



SAFETY AUDIT REPORT – 6 CONSTRUCTION STAGE

FOR PACKAGE NO 15

Six Laning of Tumkur-Chitradurga (Excluding Tumkur & Chitradurga Bypasses) section from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V

Submitted by

Safety Consultant

HAKS Engineers, Architects and Land Surveyors, P.C.
in association with InfoTrans Engineers Pvt. Ltd.



In Association with:



February 2014

National Highways Authority of India

Ministry of Road Transport & Highways, Government of India

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1.0 INTRODUCTION

Six Laning of Tumkur-Chitradurga (Excluding Tumkur & Chitradurga Bypasses) section from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V

Safety Consultant (SC) has conducted day and night time site audit of Four lane to Six lane of Tumkur – Chitradurga section (excluding Tumkur & Chitradurga Bypasses) on 19th & 20th February 2014.

This report is submitted as per S. No. 2 a) and S. No. 2 c) of clause 3.2. (Deliverables, Periodicity, Payment Schedule for Construction Period) of the Safety Consultancy Contract agreement. This Safety Audit Report – 6, for Construction Stage has to be read in continuation with SC's Safety Audit Report – 5, 4, 3, 2, 1 & 1A.

1.1. Project Background

The Government of India, Ministry of Shipping Road Transport and Highways (MORT&H) is responsible for development and maintenance of National Highways in the country. The National Highway Authority of India (NHAI) is the executive wing of the MORT&H.

This project scope includes Up gradation, Operation and Maintenance from Km 75.00 to Km 189.450 of Tumkur–Chitradurga of NH-4 in the state of Karnataka to be executed as BOT (Toll) project on DBFOT Pattern under NHDP Phase-V.

In order to provide a better level of service to the vehicular traffic, it has been decided to augment the capacity of the Tumkur to Chitradurga section to six lanes.

1.2. The Concession Agreement

The Concession Agreement for Design, Built, Finance, Operate and Transfer (DBFOT) Toll basis including maintenance of Tumkur – Chitradurga section from Km 75.000 to Km 189.450 of NH-4 in the State of Karnataka was signed on 16th August 2010 between National Highways Authority of India having principal office at G-5&6, Sector-10, Dwarka, New Delhi-110075 and IRB Tumkur–Chitradurga Toll way Private Limited as concessionaire having registered office at IRB Complex, Chandivali Farm, Chandivali Village, Andheri (East), Mumbai – 400 0072.

1.3. Independent Engineer (IE)

The Concession Agreement envisaged the appointment of Independent Engineer (IE) by the NHAI. The Independent Engineer nominated by NHAI is The Intercontinental Consultants Technocrats Private Limited, India. The function of the IE is clearly defined in the Concession Agreement and must operate in the supervision of the Works, on behalf of the NHAI.

1.4. Safety Consultant (SC)

It is stipulated in the Model Concession Agreement (MCA) of the PPP Projects that the Concessionaire shall develop, implement and administer a surveillance and safety program for providing a safe environment on or about the Project Highway and/or shall comply with the safety requirements set forth in **Schedule 'L'** of the Concession Agreement in Development, Construction and Operation & Maintenance Phase of the Project. It is also

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stipulated in the Model Concession Agreement that NHAI shall appoint an experienced and qualified firm or organization as a “Safety Consultant” for carrying out safety audit of the Project Highway in accordance with the safety requirements set forth in Schedule-L for Development and Construction periods only.

HAKS Engineers, Architects & Land Surveyors P.C. in association with InfoTrans Engineers Pvt. Ltd., have been appointed as Safety Consultant (SC), by NHAI for Development and Construction Phase. The agreement between NHAI and HAKS-ITE was signed on 11th May 2012.

1.5. Project Details

The Authority:	National Highways Authority of India (NHAI)
Project Director:	Mr. S.Vijay Kumar, NHAI – PIU, Chitradurga
Chief General Manager:	Mr. A. K. Mathur, NHAI – Regional Office, Bangalore
Concessionaire:	M/s IRB Tumkur Chitradurga Tollway Pvt. Ltd., Mumbai
Independent Engineer:	M/s ICT
Road Safety Consultant:	HAKS Engineers, Architects and Land Surveyors, P.C. in association with InfoTrans Engineers, Pvt. Ltd.
Length (Km) under Road Safety Audit:	114
Concessionaire commencement date:	04.06.2011
Concession period:	26 Years
Construction period:	30 Months
Project Status:	Construction in progress

Project Salient Details (Proposed)

1. Project Chainage	km 75.000 to km 189.000 (NH-4) (Length – 114 Km)
2. Flyovers	6 no
3. Major bridges	1 no (reconstruction on RHS) 3 no's existing 2 no's to be widened
4. Minor bridge	Proposed: 2 no Existing: 26 no (existing) RCC Box structures– 14 nos., RCC Slab– 11, With RCC, T beams - 1
5. Pedestrian underpass	Proposed: 15 Existing: 13
6. Cattle underpass	Proposed: 5, Existing: 22
7. Foot over bridge	Proposed: Nil, Existing: 9
8. Toll plaza	2 no @ km 104+530 & 173+230
9. Truck lay byes	Proposed: 7 Existing: Nil
10. Bus bays	Proposed: 38 & Existing: 17

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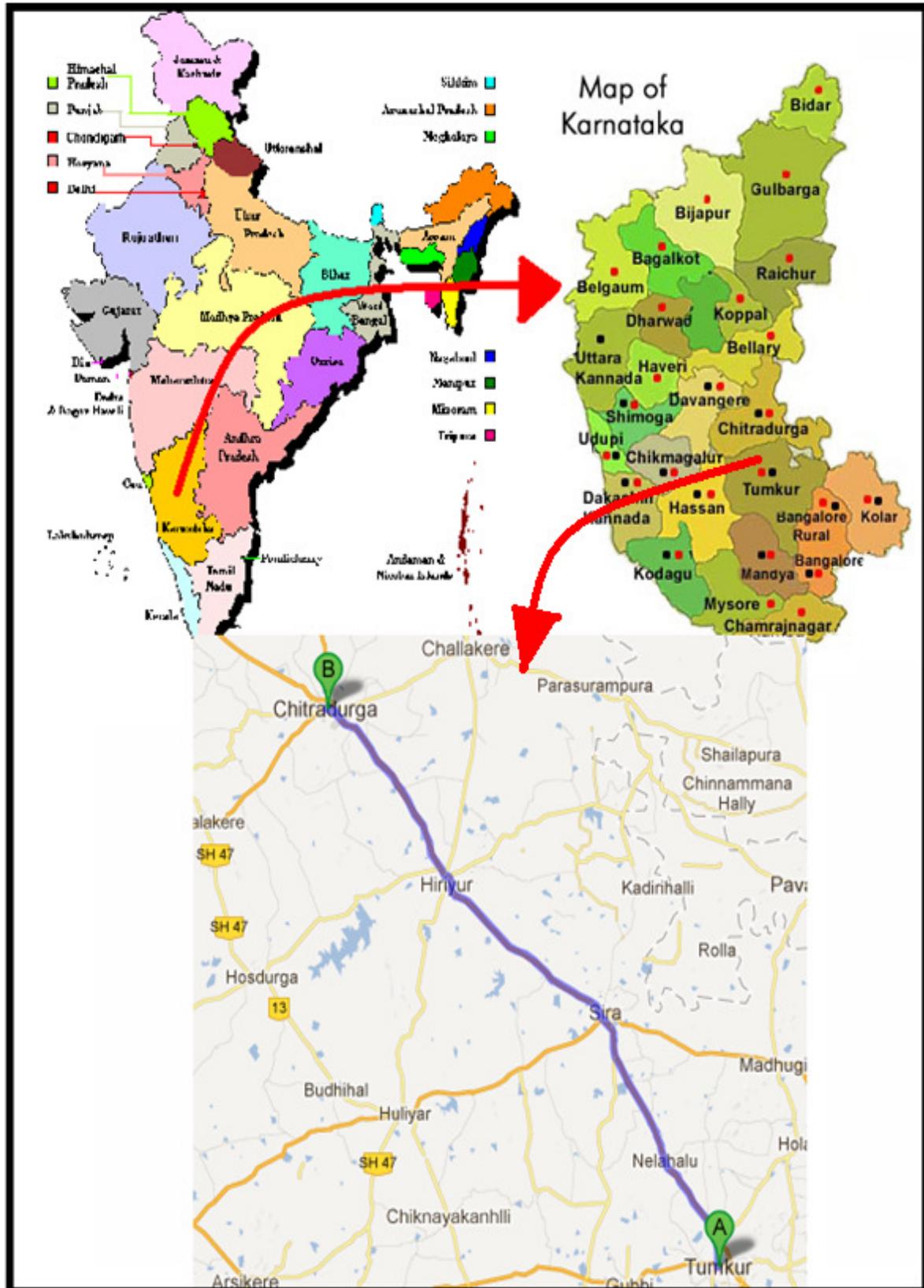


Figure: 1, Location Map

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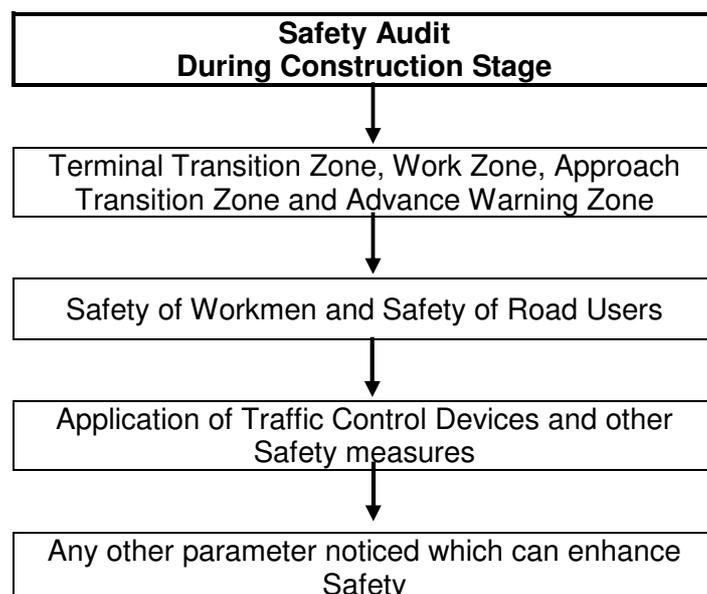
2.0 METHODOLOGY

In this report SC discusses the gap between what the road users are expected to do in a given situation and what they really do in that situation. Road Safety Audit (RSA) will review and report findings in this angle. The project highway is in advanced construction phase, where most of the section is under construction. The safety provisions for the sections of the highway where construction is either completed or not yet started have been audited and the findings are highlighted in this report.

