



Bus Rapid Transit System , Indore

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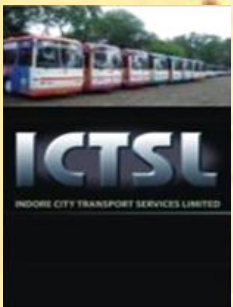


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Chandramauli Shukla
CEO
Indore City Transport Services Limited





IDENTIFIED BRTS CORRIDORS

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AB. ROAD CORRIDOR - 27.80 KMS

EASTERN RING ROAD CORRIDOR - 23.65 KMS

M.R.10 CORRIDOR - 8.70 KMS

RIVER SIDE ROAD CORRIDOR- 14.50 KMS

WESTERN RING ROAD PART 1 – 5.70 KMS

RW 2 UJJAIN ROAD TO AIRPORT- 5.7 KMS

M.G. ROAD - 3.0 KMS

BADA GANPATI TO AIRPORT ROAD - 5.30 KMS

WESTERN RING ROAD PART 2 - 10.20 KMS

M.G. Road Remaining – 4.20 KMS

Total -88.4 Kms





Project Cost & Financial Outlay

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Total estimated cost for the BRT System in Indore city

Estimated cost of creating infrastructure	Rs. 654.95 Cr.
Estimated cost for Operation and service Facilities	Rs. 213.20 Cr.
Total project cost (A+B)	Rs. 868.15 Cr.

Financial Outlay for Proposed BRT System INDORE

Grant from Central Govt. under JNNURM (50%)	Rs.434.07Cr.
Grant under JNNURM by M.P Govt.(20%)	Rs.173.63 Cr
Contribution from ICTSL and other Agencies IDA,IMC and MPPWD (30%)	Rs.260.45 Cr.
Total Project Cost	Rs. 868.15 Cr.



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System Design

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System	Partially closed system
Bus Shelter Location	Junction shelters (Before junction), With Mid Block shelters at 1 location
Ticketing Type	'Off Board' within the corridor & on board with on bus unit for other ICTSL buses.
Bus Shelter Type	Linear with overtaking with a possibility of up gradation to parallel bus shelters
System capacity	18,000pas.PHPD,Upgradable to 28,000 pas PHPD

Lane Configuration	Central
Bus Shelter Configuration	Central Staggered
Other Corridor Development	New City Truck Sever
	New Water Supply Lines
	New Lighting (Avg.50 Lux for all users)
	Continuous Cycle Tracks
	Continuous Pedestrian Paths
	Parking control and development of new parking infrastructure
	Up gradation of existing Electrical cables
	Provision for Data conduits long the corridor
	Provision for Demand driven Activities like Hawkers



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System Design

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Corridor ROW	62% - 60m, 38% - 32m
NMV Lane Configuration	2 way on both sides of the corridor
Pedestrian Crossing	23 signalized crossing, 1 Half Subway
No. of Lanes in 60m ROW	2 NMV lanes, 6 MV lanes (1 extra lane before junction), 2 Bus lanes
No. of Lanes in 31.6m ROW	2 NMV lanes, 4 MV lanes (1 extra lane before junction), 2 Bus lanes

	Signalized	Non Signalized	Roundabouts	Total
No. of Existing Junctions	9	9	5	23
No. of Proposed Signalized Junctions	18	0	5	23
	Junctions	Mid Block	Roundabouts	Total
Proposed Bus Shelters (for each direction)	15	1	5	21
	Average	Minimum	Maximum	
Distance between bus Shelters (m)	553	325	771	

