Road Upgrade: Cost and Technical Specifications

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Cost estimate and technical specifications for bringing the Cyberabad bus-network roads and home-to-station streets up to the walk-and-scoot standard. Companion to the Bus Loops Final Plan and the two street design guides.

Summary

Bringing the bus-network roads and home-to-station streets up to standard will cost about ₹1,400 crore at 2026 rates, and about ₹1,500 crore once price rises over a five-year build are included.

	Approximate figure
Bus roads, full rebuild (walk-and-scoot edge, new drains, cable ducts, bus lanes)	About ₹21–23 crore per km of road
Bus roads in the network	About 53 km (loops 32 km, corridors 21 km)
West feeder and home-to-station streets	About 74 km
Total at 2026 rates	**About ₹1,400 crore (range ₹1,200–1,650 crore)**
With escalation over five years	About ₹1,500 crore
Phase 1: L1 and L2 roads plus their residential routes	About ₹470 crore
Cheaper option: keep existing drains, no duct bank	About ₹970 crore at 2026 rates

Why it costs this much. Paving and kerbs are the smaller share. Most of the cost on an Indian city road is what lies under and beside it: moving water pipes, power poles and cables; new covered drains; a shared duct bank so the road is never dug up again; and putting overhead cables underground. That is the scope of Bengaluru's TenderSURE streets, which have reportedly cost in the region of ₹10–20 crore per km.

How it was built: unit rates for each item (pavers, kerbs, coloured concrete, drains, ducts, lights, trees, crossings, utility moves) multiplied by quantities per km, then 4% for traffic management during works and 15% for design, supervision and contingency. Rates include GST. Land purchase is excluded: everything fits within the existing road width.

Scope

About 127 km of road, in four types. Lengths are counted once where two routes share a road.

Road type	Routes	Length (km, approx.)	Treatment
Loop roads, 80 ft+	L1, L2, L3	32	Full rebuild: walk-and-scoot edge both sides, one-way median bus lane, new drains, duct bank
Corridor roads, 90 ft+	C1, C2, C3 (stretches shared with loops removed)	21	Full rebuild with two-way median bus lanes
Feeder road	W: Nallagandla Road, Gopanpally–Wipro Road	14	Raised walkways, painted scooter lane, Tokyo style
Home-to-station routes	About 40 routes of 1.5 km nearest the stations, within the 3–5 km reach	60	Quick kit on all; full upgrade on the busiest 30 km

Not included here: bus stations, depots, chargers and the fare system (about ₹115 crore in the Bus Operations proposal), and the buses themselves, which come through the operating contract.

Technical specifications

The specifications follow Indian Roads Congress guidance (IRC:103 for pedestrian facilities, IRC:11 for cycle tracks, IRC:37 and IRC:58 for pavements, IRC:SP:117 for accessibility), adapted for e-scooters. Final designs need a topographic survey, soil tests and a utility survey for each road.

Cross-sections

Road type	Building line to median, one side	Median
Loop road, 24 m (80 ft)	Walkway 1.5 m (1.8–2.0 m near stations) · scooter lane 2.0 m · planted kerb 0.5 m · two car lanes 3.0 m each	One-way bus lane 3.5 m with 0.25 m kerbs; 3.0 m platform at stations
Corridor road, 27.6 m (90 ft)	Same as loop road	Two bus lanes of 3.5 m; staggered platforms
Feeder road, 18–24 m	Raised walkway 1.5 m both sides · painted scooter lane 1.5 m · car lanes	None
Collector road, 16 m	Walkway 2.0 m both sides · two-way kerbed scooter track 2.5 m on one side · two car lanes · parking bays and trees 2.0 m	None
Colony road, 11 m	Raised walkway 1.5 m both sides · shared 6 m carriageway at 20 km/h · bays and trees 2.0 m	None
Lane, under 9 m	Painted walking strip 1.2 m both sides · shared middle at 15 km/h	None

Layer build-ups

Part	Surface	Base layers	Level above road
Walkway	60 mm interlocking concrete pavers, M35, one colour, tactile strips at crossings	30 mm sand bed · 75 mm plain concrete M15 · 100 mm granular sub-base	150 mm

Part	Surface	Base layers	Level above road
Scooter lane	150 mm pigmented pavement-quality concrete M30, light broom finish, joints sawn at 4 m and sealed flush	100 mm dry lean concrete · 150 mm granular sub-base	75 mm
Scooter lane, feeder and quick option	40 mm pigmented bituminous concrete	50 mm dense bituminous macadam on existing base	Road level, painted
Bus lane	Red anti-skid surfacing (methyl methacrylate) on the existing carriageway, or 40 mm red bituminous concrete	Existing road, milled and relaid where weak	Road level
Raised crossing	Pigmented concrete table at walkway level	Ramps 1:10 for cars	150 mm

Kerbs and edges

- Precast concrete kerbs, M30, bedded and haunched in M15, set to ±3 mm.
- Walkway to scooter lane: mountable splay kerb, 75 mm rise over 300 mm.
- Scooter lane to planted kerb: 75 mm upstand with gaps every 15 m for drainage.
- Planted kerb to carriageway: 150 mm barrier kerb.
- Bus lane: 150 mm kerbs both sides, mountable on the car side so a bus can pass a broken-down bus.

