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India's First Smart Elevated Corridor: A Benchmark in Safety, Sustainability and Urban Mobility - A Case Study of the G.D. Naidu Flyover, Coimbatore, India

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Abstract - The G.D. Naidu Elevated Corridor on Avinashi Road, Coimbatore, is a rare example of an urban transport project in which structural engineering, construction methodology, traffic safety, water management, intelligent systems, landscaping, and urban aesthetics have been integrated into a single continuous corridor. Rather than functioning only as a grade separator, the project has been developed as a comprehensive urban infrastructure system addressing mobility, safety, durability, environmental performance, and visual identity.

The 10.1 km long facility, constructed at a cost of approximately Rs. 1791.23 crores, includes multiple access provisions comprising 4 intermediate up-ramps and 4 down-ramps, ensuring efficient traffic distribution across a high-density urban network.

The corridor incorporates advanced structural systems such as pile and open foundations, portal beam arrangements in ramp portions, precast strutted segmental box girders, epoxy-bonded segmental assembly, staged prestressing operations, and a 52 m steel composite railway span. Riding quality and durability are enhanced through mastic asphalt, bituminous concrete surfacing, and sinus plate expansion joints.

A multilayered safety framework is provided through high-containment RCC crash barriers, continuous metal beam barriers, roller crash barriers, solar-powered blinkers, speed control measures, and advanced signage systems. Sustainability features include rainwater harvesting with 250 recharge pits, drip and sprinkler irrigation, and extensive corridor landscaping. Intelligent transport systems comprising AI cameras and video walls further enhance monitoring and user information.

The study establishes the corridor as a replicable model for integrated urban elevated infrastructure in dense city environments.

***Keywords*: Urban elevated corridor; segmental box girder; smart corridor; sustainability; urban infrastructure; Coimbatore**

1. INTRODUCTION

1.1 Importance of Avinashi Road Corridor

Avinashi Road is one of the most critical arterial corridors in Coimbatore, functioning as a primary urban spine connecting key activity centres such as the Coimbatore International Airport, major bus terminals, commercial districts, and residential areas. The corridor experiences continuous 24-hour high-intensity traffic [1] due to diverse trip purposes including airport access, intercity travel, daily commuting, and institutional movement.

Fig 1. G.D.Naidu Elevated Corridor, Coimbatore

A wide range of high-attraction land uses—including multi-speciality hospitals, educational institutions, shopping malls, offices, schools, and retail establishments—are located along both sides of the corridor. This results in sustained and heterogeneous traffic demand [2] throughout the day, leading to severe congestion, delay, and operational inefficiencies prior to the construction of the elevated corridor. Frequent junctions, pedestrian activity, frontage access, and mixed traffic conditions further intensified these challenges, necessitating a grade-separated mobility solution.

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Urban elevated corridors in India are traditionally designed to improve traffic flow by separating through traffic from local movements.

Table 1.Traffic Census Summary

Traffic Census Summary – G.D Naidu - Avinashi Road Elevated Corridor, Coimbatore
3 Days Average During Nov 2025

Sl. No	Location	Direction	No.of Vehicles using **ATGRADE ROAD**	No.of Vehicles using **FLYOVER**	Total (Nos)	% of Service Road Users	% of Flyover Users
1	Km 147/100 Gold Wins	Towards City	45,828	24,150	69,978	65.49	34.51
2	Km 147/100 Gold Wins	Towards Gold Wins	46,241	21,438	67,679	68.32	31.68
3	Km 152/200 Flyover Centre	Towards City	78,495	56,738	1,35,233	58.04	41.96
4	Km 152/200 Flyover Centre	Towards Gold Wins	93,373	53,415	1,46,788	63.61	36.39
5	Km 157/100 Uppilipalayam	Towards City	15,380	12,727	28,107	54.72	45.28
6	Km 157/100 Uppilipalayam	Towards Gold Wins	22,433	11,670	34,103	65.78	34.22
	Average (Both Directions)		**100583**	**60046**	**160629**	**62.66**	**37.34**

However, modern infrastructure expectations extend beyond mobility to include durability, construction efficiency, safety, environmental performance, urban aesthetics, and long-term maintainability [3].

The G.D. Naidu Elevated Corridor represents a significant shift from conventional design by integrating multiple engineering and architectural features within a single continuous system. These include advanced segmental superstructure technology, staged prestressing, special spans, comprehensive safety systems, smart surveillance, rainwater harvesting, irrigation-supported landscaping, decorative lighting, and culturally inspired architectural elements. Thus, the corridor functions not merely as a transport facility but as an integrated urban infrastructure asset.

The project is particularly notable due to its execution along a densely developed urban corridor. Constructing a 10.1 km elevated facility under such conditions required careful planning to minimize disruption while ensuring structural efficiency and safety. The corridor therefore provides an important case study demonstrating how engineering, construction strategy, and urban design can be effectively integrated.

This paper focuses on the physical, technical, sustainability, and aesthetic features of the corridor, while detailed economic and operational analyses are presented separately by the author. The study aims to document the project as a benchmark model for future urban elevated corridor development.

Objectives of the Study

1. To document the structural, safety, smart-system, sustainability, and aesthetic features of the corridor in a systematic manner.
2. To explain the engineering purpose and urban significance of key features.
3. To demonstrate the integration of multiple infrastructure systems within a single corridor.
4. To establish the project as a benchmark model for future urban elevated corridors.

Table 2. Summary of major corridor features and their engineering purpose

Category	Feature	Engineering Purpose	Key Benefit
Structural	Strutted box girder	Efficient load transfer	Stability & aesthetics
Structural	Segmental construction	Rapid erection	Minimal traffic disruption
Structural	Epoxy bonding	Joint integrity	Durability
Structural	Steel composite span	Long span crossing	Reduced self-weight
Foundation	Pile & open foundation	Site adaptability	Cost optimization
Safety	RCC crash barrier	Vehicle containment	High safety
Safety	Metal beam barrier	Vehicle redirection	Continuous protection
Safety	Roller crash barrier	Energy absorption	Reduced accident severity
Safety	Speed breakers	Speed control	Safer ramp exit
Smart	AI cameras	Violation detection	Enforcement
Smart	Video walls	Information display	Awareness
Pavement	Mastic asphalt	Waterproofing	Deck protection
Pavement	BC layer	Riding quality	Comfort
Joint	Sinus expansion joint	Smooth movement	Low noise
Marking	Thermoplastic	Visibility	Long life

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Category	Feature	Engineering Purpose	Key Benefit
Marking	Reflective studs	Night guidance	Safety
Marking	Solar studs	Self illumination	Energy saving
Marking	Solar blinkers	Warning system	Accident prevention
Water	Rainwater harvesting	Groundwater recharge	Sustainability
Irrigation	Drip irrigation	Water efficiency	Plant survival
Irrigation	Sprinkler irrigation	Uniform coverage	Healthy landscaping
Landscaping	Bougainvillea	Visual identity	Beautification
Landscaping	Cypress/palms	Urban greenery	Cooling effect
Lighting	LED poles	Illumination	Energy saving
Lighting	Decorative lighting	Aesthetics	Night appeal
Architecture	Gopuram pylons	Cultural identity	Landmark value
Protection	Pier protection wall	Structural safety	Impact resistance

2. PROJECT BACKGROUND AND CORRIDOR OVERVIEW

The G.D. Naidu Elevated Corridor is located along Avinashi Road in Coimbatore, Tamil Nadu, extending approximately 10.1 km between Uppilipalayam and Goldwins. The corridor serves as a major urban arterial carrying mixed traffic, including airport-bound, commercial, institutional, and residential movements, and was previously affected by congestion due to intersections, roadside activity, and traffic conflicts.

