04th June 2026

Cube Highways suggestions on TRAI Consultation Paper No. 08/2026

To,

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Document: Regulatory Framework for V2X Communication, dated 30.04.2026

Submitted by: Cube Highways Technologies Pvt. Ltd.

Scope of these comments: These comments are submitted from the perspective of a highway operator and address Question Q11 of the Consultation Paper. Cube Highways proposes the following two related recommendations:

(i) the addition of Hazardous Location Notifications — Mobile Safety Vehicle (V2V) to the Day-0 use-case taxonomy,

(ii) Clarification that the V2X communication unit installed on a Mobile Safety Vehicle should be classified as an On-Board Unit (OBU), rather than a Roadside Unit (RSU), for the purposes of authorisation, certification, and compliance requirements.

1. Background

Cube Highways Group is among the largest highway operators in India, holding long-term concession and operational rights for multiple highway assets through public-private partnership arrangements with the National Highways Authority of India (NHAI). The Group manages a diversified portfolio of over 34 assets, covering more than 10,000 lane kilometers across 13 states and union territories. Backed by leading global institutional investors, Cube combines operational excellence, innovation, and data-driven decision-making to deliver safer, more efficient, and sustainable highway infrastructure solutions. Cube Highways Technologies Pvt. Ltd. serves as the technology and advisory arm of the Group, driving innovation, digital transformation, and technology-led solutions across the transportation infrastructure sector.

Three operational realities of the Indian highway network have shaped this submission:

(a) High fatality rates on highways. India records approximately 173,000 road-accident fatalities per year (MoRTH, "Road Accidents in India 2023", referenced at Section 5.2(iii) of Annexure-III), of which a substantial proportion occurs on national and state highways.

(b) Accidents in roadworks zones. Work zone safety remains a critical concern for highway operators. Highway maintenance activities are essential to maintain road quality, safety and driving comfort, however, work zones inherently introduce temporary hazards into the traffic environment. A significant number of highway incidents are associated with maintenance activities, particularly mobile work zones such as median watering, vegetation management and inspection operations. These activities involve slow-moving or stationary maintenance vehicles operating near live traffic, creating elevated collision risk. The risk is especially pronounced on Indian expressways, where high operating speeds reduce driver reaction times and increase the likelihood and severity of work zone-related crashes.

(c) Low-visibility conditions. Large sections of the Indian highway network are regularly affected by dense fog and heavy monsoon rainfall, significantly reducing the effectiveness of conventional visual warning measures. In contrast, V2X-enabled in-vehicle alerts provide drivers with advance hazard awareness beyond visual detection range and can provide timely hazard warnings even under severely degraded visibility conditions.

Cube Highways firmly believes that the widespread deployment of V2X services presents a unique opportunity to leapfrog highway safety standards by addressing these operational realities.

The following proposals are advanced with this objective in mind.

2. Responses to Specific Questions

Q11 — Other relevant issues

(a) Proposed addition to the Day-0 use-case taxonomy

Cube Highways supports the framework set out in Chapter 5 of Annexure-III, which prioritises C-V2X use cases for India and categorises them into Day-0, Day-1 and Day-2 stages. Cube Highways proposes the following addition:

Proposal	§5.2(vii) — Hazardous Location Notifications — via Mobile Safety Vehicle
Stage	Day-0
Mode	V2V
Infrastructure Dependencies	V2X communication unit on the mobile safety vehicle (on mobile VMS equipped or shadow vehicles) deployed at work zones; no fixed roadside infrastructure required
Global Precedent	Europe: ASFINAG (Austria) Roadworks Warning service based on roadworks vehicles; similar deployments are progressing in Germany along the URSA MAJOR corridor.
Demonstration in India	Roadworks information trial completed on the Nelamangala–Devihalli Expressway (FY2025-26) under a multi-party collaboration between Cube Highways, Maruti Suzuki India Limited, Zero-Sum ITS Solutions India Pvt. Ltd. and Nagoya Electric Works CO., LTD, using a mobile-VMS-equipped vehicle configuration.

