PERFORMANCE IMPROVEMENT PLAN PRESENTATION

PRESENTED BY SATARA MUNICIPAL COUNCIL

Preparation of PIP: Modus -Operandi…

- **Bringing Ownership of ULB**
  - Periodic Consultations with Satara CO and Officials from respective Departments
  - Sharing analysis results and strategies for improvement with Satara Officials periodically.
  - 3 Major Workshops Conducted with Satara Officials to share (a) Existing service levels, (b) Situation analysis (c) Strategies/ Actions for improvement with block cost estimates.
- **On Ground Assessment – Situation Analysis**
  - Field Visits (6 no.) - To Assess On Ground Situation
  - All 21 Slums Visited and FGDs Conducted

Slum – Field Survey and FGD

FGD with Women, Laxmi Tekadi Vasti

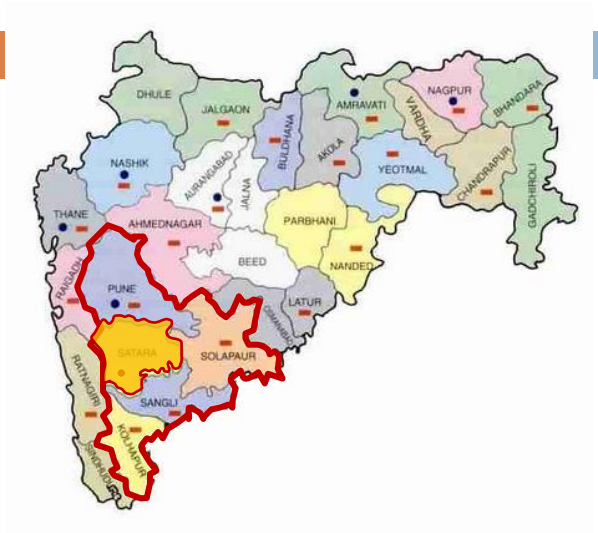
Preparation of PIP: Modus –Operandi..

- **Incorporating WSS & SWM Experts Inputs**
  - Working with Sanitation Expert during his visit to Satara
  - Discussions and Consultations with Water Supply, Sanitation & SWM Experts
- **Visiting Local Factory that manufactures prefabricated septic tanks and prefabricated toilets.**

1

Introduction

Satara Municipal Council - Location



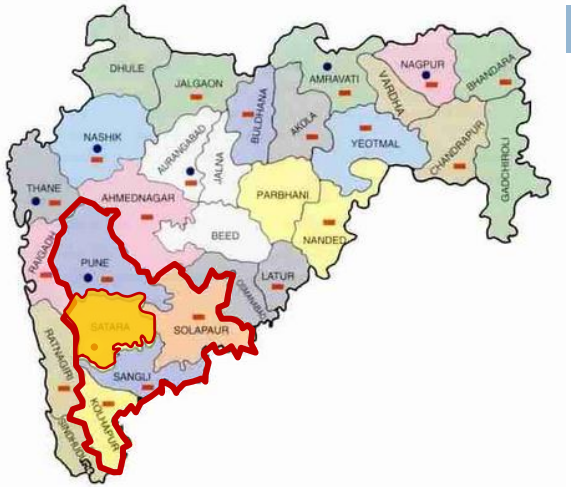
Satara : A Municipal Council

Satara District

Pune Division

Population (2010-11)	**1,20,079**
HHs	**29028**
Area (Sq Kms)	8.15
Density (persons per sq km)	14734
HH size	4.14
Floating Population	12250

Satara Municipal Council - Location



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Total Property Tax Wards	**22**

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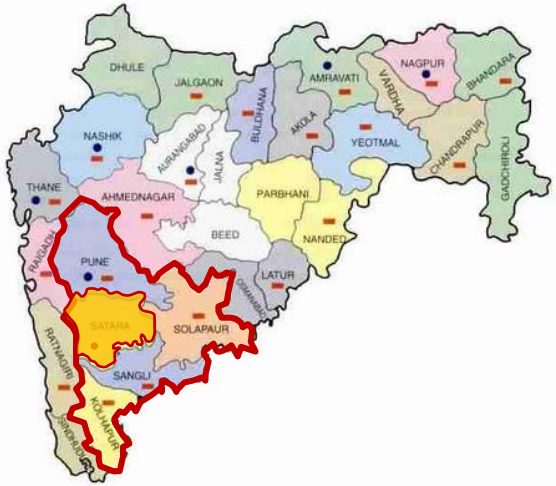

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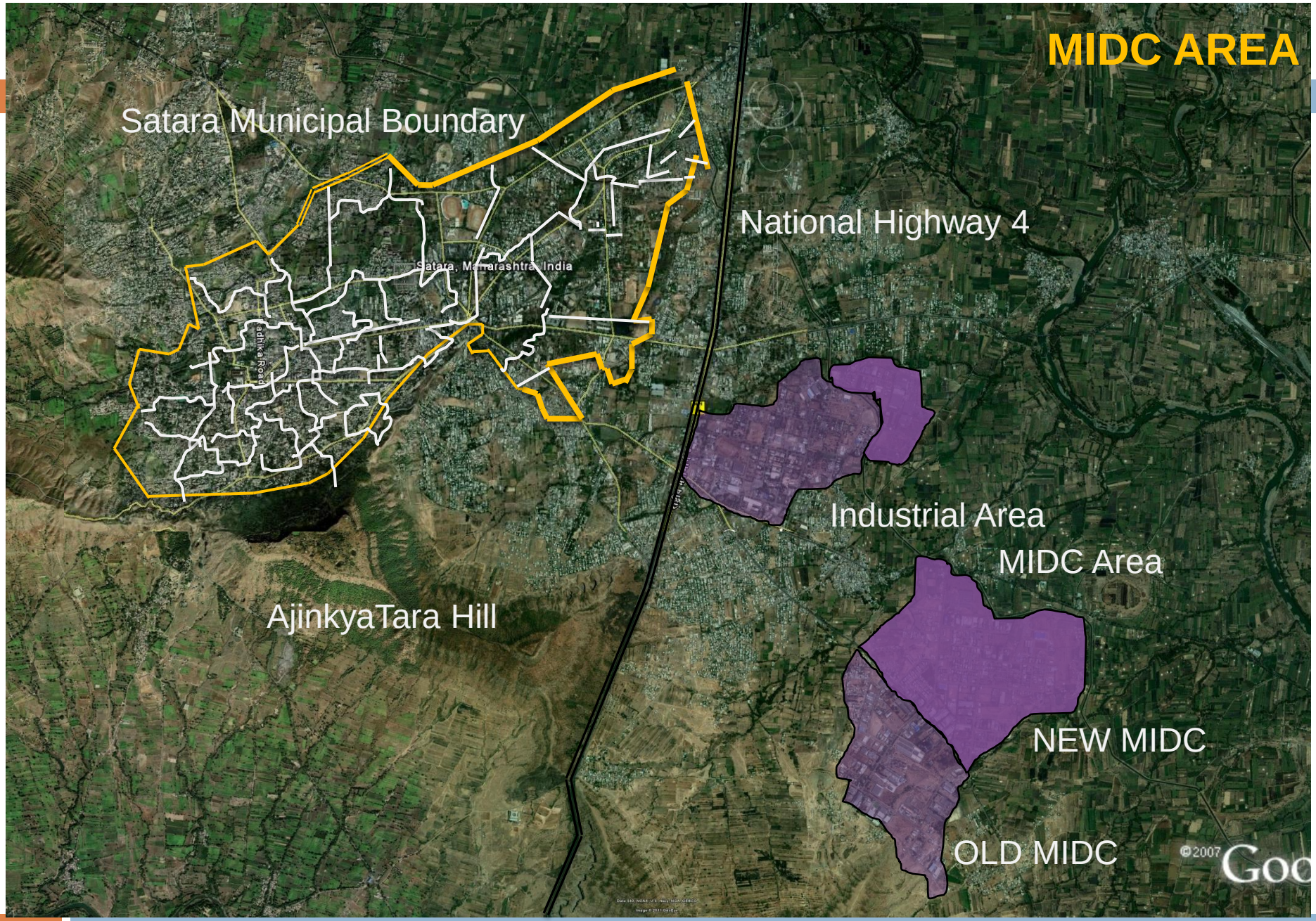
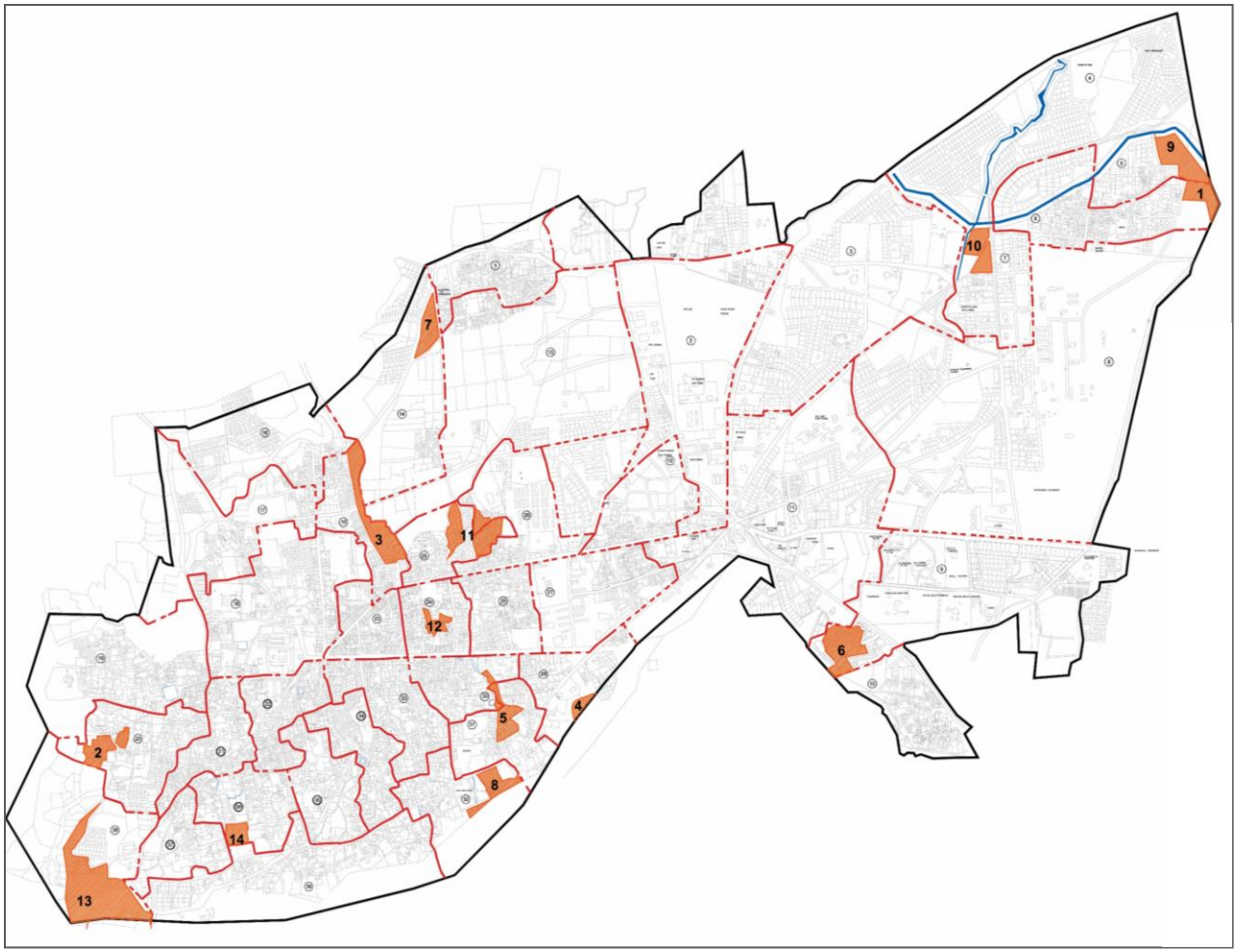
MIDC AREA


Satara Municipal Boundary
National Highway 4
Industrial Area
MIDC Area
AjinkyaTara Hill
NEW MIDC
OLD MIDC
©2007

Slums

	2010-11
Slum Population	8374
Slum HHs	1824
Slum HH size	4.6
Number of slums	14
% slum population	7 %

- None of the slums is notified.
- All slums are on municipal land or state government land.
- 13 slums are located in the core town area and 1 in fringe area.
- 4 slums are located along nallahs and 10 slums located on non-hazardous locations.



- *Source: Survey 2011*

Satara Municipal Council

Administrative Departments

- Establishment
- Computer
- Death and Birth
- Court
- Store
- Internal Auditor

- **6 Administrative Departments**
- **13 Line Departments**

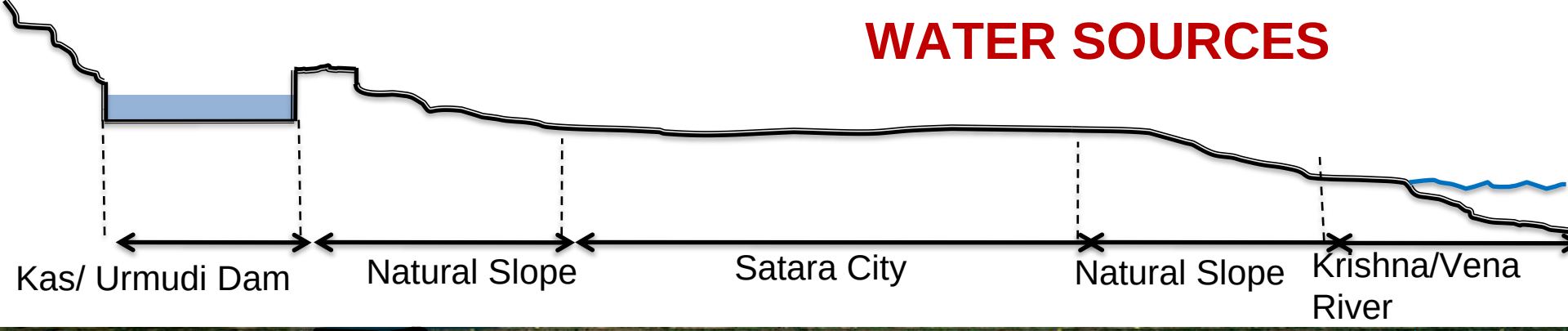
Line Department

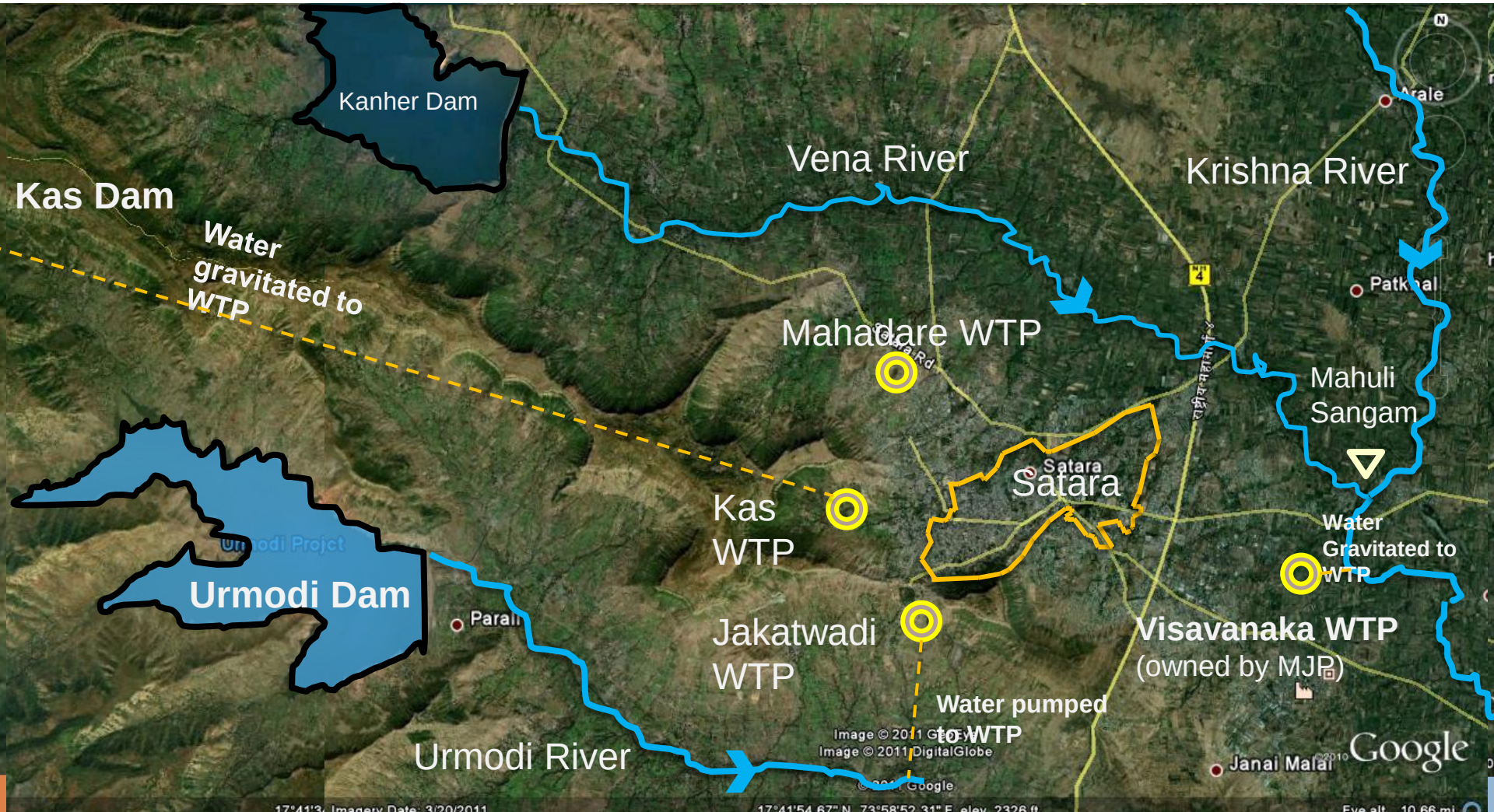
- Water Supply
- Health (for Sanitation and SWM)
- PWD
- Account
- Pension
- Tax
- City Development Department
- Electricity
- SJSRY
- Garden
- Market
- Encroachment
- Maternity hospital

Water Supply Assessment

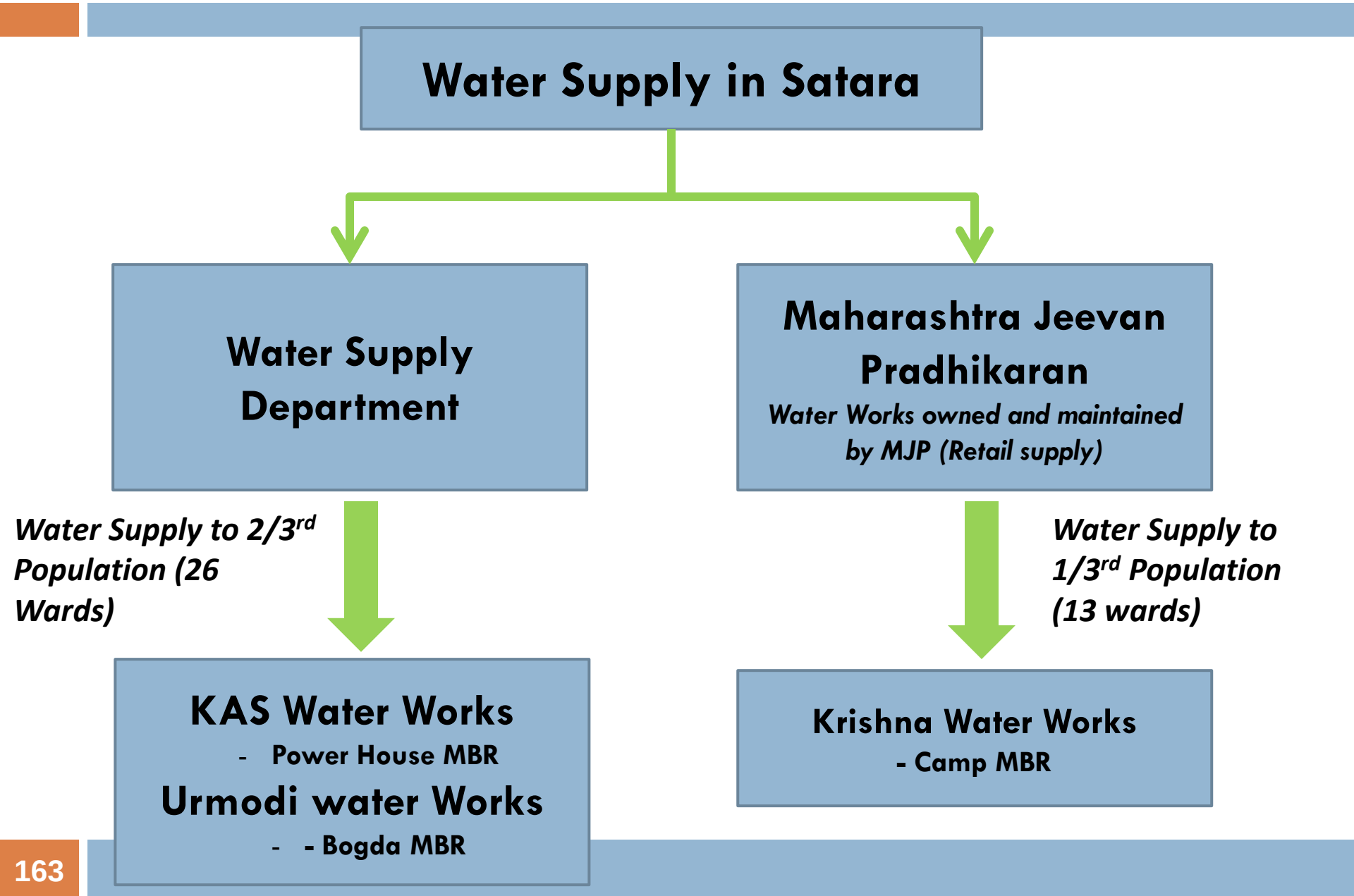
- Performance Assessment
- Identification of Improvement Areas
- Prioritisation of Improvement Areas
- Proposed Solutions & Actions
- Assessment of Ongoing Projects – UIDSSMT, MSNA

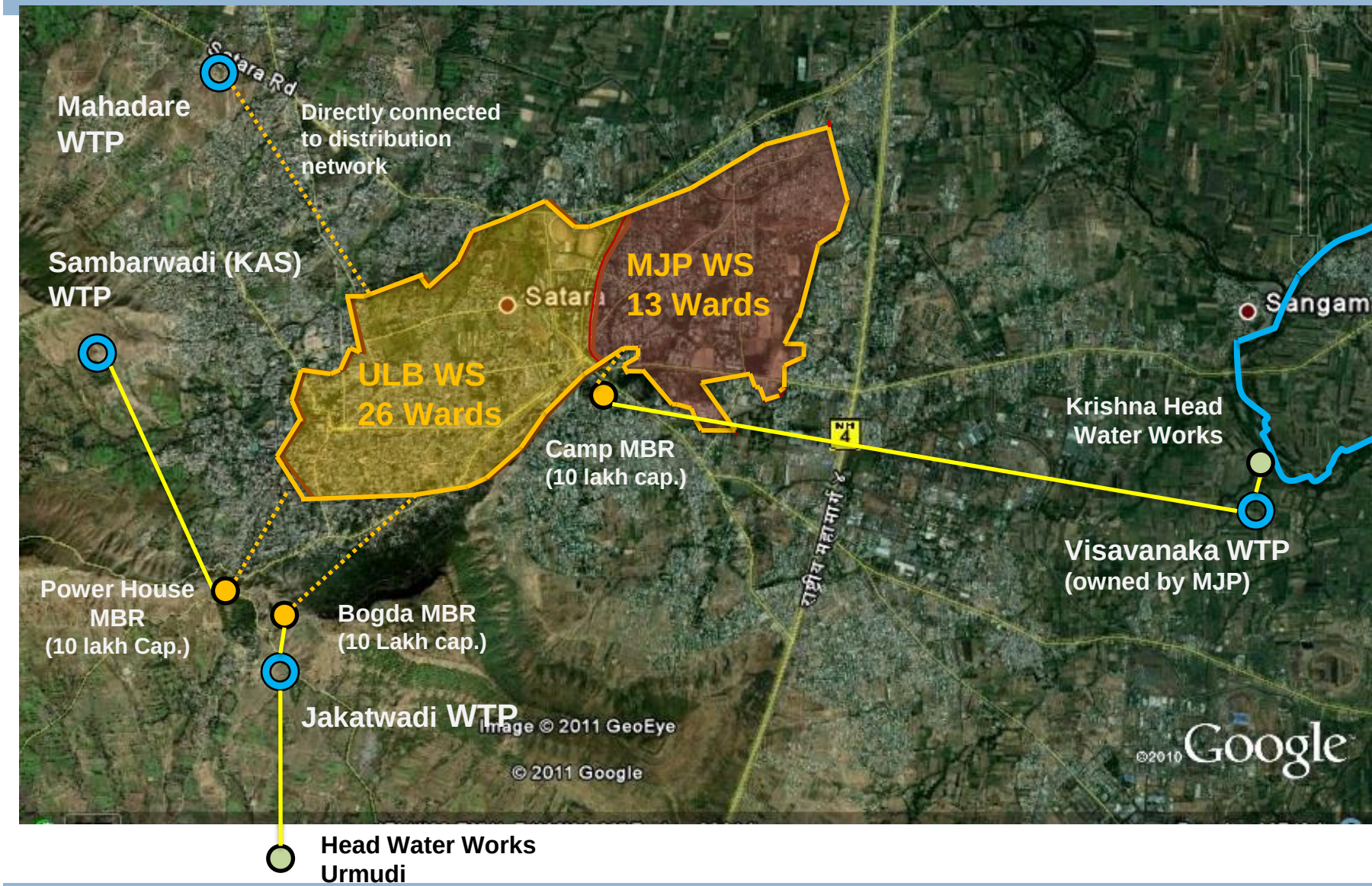
WATER SOURCES





WATER SUPPLY – Institutional Structure




Mahadare WTP
Directly connected to distribution network
Sambarwadi (KAS) WTP
MJP WS 13 Wards
ULB WS 26 Wards
Satara
Sangam
Camp MBR (10 lakh cap.)
Krishna Head Water Works
Visavanaka WTP (owned by MJP)
Power House MBR (10 lakh Cap.)
Bogda MBR (10 Lakh cap.)
Jakatwadi WTP
Head Water Works Urmudi
Image © 2011 GeoEye
© 2011 Google
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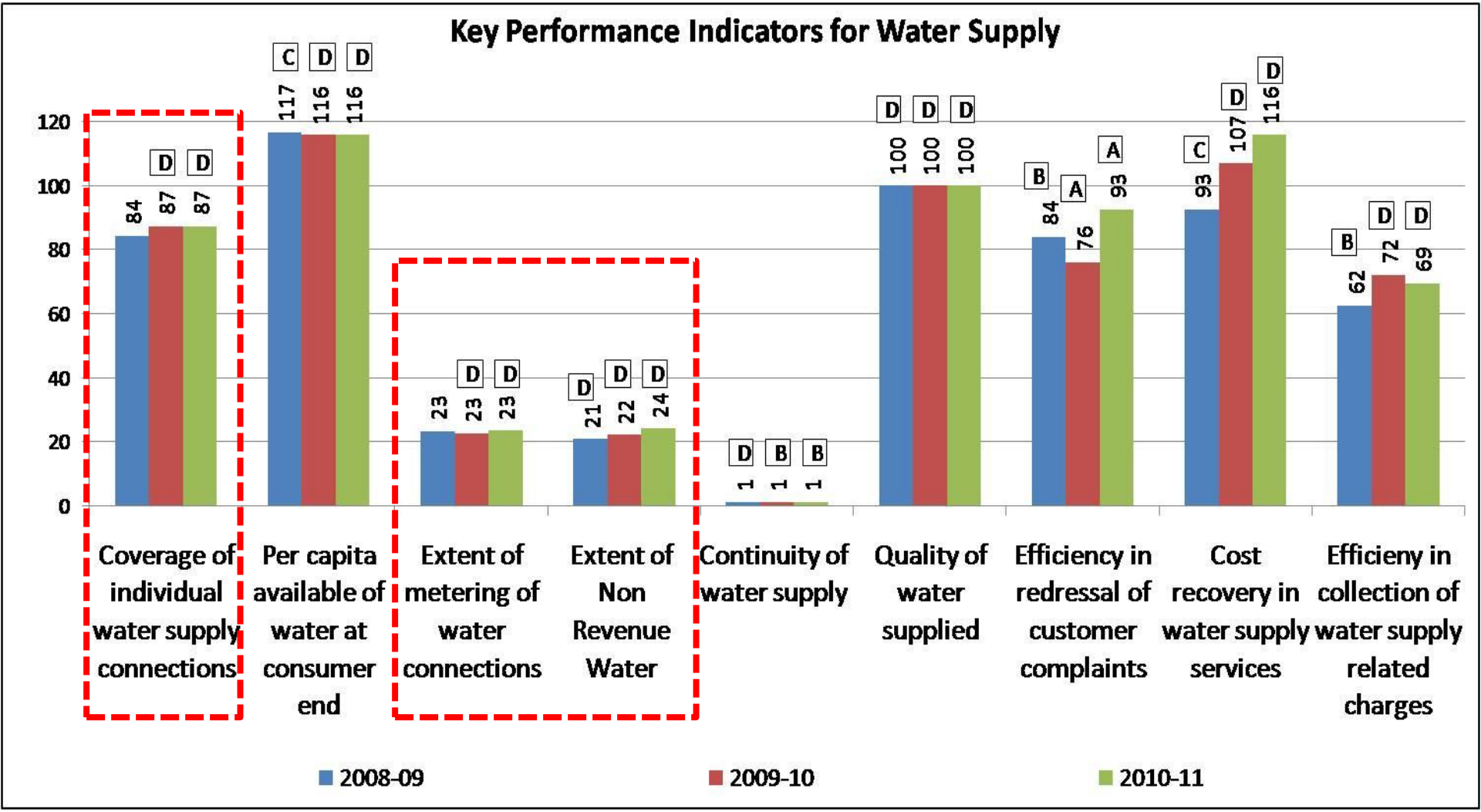
Water Supply Assessment

- **Performance Assessment**
- Identification of Improvement Areas
- Prioritisation of Improvement Areas
- Proposed Solutions & Actions
- Assessment of Ongoing Projects – UIDSSMT, MSNA

Water Supply: Status on Key Performance Indicators



Water Supply Assessment

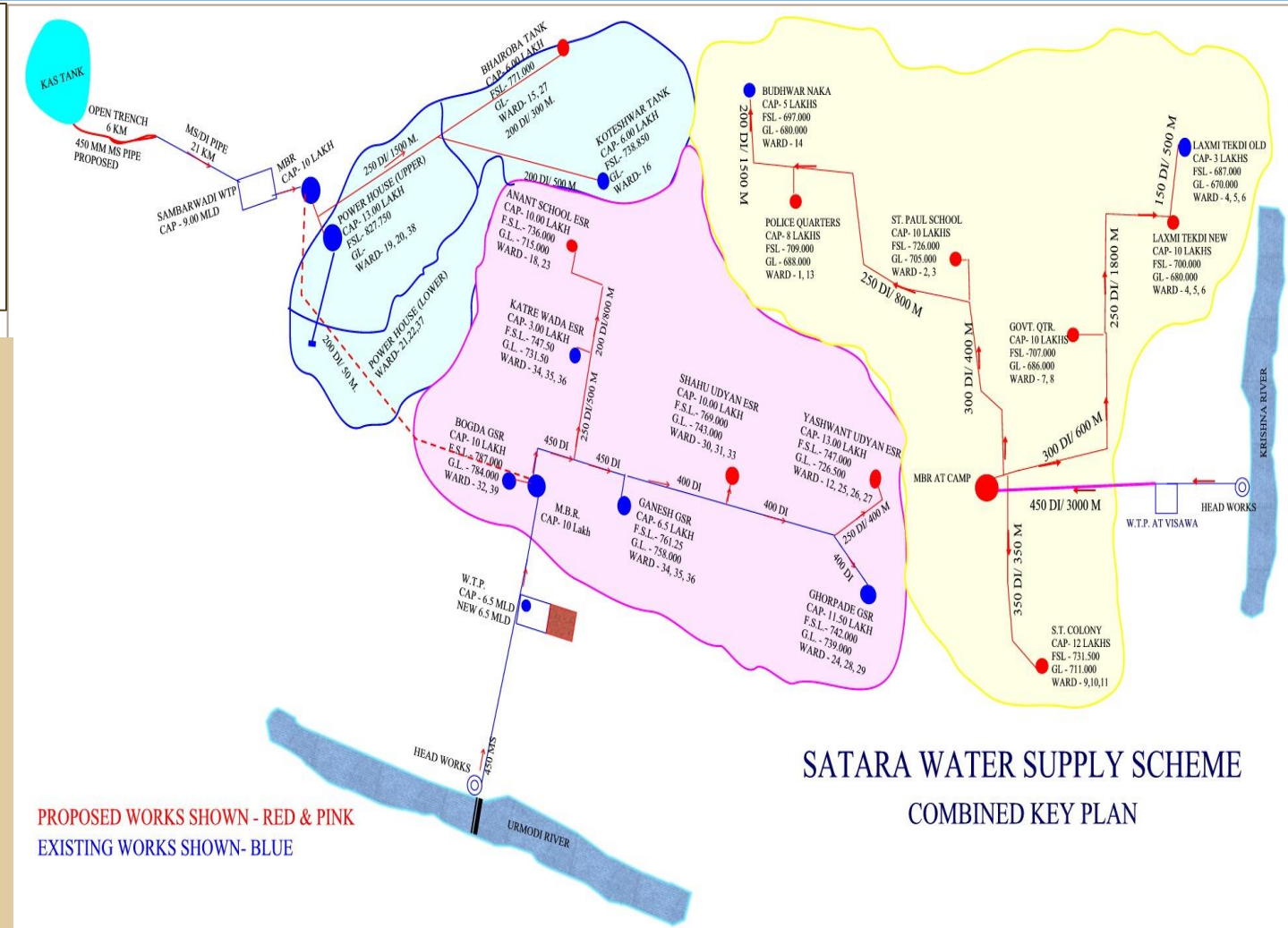
I. Source	II. Treatment	III. Transmission	IV. Distribution
• Water Availability and Adequacy • Current Allocation • Future Needs Augmentation	• Treatment Capacity & Adequacy • Utilization Capacity • Water Quality • Future Needs Augmentation	• Storage Capacity • Storage Adequacy • Leakages • Pumping Future Needs Augmentation	• Access and Coverage • Present Allocation and adequacy (LPCD) • Network adequacy • Metering

Satara – 3 Water Sources

Satara has 3 Water Sources:

1. **KAS Dam**
2. **Urmodi River**
3. **Krishna RIver**

1. KAS Dam – ULB Owned
2. Urmodi River – ULB buys Raw Water from Irrigation Dept
3. Krishna River – Owned by MJP and MJP supplies water in 13 wards in Satara



I. Assessment of Water Source

Source → Treatment → Transmission → Distribution

Per Capita Water Supply 150

Water allocation

Current Water supply for Satara is adequate

- Current Water Supply: 19 MLD
  - 5.5 MLD - KAS Dam
  - 6 MLD- Bulk Purchase Irrigation Dept (urmudi)
  - 1.25 MLD (MJP Treated Purchased)
  - 6 MLD (MJP Retail Supply)

Proposed Source Augmentation

Augmentation of source at Kas dam by 4-4.5 MLD (Scheme – MSNA)

- To meet future demand
- To reduce dependency on bulk purchase of water
- Low/ no O&M cost as water flows on gravity up to WTP hence no need of pumping

KAS dam source to Sambharwadi WTP (6 kms open channel – less water discharge capacity due to the same.)

But some areas of improvement remain- based on detail studies and field review

water source

II. Assessment of Treatment Capacity

Source → **Treatment** → **Transmission** → **Distribution**

Current Treatment Capacity is adequate

ULB Owned

- Jakatwadi WTP 8 MLD
- Sambarwadi WTP 9 MLD
- Mahadare WTP 1.25 MLD

MJP Owned

- Visavanaka 28.5 MLD

Treatment Capacity (18.5 MLD – ULB owned)

Actual Utilization- 11.25

Utilization is less than capacity

- 10 new flow meters to be installed, of which 4 are installed.
- 2 flow meter at raw water and treated regiment - Kas Source
- 2 flow meter at raw water and treated regiment -Urmudi Source

Proposed Treatment Facility

Additional WTP at Jakatwadi (Shahpur - Urmodi) Capacity 5 MLD
Operational since 4 years

System Improvement Sambarwadi (Kas) WTP.
This WTP is operational since last 25 years

Possible Actions:

- **Install Flow Meters at inlets and outlets of WTPs**
- **Water quality monitoring system**

But some areas of improvement remain- based on detail studies and field review

Water Treatment Plant at Jakatwadi

(ULB Owned)

Head Water Works Urmodi River source

Capacity – 8 MLD

- **O and M of Jakatwadi Water Treatment Plant**
  - O & M contract given to Private Agency
    - 3 persons appointed
  - ULB pays Rs. 8,00,000/- per annum
  - Energy bill paid by ULB

III. TRANSMISSION

Source → Treatment → Transmission → Distribution

Storage Reservoir Capacity

- Prima facie optimum capacity

Storage adequacy

- Existing number of ESR & GSRs - 11
- **Existing Storage Capacity (ESRs, GSRs) 8.7 MLD**
- **Utilisation Capacity: 13.25 MLD** (ESRs, GSRs filled multiple times)

Leakages

- There is substantial leakage
- Leakage data is not reliable due to lack of flow meters

Pumping

- Pumping efficiency study is recommended
- 1 pump is replaced at Jakatwadi WTP

At present Storage Capacity is Inadequate

Possible Actions:

- **Install bulk flow meters at inlet and outlets of ESRs and GSRs**
- **Reduce transmission losses**
- **Proposed ESRs/ GSRs – 14 numbers to augment storage capacity in view of equitable distribution of water and augmentation of KAS water supply. (proposed storage capacity augmentation- 5.55 MLD)**

Possible actions:

- **Replacing inefficient pumps**
- **Maintaining power factor**

But some areas of improvement remain- based on detail studies and field review

IV. DISTRIBUTION

Source → **Treatment** → **Transmission** → **Distribution**

LPCD at consumer end 110

Adequacy

- Inequitable water supply
- Absence of data regarding zonal distribution
- Low water pressure at tail ends

Possible Actions:

- **Proposed - Designate 15 water supply zones. And designate district meter areas**
- **Introduce Consumer Metering**
- **Introduce volumetric tariff**
- **Install/ implement Hydraulic system**

Piping

- Old piping system leading to breakage and leakages
- Network capacity is less – leading to low water pressure at tail end.

Network

- High NRW - Leakages, illegal connections
- Max. leakages at distribution network.
- Water leakages at tap connection at consumer end. Leakages and contamination of water at HH connections

Possible Actions:

- **Replacement of 124 km. length of distribution network**

Metering MJP Area

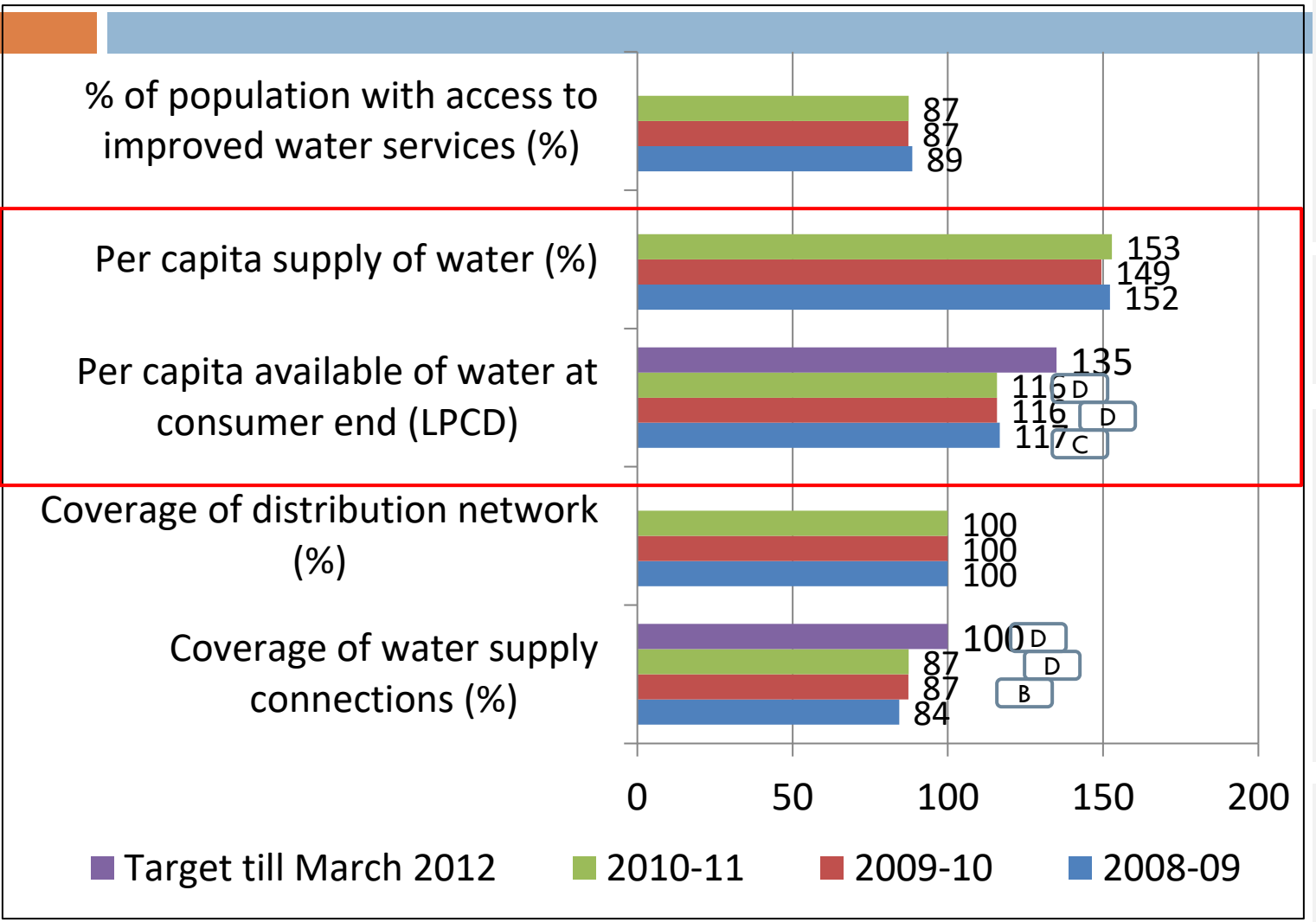
- Non-functional meters

Possible Actions:

- **Leak detection Survey**
- **Plugging of joints**
- **Water audit**
- **Regularize illegal connections**

But some areas of improvement remain- based on detail studies and field review

Coverage of water Supply



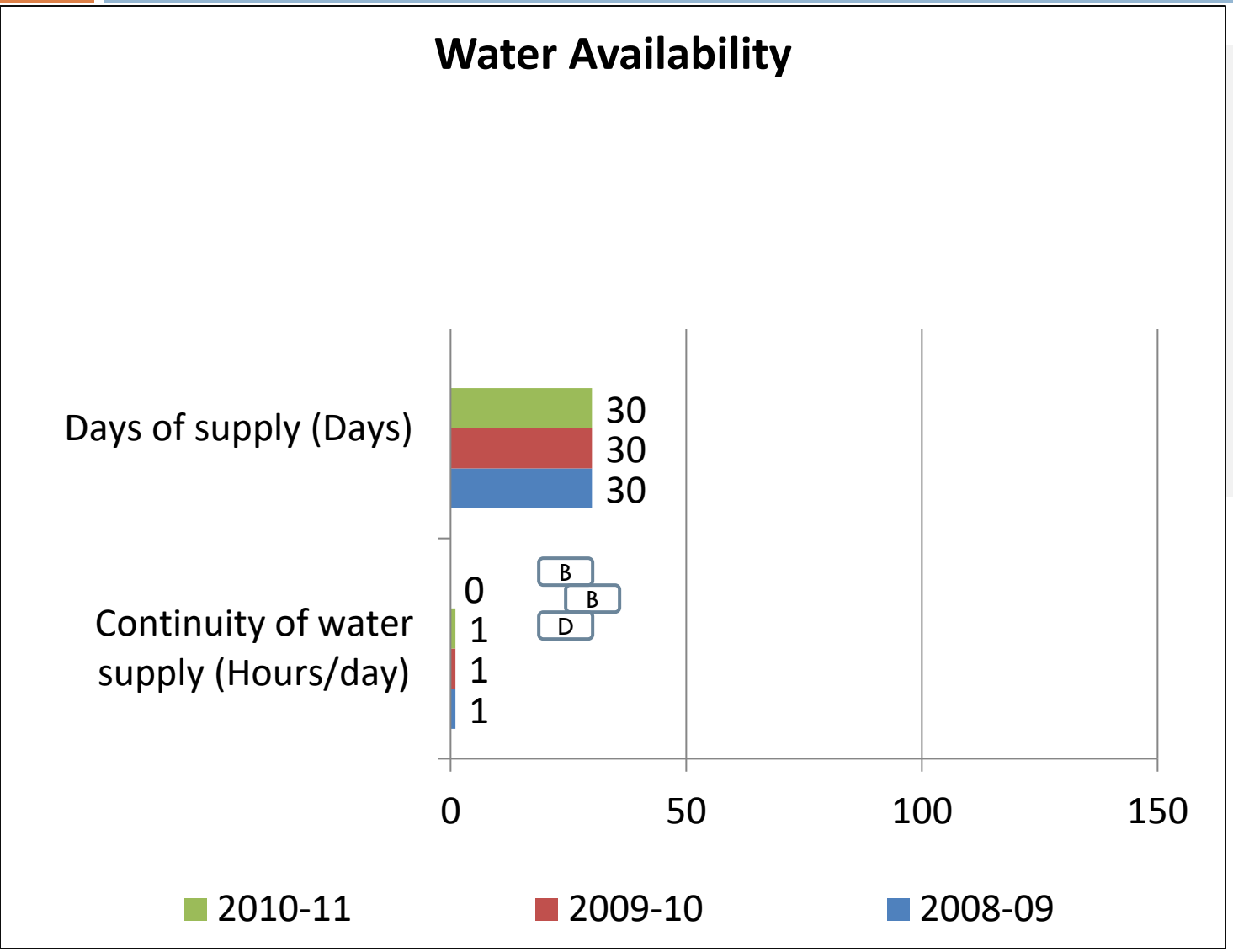
Every year approx. 300 – 350 new water connections are given.

Indicates high water losses

100% coverage of distribution network. Length of distribution network: 185 km

Coverage of water supply has marginally improved.

Water Availability



Intermittent water supply & inequitable distribution of water.

Low water pressure at tail end.

Coverage of Water Supply in Slums through –

1. Individual Connections (very very few only in MJP served area)
2. Public Stand Postss
3. Bore wells/ hand pumps

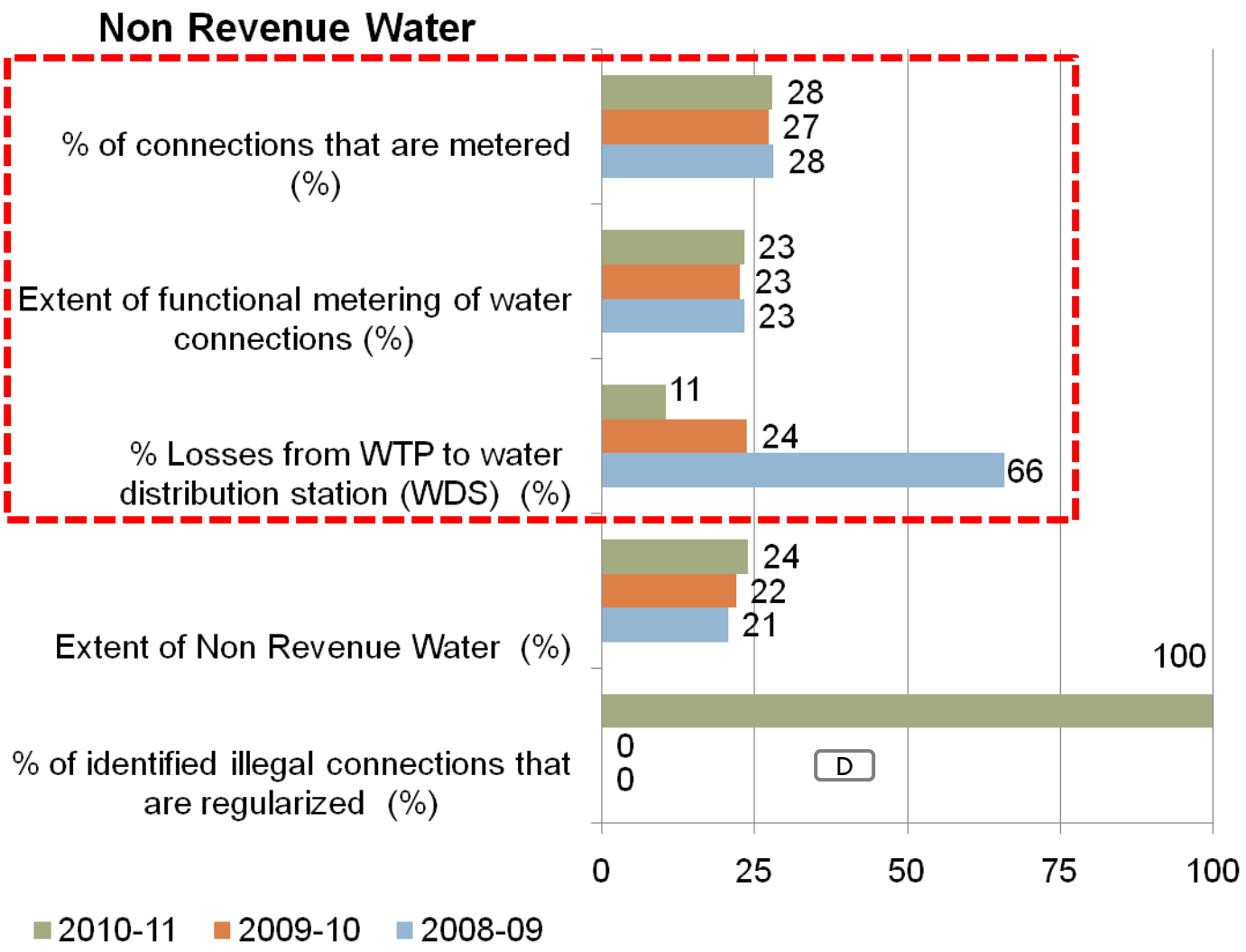
No group connections in slums

Bhimabai Ambedkar Nagar Slum

At very few places in slums individual connections were observed.

