



IMAGE SOURCE : <http://bangaloreheritage.in>

PUBLIC TRANSPORT (BUS)
AND
NMT ACCESSIBILITY PLAN
FOR
THE HISTORIC CORE OF
BANGALORE CITY

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MURALI T V
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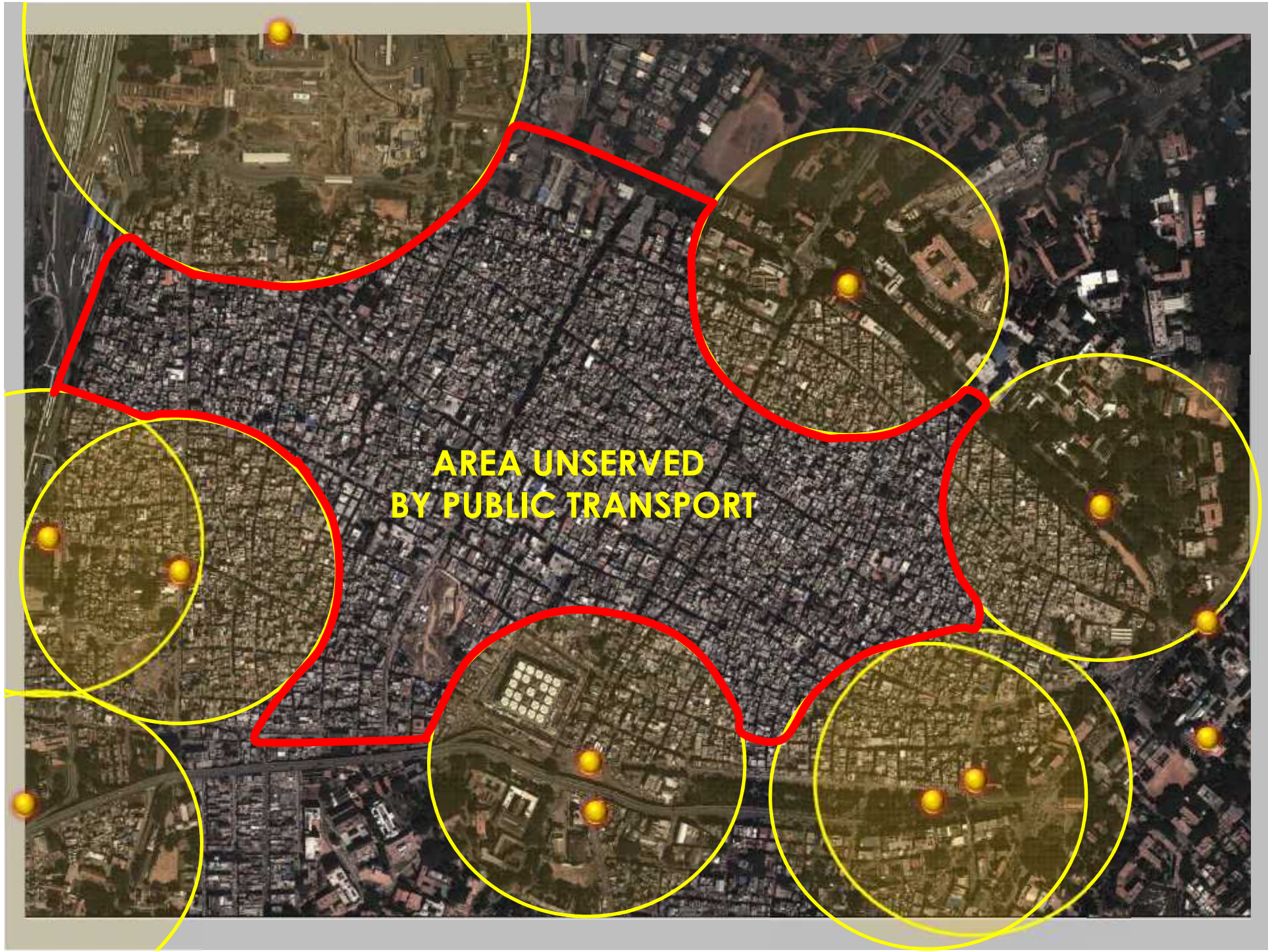
NEED FOR THE STUDY

EXIST. PT ROUTES



Source: Primary survey, 2013

**AREA UNSERVED
BY PUBLIC TRANSPORT**



AIM AND OBJECTIVE

- AN ATTEMPT TO PROVIDE ACCESS TO THE HISTORIC CORE THROUGH PUBLIC TRANSPORT AND CONSEQUENTIAL ENHANCEMENT OF MOBILITY FROM, TO AND WITHIN HISTORIC CORE

SCOPE

- DELINEATION OF THE **STUDY AREA**
- STUDY OF THE EXISTING SERVICES OF **PUBLIC TRANSIT**
- STUDY OF THE EXISTING **LAND USE**
- STUDY OF THE EXISTING STREET **CAPACITY**
- STUDY OF THE EXISTING **PARKING SITUATION** ALONG THE CORRIDORS
- STUDY OF **PEDESTRIAN** MOVEMENT
- STUDY OF THE **ACTIVITY** AND **TRAVEL PATTERN**
- ANALYSIS OF EXISTING SITUATION
- IDENTIFICATION OF **PROBLEMS** AND **ISSUES**
- PROPOSALS FOR THE **PUBLIC TRANSIT** (BUS) MOVEMENT IN THE STUDY AREA
- PROPOSALS FOR THE **INTEGRATION** OF THE OTHER MODES AND LAST MILE CONNECTIVITY

METHODOLOGY

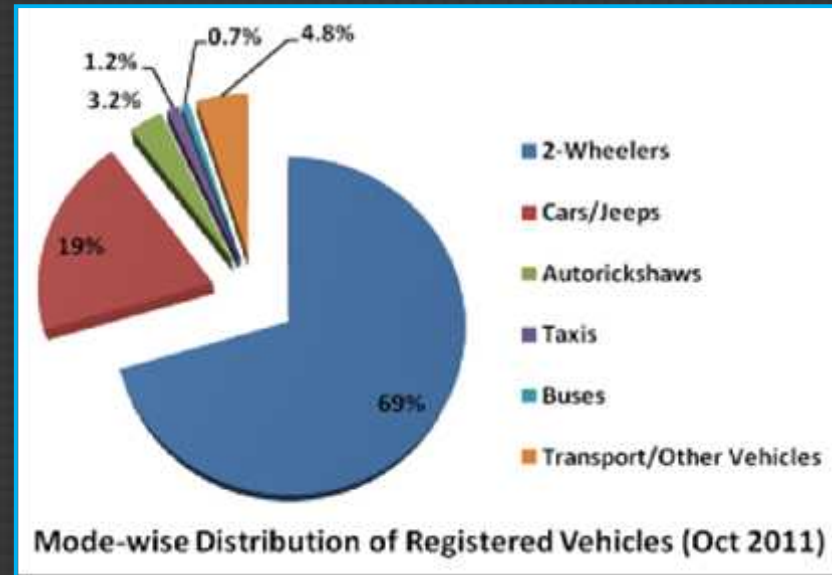
- INTRODUCTION
- STUDY AREA - 'PETE' OF BANGALORE
- DEMOGRAPHIC STUDY
- SOCIO ECONOMIC PROFILE
- STUDY OF EXISTING SCENARIO (DATA COLLECTION)
- **ANALYSIS OF DATA**
- **ISSUES AND FINDINGS**
- **PROPOSALS & PLAN FOR ACTION**

INTRODUCTION



Source: Master Plan-BMA, 2015

- BENGALURU, 5TH LARGEST 'METROPOLIS'
- INCREASED URBANISATION
- INCREASED MOTORISATION
- CITY IS PLAYING A DOMINANT AND SIGNIFICANT ROLE IN COUNTRY'S ECONOMY



Source: Transportation Department, GOK.