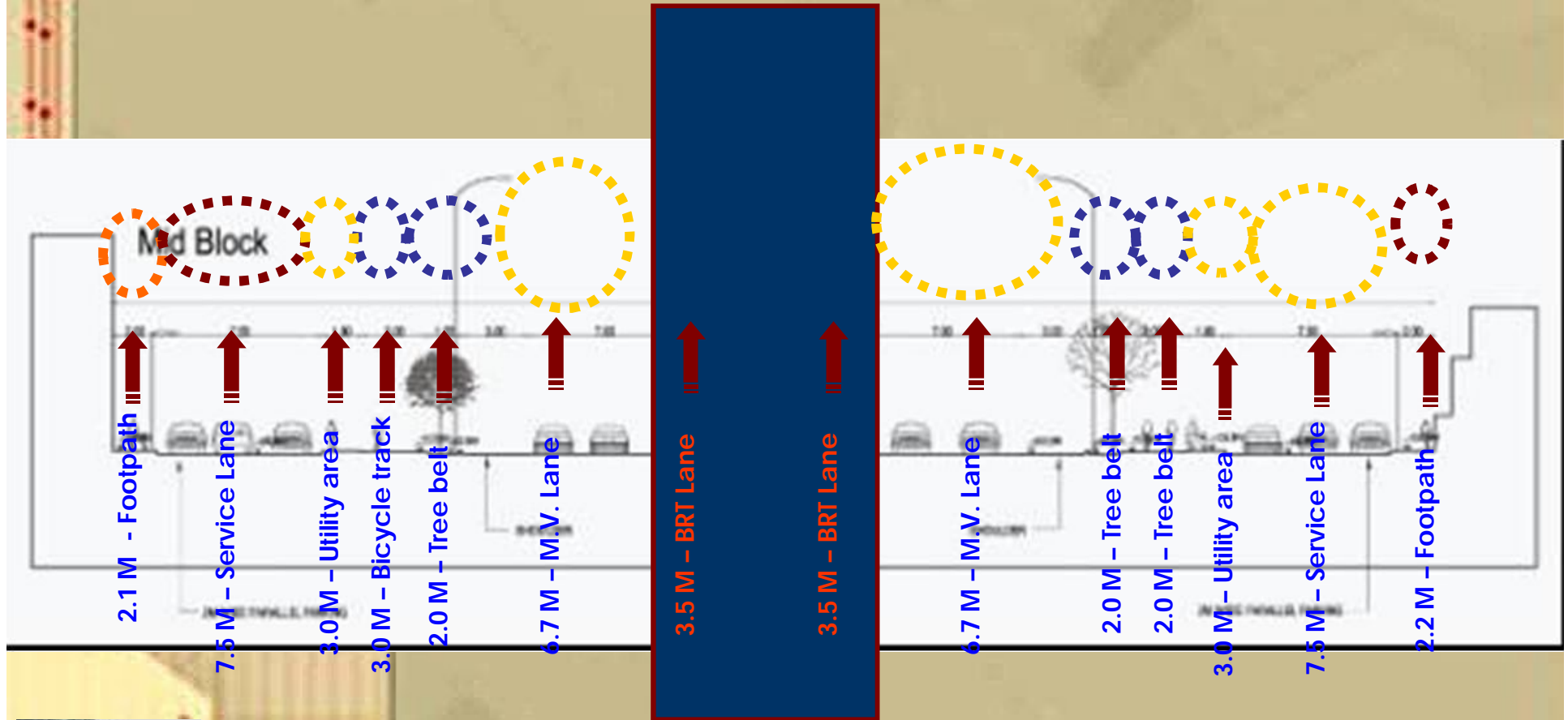


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Typical cross - section of AB Road

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INDORE BRTS COMPONENTS

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Road Infrastructure

Physical Inventory
Traffic Inventory
Rd X section
Bus Stops
Junctions

Social Marketing

Capacity Building,

workshops

Training

Site Visits

Stakeholder meetings

INDORE BRT

Operation

Bus, Depots,
Maintenance, Fleet
Management

Financial Plan

JnNURM, PPP,
Alternative sources

ITS

**Institutional
Set up**

Fare Collection



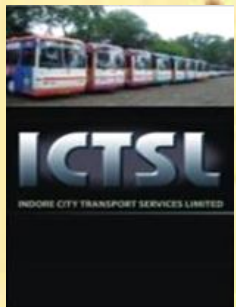
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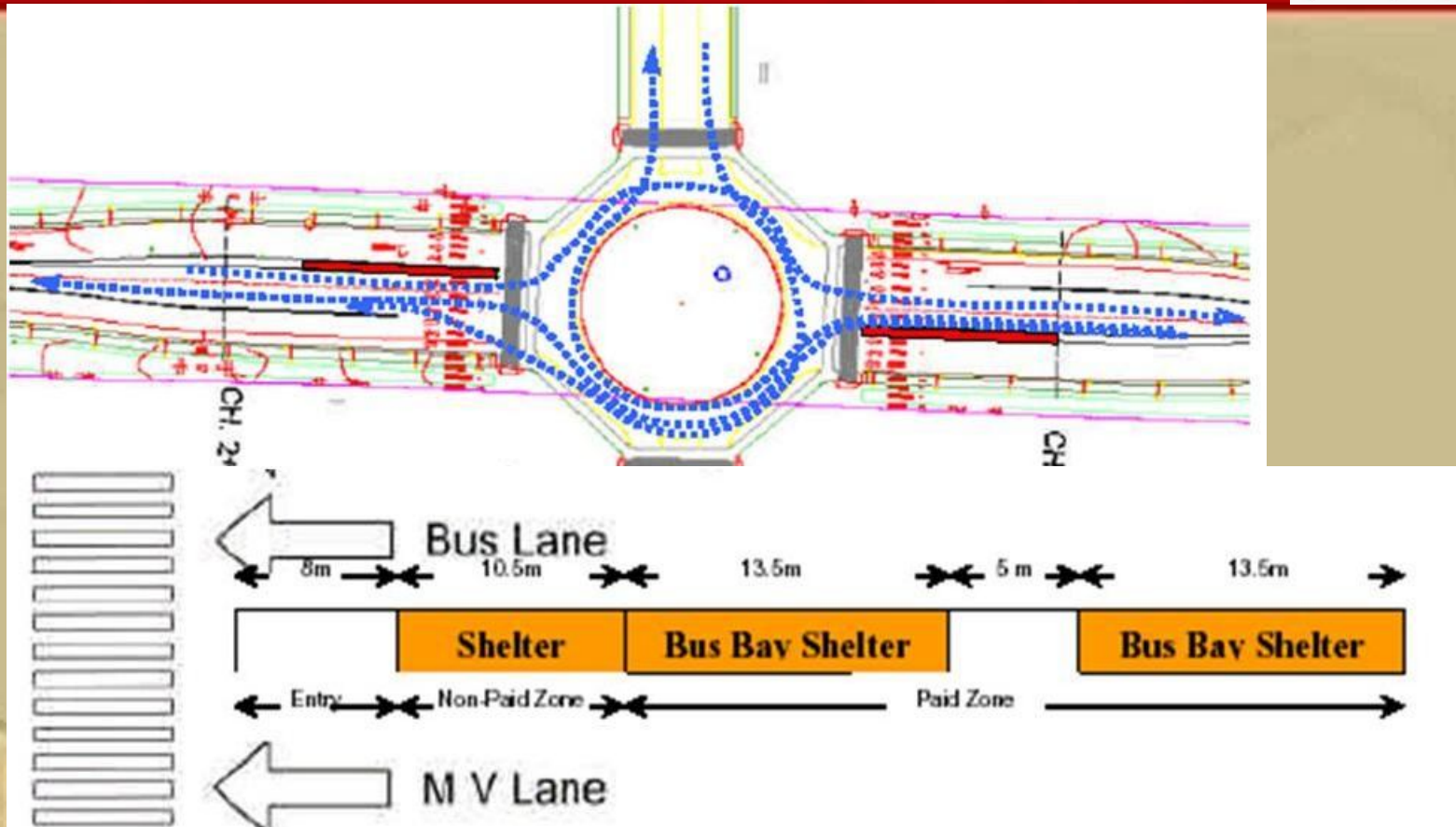


