WORK-IN-PROGRESS

Last Mile Analysis for Mumbai Transport Infrastructure Projects

Mumbai Transformation Support Unit

Discussion Document

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Executive summary

- Mumbai will spend **~Rs. 50,000 crores on major transport infrastructure** projects in the next 5 years
- However, a few **'Last Mile' bottlenecks** are likely to significantly reduce the effectiveness of these projects
- **About 2% additional spend (~Rs. 750-1000 crores)** is needed to solve the **top 30** 'Last Mile' bottlenecks
  - Top 30 bottlenecks have been prioritized on the basis of **3 criteria:**
    - **Volume of traffic** (vehicular and/or pedestrian)
    - **'Last Mile' nature:** Essentially the bottleneck can be solved by an incremental modification or improvement
    - **Hub:** The bottleneck can potentially affect more than one mode of transport at critical intersections
- **Checklist of Parameters** has been created to formalize the detailed study to identify potential bottlenecks in transport infrastructure projects
- **Sample deep-dives** have been carried out for a representative project in each of the 3 categories - Metro, Monorail and Road

Contents

Mumbai will spend ~Rs. 50,000 crores on major transport infrastructure projects over the next 5 years

Rs. crores

Name of Project	Description	Cost of Project[1]
Metro Line 1, 2 and 3	Line 1: Versova-Andheri-Ghatkopar Line 2: Charkop-Bandra-Mankhurd Line 3: Colaba-Bandra	28000[2]
Monorail	Jacob Circle-Wadala-Chembur	2500
Metro-Monorail Hybrid	Thane-Bhiwandi-Kalyan	4800
Railway Projects (MUTP-II)	Additional suburban rail lines and up-gradation of stock	5300
Mumbai Trans-Harbour Link	Sewri – Nhava Sheva	8300
Eastern Freeway-APLR-PGLR	P D'Mello Road – Anik – Panjarpole – Ghatkopar Mankhurd Link Road	900[3]
East-West connectivity	Santacruz-Chembur Link Road, Jogeshwari-Vikhroli Link Road	700[4]
	Total	**48100**

1 Based on MMRDA websites, news reports

2 Line 1 – 2300, Line 2 – 11000, Line 3 – 15000 crores

3 Eastern Freeway – 530, APLR – 221, PGLR – 168 crores

4 SCLR – 550, JVLR – 150 crores

However, 30 key bottlenecks across Mumbai are likely to significantly reduce the effectiveness of these projects (1/6)

Category	Link/Corridor	Specific Bottleneck	Key Issue
Metro - Line 1	1 Andheri Station (Western Line)	Skywalk & FOB network connecting suburban and metro stations	▪ Hub, high volume of commuters ▪ Road is congested , lack of sufficient internal station links
	2 Ghatkopar Station (Central Line)	Connection between suburban & metro stations	▪ Hub, high volume of commuters ▪ Need for Skywalk & FOB[1] network for smooth connectivity
Metro - Line 2	3 Bandra Station (Western Line)	Commuter dispersal and connection between suburban & metro stations	▪ Hub, high volume of commuters ▪ Station planned in narrow road, exits near congested SV Road, Linking Road
	4 Kurla Station (Central & Harbour Line)	Connection between suburban & metro stations	▪ Hub, high volume of commuters ▪ Need for Skywalk & FOB network for smooth connectivity
	5 VN Purav Marg – RC Marg Stations	Commuter dispersal	▪ Hub, 3 metro/monorail stations and major roads in close vicinity ▪ High volume of pedestrian movement expected

1 Foot Over -Bridge

However, 30 key bottlenecks across Mumbai are likely to significantly reduce the effectiveness of these projects (2/6)

Expected
Current

Category	Link/Corridor	Specific Bottleneck	Key Issue
Metro - Line 3	6 Churchgate Station (Western Line)	Connection between suburban & metro stations	▪ Hub, high volume of commuters ▪ Planned as underground metro, direct underground link to suburban station needed
	7 CST Station (Central Line)	Connection between suburban & metro stations	▪ Hub, high volume of commuters ▪ Planned as underground metro, direct underground link to suburban station needed
Monorail	8 Chembur Station (Harbour Line)	Commuter dispersal and connection between suburban & monorail stations	▪ Hub, high volume of commuters ▪ Busy intersection of RC Marg & Eastern Express Highway near the station
	9 Dadar (E) Station (Central & Western Line)	Connection between suburban & monorail stations	▪ Hub, high volume of commuters ▪ Need for Skywalk & FOB[1] network for smooth connectivity

1 Foot Over-Bridge

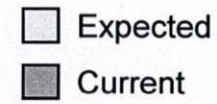
However, 30 key bottlenecks across Mumbai are likely to significantly reduce the effectiveness of these projects (3/6)

Expected
Current

Category	Link/Corridor	Specific Bottleneck	Key Issue
Roads – South	10 Haji Ali junction	Intersection of multiple major roads	▪ High volume of north-south traffic, pedestrian movement ▪ Long waiting time at signal, could worsen with Worli-Haji Ali ramp
	11 Peddar Road	Cadbury junction (intersection with Bhulabhai Desai Road)	▪ High volume of traffic from Haji Ali to Nariman Point & other parts of South Mumbai ▪ Chaotic turning by vehicles into B.D. Road impedes movement
	12 Bandra-Worli Sea Link	T-junction at Worli exit	▪ Links BKC[1] & Airport to South ▪ Signal at exit leads to traffic jam on the high-speed sea link
	13 Dr. Ambedkar Marg	Khada Parsi junction, Nesbit junction & Sofia Zuber Marg junction	▪ High volume of north-south traffic ▪ Lalbaug flyover shifts traffic congestion from Lalbaug to near CST at these junctions
	14 Eastern Freeway	CST to P D'Mello Road	▪ High volume of traffic to CST ▪ Freeway ends 2-3 kms before CST, this stretch likely to be the main congestion point

1 Bandra-Kurla Complex

However, 30 key bottlenecks across Mumbai are likely to significantly reduce the effectiveness of these projects (4/6)



Category	Link/Corridor	Specific Bottleneck	Key Issue
Roads – West	15 Western Express Highway	Kherwadi junction	▪ High volume of north-south traffic to BKC and Airport ▪ Long waiting time, preceding flyover with signal at end
	16 Western Express Highway	Kalanagar junction	▪ High volume of traffic between BKC and WEH[1] ▪ Mixing of traffic by vehicles turning into WEH slows traffic ▪ BEST bus stop at junction
	17 Western Express Highway	Dahisar Check Naka	▪ High volume of truck movement – entry point from Ahmedabad ▪ Lack of parking at octroi booth leads to congestion on WEH
	18 Juhu	Juhu Tara Road - V.Mehta Road (near Tulip Star)	▪ High volume of traffic to hotels and ISKCON, JVPD[2], SV Road ▪ Metro Line 2 could worsen situation with more autos/taxis
	19 Bandra Worli Sea Link	Access to Bandra (west)	▪ High volume of traffic from south to Bandra (west) and Khar ▪ Circuitous connection

1 Western Express Highway 2 Juhu-Vile Parle Development Scheme

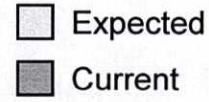
However, 30 key bottlenecks across Mumbai are likely to significantly reduce the effectiveness of these projects (5/6)

Expected
Current

Category	Link/Corridor	Specific Bottleneck	Key Issue
Roads – West	20 Hill Road – SV Road	Lucky junction (intersection of Hill Road & SV Road near Bandra station)	▪ Traffic on SV Road intersects with large pedestrian flow ▪ Unused skywalk, BEST depot, metro stations add congestion
Roads – Central & East	21 Lal Bahadur Shastri Marg	Ghatkopar Police Station to Ghatkopar Bus Depot Road	▪ High volume of traffic ▪ MCGM water office – tanker flow ▪ Multiple signals, intersections
	22 Lal Bahadur Shastri Marg	Bhandup Station Road	▪ High volume of traffic from south Mumbai to northern suburbs ▪ Heavy pedestrian flow to station
	23 Lal Bahadur Shastri Marg	Sion-Thane	▪ Major arterial road of city ▪ 83 gaps in divides (chaotic turns), only about 8 needed
	24 Eastern Express Highway	Amar Mahal junction	▪ Connects SCLR[1] and EEH[2] ▪ Congestion at signal, likely to worsen once SCLR is ready
	25 VN Purav Marg	Panjarpole junction	▪ Links to Ghatkopar-Mankhurd Link Road, PGLR[3], RC Marg ▪ 3 metro/monorail stations ▪ Vehicular, pedestrian congestion

1 Santacruz-Chembur Link Road 2 Eastern Express Highway 3 Panjarpole-Ghatkopar Link Road

However, 30 key bottlenecks across Mumbai are likely to significantly reduce the effectiveness of these projects (6/6)



Category	Link/Corridor	Specific Bottleneck	Key Issue
Roads – East-West connection	26 Jogeshwari-Vikhroli Link Road	IIT Main Gate	▪ High volume of pedestrian traffic crossing road to go to market ▪ Pedestrian signal slows vehicles
	27 Jogeshwari-Vikhroli Link Road	SEEPZ crossing	▪ High volume of pedestrian traffic due to commercial establishment ▪ Pedestrian signal slows vehicles
	28 BKC-Sion via Dharavi/LBS Marg	T-junction joining LBS Marg & Dharavi Road and junction of EEH[1] with LBS[2] Marg	▪ High volume of traffic generated at BKC and EEH ▪ Encroached road near Dharavi ▪ High Pedestrian movement ▪ Mixing of traffic - Dharavi, LBS
Roads – Navi Mumbai	29 Mumbai Trans Harbour Link	Dispersal at entry/exit	▪ Key connection from Mumbai to new airport at Navi Mumbai ▪ Swift dispersal crucial for smooth flow of traffic
	30 Thane Creek bridge: JVLR to Koparkhairane	Access to Bandra (west)	▪ High volume of east-west traffic from JVLR[3] to Navi Mumbai ▪ Swift dispersal crucial for smooth flow of traffic

1 Eastern Express Highway 2 Lal Bahadur Shastri 3 Jogeshwari-Vikhroli Link Road

2% additional spend (~Rs. 750-1000 cr.) can solve these bottlenecks (1/4)

Rs. crores

VERY APPROXIMATE

Category	Link/Corridor	Possible Solution	Cost
Metro - Line 1	Andheri Station	▪ Develop skywalk - metro to suburban station ▪ Interconnect with existing skywalk, 3 FOBs ▪ Add escalators to the skywalk	12
	Ghatkopar Station		12
Metro - Line 2	Bandra Station	▪ Develop skywalk - metro to suburban station ▪ Connect - existing skywalk, FOBs, SV Road ▪ Add escalators to the skywalk	17
	Kurla Station	▪ Develop skywalk and connect with FOBs ▪ Add escalators to the skywalk	17
	VN Purav Marg – RC Marg Station	▪ Develop network of subways linking the 3 metro and monorail stations	20
Metro - Line 3	Churchgate Station	▪ Develop subway to suburban station ▪ Connect existing subway with above system	15
	CST Station	▪ Develop subway - metro to suburban station	15
Monorail	Chembur Station	▪ Skywalk to suburban station with escalators ▪ Interconnect with existing skywalk, 3 FOBs ▪ Realign bus routes, set up IPT stops	18
	Dadar (E) Station	▪ Develop skywalk and connect with FOBs ▪ Add escalators to the skywalk	17

2% additional spend (~Rs. 750-1000 cr.) can solve these bottlenecks (2/4)

