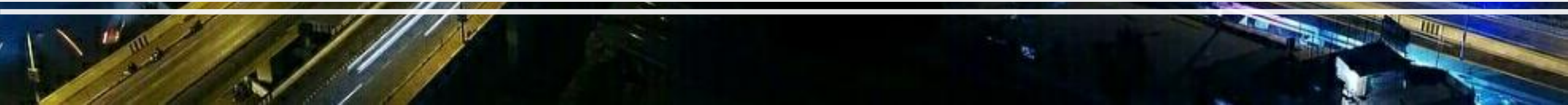
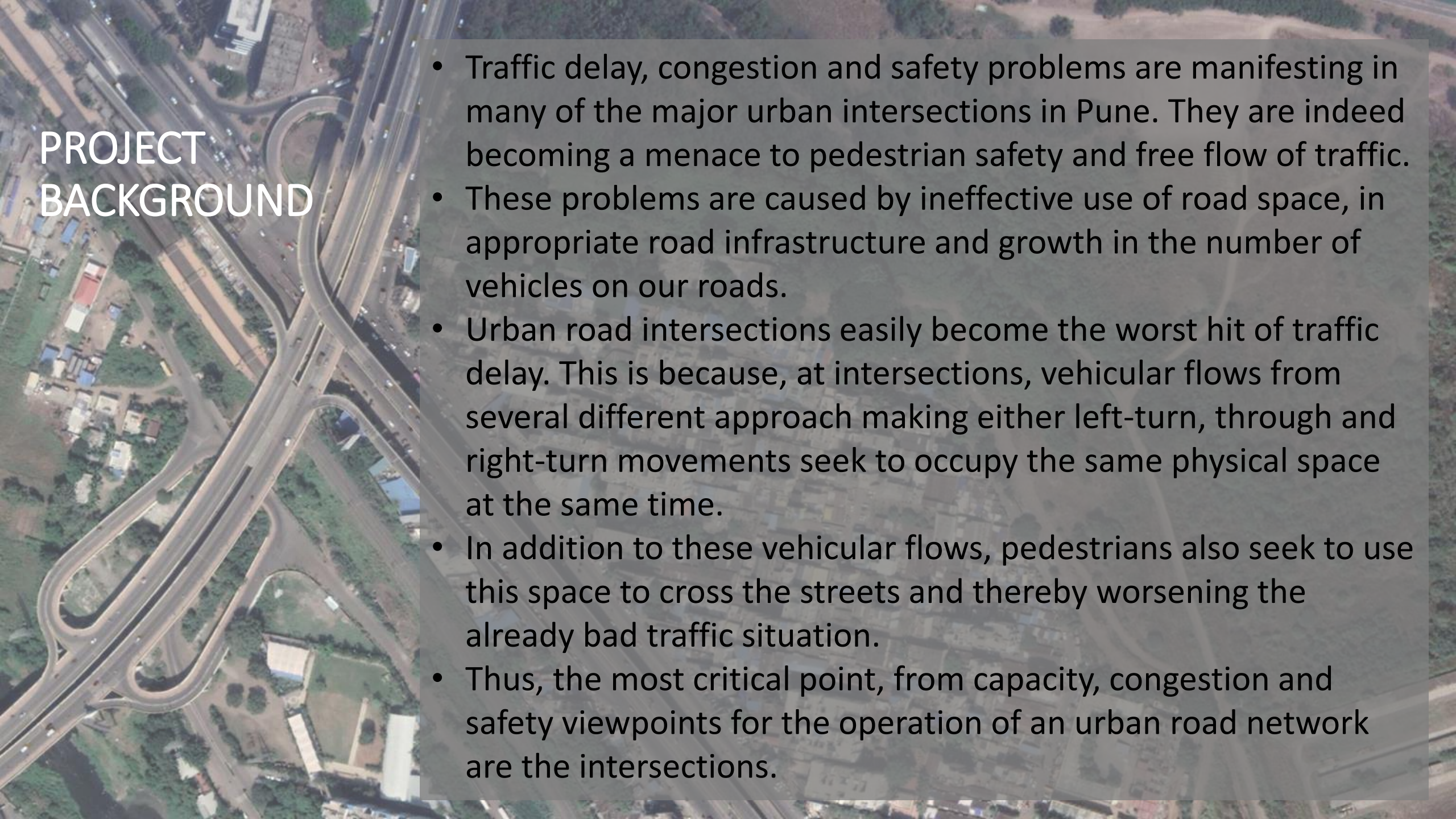
Improvement of Nashik Phata Junction with respect to the Pedestrian Movement



CITY BACKGROUND

- Pimpri-Chinchwad Municipal Corporation or PCMC is a Municipal Corporation in Pimpri-Chinchwad, Pune.
- PCMC is situated on the old Mumbai – Pune Highway in the heart of Pimpri-Chinchwad which is one and a half hours from Navi Mumbai
- Pimpri-Chinchwad Council covered an area of about 87 sq. km., which now covers an area of about 181 sq. km. The city is located at an altitude of 530 m AMSL.
- As per 2011 Census population of Pimpri Chinchwad is 17,29,000 and growing at a rate of 6% annually.



