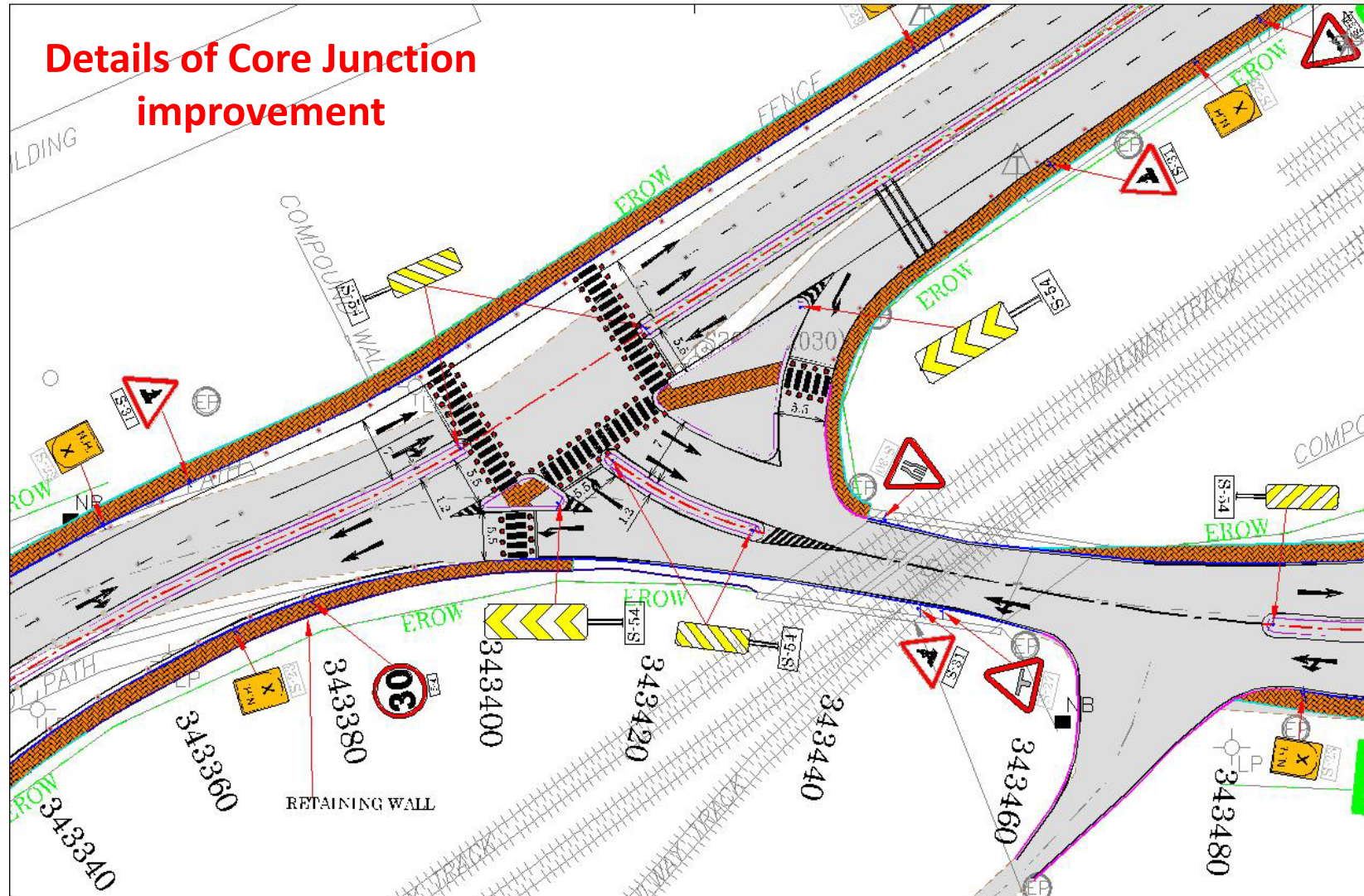
Examples of remedial measures for black spot rectification on National highways contd..