The objective of RSA is to identify potential hazards during the *Construction Stage* of road projects by experienced road safety specialists and to evolve with possible remedial measures to improve road safety, with special emphasis on vulnerable road user group. Driver's behavior significantly changes as they traverse from construction to non – construction zones of the project highway. SC will inspect the Project Highway keeping into consideration the construction planning for the project and then identify the safety implications of the construction planning.

Construction zone is that area of the road which is affected by the construction works that affect traffic flow and safety of workers and road users. In this context it can also be called Traffic Control Zone. In rural areas, problem at these zones is accentuated by the reduced availability of carriageway, acquisition of land for diversions, etc. In urban areas, the problems are even more acute as diversions may have to be over adjacent road of the road network as well as the sharing of road space by different categories of road users. Traffic control zone can be divided into three major components i.e., Advance Warning Zone, Transition Zone and Work Zone. Manual on Traffic Management at Construction Zones is published by the Indian Roads Congress as IRC: SP: 55 should be referred to. Steps involved in the Audit are given below:

- Examination of Terminal Transition Zone, Work Zone, Approach Transition Zone and Advance Warning Zone with respect to safety point of view.
- Examination of safety measures adopted for workmen and road users.
- Examination of traffic control devices adopted at construction zone.



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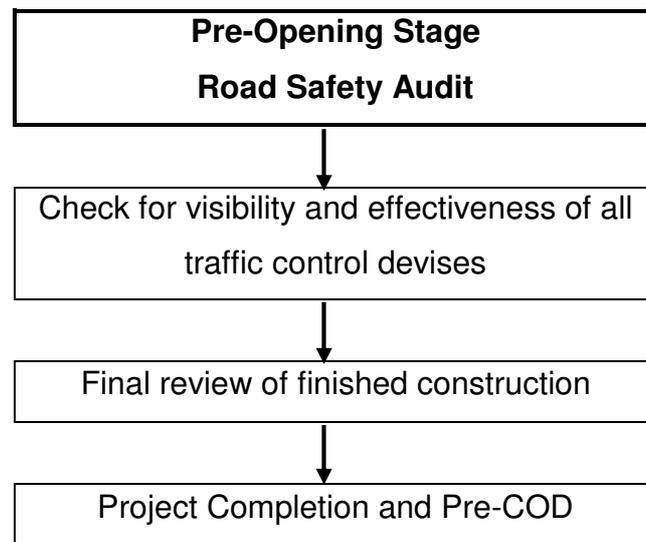
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Pre-Opening Stage Safety Audit

As per IRC: SP: 88-2010, the Pre-Opening stage is recommended immediately prior to opening of scheme. This should take the form of driving and when appropriate, walking and/or cycling the new route. This is checked also during night time to ensure that required night time safety standards have been achieved.

- A final review of the finished construction, to check from the standpoint of road safety that it is ready to be opened for traffic. It is particularly important to check the location and visibility of markings and other traffic control devices especially where changes were made during the construction period. The finished scheme should be assessed from the road users' point of view in daylight and in darkness.
- The auditor should examine whether or not road users are using the project facility in an appropriate manner.

Many schemes are constructed with the road open to traffic throughout the entire construction phase. When there is no question of an actual opening for traffic, an overall examination is to be carried out to audit whether the markings and all traffic control devices are in place. This examination is to be carried out by the auditor independently in the first instance and thereafter along with the Project Manager of the Contractor. Steps involved in Stage 5 Audit are given in Fig.1.



2.1. Safety Consultant's Project Activities

S. No.	Activities taken up by SC	Submissions	References
1.	Project start	Inception Report	HAKS-ITE/ 2012/ P002/ RSC/ 15/NHAI/004 dated 16.06.2012
2.	Conducting Training & Workshop	SC conducted 4 day training & workshop at BIT – Bangalore from 17 th to 20 th July 2012	
3.	Construction Stage	Preliminary Safety Audit Report (for audit done during 8 th & 9 th Aug 2012)	HAKS-ITE12/ P002/ RSC_15/ NHAI/ 006 dated 14.08.2012

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S. No.	Activities taken up by SC	Submissions	References
4.	Development Stage	Safety Audit Report	HAKS-ITE/2012/P002/RSC_15/NHAI/008 dated 29.08.2012
5.	Construction Stage	Safety Audit Report – 1 First Quarter (for audit done during 8 th & 9 th Aug 2012)	HAKS-ITE12/ P002/ RSC_15/ NHAI/011 dated 07.09.12
6.	Construction Stage	Safety Audit Report – 1A First Quarter (for audit done during 8 th & 9 th Aug 2012)	HAKS-ITE12/ P002/ RSC_15/ NHAI/013 dated 08.10.12
7.	Development Stage	Accident Analysis Report (for Accident data collected for the period between Jan-2009 to Aug-2012)	HAKS-ITE12/P002/RSC_15/NHAI/015 dated 23.10.2012
8.	Construction Stage	Safety Audit Report – 2 Second Quarter (for audit done during 22 nd , 23 rd & 24 th Nov 2012)	HAKS-ITE12/P002/RSC_15/NHAI/024 dated 29.12.2012
9.	Construction Stage	One Day Site Work Shop Report - 1	HAKS-ITE/2013/P002/RSC_15/NHAI/028 dated 21.01.2013
10.	Others	Observance Report on 24 th National Road Safety Week	HAKS-ITE/2013/P002/RSC_15/NHAI/029 dated 25.01.2013
11.	Construction Stage	Safety Audit Report – 3 Third Quarter (for audit done during 27 th & 28 th of Feb 2013)	HAKS-ITE/2013/P002/RSC_15/NHAI/033 dated 25.03.2013
12.	Construction Stage	Accident Analysis Report (for Accident data collected for the period between Sep-2012 to Feb-2013)	HAKS-ITE/2013/P002/RSC_15/NHAI/036 dated 18.04.2013
13.	Construction Stage	GAP Report	HAKS-ITE/2013/P002/RSC_15/NHAI/039 dated 09.05.2013
14.	Construction Stage	One Day Site Work Shop Report - 2	HAKS-ITE/2013/P002/RSC_15/NHAI/050 dated 26.06.2013
15.	Construction Stage	Safety Audit Report – 4 Fourth Quarter	HAKS-ITE/2013/P002/RSC_15/NHAI/053 dated 19.07.2013
16.	Construction Stage	Safety Audit Report – 5 Fourth Quarter	HAKS-ITE/2013/P002/RSC_15/NHAI/067 dated 17.12.2013
17.	Construction Stage	Accident Analysis Report (for Accident data collected for the period between MAR-2013 to OCT-2013)	HAKS-ITE/2013/P002/RSC_15/NHAI/068 dated 24.12.2013
18.	Development Stage	Comprehensive Safety Audit Report	HAKS-ITE/2013/P002/RSC_15/NHAI/069 dated 04.01.2014
19.	Construction Stage	One Day Site Work Shop Report - 3	HAKS-ITE/2014/P002/RSC_15/NHAI/081 dated 25.02.2014

2.2. Safety Audit Team

The physical inspection of the Project Corridor was carried out on 19th and 20th February 2014. Trips to the site were made during the day time as well as during the night time. The

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focus of primary observations was combined on road safety and measures taken for the safety of road users, work zones, protection of workers and pedestrians.

2.3. Safety Audit Report – 6: Construction Stage

This Safety Audit Report – Construction Stage is the outcome of the physical inspection of the project corridor under construction (February 2014). This report will review the safety measures adopted by Concessionaire in the proposed construction activities and it will report potential hazards due to the noncompliance of safety norms. Further, it will review safety of completed project highway sections to identify gaps in implementation of safety measures recommended in Development Stage Safety Report. Note that this report's intent is to advise NHAI about immediate measures to be undertaken to improve work zone safety for all road users. Also the recommendations/improvements suggested herein are based on the philosophy of averting road accidents due to erroneous judgment of the drivers and to protect the vulnerable road users and workers in the work zone from getting involved in collisions.

2.4. Checklists (Included as Appendix – A)

Checklists are useful to assist the audit team. These checklists describe the performance and situations that can affect the road safety. Checklists have been prepared for this Stage – Audit, as per IRC: SP: 88-2010. These checklists are used as a guide to focus audit towards important matters that should be covered and not overlooked. Each project is different and will raise specific issues that may contain further safety implications. When reviewing each of the points, the team considered that the road user would have to cope with conditions during night and in night/ adverse weather conditions.

2.5. Safety Audit Observations and Site Photos

Safety Audit findings/ observations are listed in Appendix – B and corresponding site photos are attached as Appendix – C.

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3.0 DETAILED DISCUSSION AND RECOMMENDATIONS ON SPECIFIC SAFETY ISSUES

Road safety inspections have been conducted for the detailed assessment of defectives/deficiencies of the project highway by visual inspection. During the field investigations, the existing substandard features and roadway conditions, roadside obstructions, pavement markings, signs and other features were observed.

Though focus has been given to construction work zones, it was found that the entire length of the project roadway has non standard signage, non standard Exit/Entry ramps, unauthorized access, unprotected bridge approaches, non standard/retro reflective pavement markings and traffic control devices.

The detailed findings (direction wise and with chainage) from the audits carried out for each specific segment along with case specific mitigation measures have been given in the Summary Sheets placed at Appendix B. Appendix C give photographic descriptions (direction wise) of some of the more important deficiencies in safety measures at various locations. Below is a brief description of deficiencies as observed over various study sections comprising the entire study corridor.

