



REIMAGINING PUNE: MISSION SMART CITY

DETAILED PLAN TO TRANSFORM PUNE INTO A WORLD-CLASS SMART CITY



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Pune Smart City Main Proposal





Annexure 1 – Smart City Features



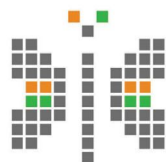
ANNEXURE 1

S. No	Feature	Definition
1.	Citizen participation	A smart city constantly adapts its strategies incorporating views of its citizens to bring maximum benefit for all. (Guideline 3.1.6)
2.	Identity and culture	A Smart City has a unique identity, which distinguishes it from all other cities, based on some key aspect: its location or climate; its leading industry, its cultural heritage, its local culture or cuisine, or other factors. This identity allows an easy answer to the question "Why in this city and not somewhere else?" A Smart City celebrates and promotes its unique identity and culture. (Guideline 3.1.7)
3.	Economy and employment	A smart city has a robust and resilient economic base and growth strategy that creates large-scale employment and increases opportunities for the majority of its citizens. (Guideline 2.6 & 3.1.7 & 6.2)
4.	Health	A Smart City provides access to healthcare for all its citizens. (Guideline 2.5.10)
5.	Education	A Smart City offers schooling and educational opportunities for all children in the city (Guideline 2.5.10)
6.	Mixed use	A Smart City has different kinds of land uses in the same places; such as offices, housing, and shops, clustered together. (Guidelines 3.1.2 and 3.1.2)
7.	Compactness	A Smart City encourages development to be compact and dense, where buildings are ideally within a 10-minute walk of public transportation and are located close together to form concentrated neighborhoods and centers of activity around commerce and services. (Guidelines 2.3 and 5.2)
8.	Open spaces	A Smart City has sufficient and usable public open spaces, many of which are green, that promote exercise and outdoor recreation for all age groups. Public open spaces of a range of sizes are dispersed throughout the City so all citizens can have access. (Guidelines 3.1.4 & 6.2)
9.	Housing and inclusiveness	A Smart City has sufficient housing for all income groups and promotes integration among social groups. (Guidelines 3.1.2)
10.	Transportation & Mobility	A Smart City does not require an automobile to get around; distances are short, buildings are accessible from the sidewalk, and transit options are plentiful and attractive to people of all income levels. (Guidelines 3.1.5 & 6.2)
11.	Walkable	A Smart City's roads are designed equally for pedestrians, cyclists and vehicles; and road safety and sidewalks are paramount to street design. Traffic signals are sufficient and traffic rules are enforced. Shops, restaurants, building entrances and trees line the sidewalk to encourage walking and there is ample lighting so the pedestrian feels safe day and night. (Guidelines 3.1.3 & 6.2)
12.	IT connectivity	A Smart City has a robust internet network allowing high-speed connections to all offices and dwellings as desired. (Guideline 6.2)

13.	Intelligent government services	A Smart City enables easy interaction (including through online and telephone services) with its citizens, eliminating delays and frustrations in interactions with government. (Guidelines 2.4.7 & 3.1.6 & 5.1.4 & 6.2)
14.	Energy supply	A Smart City has reliable, 24/7 electricity supply with no delays in requested hookups. (Guideline 2.4)
15.	Energy source	A Smart City has at least 10% of its electricity generated by renewables. (Guideline 6.2)
16.	Water supply	A Smart City has a reliable, 24/7 supply of water that meets national and global health standards. (Guidelines 2.4 & 6.2)
17.	Waste water management	A Smart City has advanced water management programs, including wastewater recycling, smart meters, rainwater harvesting, and green infrastructure to manage storm water runoff. (Guideline 6.2)
18.	Water quality	A Smart City treats all of its sewage to prevent the polluting of water bodies and aquifers. (Guideline 2.4)
19.	Air quality	A Smart City has air quality that always meets international safety standards. (Guideline 2.4.8)
20.	Energy efficiency	A Smart City promotes state-of-the-art energy efficiency practices in buildings, street lights, and transit systems. (Guideline 6.2)
21.	Underground electric wiring	A Smart City has an underground electric wiring system to reduce blackouts due to storms and eliminate unsightliness. (Guideline 6.2)
22.	Sanitation	A Smart City has no open defecation, and a full supply of toilets based on the population. (Guidelines 2.4.3 & 6.2)
23.	Waste management	A Smart City has a waste management system that removes household and commercial garbage, and disposes of it in an environmentally and economically sound manner. (Guidelines 2.4.3 & 6.2)
24.	Safety	A Smart City has high levels of public safety, especially focused on women, children and the elderly; men and women of all ages feel safe on the streets at all hours. (Guideline 6.2)

INDIA SMART CITY MISSION

MISSION TRANSFORM-NATION



Smart City
MISSION TRANSFORM-NATION

THE SMART CITY CHALLENGE **STAGE 2**

SMART CITY PROPOSAL

SMART CITY CODE:

MH-02-PUN

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सत्यमेव जयते

Ministry of Urban Development
Government of India

CHECKLIST

All fields in the SCP format document have to be filled. The chart below will assist you in verifying that all questions have been answered and all fields have been filled.

Q. No	TICK		
PART A: CITY PROFILE			
1.	<input checked="" type="checkbox"/>	QUALITY OF LIFE	
2.	<input checked="" type="checkbox"/>	ADMINISTRATIVE EFFICIENCY	
3.	<input checked="" type="checkbox"/>	SWOT	
4.	<input checked="" type="checkbox"/>	STRATEGIC FOCUS AND BLUEPRINT	
5.	<input checked="" type="checkbox"/>	CITY VISION AND GOALS	
6.	<input checked="" type="checkbox"/>	CITIZEN ENGAGEMENT	
7.	<input checked="" type="checkbox"/>	SELF-ASSESSMENT: BASELINE	
8.	<input checked="" type="checkbox"/>	SELF-ASSESSMENT: ASPIRATIONS & IMPERATIVES	
PART B: AREA BASED PROPOSAL			
9.	<input checked="" type="checkbox"/>	SUMMARY	
10.	<input checked="" type="checkbox"/>	APPROACH & METHODOLOGY	
11.	<input checked="" type="checkbox"/>	KEY COMPONENTS	
12.	<input checked="" type="checkbox"/>	SMART URBAN FORM	
13.	<input checked="" type="checkbox"/>	CONVERGENCE AGENDA	<input checked="" type="checkbox"/> Table 1
14.	<input checked="" type="checkbox"/>	CONVERGENCE IMPLEMENTATION	
15.	<input checked="" type="checkbox"/>	RISKS	<input checked="" type="checkbox"/> Table 2
16.	<input checked="" type="checkbox"/>	ESSENTIAL FEATURES ACHIEVEMENT PLAN	
17.	<input checked="" type="checkbox"/>	SUCCESS FACTORS	
18.	<input checked="" type="checkbox"/>	MEASURABLE IMPACT	
PART C: PAN-CITY PROPOSAL(S)			
19.	<input checked="" type="checkbox"/>	SUMMARY	
20.	<input checked="" type="checkbox"/>	COMPONENTS	
21.	<input checked="" type="checkbox"/>	APPROACH & METHODOLOGY	

22.	<input checked="" type="checkbox"/>	DEMAND ASSESSMENT			
23.	<input checked="" type="checkbox"/>	INCLUSION			
24.	<input checked="" type="checkbox"/>	RISK MITIGATION	<input checked="" type="checkbox"/>	Table 3	
25.	<input checked="" type="checkbox"/>	FRUGAL INNOVATION			
26.	<input checked="" type="checkbox"/>	CONVERGENCE AGENDA	<input checked="" type="checkbox"/>	Table 4	
27.	<input checked="" type="checkbox"/>	CONVERGENCE IMPLEMENTATION			
28.	<input checked="" type="checkbox"/>	SUCCESS FACTORS			
29.	<input checked="" type="checkbox"/>	BENEFITS DELIVERED			
30.	<input checked="" type="checkbox"/>	MEASURABLE IMPACT			
PART D: IMPLEMENTATION PLAN					
31.	<input checked="" type="checkbox"/>	IMPLEMENTATION PLAN	<input checked="" type="checkbox"/>	Table 5	
32.	<input checked="" type="checkbox"/>	SCENARIOS			
33.	<input checked="" type="checkbox"/>	SPV	<input checked="" type="checkbox"/>	Table 6	<input checked="" type="checkbox"/> 7 DOCUMENTS
34.	<input checked="" type="checkbox"/>	CONVERGENCE	<input checked="" type="checkbox"/>	Table 7	
35.	<input checked="" type="checkbox"/>	PPP	<input checked="" type="checkbox"/>	Table 8	
36.	<input checked="" type="checkbox"/>	STAKEHOLDER ROLES			
PART E: FINANCIAL PLAN					
37.	<input checked="" type="checkbox"/>	ITEMISED COSTS			
38.	<input checked="" type="checkbox"/>	RESOURCES PLAN			
39.	<input checked="" type="checkbox"/>	COSTS			
40.	<input checked="" type="checkbox"/>	REVENUE AND PAY-BACK			
41.	<input checked="" type="checkbox"/>	RECOVERY OF O&M			
42.	<input checked="" type="checkbox"/>	FINANCIAL TIMELINE			
43.	<input checked="" type="checkbox"/>	FALL-BACK PLAN			
ANNEXURE 1		Smart City features			
ANNEXURE 2		A-3 sheets (self-assessment)			
ANNEXURE 3		max 20 sheets (A-4 and A-3)			
ANNEXURE 4		Documents for Question 33			

INSTRUCTIONS

1. This document must be read along with the Smart City Mission Guidelines. An electronic version of the SCPformat is also available on the website <smartcities.gov.in> Follow: 'Downloads' > 'Memos'.
2. The responses must be within the word limits given. The font size must be 12 Arial, with 1.5 spacing, left aligned paragraphs with one inch margins. All additional information must be given in 20 nos. A-4 size pages in Annexure 3.
3. For the Area-Based Proposal, only one 'Area' should be selected. The Area selected can be a combination of one or more types of area-based developments. This can be retrofitting or redevelopment or greenfield alone or a combination of these, but the area delineated should be contiguous and not at separate locations in the city.
4. The Area-based Development must contain all the Essential Features as per para 6.2 of the Mission Guidelines. Please fill out the following checklist.

S. No	Essential Feature	Confirm if included (✓)	Para. No. in SCP
1.	Assured electricity supply with at least 10% of the Smart City's energy requirement coming from solar	<input checked="" type="checkbox"/>	Q.16: Para1,2
2.	Adequate water supply including waste water recycling and storm water reuse	<input checked="" type="checkbox"/>	Q.16: Para 3,4
3.	Sanitation including solid waste management	<input checked="" type="checkbox"/>	Q.16: Para 5
4.	Rain water harvesting	<input checked="" type="checkbox"/>	Q.16: Para 6
5.	Smart metering	<input checked="" type="checkbox"/>	Q.16: Para 7
6.	Robust IT connectivity and digitalization	<input checked="" type="checkbox"/>	Q16: Para 8
7.	Pedestrian friendly pathways	<input checked="" type="checkbox"/>	Q.16: Para 9
8.	Encouragement to non-motorised transport (e.g. walking and cycling)	<input checked="" type="checkbox"/>	Q.16: Para 10
9.	Intelligent traffic management	<input checked="" type="checkbox"/>	Q.16: Para 11
10.	Non-vehicle streets/zones	<input checked="" type="checkbox"/>	Q.16: Para12
11.	Smart parking	<input checked="" type="checkbox"/>	Q.16: Para 13
12.	Energy efficient street lighting	<input checked="" type="checkbox"/>	Q.16: Para 14

13.	Innovative use of open spaces	<input checked="" type="checkbox"/>	Q.16: Para 15
14.	Visible improvement in the Area	<input checked="" type="checkbox"/>	Q.16: Para 16
15.	Safety of citizens especially children, women and elderly	<input checked="" type="checkbox"/>	Q.16: Para 17 (1),(2)
16.	At least 80% buildings (in redevelopment and green-field) should be energy efficient and green buildings	<input type="checkbox"/>	
17.	In green-field development, if housing is provided, at least 15% should be in 'affordable housing' category.	<input type="checkbox"/>	
18.	Additional 'smart' applications, if any	<input checked="" type="checkbox"/>	Q.18 a(2),(3): ABB Card, e-SPV

5. The pan-city Smart Solution should be IT enabled and improve governance or public services. Cities may propose one or two such Smart Solution(s). If more than one solution is presented kindly use supplementary template 'Pan-City Proposal No 2'.

6. In order to make the proposal credible, all claims must be supported with government order, council resolutions, legal changes, etc and such supporting documents must be attached as Annexure 4.

7. The Questions can be answered directly in this editable PDF file and can be saved on local computer, before printing. Your submission in electronic form should contain:

1. The SCP in whole (92) pages
2. The Self Assessment Sheet (Annexure 2)
3. Additional 20 Sheets (Annexure 3)
4. Additional list of Documents (Annexure 4)

Electronic submission to be sent on DVD along with printed copies. 5 printed copies of the SCP document (complete in all respect) should be sent to MoUD along with the DVD containing the complete electronic copy. The printed copies should be spiral bound as separate volumes.

It is advised to use latest version of Acrobat Reader (Acrobat XI or higher) to fill the form.