BANGALORE

Population: 8.4 million
Land area: 226 km²

Mode share

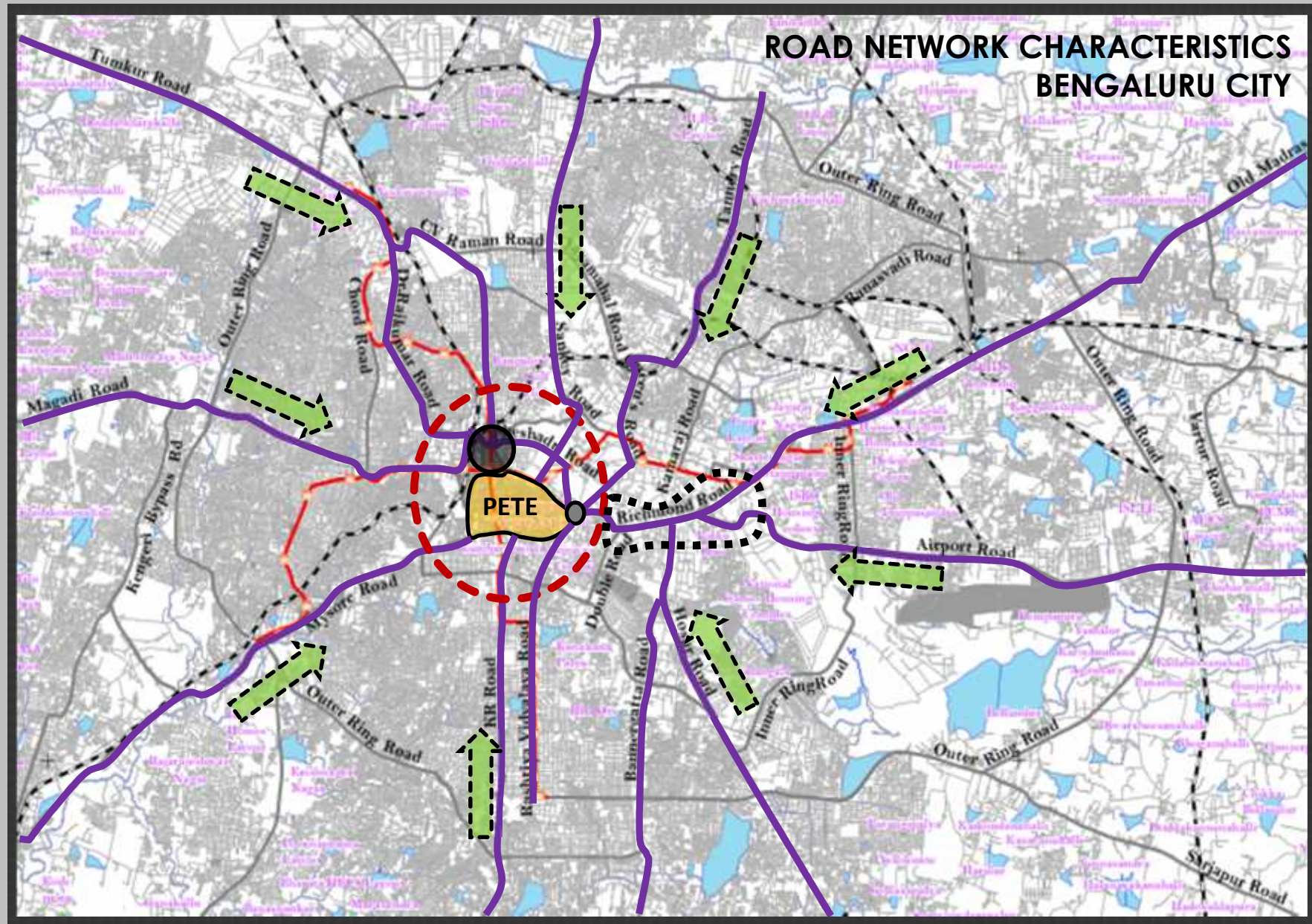
Based on the number of journeys by main mode of transport. It includes all modes for all purposes. Mass transit constitutes 35% of all journeys.

Data Sources:

Census of India 2011
Ministry of Urban Development, 2008. Study on Traffic and Transportation Policies and Strategies in Urban Areas in India

Figure 2: Mode Share in Bangalore





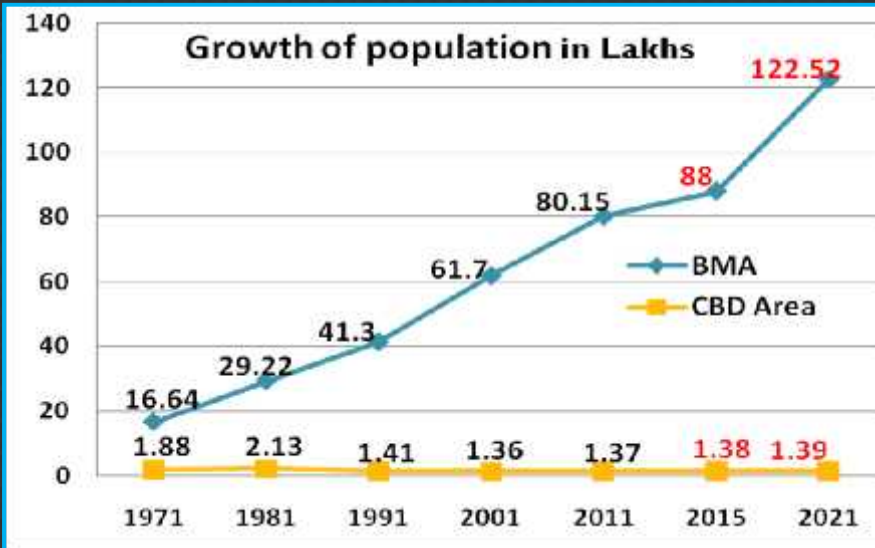
STUDY AREA – ‘PETE’ OF BANGALORE

HISTORICAL LAYOUT AND CHARACTERISTICS

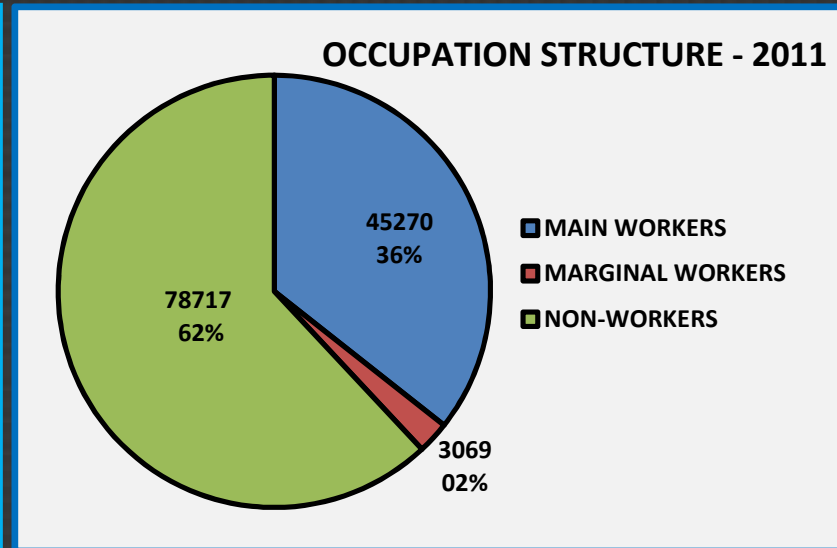
- NATIVE TOWN & FIRST SETTLEMENT
- INSPIRED BY ‘VIJAYANAGARA’
- AREA DIVIDED INTO MARKET AREA STREETS
- SKILLED ARTISANS AND CRAFTSMAN GOT SETTLED
- ESTABLISHED ON UNDULATING TABLE LAND
- HAD LARGE GATES AROUND THE FORT
- PRINCIPAL BAZAARS ; CHICKPETE & DODDAPETE
- HIGH DENSITY RESIDENTIAL SETTINGS
- TRANSFORMED ITSELF INTO A ‘COMMERCIAL HUB’
- ONLY SUCH EXAMPLE IN THE SOUTH INDIA
- ‘PETE’ IS AN INTEGRAL PART OF THE PRESENT CBD



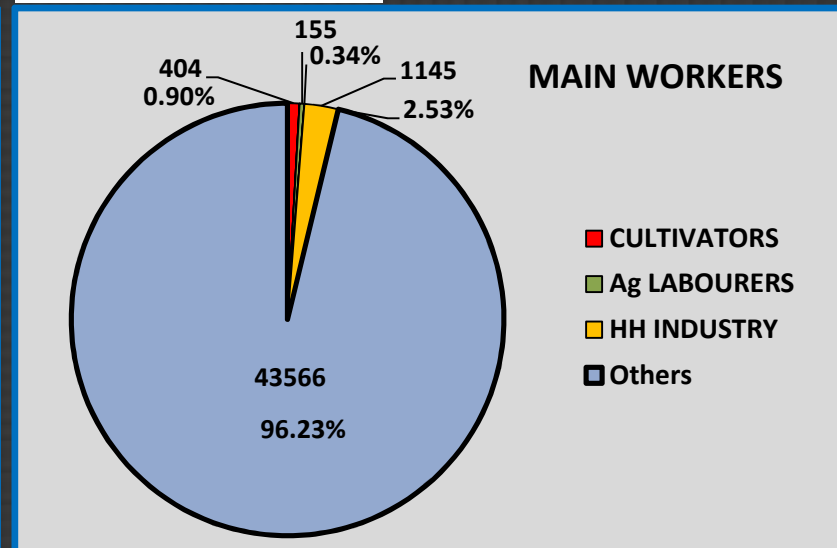
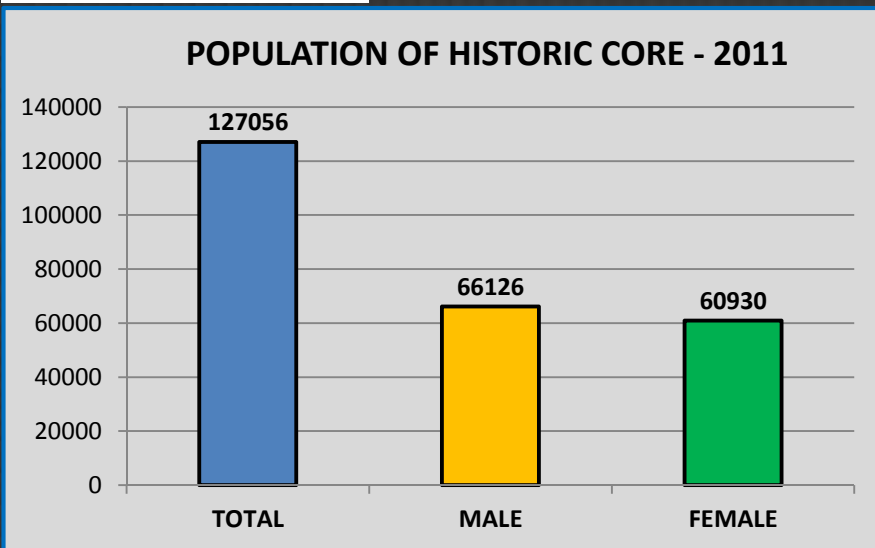
DEMOGRAPHIC STUDY