3.1. Access to Six Lane Highway:

SC has reviewed Six-Laning operations w.r.t. prevailing conditions at all existing openings along MCW. Overall, it is observed that there are many uncontrolled direct access points/U-turn facilities along the project highway. Slow moving vehicles entering MCW thru these openings from Service/ Side road/U-turn facilities and creating hazardous conditions for all as high speed thru traffic on MCW is unaware of these merging points. In light of the above please note the following:

- With reference to clause 1.3 of Manual of Specifications and Standards for Six Laning of National Highways through Public Private Partnership (Schedule – D of CA) states that: “access to the highway shall be provided only at pre-determined locations from service roads through properly designed entry/exit ramps and or from interchanges”.
- With reference to clause 2.2.1 of Manual of Specifications and Standards for Six Laning of National Highways through Public Private Partnership (Schedule – D of CA) states that “Inter connection between the service roads shall be through under passes only, Which will facilitate cross movement of local traffic from one side service road to other side service road.”
- Exit/Entry ramps should be provided with proper Deceleration/Acceleration Lane. It is observed that Kerbs are built at the exit locations from the MCW to S/R. SC recommends kerbs to be removed at such exit locations
- Provide standard pavement markings and Signing to guide the road user
- Install Road studs and Lighting at Exit/Entry Locations
- **RECOMMENDATION:** SC recommends that Independent Engineer is requested to review with Concessionaire on possibility of closing the open drain and utilize RCC Pipes to get additional lane/ space for deceleration/acceleration lanes for exit/entry ramps. IE & Concessionaire shall review SC’s recommendations to redesign Traffic Control Devices (Signs, Pavement Marking, Lighting) for Exiting traffic from MCW to S/R.

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Ch 80.000 Bullet type Exit without deceleration lane.

3.2. Traffic signs and road markings for guidance to user:

Note that Concessionaire is yet to submit revised Signage & Marking Plans addressing IE's & Safety Consultant observations. However, SC's observations on field review of installed signage are listed below:

- Placement and Design of IRC mandated minimum regulatory, cautionary, and informative sign were improper and not as per prescribed standards.
- At some locations none of IRC mandated signs were installed. Further, the Advance Direction signs/Flag Type Direction signs installed does not meet the dimension criteria as set forth in the specified Guidelines.
- **General Recommendations for Signing at the Exit/ Entry Ramps:**
 - a) At the entry point of the Service Road into the Main Carriageway "NO ENTRY" Sign to be provided. This is to prevent MCW traffic entering onto Service Road.
 - b) At the entry point of the Service Road into the Main Carriageway "GIVE WAY" Sign to be provided for the traffic entering the Main Carriageway.
 - c) "Merging Traffic Ahead" to be provided on the Main Carriageway min 180m ahead of the point of entry of the service road traffic into the main Carriageway.
 - d) For Exit Ramp from the Main Carriageway, Give Way Signs are recommended for Service Road Traffic. Only if the traffic is exiting into a through service road.
 - e) For grade separated intersections, (i.e. where the traffic movement occurs on two or more than two levels), two advanced direction signs should be provided. The first Advance Direction Sign is located 750m to 1.5km from the Exit, which should be preferably gantry mounted sign. The second Advance Direction Sign is located 250m to 750m from the exit. It should be gantry mounted; but at intersections where the number of through lanes remains constant, it may be shoulder mounted. Location of signs should be measured from the taper
 - f) A map type and stack type direction sign can be installed at 100m to 250m ahead of exit
 - g) An exit sign as shown below with name of the exit place can be installed at the start of deceleration lane

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Schematic Representation

- Majority of highway is furnished with non-retro reflective pavement marking. Remove old Pavement Markings
- Non-standard Private Advertisements are installed in the ROW.
- RECOMMENDATION: Concessionaire is required to install standard Signage, Retro Reflective Pavement Markings and remove private signs at the earliest.

3.3. Placement of Fixed Objects, Milestones to Travel Ways on MCW:

SC's field observations with respect of forging highways are listed below:

- KM stones are placed close to the edge of paved shoulder due to the presence of open ditch creating hazardous conditions for errant vehicles.
- RECOMMENDATION: It is recommended to relocate all KM stones to median side. Provide Standard and Retro reflective Hazard Markers ahead of metal crash beam railing was provided in front of ECBs



Ch 115.000 Km stone placed at the edge of shoulder.

3.4. Junctions, Median Openings & U-turn Facilities:

In SC's Field Review, it is noted that there are many direct access points along the project highway, where slow moving traffic from Service/ Side road/U-turn facility can directly access the high speed Six-Lane highway and Service Road / Cross Road/U –turn facility traffic can also cut across the highway thru median openings creating hazardous conditions to all road users. SC has raised this issue several times before through letters, reports, meetings & workshops and again it is requested that Concessionaire to review the following and take necessary actions:

- At-grade intersections/ U-turn facilities are not allowed on six-lane highways as they create unsafe operations at these locations and same is specified in Six-Laning Manual. Therefore, it is recommended to eliminate direct access from cross roads and services roads by providing combination of proper exits, entries and/or staggered median openings.

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Inter connections between S/R shall be through Under passes only, Which will facilitate cross movement of local traffic from one side service road to other side service road.”

- It is recommended to provide deceleration lane at U-turn facilities instead of using the outer lane as left turning lane
- It is recommended to remove the thru and Left turn lane pavement markings and provide thru lane marking only.
- It is recommended to close all unauthorized and unnecessary/redundant median openings.
- If Six-Laning Highway is required to have median openings, they should be designed to meet IRC standards with turning lanes, advanced warning along with proper delineation.



Ch 91.000 U-Turn Facility.

3.5. Accident Black Spot Intervention:

SC has reviewed and analyzed crash data for Development & Construction stage and prior 2-years and recommended that all black spot locations shall be provided with suggested interventions. Concessionaire shall review SC's Crash Analysis Report and implement all recommended interventions.

3.6. Lighting System:

Clause 2 (c) of the Concession Agreement states that: “The Project Highway shall be provided with lighting system in Urban stretches/ built up areas, grade separators, underpasses, pedestrian subways, toll plaza and its approaches, rest areas and bus stops. Lighting Systems shall have specifications mentioned in Schedule-D”.

Clause 4.23 of Manual of Specifications and Standards for Six Laning of National Highways through Public Private Partnership (Schedule – D of CA) states that:

- All light posts erected on the railings of bridges, structures shall have adequate height such that a uniform illumination of 40 lux is available.
- All high mast lights in the interchange area shall illuminate the interchange with intensity of 40 lux.
- All entry and exit ramp areas shall be uniformly illuminated with 40 lux intensity
- All underpasses shall be illuminated with minimum intensity of 30 lux.

In SC's field review it is observed that light poles with fixtures were installed at some locations and they are yet to be installed on many locations. Further, none of the installed lights fixtures are lit at the time of SC's night inspection.

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RECOMMENDATION: Concessionaire is required complete installation of Required Lighting at the earliest. Lighting is required at all U-Turn Facilities, exit/entry points.

3.7. Illegal Cuts in the Stone Masonry Walls along built up sections:

SC vide various letters, reports, meetings and workshops, has been endorsing the view that gap (locals in the area have broken these wall to walk across the six lane highway) in stone masonry walls. SC recommends drivers shall be alerted about these locations by furnishing with cautionary flashing yellow beacons along with proper signage until a permanent solution is identified with local administration.



Ch 109.500 Unauthorized access from S/R to MCW and Unauthorized Median Opening.

3.8. Headlight Glare:

Headlight glare is severely affecting driving conditions at night on curves as well as on straight sections. Therefore, it is recommended that glare screen fence shall be installed along the median at subject locations.

3.9. Merging of Service road in to MCW at four lane Bridge Locations:

During Construction Stage Safety Audit Field Visit, Safety Consultants observed that service road merging in to high speed Main Carriage Way at new four lane bridge locations, which is a potential safety hazard

- With reference to clause 2.2.9 of Manual of Specifications and Standards for Six Laning of National Highways through Public Private Partnership (Schedule – D of CA) states that “Service roads and the main highway shall be physically separated in all circumstances so that there is no interference to the traffic on main highway due to the traffic on service roads and merging / diverging takes place at specified locations.”
- Entry/Exit from/to Service road from Main Carriage Way shall be through proper Acceleration/Deceleration lanes only at specified location
- It is recommended to remove sidewalks on Bridge locations to gain extra width of lane to provide/Continue safety Barriers/Iron Fence to separate Service road from Main Carriage Way at such locations.
- It is recommended to provide Road Studs/RPMs immediately at such locations

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 158.400 Merging of S/R into MCW.

3.10. Transition/Approach Railing to Bridges & Culverts:

Majority of Bridge and Culvert Railing ends are yet to be treated with proper transition and/or delineation. Note the following:

- It is recommended that all culvert and Bridge headwall/railing ends shall be furnished with delineators/hazard marker and approach metal beam railing with proper end treatments.
- It is recommended that approach railing shall be properly attached to bridge and culvert rigid rails to ensure rigid blunt edges are not exposed to impacting vehicles.
- It is recommended to remove rigid concrete barriers installed in front of Culverts or Minor bridge railings which are furnished for the provision of safe walks. Installation of Safe walks on structures in isolated locations along highways without any approach sidewalks has no practical purpose.

3.11. Drainage ditch/Earthen drain

The drainage ditch along the project stretch is located close to the Main Carriage Way. It is observed that due to the close proximity of the drainage ditches the vehicles fall into the ditches. It is recommended that guide rails be installed at the locations where the drainage ditch/earthen drain are close to the MCW. Below are the pictures of such accidents



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Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V

3.12. Clear zone

As per the AASHTO (American Association of State Highway and Transportation Officials): Clear Zone is an unobstructed, traversable roadside area that allows a driver to stop safely, or regain control of a vehicle that has left the roadway. The width of the clear zone should be based on risk (also called exposure). Key factors in assessing risk include traffic volumes, speeds, and slopes. Clear roadides consider both fixed objects and terrain that may cause vehicles to rollover. The recommended clear zone ranges are based on a width of 30 to 32 feet (9 meters) for flat, level terrain adjacent to a straight section of a 60mph highway with an average daily traffic of 6000 vehicles.

Also a per the DMRB (Design Manual for Roads and Bridges , United Kingdom) A clear zone next to the highway will make a large contribution to roadside safety. The DMRB advised a clear zone of 4.5 meters for trunk roads where speed limits were 50 mph and over. Taking these standards in account and with respect of safety of the project highway it is recommended to follow the UK standards of 4.5m.

