

URBAN ROADS TRANSFORMATION

COMPREHENSIVE RECOMMENDATIONS REPORT

Uttar Pradesh Transformation Commission, Lucknow

Technical Committee – Expert Advisory Report

Achieving Quality Equal to or Better than UP Expressways

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This report contains detailed technical recommendations for transformation of all categories of urban roads in Uttar Pradesh to world-class standards, prepared in accordance with IRC codes, MoRTH specifications and international best practices.

EXECUTIVE SUMMARY

Vision, Approach & Key Recommendations

The Government of Uttar Pradesh, through the UP Transformation Commission, has embarked on an ambitious programme to transform all urban roads across the state to a quality level equal to or surpassing that of UP's world-renowned expressway network. This report presents the Technical Committee's comprehensive recommendations covering planning, geometric design, structural design, safety, drainage, signage, markings, intelligent traffic management, maintenance, and institutional arrangements.

VISION STATEMENT

VISION 2030 – UP URBAN ROADS

- Every urban road in UP shall be safe, smooth, aesthetically pleasing and accessible to all users including pedestrians, cyclists, persons with disabilities and street vendors.
- Urban roads shall achieve Level of Service 'B' or better on major arterials and collectors.
- Zero-fatal crashes on urban roads in KAVAL cities by 2030.
- Green, sustainable, drainage-compliant urban streetscapes with smart traffic management.
- Transformation of existing roads within 5 years through phased programme.

KEY RECOMMENDATIONS SUMMARY

The following summarises the 19 major recommendation areas of this report:

- **Geometric Design (IRC-86-2018):** Mandatory compliance with cross-section standards for all ROW categories (8m, 12m, 20m+). Carriageway, footpath, cycle track, median and utility corridor as per zoning of city category.
- **Traffic Safety Barriers (IRC-119-2015):** W-beam crash barriers on medians of all arterials; MASH-tested systems on elevated sections; end treatments mandatory.
- **Cycle Tracks (IRC:11-2015):** Segregated cycle tracks on all roads with ROW $\geq 20\text{m}$; shared paths where ROW is limited; coloured surfacing and dedicated signals.
- **Parking (IRC-SP-12-2015):** Structured parking demand management; multilevel parking in KAVAL cities; prohibition of on-street parking on arterials.
- **At-Grade Intersections (IRC:SP-41):** Channelised intersections with proper turning radii, refuge islands, and signal phasing; roundabouts where appropriate.
- **School Safety (IRC:SP-32-2023):** Safe school zones with speed tables, signage, drop-off zones and pedestrian crossing signals at all schools.
- **Road Signs (IRC-67-2012):** 100% compliance with retroreflective signs; VMS boards on arterials; advance information signing.
- **Pedestrian Facilities (IRC-103-2012):** Grade-separated crossings at high-volume junctions in KAVAL cities; signalised zebra crossings at all major intersections; tactile paths.
- **Urban Drainage (IRC-SP-50-2015):** Covered RCC drains; storm water management; no waterlogging within 30 minutes of cessation of rain.
- **Utility Ducts (IRC-98):** Common utility ducts / duct banks under footpaths for all services; no road cutting after construction.
- **Road Markings & Delineation (IRC-35-2015 / IRC-79-2018):** Thermoplastic markings; retroreflective delineators; raised pavement markers.

- **Pavement Design (IRC-37):** Mechanistic-empirical design; milling and recycling before overlay; no level raising; bituminous surface with crack-free warranty.
- **Urban Roads Planning (IRC-118-2015):** Integrated land-use transport planning; complete streets approach; mobility plan for each KAVAL city.
- **Work Zone Safety (IRC-88-2019):** Mandatory traffic management plans; barriers, signing and flagging at all construction sites.
- **Road Safety (IRC-SP-88-2019):** Road Safety Audit for all new roads before opening; iRAP star-rating for KAVAL city arterials.
- **ATMS (MoRTH Spec-816):** Area Traffic Control (ATC) system in all KAVAL cities; CCTV surveillance; adaptive signal control; VMS; incident management.
- **Street Vendor Management:** Hawker zones on widened footpaths with weather protection; night bazaar streets; no encroachment on carriageway.
- **Transformation of Existing Roads:** Condition survey → priority ranking → phased rehabilitation programme for all KAVAL city roads within 5 years.
- **Cost & SOR:** All works as per UP PWD / MoRTH SOR; market rates with competent authority approval for non-SOR items; DPRs mandatory before tendering.

BEST PRACTICE BENCHMARK – INTERNATIONAL REFERENCE

City / Country	Best Practice Feature	Applicability to UP
Dubai, UAE	8-lane arterials with landscaped medians, grade-separated pedestrian crossings, underground utilities, full ATMS	KAVAL city arterials and Noida/Greater Noida
Singapore	Road pricing, area traffic control, 100% retroreflective signs, bus rapid transit lanes, continuous cycle network	KAVAL cities – phased adoption
Netherlands	Protected cycle tracks with dedicated signals, raised crossings near schools	All ROW ≥20m roads
USA (AASHTO)	Complete Streets policy, ADA-compliant curb ramps, MUTCD signs, high-friction surfaces at bends	Footpath standards, school zones
UK (London)	Pedestrian countdown signals, shared spaces, controlled parking zones	KAVAL city junctions
Japan	Zero road cuts after construction – common utility galleries; smooth footpaths	Utility duct policy for all new roads
Sweden (Vision Zero)	Speed management through design; forgiving roadside; data-driven safety audit	Road safety programme for all UP urban roads

CHAPTER 1

Road Categories, ROW Requirements & City Classification

1.1 CITY CLASSIFICATION FOR UP URBAN ROADS

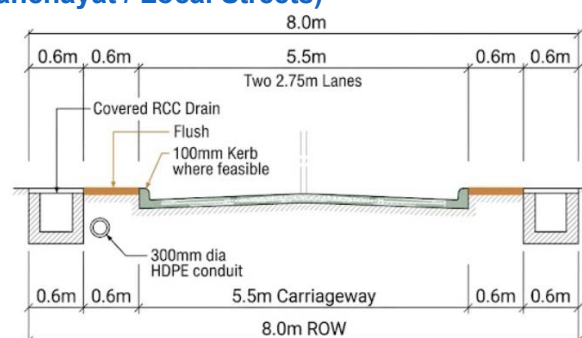
Category	Cities / ULBs	Population	Road Authority
KAVAL Cities	Kanpur, Agra, Varanasi, Allahabad (Prayagraj), Lucknow + Noida, Greater Noida	>1 million / Special	Nagar Nigam / Development Authorities
Nagar Mahapalika	Other Municipal Corporations and large municipalities	3 lakh – 10 lakh	Nagar Palika Parishad / Nagar Nigam
Panchayat / Nagar Panchayat	Small towns, census towns, gram panchayats	Below 3 lakh	Panchayati Raj / Block Development

1.2 ROAD CLASSIFICATION (as per IRC-86-2018 Clause 5)

Road Type	Function	Design Speed (km/h)	Min ROW (m)	Remarks
Urban Expressway / Arterial	Intercity traffic movement	80-100	45-60	Controlled access; grade-separated intersections
Major Arterial	City-level traffic distribution	60-80	30-45	Signal-controlled at-grade intersections
Minor Arterial / Sub-Arterial	District-level movement	50-60	18-30	At-grade junctions; partial access control
Collector Street	Neighbourhood traffic collection	40-50	12-20	Speed control measures
Local Street	Access to properties	20-30	9-12	Low traffic, pedestrian priority
Panchayat Road	Village / rural connectivity	20-30	8-12	Basic standards; slow traffic

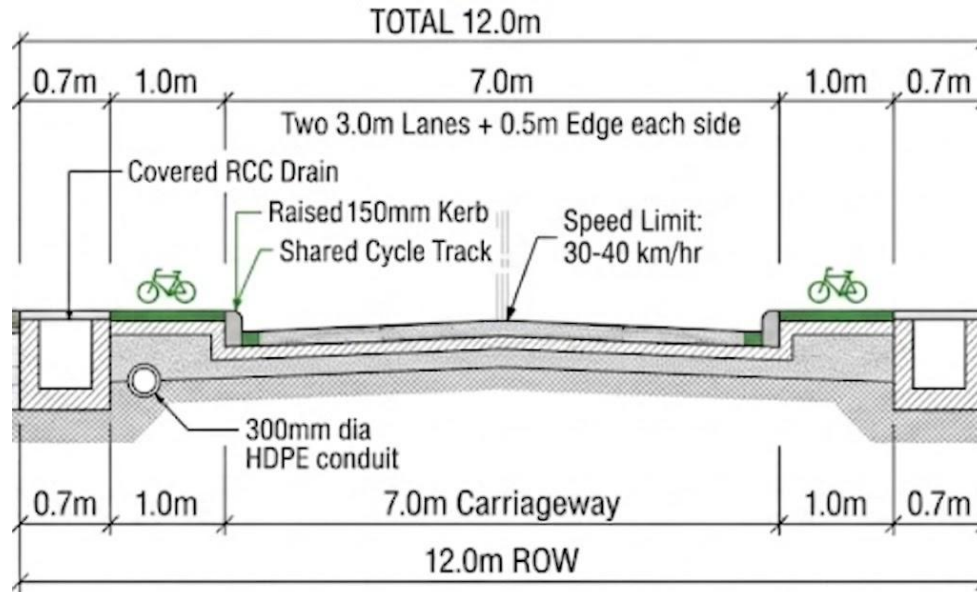
1.3 RECOMMENDED CROSS-SECTIONS BY ROW

1.3.1 ROW = 8 metres (Panchayat / Local Streets)



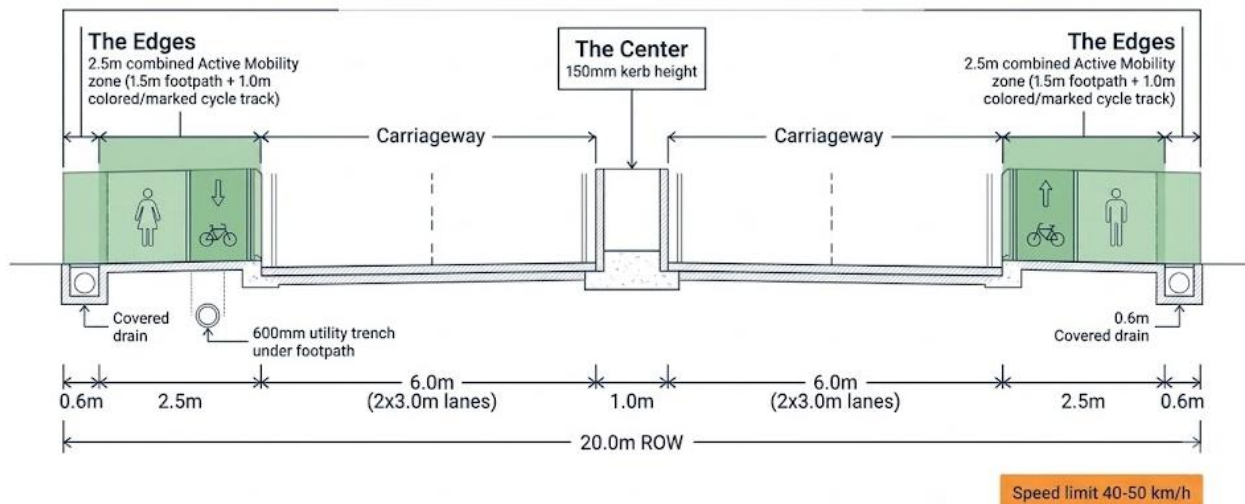
Rule: No median. Speed limits 20-30km/h with humps every 100m.