Source: Master Plan-BMA, 2015

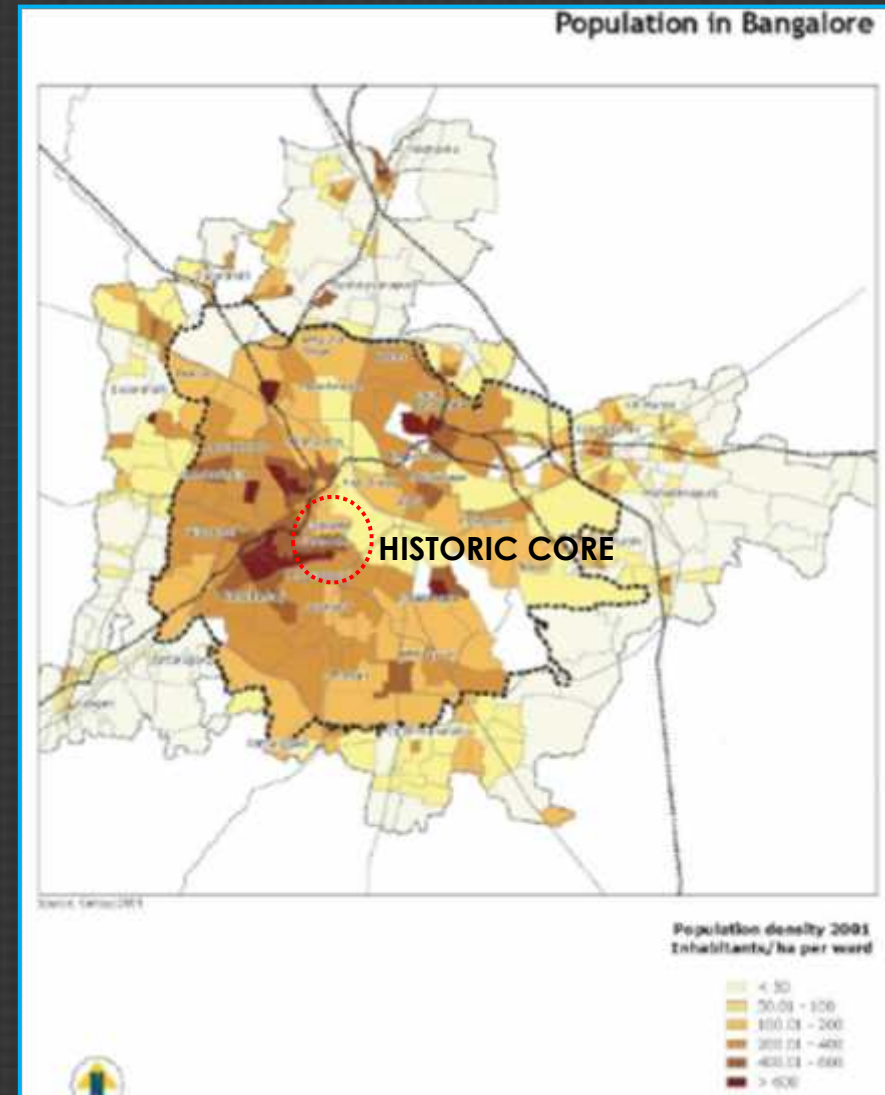


Source: District Census, 2011



DEMOGRAPHIC STUDY

- STUDY AREA MEASURES ABOUT 2.24 SQ KM
- HOUSES POPULATION OF ABOUT 1.3 LAKH (2011)
- GROSS DENSITY OF THE AREA - ABOUT 600 PPH
- DENSITY COMPARITIVELY HIGHER



Source: Master Plan-BMA, 2015

SOCIO-ECONOMIC PROFILE

- **'PETE'** IS A TYPICAL MARKET AREA- MARKETS ARE ASSOCIATED WITH VARIOUS TRADES AND PROFESSIONS
- HISTORICALLY PETE AREA WAS CARVED OUT BASED ON THE **'COMMUNITY'** AND **'TRADE'** PURSUED
- AN INTRINSIC RELATIONSHIP EXISTS BETWEEN **OCCUPATION AND COMMUNITY**
- HENCE, ENTRENCHED IN TRADITIONAL PATTERN OF LIVING EVEN TODAY
- **'MARWARI'** COMMUNITY DOMINATES THE CULTURAL SETTING AND CONTROLS MOST OF THE BUSINESS
- DIVERSIFICATION OF TRADE AND INDUSTRY
- STRONG PRESENCE OF COMMUNITY BASED OCCUPATION ENSURES THE MOST OF THE AREAS WITHIN THE PETE AS **'PLACES OF SPECIALISED ACTIVITIES'**
- **'PETE'** IS DOMINATED BY **THE INFORMAL INDUSTRIES** AND MARKETS
- SUCH INFORMAL ECONOMY HAS CONTRIBUTED A LOT TO THE **ECONOMY OF THE CITY**
- IT CONTRIBUTES LARGELY TOWARDS PROVIDING LIVELIHOODS

STUDY OF EXISTING SCENARIO

STUDY OF EXISTING SCENARIO

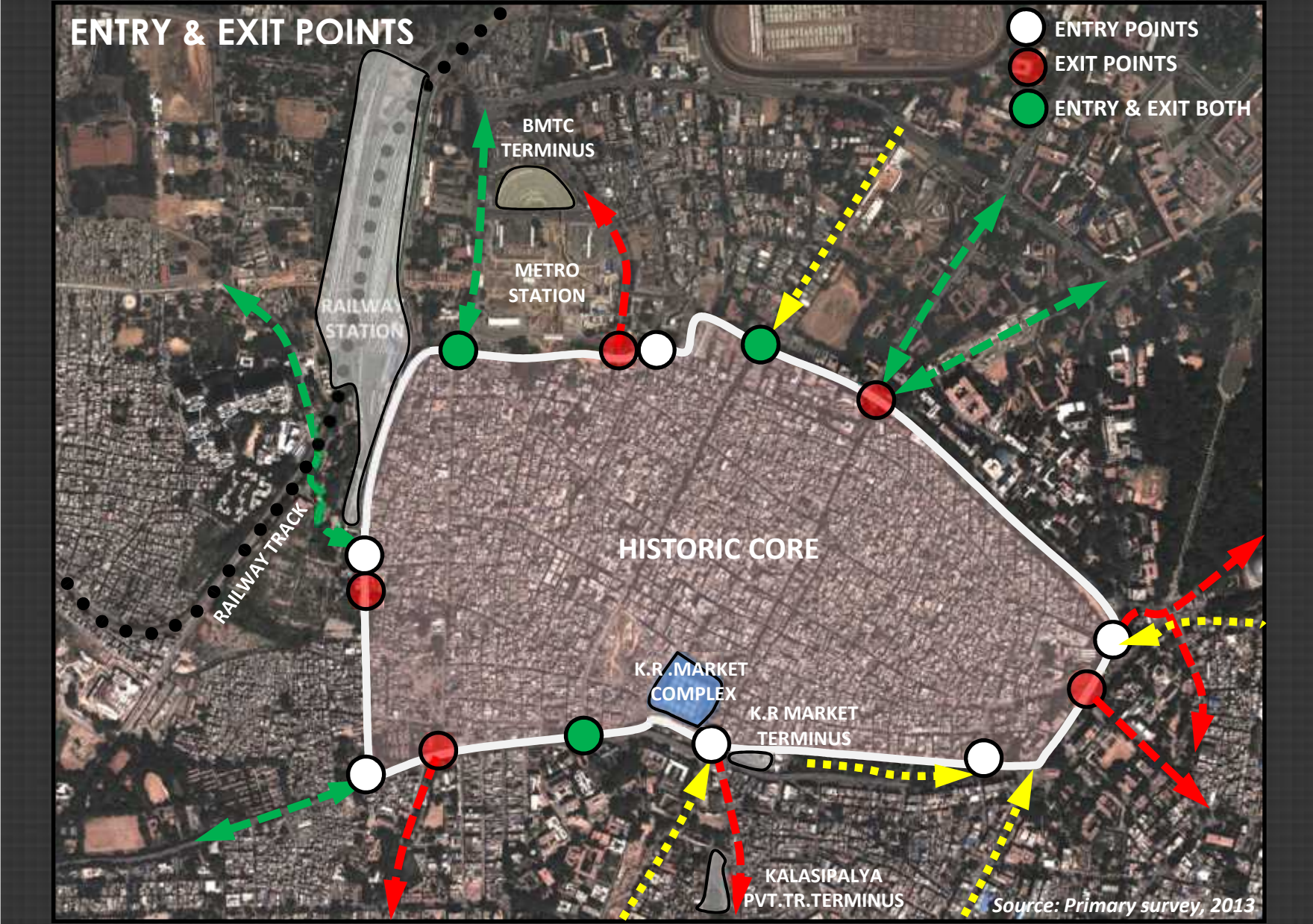
NETWORK CHARACTERISTICS

- THE AREA IS LIMITED BY GRID PATTERN
- ROAD WIDTH ARE NOT CONSISTENT
- MAJOR ROADS ALONG THE PERIPHERY
- MAJOR ROADS – 24m TO 35m WIDE

TRAFFIC CHARACTERISTICS

- TRAFFIC IS MIXED IN NATURE
- MAJORITY OF ROADS UNDER ONE-WAY SYSTEM OF CIRCULATION
- HIGH DENSITY PEDESTRIAN ZONE
- ORGANIC DEVELOPMENT, HIGH INTENSITY OF ACTIVITIES
- DENSELY BUILTUP AREA
- FLOATING POPULATION