Safety barriers are recommended to be installed at the locations where fixed objects such as milestones/ECBs, drainage ditches, transition or approaches to bridges and culverts are located within 4.5m of the edge of the paved highway (Clear Zone). (See above sections in this report, 3.3 Placement of Fixed Objects, Milestones/ECBs Close to Travel Ways on MCW, and 3.9 Transition/Approach Railing to Bridges & Culverts and 3.10 Drainage ditch / earthen drains)

3.13. High Embankments

SC has observed high embankments on curves as well as on tangent sections are under construction and they are yet to be furnished with Metal Beam Railings. It is recommended that a strip chart shall be generated to indicate existing and proposed metal beam railings for field review.



Ch 96.100 High Embankment .

3.14. Project Facilities

It has to be noted that the Concessionaire is yet to provide SC with details of Truck Lay Bay and Toll Plaza among others. Also, it is observed that construction activities for the facilities are started at some locations. At remaining locations work has not yet started due to land acquisition issues

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Ch 156+200 to Ch 156+400(LHS & RHS) Truck parking is observed on the Outer lane of MCW at this Location

3.15. Ambulance and Crane

The Concessionaire as per CA is responsible for providing Emergency response team of Ambulance, Crane and Route patrol, in case of any incidents along the project.



Ch 104+600 Ambulance and Crane

3.16. Accidents on MCW

In the case of unsafe conditions, vehicle breakdowns and accidents, the Concessionaire shall follow the relevant operating procedures, which shall include the setting up of temporary traffic cones and lights as well as the removal of obstruction and debris expeditiously. Such procedures shall be in accordance with Applicable Laws, Applicable Permits and provisions of the Concession Agreement.

3.17. Accident Records

Concessionaire is maintaining monthly accident records as per NHA standard format and is submitting the same to PIU-Chitradurga, Independent Engineer and Safety Consultant.

3.18. Service Road

In Safety Consultants field review it is observed that, Service road construction has been completed and Exit/Entry ramps were provided from MCW to Service road at many locations and under construction at few locations. The following are the field observations

- Exit/Entry to service road without proper Acceleration/Deceleration lane is provided, which is major safety hazard

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- Pavement Markings are not provided on Service road, which makes difficult for night time driving
- Signage and Advance warning signs are not installed
- Unauthorized/Forced access were created from service road to MCW at many locations

Recommendations

- Provide Acceleration/Deceleration lane for Exit/Entry from/to Service road with road markings
- Install Cautionary/Informatory signs ahead of Exit/Entry, VUP, CUP, PUP and Intersection locations
- Install Speed humps ahead of exit locations where high speed traffic from MCW exits into Service road
- Install speed humps on side roads
- Immediately close the Unauthorized/Forced access/openings.
- Install delineaters/Hazard Markers ahead of Footings of FOBs on Service Roads

3.19. Hazard Markers

Hazard markers are warranted at:

- Beginning of Stone masonry wall at all villages/ towns.
- Masonry walls abutting pedestrian sub-ways.
- Beginning of retaining walls provided for structures (VUP, CUP, PUP etc.)
- Footings of FOBs on Service roads.
- Steps (abutting stone masonry walls) provided for pedestrians to access MCW from Service road.

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4.0 Work Zones Safety Audit

SC has noted that work zones are established at several locations along the project stretch without advanced signage alerting road users about on-going activities. In some instances, Outer/Inner lane of MCW is closed for longer periods without any signage or flagmen on site. This is unacceptable and this attitude of total disregard for road users should be penalized which may include work suspensions. We request Authority and Independent Engineer to review and take necessary action.

4.1. Reduced Carriage way

The project highway is in its final construction phase. There are several locations where Three lane Main carriage way is reduced to two lane carriage way. At these locations either construction work is going on median or Culvert locations or Exit/Entry ramps. Transition from 3-2 Lane without proper channelization and advance warning signs and Transition areas are difficult to negotiate because of very poor transition area geometry. There are no flag men/Advance warning signs to guide or alert the road user regarding transition/Reduced Carriage way. Barricading provided are not consistent and are not as per IRC standards. Traffic diversion needs to be organized as per standards with necessary Barricading, signage and pavement markings.



Ch.98.250 Transition from 3-2 Lane

4.2. Barricading of work area

Construction sites must be barricaded as per IRC Guidelines. These need to be supplemented with warning signs and delineators. Barricading has been generally found to be poor at those locations. No additional safety measures / traffic management measures or flagmen (not always desirable) are available for guiding the traffic. At many locations barricades are found to be Substandard and distance between barricades is more. High embankment locations are not barricaded at some locations. Plastic Tapes have been used to connect the barricades

Ch 158.400 Standard Practicing of Work zone Barricading procedure is not followed.



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Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V

4.3. Worker's Safety

In this section, the SC review covers aspects pertaining to provisions and use of Personal Protective Equipment such as helmets, masks, safety harness/belts, boots, gloves, eye's and hearing protection devices. The assessment also include review of safety provisions during operations such as loading and unloading of materials; bar bending and cutting; gas, excavation work; working near equipment/machinery; working at heights (including aspects pertaining to ladder, scaffolding, working platform, railing safety); safety during placement of traffic control devices.

The Concessionaire shall at all times keep and maintain an adequate supply of suitable personnel protective equipment which shall be readily available for use at all times on the sites, and would include amongst others the following items:

- a) Safety Helmets.
- b) Safety Vests.
- c) Protective Gloves.
- d) Safety Footwear.

At some locations SC noticed workmen working without wearing any of the above said safety equipment



Ch 158.400 Workmen without PPE.

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Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V

5.0 SUMMARY OF OBSERVATIONS

As project is at its advanced construction stage, traffic maneuvers thru completed 6 lane and under construction 4 lane stretches. Safety shortfalls observed in these areas are discussed with site photographs in Appendix – B & C. The Safety issues that need serious consideration (as revealed through audit) are:

- Access to the six lane highway: It is observed that there are many uncontrolled direct access points along the project highway. Slow moving vehicles entering MCW thru these openings from Service/ Side road and creating hazardous conditions for all as high speed thru traffic on MCW is unaware of these merging points.
- Traffic Signs: Placement and Design of IRC mandated minimum regulatory, cautionary, and informative signage were not as per IRC standards. At some locations none of IRC mandated signs were installed. Further, the Advance Direction signs/Flag Type Direction signs installed does not meet the dimension criteria as set forth in the specified Guidelines.
- Pavement markings: Several stretches of highway is furnished with non-retro reflective pavement marking. Also, some stretches are missing lane markings. Remove old pavement markings.
- Placement of Fixed Objects, Milestones: KM (Kilometer) stones are placed close to the edge of paved shoulder due to the presence of open ditch creating hazardous conditions for errant vehicles
- Junctions, Median Openings & U-turn Facilities: It is noted that there are many direct access points along the project highway, where slow moving traffic from Service/ Side road/U-turn facility can directly access the high speed Six-Lane highway and Service Road / Cross Road/ U-turn facility traffic can also cut across the highway thru median openings creating hazardous conditions to all road users
- Illegal Cuts in the Stone Masonry Walls along built up sections: There are many locations where illegal cuts were made in the Stone Masonry walls along the built up sections and used by pedestrians and two wheelers to cross the MCW.
- Lighting System: In SC's field review it is observed that light poles with fixtures were installed at some locations and they are yet to be installed on many locations. Further, none of the installed lights fixtures are lit at the time of SC's night inspection
- Headlight glare is severely affecting driving conditions at night on curves as well as on tangent section at locations where the median is less than 4.5m
- Transition/Approach Railing to Bridges & Culverts: Majority of Bridge and Culvert Railing ends are yet to be treated with proper transition and/or delineation
- Service road at Bridge Locations: service road shall be physically separated from MCW at new four lane bridge locations where service road continuing with high

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V

speed MCW. Entry from S/R to MCW shall be provided thru proper acceleration lane only.

- Drainage ditch/Earthen drain: The drainage ditch along the majority of the MCW is located close to the Main Carriage Way. It is observed that due to the close proximity of the drainage ditches to MCW is leading to accidents where the vehicles fall into these ditches
- High Embankments: SC has observed high embankments on curves as well as on tangent sections are under construction and they are yet to be furnished with Metal Beam Railings
- Clear Zone: Safety barriers are recommended to be installed at the locations where fixed objects such as milestones/drainage ditches/transition or approaches to bridges and culverts are located within 4.5m of the edge of the pavement
- Standard Practice of Guard fencing/Barricading has not been adopted for protecting the construction zone.
- Proper Entry/Exit is not demarcated for the construction vehicles moving around the site.
- Exit/Entry ramps with proper deceleration/acceleration lane shall be provided. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings and signing to guide the road user
- Sub standard work zone signage's placed in the work zone area.
- Damaged/broken crash barriers to be replaced/ repaired immediately.
- Pavement markings/Edge lane Markings are missing at some locations. Old Pavement Markings shall be removed
- Retro-Reflective bollards/Flashing Beacons/ median opening signs must be provided at appropriate locations.
- Truck parking particularly along the outer lane is seen over the entire stretch this needs to be dealt with seriously.

