



CAREC Road Safety Engineering Manuals

# I. Road Safety Audit

## Case Study 1

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Detailed design stage audit of the proposed duplication of a national highway.

### Title

The complete technical title of the audit including its location and aims

### Audit Team

The name and the role of each audit team member

### Project Background

The project includes the design, construction, widening and upgrading of a National Highway. It involves upgrading and duplicating an existing national highway along the same alignment from the capital city to the western border crossing. The road commences in the capital (Km 4+560) and ends at the border post at Km 61+552. It is 57km in length, of which some 45.2km will be 4 lane divided highway. From the roundabout at West Gate to the Km 48, the highway is being upgraded to a Class I, four-lane divided road. For the final 13.5 km, the road will be built to a Class II, two-lane highway according to the Trans Asian Highway design standard. The road is a major international route for road traffic and the transport of goods. The highway is generally quite flat with generous horizontal alignment. It passes through one large town and twelve villages.



### Audit Details

The road safety audit included four-day time and two-night time site inspections – on Wednesday 5<sup>th</sup>, Friday 7<sup>th</sup>, Monday 10<sup>th</sup> (day and night), and Monday 17<sup>th</sup> December (day and night). The weather during the inspections was varied – it was fine, sunny and mild on the first two days, cool and dry on the third day and wet, cold and with light snow on the final day.

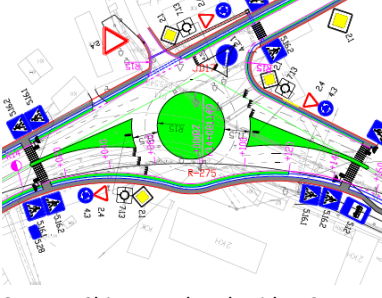
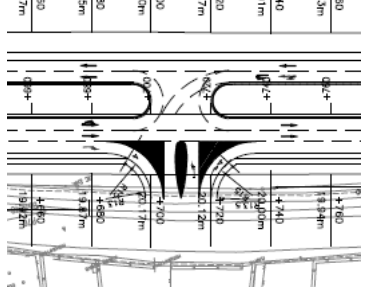



The existing single carriageway highway near km 21 showing typical road user groups

## Audit Findings

KM.	SAFETY CONCERN	RISK	PHOTO	RECOMMENDATION	CLIENT RESPONSE
<b>SAFETY CONCERNS WITH THE PROPOSED DUPLICATION OF THE NATIONAL HIGHWAY</b>					
From Km 5+400 to 6+300	This section of road passes through a village and it will be subjected to high speed traffic once the road is built. There will be a risk of high speed collisions between through traffic and pedestrians in this village. It warrants speed management to maintain speeds at or below 40km/h because of the high numbers of pedestrians in this village. The drawings do not show any "traffic calming" treatments proposed for here.	<b>VERY HIGH</b>		<ul style="list-style-type: none"> <li>- Install a "gateway" on both approaches to this village.</li> <li>- Install flat topped road humps at spacing's of approx. 150m through the village. Ensure that humps are located close to bus stops and the Police Station, that they are well signed, marked and lit.</li> <li>- Provide a physical median through the village (to serve as a refuge), but DO NOT install barrier or fencing on the median.</li> </ul>	
From Km 13+500 to Km 14+300	This village is located at the end of a long straight downhill section of road (from the capital) and a long straight flat section of road (from the south west). It is expected that speeds will be high through this village once the highway is duplicated. The highway takes a right-hand curve in this village and a major side road continues straight. The village warrants speed management to maintain speeds at or below 60km/h because of the many pedestrians in this village. The drawings are silent about this.	<b>VERY HIGH</b>		<ul style="list-style-type: none"> <li>- Install a "gateway" on the three approaches to this village.</li> <li>- Install flat topped road humps at spacing's of approx. 150m through the village. Ensure that humps are located close to bus stops, mosques and schools and that they are well signed, marked and lit.</li> <li>- Provide a raised concrete median 2m wide through the village to serve as a pedestrian refuge.</li> <li>- DO NOT install barrier or fencing on the median.</li> </ul>	

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KM.	SAFETY CONCERN	RISK	PHOTO	RECOMMENDATION	CLIENT RESPONSE
<p><b>Km 14+080</b></p>	<p>The design for the roundabout proposed for this key intersection in this village has insufficient deflection from the west and from the south to cause drivers to slow sufficiently. This lack of adequate deflection will increase crash risk at the roundabout.</p>	<p><b>MED</b></p>	 <p>Source: China Road and Bridge Corp.</p>	<ul style="list-style-type: none"> <li>- Review this design and attempt to improve deflection for these approaches.</li> <li>- If this is not possible, reconsider the use of a roundabout at this intersection. Seek alternative traffic control options instead.</li> </ul>	
<p><b>Km 15+710</b></p>	<p>At Km 15+710 a median opening and a T junction is proposed for access to the Village Access Road. The median opening will also serve as a U-turn opportunity. However, there are no sheltered left turn lanes proposed in the median for either direction. There will be a high risk of rear end collisions at this location as vehicles slow down to turn from the “fast” lane.</p>	<p><b>MED</b></p>	 <p>Source: China Road and Bridge Corp.</p>	<ul style="list-style-type: none"> <li>- Provide sheltered left turn lanes on both approaches to the break in the median.</li> <li>- Ramp down the median W-beam barrier at least 50m in advance of the junction on each approach so that pedestrians are given good access to the median (to use it as a refuge) and so that sight lines are kept open for turning vehicles.</li> </ul>	
<p><b>Km 23+150</b></p>	<p>There is a large mosque on the southern side of the road. During Friday prayers hundreds of men attend this mosque, parking their vehicles on both sides of the road. The drawings show no parking and no pedestrian facility is to be provided, although both are needed. It will be more dangerous for pedestrians walking across the new duplicated highway due to increased speeds on it. The highway needs to be kept open for through traffic.</p>	<p><b>VERY HIGH</b></p>	 <p>Photo credit: Phillip Jordan</p>	<ul style="list-style-type: none"> <li>- Consider providing off road parking close to the mosque for use by those attending the mosque.</li> <li>- If this is not possible, seal the shoulders of the highway (2m wide) for at least 250m either side of the side road leading to the mosque to encourage orderly parking.</li> <li>- Construct an all-weather footpath between the mosque and suitable breaks in the W-beam barrier on the southern side of the highway to permit pedestrian access to parked vehicles.</li> </ul>	

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<p><b>Km 61+200</b></p>	<p>Drivers approach the border but the drawings show no new advance warning signs to alert drivers to the Customs post ahead. There is a need for drivers to slow down and prepare to stop; but some will have been travelling at high speed for some distance and may not be thinking of what is ahead. The drawings are silent about any action in this regard.</p>	<p><b>LOW</b></p>		<p>- Install signs (at 2km, 1km and repeated at 500m) in advance of the border to inform drivers of the border ahead and their need to prepare to stop.</p>	

*The Audit Team has carried out this detailed design stage road safety audit according to the CAREC Road Safety Audit Manual.*

**SIGNED:**

*{INSERT NAME HERE} Team Leader on behalf of the RSA Team {DATE}*