Rs. crores

VERY APPROXIMATE

Category	Link/Corridor	Possible Solution	Cost
Roads - South	Haji Ali junction	▪ Worli-Nariman Point Link, no ramp to Haji Ali ▪ Car deck at Haji Ali for south-bound lane	TBD[2]
	Peddar Road	▪ Car deck at junction for south-bound lane	2
	Bandra Worli Sea Link	▪ Car deck at Worli T-junction	2
	Dr. Ambedkar Marg	▪ Flyover from Sant Savte Marg junction to JJ Flyover, covering Nesbit junction ▪ Single-lane flyover from Sofia Zuber Marg towards JJ Flyover for right-turn bound traffic ▪ Demolish exiting Byculla bridge	95
	Eastern Freeway	▪ Extend upto new CST Terminus with one arm landing into Parking Plaza of CST ▪ Another arm covering Carnac Bunder junction	54
Roads - West	WEH[1] – Kherwadi junction	▪ Flyover on WEH, underpass on perpendicular road (recommended) ▪ Other option - Flyover on perpendicular road	98
	WEH – Kalanagr junction	▪ Priority-based system for traffic flow at peak hours, to avoid mixing due to right-turn ▪ Relocation of bus stop away from junction	1

1 Western Express Highway 2 To be decided

2% additional spend (~Rs. 750-1000 cr.) can solve these bottlenecks (3/4)

Rs. crores

VERY APPROXIMATE

Category	Link/Corridor	Possible Solution	Cost
Roads - West	WEH[1] – Dahisar Check Naka	▪ Build parking plaza near octroi toll booth	TBD[4]
	Juhu Tara Road – V.Mehta Road	▪ Shift central median by about 10 feet, as lane on one side is broader than the other	1
	Bandra Worli Sea Link – Access to Bandra	▪ Direct ramp difficult due to Bandra Fort ▪ Build DP road from Toll plaza to Mehboob Circle via MSRDC open place, Kadeshwari Marg and Peter Dias Road	65
	Lucky junction (Hill Road - SV Road)	▪ Subway from Lucky junction to Bandra station ▪ Extend Mahim causeway flyover to Turner Rd	69
Roads – Central & East	LBS[1] Marg – Ghatkopar	▪ Flyover on 1-1.5 km stretch from Ghatkopar police station to Ghatkopar Bus depot road	81
	LBS Marg – Bhandup	▪ Subway on Bhandup Station Road intersection	15
	LBS Marg – Sion-Thane	▪ Cover the divider gaps (about 75), except at the essential points	1
	EEH[3] – Amar Mahal junction	▪ TBD	TBD

1 Western Express Highway 2 Lal Bahadur Shastri 3 Eastern Express Highway 4 To be decided

2% additional spend (~Rs. 750-1000 cr.) can solve these bottlenecks (4/4)

Rs. crores

VERY APPROXIMATE

Category	Link/Corridor	Possible Solution	Cost
Roads – Central & East	VN Purav Marg	▪ Redesign of junction ▪ Adaptive signalling as per traffic flow	TBD[3]
Roads – East-West connection	JVLR – IIT Gate	▪ Subway connecting IIT Gate to market	15
	JVLR – SEEPZ crossing	▪ Subway for pedestrian movement	15
	BKC - Sion	▪ Elevated road from BKC to Sion station over Dharavi and/or Lal Bahadur Shastri Marg	81
Roads – Navi Mumbai	Mumbai Trans-Harbour Link	▪ Interchange facility at Sewri (Eastern Freeway) and elevated road over Acharya Donde Marg upto Prabhadevi ▪ Road connectivity from Shivaji Nagar to Navi Mumbai International Airport and further connectivity to NH4B	TBD
	Thane Creek bridge: JVLR to Koparkhairane	▪ Multi-level facility at entry and exit	TBD

1 Jogeshwari-Vikhroli Link Road 2 Bandra-Kurla Complex 3 To be decided

In the long-term, it is crucial to develop institutional mechanisms to identify, prioritize and solve bottlenecks

WORK-IN-PROGRESS

- **Checklist of parameters**
  - Formalize evaluation for every new transport infrastructure project
- **Coordination** among all planning and executing agencies – MMRDA, MSRDC, PWD, MCGM
- Involvement of the **Traffic Police department**
  - Brings day-to-day 'practical' and 'on-ground' experience to the table
  - Include in all stages from planning to execution
- .....others??

Contents

- Overall Analysis – Last Mile Bottlenecks in Mumbai
- **Checklist of Parameters for evaluation of bottlenecks**
- Sample Deep-dives – Metro, Monorail and Road

Each parameter for evaluation of Metro/Monorail projects has specific questions

1. **Access & Dispersal**
   1. **Pedestrian Movement**
      1. **Pathways**: Are there adequate pedestrian pathways/footpaths for ease of dispersal from the metro station?
      2. **Encroachment**: Are the pathways encroachment-free?
      3. **Traffic Intersections**: Do the nearby traffic intersections have adequate facilities for pedestrian crossing?
   2. **Public Transport**
      1. **Connectivity**: Are there adequate connections via bus and auto/taxi in terms of capacity and frequency?
      2. **Integration with suburban rail**: Are the metro stations integrated with nearby suburban rail stations (wherever applicable) to facilitate movement?

2. **Impact on Traffic Flow**
   1. **Congestion**: What are the measures proposed to combat increased congestion due to greater movement (buses, autos, etc) in the area?
   2. **Parking**: Are there sufficient parking facilities in the vicinity of the station, especially catering to 2-wheelers?

3. **Safety & Security Concerns**
   1. **Emergency Services**: Are facilities available for quick response in times of emergency - fire, ambulance, etc?
   2. **Security**: Have adequate security measures been put in place, considering that the Metro is a high-value target?

Metro/monorail stations need to rated along various parameters on a scale of 1-4 as per a set pattern

- Access & Dispersal
- Impact on other flows
- Safety & Security

Parameters	Key evaluation issue	Rating Scale (1- poor, 2- below average, 3- above average, 4- excellent)			
		1	2	3	4
1 Pathways	▪ Presence of footpaths ▪ Condition of footpaths ▪ Minimal cross-flow between paths	▪ No footpaths	▪ Some footpaths ▪ Narrow, not demarcated	▪ Footpaths near most entry/exit ▪ Broad, marked ▪ Cross-flow between paths	▪ Footpaths near all entry/exit ▪ Broad, marked ▪ No cross-flow; smooth end-to-end dispersal
Encroach-ment	▪ Encroachment on pedestrian pathways	▪ Fully encroached	▪ Majority area encroached	▪ Little area encroached	▪ No encroachment
Traffic Intersection	▪ Pedestrian facilities at junctions near the station	▪ No pedestrian crossing	▪ Few junctions have crossing	▪ Most junctions have crossing	▪ All junctions have crossing
Public Transport Connectivity	▪ Frequency of services ▪ Capacity of services ▪ Regulated flow	▪ No bus or IPT stop	▪ Low bus no. & frequency ▪ No IPT stop	▪ Moderate bus no. & frequency ▪ IPT stop exists	▪ High bus no. & frequency ▪ IPT stop exists
Integration with suburban rail	▪ Smooth internal connection to suburban station (skywalk, subway)	▪ No connection	▪ Pedestrian connection (footpath) ▪ Accessible	▪ Connection to some entry/exit points via skywalk/subway	▪ All entry/exit points and internal FOBs linked

Metro/monorail stations need to rated along various parameters on a scale of 1-4 as per a set pattern

- Access & Dispersal
- Impact on other flows
- Safety & Security

Parameters	Key evaluation issue	Rating Scale (1- poor, 2- below average, 3- above average, 4- excellent)			
		1	2	3	4
2 Congestion	▪ Capacity for increased vehicular congestion	▪ Not well linked to roads	▪ Nearby roads are narrow, encroached	▪ Some roads are major roads, high capacity	▪ Nearby roads have sufficient capacity
Parking	▪ Parking facilities near the station	▪ No parking facilities	▪ No dedicated parking, some public parking	▪ Dedicated parking but low in capacity	▪ Dedicated and high-capacity parking
3 Emergency Services	▪ Response time of emergency services	▪ No emergency services nearby	▪ Services exist ▪ No response protocol	▪ Protocol exists ▪ 1st response centres unclear	▪ Protocol exists ▪ 1st response centres marked
Security	▪ Level of security measures	▪ Basics lacking (CCTV, metal detector, etc)	▪ Corridor close to built areas	▪ Barricading (visual, sound)	▪ Barricading ▪ Security Response protocol

Each parameter for evaluation of road corridors has specific questions

1. **Traffic Flow**:
   1. **Capacity Design**: Has the link been designed and 'laned' appropriately to cater to observed traffic numbers?
   2. **Physical Bottlenecks**: Are there any major physical bottlenecks leading to congestion?
   3. **Signal-free Flow**: Is the flow of traffic seamless/'signal-free'?
   4. **Impact on other flows**: What is the impact on at-grade dispersal and the traffic flow of nearby links/corridors?
   5. **Pedestrian movement**: Have arrangements been made for facilitating pedestrian movement?

2. **Connectivity**:
   1. **Access**: Is the road link/corridor readily and smoothly accessible on both ends?
   2. **Entry/Exit Points**: Have the entry/exit points be planned, in accordance with accepted standards to aid traffic flow?
   3. **Link to next major highway**: How smooth is the connectivity to the next major road link(s) on either side?
   4. **Links to suburban and metro stations**: How smooth is the connectivity to the nearest suburban railway or metro stations (planned)?

3. **Safety & Maintenance**:
   1. **Safety**: Does the condition of the link pose a safety hazard for motorists/passengers and pedestrians?
   2. **Scope of Re-design**: Is there scope to alter the design, like widening of road lanes?

Road corridors need to rated along various parameters on a scale of 1-4 as per a set pattern

- Traffic Flow
- Connectivity
- Safety & Security

Parameters	Key evaluation issue	Rating Scale (1- poor, 2- below average, 3- above average, 4- excellent)			
		1	2	3	4
1 **Capacity Design**	▪ Appropriate capacity as per expected demand ▪ Appropriately chosen number of lanes	▪ Lack of capacity as per current demand	▪ Moderate capacity as per current demand	▪ Sufficient capacity for current demand	▪ Sufficient capacity for current, expected future demand
Physical Bottlenecks	▪ Presence of a physical bottleneck like trees, temple, etc on the road	▪ Many physical bottlenecks on the road	▪ Some physical bottlenecks on the road	▪ Few (1 or 2) physical bottlenecks	▪ No physical bottlenecks on the road
Signal-free flow	▪ Seamless flow of traffic	▪ Many signals on the road	▪ Some signals on the road	▪ Few signals on the road	▪ No signals on the road
Impact on other flows	▪ Any adverse impact on a connecting/adjacent road	▪ Severe impact – significantly congests other road	▪ Moderately adverse impact	▪ Low adverse impact	▪ No adverse impact ▪ De-congests other road
Pedestrian Movement	▪ Facilities for pedestrians	▪ No pedestrian crossing	▪ Zebra crossing at some intersections	▪ Zebra crossing at most intersections	▪ Zebra crossing at all intersections, major crossings have skywalk or subway

Road corridors need to rated along various parameters on a scale of 1-4 as per a set pattern