Why Day-0 is appropriate. The proposed use case requires no fixed roadside infrastructure: its profile is equivalent to that of EEBL, FCW or Hit-from-Behind Warning, which are already listed as Day-0 use cases in Section 5.2 of Annexure-III. The hazard position is itself moving (moving work zones or slow-moving maintenance convoys), and a mobile broadcasting platform is intrinsically better matched to such a moving hazard than a fixed roadside installation. A highway operator can bring the service into operation by retrofitting its existing mobile safety vehicle, and the safety benefit is realised from the first day of operation, without the dependency on RSU rollout.

Additionally, the service is of particular value during fog and monsoon conditions, where drivers' ability to perceive conventional roadside warning signs is significantly reduced. V2V-based hazard notifications can provide advance warning directly within the vehicle as soon as it enters communication range (typically several hundred metres) thereby improving situational awareness and enabling earlier driver response.

Relationship with Section 5.4(ii). This proposed addition does not displace the use case listed at Section 5.4(ii) of Annexure-III as a Day-2 item (Hazardous Location Notifications dependent on "I2N-V2N + environmental sensors"). The Day-2 item is an advanced form integrated with the traffic management centre; the proposed §5.2(vii) is a simplified form operating without any uplink. The two shall co-exist as a staged roadmap.

(b) Confirmation that the V2X communication unit on a mobile safety vehicle is to be treated as an OBU, not an RSU

Cube Highways respectfully requests that the Authority clarify in the final regulatory framework that a V2X communication unit installed on a mobile safety vehicle shall be classified and regulated as an On-Board Unit (OBU), rather than a Roadside Unit (RSU), for the purposes of authorisation, certification, and operational compliance.

Definitional consistency. The defining attribute of OBU vs RSU classification, as reflected in Annexure-III to the Consultation Paper, is whether the V2X equipment is vehicle-mounted or roadside-installed. A V2X unit installed on a mobile safety vehicle is, by definition, vehicle-mounted, and the communications mode is V2V (broadcasting from the presence of safety vehicle to approaching traffic). Both attributes are consistent with the OBU classification.

Operational unsuitability of RSU-style regulation for mobile equipment: The RSU regulatory framework contemplated in paragraph 3.14(b) and Question 8 of the Consultation Paper—including site-specific authorisation, prior approvals, and prescribed parameters such as antenna height, directionality, and protection distance—is inherently designed for infrastructure deployed at fixed locations. These requirements do not align with the operational characteristics of a mobile safety vehicle, whose purpose is to move dynamically along the highway network. Applying RSU-specific obligations to such equipment would create unnecessary deployment constraints and limit the effectiveness of this safety use case. In contrast, the OBU framework provides an appropriate regulatory pathway through equipment certification, communication security controls, and software integrity requirements, while remaining fully aligned with the mobile nature of the device.

Operational consequences of the confirmation:
The proposed classification would place the equipment within the established MTCTE certification framework applicable to OBUs, consistent with paragraph 8.8 of Annexure III. The corresponding OBU requirements relating to communication security, software integrity, and lifecycle management would continue to apply (paragraph 3.38(g)(iv) and paragraphs 3.48–3.55 of the Consultation Paper). At the same time, requirements designed for fixed roadside infrastructure—such as site-specific authorisations, prior location approvals, and prescribed parameters relating to antenna configuration and protection distances—would remain appropriately limited to RSU deployments. This approach would provide regulatory certainty while enabling the practical deployment of mobile safety vehicles across the highway network.

Cube Highways would be pleased to support the Authority in developing any additional operational guidance specific to work zone and mobile safety vehicle applications.

3. Conclusion
Cube Highways thanks the Authority for the opportunity to comment on the Consultation Paper. The proposals advanced above is grounded in the operational realities of the Indian highway network and seek to facilitate the practical deployment of high-impact V2X safety applications from the outset. Their adoption would enable highway users and operators to leverage V2X technologies for enhanced work zone safety, hazard communication, and driver awareness, while remaining fully aligned with the regulatory objectives of safety, interoperability, security, and efficient spectrum utilization reflected in the Consultation Paper.

Cube Highways remains committed to supporting the Authority in the development and deployment of a robust, scalable, and globally aligned V2X ecosystem for India.

[End of submission]