PROJECT BACKGROUND

- Traffic delay, congestion and safety problems are manifesting in many of the major urban intersections in Pune. They are indeed becoming a menace to pedestrian safety and free flow of traffic.
- These problems are caused by ineffective use of road space, in appropriate road infrastructure and growth in the number of vehicles on our roads.
- Urban road intersections easily become the worst hit of traffic delay. This is because, at intersections, vehicular flows from several different approach making either left-turn, through and right-turn movements seek to occupy the same physical space at the same time.
- In addition to these vehicular flows, pedestrians also seek to use this space to cross the streets and thereby worsening the already bad traffic situation.
- Thus, the most critical point, from capacity, congestion and safety viewpoints for the operation of an urban road network are the intersections.

PROJECT BACKGROUND

- Nashik Phata Junction is also known as Kasarwadi Junction. This is a critical junction where two major highways viz. Mumbai Pune old Highway (Old NH-4) and Pune Nashik Highway (Old NH-50) meet.
- The link was missing between Mumbai Pune Highway and Westerly Bypass upto 2007. This link was proposed to cross Pawana River and Central Railways which are running parallel to Mumbai Pune Highway.
- The BRTS bus route from Pune to Nigdi crosses the junction at ground level and the other BRTS bus route from Bhosari to Wakad crosses at first level at the junction.
- Also presently the metro work for route from pune to Pimpri is in progress and also crosses the same junction parallel to railway line.
- Kasarwadi Railway station is also situated in the same junction. In addition to it the workers working from nearby area also flow through the same junction to Chinchwad and Bhosari MIDC.
- Also state transport buses are situated at the junction on either side of the road going towards Nashik. Rickshaw auto stands are also located on all the corners of the junction.


Image Landsat / Copernicus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image IBCAO
Google Earth


MSRT Bus Stop
BRTS Bus Stop
MSRT Bus Stop
Kasarwadi
Railway Station
BRTS Bus Stop
Mumbai Pune Highway
Railway Line
Pune Nashik Highway

Aim

To prepare a plan for safe mobility around Nashik Phata

Objectives

1. To study the travel & transport interchange characteristics of users
2. To study interaction & interchange between different activity nodes such as railway station, Metro station, Bus station,etc
3. To identify issues for safety and mobility
4. To prepare intervention plan for Short term & Long term

Scope

Is only confined to Transport interchange between different modes/system.

LITERATURE REVIEW

What is a Transport Interchange?

A ***Multimodal Interchange*** is one in which ***co-ordination and integration of different modes of transport*** takes place to decongest road, reduce journey time, enhance environment, provide greater convenience for commuters, efficiency and cost effective.

According to "***GUIDE(Group for Urban Interchanges Development and Evaluation)"***(Terzis, 2000)

It can describe the action of interchanging, as undertaken by passengers as part of a journey. But it can also mean a location where interchange takes place.

According to "***Public Transport Interchange Design Guidelines, Auckland Transport"***(Turnbull, 2013)

An interchange is a location where customers transfer from one mode of transport to another or between two services of the same mode.

A word **'INTERCHANGE' can** have both functional as well as spatial meaning (Andrés Monzón, 2016)

- **Interchange describing a Function**: It means the act of interchanging and that is the main function of an interchange. As people transfer from one mode to another and between two or more than two modes that forms a part of journey.
- **Interchange describing a Space**: The space indicates the location that means the interchange is describing a space when the interchange/ transfer takes place at one location.

LITERATURE REVIEW

Types of Transport Interchange?

There is different type of interchanges called intermodal and multimodal interchange which varies on basis of type of mode and type of service. Following type of interchanges are as follows:

1. **Bus-Bus**: In which Bus as one mode is used for transfer/interchange like bus is used to transfer within city i.e. Inter City or transfer between one state to other i.e. Interstate
   - For Intra City Movement
   - For Inter State movement
2. **Bus-Metro:** In which Bus and metro is used for interchange in intercity movement
   - For Intra City Movement
3. **Metro-Rail:** In which metro and rail mode is used to transfer within city i.e. intra city transfer / interchange,
   - For Intra City Movement
4. **Rail-Bus:** In which Rail and Bus is used to transfer between one state to another i.e. for interstate movement.
   - For Inter State Movement