- Traffic Flow
- Connectivity
- Safety & Security

Parameters	Key evaluation issue	Rating Scale (1- poor, 2- below average, 3- above average, 4- excellent)			
		1	2	3	4
2 Access	▪ Smooth access from/to major roads	▪ Not accessible from/to major roads	▪ Low ease of access due to physical bottlenecks	▪ Moderate ease of access – some major connections	▪ Easily accessible from/to major roads
Entry/exit	▪ Spacing of entry/exit points	▪ Very low separation	▪ Low separation	▪ Moderate separation	▪ Appropriately separate, as per standards
Link to next highway	▪ Ease of connection to next major highway/arterial road	▪ No connection	▪ Low ease of access	▪ Moderate ease of access – some major connections	▪ Easily accessible - direct connection
Link to metro, monorail & suburban rail	▪ Ease of access to public transport services	▪ No connection	▪ Low ease of access	▪ Moderate ease of access – some major connections	▪ Easily accessible - direct connection
3 Safety	▪ Potential safety hazards (condition of road, dangerous turns, etc)	▪ Very low safety ▪ Dangerous condition	▪ Low safety – some stretches are dangerous	▪ Moderate safety ▪ No apparent point of concern	▪ High safety ▪ Emergency services
Scope of redesign	▪ Possibility of alteration like widening of road	▪ Very difficult	▪ Difficult	▪ Feasible	▪ Easy

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  - Monorail – Jacob Circle to Wadala
  - Eastern Freeway-APLR-PGLR (road corridor)

A 5-step process has been adopted to carry out the Last Mile Analysis of Metro, Monorail and Road corridor projects in Mumbai

1 **Parameter Selection**	Identify a set of parameters for project evaluation - one for Metro/Monorail and another for Road corridor projects
2 **Project Selection**	Select a representative project for each of the three categories – Metro, Monorail and Road, from the list of priority projects
3 **Prioritization of key focus areas**	Prioritize key focus areas for each project based on: • Extent of existing problems • Potential for practical solutions
4 **Idea Generation**	Generate a list ideas for probable solutions for the key focus areas
5 **Evaluation & Recommendation**	Select recommendations based on an evaluation of the impact and feasibility of probable solutions

Contents

Metro projects have been evaluated along 3 categories of parameters

Key Parameters

1 Access & Dispersal

1. **Pedestrian Movement**
   1. Pathways: Are there adequate pedestrian pathways?
   2. Encroachment: Are the pathways encroachment-free?
   3. Traffic Intersections: Are there adequate pedestrian crossing facilities?
2. **Public Transport**
   1. Connectivity: Are the connections adequate, in capacity & frequency?
   2. Integration with suburban rail: Are the 2 systems well-integrated?

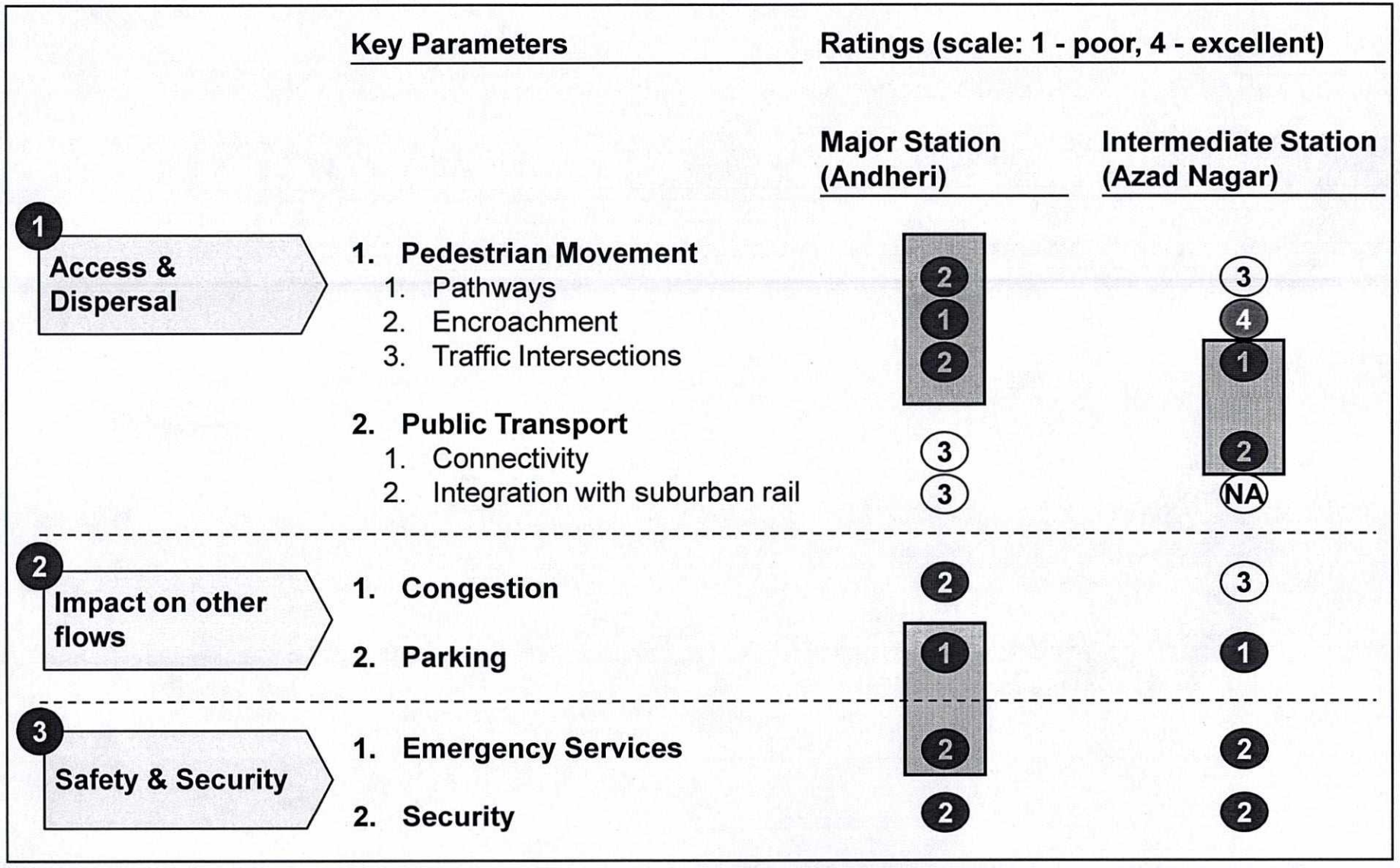
2 Impact on other flows

1. **Congestion**: How will increased vehicular congestion be combated?
2. **Parking**: Are there sufficient facilities nearby, especially for 2-wheelers?

3 Safety & Security

1. **Emergency Services**: Is quick response ensured?
2. **Security**: Are adequate security measures in-place?

Access & Dispersal issues were identified as priority areas for Andheri & Azad Nagar metro stations



Lack of adequate pedestrian facilities & public transport management emerge as key issues

	Prioritized Areas	Key Issues
Andheri	▪ Pathways	▪ Lack of clearly marked pedestrian footpaths near entry/exits ▪ Footpaths merge with narrow roads – no clear separation ▪ Entry/exit stairs have no median railings – leads to cross-flow
	▪ Encroachment	▪ Footpaths near station are heavily encroached
	▪ Traffic intersections	▪ Intersection of MV Road & Old Nagardas Road currently has no pedestrian crossing ▪ 2 entry/exit points of the station located near this intersection
	▪ Parking	▪ No parking facilities currently or planned ▪ Addition of parking capacity would enhance utility of metro
	▪ Emergency services	▪ No identified protocol and procedure for emergency response
Azad Nagar	▪ Traffic Intersections	▪ Intersection of JP Road with Veera Desai Road and Dada bhai Road has no traffic signal or pedestrian crossing ▪ All entry/exit points of the station are near the above crossings
	▪ Public transport - Connectivity	▪ Bus depot needed to add capacity to cater to increased commuter numbers in future, at the desired frequency ▪ Dispersal of metro passengers will lead to greater demand for auto-rickshaws ; regulation of auto movement needed

Dedicated pedestrian & public transport facilities need to be provided for smooth dispersal from the metro stations

	Key Issues	Proposed Solutions	Next Steps
Andheri	▪ Lack of available footpaths and likely problem of cross-flow	▪ Connected Skywalks & FOBs[1] ▪ Barricaded footpaths	▪ Under implementation ▪ Proposed at few stations; extend idea to Andheri
		▪ Median railings on staircases	▪ On-site study
	▪ Footpath encroachment	▪ Clear encroachment	▪ On-site study
	▪ Inadequate facilities for crossing intersections	▪ Pedestrian signal & zebra crossing at intersection	▪ Study of intersection layout, traffic flow
	▪ Lack of parking facilities	▪ Multi-storey/underground car park at/near station	▪ Feasibility study; identify sites and road links
	▪ Lack of emergency response protocol	▪ Setup a command chain with proper procedures	▪ Replicate planned model at monorail project sites
Azad Nagar	▪ Inadequate facilities for crossing intersections	▪ Pedestrian signal & zebra crossing at JP Road	▪ Study of intersection layout and flows
	▪ Lack of bus capacity for increased frequency	▪ Set up Bus depot near station	▪ Discussions with BEST; identification of sites
	▪ High auto movement	▪ Set up IPT stops to regulate auto queues near station	▪ Already proposed; sites identified

1 Foot Over Bridge
2 Intermediate Public Transport

Proposed solutions show clear impact; solutions for pedestrian movement are most feasible

	Proposed 'New' Solutions	Impact	Feasibility		
			Cost	Operational Complexity[1]	Regulatory Issues[2]
Andheri	▪ Barricaded footpaths	▪ Safety for pedestrians	▪ Negligible	▪ Encroach-ments	▪ None
	▪ Median stair railings	▪ No cross-flow	▪ Negligible	▪ Narrow stairs	▪ None
	▪ Pedestrian signal & zebra crossing at the identified intersections	▪ Less chaos, smooth traffic flow	▪ Negligible	▪ Likely presence of utilities; to be checked	▪ None
Azad Nagar	▪ Pedestrian signal & zebra crossing at the identified intersections	▪ Safety for pedestrians ▪ Less chaos, smooth flow	▪ Negligible ▪ Negligible	▪ Encroach-ments ▪ Check utilities' presence	▪ None ▪ None
	▪ Set up Bus depot	▪ High capacity and frequency	▪ TBD[3]	▪ Space to be earmarked	▪ BEST, MCGM approval
	▪ Set up IPT stops	▪ Regulated auto queues	▪ Negligible	▪ Part of road to be reserved	▪ Coordination with MCGM

1 Includes dislocation of people, utilities, etc
2 Includes heritage, environmental issues, etc
3 To be decided

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  - Eastern Freeway-APLR-PGLR (road corridor)

Monorail projects have been evaluated along the same parameters as the Metro projects

Key Parameters

1 Access & Dispersal

1. **Pedestrian Movement**
   1. Pathways: Are there adequate pedestrian pathways?
   2. Encroachment: Are the pathways encroachment-free?
   3. Traffic Intersections: Are there adequate pedestrian crossing facilities?
2. **Public Transport**
   1. Connectivity: Are the connections adequate, in capacity & frequency?
   2. Integration with suburban rail: Are the 2 systems well-integrated?