Acrobat Reader XI can be downloaded from:

<https://www.adobe.com/support/downloads/thankyou.jsp?ftpID=5507&fileID=5519>

SCORING DIVISION

<u>TOTAL 100 POINTS</u>	
CITY-LEVEL:	30
AREA-BASED DEVELOPMENT:	55
PAN-CITY SOLUTION:	15

CITY LEVEL CRITERIA: 30%

S.No.	Criteria	%
1.	Vision and goals	5
2.	Strategic plan	10
3.	Citizen engagement	10
4.	Baseline, KPIs, self-assessment and potential for improvement	5

AREA-BASED DEVELOPMENT (ABD): 55%

S.No.	Criteria	%
1.	'Smartness' of proposal	7
2.	Citizen engagement	5
3.	Results orientation	15
4.	Process followed	3
5.	Implementation framework, including feasibility and cost-effectiveness	25

PAN-CITY SOLUTION: 15%

(If more than one solution is proposed, each proposed solution will be graded separately and the average of the two aggregate scores will be awarded to the city toward the 15% overall weightage)

S.No.	Criteria	%
1.	'Smartness' of solution	3
2.	Citizen engagement	1
3.	Results orientation	5
4.	Process followed	1
5.	Implementation framework, including feasibility and cost-effectiveness	5

A. CITY PROFILE

1. QUALITY OF LIFE

In the last three years, what efforts have been made by the city to improve livability, sustainability and economic development? Give specific examples along with improvement with KPIs that are in the public domain and/ or can be validated. Your answer should cover, but not be restricted to (Describe in max. 50 words each, mentioning the source of the data):

a. Transportation condition in the city

- Pune relies solely on buses for public transportation. Detailed roadmap created for 98 km of an integrated BRT system, of which 8 km is already functional, with good daily ridership of 30,000. Another 14 km will be functional by January 2016. 660 buses have been hired by the PMPML for the BRT corridors. Intelligent traffic management system (ITMS) has been installed in 220 buses (PIS, two-way communication, control centre). Online ticketing rolled out based on Common Mobility Card Guidelines. 464 new bus shelters were installed and 2 new depots will be functional.
- 100 km of roads and 200 km of footpaths have been constructed (Ref.1)
- Two metro lines totaling 31 km have been approved by Government of India

b. Water availability in the city and reduction in water wastage/ NRW

Pune has sufficient water at aggregate level—1,250 mn liters per day, or 219 lpd per citizen. The focus has been to improve supply and reduce leakages. It addresses 95% of visual leakages in 24 hrs with a 75 member team. Commissioned New Warje WTP (200 MLD) in 2015; about to complete Vadgaon WTP (125 MLD); construction of Parvati WTP (500 MLD) is going on in full swing. About to complete laying of 12kms long supply line from Khadakwasla dam to Parvati WTP. Construction of jackwell in Khadakwasla dam is in final stages. Initiated systems for online collection of water bills; received approval to kick off drive to regularize illegal water connections. Constructed 3 new reservoirs at Kharadi, Katraj and Bakri Hill.

c. Solid waste management programs in the city

- Significant progress under Swachh Bharat - featured as model city in the GOI newsletter, https://swachhbharaturban.gov.in/writereaddata/SBM_newsletter.pdf
- Increase in segregation from 23.8 percent in 2012 to 57.2 percent by 2015 and in collection efficiency from 70.9 percent in 2012 to 90 percent in 2015. Door-to-door collection is underway in 15 prabhags and 15 prabhags have zero waste
- PMC is in process to sign contracts with SWaCH and Janwani to improve collection efficiency in slums from 35% to 100%.
- 100 percent scientific disposal since 2010 and no open dumping – scientific land filling and capping

d. Safety/ security conditions in the city

- Pune's share of crimes (for million-plus cities) has come down from 2.6 percent in 2012 to 2.3 percent in 2014.
- First city in Maharashtra to have 24x7 surveillance using around 1,300 CCTV cameras.
- Apps used to check registration details of vehicles on a real-time basis.
- Automatic number plate recognition (ANPR) cameras used to identify stolen cars.
- Social media services used to connect and communicate with citizens.

e. Energy availability and reduction of outages in the city

- 98 percent households have electricity connections, as compared to 93 percent for urban India
- Pune has 90 percent billing efficiency and collection efficiency has increased from 97% in 2013 to 99.7% in 2015
- Aggregate technical and commercial (AT&C) losses are low at 9.8 percent, as compared to overall utility (Maharashtra State Electricity Distribution Company Limited [MSEDCL]) losses at around 25 percent.
- The Pune Municipal Corporation doesn't have official load-shedding schedule
- Promotion of solar energy - solar water heating compulsory in certain buildings in DC

f. Housing situation in the city, specifically role of municipality in expediting building plan approvals, enhancing property tax collection, etc

- 85% coverage ratio of properties under the property tax net has been achieved 99%
- Property tax increased from nearly INR 293 cr in 2011 to around INR 550 cr by 2014.
- Slum Rehabilitation Authority has completed 38 projects till now, 21 over the last 3 years, targeting 7176 tenements. 34 projects are currently going on targeting 10,092 tenements
- Permission time has been reduced from around 45–50 days to 21 days through the automated building plan approval system.
- 6.7 mn sq ft of new floor space index (FSI) was approved in 2014–15.

2. ADMINISTRATIVE EFFICIENCY

In the last three years, what have been the changes in Administrative Efficiency due to the use of Information and Communication Technology (ICT) (Describe in max. 50 words each, mentioning the source of the data):

a. Overall attendance of functionaries

- Initiated biometric attendance system in 2011 for all ~13,000 employees of PMC
- Provided PMC employees with information on software, hardware drivers, orders, GRs, quick links to frequently used portals, font-conversion tools (Marathi to English and vice versa), daily announcements via department scorecards, smartgov newsletters, smartgov website and the smartgov roadmap
- Arranged for continuous evaluation of department-wise service level benchmarks (SLBs) and highlighted key areas for improvements updated regularly
- Started departmental scorecards, smartgov newsletter, smartgov website/ roadmap

b. Two-way communication between citizens and administration

- Online engagement with PuneKars through Facebook page, YouTube channel, Instagram page, Monthly newsletter, website, twitter and apps.
- Developed online Complaint Management System for citizens to raise their grievances, supported by tracking of status through SMS and e-mails to citizens
- Provided PMC connect portal for citizens to obtain information on community-level facilities, property tax, etc. This is facilitated with SMS feedback from PMC
- Public views, opinions, updates, and feedbacks are welcomed through emails. Plan to facilitate citizen-to-administration communication through development of a citizen-centric call center and app

c. Use of e-Gov to enable hassle free access to statutory documents

- PMC website hosts all important communications, notifications and citizen-centric forms
- PMC shares major statutory documents on its website, e.g., Development plan (DP), annual budgets, property tax, detailed project report (DPR), expression of interest (EOI) and tendering, recruitment related information, RTI monthly reports, e-newsletter, contact information, elections details, right to services and citizens' charter
- Consequently, efficiency has increased significantly - 1.5 mn downloads of the old DP over the last 3 years; online payment of property tax increased from 47 crore in 2012-13 to 123 crore for the first 6 months of the current fiscal

d. Dashboards that integrate analytics and visualization of data

- Track key indicators of the property tax department, e.g., target, status of property tax collection and collection by each inspector via a centralized dashboard
- Requisite management information system (MIS) details of all welfare schemes administered through the urban community development (UCD) department, represented on the UCD dashboard
- Requisite MIS details of all marriage registration approvals issued through PMC's 15 ward offices, represented on the marriage registration dashboard.
- Single-click information availability and analysis facilitated through integration of multiple dashboards to be started in the 2-3 months

e. Availability of basic information relevant to citizens

- All basic information involving DP, annual budgets, property tax, DCR, EOI and tendering, recruitment-related information, RTI monthly reports, e-newsletter, contact information, etc. are available on the PMC web portal.
- Information available through mobile apps and call center with good reach
- Basic information provided through FAQs and the RTI section (4)
- Telephone directory of officers, with details like name, designation, phone numbers is published and frequently updated on the website:
punecorporation.org/informpdf/TelephoneBill/Telephone_Directory_June_2015.pdf
- Until now, PMC website has received 5.7 million unique visitors over the last 3 years

3. SWOT

Based on the detailed city profiling, what are the strengths and developmental areas of the city?

Conduct a detailed SWOT analysis of the city with all relevant metrics and data. (max 1000 words):

Strengths of Pune

Pune has been able to create one of the strongest human capital and economic growth engines among Indian cities. With 811 colleges, it is often called the “Oxford of the East”. This has resulted in more than 30% graduate workforce, which has triggered the IT revolution in the city. Almost all of the top IT companies in the country have their presence here, making it the 2nd biggest software hub in the country. The city also has a strong manufacturing base across auto and engineering. Thus, Pune is among the top five foreign direct investment (FDI) destinations in India. It is also one of the successful start-up destinations in India with more than 400 local start-ups.

Pune’s educated citizens have also been instrumental in driving participative governance, which is again one of the best across Indian cities. Pune City Connect is a forum to bring corporates and eminent citizens together to work on corporate social responsibility (CSR) activities on city-level issues.

Pune has sufficient water at aggregate level (1,250 mld). Citizens get average water of 220 lpd, which is much higher than the 150 lpd benchmark (as compared to other cities like Delhi, Chennai and Hyderabad). Pune also has a comfortable climate with temperatures ranging from 12 to 38 degrees Celsius. The city is also called the cultural capital of Maharashtra, with a thriving arts and culture centre. It was the seat of power of Deccan India during the Peshwas in the 17th and 18th centuries and has promoted arts and literature ever since.

Encouraged by this, Pune Municipal Corporation (PMC) has also been at the forefront to deliver core urban services well. The city today has 94 percent households with tap water (71 percent for urban India), 57 percent MSW segregation (highest in India), 97 percent population covered by sewage systems (63 percent for urban India), 220 lpd water (highest in India among top 10 cities), and 98 percent electricity coverage with no load-shedding. PMC spent INR 9,461 per citizen in 2013–14 (3rd highest in India after Delhi and Mumbai). It has been the leading city under the Swachh Bharat Abhiyan.

PMC has also been able to manage its finances well and has recently received an AA rating from Fitch—an independent testimony to its strong balance sheet and fiscal prudence.

Areas of improvement

While Pune has been able to deliver on most core urban services, top most area which needs significant improvement is mobility.

A significant rise in the number of private vehicles and the lack of public transportation options have led to massive congestions across the city, with an average speed of 18 kmph. Pune is the only city among the top eight in the country without a mass rapid transit system (MRTS). The average number of buses per lakh population is only 37, compared to the benchmark of 55. This has resulted in 18 percent share of public transportation vs the 50 percent benchmark. The city has also grown radially, with most new job opportunities in IT and manufacturing being created on its outskirts. This has increased the average trip length to 10 km (Ref. 2), with 30 percent of bypass traffic going through the heart of the city. A lack of ring roads makes matters worse. While 50 percent of the commute is less than 5 km, limited non-motorised transport (NMT) options for pedestrians and cyclists has discouraged usage.

Also, while there is abundant water at an aggregate level, inequality of water distribution among citizens is a challenge. Around 85 percent of citizens get more than 150 litres per capita, per day (lpcd) benchmark whereas 14 percent of citizens get less than the stipulated amount on daily basis. This is driven by the lack of infrastructure (e.g., reservoirs, pipelines) in certain regions, about 30 to 35 percent non-revenue water (NRW) due to internal leakages and lack of water metering leading to excess consumption.

The housing challenge also needs to be addressed. Twenty-eight percent of the city's households live in slums (compared to 17 percent for national average).

Finally, while Pune was earlier known for its dense tree cover and good environment, urbanization has taken a toll on the liveability and sustainability parameters. Air quality (PM10 levels) in Pune stands at 91 compared to the ideal state of 60. Upto 355 mld untreated sewage is discharged into the Mula-Mutha river, which has biochemical oxygen demand (BOD) levels of 50 to 80. Sound pollution, driven by congestion, is one of the highest among top Indian cities. With its unplanned growth, Pune lacks the benchmark levels of open spaces (7 percent vs 15 percent).

Opportunities going forward and further threats that must be addressed

Pune must capitalize on its human capital and economic prowess to leapfrog to be one of the top investment destinations in Asia. With India continuing to grow at 7 to 8 percent for the next decade, Pune should attract investments coming to India for high-end jobs. It has the necessary human capital to be the destination for high-end jobs, such as technology start-ups, high-end IT, R&D and innovation labs for manufacturing companies. This will also trigger job creation in the city, which has not happened in the last decade, and will address the issue of lack of mixed-use development, reducing lead distances to work and promoting walk-to-work.

One of the critical enablers of job creation will be the ease of doing business. Pune must capitalize on and further improve its good governance to become one of the top 10 cities on the parameter of ease of doing business.

It could also make the most of its rich natural and cultural heritage to build a vibrant city besides being economically strong. With three rivers, Pune has the potential to develop its riverside tourism in the manner of other global cities like Seoul, London and Amsterdam.

Finally, as Pune grows into an economical and cultural powerhouse, urbanization rates will intensify significantly, putting severe pressure on the already stretched infrastructure. As per proprietary econometric models, the population is likely to increase from 3.5 mn today to about 5 mn by 2030 (Ref. 3) . If suitable measures are not taken, the urban infrastructure will collapse. Peak hour traffic speed will come down from 18kmph to 10-12 kmph by 2030 (Ref. 4).

To meet future infrastructure needs, Pune will need to invest INR 50,000-55,000 cr in the next 15 years (Ref. 5). It must also leverage its existing assets (e.g., land monetization) and create mechanisms to borrow from the market to meet its infrastructure funding needs.

4. STRATEGIC FOCUS AND BLUEPRINT

Based on the SWOT analysis, what should be the strategic focus of the city and the strategic blueprint for its development over next 5-10 years to make it more livable and sustainable? (max 500 words):

Based on the SWOT analysis, Pune has come up with five strategic requirements:

1. Fix core urban infrastructure and make it “future-proof”

Using proprietary econometric model, PMC will require around 2500 cr per year (capex + opex) up to 2030 to completely overhaul and fix its infrastructure (Exhibit 1) (Note: this is assuming that PMC contributes 10% for metro, 60% for additional buses and nothing on ring roads, with funds coming from other sources for the balance) (Ref. 6). As strategy, PMC will think proactively to fix infrastructure for the future. Most cities do not take into account urbanization and population growth, thus creating infrastructure that always lags demand.

Besides a long-term fix, the city would also like to move quickly in the next five years and fix infrastructure as much as possible, with all “less is more” (e.g. junction/ street design) and ICT solutions implemented along with significant progress in BRT (70 km in 5 years), ring road (2 done in 5 years) and metro (phase 1 - 31 km done in 5 years). A comprehensive framework has been drawn for the core sectors, e.g., mobility and water (Exhibits 2 and 3). Pune will also need to fix the housing challenge with 20,000 cr required for affordable and mass housing in the next 5 years (5000 cr for slums).