Current Status of Infrastructure Development

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- Physical Work at site started.
- Right of Way cleared and site handed over to contractor.
- The work of laying the sewerage line and water supply line started.
- The work of laying the underground electrical HT & LT line started.

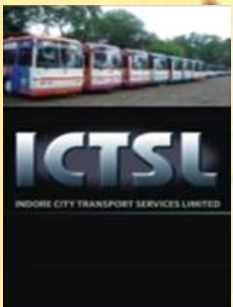




- **Signalisation**

- 4 arm Junction (cycle time 150 seconds 6 phases)
- 3 arm Junction (cycle time 100 seconds 3 phases)
- Mid Block Bus shelter (cycle time 65 seconds 2 phases)

- **Junction Bus Shelters**

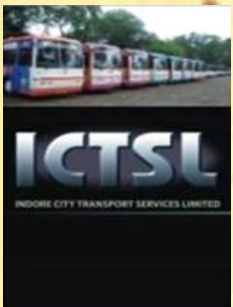




Bus Shelters

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- Pre-cast Modular Bus shelter
- 2 Boarding and alighting Bay with one additional bay with Overtaking Lane
- Space Division of Paid and un-paid zone
- Level Boarding
- Off Board Fare Collection
- PIS
- Boarding and alighting time of 0.75-0.5 Secs/Passenger
- Passenger Handling Capacity of 3-5K Per Hr
- Access to Bus shelter through 5 mts Zebra Crossing
- 30 Secs Pedestrian Phase
- 3-4k Commuters Crossing per hr

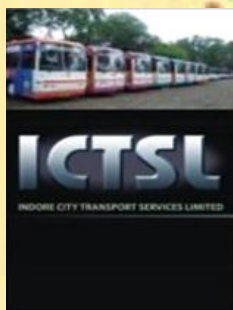




IMPLEMENTATION SCHEDULE

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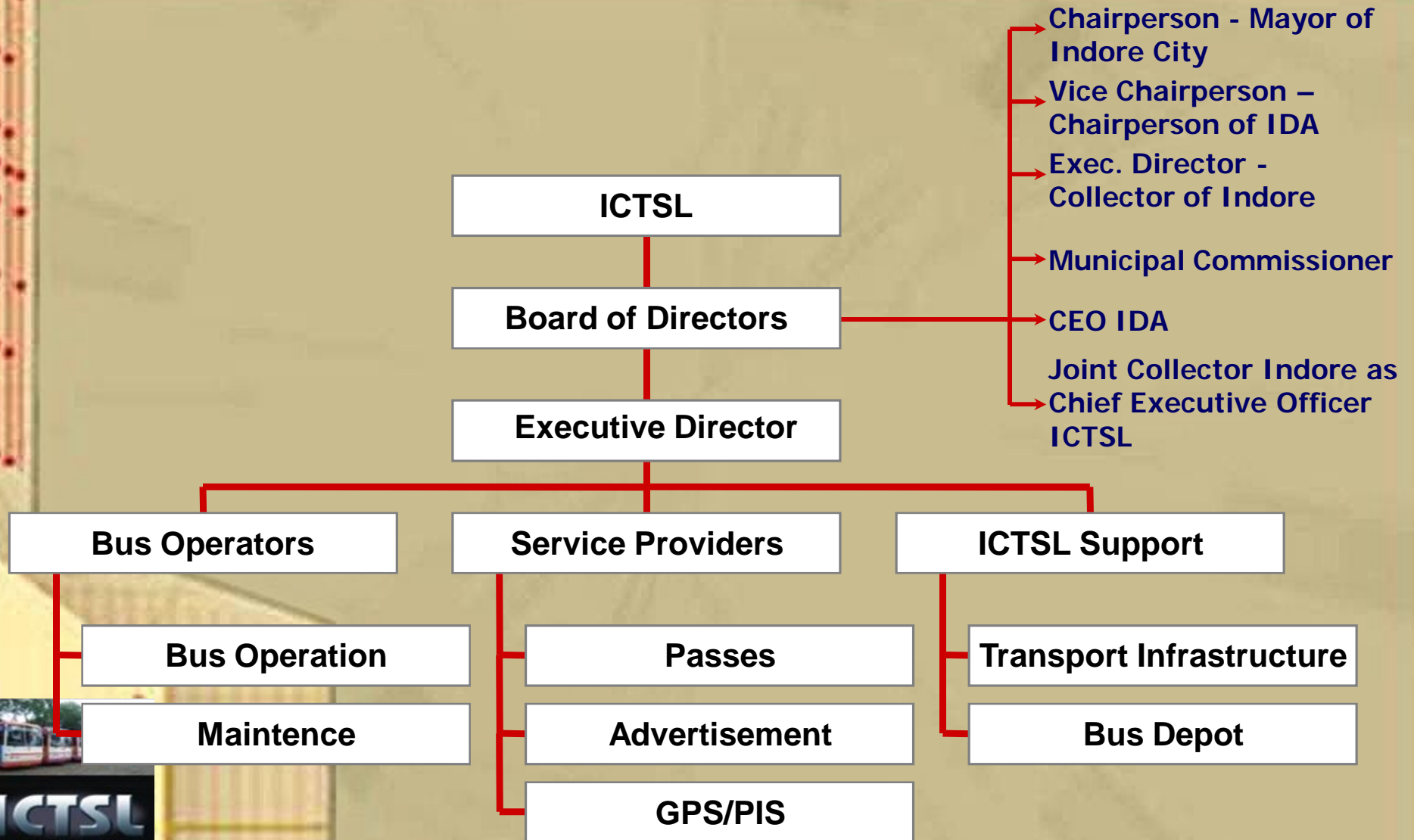
WEEKS/DESCRIPTION	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
Data Collection and Site Survey	█	█	█																	
Discussions with Stake Holders					█	█	█													
Tender drawings, specs, etc.		█	█	█	█	█	█													
Appointment of PMC Consultant		█	█	█	█	█	█													
Award of Construction Contract						█	█													
Preparation of Bus Specifications							█	█	█	█	█	█	█	█						
Route Rationalization								█	█	█	█	█	█	█	█					
Traffic Modelling/Signal Phasing								█	█	█	█	█	█	█	█	█				
Setting of Camp/Depot								█	█	█	█	█	█	█	█	█				
Working Plans						█	█	█	█	█	█	█	█	█	█	█				
Working sections							█	█	█	█	█	█	█	█	█	█				
Shifting/New Services								█	█	█	█	█	█	█	█	█				
Cutting/transplanting/planting trees								█	█	█	█	█	█	█	█	█				
Approval of Samples								█	█	█	█	█	█	█	█	█				
Execution at site/construction								█	█	█	█	█	█	█	█	█	█	█	█	█
Bus shelter design/tender						█	█	█	█	█	█	█	█	█	█	█				
Bus Shelter Construction								█	█	█	█	█	█	█	█	█	█	█	█	█
Signage/Marking design										█	█	█	█	█	█	█				
Signage/ Marking Execution												█	█	█	█	█	█	█	█	█