Project: Remedial Measures to Black Spot Code No. KA-006 (Government Polytechnic Road) in Bellary City Limits on NH-63 Ankola Gooty Section.

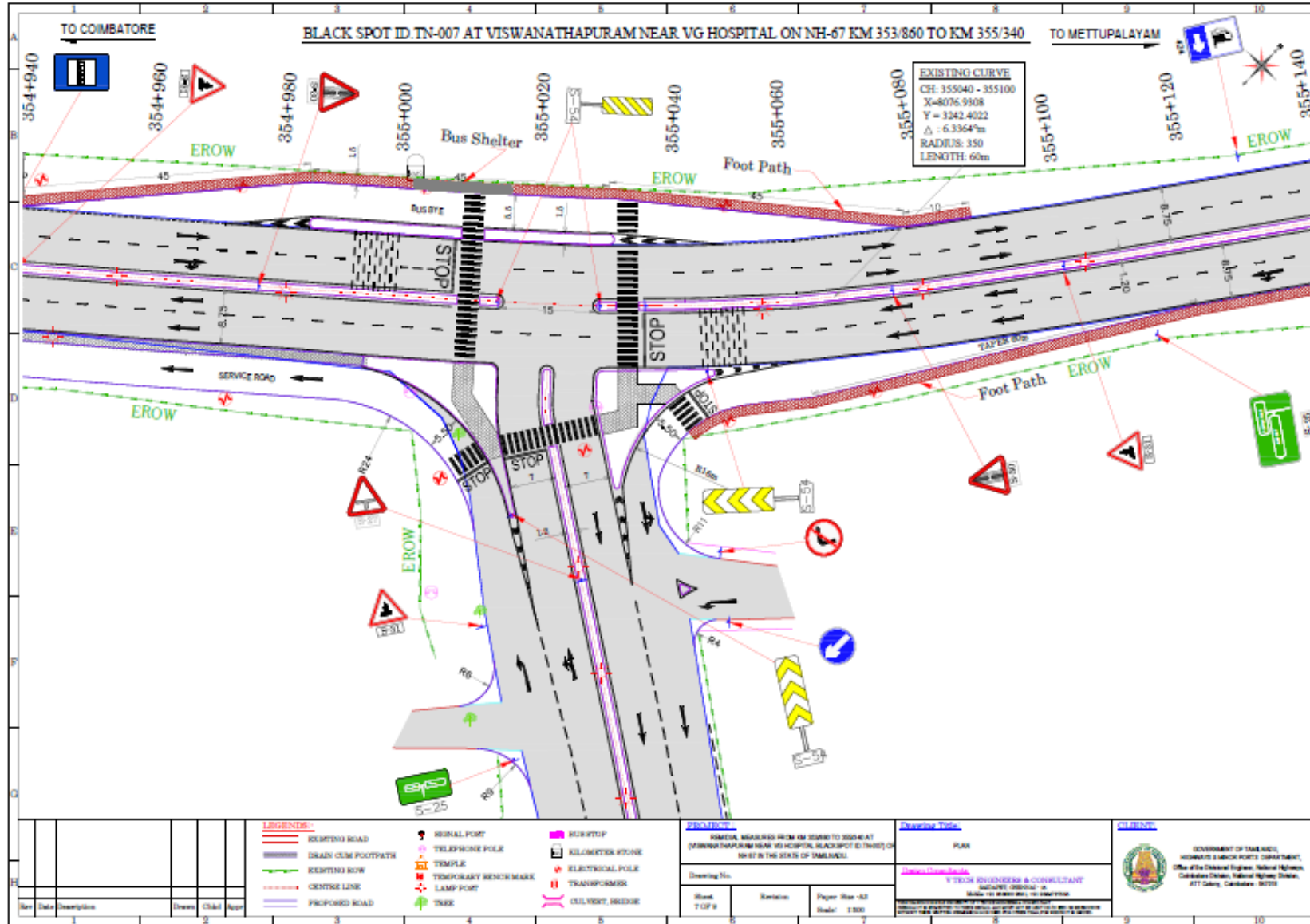
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Examples of remedial measures for black spot rectification on National highways contd..