2 Impact on other flows

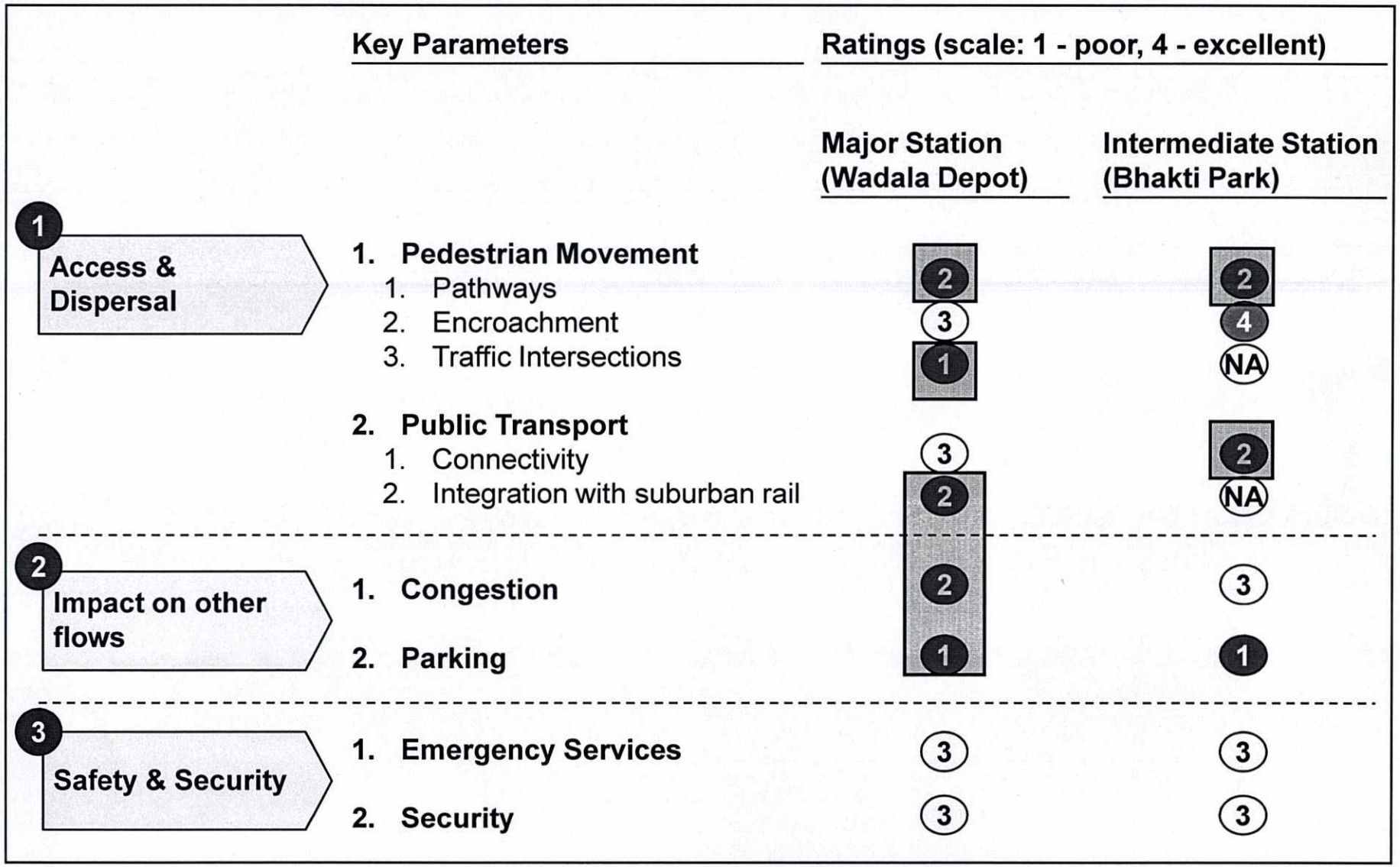
1. **Congestion**: How will increased vehicular congestion be combated?
2. **Parking**: Are there sufficient facilities nearby, especially for 2-wheelers?

3 Safety & Security

1. **Emergency Services**: Is quick response ensured?
2. **Security**: Are adequate security measures in-place?

Priority areas for Wadala Depot and Bhakti Park stations were spread across parameters, with Access & Dispersal being dominant

Prioritized Areas



Pedestrian facilities, public transport management and vehicular congestion emerge as key issues

	Prioritized Areas	Key Issues
Wadala Depot	▪ Pathways	▪ Footpaths near station on RTO road merge with wasteland
	▪ Traffic intersections	▪ No pedestrian crossing at intersection of RTO road and the road leading to the station exit
	▪ Integration with suburban rail	▪ Nearest station is GTB[1] (Harbour line), about 1.5-2 kms away ▪ Pedestrian footpaths leading to station is heavily encroached
	▪ Congestion	▪ Road to GTB station is narrow (only 1 lane on either side)
	▪ Parking	▪ Addition of parking capacity would enhance utility of monorail ▪ Possible space exits near Wadala Depot station
Bhakti Park	▪ Pathways	▪ Footpath on Anik-Wadala road merge with wasteland ▪ All entry/exit points of station are located on this road
	▪ Public transport - Connectivity	▪ Dispersal of monorail passengers will lead to greater demand for taxis ▪ Regulation of taxi movement to ensure smooth flow of traffic ▪ Taxi stand exists nearby at Wadala IMAX

1 Guru Tegh Bahadur station

Clearing wasteland and encroachments will solve many issues related to these stations

	Key Issues	Proposed Solutions	Next Steps
Wadala Depot	▪ Lack of available footpaths on RTO road	▪ Clear wasteland and encroachment on both sides	▪ Check land ownership status
	▪ Inadequate crossing at RTO road, Anik Wadala road	▪ Zebra crossing at intersection	▪ Coordination with MCGM ▪ Study pedestrian flow
	▪ Path to GTB[1] suburban station is congested and encroached upon	▪ Government Resolution to clear encroachments ▪ Barricaded footpaths	▪ On-site study; discuss implications ▪ Coordination with MCGM
	▪ Lack of parking facilities	▪ Multi-storey/underground car park at/near station	▪ Feasibility study; identify sites and road links
Bhakti Park	▪ Inadequate footpath near the station, on both sides	▪ Clear wasteland on both sides	▪ Check land ownership status
	▪ High taxi movement likely, could be chaotic	▪ Set up Intermediate Public Transport (IPT) stops to regulate taxi queues near station ▪ IPT stop can be common for Bhakti Park and Wadala Depot	▪ Identify sites ▪ Check status of taxi stand at IMAX; consider integration

1 Guru Tegh Bahadur station

Proposed solutions seem feasible; further study on encroachments and parking facilities needed

	Proposed 'New' Solutions	Impact	Feasibility		
			Cost	Operational Complexity[1]	Regulatory Issues[2]
Wadala Depot	▪ Clearing wasteland	▪ Wider footpath	▪ Negligible	▪ Check land ownership	▪ None
	▪ Clearing encroachments	▪ Road widening, wider footpath	▪ TBD[3]	▪ Legal disputes	▪ Rehabilitation of people
	▪ Pedestrian signal & crossing at RTO road, Anik Wadala Road	▪ Safety for pedestrians	▪ Negligible	▪ Negligible	▪ None
	▪ Barricaded footpaths	▪ Pedestrian comfort	▪ Negligible	▪ Negligible	▪ None
	▪ Parking facilities	▪ Commuters' convenience	▪ TBD	▪ TBD	▪ TBD
Bhakti Park	▪ Clearing wasteland	▪ Wider footpath	▪ Negligible	▪ Check land ownership	▪ None
	▪ Set up IPT stops	▪ Regulated taxi queues	▪ Negligible	▪ Lack of space	▪ MCGM, Traffic approval

1 Includes dislocation of people, utilities, etc
2 Includes heritage, environmental issues, etc
3 To be decided

Contents

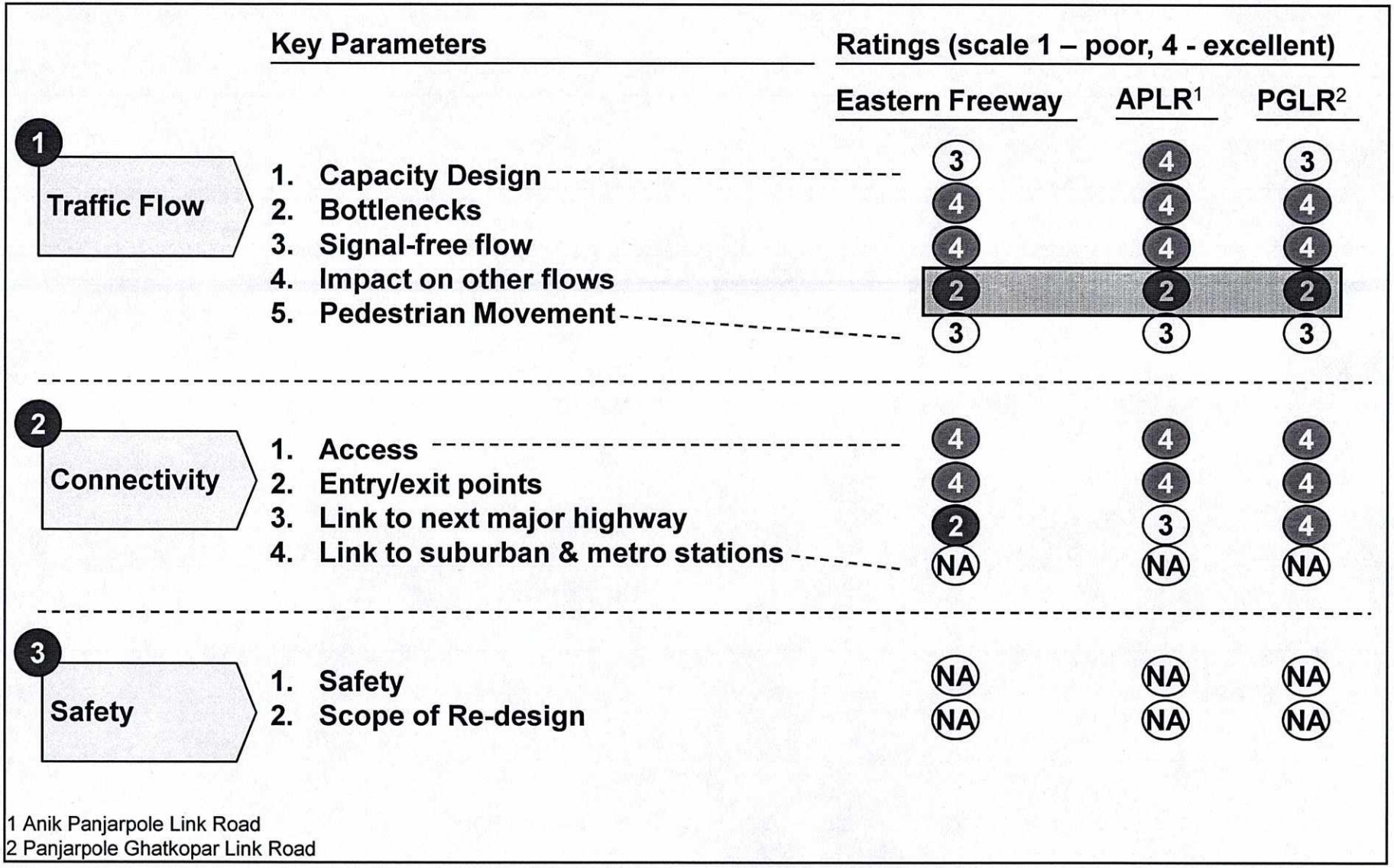
- Overall Analysis – Last Mile Bottlenecks in Mumbai
- Checklist of Parameters for evaluation of bottlenecks
- **Sample Deep-dives – Metro, Monorail and Road**
  - Metro Line 1 – Versova-Andheri-Ghatkopar
  - Monorail – Jacob Circle to Wadala
  - **Eastern Freeway-APLR-PGLR (road corridor)**

Road corridor projects have been evaluated along 3 categories of parameters

	Key Parameters
1 **Traffic Flow**	1. **Capacity Design**: Appropriate capacity and 'laning' of road? 2. **Physical Bottlenecks**: Any visible bottlenecks like trees, junctions, blockages, etc? 3. **Signal-free flow**: Is smooth vehicular flow impeded by traffic signals? 4. **Impact on other flows**: What is the impact on at-grade dispersal and other nearby corridors? 5. **Pedestrian Movement**: Has pedestrian movement been facilitated?
2 **Connectivity**	1. **Access**: Is the corridor smoothly accessible on both ends? 2. **Entry/exit points**: Are the entry/exit points spaced as per standards? 3. **Link to next major highway**: Is the corridor connected to a highway? 4. **Link to suburban and metro stations**: Is the corridor connected to nearby suburban and metro rail stations?
3 **Safety**	1. **Safety**: Does the condition of the corridor pose a safety hazard for motorists and/or pedestrians? 2. **Scope of Re-design**: Can the corridor's design be altered, like widening of road lanes?