Fig 2. Down Ramp

The project was conceived to provide uninterrupted through-movement while retaining and enhancing at-grade road functionality. Accordingly, the corridor operates as an integrated system, where the elevated carriageway carries through traffic and the at-grade system supports local access, drainage, landscaping, lighting, and urban infrastructure elements.

Multiple ramps, including intermediate access points, improve traffic distribution and network connectivity. Beyond its transport function, the corridor incorporates a wide range of structural, safety, environmental, and aesthetic components such as advanced superstructure systems, crash barriers, smart surveillance, irrigation-supported landscaping, rainwater harvesting, and coordinated urban design features.

The project is particularly significant as it demonstrates how an elevated corridor can function as a comprehensive urban infrastructure asset rather than merely a traffic facility. The integration of architectural elements, landscaping, and lighting contributes to a strong corridor identity while enhancing the surrounding urban environment.

3. STRUCTURAL AND CONSTRUCTION FEATURES

3.1 Foundation Systems and Pile Load Testing

The corridor adopts a combination of pile foundations and open foundations based on location-specific geotechnical conditions, structural loads, and construction constraints. In long urban corridors, soil characteristics and utility interferences vary significantly, making a uniform foundation system impractical. Pile foundations are used in weaker strata to transfer loads to deeper competent layers, ensuring stability and settlement control, while open foundations are adopted in locations with adequate bearing capacity to optimize cost and constructability.

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Fig 3. Initial Pile load test.Anchor Pull out method

Fig 4. Dynamic Pile Load Test

To ensure the reliability of foundation performance, pile load testing [4],[5] was carried out as part of the construction verification process. Static load tests were conducted using incremental loading to evaluate load–settlement behaviour and confirm design capacity. In addition, dynamic load testing techniques were adopted for rapid assessment of multiple piles, ensuring consistency across the corridor. In constrained locations, pull-out (tension) tests were also performed to verify uplift resistance. These tests collectively ensured that all foundation elements met the required safety and performance criteria.

Table 3: Structural System Components

Component	**Type**	**Function**	**Engineering Significance**
Foundation	Pile/Open	Load transfer	Adaptability to soil
Pier	RCC	Vertical support	Stability
Portal Beam	RCC	Ramp support	Space optimization
Superstructure	Pre cast Segmental Box girder	Deck support	Torsional rigidity
Prestressing	Longitudinal/ Lateral	Strength enhancement	Crack control
Railway Span	Steel composite	Long span crossing	Lightweight & efficient
Approach Ramp	Reinforced earth wall [**Reinforced Earth Wall (RE Wall)**]	Soil retention & approach formation	Space-efficient, economical & rapid construction [**Soil retention & approa formation**]

3.2 Portal Beam Structures in Ramp Portions

Ramp sections involve complex geometry due to merging, diverging, and space constraints near junctions. Portal beam structures were adopted in these zones to maintain structural continuity while minimizing obstruction to traffic below. These systems efficiently transfer loads while accommodating geometric requirements and contribute to both structural performance and visual organization of ramp areas.

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Fig 5. Portal Beam

3.3 Strutted Segmental Box Girder System

The superstructure consists of a strutted segmental box girder system, which is highly suitable for urban elevated corridors due to its torsional rigidity, structural efficiency, and clean profile. The closed box section performs well under curved alignments and eccentric loading, while the strutted configuration enhances load distribution and provides a distinct architectural identity [6],[7].

3.4 Segmental Construction and Prestressing Methodology

Segments were cast in a controlled yard environment and laterally prestressed prior to transportation. After erection at site, longitudinal prestressing was carried out to integrate the segments into a continuous structural system. This staged prestressing approach ensures quality control, reduces on-site complexity, and improves structural performance by controlling cracking and enhancing durability [8],[9].

Fig 6. Segmented Box Girder.

Segmental assembly and launching at site minimize disruption to traffic, making this approach particularly effective in dense urban environments. The method reflects modern construction practices emphasizing prefabrication, speed, and safety.

Fig 7. Segment Launcher.

3.5 Bridge Bearings System (Pot–PTFE Bearings

Bridge bearings play a critical role in transferring loads from the superstructure to the substructure while accommodating movements and rotations induced by traffic loads, temperature variations, creep, and shrinkage. In this project, **Pot–PTFE bearings** have been adopted due to their high load-carrying capacity, durability, and ability to accommodate multidirectional movements.

The pot bearing consists of an elastomeric disc confined within a steel pot, which behaves like a fluid under pressure, allowing rotational movements. The PTFE (Polytetrafluoroethylene) sliding surface facilitates low-friction translational movement, ensuring smooth response under thermal and traffic-induced displacements.

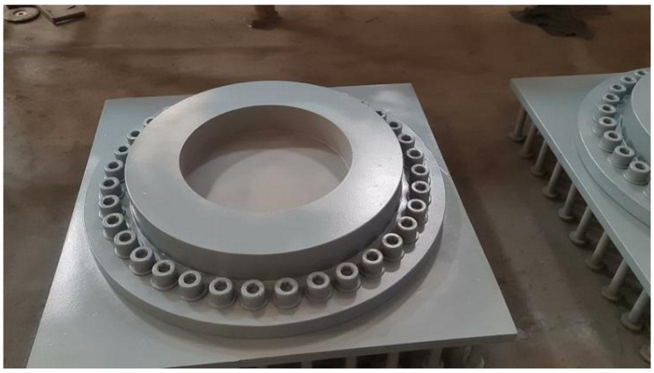

Fig.8. Pin Bearing

Different types of bearings have been strategically provided based on functional requirements:

- **Fixed Bearings**: Restrict all translational movements and allow only rotation; used to anchor the superstructure.
- **Guided Bearings**: Permit movement in one direction while restraining the other, ensuring controlled longitudinal displacement.
- **Free Bearings**: Allow movement in all horizontal directions, accommodating thermal expansion and contraction.
- **Pin Bearings**: Facilitate rotation with limited translational movement, used in specific locations requiring rotational flexibility.

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The selection and placement of these bearings ensure optimal distribution of forces, minimize stress concentration in structural elements, and enhance the overall serviceability and longevity of the elevated corridor.

3.5 Reinforced Earth Wall System

Reinforced earth walls [10] have been constructed at both main ramps and all eight intermediate ramps to facilitate smooth approach transitions and grade separation.

Fig.9. Geo Strips in RE Wall

These systems provide an efficient and economical solution for retaining earth while accommodating space constraints in urban environments.

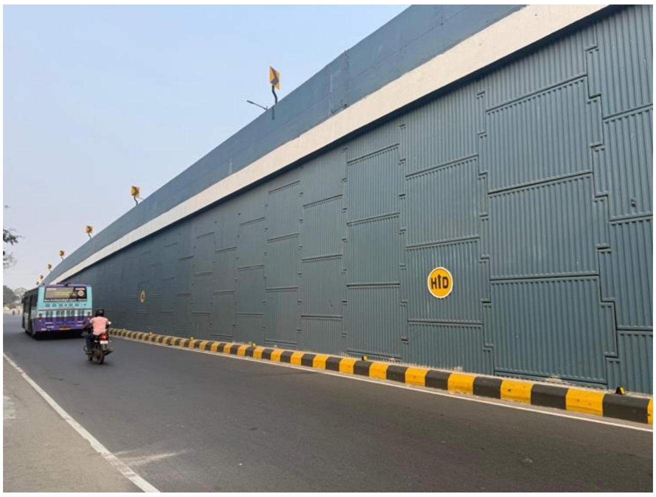

Fig 10. RE wall for Ramp

By using reinforced backfill with facing panels, the walls ensure stability, reduce lateral earth pressure, and allow rapid construction. The adoption of reinforced earth walls also minimizes land requirements and integrates well with the overall structural and geometric configuration of the corridor.