Nashik Phata is a multi-modal **inter-spatial interchange**

LITERATURE REVIEW

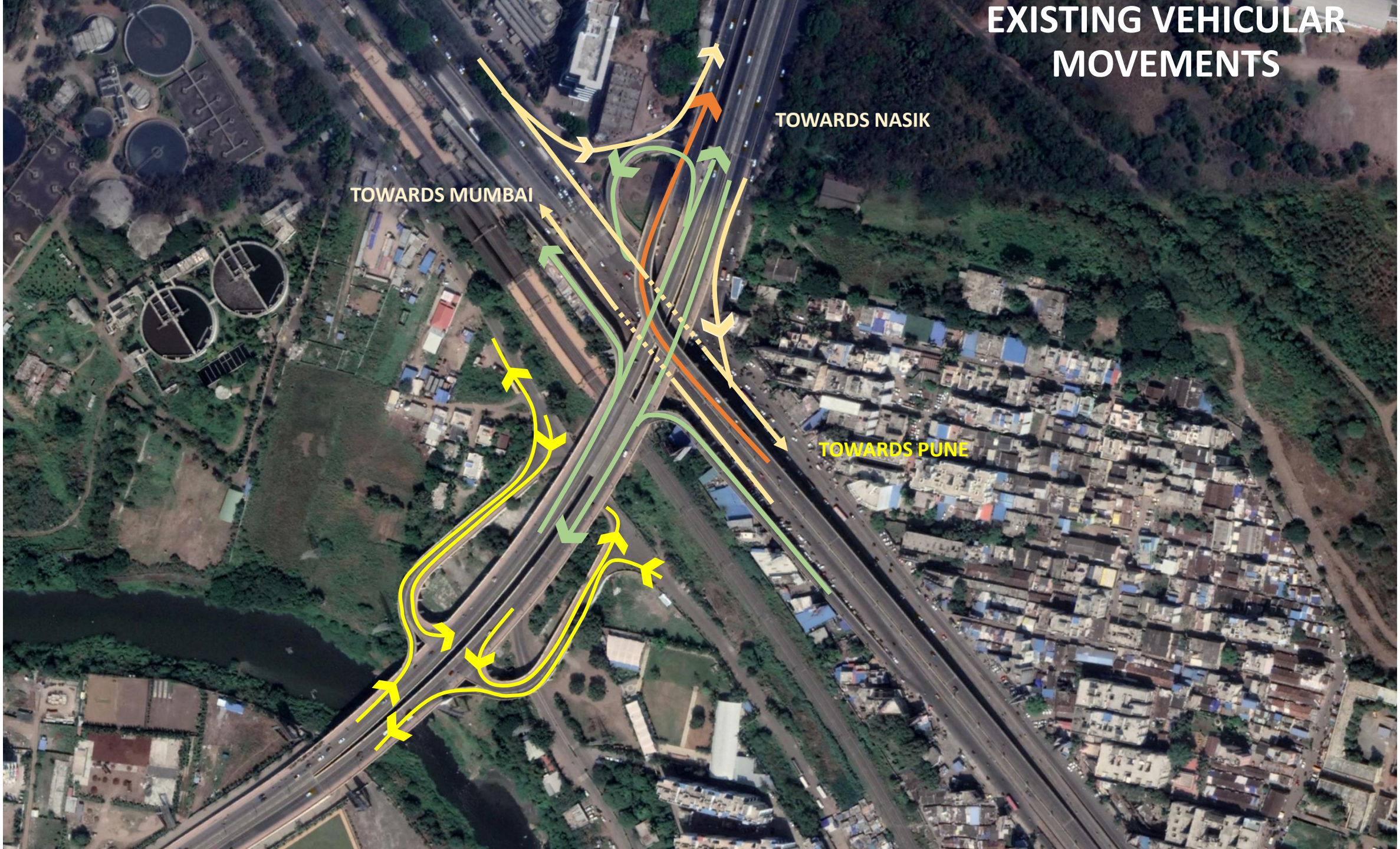
Need and benefits of Interchange

As per NUTP-2014, The main objectives of integrated transport are:
Transport hubs should provide seamless inter-change between inter-city regional & sub-urban services, and the PT system of the city.

a) Integration means where all different type of modes works in unity and provide a seamless connectivity for transfer/interchange and making smooth journey.
b) To make interchange convenient and reduce the travel and transfer time of journey by introducing one single ticket for all type of modes.
c) Distance between the modes should be short by physical integration of all modes.
d) System should be least cost with best possible financial viability & hence affordable & sustainable.

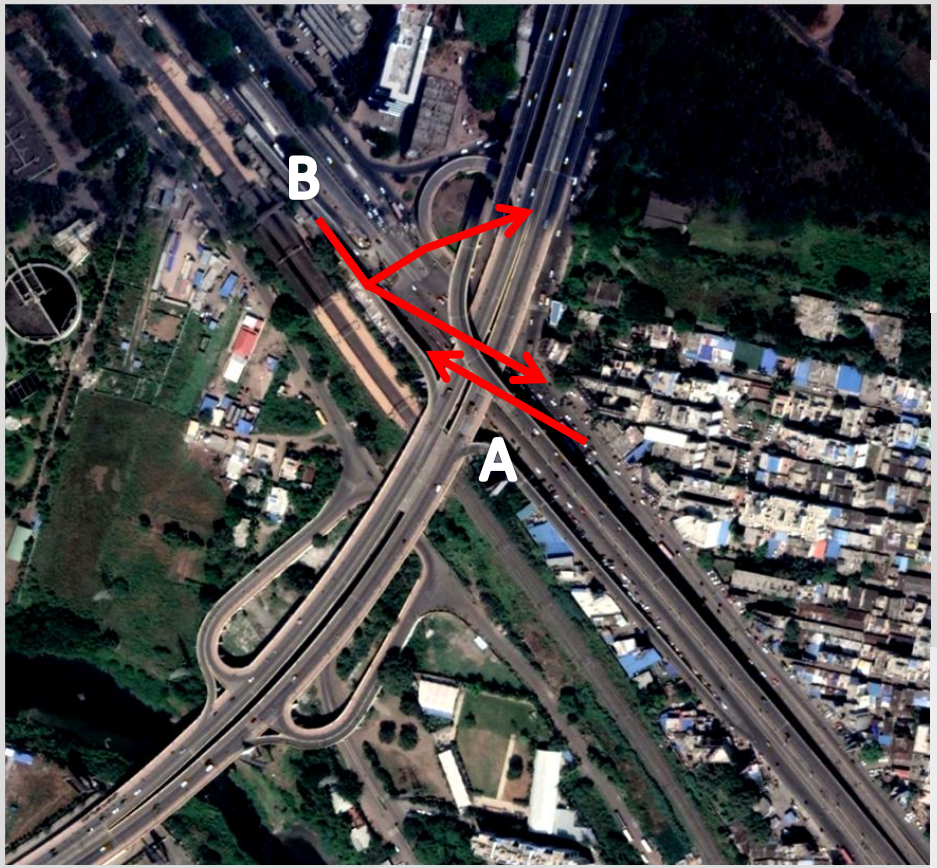
(MOUD (Ministry of Urban Development, National Urban Transport Policy, 2014)