Water losses at consumer end due to no stop cocks/ stop valves at connections at consumer end.

I. Non Revenue Water



Of total 18067 domestic connxns, 4970 (27.9%) are metered connxns. (Meters installed in MJP served area)

11 pipe breaks reported in current year

209 illegal connections identified & regularized

NRW is constant

722 (3.8%) domestic meters are not functional

Schematic Diagram Water Supply– Satara Municipal Council

Source: 19 MLD

11.75 (ULB) + 1.25 (MJP Purchased) + 6 (MJP Supply)

Bulk Purchase Treated Water 1.25 MLD *(MJP retail supply – Source KAS Dam)*

Bulk Purchase Raw Water – 6 MLD
(Urmodi River Source from Irrigation Dept)

Water Supply from own source KAS Dam – 5.5 MLD

ULB own source Mhardare Tank – 0.25 MLD

Treated Water Supply by MJP in ULB Jurisdiction - 6 MLD *(Krishna River Source Water Supply – Owned and operated by MJP)*

Ground Water 1 Bore Well - 0.35 MLD ***(not in distribution network)***

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Jakatwadi WTP
(Nr. Shahpur)
(Cap – 8 MLD
Treated water – 6 MLD)

Power house Old GSR,
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Visava Naka WTP
(Cap. – 28.5 MLD , Owned by MJP, Krishna River source,
Treated water supplied by MJP in ULB – 6 MLD)

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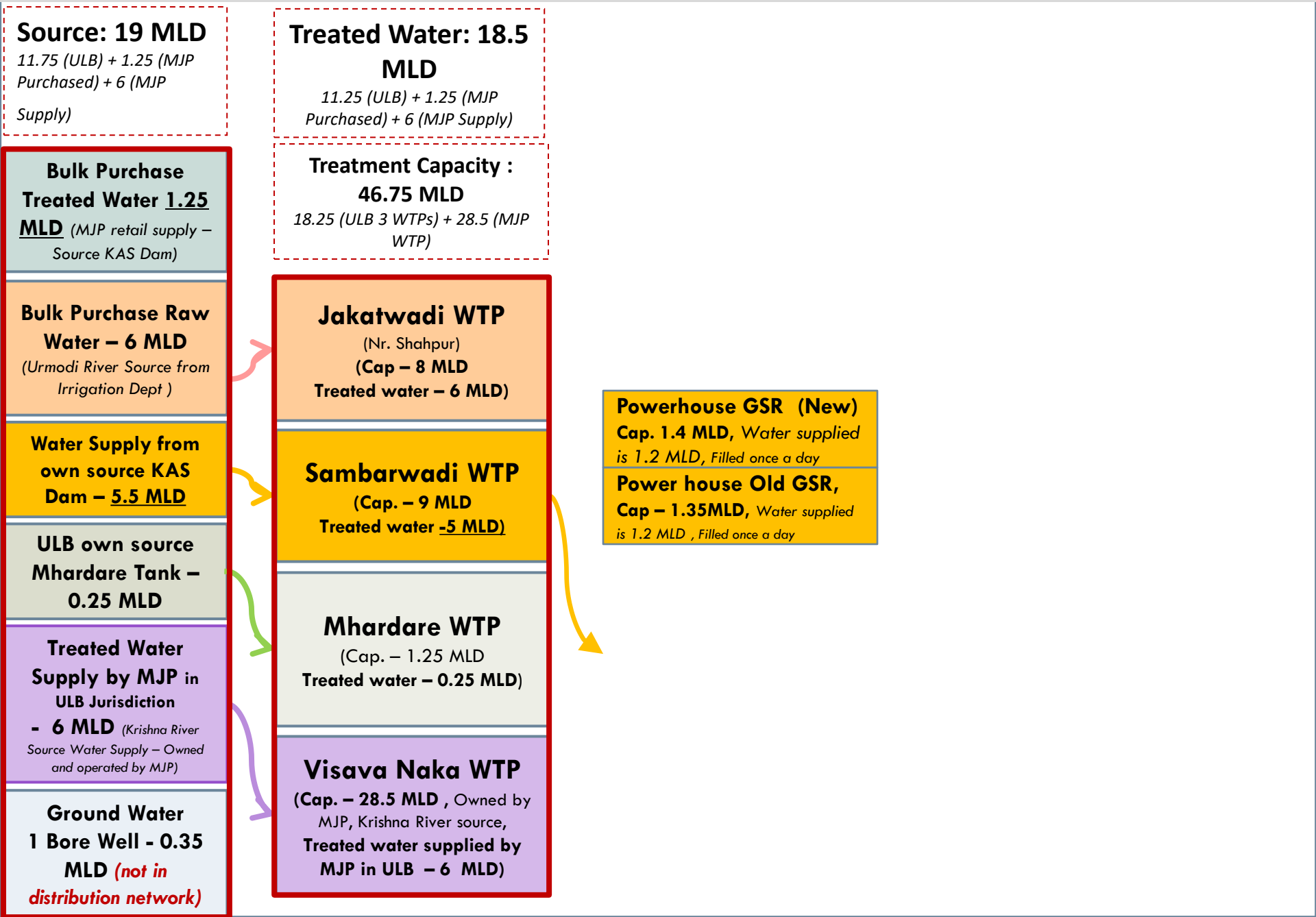
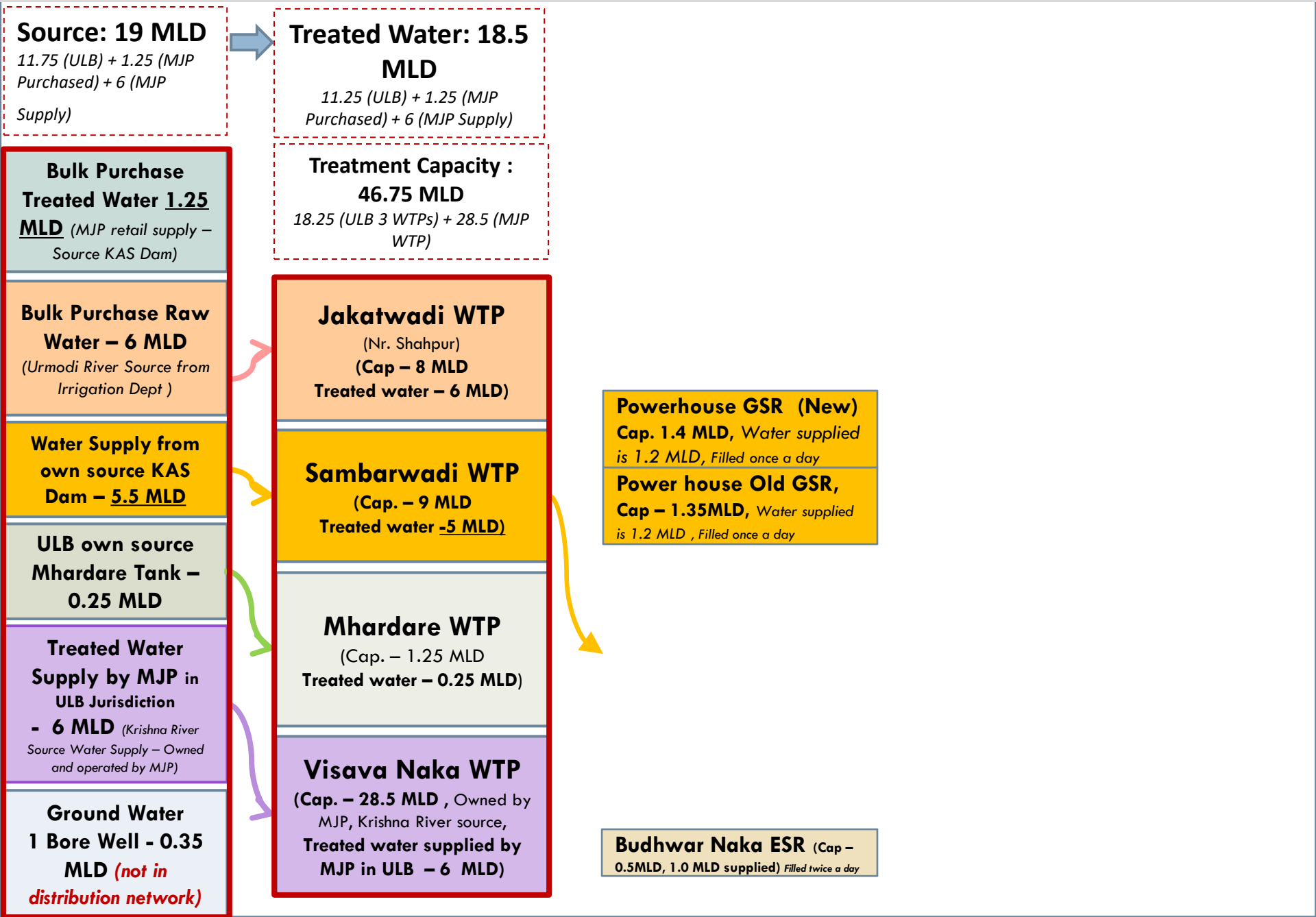
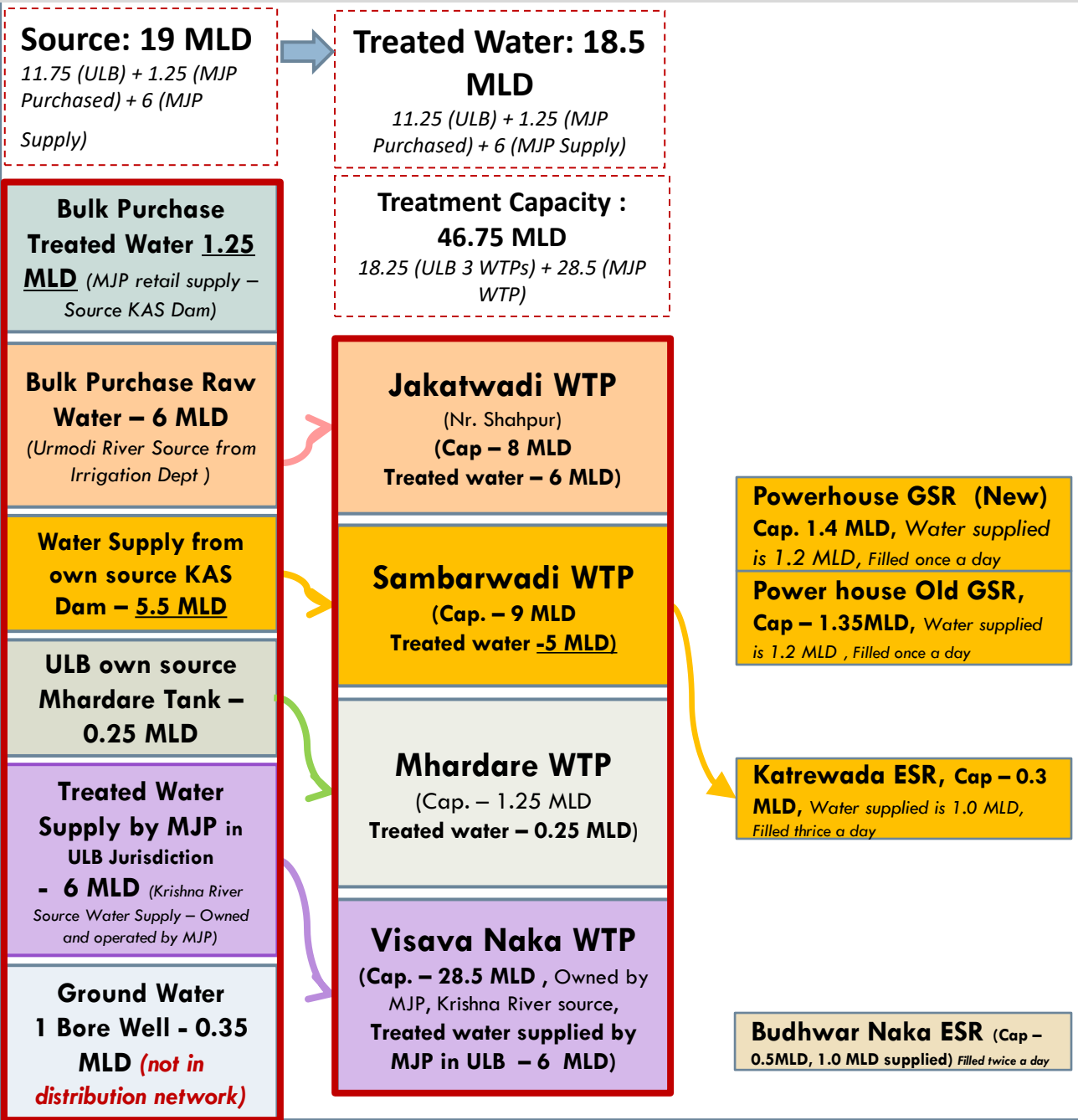


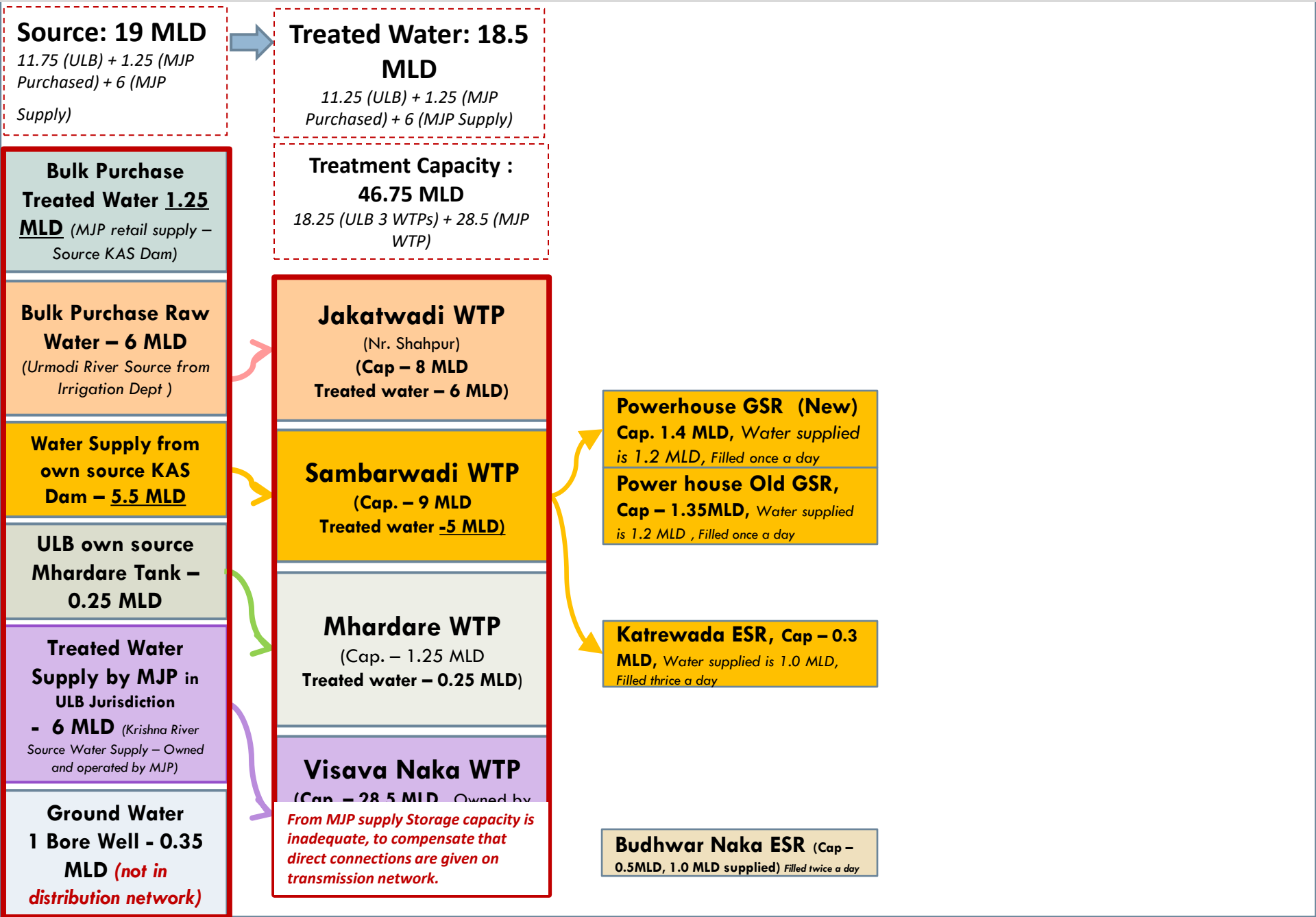
Schematic Diagram Water Supply– Satara Municipal Council



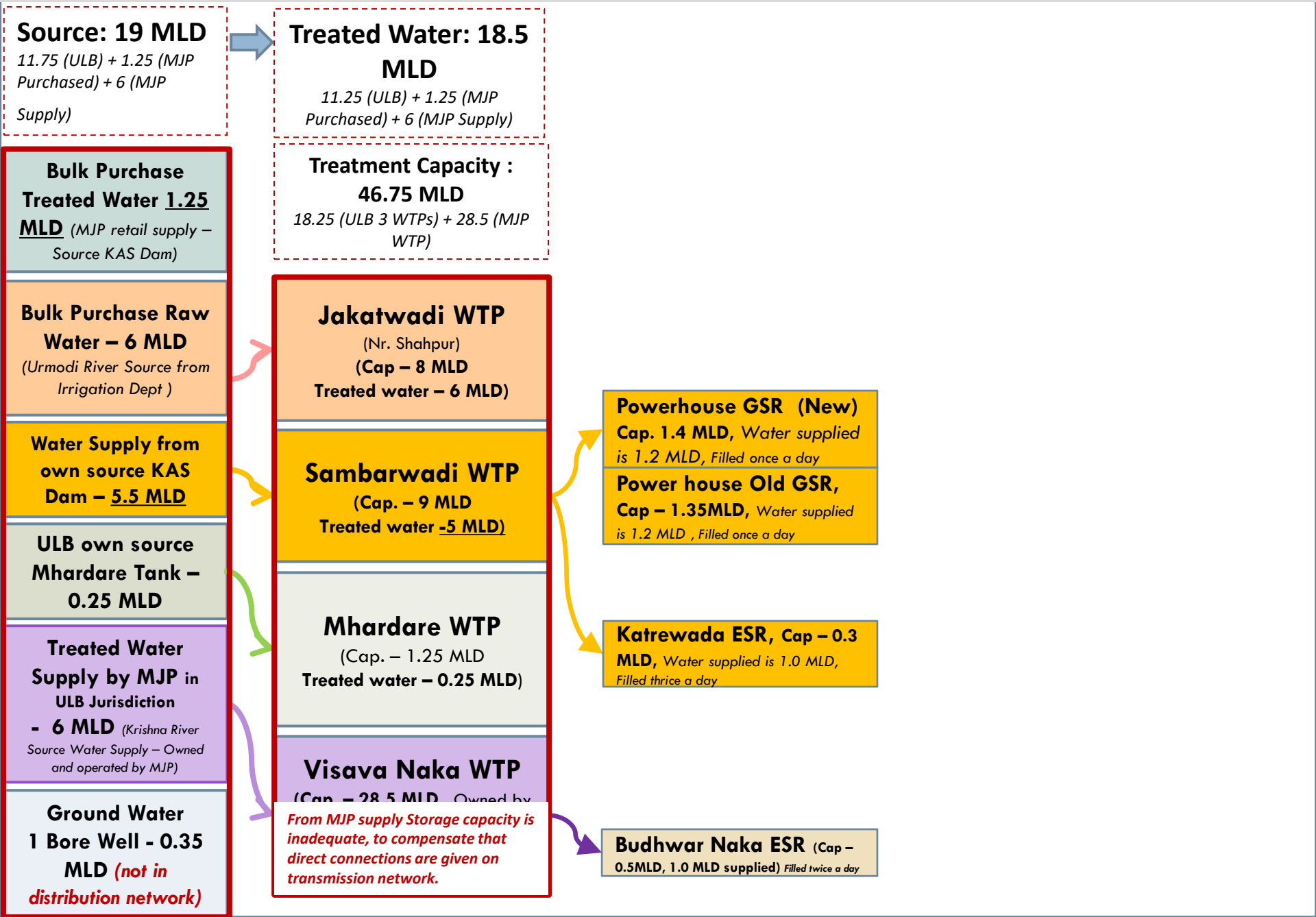
Schematic Diagram Water Supply– Satara Municipal Council



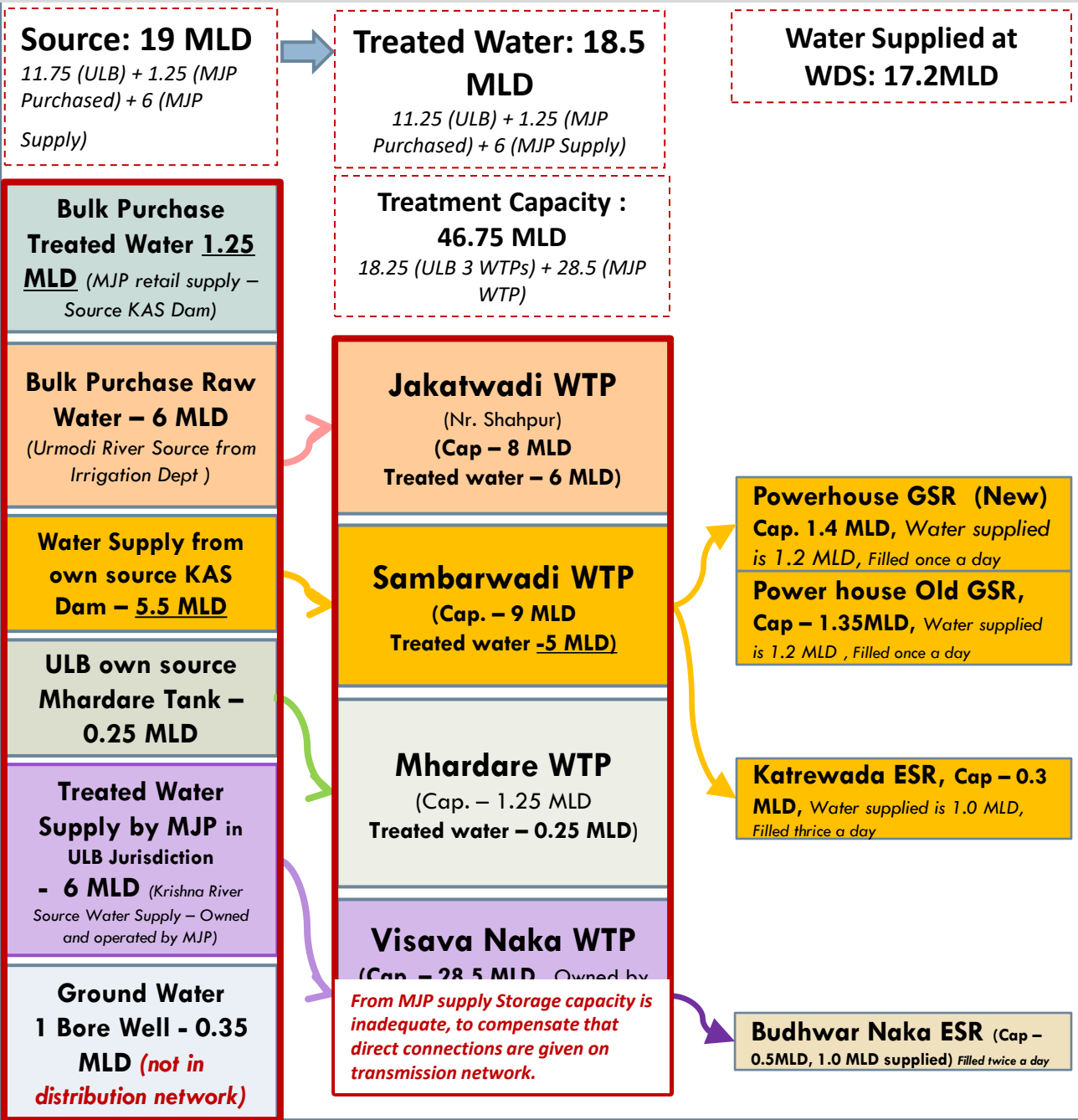
Schematic Diagram Water Supply– Satara Municipal Council



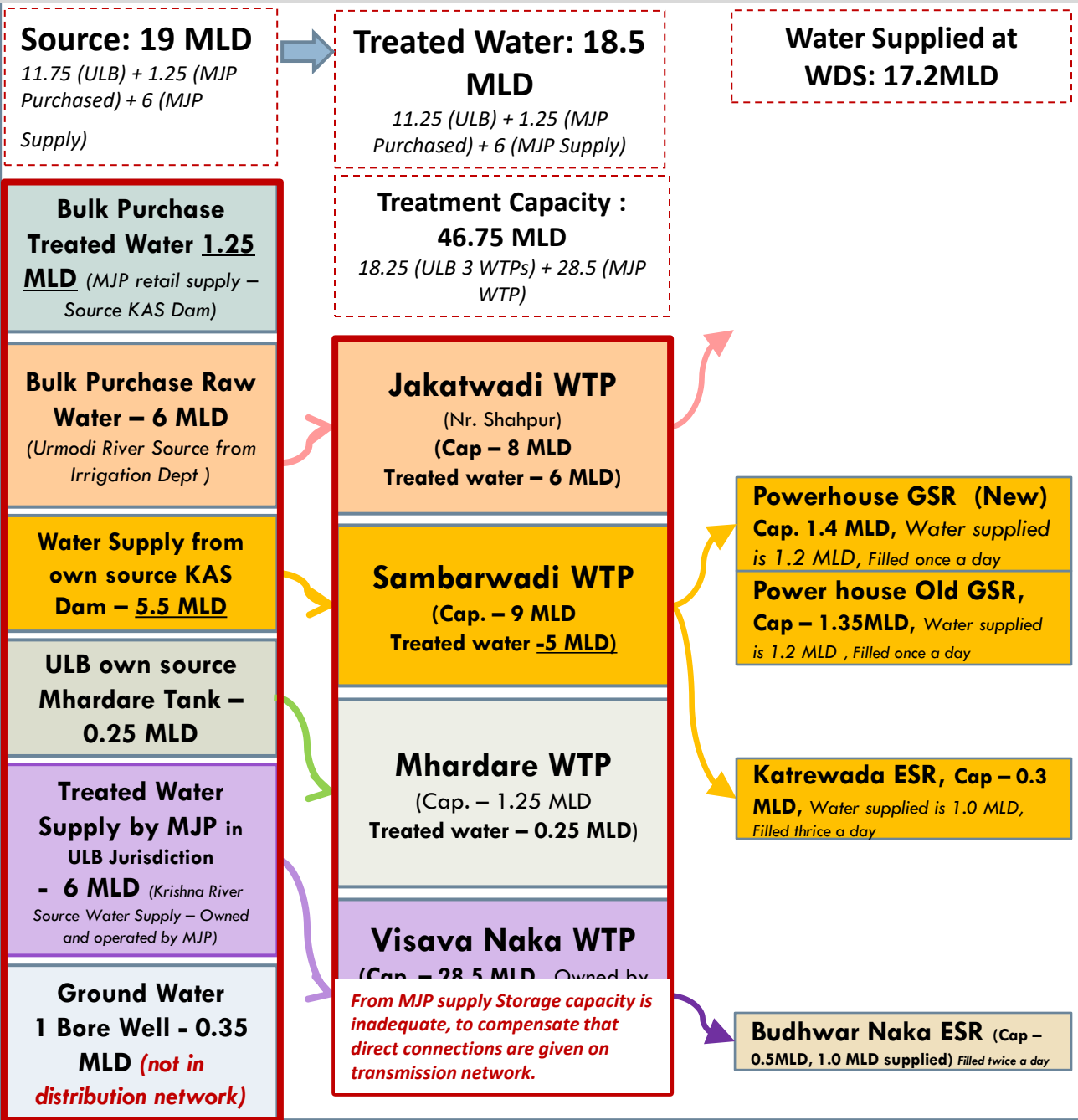
Schematic Diagram Water Supply– Satara Municipal Council



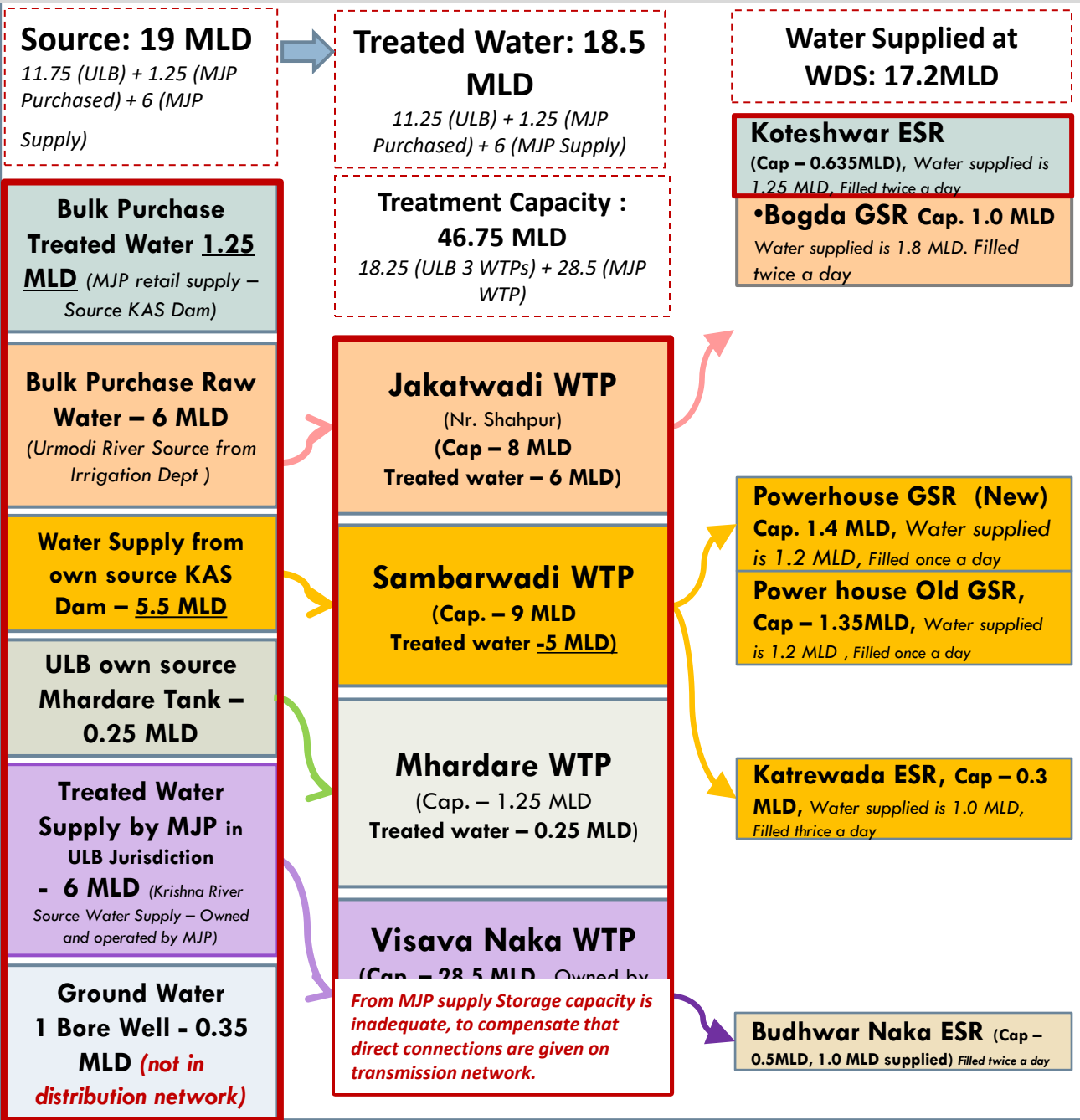
Schematic Diagram Water Supply– Satara Municipal Council



Schematic Diagram Water Supply– Satara Municipal Council



Schematic Diagram Water Supply– Satara Municipal Council



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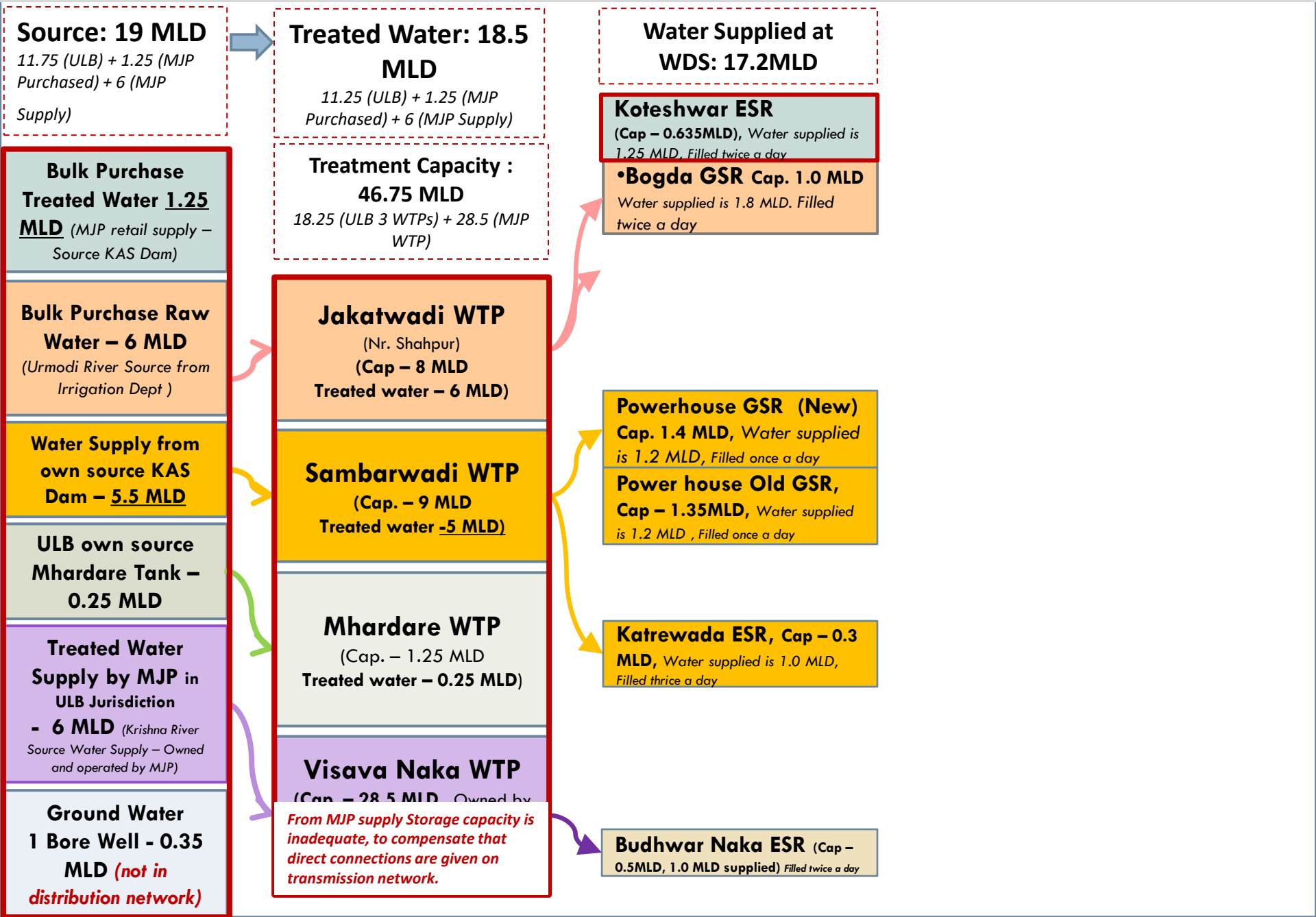
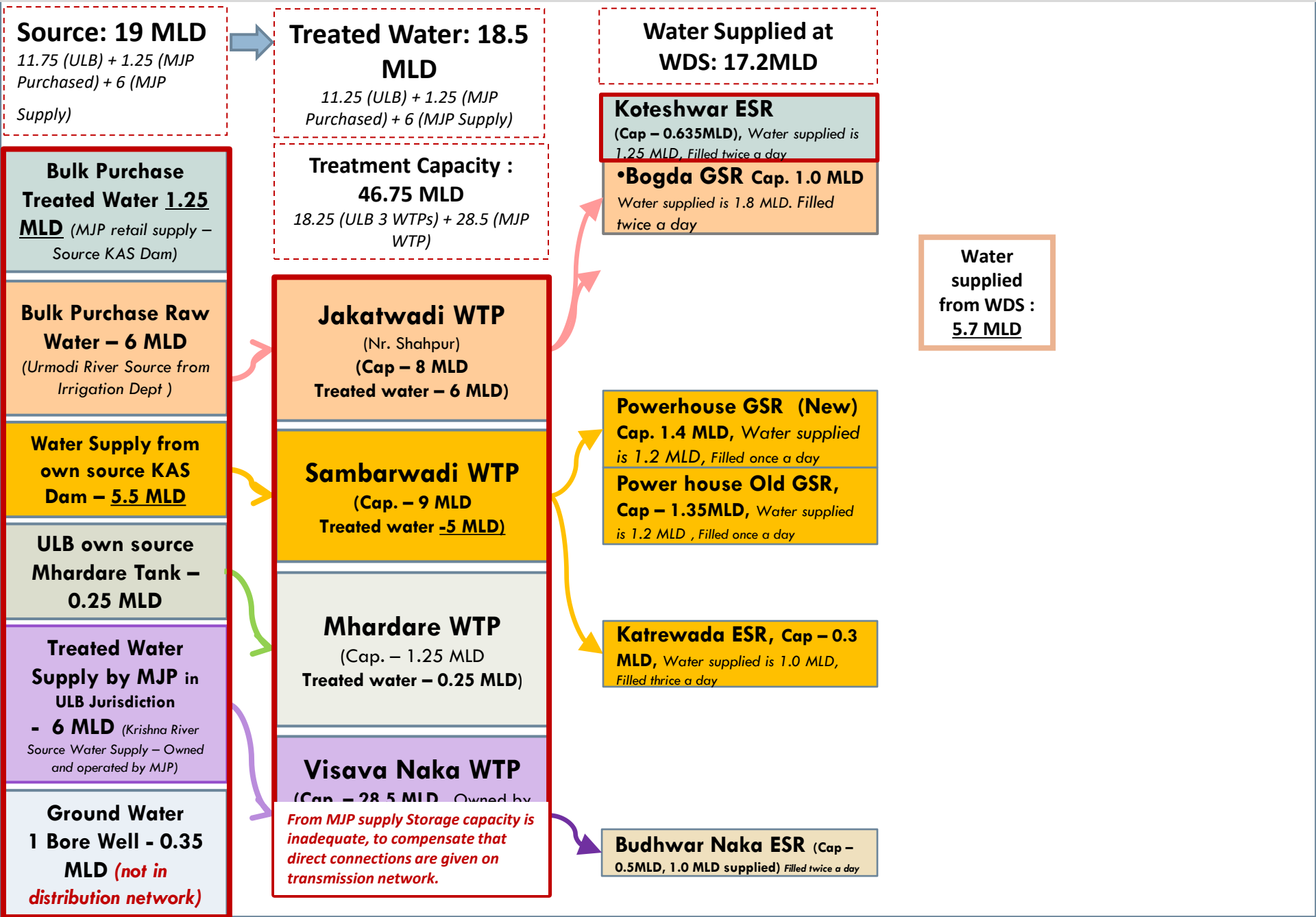
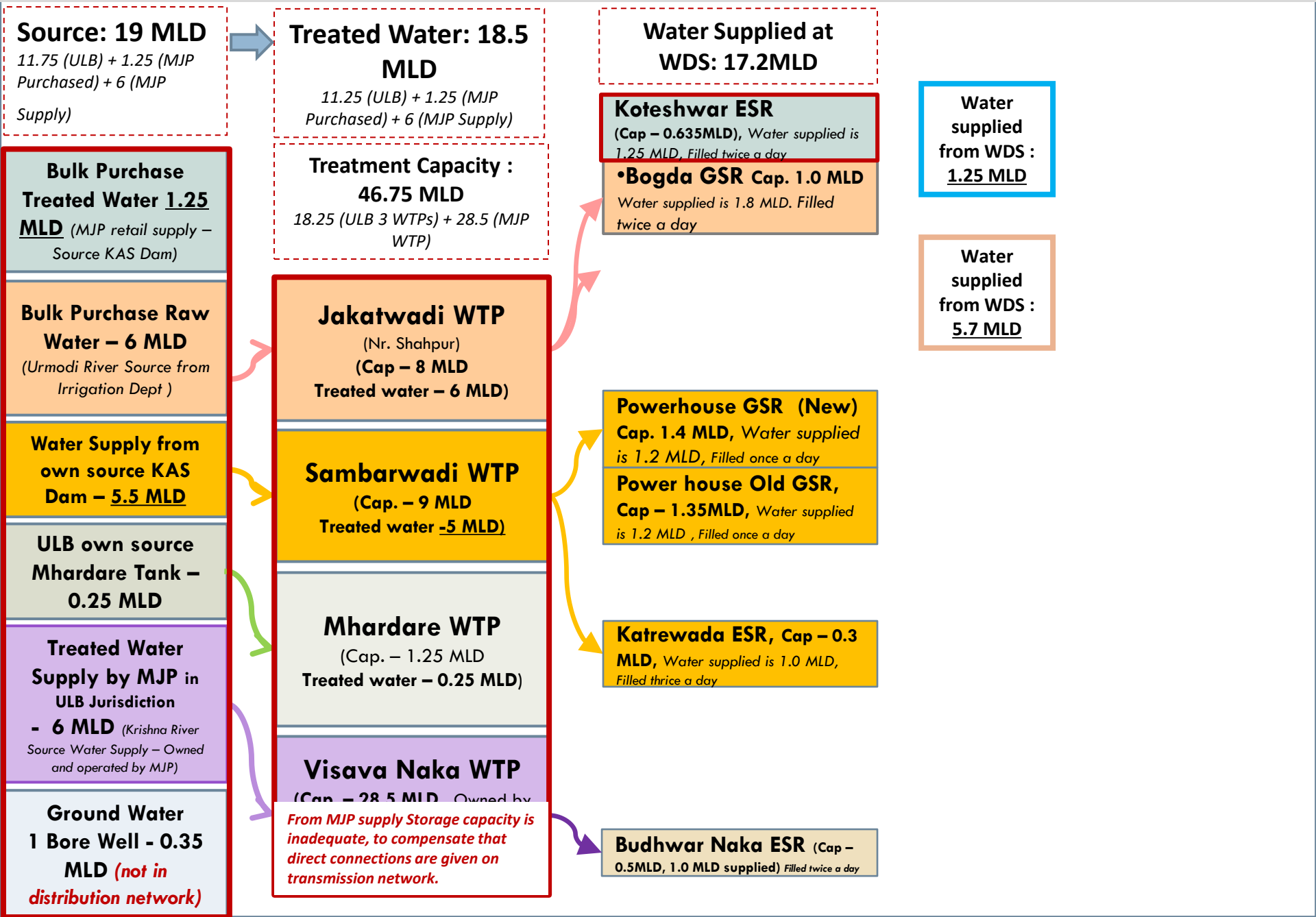


Schematic Diagram Water Supply– Satara Municipal Council



Schematic Diagram Water Supply– Satara Municipal Council



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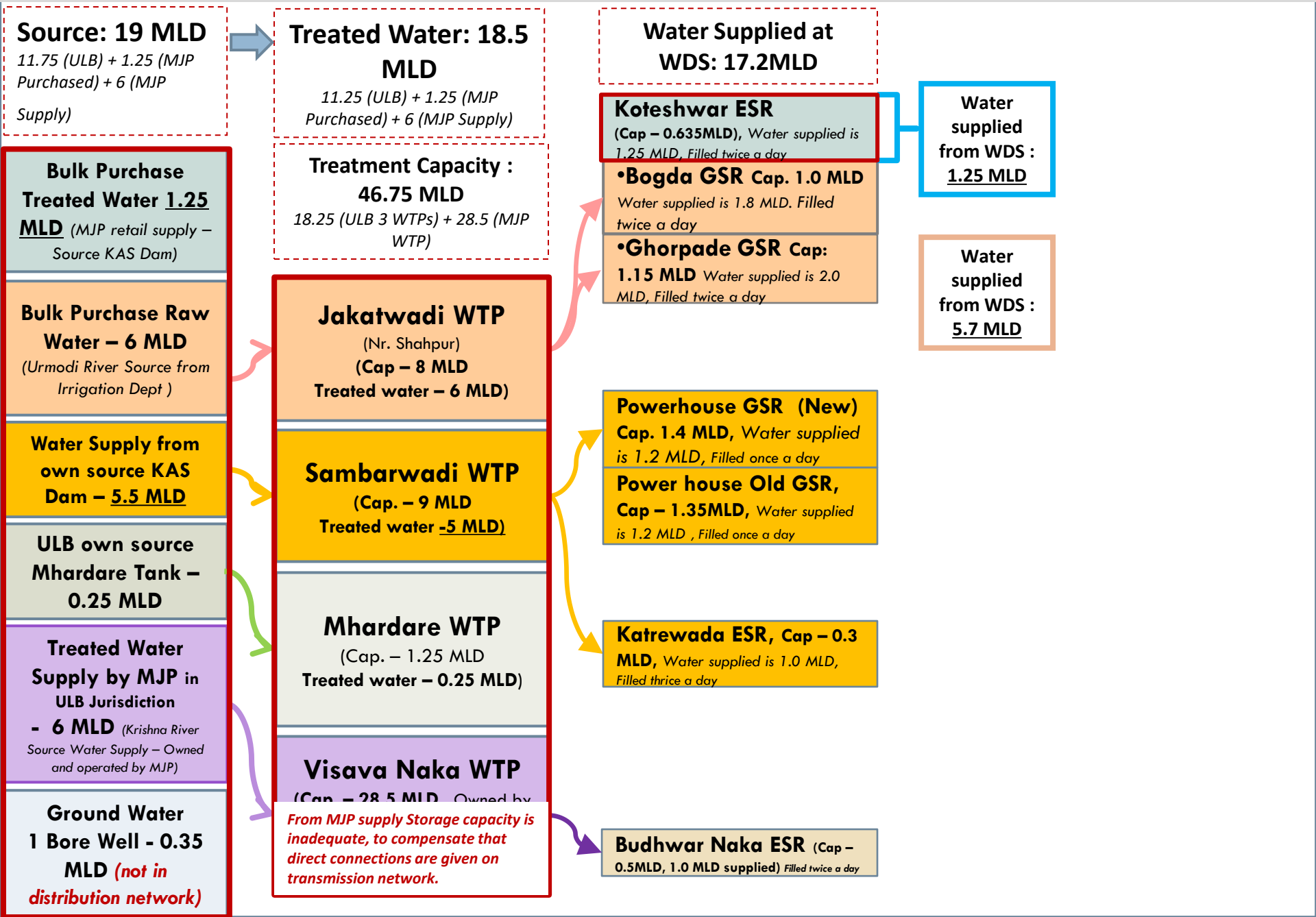