EXIST. PT ACCESSIBILITY WITHIN THE CORE

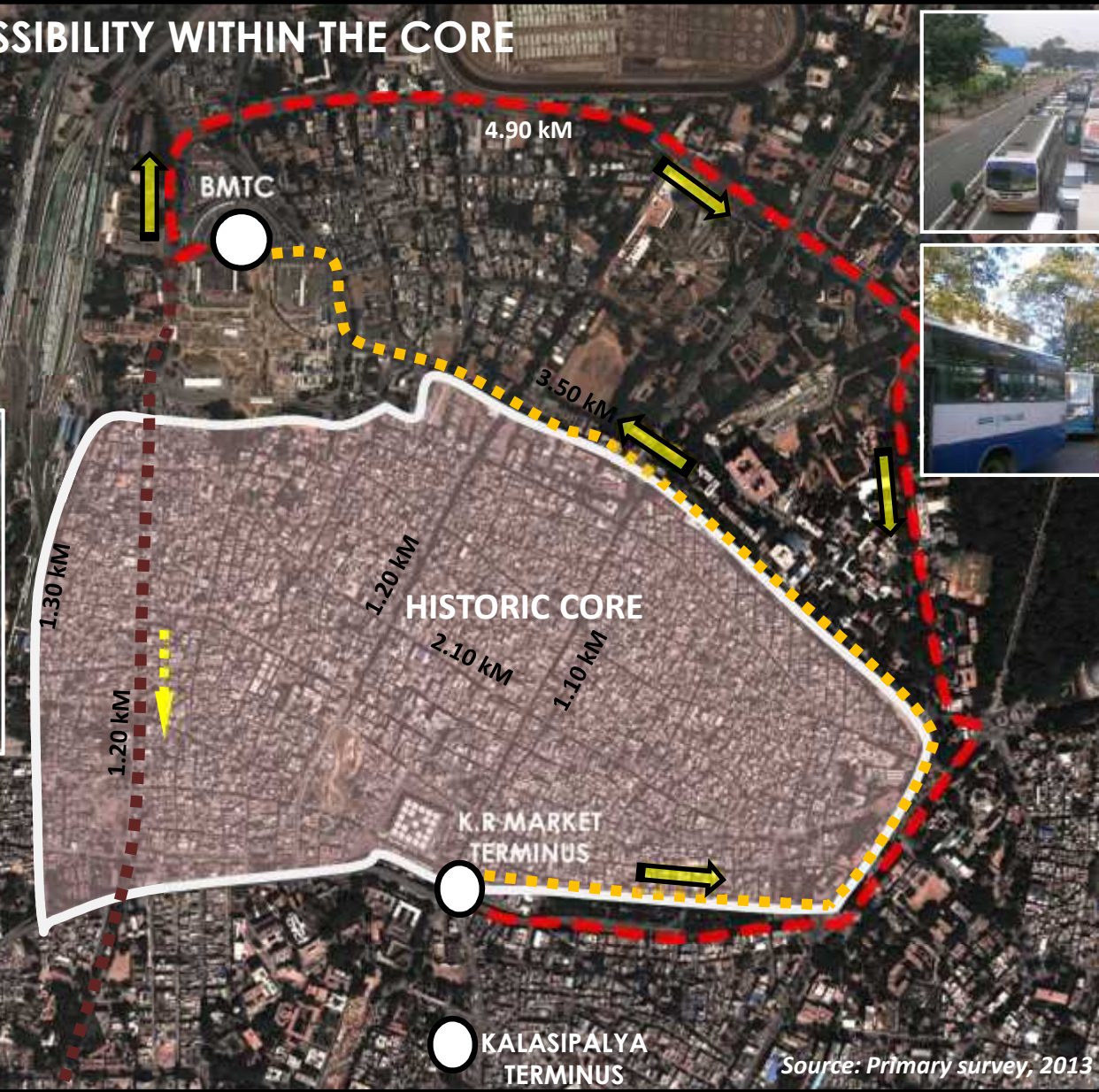
- PT - 18650 DAILY TRIPS
- VIA MARKET – 2211 TRIPS
- EVERY MIN 45-50 BUSES ENTER & DEPARTS
- ABOUT 8 – 9 LAKH PEOPLE BOARD THE BUSES DAILY



ONLY BUS ROUTE WHICH PASSES THROUGH THE HISTORIC CORE

MIXED TRAFFIC SITUATION BECAUSE OF PRESENCE OF OTHER MODES ON THE ROUTE

VERY FEW BUSES PLY ON THIS ROUTE BECAUSE OF LESS ROAD CAPACITY



Source: Primary survey, 2013

PETE AREA IS DEVOID OF PUBLIC TRANSPORT (BMTC'S PERSPECTIVE)

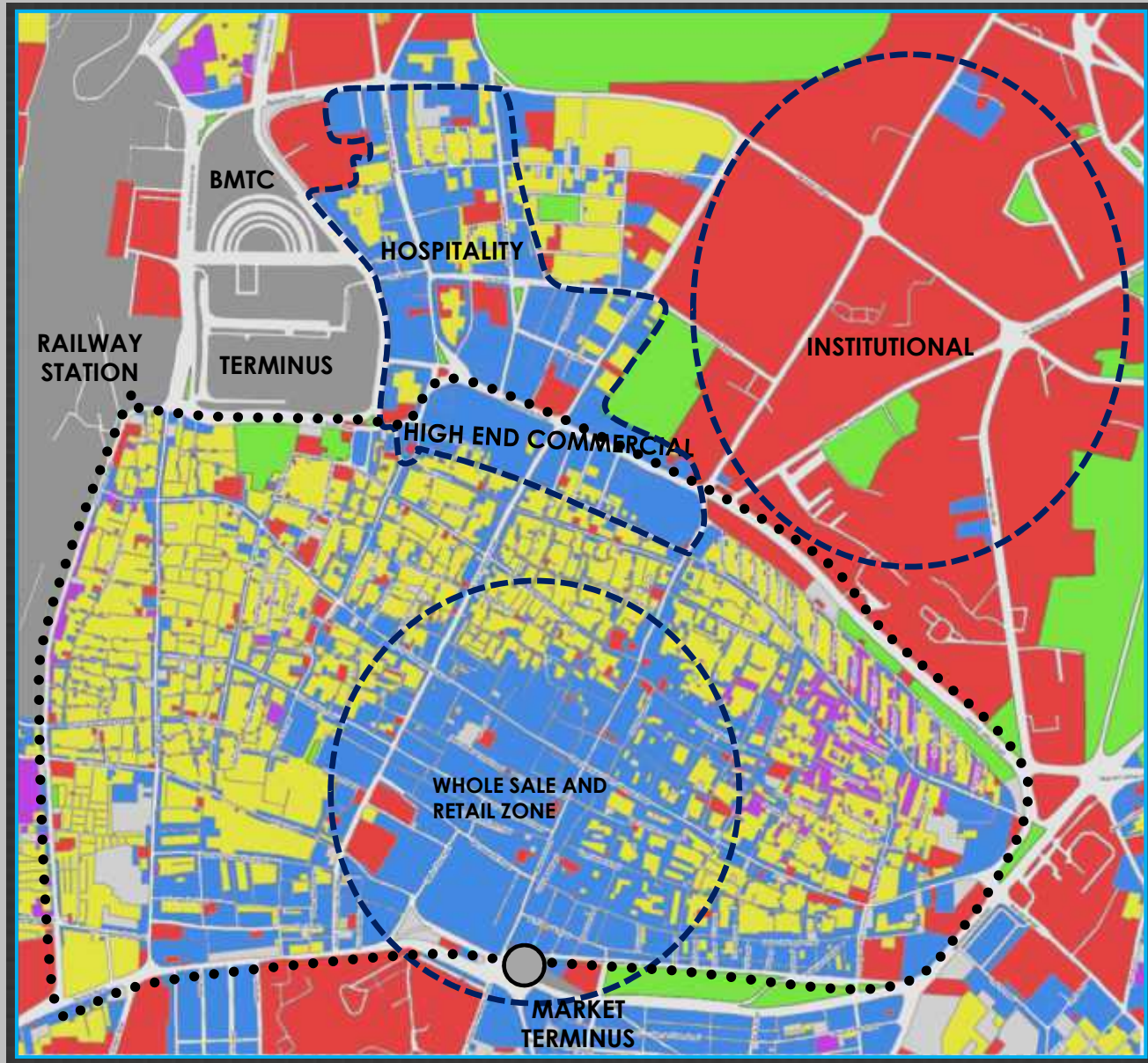
REASONS COULD BE

- ROAD CAPACITY CONSTRAINTS
- SLOW MOVING AND MIXED NATURE OF TRAFFIC
- LESS BUS FLEET INFRASTRUCTURE
- TWO TERMINALS AT BOTH THE EXTREMES HENCE, PERCEIVED AS WALKABLE
- THRUST WAS ON TO CONNECT DISTANTLY LOCATED AREAS
- SUPPLY ORIENTED TOWARDS PROBLEMATIC AREAS AND WHERE THERE WAS A DEMAND
- GOOD CONNECTIVITY FROM THE PERIPHERY ROAD, WHICH DO HAVE PT SERVICES
- HIGH PEDESTRIAN MOVEMENT IN THE AREA
- THERE WAS NO DEMAND

PETE AREA IS DEVOID OF PUBLIC TRANSPORT (AUTHOR'S ANALYSIS)

