

2015 STREET QUALITY SCORE

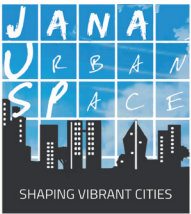
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AN INITIATIVE BY JANAAGRAHA

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ACKNOWLEDGEMENTS



Jana Urban Space Foundation (India)

Jana Urban Space Foundation (JanaUSP) worked in partnership with Janaagraha on Street Quality Score 2015, providing GIS mapping support for the survey and locational bus stop data.

JanaUSP was first established as India Urban Space Foundation (IndiaUSP) in 2007. It is a non-partisan, not-for-profit trust working on the core premise that urban planning and urban design are central to shaping vibrant cities and city regions, thus enhancing the quality of life.



Jana Urban Services for Transformation (JUST) worked in partnership with Janaagraha on the Street Quality Score 2015 carrying out all primary field surveys and data validation exercises.

JUST is a 100% owned subsidiary of Jana Urban Foundation and provides specialized services such as Customer Insights & Analytics, Financial Advisory Services, Community Connect, Field Survey, Skills and Livelihoods services to group companies and their customers.

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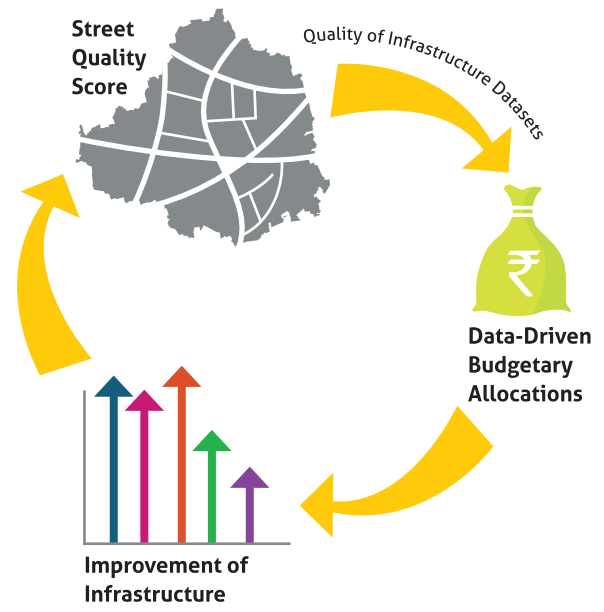
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PREFACE

Even as our city needs several fixes, some areas in the city are evidently nicer and more liveable than others. Not all neighbourhoods have access to basic minimum quality of infrastructure and services. On the other hand, the city only has limited funds each year. Therefore, where these funds are spent, for what purposes and towards what goals, all greatly matter.

If all citizens in a city were to have equal access to basic minimum quality of infrastructure and services, then areas that today have poorer infrastructure and services need to have a greater share of funds. Similarly sectors (e.g. water, sanitation, environment, mobility etc.) where the city or its neighbourhoods are faring badly also merit greater share of spending. ■



SQS seeks to create a framework whereby quality of life can be measured objectively in different parts of a city and across categories (such as water, sanitation, environment, mobility etc.). We believe SQS can be a frame of reference that can bring together MLAs and Councillors, administrators and citizens to inform budgeting decisions in the city.



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SURVEY SCOPE & METHODOLOGY

The Street Quality Score 2015 commenced on 3,500 km of roads (Arterial, Sub-arterial and Collector) across Bengaluru to measure the quality of infrastructure (Footpaths, Pedestrian Crossings, Streetlighting, Bus-Stops and Air Pollution) at a street-level, through the use of simple Android Apps. The survey was performed by JUST over the course of three months, from Sept to Nov 2015.

A detailed explanation of our indicators, methodology and reporting is available below
↓

INDICATOR	SURVEY BASIS	BENCHMARK	SCOPE	METHOD	WHAT ARE WE REPORTING?
Footpath	Is the footpath present? Is the footpath usable? a) Is it of sufficient width? b) Is it without obstructions?	100% presence of footpath on all roads. a) The width of the footpath must be enough to accommodate two people walking side-by-side. b) The footpath should be 100% free of obstructions.	3318/3500 km	A pedometer app was used to measure the walkable length of every street. Each obstruction was captured in type (through geo-tagged photographs) and length (by pausing the pedometer).	Percentage of footpaths walkable.
Pedestrian Crossing	Is the pedestrian crossing present? Is the pedestrian crossing usable? a) If it is a zebra crossing, is it accompanied by a pedestrian signal? b) If it is a subway/footbridge, is it well lit?	Every intersection between arterial, sub-arterial and collector roads should have a usable pedestrian crossing. Usable pedestrian crossings are defined as: a) Zebra crossing with a working pedestrian signal alongside it. [Tender S.U.R.E (pg 52)] b) Subways and footbridges with lighting provided at the entrance, exit and throughout. (UDPFI guidelines).	3256/3442 intersections	An app was used to capture the presence/absence and quality of pedestrian crossings at all intersections, through geo-tagged photographs .	Percentage of intersections crossable.
Streetlighting (On Footpath)	Is there adequate street lighting on the footpath?	Lighting provided on a footpath should be at least 10 lux for arterial, sub-arterial and collector roads (UTTIPEC minimum safety benchmark).	3075/3500 km	A calibrated app was used to capture geo-tagged lux values , at one second intervals, across the length of the street.	Average lux availability for the street.
Bus Stop	Are there adequate number of bus-stops across the city?	A bus-stop should be available every 500m on all main roads, in order for it to be available at a walkable distance for citizens.	1750/1750 km	All bus-stops were mapped using GIS software, and the service area of each bus-stop (500m along its adjoining road networks) identified.	Serviced kms.
Air Pollution PM 2.5	Is the air you are breathing healthy	WHO Benchmark for PM 2.5 concentrations is < 25 mg/m3.	917/1750 km	The Airbeam instrument was used to capture PM 2.5 readings, at one second intervals, across the length of the street.	PM 2.5 levels across the city. Min, Max and Average Lux levels across the city.

UNDERSTANDING THIS REPORT

Definition

This box will provide definitions, benchmarks and standards.