1.3.2 ROW = 12 metres (Collector / Local Roads – Nagar Mahapalika)

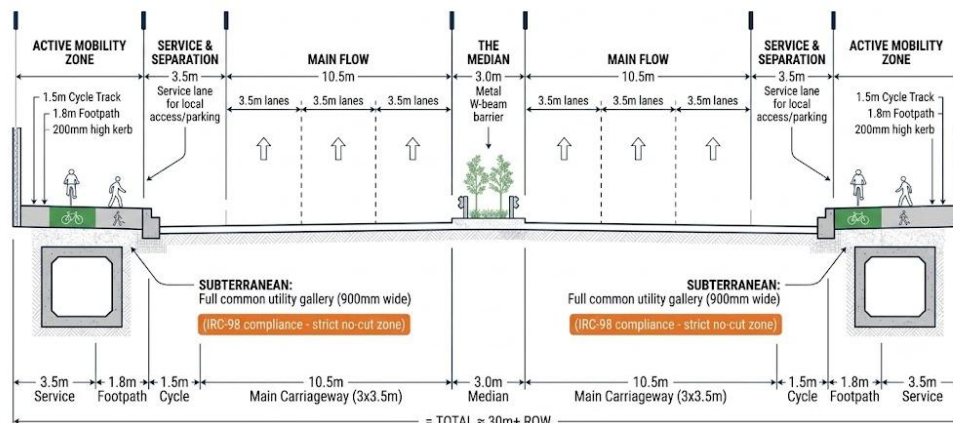


Key Addition: Cycle track shared with footpath (marked with paint).

1.3.3 ROW = 20 metres (Sub-Arterial / Minor Arterial)



1.3.4 ROW = 30 metres and above (Arterial Roads – KAVAI Cities)



1.4 KERB & MEDIAN HEIGHT STANDARDS (IRC-86-2018)

Element	Height Above Carriageway	Material	Notes
Footpath Kerb (Standard)	150 mm	Precast RCC / Granite	Flush curb ramp at crossings (per IRC-103 & ADA)
Footpath Kerb (Arterial)	200 mm	Precast RCC	Higher kerb for pedestrian safety; recessed at bus stops
Raised Median – Low speed roads	150 mm	Precast RCC or Granite	Painted yellow-black; retroreflective delineators
Raised Median – Arterials	200-250 mm	M30 Concrete in-situ or precast	Landscaping on top; tree guards if trees planted
Depressed Median (High speed)	Flush / depressed 150mm	Concrete	W-beam barrier on top of depressed median
Element	Height Above Carriageway	Material	Notes
Cycle Track Edge Kerb	50-75 mm	Precast RCC	Tactile strip on pedestrian side; coloured
Service Road Separator	150 mm	Precast RCC	With vehicle crossings at 50m intervals

Note: All kerb heights to be strictly maintained. No raising of road level over existing footpath or drain levels. Kerb and channel to be completed before carriageway paving to ensure proper drainage.

CHAPTER 2

Traffic Safety Barriers – IRC-119-2015

Traffic safety barriers are critical protective devices that prevent errant vehicles from crossing into opposing traffic or striking hazardous roadside objects. All urban roads in UP shall comply with IRC-119-2015 and MASH (Manual for Assessing Safety Hardware) tested systems.

2.1 TYPES OF BARRIERS (IRC-119 Clause 2)

Barrier Type	Application	Location in UP Urban Roads
W-Beam Guard Rail (Semi-rigid)	Median of arterials; edge of elevated sections	All arterials with median, ROW $\geq$ 20m
Thrie-Beam Guard Rail	Higher containment – near bridges, underpasses	Bridge approaches, grade separations
Concrete Median Barrier (Jersey / F-type)	High-speed, high-volume medians; bridge medians	Expressway-grade urban roads, flyovers
Cable Barrier	Wide medians where run-out space is available	Where median width $\geq$ 4.0m
Metal Beam Crash Barrier (MBCB)	Rural and urban fringe sections	Sub-arterials and collectors where needed
Pedestrian Guardrail	Protecting pedestrians from falling / vehicle intrusion	All footpaths adjoining busy carriageways
Water-filled / Temporary Barrier	Work zones	All road construction / maintenance sites (IRC-88)

2.2 BARRIER SELECTION & PLACEMENT (IRC-119 Clauses 3 & 4)

BARRIER DESIGN CRITERIA

- Containment Level: Select based on design speed and truck traffic percentage.
- Working Width: Ensure working width does not encroach on travel lane or footpath.
- Deflection: MASH TL-3 minimum for all urban arterials; TL-4 for freight routes.
- End Treatments: Flared, buried or energy-absorbing terminals MANDATORY on all barrier ends.
- Height: W-beam 720mm; Concrete barrier 810mm above carriageway.
- Post Spacing: Maximum 1.9m for W-beam on straight sections; reduce to 0.95m on curves.
- Retroreflective markers / delineators on all barrier elements at 40m spacing.

2.3 SPECIFIC PROVISIONS FOR UP URBAN ROADS

- All new arterial and sub-arterial roads with raised medians shall have W-beam MBCB on the median face.
- All grade separations, ROBs, flyovers and underpasses in KAVAL cities to have concrete median barriers.
- Pedestrian guard rails (1.1m height) to be installed on footpaths where carriageway is elevated or traffic speed exceeds 60 km/h.
- Work zone barriers (water-filled or MBCB) mandatory; traffic management plan required before any work begins.

- All barriers to be maintained; damaged posts and beams replaced within 7 days of damage identification.
- Bright retro-reflective chevron signs on all barrier systems at curves and terminals.

CHAPTER 3

Cycle Track Guidelines – IRC:11-2015

Cycling is an affordable, sustainable and healthy mode of transport. All KAVAL cities and Nagar Mahapalikas shall develop a continuous, safe cycle network. IRC:11-2015 provides the design framework.

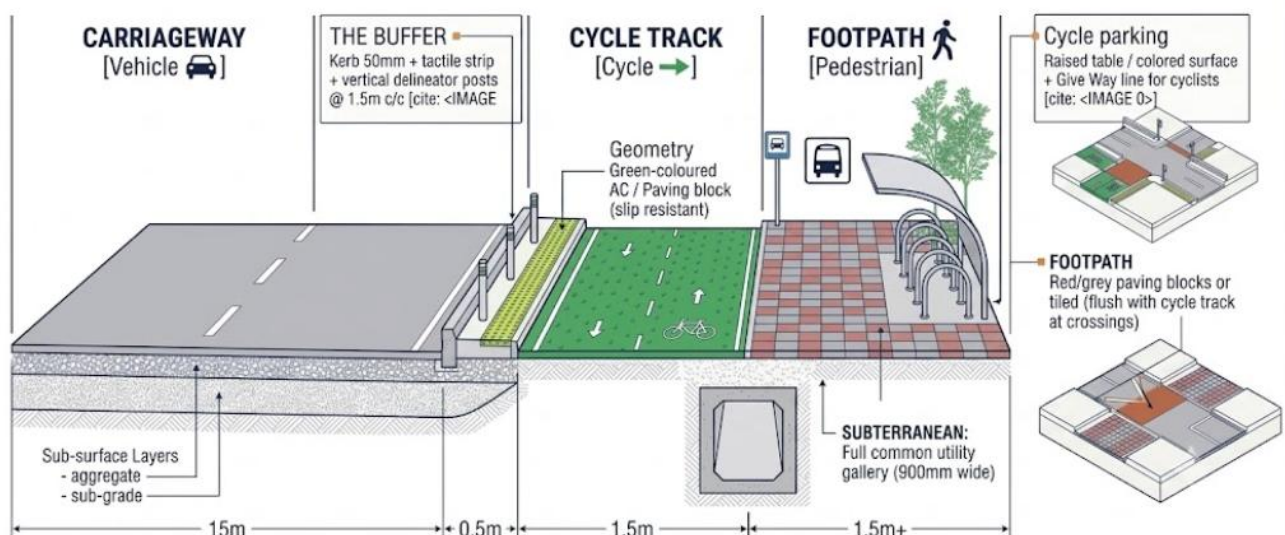
3.1 CYCLE TRACK TYPES (IRC:11 Clause 4.2)

Type	Description	Applicable ROW	Recommended for UP
Segregated Cycle Track	Physically separated from carriageway and footpath	≥20m	KAVAL cities, Noida, Gr. Noida – all arterials
Shared Cycle-Pedestrian Path	Shared space; pedestrians and cyclists together	12-20m	Collector and local roads in urban areas
Marked Cycle Lane	Within carriageway, demarcated by paint only	≥15m	Only where ROW constraints prevent segregation
Contra-flow Cycle Lane	Cyclists against traffic flow on one-way streets	≥12m	One-way streets in KAVAL city cores

3.2 GEOMETRIC STANDARDS (Clauses 5.2, 5.3, 6.2, 6.5, 7.2, 7.5)

Parameter	Minimum	Desirable	Notes
Width – One-way track	1.0m	1.5m	1.5m preferred for two-way use
Width – Two-way track	2.0m	2.5m	Physical barrier from carriageway mandatory
Vertical Clearance	2.5m	3.0m	Under grade separations and bridges
Cross Slope	1.0%	2.0%	For drainage; max 3.0% acceptable
Longitudinal Grade	Max 3%	< 2%	Ramps at grade changes max 1:12
Surface	Smooth AC / CC / Paving blocks	Coloured AC (Green / Red)	Colour differentiates cycle track from footpath
Separation from carriageway	Kerb 50-75mm + 0.5m buffer	Physical planter / delineator	Mandatory on all ROW ≥ 20m roads
Cycle Signal Phase	Dedicated cycle phase at signals	Leading Cycle Interval 6-7 sec	KAVAL cities and all major intersections

TYPICAL CYCLE TRACK CROSS-SECTION (IRC:11-2015 Typical)



CHAPTER 4

Parking Facilities – IRC-SP-12-2015

Unmanaged parking is a primary cause of congestion and road accidents in UP cities. A comprehensive parking policy aligned with IRC-SP-12-2015 and international demand management principles is essential.