Across all three projects, the key priority area is the impact on other flows

Prioritized Areas



1 Anik Panjarpole Link Road
2 Panjarpole Ghatkopar Link Road

Improvements need to be made along the corridors to reduce adverse impact on adjacent/connecting corridors

	Prioritized Areas	Key Issues
Eastern Freeway	▪ Impact on other flows	▪ Congestion is likely at 2-3 km stretch from CST, due to the high volume of traffic bound to/from CST ▪ Mixing of various flows (at-grade) at Barkhat Ali Road junction ▪ Integration with the proposed Mumbai Trans-Harbour Link at Sewri
Anik-Panjarpole Link Road	▪ Impact on other flows	▪ At-grade traffic and pedestrian dispersal at Mahul creek to Anik Wadala Road near Bhakti Park
Panjarpole-Ghatkopar Link Road	▪ Impact on other flows	▪ Panjarpole junction is likely to get congested due to the at-grade mixing of various flows ▪ Lanes for local traffic will be reduced at Govandi Rail over-bridge, thereby leading to congestion for local traffic

Re-design of major intersections/junctions to aid smooth flow is needed

	Key Issues	Proposed Solutions	Next Steps
Eastern Freeway	▪ Congestion likely at 2-3 km stretch from CST	▪ Extend to CST parking plaza and Carnac Bunder junction	▪ Feasibility and technical study
	▪ Mixing of various flows (at-grade) at Barkhat Ali Road junction	▪ Adaptive signalling - change in signal timings as per new traffic flow numbers	▪ Study of expected traffic and pedestrian flows ▪ Coordination with MCGM
	▪ Integration with Mumbai Trans-Harbour Link	▪ Provision for future expansion to be built-in	▪ In place
APLR[1]	▪ Traffic and pedestrian dispersal at Mahul creek to Anik Wadala Road near Bhakti Park	▪ Extend Foot Over-bridge in perpendicular direction ▪ Change in signal timings as per new traffic flow	▪ Study of expected traffic and pedestrian flows ▪ Coordination with MCGM
PGLR[2]	▪ Panjarpole junction is likely to get congested	▪ Re-design of junction ▪ Change in signal timings as per new traffic flow numbers	▪ Already proposed; to be taken up in later phase ▪ Coordination with MCGM
	▪ Govandi Rail Over-bridge (ROB) – lanes for local traffic will be reduced	▪ PGLR to be fully elevated over Govandi ROB ▪ Widening of lanes for local traffic	▪ Rejected due to financial restrictions ▪ Planned, by reducing median widths

1 Anik Panjarpole Link Road
2 Panjarpole Ghatkopar Link Road

Most of the proposed solutions for the key issues are feasible; some need further study

	Proposed 'New' Solutions	Impact	Feasibility		
			Cost	Operational Complexity[1]	Regulatory Issues[2]
Eastern Freeway	▪ Extension to CST	▪ Direct link from CST-Ghatkopar	▪ ~100 crores	▪ Technical issues	▪ Likely heritage issues
	▪ Adaptive signalling – at Barkhat Ali Road	▪ Smooth traffic flow	▪ Negligible	▪ None	▪ None
APLR[1]	▪ Extension of foot over-bridge at Anik-Wadala Road	▪ Safety for pedestrians	▪ Negligible	▪ None	▪ None
	▪ Adaptive signalling	▪ Less chaos, smooth traffic flow	▪ Negligible	▪ None	▪ None
PGLR[2]	▪ Re-design of Panjarpole junction	▪ Safety for pedestrians	▪ Negligible	▪ None	▪ None
	▪ Adaptive signalling	▪ Less chaos, smooth flow	▪ Negligible	▪ None	▪ None
	▪ PGLR to be fully elevated	▪ No mixing with local traffic	▪ TBD[3]	▪ TBD	▪ None

1 Anik-Panjarpole Link Road
2 Panjarpole-Ghatkopar Link Road
3 To be decided

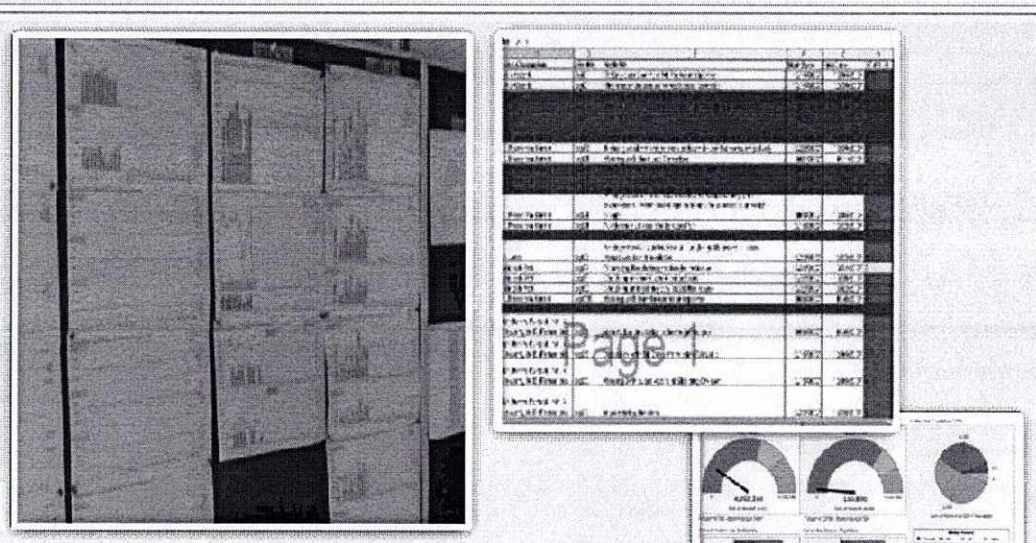
Transforming Mumbai and MMR: Chief Minister's War Room (CMWR)

Presentation to the
Hon'ble Chief Minister, Shri Ashok Chavan

MTSU

26th April, 2010

On November 24, we agreed to create a Chief Minister's war-room to debottleneck the top 35–40 projects



The Delivery Report: Dept A

PMDU Assessment July 2004

Final

The Prime Minister's DELIVERY UNIT

Summary at PSA level

Copy:

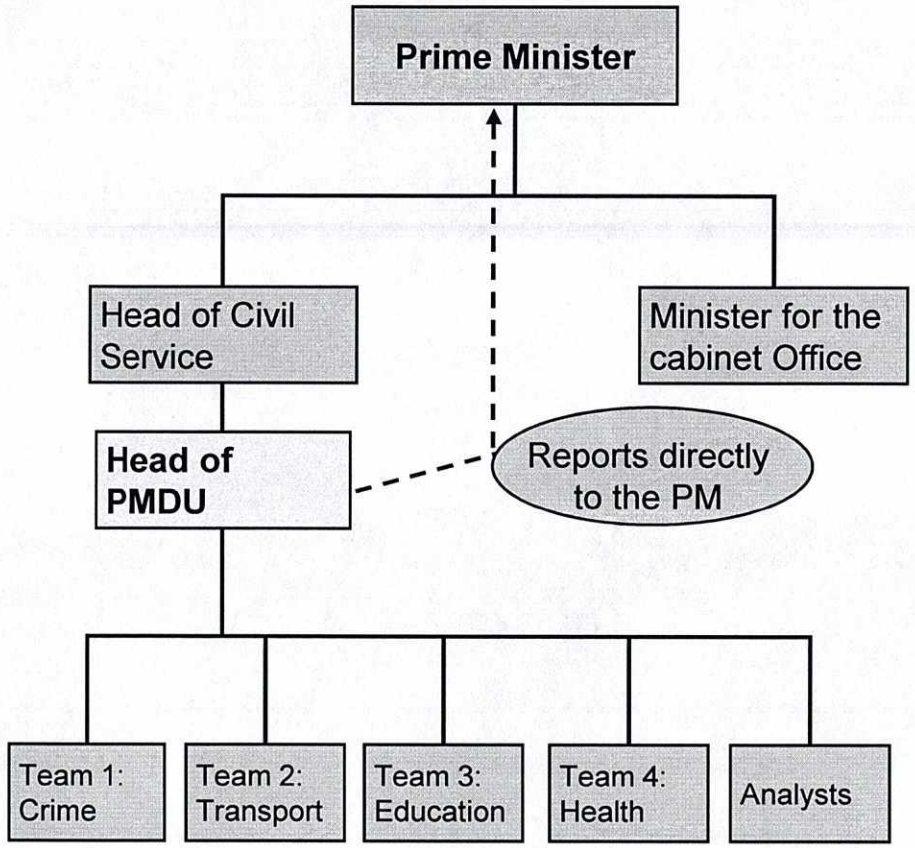
Code	PSA Target	Assessment Criteria: Degree of challenge	Quality of planning, implementation and performance management	Capacity to drive progress	Stage of Delivery	Overall Judgment: Likelihood of Delivery	Rank (out of 21 PSAs)
		VH-H-M-L	R-AR-AG-G	R-AR-AG-G	1-2-3-4	R-AR-AG-G	
	PSA 1	VH	AG	AR	3	R	20
	PSA 2	H	AG	AR	3	R	=18
	PSA 3	VH	R	R	2	R	21
	PSA 4	VH	AG	AR	2	AR	=14
	PSA 5	VH	G	AG	2	AG	5

CM will need to spend just 1 hour every 15 days

- A visual war-room housed at Mantralaya
- Start with top 35–40 MMR projects/ policies
- Extend to the whole state if applicable
- Weekly/Monthly dash-boards and updates to ministries/ agencies to debottleneck project implementation