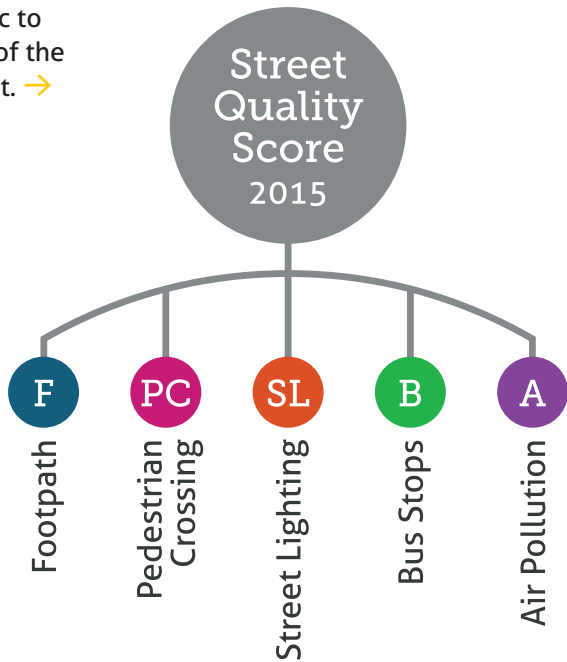
INSIGHT

This box will provide you with insights, analysis and impact. It will point out the relevance of the data and make it meaningful.

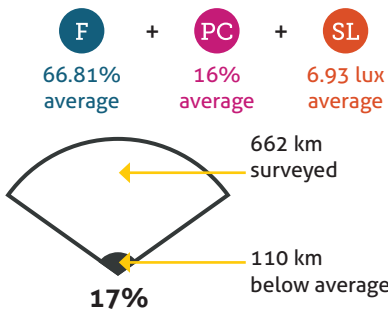


A box, such as the one on the left will be present on each key insight page. It will enable you to navigate this report.

Please refer to this graphic to understand the structure of the Street Quality Score report. →



Arterial roads below average



STREETS YOU KNOW, THAT GOT IT RIGHT ✓

- 100 ft road Koramangala
- 24th Main, JP Nagar
- 4th Main, Jayanagar 3rd Block
- 13th Cross, Basavanagudi

STREETS YOU KNOW, THAT GOT IT WRONG ✗

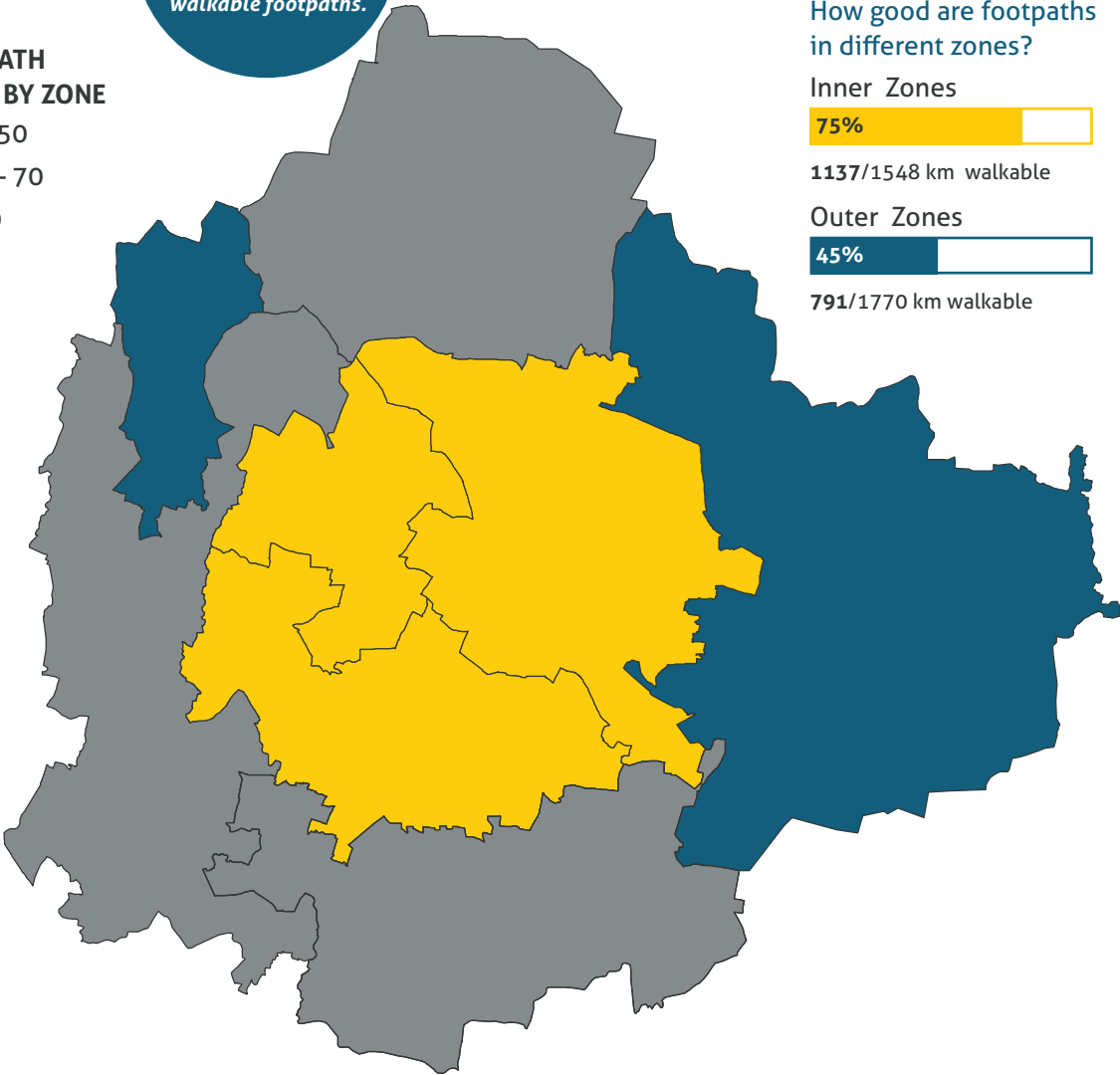
- Hosa Road
- Madivala Road
- Mysore Road
- Wind Tunnel Road



Out of 3318 km of streets that we surveyed, only 1928 km (i.e. 58 %) have walkable footpaths.