Institutional Setup

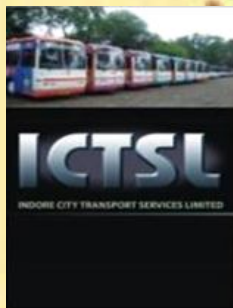
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INSTITUTIONAL SET UP FOR BRTS

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EXPERT ADVISE REQUIRED ?

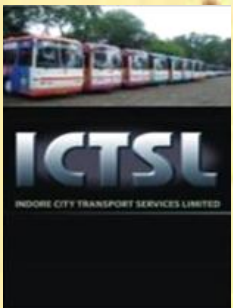


Existing Bus Operations

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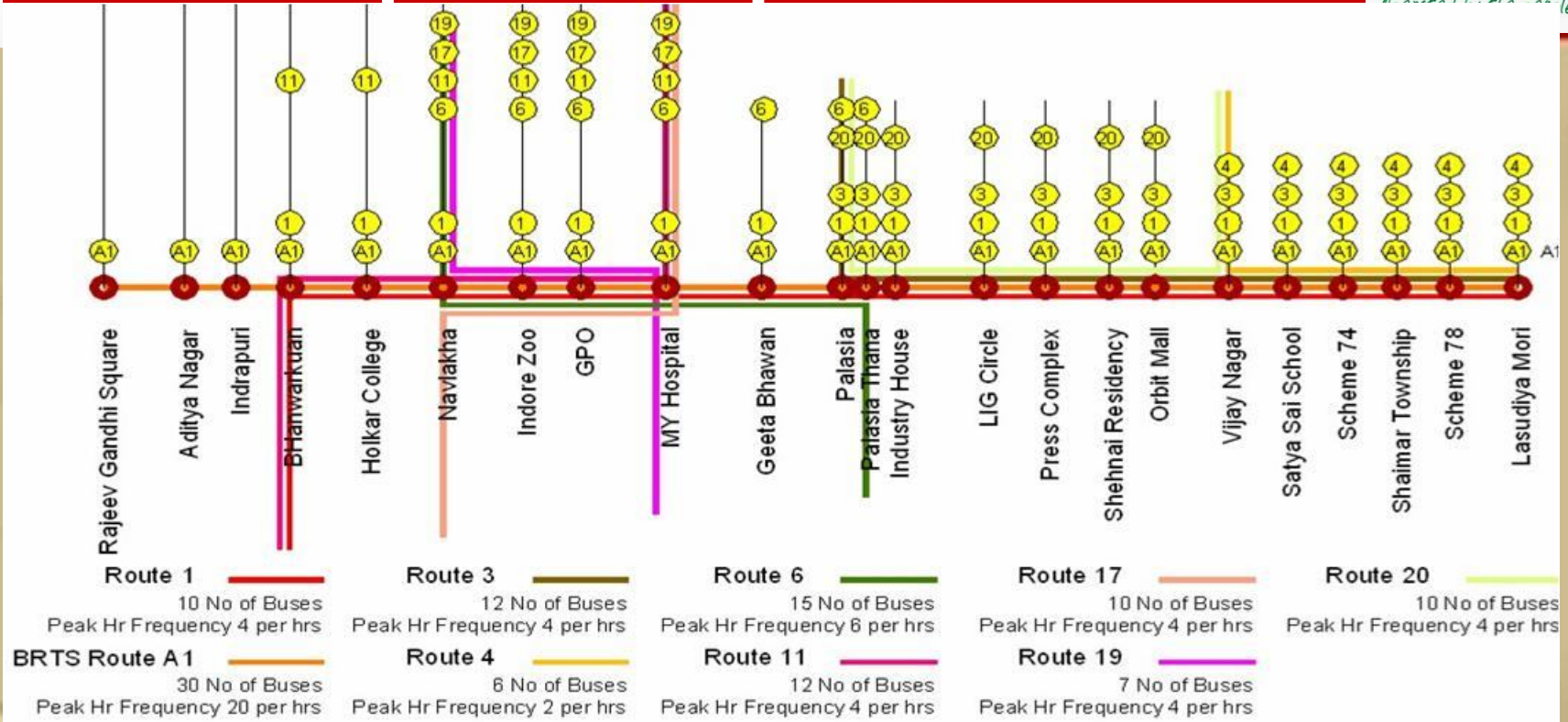
- Nine Route Operate on the Corridor
- Daily Rider ship of 5-10K
- 30 ICTSL Buses move along different Links of Corridor
- Operation Frequency varies from 2-11 buses per Hr (hd way 6-30 mints)
- Route Reorganisation for Minibuses underway.