Drainage and utilities (full rebuild)

- Precast covered drains, about 600 × 900 mm, under the walkway edge, with removable slabs and inlets every 15 m.
- Cross falls: 2% on walkway and scooter lane, 2.5% on the carriageway.
- Grates with slots no wider than 10 mm, across the direction of travel.
- Duct bank under the planted kerb: four 110 mm telecom ducts, three 160 mm power ducts, one street-light duct, two spares, with chambers every 50 m.
- Overhead low-tension and telecom cables moved into the duct bank.

Fittings

Item	Specification
Street lights	LED, 9 m poles every 30 m on both sides, at least 20 lux on walkway and scooter lane
Trees	Native shade species in root cells, every 20 m, 2.5 m clear height kept over paths
Bollards	900 mm high, 1.2 m clear gaps at every entry to the walkway and scooter lane
Markings	Thermoplastic scooter pictograms and arrows every 20–30 m; coloured no-stopping kerb line
Junctions	Protected layout: corner islands, crossings set back 5–6 m, signal phase for walkers and scooters
Tactile paving	Yellow warning tiles 600 mm deep at every kerb ramp; ramps no steeper than 1:12

Bus-lane enforcement

- **Car-trap pits** at every entry to the bus lane and at stations: a pit across the lane whose width sits between a car's wheel track and a bus's, so buses roll over and car wheels drop in. Exact dimensions set from the chosen bus fleet's wheel track; drained, with a steel or concrete edge; only at low-speed entry points, never along the lane; road-safety audit before use.
- **Bollards** 1.2 m apart beside each pit to keep two-wheelers and autos away; red surface and warning signs 30 m before it.
- **Roadside AI cameras:** number-plate cameras every 300–500 m on each bus lane, linked to the Cyberabad Traffic Police e-challan system, with automatic alerts for stopped vehicles.
- **On-bus cameras:** a forward camera on every bus that records vehicles in the lane ahead.

Narrow stretches

Where a stretch is narrower than the cross-sections above, apply this fallback in order and never narrow the walkway:

1. Drop one car lane on the stretch.
2. On 60–80 ft stretches, move the bus lane to the kerb side in the peak direction and paint a 1.5 m scooter lane, Tokyo style.
3. At short pinch points under 60 ft, share one lane with a bus-first signal and slow scooters and cars to 20 km/h.
4. Buy land only as a last resort.

Under metro pillars, run the bus lane between pillars where the gap allows, otherwise at the kerb.

Unit rates used

Indicative Hyderabad rates for 2026 including materials, labour, contractor margin and GST. They are planning assumptions, to be replaced by the current Telangana schedule of rates and tender prices.

Item	Unit	Rate (₹, approx.)
Walkway: pavers on sand, concrete and sub-base	per m²	2,000–2,500
Scooter lane: pigmented concrete on lean concrete and sub-base	per m²	4,500–5,500
Scooter lane: pigmented bituminous on macadam	per m²	2,000–2,500
Precast kerb, laid and haunched	per m	1,500–2,000
Planted kerb: planter, soil, hedge	per m	1,200–1,800
Covered precast drain with inlets and chambers	per m	18,000–25,000
Duct bank with chambers every 50 m	per m	6,000–8,000
Overhead cables moved underground	per km of road	1–2 crore
Moving water pipes, sewers and power poles (allowance)	per km of road	1–3 crore
LED street light, 9 m pole with cabling	each	1.0–1.2 lakh
Shade tree with root cell and guard	each	30,000–50,000
Raised crossing table	each	8–12 lakh

Item	Unit	Rate (₹, approx.)
Junction rebuilt to the protected layout, with signals	each	50–80 lakh
Red bus-lane surfacing	per m²	1,200–1,500
Bus signal priority and roadside AI enforcement cameras	per km	35–45 lakh
Car-trap pit at a bus-lane entry, with bollards and signs	each	10–15 lakh
Forward enforcement camera on a bus	each bus	about 50,000
Speed table on residential streets	each	2–3 lakh
Traffic management during works	% of works	3–5%
Design, supervision and contingency	% of works	15%

Cost per km

A bus road rebuilt in full costs about ₹21 crore per km with a one-way bus lane and about ₹23 crore with two-way lanes. More than half goes below the surface: utility moves, drains, ducts and undergrounding cables.