REASONS COULD BE

- ROAD CAPACITY CONSTRAINTS
- AREA CHARACTERISED BY SLOW MOVING MIXED TRAFFIC
- PERSONALISED VEHICLES COMPETE TO ENTER THE AREA
- AFFECTS THE FLOW IN THE MAJOR CORRIDORS
- CONFLICTS DUE TO MIXED TRAFFIC HENCE, TRAVEL TIME WOULD BE TOO HIGH
- ADDING TRAFFIC IN ALREADY CHOKED CORRIDORS
- PEOPLE THROG THE AREA HENCE, HIGH DENSITY PEDESTRIAN MOVEMENT
- PUBLIC TRANSPORT BUSES PLYS ON THE PERIPHERY
- FOLLOWS CIRCUITOUS ROUTE



Source: Master Plan-BMA, 2015

LAND USE CHARACTERISTICS

LAND USE ANALYSIS – 2007

■	RESIDENTIAL	37.5 %
■	COMMERCIAL	34.6 %
■	INDUSTRIAL	06.0%



ROAD INVENTORY



Source: Primary survey, 2013

ROAD INVENTORY

BOTTLENECKS

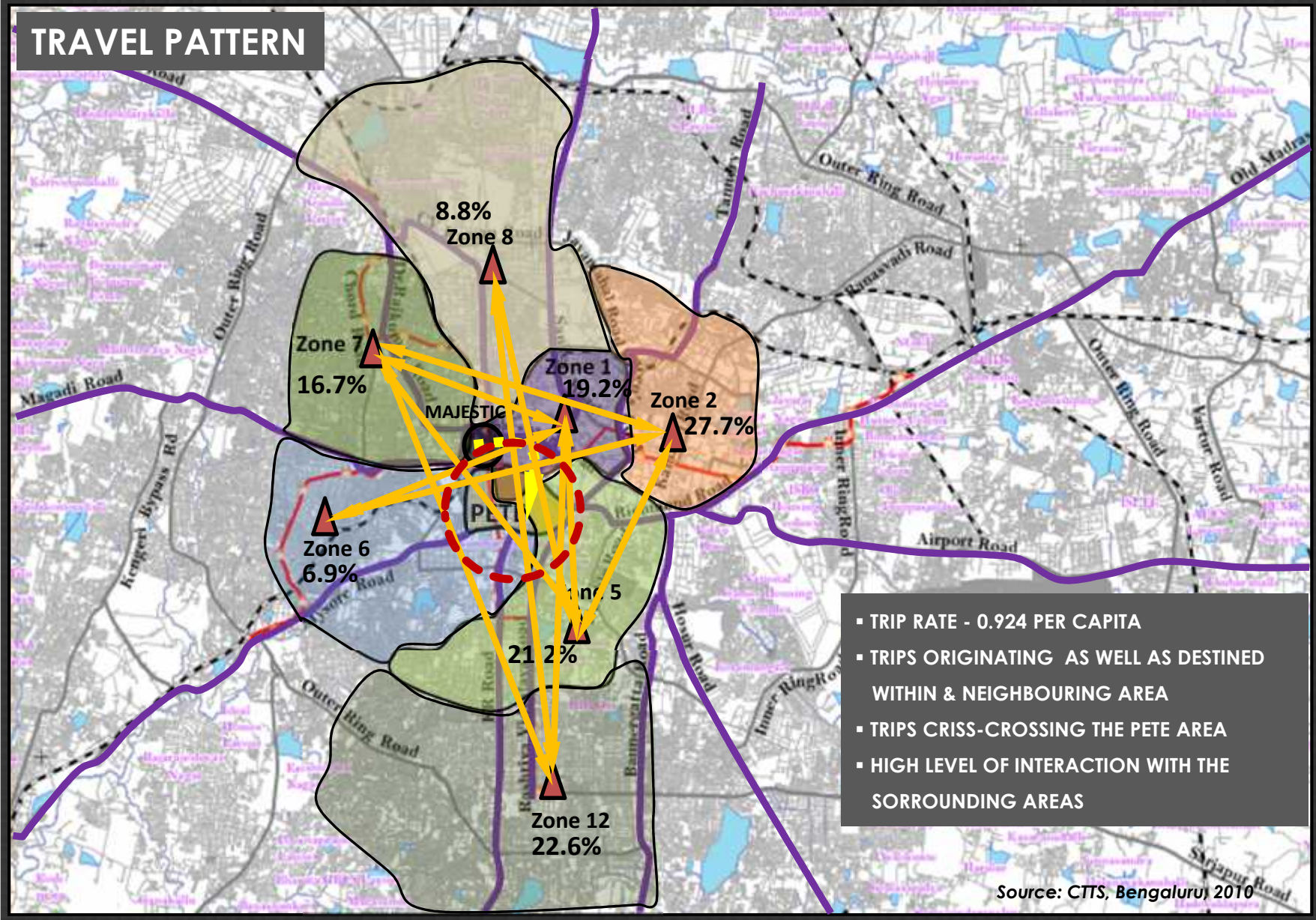


Source: Primary survey, 2013

PARKING SITUATION AND MOVEMENT PATTERN ALONG CORRIDORS



TRAVEL PATTERN

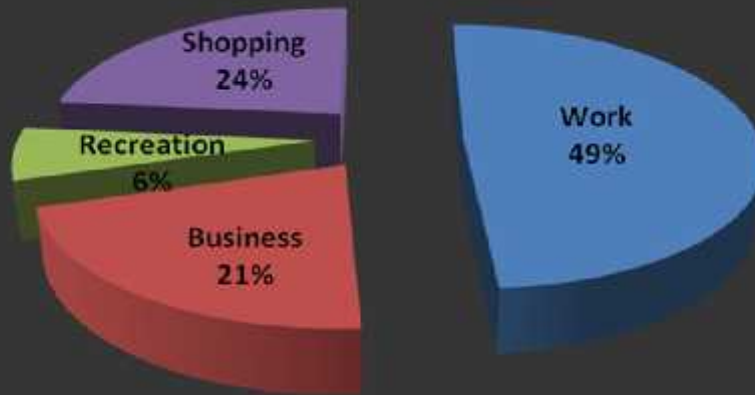


TRAVEL BEHAVIOUR

TPOLOGY OF TRIPS EFFECTING THE STUDY AREA

- 2-WHEELERS, CARS, RICKSHAWS PREDOMINANT
- PERSONALISED VEHICLES ARE PREDOMINANT
- ABSENCE OF THE PT IS THE REASON

PURPOSE OF THE TRIP



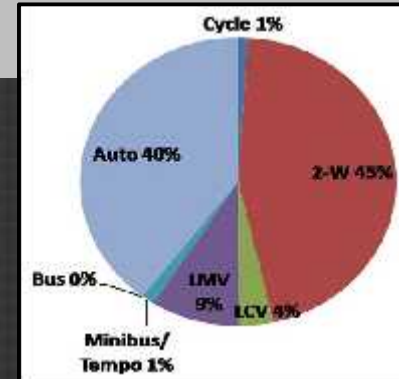
Source: Traffic Management Plan for the CBD of Bengaluru city, 2011

OPINION SURVEY

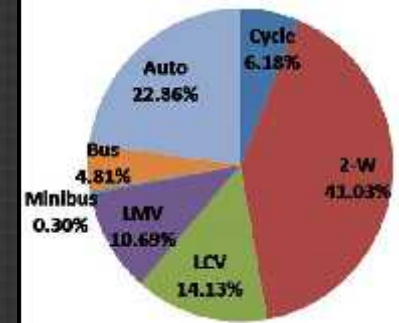
- 48.0% PEOPLE PREFER TO WALK – UPTO 250M
- 38.8% PEOPLE PREFER TO WALK – UPTO 500M
- 89.92% PEOPLE SAYS FEEDER BUSES ARE ESSENTIAL
- 10.08% PEOPLE SAYS FEEDER BUSES ARE NOT ESSENTIAL