2. Leverage multiple sources of funds to fulfil long-term infrastructure demand

Funding INR 2,500 cr of opex + capex every year for next 15 years will require multiple sources, e.g., government missions, own funds, debt and public-private partnership (PPP). PMC has created a detailed roadmap consisting of current capex plan (1400 cr per year), land monetization (1250-1450 cr per year), other government missions (500-700 cr per year), debt and PPP (1000-1200 cr per year). PMC has drawn a detailed plan to monetize its own land every year (Exhibit 4) (Ref. 7). PMC has been rated AA by Fitch and has also moved ahead to create a separate, ring-fenced infrastructure fund (a first of its kind in India). This will help Pune to borrow from the market at attractive rates.

3. Transform Pune into the most liveable city in India

In addition to fixing infrastructure, Pune will also upgrade its neighbourhoods to world-class livability standards in a phased manner, starting with the local area development pilot. This would be a holistic transformation of neighbourhoods across core infrastructure, social infrastructure (e.g., schools, healthcare), livability parameters (e.g., open spaces, pollution control, recreation options), resource productivity, e.g., (ICT solutions), sustainability (e.g., recycling, energy efficiency), and neighbourhood governance through a suite of citizen and business interfacing solutions.

continue on next page

A detailed roadmap has been created in the proposal for the local area selected, which will be replicated across Pune. This would require funds of INR 1,500 cr to 2,000 cr per neighbourhood.

4. Focus on creating sufficient high-end jobs to leverage Pune's human capital

In order to remain a leading IT services and manufacturing city, Pune will need to create at least 500,000 jobs in the heart of the city (Ref. 8), in technology start-ups, high-end IT, R&D and innovation labs in manufacturing. An exclusive start-up zone will be created in Pune to trigger the next wave of the start-up revolution. While Pune has one of the largest numbers of start-ups in India, their success rate is relatively low due to lack of incubators, accelerators and early-stage venture capital (VC) funds. PMC will try to create a complete ecosystem through the proposed start-up hub. An initial roadmap has already been drawn in the local area, in collaboration with Microsoft Incubator and Future Cities Catapult to accelerate urban ideas.

5. Build city attractiveness further through iconic riverfront development

Leveraging on Pune's strength of multiple riverfronts, PMC will endeavour to fully clean the rivers and develop them as attractive recreational destinations. This could be a strong distinguishing factor vis-à-vis other cities. The National River Conservation Fund to the tune of 900 Cr has been approved by the Govt of India for river cleaning, while the contract for consultancy for the riverfront development has been issued to HCP consultants to create a detailed master plan (which drove Sabarmati riverfront development)

5. CITY VISION AND GOALS

What should be the vision of the city based on the strategic blueprint? How does the Vision Statement relate specifically to the city's profile and the unique challenges and opportunities present in your city?

Define overall aspirations and goals for the city along with how you see key metrics of livability and sustainability improving over the next 5-10 years? (max 1000 words):

Pune: the most liveable city in India!

Leveraging its rich cultural and natural heritage, strong human capital and strong business environment as key strengths, Pune aspires to become one of the most liveable cities in India by solving its core infrastructure issues in a "future-proof" way, and by making its neighbourhoods beautiful, clean, green and liveable.

Both extensive citizen inputs (detailed in the next question) and city profiling were taken into account when defining this vision. As described in the previous two questions, this three-part blueprint is a true reflection of Pune's unique profile, opportunities and challenges:

A. Leverage the rich cultural and natural heritage, strong human capital and effective business environment as key strengths:

- **Make riverfronts clean, green and iconic:** Pune-kars love their riverfront. In the citizen survey on specific goals, clean rivers and water bodies along with zero discharge of unauthorized water featured among top priorities. One of the visions of Pune, then, will be to develop its large riverfront along three rivers. Bimal Patel of HCP Consultants, one of the top urban planners (redeveloped Sabarmati riverfront), has already been engaged. A key short-term goal will be to develop 3.5 km of riverfront in the selected local area under Smart Cities Mission (SCM), which will be replicated across the city.

- **Create 500,000 high-end jobs in the start-up hub and other locations within the core city:** With more than 10 km of lead travel and slowing speed of traffic, Pune-kars are feeling the commute challenge in a city that is growing radially. Creating at least 0.5 million high-end jobs in the heart of the city will be one of the key goals. As the first step, PMC wants to create at least 40,000 to 45,000 jobs in the start-up hub of ABB, which will be the catalyst for mixed-use development across Pune and promote walk-to-work.

- **Become one of the top 10 cities in the ease of doing business and e-governance parameters:** With a high-performing municipality that has been able to perform well in most urban services and has leveraged ICT to improve citizen services and interaction, the next challenge is to significantly improve the ease of doing business and e-governance, to be at par with top 10 cities worldwide. As the first step, the special purpose vehicle (SPV) in the local area (ABB) will implement five specific solutions end-to-end, which could be replicated across the city.

B. Solve core infrastructure issues in a “future-proof” way:

■ Solve mobility challenge: this is critical since mobility is #1 issue in both citizen engagement and desk profile. The aspirations on transportation include

- Increased use of public transportation from 18 to 30% in 5 years and to benchmark 50% by 2030

- Fully implementing all ICT solutions in 5 years – ITMS and adaptive traffic control
- Fully implementing all “less is more” non-ICT solutions – street, junction and footpath redesign – in 5 years

- Moving significantly in public transportation options in 5 years (30 km BRT, 31 km metro) with aspiration to complete balance metro (44 km) by 2025

- Creation of 2 ring roads in next 5 years to address 50% bypass traffic

- Increase trip share of NMT to 40 percent with PBS and walkable footpaths

■ Provide equitable water across Pune: Capitalizing on Pune’s water abundance, one of the key goals will be to ensure at least 150 lpcd of water to 100 percent of citizens 24x7. Like transportation, this will also require a holistic set of solutions, both short-term and long-term. The ICT solutions will be driven under the Smart City framework. Specific goals in water and sewerage include:

- Provide 100 percent of citizens with 150 lpcd water 24x7

- Reduce leakage and NRW from 30 to 15 percent

- Increase in reservoir storage capacity from 23 to 33 percent

- Coverage of 100 percent of city by sewage network (as compared to the current 91.3 percent)

- Treat 100 percent of waste water (up from 64 percent), and usage recycled water by industries, railways and the construction

■ Taking other core infrastructure from “good to great”:

While Pune has done well compared to other cities on many dimensions of core urban infrastructure, it will still need to work on them to fulfil its aspiration of becoming one of the most liveable cities in India. Specific goals include:

Swachh Pune Mission

- 100 percent segregation at source (currently 57 percent) and efficient ITMS-enabled solid-waste management (SWM) system with 100 percent of waste recycled and all organic waste used for energy generation. 100 percent of slums to be covered by SWM services (30 percent currently)

- 100 percent of population to have access to toilets (from 96.5 percent currently), with 29,000 toilets built over the next two years

- Clean streets and public spaces with smart bins at every 300 metre (m)

Energy

- Smart grid set-up with net metering across the entire city

- All new buildings in city to be energy efficient and green

- Smart public lighting to reduce consumption by 15 to 20 percent

- Solar usage in neighbourhoods to be at least 15 to 20 percent

Housing

– Making Pune slum-free by 2025 by constructing 20,000 affordable houses every year, for the next 10 years

Safety and security

– While Pune already has extensive CCTV surveillance, the vision will be to make it fully “crime-free” by enhancing surveillance further and providing emergency help

All these will be driven in the local area and then replicated across the city.

C. Making its neighbourhoods beautiful, clean, green and fully liveable

With “clean”, “beautiful” and “green” featuring as the top three adjectives in Pune-kars’ visioning exercise, the idea will be to transform all neighbourhoods on these dimensions, by first driving change in the local area and then replicating it across the city. Specific goals include:

- Increasing open space from the 7 percent to the 15 percent benchmark
- Developing adequate number of parks and doing open space innovation
- Making all neighbourhoods zero garbage through waste segregation and disposal systems
- Beautifying certain streets and creating go-to recreation zones in waterfront development

6. CITIZEN ENGAGEMENT

How has city leveraged citizen engagement as a tool to define its vision and goals? Specifically describe (max 150 words each):

a. Extent of citizens involved in shaping vision and goals

Pune engaged citizens in what is perhaps one of the largest envisioning exercises in the history of Indian cities. The entire administrative machinery along with an ecosystem of the media, NGOs and private companies reached out to over 4 lakh households, i.e., about 50 percent of Pune's total households. This was done in a true pan-city manner, covering all 15 wards across the city in a door-to-door campaign by 1,50,000 "smart volunteers". The smart volunteers were supported by a team of 400 members across the public and private sectors.

More than 35 lakh inputs were received from the citizens across the city. In addition, there was significant citizen involvement through the internet and social media. An exclusive website was set up, where the entire citizen engagement strategy and interactive forms were created, to get citizen inputs on vision and goals. Also, Pune created Twitter and Facebook pages for Pune Smart City, which were highly successful with ~16,000 tweets and 5,095 likes. The extent of citizen engagement is seen in Exhibit 5.

b. Engagement strategy to get best results from citizens

Pune's engagement strategy to get best results had three highlights:

- Structured five-phase approach for pan-city: a) Envision (17–28 September): create vision, identify top issues; b) Diagnose (28 September–12 October): Identify goals within priority sectors; c) Co-create (13–23 October): specific solutions for prioritized goals; d) Refine (23–28 October): Refinement with citizens' inputs in mini-labs; and e) Share (15 November–15 December): Final set of solutions shared for inputs

- Structured four-phase approach for local area development (LAD): a) Explore (citizen surveys); b) Syndicate (through public representatives); c) Learn (citizen consultations) and Design (urban planner interaction)

- Use of "Five-S" principle: a) Speed: Tight 100-day process; b) Scale: Outreach to 50 percent citizens; c) Structure: Phased approach; d) Solutioning: Crowd-sourcing to identify solutions; and e) Social audit: Citizen syndication

- Create ecosystem of partners: team of 400 members comprising PMC, corporates, NGOs, citizen groups, industry associations, consulting firms, schools, colleges, media and eminent citizens was formed

- 24x7 war room to drive citizen engagement with five cells: a) Campaign management; b) Response management; c) Analytics; d) Creative management; and e) Documentation management

c. Different means of citizen engagement adopted

Pune focused on five different modes of citizen engagement:

A. Face-to-face

1. Door-to-door visits and citizen engagement by PMC employees and volunteers to get forms filled
2. Camps in schools, colleges, companies, slums
3. Crowd-sourcing ideas in Ganesh Mandals during the Ganesh Chaturthi Festival

B. Digital and online

1. Pune Smart City web portal—punesmartcity.in
2. E-seva kendras and ward offices across the city with Smart City access
3. Computer labs in schools and colleges opened to citizens
4. Twitter handles and Facebook page, apps for smartphones, WhatsApp, missed calls

C. Competitions for crowdsourcing of ideas and creativity

1. Essay, logo and mascot-design competitions in English and Marathi newspapers
2. Area development competition for students from architecture colleges
3. Digital “Hackathon” conducted across 60 engineering colleges
4. “Smart family” and “Smart citizen” initiatives

D. Publicity and advertising

Hoardings and banners, interviews on media, “Gallery walk” set up in the war room to make citizens aware of the Smart City initiative, advertisements on the FM radio, local cable, newspapers

d. Extent of coverage of citizen engagement in different media and channels

Total 34 lakh inputs received from citizens:

Offline

1. Face-to-face: All wards across PMC performed citizen engagement exercise with 4 lakh households giving inputs
2. Discussions: More than 100 meetings with different groups from Pune stakeholder grid
3. Extensive usage of broadcasting channels: Through newspapers, FM radio, essay competitions, open houses
4. Others: Missed call on citizen support: total 60K, Essay competition: 300 entries, essay competition for blind students, Happy street event participation in local area

Online (Exhibit 5)

1. Portal: 1.5 lakh registrations on the Pune Smart City portal within one month
2. Facebook: 2,20,717 digital audience along with 5,095 likes, 727 posts and 508 shares of broadcasted messages
3. Twitter: 4,279,624 impressions and reach of 2,228,603 through 5,569 tweets and 10,118 retweets in two months
4. Mobile apps: More than 6,700 responses with 1,355 downloads and 939 ideas received from citizens
5. YouTube: Broadcasts received 21,767 views and 3,951 likes
6. WhatsApp and missed call services

e. Incorporation of citizen inputs in overall vision

■ Based on citizen inputs from more than 50 percent households, two word clouds were created for: a) Vision and b) Major issues facing citizens (Exhibit 6). The top three vision words—clean, beautiful and green—feature in the overall vision for Pune. Also, the top issues—transport, water and other core infrastructure issues—feature in the overall vision of Pune. Initiatives selected under pan-city development fully reflect this.

■ Thereafter, citizens were engaged with to identify specific goals within these sectors. A location based heat map for issues is depicted in Exhibit 7 & 8. Top goals identified by the citizens are mentioned in Exhibit 8. The overall plan for Pune is fully in line with solving these specific issues.

■ Ideas were then crowd-sourced through discussion forums on the portal. Transport received maximum number of solutions (43.6 percent) followed by water and sewage (15.1 percent) and SWM (14.4 percent)

■ Solutions proposed by the citizens were further refined with inputs from experts, solution providers, NGOs and people representatives through four mini-labs, and finally, the Smart City Proposal (SCP) was shared with citizens. In an unprecedented support, 7.5 lakh citizens pledged their support to Pune's SCP through signature campaigns in both offline and online modes.