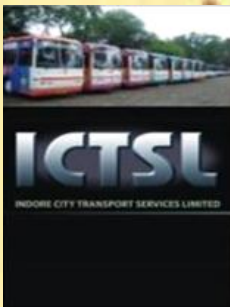


Proposed Bus Operations

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- **Partial Closed System - ICTSL Buses Continue to Operate**
- **New Articulated BRT Buses for Up- down service along the Corridor**
- **Travel Demand - 1000-6000 pphpd by 2009 (30% Modal share)**
 - Same is estimated to increase upto 2500-10000 by 2012 (42% modal share)
- **112 Buses will Run along the corridor with 30 new Articulated Buses**
- **Operation Frequency varies from 20-42 buses per Hr (hd way 1.5-3 mins)**
- **Route Cycle time of 90 Minutes**



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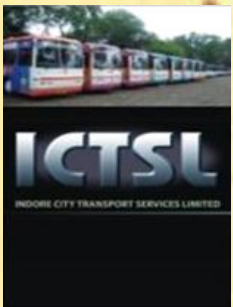
BUS

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BRTS

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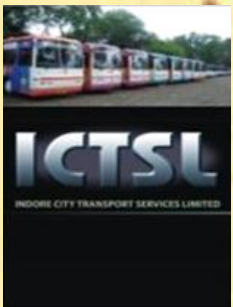




Selection of Vehicles

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- **Customized single and articulated Buses**
- **Low entry, doors with sufficient width to minimize boarding time**
- **Customization already started as for as pneumatic doors and ITS is concerned.**
- **Organised workshop with SIAM at Indore**

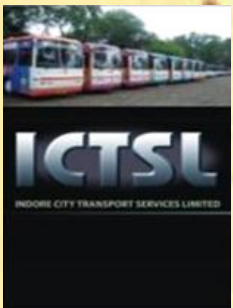




Fare Collection Technology

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ICTSL has worked out a business model of fare collection system for Indore BRTS under PPP in consultation with ERG Group and TCS. Tendering through Swiss Challenge Method





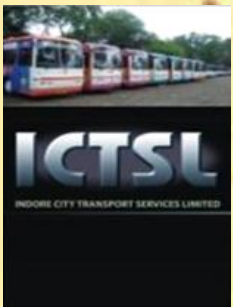
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It will have both the systems

Off Bus / On Board System

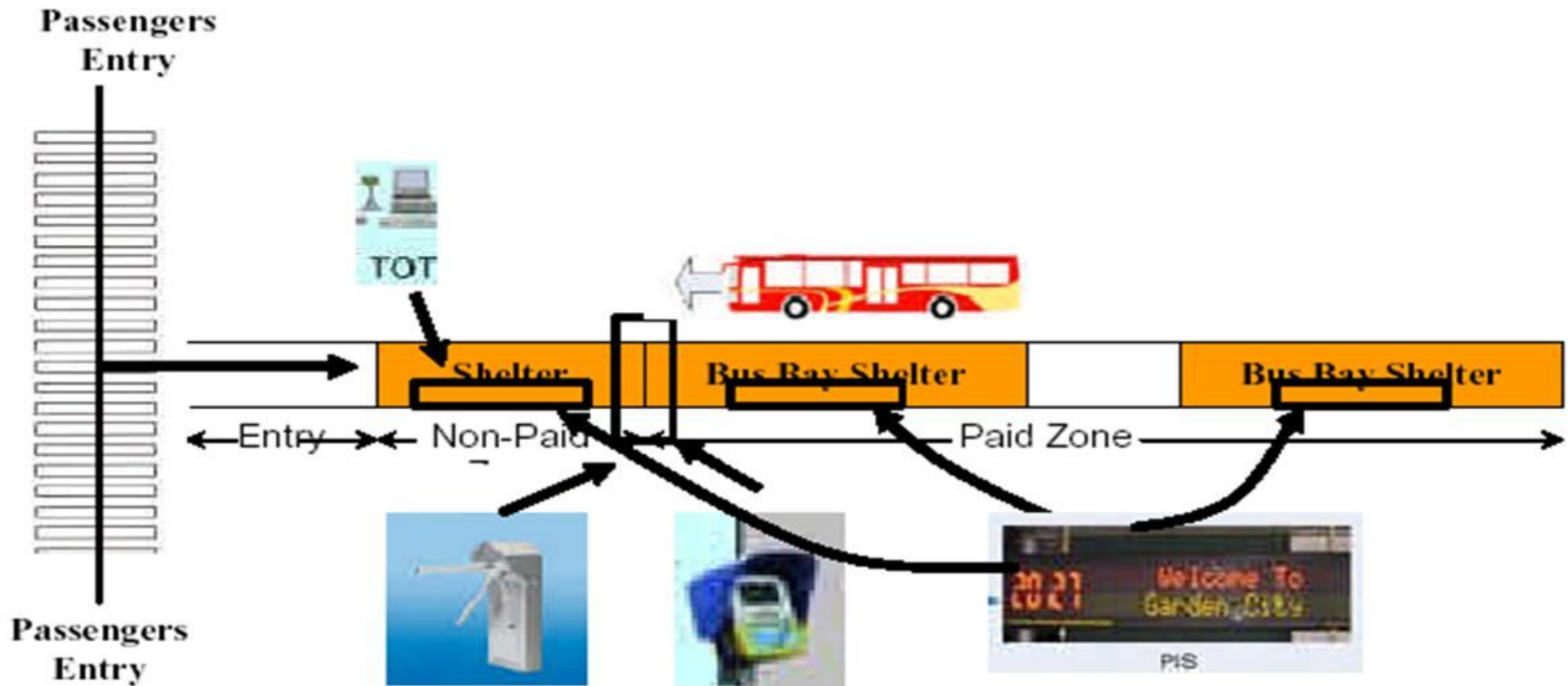
- In Off-Bus System all the main components like Gates, Validators etc will be placed in the Bus Shelter.
- In On-board System all the components will be placed on the bus.
- A Bus Control Unit (BCU) is installed on the bus which is primarily used to issues paper tickets and to act as a scanner for smart cards.
- The other common Components are.....
- Depot Computer System: This computer reconciles the data and transmits data to the central server.
- Central Server: Contains business rules and generates reports etc.
- The other pluggable system components are shown in next slide:





Off Board Ticketing at BRTS Bus Shelters

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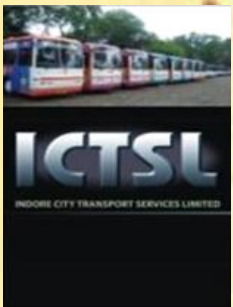
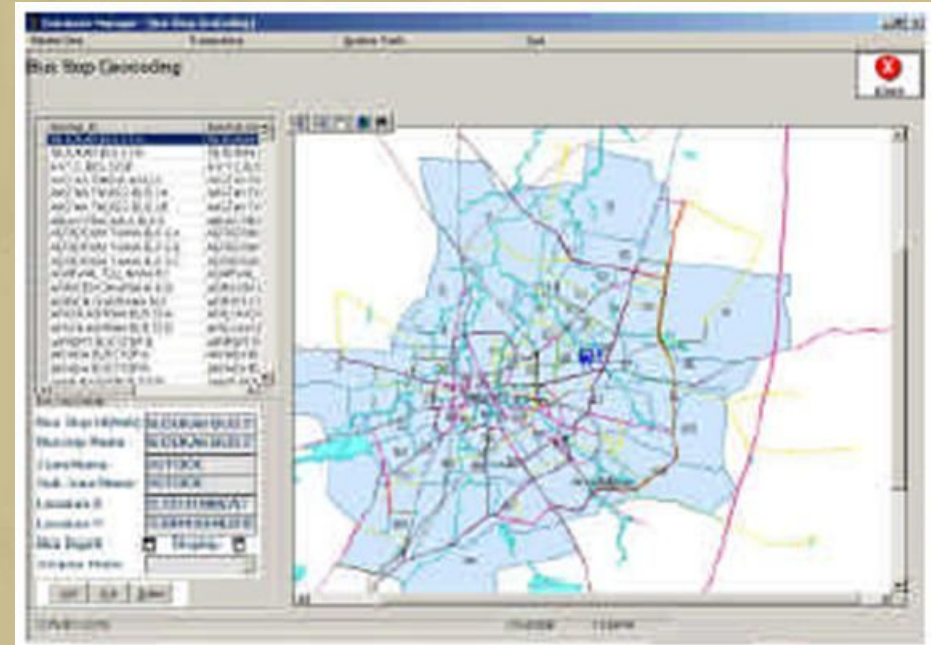




Fleet Management System and PIS

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- Fleet Management System and Passenger Information System is in Place in existing ICTSL Operations
- The System will be upgraded for better interfacing with Automatic Fare Collection and Intelligent Transport System for Indore City.
- Fleet Management System Components
 - Communication System
 - Automatic Vehicle location
 - Transit Operations Software
 - Geographical Information System



- ITS being Planned for Entire City of Indore and Bhopal by an initiation through Ministry of Urban Development Government of Madhya Pradesh



GPS Based Passenger Information System

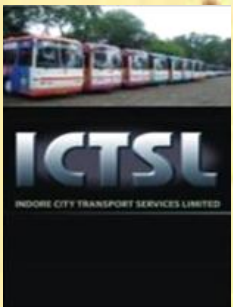
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- Components of GPS based Public Information System – in-place to be upgraded
 - Pre Transit Traveler Information System
 - In Shelter/Way side Transit Information System (Audio-Visual)
 - In Vehicle Transit Information System (Audio-Visual)
 - Internet, mobile phone information