3.6 Steel Composite Railway Span

A 52 m steel composite span was provided to cross railway lines, addressing clearance constraints and minimizing disruption to rail operations. [11] The composite system combines the tensile strength of steel with the compressive properties of concrete, enabling longer spans with reduced self-weight. This feature highlights the structural adaptability of the corridor to site-specific challenges.

Fig 11. Second Level ROB

Fig 12. Launching of Steel Girders.

4. PAVEMENT, RIDING QUALITY, AND DECK ACCESSORIES

The performance of an elevated urban corridor is not determined solely by its structural system, but also by the quality of its deck surfacing and accessories, which directly influence user comfort, durability, and long-term maintenance. In the G.D. Naidu Elevated Corridor, the pavement and deck systems have been designed as an integrated solution to address riding quality, waterproofing, and structural protection under continuous high-intensity traffic conditions [12], [13].

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4.1 Sinus Plate Expansion Joints

Expansion joints [14] are essential components in bridge structures, allowing for thermal expansion and contraction, shrinkage, creep, and other structural movements. However, in heavily trafficked urban corridors, conventional expansion joints often become sources of discomfort and maintenance issues due to their tendency to generate impact loads, noise, vibration, and leakage.

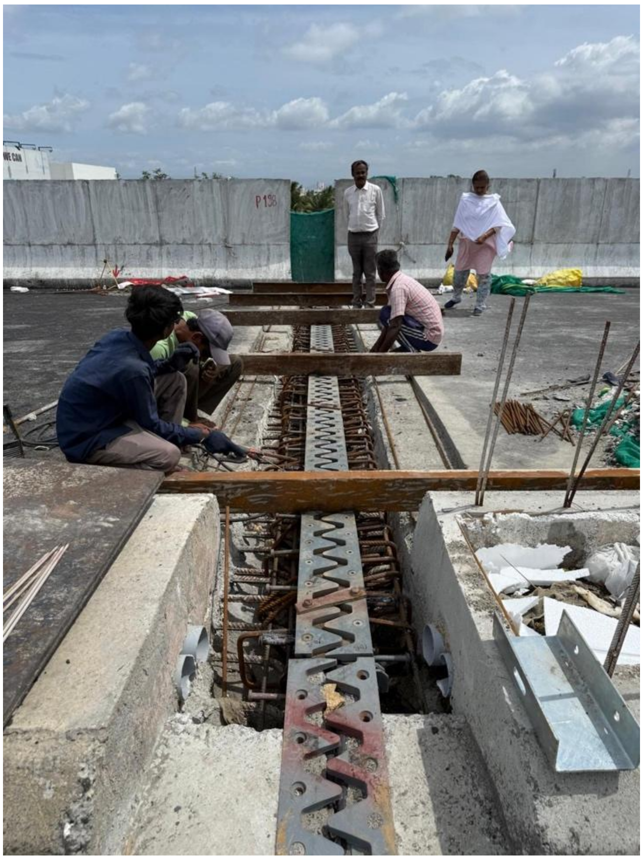

Fig 13. Sinus Plate Expansion Joint

To overcome these limitations, **sinus plate expansion joints** have been adopted in the G.D. Naidu Elevated Corridor. Unlike conventional joints, the sinusoidal geometry provides a smooth and gradual transition for moving vehicles. This significantly reduces impact effects when vehicles pass over the joint, resulting in improved riding comfort and reduced dynamic loading on the structure.

From an engineering perspective, the use of sinus plate joints minimizes localized stress concentrations and reduces wear and tear at joint interfaces. The smoother load transfer mechanism enhances durability and lowers maintenance frequency. Additionally, reduced noise and vibration are particularly beneficial in dense urban environments, where user comfort and surrounding environmental quality are critical considerations.

Since the perception of an elevated corridor by users is strongly influenced by ride smoothness and noise levels, the adoption of sinus plate expansion joints represents a key design intervention aimed at improving both structural performance and user experience.

4.2 Deck Surfacing System – Mastic Asphalt Layer

The elevated corridor is configured as a **four-lane divided carriageway**, designed to carry uninterrupted through traffic subjected to continuous loading and environmental exposure. To ensure durability and long-term performance, a **mastic asphalt layer** has been provided as an intermediate waterproofing course over the deck.

Mastic asphalt is characterized by its dense, impermeable, and flexible properties, making it highly suitable for bridge deck applications. It effectively prevents water ingress into the deck slab, thereby protecting reinforcement and concrete from deterioration caused by moisture and environmental effects.

Fig 14. Mastic Asphalt Laying

In the context of a long urban elevated corridor, where exposure to rain, temperature variations, and traffic-induced stresses is continuous, the role of mastic asphalt becomes critical. It acts as a protective barrier that enhances the service life of the structure while reducing maintenance requirements.

4.3 Bituminous Concrete Wearing Course

Above the mastic asphalt layer, a **bituminous concrete (BC) wearing course** is provided to ensure smooth riding quality and adequate skid resistance. The BC layer directly interacts with vehicular traffic and is therefore designed to provide comfort, safety, and durability under repeated loading conditions.

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The combination of mastic asphalt and bituminous concrete forms a **dual-layer surfacing system**, where:

- The mastic asphalt layer provides **waterproofing and structural protection**, and
- The BC layer provides **riding quality and surface performance**.

This layered approach reflects a well-engineered pavement strategy in which both durability and user comfort are addressed simultaneously, rather than treating deck surfacing as a minimal finishing layer.

4.4 Integrated Performance of Deck System

The integration of sinus plate expansion joints with a dual-layer surfacing system significantly enhances the overall performance of the elevated corridor. Smooth transitions at joints, combined with high-quality surfacing, ensure consistent riding conditions throughout the corridor length.

In high-speed urban corridors, such integration reduces vehicle-induced vibrations, minimizes structural fatigue, and improves user satisfaction. It also contributes to lower maintenance interventions, which is particularly important in elevated structures where maintenance operations can disrupt traffic flow.

Thus, the pavement and deck accessories in the G.D. Naidu Elevated Corridor are not treated as secondary elements but as **critical components of overall infrastructure performance**, contributing to durability, safety, and user experience.

5. SAFETY AND CRASH PROTECTION FEATURES

5.1 High-Containment RCC Crash Barrier of 1.5 m Height

The elevated corridor is provided with high-containment reinforced concrete crash barriers of approximately 1.5 m height. This is a major safety feature. High-containment barriers are intended to control, redirect, and contain errant vehicles under severe impact conditions, particularly on elevated structures where the consequences of vehicle departure are extremely serious.

The height and robustness of the barrier indicate that the design prioritizes not only lane delineation but actual containment. In urban flyovers carrying mixed vehicle categories, the barrier must be capable of resisting impact loads while minimizing the risk of vehicle override or breach. A reinforced concrete high-containment barrier provides mass, rigidity, and continuity, all of which are important in such contexts.