7. SELF-ASSESSMENT: BASELINE

Define the baseline for your city based on self-assessment criteria given in Annexure 2 (column 'H'). Marks will be awarded based on how well you know your city (Fill column 'I' in the self assessment sheet in Annexure 2 with as many KPIs and "hard metrics" as possible; max 50 words per cell)

Note: Attach Annexure 2

8. SELF-ASSESSMENT: ASPIRATIONS & IMPERATIVES

Emerging from the vision statement, assess the qualitative or quantifiable outcomes that need to be achieved for each of the Smart City Features described in Annexure 2 (column 'J'). In column 'K' describe the biggest single initiative/solution that would get each feature of the city to achieve 'advanced' characteristics (eg. increasing share of renewable energy generation in the city by X percent). Note that a single initiative/solution may impact a number of features (eg. improved management of public spaces may ease congestion on roads as well as improve public health). (Fill in Annexure 2; max 50 words per cell)

Note: Attach Annexure 2

B. AREA-BASED PROPOSAL

The area-based proposal is the key element of the proposal. An area-based proposal will identify an area of the city that has been selected through desk research, analysis, meetings with public representatives, prominent citizens, and citizen engagement, as the appropriate site for either of three types of development: retrofitting (approx. 500 acres), redevelopment (approx. 50 acres) or Greenfield development (approx. 250 acres). This area will be developed into a 'smart' area, which incorporates all the Essential Features/Elements prescribed in the Mission Guidelines and any additional features that are deemed to be necessary and appropriate.

Mapping of information and data is a key part of your Smart City Proposal. Create a suitable Base Map of your city with all the relevant systems and networks as they exist today, showing its physical, administrative and other characteristics, such as natural features, heritage areas, areas prone to flooding, slums, etc. The base map should show the regional context in which your city is located and should contain the spatial and physical layout/morphology of your city, the street network, the open and green spaces, the geographical features and landmarks and the infrastructure, including for transportation, water supply, sewerage, electricity distribution and generation, and so on.

Using the base map, represent, with the most effective method available, as much information and data about the 'Area' selected for area-based development. **Only one 'Area' should be selected and attached in the form of a map containing the spatial and physical layout/morphology of the Area, the street network, the open and green spaces, the geographical features and landmarks and the infrastructure, including for transportation, water supply, sewerage, electricity distribution and generation, and so on.** The Essential Elements and additional features that are proposed to be part of the area-based development should be included. Describe, using mainly graphic means (maps, diagrams, pictures, etc.) the proposed area-based development, including the project boundaries, connectivity, significant relationships, etc.

(max. 2 nos. of A-3 size sheets)

9. SUMMARY

Summarize your idea for an area-based development. (max. 100 words)

Pune's idea is to invest 2,200 cr in 5 years in selected local area (Aundh-Baner-Balewadi (ABB)) to fully transform liveability across all dimensions so that it matches best-in-class global cities. Also, the transformation should be able to sustain 4x population growth by 2030 (40,000 to 150,000 by 2030). Some key investments and outcomes are:

- Mobility: 100 e-buses, 8 km BRT route, overhaul of 54 bus stops, 100 e-rickshaws; 42 km of bicycle tracks, 60 km of footpath redesign – increase average speed by 5 kmph and public transport usage from 18% to 40% due to this
- Water: reduce water deficient areas from 65% to zero by building 7 reservoirs, 50 km pipelines, 10% recycling and 100% smart meters
- Open space: 4 to 10% increase through 13 parks and 3.4 km riverfront development
- Employment: Increase jobs from 10,000 to 45,000 through start-up hub and more commercial offices to make area mixed use and promoting walk-to-work.
- Citizen services: a suite of citizen services/ e-governance (single window desk, integrated citizen desk, ABB Punetel card)

A self-sufficient funding plan has been created to meet this ambitious plan. Also, a summary of “hard outcomes” that this plan aspires to achieve is in Exhibit 12.

10. APPROACH & METHODOLOGY

What is the approach and methodology followed in selecting/identifying the area-based development?

Describe the reasons for your choice based on the following (max. 1000 words):

- a. The city profile
- b. Citizen opinion and engagement
- c. Opinion of the elected representatives
- d. Discussion with urban planners and sector experts
- e. Discussion with suppliers/ partners

How could the entire city select a local area in an objective and transparent manner in the fastest possible time? Pune was one of the first cities to achieve this feat in October itself, which enabled the development of detailed solutions and funding.

Two things made this possible:

1. Objective criteria:

Well thought-out criteria were followed at every stage—city profiling, citizen engagement, discussions with elected representatives, and discussions with urban planners.

For example, while selecting options among retrofitting, redevelopment or greenfield development, retrofit was chosen because:

- a) It had far better replicability across the entire city.
- b) A larger area (1,000 acres) can be covered, impacting most citizens in the pilot phase itself.
- c) The time to impact is relatively shorter compared to greenfield or redevelopment.

d) The cost of retrofitting is relatively lower compared to greenfield or redevelopment these need much more hard infrastructure. This makes implementation far more feasible.

Once retrofit was identified as Pune's imperative, 10 objective criteria were identified for area selection:

1. Ease of replicability
2. Ease of implementation
3. Criticality to the city
4. Future development potential
5. Number of people impacted (population density)
6. Scope for mixed-use development
7. Critical to city's identity/heritage
8. Scope for inclusive transition
9. Existing degree of liveability
10. Scope for sustainable development

Exhibit 9 details the 11 contiguous areas that were shortlisted across Pune after applying these criteria. This was the result of detailed desk research to scrutinize each area on these 10 parameters.

Post identification, 10 urban planners locked themselves up with city authorities for multiple workshops to make their choice. Exhibit 10.1 details out the outcome of this exercise with urban planners, where they scored each area objectively.

Similarly, even for citizen engagement, objective, simplified criteria were used (unlike most cities which merely asked citizens to choose). Exhibit 10.2 shows the outcome of the citizen engagement effort for the local area.

The output of the citizen engagement and urban planning exercises was shared with elected representatives, who facilitated and expedited the selection process.

As the exhibits show, ABB emerged as a top choice in a fair, transparent way. This gave Pune significant strength to drive the LAD agenda in a full-fledged manner.

2. Scale of engagement and involvement of expertise:

Besides objective criteria, Pune continued its unprecedented stakeholder engagement even for local area selection.

- Citizen engagement was done across the city, with 24,000 citizens sharing their views on area selection—1,16,965 inputs were collected online/ offline.

- More than 40 key elected representatives from all major political parties including local ministers, MPs, MLAs, party leaders engaged in the selection process. Getting support across all parties in such a short time was unprecedented even in the history of Pune.

- More than 10 renowned urban planners practically seconded themselves to Pune Municipal Corporation for a month to see the entire process through.

■ About 100 partners/suppliers were engaged over 15 workshop-days to discuss possible solutions (both ICT and non-ICT) that could be applied for local area development across seven sectors: transport, water, solid-waste management, sewage, safety and security, e-governance, energy. They focused on understanding solutions, ascertaining costs and feasibility, and assessing suppliers' experience in successful delivery. As a result, 19 MoUs were signed with KPIT Technologies, CII, NASSCOM, FICCI, EMBARQ, rBus, India Smart Grid Forum, C-DAC, Pune City Connect (PCC), Institute of Transportation and Development Policy (ITDP), IEEE- Pune Section, PMPML, Prayas (Energy group), India Smart Grid Forum, CISCO, MSEDCL, Persistent & Digital.

■ These MoUs along with over 4 in the pipeline (Wipro, Siemens consortium, Catapult and Microsoft) have been instrumental in establishing a strong support network to execute the proposed plan.

With this exhaustive exercise, ABB emerged as the democratic and rational choice. About 900 acres in the area were demarcated for local area development. ABB is indeed the right choice for several strategic reasons:

- Impact can happen over a large area (900 acres) with a sizeable population (40,000 population)
- Strategic location at the entry point into Pune from Mumbai side
- Large 3.5 km riverfront could be leveraged for riverfront development ■ Mostly residential area today with people going to Hinjewadi to work; can be developed for mixed-use development due to vacant pieces of land
- Potential to create a start-up zone, leveraging the entrepreneurial energy of Pune
- Potential for inclusive transformation of the neighbourhood, with 500 households in the slums
- Large private land parcel (70 acres) next to riverfront for model development

Exhibit 11 details out the demarcated area and some potential interventions.

11. KEY COMPONENTS

List the key components of your area-based development proposal (eg. buildings, landscaping, on-site infrastructure, water recycling, dual piping for water supply, etc.)? (max. 250 words)

To make ABB a model neighbourhood, there are 36 components along 6 themes (Ex 26):

Theme #1: Fix hard infrastructure and make it future-ready as the population grows: 1. 8-km BRT 2. 54 regular bus stops with ICT solutions 3. 100 e-buses for ABB–Hinjewadi connectivity.4. Express airport service.5. Improve 46 km of road. 6. Easy access to mass public transport through 100 e-rickshaws.7. NMT focus through PBS with 40 stations, 42 km of cycle tracks, and redesign 60 km of footpath, 15 junctions and 27 km streets. 8. Transit hub at Pune entry point.9. 100% pathways accessible for the differently-abled. 10. Water availability from 90 lpcd to 150 lpcd to pilot 24x7 water 11. 100 percent smart bulk, commercial and domestic metering. 12. 3.5 km riverfront for replication across Pune. 13. Rain water harvesting across most buildings 14. Recycle 10% of waste water.15. Zero waste and garbage through garbage truck augmentation, RFID-based vehicles tracking and attendance system 16. Centralized command and control centre with camera feed, emergency services through five Sanitation and Waste Action Team (SWAT) vehicles.

Theme# 2: Social infrastructure as per benchmark standards: 17. Three additional hospitals with 110 beds 18. Three additional schools with international standards.19. 76 additional public toilets to global standards. 20. State-of-the-art fire stations 21. Smart parking for 750 cars.

Theme#3: Enhance liveability quotient considerably on top of fixing infrastructure: 22. Open-space innovation: Use increased open space (from 4 percent to 10 percent of total area) to create interconnected gardens 5 minutes away from each resident, open vegetable market. 23. 3.5-km riverfront with promenade, recreation and entertainment zone.24. 8 acre start-up zone and 36-acre commercial space to create over 45,000 jobs by 2030 for mixed-use development and walk-to-work.25. Moving all wiring underground and creating vehicle-free roads.

Theme #4: Drive socially inclusive growth in the region: 26. Slum-free area by redeveloping 500 slum households.27. Socio-economic transformation of slums by focusing on sanitation, healthcare, education and skill building.

Theme #5: Improve sustainability 28. Smart street lights with 85% LED lamps, saving 30% of the energy; Lampposts with air-pollution sensors, panic button, wi-fi access point and CCTV camera.29. Smart grid in ABB for 100% power supply, to reduce AT&C losses by 30% .30. Solar roof-tops to contribute 15% of energy requirements.

Theme #6: ICT solutions for citizen convenience and e-governance: 31. Seamless wi-fi connectivity at 1 Mbps through over 100 access points for 10,000 simultaneous logins.32. ABB Punetel Card for a connected community. 33. Intelligent Operations Centre(IOC) with integrated data across utilities, transport and public safety.34. Citizen app to redress grievances and integrate multiple functions with the IOC.35. Digital SPV to improve functioning with geo-enabled city operations for activities such as land management and tax assessment.36. Launch e-SPV, a comprehensive ABB portal online with multiple activities across all departments.

12. SMART URBAN FORM

Describe the 'smart' characteristics of the proposed development that relate to urban form (eg. uncluttered public places, mixed-use, open spaces, walkability) and how these will be incorporated. (max. 250 words)

Pune plans to incorporate seven Smart Urban Forms in ABB:

1. **Planned densification:** ABB has 16 acres of amenity space lying unutilized. This will be used to develop social infrastructure meeting the benchmark, which will also lead to planned densification. The plan is to have three additional schools, three multi-specialty hospitals and 76 public toilets to meet benchmarks. There is also a plan to create smart parking for 750 cars.

2. **Creating uncluttered public and open spaces:** While pushing densification, there will be equal emphasis on creating uncluttered public spaces. Thirteen open spaces will be developed as gardens to ensure a garden just 5 minutes away from all residents. These gardens will remain open till late night with adequate security features and facilities like an open gymnasium for senior citizens. The open space identified near Parihar Chowk will be developed as a vegetable market to shift street hawkers. These measures will increase open space to 10 percent of the total area.

3. **Urban riverfront development:** 3.5 km of walking promenades and 18 acres of urban farms will be developed, adding further to open spaces (Exhibit 13).

4. **Mixed use:** A start-up zone will be created over 12 acres along with commercial office space over 15 acres to create 45,000 primary jobs, promoting a walk-to-work culture for working areas within 1 to 2 km of people's homes. (Ref. 9)

5. **Uncluttered public space:** A transit hub will be created at ABB entry. No heavy vehicles will be allowed into the area. Special electric buses will operate between Aundh and Hinjewadi, serving over 50 percent of the working population in Aundh. There will also be a commercial hub in this area for mixed-use development (Exhibit 14).

6. **Placemaking through street, footpath and junction redesign:** 60 km of footpath, 15 junctions and 27 km of streets will be redesigned as per smart urban forms (Exhibit 15 and 16).

7. **Walkability and vehicle reduction:** Footpaths will connect all gardens to ensure 100 percent walkability to gardens. A total 60 km of footpaths will be redesigned to ensure 100 percent continuity and promote walkability; a public bicycle system will be initiated with connectivity to the university and more than 40 stations (Exhibit 17).