Source: DPR Metro Phase-I, 2003

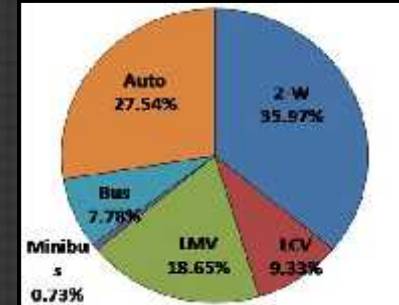
AVENUE STREET



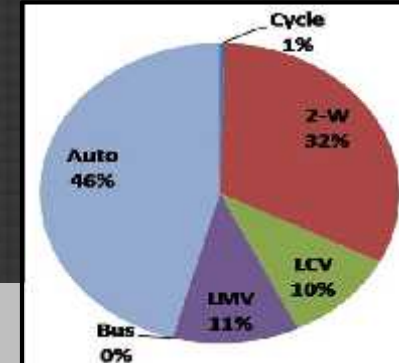
COTTONPETE ROAD



GOODS SHED ROAD

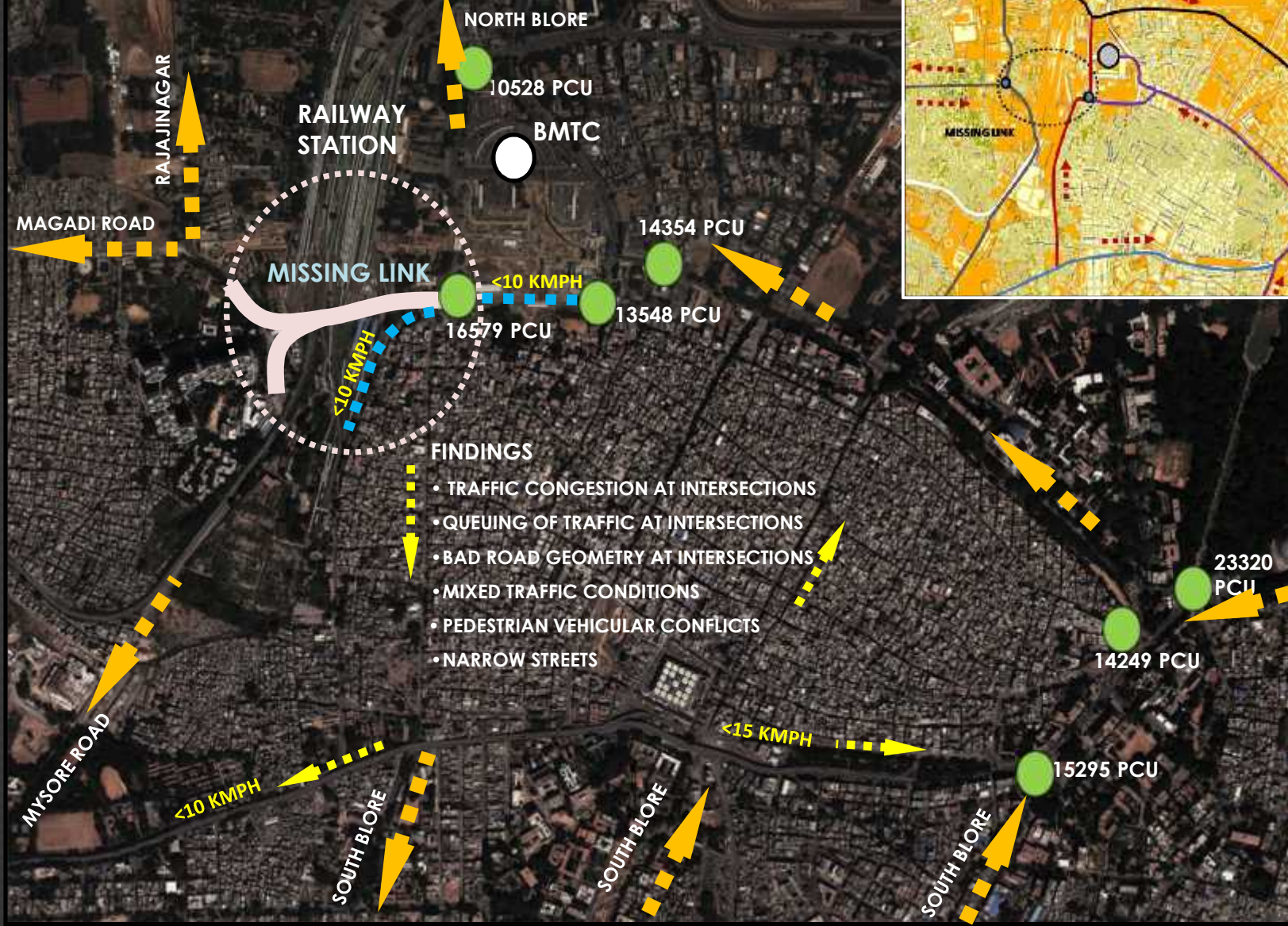


BVK IYENGAR ROAD



ANALYSIS AND FINDINGS

LOAD ON INTERSECTIONS AND MISSING LINK



AVENUE STREET

- MOST CROWDED STREET DUE TO PEDESTRIAN MOVEMENT
- ACTIVITIES SPILLOVER TO THE STREET
- STREET VENDORS OCCUPIES THE FOOTPATH & STREET SPACE
- PEOPLE THROUGH THE AREA FOR THEIR NEEDS
- SINCE NO PT IS ACCESSIBLE- FORCED TO WALK
- WALK ON THE STREET SPACE, HENCE CONFLICTS
- LONGER DISTANCE TO WALK- HOLDING BAGS & CARRYING LUGGAGE



PEDESTRIAN COUNT

AVENUE ROAD (KG ROAD END)	6.00 – 7.00 pm	1600 UP	2049 DOWN	* CARRYING CAPACITY- 2240	TO MAJESTIC TERMINALS
AVENUE ROAD (MARKET END)	6.00 – 7.00 pm	1253 UP	1807 DOWN	* CARRYING CAPACITY- 800	TO MARKET TERMINALS

* CARRYING CAPACITY - IRC : 73

Source: Traffic Management Plan for the CBD of Bengaluru city, 2011

CONSTRAINTS

- LIMITED ROAD CAPACITY AND GEOMETRY
- HIGH LEVEL OF PEDESTRIAN MOVEMENT (RESTRICT HIGH SPEED OF PT)
- LESS TRAVEL LENGTH (MAY NOT PROFITABLE FOR HIGH CAPACITY SYSTEM)
- POOR INFRASTRUCTURE CONDITIONS
- ATTENTION NOT PAID FOR PEDESTRIAN FACILITIES

POTENTIAL AND OPPURTUNITY

- HIGH DENSITY CORRIDOR (HIGH LATENT DEMAND)
- HIGH CAPACITY SYSTEMS IN PERIPHERAL AREA (NEED FOR LAST MILE CONNECTIVITY)
- ENERGY SAVING TECHNOLOGY (BATTERY OPERATED IPT/PBS)
- PETE AREA IS COMPACT
- MRT INSIDE THE PETE. HENCE, SCOPE FOR MULTIMODAL CONNECTIVITY

STRATEGIES AND PROPOSALS

STRATEGIES

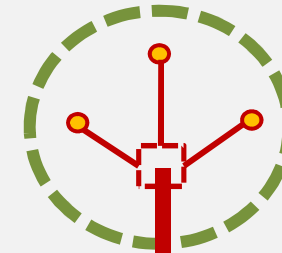
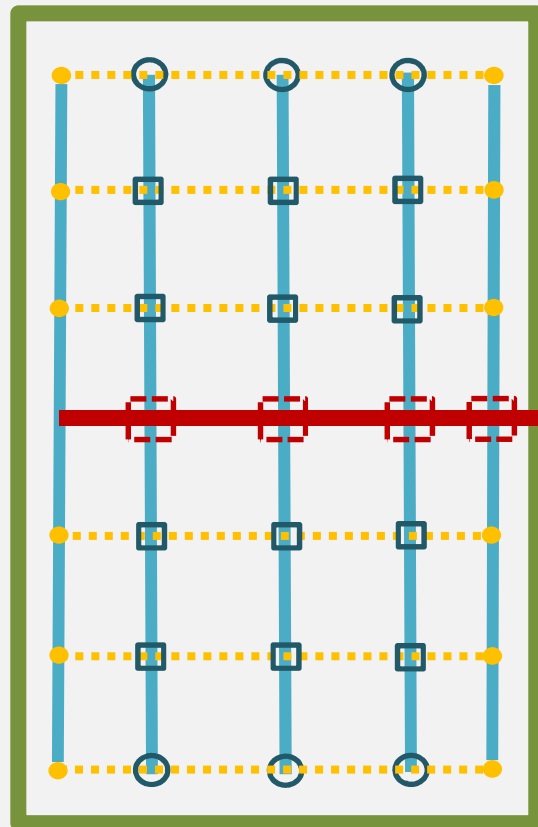
FOCUS ON IMPLEMENTATION OF SUSTAINABLE & INCLUSIVE TRANSPORT STRATEGIES






- DISCOURAGE THE USE OF PERSONALISED TRANSPORT – BY CREATING NO PVT VEHICLES ZONES
- MAKE THE AREA MORE APPROACHABLE BY PUBLIC TRANSIT - ACCESSIBILITY IMPROVEMENT FOR BUS ROUTES
- PUBLIC TRANSIT - TO CATER THE UN-SERVED AREAS
- STREAMLINING THE TRAFFIC PASSING THROUGH THE PETE AREA TO REDUCE THE DELAY
- DELINEATION OF PEDESTRIAN AREAS AND REDUCE THE PEDESTRIAN CONFLICT BY FERRYING PEOPLE THROUGH PUBLIC TRANSIT
- CREATION OF NMT FACILITIES ACROSS THE PETE AREA FOR LAST MILE CONNECTIVITY FROM HIGHER ORDER SYSTEMS
- IDENTIFYING NEW LINK IMPROVEMENT TO PROVIDE ALTERNATE ROUTE FOR PERSONAL VEHICLES
- USE OF THE UNDERUTILIZED LANES ON VARIOUS SEGMENTS OF THE NETWORK
- SAFETY OF THE PUBLIC BY REDUCING THE CONFLICTS BETWEEN VEHICLES AND PEDESTRIANS

CONCEPTUAL PUBLIC TRANSIT PLAN

BANGALORE

PETE AREA



-  HIGHER ORDER MASS TRANSIT SYSTEM - **METRO**
-  Middle Order Public Transport - **BUS SYSTEM**
-  Lower Order Public Transport - **IPT**
-  INTERCHANGES
-  STATIONS AND STOPPAGE POINTS

SHORT TERM PROPOSALS

PROPOSED PUBLIC TRANSIT ROUTES



- RESTRICT ENTRY OF CARS & 2-WHEELERS ON CORRIDORS
- BUS, BICYCLE AND PARA-TRANSIT LANE ONLY STREETS
- ROUTING OF PUBLIC TRANSIT (BUSES) THROUGH PETE