FOOTPATH SCORE BY ZONE

- 0 – 50
- 51 – 70
- >70

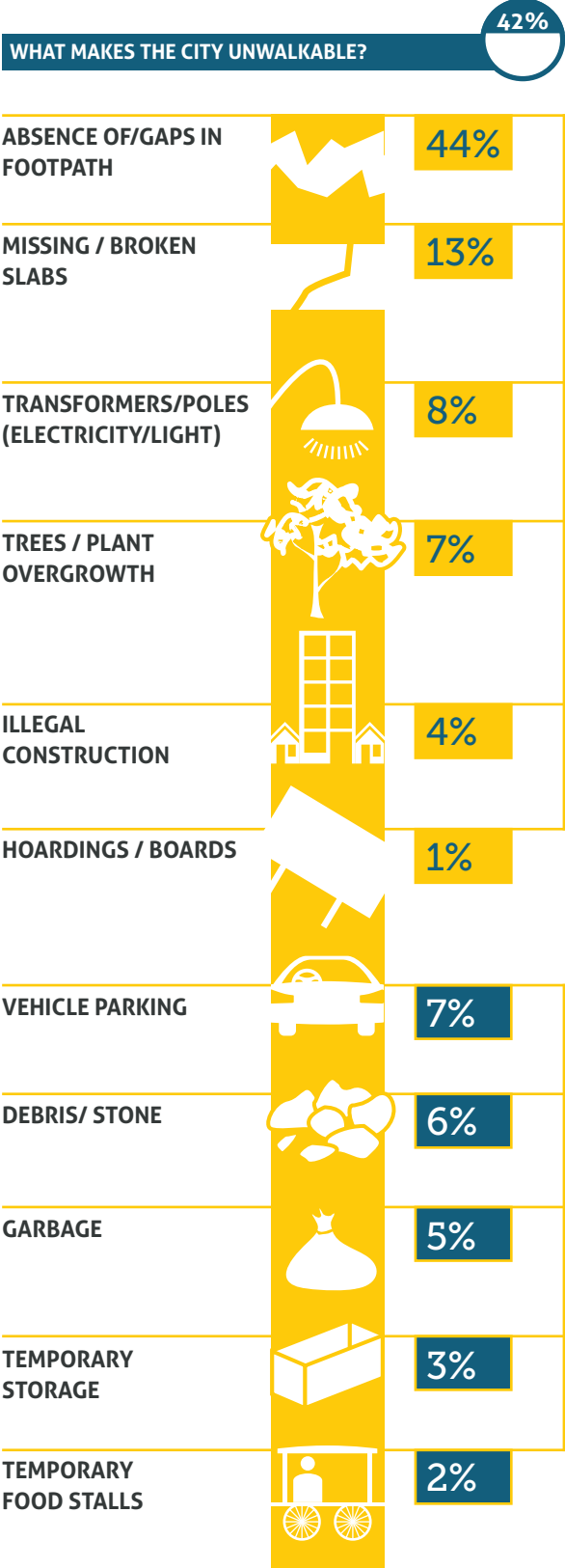
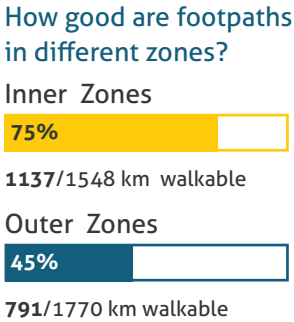


Footpath

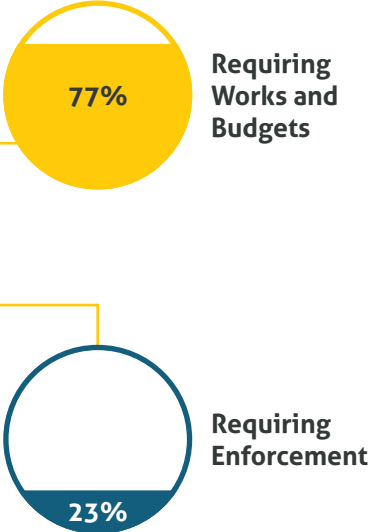
What is a Walkable Footpath?
In the absence of any standard measure of walkability of a footpath, we have considered a footpath as walkable if two people can walk on it side-by-side without having to step onto the road.



INSIGHT
Footpaths in Outer Zones are far worse than in Inner Zones.



INSIGHT
There are 23,343 locations across the city that have been identified where footpath may have to be laid, an existing footpath repaired, or an obstruction cleared.



Please refer to the Street Quality Score Dashboard at www.ichangemycity.com/bangalore/street-quality-score for detailed scores on all streets.

Pictures of Obstructions



WHICH TYPE OF ROADS HAVE BETTER FOOTPATHS?

Arterial Roads



Sub-Arterial Roads



Collector Roads

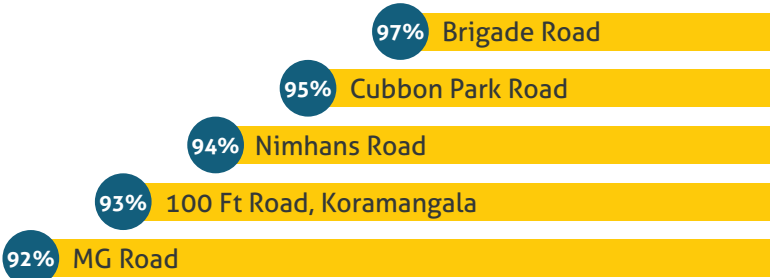


INSIGHT
Collector roads connect residences to larger main roads and also house most community amenities, but are the least walkable. Making these pedestrian friendly would be the first step in creating walkable neighborhoods.

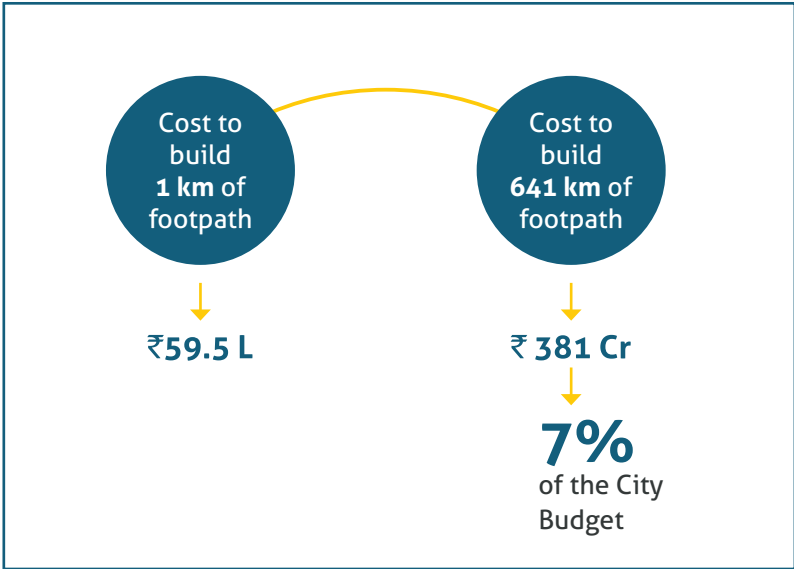
STREETS YOU KNOW, THAT GOT IT RIGHT!