13. CONVERGENCE AGENDA

In Table 1, list the Missions/Programmes/Schemes of the Government of India (eg. AMRUT, HRIDAY, SBM, IPDS, Shelter for All, Digital India, Make in India, Skill India) and relevant external projects and describe how your proposal will achieve convergence with these, in terms of human and financial resources, common activities and goals. (max. 50 words per cell)

TABLE 1		
S.No	Mission/Programme/ Scheme/Project	How to achieve convergence
1	Swachh Bharat Mission	<ul style="list-style-type: none"> Swachh Bharat will create a zero-waste society that scientifically disposes of 100% of waste (50% energy, 30% recyclables, 20% roads/brick making) SCM will help to improve collection efficiency and meet the source-segregation target of 100% using ICT solutions (e.g. GPS-enabled trucks)
2	Integrated Power Development scheme (IPDS), India Smart Grid Forum (ISGF)	<ul style="list-style-type: none"> Transmission and distribution (T&D) network strengthening will be taken up under IPDS to ensure that utility services are future-proof (INR 304 cr) (Ref. 10) Smart Grid and Metering part will be driven under SCM (60 cr) DPR has been created for T&D strengthening, smart grid and smart meters and MOU signed with MSEDCL and India Smart Grid Forum
3	Digital India Mission	<ul style="list-style-type: none"> Offering vocational and skills training to the ABB community by using the community halls can be linked to the Digital India Mission Setting up National Digital Literacy Mission centres with the aim that by 2016, at least 1 person from each household in ABB area will be digitally literate

Continue on next page

TABLE 1		
S.No	Mission/Programme/ Scheme/Project	How to achieve convergence
4	Atal Innovation Mission 4A. Technology Business Incubator (TBI)	<ul style="list-style-type: none"> • Setting up start-up hub along with NASSCOM in the area can be linked to the mission • The project would be partially funded through the INR 150 cr earmarked for the mission in 2015 (Ref. 10) • The plan to encourage entrepreneurship among innovative thinkers in the start-up hub can be linked to the TBI. Qualified start-ups will be able to leverage finance in soft loans
5	Housing for All 5A. FAME Scheme (Faster Adoption and Manufacturing of Electric Vehicles)	<ul style="list-style-type: none"> • The plan to rehabilitate the 486 slums in the area will be linked to the Scheme. The project will be funded through the existing Slum Rehabilitation Authority under the ambit of the Housing for All policy • Plan to procure 100 e-buses will cost ~INR 125 cr including charging infrastructure. This can be financed through the Government of India's FAME scheme (incentive of 69 lakh per bus for hybrid buses)
6	Atal Mission for Rejuvenation and Urban Transformation AMRUT	<ul style="list-style-type: none"> • Plan to build key infrastructure to help the deficient 14% population overcome water scarcity (getting less than 135 lpcd). Under (AMRUT), PMC has requested INR 938 cr for the entire city and will use a portion of this for the area development
7	NRCP (National River Conservation Plan)	<ul style="list-style-type: none"> • About 10% (INR 99 cr) of the INR 990 crore pan-city project funded under this scheme will be used for the area, split-up as below: <ul style="list-style-type: none"> - Branch sewers in Baner area with allied works (43 km)—INR 23.5 cr , botanical garden, Baner, with allied works—INR 72.6 cr - SCADA—INR 3.1 cr

14. CONVERGENCE IMPLEMENTATION

Describe how the convergence will be implemented? For example, convergence with IPDS will be credible if 'smart' city elements (e.g. smart metering, underground cabling, shifting of transformers) are included in the DPR being prepared for IPDS. If, a DPR has already been prepared, then the 'smart' elements should be included in the form of a supplementary DPR. Furthermore, according to the IPDS Guidelines the DPR has to be approved by the State Government and sent to the Ministry of Power, Government of India. All these have to be completed before submitting the proposal. (max. 350 words)

Swachh Bharat:

- Plan to create 74 new world-class public toilets in the area and completely refurbish the 10 existing toilets, creating 84 public toilets to cater to 100 percent of the floating population in the area (5 percent of the projected 2030 population of 1.3 lakh) in line with cities like Singapore and Melbourne
- Plan to refurbish existing toilet spaces in public schools, including adding more WCs (to create a total of 76 WCs) to cater to 3,991 students and 120 teachers in the area. This is in line with international standards (1 per 50 people)
- 100 percent of the capital cost of these facilities is covered under the Swachh Bharat Mission, for which the Detailed Project Report (DPR) is already prepared
- An additional element of improving collection efficiency and meeting source segregation target of 100 percent by utilizing ICT solutions (e.g., RFID tagged waste bins, GPS enabled trucks) will be appended under Swachh Bharat Mission

National River Conservation Project:

A comprehensive plan along with a DPR has been created under NRCP to clean the Mula–Mutha rivers, entirely preventing the discharge of domestic sewage into the rivers, rehabilitating the existing 50-year old trunk sewer and existing sewage treatment plants (STPs) and integrating the proposed sewer lines with the existing infrastructure and measures for O&M. The total project cost is INR 990 cr, of which the Government of India has sanctioned a loan of INR 841.72 cr under NRCP for this project, with the balance contributed by us. Waste-water recycling will be undertaken in sync with the work as per approval of the NRCP. (Ref. 11)

Smart Electricity Grid:

We plan to deploy smart grid technology in ABB to support the ambitious solar energy rollout and also to help with demand-side control. MoUs have already been signed with the India Smart Grid Forum, a PPP initiative of the Ministry of Power (MoP), Government of India. This is being built into a DPR to be submitted to the State government for approval. The total project cost is INR 537 cr which will be funded as follows: INR 74 cr from National Smart Grid Mission (NSGM), INR 171 cr from SCM and INR 292 cr from the MoP under IPDS. (Ref. 12)

AMRUT

Under AMRUT, PMC has requested INR 938 cr to build key infrastructure to help the deficient 14 percent of the population overcome water scarcity. This will consist of installing bulk meters, conducting water audits and identifying usage leaks to reduce NRW. AMRUT will provide the funding and the SPV will ensure implementation. In addition, smart metering of water for residents will be done under SCM, with inclusion in the DPR.

Housing for All

The DPR has been submitted to the state government for rehabilitation of the slums in the area.

15. RISKS

What are the three greatest risks that could prevent the success of the area-based proposal? In Table 2, describe each risk, its likelihood, the likely impact and the mitigation you propose. (max. 50 words per cell)

TABLE 2			
Risk	Likelihood	Impact	Mitigation
Execution risk: Significant governance and competency will be required to execute all 36 local area development ideas in a seamless manner	High	Delay in project execution; significant cost and time overruns; potential of investments being unable to create the right impact due to poor execution	<ul style="list-style-type: none"> • A separate SPV to drive all ABB projects in early stages of formation, with approval from the general body of municipality • 45-50 strong team structure designed for SPV along with a governing board consisting of the right people to drive action on the ground. • Operating model defined very clearly for each initiative with clear roles for SPV and other agencies—passed by the general body
Funding risk: Based on detailed calculations, the total funding requirement is INR 1,851 cr capex and INR 360 cr total opex for next 5 years (2,200 cr total)	Medium	Plan can be derailed / delayed if Pune is unable to arrange funds beyond SCM	<p>Detailed sources of funds identified:</p> <ul style="list-style-type: none"> • Land monetization plan of INR 1,000 cr has been created within ABB area • About INR 700 cr funds have been identified from other missions • About INR 140 cr of additional revenue sources identified • About INR 100 cr of CSR for ABB • INR 500 cr allocation from SCM

Continue on next page

TABLE 2			
Risk	Likelihood	Impact	Mitigation
<p>Land-use change risk: To achieve the mission, a few important land-use changes are required, e.g., change in transit land from amenities to amenities + commercial</p>	Low	Implementation quality and timelines may suffer as projects may get stalled due to delay in land-use change	<ul style="list-style-type: none"> • PMC has already made the first set of DP changes to help in land use • Any further DP changes can be easily done since DP review is underway

Continue on next page

TABLE 2			
Risk	Likelihood	Impact	Mitigation

16. ESSENTIAL FEATURES ACHIEVEMENT PLAN

Describe a plan for achieving the Essential Features in your area-based proposal. Importantly, accessible infrastructure for the differently-abled should be included. List the inputs (eg. resources) that will be required for the activities that you will conduct, leading to the outputs. Please note that all Essential Elements, item-wise, have to be included in the area-based proposal. (max. 2000 words)

Assured electricity supply: A comprehensive 24x7 electricity plan consisting of smart grid, distribution and meters to make the system future-ready, reduce AT&C losses from 9% to 6%, and integrate solar-power supply to the grid at a total cost of INR 245 cr. There is no load shedding in ABB at present, except for the distribution transformers tripping (1.8% per month). The DPR prepared for distribution system in ABB area, including smart grid and T&D network strengthening, takes care of infrastructure requirements till 2030. It projects the load to grow at 15% till 2020 and at 6% thereafter. MSEDCL would enter into a PPA as and when required to ensure 100% power supply to this area. T&D network strengthening would cost INR 304 cr, which is expected to be covered under the IPDS scheme. Of the smart grid cost of INR 250 cr, 74 cr will be funded from the National Smart Grid Mission and the rest by SCM. PMC has entered into an MoU with India Smart Grid Forum (a PPP initiative of MoP) and MSEDCL to ensure successful implementation of the project.

At least 10% of the Smart City's energy requirement coming from solar: Make ABB area maximum solar city, with solar power fulfilling 15–20% of energy needs at zero cost model. A feasibility analysis is being conducted for installation of solar panels on all PMC owned buildings (with help from Pune International Center (PIC) and Prayas). PMC will conduct a bidding process in Dec '15–Jan '16 to shortlist 2–3 private agencies to install solar panels under a renewable energy service company (RESCO) model (capex and opex is borne by private agency, PMC would pay consumption charges as per the tariff defined in PPA signed between PMC and private agencies) A preliminary survey depicts the availability of 176 acre of roof-top space in ABB area. At a reasonable estimate of 25% coverage of roof-tops, 15% to 20% of energy supply will come from solar power. For ABB area, solar roof-top implementation would start with government buildings and then expand to commercial and residential establishments, all under the RESCO model. Net metering regulations in Maharashtra are already in effect, thereby providing incentive to consumers to install solar panels. PMC has entered into an MoU with Prayas energy group—a leading Indian NGO—and would be responsible for conducting the solar awareness programs in the ABB area. PMC has entered into an MoU with MSEDCL to streamline the smart metering process.

Adequate water supply including waste water recycling and storm water reuse: Increase per capita water availability to 150 lpcd and ensure 10% waste water recycling in ABB region. Adequate water supply: Build infrastructure to increase per capita consumption in ABB from 90 to 150 lpcd (capex of INR 87 cr) - Create two reservoirs each at Balewadi and Baner, Augment Pashan reservoir with two reservoirs of 30 lakh litres each and install an additional 450 hp pump, Lay 40 km of pipeline in Baner–Balewadi and 10 km in Aundh, Create three reservoirs in Aundh at Pune University, Chatrashunghi and Panchvati.

Waste-water recycling: Recycle 48 mld sewage generated in ABB by enhancing the capacity of Baner STP by 30 mld under JICA–NRCP to ensure full treatment of

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sewage up to 2031, and then using the treated water for all consumption in parks (for irrigation) and construction activities. Storm water re-use: An INR 200 cr project under JnNURM launched 4 years ago has ensured efficient drainage of storm water in city.

Sanitation including solid-waste management: Create 74 world-class public toilets in the area and completely refurbish the 10 existing toilets to create a total of 84 public toilets to cater to 100 percent of the floating population in the area (5% of the projected 2030 population of 1.3 lakh) in line with cities like Singapore and Melbourne. Refurbish existing toilet spaces in public schools, including adding more WCs (creating a total of 76 WCs) to cater to 3,991 students and 120 teachers in the area, in line with standards followed internationally (1 per 50 people). Design each toilet space to have separate facilities for males, females and the differently-abled. All sanitation facilities will use smart features like solar panels to generate uninterrupted electricity and bring down O&M costs, be located close to accessible car parks with most cubicles directly facing the open areas, optimizing casual surveillance, partial screening provided by fretwork screens and mesh screens above door height maximizing natural ventilation. 30 drinking-water fountains and 357 "smart" dustbins are to be installed in line with global benchmarks (eight drinking-water fountains and 89 dustbins per sq km). Solid-waste management: Pune is already one of the top Indian cities with 57% waste segregation. Deploy solutions to: Achieve zero waste society with 100% collection, segregation and disposal with no garbage visible on any street, SPV to invest in the following, which will then be given to a professional third party for O&M: A) 3 modern road-sweeping machines; B) 3 garbage collection trucks for transportation; C) 100% enclosed transfer station with charging points for e-rickshaws, SWAT (Sanitation and Waste Action Team) with one garbage collection truck for picking up garbage not collected by third party or to act on complaints received at the Control Centre, 500 people (existing rag pickers) to be employed for door to door collection with e-rickshaws. All organic garbage to be transferred to Noble Exchange's biomethanation plant in Baner.

Rain-water harvesting: Ensure 100% of establishments have rain-water harvesting pits. Under DC regulations of PMC rain-water harvesting is compulsory and a part of existing building codes. Increase enforcement of rain-water harvesting through audits. Provide increased tax incentives to households which adopt rain-water harvesting. Create society-level "sumps" to collect rain water that is then used for gardens, car washing, etc. across all households (expected to cost INR 0.6 cr).

Smart metering: Implement 100% smart AMR (automatic meter reading) metering across 2,900 commercial and 8,500 domestic connections at a cost of INR 22 cr. Install smart bulk meters at inlets and outlets of Warje WTP, 7 reservoirs, 3 pumping stations and all DMAs in region. Link all data received via meters to centralized dashboard with SCADA.

Robust IT connectivity and digitalization: A fibre optic cable network along 250 Km of road will be placed across the ABB region costing Rs. 137 Crore. This will create the first layer of IT connectivity for all smart solutions as well as Wi-Fi hotspots across the city. A total of 100 hotspots will be placed across the city costing Rs. 1 Crore and the annual O&M will cost Rs. 0.6 Crores annually (bandwidth and core infra cost separate). Pedestrian-friendly pathways: Creating pedestrian-friendly roads and footpaths with 100% of them being accessible for differently-abled (an expected cost of INR 106 cr) will complement mixed-use development, open spaces, gyms by creating inclusive, safe, pedestrian-friendly infrastructure. This will be done by increasing inclusivity of streets and pedestrian comfort through the intelligent redesign of 27 km of streets and 14

junctions—10 km of streets to be taken in the first phase, 9 km in the second phase and 8 km in the last phase, 70 km (60 km retrofit) differently-abled friendly, pedestrian-friendly footpaths, 2 m wide, to be constructed. Kerb ramps will be constructed to ensure accessibility for the differently-abled.