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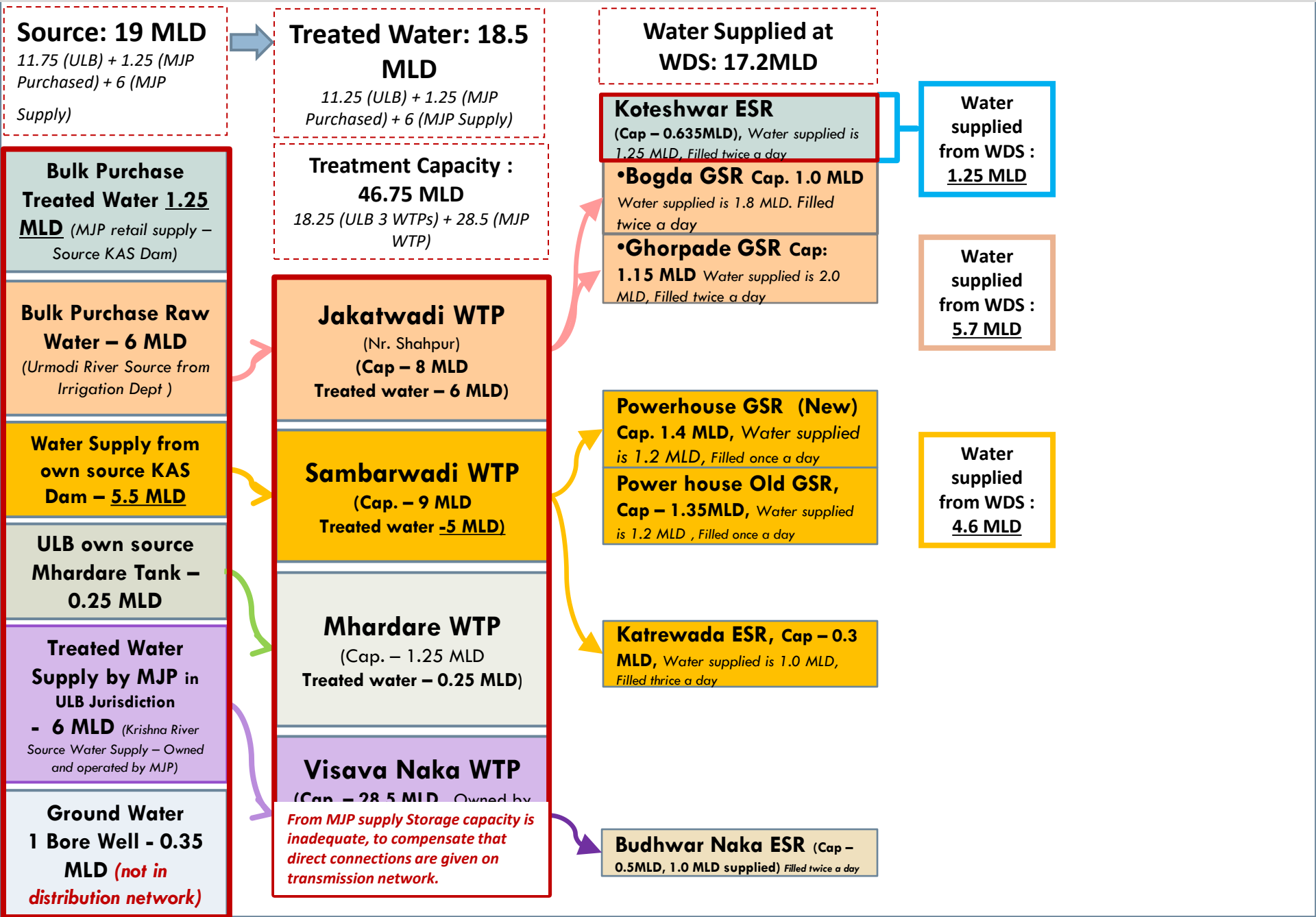
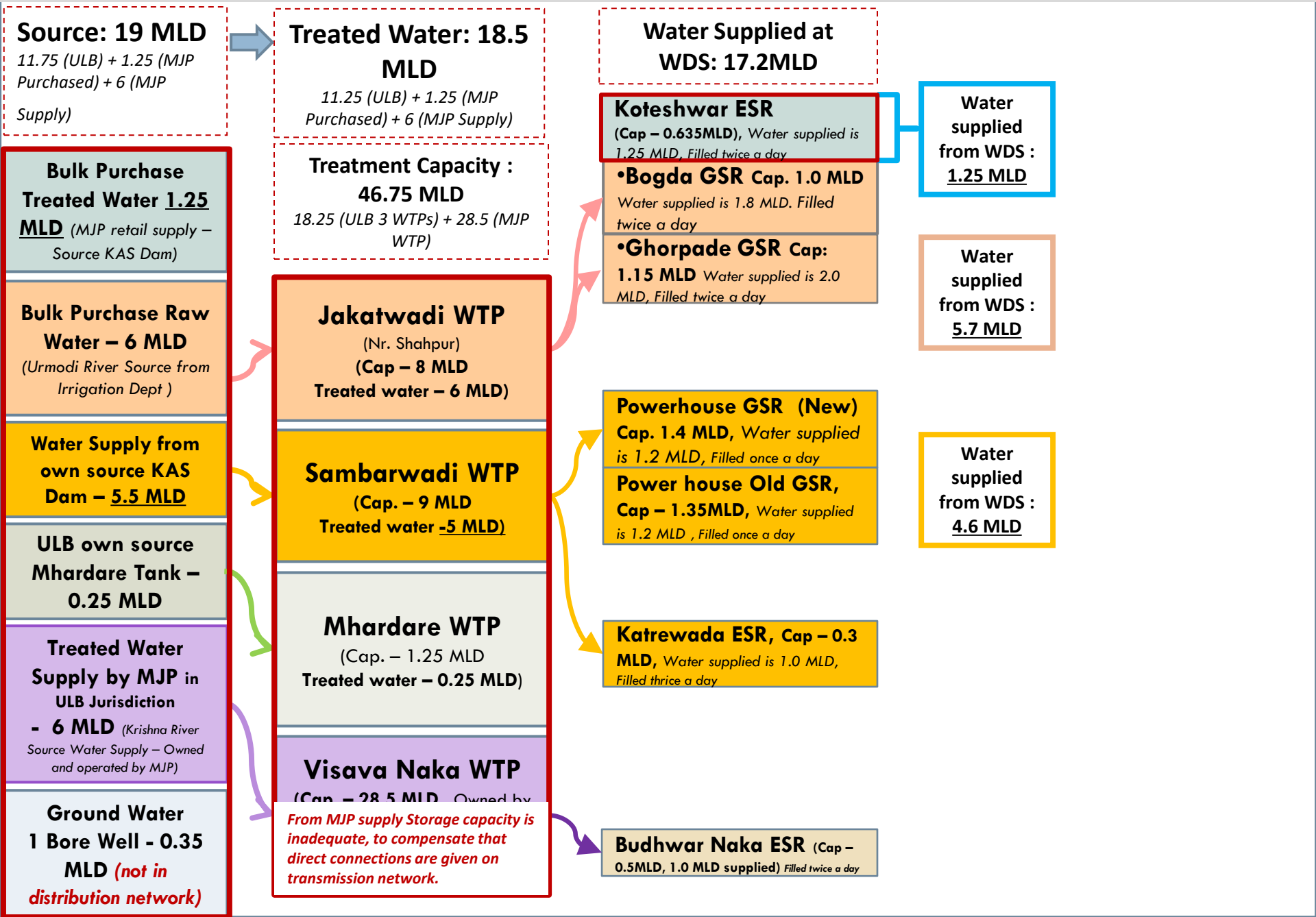


Schematic Diagram Water Supply– Satara Municipal Council



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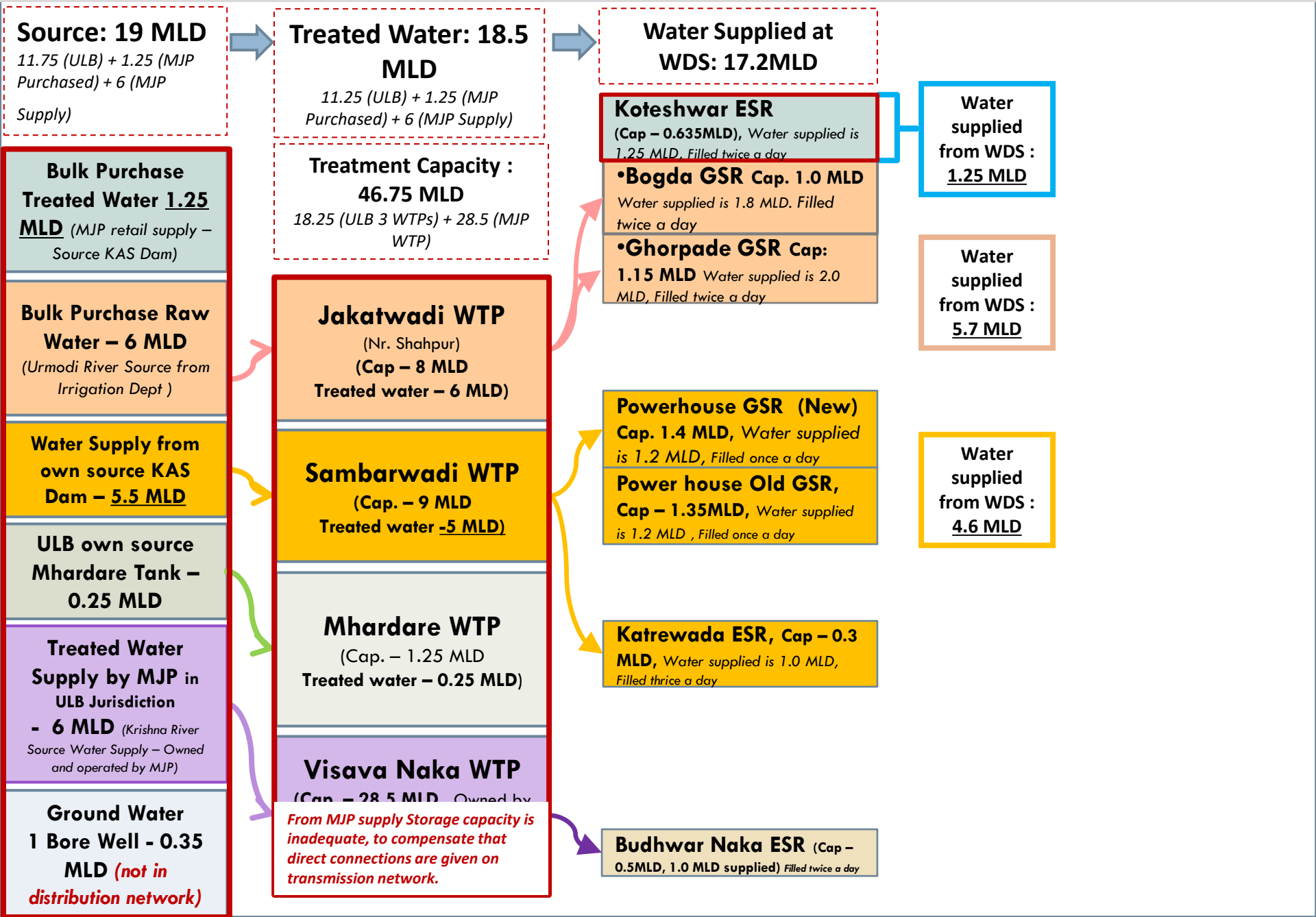
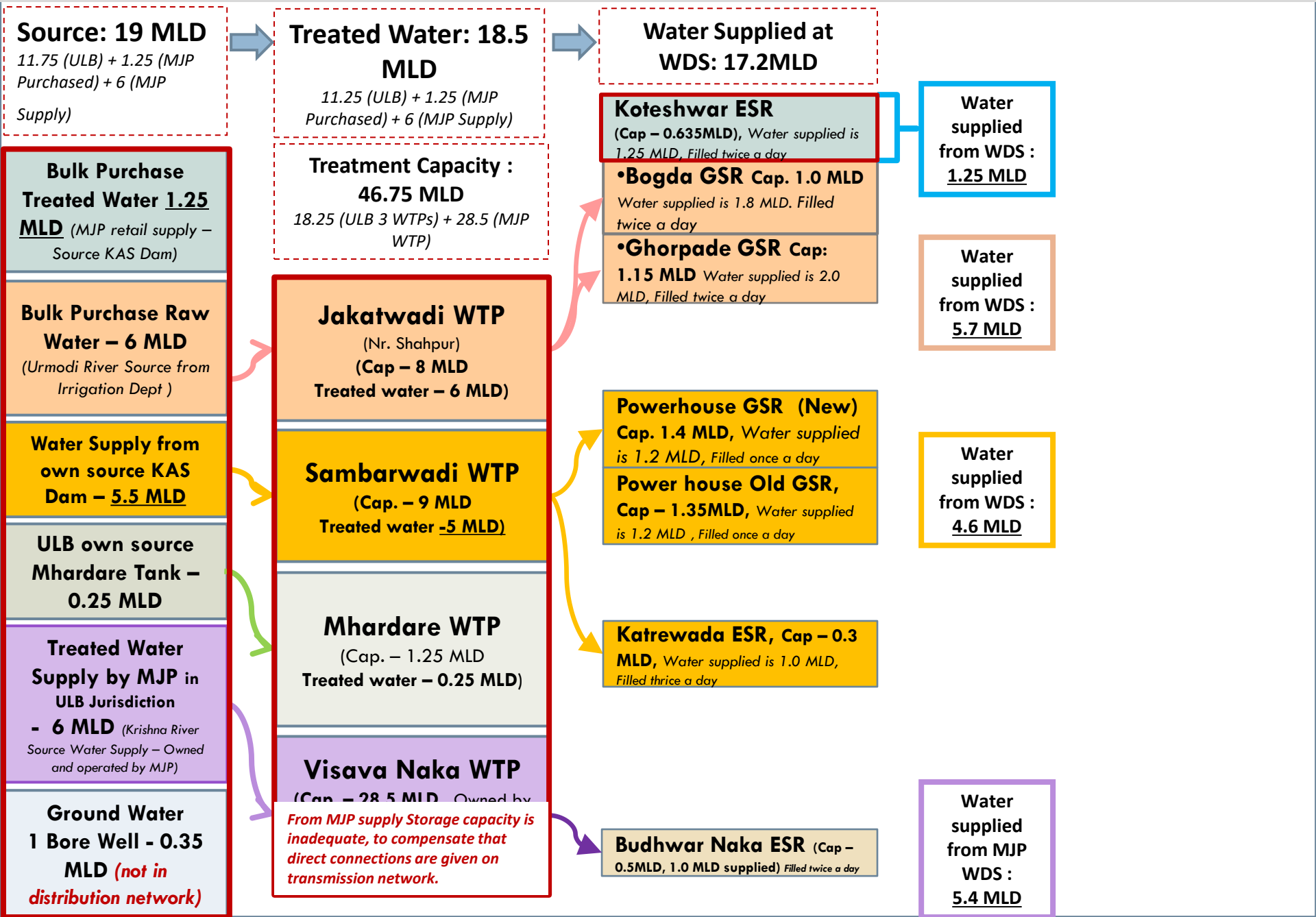
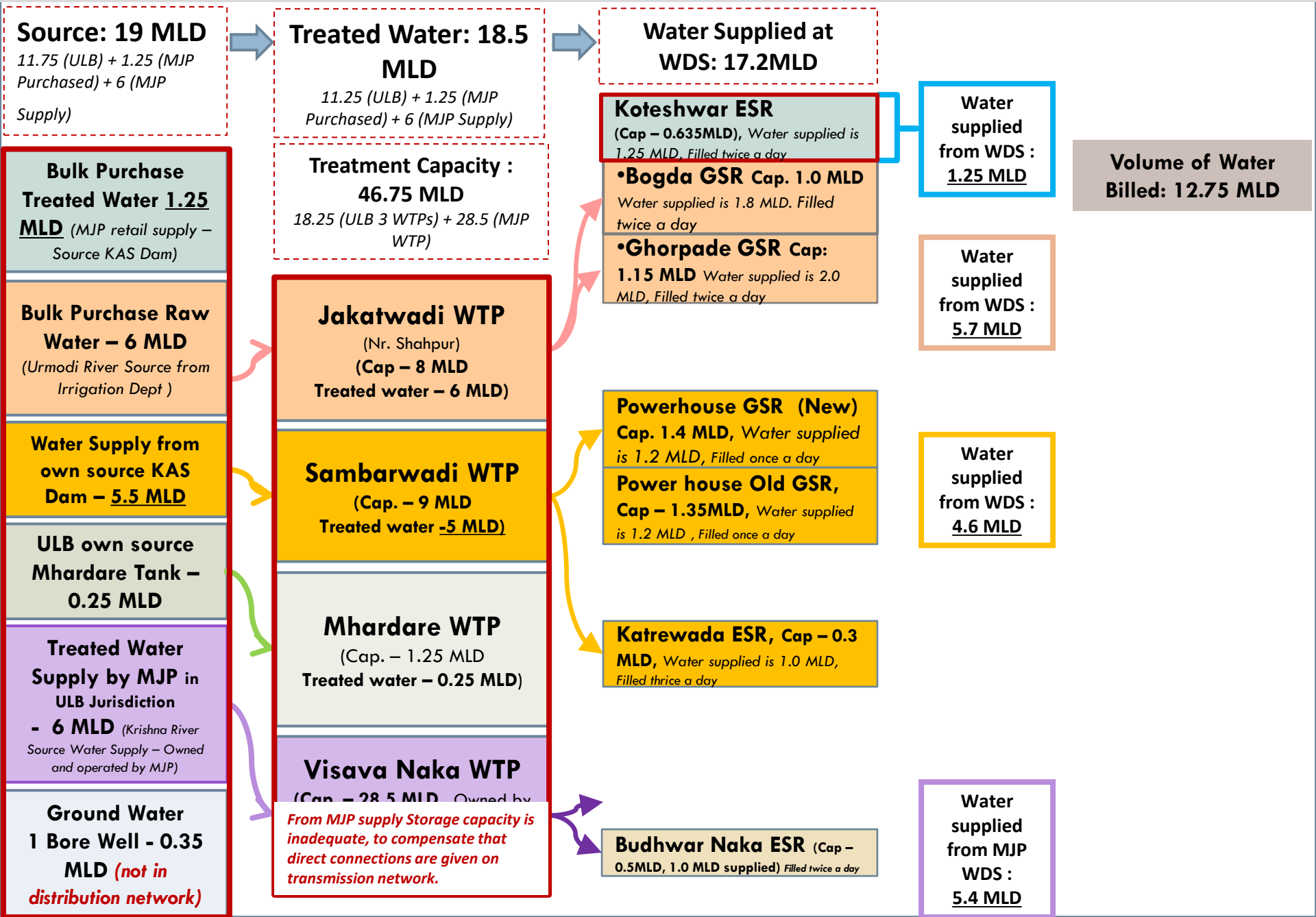


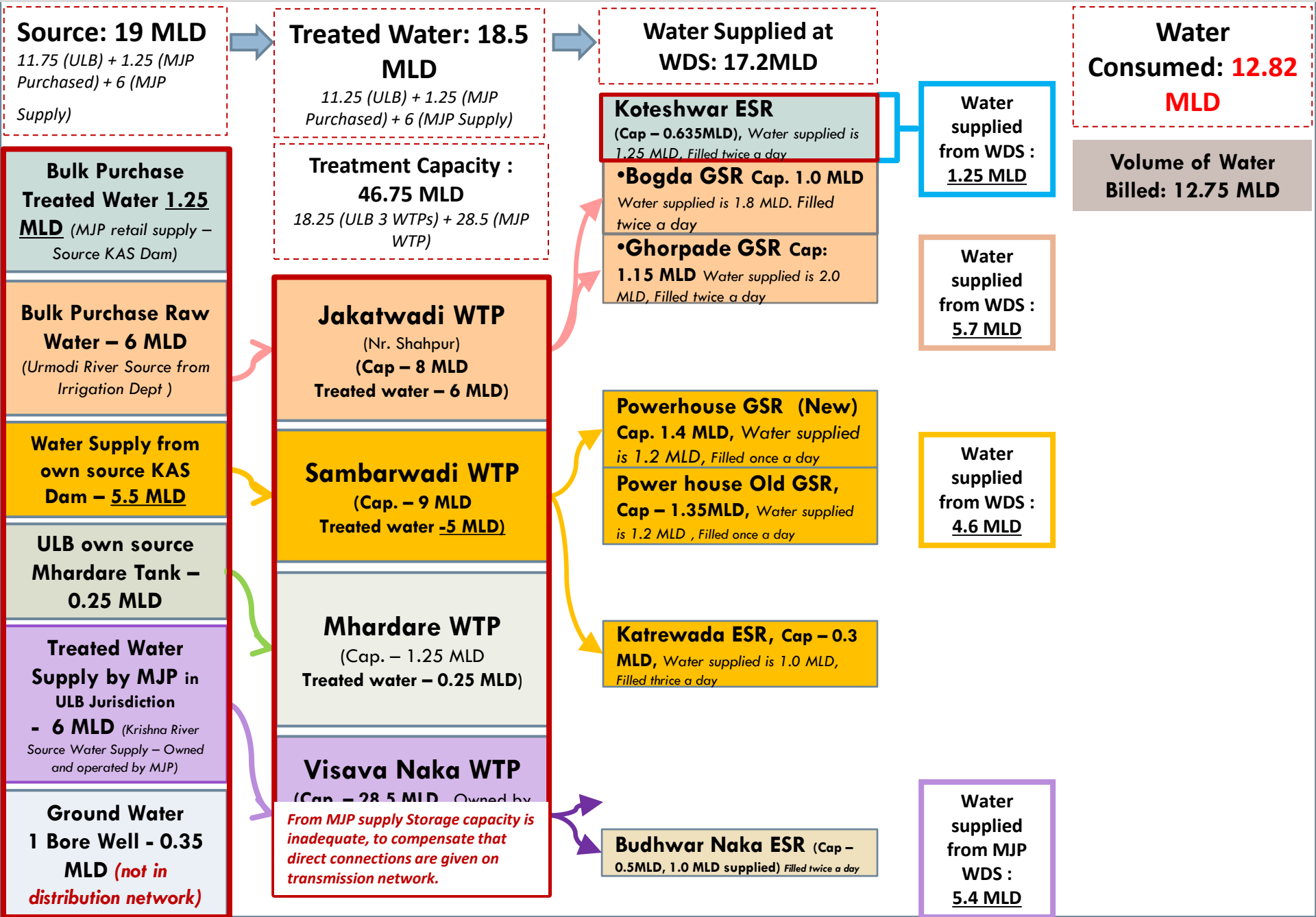
Schematic Diagram Water Supply– Satara Municipal Council



Schematic Diagram Water Supply– Satara Municipal Council



Schematic Diagram Water Supply– Satara Municipal Council



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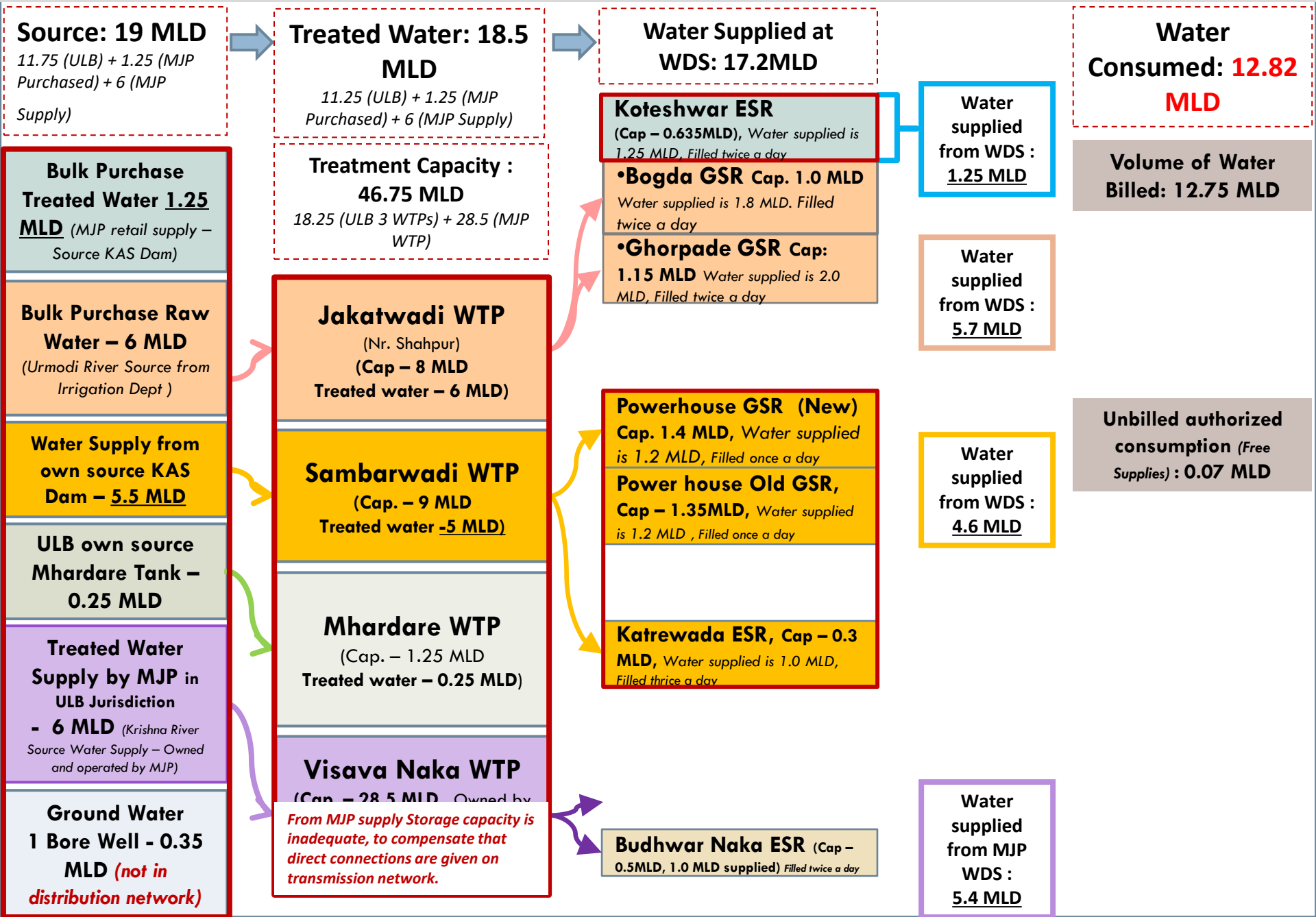
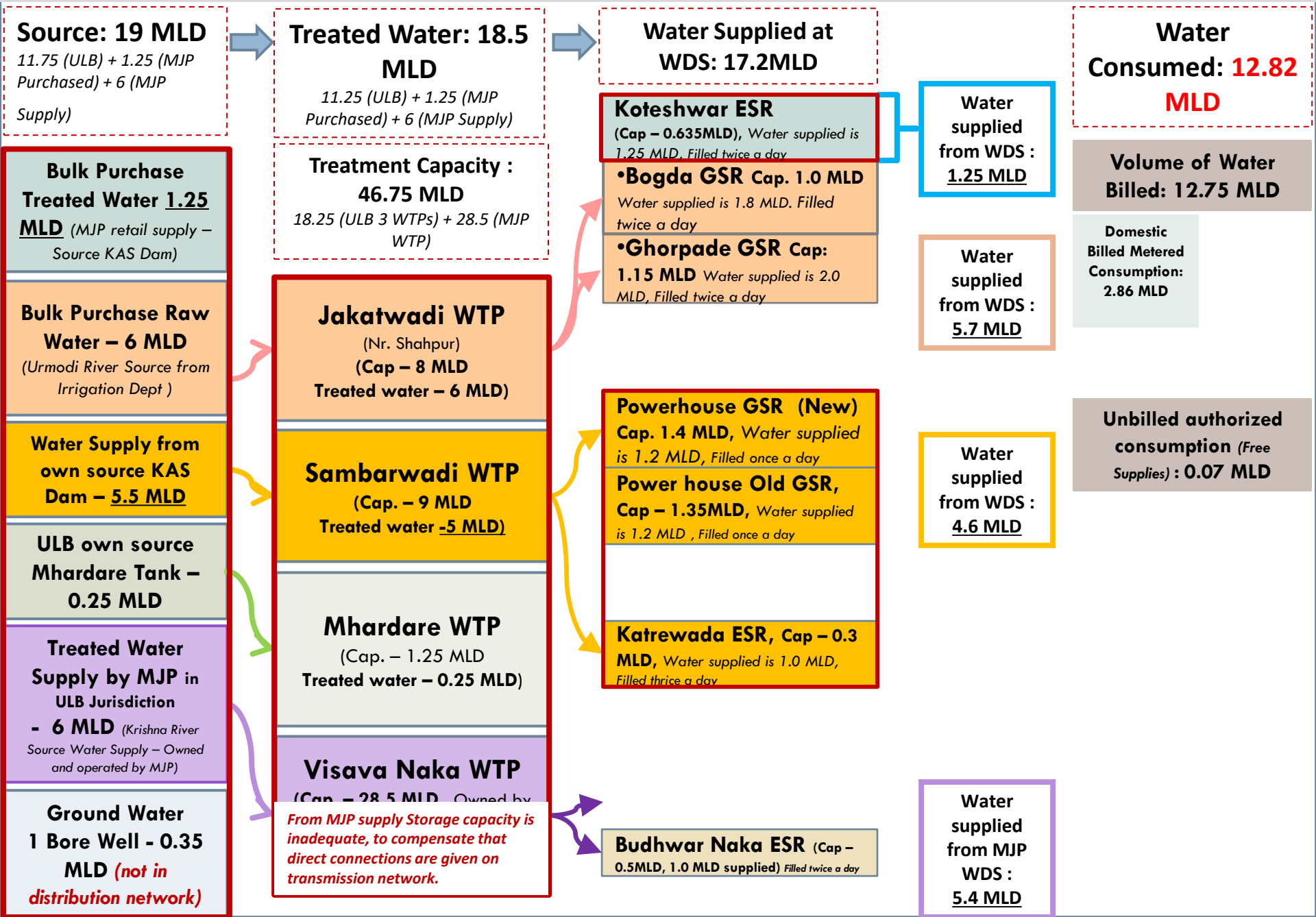
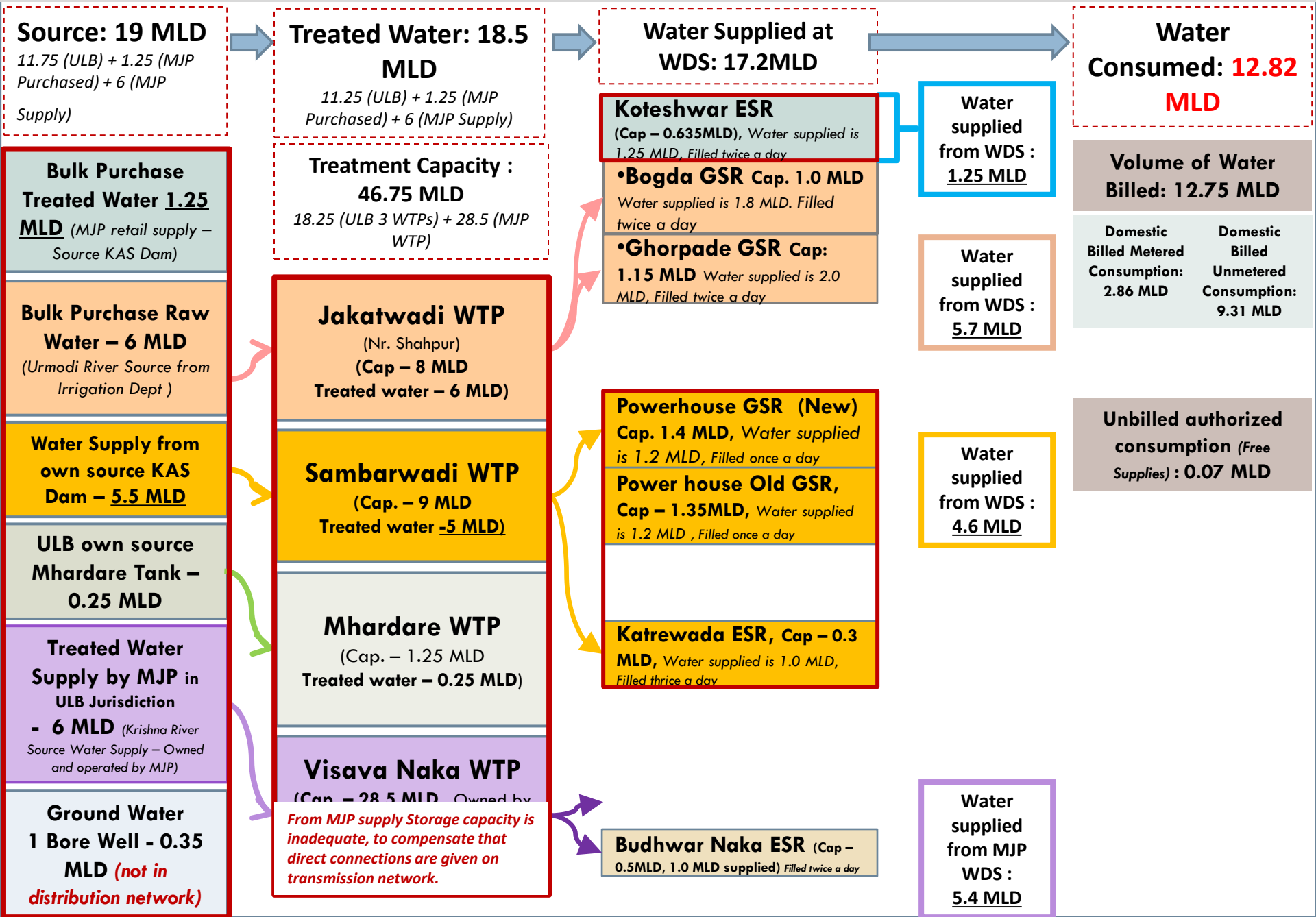


Schematic Diagram Water Supply– Satara Municipal Council



Schematic Diagram Water Supply– Satara Municipal Council



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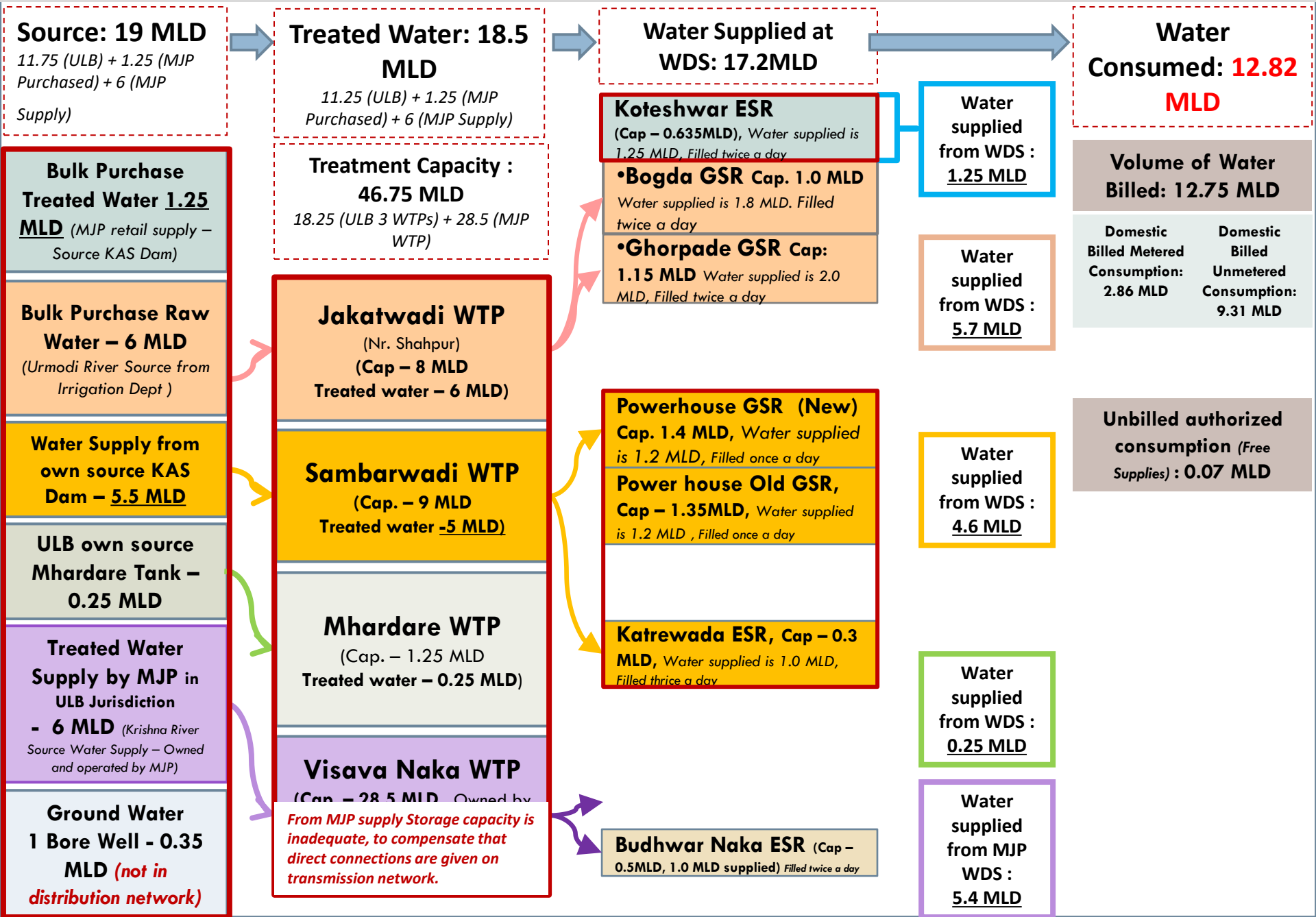
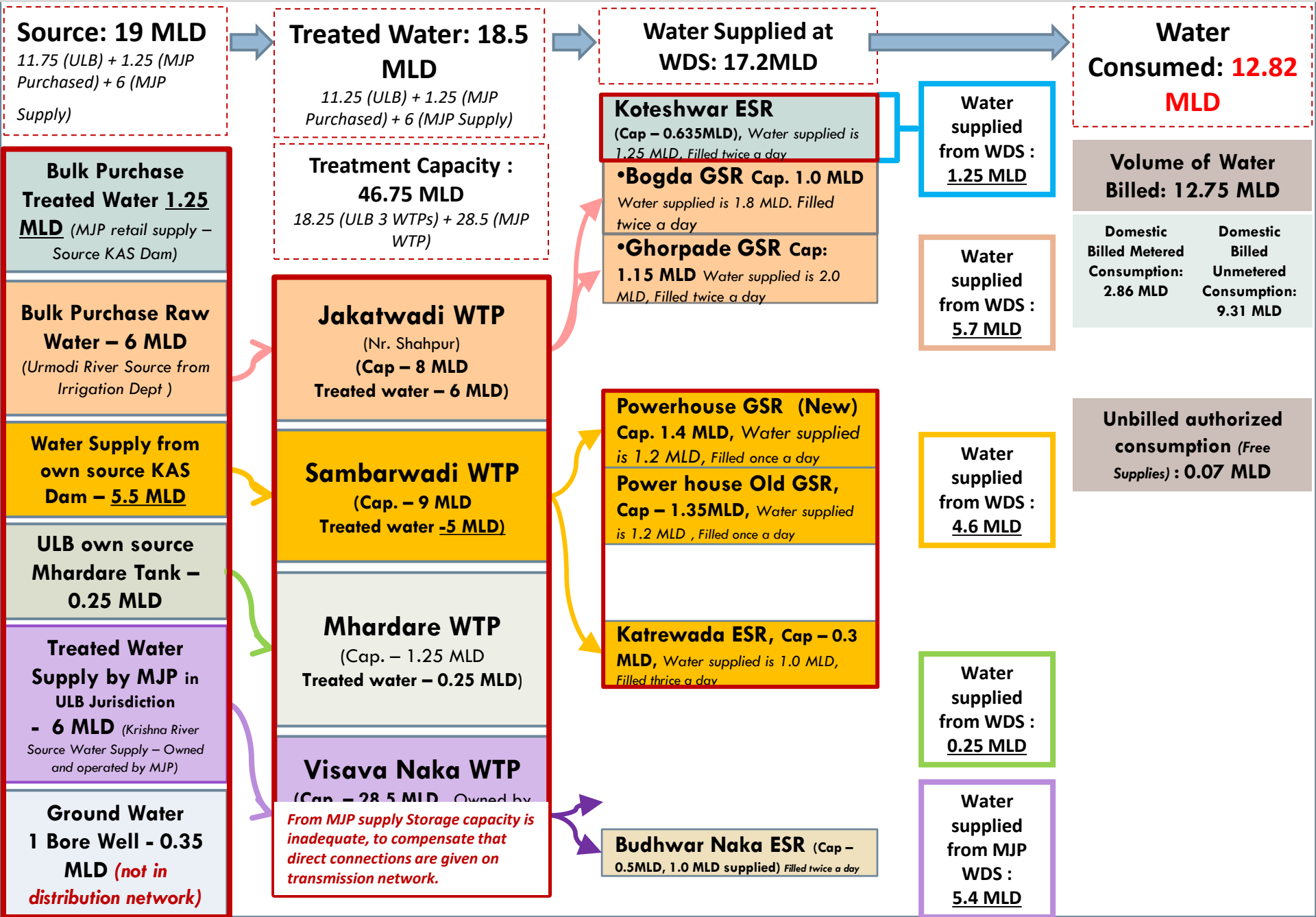


Schematic Diagram Water Supply– Satara Municipal Council



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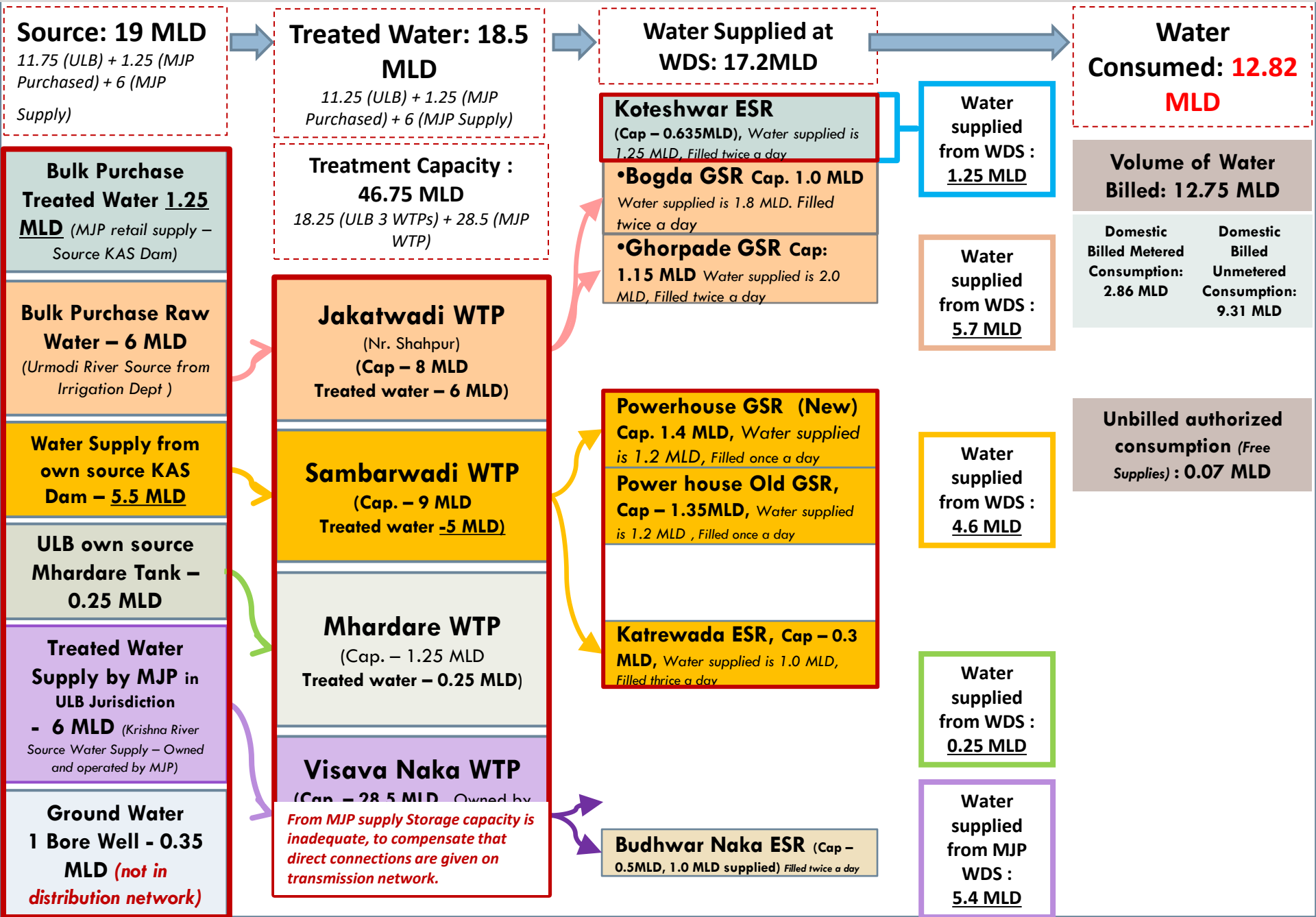

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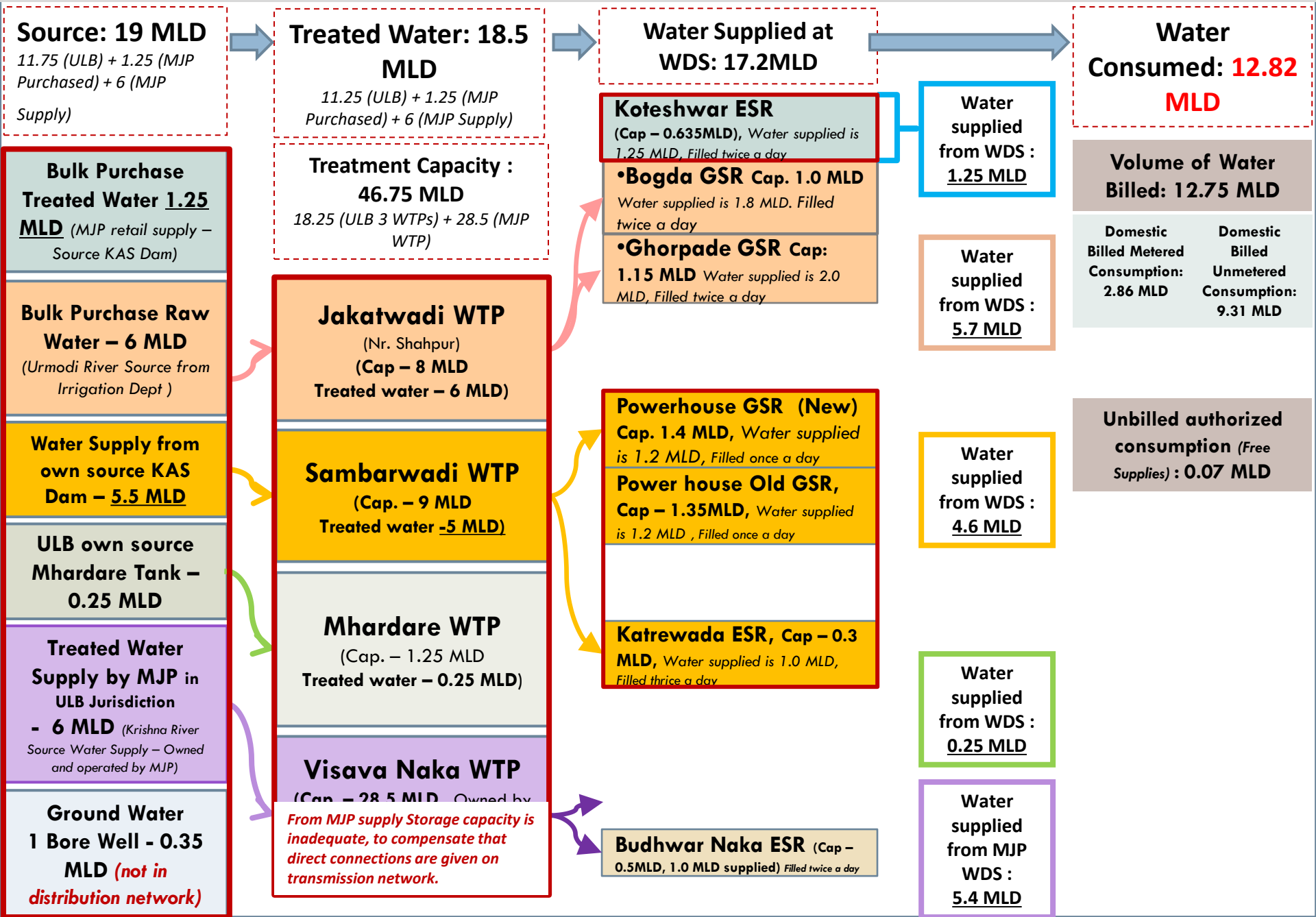