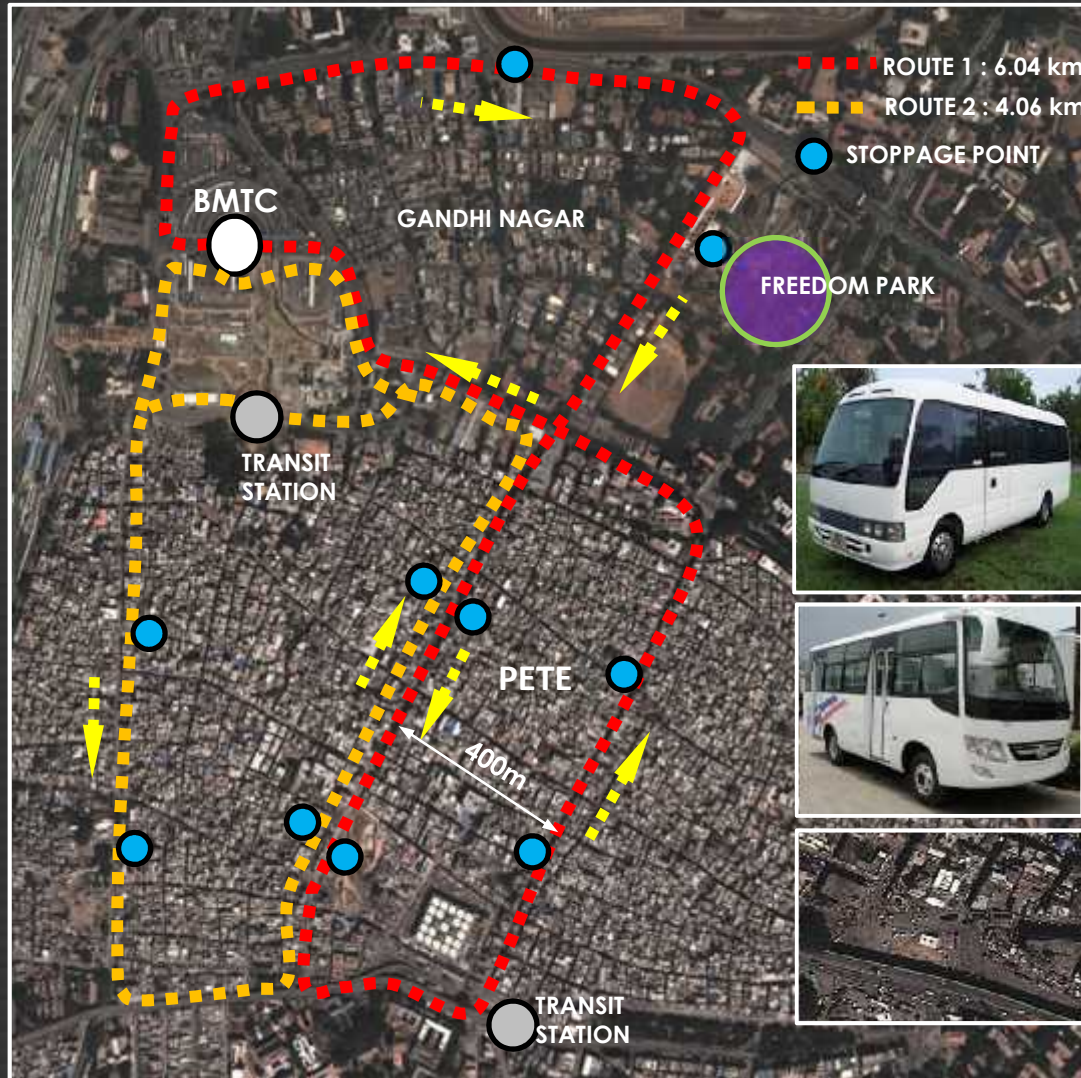


PEDESTRIAN STREETS

- AVG. DISTANCE BETWEEN METRO STATION & K R MARKET COMPLEX IS ABOUT **225m**
- VENDORS AND CUSTOMERS VISIT IN HUGE NUMBERS
- AREA REMAINS CROWDED
- INTERACTION BETWEEN BOTH NODES
- CREATION OF SAFE PASSAGE FOR THE PEOPLE SHALL BE THE PRIORITY
- HENCE, TWO STREETS APPROACHING THE METRO – PROPOSED AS **PEDESTRIAN STREETS**
- LESS CONFLICT IN MOVEMENT DUE TO ABSENCE OF VEHICULAR TRAFFIC
- HOWEVER, BYCYCLE CAN MOVE ON THESE STREETS



SHORT HAUL PUBLIC TRANSIT FOR THE HISTORIC CORE



SYSTEM

- EXT. MARKET TERMINUS BE MADE AS SHORT HAUL TRANSIT STATION
- TRANSIT STATION AT MAJESTIC TERMINUS
- COVERS THE MOST VISITED DESTINATION
- ALSO CATERS TO GANDHINAGAR AREA
- FREEDOM PARK – PLACE OF CONGREGATION
- 25 SEATER CAPACITY BUS FLEET

BENEFITS

- PT ACCESSIBILITY TO THE UNSERVED AREAS
- USE OF UNDER UTILISED STREETS
- REDUCES THE TRAVEL DISTANCE
- DRASTIC REDUCTION IN TRAVEL TIME