Encouragement for non-motorised transport (e.g., walking and cycling): Increase NMT from ~30% to ~45%. While most of the cost is covered above, the additional cost will be INR 9.5 cr: NMT (particularly bicycles) to serve as feeders to public transportation systems and last-mile connectivity, i.e., a 5–6% modal shift to cycling possible as per a city-wide survey. Smart Public Bicycle Sharing System will be developed with the following (over 16.3 sq km)-1,230 bicycles, 112 cycle stops, Safe cycling infrastructure by accommodating demarcated cycle tracks through redesign of 27 km of streets, Traffic calming to be implemented on 14 km of streets, Smart, interoperable cards to be created

Intelligent traffic management: Pan-city transportation initiatives to cover public transport ITMS, adaptive traffic management systems, intelligent road asset management and smart parking initiatives. ABB specific initiatives (total cost of INR 153 cr) include: 100 ITMS-enabled electric buses to run from transit hub to Hinjewadi: MoU already entered into between PMC and KPIT Technologies for supply of buses and a potential PPP model. 100 e-rickshaws for commuting within ABB. 54 bus stops to be revamped – PIS system with LED screens, showing ETA for buses, Wi-fi enabled bus stops with charging ports for commuters

Non-vehicle streets/zones: Pedestrianization of half right of way (RoW) of DP road by redesign and cobbling at an expected cost of INR 5 cr

Smart parking: Provision of 1 smart multi-level car park (~750 cars) with PIS and apps (costing covered as part of pan city)

Energy efficient street lighting: 3,070 street lights to be replaced by LED lamps with wireless control(similar to Telensa Smart City IoT model) to increase the coverage from 7% to 83% and achieve energy savings of more than 30% at zero cost, under PPP model. Existing 1,000 70w sodium vapour lamps to be replaced by 45w LED fittings; 900 150w sodium vapour lamps by 90w LED fittings; 50 400w metal halide lamps by 200w LED fittings; and 1120 T5 fittings by 45w LED fittings. For the 700 250w sodium vapour lamps that cannot be replaced by LED, the plan is to put dimmers that would help to stabilize voltage at 230V in non-peak hours, thereby saving energy to the tune of 15–20%. Without incurring any cost, PMC could get LED lamps and dimmers installed through the PPP model, where the private player puts all the infrastructure required and maintains it for 7 years (typically). In return, the private player gets a percentage of savings (typically in the range of 75–85%) achieved by putting up LEDs. PMC recently ran a bidding process to get 35,000 lamps replaced by LED fittings in Pune city (non-ABB area).

Innovative use of open spaces: Through open parks, gardens, open gyms and multipurpose halls. 8,654 sq m area to be utilized for creating 7 new gardens/parks/open gyms, taking total to 13. 2 community centres over an area of 1,878 sq m facilitating citizen engagement and skill development. 2 open vegetable markets over an area of 2,282 sq m catering to 20% of ABB's population.

Visible improvement: As part of the T&D network strengthening project (INR 292 cr), 100% of overhead electric cables would be re-laid underground. PMC has entered into an MoU with MSEDCL to support project implementation. ~500 m of busy DP road to be made a 12x7 vehicle-free street, from 9AM to 9PM

Ensuring safety of citizens, especially children, women and the elderly: Aspire to create a zero-crime area with the following initiatives on safety and security that focus on three broad areas:

1. Video surveillance and CCTV coverage:

- Installation of CCTV cameras across all areas of ABB with special emphasis on entertainment venues, schools, crowded markets, etc.
 - Integrate video analytics software with CCTV camera, i.e., replace manual browsing with automated pattern analysis and recognition of faces, car number plates, unidentified objects, etc.
 - Allow instant video search and retrieval of CCTV footage
 - Use high-quality video imaging, i.e., use a second-generation Exmor CMOS chip that features back-lit sensor technology
 - Automatically detect faulty cameras and have a dedicated maintenance team
 - Use integrated hardware architecture enabling every hardware unit to store, distribute, and forward data streams, thus minimizing the number of faulty points
 - Use cluster deployment and 2-level security protection for data in the hard disk and host layers to prevent video data loss
 - Ensure a dedicated live feed of relevant zones to police stations and command centres
- Multiple remote monitoring technologies can be leveraged
 - Infrared
 - Gun-shot / audio sensors
 - Cyber patrol and communication monitoring system
 - Integrated GIS-based automated vehicle tracking and management system

2. Citizens' participation

- Create comprehensive information online for travellers using crowd-sourced information with tips and tricks on guarding against being fleeced by taxis, bank/ATM fraud, etc.
- Develop ABB Punetel app along with a suite of other citizen apps that allow citizens to directly report crime in real time to the appropriate authorities
- Share effectiveness assessments, reports and research done by crime branch, police and other agencies with the public
- Develop heat maps using both police and citizen inputs which would help citizens avoid certain hot-beds of crime and gang violence

3 Special service for children, senior citizens and women

- Use location-based services and CCTV technologies to notify authorities and family members of emergencies involving children, the disabled, the elderly, and those suffering from Alzheimer's disease
- Use smart devices such that when the user leaves a designated safe zone or pushes its emergency button, an emergency alert is sent to guardians, police, fire departments and CCTV control centres
- Set up real-time CCTV networks and children's smart devices to use wireless networks to locate missing children as quickly as possible
- Create dedicated "children safety zones" using a multiple-input and multiple-output (MIMO) wireless infrastructure mesh network

17. SUCCESS FACTORS

Describe the three most significant factors for ensuring the success of the area-based development proposal. What will your city do if these factors turn out to be different from what you have assumed?

(max. 500 words)

The success factors for ABB are driven by the key strengths of Pune, which are along the following dimensions:

Citizens' buy-in for proposed initiatives: PMC was able to connect to more than 10,000 households and 20,000 people in the ABB area for local area development. As a result, the current ABB proposal has extensive citizen support, which will be one of the key success factors for successful execution. 8000 families (around 30,000 people out of 40,000) of ABB Area signed on citizen pledge, supporting the effort. Pune will need to continue receiving such support to make this a reality. Residents will need to adhere to the new policies for smart zone, and pay extra charges for the services provided by PMC.

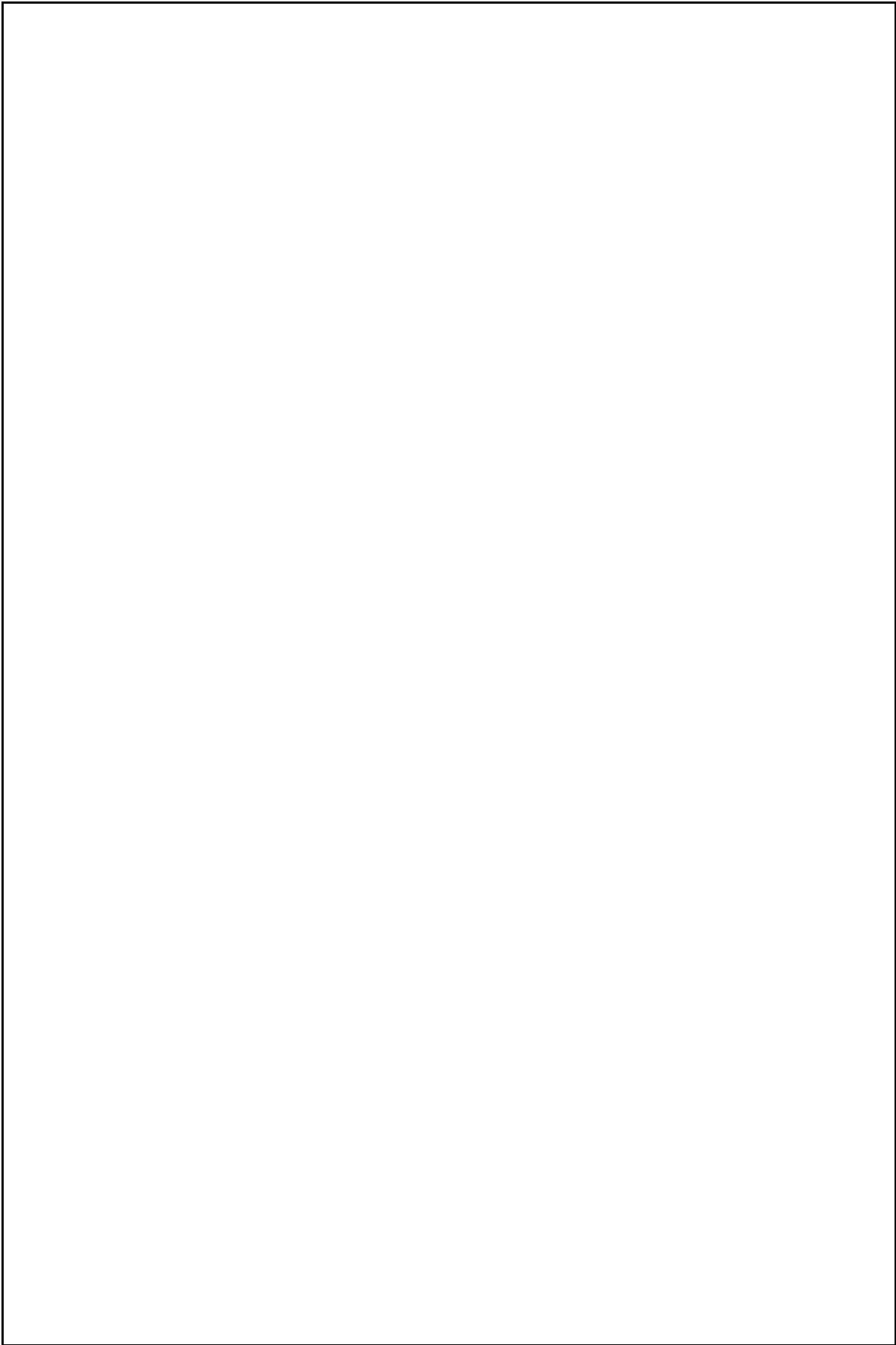
There is a risk that adequate financial resources might not be recovered from the citizens. As a risk-mitigation factor, PMC has identified alternate sources of financing that include land monetization and funds from other missions besides SCM.

Adoption of technology by ABB residents: Pune is one of the prominent IT locations in the country and contributes a significant share to IT exports. More than 50 percent of the working population in ABB works in the IT sector and is expected to quickly adopt the technology-based smart solutions envisaged in the local area. There is a basic assumption that the residents of ABB would eventually have access to smartphones and subscribe to 3G/4G plans for connectivity.

There is a risk that penetration levels of internet connectivity remain low, resulting in fewer downloads of apps from the Pune city app store. As a fallback plan, PMC would switch to non-internet SMS-based solutions wherever possible. It would also run skilling initiatives and app-awareness drives in the ABB region.

Start-up zone to trigger mixed-use development: Besides the strong presence of the IT sector, Pune also boasts of being one of the favorite destinations for tech start-ups in the country. As per the 2015 NASSCOM report, Pune accounts for 6 percent of all start-ups in India. It has large technical talent available due to its many universities, along with cost-effective real estate and good infrastructure. On these lines, PMC has identified an area to develop a start-up zone in ABB, which would help to create a culture of innovation and promote mixed-use development.

There is a risk that start-ups may not move to the area or that new start-ups may not come. To cover up the risk, PMC will ensure adequate incentives, such as free rentals for 18 to 24 months to start-ups to create initial attraction. In addition, PMC has collaborated with NASSCOM to help bring incubators and accelerators to the city, thereby creating a whole ecosystem around commercial development in ABB. PMC has also initiated collaboration with Microsoft and Future Cities Catapult for this.



18. MEASURABLE IMPACT

What will be the measurable impact of the area-based development proposal, on the area and the wider city, through scale-up and replication? Please describe with respect to the five types below, as relevant to your city and proposals (max. 150 words each):

- a. Governance Impact (eg. improvement in service provision and recovery of charges due to establishment of SPV)

1. Faster and better citizen services through an Intelligent Operations Centre (IOC) and a integrated citizen app for grievance redressal. Targeted to transform local area operations from reactive to proactive. It will become an integration hub for domain systems—utilities, transportation, public safety, and prevent them from operating in silos. Process integration and information sharing across agencies will maximize benefits.

2. ABB–PuneTel Card to develop a connected community in the Aundh–Baner–Balewadi region: Based on their demographic information, citizens will receive customized information like updates on cultural events, school registration, major blockages on routes, etc. This will create a connected community with access to the right information.

3. Digital SPV and e-SPV for better service delivery to partners and citizens: Targeted ICT solutions to improve the overall functioning of the SPV and streamline multiple processes. Digital SPV will help partners through faster geo-enabled city operations for multiple activities such as land management, tax assessment, etc. E-SPV will automate the entire functionality to deliver citizen services by urban local bodies (ULBs), ensuring easy, efficient and error-free transactions to citizens. The benefits will include easy tracking of information, a citizen desk as a nodal point for all citizen-to-government official interactions including signatures, verification, document submission, etc., and manning by best-in-class frontline staff.

- b. Spatial Impact (eg. built form changed to incorporate more density or more public space)

Public space: Of the 900 acres in ABB, 42 have been earmarked for open spaces. Also, 46 acres of riverfront development, will take total open space to 10% from current 4%.

1. Gardens: 7 new gardens with a total area of 8,654 sq m will ensure that every citizen will be able to walk to a garden within 5 minutes, designed to highlight the identity of Pune (e.g., rich culture, musical instruments as a theme). Open gyms with equipment suitable for senior citizens will also be built into 3 of the gardens. The design will be simple and spacious, offering a hassle-free place to exercise and socialize.

2. Community halls: Two centres will be constructed with a total area over 1,878 sq m to be used for community engagements (e.g., vocational programs for low-income women).

3. Open Vegetable gardens: Two vegetable markets will be created over an area of 2,282 sq m to serve 20 percent of the population of the area, creating an experience similar to other global cities with well-developed open vegetable and fruit markets.

4. Riverfront development: ABB's 3.5-km stretch of riverfront will be developed into a world-class recreation hub. This will increase community engagement from local activities, tourism, improve liveability and also create additional job opportunities for local slum-dwellers. This concept can be replicated across the 40 km of riverfront in Pune.

Density: While open space will increase, the population in the area will also increase from 40,000 (current) to 1,50,000 (by 2030). As a result, the density in the area will increase to 8,125 people per km (from the current 2500 people per km)—a four-fold increase while more than doubling public open space. (SEE EXHIBIT 26 for detailed spatial impact)

c. Economic Impact (eg. new commercial space created for organized economic activity)

As the population of the ABB region increases from 40,000 to 150,000, the total working population will increase from 25,000 to around 100,000 (Ref. 9). Adding 45,000 jobs in the region will ensure that:

A) Almost all 100,000 people are gainfully employed. Today, 60 percent of the population goes out of the ABB area to work and there may not be enough jobs to support this population growth.