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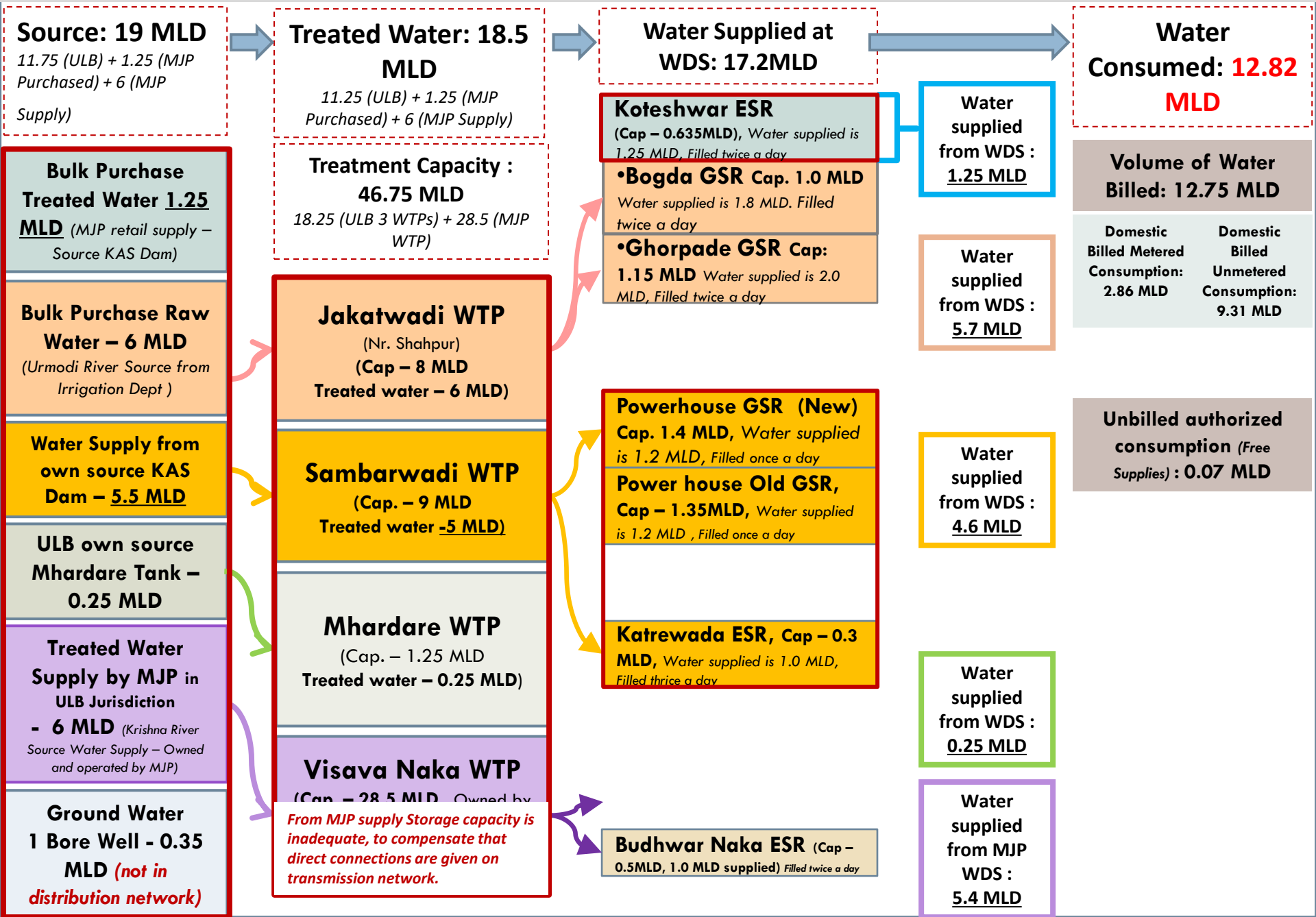

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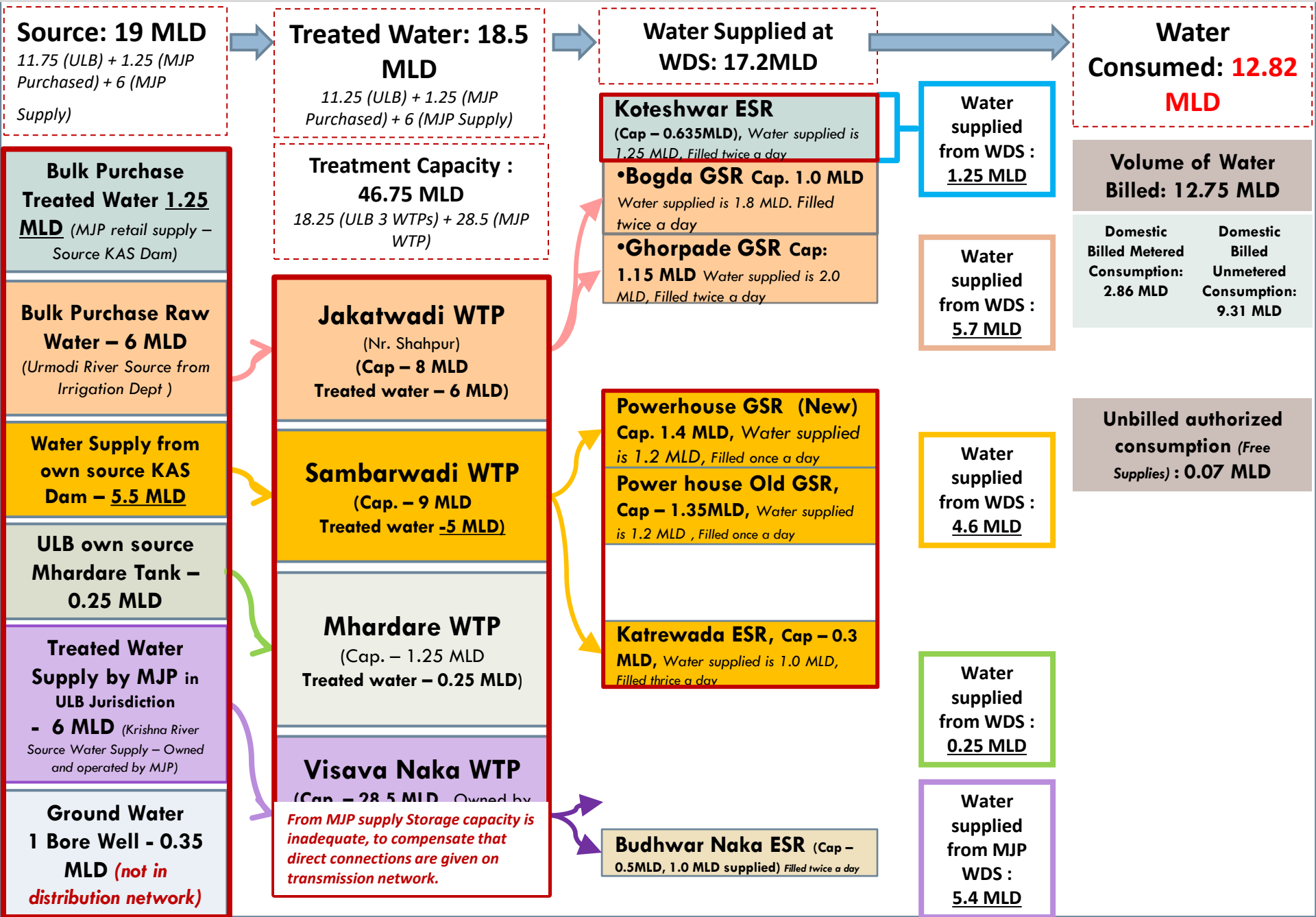

Schematic Diagram Water Supply– Satara Municipal Council

Source: 19 MLD
11.75 (ULB) + 1.25 (MJP Purchased) + 6 (MJP Supply)

Treated Water: 18.5 MLD
11.25 (ULB) + 1.25 (MJP Purchased) + 6 (MJP Supply)

Treatment Capacity : 46.75 MLD
18.25 (ULB 3 WTPs) + 28.5 (MJP WTP)

Water Supplied at WDS: 17.2MLD

Water Consumed: 12.82 MLD

Bulk Purchase Treated Water 1.25 MLD *(MJP retail supply – Source KAS Dam)*

Bulk Purchase Raw Water – 6 MLD *(Urmodi River Source from Irrigation Dept)*

Water Supply from own source KAS Dam – 5.5 MLD

ULB own source Mhardare Tank – 0.25 MLD

Treated Water Supply by MJP in ULB Jurisdiction - 6 MLD *(Krishna River Source Water Supply – Owned and operated by MJP)*

Ground Water 1 Bore Well - 0.35 MLD ***(not in distribution network)***

Jakatwadi WTP
(Nr. Shahpur)
(Cap – 8 MLD
Treated water – 6 MLD)

Sambarwadi WTP
(Cap. – 9 MLD
Treated water -5 MLD)

Mhardare WTP
(Cap. – 1.25 MLD
Treated water – 0.25 MLD)

Visava Naka WTP
(Cap. – 28.5 MLD Owned by

From MJP supply Storage capacity is inadequate, to compensate that direct connections are given on transmission network.

Koteshwar ESR
(Cap – 0.635MLD), *Water supplied is 1.25 MLD, Filled twice a day*

•Bogda GSR Cap. 1.0 MLD
Water supplied is 1.8 MLD. Filled twice a day

•Ghorpade GSR Cap: 1.15 MLD *Water supplied is 2.0 MLD, Filled twice a day*

Powerhouse GSR (New) Cap. 1.4 MLD, *Water supplied is 1.2 MLD, Filled once a day*

Power house Old GSR, Cap – 1.35MLD, *Water supplied is 1.2 MLD , Filled once a day*

Katrewada ESR, Cap – 0.3 MLD, *Water supplied is 1.0 MLD, Filled thrice a day*

Budhwar Naka ESR (Cap – 0.5MLD, 1.0 MLD supplied) *Filled twice a day*

Water supplied from WDS : 1.25 MLD

Water supplied from WDS : 5.7 MLD

Water supplied from WDS : 4.6 MLD

Water supplied from WDS : 0.25 MLD

Water supplied from MJP WDS : 5.4 MLD

Volume of Water Billed: 12.75 MLD

Domestic Billed Metered Consumption: 2.86 MLD	Domestic Billed Unmetered Consumption: 9.31 MLD

Unbilled authorized consumption *(Free Supplies)* **: 0.07 MLD**

- Total non domestic Connections – 702
- Total domestic connections 18067
- HHs served per connection – 1.4
- HH size – 4.14
- LPCD - 116
- Metered Domestic Connections – 4248
  - HHs served– 5727
  - Population served – 24675
  - Water consumed - 2.86 MLD
- Unmetered/ metered non functional domestic connections – 13819
  - HHs served– 19403
  - Population served - 80328
  - Water consumed - 9.31 MLD

Schematic Diagram Water Supply– Satara Municipal Council

Source: 19 MLD
11.75 (ULB) + 1.25 (MJP Purchased) + 6 (MJP Supply)

Treated Water: 18.5 MLD
11.25 (ULB) + 1.25 (MJP Purchased) + 6 (MJP Supply)

Treatment Capacity : 46.75 MLD
18.25 (ULB 3 WTPs) + 28.5 (MJP WTP)

Water Supplied at WDS: 17.2MLD

Water Consumed: 12.82 MLD

Bulk Purchase Treated Water 1.25 MLD *(MJP retail supply – Source KAS Dam)*

Bulk Purchase Raw Water – 6 MLD *(Urmodi River Source from Irrigation Dept)*

Water Supply from own source KAS Dam – 5.5 MLD

ULB own source Mhardare Tank – 0.25 MLD

Treated Water Supply by MJP in ULB Jurisdiction - 6 MLD *(Krishna River Source Water Supply – Owned and operated by MJP)*

Ground Water 1 Bore Well - 0.35 MLD ***(not in distribution network)***

Jakatwadi WTP
(Nr. Shahpur)
(Cap – 8 MLD
Treated water – 6 MLD)

Sambarwadi WTP
(Cap. – 9 MLD
Treated water -5 MLD)

Mhardare WTP
(Cap. – 1.25 MLD
Treated water – 0.25 MLD)

Visava Naka WTP
(Cap. – 28.5 MLD Owned by

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(Cap – 0.635MLD), *Water supplied is 1.25 MLD, Filled twice a day*

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Budhwar Naka ESR (Cap – 0.5MLD, 1.0 MLD supplied) *Filled twice a day*

Water supplied from WDS : 1.25 MLD

Water supplied from WDS : 5.7 MLD

Water supplied from WDS : 4.6 MLD

Water supplied from WDS : 0.25 MLD

Water supplied from MJP WDS : 5.4 MLD

Volume of Water Billed: 12.75 MLD

Domestic Billed Metered Consumption: 2.86 MLD

Domestic Billed Unmetered Consumption: 9.31 MLD

Non domestic billed consumption- 0.58 MLD

Unbilled authorized consumption *(Free Supplies)* **: 0.07 MLD**

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  - Population served – 24675
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  - HHs served– 19403
  - Population served - 80328
  - Water consumed - 9.31 MLD

Schematic Diagram Water Supply– Satara Municipal Council

Source: 19 MLD
11.75 (ULB) + 1.25 (MJP Purchased) + 6 (MJP Supply)

Treated Water: 18.5 MLD
11.25 (ULB) + 1.25 (MJP Purchased) + 6 (MJP Supply)

Treatment Capacity : 46.75 MLD
18.25 (ULB 3 WTPs) + 28.5 (MJP WTP)

Water Supplied at WDS: 17.2MLD

Water Consumed: 12.82 MLD

Bulk Purchase Treated Water 1.25 MLD *(MJP retail supply – Source KAS Dam)*

Bulk Purchase Raw Water – 6 MLD *(Urmodi River Source from Irrigation Dept)*

Water Supply from own source KAS Dam – 5.5 MLD

ULB own source Mhardare Tank – 0.25 MLD

Treated Water Supply by MJP in ULB Jurisdiction - 6 MLD *(Krishna River Source Water Supply – Owned and operated by MJP)*

Ground Water 1 Bore Well - 0.35 MLD ***(not in distribution network)***

Jakatwadi WTP
(Nr. Shahpur)
(Cap – 8 MLD
Treated water – 6 MLD)

Sambarwadi WTP
(Cap. – 9 MLD
Treated water -5 MLD)

Mhardare WTP
(Cap. – 1.25 MLD
Treated water – 0.25 MLD)

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(Cap. – 28.5 MLD Owned by

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Katrewada ESR, Cap – 0.3 MLD, *Water supplied is 1.0 MLD, Filled thrice a day*

Budhwar Naka ESR (Cap – 0.5MLD, 1.0 MLD supplied) *Filled twice a day*

Water supplied from WDS : 1.25 MLD

Water supplied from WDS : 5.7 MLD

Water supplied from WDS : 4.6 MLD

Water supplied from WDS : 0.25 MLD

Water supplied from MJP WDS : 5.4 MLD

Volume of Water Billed: 12.75 MLD

Domestic Billed Metered Consumption: 2.86 MLD	Domestic Billed Unmetered Consumption: 9.31 MLD

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  - HHs served– 19403
  - Population served - 80328
  - Water consumed - 9.31 MLD

Schematic Diagram Water Supply– Satara Municipal Council

Source: 19 MLD
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Treatment Capacity : 46.75 MLD
18.25 (ULB 3 WTPs) + 28.5 (MJP WTP)

Water Supplied at WDS: 17.2MLD

Water Consumed: 12.82 MLD

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Bulk Purchase Raw Water – 6 MLD *(Urmodi River Source from Irrigation Dept)*

Water Supply from own source KAS Dam – 5.5 MLD

ULB own source Mhardare Tank – 0.25 MLD

Treated Water Supply by MJP in ULB Jurisdiction - 6 MLD *(Krishna River Source Water Supply – Owned and operated by MJP)*

Ground Water 1 Bore Well - 0.35 MLD ***(not in distribution network)***

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  - Water consumed - 9.31 MLD

Schematic Diagram Water Supply– Satara Municipal Council

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Ground Water 1 Bore Well - 0.35 MLD ***(not in distribution network)***

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(Cap. – 1.25 MLD
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Power house Old GSR, Cap – 1.35MLD, *Water supplied is 1.2 MLD , Filled once a day*

Katrewada ESR, Cap – 0.3 MLD, *Water supplied is 1.0 MLD, Filled thrice a day*

Laxmi Tekdi ESR **(Cap – 0.4 MLD, 0.4 supplied)** *Filled once a day*

Budhwar Naka ESR **(Cap – 0.5MLD, 1.0 MLD supplied)** *Filled twice a day*

Water supplied from WDS : 1.25 MLD

Water supplied from WDS : 5.7 MLD

Water supplied from WDS : 4.6 MLD

Water supplied from WDS : 0.25 MLD

Water supplied from MJP WDS : 5.4 MLD

Volume of Water Billed: 12.75 MLD

Domestic Billed Metered Consumption: 2.86 MLD	Domestic Billed Unmetered Consumption: 9.31 MLD

Non domestic billed consumption- 0.58 MLD

Unbilled authorized consumption ***(Free Supplies)*** **: 0.07 MLD**

- Total non domestic Connections – 702
- Total domestic connections 18067
- HHs served per connection – 1.4
- HH size – 4.14
- LPCD - 116
- Metered Domestic Connections – 4248
  - HHs served– 5727
  - Population served – 24675
  - Water consumed - 2.86 MLD
- Unmetered/ metered non functional domestic connections – 13819
  - HHs served– 19403
  - Population served - 80328
  - Water consumed - 9.31 MLD

Schematic Diagram Water Supply– Satara Municipal Council

Source: 19 MLD
11.75 (ULB) + 1.25 (MJP Purchased) + 6 (MJP Supply)

Treated Water: 18.5 MLD
11.25 (ULB) + 1.25 (MJP Purchased) + 6 (MJP Supply)

Treatment Capacity : 46.75 MLD
18.25 (ULB 3 WTPs) + 28.5 (MJP WTP)

Water Supplied at WDS: 17.2MLD

Water Consumed: 12.82 MLD

Bulk Purchase Treated Water 1.25 MLD *(MJP retail supply – Source KAS Dam)*

Bulk Purchase Raw Water – 6 MLD *(Urmodi River Source from Irrigation Dept)*

Water Supply from own source KAS Dam – 5.5 MLD

ULB own source Mhardare Tank – 0.25 MLD

Treated Water Supply by MJP in ULB Jurisdiction - 6 MLD *(Krishna River Source Water Supply – Owned and operated by MJP)*

Ground Water 1 Bore Well - 0.35 MLD ***(not in distribution network)***

Jakatwadi WTP
(Nr. Shahpur)
(Cap – 8 MLD
Treated water – 6 MLD)

Sambarwadi WTP
(Cap. – 9 MLD
Treated water -5 MLD)

Mhardare WTP
(Cap. – 1.25 MLD
Treated water – 0.25 MLD)

Visava Naka WTP
(Cap. – 28.5 MLD Owned by

From MJP supply Storage capacity is inadequate, to compensate that direct connections are given on transmission network.

Koteshwar ESR **(Cap – 0.635MLD),** *Water supplied is 1.25 MLD, Filled twice a day*

•Bogda GSR Cap. 1.0 MLD *Water supplied is 1.8 MLD. Filled twice a day*

•Ghorpade GSR Cap: 1.15 MLD *Water supplied is 2.0 MLD, Filled twice a day*

Powerhouse GSR (New) Cap. 1.4 MLD, *Water supplied is 1.2 MLD, Filled once a day*

Power house Old GSR, Cap – 1.35MLD, *Water supplied is 1.2 MLD , Filled once a day*

Katrewada ESR, Cap – 0.3 MLD, *Water supplied is 1.0 MLD, Filled thrice a day*

Laxmi Tekdi ESR **(Cap – 0.4 MLD, 0.4 supplied)** *Filled once a day*

Budhwar Naka ESR **(Cap – 0.5MLD, 1.0 MLD supplied)** *Filled twice a day*

Water supplied from WDS : 1.25 MLD

Water supplied from WDS : 5.7 MLD

Water supplied from WDS : 4.6 MLD

Water supplied from WDS : 0.25 MLD

Water supplied from MJP WDS : 5.4 MLD

Volume of Water Billed: 12.75 MLD

Domestic Billed Metered Consumption: 2.86 MLD	Domestic Billed Unmetered Consumption: 9.31 MLD

Non domestic billed consumption- 0.58 MLD

Unbilled authorized consumption ***(Free Supplies)*** **: 0.07 MLD**

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Treatment Capacity : 46.75 MLD
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Water Supplied at WDS: 17.2MLD

Water Consumed: 12.82 MLD

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Water Supply from own source KAS Dam – 5.5 MLD

ULB own source Mhardare Tank – 0.25 MLD

Treated Water Supply by MJP in ULB Jurisdiction - 6 MLD *(Krishna River Source Water Supply – Owned and operated by MJP)*

Ground Water 1 Bore Well - 0.35 MLD ***(not in distribution network)***

Jakatwadi WTP
(Nr. Shahpur)
(Cap – 8 MLD
Treated water – 6 MLD)

Sambarwadi WTP
(Cap. – 9 MLD
Treated water -5 MLD)

Mhardare WTP
(Cap. – 1.25 MLD
Treated water – 0.25 MLD)

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Volume of Water Billed: 12.75 MLD

Domestic Billed Metered Consumption: 2.86 MLD	Domestic Billed Unmetered Consumption: 9.31 MLD

Non domestic billed consumption- 0.58 MLD

Unbilled authorized consumption ***(Free Supplies)*** **: 0.07 MLD**

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Schematic Diagram Water Supply– Satara Municipal Council

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Treated Water: 18.5 MLD
11.25 (ULB) + 1.25 (MJP Purchased) + 6 (MJP Supply)

Treatment Capacity : 46.75 MLD
18.25 (ULB 3 WTPs) + 28.5 (MJP WTP)

Water Supplied at WDS: 17.2MLD

Water Consumed: 12.82 MLD

- **Bulk Purchase Treated Water 1.25 MLD** *(MJP retail supply – Source KAS Dam)*
- **Bulk Purchase Raw Water – 6 MLD** *(Urmodi River Source from Irrigation Dept)*
- **Water Supply from own source KAS Dam – 5.5 MLD**
- **ULB own source Mhardare Tank – 0.25 MLD**
- **Treated Water Supply by MJP in ULB Jurisdiction - 6 MLD** *(Krishna River Source Water Supply – Owned and operated by MJP)*
- **Ground Water 1 Bore Well - 0.35 MLD** ***(not in distribution network)***

Jakatwadi WTP
(Nr. Shahpur)
(Cap – 8 MLD
Treated water – 6 MLD)

Sambarwadi WTP
(Cap. – 9 MLD
Treated water -5 MLD)

Mhardare WTP
(Cap. – 1.25 MLD
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- **•Ghorpade GSR Cap: 1.15 MLD** *Water supplied is 2.0 MLD, Filled twice a day*
- **•Ganesh GSR Cap: 0.65 MLD** *Water supplied is 1.9 MLD. Filled thrice a day*
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- **Power house Old GSR, Cap – 1.35MLD,** *Water supplied is 1.2 MLD , Filled once a day*
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- **Laxmi Tekdi ESR** (Cap – 0.4 MLD, 0.4 supplied) *Filled once a day*
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Water supplied from WDS : 1.25 MLD

Water supplied from WDS : 5.7 MLD

Water supplied from WDS : 4.6 MLD

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Domestic Billed Metered Consumption: 2.86 MLD	Domestic Billed Unmetered Consumption: 9.31 MLD

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- •HH size – 4.14
- •LPCD - 116
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Treatment Capacity : 46.75 MLD
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Water Supplied at WDS: 17.2MLD

Water Consumed: 12.82 MLD

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Water Supply from own source KAS Dam – 5.5 MLD

ULB own source Mhardare Tank – 0.25 MLD

Treated Water Supply by MJP in ULB Jurisdiction - 6 MLD *(Krishna River Source Water Supply – Owned and operated by MJP)*

Ground Water 1 Bore Well - 0.35 MLD *(not in distribution network)*

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(Cap – 8 MLD
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Water supplied from WDS : 1.25 MLD

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Treatment Capacity : 46.75 MLD
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Water Supply from own source KAS Dam – 5.5 MLD

ULB own source Mhardare Tank – 0.25 MLD

Treated Water Supply by MJP in ULB Jurisdiction - 6 MLD *(Krishna River Source Water Supply – Owned and operated by MJP)*

Ground Water 1 Bore Well - 0.35 MLD *(not in distribution network)*

Jakatwadi WTP
(Nr. Shahpur)
(Cap – 8 MLD
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Ground Water 1 Bore Well - 0.35 MLD *(not in distribution network)*

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Laxmi Tekdi ESR **(Cap – 0.4 MLD, 0.4 supplied)** *Filled once a day*

Budhwar Naka ESR **(Cap – 0.5MLD, 1.0 MLD supplied)** *Filled twice a day*

Water supplied from WDS : 1.25 MLD

Water supplied from WDS : 5.7 MLD

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- HH size – 4.14
- LPCD - 116
- Metered Domestic Connections – 4248
  - HHs served– 5727
  - Population served – 24675
  - Water consumed - 2.86 MLD
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  - Population served - 80328
  - Water consumed - 9.31 MLD

Schematic Diagram Water Supply– Satara Municipal Council

Source: 19 MLD
11.75 (ULB) + 1.25 (MJP Purchased) + 6 (MJP Supply)

Treated Water: 18.5 MLD
11.25 (ULB) + 1.25 (MJP Purchased) + 6 (MJP Supply)

Treatment Capacity : 46.75 MLD
18.25 (ULB 3 WTPs) + 28.5 (MJP WTP)

Water Supplied at WDS: 17.2MLD

Water Consumed: 12.82 MLD

Bulk Purchase Treated Water 1.25 MLD *(MJP retail supply – Source KAS Dam)*

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Water Supply from own source KAS Dam – 5.5 MLD

ULB own source Mhardare Tank – 0.25 MLD

Treated Water Supply by MJP in ULB Jurisdiction - 6 MLD *(Krishna River Source Water Supply – Owned and operated by MJP)*

Ground Water 1 Bore Well - 0.35 MLD ***(not in distribution network)***

Jakatwadi WTP
(Nr. Shahpur)
(Cap – 8 MLD
Treated water – 6 MLD)

Sambarwadi WTP
(Cap. – 9 MLD
Treated water -5 MLD)

Mhardare WTP
(Cap. – 1.25 MLD
Treated water – 0.25 MLD)

Visava Naka WTP
(Cap. – 28.5 MLD Owned by

From MJP supply Storage capacity is inadequate, to compensate that direct connections are given on transmission network.

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(Cap – 0.635MLD), *Water supplied is 1.25 MLD, Filled twice a day*

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Water is released directly into distribution network
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Laxmi Tekdi ESR (Cap – 0.4 MLD, 0.4 supplied) *Filled once a day*

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Water supplied from WDS : 1.25 MLD

Water supplied from WDS : 5.7 MLD

Water supplied from WDS : 4.6 MLD

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Volume of Water Billed: 12.75 MLD

Domestic Billed Metered Consumption: 2.86 MLD	Domestic Billed Unmetered Consumption: 9.31 MLD

Non domestic billed consumption- 0.58 MLD

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Water supplied from WDS : 0.25 MLD

Water supplied from MJP WDS : 5.4 MLD

Volume of Water Billed: 12.75 MLD

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Non domestic billed consumption- 0.58 MLD

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Schematic Diagram Water Supply– Satara Municipal Council

Source: 19 MLD
11.75 (ULB) + 1.25 (MJP Purchased) + 6 (MJP Supply)

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Non Revenue Water Calculation – Satara Municipal Council

Water Produced: 19 MLD

- 11.75 MLD – ULB Sources
- 1.25 MLD - Water Purchased from MJP
- 6 MLD - MJP Supply

Water Treated: 18. 5 MLD

- 11.25 MLD - ULB Sources
- 1.25 MLD - Treated Water Purchased from MJP
- 6 MLD - MJP Supply in Camp area

Water Supplied at WDS: 17.2 MLD

- Water supplied from Koteshwar ESR : 1.25 MLD
- Water supplied from Jakatwadi ESRs and GSRs : 5.7 MLD
- Water supplied from Mahadare tank: 0.25 MLD
- Water supplied from Sambharwadi ESRs and GSRs: 4.6 MLD
- Water supplied from MJP : 5.4 MLD

Water Consumed: 12.82 MLD

- Volume of Water Billed: from Domestic Consumption : 12.17 MLD
- Volume of Water Billed from Non-domestic consumption: 0.58 MLD
- Unbilled authorized consumption (Free Supplies) : 0.07MLD

Water Losses from Source to WTP: 0.5 MLD
% losses from source to WTP : 2.6

Water Losses from WTP to WDS : 1.3 MLD
% losses from WTP to WDS: 7

Water Losses from WDS to final consumption: 4.38 MLD
% losses from WDS to Consumer end: 25.4

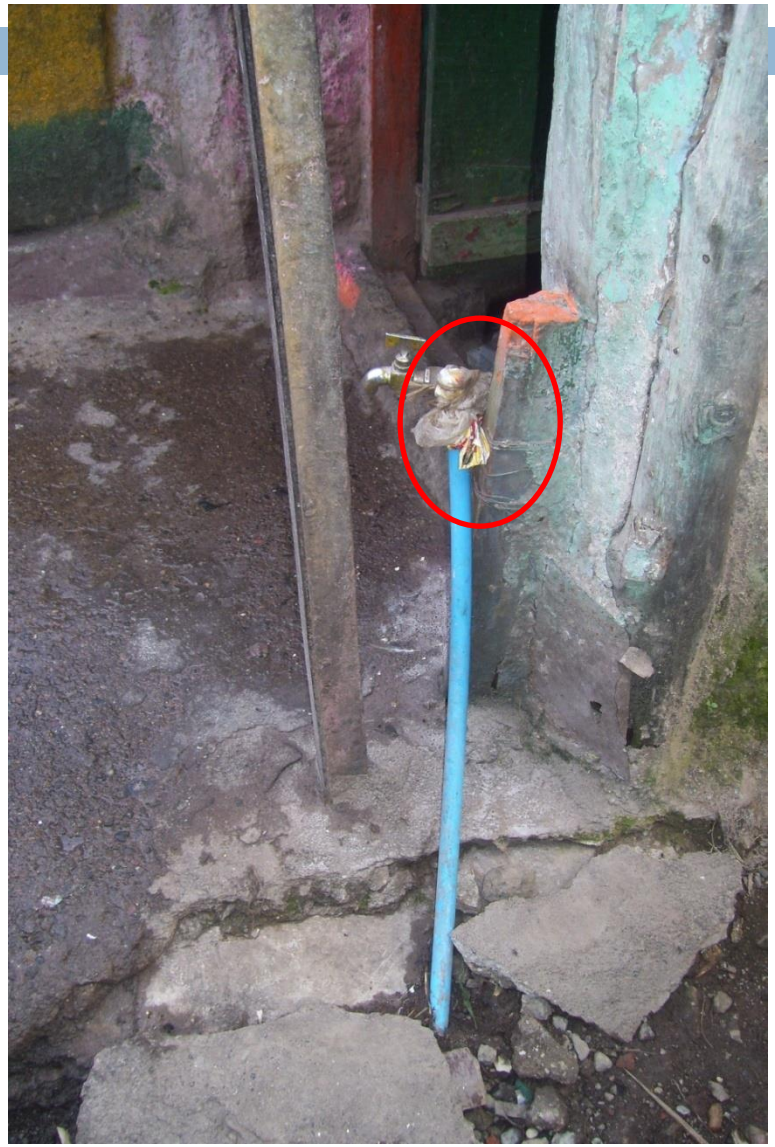
Total Non Revenue Water = 5.7 MLD

Extent of Non Revenue Water : 30.8 % *(From ULB Data 21%)*

Reasons for Non Revenue Water…

1. Illegal connections
   - Till now 209 illegal connections identified and regularised from a single ward.
   - 1/2" domestic connxn on record but actual 1" connxn.
   - Water connections are given directly on transmission network from WTPe.g. Mangalwar pet, MJP served area etc.
   - To estimate illegal connections in the city based on ongoing water audit and consumer survey.
   - Initiated drive for regularization of illegal connections, b not successful
2. Pipe breaks
   - 11 pipe breaks reported in current year
3. Leakages at pipe joints (distribution system of 1965)
4. Leakages at consumer end
5. Public stand posts don't have stop cocks

No stop cock/ valve on water connection



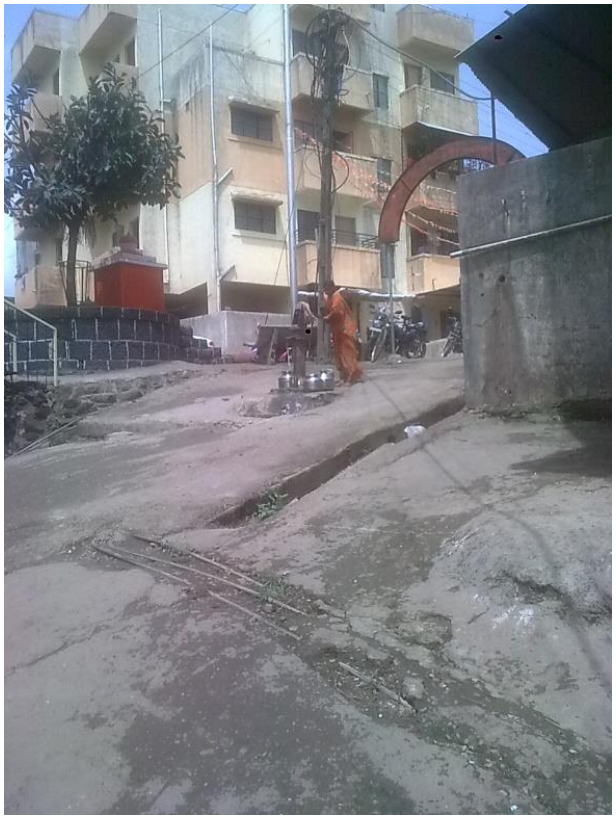
Water losses due to

- No stop cocks/ valve at connection at consumer end.
- Pipe breaks
- Illegal connections
- Leakages in distribution network

Gutters and water distribution lines

Raghunathpura, Karanje, 27th June 2011

Ramach Got, 24th June 2011



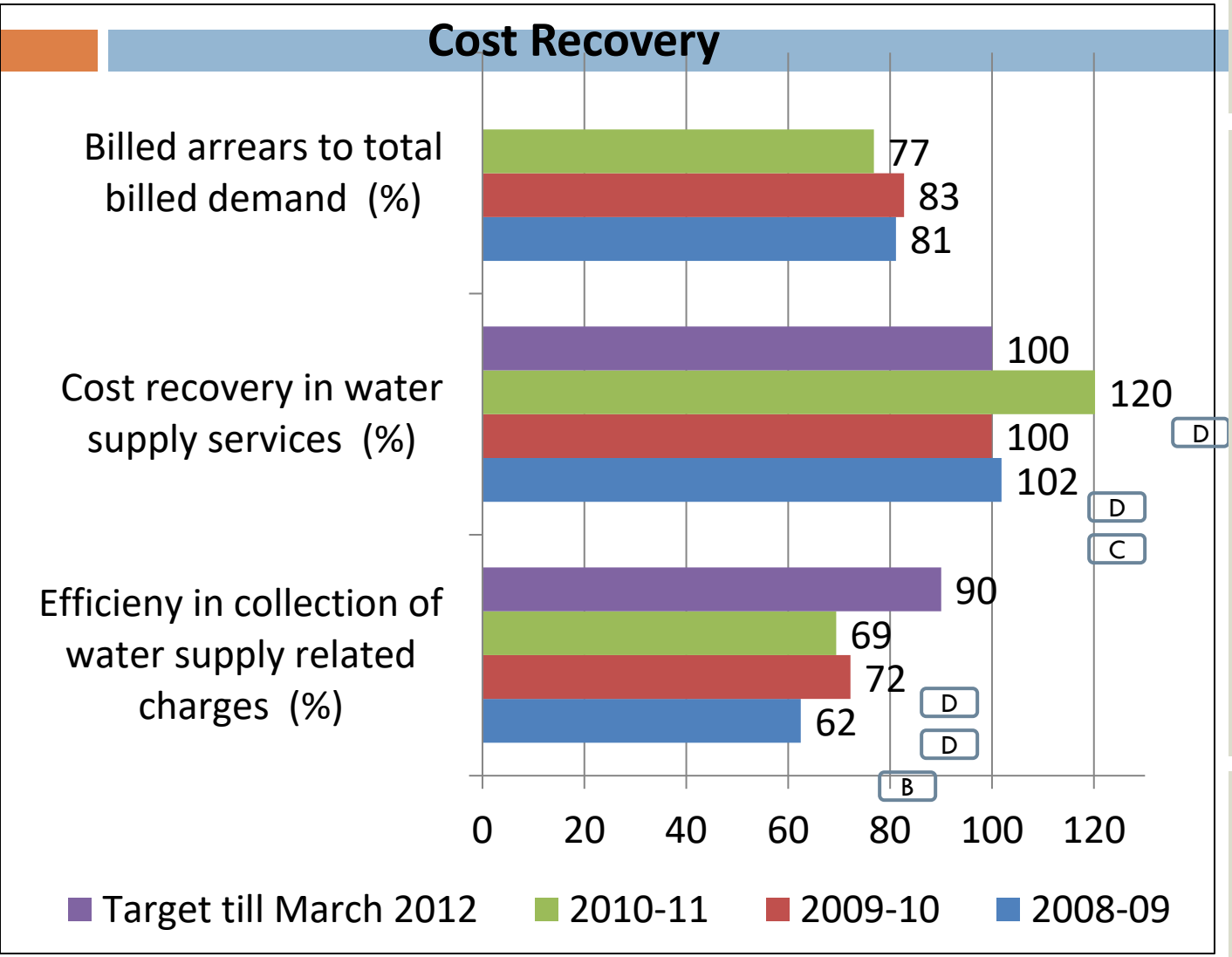
Water Distribution Pipes found passing through gutters may result into contamination water supply

Sant Kabir Slum, dated 24th June 2011

Malhar Peth Slum, Near Nalla taken on 26th June 2011

- The existing distribution network is very old. This leads to water loss due to many pipe breaks and water leakages at joints.

II. Cost Recovery



Data on revenue demand and collection from MJP served in Satara Municipal Jurisdiction is not available as currently no separate records are maintained for it.

1. High amount of arrears 2. Very low collection against arrears

Billed revenue demand is more than revenue expenditure.

1. Door to Door billing
2. No door to door collection.
3. Flat water charges based on connection size are levied .
4. Water charges are part of property tax bill.

Cost recovery (Revenue demand) has improved due to increase in tariff (Rs. 800- Rs.1000- Rs.1500) in last 3 years

Satara - water supply - Revenue Income and expenditure

(Budget copy year 2011-12)

Financial Information - Operating Expenses	Unit	2008-09	2009-10	2010-11
Regular Staff and administration	Rs. Lakhs	37.40537	28.82032	39.7
Outsourced/Contract Staff Costs	Rs. Lakhs	0	0	0
Electricity Charges/Fuel Costs	Rs. Lakhs	76.52532	83.1281	102
Chemical Costs	Rs. Lakhs	6.02094	8.97627	9
Repairs/Maintenance Costs	Rs. Lakhs	37.63095	46.68529	42.46
Bulk (Raw/Treated) Water Charges	Rs. Lakhs	63.54584	46.63339	61
Other Costs	Rs. Lakhs	0	14.7098	20.15
Total Operating Expenditure	Rs. Lakhs	221.1284	228.95317	274.31

MJP - water supply - Revenue Income and expenditure in MJP served area within ULB limit

(Taken as 40% of total MJP Revenue receipts)

Financial Information - Operating Expenses	Unit	2008-09	2009-10	2010-11
Regular Staff and administration	Rs. Lakhs	66.42	69.81	77.44
Outsourced/Contract Staff Costs	Rs. Lakhs	0.00	0.00	0.00
Electricity Charges/Fuel Costs	Rs. Lakhs	81.88	53.80	99.02
Chemical Costs	Rs. Lakhs	3.83	4.44	1.31
Repairs/Maintenance Costs	Rs. Lakhs	14.02	6.47	9.70
Bulk (Raw/Treated) Water Charges	Rs. Lakhs	23.82	22.92	25.12
Other Costs	Rs. Lakhs	0.06	0.45	0.10
Total Operating Expenditure	**Rs. Lakhs**	**190.04**	**157.89**	**212.69**

Revenue Receipts – Water Supply

- **Revenue Expenditure Maximum on –**
  - **Electricity Charges on pump operation**
  - **Bulk purchase of water**
  - **Repair and Maintenance**
  - **Staff Salaries** *(increase in salaries after 6th pay commission from year 2010-11)*

- **Revenue Income – Poor**
  - Poor collection efficiency against arrears
  - Need to improve collection efficiency against current demand to meet O and M expenditure

Improve collection efficiency

Tariff Structure

ULB Water Supply (Non Metered)			
Water Tax - Flat Rate Tariff based on connection size (Annual Water Charges)			
Remarks	**½"**	**3/4"**	**1"**
Rates for domestic connections	Rs. 1500/-	Rs. 2330/-	Rs. 5492/-
Rates for non-domestic connections	Rs. 4080/-	Rs. 8135/-	Rs. 18408/-
	ULB don't supply water to MIDC Area		

For Domestic Connections:

- **Connection Fees : Rs. 500/-**
- **Deposit : Rs 500/-**
- **No subsidy for poor or slum dwellers for connection charges and water tax.**
- **No provision to pay in instalments.**
- **Rebate for early payment: 1% on the current amount of consolidated property tax, tree tax and special education tax.**
- **Penalty for late payment :1% per month on all outstanding amount including arrears.**

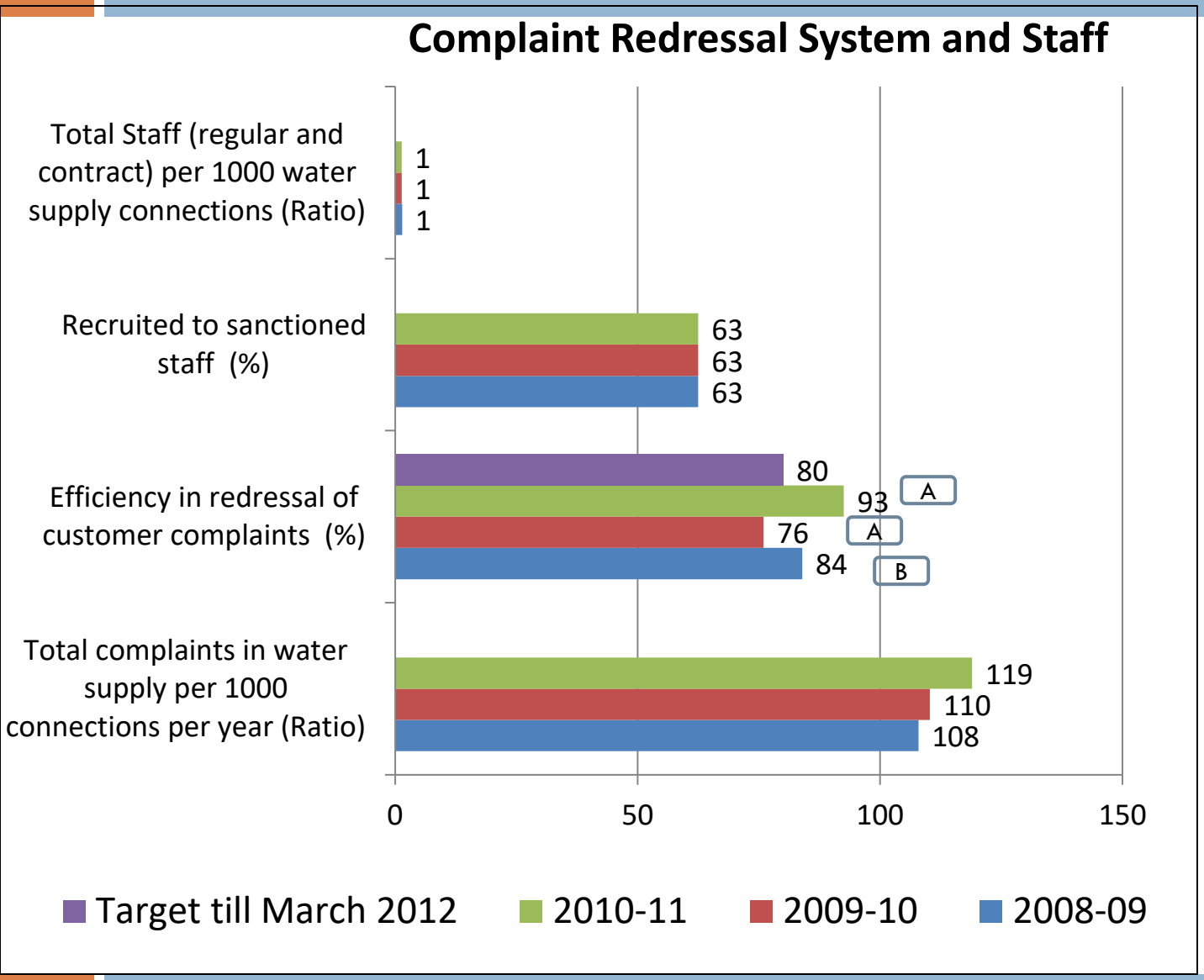
Tariff Structure

MJP Water Supply (Metered)				
Water Charge - Volumetric Tariff (Bimonthly Water Bill)				
Remarks	**Upto 15000 lts**	**15001 - 20000 lts**	**20001 - 25000 lts**	**> 25000 lts**
Rates for domestic connections	Rs. 11.20	Rs. 12.30	Rs. 16.80	Rs. 22.40
Institutional	Rs. 21.60	Rs. 21.60	Rs. 21.60	Rs. 21.60
Rates for non-domestic connections	Rs. 50.80	Rs. 50.80	Rs. 50.80	Rs. 50.80

For Domestic Connections:

- **One time Connection Fees : Rs. 270/-**
- **One time Deposit : Rs 330/-**
- **Consumers have to buy water meters on their own. Cost of 1 meter is about Rs. 1000 – 1500/-**
- **No subsidy for poor or slum dwellers for connection charges and water tax. No provision to pay in instalments.**
- **Minimum charges for unmetered public stand posts are**
  - **15 mm dia: Rs. 2035/- per month/ PSP**
  - **20 mm dia: Rs. 4895/- per month/ PSP**
  - **25 mm dia: Rs. 10493/- per month/ PSP**

III. Complaint Redressal System and Staff



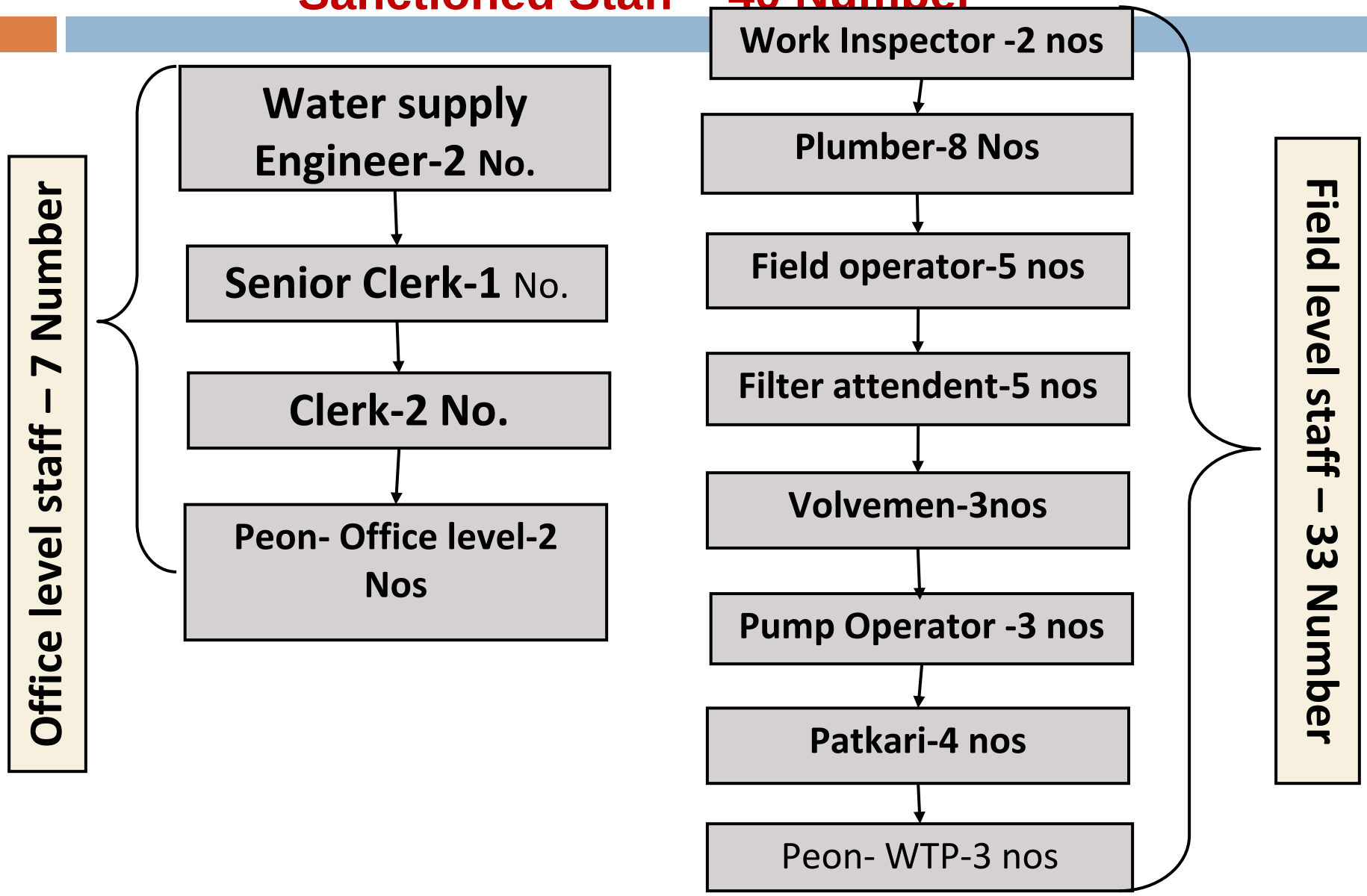
Technical and Field Staff of ULB for WS a) 1 Engineers
b) 3 clerks
c) 6 plumbers
d) 3 Volvemen
e) 3 Filter attendant
f) 2 Field Operator

Number of complaints are increasing (1862-2025-2233)

Major complaint areas – leakages, low water pressure.