4.1 PARKING DEMAND ASSESSMENT (Clauses 3.2, 3.3, 3.4)

- Conduct comprehensive parking surveys in all KAVAL cities – occupancy, turnover, duration.
- Identify parking generation rates by land use (commercial, residential, institutional, hospital).
- Develop city-wide parking demand model and forecast to 2035 and 2040.
- Classify parking zones: Core Central Business District (no on-street), Inner City (paid on-street limited), Periphery (park-and-ride).
- Panchayat towns: ensure dedicated off-street parking for weekly markets / haats.

4.2 PARKING STANDARDS (Clauses 3.7, 3.8)

Land Use	Standard	Remarks
Residential (plots > 100 sq m)	1 ECS per unit	Off-street in building setback; no on-carriageway
Commercial / Retail	2-3 ECS per 100 sq m GFA	Multi-level parking if plot < 500 sq m
Offices / IT Park	1 ECS per 50 sq m GFA	Shared parking if proximity < 200m
Hospitals	1 ECS per 5 beds + 1 per doctor	Patient drop-off zone mandatory
Schools	Bus parking + 1 ECS per 10 staff	Safe drop-off / pick-up lanes (IRC:SP-32)
Hotels	1 ECS per room	Valet parking acceptable
Multiplexes / Cinema	1 ECS per 6 seats	Shared use with daytime office parking

Note: ECS = Equivalent Car Space (2.75m x 5.5m); 2-wheeler = 0.25 ECS; bus = 3.0 ECS

4.3 PARKING FACILITY DESIGN (Clause 4, 6.3 and sub-clauses)

KEY PARKING DESIGN REQUIREMENTS

- On-Street Parking: Marked bays; parallel parking preferred on collectors (2.5m wide x 6.0m long); no parking on arterials.
- Multilevel Parking (MLCP): Minimum 2.5m floor-to-floor clearance; 6.0m ramp width; automated guidance system.
- Park-and-Ride: At metro stations and city bus terminals in KAVAL cities; secure cycle parking at park-and-ride.
- Disabled Parking: Minimum 5% of spaces (or 1 per 20 spaces) for persons with disabilities; near entrance.
- EV Charging: Minimum 20% of spaces to be EV-ready (conduit provision) in all new parking facilities.
- Parking Guidance: Electronic guidance signs at entries showing available spaces.
- Payment: Smart parking meters; mobile app payment; cashless transactions.
- Footpath Parking: STRICTLY PROHIBITED. Footpath shall never be used for parking.

CHAPTER 5

At-Grade Intersections – IRC:SP-41

Intersections are the most critical safety locations on any road. Properly designed intersections in KAVAL cities reduce delays, conflicts and fatalities. All major intersections shall be designed as per IRC:SP-41 with reference to best international standards.

5.1 INTERSECTION TYPES (Clause 3.1 and sub-clauses)

Type	Traffic Volume (PCU/hr)	Design Feature	Recommended for
Priority / Give Way	< 500 one-way	Give way signs, sight triangles	Panchayat roads, local streets
Signalised Intersection	500 – 3000	Signal phasing, pedestrian signals, turning lanes	All major urban intersections – KAVAL cities, Nagar Mahapalika
Channelised (with islands)	All volumes	Refuge islands, channelisation markers, turning radii	Sub-arterial and arterial T and 4-way junctions
Roundabout	500 – 2000 entry/arm	Splitter islands, yield at entry, central island landscaping	4-arm junctions; CBD areas; calming effect
Grade Separation (ROB/Flyover)	> 3000 PCU/hr	Elevated or depressed; ramps; merging sections	Major arterials in KAVAL cities where land permits
Mini Roundabout	< 500 all arms	Dome; 1.0m radius central island	Local streets; residential areas

5.2 GEOMETRIC DESIGN STANDARDS FOR INTERSECTIONS

INTERSECTION DESIGN CHECKLIST (IRC:SP-41)

- Sight Distance: Clear sight triangles free of obstructions at all approaches (IRC-86 Cl 5.7).
- Turning Radii: Minimum 6m (local), 9m (collector), 12m (arterial) for kerb radius.
- Channelisation Islands: Minimum 5 sq m; 150mm raised kerb; retroreflective delineators.
- Approach / Departure Width: Minimum 1 additional lane for turning movements on arterials.
- Pedestrian Crossings: Zebra markings + tactile → at all signalised junctions.
- Bicycle Path through Intersection: Colour-marked (green) diagonal or side crossing.
- Signal Timing: Webster's formula; peak and off-peak plans; adaptive control on arterials.
- Night Lighting: 15-30 lux minimum at intersection; LED luminaires; uniformity ratio ≥ 0.4 .
- Road Furniture: All poles, signs, signal heads outside clearance envelope.
- No Hawkers / Vendors at Intersection: Minimum 30m clear approach.

5.3 SIGNAL DESIGN STANDARDS

Parameter	Standard	Remarks
Cycle Length	60-120 seconds	Shorter cycle better for pedestrians
Pedestrian Walk Phase	Minimum 7 seconds	Countdown display mandatory in KAVAL cities
Leading Pedestrian Interval	4-7 seconds before vehicle green	All KAVAL city intersections

Parameter	Standard	Remarks
Signal Heads	300mm LED; 3-section	2 signal heads per approach; back-to-back display
Turn Arrows	Separate phase for protected right turn	Where turning volume > 100 PCU/hr
Solar UPS Backup	Minimum 8 hours	All traffic signals must have UPS
Signal Timing Plans	AM peak, PM peak, Off-peak, Night	Programmed in ATC system (ATMS)

CHAPTER 6

School Safety (IRC:SP-32-2023) & Pedestrian Facilities (IRC-103-2012)

6.1 SAFE SCHOOL ZONES – IRC:SP-32-2023

Every school in UP urban areas shall be surrounded by a designated Safe School Zone with the following mandatory infrastructure and management measures:

Zone / Feature	Distance from School Gate	Treatment Required
Advance Warning Zone	200m each side	"SCHOOL AHEAD" signs; speed limit 25-30 km/h; flashing beacons during school hours
School Zone (Active)	Within 50m	Speed tables (raised crossings); bright yellow road markings; CCTV
Pedestrian Crossing	At school gate	Zebra crossing + signal; school patrol officer; countdown signal
Drop-off / Pick-up Zone	Along school frontage	Separate lane; 3m wide x 10-15m long bays; no parking on main road
School Bus Bay	Where buses present	4.5m wide x 14m long bay off carriageway; no blocking
Footpath to School	From nearest bus stop	Continuous footpath; tactile tiles; adequate lighting
Cycle Parking	Within school premises	Covered; supervised; Sheffield stands

MANDATORY SCHOOL SAFETY FEATURES (IRC:SP-32-2023 – All Main Clauses)

- School Zone markings in retro-reflective yellow/white thermoplastic.
- "SCHOOL ZONE – SPEED 25 KM/H" signs with flashing LED during 7-9am and 1-5pm.
- Raised pedestrian crossing with reflective markers at school gate.
- School Patrol (Crossing Guard) or Traffic Police during arrival/departure times.
- No hawkers within 50m of school gate.
- Adequate street lighting (min 20 lux) at school gates.
- Speed enforcement cameras in school zones in KAVAL cities.
- Every school to prepare and submit a school travel plan to local traffic authority.

6.2 PEDESTRIAN FACILITIES – IRC-103-2012 (ALL KAVAL TOWNS)

All KAVAL cities shall provide a comprehensive network of pedestrian facilities ensuring safe, comfortable and dignified walking for all citizens including elderly and persons with disabilities.

Facility	Standard / Specification	Location
Footpaths	Min 1.5m clear width (2.0m preferred); paved; no obstructions; tactile tiles at crossings	All roads with ROW $\geq$ 8m
Pedestrian Crossings (Zebra)	Thermoplastic white stripes; 50cm wide x 4m long; raised preferred	All intersections and mid-block crossings
Signalised Crossings	Pedestrian signal + countdown + audible tone for visually impaired	All major intersections in KAVAL cities

Facility	Standard / Specification	Location
Mid-block Crossings	Refuges 2.0m wide; raised table; tactile; signal if volume high	Every 150-200m on arterials
Subways / Underpasses	Min 3.0m wide x 2.4m high; well lit; CCTV; ramps for disabled	Where at-grade crossing unsafe
Footpath Ramps	1:12 gradient; 1.5m width; tactile strip; flush with carriageway	Every kerb; at bus stops
Street Lighting	LED poles at max 25-30m spacing; 15-20 lux on footpath	All footpaths
Bus Shelters	3.0m wide x 1.5m deep; weather protection; seating; route information	Every 400-500m on arterials
Stop-light Signals at Crossings	Manual + automatic signal; police patrol during peak hours	All major crossings in KAVAL cities

CHAPTER 7

Road Signs (IRC-67-2012), Markings (IRC-35-2015), Delineation (IRC-79-2018) & Drainage (IRC-SP-50-2015)

7.1 ROAD SIGNS – IRC-67-2012

ROAD SIGN REQUIREMENTS – ALL URBAN ROADS

- **MANDATORY SIGNS:** At every intersection – Give Way, Stop, Speed Limit, No Entry, One Way.
- **CAUTIONARY SIGNS:** School Ahead, Pedestrian Crossing, Speed Bump, Narrow Road, Junction Ahead.
- **INFORMATORY SIGNS:** Street name plates at all junctions; Hospital, Parking, Bus Stop direction signs.
- **RETRO-REFLECTIVITY:** Type III sheeting minimum (Engineering Grade for local roads; Diamond Grade for arterials).
- **SIGN MOUNTING:** Side-mounted at 2.5m clearance; overhead gantry on arterials with multiple lanes.
- **VARIABLE MESSAGE SIGNS (VMS):** On all arterials in KAVAL cities – traffic, weather, incident information.
- **STREET NAME PLATES:** At all intersections; bilingual (Hindi + English); illuminated in KAVAL cities.
- **MAINTENANCE:** Monthly inspection; immediate replacement of damaged/faded signs.