B) Creating 45,000 primary jobs will also lead to around 10,000 to 15,000 secondary jobs, creating the right multiplier. Both the start-up hub (with service-sector focus) and the recreation zone on the riverfront will create many secondary employment opportunities.

C) Average productivity of people will increase significantly, thanks to shorter commutes and the encouragement to “walk to work”.

Driven by 4x population growth, 40,000 to 45,000 new primary jobs and many more secondary jobs, the GDP of the ABB region could grow 6 to 7x in the next 15 years, making it one of the fastest economically growing global neighbourhoods.

This will be the trigger to mixed use development and more high-end jobs across the city, bringing a significant revolution in Pune's economy.

d. Social Impact (eg. accessible features included in the Proposal)

Apart from the ideas covered under public spaces under spatial impact, here are two other scalable social impact features (detailed in Exhibit 18):

a) Schools: Three higher secondary schools over a total area of 6,596 sq m (international benchmarks of 35 sq ft area requirement per student). Open areas in public schools will be utilized for developing sports facilities and will be open to the public after school hours.(Ref. 13)

b) Hospitals: Three specialty hospitals over a total area of 8,211 sq m (international benchmarks of 40 beds needed per 10,000 population) to provide quality affordable healthcare attracting healthcare tourists from across the world. (Ref. 13)

c) Slum-free ABB: Babasaheb Ambedkar Vasti slum is a typical representation of slums in Pune, where the key issues are sanitation, livelihood, education and healthcare. Under Housing for All, the 486 slums will be redeveloped, leading to inclusive development.

d) Fire stations: Two fire stations in the area will ensure quick accessibility in case of fire accidents, and 1,372 sq m of amenity space is allocated for this.

ABB area will become slum free and in line with international benchmarks for schools, hospitals which can be replicated across Pune.

- e. Sustainability, including environmental impact (eg. intensive 24X7 use of public spaces results in reduced traffic and reduced pollution)

Roof-top solar: Solar power will take care of around 15 percent of the total 110 MU energy requirement in ABB by utilizing 25 percent of available roof-top space. Net meters will be installed to enable exporting surplus power back to the grid. This model will be replicated across the city.

a) LED: Energy savings of 30 to 40 percent will be achieved by using LED lamps; 1 MU of energy can be saved per annum by replacing 3,000 sodium vapour and T5 lamps (typically 150 W rating) with 90w LED lamps.

b) Green buildings: Pune has already sent to the state government a draft policy for incentivizing green buildings -in a tie-up with Gruha and the Indian Green Building Council (IGBC) - where we encourage property developers to get their building green-certified through discounts on FSI based on Gruha's star-rating evaluation.

c) Shift to NMT and greener transportation options: With 42 km of bicycle tracks, 100 e-buses, and 100 e-rickshaws, there will be a significant environmental impact improving the air quality in the ABB area.

d) The river-cleaning project will make riverfronts sustainable again with a healthy river ecosystem.

e) 10 percent water recycling and rain-water harvesting will improve the water table considerably and reduce per capita requirement of "fresh water".

C. PAN-CITY PROPOSAL (S)

A pan-city smart solution should benefit the entire city through application of ICT and resulting improvement in local governance and delivery of public services. The SCP should contain one or two such Smart Solutions. Generally, 'smartness' refers to doing more with less, building upon existing infrastructural assets and resources and proposing resource efficient initiatives.

19. SUMMARY

Summarize your idea(s) for the pan-city proposal(s). (max. 100 words)

Pune pan-city idea is to invest 700 cr (capex+opex) in 5 years in “less is more” pan-city solutions to fix short-term challenges in two of the biggest citizen concerns - mobility and water. Besides driving ICT solutions through SCM, Pune will drive non-ICT “less is more” solutions (e.g. street redesign) and long-term capex initiatives (e.g. metro) through other sources of fund to solve problems holistically (as detailed in the strategic plan). Key themes for ICT solutions are:

1. Increase public transport usage through better availability and reliability by developing a “Smart Pune Public Transport System”. Against the 50 percent benchmark, Pune’s public transportation usage is only 18 percent .
2. Reduce congestion through “Intelligent Pune Traffic Systems” (comprising of adaptive traffic management). Peak hour average speed is only 18 kmph.
3. Ensure equitable distribution of 150 lpcd water to 100 percent citizens 24x7, along with best-in-class customer experience (Ref. 14)

20. COMPONENTS

List the key components of your pan-city proposal(s). (max. 250 words)

Pune has identified 19 “less is more” ICT solutions along three themes (Exhibit 27):

A. “Smart Pune Public Transport System” to improve availability, reliability and passenger comfort

1. Vehicle health monitoring system (VMS) across ~1080 buses with intelligent kits and back-end maintenance management system
2. Real-time tracking of 100 percent buses (vehicle tracking system [VTS]) by installing GPS and setting up a central command control room to monitor driving quality and service levels
3. CCTV surveillance and panic buttons on 510 buses to improve security
4. Public information system (PIS) comprising bus guides and LED screens depicting expected time of arrival (ETA) and other critical information across all 190 bus stops and in around 510 buses, along with mobile apps and website providing real-time information
5. In-bus entertainment through Wi-Fi in around 1080 buses

B. “Smart Pune Traffic Management System” to reduce congestion

1. Adaptive traffic signals across 319 signals, with a central command centre, and also equipped with “pedestrian buttons” and PIS
2. Smart parking across seven multi-level car parks, with PIS and real-time mobile apps
3. Private bus aggregators, such as rBus and Shuttl, to provide premium bus options
4. Intelligent road asset management system to improve road condition (using geographic information systems, or GIS)
5. Traffic mobile apps and online portal with live and future traffic
6. Traffic analysis using CCTV feed and mobile GPS (similar to Citilogik concept in UK)

C. “Smart Water” solutions to ensure equitable distribution of 150 lpcd water to 100 percent citizens 24x7, along with best-in-class customer experience

1. Smart bulk metering at eight WTPs, 161 elevated reservoirs and 328 DMAs across six zones with SCADA, followed by water audit across the 2,500 km pipeline
2. Helium leak identification system to significantly reduce internal water leakage
3. 100 percent smart metering across 42,650 commercial connections
4. Smart meters for domestic consumption along with revised telescoping tariffs through a “Give up water subsidy” campaign
5. 24x7 water supply to the city through five pilot DMAs which has 2,000 domestic, 300 commercial and 2,000 slum connections
6. Comprehensive GIS-based customer survey to increase the number of recorded connections from 1,50,000 to 4,00,000
7. Develop a suite of web, app and call-centre based solutions to address 37,000 grievances annually
8. Set up a separate ICT-enabled billing and recovery department for water with world-class customer service and improved collections

21. APPROACH & METHODOLOGY

What is the approach and methodology followed in selecting/identifying the pan-city proposal(s)?

Describe the reasons for your choice based on the following (max. 1000 words):

- a. The city profile and self assessment;
- b. Citizen opinion and engagement
- c. Opinion of the elected representatives
- d. Discussion with urban planners and sector experts
- e. Discussion with suppliers/ partners

a) The city profile and self-assessment

The purpose of city profiling was to identify issues that are most acute and impact maximum number of citizens. After extensive desk research across 12 sectors, water and transportation emerged as the most critical sectors due to the following reasons:

Transport

■ Pune clearly lags behind other large cities in India in public transportation options. There is no mass transit system in Pune and the number of buses per population is below the benchmark (37 buses per lakh vs a benchmark of 55 (ref. 20)). Additionally, buses in Pune have significant issues with availability (25 percent fleet off-road most of the time (ref.21)) and reliability (84 percent routes have a waiting time of more than 20 minutes). As a result, the public transport trip share is a low 18 percent vs the 50 percent benchmark. Furthermore, there is a significant perception that people earning more than INR 20,000 each month hardly use buses. But based on the success of the recent BRTS corridors—where there has been a 12 percent modal shift (ref.22) to public transport—there is clear evidence that people will use more public transport if the quality, reliability and availability of buses are improved.

■ Adding to public woes, congestion has increased dramatically in Pune due to additional reasons beyond public transportation. Most roads are not uniformly wide, leading to bottlenecks, signal timings are not synchronized, on-street parking is high due to limited parking options, and there is lower than benchmark share of NMT (33 percent as against 40 to 45 percent) due to the lack of safe NMT infrastructure and pedestrian walkaways (60 percent of footpaths have less than 2 m width). As a result, the average speed is 18 kmph and is likely to come down dramatically to 12 kmph by 2030 if no action is taken. A Google Maps picture of Pune at 7:30 pm on weekdays proves the extent of the problem, with 70 percent of main roads marked “deep red”, indicating severe traffic congestion. Transportation and mobility clearly emerged as the biggest pan-city problems to resolve, based on this exercise (Exhibit 19).

Water and Sewage

■ While Pune’s overall water supply is adequate (average net 219 lpcd vs 135 lpcd benchmark and against 78, 91 and 116 lpcd in Delhi (Ref. 15), Mumbai and Kolkata respectively), the distribution of water is not equitable, with 14 percent of the population getting less than the stipulated 135 lpcd owing to topography, lack of key infrastructure in some parts of the city and excess consumption in certain localities—driven by lack of metering (Exhibit 20).

■ Also, majority of the city receives intermittent water supply, with certain regions receiving water for durations of one to two hours up to four to five hours (e.g., Baner–Balewadi).

■ Pune also faces the issue of the discharge of untreated sewage water because of lower STP capacity.

With Pune's abundant water availability, ICT solutions can help to drive equitable and consistent supply of water to citizens. This was taken as another key area to be solved under the SCM.

b) Citizen opinion and engagement

While city profiling revealed mobility and water as two most critical issues, they had to be endorsed by citizens across the city to eventually be addressed as pan-city problems. In true pan-city fashion, a fully inclusive effort of citizen engagement was driven, reaching out to 50 percent of Pune households before making the choice of pan-city solutions:

■ **Envision:** With 12 lakh inputs from three lakh households (50 percent of total households), transport and mobility emerged as the biggest concern of citizens with 30 percent votes, while water and sewage was the next major concern with 25 percent votes

■ **Diagnose:** 13.5 lakh inputs from citizens identified the biggest goals with mobility and water. In transport, the top goals were reduction of traffic congestion, improvement of public transport and better parking facilities. In water and sewerage, the top goals were clean river/water bodies, zero discharge of untreated water, increased use and sale of recycled water, availability of 24x7 water supply and reduction in leakage and NRW (29 percent). Citizens were already acutely aware of the key issues revealed by city profiling! Therefore, Pune identified the exact issues that citizens wanted resolved across the city, and worked on them to develop truly inclusive solutions.

■ **Co-create:** Post identification of specific issues, ideas were captured from citizens in crowd-sourcing mode through workshops and the website. Forty-four percent of the solutions were related to transport and 15 percent to water and sewage.

■ **Refine:** Two day-long mini-labs were conducted with elected representatives and citizens for the two priority sectors to refine solutions.

■ **Share:** Finally, the developed pan-city solutions were shared with citizens for their approval before submission, with a total of seven lakh citizens supporting the solutions proposed for the city.

c) Opinion of the elected representatives

For the approval of pan-city initiatives by the elected representatives, an extensive four-phase engagement was conducted:

■ Meetings with more than 30 elected representatives presenting the Pune city profile across 12 key sectors, and also discussing the potential pan-city solutions

■ Review of pan-city solutions by Ministers, Member of Parliaments, Members of Legislative Assembly, Mayor, Deputy Mayor and other elected representatives to solicit their views

■ Two day-long mini-labs were conducted for the transport and mobility sectors, where elected representatives (corporators) and citizens were invited to work with PMC to refine the solutions developed in each sector

■ Finally, Smart City proposal was presented to the standing committee for their approval

d) Discussion with urban planners and sector experts

■ More than 80 Indian experts and 25 global experts were engaged to develop solution – Local and pan-India experts and academics, who have worked extensively on projects in other Indian cities (e.g., 24x7 water projects in Nagpur and Amanora) were consulted, including former secretaries of Maharashtra Jeevan Pradhikaran (MJP), Delhi Jal Board and MSMPCB, former president of the Indian Water Works Association (IWWA),

professors from the Indian Institute of Technology (Madras and Delhi).

– Global Experts from the consulting firm (e.g. global head of City Service line, global head of water service line, etc)

– Fifteen urban planners, consultants (e.g., ITDP, Embarq, Cypher, SGI), architects (e.g., Water Moore, RSP) and building contractors were asked to design sustainable and implementable solutions.

■ Four two-day long subject workshops were conducted where focus groups were created to brainstorm on issues, prioritize the most critical ones, determine causal factors and develop feasible solutions. These were attended by a mix of local (e.g., Parisar, Pedestrians First) and global NGOs (e.g., WRI), transportation consultants (e.g., ITDP, Embarq), urban planners (e.g., PDA, CREDAI), academicians (e.g., CIRT) and PMC experts.

e) Discussion with suppliers/partners

■ Around 70 best-in-class suppliers were engaged across all sectors to determine the applicability and feasibility of the solutions.

■ Five day-long supplier workshops were conducted with more than 50 best-in-class players (e.g., Siemens, Bosch, IBM, Veolia, ESRI, KPIT, L&T, Fairwood Infrastructure, IL&FS, Intel Solutions, Essel Infra).

■ Continuous engagement with suppliers, such as KPIT, Wipro, rBus and Shuttl, Siemens, IBM, Wabag, Essel Infra, Suez and Veolia, helped to develop initial solutions as well as detailed costing and implementation timelines.

■ Several MoUs were signed and PPP models were explored with interested suppliers, e.g., KPIT for ITMS deployment across buses in Pune, Veolia for 24x7 water supply, Embarq for the public bicycle sharing system, and rBus and Shuttl for private bus aggregators

■ Attracting technology start-ups to Pune, e.g., private bus aggregators (Shuttl & rBus) to create reliable, premium, low-capex public transport options

22. DEMAND ASSESSMENT

What are the specific issues related to governance and public services that you have identified during city profiling and citizen engagement that you would like to address through your pan city proposal(s)?