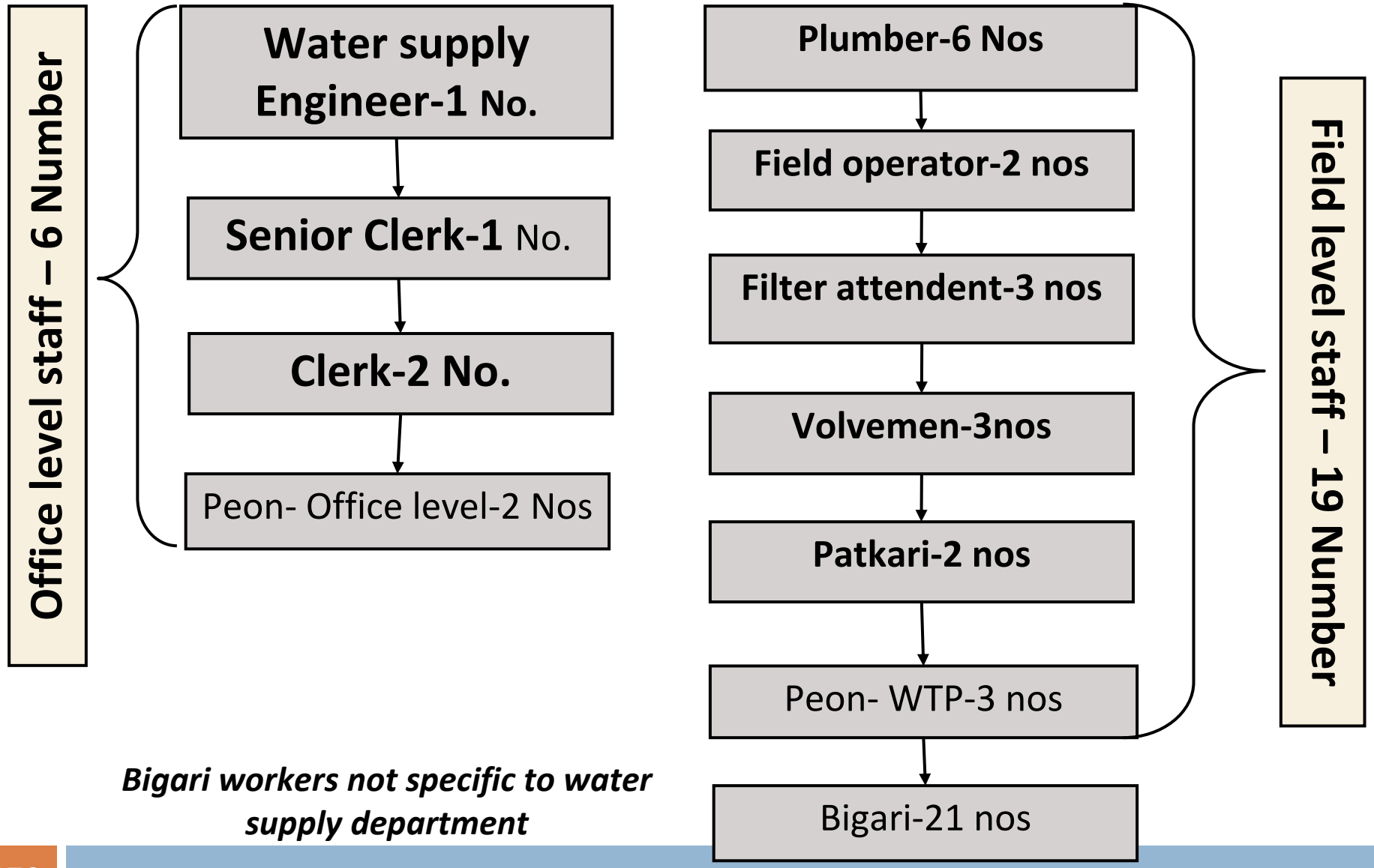
ULB Water supply- Organogram

Sanctioned Staff – 40 Number



ULB Water supply- Organogram

Staff Working - 25



Bigari workers not specific to water supply department

Water Supply Assessment

- Performance Assessment
- **Identification of Improvement Areas**
- Prioritisation of Improvement Areas
- Proposed Solutions & Actions
- Assessment of Ongoing Projects – UIDSSMT, MSNA

Water Supply – Improvement Areas

❖ Improve Cost Recovery

- Improve Collection Efficiency – Special drive and provision to collect arrears
- Rationalisation of tariff to recover 100% O and M cost
- Reduce revenue expenditure : Conduct energy audit (Energy bills (Rs. 7.5-8 lakh per month). Replace old pumps.

❖ Reduce NRW, Conduct Water Audit

- Consumer Survey
- Regularise Illegal connections
- Conduct Leak Detection Survey (pipe breaks, pipe joints)
- Reduce water loss/ leakages at tap connection at consumer end.
- Cover 6 km open canal from KAS Dam

❖ Improve Access and Coverage especially in Slums

- To increase coverage in slums – conversion of PSPs into Group Connections.
- Laying Distribution network in slums.

Water Supply – Improvement Areas

- **Increase Distribution Network Capacity**
  - Replace very old pipelines in distribution network to increase network capacity and reduce physical water losses. (1965 scheme)
- **Improve Equal Distribution of Water**
  - Low water pressure at tail end.
  - Unequal distribution of water because of topography
  - Inadequate storage capacity
  - Leakages and contamination of water at HH connections.
- **Metering**
  - Install bulk flow meters at WTPs, ESRs, GSRs.
  - Introduce consumer end metering.

Priorities for Water Supply

PRIORITY	WATER SUPPLY KPIs
First / Immediate	Coverage of water supply connections Coverage of water supply connections in slums Per Capita supply of water Efficiency in collection of water supply charges
Second	Efficiency in redressal of customer complaints Extent of Non Revenue Water (NRW) Extent of functional metering of water connections Cost recovery (O&M) in water supply services
Third	Continuity of water supply Quality of water supplied

Water Supply

- Performance Assessment
- Identification of Improvement Areas
- Prioritisation of Improvement Areas
- **Proposed Solutions & Actions**
- Assessment of Ongoing Projects – UIDSSMT, MSNA

Solutions and Actions for Improving Water Supply

S. no	Summary of Water Supply Issues	Possible Solutions	Proposed Actions/ Interventions
1	Intermittent water supply & inequitable distribution of water, low water pressure at tail end. ○ No water ditricts designated. ○ Highly inadequate water storage reservoir capacity. ○ Connections given directly on transmisison network.	Designate water districts and district meter areas. Increase Water Storage Reservoir Capacity. Augmentation of water supply. Improvement in water supply mechanism.	
2	Physical losses of water at transmission main and distribution network due to pipe breaks, leakages at joints. Also water losses at consumer end as no stop valve at water connection.	Refurbishment of old network, replacing old pipelines, leak detection and plugging of leakages. Survey to detect water connections without stop valves and introduce heavy penalty on defaulters.	
3	Quantity of water paid for is much more than quantity of water actually consumed through legal connections. *Per capita water supply is high (153 lpcd) and per capita water availability is relatively low (110 lpcd).*	Quantifying water production; supply and consumed. Introducing metering at supply and consumption ends	Install bulk flow meters at WTP, ESRS, GSRs to measure flow of water. Replace non functional consumer meters. Inroduce 100% consumer metering

Solutions and Actions for Improving Water Supply

S. no	Summary of Water Supply Issues	Possible Solutions	Proposed Actions/ Interventions
4	Illegal connections at distribution network and consumer end.	Identification and Regularization of illegal connections.	Conduct Water Audit and Consumer Survey
5	Inadequate network effecincy unable to cater to current demand as old distribution network (since 1965)	Rehabilitation and remodelling of distribution network. Replacement of old pipelines.	
6	High billed arrears to total billed demand. (Very low collection effecincy against arrears)	Special drive to collect arrears. Timebound billing and collection. Implement Dispute resolution mechanism.	Computerised billing. Facilitate e-payment of bills and through designated banks. Introduce heavy penalty on defaulters. Introduce incentives for early payment and advance payment. Special provison for speedy decisions on court litigation cases.

Solutions and Actions for Improving Water Supply

S. no	Summary of Water Supply Issues	Possible Solutions	Proposed Actions/ Interventions
7	No coverage of individual water connections in slums	Policy level interventions to provide individual water connections or group connections in slums.	Conversion of PSPs into Group Connections. Laying Distribution network in slums.
8	Improve coverage of water supply in non slum areas	Additional connections by expanding distribution network	
9	High energy bills	Conduct energy audit	Maintain power factor, replace inefficient pumps
10	Lack of technical expertise and staff	Capacity building and training of existing staff Fill vacant posts	

Minimal Capital Expenditure Interventions

Interventions with Minimal Capital Expenditure			
	SN.	**Action**	**KPIs Impacted**
Immediate Priority	1	Energy and Water Audit **	Coverage, LPCD, Continuity, Coverage in slums, complaint redressal, Cost Recovery and Efficiency in Collection of Charges
	2	Identification and plugging of leakages *	LPCD, NRW and Cost Recovery
	3	Regularizing illegal connections #	Coverage of WS Connections, LPCD, NRW and Cost Recovery
	4	Installing bulk flow meters at raw & treated water regiments, at WDS **	LPCD, NRW
Second Priority	5	Replacing non-functional meters #	LPCD, NRW, Cost recovery
	6	Computerised billing system **	Cost recovery, Collection efficiency
	7	Hydraulic Modelling **	Continuity of water, Quality of water, LPCD
	8	Maintenance of WTP and pumping machinery	Quality of water
	9	Periodic checking of water losses and its repairing	LPCD and NRW

**Action being implemented under UIDSSMT*
***Action being implemented under MSNA*
#Action under consideration by Satara Municipal Council

Substantial Capital Expenditure Interventions

Interventions with Substantial Capital Expenditure			
	SN.	**Action**	**KPIs Impacted**
Immediate Priority	1	Reduction in treated water transmission losses and improvement in transmission mains* *(Replacement of old pipelines and mains)*	LPCD, NRW, Quality of water and Cost Recovery
	2	Improvement in Distribution System* *(Replacement of old pipelines)*	Coverage, LPCD, Continuity, NRW, Quality of water and Cost Recovery
	3	Systems improvement and up-gradation of WTPs*	Quality of water
	4	Improvement in water head works*	LPCD, Quality of water
	5	Improvement and augmentation of water storage*	LPCD, NRW and Quality of water
	**Action being implemented under UIDSSMT* ***Action being implemented under MSNA* *#Action under consideration by Satara Municipal Council*		

Substantial Capital Expenditure Interventions

Interventions with Substantial Capital Expenditure			
	SN.	**Action**	**KPIs Impacted**
Second Priority	6	Replacement of Pumping machinery*	LPCD and NRW
	7	Expansion of distribution network#	Coverage of WS Connections
	8	Consumer metering#	NRW, Cost Recovery
	9	Improvement in Trunk Main – *Converting 6 Km open canal into closed pipeline* (reduction in raw water transmission losses)*	LPCD, NRW and Cost Recovery
	10	Augmentation of source** *(Kas source augmentation)*	Coverage. LPCD, Continuity, Coverage in slums, complaint redressal, Cost Recovery and Efficiency in Collection of Charges
	*Action being implemented under UIDSSMT **Action being implemented under MSNA #Action under consideration by Satara Municipal Council		

Process Related Changes To Improve Cost Recovery

- Special drive is needed to improve collection efficiency especially against arrears.
  - Facilitate payment of bills through customer facilitation centres (e kiosks, civic centres etc)
  - Facilitate payment of bills through dedicated banks
- Out sourcing door to door distribution of bills and collection to private agencies
- Temporarily disconnecting water connection to defaulters after repetitive reminders.
- Updation of any new water connection approved in the water tax/ property tax register.
- Improved billing and collection efficiency by efficient production of bills, customer friendly collection systems, Incentives for early payments/ penalties for arrears

Process Related Changes

- Policy provision to provide individual or group water connections in slums. Conversion of existing public stand posts in group connections.
- Simplification of application procedures for new connections.
- GR to take action against consumers to repair/ replace faulty/ non functional meters.
- Monitoring of functioning of meters.
- Special GR for regularisation of illegal connections and disconnection of illegal connection after repetitive reminders.
- Formation of leak detection cell for each administrative ward. Provision for leak detection instruments i.e. pipe locator, electronic leak locator, metal detector, sounding rods etc.

Process Related Changes

- Procurement of mobile water sample testing unit to for periodic monitoring of water quality. Improved process for maintaining water quality protocol.
- Improved processes for handling, resolving complaints & reporting back to consumer as per citizen charters
- Process for periodic analysis & feedback from complaints database for quality, leakage, etc.

SATARA – TOWARDS 24X7 WATER SUPPLY

Water Supply Assessment

- Performance Assessment
- Identification of Improvement Areas
- Prioritisation of Improvement Areas
- Proposed Solutions & Actions
- **Towards 24 x 7 Water Supply**
- **Assessment of Ongoing Projects – UIDSSMT, MSNA**

Pre-requisites for 24x7 Water Supply in Satara

Reforms	Actions	Status
Introduce Metering	Installation of flow meters at supply	Ongoing under MSNA
	Consumer end Metering	Under consideration by SMC
Reduce NRW	Leak detection and plugging of leakage joints	Ongoing under MSNA
	Regularise illegal connections	Under consideration by SMC
	Replacing old pipelines	Ongoing under UIDSSMT
Water audit	Consumer survey, identify illegal connections	Ongoing under MSNA
Energy audit	Replace inefficient pumps	Ongoing under MSNA, UIDSSMT
Water quality improvement	Introduce water quality monitoring system	Proposed

Pre-requisites for 24x7 Water Supply in Satara

Reforms	Actions	Status
Billing and Collection efficiency improvement	Computerized billing, door to door billing, faciliatate bill payment	Ongoing under MSNA, e-governance
Cost recovery improvement	Telescopic tariff structure Volumetric billing	Under consideration by SMC
Digitalization of existing system	GIS mapping of existing distribution network and consumer survey	Ongoing under MSNA
Equitable distribution of water	Hydraulic modeling	Ongoing under MSNA
135 lpcd of water supply	Source augmentation	Ongoing under MSNA under special provision

Proposed Cost for 24 x 7 Water Supply in Satara Municipal Council

S. No.	Head	Rs. Lakh
1	GIS digitisation and mapping and consumer survey	**180.32**
2	Water Audit	
3	EnergyAudit	
4	Hydraulic Modelling	
5	Computerised billing system	
6	Installation of bulk flow meters (10 Number)	
7	Rehabilitation of Distribution Network- 120 Km to be replaced and improvement in transmission network	**4712**
8	Converting 6 km open canal into closed pipeline	**832**
9	Storage reservoirs	**588**
10	Systems improvement and up-gradation of WTPs	**253**

Proposed Cost for 24 x 7 Water Supply in Satara Municipal Council

S. No.	Head		Rs. Lakh
10	Systems improvement and up-gradation of WTPs		**253**
11	Connecting Kas MBR to Urmodi MBR		**48**
12	Pumping works		**270**
13	Water head works		**80**
14	Kas Source Augmentation (Increasing dam height)		**4300**
15	Consumer metering, replacement of house service connection (Total 18769 conections of these 4970 metered connections, 13799 unmetered connections)	Block Cost - Rs. 5000/- per connection with electromagnetic meter	**689.95**
	TOTAL Rs. Lakh		**11953.27**
	TOTAL ESTIMATED COST FOR 24 X 7 WATER SUPPLY IN SATARA (Rs.)		**119.5 Cr**

Most of the improvement areas highlighted to improve Water Supply in Satara are covered under 2 ongoing projects for Water Supply in the town.

- **ONGOING PROJECT**
  - **UIDSSMT**
  - **MSNA**

Satara – Towards 24x7 Water Supply

Proposed scheme funded under UIDSSMT

Total cost of project sanctioned 49.10 Cr. But now it is revised to 68 Cr as per new DSR

Designed for year 2040 (For population – 2,07,917)

Implementing Agency MJP Satara

Proposed scheme funded under MSNA

- **Total sanctioned cost of project 1.80 Cr.**

Implementing Agency MJP Kolhapur

Total Cost for Improving Water Supply in Satara – approx. (68 + 1.8) = 70 Cr.

Kas Dam Source Augmentation – 43 Cr.

Satara – Towards 24x7 Water Supply

- **UIDSSMT Project Sanctioned Cost = Rs. 68 Cr**
- **MSNA Project Sanctioned Cost = Rs. 1.8 Cr**
- **Kas Dam Source Augmentation Sanctioned Cost = 43 Cr.**
- **Total Cost for Improving Water Supply in Satara is approx. = 112.8 Cr.**

Proposed Tariff Structure (After 100% consumer metering implemented as projected by MJP, Satara)

Telescopic Rates For domestic connections

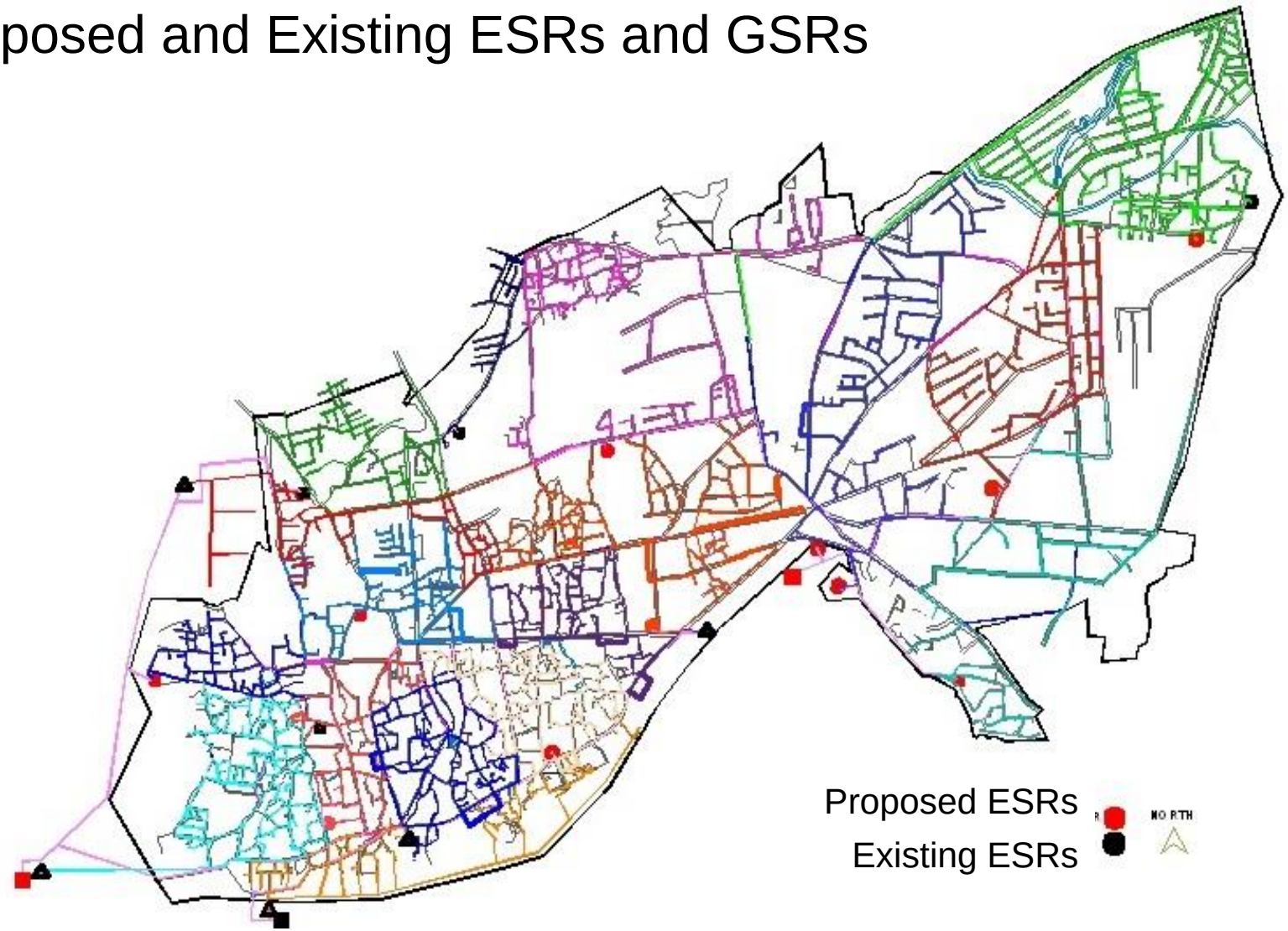
- Up to 15000 liter/month- Rs.11.20/1000 liter
- 15000 to 20000 liter/month- Rs.12.30/1000 liter
- 20000 to 25000 liter/month- Rs.16.40/1000 liter
- More than 25000 liter/month- Rs.21.20/1000 liter

Non domestic volumetric rates (Not as per telescopic rates)

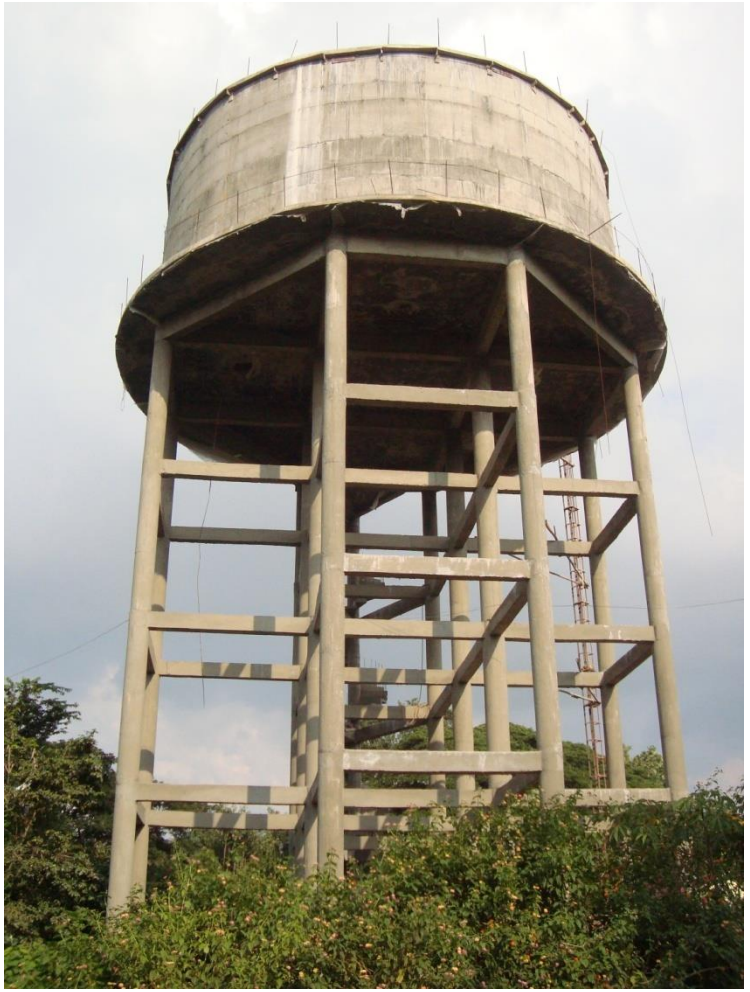
- Rs. 50.20/1000 liter

Proposed Water Distribution Zones Map

Proposed and Existing ESRs and GSRs



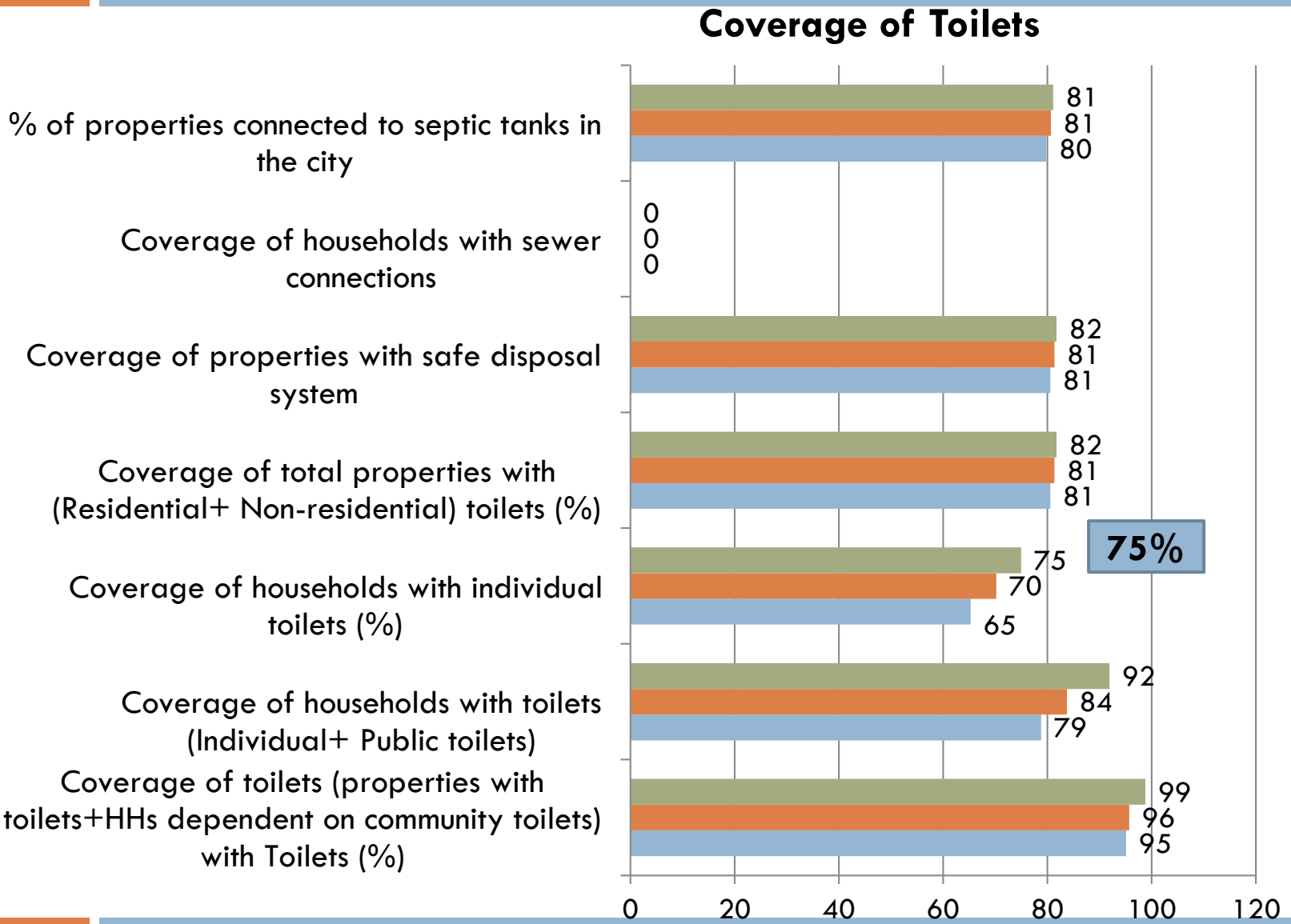
ESRs – Newly constructed under UIDSSMT



- General Body Satara passed a resolution on 12th September 2011 to give preparation of DPR to MJP, Satara to achieve 24x7 water supply in the town.
- In next annual budget provision will be made for the payment of fees to MJP Satara for their services in preparing DPR.
- Tharav No. - 1306

Sanitation Scenario in Satara

Coverage of Toilets

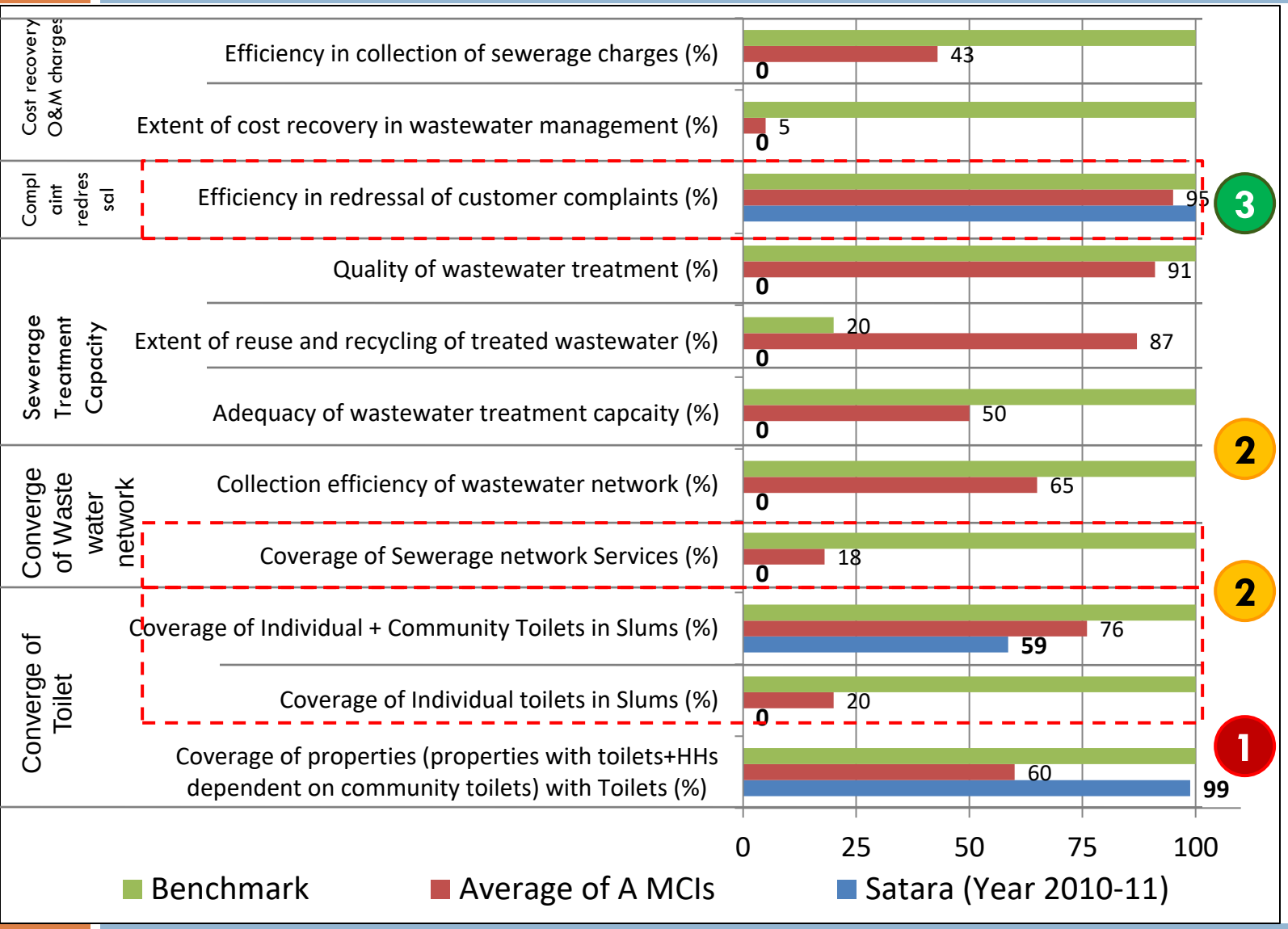


Coverage of septic tanks is good – 80%

No sewerage network

Coverage of HHs with individual toilets – 75%

Satara Municipal Council: Priorities for Sanitation



Computerised systems for complaint redressal

Proper cleaning of open drains. Better Septage management practices and Fecal Sludge Treatment & disposal.

Planning for drainage/ wastewater network and STP

Increasing coverage of community & individual toilets in slums

SANITATION PRIORITIES

I. **Improve Access to Sanitation**
   - Improve access to community toilets in slums
   - Improve O & M of community toilets
   - Encourage individual toilets in slums

II. **Strengthen Septage Management**
   - Plan for fecal sludge management and treatment
   - Strengthen complaint redressal system regarding septage

III. **Wastewater network**
   - Convert open drains to covered drains
   - Increase coverage of drainage network in slums (no drainage network in many slums)

IV. **Plan for Waste Water Treatment (STPs)**

Introduce Service Charges/ Sanitation Tax to recover O & M

Coverage of Toilets – City Level

Coverage of Individual Toilets

- Total Properties- 28918
- Properties with Individual Toilets - 23644
- Properties with coverage of Individual Toilets – 81.7%
- Total HHs- 29028
- Number of HHs with Individual Toilets- 21759
- % Coverage of HHs with Individual Toilets – **74.95**

Coverage of Community Toilets

- Total community & public toilet seats – 821
- Total HHs – 29028
- HHs dependent on community & public toilet seats - 4926 (Survey 2011)
- % Coverage of HHs with Community & Public Toilets – 16.96 (Survey 2011)

- % Coverage of HHs with Individual, Community & Public Toilets: 91.91

Coverage of Toilets – City Level

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But it does not depicts coverage of toilets in slums…
No segregated data/ information on community toilets and public toilets…

Total Coverage of Toilets (Individual and Community) in Satara is seemingly Adequate

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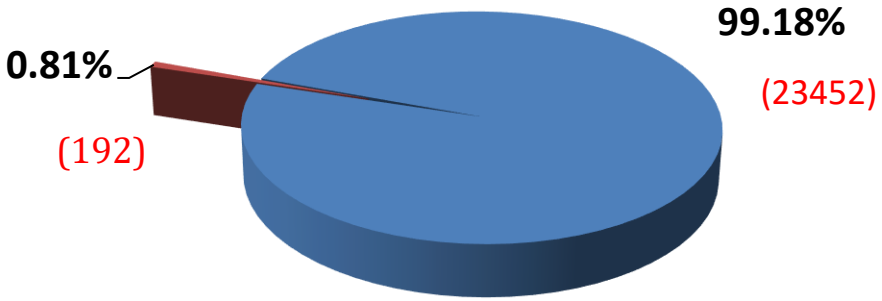
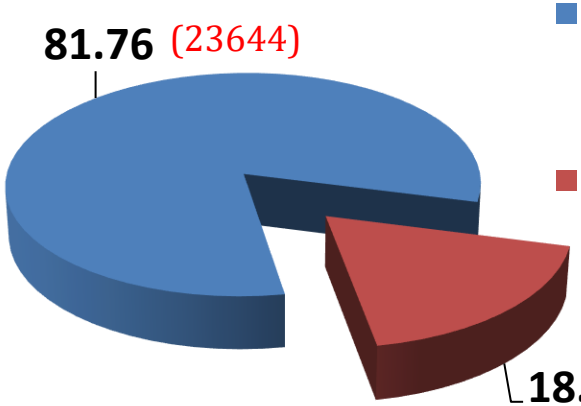
Properties With Safe Disposal System

Properties Connected to Safe Disposal System



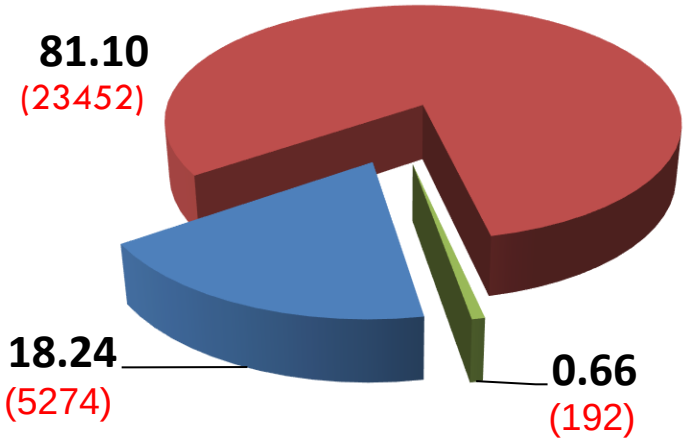
- Number of connections to septic tanks in the city
- No of connections with soak pit/ other disposal system on site

Properties with Toilets



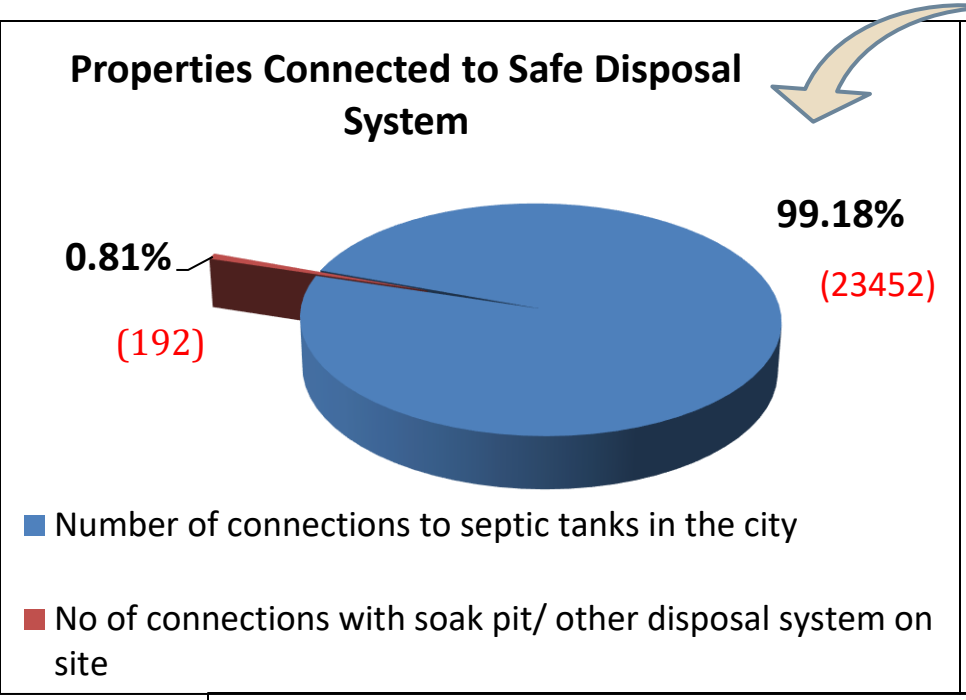
- Properties with toilets (Year 2011)
- Properties without toilets (Year 2011)

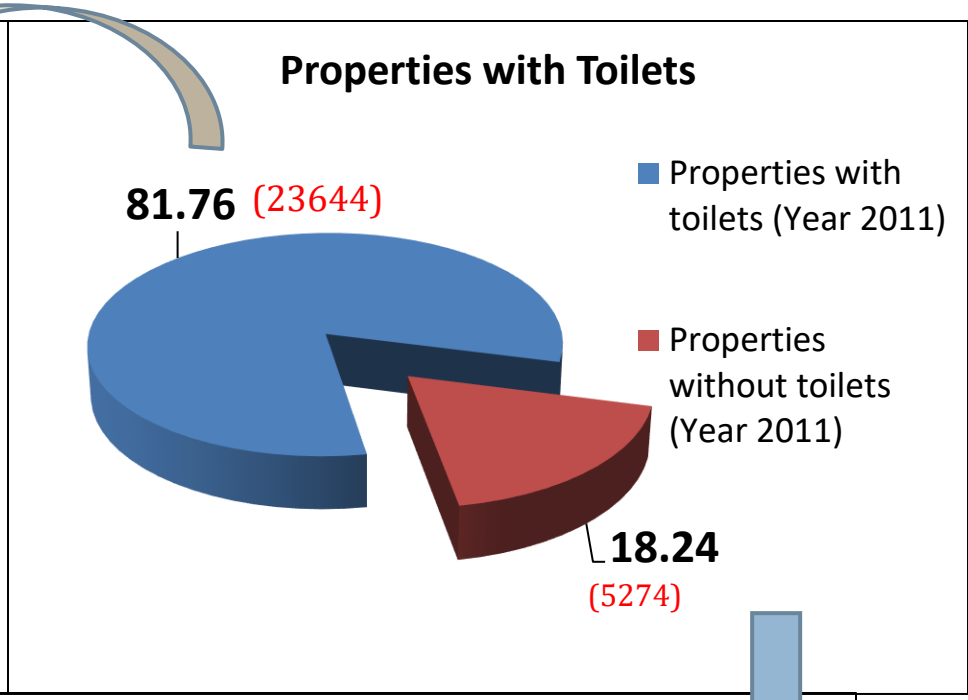
Properties with Toilets & Safe Disposal System



- Properties without toilets (Year 2011)
- Number of connections to septic tanks in the city (Year 2011)
- No of connections with soak pit/ other disposal system on site (Year 2011)

Properties With Safe Disposal System





- 81% properties of total properties connected to toilets
- 99% of properties having toilets are connected with septic tanks
- 1% properties having toilets are connected with soak pits (on site disposal)

Slums – Access to Sanitation

FGD and Field Observations

- No Individual Toilets in Slums
- 188 community seats in slums
  - Functional seats - 178
  - Non Functional Seats - 10
- Slum HHs- 1824

Community Toilets at Bagadi Vasahat Slum

Scenario 1

- **Population ratio per seat – 6HHs**
- Slum Population with access to community toilets: 6HHsx178 = 1068
- % Slum HHs with access to community toilets- 58.55

Scenario 2

- **Population ratio per seat – 10 HHs**
- Slum Population with access to community toilets: 10x178 = 1780
- % Slum HHs with access to community toilets- 97.58

Slums – Access to Sanitation

FGD and Field Observations

- No Individual Toilets in Slums
- 188 community seats in slums
  - Functional seats - 178
  - Non Functional Seats - 10
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Scenario 2

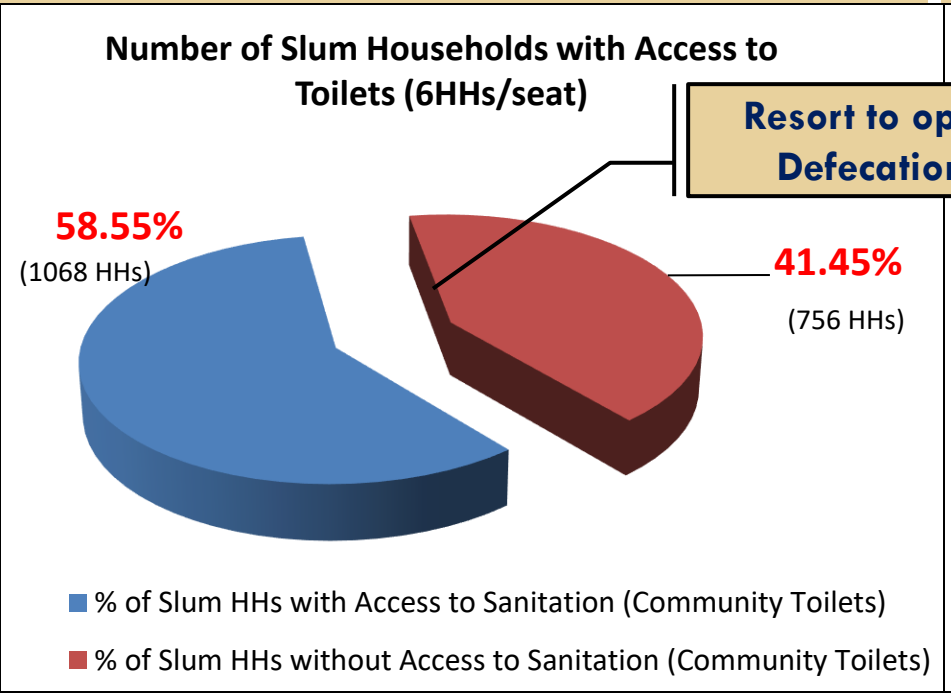
- **Population ratio per seat – 10 HHs**
- Slum Population with access to community toilets: 10x178 = 1780
- % Slum HHs with access to

Need for Slum HH survey/ Community Toilet Survey/ OD Survey to arrive at reliable assessment of Coverage of Community Toilets in slums and extent of Open Defecation …

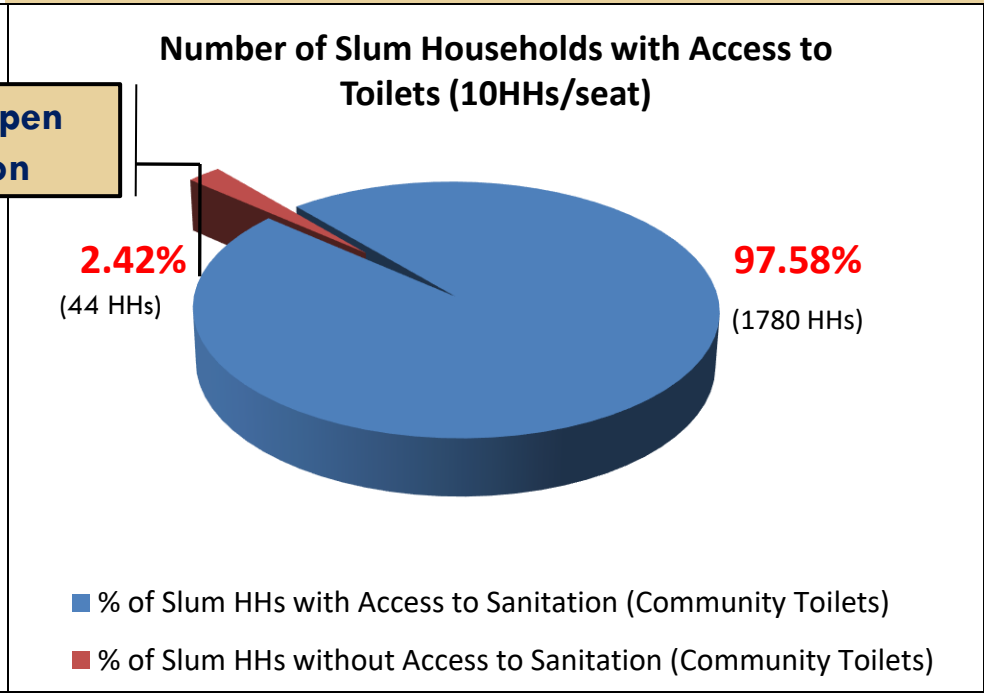
Slums: Extent of Open Defecation

Existing seats in community toilets in slums- 188. **Functional seats in community toilets in slums -178**

Norm: 6HHs per Toilet Seat



Norm: 10 HHs per Toilet Seat



41 % Slum Population - OD

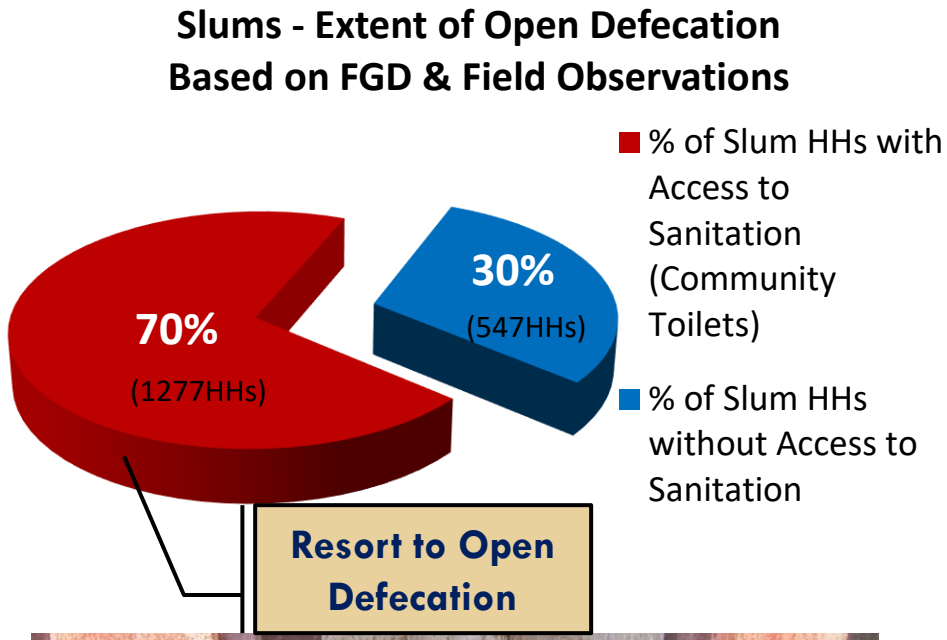
2 % Slum Population - OD

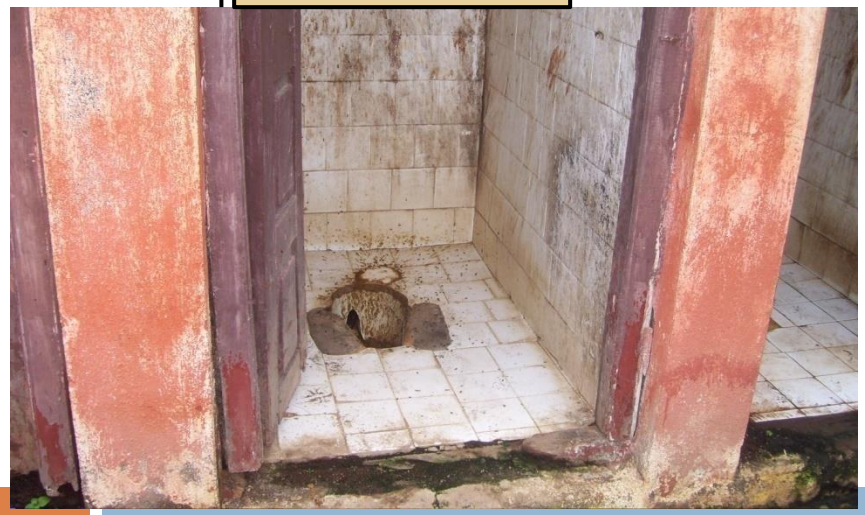
Reasons for Open Defecation

1. Inadequate number of seats in community toilets as per 6HHs/ seat norm
2. Poor O and M of existing toilets

Slums- Reasons Open Defecation

Based on FGD and Field Observations

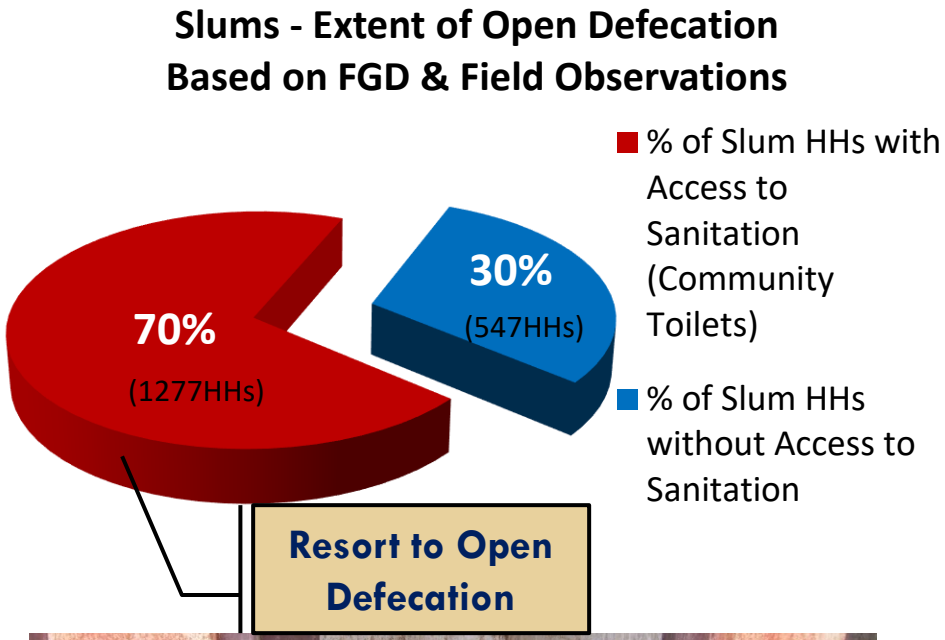


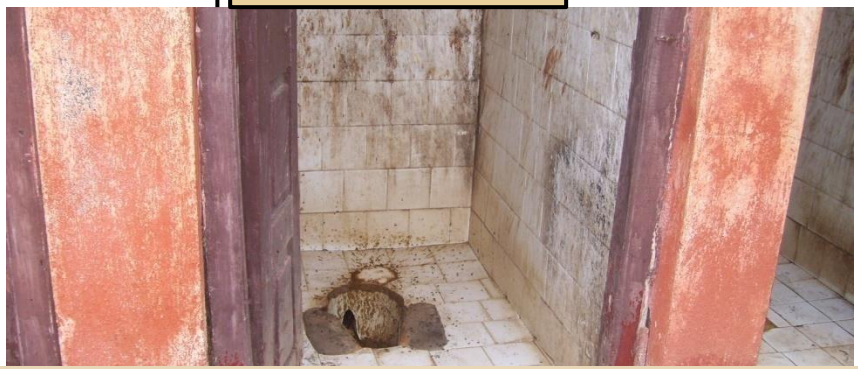


- No regular O & M of Community Toilets
- No Water Availability near Toilet
- Choked and Overflowing Septic Tanks
- No proper disposal system
- Toilets far away from slum with No Approach Road making toilets inaccessible/ difficult to access esp in rainy season.
- No electricity connection
- Inadequate number of seats in community toilets as per 6 HHs/ seat norm.