7.2 ROAD MARKINGS – IRC-35-2015

Marking Type	Material	Colour	Application
Centre Line (2-lane road)	Thermoplastic	Yellow broken	All roads with centre line
Lane Lines	Thermoplastic	White broken	Multi-lane roads
Edge Lines	Thermoplastic	White solid	All arterials and sub-arterials
Stop Lines at Junctions	Thermoplastic	White solid 400mm wide	All junctions; 1.0m from pedestrian crossing
Pedestrian Crossings (Zebra)	Thermoplastic	White solid 500mm stripes	All crossings; at-grade and raised
Cycle Track Marking	Thermoplastic (coloured)	Green / Red	Cycle tracks and conflict zones
Speed Humps / Tables	Thermoplastic + RPMs	Yellow / White	School zones, residential areas
No Parking Zone	Thermoplastic kerb marking	Yellow solid continuous	All no-parking kerbs
Bus Stop Marking	Thermoplastic	Yellow / White with symbol	Bus bays and on-street stops
Raised Pavement Markers (RPMs)	Glass bead retro-reflective	White / Amber / Red	Lane lines, edge lines – all arterials

7.3 URBAN DRAINAGE – IRC-SP-50-2015 (Clauses 3.1, 3.3)

Urban drainage is the single largest source of urban road distress in UP. A robust drainage system shall be designed and constructed before or simultaneously with road works.

DRAINAGE DESIGN STANDARDS

- Design Storm: 10-year return period for surface drains; 25-year for storm water mains.
- Side Drains: Covered RCC drains; L-section with minimum 0.5% longitudinal slope.
- Kerb and Channel: Concrete kerb and channel on all roads; no earthen side drains on surfaced roads.
- Road Camber: 2.5% cross-fall on bituminous roads; 2.0% on concrete roads for surface drainage.
- Storm Water Mains: Underground pipe network (300-1200mm dia) for KAVAL cities and Nagar Mahapalikas.
- Catch Basins / Gully Pits: At every low point and at max 30m intervals in kerb and channel.
- No Water Logging: Design shall ensure no ponding > 150mm depth for > 30 minutes after 1-hour rainstorm.
- Outlet: Storm water to discharge into nallahs / drains; no mixing with sewage.
- Drain Covers: Heavy-duty cast iron or RCC covers; anti-theft design; load rating D400 minimum.
- Maintenance: Monthly cleaning pre-monsoon; weekly during monsoon season.

Road Type / ROW	Drain Type	Size	Frequency of Catch Basins
8m ROW – Local / Panchayat	Covered RCC side drain each side	300-450mm x 300mm	Every 20-30m
12m ROW – Collector	Covered RCC drain + kerb & channel	450-600mm x 400mm	Every 25-30m
20m ROW – Sub-Arterial	Kerb & channel + underground storm pipe	600-900mm dia pipe	Every 30m; all low points
30m+ ROW – Arterial	Full storm water system; service road drains	900-1200mm dia main + laterals	Every 30-40m

CHAPTER 8

Utility Ducts (IRC-98), Pavement Design (IRC-37) & Maintenance

8.1 UNDERGROUND UTILITY DUCTS – IRC-98

Road cutting for utilities is the primary cause of premature road failure in UP cities. The policy shall be: NO ROAD CUTTING AFTER ROAD CONSTRUCTION. All utilities shall be laid in pre-installed ducts.

ROW / Road Type	Duct Provision	Specification
8m ROW	HDPE conduit 2 x 110mm dia each side under footpath	Depth 600mm; pull wire installed; end caps
12m ROW	HDPE conduit 3 x 110mm + 1 x 160mm each side under footpath	Depth 750mm; inspection chambers at 30m
20m ROW	Common utility trench 600mm wide under footpath	Depth 900mm; cable trays for telecom, power, OFC; gas in separate conduit
30m+ ROW (Arterial)	Full utility gallery (walk-in / crawl-in) under footpath	1.0m wide x 1.8m high gallery; access manholes at 50m; CCTV inside gallery

UTILITY DUCT POLICY

- All utility service providers (power, telecom, gas, water, sewage, OFC) to use pre-installed ducts.
- Joint utility corridor committee (JUCC) to be constituted in each KAVAl city.
- Penalty for illegal road cutting: Rs. 5 lakh per incident + restoration at utility agency's cost.
- Utility laying to be 100% complete before road construction commences.
- Emergency repairs: only 300mm x 300mm opening permitted; to be restored within 24 hours.

8.2 PAVEMENT DESIGN – IRC-37

All urban road pavements shall be designed using the Mechanistic-Empirical approach as per IRC-37-2018 for flexible pavements or IRC-58-2015 for rigid pavements. Pavement type to be selected based on traffic, subgrade strength (CBR) and lifecycle cost.

Category	Traffic (MSA)	Subgrade CBR	Recommended Pavement	Total Thickness
Panchayat Road (8m)	< 2 MSA	≥ 3%	WBM/WMM + 40mm BC	250-300mm total
Local / Collector (12m)	2-10 MSA	≥ 4%	GSB + WMM + DBM + BC	400-450mm total
Sub-Arterial (20m)	10-30 MSA	≥ 5%	GSB + WMM + DBM 75mm + BC 40mm	500-550mm total
Arterial (30m+, KAVAl)	30-150 MSA	≥ 7%	Full depth mechanistic design; VG-40 bitumen; modified binders	600-700mm total
Concrete (Bus stops, junctions)	Any	≥ 5%	DLC + PQC M40 cement concrete	200mm DLC + 200-250mm PQC

MAINTENANCE POLICY – SCRAPING BEFORE OVERLAY (IRC-37)

- MANDATORY: Mill / scrape existing surface by minimum 40-50mm before any overlay.

- Recycle milled material: Cold-in-place recycling (CIR) or hot-mix recycling using Reclaimed Asphalt Pavement (RAP).
- Road level shall never be raised above the footpath or drain top level.
- Crack sealing: All cracks > 3mm filled with bituminous sealant before overlay.
- Pothole repair: Hot-mix patching only (no cold-mix); within 48 hours of reporting.
- Warranty: 5-year performance warranty for all new arterial roads; 3-year for collectors.
- White topping: Concrete overlay on heavily trafficked bus routes and junctions.

CHAPTER 9

Advanced Traffic Management System (ATMS) – MoRTH Spec-816 & Traffic Police Guidelines

An integrated, technology-driven traffic management approach shall be implemented in all KAVAL cities as per MoRTH Specification 816 and international best practices.

9.1 ATMS COMPONENTS

Component	Specification	Coverage
Area Traffic Control (ATC)	UTC (Urban Traffic Control) server; SCOOT or SCATS adaptive signal control	All signalised intersections in KAVAL cities
CCTV Surveillance	2MP PTZ cameras at every intersection + fixed cameras on arterials; 30-day recording	100% arterials; 80% collectors
Variable Message Signs (VMS)	LED matrix; controllable from TMC; travel time, incidents, diversions	All arterials; at entry to city
Automatic Number Plate Recognition (ANPR)	OCR + violation detection (red light, speed, overloading)	All signalised junctions + speed enforcement zones
Traffic Counting Stations	Loop detectors or radar; 24/7 volume, speed, classification data	All major arterials (200m upstream of junctions)
Traffic Management Centre (TMC)	Command and control facility; multi-screen video wall; network management	One per city; 24/7 staffed
Emergency Vehicle Preemption	GPS-based signal preemption for ambulance / fire tender	All signals on emergency routes
Incident Detection	Video analytics; event detection; alerts to TMC and Police PCR	All CCTV-covered stretches
Public Information	Web portal + mobile app: real-time traffic, parking, incidents	City-wide; multilingual (Hindi + English)

9.2 TRAFFIC POLICE INTEGRATION & GUIDELINES

GUIDELINES FOR TRAFFIC POLICE – UP URBAN ROADS

- **Training:** All traffic police officers to be trained in ATMS use; refresher annually.
- **Post Deployment:** Traffic police at major intersections during peak hours (7-10am, 5-8pm); ATMS manages off-peak.
- **PCR (Police Control Room) Integration:** Direct video feeds from TMC to PCR; co-located or interlinked.
- **Violation Enforcement:** Challan through ANPR system; online payment; court integration.
- **Incident Response:** Rapid response team deployed within 10 minutes of incident detection by TMC.
- **Night Patrolling:** Motorcycle patrols on arterials 10pm-6am; responsive to TMC alerts.
- **Special Events Management:** Pre-planned traffic management for festivals (Kumbh, Navratri, cricket); ATMS-controlled diversions.
- **Coordination with NHAI/PWD:** Joint operations for national highway sections passing through urban areas.
- **PPE:** All traffic police in reflective jackets; hand-held speed guns; breathalyser.
- **Speed Limit Enforcement:** Photo-radar on all school zones and accident black spots.

CHAPTER 10

Work Zone Safety (IRC-88-2019), Road Safety (IRC-SP-88-2019), Street Vendors & Urban Roads Planning

10.1 WORK ZONE TRAFFIC MANAGEMENT – IRC-88-2019

MANDATORY REQUIREMENTS FOR ALL CONSTRUCTION / MAINTENANCE SITES

- Traffic Management Plan (TMP): Prepared and approved by traffic police + PWD before work begins.
- Site Signage: Advance warning signs 200m, 100m, 50m upstream; retroreflective; night-visible.
- Barricading: Solid interlocking concrete barriers or water-filled barriers; no open excavation without cover.
- Flagmen / Pilot Vehicle: At all single-lane situations; fluorescent jackets + stop-go paddles.
- Night Work: Flashing amber beacons at 15m intervals; additional lighting minimum 20 lux.
- Pedestrian Walkway: Dedicated pedestrian path maintained at all times through work zone; min 1.5m.
- Lane Closure: Maximum 1 lane on 2-lane roads; always maintain 1 lane each direction on 4-lane roads.
- Completion: Restore road markings and signs within 24 hours of completion of work.
- Penalty: Rs. 1 lakh per day for non-compliance with work zone safety requirements.