EXISTING NETWORK WITH UPCOMING INFRASTRUCTURE
U/C MRTS Station
MSRT Bus Stop
BRTS Bus Stop
MSRT Bus Stop
Kasarwadi Railway Station
BRTS Bus Stop
BRTS Corridor
Railway Line
BRTS Corridor
U/C MRTS


EXISTING VEHICULAR MOVEMENTS
TOWARDS NASIK
TOWARDS MUMBAI
TOWARDS PUNE


EXISTING PEDESTRIAN MOVEMENTS
U/C MRTS Station
TOWARDS MUMBAI
BRTS 1 Bus Stop
MSRT 1 Bus Stop
TOWARDS NASIK
TOWARDS NASIK
MSRT 2 Bus Stop
TOWARDS MUMBAI
Kasarwadi Railway Station
BRTS 2 Bus Stop
TOWARDS PUNE
Pune Bus Stop
TOWARDS PUNE

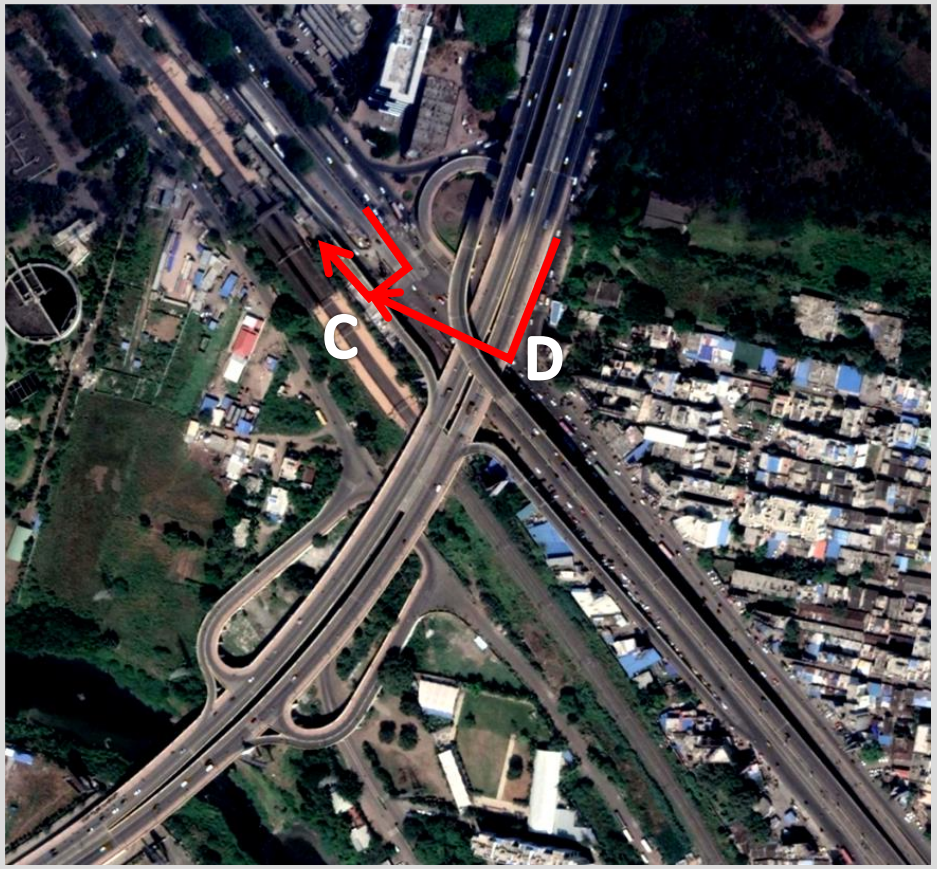
Pedestrian Movement Video



A: Pune Bus Stop to Kasarwadi RS

B: Kasarwadi RS to Pune Bus Stop & Nashik Road MSRT1

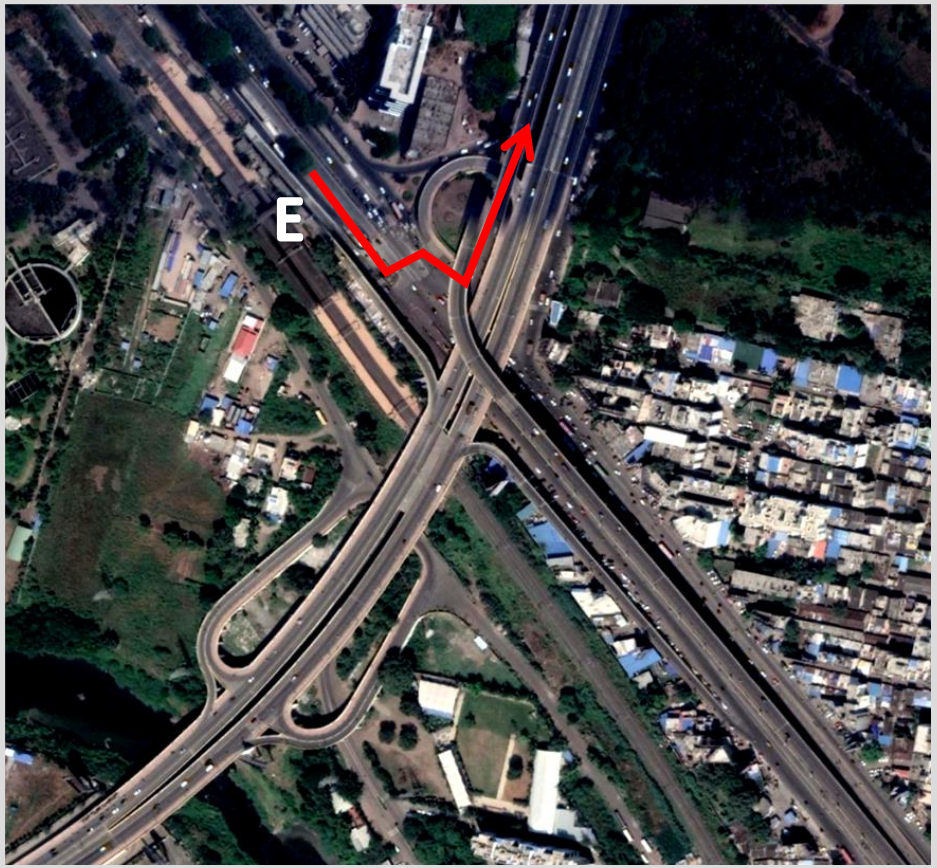
Approach Arm Video



C: BRTS1 to RS

D: RS to MSRT2

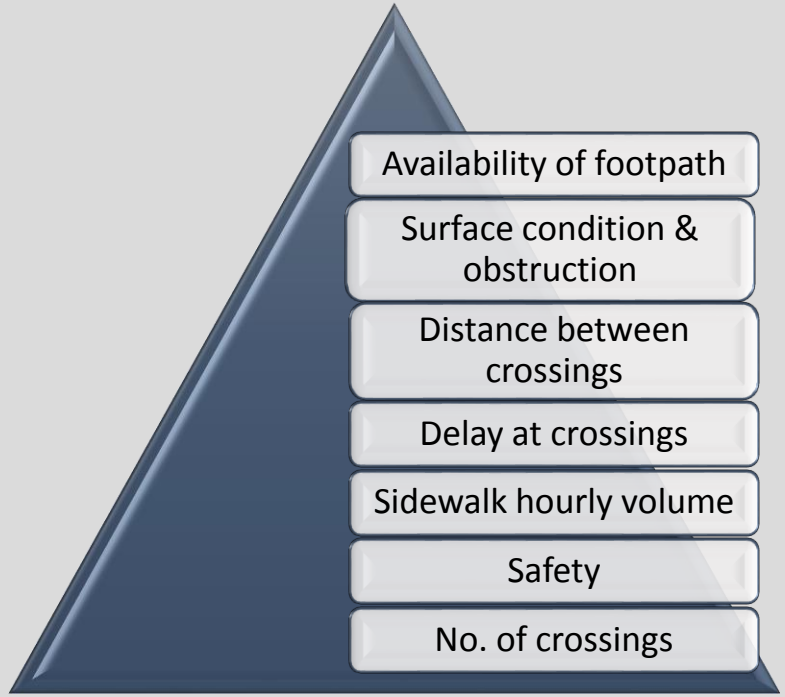
Approach Arm Video



E: BRTS1 to MSRT1

WALKABILITY INDEX

- Walkability is a measure of the effectiveness of the designs in promoting walking as an alternative to driving cars or taking para-transit modes
- Only those parameters which takes into consideration - along and across all the roads have been selected
- Parameters like safety and security, amenities available, etc were not considered because of the data constraints
- Facilities for the disabled do not exist along or across any route



Footpath Availability			Safety	Surface Condition/ Obstruction	No. of crossing	Distance	Delay (seconds)	Hourly Volume
No footpath	1		**Extremely Poor and Unsafe**	Plants+ Posts+ Cover slabs+ Unevenness	>2	>300 m	>120	>IRC Sidewalk Capacity
Discontinuous	2		**Poor**	Plants/ Posts/ Cover slabs/ Unevenness	>2	150-300 m	30-120	< 15% of Sidewalk Capacity
Discontinuous	3		**Marginally satisfactory but unsafe at peak time**	Plants/ Posts/ Cover slabs/ Unevenness	≤2	150-300 m	30-120	< 15% of Sidewalk Capacity
Continuous	4		**Acceptable**	No obstruction/ unevenness	0	150 m	<30	Up to <15% IRC Sidewalk Capacity