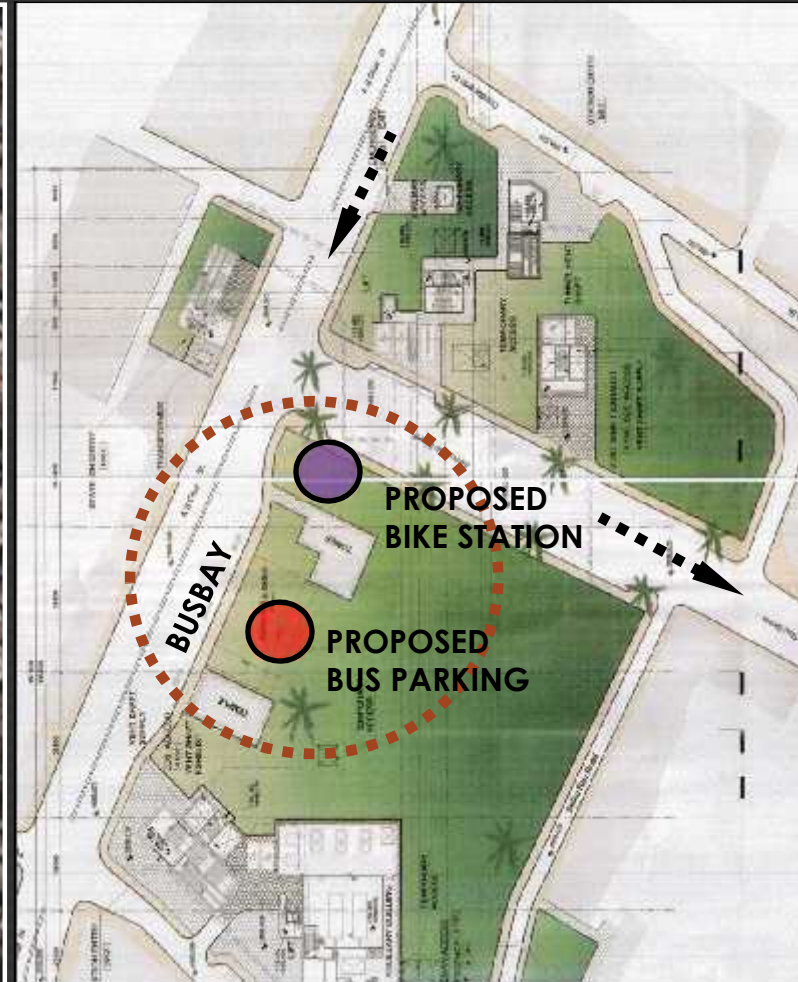


DESIGN PROPOSALS

CHICKPET METRO STATION



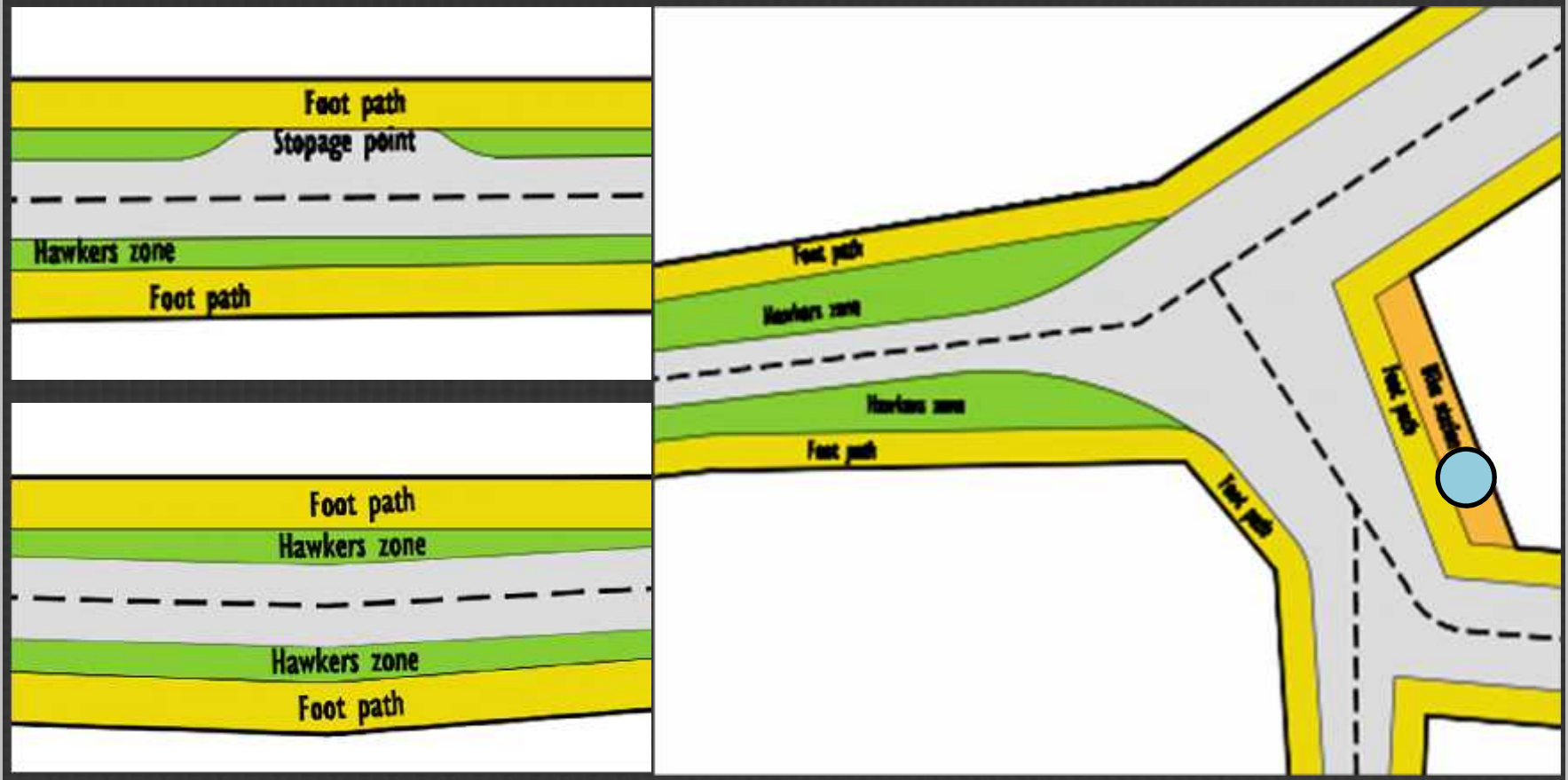
PROPOSED STATION DESIGN

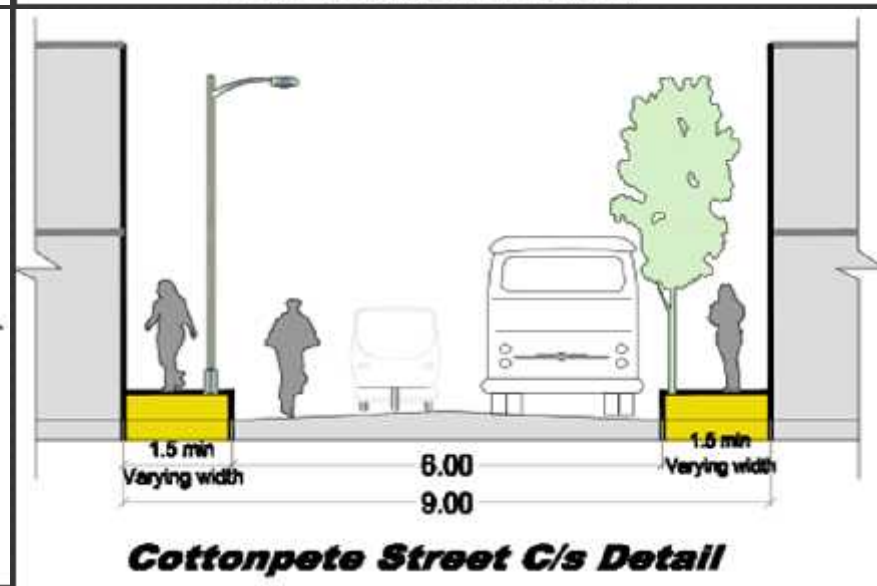
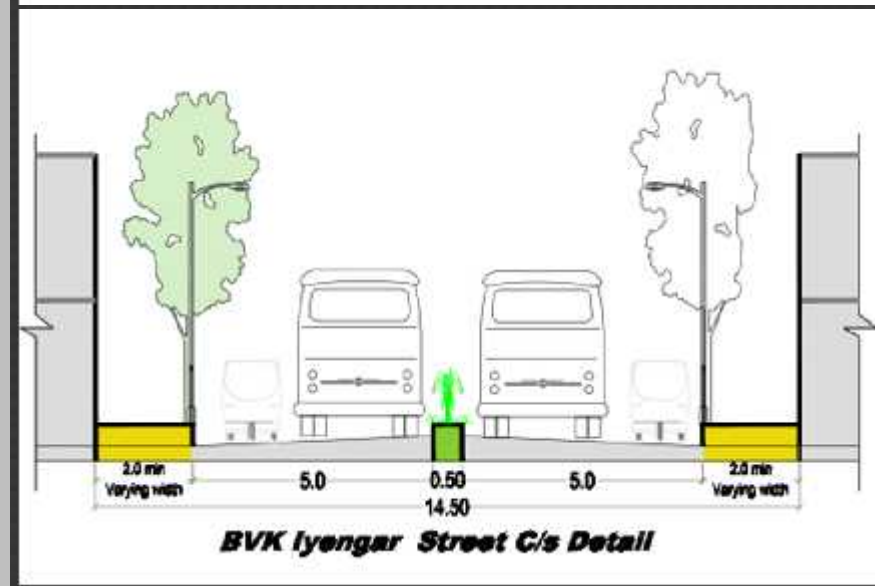
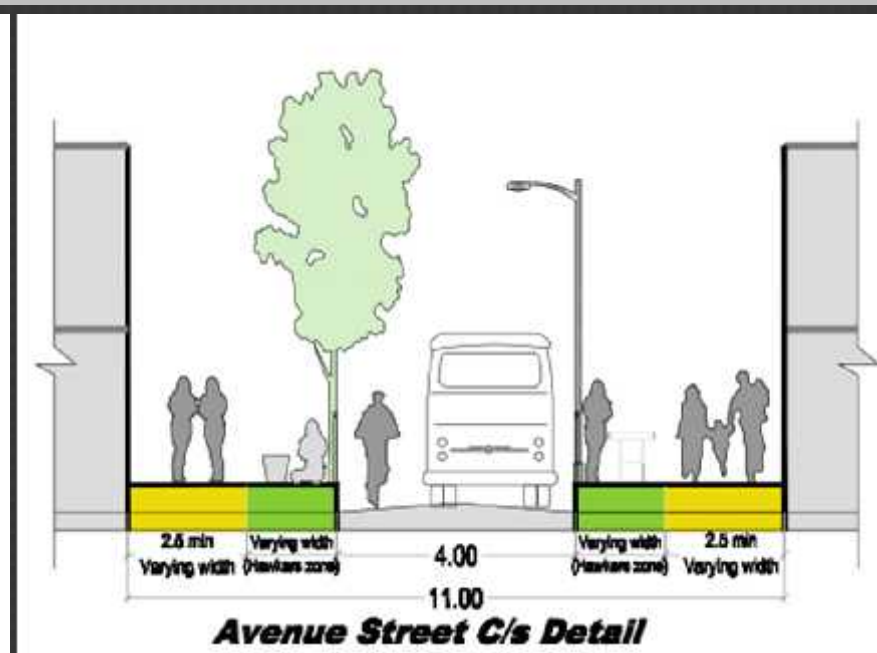
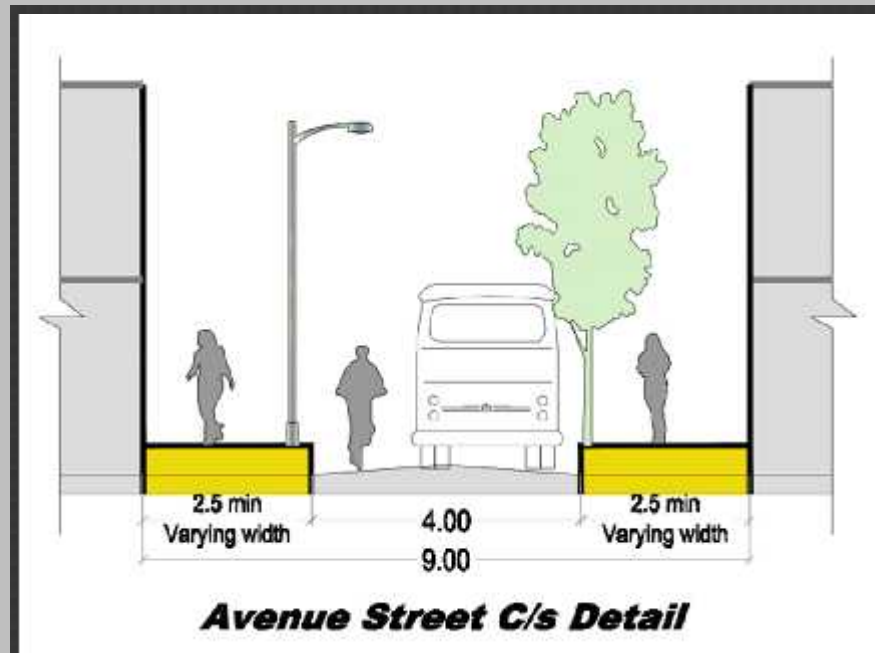


- PROVISION OF BUS BAYS NEAR THE STATION
- HOWEVER, NO PROVISION FOR PARKING OF THE BUSES
- NO PROVISION FOR BIKE STATIONS

Source: BMRCL, Bengaluru

AVENUE STREET





LONG TERM PROPOSALS

▪ CONGESTION PRICING – HISTORIC CORE AREA

- 'CONGESTION PRICING' SHALL BE IMPLEMENTED AS TRIP REDUCTION STRATEGY TO REDUCE THE TRAFFIC ENTERING THE CORE AREA
- PRICING IS PROPOSED FOR THE COMPACT HISTORIC CORE (PETE) AREA WHICH IS IN A MANAGEABLE FORM
- BEST MEANS TO REDUCE CONGESTION IN THE CORE IS TO TAX THE MOTORIST

THANK YOU