OTHER WELL-KNOWN STREETS THAT GOT IT RIGHT

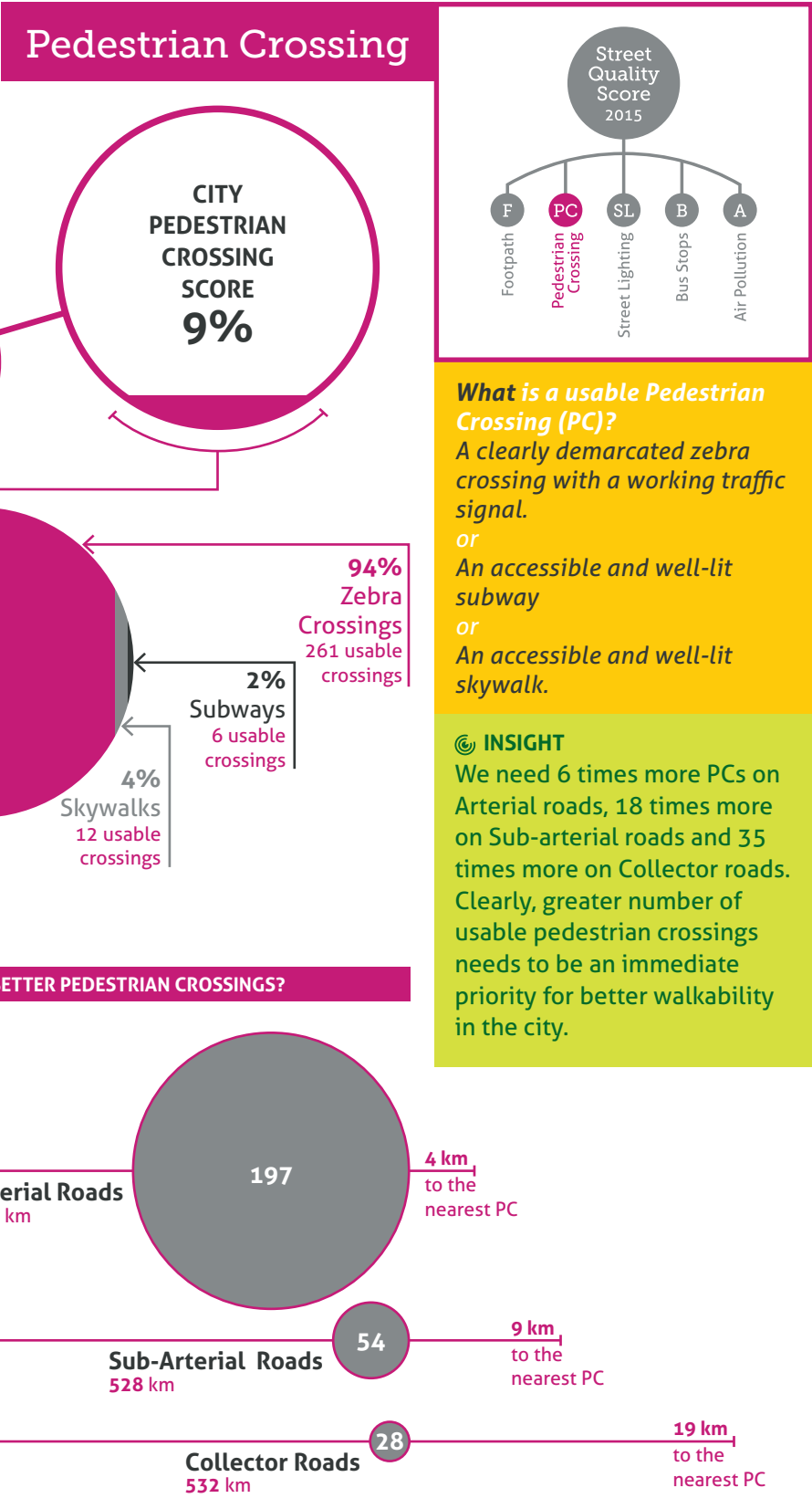


HOW CAN WE MAKE IT BETTER?

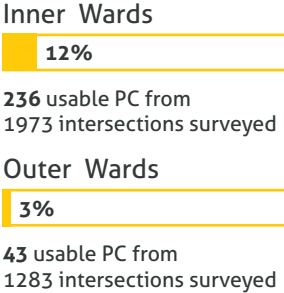


If we can build 1 km of footpath a day, in 21 months all streets across Bengaluru will have footpaths! This will just cost 6% of BBMP's annual budget. Gaps in footpath and obstructions can be simultaneously prioritized and addressed based on severity.

Please refer to the Street Quality Score Dashboard at www.ichangemycity.com/bangalore/street-quality-score for detailed scores on all streets.



How many usable Pedestrian Crossings are there across the city?