VOLUME MATRIX (peak hr)

		BRTS-1 (To go towards s pune)	BRTS-1 (to go towards s Mumbai ai)	BRTS-2	MSRTC-1	MSRTC-2	Metro stn	Rly Stn
BRTS-1 (To go towards s pune)	Volume	----	No movement	Under constr	240	100	Under constr	44
	No. of crossing				2	4		2
BRTS-1 (to go towards s Mumbai ai)	Volume	No movement	----	Under constr	168	84	Under constr	38
	No. of crossing				2	4		2
BRTS-2		Under constr	Under constr	----	Under constr	Under constr	Under constr	Under constr
MSRTC-1	Volume	92	88					192
	No. of crossing	2	2	Under constr	----	No movement	Under constr	4
MSRTC-2	Volume	188	232					872
	No. of crossing	4	4	Under constr	No movement	----	Under constr	6
Metro stn		Under constr	Under constr	Under constr	Under constr	Under constr	----	Under constr
Rly Stn	Volume	84	148		328	144		
	No. of			Under			Under	

DISTANCE MATRIX (in metres)

		BRTS-1 (To go towards s pune)	BRTS-1 (to go towards s Mumbai ai)	BRTS-2	MSRTC-1	MSRTC-2	Metro stn	Rly Stn
BRTS-1 (To go towards s pune)	Distance	----	No movement	Under constr	305	228	Under constr	90
	No. of crossing				2	4		2
BRTS-1 (to go towards s Mumbai ai)	Distance	No movement	----	Under constr	475	371	Under constr	18
	No. of crossing				2	4	Under constr	2
BRTS-2	Distance	Under constr	Under constr	----	Under constr	Under constr	Under constr	Under constr
MSRTC-1	Distance	305	475	Under constr	----	No movement	Under constr	567
	No. of crossing	2	2	Under constr	----		Under constr	4
MSRTC-2	Distance	228	371	Under constr	----	----	Under constr	447
	No. of crossing	4	4	Under constr	No movement	----	Under constr	6
Metro stn	Distance	Under constr	Under constr	Under constr	Under constr	Under constr	----	Under constr
Rly stn	Distance	90	18	Under constr	567	447	Under constr	----
	No. of crossing	2	2	Under constr	4	6	Under constr	----