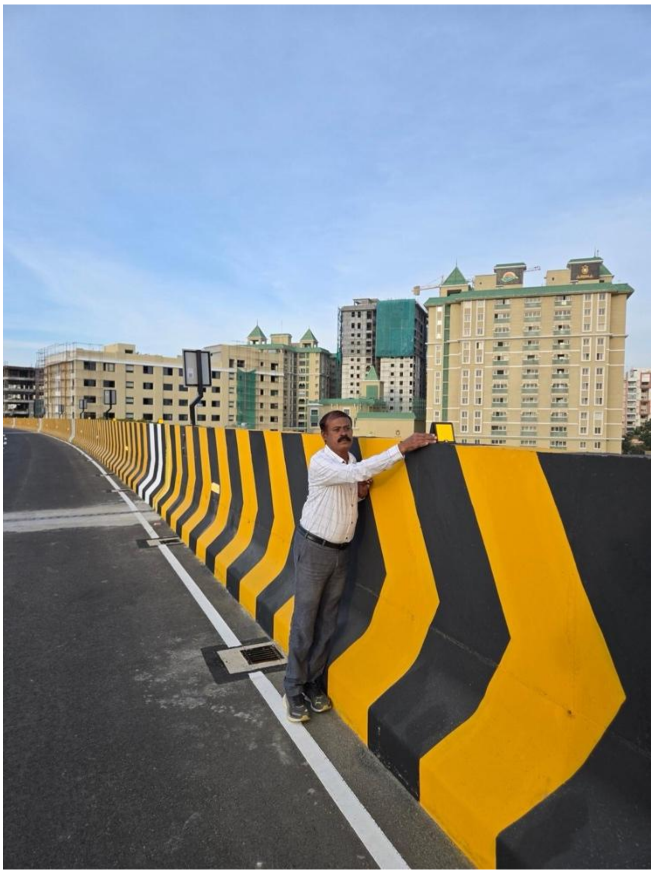

Fig 15. High Containment Crash Barrier

The significance of this feature also extends to public confidence. A visually substantial barrier communicates safety and protection to users. In technical terms, it enhances the defensive character of the elevated carriageway and acts as a primary safety envelope [15], [16], [17].

Table 4: Safety Features and Functions

Safety Element	Location	Function	Benefit
RCC Crash Barrier	Elevated	Containment	Prevent fall-off
Metal Beam Barrier	Full length	Redirection	Lane discipline
Roller Barrier	Ramp ends	Energy absorption	Reduced impact severity
Raised Median	Elevated	Separation	Prevent collisions
Speed Breakers	Down ramps	Speed control	Safer transition

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Safety Element	Location	Function	Benefit
Pier Protection Wall	At-grade	Impact protection	Structural safety

5.2 Raised Centre Median of 1.2 m Width

A raised center median of 0.3 m height and 1.2 m width has been provided. Medians on elevated corridors perform several functions: they separate traffic streams, reduce headlight glare where applicable, assist in visual guidance, and improve traffic discipline by discouraging unsafe crossover movements. When treated with adequate height and form, the median becomes a major safety and operational element rather than a simple divider.

Fig 16. Continuous Centre Median in Elevated Corridor

The raised median also contributes to corridor orderliness and can support an organized visual language along the route. In this project, where the corridor is intended to have strong visual identity, the median becomes part of the overall structural and urban design composition.

5.3 Continuous Metal Beam Crash Barrier with Aesthetic Painting

Throughout the corridor length, metal beam crash barriers have been provided and aesthetically painted. Metal beam barriers are commonly used because of their proven redirection performance, relative ease of installation, and adaptability along long alignments. However, the decision to paint them aesthetically across the entire corridor adds an additional visual layer to a standard safety device.

Fig 17. Metal Beam Crash Barrier

This integration of utility and appearance is important. In many infrastructure projects, safety elements are left as purely functional items. Here, the metal beam barrier is not only a protective device but also a visual component of corridor identity. This indicates design intentionality at the level of road furniture and not only at the level of major structures.

5.4 Roller Crash Barriers at Entry and Exit of Ramps

Roller crash barriers have been installed at the entry and exit of ramps. These locations are critical because they involve merging, diverging, speed adjustment, and directional change. Errant movements are more likely in such transition zones, especially if drivers misjudge speed or alignment.

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Fig 18. Roller Crash Barrier

Roller barriers are designed to absorb and dissipate impact energy while redirecting vehicles along the barrier line. Their rotational elements can reduce the severity of impact and assist in channelizing vehicles back into the traffic stream. Installing them at ramp approaches and exits reflects a targeted safety strategy that recognizes the special risk profile of these locations.

5.5 Rubber Speed Breakers at Down Ramps

Speed breakers [18] at down ramps serve as traffic calming devices intended to moderate vehicle speed before vehicles transition from elevated flow to surface-level conditions. Down ramp exits often lead into urban traffic environments with pedestrians, side roads, and local movements. A speed moderation strategy is therefore essential.

Fig 19. Temporary Rubber Speed breaker.

The use of rubber speed breakers rather than rigid, harsh devices suggests an attempt to balance effectiveness with user comfort and maintainability. These devices are especially relevant where operational safety at transition points is a priority.

5.6 Pier Protection Wall of 2.5 m width witH SS Railing at At-Grade Level

At the at-grade level, a 2.5 m pier width , 0.9m height protection wall has been provided. Pier zones within urban corridors are susceptible to accidental impact, encroachment, debris accumulation, and in some cases undesirable movement conflicts. A pier protection wall therefore acts as a physical buffer safeguarding the substructure.

Fig 20 Pier Protection Wall with SS Railings

The provision of such a protection wall over substantial lengths indicates careful attention to the vulnerability of at-grade structural elements. This is an important but often overlooked component of corridor safety design.

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6. GEOMETRIC CONFIGURATION AND TRAFFIC DISTRIBUTION FEATURES

6.1 Main Ramps and Intermediate Ramps

The elevated corridor which has been designed as four lane divided carriageway includes four intermediate up ramps and four intermediate down ramps apart from the main ramps. This distributed ramp system is highly significant in urban elevated corridors because accessibility determines how effectively the elevated facility serves the wider road network. If access is available only at distant terminals, the benefits of the corridor may be concentrated rather than distributed.

Fig 21. Ramp portion at Night View

Intermediate ramps allow strategic entry and exit at multiple points, thus improving network penetration and providing flexibility for different trip origins and destinations. They also reduce pressure on terminal ramps by distributing traffic loading and weaving movements.

From a planning standpoint, these ramps convert the corridor from a purely terminal-to-terminal facility into a more usable urban mobility system. Their inclusion also complicates structural and safety design, which makes the ramp-related engineering features discussed elsewhere in this paper especially important.

6.2 At-Grade Six-Lane Configuration

The at-grade component is designed as a six-lane carriageway. This is a major urban integration feature. Many elevated corridor projects focus heavily on the upper deck while leaving the surface network functionally compromised or visually neglected. In contrast, a six-lane at-grade arrangement shows that the project attempts to maintain strong ground-level road capacity and urban movement even while through-traffic is shifted to the elevated level

Fig 22. 6 Lane Atgrade Configuration.

This dual-level design philosophy makes the corridor more complete. The elevated portion handles uninterrupted movement, while the at-grade level remains active, landscaped, lighted, and protected. In publication, the at-grade six-lane provision should be highlighted as evidence that the project is a corridor redevelopment exercise rather than a narrow bridge work.

6.3 Elevated Four-Lane Divided Carriageway Configuration

The elevated corridor is designed as a four-lane divided carriageway to carry uninterrupted through traffic.