10.2 ROAD SAFETY – IRC-SP-88-2019

Safety Measure	Implementation	Timeline
Road Safety Audit (RSA)	Mandatory RSA for all new roads before opening; Stage 3 (during construction) and Stage 4 (post-opening)	Before opening
iRAP Star Rating	All KAVAL city arterials to be iRAP rated; target 3-star minimum	Year 1-2 of programme
Black Spot Identification	Crash data analysis; top 10 black spots per city to be treated first	Ongoing; annual review
Speed Management	Speed humps, raised crossings, gateway treatments on entry to urban areas	All new roads
Road Safety Committee	City-level committee: Police, PWD, Health, Transport, Education	Immediately constitute
Crash Data System	Integrate with ICJS; geo-coded crash mapping; monthly reports to committee	KAVAL cities first; Year 1

10.3 STREET VENDOR MANAGEMENT

Street vendors are an integral part of UP's urban economy. A managed, safe vendor policy shall be adopted:

- Hawker Zones to be designated on widened footpaths (minimum 3.5m total footpath width; 1.5m clear for pedestrians + 2.0m vendor zone).
- Weather protection canopy (tensile structure) over vendor zones funded by local body.
- Vendor stalls: maximum 1.5m x 1.0m; standardised; aesthetically designed.
- No vendors within 30m of intersections, 50m of school gates, on medians or carriageways.
- Night Bazaar Streets: Designated streets closed to traffic 8pm-11pm for vendor markets.
- Vendor registration: All vendors to be registered under Street Vendors Act 2014; ID cards + GPS-tagged locations.

- Electricity and water connections at vendor zones; waste bins at 10m intervals.
- Regular inspection and enforcement by Municipal Authority; penalties for non-compliance.

10.4 PLANNING & DEVELOPMENT – IRC-118-2015

- Integrated Land-Use Transport Plan (ILUTP): Prepare for each KAVAL city; review every 5 years.
- Complete Streets Policy: Every road design to consider all users – pedestrians, cyclists, disabled, vendors, transit.
- Mobility Plan: Each KAVAL city to prepare City Mobility Plan covering transit, NMT, parking, freight.
- ROW Reservation: Notify and protect ROW for all road widening projects; no new buildings in reserved ROW.
- TOD (Transit-Oriented Development): High-density development around metro / BRT stations; reduced parking norms.
- Street Hierarchy: Adopt MoRTH / IRC street classification and design accordingly for each city.

CHAPTER 11

Transformation of Existing Roads – KAVAL Cities & Cost / SOR Framework

11.1 TRANSFORMATION PROGRAMME

All existing urban roads in KAVAL cities shall be systematically assessed and upgraded to the standards prescribed in this report. The following phased approach is recommended:

Phase	Period	Scope	Priority
Phase 0 – Condition Survey	Year 1	PCI survey of all roads; utility mapping; ROW measurement; crash black spots	All KAVAL cities – immediate
Phase 1 – Emergency Repairs & Quick Wins	Year 1-2	Pothole repairs, sign installation, marking, basic drainage clearance; school zone safety	High-traffic arterials; school zones
Phase 2 – Major Arterial Transformation	Year 2-3	Full geometric + pavement reconstruction of all arterials; utility ducts; ATMS; cycle tracks	KAVAL cities: Lucknow, Noida, Kanpur first
Phase 3 – Sub-Arterial & Collector	Year 3-4	Sub-arterial roads; collector streets; parking facilities; vendor zones; pedestrian networks	All KAVAL cities
Phase 4 – Local Streets & Panchayat	Year 4-5	Local streets in KAVAL cities; Nagar Mahapalika roads; Panchayat roads	District-wide rollout
Phase 5 – Consolidation & Smart Systems	Year 5+	Full ATMS; iRAP rating; performance monitoring; remaining gaps	State-wide

11.2 DPR PREPARATION & COST FRAMEWORK

DPR REQUIREMENTS FOR EACH ROAD PROJECT

- Detailed Project Report (DPR): Mandatory for all projects > Rs. 50 lakh.
- DPR Contents: Topographic survey; utility mapping; pavement condition; traffic counts; geometric design; drainage design; cost estimate; ROW clearance; environmental & social impact.
- Third-party design check: All DPRs > Rs. 5 crore to be peer-reviewed by approved technical agency.
- Cost Estimate: Based on UP PWD SOR (latest edition) for all standard items.
- Non-SOR Items: Market rate analysis with 3 quotes; approval of Superintending Engineer or above.
- Contingency: 5% of estimated cost for unforeseen items; no contingency used for scope changes.
- Price Variation: PVC clause as per MoRTH norms for contracts > 18 months duration.
- Tendering: e-procurement; minimum 4 weeks bidding period; technical + financial evaluation.

11.3 SOR / RATE SCHEDULE GUIDANCE

Item Category	SOR to Follow	Remarks
Earthwork, WBM, WMM, GSB	UP PWD SOR – Civil Works	Standard items; apply directly
Bituminous Works (BC, DBM, SDBC)	UP PWD SOR or MoRTH SOR	Use MoRTH if UP PWD SOR not updated; VG-40 for arterials
PQC / RCC Pavement	UP PWD SOR – Concrete Works	As per IRC-58; M40 concrete
Traffic Signals & ATMS	MoRTH SOR / Market Rate	Pre-approval of CE for market rate items
Utility Ducts / Galleries	Market Rate (with approval)	Novel item; 3-quote market rate; CE approval
Landscaping / Street Furniture	UP PWD SOR + Horticulture Dept rates	Combine rates; approval of SE level
Smart Parking Systems	Market Rate (with approval)	Specify minimum technical standards in tender
MLCP (Multi-level Car Park)	BOT / PPP / Market Rate	Concession-based; no SOR applicable

CHAPTER 12

Institutional Framework, Best Management Practices & Implementation

12.1 RECOMMENDED INSTITUTIONAL STRUCTURE

Level	Body / Authority	Role & Responsibility
State Level	UP Transformation Commission (CEO)	Policy approval; inter-departmental coordination; monitoring dashboard
State Level	PWD (Urban) / MoRTH nodal	Technical standards; SOR; design approval for State roads
City Level – KAVAL	Smart City / Nagar Nigam CEO	Project execution; ATMS operation; road maintenance contracts
City Level – Mahapalika	Nagar Palika EO	Sub-arterial and collector roads; parking; vendor zones
District Level	District Magistrate + CDO	Panchayat roads; coordination with DRDA and BDC
Technical Support	Third-party PMC (Project Management Consultant)	DPR preparation; quality assurance; monitoring
Community	Ward Committees + RWAs	Feedback; maintenance reporting; participatory planning

12.2 QUALITY ASSURANCE FRAMEWORK

- Third-party Quality Control (TPQC): All road works > Rs. 1 crore to have independent TPQC agency.
- Material Testing: RCC, bituminous mix, soil tests as per MoRTH QC norms; frequency as per contract.
- Video Documentation: Before/during/after construction video for all roads on shared portal.
- GPS-tagged Inspection: All site inspections recorded with GPS coordinates and geotagged photos.
- GIS Road Asset Register: Maintain GIS database of all road assets, conditions, utilities.
- Annual Condition Survey: Pavement Condition Index (PCI) survey for all KAVAL city roads annually.
- Citizen Grievance: Mobile app for citizens to report potholes, signs, drainage issues; 24/48/72 hour response SLA.
- Performance-linked Contracts: Annual maintenance contracts (AMC) with penalty for defects.

12.3 FUNDING FRAMEWORK

Source	Applicable For	Remarks
AMRUT 2.0 (Central)	Water, sewage, roads – KAVAL and Mahapalika towns	Apply for urban transport component
Smart Cities Mission	KAVAL cities – ATMS, smart parking, integrated command centre	Project-based approval
State Budget – UP PWD	State and district roads	Annual capital budget
14th / 15th Finance Commission	Panchayat roads; basic infrastructure	Untied grants to PRIs
PPP / BOT	Multilevel parking; MLCP; pay-and-use bridges	Viability Gap Funding (VGF) if needed
Land Monetisation	Road widening / TOD development	Floor Area Ratio (FAR) bonuses to fund road projects
User Charges	Parking fees; congestion charge (future)	Revenue for road maintenance fund

Source	Applicable For	Remarks
CSR Funds	Street lighting; footpaths; parks along roads	Coordinate with corporate sector

12.4 KEY PERFORMANCE INDICATORS (KPIs)

KPI	Baseline Target (Year 1)	5-Year Target
% Roads in Good/Fair Condition (PCI $\geq$ 60)	< 50% (estimated)	$\geq$ 90%
Fatal Crashes per lakh population	Current UP urban rate	50% reduction
Average Peak-hour Travel Speed (Arterials)	8-12 km/h (estimated)	$\geq$ 20 km/h
% Intersections with Functional Signals	< 40%	100%
Pedestrian Crossings with Signals / Signals	< 20%	100% of major crossings
Waterlogging Events > 30 min (per monsoon)	High (current)	Zero on arterials
Citizen Satisfaction Score (road quality)	Baseline survey	$\geq$ 75% satisfied
Road Cutting Incidents (per km per year)	Current (high)	< 2 per km

CHAPTER 13

Proposal for Scientific Traffic Management and Road Infrastructure Quality in Urban Areas of Uttar Pradesh

13.1 EXECUTIVE SUMMARY

Urban roads in Uttar Pradesh undergo frequent renovation, repair and maintenance, and carry rapidly growing volumes of mixed traffic. Despite considerable investment, many stretches continue to suffer from poor workmanship, inconsistent material quality, unscientific traffic diversion during works, and weak enforcement of traffic rules. The result is recurring potholes, premature pavement failure, traffic congestion, and a continuing toll of road accidents and fatalities.

This proposal identifies two foundational, mutually reinforcing pillars that must underpin any programme of urban road renovation, maintenance and scientific traffic management in the State:

- **Pillar I — Mandatory, role-specific training** for every person involved in the design, construction, maintenance and traffic control of urban roads, from engineers and contractors to site supervisors, traffic constables and signal operators.
- **Pillar II — Sustained public awareness** on traffic rules, road safety etiquette and respect for work-zone diversions, reaching motorists, pedestrians, school children and commercial drivers alike.