Extremely Poor and Unsafe

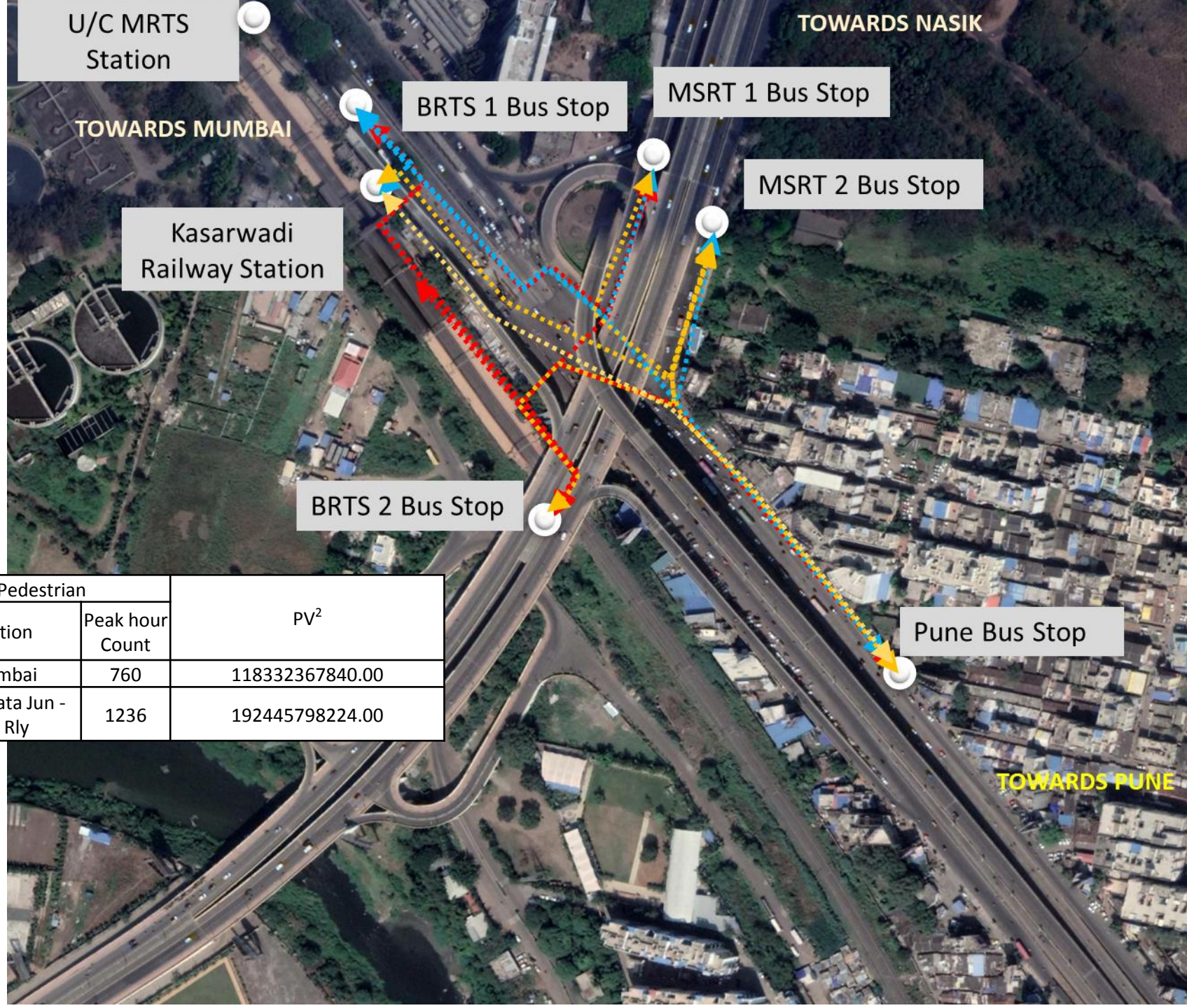
Poor

Marginally satisfactory but unsafe at peak time

Acceptable

TIME MATRIX (in min)

		BRTS-1 (To go towards pune)	BRTS-1 (to go towards Mumbai)	BRTS-2	MSRTC-1	MSRTC-2	Metro stn	Rly Stn
BRTS-1	Time	----	No movement	Under constr	7'07"	5'20"	Under constr	2'05"
(To go towards pune)	No. of crossing				2	4		2
BRTS-1	Time	No movement	----	Under constr	11'10"	8'40"	Under constr	0'25"
(to go towards Mumbai)	No. of crossing				2	4		2
BRTS-2	Time	Under constr	Under constr	Under constr	Under constr	Under constr	Under constr	Under constr
MSRTC-1	Time	7'07"	11'10"	Under constr	----	No movement	Under constr	13'20"
	No. of crossing	2	2	Under constr			Under constr	4
MSRTC-2	Time	5'20"	8'40"	Under constr	No movement	----	Under constr	10'30"
	No. of crossing	4	4	Under constr			Under constr	6
Metro stn	Time	Under constr	Under constr	Under constr	Under constr	Under constr	Under constr	Under constr



Sl.no	Peak Hour	Vehicle		Pedestrian		PV^2
		Location	Peak hour Count	Location	Peak hour Count	
1	08.00-09.00	Pune -Mumbai	12478	Pune -Mumbai	760	118332367840.00
2	17.00 - 18.00	Nashik Phata Jun - Kasarwadi Rly	12478	Nashik Phata Jun - Kasarwadi Rly	1236	192445798224.00

As per clause 7.3.2 of IRC:103(2012), the PV^2 value is greater than 2×10^8, hence here it is required to provide controlled crossing for Pedestrian

MINISTRY OF URBAN DEVELOPMENT(MOUD) METHOD

METHODOLOGY:

- Pedestrian facility survey for taking pedestrian ratings is prepared which includes the design and usability factors of pedestrian facilities that are provided in the area.

- The length of the major roads and pathways in the city is calculated using the city plan or a tape or Google maps.

- For finding the pedestrian facility rating, a pedestrian survey is to be done The factors that were considered in the pedestrian survey form are:

- Walkway height,
- Walkway width,
- Walkway Surface (smooth and regular),
- Walkway continuity,
- Provision of ramps connecting to carriageway,
- Illumination at night time,
- Traffic separator like pipe railing and hand rails,
- Free from Obstructions,
- Maintenance and cleanliness,
- Raised continuous crossing facility,
- Walkway available on appropriate side of carriageway.