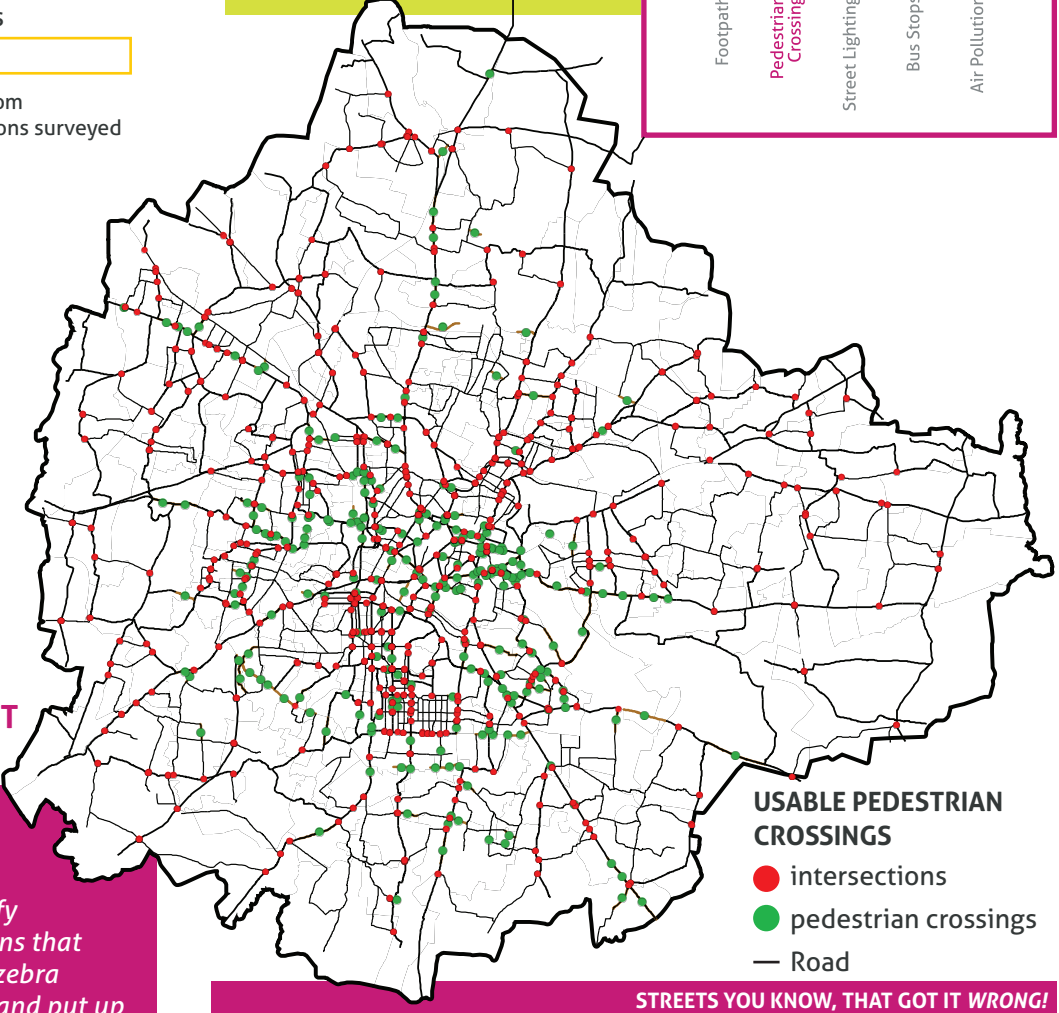
INSIGHT
While both Inner and Outer Wards have much to improve, Outer Wards perform especially poorly with 97% of its intersections having no usable Pedestrian Crossings.



HOW CAN WE MAKE IT BETTER?

BBMP & BTP should work together

- to identify intersections that only have zebra crossings, and put up pedestrian signals there
- to plan for skywalks or subways at intersections that are particularly difficult to cross and
- to paint zebra crossings at all pedestrian signals.



0
USABLE
PEDESTRIAN
CROSSINGS

GKVK Road	8.6 km
Whitefield Main Road	8 km
Bangalore University Road	7 km
80 Feet Road, JP Nagar	4 km

Please refer to the Street Quality Score Dashboard at www.ichangemycity.com/bangalore/street-quality-score for detailed scores on all streets.

Street Lighting (on Footpaths)

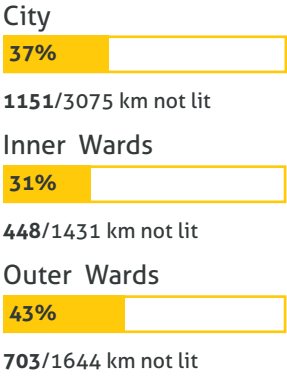


What is a safely-lit street?
A safely-lit street is one which has an average lux* score greater than 10 [as defined by UTTIPEC‡, DDA in their Action Plan for Women Safety on Streets, as the minimum safety benchmark].

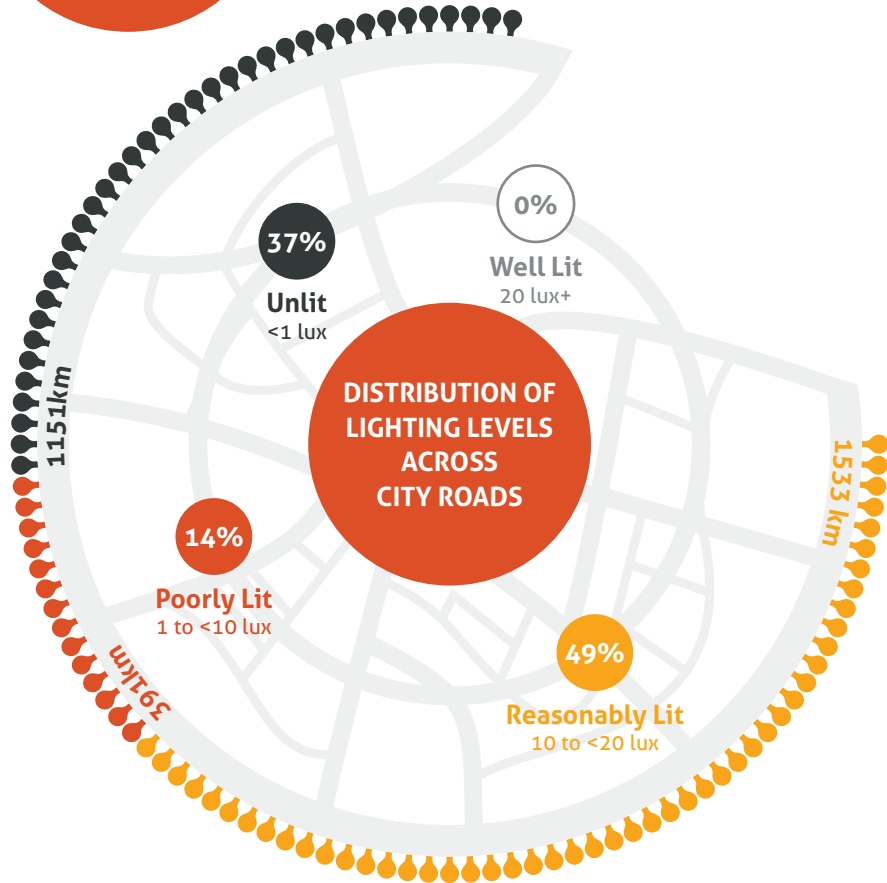


INSIGHT
51 % of the city streets have lux levels below the safety benchmark of 10 lux, making them unsafe for pedestrians.