Fig 23. Elevated 4 lane Configuration

By separating fast-moving vehicles from at-grade movements, it reduces congestion, delays, and conflict points. The divided layout improves safety and traffic discipline, making it well-suited for dense urban conditions. This elevated system complements the at-grade six-lane road, which continues to handle local access and mixed traffic, resulting in an efficient dual-level corridor.

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7. SMART CORRIDOR AND INFORMATION SYSTEM FEATURES

Modern urban infrastructure is increasingly expected to extend beyond physical mobility and incorporate intelligent systems that enhance monitoring, enforcement, and user interaction. In this context, the G.D. Naidu Elevated Corridor represents a significant advancement toward the development of a **smart transport corridor**, where digital technologies are seamlessly integrated with civil infrastructure to improve operational efficiency, safety, and long-term planning capabilities.

7.1 AI Cameras for Violation Detection, Traffic Monitoring, and Data Analytics

The installation of AI-based surveillance cameras along the corridor is one of its most advanced and defining features. These cameras continuously capture real-time traffic flow and transmit high-resolution video data to a centralized control room, where intelligent software systems process the information for multiple operational purposes.

Fig 24. AI Enabled Camera

At the control center, the captured footage is analyzed using AI-enabled algorithms capable of detecting a wide range of traffic violations. These include overspeeding, helmetless riding, seatbelt non-compliance, triple riding, mobile phone usage while driving, wrong-side driving, and unsafe or sudden lane changes. The system is designed to classify violations based on predefined parameters—for example, identifying vehicles exceeding a threshold speed such as 80 km/h—and instantly displaying the vehicle registration number along with violation details on the monitoring screens.

Table 5: Smart Corridor Systems

System	Quantity	Function	Benefit
AI Cameras	44	Violation detection	Enforcement automation
Video Walls	16	Public display	Awareness
Solar Blinkers	Multiple	Warning system	Accident prevention
Solar Studs	Multiple	Night visibility	Energy saving

This automated detection mechanism significantly reduces reliance on manual enforcement and ensures consistency, accuracy, and rapid response. From a traffic engineering perspective, it enhances behavioural compliance among road users and contributes to improved safety conditions across the corridor [19],[20].

In addition to enforcement functions, the system also performs continuous analysis of **traffic intensity, traffic volume, and flow characteristics**. The collected data can be systematically archived and utilized for future research applications, including traffic pattern analysis, congestion studies, level-of-service evaluation, and infrastructure performance assessment.

The availability of such high-resolution, continuous traffic data creates significant opportunities for advanced research in areas such as AI-based traffic modelling, predictive analytics, intelligent transport systems (ITS), and smart city planning, thereby extending the corridor's role from a physical infrastructure asset to a long-term data-driven research platform.

7.2 Video Walls and Real-Time Information Systems

To complement the surveillance system, video walls are installed along the corridor to display real-time information and awareness messages. These systems serve as an interface between the infrastructure and road users, enabling communication of traffic advisories, safety warnings, emergency alerts, and operational instructions.

Fig 25. Video Wall

The presence of video walls ensures that the corridor actively engages with users rather than functioning as a passive infrastructure system. Real-time information dissemination is particularly important in high-density urban corridors, where timely communication can influence driver behaviour and enhance safety outcomes.

7.3 Integrated Smart Corridor Framework

The combined deployment of AI cameras and video walls establishes a comprehensive smart corridor framework. Unlike conventional infrastructure, where structural and operational systems function independently, the G.D. Naidu Corridor integrates digital intelligence directly into its physical design.

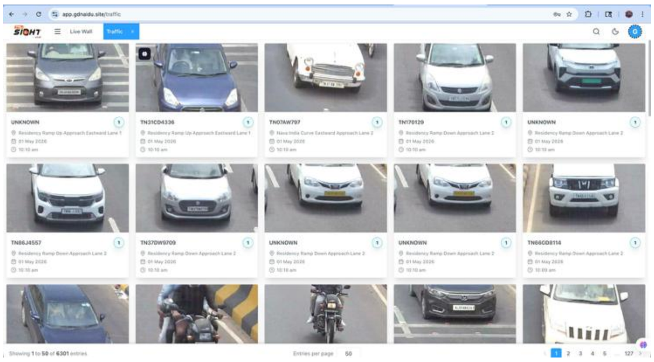

Fig 26. Remote Traffic Monitoring

This integration aligns with contemporary concepts of smart mobility and smart city development, where infrastructure is expected to generate data, support automated decision-making, and enable real-time management. By embedding intelligent systems within the corridor, the project enhances not only traffic movement but also safety enforcement, user awareness, and long-term operational efficiency.

Thus, the corridor represents a transition from a traditional transport facility to a **multi-functional, technology-enabled urban infrastructure system**, combining engineering, data analytics, and user-centric design.

8. SIGNAGE, VISUAL COMMUNICATION, AND ROAD FURNITURE

8.1 Thermoplastic Road Markings Thermoplastic road markings have been extensively applied for lane lines, edge lines, stop lines, arrows, and other traffic control symbols. Compared to conventional paint, thermoplastic materials provide superior durability, skid resistance, and retro-reflectivity. This ensures long-lasting visibility under heavy traffic conditions typical of the corridor. Their high luminance enhances driver guidance during both day and night, contributing to improved lane discipline and safety.

8.2 Reflective Road Studs Reflective road studs have been installed to improve night-time lane delineation and visibility. These studs act as continuous visual guides, particularly under low-light, foggy, or rainy conditions. Their placement along lane edges and median lines enhances alignment perception. They are especially important on elevated sections where edge definition is critical, improving driver confidence and reducing the risk of lane deviation.

Fig 27. Reflective Road studs

8.3 Solar Road Studs Solar-powered road studs have been introduced at critical locations requiring enhanced illumination. These units store solar energy during the day and emit light during night-time without external power supply. Their application at curves, ramps, and transition zones improves visibility in high-risk areas. The self-sustaining nature reduces maintenance requirements and ensures reliable performance.

8.4 Solar Blinkers Solar blinkers have been installed at key traffic control points such as ramp entries, exits, and junction influence zones.

Fig 28 .Solar Powered Blinker

These devices provide active warning through flashing signals, alerting drivers to changes in alignment or traffic conditions. They are particularly effective in highlighting merging traffic and speed reduction zones. Their solar-powered operation ensures reliability with minimal maintenance.

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8.5 Retro-Reflective and UV-Printed Signage Systems (Including Warning Boards) Retro-reflective signboards integrated with UV-printed graphics have been provided to ensure high visibility, durability, and clarity under all operating conditions. These signs reflect vehicle headlight illumination, maintaining legibility during night travel and adverse weather. The use of UV printing enhances visual quality, color stability, and resistance to environmental degradation.

Fig 29. Retro Reflective Boards

Warning boards and information systems are uniformly installed at both elevated and at-grade levels, ensuring consistent and predictable driver guidance. This integrated signage approach improves safety, readability, and overall corridor aesthetics.

Fig 30. UV Printed Information Boards

8.6 Reflective Kerb Markers Reflective kerb markers have been installed along kerb walls to enhance edge visibility. These markers provide a continuous visual reference for roadway boundaries, especially during night-time conditions. Their retro-reflective properties ensure effective illumination under vehicle headlights. This is particularly important on elevated stretches where lateral definition is critical.

8.7 Reflective Elements on Crash Barriers and Pier Protection Walls Reflective markers have been provided on crash barriers and pier protection walls to improve visibility of structural elements.

Fig 31. Reflective stickers on Crash Barrier Post.

These features highlight rigid roadside objects, making them easily identifiable under all conditions. Their presence helps drivers anticipate alignment changes and avoid potential collisions. This measure enhances passive safety across the corridor.