Beyond these two pillars, the proposal sets out scientific standards for construction and maintenance, scientific traffic control measures (signage, signal timing, lane discipline, work-zone management), an institutional mechanism for coordination among PWD, Urban Local Bodies (ULBs) and UP Traffic Police, a phased three-year implementation roadmap, monitoring indicators, and an indicative budget. The overarching goal is to institutionalise quality and safety as standard practice — not as one-off campaigns — across all urban centres of Uttar Pradesh.

13.2 Background and Rationale

Uttar Pradesh is undergoing rapid urbanisation, and its city road networks are under constant renovation and repair to keep pace with growing vehicular load, utility works (water, sewer, power, telecom) and city-beautification drives. However, three recurring problems are widely observed across UP's cities and towns:

- **Inconsistent construction and maintenance quality**, leading to potholes, uneven surfaces, poor drainage and rapid deterioration soon after renovation, often because supervisory staff and contractor crews have not been trained in current specifications (MoRTH / IRC standards) or quality-control testing.
- **Unscientific traffic management during works**, where diversions are created without proper signage, barricading or advance notice, leading to congestion, confusion and accidents near work zones.
- **Low public compliance with traffic rules**, including signal jumping, wrong-side driving, lane indiscipline, and disregard for pedestrian safety — compounded by limited public understanding of why and how diversions, one-ways or new signal patterns operate.

Road Accident reports compiled by the Ministry of Road Transport and Highways consistently place Uttar Pradesh among the States with the highest number of road accidents and fatalities annually, with urban arterial roads and junctions being significant contributors. A large share of this burden is attributable not to a lack of infrastructure investment, but to deficiencies in the human systems around that infrastructure: training of those who build and manage roads, and awareness of those who use them. This proposal addresses precisely that gap.

13.3 Objectives of the Proposal

- 1 To institutionalise mandatory, certified training for all categories of personnel involved in the design, construction, renovation, maintenance and traffic control of urban roads in UP.
- 2 To establish a sustained, multi-channel public awareness programme on traffic rules and road safety, targeted at all road-user groups across urban UP.
- 3 To adopt and enforce scientific engineering standards (IRC/MoRTH-aligned) for road construction and maintenance works, including quality control and third-party audit.
- 4 To introduce scientific traffic control practices — signal optimisation, signage standards, lane marking, work-zone safety — at construction, renovation and high-traffic sites.
- 5 To create a clear institutional mechanism for coordination between PWD, ULBs/Municipal Corporations, UP Traffic Police and other stakeholder departments.
- 6 To define measurable indicators for monitoring progress and to recommend a phased, time-bound implementation plan with an indicative budget.

13.4 Current Gaps in Urban Road Works and Traffic Management in UP

Area	Observed Gap	Consequence
Design & Engineering	Limited use of updated IRC codes; weak traffic-impact assessment before renovation works	Roads not designed for actual traffic mix and growth; recurring redesign costs
Construction & Materials	Inconsistent quality control, sub-standard bitumen/aggregate use, inadequate compaction	Premature potholing, cracking and resurfacing within 1–2 years
Maintenance	Reactive rather than scheduled/preventive maintenance; lack of trained maintenance crews	Recurrent monsoon-season failures; higher lifecycle cost
Work-zone Traffic Control	Ad-hoc diversions, missing/insufficient signage and barricading, no advance public notice	Congestion, confusion, accidents near construction sites
Signal & Junction Management	Manually-set or outdated signal timings; lack of trained signal/traffic operators	Congestion, signal-jumping, junction blockages
Traffic Personnel Training	Limited periodic refresher training for traffic constables on modern ITS tools and scientific control	Inconsistent enforcement; reliance on manual, ad-hoc control
Public Awareness	Awareness campaigns are sporadic, often only post-accident or during 'Road Safety Week'	Low retention; persistent rule violations

13.5 Pillar I — Training and Capacity Building of All Personnel

The single most cost-effective intervention available to the State is to ensure that every person who touches a road project — from the drawing board to the diversion barricade — is properly trained for their specific role. Training must be treated as a pre-condition for deployment, not an optional add-on.

• Stakeholder Categories Requiring Training

Category	Personnel Covered	Core Training Need
Design & Planning	PWD/ULB engineers, consultants, traffic planners	IRC/MoRTH codes, traffic impact assessment, drainage design, road safety audits
Construction	Contractor site engineers, supervisors, machine operators, labour gangs	Material specifications, compaction & quality testing, work-zone safety, tools handling
Maintenance	Municipal maintenance crews, pothole-repair teams, drainage staff	Preventive maintenance scheduling, patching techniques, monsoon preparedness
Traffic Control	Traffic police constables/inspectors, Home Guards on traffic duty, signal operators	Scientific traffic control, ITS/signal systems, junction management, courteous public dealing
Contractors/Supervisors at Work Sites	Site safety officers, flagmen, barricading crews	Signage placement standards, diversion planning, night-work lighting and visibility
Quality & Audit	PWD quality control wing, third-party auditors	Standard testing protocols, audit checklists, non-conformance reporting

• Proposed Training Framework

- **Induction training (mandatory, one-time):** No person shall be deployed on design, construction, maintenance or traffic-control duty on a State or ULB road project without completing role-specific induction training and passing a basic competency assessment.
- **Refresher training (mandatory, annual):** Short refresher modules updated with the latest codes, technology (e.g., ITS, new-generation materials) and lessons learnt from recent incidents.
- **Training-of-Trainers (ToT) programme:** A core group of master trainers developed at the State level (in partnership with institutions such as the State Institute of Rural Development, engineering colleges, and the UP Police Training establishment) to cascade training to districts.
- **District-level training cells:** Each district to have a designated nodal officer and training calendar coordinated jointly by PWD/ULB and Traffic Police.
- **Use of demonstration sites:** Live or simulated work-zone sites used for practical training in barricading, signage placement and traffic diversion, not classroom instruction alone.

• Curriculum Components

Module	Indicative Content
Engineering Standards	Latest IRC/MoRTH specifications, pavement design, drainage, utility-duct coordination
Material & Quality Control	Bitumen/concrete quality tests, compaction standards, field testing equipment use
Work-Zone Safety	Signage (IRC:67), barricading, night visibility, advance public notice procedures
Scientific Traffic Control	Signal timing principles, junction design, lane discipline enforcement, ITS basics
Road Safety & First Response	Accident-scene management, basic first aid, coordination with emergency services
Public Communication	Courteous public interaction, handling commuter grievances during diversions
Ethics & Accountability	Anti-corruption norms in material procurement and contractor supervision

• Certification and Mandatory Compliance

A State-recognised certificate (physical and digital, QR-verifiable) should be issued upon successful completion of induction and refresher training. The following compliance measures are recommended:

- Tender and work-order conditions for contractors should explicitly require that all deployed supervisory staff hold a valid training certificate.
- Traffic police postings to junction or work-zone duty should be linked to completion of the scientific traffic-control module.
- A centralised digital training register (could be hosted under the proposed monitoring dashboard — see Section 11) to track certification status of personnel department-wise and district-wise.
- Non-compliance to attract administrative consequences, including ineligibility for future tenders (for contractors) or postings (for personnel), until training is completed.

13.6 Pillar II — Public Awareness on Traffic Rules

Trained personnel and well-built roads alone cannot guarantee safe, smooth traffic flow if road users do not understand or respect traffic rules and temporary diversions. Public awareness must be continuous, locally tailored, and delivered through channels that reach different age groups and user categories.

• Target Audiences

- Private vehicle owners (two-wheeler, car) and daily commuters
- Commercial and heavy vehicle drivers (buses, trucks, e-rickshaws, autos)
- Pedestrians and cyclists, especially near schools, markets and bus stands
- School and college students (as both immediate road users and future drivers)
- Residents and shopkeepers along roads undergoing renovation or diversion

• Proposed Awareness Strategy

Channel	Activity	Frequency
Mass Media	Radio/TV spots, FM jingles, cinema-hall slides on traffic rules and ongoing diversions	Continuous; intensified during major works
Digital & Social Media	Short videos, infographics on diversions, helpline numbers, city Traffic Police social handles	Weekly / event-based
On-Ground Signage	Advance notice boards 500m–1km before diversion/work-zone, QR codes linking to live traffic updates	Throughout work duration
Community Engagement	Resident Welfare Association meetings, market-association briefings before major renovation works	Before & during works
Road Safety Clubs	School/college road-safety clubs, student traffic volunteers near school zones	Academic-year round
Enforcement-linked Awareness	Counselling sessions in lieu of/along with fines for first-time minor violations	Ongoing

• School and College Integration

Road safety and traffic rules should be embedded as a recurring activity (not a one-time lecture) in schools and colleges across urban UP, in coordination with the Education Department:

- Annual road-safety curriculum module (age-appropriate) integrated into existing co-curricular activity time.
- Student 'Traffic Safety Ambassador' programme, with senior students assisting at school-gate zones during peak hours under teacher and police supervision.
- Inter-school road-safety quiz/poster competitions coordinated by district Traffic Police, with visible recognition for participating schools.

13.7 Scientific Standards for Road Construction, Renovation and Maintenance

All urban road works should conform to applicable Indian Roads Congress (IRC) and Ministry of Road Transport & Highways (MoRTH) specifications. Key recommended practices include:

- 1 **Pre-construction survey and design:** Traffic count, soil testing, drainage assessment and utility mapping (water/sewer/power/telecom ducts) before finalising the renovation design, to avoid repeated digging-up of newly laid roads.
- 2 **Material quality assurance:** Mandatory field and laboratory testing of bitumen, aggregates and concrete mix at specified intervals, with results logged against each work order.
- 3 **Standardised construction supervision:** Use of checklists aligned to IRC codes for sub-grade preparation, layer-wise compaction, and surface finishing, signed off by a trained site engineer.
- 4 **Utility-coordination protocol:** A 'one-time-dig' policy under which all utility departments complete underground works before final road surfacing, coordinated through the ULB.
- 5 **Preventive maintenance schedule:** Shift from reactive pothole-filling to a scheduled maintenance calendar (pre-monsoon, post-monsoon) for every urban road segment.
- 6 **Independent quality audit:** Third-party technical audit of a sample of completed works each quarter, with findings published on the district ULB website for transparency.
- 7 **Defect liability enforcement:** Strict enforcement of the contractual defect-liability period, with contractors required to rectify failures within it at their own cost.