Slums- Reasons Open Defecation

Based on FGD and Field Observations





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- No electricity connection
- Inadequate number of seats in community toilets as per 6 HHs/ seat norm.

Although number of functional seats are available but poor O & M rendered them not usable

Community Toilets – Unclean, No Water Supply, No electricity connection

Water tank without water supply connection.
Devdasi Vasti, Bhimabai Ambedkar Nagar

Gendamal Jakat Naka, 26th June 2011

No drainage network. Discharge from bathroom flows on the road.
Bhimabai Ambedkar Nagar

Juna Davakhana Pichadi, 24th June 2011

Unhygienic Community Toilets, Lack of water resulting Open Defecation in Satara City

*Bhimabai Ambedkar/ Laxmi Tekdi - 60% OD in these slums. Reason is **nuisance of insects, worms and flies** from the toilet pan as outlet from septic tank is left open….*

Few Good Community Toilets in the Satara City

Community toilets of Ward No 20 ‘ Chiman Pura Pet’.
It is one of the more developed ward of the city.

I. Strategy for Improving Access to Sanitation

1. Improving Existing Community Toilets

- **Outsource contract for O&M of Community Toilets** - Explore option of appointing private agency/ NGO at city level for O&M of community toilets:
- **Refurbishment of Existing Community Toilets -** Ensuring provision of water supply, electricity, safe disposal system & access road to community toilets.

2. Constructing new additional seats in community toilets.

- Construct additional seats in existing community toilets.
- Construct new community toilet blocks.

3. Encourage construction of Individual Toilets including in slums

- Provide subsidy for construction of individual toilet (ILCS, MSNA)
- Awareness generation about low cost options for construction of individual toilets: Pre casted toilets, precast septic tank, shared septic tank etc.

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- Construct new community toilet blocks.

3. Encourage construction of Individual Toilets including in

Refurbishing non functional toilets and improving O & M of existing community toilets will improve Access and Coverage of toilets in Slums drastically.

toilets. Pre-cast toilets, precast septic tank, shared septic tank etc.

I. Strategy for Improving Access to Sanitation

4. Allocating existing Public Toilets near to slums as dedicated Community Toilets.

- Locate public toilets near to slums where there are no community toilets.
- Locate public toilets near to slums where there are community toilets but inadequate number of seats.

Public toilets, Community toilets inaccessible…..

- Near Bagadi Vasahat Slum

I. Strategy for Improving Access to Sanitation

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- Locate public toilets near to slums where there are no community toilets.
- Locate public toilets near to slums where there are community toilets but inadequate number of seats.

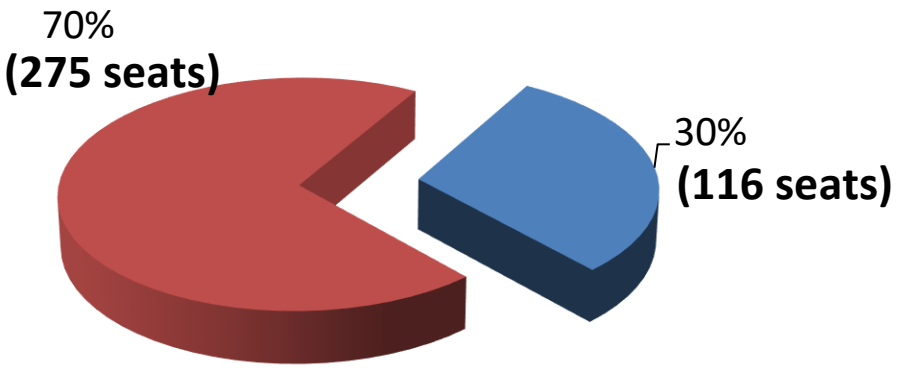
To refine it further community, public toilets to be spatially located with reference to existing slums and other public places (Bus stand, market etc).

Public toilets, Community toilets inaccessible…..

- Near Bagadi Vasahat Slum

Requirement of Community Toilet Seats in Slum & Non-slum Area

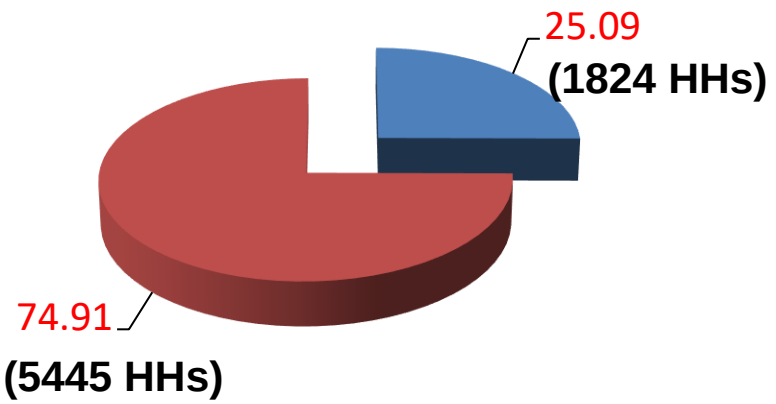
Number of Community Seats Needs to be Constructed in Slum & Non-slum Area



Norm: 6 HHs/seat

- Seats need to be constructed for slum areas- [Existing seats in slums-188]
- Seats need to be constructed for non-slum areas

Number of Individual Seats Needs to be Constructed in Slum & Non-slum Area



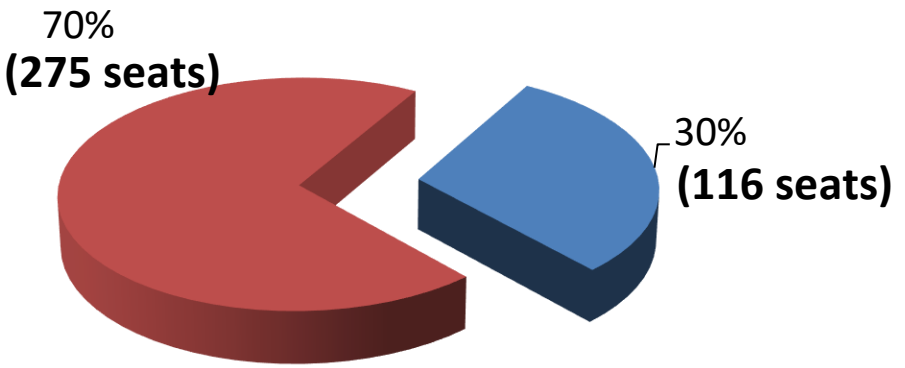
- % Individual toilets needs to be constructed in slum area (Year 2011)
- % Individual toilets needs to be constructed in non-slum area (Year 2011)

Coverage of HHs with individual , and community/ public toilets in Satara is 92% (26685 HHs including slum HHs). 8% (2343 HHs) in Satara (incl. slum HHs) don't have access to sanitation facilities.

Coverage of HHs with individual toilets in Satara is 75% (21759 HHs). 7269 HHs in Satara (including slum HHs) don't have access to individual sanitation facilities.

Requirement of Community Toilet Seats in Slum & Non-slum Area

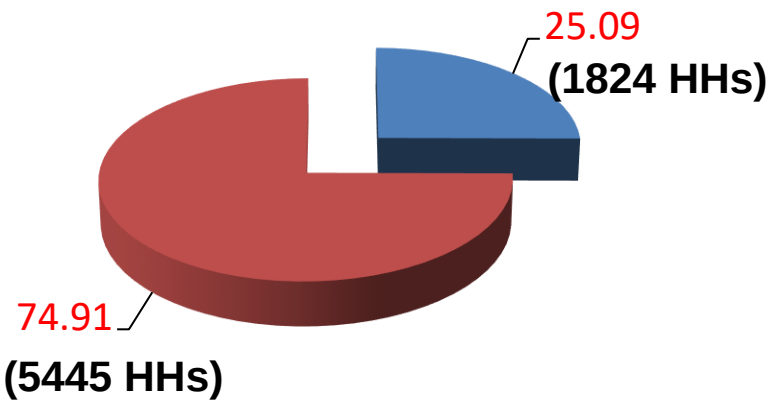
Number of Community Seats Needs to be Constructed in Slum & Non-slum Area



Norm: 6 HHs/seat

- Seats need to be constructed for slum areas- [Existing seats in slums-188]
- Seats need to be constructed for non-slum areas

Number of Individual Seats Needs to be Constructed in Slum & Non-slum Area



- % Individual toilets needs to be constructed in slum area (Year 2011)
- % Individual toilets needs to be constructed in non-slum area (Year 2011)

- **As per 10 HHs/ seat norm all 234 seats needs to be constructed in non-slum area**
- **Slums have sufficient toilet seats but some of them are needs to refurbishment.**

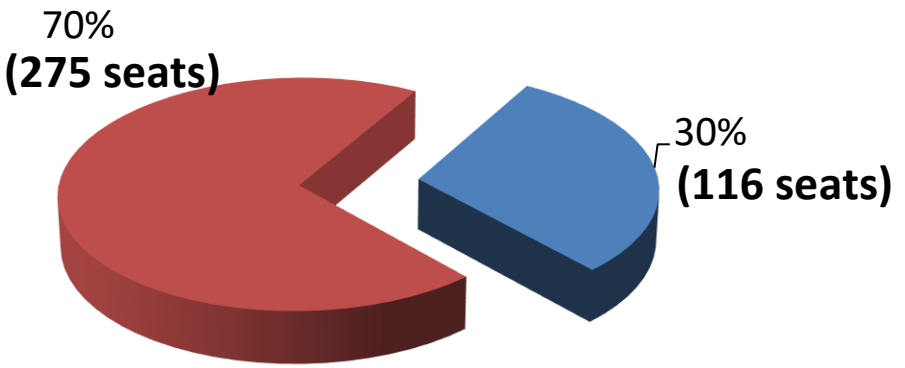
don't have access to sanitation facilities.

7269 individual toilets to be constructed in Satara (including slums and non slum areas).

391 community toilets to be constructed in Satara (including slums and non slum areas) as per 6 HHs/ seat norm.

Requirement of Community Toilet Seats in Slum & Non-slum Area

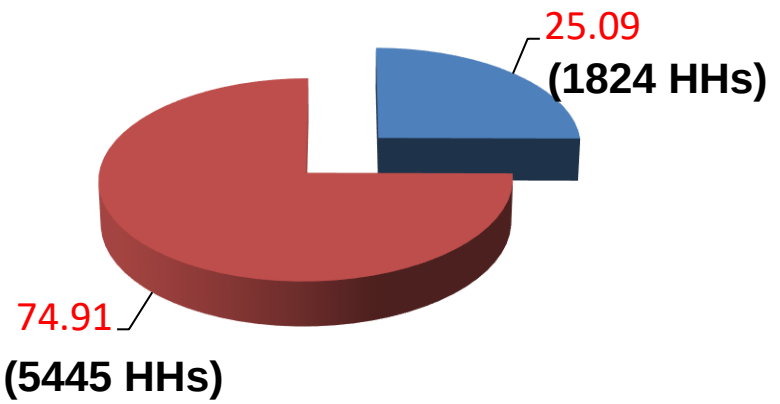
Number of Community Seats Needs to be Constructed in Slum & Non-slum Area



Norm: 6 HHs/seat

- Seats need to be constructed for slum areas- [Existing seats in slums-188]
- Seats need to be constructed for non-slum areas

Number of Individual Seats Needs to be Constructed in Slum & Non-slum Area



- % Individual toilets needs to be constructed in slum area (Year 2011)
- % Individual toilets needs to be constructed in non-slum area (Year 2011)

- **As per 10 HHs/ seat norm all 234 seats needs to be constructed in non-slum area**
- **Slums have sufficient toilet seats but some of them are needs to refurbishment.**

don't have access to sanitation facilities.

7269 individual toilets to be constructed in Satara (including slums and non slum areas).

391 community toilets to be constructed in Satara (including slums and non slum areas) as per 6 HHs/ seat norm.

- **Total HHs: 29028**
- **Total HHs with individual toilets in Satara: 21759 (75%)**
- **Total HHs with access to community/ public toilets: 4926 (17%)**
- **Total HHs with Access to individual, community/ public toilets: 26685 (92%)**
- **HHs resorting to open defecation: 2343 (8% of total HHs)**
- **Of 4926 HHs dependent on community/ public toilets 1824 resides in slums.**
- **HHs dependent on community/ public toilets in non slums areas : 3102**

Estimated Cost for Constructing Toilets in Non-slum Area

Community Toilets

6 HHs/seat norm

275 seats

Aqua privy Disposal System
Block Cost per seat Rs. 77000/-
Total Cost : Rs. 211.75 Lac

Septic Tank System.
Block Cost per seat Rs. 15000 – 20000/-
Total Cost: Rs. 55 Lac

10 HHs/seat norms

234 seats

Aqua privy Disposal System
Block Cost per seat Rs. 77000/-
Total Cost : Rs. 180.18 Lac

Septic Tank System.
Block Cost per seat Rs. 15000 – 20000/-
Total Cost: Rs. 46.8 Lac

Individual Toilets

HHs resorting to OD 2343

Septic Tank System.
Block Cost per seat Rs. 20000 – 25000/-
Total Cost: Rs. 585.75 Lac

2343 individual toilets

Rs. 585.75 Lac

3102 HHs currently depend on community/ public toilet

Septic Tank System.
Block Cost per seat Rs. 20000 – 25000/-
Total Cost: Rs. 775.5 Lac

3102 individual toilets

Rs. 775.5 Lac

21759 HHs have access to individual toilets

No individual toilets in slums thus 1824 slum HHs don't have access to individual toilets

Note: Of total existing 821 public toilet seats identify as per their location the seats required at market, public places and for floating population . The remaining seats can be allotted to near by individual HHs not having access to sanitation.

Additional community seats to be constructed

- Community Toilets
- Total community seats – 188
- HHs-1824
- Present Slum HH Ratio per Community Toilet Seat – 9.70

Norm for Shared Toilets

6 HHs/ seat

- Total Seats Required - 304
- Present Seats - 188
- **Additional Seats to be Constructed: 116**

Aqua privy Disposal System
Block Cost per seat Rs. 77000/-
Total Cost : Rs. 89.32 Lac

Septic Tank System.
Block Cost per seat Rs. 15000 – 20000/-
Total Cost: Rs. 23.20 Lac

Norm for Community Toilets

10 HHs/ seat

- Total Seats Required – 182
- Present Seats - 188
- **Additional Seats to be Constructed: None**

Aqua privy Disposal System
Block Cost per seat Rs. 77000/-
Total Cost : 0

Septic Tank System.
Block Cost per seat Rs. 15000 – 20000/-
Total Cost: 0

Estimated Cost for Constructing Individual Toilets

- Total Individual Toilets to be constructed in slums – 1824
- Slum HHs – 1824

Individual Toilets with individual septic tank & individual water tank	Individual Toilets with shared septic tank & water tank (5 HHs)
Toilet Unit - Toilet + Septic Tank + Overhead water tank + Electricity Connection + Plumbing **Block Cost per seat Rs. 20000 - 25000** *(Based on Discussion with Local Citizens)* **Total Cost : Rs 456 Lac**	**Toilet Unit** - Toilet + Septic Tank + Overhead water tank + Electricity Connection + Plumbing **Block Cost per seat Rs. 10000 - 15000** *(Based on Discussion with Local Citizens)* **Total Cost : Rs 273.6 Lac**
MSNA **90% State Grant- Rs. 410.4Lac** 10% beneficiary Contribution - Rs. 45.6 lac	**ILCS** **75% Central Grant- Rs. 342 Lac** **15% State Grant – Rs. 68.4 Lac** 10% beneficiary Contribution - Rs. 45.6 lac
MSNA **90% State Grant- Rs. 213.84 Lac** 10% beneficiary Contribution - Rs. 27.36lac	**ILCS** **75% Central Grant- Rs. 205.2 Lac** **15% State Grant – Rs. 41.04 Lac** 10% beneficiary Contribution - Rs. 27.36 lac

Low Cost Options for Constructing Individual Toilets…

- Total Individual Toilets to be constructed in slums – 1824

Prefabricated Individual Toilets with individual septic tank & water tank

Toilet Unit - Toilet + Septic Tank + Water Tank

Block Cost per seat Rs. 8000+5500+2000 = 15500

Total Cost : Rs 282.72 Lac

MSNA

90% State Grant- Rs. 254.448 Lac

10% beneficiary Contribution - Rs. 28.27 lac

ILCS

75% Central Grant- Rs. 212.04 Lac

15% State Grant – Rs. 42.408 Lac

10% beneficiary Contribution - Rs. 28.27 lac

Prefabricated Individual Toilets with shared septic tank & water tank (5 HHs)

Toilet Unit - Toilet + Septic Tank + Water Tank

Block Cost per seat Rs. 8000+4000+1000 = 13000

Total Cost : Rs 237.12 Lac

MSNA

90% State Grant- Rs. 213.408 Lac

10% beneficiary Contribution - Rs. 23.712 lac

ILCS

75% Central Grant- Rs. 177.84 Lac

15% State Grant – Rs. 35.568 Lac

10% beneficiary Contribution - Rs. 23.71 lac

Septic Tank innovation

- Comes in various capacities and sizes.
- Quality of septic tanks ensured since these are mass produced in a factory.
- A 1m (3' Ft Dia) internal diameter septic tank of capacity will last a family of 5 about 5 years. (Cost – Rs 5500/-)
- Cost – Rs. 3000 to 5500/- depending upon the capacity.
- A factory 'Koina Cement Pipe' in Satara manufactures these.
- Demand of about 600 units/Yr.
- Large septic tanks (>4Ft Dia) are preferable for shared septic tanks as it does not require de sludging/ cleaning very frequently.

For more than a decade, some homes in Maharashtra have been using readymade septic tanks of different capacity.

Prefabricated Septic Tank

Pre fabricated Toilets

- Demand of approx. 500 units a year, mostly in villages.
- Size – 3'x3'x7'
- Cost – Rs. 6000 to 8000/-
- Local Fabricator in MIDC, Satara – 'Mandaar Tiles Company'

Prefabricated Water Tank

Cost - Rs. 4/Liter

Financing Model For Constructing Individual Toilets

Central/state grants subsidy

Central scheme
ILCS for EWS

Cost- 10,000/seat with safe disposal system

Central-75% (Rs.7,500), State 15% (Rs.1,500) Beneficiaries 10% (Rs.1,000)

If cost is more than the Rs.10,000/seat of integrated toilet block then additional cost to be raised by ULB own funds
(Ref: Gr-ILCS, Sept 10, 2008)

State govt. scheme
MSNA for SC, Nav buddha

Cost-12,000/seat with safe disposal system

Share- State-90% (Rs.10,800), ULB or Beneficiaries 10% (Rs.1200)

If cost is more than the Rs.12,,000/seat of integrated block then additional cost to be raised by beneficiary

Individual contribution

Assessing willingness to contribute

- Financial
- Labor
- Both

Enabling Provisions by ULB

- ULB to give NOC for construction of toilets.
- Land to be made available by ULB.
- Water supply provision by ULB.
- Connecting toilets to safe disposal system (septic tanks)
- Electric connection

Options for ODF

Community Toilets

Strengthen O & M

- Improve O and M of all 188 community toilet seats.
- Awarding Performance based contracts – Pay & Use Model or ULB Payment Model.
- **Estimated Cost: Rs. 4.25 Lac**

Refurbishment of non functional community toilets

- Water Supply (Water Tank) provision for all community toilets.
- 10 non functional toilet seats to be refurbished.
- **Estimated Cost : 1.0 Lac**

Construct Additional Seats
- Shared Toilets,
- Community Toilets

- Shared Toilets (6 HHs/ seat)
- **Estimated Cost : Rs 89.32 lac**
- Community Toilets (10 HHs/ seat)
- **Estimated Cost : 0**

Individual Toilets

Individual toilets with shared septic tanks and water tanks

- Subsidy to slum HHs for cleaning of Septic Tanks.
- **Estimated Cost : Rs 274 lac**

Prefabricated Toilet Unit

- **Estimated Cost : Rs 238 lac**

Individual toilets with individual septic tanks & water tanks

- Subsidy to slum HHs for cleaning of Septic Tanks.
- **Estimated Cost : Rs 456 lac**

Prefabricated Toilet Unit

- **Estimated Cost : Rs 283 lac**

Options for ODF

Community Toilets

Strengthen O & M

- Improve O and M of all 188 community toilet seats.
- Awarding Performance based contracts – Pay & Use Model or ULB Payment Model.
- **Estimated Cost: Rs. 4.25 Lac**

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Construct Additional Seats

- Shared Toilets,
- Community Toilets

- Shared Toilets (6 HHs/ seat)
- **Estimated Cost : Rs 89.32 lac**
- Community Toilets (10 HHs/ seat)
- **Estimated Cost : 0**

Individual Toilets

Individual toilets with shared septic tanks and water tanks

- Subsidy to

Individual toilets with individual septic tanks & water tanks

- Subsidy to

- Individual toilets (pour flush) are most suitable in areas where
  - Land is available for construction
  - Water supply distribution network is present
  - Presence of Drainage network
  - HHs willingness to contribute

PRESENT O AND M CONTRACT FOR CLEANING OF ALL TOILET SEATS 226640/- PER MONTH O AND M COST FOR CLEANING 821 TOILET SEATS, 57 PUBLIC URINALS AND 10 MUNICIPAL SCHOOLS

23/- per toilet seat per month.

Proposed

53820/- per month O and M cost for cleaning 300 toilet seats

180/- per toilet seat per month.

188 community toilet seats per year – Rs 4,06,080/-

Approx. 425000/-

- Refurbishment cost per seat – 10,000/-
- Block cost per community toilet seat – 75000/-
- Block cost per individual toilet seat – 25000/-

SLUMS – Strategy Towards ODF

- Explore option of handing over all public/ community toilets/ Public Urinals (including those not located in slums) to private agency/ NGO for O and M.
- Promote construction of individual toilets, connect it to shared septic tanks. A pre-condition for successful ODF would be adequate water provision and safe disposal system.
- From our field visit in slums we determined that there is space for toilet/ septic tank/ drain construction using innovative approaches for slum HHs.
- Adequate land is available to construct new community toilets and increase number of seats in existing toilets.

Individual clustered toilets and Shared septic tanks

HH with space within House to build toilets

HH with no space within House to build toilets

Vacant space to build toilets

Individual toilet

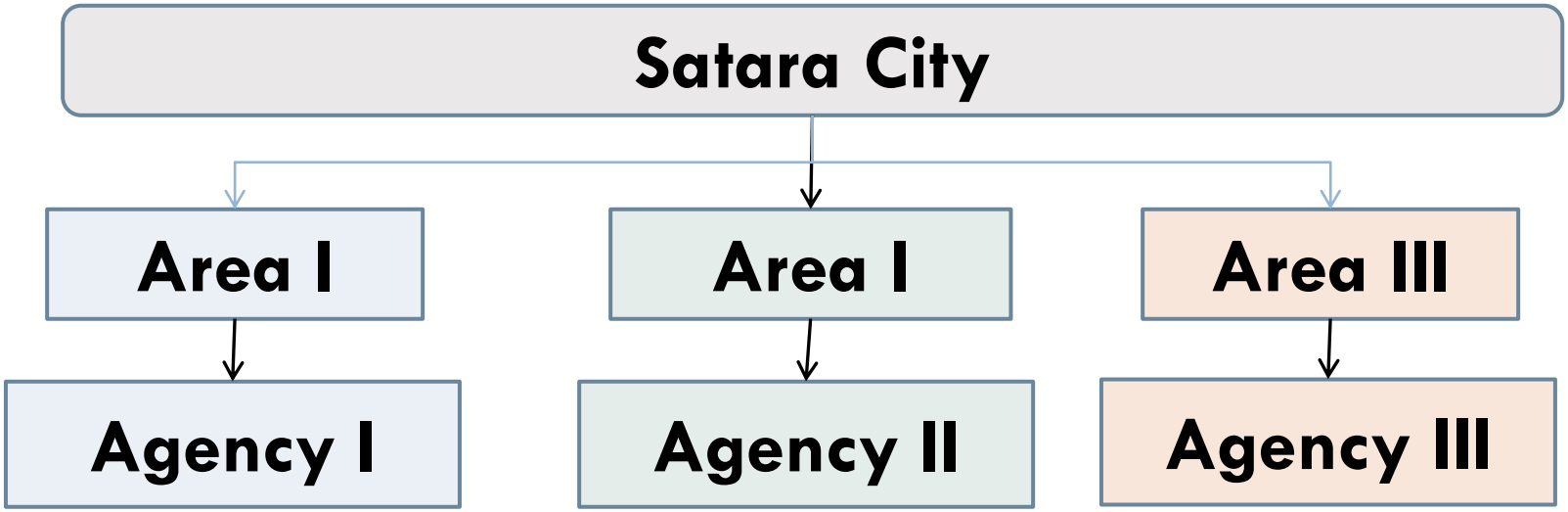
Septic tank (individual or shared)

Sewer lines upvc 80mm for settled sewerage

Improve O & M of Community Toilets

Proposed Options:

- **Performance Based O&M Contract on ULB Payment Model**



- **O&M contract to private agencies/ NGOs on Pay & Use Model:** *(e.g. Sulabh International etc etc)*

Septage Management

- De-sludging of Private Septic Tanks
- Cleaning / De-sludging of Common Septic Tanks (community toilets, public toilets, municipal schools etc) regularly.
- Cleaning of accumulated sludge in drains.
- Cleaning of Sulabh Toilets at various places.

Challenges

- **Only one Suction Emptier of 5000 lt capacity.**
- **ULB don't have facility to treat septage/ fecal sludge.**
- **Septage cleaned by ULB is disposed to open dumping site outside city limits.**
- **Longer duration for complaint redressal (2-3 days).**
- **20-22 days services provided for septage management.**
- **Private agency septage cleaning charges Rs. 4000 to 5000 per trip.**

Septage Management

- Septage management services are provided by ULB and private agency.
- Approx. 700 septic tanks are cleaned annually.
- ULB has one suction emptier of 5000 lt capacity.
- Charge levied by ULB for emptying septic tanks:
  - Within ULB limits: Rs. 350/per trip
  - Outside ULB limits: Rs. 1050/per trip
- For large septic tanks more trips are required for cleaning.
- ULB don't have facility to treat septage .
- Septage cleaned by ULB is disposed to open dumping site outside city limits. Septage/ sludge dumped into open trenches is decomposed naturally.

II. Strengthen Septage Management

• Increase capacity to provide septage services

- Option I
  - **Purchase 6 more vacuum suction emptiers to meet current demand.** *(Assuming septic tank emptying cycle of 5 yrs)*
  - **Capital cost required- Rs. 30 lakh**
  - **Annual O and M cost per suction emptier: Rs. 5.5. lakh**
    - Rationalise septage charges/ fees to recover O & M cost. *Current charges - within ULB limits: Rs. 350/per trip, Outside ULB limits: Rs. 1050/per trip. Existing total O & M cost for 1 emptier- 55000/- per month.*
  - **Income earned per emptier per annum by emptying 70 setic tanks @ service fees of Rs 1000/ tank: RS. 7.5 lakh**
- Option II
  - **Outsource septage services to private agency** (Currently private agency is not providing septage services in ULB limit)
- Option III
  - **Take suction emptier on lease from private agency**
  - *Rationalise septage charges/ fees to recover O & M cost and share revenue with the private agency.*

• Plan for fecal sludge management and treatment

Existing Practice

- Septage cleaned/ sludge is disposed to open dumping site (7.6 Hect.) at Songaon outside city limits.
- In 2-3 acres open trenches are dug and sludge is dumped into it.
- Naturally decomposes

Proposed

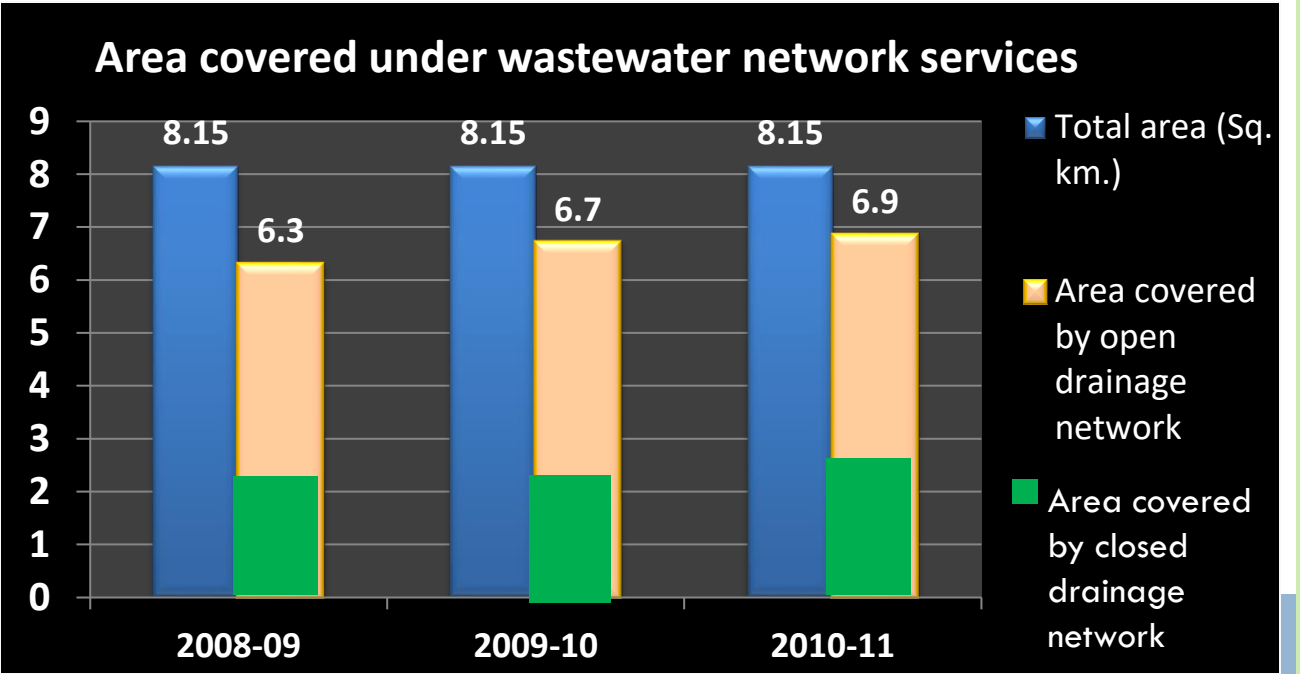
- **Pit Composting or co-composting**
- Dig trenches 30 cumt capacity (10 L x 3 W x 1 D mt) or Dig pits 27 cumt capacity (3 L x 3 W x 3 D mt) in earmarked area in existing dumping/ landfill site.
- Add a layer of sludge into it and cover it with a layer of organic waste above it. Repeat till the trench is filled.
- Cover it with soil/ lime and add vent pipe.
- After a year it naturally decomposes.The organic manure resulted output can be auctioned for sale.

- **Plan for fecal sludge treatment through Composting**

  - Area required for compost pits including 25% area for circulation if 6 monthly cycle of composting is adopted: 5512.5 sq.m
  - Area required for compost pits including 25% area for circulation if annual cycle of composting is adopted: 9187.5 sq.m

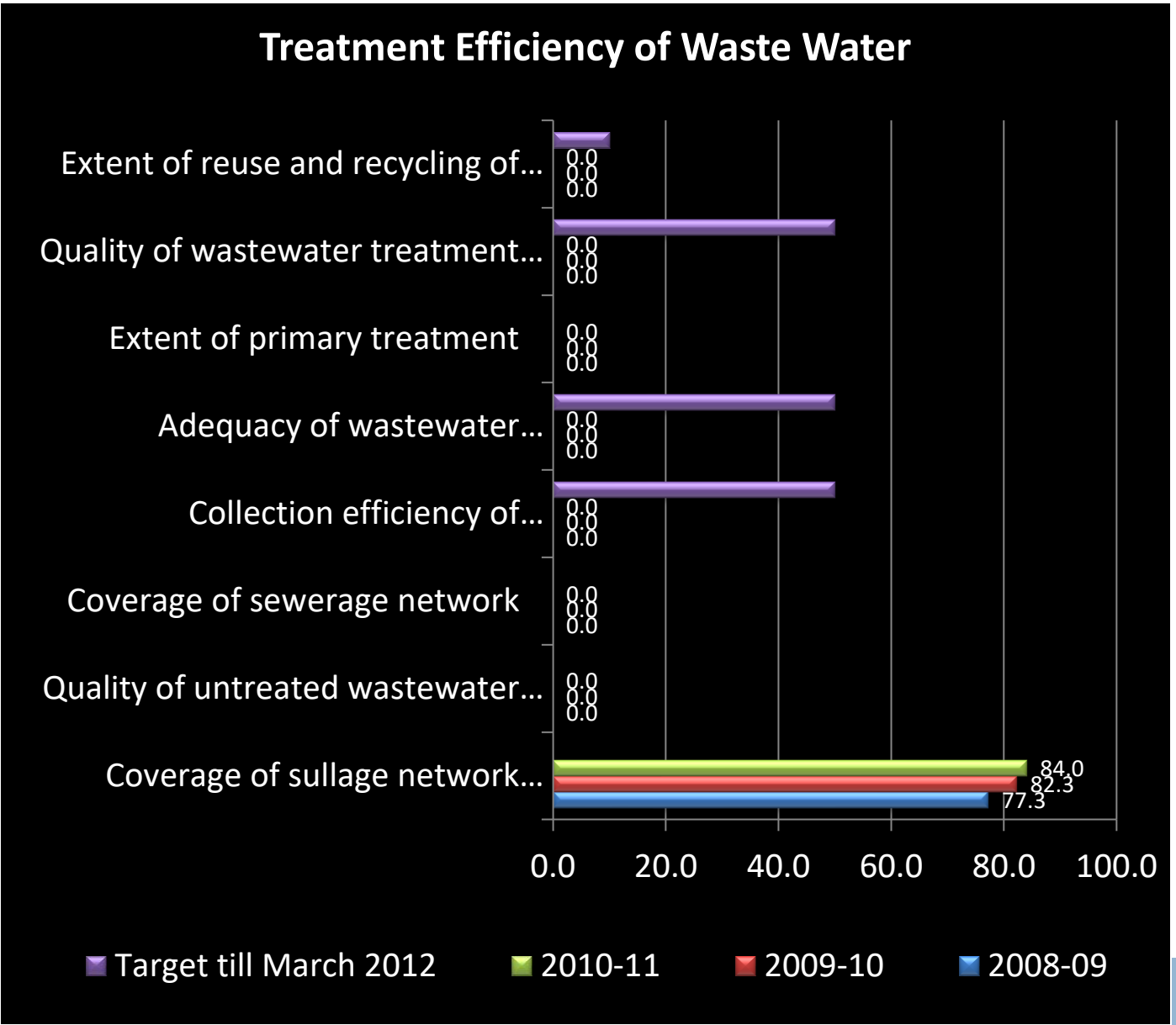
Satara Municipal Council: Existing Wastewater Status

	Yr 2009-10
Total Area of the city (Sq. km)	8.15
Area covered by wastewater network (Sq. km)	6.85
Area covered by underground sewerage network (sq. km)	0
Area covered by open drainage network (sq. km)	4.45
Area covered by covered drainage network (sq. km)	2.40
Length of open drainage network (Km)	125.0
Length of covered drainage network (Km)	75.0



- **No underground sewerage network.**
- **84% of area covered by wastewater network services (open and closed drains).**
- **For newly developed areas ULB extend closed drainage network .**
- **Majorly well lined pucca drains in the core area of the city.**
- **150 sewer overflows reported in the city in year 2010-11.**
- **Kuccha and overflowing drains mostly in slums.**
- **7 drainage outfalls outside the city. Untreated wastewater is discharged into the river .**

Treatment Efficiency of Waste Water



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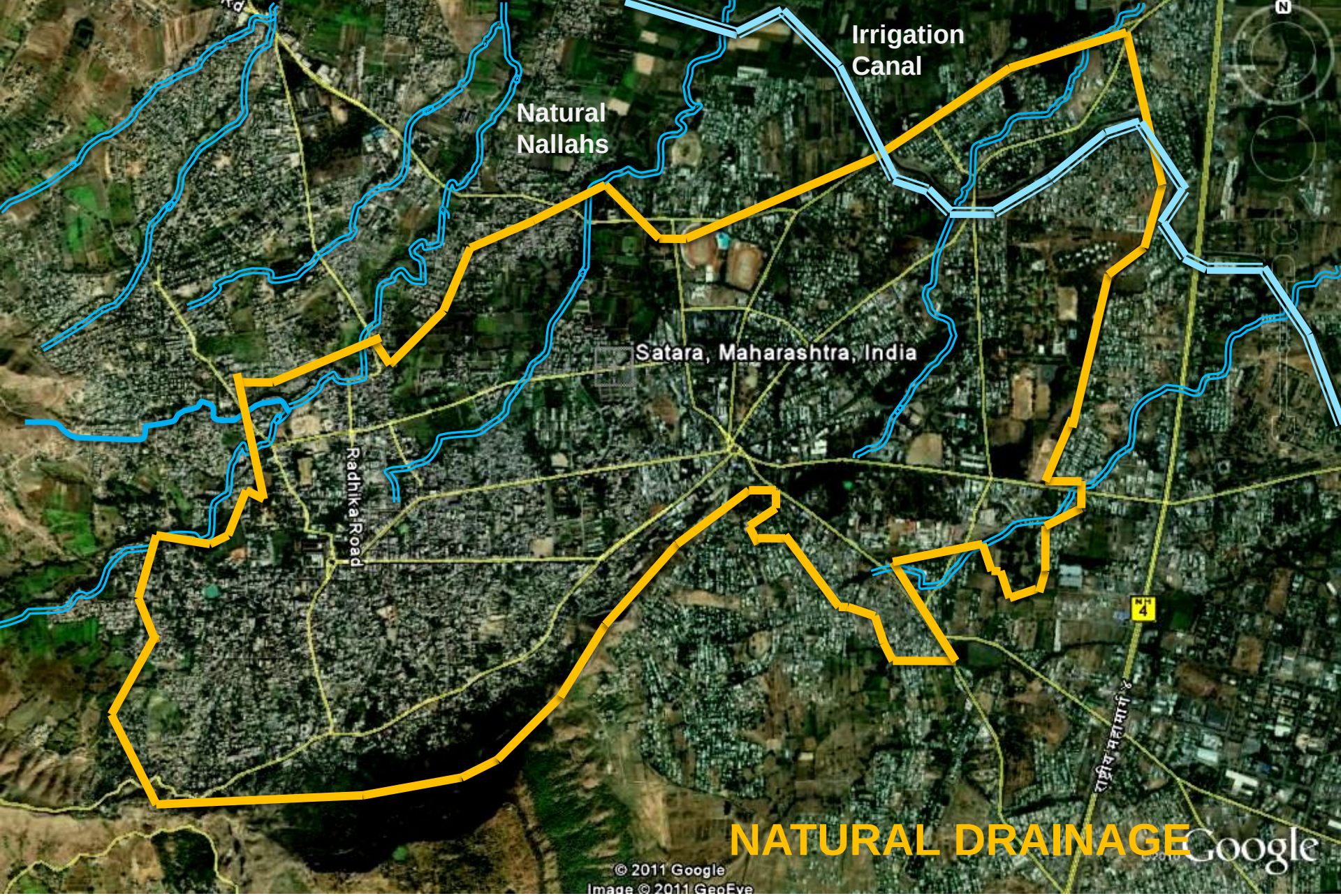
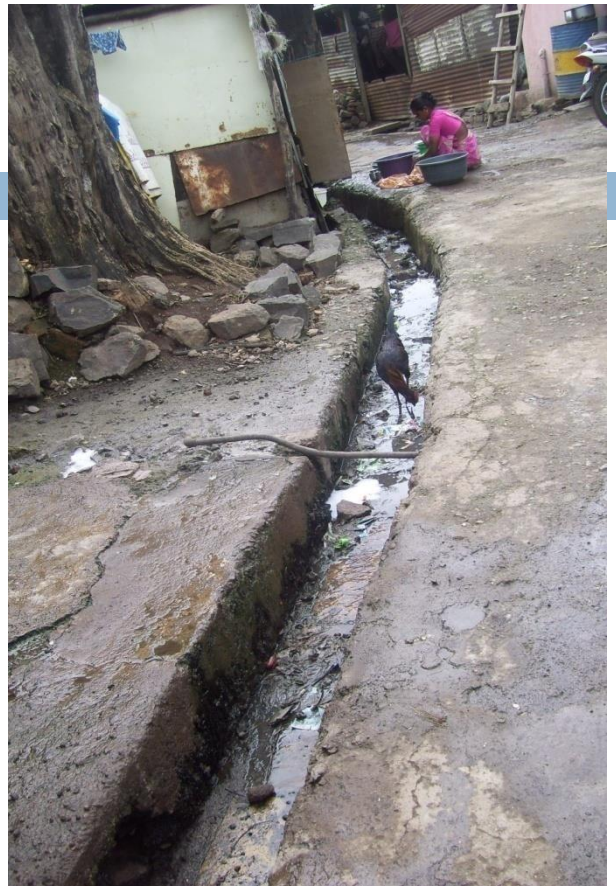

Irrigation Canal
Natural Nallahs
Satara, Maharashtra, India
Radhika Road
NH 4
NATURAL DRAINAGE
© 2011 Google
Image © 2011 GeoEye
Google

Mostly open drains in slums

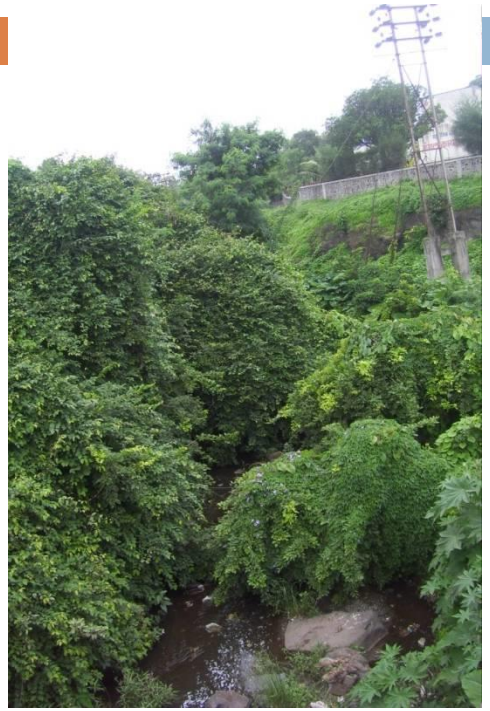


Covered drainage at few places

Malhar Peth Odhyalagat, 27th June 2011

Raghunathpura, Karanje, 26th June 2011

Covered gutters at few places



- 7 Drainage Outfalls

- Satara Municipal Council (SMC) has proposed conventional sewerage at an estimated cost of 112 crores (including STP). Conventional sewerage for Satara is a costly idea.

PLANNING

Covering of Open Drains	Settled Sewerage System/ Small Bore Sewers	Conventional Sewerage System
• Satara has Good Coverage of Functional Septic Tanks & Drainage Network. Hard Strata found at some place • No pumping required, using gravity for conveyance of sullage. Ground Water table is >10 meters below.		• Adequate Water Supply to maintain good discharge flow for underground sewerage system. • Good Net Residential Density.
Possible Actions • Convert open drains into covered drains. • Ensure gratings at regular intervals for cleaning access and ventilation. • Utilising Corporators' Fund for ward wise covering of open drains.	• Can be planned for shallow depths *(0.5-0.9 mts except few main sewers)* with inspection chambers/ junction boxes at 250 mts and around corners. • Adequate Water Supply to maintain good discharge flow. • Good Net Residential Density. • Favourable topography – No pumping required. • No need to demolish existing septic tanks.	• Requires demolishing of all existing septic tanks. • Connecting all properties with sources of black and grey water to sewerage network. • Requires deep and wider excavation to maintain self cleaning velocity in sewers. *In Satara at places hard strata.*

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• Improve septage management and desludging of septic tanks.

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• Fecal sludge management system needs to be in place

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• Effluent reaching STP will have BOD of 100-150 (weak sewage) which can be treated in oxidation pond which comes cheap.

• Fecal sludge management system needs to be in place

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PLANNING

Covering of Open Drains	Settled Sewerage System/ Small Bore Sewers	Conventional Sewerage System
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Possible Actions • Convert open drains into covered drains. • Ensure gratings at regular intervals for	• Can be extended easily to new growth areas of city, even with less density of population (upto 50 persons / ha @ 100 lpcd) 250 mts and around corners.	• Requires demolishing of all existing septic tanks. • Connecting all properties with sources of black and grey water to sewerage network. • Requires deep and wider excavation to maintain self cleaning velocity in sewers. *In Satara at places hard strata.*
	• Effluent reaching STP will have BOD of 100-150 (weak sewage) which can be treated in oxidation pond which comes cheap.	
	• Fecal sludge management system needs to be in place	
	• Improve septage management and desludging of septic tanks.	

PLANNING

Covering of Open Drains

- Less capital investment
- Very Low O & M Cost

Improving existing system.

Settled Sewerage System/ Small Bore Sewers

- Moderate Capital Investment
- Sewer pipes with small dia. (3")
- Savings in cost as no deep excavations required
- Low O & M cost

Underground sewerage System

- High Capital Investment

•Deep excavations and manholes necessary
•Demolishing existing septic tanks
•Constructing underground sewerage system
•Connecting properties with the sewerage system.
•Needs at least 125 persons / ha density @ 135 lpcd water supply level.

- High O & M cost

(Pumping stations essential)

System may fail if it is not connected to properties as per its design capacity.

Implication on Capacity of STP (ASP)

- Total Waste water generated (future) 16 Mld
- 1/3rd (5 Mld) are solids that get retained in septic tank
- Design Capacity of STP: 11 Mld
- Cost of STP: 11 Cr.

PLANNING

Covering of Open Drains

- Less capital investment
- Very Low O & M Cost

Improving existing system.

Settled Sewerage System/ Small Bore Sewers

- Moderate Capital Investment
- Sewer pipes with small dia. (3")
- Savings in cost as no deep excavations required
- Low O & M cost

Underground sewerage System

- High Capital Investment

•Deep excavations and manholes necessary
•Demolishing existing septic tanks
•Constructing underground sewerage system
•Connecting properties with the sewerage system.
•Needs at least 125 persons / ha density @ 135 lpcd water supply level.

Implication on Capacity of STP (ASP)

- Total Waste water generated (future) 16 Mld
- 1/3rd (5 Mld) are solids that get retained in septic tank
- Design Capacity of STP: 11 Mld
- Cost of STP: 11 Cr.