8.8 Megalux Reflective Panels Megalux reflective panels have been installed along crash barriers and pier protection walls to provide high-intensity visibility. These panels offer superior retro-reflective performance compared to standard materials. Their continuous arrangement creates a well-defined visual corridor for drivers.

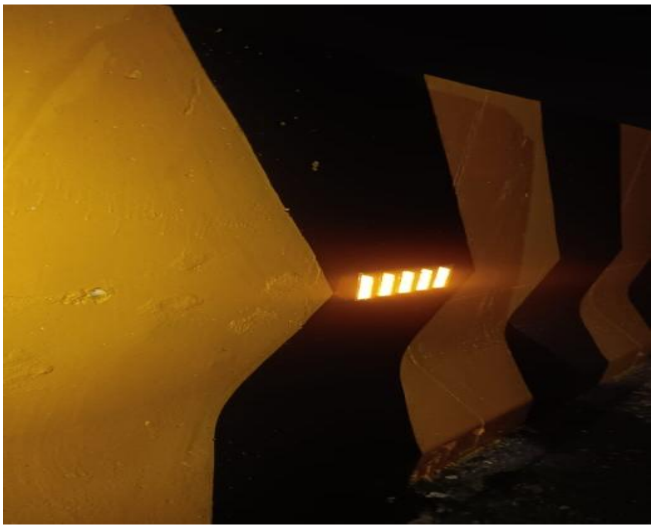

Fig 32 Megalux Reflective Panel over Crash Barrier

This is particularly beneficial in high-speed and low-light conditions.

8.9 Chevron Boards in Curves Chevron boards have been placed along horizontal curves to indicate direction and

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curvature severity.

Fig 33. Chevron Boards in Curves

These boards provide clear visual guidance that helps drivers anticipate alignment changes. Their high-contrast and reflective design ensures visibility in all conditions. This installation significantly improves safety in curved sections.

8.10 Gantry-Mounted Destination Boards Gantry-mounted destination boards have been installed at major junctions to provide advance directional guidance.

Fig 34. Gantry Boards

These overhead signs ensure high visibility even in dense traffic conditions. Their placement allows drivers to make timely lane choices without abrupt maneuvers. This contributes to smoother traffic flow and reduced confusion at critical points.

8.11 Reflective Stickers on Metal Beam Crash Barrier Posts Reflective stickers have been applied on the posts of metal beam crash barriers along the elevated stretch to enhance visibility of the barrier system. These stickers provide intermittent yet continuous visual cues that clearly define the roadway edge during night-time and low-visibility conditions. The retro-reflective surface ensures effective illumination under vehicle headlights without requiring external power. Their uniform placement along the entire stretch improves alignment perception and lateral guidance for drivers. This measure contributes to enhanced safety by reducing the likelihood of unintended vehicle encroachment towards the barrier. [21], [22], [23].

9. LANDSCAPING AND GREEN CORRIDOR FEATURES

9.1 Potted Plantation between Metal Beam Crash Barriers

A distinctive feature of the elevated corridor is the provision of potted plantations within the 1.2 m wide space between metal beam crash barriers.

Fig 35. Potted Plantation in elevated Level

The use of multi-coloured bougainvillea combined with golden cypress creates a continuous landscaped strip, enhancing visual quality and establishing a strong corridor identity.

Fig 36. Potted Plantation in Approach

Beyond aesthetics, the plantation contributes to functional benefits such as partial glare reduction from opposing traffic during night-time, thereby improving driver comfort. The selection of hardy, climate-adapted species ensures resilience and low maintenance. The arrangement is carefully designed

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to maintain structural clearances, ensure wind stability, and allow maintenance access without affecting barrier performance, demonstrating effective integration of landscape and engineering requirements [24].

9.2 At-Grade Plantation and Edge Landscaping

At the at-grade level, a combination of palm varieties (royal palm, mirchi palm, areca palm), Thuja, and other ornamental species, along with continuous edge plantation, creates a well-defined green corridor.

Fig 37. Edge Plantation between Pier Protection Wall

Palms provide vertical visual rhythm, while shrubs and edge planting introduce softness and spatial enclosure, enhancing the corridor's character both during day and night.

9.3 Green Carpet with Korean Grass

Korean grass is used as a continuous green carpet in median and landscape zones, improving visual continuity and overall neatness.

Fig 38. Green Grass Carpet between Pier Protection Wall

It acts as a base layer supporting larger plantation elements and contributes to a well-maintained urban appearance

9.4 Landscaping as Environmental Infrastructure

The landscaping system functions not only as an aesthetic feature but also as environmental infrastructure.

Fig 39. Landscaping at At-grade Level

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Continuous plantation along the corridor helps in dust control, heat reduction, and visual comfort, while improving public acceptance of large-scale elevated structures. Thus, the green corridor approach enhances both environmental performance and user experience.

10. IRRIGATION AND PLANT MAINTENANCE SYSTEMS

10.1 Drip Irrigation for Elevated Plantation

Providing plantation on or alongside an elevated corridor is only meaningful if long-term survivability is ensured.

Fig 40. Drip Irrigation at Elevated Level

The use of drip irrigation for elevated plants is therefore a significant sustainability and maintenance feature. Drip systems deliver water directly to the root zone with high efficiency and minimal wastage. They are particularly appropriate where water conservation and controlled application are important.

In elevated settings, drip irrigation also reduces splashing, runoff, and unnecessary wetting of structural surfaces compared with broader spray-based systems. It is thus both a horticultural and structural maintenance-friendly choice.

Table 6: Landscaping and Irrigation

Component	Type	Purpose	Benefit
Median Plants	Bougainvillea	Visual appeal	Beautification
Trees	Palm/Thuja	Urban greenery	Cooling
Grass	Korean grass	Ground cover	Aesthetic finish
Irrigation	Drip	Water efficiency	Plant survival
Irrigation	Sprinkler	Area coverage	Uniform growth

10.2 Sprinkler Irrigation for At-Grade Landscaping

At the at-grade level, sprinkler irrigation has been provided for broader landscape areas. Sprinkler systems are well suited to grassed zones, large planted beds, and wider green strips

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where uniform area coverage is required.

Fig 41. Sprinkler Irrigation in At-Grade Level

The combined use of drip and sprinkler systems across different corridor zones demonstrates that the irrigation strategy was matched to plant type and spatial condition. This is a sophisticated feature because it shows that the landscaping was designed as a maintainable long-term system rather than a one-time beautification effort.

11. WATER MANAGEMENT AND RECHARGE FEATURES

11.1 Rainwater Harvesting with More than 250 Recharge Pits

One of the strongest sustainability features of the corridor is the provision of more than 250 rainwater harvesting pits for groundwater recharge. Urban elevated corridors create large impervious surface areas from which runoff can be collected and managed. Instead of treating this runoff only as drainage discharge, the project uses it as a resource for recharge.

Fig 42. Rain Water Harvesting System

This approach is highly significant in Indian urban conditions where groundwater depletion, stormwater runoff, and localized water stress often coexist. By creating a distributed recharge system along the corridor, the project transforms linear infrastructure into a water management asset.

The large number of recharge pits suggests that the system is not symbolic but substantial. It indicates corridor-scale implementation rather than isolated pilot intervention. From a journal standpoint, this is one of the project's most publishable sustainability features.

11.2 Integrated Stormwater and Recharge Philosophy

The importance of the rainwater harvesting system is magnified when understood in relation to drainage design. Efficient collection, conveyance, and controlled diversion

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into recharge structures require planning across the corridor.