APPENDIX A: CHECKLIST 4 - STAGE 4 AUDIT (DURING CONSTRUCTION STAGE)

S. No.	Issue	SC Observation
1)	Have all recommendations from the previous stage been followed? If not, why not?	Most of the Safety Consultant's recommendations submitted via Safety Audit Report – 1, 1A, 2, 3, 4 & 5 for construction stage of this project have not been followed. Please refer IE's Observation/ Compliance reports on above said SC's audits: 1. ICT/IC/NHAI/IND/NHDP-V/MC-II/BOT/1400/TL 1735 2. ICT/IC/NHAI/IND/NHDP-V/MC-II/BOT/1400/ATL 1529 3. ICT/IC/NHAI/NHDP-V/MC-II/BOT/1400/ATL 1192 4. ICT/IC/NHAI/NHDP-V/MC-II/BOT/1400/TL 1372
2)	Whether information regarding the construction zone approaching has been provided well in advance or not?	Yes, advance warning & informatory signage regarding construction zones have been provided. But, the night time visibility of these signs is not adequate.
3)	Whether standard procedure and contract conditions provided for proper management of the construction site and road users are properly and safely accommodated?	Yes Clause 2 of Schedule-L of the Concession Agreement states the Obligations of the Concessionaire, which he shall abide by as they are relate to safety of the Users.
4)	Whether the transitions from the existing road to the site of works safe and clearly laid out?	The project is in its final construction stage. At very few locations Main Carriage way outer lane/inner lane traffic has been diverted/Merged to the remaining lanes. These diversions are not in compliance with IRC SP 55
5)	Whether the width of the lanes is satisfactory for the traffic passing through the works area?	The project is in its final construction stage. At very few locations Main Carriage way outer lane/inner lane traffic has been diverted/Merged to the remaining lanes. These diversions are not in compliance with IRC SP 55
6)	Whether sight and stopping distances adequate at site of works and at intersections?	The project is in its final construction stage. Ongoing Construction Activities are at Culverts, Crash Barriers, Embankment works, Electrical wiring in Median etc. and these are work sites are scattered along the project highway. Fast moving vehicles on the completed stretches are subjected to sudden lane shifts due to the works mentioned above. Concessionaire to provide additional safety measures at these sites to increase night visibility and to inform the users about these work sites.
7)	Whether bus stops appropriately located with adequate clearance from the traffic lane for safety and visibility.	No All the buses are stopping on the MCW for pick up/ drop off. Bus stops are not appropriately located.

Safety Audit Report 6 – Construction Stage**Appendix - A**

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V

S. No.	Issue	SC Observation
8)	Whether appropriate street lighting or other delineation provided at the road works to ensure that the site is safe at night? Check the night time visibility of traffic control devices.	No Delineation provided at all the construction sites are non retro-reflective/ their retro-reflectivity has been reduced due to accumulation of dirt/dust.
10)	For clear and sufficient information to the road user, advance warning signs installed or not?	No Placement and Design of Advance warning signs installed were not as per Prescribed IRC standards
11)	Is there any provision of marked lanes for safe and clearly guiding road users?	The project is in its final construction stage. Ongoing Construction Activities are at Culverts, Crash Barriers, Embankment works, Electrical wiring in Median etc. and these are work sites are scattered along the project highway. Fast moving vehicles on the completed stretches are subjected to sudden lane shifts due to the works mentioned above. Concessionaire to provide additional safety measures at these sites to increase night visibility and to inform the users about these work sites.
12)	Whether suitable measures provided through construction zones to control driver behavior?	SC observations on adequacy of Traffic Control Devices are discussed in detail under Safety Audit Report – 1, 1A, 2, 3, 4 & 5 for construction stage. Please refer IE's Observation/ Compliance reports on above said SC's audits: 1. ICT/IC/NHAI/IND/NHDP-V/MC-II/BOT/1400/TL 1735 2. ICT/IC/NHAI/IND/NHDP-V/MC-II/BOT/1400/ATL 1529 3. ICT/IC/NHAI/NHDP-V/MC-II/BOT/1400/ATL 1192 4. ICT/IC/NHAI/NHDP-V/MC-II/BOT/1400/TL 1372
13)	Check for the adequacy of traffic control devices (such as signs, markings, cones, drums, delineators, barricades, flashing lights etc.) required for each zone i.e., at advance warning zone, at approach transition zone and at work zone? Check for placement and visibility of these control devices.	SC observations on adequacy of Traffic Control Devices are discussed in detail under Safety Audit Report – 1, 1A, 2, 3 & 4 for construction stage. Please refer IE's Observation/ Compliance reports on above said SC's audits: 1. ICT/IC/NHAI/IND/NHDP-V/MC-II/BOT/1400/TL 1735 2. ICT/IC/NHAI/IND/NHDP-V/MC-II/BOT/1400/ATL 1529 3. ICT/IC/NHAI/NHDP-V/MC-II/BOT/1400/ATL 1192 4. ICT/IC/NHAI/NHDP-V/MC-II/BOT/1400/TL 1372
14)	Has permission been taken while changing the standard layouts from safety point of view?	Concessionaire submitted Traffic Management Plans to IE for review and comments. He has submitted typical sections on which IE has already commented
15)	Whether police and other emergency services been consulted?	Yes On occurrence of any accident along the project highway the Route Patrol Personnel immediately consult/ inform nearby Police Stations. This is the standard
16)	Check for proper care and attention for pedestrian and non-motorized traffic at construction sites.	Adequate safety provisions were not provided. Pedestrians and non-motorized traffic could enter construction sites. Construction sites were not protected.

Safety Audit Report 6 – Construction Stage**Appendix - A**

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V

S. No.	Issue	SC Observation
17)	Check for adequate safety provisions for the elderly and persons with disabilities.	No safety provisions for the elderly and persons with disabilities were observed
18)	Whether construction workers provided with protective clothing etc. reflecting jackets, hard hats, gloves etc.?	No
19)	Whether flagmen are available on duty at the appropriate places? Check for proper traffic management practice to avoid inhibiting traffic to pass clear of work site and necessary attention to roadside safety.	No Concessionaire's Safety Manual clearly defines the traffic management practice, but it is not implemented at site.
20)	Whether the temporary diversion is provided at work zones in compliance with the contract and traffic management plan approved by the Engineer.	Yes, Traffic Management Plan is reviewed and approved by the Independent Engineer. At few locations, field application is not in compliance with the approved plans. Refer IE letters mentioned in S.N. 1 of this checklist.
21)	Whether the Traffic Management Plan at work site prepared and submitted by the Contractor to the Engineer for approval,	Yes
22)	Is the Supervision Engineer ensuring the required quality of traffic management plan?	Yes/ No Independent Engineer has raised this issue several times, the Concessionaire complied with both Safety Consultant's and Independent Engineer's comments/ observations on quality of implementation of traffic management plan at few locations. Refer IE letters mentioned in S.N. 1 of this checklist.
23)	Whether arrangements of First Aid Box and other emergency care exist for persons getting injured.	Yes
24)	Whether suitable speed reducing measures are provided at work zones.	The project is in its final construction stage. Ongoing Construction Activities are at Culverts, Crash Barriers, Embankment works, etc. and these are work sites are scattered along the project highway. Fast moving vehicles on the completed stretches are subjected to sudden lane shifts due to the works mentioned above. Concessionaire to provide additional safety measures at these sites to increase night visibility and to inform the users about these work sites.
25)	Other checks made at discretion of auditor or client.	N/A

Sl. No.	Chainage		Side	Road Safety Audit Observations	Reference Page in Appendix - C of this report
	From	To		19th & 20th February 2014	
1	75.000		LHS	Buses are stopping on the MCW. As the Buses are stopping on the main carriage way for pickup which results in lot of pedestrain movement around the MCW	Page 1
2	76.900		LHS	Lot of Pedestrain Crossing movement is observed on the MCW	Page 1
3	77.000		LHS	Entry/Exit from the Service road to Main Carriageway without Proper Acceleration/Deceleration lane	Page 1
4	77.400		LHS	Exit from the Service road to Main Carriageway without Proper Deceleration lane. provide standard pavement markings and Signage to guide the road user	Page 1
5	80.000		LHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings and signage to guide the road user	Page 2
6	81.450		RHS	Buses are stopping on the MCW. As the Buses are stopping on the main carriage way for pickup which results in lot of pedestrain movement around the MCW	
7	82.000	82.200	LHS	High Embankment area. Construction of W-Beam metal crash Barriers are yet to be completed.	
8	82.400		LHS	At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only. Improper Channelization of traffic	Page 2
9	82.850		LHS	Non standard hazard marker	Page 2
10	83.200		LHS	Provide Hazard markers ahead of approach of kerbs on shoulders	Page 2
11	83.850		LHS	Unauthorised Median Opening	Page 3
12	83.900		LHS	Bullet type Entry without proper acceleration lane. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings and Signage to guide the road user	
13	84.100		LHS	Provide Hazard markers ahead of approach of kerbs on shoulders	
14	84.450		LHS	Truck Parking on the shoulder is observed at this location	Page 3
15	85.400		LHS	Bullet type Exit/Entry without proper Deceleration/Acceleration lane. Irregular Pavement Markings. Old Pavement Markings should be removed	Page 3
16	86.650		LHS	Provide Hazard markers ahead of approach of kerbs on shoulders	
17	87.250		LHS	Break in Masonry wall creating direct access to the MCW, which is a potential safety hazard and Unauthorized Median Opening	Page 3
18	88.400		LHS	Provide Hazard markers ahead of approach of kerbs on shoulders	
19	88.900		LHS	Bullet type Entry without proper acceleration lane. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings and Signage to guide the road user	Page 4
20	89.000		LHS	Buses are stopping on the MCW. As the Buses are stopping on the main carriage way for pickup which results in lot of pedestrain movement around the MCW	
21	90.250		LHS	High embankment area, crash barriers are not provided at this location	

Sl. No.	Chainage		Side	Road Safety Audit Observations	Reference Page in Appendix - C of this report
	From	To		19th & 20th February 2014	
22	91.000		LHS	At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only. Improper Channelization of traffic	Page 4
23	91.800		LHS	Break in Masonry wall creating direct access to the MCW, which is a potential safety hazard	
24	92.100		LHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings and signage to guide the road user	Page 4
25	93.600		LHS	Pedestrians waiting for Bus/Pickup vans on MCW. Unauthorized Median Opening	Page 4
26	95.000		LHS	Unauthorized opening creating direct access to MCW	Page 5
27	95.600	95.800	LHS	Truck Parking on the shoulder is observed at this location	
28	96.100		LHS	High embankment area, crash barriers are not provided at this location	
29	97.400		LHS	Bullet type Exit without proper Deceleration lane	Page 5
30	97.600		LHS	Retroreflective hazard markers are not placed at the entrance or headwall of the Structure	
31	98.250		LHS	Construction work in progress, Standard practices of Guard fencing/Barricading/Diversion have not been followed for protecting the construction zone, No Flag man to warn the users. Workers without PPE	Page 5
32	98.550		LHS	Unauthorized opening creating direct access to MCW	Page 5
33	99.300		LHS	Unauthorized opening creating direct access to MCW	Page 6
34	99.400		LHS	Buses are stopping on the MCW. As the Buses are stopping on the main carriage way for pickup which results in lot of pedestrain movement around the MCW	
35	99.950		LHS	Bullet type Entry without proper acceleration lane. No Pavement Markings	
36	100.000		LHS	Bullet type Entry/Exit without proper acceleration/Deceleration lane. No Pavement Markings	
37	103.400		LHS	Direct access to Subway from MCW. Unauthorized Median Opening	Page 6
38	105.100		LHS	No hazard marker is placed at the stone masonry wall which is not visible during nights	Page 6
39	106.200		LHS	Bullet type Exit/Entry without proper Deceleration/Acceleration lane	Page 7
40	107.800	107.900	LHS	Pedestrian on MCW waiting for Bus/Pickup Van. Break in Metal Beam Crash Barrier on Median.	Page 7
41	108.500		LHS	Unauthorized opening creating direct access to MCW	Page 7
42	109.500		LHS	Un authorized median opening and forced opening to access MCW from SR.	Page 7
43	109.800		LHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit/Entry locations to be removed. Provide standard pavement markings and signage to guide the road user	
44	110.400		LHS	Unauthorized opening creating direct access to MCW	
45	111.150		LHS	Pedestrians waiting for Bus/Pickup vans on MCW.	
46	111.750		LHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit/Entry locations to be removed. Provide standard pavement markings to guide the road user	Page 8
47	113.600		LHS	Bullet type Entry from Service road to Main Carriageway without Proper Acceleration lane. Provide pavement markings and sigange to guide the road user	
48	115.800		LHS	Unauthorized opening creating direct access to MCW	Page 8