UK'S PMDU reports directly to the PM through a 1-page progress summary

UK's PMDU reports directly to PM

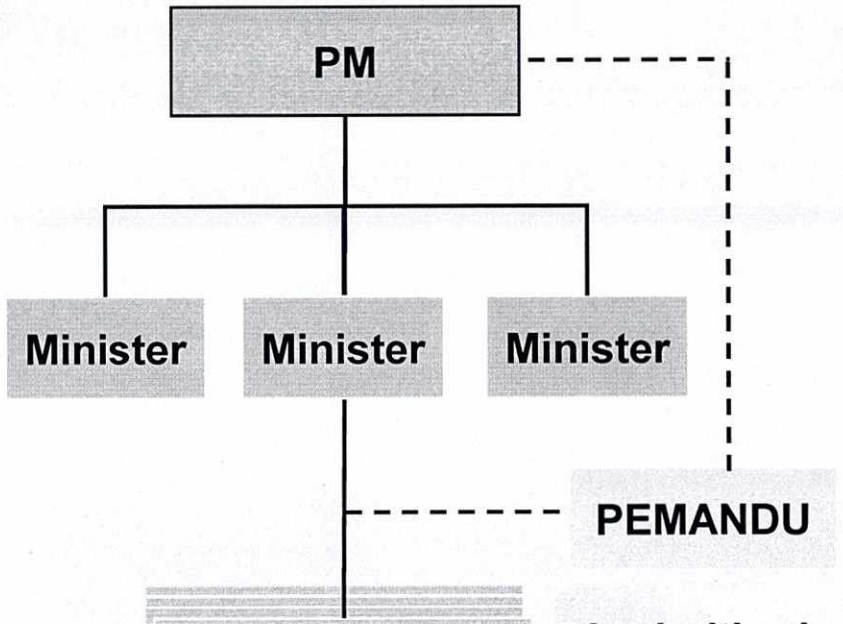


A 1-page monthly report to summarize progress

Lead Ministry		Assessment Criteria: Degree of Chall-enge	Quality of planning,	Capacity to deliver	Stage of Delivery	Overall Judgement: Likelihood of Delivery	Rank (out of 21)
A	Sub-NKRA 1	L	G	G	3	G	1
B	Sub-NKRA 2	L	G	AG	2	G	2
C	Sub-NKRA 3	H	AG	AG	3	G	3
D	Sub-NKRA 4	H	G	AG	3	AG	4
E	Sub-NKRA 5	VH	G	AG	2	AG	5
F	Sub-NKRA 6	H	AG	AG	3	AG	6
A	Sub-NKRA 7	H	AG	AG	2	AG	7
B	Sub-NKRA 8	H	AG	AG	3	AG	8
C	Sub-NKRA 9	H	AG	AG	2	AG	9
D	Sub-NKRA 10	VH	AG	AG	2	AG	10
E	Sub-NKRA 11	VH	AG	AG	2	AG	11
F	Sub-NKRA 12	H	AR	AG	3	AG	12
A	Sub-NKRA 13	VH	AR	AG	2	AR	13
B	Sub-NKRA 14	VH	AG	AR	2	AR	14
C	Sub-NKRA 15	VH	AG	AR	2	AR	15
D	Sub-NKRA 16	VH	AR	AR	2	AR	16
E	Sub-NKRA 17	VH	AR	AR	2	AR	17
F	Sub-NKRA 18	H	AG	AR	3	R	18
A	Sub-NKRA 19	H	AG	AR	2	R	19
B	Sub-NKRA 20	VH	AG	AR	3	R	20
C	Sub-NKRA 21	VH	R	R	2	R	21

Malaysia's PEMANDU used a war-room approach to track initiatives along 6 national priorities

PEMANDU reports and assists the PM to push delivery



6 priorities included:

- **Crime**
- **Education**
- **Urban transport**
- **Rural infra**
- **Housing (urban poor)**
- **Corruption**

A 1-page weekly summary to the PM submitted every Friday to update and request for action

To: YAB Dato' Sri Najib Tun Razak, Prime Minister of Malaysia

From: YB Tan Sri Dr Koh Tsu Koon, Minister in the Prime Minister's Department (Unity and Performance Management)

Re: **Weekly update on Project PEMANDU**

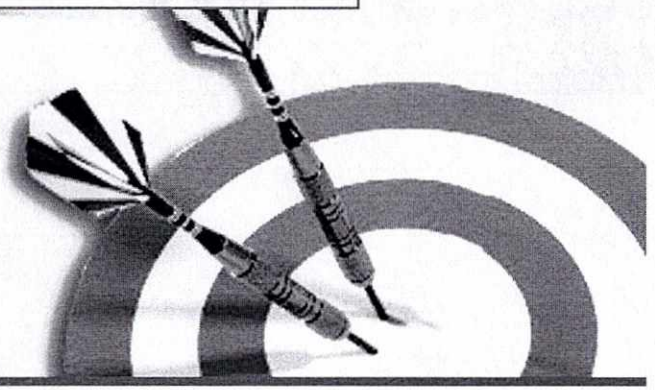
Date: 6 August 2009

The purpose of this memo is to update YAB PM on Project PEMANDU

	Action from YAB PM
1. Head of PEMANDU	
• *<MUPM – if you need to update the PM, please insert a paragraph>*	*Update*
2. Cabinet Workshop on 27 August	
• Update to YAB that the fourth Cabinet Workshop has been scheduled for the morning of 27 August and involves YAB and all Cabinet Ministers	*Update*
• The objective of the Cabinet Workshop is to – Update the Cabinet on progress of delivery of NKRAs by each Delivery Task Force Lead Minister – Finalise Ministerial KPIs – Agree a unified Engagement and Communications Strategy – Illustrate great delivery planning (led by Sir Michael Barber, who will be in Malaysia for the Cabinet Workshop)	
• Update to YAB that the first Education Delivery Taskforce has been scheduled for 11 August and will require 30 minutes of YAB's time to launch the session	*Update*
	Request

Progress since last meeting

1. Physical room located on 4th floor of Mantralaya
2. Agreed to first focus on MMR projects, then roll out to Maharashtra
3. Potential time: 1-2 Wednesdays every month
4. 37 MMR Projects identified for CMWR



The war room will focus on 37 projects relevant to MMR (1/5)

Transport Infrastructure Projects

	Project	Target completion date	Agency	Budget (Rs. Cr)
1	A MTHL – Sewri to Nhava Sealink	–	TBD	8,311
	B MTHL – Sewri-Worli elevated road	–	MMRDA	350
2	A Western Freeway – Bandra-Worli section	May 2010	MSRDC	1,634
	B Western Freeway – Worli-Haji Ali section	Apr 2014	MSRDC	1,950 (717 for extension)
	C Western Freeway – Haji Ali-Nariman Point	–	MSRDC	5,439
	D Western Freeway – Bandra-Versova section	Phase I – 2014	MSRDC	2,650
3	A Metro Rail – Versova – Andheri – Ghatkopar	Dec 2010	MMRDA	2,356
	B Metro Rail – Charkop – Bandra – Mankhurd	Mar 2014	–	8,250
	C Metro Rail – Colaba – Bandra – Santacruz	–	–	10,315
	D Metro Rail – Other six corridors	–	–	To be fixed
4	Bus Rapid Transit System (BRTS)	Dec 2011	MMRDA	120
5	A Western Waterways	Jan 2012	MSRDC	1,200
	B Eastern Waterways	–	–	250
6	A Monorail – Sant Gadge Maharaj Chowk-Wadala-Chembur Corridor	May 2011	MMRDA	2,639
	B Monorail – Thane-Bhiwandi-Kalyan-Badlapur Corridor	–	MMRDA	6,108
7	A Eastern Freeway – Prince of Wales to Anik	Jul 2011	MMRDA	531
	B E Freeway – Anik to Panjarpole link road	Dec 2010	MMRDA	222
	C Eastern Freeway – Panjarpole to Ghatkopar	Feb 2011	MMRDA	168

The war room will focus on 37 projects relevant to MMR (2/5)

	Project	Target completion date	Agency	Budget (Rs. Cr)
Transport Infrastructure Projects	8 Vasai/Virar – Alibaug multi-modal corridor	–	MMRDA	10,000
	9 A Sion-Panvel Express Way – Sion-BARC Elevated Road	–	MCGM	263
	B Sion-Panvel Express Way – Additional Thane Creek Bridge	–	MSRDC	355
	C Sion-Panvel Express Way – Thane Creek-Panvel Expressway	Sep 2013	PWD	1,220
	10 Airport at Navi Mumbai	Phase I – Dec '13 (All 4 Phases Dec '30)	CIDCO	Phase I – 4,765
	11 Renovation of existing airport	Dec 2012	MIAL	9,802
	12 Heliports in Mumbai and Navi Mumbai	Dec 2013	MMRDA	154
	13 World class station at CST	–	Central Railways	NA
	14 Minor ports in MMR-Rewas and Mandwa	NA	MMB	5,200 (Phase I) and 42
Policies for Improvement in Public Transport	15 A Area Traffic Control System	Oct 2010	MCGM/MMRDA /Jt. CP(Traffic)	62.3
	B Seamless Travel	Ticketing Integration by Mar 2011	UMMTA, MMRDA	–
	C Strengthening UMMTA	Fare Integration by Mar 2012	UDD-I	–

The war room will focus on 37 projects relevant to MMR (3/5)

	Project	Target completion date	Agency	Budget (Rs. Cr)
24 x 7 Safe Drinking Water	16 Gargai – Pinjal water supply project	Feb 2011	MCGM	168
	17 Construction of dam at Shai	Sep 2013	MMRDA	580
	18 Construction of dam at Kalu	Aug 2014	MMRDA	863
	19 Surya water supply scheme.	Dec 2012	MMRDA	4,731
	20 Water desalination plant	–	MCGM	0
Waste Disposal and Sanitation	21 A Mumbai Sewage Disposal Project (MSDP) Stage-II Priority Works – Component - I	Mar 2011	MCGM	502
	B MSDP – Component - II	Dec 2011	MCGM	562
	C MSDP – Component - III	Dec 2011	MCGM	1,001
	22 A BRIMSTOWAD – Phase I	Jan 2011	MCGM	357
	B BRIMSTOWAD – Phase II	May 2011	MCGM	835
	23 A Mithi River Development Phase II	MMRDA – Dec 2010	MMRDA	570
	B Mithi River Development Phase II	MCGM – May 2012	MMRDA	920
	C Mithi River Development Phase II	MIAL – NA	MIAL	NA
	24 Scientific development of regional landfills	NA	MMRDA	~3,000

The war room will focus on 37 projects relevant to MMR (4/5)

	Project	Target completion date	Agency	Budget (Rs. Cr)
Urban Renewal	25 Dharavi Redevelopment Project	–	OSD, DRP	5,600
	26 Redevelopment of Nariman Point area	NA	MMRDA	3,500
	27 Redevelopment of Bandra colony	NA	PWD	3,406
	28 Redevelopment of BDD chawls	NA	Housing Dept.	NA
Culture and Tourism	29 Modernization of Taraporewala Aquarium	May 2012	MUINFRA	250
	30 Setting up maritime museum in IMS Vikrant	Mar 2013	MUINFRA	450
Energy Infrastructure in MMR	31 Rejuvenation of Thakurli Power Plant	–	MMRDA	2,500
Environment and Ecological Sustainability	32 A Promotion of Green Housing	–	UDD and Housing Dept.	–
	B Climate change policies	Mar 2012	Env. Dept.	0.98
	C Revival and renovation of lakes in MMR	–	Env. Dept, MMRDA, MCGM	–

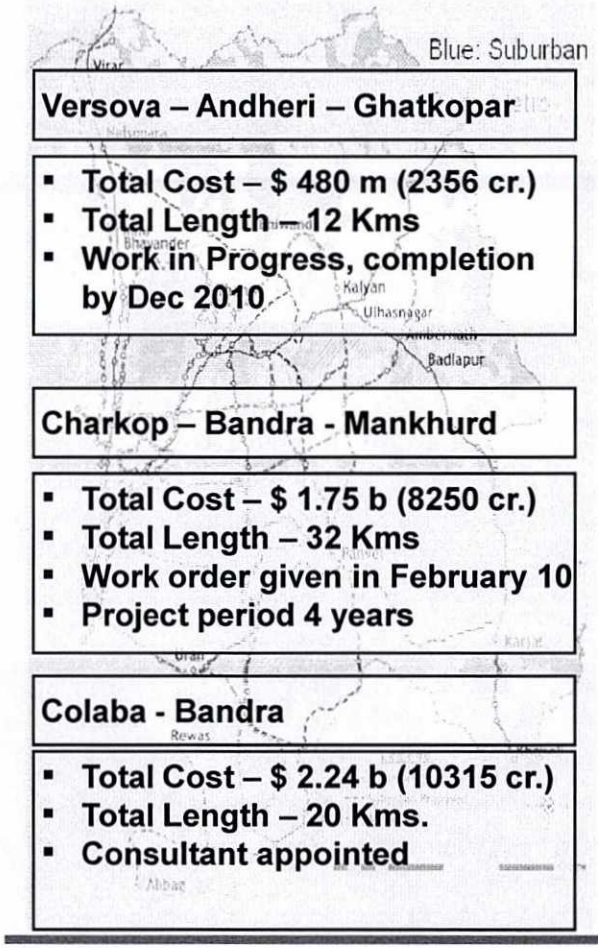
The war room will focus on 37 projects relevant to MMR (5/5)