Fig 43. Drainage Pipe Connected to RWH System

This means the water management system was integrated into the civil design rather than added later. Such embedded sustainability is an important benchmark characteristic , [25], [26].

12. LIGHTING FEATURES

12.1 Integrated LED Lighting and Pole Design System.

Continuous LED lighting is provided throughout the corridor to ensure adequate visibility, safety, and aesthetic enhancement. LED luminaires offer high energy efficiency, long service life, and reduced maintenance, making them suitable for urban infrastructure. Uniform illumination improves night-time safety by enhancing lane visibility, structural clarity, and overall corridor legibility.

Fig 44. Lighting at elevated Level

The lighting system is supported by aesthetically designed poles that contribute to the visual identity of the corridor. On the elevated section, **9 m high powder-coated poles** are provided for durability and uniform lighting coverage, while at the at-grade level, **5.5 m high poles** are integrated within the centre median to maintain organized roadside geometry. [27].

Table 7: Lighting and Aesthetic Systems

Element	Type	Purpose	Benefit
LED Lighting	Functional	Visibility	Safety
Poles	9 m aesthetic	Support	Visual uniformity
Poles	5.5m, 3 arm poles	Support	Visual uniformity
Underdeck Lighting	Color changing	Aesthetic	Landmark effect
Uplighters	Tree lighting	Highlight landscape	Night beauty

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Element	Type	Purpose	Benefit
Strip Lights	Around piers at junctions	Aesthetic	Landmark effect

At major junctions and median openings, **three-arm poles** are installed to achieve wider and more uniform light distribution in complex traffic areas. All poles are equipped with Lumex LED luminaires, ensuring consistent illumination quality across the corridor.

Overall, the system reflects an integrated approach combining **energy efficiency, safety, and architectural aesthetics**.

12.2 Tree Uplighters and Stick Lights

Within landscaped areas, tree uplighters and stick lights have been used to enhance night-time visibility and aesthetic effect. These features are significant because they transform the corridor from a purely illuminated roadway into a curated night-time urban landscape.

Fg 45. Ornamental Stick Light

Such lighting can highlight palms, shrubs, pylon features, and planted medians, creating layered visual depth after dark. In publication, these elements can be discussed as part of placemaking through infrastructure.

Fig 46. Tree up lighter

12.3 Strip Lighting around Junction Piers

Strip lighting around piers in junction zones creates localized emphasis at critical nodes and improves visibility around structural supports.

Fig 47. Strip lighting over Pier at Junction

Since junctions are visually complex and traffic-sensitive areas, lighting treatment at these locations helps both orientation and aesthetics.

12.4 Colour-Changing LED Lighting beneath the Deck

The underside of the deck includes colour-changing LED lighting. This feature has strong symbolic and visual

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significance.

Fig 48. RGB Lighting at deck bottom in Junctions.

Under-deck zones in urban elevated projects are often dark, visually neglected, or perceived as dead spaces. By introducing colour-changing lighting, the project transforms the underside into a dynamic visual element.This can significantly change public perception of the corridor, especially in the evening. It creates an identity beyond engineering utility and contributes to the project’s iconic character.

13. ARCHITECTURAL, CULTURAL, AND AESTHETIC FEATURES

13.1 Pylon Pillars with Traditional Structures at Ramp Ends

Pylon pillars incorporating traditional forms at the ends of ramps are a remarkable feature because they connect major urban infrastructure with local cultural vocabulary. This creates a sense of place and prevents the corridor from appearing anonymous or interchangeable.

Fig 50. Decorative Pylons at Ramps

The use of traditional motifs at ramp terminals is especially appropriate because such locations act as thresholds between elevated and surface movement. Their architectural treatment can therefore reinforce arrival, departure, and identity.

13.2 Temple Gopuram-Inspired Elements at Main Entrance

At both the main ramp entrance, structures inspired by the Srivilliputhur Andal Temple Tower—the iconic emblem of Tamil Nadu—have been prominently incorporated.. This is a highly distinctive cultural feature. The incorporation of a recognizable traditional architectural motif creates local association, civic pride, and immediate visual recall.

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Fig 51. Decorative Cultural Landmark Element Provided at Median of the Elevated Corridor

13.3 Attractive Painting over Concrete Structural Components

The project includes aesthetic painting over piers, deck elements, struts, crash barriers, and related concrete surfaces. Concrete in large linear infrastructure can often appear monotonous and visually heavy. A considered painting scheme can soften this effect, improve legibility, highlight structural form, and reduce the perception of massiveness.

This is particularly important where the corridor is expected to function as a visual landmark. Painting transforms raw civil structures into finished urban elements.

13.4 Coordinated Aesthetic Language across the Corridor

One of the most important but less tangible features is the coordinated aesthetic language maintained across barriers, lighting poles, boards, plantings, pylons, and structural surfaces. The corridor does not appear as a random accumulation of separate utility items; rather, it reads as an integrated composition. This coherence is one of the primary reasons the corridor can be described as iconic.

14. AT-GRADE CORRIDOR DESIGN QUALITY

The at-grade corridor deserves separate recognition because it demonstrates that the project extends beyond the elevated deck. The six-lane surface carriageway, pier protection wall, green carpet, palm planting, ornamental shrubs, edge plantation, UV-printed signage, LED lighting, and decorative treatment of pier zones show that the surface level was consciously upgraded as part of the overall project vision.

This is important because large elevated works often cast a physical and psychological shadow on the urban space below. In contrast, the G.D. Naidu Corridor attempts to activate and beautify the ground plane. Such treatment improves civic acceptance and expands the project's benefits beyond users of the elevated deck alone.

15. Integrated Stormwater Drainage and Pedestrian Pathway System

Throughout the entire stretch of the corridor, a continuous stormwater drain-cum-footpath system has been provided on both sides. This integrated design ensures efficient collection and conveyance of surface runoff while simultaneously offering a dedicated and safe pedestrian walkway.

Fig 52. Foot Path with Hand Rails over Drain

The footpath is constructed above the drainage channel with adequate structural support, optimizing the use of available space in a dense urban environment. Continuous handrails are provided along the footpath to enhance pedestrian safety, particularly in high-traffic zones. This approach reflects a holistic infrastructure design philosophy, where drainage and pedestrian facilities are combined into a single functional system, improving both utility and urban usability of the corridor. [28]

16. Bus Lay-byes and Passenger Shelters

At essential locations along the corridor, dedicated bus lay-byes [29] and passenger shelters have been provided to facilitate safe and efficient public transport operations. The bus lay-byes are designed as recessed bays separated from the main traffic stream, allowing buses to stop without obstructing through traffic, thereby maintaining smooth traffic flow. These lay-byes are strategically located near major activity zones such as commercial areas, institutions, and residential clusters to ensure accessibility for commuters. Passenger shelters are provided in conjunction with the lay-byes, offering protection from weather conditions and

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improving user comfort. This integrated provision supports public transport usage, enhances pedestrian safety, and reflects a balanced corridor design that accommodates both private and public transport systems.

17. COMPARATIVE INTERPRETATION: WHY THIS CORRIDOR IS DISTINCTIVE

A useful way to interpret the project is to compare it with a typical urban flyover or elevated road. Conventional projects may include a repetitive superstructure, basic barriers, limited signage, standard lighting, and minimal landscaping. The G.D. Naidu Corridor goes considerably further by integrating the following in one continuous project:

- Adaptive foundation systems
- Portal beam ramp structures
- Staged yard-to-site segmental prestressing
- Special steel composite railway span
- High-containment RCC barriers
- Roller barriers at targeted ramp locations
- Raised medians and pier protection systems
- AI cameras and video walls
- Corridor-wide premium signage and UV-printed boards
- Elevated and at-grade plantation systems
- Drip and sprinkler irrigation
- More than 250 recharge pits
- Functional plus decorative lighting systems
- Cultural pylons and regional motifs
- Aesthetic treatment of structural components
- Storm water drain cum foot path.