- Total Waste water generated future: 16 Mld
- Design Capacity of STP: 16 Mld
- Cost of STP: 16 Cr.

PLANNING

Covering of Open Drains

- **Less capital investment**
- **Very Low O & M Cost**

Improving existing system.

- **Capital Cost: 7.61 Cr**
- **Capital Cost with STP 11 Mld: 18.61 Cr**
- **O & M Cost : 2 Cr**
- Cost is for considering future Requirement

Settled Sewerage System/ Small Bore Sewers

- **Moderate Capital Investment**
  - Sewer pipes with small dia. (3”) and works well with gentler gradient.
  - Savings in cost as no deep excavations required
- **Low O & M cost**

Success rate of system is very high as it strengthens existing system of septic tanks and septage management.

- **Capital Cost: 23Cr.**
- **Capital Cost with STP 11 Mld: 34 Cr**
- **O & M Cost Annual : 20 Cr**

Underground sewerage System

- **High Capital Investment**
  - Requires deep & wider excavations , more gradient
  - Demolishing existing septic tanks
  - Constructing underground sewerage system
  - Connecting properties with the sewerage system.
- **High O & M cost**

System may fail if it is not connected to properties as per its design capacity.

- **Capital Cost with STP 18.5 Mld: 112 Cr.**
- **O & M Cost Annual : 28 Cr**

Schematic of settled sewer system for a slum

HH with space within House to build toilets

HH with no space within House to build toilets

Individual toilet

Septic tank (individual or shared)

Sewer lines upvc 80mm for settled sewerage

Storm Water Drainage Options

- Existing network carries sullage and storm water during monsoon.
- Once sewerage is implemented the drains/ nallahs will only carry storm water.
- Whenever drains are proposed to be covered. Ensure gratings at regular intervals for cleaning access and ventilation.
- Strengthen repair anexisting natural streams and drains as storm water drains. Existing coverage – 30%
- Up to March 2012 – 100% coverage

Preferable Sewerage Option

- Conventional sewerage for Satara is not a good idea!!!
- Since everyone has septic tank, ensuring connections and making new sewer system functional would be difficult.
- Settled sewer pipes can be installed at shallow depths below existing drains (0.5 – 0.75 mts).
- **Alternate option would be 'Settled Sewerage' (also called Small Bore).** Only effluent from septic tanks, kitchen and bathroom sullage would flow in the sewer system. This system ensures separation of solid, only liquid will flow in pipes allowing gentler gradient, smaller pipe diameters, avoidance of manholes resulting in steep cost reduction (from 49.9 cr to 20 cr)

Plan for Waste water Treatment Facility

Oxidation Pond (Aerobic)	Facultative Aerated Lagoon	Activated Sludge Process (Anaerobic)
Design Capacity of STP 16 Mld for year 2025		
• Land Area – 16 Hect. • Capital cost – 2.4 Cr excluding cost of land. • O & M cost – 2.4 cr for 15 yrs	• Land Area – 6 to 7 Hect. • Capital cost – 6.0 Cr excluding cost of land. • O & M cost – 7 cr for 15 yrs	• Land Area – 3 Hect. • Capital cost -16.0 Cr excluding cost of land. • O & M cost – 14 cr for 15 yrs
• Requires large parcel of land. • Low capital cost. • Minimal O & M cost. • If land availability is constraint or if land prices are too high then not suitable option.	• Requires moderate land. • Moderate Capital Cost. • Moderate O & M cost. • Suitable when land is available but land costs are not too high.	• Requires less land. • High Capital Cost • Very High O & M Cost because high energy expenditure. • Not suitable if O & M cost is too high to be covered from ULB's own revenue income.

Plan for Waste water Treatment Facility

Oxidation Pond (Aerobic)	Facultative Aerated Lagoon	Activated Sludge Process (Anaerobic)
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• **For Satara Facultative Aerated Lagoon is most suitable**

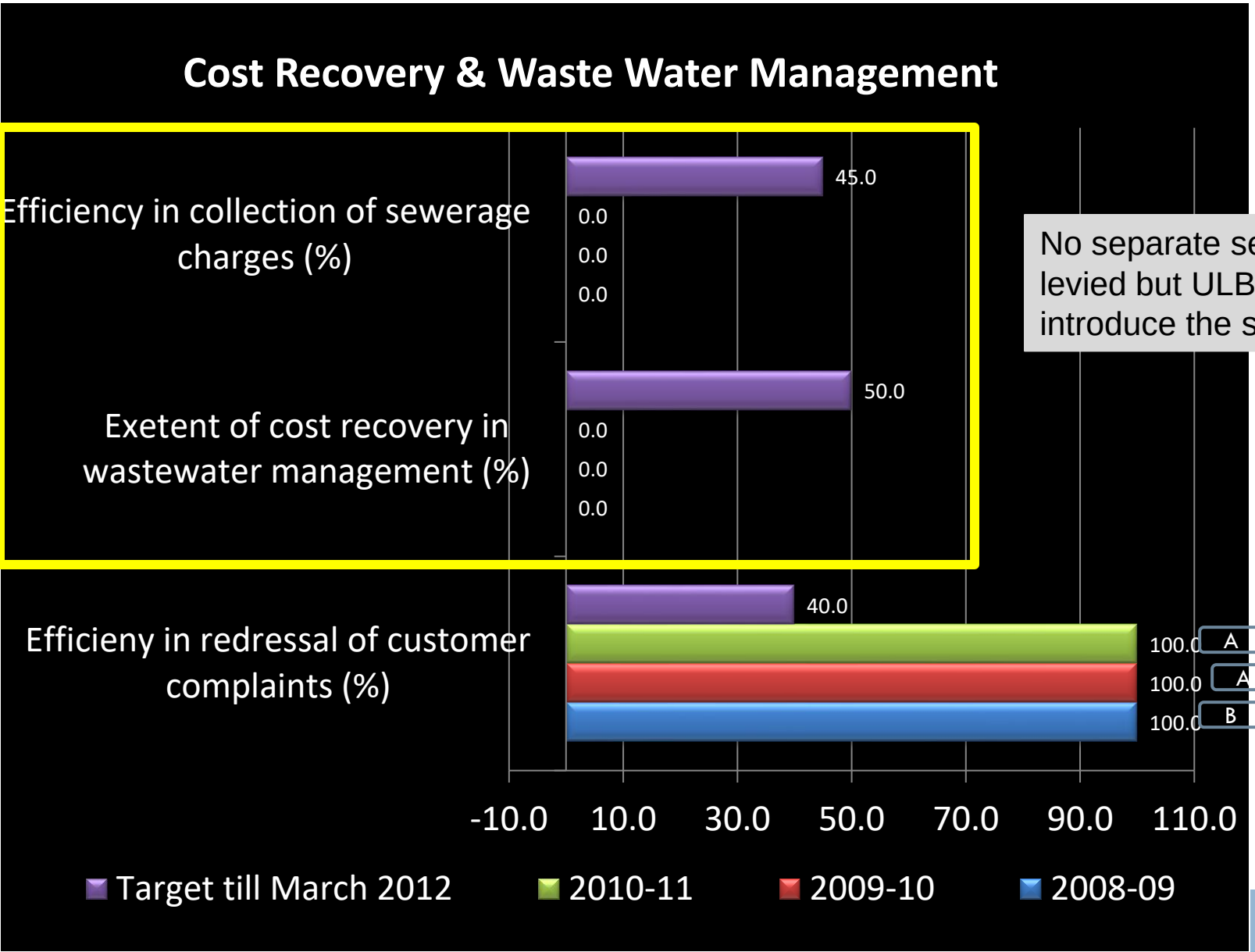
Plan for Waste water Treatment Facility

- City drains towards NE. **A single STP** can be proposed anywhere along ‘Jarandeshwar Naka’
- *Satara topography favours single STP as no pumping required as sullage is conveyed through gravity.*

- The **Decentralized STPs** will minimize the capital cost (pipe network cost) but the O & M cost will be very high. The capital cost will be one time but the O&M cost will be life long.
- *Availability of land at various locations may be a constraining factor for Decentralized STPs.*

- As there are septic tanks relatively weak sewage as solids gets retained in septic tanks thus not very high efficiency in sewage/ sullage treatment is required.

Cost Recovery & Waste Water Management



No separate sewerage tax levied but ULB intends to introduce the same.

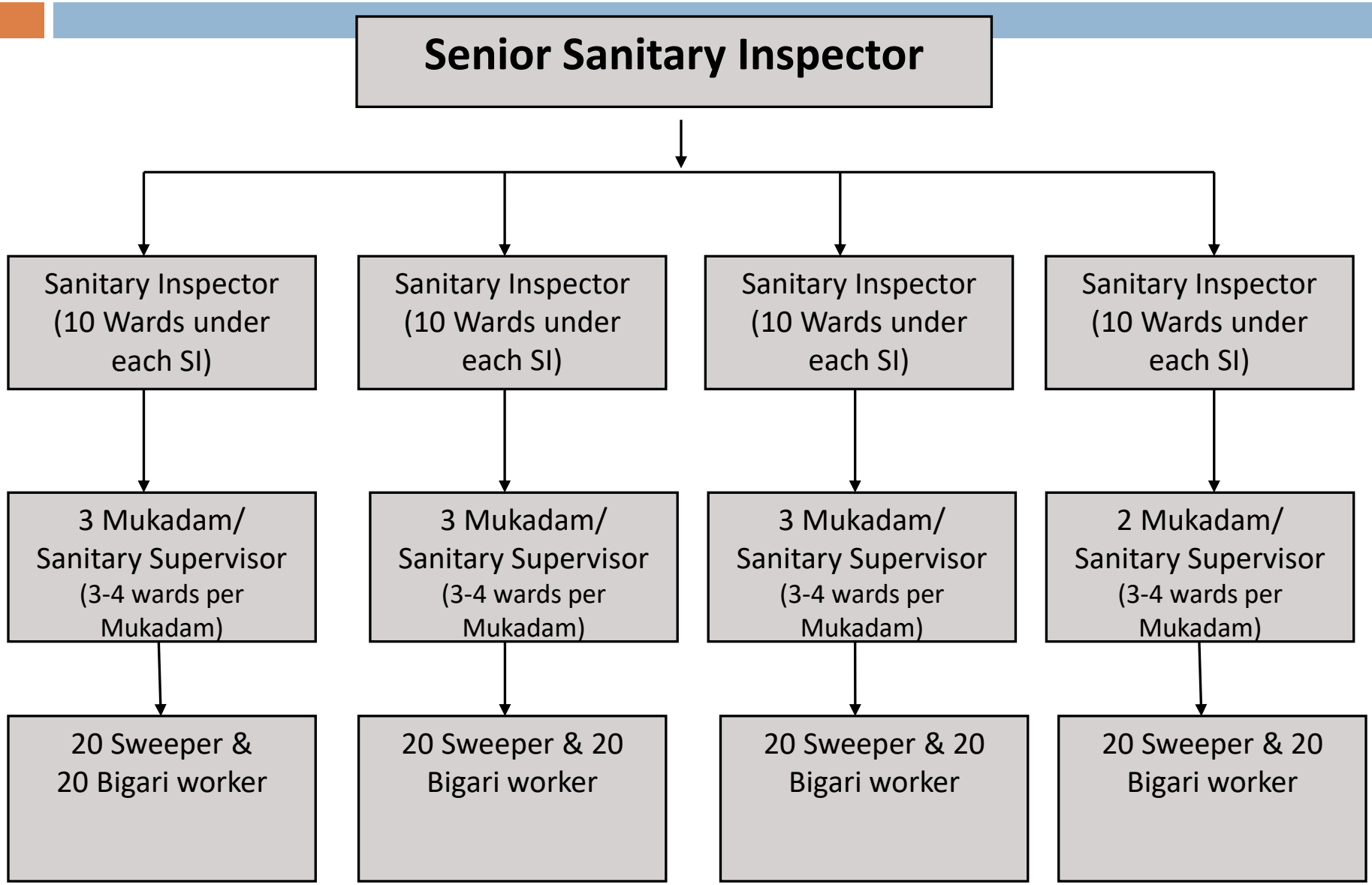
Frequency of drainage outflow in a year is 150

Introduce Service Charges

- Introduce sanitation tax/ service charges to recover O & M cost.
- The service charges can be collected with property tax.
- Maintain separate revenue budget heads for Sanitation.

Solid Waste Management Scenario

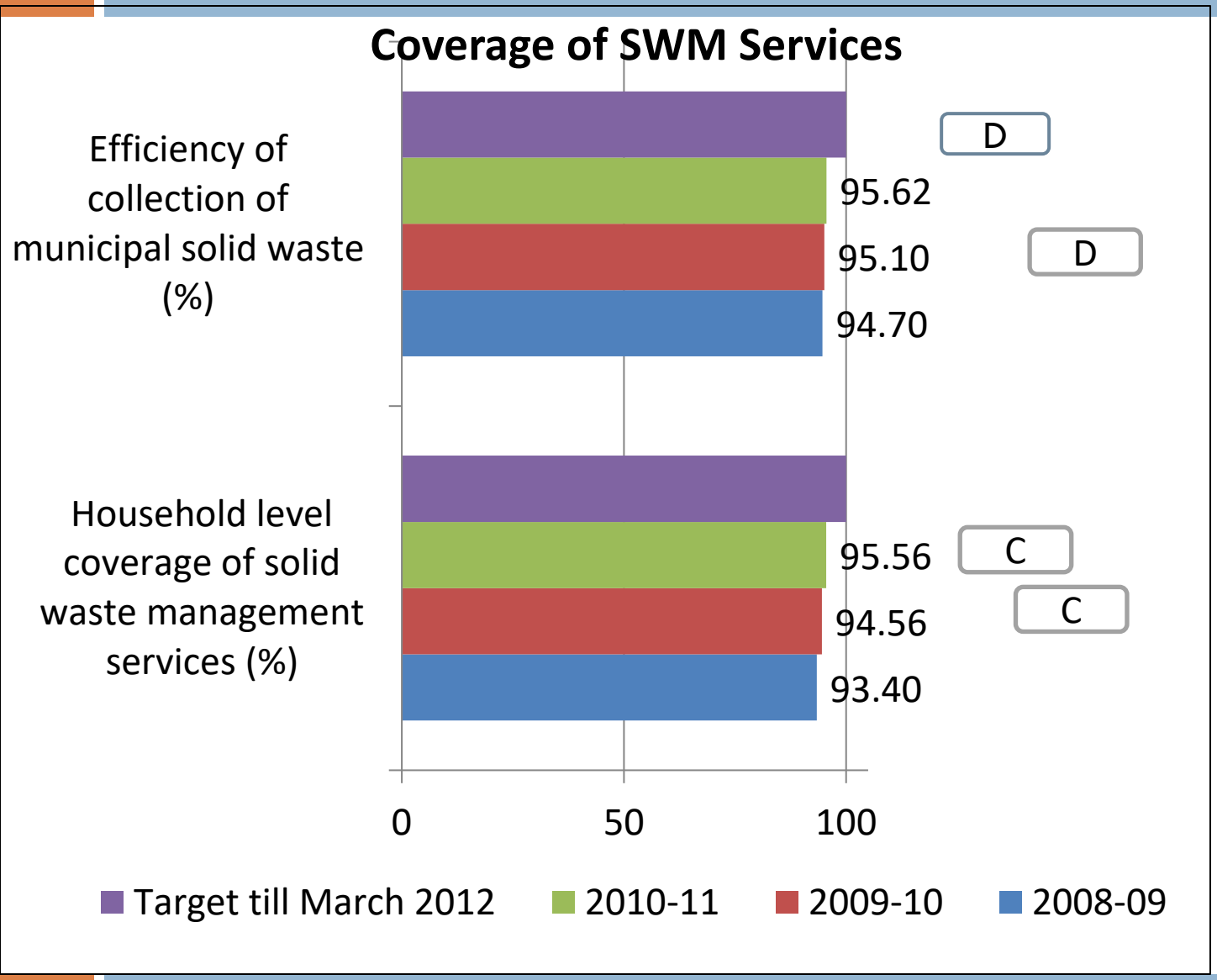
Health Department Organogram



Health Department Organogram

- There are 279 sanctioned posts of which 278 posts are filled (Akrutiband 2011, DMA). Total 5 sanitary inspectors and 11 sanitary supervisors are working and overseeing work in 39 wards. There is no post for Health Officer designated for the city.

I. Coverage of SWM Services



D to D collection through dedicated 39 Ghantagadis for 39 wards along with 1 dumper placer, 2 tipper trucks provided for secondary collection.

99 secondary storage bins also provided.

Provision of Ghantagadi

Total 39 Ghantagdis for waste collection – one for each election ward.

Areas with narrow lanes where ghantagadi can't enter e.g. Magalwarpet, kasalkarpet

Ghantagadi for waste collection

Solid Waste Management: Secondary Bins

Malhar Peth Odhyalagat, 27th June 2011

Komti Chowk, 28th June 2011

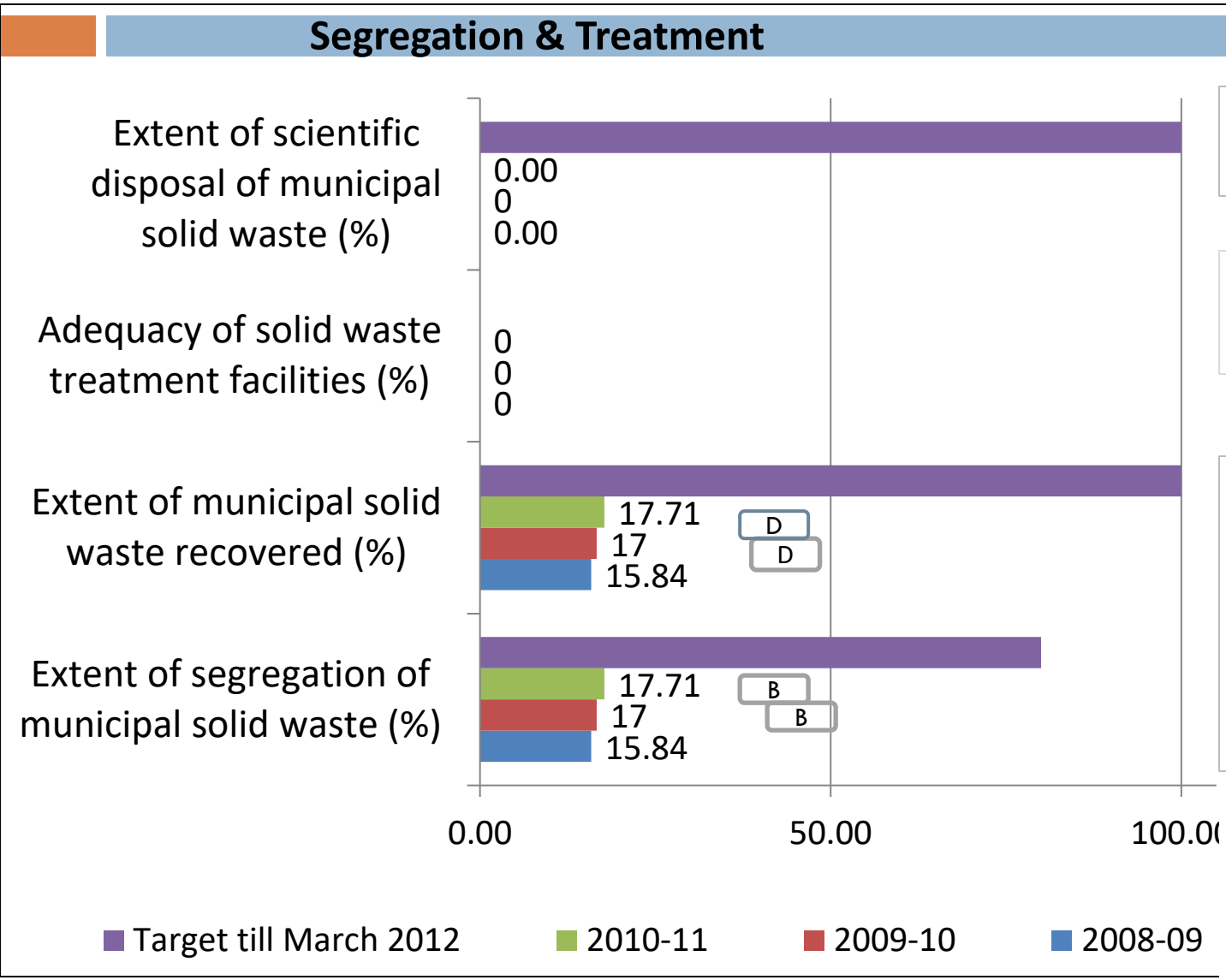
Waste Dumped in Nalla

ULB has a provision of Ghantagadi for door to door collection. But in some areas, few slums narrow lanes and congested areas make them inaccessible through Ghantagadi's which results into throwing waste into nalla or open space by people.

Gendamal Jakat Naka, 28th June 2011

Juna Davakhana Pichadi, 24th June 2011

II. Segregation &Treatment



Open dumping- 45 TPD solid waste generated

No municipal waste processing facility

Recyclable waste taken by rag pickers from open dumping site (Manual Scavenging)

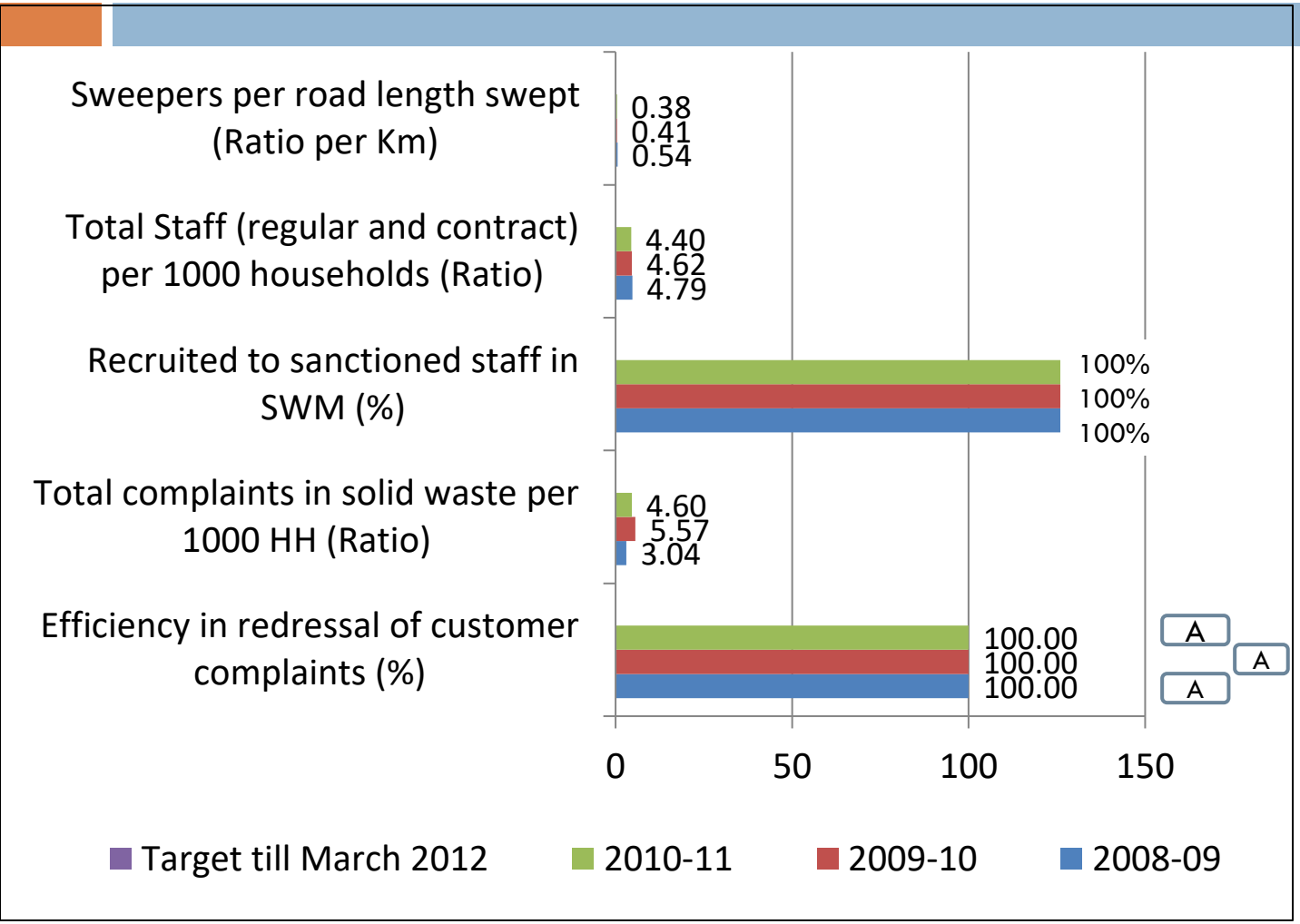
The MCI is facing problem of dumping grounds.
Solid waste is thus dumped in low lying areas.

Open Dumping Site at Songaon

Open dumping site at Songaon – 7 kms from city

Area – 7.6 Hectares

III. Staff Management and Complaint redressal



No. of sweepers decreased from 95 to 67

Lack of human resource for street sweeping, cleaning of public/ community toilets.

IV. Extent of Cost Recovery

Extent of cost recovery in solid waste management services (%)

Efficiency in collection of solid waste management charges (%)

- No separate charge or tax is levied for SWM services thus no cost recovery.
- High O & M expenditure on SWM.
- Expenditure on D to D waste collection through ghantagadi – 45 to 50 lakh per annum.

Solid Waste Management

Collection → Segregation → Transportation → Treatment → Disposal

Collection

- 39 Ghantagadies for 39 wards
- Adequate Staff

Segregation

Improve segregation at source

Possible Actions

- Provide 2 bins in Ghantagadies
- IEC campaign/ awareness generation

Transportation

Adequate

- Adequate number of ghantagdis, and transportation trucks are available.
- From D/D collection and secondary bins directly to open dumping site.

Treatment

No treatment

Possible Actions

- **Composting**
- **Decentralized bio methanation cum bio gas generation plant**
- **Waste to energy**
- **Vermi composting**

Disposal

Open dumping

Possible Actions

- **Scientific land filling**
- **Lechate Treatment plant**

Major Improvement Areas

- Treatment facility
- Scientific land filling
- Segregation at source
- Introduce service charges (Framing Bylaws)

I. Waste Treatment Options for Satara

	Option I		Option II	Option III
	Composting		Bio-Methanation cum Biogas Generation plant	Waste to Fuel (RDF/ Gasifaction)
	Windrow Composting	Vermi Composting		
Land Requirement	Large parcel of land	Small parcel of land (Multistorey Building)	Small parcels of land within city	Large parcel of land
Waste Type	Organic	Organic	Organic	Dry Organic (Not inert)
Waste Seg.	Require	Require	Require	Require
Climatic Cond.	Tropical	Tropical	No	No
Capital Cost	Low to Moderate *(if mechanical seg.)*	Low	Moderate (50 Lakh)	High (depending on Technology)
O & M Cost	Low to Moderate	Low	Moderate (6 Lakh)	High
Suitability	At large scale / city level (100-	For small scale (housing society	At decentralized level – small to medium	At centralized level (100-200TPD)

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Land Requirement	Large parcel of land	Available at Songaon	Need to locate	Large parcel of land
Waste Type	Organic	Adequately available	Adequately available	Dry Organic (Not inert)
Waste Seg.	System not there but can be introduced as 'Segregation at Source'			
Climatic Cond.	Tropical	Favourable	Not Reqd.	No
Capital Cost	Low to Moderate *(if mechanical seg.)*	ULB Own Sources/ Grants	Turn Key Model	High (depending on Technology) (>5 Cr)
O & M Cost	Low to MOderate	Low	Moderate to Lakh	High (10-15 Lakh)
Suitability	At large scale /	Introduce it at housing society level.	Not Suitable	At centralized

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Suitability	At large scale /				

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O & M Cost	Suitable	Introduce it at housing society level.	Not Suitable	Can be tried on pilot basis
Suitability				

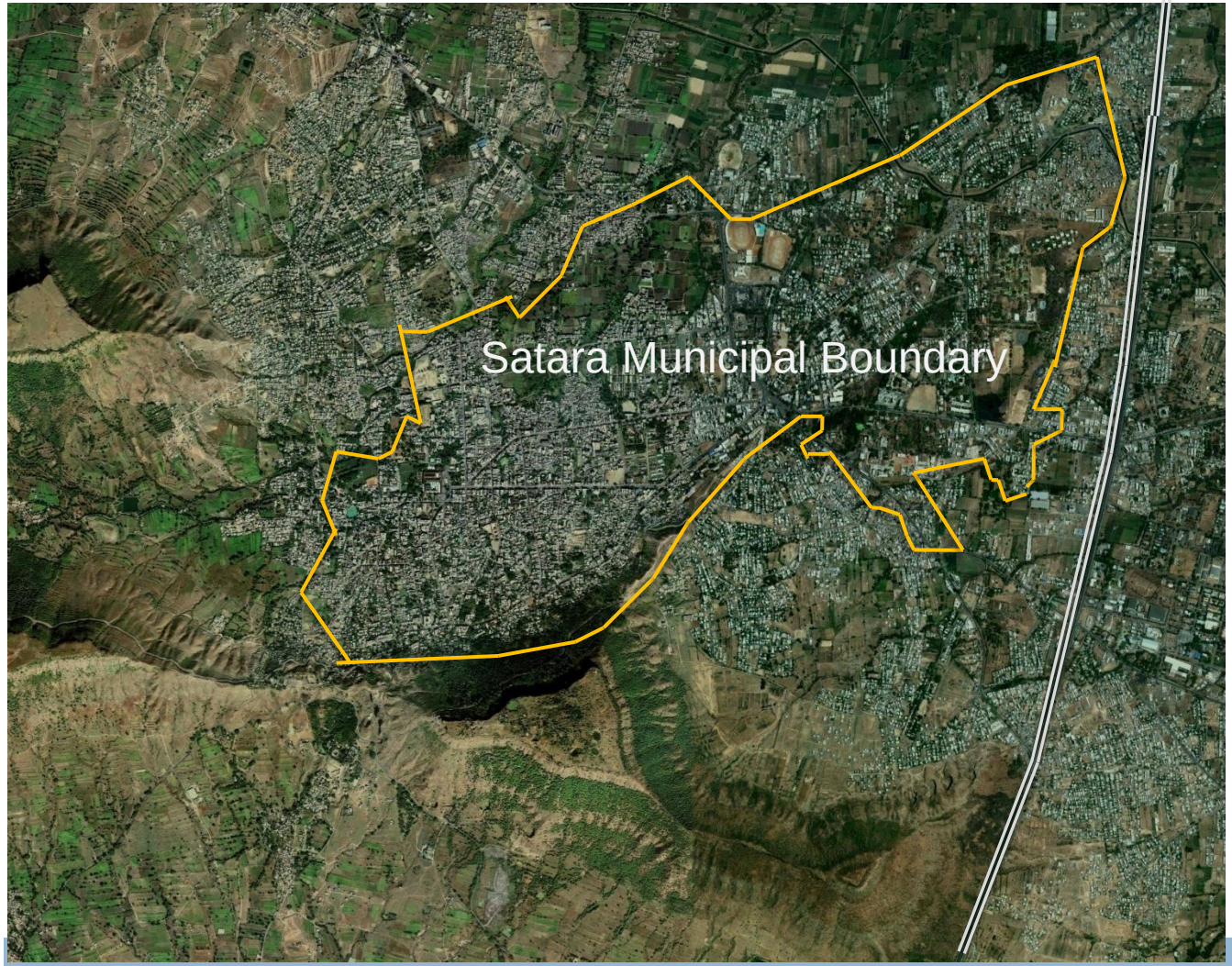
Waste Treatment

- An aerobic composting unit of 20 TPD capacity would cost Rs.16 million to install. It could be possible to fully recover the O & M costs (Rs. 2 million per annum) and part of capital cost by sale of compost.

II. Scientific Land Filling

- Selection of appropriate type of scientific land filling *(Sanitary landfill, Modified sanitary landfill, Selected waste landfill)*
- Total waste generation (year 2041) is 55 TPD
  - Assuming 40% biodegradable waste converted into compost (approximately 17TPD)
  - 15% recyclable waste
  - **Waste to be disposed in land fill site per day 32 TPD**
- **Land requirement for 30 yrs capacity is 8 hect. Including circulation**
- **Capital cost for Scientific Land Fill site: Rs. 55 Cr** (excluding land cost)
- **O & M cost: Rs. 9.5 Cr**
- Construction of Leachate treatment plant at SLF
- Implementation
  - Involvement of private agencies (PPP model)

LOCATION OF OPEN DUMPING SITE



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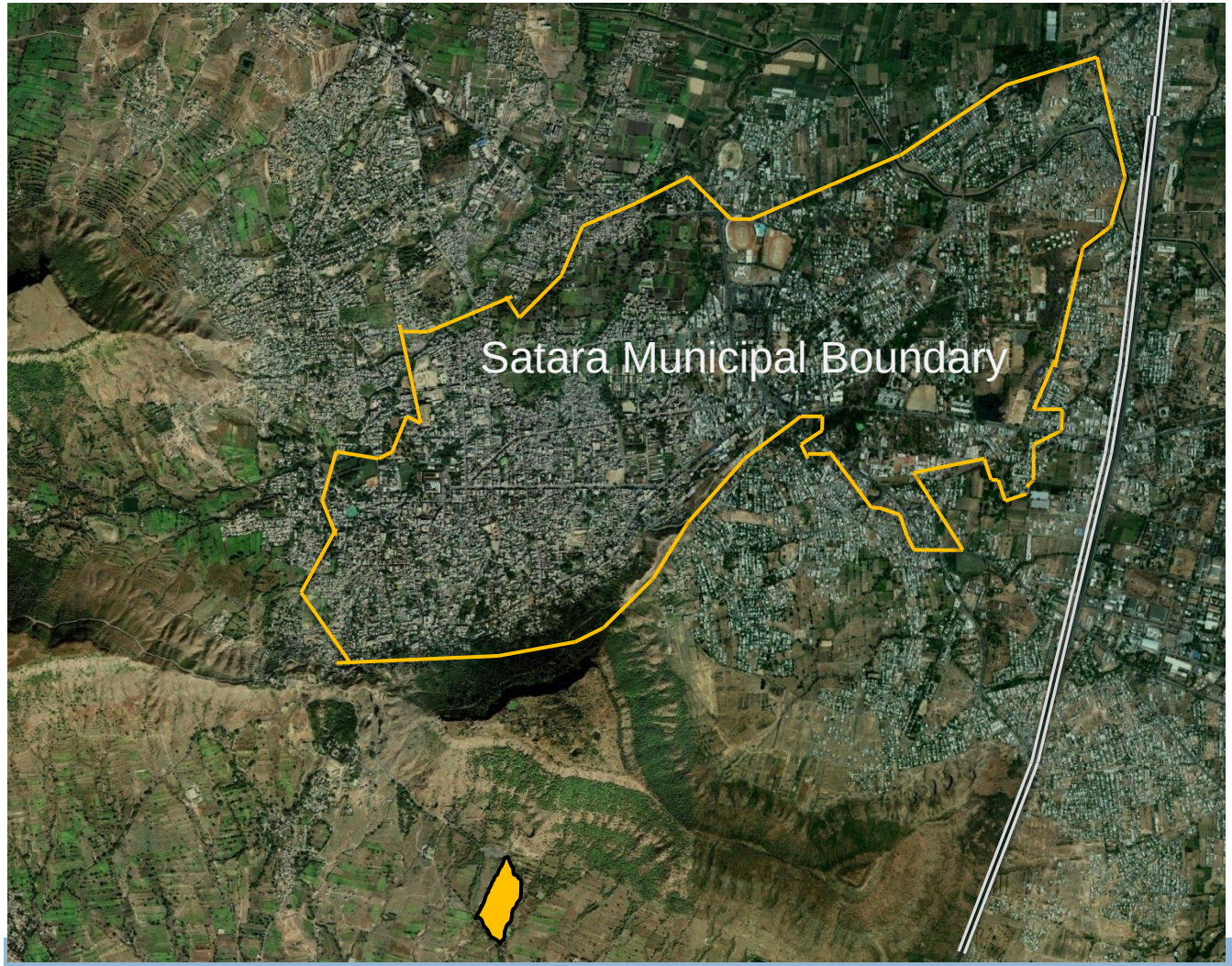

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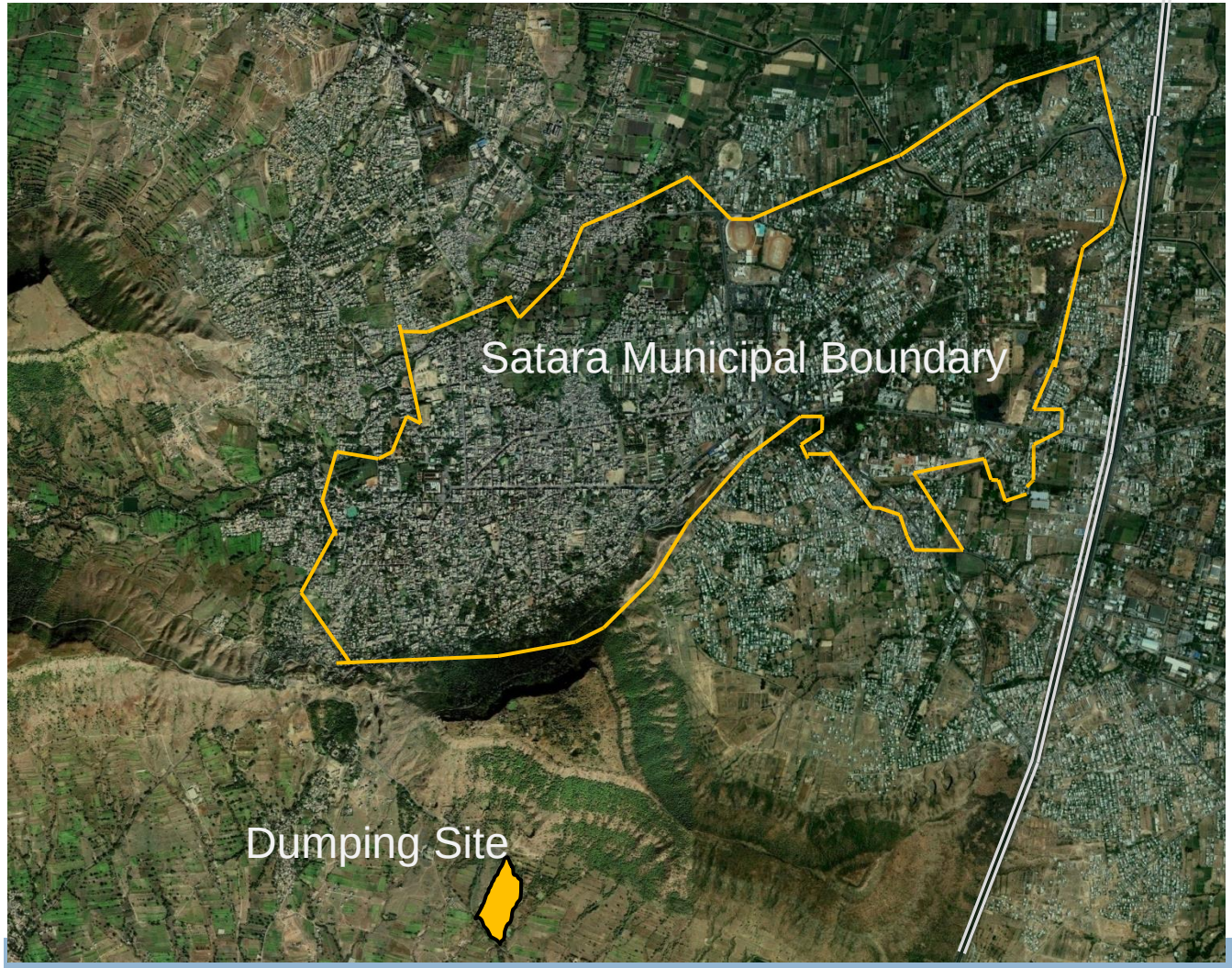

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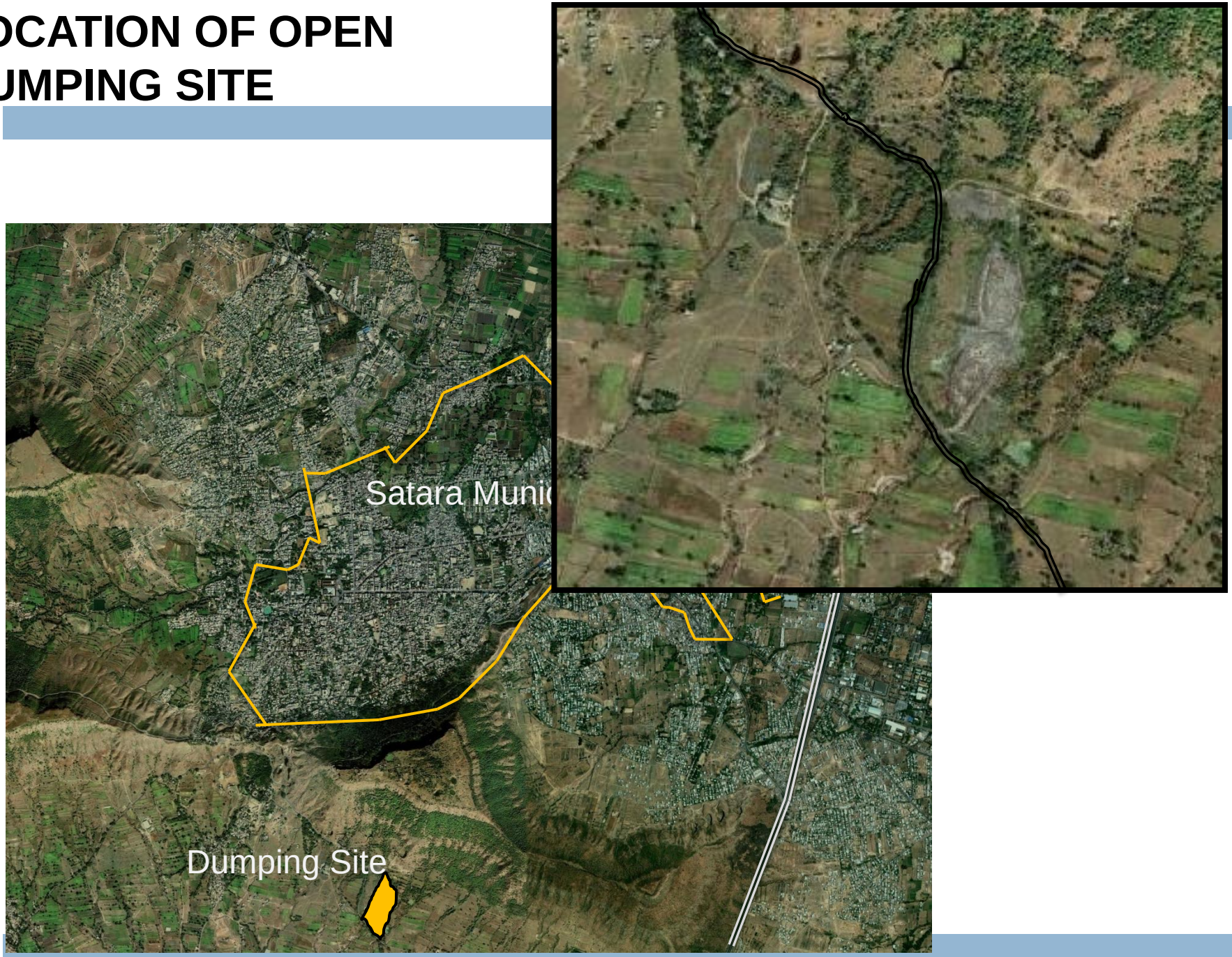

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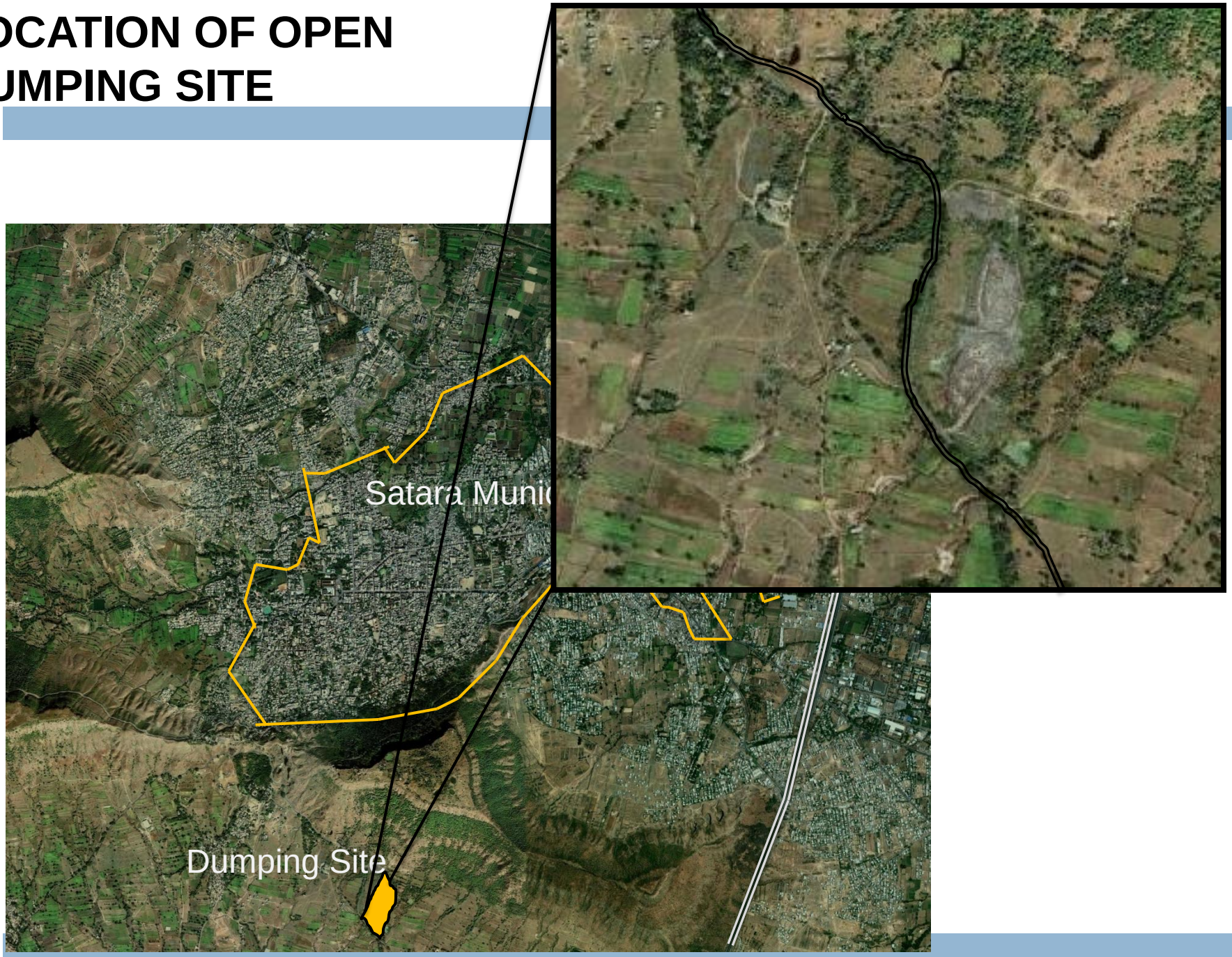

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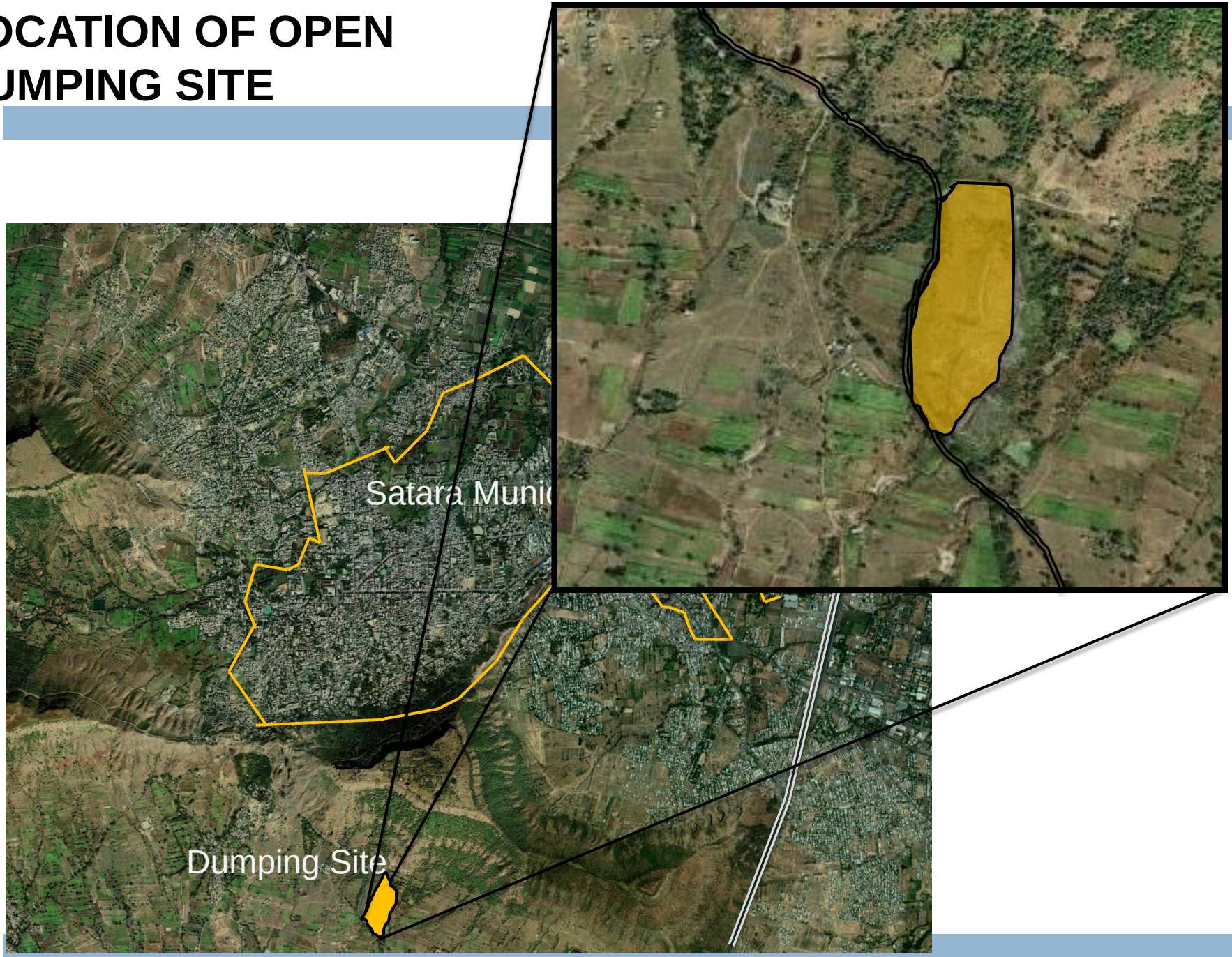