	Project	Target completion date	Agency	Budget (Rs. Cr)
Beautification Projects	33 A Marine Drive – Phase II	NA	MCGM	NA
	B Haji Ali Promenade	NA	MCGM	48
	C Dadar and Mahim Beach Nourishment	NA	MCGM	25
	D Veermata Jijabai Bhosale Udyan Zoo	Feb 2015 (Phase I by Feb 2011)	MCGM	480
	E Dadar Chaityabhoomi Beautification (Phase – II and III)	–	–	25
Other Projects and Initiatives	34 Interstate Bus Terminus (ISBT) at Wadala	Apr 2013	MMRDA	350
	35 Iconic Tower at Wadala	Jun 2014	MMRDA	2,475
	36 Setting up a Railway Hub in Navi Mumbai	–	Indian Railways UDD – I, MMRDA	–
Policies	37 Setting up Mumbai Development Fund	–	UDD – I	–
	Others – To be determined			

Project dashboard – Metro Rail

Key features

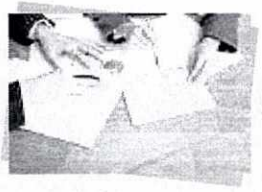
- Total length 146.5 kms in 9 corridors in Mumbai
- Implementation in 2 phases by 2015
- Proposed Budget USD 4.6 B



	Status	Way Forward
Versova – Andheri – Ghatkopar ▪ **Total Cost – $ 480 m (2356 cr.)** ▪ **Total Length – 12 Kms** ▪ **Work in Progress, completion by Dec 2010**	▪ 79% piles completed, 68% pile caps completed. 61% piers completed, 35% pier caps completed, 9% girders laid. Work at 9 out of 12 stations started – Rolling stock arrival by 30 April 2010 – Trial Run by 15 August 2010 – Casting of piles and piers to be completed by August 2010.	▪ Approval of WR for over bridge at Andheri still awaited.
Charkop – Bandra - Mankhurd ▪ **Total Cost – $ 1.75 b (8250 cr.)** ▪ **Total Length – 32 Kms** ▪ **Work order given in February 10** ▪ **Project period 4 years**	▪ Work order issued in February, 2010 – Financial Closure by Oct. 2010 – Physical work to start by Nov. 2010	▪ In-principle approval of CR for over-bridge between Kurla and Mankhurd still awaited ▪ CRZ clearance from MOEF for depots at Charkop and for crossing Mahim Creek awaited ▪ Fare Notification from GOM awaited
Colaba - Bandra ▪ **Total Cost – $ 2.24 b (10315 cr.)** ▪ **Total Length – 20 Kms.** ▪ **Consultant appointed**	▪ Proposal submitted to Govt. of India to implement this project on Delhi Airport Link model. Consultant appointed to work out commercial exploitation potential – Report of consultant by May 2010 – Implementation strategy by June 2010	▪ Actively follow up on proposal to ensure on-time delivery

Today's Agenda

Seek 10 decisions / interventions on critical projects



Seek 3 other decisions to make CMWR more effective going forward

Today, we will discuss 10 decisions on projects and 3 war-room related decisions

A **Projects ready for physical launch within the next 1 year**

- **Mumbai Trans-Harbour Link**
- **Bus Rapid Transit System** (BRTS)
- **Western freeway** (Bandra – Versova section)
- **Nariman Point redevelopment**

B **Projects where substantial progress needed over 6 months to complete by 2014**

- **Western freeway** (Haji Ali – Nariman Point section)
- **Eastern waterway**
- **Mumbai Metro Rail** – 6 corridors beyond the 3 already decided

C **Ongoing projects slated for completion over the next 2 years**

- **BRIMSTOWAD** – Phase II
- **Mumbai Metro Rail (MMRP)** (Versova – Andheri – Ghatkopar link)
- **Eastern Freeway** (Prince of Wales museum – Anik)

Category A (Projects ready for physical launch within the next 1 year): Decisions/interventions needed

Project	Challenges	Decisions/interventions required
▪ **Mumbai Trans-harbour Link**	▪ Government decision on implementing agency yet to be communicated	▪ Communicate the decision of the implementing agency (in this case, MMRDA) through a GR ▪ **Responsibility**: Secretary UD ▪ **Time frame**: 7 days
▪ **BRTS**	▪ Decision on implementing agency pending	▪ Implementation agency for project, i.e., MMRDA or MCGM or BEST (Suggestion: BEST) ▪ Issue GR to the implementing agency ▪ **Time frame:** 15 days
▪ **Western freeway** (Bandra – Versova section)	▪ No timelines or aspirational targets	Get timelines from MSRDC on key milestones • Appointment of consultant • Creation of DPR • Execution of project • **Timeframe: xxxx**
▪ **Nariman Point redevelopment**	▪ Lack of clarity on: (a) scope of work and, (b) agency for implementation	▪ Finalize and communicate the decision on implementation agency ▪ Decide whether to include Mantralaya in the scope

Category B (Projects where substantial progress needed over 6 months to complete by 2014): Decisions/interventions needed

Project	Challenges	Decisions/interventions required
▪ **Western freeway** (Haji Ali – Nariman Point section)	▪ Can the timeline of 16 months be compressed to 12 months given importance of link?	▪ Ask MSRDC to review timelines and revert ▪ **Responsibility:** MSRDC ▪ **Time frame:** 4 weeks
▪ **Eastern waterway**	▪ No response to BOT bids ▪ Decision on location of terminal pending	▪ Agree on implementing agency (Suggestion: MMRDA with their own funding) ▪ Implementation agency to revert on location of terminal – **Time frame:** 4 weeks
▪ **Mumbai Metro Rail** – 6 corridors beyond the 3 already decided	▪ One DPR completed ▪ 5 to be completed by June '10	▪ Get target dates from MMRDA on complete timelines including finalisation of bids ▪ **Time frame**: 2 weeks

Category C (Ongoing projects that can be completed in the next 2 years): Decisions/interventions needed

Project	Challenges	Decisions/interventions required
▪ **BRIMSTOWAD** – Phase II	▪ 11 works held up due to encroachment	▪ Need target timelines from MCGM on when encroachment across each of the 11 areas will be overcome ▪ **Timeframe:** 4 weeks
▪ **Mumbai Metro Rail** (Versova – Andheri – Ghatkopar link)	▪ Approval from Western Railway for over bridge at Andheri awaited	▪ Perhaps, Chief secretary could coordinate with GM of Western Railway within the next 2 weeks
▪ **Eastern Freeway** (Prince of Wales museum – Anik)	▪ Less than 1 km stretch work held up due to right of way	▪ Need target date from MMRDA on approval from customs and forest department

3 other decisions to make the CMWR more effective going forward

		Responsibility and timeline
1	• Initiatives required on healthcare and education • Send GR to create this mission and submit report within 3 months	Secretary , UD Timeline: 7 days to send GR
2	• Next war room meeting on Wednesday 19th May • Meeting will be happen in the "war room"	Principal secretary CM
3	• Finalise and add 5 – 6 important policies to be tracked, e.g., low-income affordable housing policy, Mumbai Development Fund	MTSU, Secretary UD

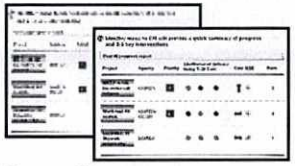
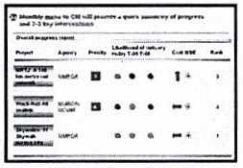
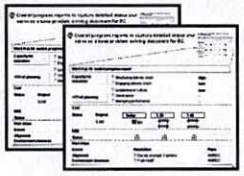
Appendix 1 – How the CMWR will function

Process-related suggestions for effective functioning of the war room

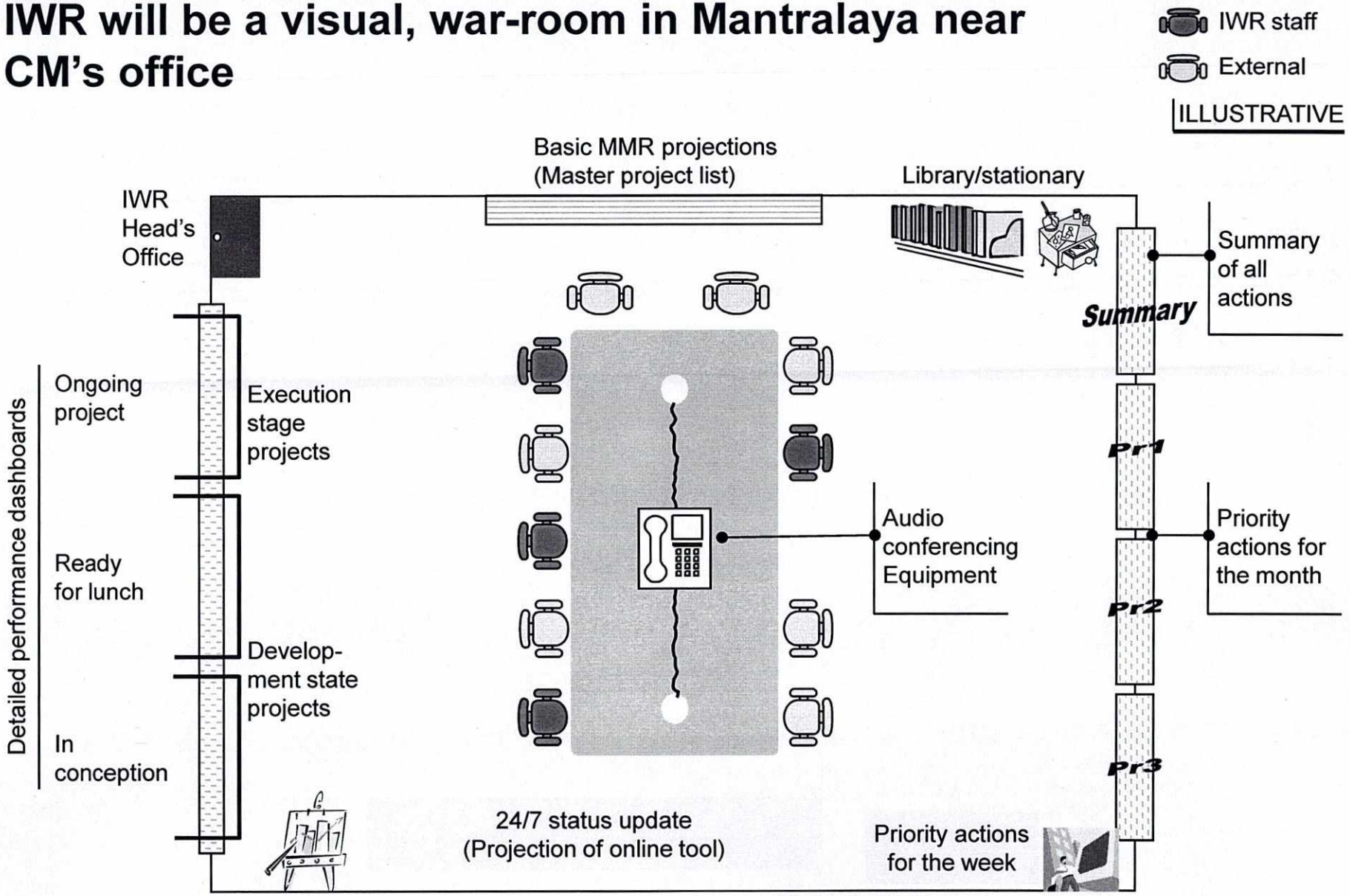
- Layered review architecture to be followed (weekly reviews with IWR directors, fortnightly CM walk-through a key element)
- Next war room meeting to happen in war room only
- Next meeting on 12th May and every alternate Wednesday thereafter
- Policy decisions to be covered from next war room meeting
- Important projects as advocated by the CAG to be included in the review architecture
- Online tool to be developed for high visibility and transparency of project status across all stakeholders and participating agencies