Sl. No.	Chainage		Side	Road Safety Audit Observations	Reference Page in Appendix - C of this report
	From	To		19th & 20th February 2014	
49	117.200		LHS	Entry from the Service road to Main Carriageway without Proper Acceleration lane.	
50	117.500		LHS	Entry from the Service road to Main Carriageway without Proper Acceleration lane.	
51	118.600		LHS	Old Pavement Markings should be removed	
52	119.800		LHS	Bullet type Exit without proper deceleration lane. Provide standard pavement markings and signage to guide the road user	
53	120.100		LHS	Remove old Pavement Markings	Page 8
54	120.600		LHS	Entry from the Service road to Main Carriageway without Proper Acceleration lane.	Page 8
55	120.950		LHS	Provide Hazard markers ahead of approach of Metal Beam Crash Barrier	Page 9
56	121.250		LHS	Unauthorized Median Opening	Page 9
57	122.200		LHS	Retroreflective hazard markers are not placed at the entrance or headwall of the Structure	
58	122.950		LHS	Bullet type Exit without proper deceleration lane. Provide standard pavement markings and signage to guide the road user	
59	123.200		LHS	Provide standard and retro reflective hazard marker	
60	124.800		LHS	Bullet type Entry without proper acceleration lane. Provide standard pavement markings and signage to guide the road user	
61	126.600		LHS	Unauthorized opening creating direct access to MCW	
62	127.150		LHS	Entry from the Service road to Main Carriageway without Proper deceleration lane and Pavement Markings	
63	127.400		LHS	Exit from the Main Carriageway to Service road without Proper Acceleration lane and Pavement Markings	
64	127.500		LHS	Unauthorized opening creating direct access to MCW	Page 9
65	128.000		LHS	Unauthorized opening creating direct access to MCW	
66	128.400		LHS	Unauthorized opening from S/R to MCW and Unauthorized Median Opening	Page 9
67	128.600		LHS	Bullet type Exit without proper deceleration lane. Provide standard pavement markings and Signage to guide the road user	
68	129.100		LHS	Provide Hazard markers ahead of approach of kerbs on shoulders	
69	130.450		LHS	Unauthorized Median Opening	
70	130.850		LHS	Entry from the Service road to Main Carriageway without Proper deceleration lane. Provide standard pavement markings and Signage to guide the road user	
71	131.700		LHS	Provide standard and retro reflective hazard marker	
72	132.200		LHS	Bullet type Exit without proper deceleration lane. Provide standard pavement markings and Signage to guide the road user	Page 10
73	132.500		LHS	Pedestrians waiting for Bus/Pickup Van on MCW	Page 10
74	132.800		LHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings and Signage to guide the road user	
75	132.950		LHS	Entry from the Service road to Main Carriageway without Proper deceleration lane. Provide standard pavement markings and Signage to guide the road user	
76	133.900		LHS	Unauthorized opening creating direct access to MCW. Unauthorized Median Opening	
77	135.850		LHS	Bullet type Exit without proper deceleration lane. provide standard pavement markings and Signage to guide the road user	

Sl. No.	Chainage		Side	Road Safety Audit Observations	Reference Page in Appendix - C of this report
	From	To		19th & 20th February 2014	
78	136.500		LHS	Entry from the Service road to Main Carriageway without Proper deceleration lane. Provide standard pavement markings and Signage to guide the road user	
79	138.200		LHS	Construction work in progress, Standard practices of Guard fencing/Barricading has not been followed for protecting the construction zone.	Page 10
80	138.400		LHS	Unauthorized opening creating direct access to MCW	Page 10
81	139.400		LHS	Entry from the Service road to Main Carriageway without Proper deceleration lane. Provide standard pavement markings and Signage to guide the road user	
82	139.700		LHS	Bullet type Exit without proper declaration lane and Pavement Markings. Provide Object Hazard Marker	Page 11
83	140.150		LHS	Buses are stopping on the MCW. As the Buses are stopping on the main carriage way for pickup which results in lot of pedestrain movement around the MCW	Page 11
84	141.100		LHS	At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only.	
85	144.500		LHS	At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only.	Page 11
86	146.200		LHS	Provide standard and retro reflective hazard marker	
87	147.600		LHS	At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only. Truck Parking is observed on the Shoulder and Outer lane of MCW at this location	
88	148.000		LHS	Culvert work in progress, Standard Practice of Guard fencing/Barricading has not been followed for protecting the construction zone	
89	148.800		LHS	Provide Object Hazard Marker	
90	149.100		LHS	Unauthorized opening creating direct access to MCW	
91	153.000		LHS	Remove old Pavement Markings	
92	153.900		LHS	Bullet type Exit/Entry without proper Deceleration/Acceleration lane. Provide hazard markers at the entrance of the Stone masonry wall which is not visible in the night	Page 11
93	154.500		LHS	Unauthorized Median Opening. Slow moving vehicles like Bullock cart crossing the MCW at this location. Pedestrians using the Break in Masonry wall to access MCW.	Page 12
94	155.000		LHS	Unauthorized opening creating direct access to MCW. Unauthorized Median Opening	
95	156.200	156.400	LHS	Truck parking is observed on the Outer lane and Shoulder of the MCW at this location	Page 12
96	157.400		LHS	Construction work in progress, Standard practices of Guard fencing/Barricading/Diversion has not been followed for protecting the construction zone, No Flag man to warn the users. Workers without PPE	Page 12
97	158.100		LHS	Bullet type Exit from MCW to Side Road/Service Road without proper Deceleration lane	Page 12

Sl. No.	Chainage		Side	Road Safety Audit Observations	Reference Page in Appendix - C of this report
	From	To		19th & 20th February 2014	
98	159.400		LHS	Entry/Exit from the Service road to Main Carriageway without Proper Acceleration/Deceleration lane. Unauthorized Median Opening	
99	161.600		LHS	Bullet type Exit/Entry without proper Deceleration/Acceleration lane. Provide hazard markers at the entrance of the Stone masonry wall which is not visible in the night	
100	163.500		LHS	Bullet type Exit/Entry from MCW to Service Road without proper Deceleration/Acceleration lane	
101	164.600		LHS	Provide Hazard Marker	Page 13
102	166.500		LHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings and Signage to guide the road user	
103	168.200		LHS	Bullet type Entry without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	
104	169.200		LHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings and Signage to guide the road user	
105	170.100		LHS	Bullet type Entry without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	
106	171.500		LHS	At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only. Truck Parking is observed on the Shoulder and Outer lane of MCW at this location	
107	174.600		LHS	Construction Vehicles on the main carriage way blocking a lane and only one lane to the flowing lane, Construction activities without any safety precautions of Flagman, helpers and TCD's	
108	176.800		LHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings and Signage to guide the road user	
109	177.400		LHS	Bullet type Entry without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	
110	178.200		LHS	Bus stops on MCW to Pickup/Dropoff passengers at this location	
111	178.800		LHS	Bullet type Entry without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	
112	182.600		LHS	Construction work in progress, Standard practices of Guard fencing/Barricading have not been followed for protecting the construction zone.	
113	183.400		LHS	Unauthorized opening creating direct access to MCW	
114	188.600		LHS	Bullet type Exit without proper deceleration lane.provide standard pavement markings and Signage to guide the road user	
115	188.600		RHS	Unauthorized opening creating direct access to MCW	Page 13
116	187.000		RHS	Bullet type Exit without proper deceleration lane.provide standard pavement markings and Signage to guide the road user	
117	183.500		RHS	Bullet type Exit without proper deceleration lane.provide standard pavement markings and Signage to guide the road user	

Sl. No.	Chainage		Side	Road Safety Audit Observations	Reference Page in Appendix - C of this report
	From	To		19th & 20th February 2014	
118	182.700		RHS	Construction work in progress, Standard practices of Guard fencing/Barricading have not been followed for protecting the construction zone.	
119	180.000		RHS	Bullet type Exit without proper deceleration lane.provide standard pavement markings and Signage to guide the road user	
120	179.000		RHS	Entry/Exit from the Service road to Main Carriageway without Proper Acceleration/Deceleration lane .provide standard pavement markings and Signage to guide the road user	
121	178.900		RHS	Break in Masonry wall, which pedestrians using to access MCW for Buses/Pickup Van	Page 13
122	177.800		RHS	Bullet type Entry without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	
123	170.200		RHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit locations to be removed and provide standard pavement markings and Signage to guide the road user	
124	170.000		RHS	Unauthorized opening creating direct access to MCW	
125	169.100		RHS	Bullet type Entry without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	
126	168.200		RHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit locations to be removed and provide standard pavement markings and Signage to guide the road user	Page 14
127	166.800		RHS	High Embankment area. W-Beam metal crash Barriers are yet to be completed. Provide Hazard Marker	Page 14
128	166.600		RHS	Bullet type Entry from S/R to MCW without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	
129	163.500		RHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit locations to be removed and provide standard pavement markings and Signage to guide the road user	
130	159.200		RHS	Bullet type Entry from S/R to MCW without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	Page 14
131	158.400		RHS	S/R continuing into MCW at this new bridge location. S/R shall be physically separated from high speed MCW at this location. Access to MCW from S/R shall be provided through Entry Ramps only with proper acceleration lane.	Page 14
132	158.000		RHS	Bullet type Entry from S/R to MCW without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user.Rigid safety barrier without any retro-reflective is placed at the entry of the service road which is major hazard	Page 15
133	157.600		RHS	Entry/Exit from the Service road to Main Carriageway without Proper Acceleration/Deceleration lane .provide standard pavement markings and Signage to guide the road user. Provide Hazard Marker	
134	157.000		RHS	Truck parking is observed on the Outer lane and Shoulder of the MCW at this location	
135	156.600		RHS	No pavement markings	Page 15
136	156.000		RHS	Entry/Exit from the Service road to Main Carriageway without Proper Acceleration/Deceleration lane .provide standard pavement markings and Signage to guide the road user.	