Fleet Management

Messaging to Bus Stops

Bus Information

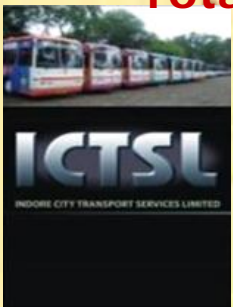




Public Transportation Capital and Operation Cost

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- **Estimated Public Transport Capital and Operation Cost**
 - **Capital Cost Per Bus (including Maintenance for 8 Years)** - Rs 14.34/ Veh Kms
 - **Variable Cost – Fuel and Oil** - Rs 14.00/ Veh Kms
 - **Other Direct Costs (Driver/Conductor)** - Rs 2.29/ Veh Kms
- **Total Direct Cost** - Rs 30.64/ Veh Kms
 - **Indirect Costs**
 - **Administration and Management** - Rs 1.53/ Veh Kms
 - **Stations and Depots up-keep** - Rs 1.53/ Veh Kms
 - **GPS TIC** - Rs 3.06/ Veh Kms
 - **Others** - Rs 1.53/ Veh Kms
 - **Total Indirect Cost** - Rs 7.66/ Veh Kms
- **Total Cost of Public Transport Operations** - Rs 38.30/ Veh Kms

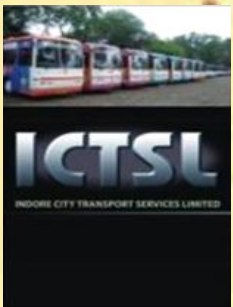




Public Transportation Capital and Operation Cost

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- **Total Cost of Public Transport Operations** - Rs 38.30/ Veh Kms
- **Average Revenue Passenger Kms Per Bus**
- 17325 Pass. Kms
- **Total Cost of Public Transport Operations per Pass Kms**
- Rs 0.48/pass Kms

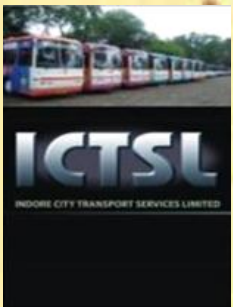




Fare Structure

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Distance in Kms	Paper tickets in Rs	Smart Card Tickets in Rs
Up to 3	5	4
3-5	7	6
5-7	9	7
7-10	10	8
10-15	12	10
15 and Above	14	12





Revenue Per Day Per Bus

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Fare Collection Mode	Pass Kms	Unit
Pass Kms of Paper Tickets (60%)	10395	Pass Kms
Pass Kms of Smart Cards (40%)	6930	Pass Kms
Fare Collection	Amount in Rs	Unit
Fare for Paper tickets 1.1 Rs per Pass Kms	11434.50	Rs
Fare for Smart Cards 0.9 Rs per Pass Kms	6237.00	Rs
Total Collection per Day	17671.50	Rs



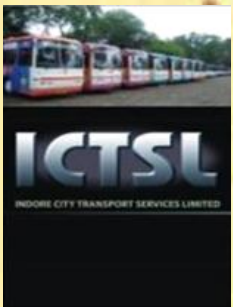
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Revenue Sharing and Operators Profit

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Particulars	Amount	Unit
FCS and TOT Operator Revenue Share 12.25% of Revenue	2208.94	Rs
Bus Operation Cost Per Day	8344.50	Rs
ICTSL Share (10% of Smartcard Rev)	623.7	Rs
FI Reducing Interests per day	2228.12	Rs
Operators Profit	4266.24	Rs

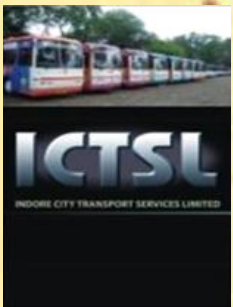




Clean Development Mechanism

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- Significant scope and potential to qualify for carbon finance under CDM
- Additional revenue stream from CERs which are tradable commodity.
- Appointed consultant and transaction advisor for project preparation.
- Work on PDD started.
- Potential of 50-75000 CERs/annum
- Current market value 10-15 Euro/CER

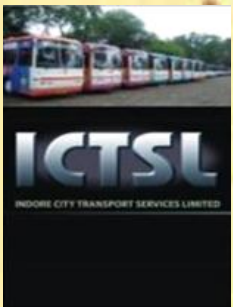




Capacity Building

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- Training, conferences, workshops.
- E.D visited to Bogota and LA
- Send team to Delhi to see construction
- Regular stakeholders meetings

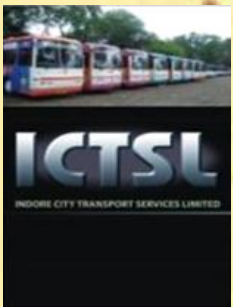




Social Marketing

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- Updating people through media, handouts
- Started our own news letter in association with HT

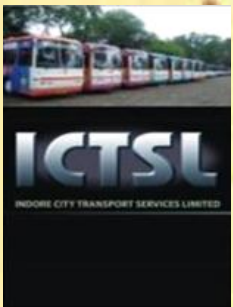




Contract Management

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- **Consultants Contract** - In place
 - System Design
 - Project Management
- **Corridor Construction & Maintenance Contracts** - In place
- **Bus Operators** - In place
- **Vehicle Maintenance** - in process
- **Fleet Management** - in place to be upgraded
- **Fare Collection and Management** - in process of finalization
- **Advertising Contracts** - In place
 - Vehicles
 - Bus Shelters
 - Along the Corridor
- **Clean Development Mechanism** - In place
- **Marketing Contracts** - in process of finalization
- **Legal and Financial Contracts** - In place
- **Security Contracts** - in process