What is the distribution of lighting levels across the city?



Average street-lighting on 3,075 km of streets that we surveyed was 8 lux. The minimum safety requirement is 10 lux and the benchmark is 20 lux.

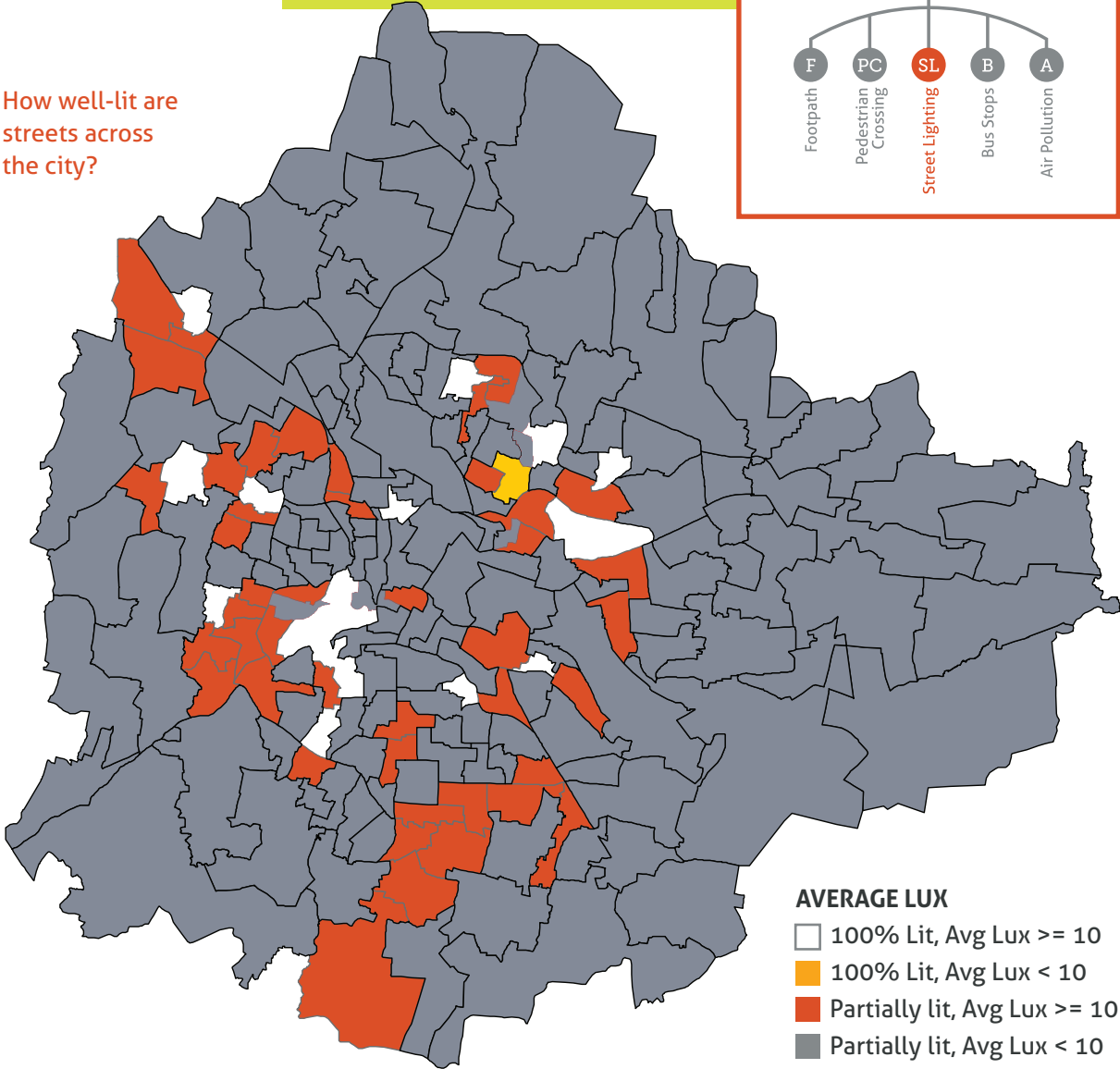


*Please refer to Glossary for the definition of 'Lux'.
‡ Unified Traffic and Transportation Infrastructure. (Planning & Engineering) Centre.

INSIGHT
127 wards are both partially lit and also have an average lux score below the minimum safety benchmark.



How well-lit are streets across the city?



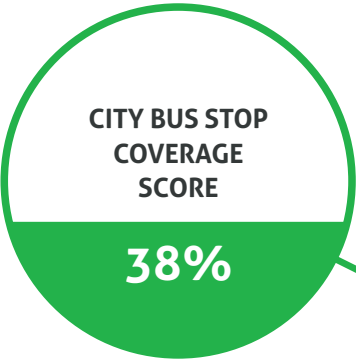
STREETS YOU KNOW, THAT GOT IT WRONG!

- Cubbon Road
- Infantry Road
- Varthur Road

HOW CAN WE MAKE IT BETTER?

- BBMP to survey the unlit stretch of 1151 km, to install new streetlights where there are none and take up maintenance of those with insufficient lux.
- BBMP to implement a phased plan for ensuring minimum 10 lux on the remaining 1880 km.

Please refer to the Street Quality Score Dashboard at www.ichangemycity.com/bangalore/street-quality-score for detailed scores on all streets.