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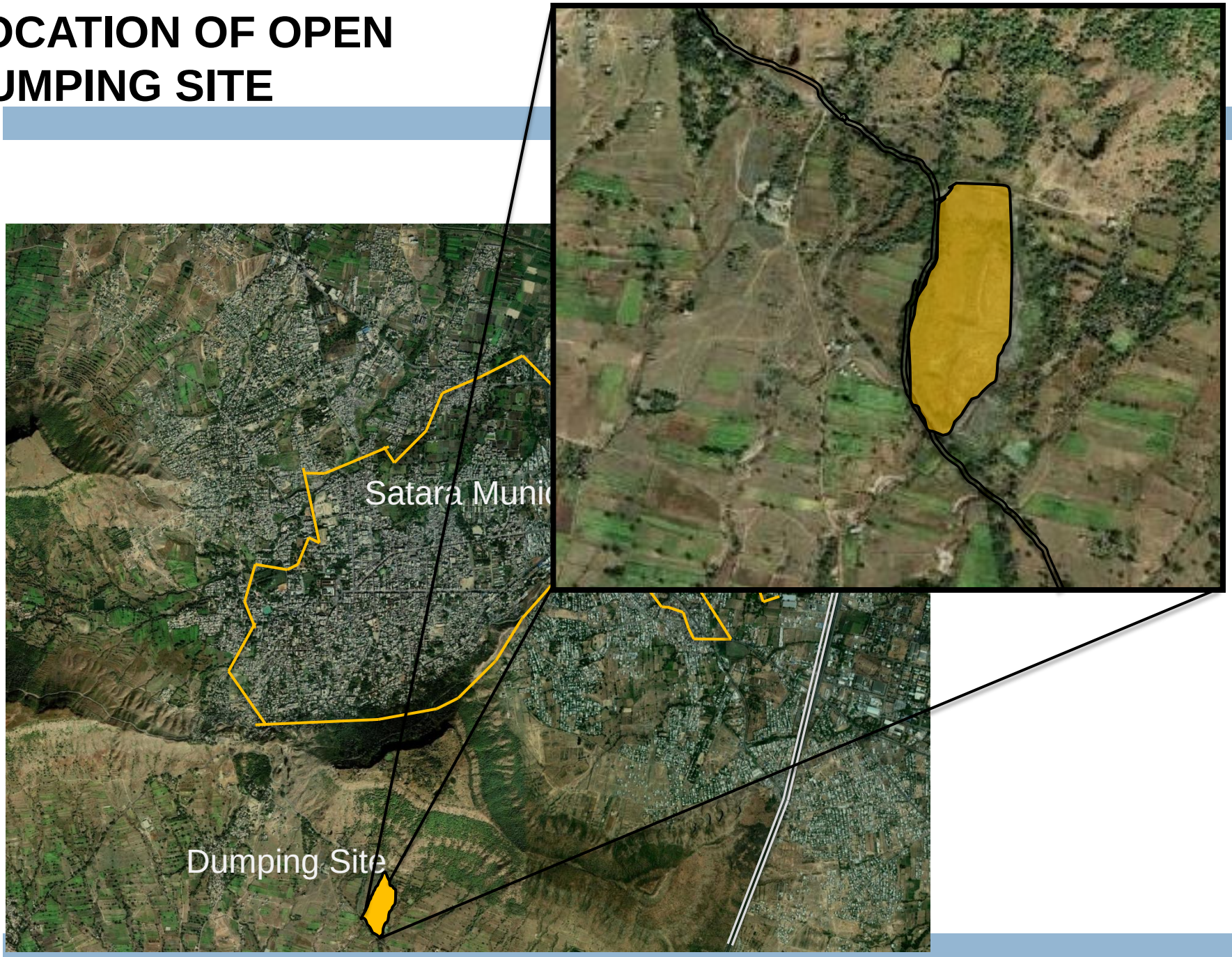

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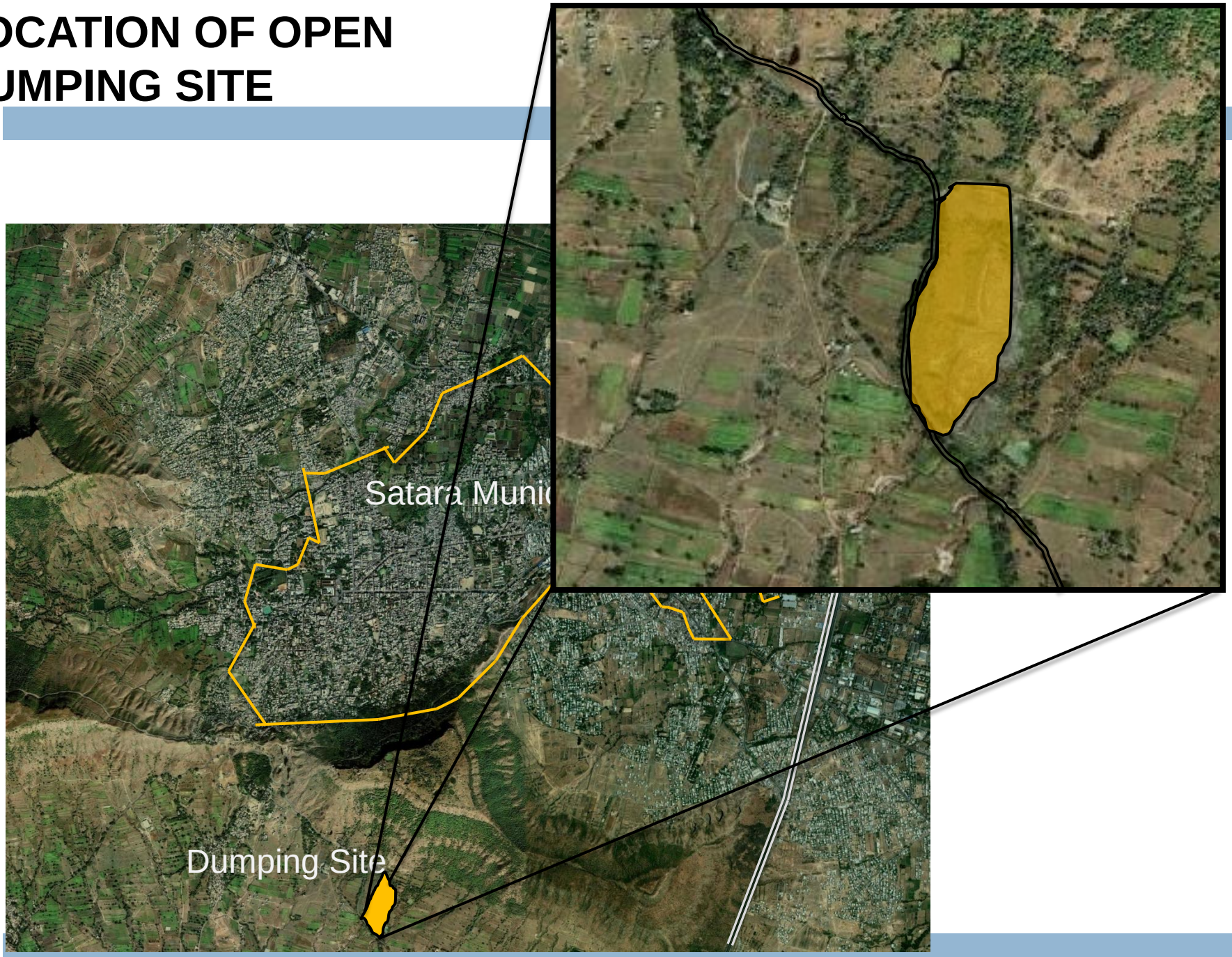

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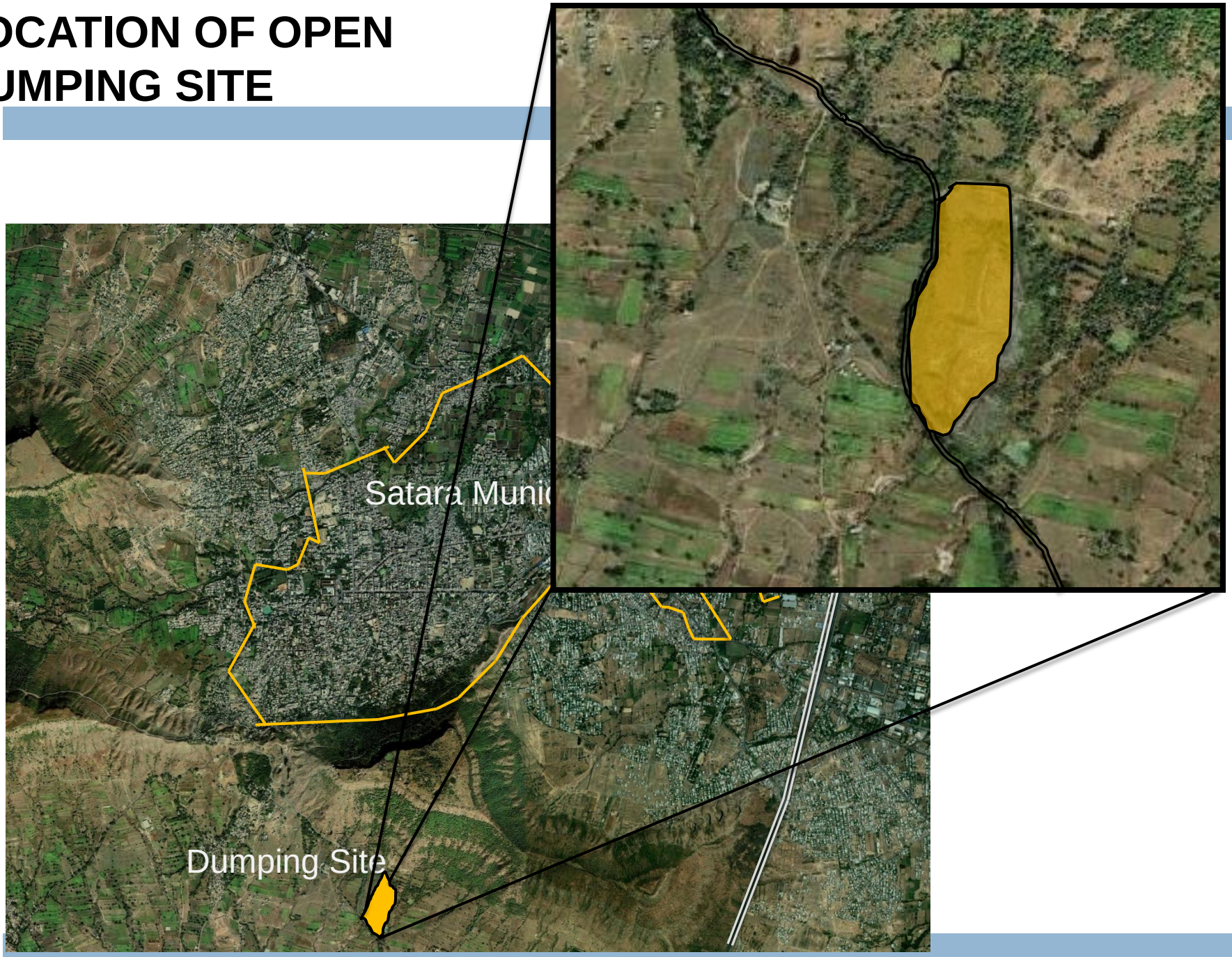

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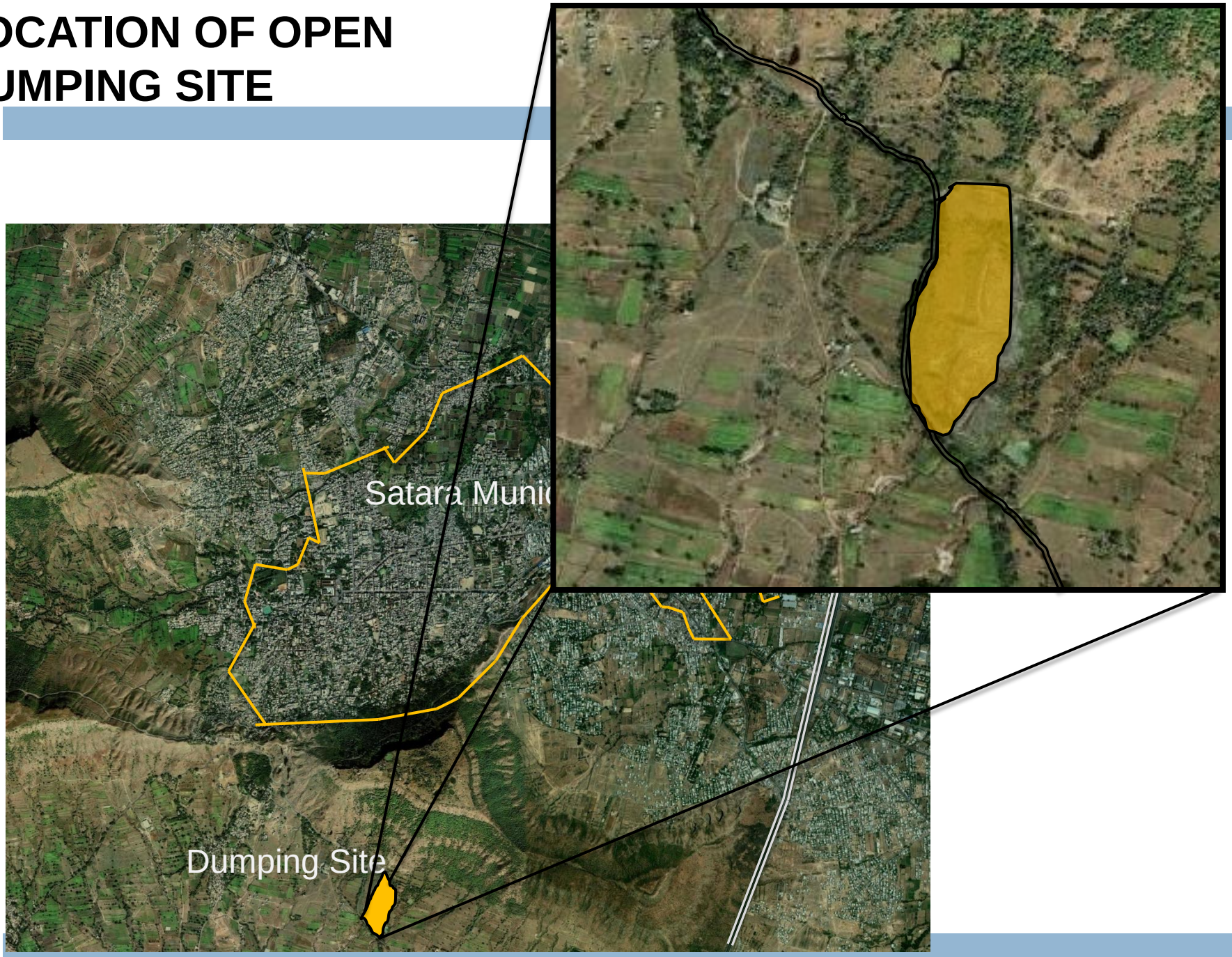

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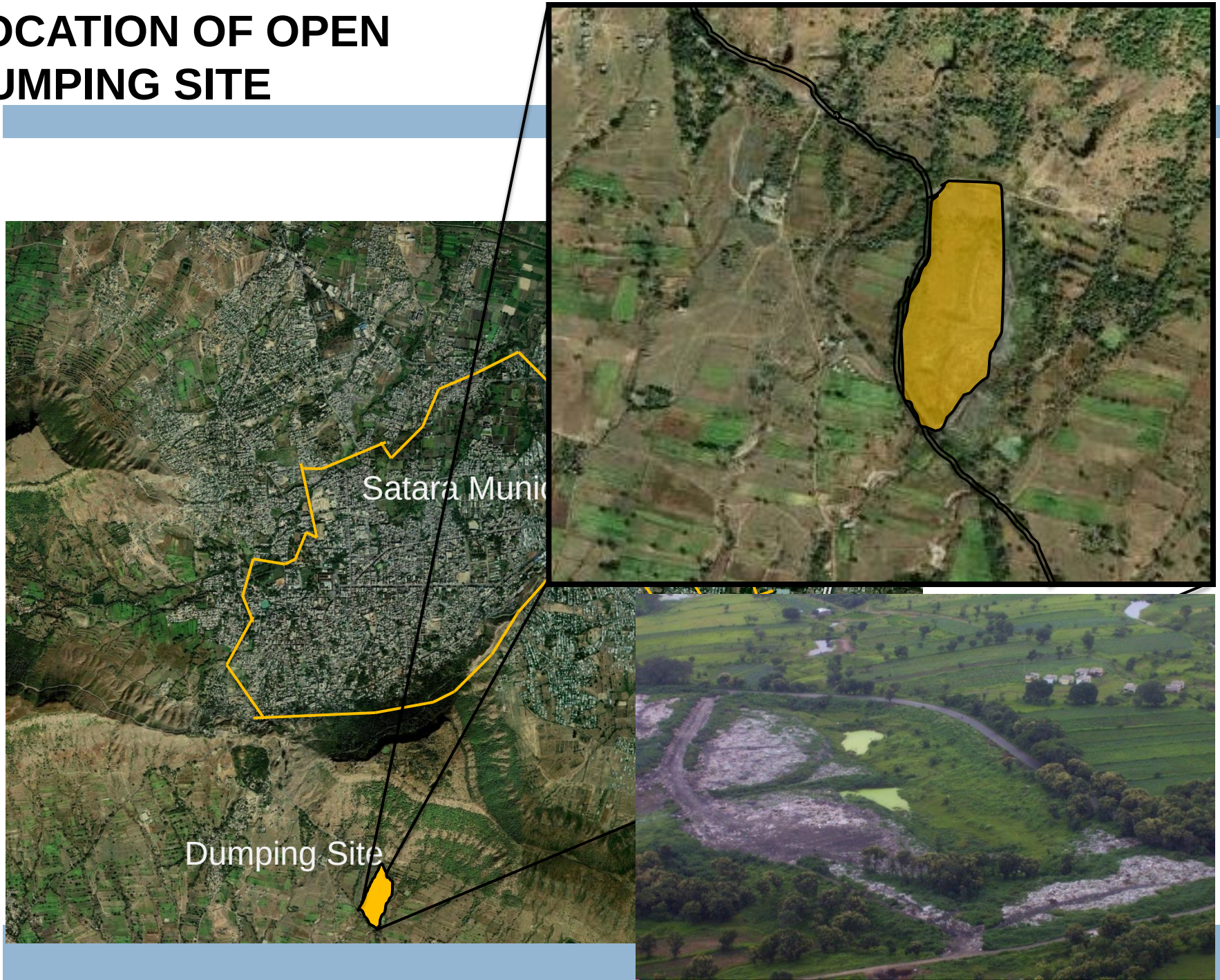

Proposed Landfill Site -1 for Future

Existing Open Dump and Biomedical Waste Treatment Plant

Proposed Landfill Site -1 for Future

Existing Open Dump and Biomedical Waste Treatment Plant

Leachate Treatment Plant

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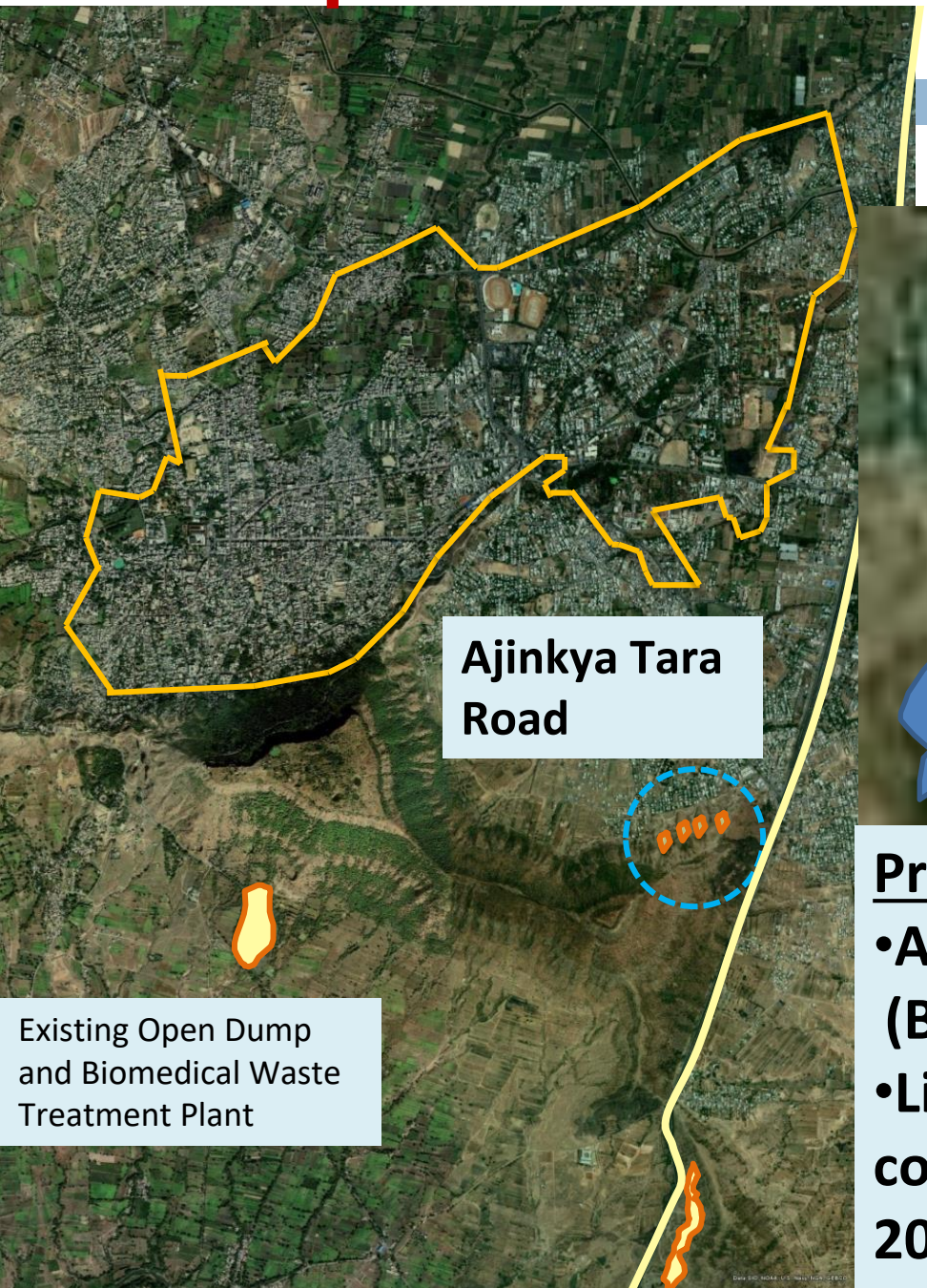
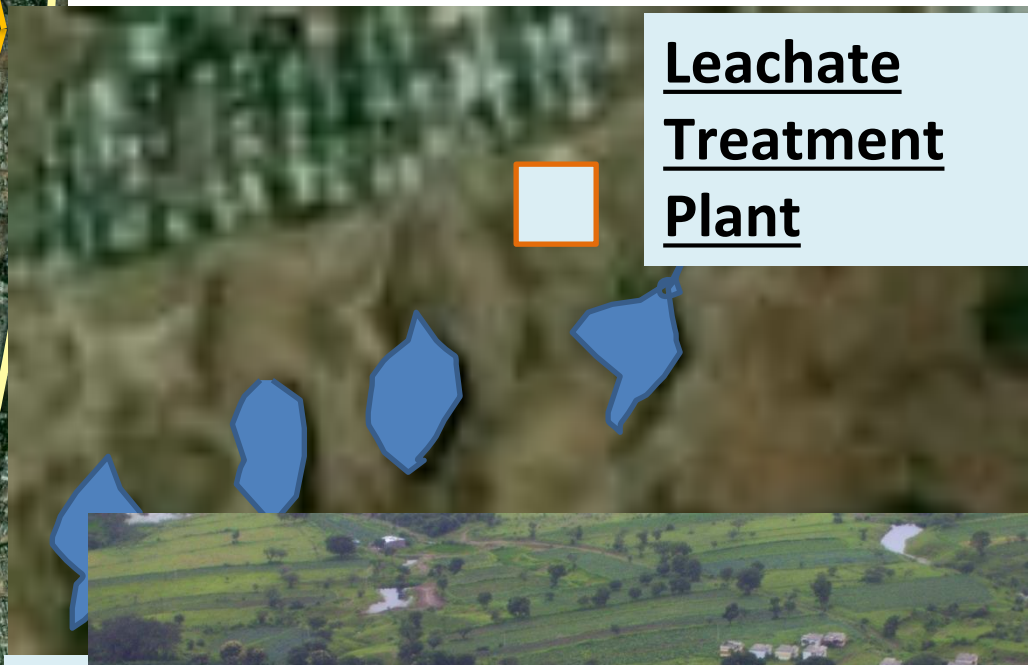
Proposed Landfill Site -1 for Future





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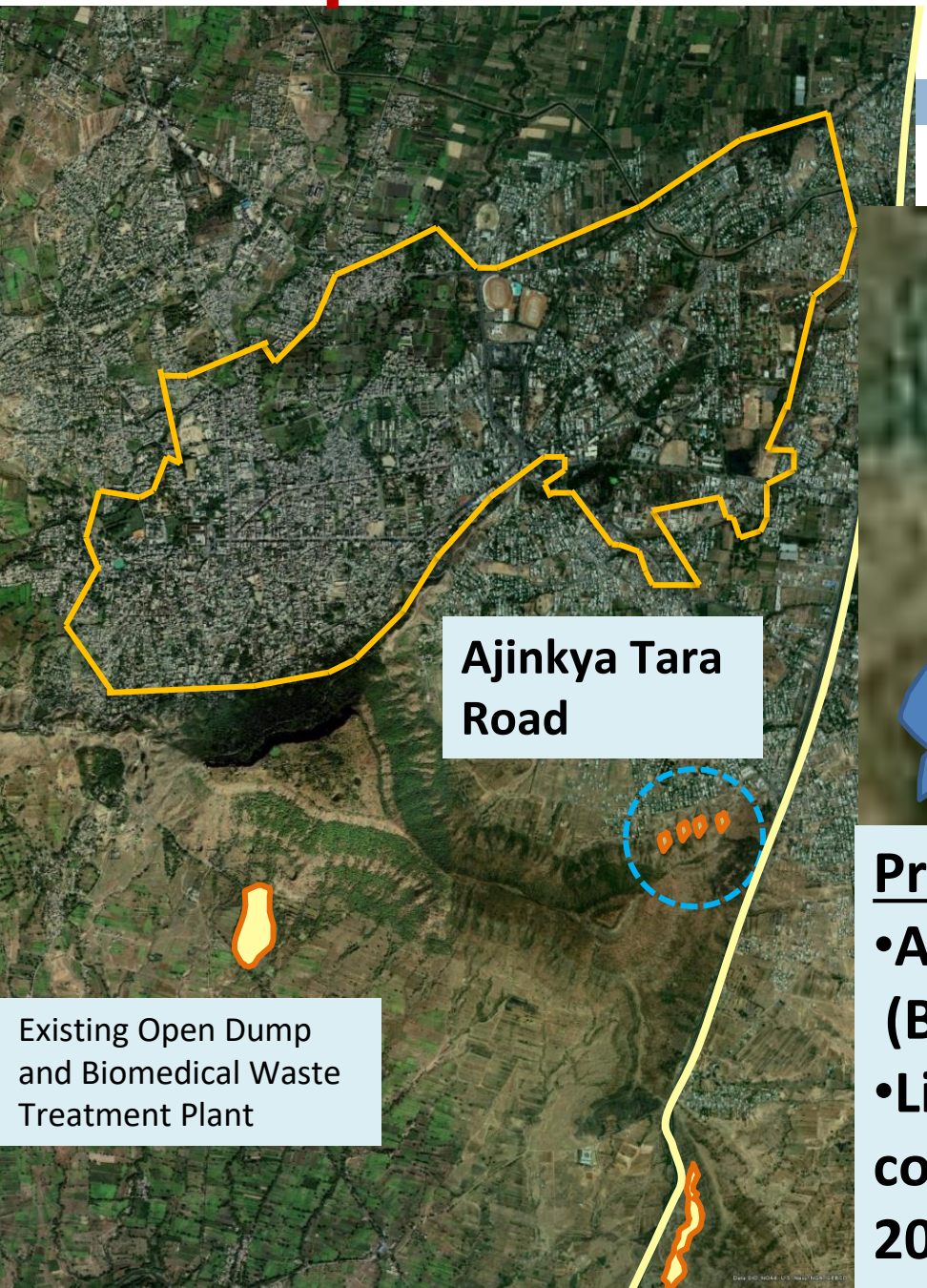

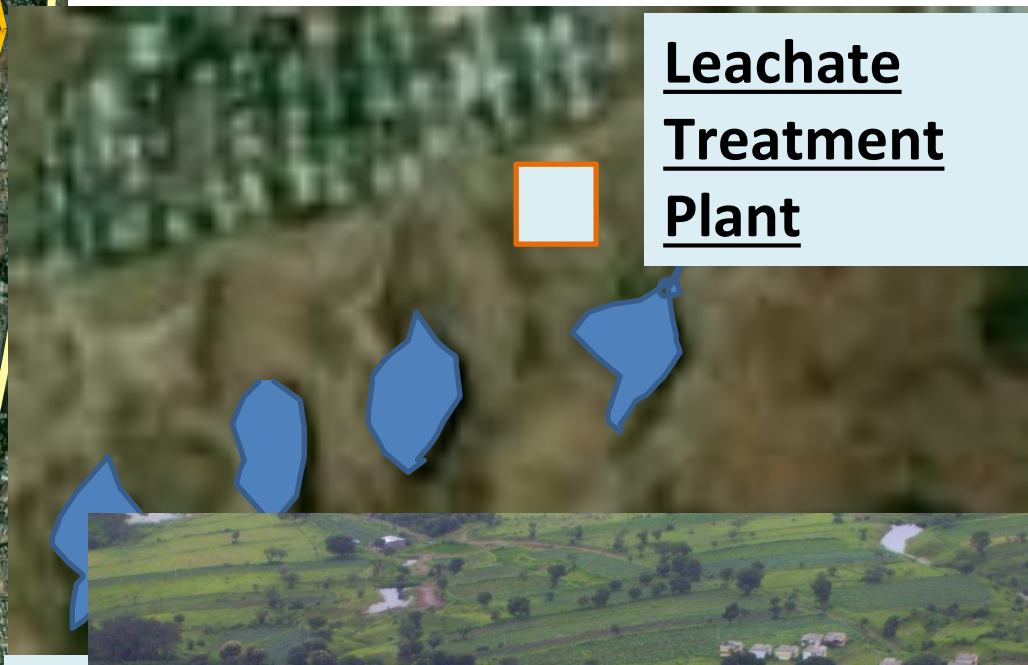

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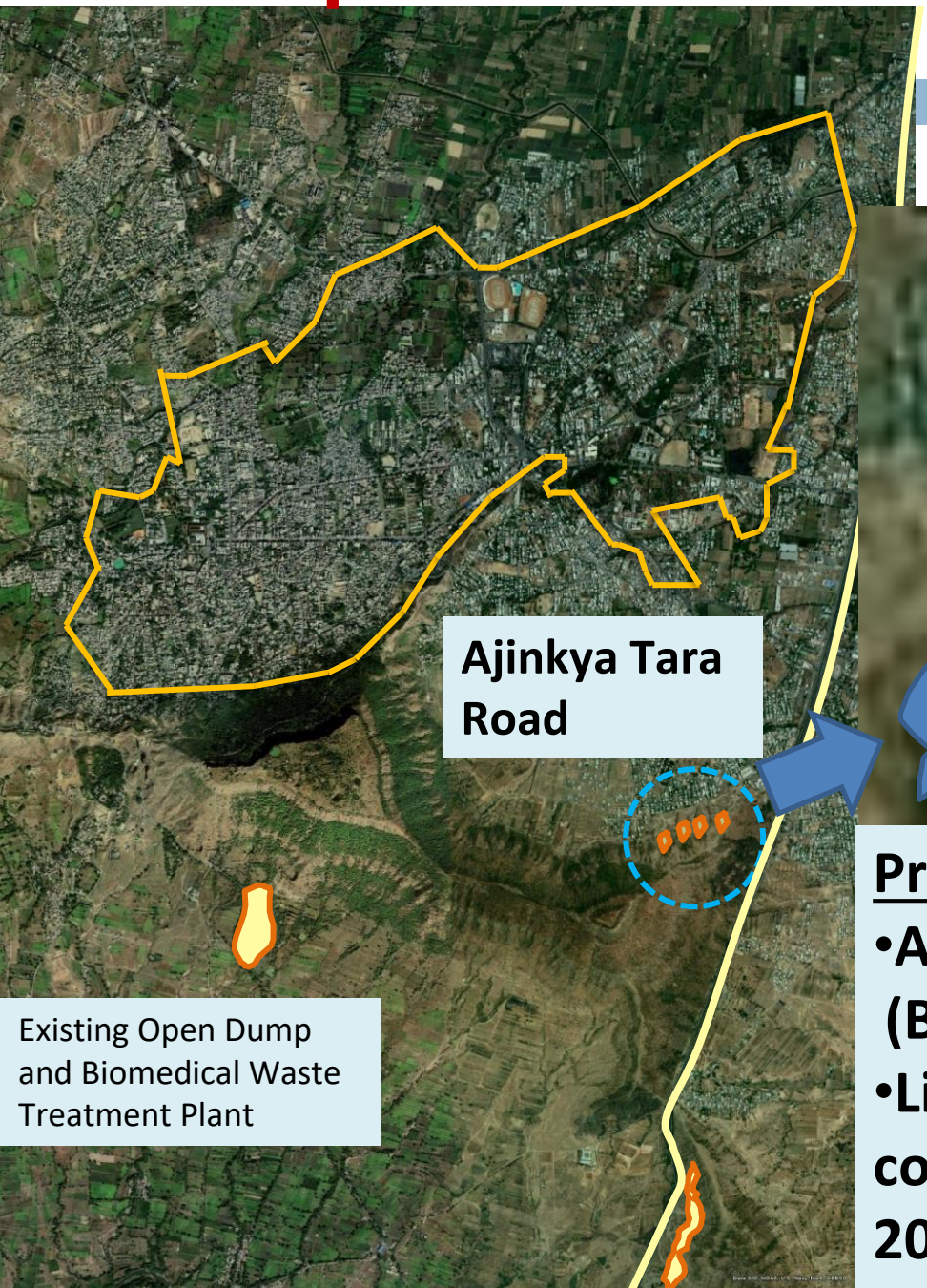

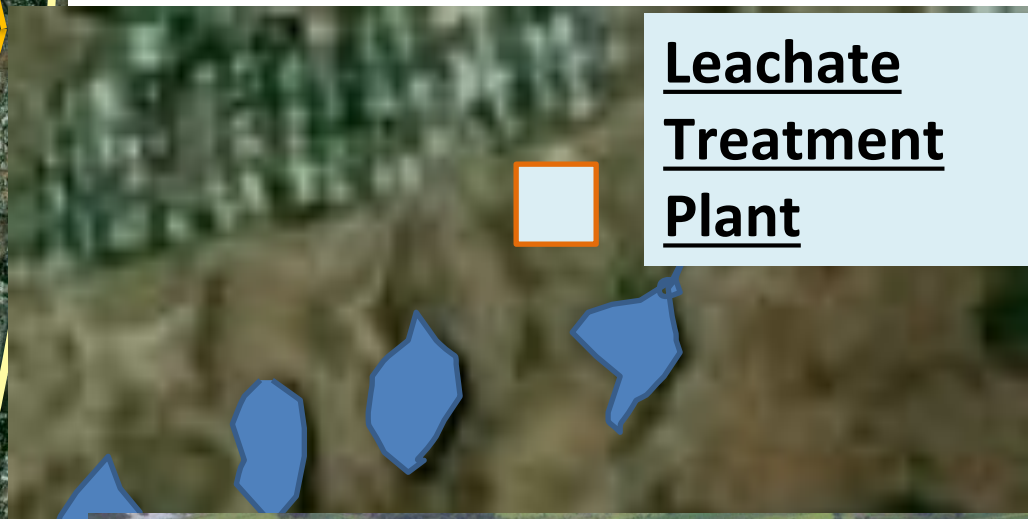

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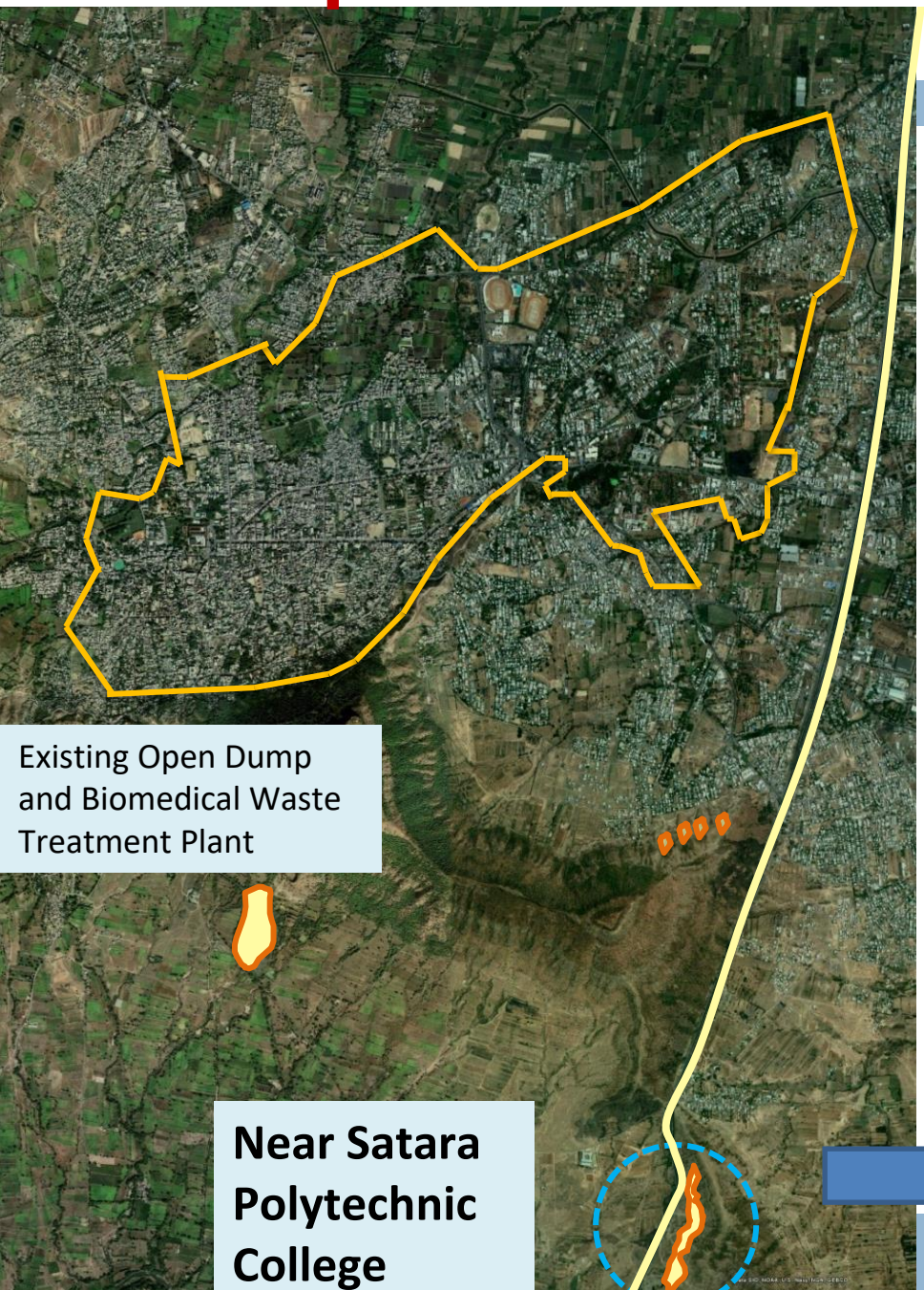
Stone quarry on NH4

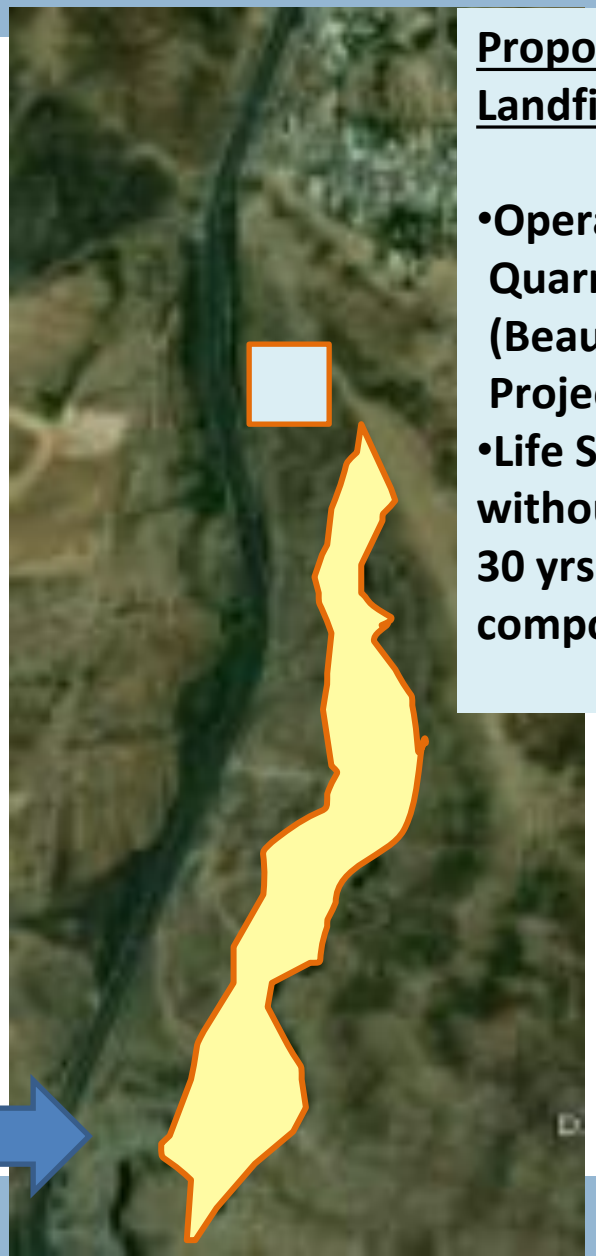
Abandoned stone quarry at foothill of Ajinkyatara fort.

Proposed Landfill Site -2 for Future



Existing Open Dump and Biomedical Waste Treatment Plant

Near Satara Polytechnic College



Proposed Scientific Landfill Site 2 (Future)

- **Operational Stone Quarries (Beautification Project)**
- **Life Span – 15 Yrs without composting 30 yrs with composting**

III. Introduce Waste Segregation

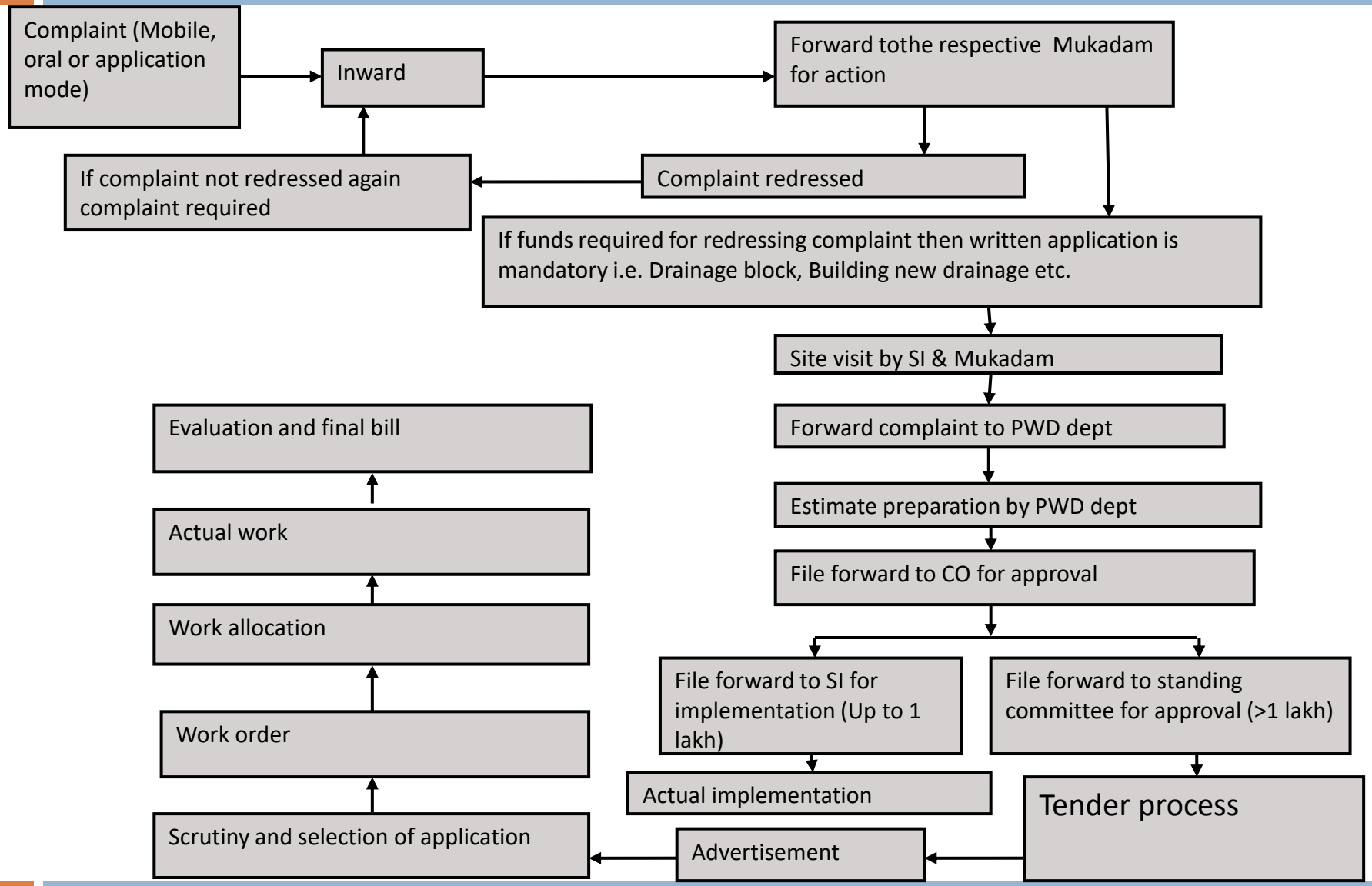
- **Introduce Waste Segregation at Source:**
  - Conduct awareness programme for waste segregation at source. (IEC Campaign)
  - Provide 2 bins in Ghantagadis for waste segregation
  - Make waste segregation at source mandatory for apartments
  - Collect separately vegetable market waste and food waste from Hotels and Restaurants - can be used for biogas generation, composting.

- **Appoint Solid Waste Magistrate**
- **Implementation of bylaws and introduce penalty for littering at public places**

IV. Introduce Service Charges

- Based on the SWM revenue expenditure the service charges can be defined and collected along with property tax
- Maintain separate account for SWM

Complaint Redressal System- SWM



Proposed Project - SWM

- Project Proposal on PPP basis for
  - Door to door waste collection
  - Waste processing
  - Land filling

- ULB has asked for RFQ/ RFP
  - 3 agencies are selected
  - These 3 agencies will submit DPR to ULB
  - ULB will assess feasibility of the project
  - Award of contract to the selected agency

- ULB has asked for PPP advisory services from state/ central government appointed panel 'Transaction Advisors for PPP'.

Thank You