A set of cascading performance dashboards and regular structured meetings will be conducted

Cascaded Reviews

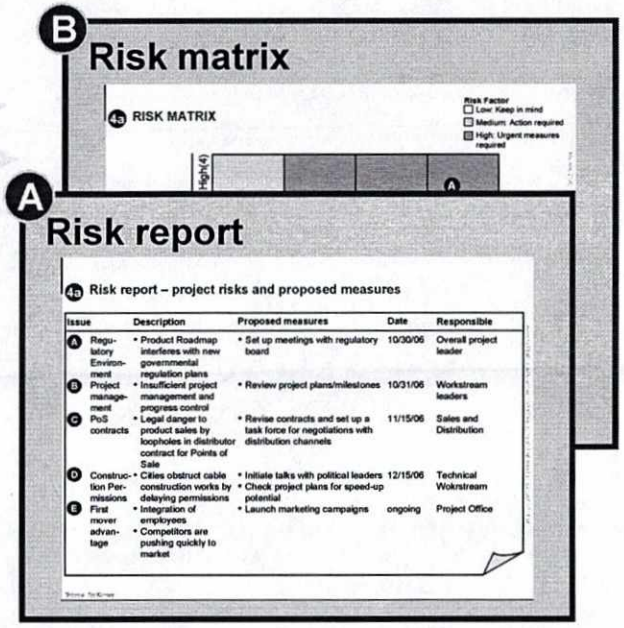
	Document(s) used	Description	Proposed participants
1 **Quarterly CM stock-takes**	 **Presen-tation by individual executing agencies**	▪ Overall quarterly stock-take – presentations by individual agency heads	▪ CM ▪ CAG members ▪ IWR Directors and Head ▪ Head of executing agency and other institutions, as needed
2 **Monthly EC reviews**	 **Overall progress report**	▪ Detailed progress report on all projects/policies ▪ List of bottle-necks and proposed resolution steps	▪ EC members – Chief secretary, key secretaries and heads – Key CAG and pvt. sector members ▪ IWR directors, head and analysts ▪ Head of executing agency and other institutions, as needed
3 **Fortnightly CM reviews**	 **1 hour walk-through + 2-page memo to CM**	▪ 1 hour walk-through of war-room ▪ 2 page summary of progress of all projects/policies ▪ Highlights of 2-3 priority bottlenecks and potential assistance from CM	▪ CM ▪ Chief Secretary ▪ IWR Directors and Head ▪ Head of executing agency and other institutions, as needed
4 **Weekly IWR progress reviews**		▪ Collection of progress data at a project/policy level ▪ Identification of critical bottle-necks	▪ IWR Team (Directors, Manager, Analysts) ▪ Representative of executing agency and other institutions, as needed

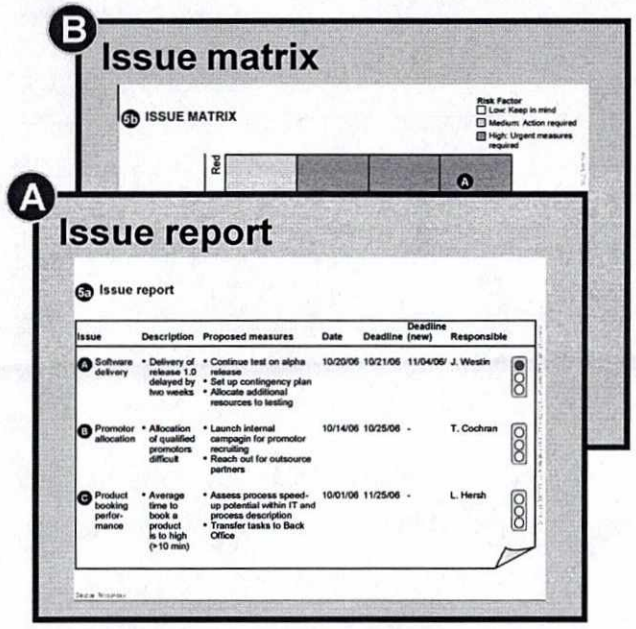
IWR will be a visual, war-room in Mantralaya near CM's office



We will bring powerful proprietary tools and templates customized to this context in order to drive an effective IWR (1/2)

Tool for automization is to be developed for GOM needs





Challenges

- Risk matrix tends to be diluted with time as smaller issues enter the list
  Management attention on risk matrix has to be kept up
- Subprojects need to be kept focused on problems in issue list

Key learnings/ best practice

- Try to keep the list short by using specific rules (e.g. market critical risks)
  Carefully assess repeating intervals especially if there are only few changes to avoid trifling
- Key success factor is ongoing tracking of issues
- Establish a regular touch point to re-port and challenge results and status of the issue list
- Setting up task forces can be a powerful tool to resolve major issues that touch many subprojects

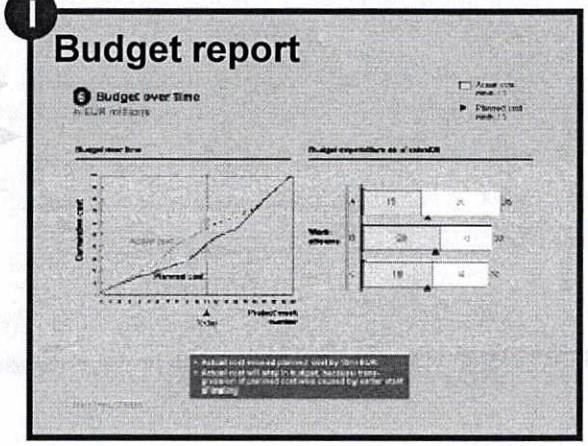
Establish senior client as owner of risk and issue report – team should be only a referee

Source: Team analysis

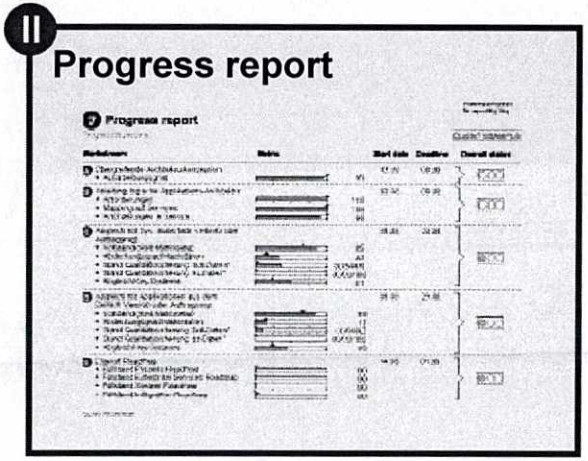
We will bring powerful proprietary tools and templates customized to this context in order to drive an effective IWR (2/2)

Tool for automization is to be developed for GOM needs

I Budget report



II Progress report



Challenges

- Mapping the bottom-up with the top-down budget
- Allocating costs correctly to work- streams
- Achieving 100% transparency about actual costs in the project

- Ensuring that costs scale linear over time, i.e. when writing specs effort increases at the end due to quality assurance
- Ability of project members to estimate the needed time to completion
- Defining milestones for non-technical work-stream, e.g. getting work-streams

Key learnings/ best practice

- Balance pressure for staying in the budget and realistic efforts
- Collecting actual costs maintaining list of project members and tasks is a full time job*
- Regular touch points with line managers outside the project to identify hidden costs (e.g. if people work significantly more than they charge on the project)

- Break down all work-streams to tasks where effort scales linear over time and where one person is the clear owner
- Estimate the time to completion together with each owner of work-streams
- Clearly define milestones together with experts, even if it seems artificial
- Clearly define criteria for a finished deliverables

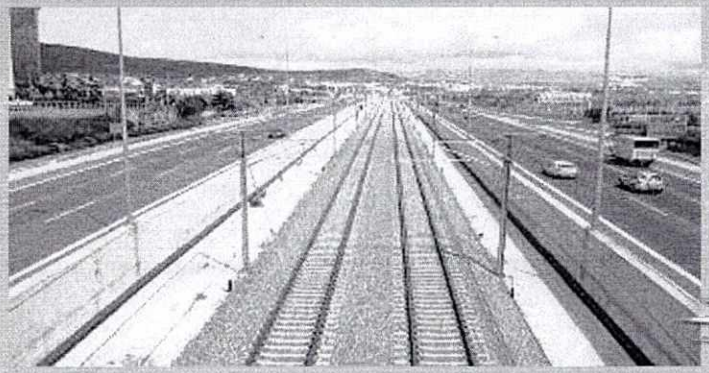
* In our case example updating the allocation, checking and reporting utilized 2 FTE from the client

Source: Team analysis

Appendix 2

Can we reduce the time taken for feasibility report for the western freeway?

Vasai – Virar – Alibaug Multi-Modal Corridor



Key features

- 8 lane corridor of 140 kms. with a provision for metro and BRTS

External consultant will provide both

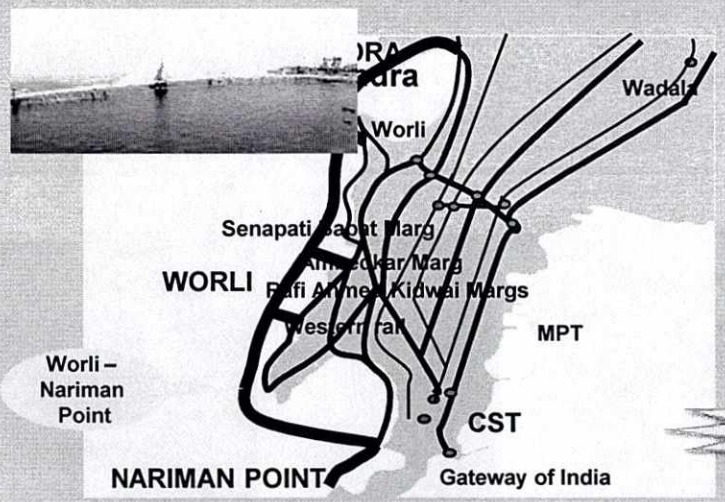
- Feasibility report &
- DPR

Within a period of 12 months

Cost: 2.18 bill. USD

Western Freeway Sea link Project

(Haji Ali-Nariman Point)



Key Features

- Sea link from Haji Ali to PDP, tunnel from PDP to Nariman Point
- 4 lanes
- length - 9 kms

External consultant will provide only

- Feasibility report

Within a period of 16 months

Cost: 2.3 bill. USD