Sl. No.	Chainage		Side	Road Safety Audit Observations	Reference Page in Appendix - C of this report
	From	To		19th & 20th February 2014	
137	155.000		RHS	Entry/Exit from the Service road to Main Carriageway without Proper Acceleration/Deceleration lane .provide standard pavement markings and Signage to guide the road user.	
138	154.800		RHS	Unauthorized opening creating direct access to MCW.	
139	154.400		RHS	Unauthorized Median Opening	Page 15
140	154.000		RHS	Entry/Exit from the Service road to Main Carriageway without Proper Acceleration/Deceleration lane .provide standard pavement markings and Signage to guide the road user. Provide Hazard Marker	
141	153.000		RHS	Entry/Exit from the Service road to Main Carriageway without Proper Acceleration/Deceleration lane .provide standard pavement markings and Signage to guide the road user. Provide Hazard Marker	
142	152.250		RHS	Entry/Exit from the Service road/Side Road to Main Carriageway without Proper Acceleration/Deceleration lane .provide standard pavement markings and Signage to guide the road user. Provide Hazard Marker	
143	148.000		RHS	Work zone not protected. Unsafe lane closing procedure	Page 15
144	147.600		RHS	At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only.	Page 16
145	144.500		RHS	At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only.	
				Truck parking is observed on the Outer lane and Shoulder of the MCW at this location	
146	143.000	143.200	RHS	High embankment area, crash barriers are not provided at this location	
147	142.300		RHS	Non standard hazard marker	Page 16
148	141.200		RHS	At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only.	
149	139.900		RHS	Buses are stopping on the MCW. As the Buses are stopping on the main carriage way for pickup which results in lot of pedestrain movement around the MCW	Page 16
150	138.300		RHS	Entry/Exit from the Service road to Main Carriageway without Proper Acceleration/Deceleration lane .provide standard pavement markings and Signage to guide the road user. Provide Hazard Marker	
151	136.700		RHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit locations to be removed and provide standard pavement markings and Signage to guide the road user	
152	136.000		RHS	Bullet type Entry from S/R to MCW without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	

Sl. No.	Chainage		Side	Road Safety Audit Observations	Reference Page in Appendix - C of this report
	From	To		19th & 20th February 2014	
153	134.200		RHS	Provide standard and Retro reflective Hazard Marker	Page 16
154	132.800		RHS	Bullet type Entry from S/R to MCW without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	
155	131.600		RHS	Bullet type Entry from S/R to MCW without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	Page 17
156	127.200		RHS	S/R continuing into MCW at this new bridge location. S/R shall be physically separated from high speed MCW at this location. Access to MCW from S/R shall be provided through Entry Ramps only with proper acceleration lane.	
157	125.800		RHS	Unauthorized opening creating direct access to MCW	Page 17
158	124.900		RHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit locations to be removed and provide standard pavement markings and Signage to guide the road user	
159	123.000		RHS	Bullet type Exit/Entry without deceleration/acceleration lane. Close the Temporary Median Opening	Page 17
160	122.800		RHS	Entry/Exit from the Service road to Main Carriageway without Proper Acceleration/Deceleration lane .provide standard pavement markings and Signage to guide the road user.	
161	121.200		RHS	Unauthorized Median Opening	Page 17
162	120.700		RHS	Protect Structure Headwall with Metal Beam Crash Barrier.	Page 18
163	120.600		RHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit locations to be removed and provide standard pavement markings and Signage to guide the road user	
164	119.900		RHS	Bullet type Entry from S/R to MCW without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	
165	119.800		RHS	Provide Object Hazard Marker	Page 18
166	119.400		RHS	Unauthorized opening creating direct access to MCW	
167	118.600		RHS	Provide standard and retro reflective hazard marker	Page 18
168	114.800		RHS	Pedestrians on MCW waiting for Bus/Pickup Van	Page 13
169	113.800		RHS	Bullet type Exit without proper deceleration lane.Provide standard pavement markings and Signage to guide the road user	
170	112.200		RHS	Workmen without PPE	Page 18
171	111.200		RHS	Unauthorized access creating direct access to MCW. Extend the Iron fence to the Start of Brick Masonry Wall	Page 19
172	110.400		RHS	Bullet type Exit without proper deceleration lane.Provide standard pavement markings and Signage to guide the road user	
173	109.500		RHS	Un authorized median opening and forced opening to access MCW from SR.	Page 19
174	108.400		RHS	Break in Masonry wall creating direct access to the MCW, which is a potential safety hazard	Page 19
175	107.900		RHS	Buses are stopping on the MCW. As the Buses are stopping on the main carriage way for pickup which results in lot of pedestrain movement around the MCW	
176	106.400		RHS	Bullet type Entry from S/R to MCW without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	Page 19
177	104.200		RHS	Truck Parking on the shoulder is observed at this location	

Sl. No.	Chainage		Side	Road Safety Audit Observations	Reference Page in Appendix - C of this report
	From	To		19th & 20th February 2014	
178	103.600		RHS	Buses are stopping on the MCW. As the Buses are stopping on the main carriage way for pickup which results in lot of pedestrian movement around the MCW	
179	102.800		RHS	Provide Object Hazard Marker	Page 20
180	101.800		RHS	Break in Iron fence creating direct access to the MCW, which is a potential safety hazard	
181	98.600		RHS	Bullet type Entry from S/R to MCW without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	
182	97.300		RHS	Bullet type Entry from S/R to MCW without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	
183	93.600		RHS	Pedestrian on MCW waiting for Bus/Pickup van at this location (Seebi-Temple location). Unauthorized Median Opening	Page 20
184	92.500		RHS	Break in Iron fence creating direct access to the MCW, which is a potential safety hazard. Pedestrians Waiting for Bus/Pickup van	
185	91.600		RHS	Extend the Iron fence to the end/Start of Brick Masonry wall. Pedestrians on MCW for Bus/Pickup van	
186	91.000		RHS	At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only.	
187	89.000		RHS	Bullet type Exit without proper deceleration lane. Kerbs built at Exit locations to be removed and provide standard pavement markings and Signage to guide the road user	Page 20
188	87.300		RHS	Break in Masonry wall creating direct access to the MCW, which is a potential safety hazard. Unauthorized Median Opening	
189	86.400		RHS	Entry/Exit from the Service road to Main Carriageway without Proper Acceleration/Deceleration lane .provide standard pavement markings and Signage to guide the road user. Provide Hazard Marker	
190	84.800		RHS	Construction Vehicle on MCW. Unsafe Lane closing Procedure	
191	83.800		RHS	Unauthorized Median Opening	Page 20
192	83.200		RHS	Provide Object Hazard Marker	Page 21
193	81.400		RHS	Break in Masonry wall creating direct access to the MCW, which is a potential safety hazard. Pedestrians Waiting for Bus/Pickup Vans	Page 21
194	80.200		RHS	Bullet type Entry from S/R to MCW without proper acceleration lane. Provide standard pavement markings and Signage to guide the road user	Page 21

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V

APPENDIX C: Site Pictures



Ch 75+000 (LHS) Bus Stop on MCW to Pick up Passengers



Ch 76+900(LHS) Pedestrians crossing the MCW



Ch 77+000(LHS) Bullet type Exit/Entry without proper Deceleration/Acceleration lane. provide standard pavement markings and Signage to guide the road user



Ch 77+400(LHS) Bullet type Exit without proper Deceleration lane. Provide Object Hazard Marker (OHM).

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 80+000 (LHS) Bullet type Exit without proper deceleration lane. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings and Signage to guide the road user



Ch 82+400(LHS). At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only. Improper Channelization of traffic



Ch 82+850(LHS) Non standard hazard marker



Ch 83+200(LHS) Provide hazard marker at the face of headwall of flyover/Structure

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 83+850 (LHS) Unauthorized Median Opening should be closed



Ch 84+450(LHS) Truck Parking on the shoulder is observed at this location



Ch 85+400(LHS) Bullet type Exit/Entry without proper Deceleration/Acceleration lane. Irregular Pavement Markings. Old Pavement Markings should be removed



Ch 87+250(LHS). Break in Masonry wall creating direct access to the MCW, which is a potential safety hazard and Unauthorized Median Opening

Safety Audit Report 6 – Construction Stage

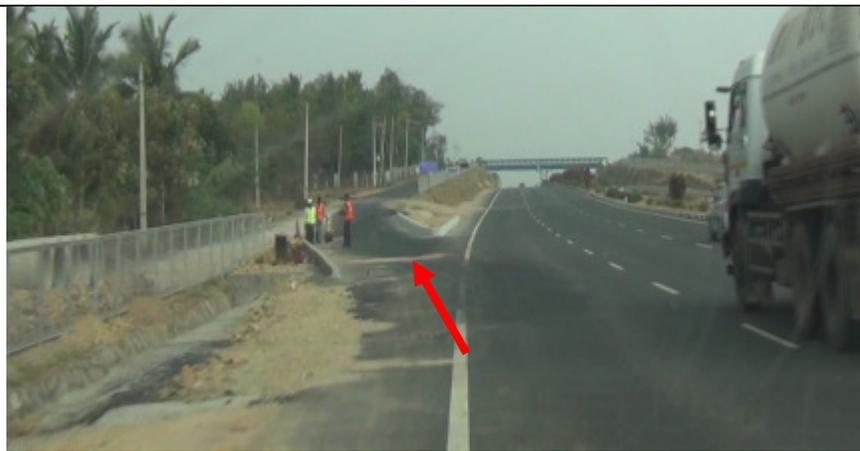
Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 88+900(LHS) Bullet type Exit without proper Deceleration lane. Exiting directly into Pedestrian Subway.