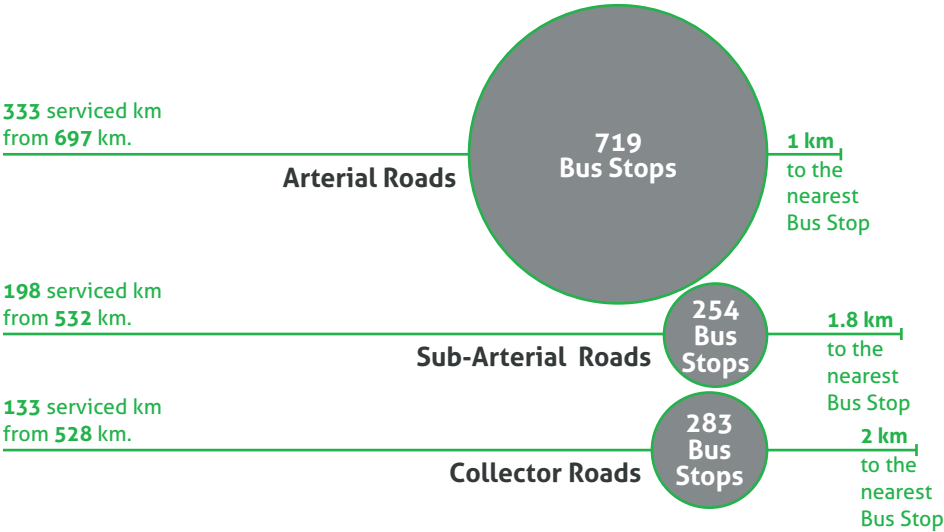
Out of 1750 km of streets that we covered, only 665 km (i.e. 38 %) are serviced by bus-stops.

Bus Stop



What is a bus-stop's serviceable area?
A bus-stop services streets and citizens within 500 m.*

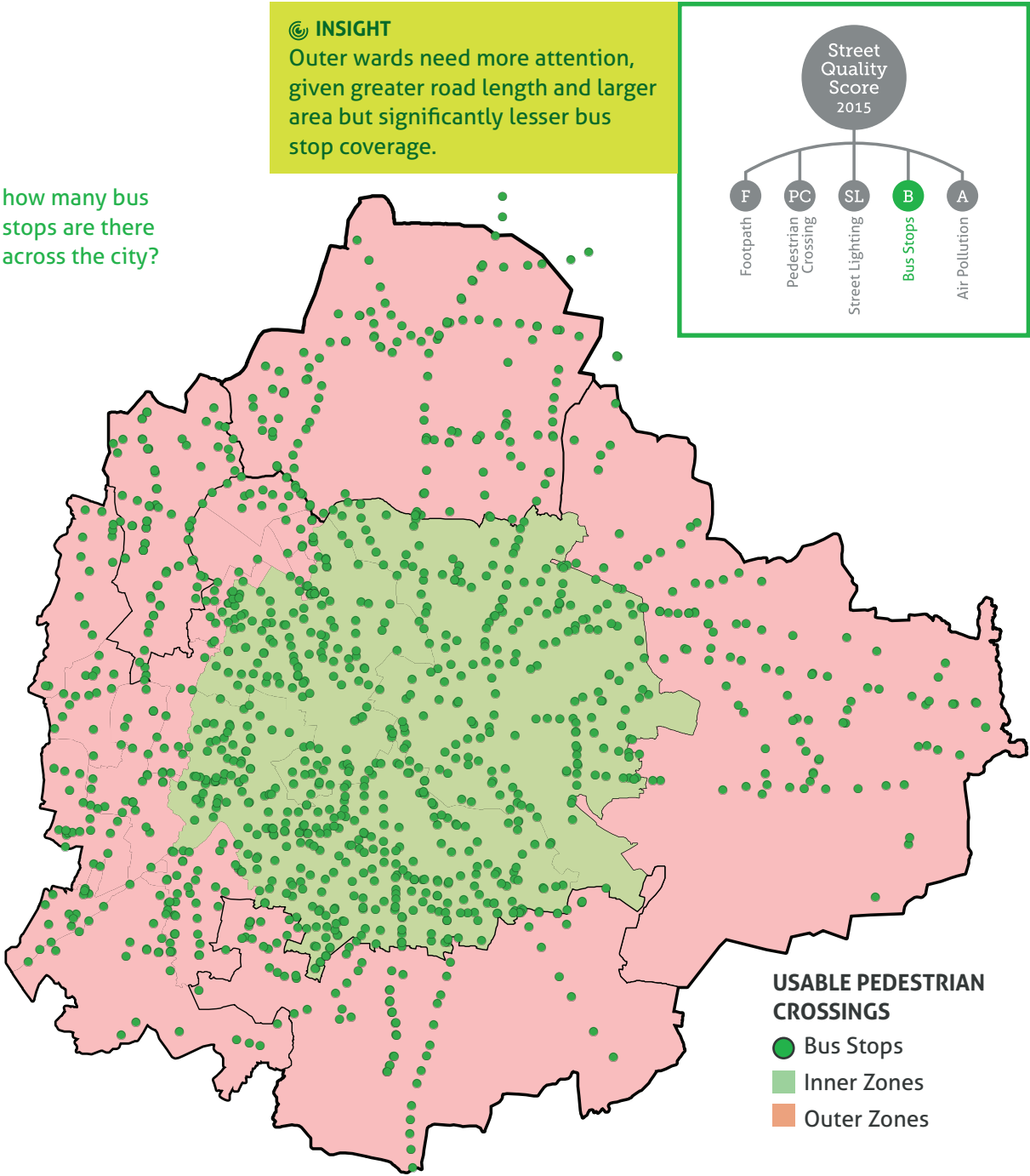
WHICH TYPE OF ROADS HAVE SUFFICIENT BUS-STOP?



INSIGHT
On Collector Roads which connect citizens' homes with the rest of the city, you are likely to find a bus stop every 2 km, which is 4 times the ideal walkable distance to a bus stop.

Inner Wards
53% 855 Bus Stops
446 km/844 km serviced
4 bus stops / sq. km
216.9 sq. km

Outer Wards
22% 401 Bus Stops
219/995 km serviced
1 bus stop / sq. km
492.2 sq. km



HOW CAN WE MAKE IT BETTER?

BBMP and BMTC to review location and adequacy of bus stops and BBMP to budget for additional bus-stops in a phased manner.

Please refer to the Street Quality Score Dashboard at www.ichangemycity.com/bangalore/street-quality-score for detailed scores on all streets.

* As per the UDPFI guidelines 2014.

Air Pollution PM 2.5

What is PM 2.5?

PM 2.5 or fine particulate matter, consists of particles with diameters that are less than or equal to 2.5 microns in size.