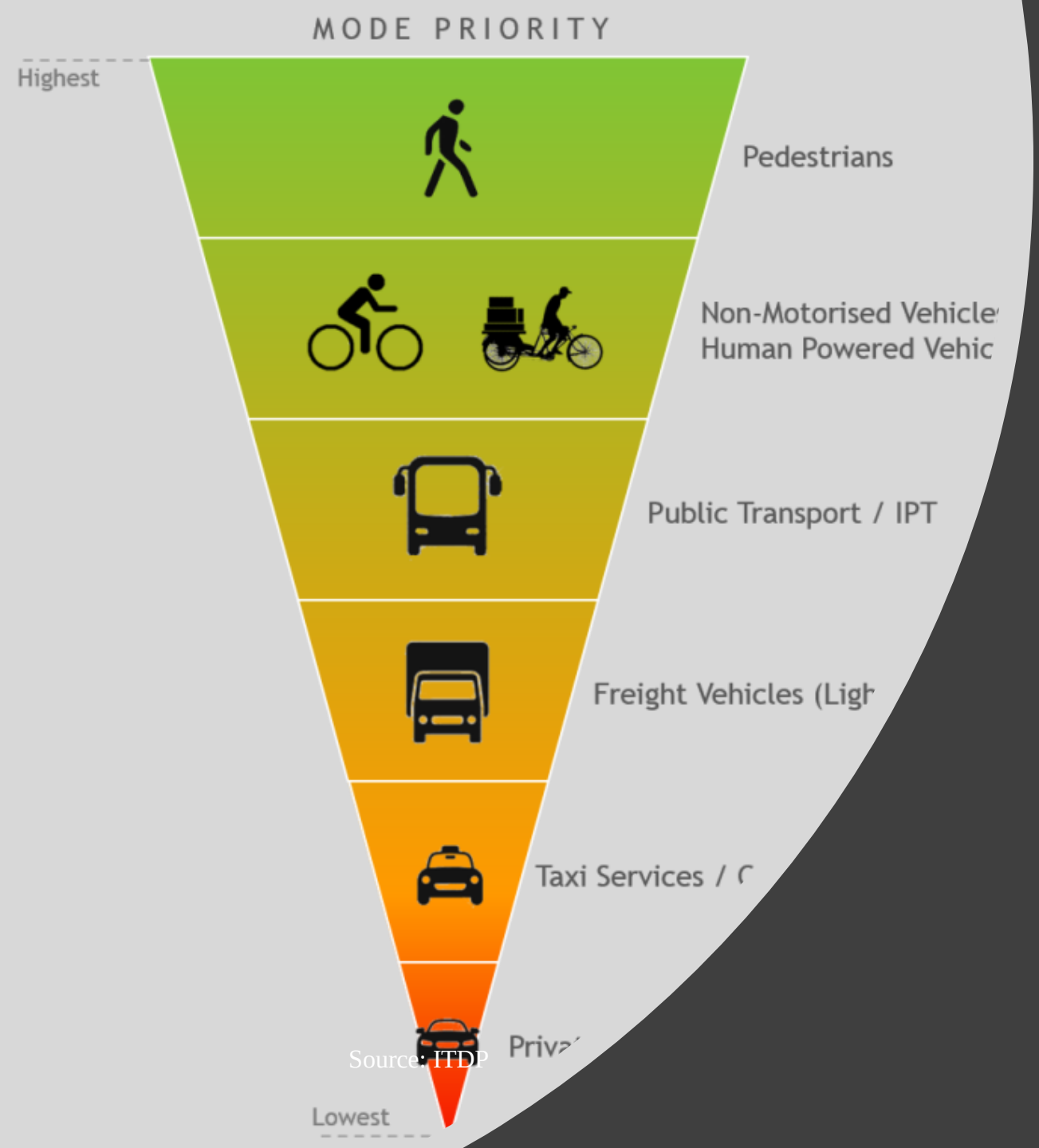
- The pedestrian have to rate the above mentioned attributes on 5 point usability scale where '1' defines 'not at all usable' and '5' define 'highly usable'.

TRANSPORT INTERCHANGE SAFE DESIGN

Some PARAMETERS to consider

- Footpath availability
- Footpath surface
- Footpath width
- Obstructions
- Potential for vehicular conflict
- Longitudinal continuity
- Encroachment
- Security
- Comfort
- Walking environment

Source : CRRI – Indo Highway Capacity Manual


MODE PRIORITY
Highest
Pedestrians
Non-Motorised Vehicle
Human Powered Vehic
Public Transport / IPT
Freight Vehicles (Ligh
Taxi Services / C
Priva
Lowest
Source: ITDP

Hierarchy

PROPOSED INTERVENTION PLAN

PROPOSED INTERVENTION PLAN

	Type of mode	BRTS-1 (To go towards pune)	BRTS-1 (to go towards Mumbai)	BRTS-2	MSRTC-1	MSRTC-2	Metro stn	Rly Stn
BRTS-1 (To go towards pune)	At grade	----	No movement	----	305m	228m	----	----
	Above FOB	-----		244m	----	----	200m	90m
BRTS-1 (to go towards Mumbai)	At grade	No movement	-----	----	235m	115m	----	18m
	Above FOB		-----	287m	240m	256m	165m	----
BRTS-2	At grade	----	----	-----	235m	115m	----	240m
	Above FOB	244m	287m	-----	140m	140m	388m	----
MSRTC-1	At grade	305m	235m	235m	-----	No movement	235m	497m
	Above FOB	----	240m	140m	-----		353m	70m
MSRTC-2	At grade	228m	115m	115m	No movement	-----	115m	377m
	Above FOB	----	256m	140m		-----	353m	70m
Metro stn	At grade	----	----	----	235m	115m	-----	----
	Above FOB	200m	165m	388m	353m	353m	-----	125m
Rly stn	At grade	----	----	240m	497m	377m	----	-----
	Above FOB	90m	240m	----	70m	70m	125m	-----

Cost estimate

(Approx)

For Short Term planning : (Rs. 49.74lakhs)

- For construction of footpath – 620m Rs. 33.50 lakhs
- For pedestrian crossing – 140m Rs. 09.24 lakhs
- Traffic Calming and
  Traffic Control Devices – 140m Rs. 05.00 lakhs
- Road Marking and
  Road Signages – 2200m Rs. 04.25lakhs

For Long term planning :

- For construction FOB/Sky walk – 543m Rs. 1365.45lakhs

Thank You ...!

Participants –

Mr. Pramod Ombhase

Mr. Sunil pawar

Mentor –

Prof. Sewa Ram sir