The importance of this comparison is that it reveals the corridor not as a single-feature project but as a multi-system benchmark. The project's iconic quality lies in the accumulation and integration of many features, each addressing a different dimension of performance.

18. DISCUSSION

The G.D. Naidu Elevated Corridor demonstrates that the future of urban transport infrastructure lies in integrated design. A major corridor should no longer be seen only as a structural object or a traffic intervention. Instead, it should be understood as a composite urban system containing structural engineering, safety design, surveillance, environmental management, horticulture, public communication, lighting design, and civic symbolism. [3]

Table 8: Comparison with Conventional Flyover

Feature	Conventional Flyover	G.D. Naidu Corridor
Structural System	PSC girder	Strutted box girder
Safety	Basic barrier	Multi-layer safety, High containment crash barrier
Smart Systems	None	AI-based
Water Management	Drain only	RWH system
Landscaping	Minimal	Full green corridor
Irrigation	Using tanker manually	Sprinkler irrigation and drip irrigation
Lighting	Basic	LED + decorative
Identity	Generic	Cultural landmark

One of the key lessons from this project is that iconicity in infrastructure does not arise only from scale. A long flyover becomes iconic when multiple systems are deliberately layered into it: a distinctive superstructure, thoughtful ramp treatment, strong safety envelope, intelligent surveillance, water recharge systems, coordinated greenery, attractive lighting, and cultural markers. In this sense, the corridor moves from being merely large to being complete.

A second lesson is that sustainability in corridors need not be confined to energy or emissions discussion alone. Rainwater harvesting, irrigation efficiency, maintainable planting systems, and reduced visual harshness through greenery all form part of a wider sustainability framework. Similarly, safety is not limited to crash barriers but extends to information systems, signage, transition control, and lighting.

A third lesson is that urban acceptability matters. In highly built environments, residents and road users judge infrastructure not only by speed but by how it looks, how it feels, and how it affects the public realm. The coordinated aesthetic treatment in the corridor therefore has serious engineering relevance because it influences long-term civic value.

19. CONCLUSION

The G.D. Naidu Elevated Corridor in Coimbatore can be regarded as a benchmark urban elevated corridor because it combines engineering performance, construction innovation, safety systems, smart infrastructure, water management,

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landscaping, and visual identity within a single integrated project. Its significance lies not in any one isolated feature but in the way many features have been assembled coherently across the entire corridor.

Structurally, the project demonstrates advanced solutions through pile and open foundations, portal beam ramp structures, a strutted segmental box girder system, staged prestressing, epoxy-bonded segmental assembly, and a major steel composite railway span. Functionally, it provides smoother riding through specialized surfacing and sinus plate expansion joints. In safety terms, it incorporates high-containment barriers, raised medians, metal beam barriers, roller barriers, speed control devices, pier protection walls, and coordinated signage. In smart corridor terms, it includes AI cameras and video walls. In sustainability terms, it provides large-scale rainwater harvesting, drip and sprinkler irrigation, and extensive planting. In visual and civic terms, it incorporates premium lighting, decorative treatments, pylon features, and culturally resonant motifs.

Taken together, these features demonstrate a mature model of corridor design suitable for dense urban environments where infrastructure is expected to do far more than carry vehicles. The project therefore offers a valuable reference for future elevated corridor planning in India and elsewhere.

20. REFERENCES

[1] IRC:86-2018, Geometric Design Standards for Urban Roads and Streets, Indian Roads Congress, New Delhi.
[2] Samuthirakani, V. (2026), Life-cycle Sustainability and Economic Performance of a High-Density Urban Elevated Corridor: Evidence from the G.D. Naidu Flyover, Coimbatore, India, Indian Highways, IRC, Vol. 54, No. 05.
[3] IRC:SP:30-2019, Manual on Economic Evaluation of Highway Projects in India (Third Revision), Indian Roads Congress.
[4] IRC:78-2024 (Part I), Standard Specifications and Code of Practice for Road Bridges, Foundations and Substructure – General Features and Working Stress Design (Third Revision), Indian Roads Congress.
[5] IS:2911 (Part 1/Sec 1)-2010, Design and Construction of Pile Foundations, Bureau of Indian Standards.
[6] IRC:112-2020, Code of Practice for Concrete Road Bridges, Indian Roads Congress.
[7] IRC:SP:65-2018, Guidelines for Design and Construction of Segmental Bridges, Indian Roads Congress.
[8] IRC:18-2000, Design Criteria for Prestressed Concrete Road Bridges, Indian Roads Congress.
[9] Podolny, W. and Muller, J.M. (1982), Construction and Design of Prestressed Concrete Segmental Bridges, John Wiley & Sons.
[10] IRC:SP:102-2014, Guidelines for Design and Construction of Reinforced Soil Walls, Indian Roads Congress.
[11] IRC:22-2015, Standard Specifications and Code of Practice for Road Bridges, Section VI – Composite Construction (Limit State Design), Indian Roads Congress.
[12] IRC:37-2018, Guidelines for the Design of Flexible Pavements (Fourth Revision), Indian Roads Congress.
[13] IRC:SP:53-2010, Guidelines on Use of Modified Bitumen in Road Construction (Second Revision), Indian Roads Congress.
[14] IRC:SP:69-2011, Guidelines and Specifications for Expansion Joints, Indian Roads Congress.
[15] IRC:5-2024, Standard Specifications and Code of Practice for Road Bridges, Section I – General Features of Design (Ninth Revision), Indian Roads Congress.
[16] IRC:SP:84-2019, Manual of Specifications and Standards for Four Laning of Highways (Second Revision), Indian Roads Congress.
[17] IRC:119-2015, Guidelines for Traffic Safety Barriers, Indian Roads Congress.
[18] IRC:99-2018, Guidelines for Traffic Calming Measures in Urban and Rural Areas (First Revision), Indian Roads Congress.
[19] IRC:SP:110-2017, Application of Intelligent Transport System for Urban Roads, Indian Roads Congress.
[20] IRC:SP:88-2019, Manual on Road Safety Audit (First Revision), Indian Roads Congress.
[21] IRC:35-2015, Code of Practice for Road Markings (Second Revision), Indian Roads Congress.
[22] IRC:67-2022, Code of Practice for Road Signs (Fourth Revision), Indian Roads Congress.
[23] IRC:79-2019, Recommended Practice for Road Delineators (First Revision), Indian Roads Congress.
[24] IRC:SP:21-2009, Guidelines on Landscaping and Tree Plantation, Indian Roads Congress.
[25] IRC:SP:42-2014, Guidelines on Road Drainage (First Revision), Indian Roads Congress.
[26] IRC:SP:50-2013, Guidelines on Urban Drainage (First Revision), Indian Roads Congress.
[27] IRC:90-2010, Guidelines of Selection, Operation and Maintenance of Bituminous Hot Mix Plant, Indian Roads Congress.
[28] IRC:103-2022, Guidelines for Pedestrian Facilities (Second Revision), Indian Roads Congress.
[29] IRC:SP:12-2015, Guidelines for Parking Facilities in Urban Areas (First Revision), Indian Roads Congress.