PM 2.5 is a serious health concern, since its smaller particles can travel deeply into our lungs and long term exposure may be associated with increased rates of chronic bronchitis, reduced lung function and increased mortality from lung cancer and heart disease.

The principal source of PM 2.5 in cities is motor vehicles.



WHAT IS THE PERMISSIBLE LIMIT FOR PM 2.5 ?

INSIGHT

It is evident that average PM 2.5 is hugely deceptive, given the peaks and troughs. What we probably need is continuous tracking of PM 2.5 and a phased plan to cap peak levels within reasonable limits, in what are currently hotspots and poisonous corridors.

As per the WHO guidelines, the benchmark for PM 2.5 is 25 µg/m³, where anything above it is considered harmful to health.

Low and High PM 2.5 levels across the city?

194	4
Outer Ring Road	Lalbagh
160	5
ITPL Road	Cubbon Park
126	11
Dasarahalli Road	GKVK, University of Agricultural Sciences

CITY PM 2.5 SCORE

35µg/m³

(micrograms per cubic meter of air)

Out of 917 km of streets that we covered, PM 2.5 concentrations were found to be 40% higher than the permissible limit.

HARMFUL EFFECTS OF PM 2.5

250+ µg/m³

Air Quality: Hazardous
Serious Respiratory impact even on healthy people.

91 - 120 µg/m³

Air Quality: Unhealthy
Respiratory illness, asthma, and discomfort to people with heart disease, children and older adults.

31 - 60 µg/m³

Air Quality: Moderate
Minor breathing discomfort to sensitive people.

121 - 250 µg/m³

Air Quality: Very Unhealthy
Respiratory illness. Effect more pronounced in people with lung and heart diseases.

61 - 90 µg/m³

Air Quality: Unhealthy for Sensitive Groups
Breathing discomfort to people with lung/heart disease, children and older adults.

0 - 30 µg/m³

Air Quality: Good
Minimal Impact on Health

GLOSSARY

Arterial

An arterial road, or arterial thoroughfare, is a high-capacity urban road. The primary function of an arterial road is to deliver traffic from collector roads to freeways, and between urban centers at the highest level of service possible.

Sub-Arterial

Sub-arterial roads carry less of the thorough-traffic, and act as feeder roads between development areas and the arterial roads. Sub-arterial roads also serve the function of a principal carrier of traffic to, through and around major facilities (eg: major shopping centers, town centers, major business and/or industrial areas, large educational establishments etc.) or provide primary access to these facilities.

Collector

A collector road, or distributor road is a low-to-moderate capacity road which serves to move traffic from local streets to arterial roads. Collector Roads are designed to provide access to residential properties.

Ward

An administrative division of a city that typically elects and is represented by a councilor or councilors.

Inner Wards

The inner wards are those that belong to the inner zones of Bengaluru: East, South and West Zones.

Outer Wards

The outer wards are those that belong to the new zones of Bengaluru that were added to BMP: RR Nagara, Bommanahalli, Mahadevapura, Dasarahalli and Yelahanka.

Not all the outer wards are necessarily new wards. BBMP reorganized the boundaries and had marked out a few older ward areas as a part of the outer wards.

Lux

Lux is the SI unit of illuminance and luminous emittance, measuring luminous flux per unit area. It is equal to one lumen per square meter. In photometry, this is used as a measure of the intensity as perceived by the human eye, of light that hits or passes through a surface.

PM 2.5

“Particulate matter” also known as particle pollution or PM, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles and is extremely injurious to health on prolonged exposure.

*Please refer to Glossary for the definition of 'PM 2.5'.

Please refer to the Street Quality Score Dashboard at www.ichangemycity.com/bangalore/street-quality-score for detailed scores on all streets.

SCORING TABLE

Geographic Area	FOOTPATH			PEDESTRIAN CROSSING		
	Target km	Surveyed km	Score %	Target Intersections	Surveyed Intersections	Score %
City	3500	3318	58.1	3442	3256	9
Inner	1640	1548	73.42	2112	1973	12
Outer	1860	1770	44.7	1330	1283	3
Arterial	1324	1252.17	66.81	1310	1235	16
Inner	606	565.47	79.54	819	756	22
Outer	718	686.69	56.32	491	479	6
Sub Arterial	1108	1055.27	60.55	1123	1052	5
Inner	592	562.78	75.5	739	690	6
Outer	516	492.48	43.47	384	362	3
Collector	1068	1011.04	44.75	1009	969	3
Inner	444	419.90	62.39	554	527	4
Outer	624	591.14	32.22	455	442	1

Geographic Area	STREET LIGHTING		
	Target km	Surveyed km	Score ave. lux
City	3500	3075	7.75
Inner	1640	1431	8.60
Outer	1860	1644	7.00
Arterial	662	1185.31	6.93
Inner	303	525.54	7.63
Outer	359	659.77	6.37
Sub Arterial	554	957.23	8.14
Inner	296	515.68	8.77
Outer	258	441.55	7.41
Collector	534	932.53	8.39
Inner	222	389.86	9.71
Outer	312	542.67	7.44

Geographic Area	BUS STOP			AIR POLLUTION		
	Target km	Surveyed km	Score %	Target km	Surveyed km	Score PM 2.5
City	1838	1838	36	1750	917	35
Inner	844	844	53	820	389	33
Outer	994	994	22	930	528	35
Arterial	676	676	50	662	363	33
Inner	307	307	64	303	135	27
Outer	369	369	37	359	228	36
Sub Arterial	573	573	34	554	290	39
Inner	301	301	51	296	153	36
Outer	272	272	17	258	137	36
Collector	568	568	26	534	264	39
Inner	236	236	41	222	101	38
Outer	332	332	11	312	163	39

INDICATOR	WHAT DOES THE SCORE REPRESENT	HOW WAS IT COMPUTED
Footpath	Percentage of footpaths walkable.	Walkable length/Total length x 100
Pedestrian Crossing	Percentage of intersections crossable.	Usable PCs found/Total Intersections x 100
Streetlighting (On Footpath)	Average lux availability.	To be compared against minimum lux safety benchmark (UTTIPEC) = 10 Lux
Bus Stop	Serviced kms.	Serviced kms/Total kms x 100
Air Pollution PM 2.5	Average PM 2.5 concentrations.	To be compared against permissible PM 2.5 limit (WHO guidelines) =25 µg/m³



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