13.8 Scientific Traffic Control Measures

Traffic control should move from manual, ad-hoc methods towards standardised, technology-supported systems, especially at junctions and around work zones:

- **Signal optimisation:** Use of traffic-volume studies to set scientifically calculated signal cycle times at major junctions, reviewed periodically as volumes change.
- **Intelligent Traffic Systems (ITS):** Phased rollout of CCTV-linked adaptive signals, automatic number-plate recognition and e-challan systems in larger cities, integrated with the Integrated Command and Control Centres already established under the Smart Cities Mission.
- **Standardised signage and road-marking:** Uniform application of IRC:67 (signage) and IRC:35 (road markings) standards across all urban roads, replacing inconsistent local practices.
- **Work-zone traffic management plans:** Every renovation/maintenance project above a defined threshold to have an approved Traffic Management Plan before work commences, covering diversion routes, signage, barricading and night lighting.
- **Lane discipline and channelisation:** Physical channelisers, rumble strips and clear lane markings at merge points and near schools/markets to reduce weaving and conflict points.
- **Dedicated work-zone safety personnel:** Trained flag-persons and traffic marshals deployed at active work sites during peak hours, distinct from regular traffic-duty police.

13.9 Institutional Mechanism and Roles & Responsibilities

Effective implementation requires clear ownership across departments, coordinated at both State and district level.

Level	Body	Key Responsibility
State	State-level Steering Committee (Principal Secretary, PWD as Chair; representation from Urban Development, Home/Traffic Police, Transport)	Policy approval, budget allocation, inter-department coordination, periodic review
State	State Road Safety Council (as constituted under the Motor Vehicles Act framework)	Overall road-safety policy oversight and convergence
District	District Road Safety Committee (District Magistrate as Chair)	Local implementation oversight, grievance resolution, school/community outreach
City/ULB	Municipal Corporation/ULB Engineering Wing	Execution and supervision of construction & maintenance works; contractor management
City	City Traffic Police	Traffic control, enforcement, Traffic Management Plan approval and field deployment
Site	Project-level Site Committee (Site Engineer + Traffic Police Liaison)	Day-to-day coordination of work-zone traffic management and worker safety

13.10 Implementation Roadmap and Phasing

Phase	Duration	Key Activities
Phase 1 — Foundation	Months 1–6	Constitute State Steering Committee and District Committees; finalise training curricula; develop ToT pool; launch baseline public-awareness campaign; issue revised tender/work-order templates mandating training compliance
Phase 2 — Rollout	Months 7–18	Conduct induction training for existing personnel across all districts; pilot ITS/signal optimisation in 5–10 major cities; roll out school road-safety clubs; begin quarterly third-party quality audits
Phase 3 — Scale-up & Institutionalise	Months 19–36	Extend ITS and scientific signal management to remaining urban centres; make annual refresher training and certification mandatory state-wide; integrate training register and audit data into a single monitoring dashboard; conduct mid-term independent evaluation

13.11 Monitoring, Evaluation and Key Performance Indicators

Progress should be tracked against a concise set of measurable indicators, reported quarterly to the State Steering Committee:

Indicator	Baseline Method	Target Direction
% of deployed personnel holding valid training certification	Digital training register	Increase to 100% by end of Phase 2
Number of road-quality non-conformances per quarterly audit	Third-party quality audit reports	Steady decrease year-on-year
Average pavement life before major repair	PWD/ULB maintenance records	Increase
Road accidents and fatalities on urban arterial roads	UP Police / MoRTH accident data	Decrease
Average junction delay at signal-optimised sites	Traffic studies / ITS data	Decrease
Public awareness recall (sample survey)	Periodic independent survey	Increase
Work-zone related complaints/incidents	ULB/Traffic Police grievance records	Decrease

13.12 Estimated Budget and Funding Sources

The following is an indicative, illustrative budget envelope for the three-year programme; actual costs should be finalised through detailed estimates by PWD/ULB finance wings based on city-wise scope.

Component	Indicative Share of Budget	Notes
Training infrastructure, curriculum development & ToT	15%	Includes demonstration sites and training material
Induction & refresher training delivery (state-wide)	20%	Recurring annual cost from Phase 2 onward
Public awareness campaign (mass media, digital, on-ground)	15%	Higher weight in Phase 1–2 for baseline reach
ITS / signal optimisation pilots and scale-up	30%	Largest capital component; phased city-wise rollout
Quality audit, monitoring dashboard & MIS	10%	Third-party audits and digital systems
Contingency and independent evaluation	10%	Mid-term and final evaluation

Possible funding sources: State PWD/Urban Development budget heads, convergence with the Nirbhaya/Road Safety Fund, Smart Cities Mission allocations (for ITS components in mission cities), Member of Parliament/MLA Local Area Development Schemes for local awareness drives, and Corporate Social Responsibility (CSR) contributions from automobile and infrastructure companies for road-safety education.

13.13 Expected Outcomes and Benefits

- Improved durability and reduced lifecycle cost of urban roads due to better-trained construction and maintenance personnel and stronger quality control.
- Reduced congestion and confusion around work zones through standardised, well-signed traffic diversions.
- Measurable reduction in urban road accidents and fatalities through scientific signal management and improved enforcement.
- Higher public compliance with traffic rules, supported by sustained, locally relevant awareness efforts rather than one-off campaigns.
- Greater public trust in civic agencies through visible quality audits and transparent reporting.
- A replicable institutional model that can extend from pilot cities to all urban local bodies in the State.

13.14 Risks and Mitigation

Risk	Mitigation
Resistance to mandatory training/certification from existing staff or contractors	Phase-in with grace period; link certification to tender eligibility and career incentives, not punitive measures alone
Budget constraints limiting ITS rollout pace	Prioritise highest-traffic junctions first; use phased, modular procurement; explore CSR/PPP for select components
Coordination gaps between PWD, ULB, Traffic Police and utility departments	Institutionalise the Site Committee and District Road Safety Committee with defined meeting frequency and reporting lines
Public awareness fatigue / low recall over time	Refresh messaging regularly; tie campaigns to real, visible local works rather than generic messaging
Data gaps in monitoring accident and quality indicators	Invest early in the monitoring dashboard and standardise data collection formats across districts

13.15 Conclusion and Recommendation

Urban roads are among the most visible and most used public assets in Uttar Pradesh, and their quality and safety directly affect citizens' daily lives. Investment in physical infrastructure alone cannot deliver durable, safe roads unless matched by an equal investment in the people who build, maintain and manage them, and in the citizens who use them. This proposal therefore recommends that the State Government:

- 1 Approve the constitution of the State-level Steering Committee and District Road Safety Committees within the first quarter of adoption.
- 2 Mandate that training certification become a pre-condition for deployment of personnel and award of contracts on all urban road works, in a phased manner.
- 3 Approve a sustained, multi-year public awareness budget rather than treating it as an annual one-time campaign expense.
- 4 Direct PWD and ULBs to adopt the scientific construction, maintenance and traffic-control standards outlined in Sections 7 and 8 as standard operating procedure.
- 5 Commission a baseline survey within six months to enable meaningful tracking of the Key Performance Indicators listed in Section 11.

Implemented together, these measures can meaningfully and measurably improve the safety, durability and efficiency of urban roads across Uttar Pradesh, benefiting both those who build them and the millions of citizens who use them every day.

ANNEXURES

Reference Codes, Checklist & Photography References

ANNEXURE A – MONITORING REPORT

GOVERNMENT OF UTTAR PRADESH
Office of the Chief Executive Officer, UPSTC

MONITORING REPORT

Upgradation of Urban & Panchayat Roads to UP Expressway Quality Standards
(As per recommendations of the Technical Committee approved by CEO, UPSTC)

Note: This single format is to be used for both **Monthly** and **Quarterly** submissions. Tick the applicable reporting period below. Quarterly reports should additionally carry the consolidated/average figures for the three months of the quarter in the relevant columns.

Reporting Period:	☐ Monthly ☐ Quarterly	Month/Quarter & Year:	
Reporting Stakeholder/Agency:	☐ Development Authority ☐ Nagar Palika/Nagar Nigam ☐ PWD ☐ Panchayati Raj Dept.	Name of Agency/ULB:	
District:		Division/Zone (if applicable):	
Report Reference No.:		Date of Submission:	
Submitted To:	Urban Cell, State Transformation Commission, U.P.	Submitted By (Name & Designation):	

1. Road-wise Physical Progress & Quality Status

List every urban/panchayat road section under upgradation. Add rows as needed.

S.No.	Road Name / Stretch (From-To)	Total Length (km)	Length Completed to Date (km)	Length Completed This Period (km)	Physical Progress (%)	Riding Quality / IRI (m/km)	Pavement Type / Specification Followed	Major Defects Observed (cracks, rutting, potholes, drainage, etc.)	Remarks / Action Taken
1									
2									
3									
4									

IRI = International Roughness Index. Benchmark for UP Expressway-equivalent riding quality to be specified by the Technical Committee and referenced here (e.g., target IRI threshold).

2. Compliance with UP Expressway Quality Standards

Quality Parameter	Prescribed Standard (UP Expressway Benchmark)	Achieved / Observed Value	Compliant (Y/N)	Remarks
Riding Quality (IRI, m/km)				
Pavement Thickness / Layer Composition				
Material Specification (aggregate, bitumen/cement grade)				
Camber & Cross-slope				
Drainage & Side Drains				
Footpath / Utility Duct Provision				
Road Markings & Signage				
Street Lighting (if part of scope)				

3. Financial Progress / Budget Utilization

Road/Project Name	Sanctioned Cost (Rs. Lakh)	Fund Released to Date (Rs. Lakh)	Expenditure to Date (Rs. Lakh)	Expenditure This Period (Rs. Lakh)	% Budget Utilized	Remarks
1						
2						
3						

4. Consolidated Summary (This Reporting Period)

Total no. of roads under this agency	
Total length targeted (km)	
Total length completed to date (km)	
Overall % physical progress	
No. of roads meeting Expressway quality benchmark	
No. of roads with quality non-compliance / defects	
Total sanctioned cost (Rs. Lakh)	
Overall % budget utilized	

5. Issues, Delays & Corrective Action

Issue / Constraint	Road(s) Affected	Impact on Progress/Quality	Corrective Action Proposed/Taken	Target Resolution Date

6. Photographic / Geo-tagged Evidence (Annexure)

Attach geo-tagged before/after photographs of works executed during the period, road inventory map, and any quality-test reports (lab test results for materials, IRI survey report, etc.) as Annexure-I, II, III respectively.