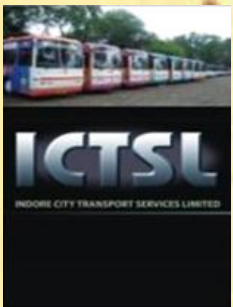




Other Features

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- **Security**
- **Route Restructuring**
- **Partial financing through CDM**
- **All other customer facilities like signages, maps, help desk etc.**





BRTS Feeder Roads

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Name of Road	Agency	Approved Cost	Physical Status
BRTS Feeder Road Pipaliyahana Link Road	IDA	19.66	Contract Awarded
Development of link Road MR 9 (BRTS Feeder Road) , Indore	IDA	39.74	Under execution
Mahesh Guard Junction to Ujjain Road. Rajkumar Bridge to A.B.Road (Race Course Road). Rajwada to Hemu Kalani Junction. Mhow Natak to Ring Road (Footi Kothi Road) Patrakar Junction to Ring Road (Tilak Nagar) Vyas Bridge to Gangwal Bus Stand. VIP Road Opp. Railway Station Total Length 14.00 K.M.	IMC	40.83	Contractor & Supervision Consultant has been appointed for the work and approx. 30% work is completed. Construction of four roads in progress



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Supplementary Facilities to BRTS

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- Feeder network has been planned with comprehensive BRTS Network
- Multilevel Parking Facilities are also been planned along the Pilot Corridor

BRTS Corridor



Pilot Corridor

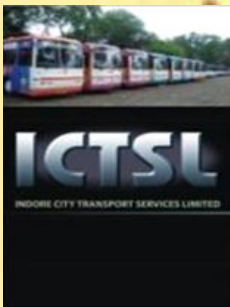
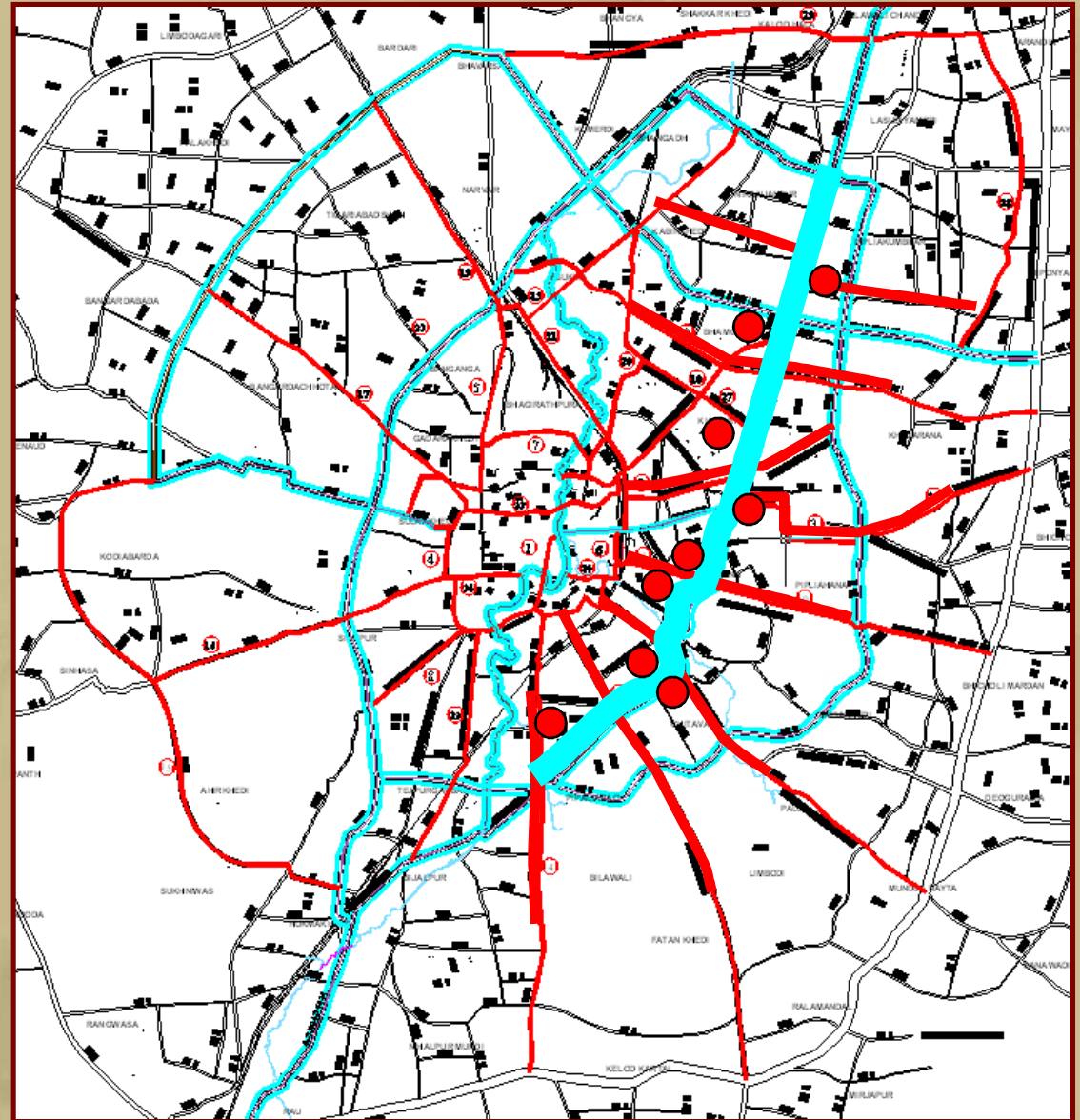


Feeder Roads



Multi Level

Parking Facilities





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Thank You

Mr. Chandramauli Shukla
CEO
ICTSL, Indore