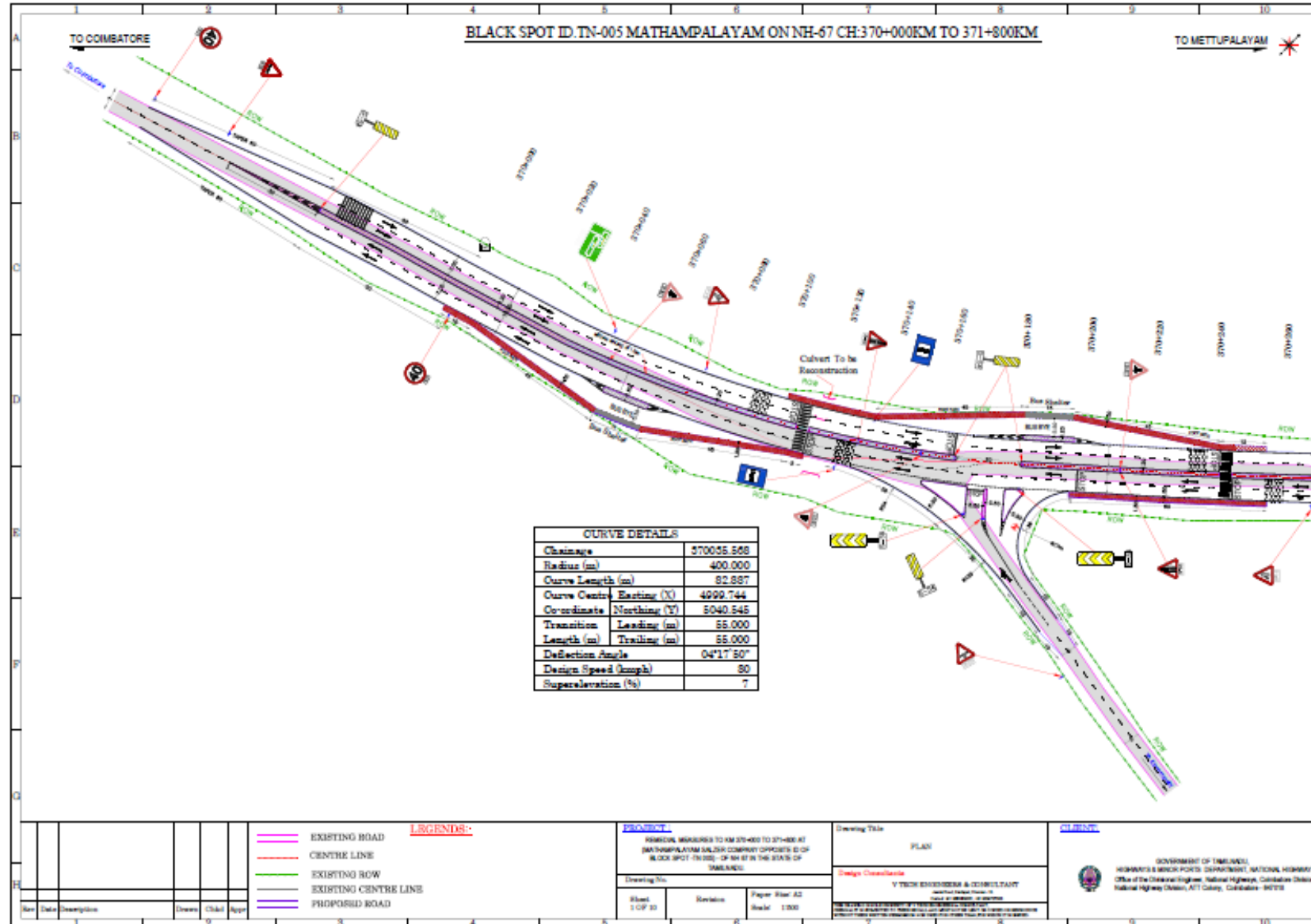


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Examples of remedial measures for black spot rectification on National highways