7. Certification

Certified that the information furnished above is correct as per records/site verification and reflects the actual physical and financial progress of urban/panchayat road works under this agency for the period stated above.

Prepared by (Name, Designation, Contact):

Verified/Approved by (Head of Agency/ULB):

Signature & Seal Date:

Signature & Seal Date:

Distribution: This report (monthly/quarterly) shall be submitted by Development Authorities, Nagar Palikas/Nagar Nigams, PWD, and Panchayati Raj Department for the urban and panchayat road segments under their respective jurisdiction to the Urban Cell, State Transformation Commission, Uttar Pradesh, as per the timelines prescribed by CEO, UPSTC.

ANNEXURE B – GOVERNING IRC CODES & MoRTH SPECIFICATIONS

Code / Standard	Title	Key Clauses for UP Urban Roads
IRC-86-2018	Geometric Design Standards for Urban Roads	Cl 5, 5.1, 5.2, 5.5, 5.7, 5.8 – Cross-sections, kerbs, medians, design speed
IRC-119-2015	Guidelines for Traffic Safety Barriers	Cl 2, 3, 4 – Barrier types, selection, design, end treatments
IRC-11-2015	Guidelines for Cycle Tracks	Cl 4.2, 5.2, 5.3, 6.2, 6.5, 7.2, 7.5 – Width, surface, separation, signals
IRC-SP-12-2015	Guidelines for Parking Facilities	Cl 3.2, 3.3, 3.4, 3.7, 3.8, 4, 6.3 – Standards, MLCP, demand management
IRC-SP-41	Design of At-Grade Intersections	Cl 3.1 and related – Signal design, channelisation, radii, pedestrian crossings
IRC-SP-32-2023	Safer Commutes to Schools	All clauses – School zones, drop-off, signage, patrol
IRC-67-2012	Road Signs	All clauses – Sign types, mounting, retro-reflectivity, VMS
IRC-103-2012	Guidelines for Pedestrian Facilities	All clauses – Footpaths, crossings, subways, disabled access
IRC-SP-50-2015	Urban Drainage Guidelines	Cl 3.1, 3.3 – Drain design, storm water management, waterlogging prevention
IRC-98-2023	Guidelines for Accommodation of Utilities in Road Sections	All clauses – Duct design for all ROW categories
IRC-35-2015	Code of Practice for Road Markings	All marking types, materials, dimensions, retro-reflectivity
IRC-79-2018	Recommended Practice for Road Delineators	Delineator types, spacing, placement
IRC-37-2018	Guidelines for Design of Flexible Pavements	Mechanistic-empirical design; traffic loading; subgrade; pavement layers
IRC-118-2015	Planning and Development of Urban Roads	Complete streets; land use integration; mobility plans
IRC-88-2019	Traffic Management in Works Zone	All clauses – TMP, barricading, signing, flagging
IRC-SP-88-2019	Road Safety for Urban Roads	RSA; iRAP; black spot; crash data; speed management
MoRTH Spec-816	Advanced Traffic Management System	ATC; CCTV; VMS; ANPR; incident detection; TMC
IRC-58-2015	Design of Plain Jointed Rigid Pavements	Concrete road design for bus stops, junctions, freight routes

ANNEXURE C – RECOMMENDED BEST PRACTICE PHOTOGRAPHS REFERENCE

Category	Reference (International Best Practice Example)
Arterial Roads	Sheikh Zayed Road, Dubai – 10-lane arterial; landscaped medians; grade-sep crossings
Cycle Tracks	Amsterdam / Utrecht, Netherlands – Protected segregated cycle highways
Pedestrian Zones	Times Square, New York – Pedestrianised street; planters; seating; lighting
Category	Reference (International Best Practice Example)
School Zones	Singapore – School zone markings; overhead warning signs; patrol crossing
At-Grade Intersections	Heathrow Junction, London – Channelised roundabout with signals; pedestrian stages
Smart Traffic Signals	Tokyo, Japan – Adaptive signal control; countdown signals; sensors

Parking	Dubai Mall MLCP – 14,000 space multilevel; guidance system; EV charging
Utility Gallery	Geneva, Switzerland – Walk-in utility gallery under footpath
Street Vendors	Bangkok – Organised night bazaar; vendor zones; clear pedestrian path
Road Markings	Melbourne, Australia – High-durability thermoplastic; retro-reflective RPMs

RECOMMENDATION FOR APPROVAL

The Technical Committee hereby submits these comprehensive recommendations to the Chief Executive Officer, UP Transformation Commission, Lucknow for approval. It is recommended that these standards be notified as mandatory technical requirements for all urban road works in Uttar Pradesh and that the phased transformation programme be commenced immediately with KAVAL cities in Phase 1.

Chairman, Technical Committee


(Signature)
01-07-2026

Urban Planning Expert



(Signature)

Shashank Shekhar
Principal Transportation Planner

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Member – Traffic Engineering


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Road Safety Expert



(Signature)

Juan Domingo Fabre

UP Transformation Commission, Lucknow | Reference: UPTC/TC/URBAN-ROADS/REC/2026 | Date: June 2026 | Classification: Official

Member



(Signature)

Btech Civil, IIT Roorkee

Technical Committee Report

To,
Chief Executive Officer
State Transformation Commission,
Uttar Pradesh.

Dear Sir,

Transformation of Urban Roads in Uttar Pradesh to Expressway-Grade Quality

Recommendations of the Technical Committee constituted by the CEO, UP State Transformation Commission

The Technical Committee constituted by the CEO, UP State Transformation Commission has recommended a comprehensive transformation of all urban roads in Uttar Pradesh to a quality standard equivalent to the state's expressways. The recommendation covers the full hierarchy of urban governance — major cities, KAVAL towns, Noida and Greater Noida, Nagar Palikas, and Panchayat-level roads — and prescribes Right-of-Way (ROW) specific design treatments for 8m, 12m and 20m corridors. The framework is fully anchored in twelve IRC codes and MoRTH specifications, with a defined hierarchy of Schedule-of-Rates (SoR) for DPR costing and a three-tier governance structure for implementation oversight.

1. Scope of Coverage

The recommendation applies uniformly across every tier of urban and peri-urban governance in the state, ensuring no category of road is left outside the new quality benchmark:

- Major cities and large urban agglomerations
- KAVAL towns (Kanpur, Agra, Varanasi, Allahabad/Prayagraj, Lucknow)
- Noida and Greater Noida (NOIDA / GNIDA jurisdiction)
- Nagar Palikas (municipal councils and boards)
- Panchayat-level roads (rural-urban interface and last-mile connectivity)

2. Right-of-Way (ROW) Specific Design Framework

Each ROW category receives a tailored cross-sectional design rather than a single design applied uniformly:

ROW	Typical Application	Key Design Elements
8m	Local / Panchayat & Nagar Palika streets	Single/two-lane carriageway, footpath both sides, surface drainage, basic lighting
12m	Collector roads, ward connectors	Two-lane + parking bay option, footpath + cycle track, storm-water drainage, street furniture
20m	Arterial roads, KAVAL / major city corridors	Multi-lane divided carriageway, footpath, cycle track, green buffer, vending zones, ATMS integration

3. Technical Standards Base

All recommendations are codified entirely against IRC and MoRTH references — no design or costing element is left to discretionary judgement outside this framework:

Code / Specification	Coverage Area
IRC-86	Geometric design standards for urban roads
IRC-119-2015	Pavement condition index and evaluation
IRC-11	Recommended practice for footpath design
IRC-SP-12	Guidelines for drainage on rural and urban roads
IRC-SP-41	Guidelines for design of at-grade intersections
IRC-SP-32	Road design in hill / constrained terrain contexts
IRC-67	Code of practice for road signs
IRC-103	Guidelines for pedestrian facilities
IRC-SP-50	Guidelines on urban drainage
IRC-98	Guidelines for maintenance management of roads
IRC-35, 37, 118, 88	Road marking, pavement design, quality control, roadside furniture
MoRTH Specifications (5th Rev.) / ATMS	Material, construction and quality-control specifications; adaptive traffic management systems for arterial corridors

4. DPR Preparation & Cost Estimation Hierarchy

Detailed Project Reports (DPRs) follow a defined three-tier costing hierarchy:

- **Primary basis:** UP PWD Schedule of Rates (SoR) for all standard cost items
- **Secondary basis:** MoRTH Schedule of Rates for items not covered under UP PWD SoR
- **Fallback:** Market rate analysis — used only where neither SoR is available, and only after documented rate analysis, justification of SoR non-availability, and written approval from the competent authority

5. Street Vendor Management

Vending activity is treated as a planned design element integrated into the ROW cross-section — particularly for 12m and 20m corridors — rather than an encroachment addressed after construction. This includes designated vending zones aligned with Town Vending Committee plans, preserved footpath continuity for pedestrian movement, and coordination with ULB enforcement to prevent post-construction encroachment.

6. Traffic and Quality Management

Traffic management: Mandatory pre-construction Traffic Management Plans, phased lane closures to preserve minimum capacity during works, and IRC-67 compliant signage and diversion arrangements, alongside preserved pedestrian and emergency-vehicle access.

Quality management: Layer-wise testing against MoRTH 5th Revision parameters, independent third-party quality audits, periodic Pavement Condition Index (PCI) tracking under IRC-119 feeding into IRC-98 maintenance cycles, and contractor defect-liability enforcement prior to final payment release.

7. Three-Tier Governance and Monitoring Framework

Tier	Level	Responsibility
1	Executing Authority	PWD / Development Authority / Municipal Corporation — site-level execution and first-line quality control
2	Nagar Palika	Ward/town-level monitoring, vending-plan compliance, citizen grievance redressal
3	Urban Cell (CEO Transformation Commission)	State-level oversight, cross-ULB standardization, escalation and policy course-correction

Recommendation

It is recommended that the technical standard set detailed above be approved for adoption across all listed ULB tiers, with pilot DPRs initiated in select KAVAL towns and Noida/Greater Noida corridors to validate cost and design assumptions, followed by state-wide rollout and parallel institutionalization of the three-tier monitoring structure under the Urban Cell.


(B.P Singh) 02.07-2026
Chairman
Technical Committee
State Transformation Commission,
Uttar Pradesh