Walk-and-scoot edge, both sides, per km of road (mid-point rates)

Item	Quantity per km	₹ crore
Walkway, 1.5 m each side	3,000 m²	0.68
Scooter lane, 2.0 m each side, pigmented concrete	4,000 m²	2.00
Kerbs, three lines each side	6,000 m	1.05
Planted kerb	2,000 m	0.30
Street lights, every 30 m both sides	67 poles	0.74
Shade trees, every 20 m both sides	100	0.40
Raised crossings at gates and side streets	6	0.60
Junction rebuilt to the protected layout	1	0.65

Item	Quantity per km	₹ crore
Markings, signs, bollards, tactile paving		0.30
Moving pipes, sewers and power poles	allowance	2.00
Repairs to existing drains, new inlets		0.50
Traffic management, 4%		0.37
Design, supervision and contingency, 15%		1.44
Standard edge		**about 11.0**
Add: new covered drains both sides, less repairs	2,000 m	3.80
Add: duct bank both sides	2,000 m	1.40
Add: overhead cables moved underground		1.50
Add: traffic management and contingency on the above		1.30
Full rebuild edge		**about 19.0**

All road types, per km of road

Road type	Treatment	₹ crore per km (range)
Loop road	Full rebuild edge plus one-way bus lane (about ₹2.2 crore: kerbs, red surfacing, median levelling, signal priority, cameras)	21 (18–25)
Corridor road	Full rebuild edge plus two-way bus lanes (about ₹4.2 crore)	23 (20–27)
Loop or corridor, standard edge only	Existing drains kept, no duct bank	13–15
Feeder road	Raised walkways, painted scooter lane, lights, utility moves	3.9 (3–5)
Home-to-station quick kit	Speed tables, walking strips, pictograms, bollards, lighting fixes	1.0 (0.7–1.2)

Road type	Treatment	₹ crore per km (range)
Home-to-station full upgrade	Raised walkways, drain covers, lights, trees, raised junctions	3.9 (3–5)

Network cost and phasing

About ₹1,390 crore at 2026 rates, spread over three phases from 2027 to 2032, or roughly ₹230–250 crore a year.

Part	Length (km)	₹ crore per km	Cost (₹ crore)	Range (₹ crore)
Loop roads, full rebuild	32	21	670	580–800
Corridor roads, full rebuild	21	23	480	420–570
West feeder	14	3.9	55	40–70
Home-to-station quick kit	60	1.0	60	40–70
Home-to-station full upgrade, busiest routes	30	3.9	120	90–150
Total at 2026 rates			**about 1,390**	**1,170–1,660**
With escalation over five years			about 1,500	

By phase

Phase	Years	Scope	Cost (₹ crore, 2026 rates)
1	2027–28	L1 and L2 roads (about 20 km) and their home-to-station routes	About 470
2	2028–30	C1, C2, C3 and L3 roads (about 33 km) and their routes	About 810
3	2030–32	West feeder and remaining routes	About 110

Phase 1 can open in weeks with a tactical kit (rubber kerbs, flexible posts, paint and planters) at about ₹1.5 crore per km, or ₹30 crore for the Phase 1 roads, while the full rebuild is designed and tendered.

Bus-lane enforcement: around 100 car-trap pits across the network add about ₹10–15 crore, within the range above; roadside cameras are already in the bus-lane rate, and bus cameras come to about ₹40 lakh for the fleet.

Cheaper option: keep existing drains and skip the duct bank and undergrounding. That brings the total to about ₹970 crore, but the roads will be dug up again for cables and drains within a few years.

Whole programme: about ₹1,500–1,620 crore including the ₹115 crore for bus stations, depots, chargers and the fare system.

Construction, quality and risks

Build each road in 500 m stretches, one side at a time, with a temporary walkway always open; a 2 km stretch takes about four to six months for a full rebuild.

Construction method

1. Survey and mark out; find every pipe and cable with ground-penetrating radar and trial pits.
2. Move utilities into the duct bank and lay new drains first.
3. Compact the base, set precast kerbs by string line, then lay surfaces.
4. Heavy work at night (10 pm to 6 am); digging outside the June–September monsoon.
5. One contractor per 3–5 km corridor, with fixed milestones and a five-year maintenance period.

Quality checks before opening

Check	Requirement
Scooter lane smoothness	No more than 3 mm under a 3 m straightedge; no lip over 6 mm at joints, covers or grates
Levels	Walkway 150 mm and scooter lane 75 mm above road, ±5 mm
Clear walkway width	At least 1.5 m everywhere, with no poles or stalls

Check	Requirement
Drainage	No standing water 15 minutes after a water test
Lighting	At least 20 lux average at night
Concrete	M30 strength confirmed by cube tests

Risks and assumptions

Risk	Effect on cost	Response
Utility moves bigger than allowed	The largest swing: ±₹1–2 crore per km	Joint utility survey before design; one agreement covering all utility owners
Road narrower than assumed	Redesign on that stretch; land purchase not costed here	Fixed fallback in order: drop a car lane, move the bus lane kerbside, share at pinch points with a bus-first signal; walkway never cut; land last (see Narrow stretches)
Cars entering the bus lane	Slower buses and lost riders; it helped end Delhi's BRT	Car-trap pits at entries, bollards, red surface, AI cameras with automatic e-challans (see Bus-lane enforcement)
Encroachments and frontage disputes	Delays more than cost	Notices and removal before work starts
Price rises	About 5–6% a year	Escalation of about ₹110 crore included in the ₹1,500 crore figure
Bus station and depot costs	The ₹115 crore in the operations proposal may also be low, at ₹50 lakh per station	Re-estimate stations alongside this road work

All figures are planning estimates.