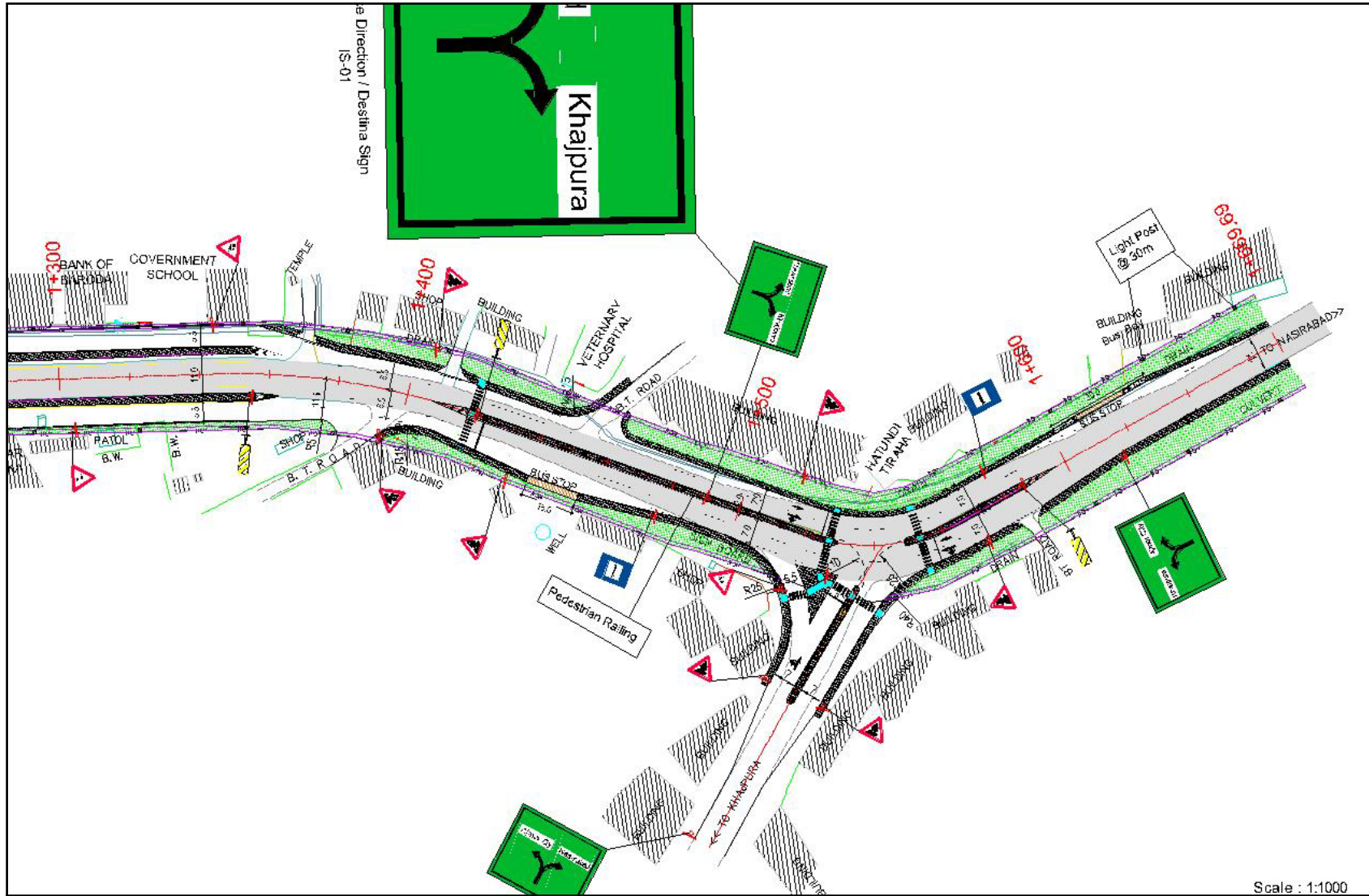


Examples of remedial measures for black spot rectification on National highways contd..



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Examples of Road safety improvement measures on National highways



Project: Road Safety Improvement work with service roads on Ajmer-Nasirabad NH-79 from Km 0.00 to Km 1.80

Thank You