Ch 91+000(LHS) At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only. Improper Channelization of traffic



Ch 92+100(LHS) Bullet type Exit without proper deceleration lane. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings to guide the road user



Ch 93+600(LHS) Pedestrians waiting for Bus/Pickup vans on MCW. Unauthorized Median Opening

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 95+000 (LHS) Unauthorized opening creating direct access to MCW



Ch 97+400 (LHS) Bullet type Exit without proper Deceleration lane



Ch 98+250(LHS) Construction work in progress, Standard practices of Guard fencing/Barricading/Diversion have not been followed for protecting the construction zone, No Flag man to warn the users. Workers without PPE



Ch 98+550(LHS) Unauthorized opening creating direct access to MCW

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 99+300 (LHS) Unauthorized opening creating direct access to MCW



Ch 103+400 (LHS) Direct access to Subway from MCW.



Ch 103+400(LHS) Two wheeler accessing Unauthorized Median Opening to cross the High Speed Six lane Main Carriage Way



Ch 105+100(LHS) No hazard marker is placed at the stone masonry wall which is not visible during nights

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 106+200 (LHS) Bullet type Exit/Entry without proper Deceleration/Acceleration lane



Ch 107+800(LHS) Pedestrian on MCW waiting for Bus/Pickup Van. Break in Metal Beam Crash Barrier on Median.



Ch 108+500(LHS) Unauthorized opening creating direct access to MCW



Ch 109+500(LHS) Un authorized median opening and forced opening to access MCW from SR.

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 111+750(LHS) Bullet type Exit without proper deceleration lane. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings to guide the road user



Ch 115+800(LHS) Unauthorized opening creating direct access to MCW



Ch 120+100(LHS) Remove old Pavement Markings



Ch 120+600(LHS) Bullet type Entry without proper acceleration lane and Pavement Markings

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 120+950(LHS) Provide Object Hazard Marker



Ch 121+250(LHS) Unauthorized Median Opening



Ch 127+500(LHS) Unauthorized opening creating direct access to MCW



Ch 128+400 (RHS) Unauthorized opening from S/R to MCW and Unauthorized Median Opening

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 132+200(LHS) Bullet type Exit without proper deceleration lane. Provide standard pavement markings and Signage to guide the road user



Ch 132+500(LHS) Pedestrians waiting for Bus/Pickup vans on MCW



Ch 138+200 (LHS) Construction work in progress, Standard practices of Guard fencing/Barricading has not been followed for protecting the construction zone.



Ch 138+400(LHS) Unauthorized opening creating direct access to MCW

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 139+700(LHS) Bullet type Exit without proper declaration lane and Pavement Markings. Provide Object Hazard Marker



Ch 140+100(LHS) Pedestrian on MCW waiting for Bus/Pickup Van



Ch 144+500 (RHS) At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only.



Ch 153+900(LHS) Bullet type Exit/Entry without proper Deceleration/Acceleration lane. Provide hazard markers at the entrance of the Stone masonry wall which is not visible in the night

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 154+500(LHS) Unauthorized Median Opening. Slow moving vehicles like Bullock cart crossing the MCW at this location. Pedestrians using the Break in Masonry wall to access MCW.



Ch 156+200 to Ch 156+400(LHS & RHS) Truck parking is observed on the Outer lane and Shoulder of the MCW at this location



Ch 157+400(LHS) Construction work in progress, Standard practices of Guard fencing/Barricading/Diversion has not been followed for protecting the construction zone, No Flag man to warn the users. Workers without PPE



Ch 158+100(LHS) Bullet type Exit from MCW to Side Road/Service Road without proper Deceleration lane

Safety Audit Report 6 – Construction Stage

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Ch 164+600(LHS) Provide Hazard Marker



Ch 182+600(LHS) Construction work in progress, Standard practices of Guard fencing/Barricading have not been followed for protecting the construction zone.



Ch 188+600(RHS) Unauthorized opening creating direct access to MCW



Ch 178+900(RHS) Break in Masonry wall, which pedestrians using to access MCW for Buses/Pickup Van

Safety Audit Report 6 – Construction Stage

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Ch 168+200(RHS) Bullet type Exit without proper deceleration lane. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings and Signage to guide the road user



Ch 166+800(RHS) High Embankment area. W-Beam metal crash Barriers are yet to be completed. Provide Hazard Marker



Ch 159+200(RHS) Bullet type Entry without proper acceleration lane



Ch 158+400 (RHS) S/R continuing into MCW at this new bridge location. S/R shall be physically separated from high speed MCW at this location. Access to MCW from S/R shall be provided through Entry Ramps only with proper acceleration lane.

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 158+000(RHS) Bullet type Exit without proper deceleration lane. Rigid safety barrier without any retro-reflective is placed at the entry of the service road which is major hazard



Ch 156+600(RHS) Bullet Type Entry without acceleration lane. No Pavement Markings at this location.



Ch 154+400(RHS) Unauthorized Median Opening



Ch 148+000 (RHS) Work zone not protected. Unsafe lane closing procedure

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 147+600(RHS) At grade U-turn facility on Six lane Highway. Per MORTH Six lane highway manual there shall be no direct access to the MCW, all access shall be from service road through acceleration lane only. Inter connections between S/R shall be through Under passes only.



Ch 142+300(RHS) Non standard Hazard Marker



Ch 139+900(RHS) Pedestrian Crossing MCW at this location



Ch 134+200(RHS) Provide standard and Retro reflective Hazard Marker

Safety Audit Report 6 – Construction Stage

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Ch 131+600(RHS) Bullet type Entry without acceleration lane. S/R continuing into MCW at this location. S/R shall be physically separated from high speed MCW at this location.



Ch 125+800(RHS) Unauthorized opening creating direct access to MCW



Ch 123+000 (RHS) Bullet type Exit/Entry without deceleration/acceleration lane. Close the Temporary Median Opening



Ch 121+200 (RHS) Unauthorized Median Opening

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V



Ch 120+700 (RHS) Protect Structure Headwall with Metal Beam Crash Barrier.



Ch 119+800(RHS) Provide Object Hazard Marker



Ch 118+600(RHS) Protect Structure Headwall with Metal Beam Crash Barrier. Non standard Hazard Marker



Ch 112+200(LHS) Workmen without PPE

Safety Audit Report 6 – Construction Stage

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Ch 111+200(RHS) Unauthorized access creating direct access to MCW. Extend the Iron fence to the Start of Brick Masonry Wall



Ch 109+500(RHS) Unauthorized opening creating direct access to MCW. Unauthorized Median Opening



Ch 108+400(RHS) Unauthorized opening creating direct access to MCW



Ch 106+400(RHS) Bullet type Entry without proper acceleration

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Ch 102+800(RHS) Provide Object Hazard Marker



Ch 93+600(RHS) Pedestrian on MCW waiting for Bus/Pickup van at this location (Seebi-Temple location). Unauthorized Median Opening



Ch 89+000(RHS) Bullet type Exit without proper Deceleration lane.



Ch 83+800(RHS). Unauthorized Median Opening

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Appendix - C

	
<p>Ch 83+200 (RHS) No Object Hazard Marker</p>	<p>Ch 81+400(RHS) Break in Masonry wall creating direct access to the MCW, which is a potential safety hazard. Pedestrians Waiting for Bus/Pickup Vans</p>
	
<p>Ch 80+200(RHS) Bullet type Exit/Entry without proper Deceleration/Acceleration lane</p>	

Safety Audit Report 6 – Construction Stage

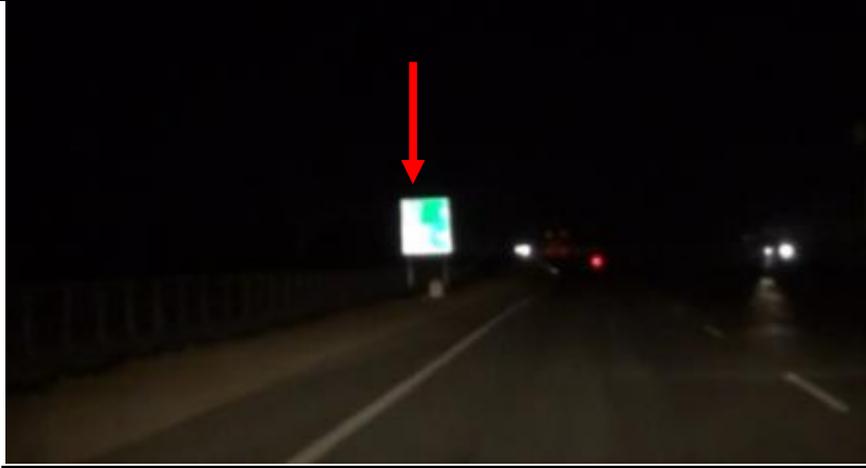
Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V

Night Audit:

	
<p>Exit not Visible during night. Bullet type Exit without proper deceleration lane.</p>	<p>Non Standard and Non – Reflective Hazard Marker</p>
	
<p>No Pavement Markings on Service road</p>	<p>Break In Masonry wall, which pedestrians using to access MCW is Major Safety Hazard</p>

Safety Audit Report 6 – Construction Stage

Six Laning of Tumkur-Chitradurga section (Excluding Tumkur & Chitradurga Bypasses) from Km 75.000 to Km 189.000 of NH-4 (approx 114.00Km) in the state of Karnataka to be executed as BOT (Toll) project on DBFO Pattern under NHDP Phase-V

	
<p>Letters on Sign Board are not retro reflective</p>	<p>Exit not Visible during night. Bullet type Exit/Entry without proper Deceleration/Acceleration lane. Kerbs built at Exit/Entry locations to be removed and provide standard pavement markings to guide the road user</p>
	
<p>Head light glare</p>	<p>High embankment. Installation of Metal Beam Crash Barriers yet to be completed. Non-reflective MBCBs</p>