How do you think these solution(s) would solve the specific issues and goals you have identified?

(max.1000 words)

There are four specific issues related to transportation and mobility that need to be resolved:

1. Improving low availability of buses (25 to 30 percent of the fleet down at any time): VHMS with provisions for diagnosing harsh braking, acceleration, engine transmission, brake failure etc. and a back-end maintenance management system which can reduce fleet downtime by nearly 5 to 7 percent (estimated by technology vendor KPIT) and therefore increase availability

2. Improving low reliability and visibility of buses to commuters (more than 84 percent of commuters have to wait for around 20 to 40 minutes for a bus)

■ VTS and PIS comprising GPS, ETA algorithms, LED/LCD screens on all eligible buses and 190 major BRT and bus stops to improve reliability and provide visibility of bus arrival

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- Continuous route optimization of buses using ITMS data and creation of open data sources to enable crowd-sourcing along with citizen apps will further reduce waiting time and crowding of buses

3. Improving poor public perception of buses (more than 60 percent of users have a monthly income of less than INR 20,000 (ref.23))

- Refurbishment of 100 percent of buses and bus stops to improve the “look and feel” to expedite the increase in adoption of buses for transport by the higher-income group

- Installation of surveillance systems in nearly 510 buses and provision of panic buttons and smart shut-downs to improve the security of commuters

- Use of VTS to monitor and control over-speeding and harsh-braking and traffic-stop skipping to ensure a comfortable ride for commuters, to further increase adoption

- In-bus Wi-Fi and preloaded entertainment systems in around 510 buses

The details of solution components for public transport ITMS are in Exhibit 21.

4. Reducing high congestion on roads (more pronounced in peak hours of 9:30 am to 10 am and 7:30 pm to 8:30 pm) with average speed of 18 kmph

- Adaptive traffic management systems (with solar and UPS backups) across 100 percent signals in Pune, to dynamically adjust traffic light timings based on vehicle density (e.g., a case study of Greater Mumbai reveals the potential to reduce travel time by nearly 30 percent and increase average speed by 10 to 15 percent). The adaptive traffic management system will also have pedestrian switches on select junctions to extend times and make crossings safer for citizens, central command control room with emergency response systems and green corridors, solar-powered traffic lights with power backup and mobile apps, and alerts and portals for live and forecasted traffic (Exhibit 22).

- Intelligent road asset management system (GIS-based) to optimize the number of roads being maintained at any time and reduce road-maintenance funds based on road conditions.

- Attract and promote bus aggregators like rBus and Shuttl to create a premium public service option for car-goers, reducing the number of private vehicles by 1 to 2 percent (around 60 to 70 percent users of rBus have private vehicles (ref. 24)).

- Smart parking with real-time mobile app, smart cards and integrated ticketing infrastructure across seven parking locations to curb movement of vehicles in search of parking spaces (Exhibit 23).

- Traffic analysis and forecasting using CCTV footage and mobile GPS that improves decision-making and reduces disruptions.

Similarly, there are six specific issues related to water and sewerage that need to be addressed:

1. Finding a solution to the inequitable distribution of water (14 percent of population get less than the stipulated 135 lpcd)

- Smart bulk metering across the distribution network with SCADA to determine lpcd consumption across the city with 95 percent accuracy and ability to take corrective action by pin-pointing leaks and overconsumption

- Creating a planning department with independent access to all network data via SCADA to ensure all pipelines are laid in line with the overall network plan

2. Improving intermittent water supply throughout Pune combined with lack of pressurized water in taps

- Round-the-clock water supply will be piloted in five DMAs (6,000 connections), accounting for 2.2 percent of Pune's population, with end-to-end activities from DMA formation to consumer awareness, done through a pay-for-performance model in a one-year timeline with a total cost of INR 18 cr to 24 cr (Exhibit 24). Eleven steps to make it happen have been outlined (Exhibit 25).

- Introduce smart metering, with a revised telescopic tariff to domestic households, through the "Give up water subsidy" campaign, where citizens give up paying cess in property tax and pay according to consumption.

3. Reducing the number of unrecorded and illegal connections that are leading to >30% NRW, with only 1,50,000 of the total 4,00,000 connections being legal: Comprehensive customer survey based on a GIS platform to identify and legitimize all unrecorded and illegal connections, thereby reducing excess pressure on the network, lowering energy costs and increasing PMC's annual revenue by INR 84 cr (i.e., 18.67 percent of PMC budget) from new connections

4. Poor recovery of water charges with nearly INR 400 cr of arrears, high cost of recovery at 10 percent (compared to the benchmark of 1 percent) with 50 percent of commercial meters being faulty

- Ensuring 100 percent smart metering for commercial establishments to increase revenue by 40 to 50 percent (i.e., INR 30 cr) and cut consumption and energy costs

- Establishment of a separate recovery department with lean management to reduce the cost of earning revenue and focus on collection of revenue from slums (INR 6 cr), new connections identified through survey (INR 80 cr) and recovery of arrears (INR 25 cr)

5. Addressing the management of approximately 37,000 grievances received annually, since the current set-up is inadequate to meet service levels: Develop a suite of web and app-based solutions for grievance redressal and online bill payment, which includes an IVR (automated calling system), a 24x7 call centre, a user-friendly website and a mobile app for clicking pictures and giving GPS co-ordinates to the local junior engineer/ward officer

6. Addressing lack of awareness among citizens and high levels of wastage at the household level: Mass online and offline consumer awareness campaigns through physical as well as digital modes that include gamification campaigns, hackathons for idea generation, and competitions for making TV adverts.

23. INCLUSION

How inclusive is/are your pan-city proposal(s)? What makes it so? (max. 150 words)

We identified and rigorously followed 3 criteria for inclusiveness: 1. Spans the city and impacts the maximum number of people. 2. Has impact across all segments, especially the low-income group. 3. Addresses the concerns citizens had explicitly raised.

Inclusiveness for transportation: An improved public transportation system will most benefit the low and mid-income segments (60 percent passengers dependent on public transport earn <INR 20,000 a month). The “Smart Pune Public Transport System” to improve availability, reliability and passenger comfort will be implemented in all public buses. The “Smart Pune Traffic Management System” will be in effect across all signals in PMC area, impacting the entire city. This will help all segments, from two-wheeler riders to car drivers, making it truly inclusive.

Inclusiveness for water and sewage solutions: Starting with five pilot DMAs, the entire city will receive 24x7 water supply, making it truly inclusive. Three ICT solutions to reduce consumption (smart commercial metering, customer survey and smart bulk metering) will save water for channelling to water-deficient areas, helping those worst hit by water scarcity. The “Give up water subsidy” campaign aims to cross-subsidize the weaker section.

All issues and solutions are based on inputs from around 40 percent of Pune households, making them fully inclusive.

24. RISK MITIGATION

What are the three greatest risks that could prevent the success of the pan-city proposal(s)? In table 3, describe each risk, its likelihood, the likely impact and the mitigation you propose. (max. 50 words per cell)

Risk	Likelihood	Impact	Mitigation
While ICT solutions in mobility and water will definitely improve the situation, making a significant, perceptible difference will require holistic solutioning across non-ICT (“less is more”), and more capex-intensive solutions.	High. Clear evidence of investments is required in capex and non-ICT solutions based on benchmarks and extensive research.	Citizens may feel that their problems have not been addressed in spite of pan-city ICT efforts.	Pune has drawn a holistic roadmap to drive not only ICT solutions, but other solutions as well. It has identified sources for the required infrastructure funding. It has also planned to resolve these issues in a holistic way, thereby mitigating the risk.

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TABLE 3

Risk	Likelihood	Impact	Mitigation
<p>While ICT solutions will be delivered under SCM, significant interaction and cooperation will be required with other agencies (e.g., PMPML that owns all buses) and the city traffic police.</p>	<p>High. Implementation of solutions like GPS on buses and adaptive traffic control will not work if other agencies do not cooperate.</p>	<p>Project execution could be delayed due to the lack of coordination between agencies; cost and time overruns on projects.</p>	<p>Other agencies have been fully co-opted while solutioning for pan-city initiatives; key people of other agencies to be part of the governing board of new SPV to ensure full cooperation; service level agreements will be created between agencies for role clarity.</p>
<p>Potential low impact of ICT solutions if ideas are not implemented well and contractors not well managed to deliver on service levels.</p>	<p>Medium. The quality of solutions will be affected without the right incentives to suppliers and the right team to manage contracts.</p>	<p>There would be low impact and below-par performance/low service levels.</p>	<p>SPV to have the right competency to award and execute pan-city projects, especially knowledge about ICT solutions and how to implement them. A detailed SPV structure has been created to execute pan-city solutions. Contracts will be structured as pay-for-performance.</p>

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TABLE 3			
Risk	Likelihood	Impact	Mitigation

Continue on next page

25. FRUGAL INNOVATION

Which is the model or 'best practice' from another city that you are adopting or adapting in your proposal(s)? How are you innovating and ensuring best use of resources? Is there an aspect of 'frugal innovation' in your proposal(s)? (max. 500 words)

Transport and mobility

- Vehicle tracking systems set up in 100 percent buses (6,800) in London, Seoul (8,500), Bogota (Transmilenio, 1,500) and Mysore (400)

Innovation: Forecasting traffic for special days/times—such as road/metro restrictions due to repair, traffic restrictions and festivals—to help optimize bus routes

- Public information system (PIS) revamp with bus guides implemented in 100 percent bus stops in Metropolitan Transportation Authority and Seoul

Innovation: Security features installed in buses and at bus stops to prevent theft and ransacking

- Vehicle health monitoring system (VHMS) kits installed on all 244 buses operated in Tennessee, USA (Intel has worked extensively on Greyhound bus fleet in US) (ref.25)

Innovation: Rugged anti-theft and anti-tampering design

- Adaptive traffic management systems with central command centre set up across 300 traffic signals in Mumbai, 97 in Patna and 100 percent of signals in Singapore (ref.26).

- Smart parking for 100 percent parking spaces in Amsterdam (aided by the app MobyPark), Barcelona (Appark) and San Francisco (ref.27)

Innovation: Use of CCTV-based system over physical sensors (which might be susceptible to theft and damage)

- Private bus aggregators—two active in Mumbai, with rBus catering to 19 routes and 63,000 rides, Shuttli (active in Delhi NCR) about to reach 100,000 rides

- New technology—traffic analysis using CCTV and mobile GPS being piloted in Pune

- Intelligent road asset management being deployed by NHA for asset management of 3,000 km of highways (called RAMS); United States Federal Highway Administration extensively uses roughness indicators and ASTM standards (ref. 28).

Water and sewage

- 24x7 water supply pilot in Pimpri–Chinchwad, which has the same terrain and structure; pay for performance model in Nagpur (250,000 connections), West Delhi (130,000) and Karnataka (25,000) (Ref. 16) has enabled a phased approach to a 24x7 water solution

Innovation: 24x7 water scale-up goes hand-in-hand with customer survey and awareness campaign to push acceptance of smart metering and ease of converting illegal connections to legal

- Comprehensive customer awareness programs including concepts such as Water

Friends/Ambassadors observed globally in Singapore and domestically in Karnataka and Nagpur

- Customer surveys based on GIS platforms have been implemented worldwide in cities such as Barcelona, Amsterdam, Delhi and Bangalore
Innovation: Low cost, since Pune’s existing network of pipelines and reservoirs is already captured on a proprietary GIS platform, total cost of INR 5.5 cr (INR 48 per connection) and additional annual revenue of INR 60 cr; incentivize plumbers to provide details of illegal connections that can be converted to 24x7 water supplied legal connections
- Smart Metering done in several cities globally such as Dubuque, Malta, Barrie (44,500 connections) (Ref. 17), as well as India such as Malkapur (5,000 connections), Greater Mumbai (100,000), Delhi NCR (300,000) (Ref. 18)
- Smart helium-based leak identification with preventive maintenance done in Doha, Sao Paulo, Beijing, Pimpri–Chinchwad, (268 km inspected, 269 leaks found), Malviya Nagar in Delhi (84 km, 303 leaks), MCGM, Maharashtra (80 km, 135 leaks) (Ref. 19)
- Prudent to make smart commercial metering compulsory and establish separate billing and recovery department—capex to be recovered in 24 months
- “Give up water subsidy” based on the previously successful “Give up LPG subsidy” program of the Central Government

26. CONVERGENCE AGENDA

In Table 4, list the Missions/Programmes/Schemes of the Government of India (eg. SBM, AMRUT, HRIDAY, Shelter for All, Digital India, Make in India, Skill India) and relevant external projects and describe how your proposal(s) will achieve convergence with these, in terms of human and financial resources, common activities and goals. (max. 50 words per cell)

TABLE 4		
S.No	Missions/Programmes/Schemes/Projects	How to achieve convergence
1	AMRUT	<ul style="list-style-type: none"> ■ Under AMRUT, PMC has requested INR 938 cr to: <ul style="list-style-type: none"> – Build key infrastructure to help the deficient 14% of the population overcome water scarcity. – Install bulk meters, conduct water audits and use leak identification to reduce NRW. ■ AMRUT will provide funding and SPV will handle implementation. ■ AMRUT will provide all core infrastructure required; SCM will implement smart ICT initiatives.

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TABLE 4		
S.No	Missions/Programmes/Schemes/Projects	How to achieve convergence
2	NRCP	<ul style="list-style-type: none"> ■ This scheme can fund initiatives which show a direct impact on the river. ■ JICA has already approved funding (INR 990 cr) to construct 11 STPs. ■ This will help to create hard infrastructure for water and sewage, complemented by ICT solutions from SCM.
3	Metro grant for public transport	<ul style="list-style-type: none"> ■ Phase-I of the Pune metro has been approved by the Ministry of Urban Development (MoUD); the grant of funds is under consideration. This will help to achieve holistic solutioning in the long term, while ICT solutions can be driven under SCM.
4	MORTH Grant for Ring Roads	<ul style="list-style-type: none"> ■ 3 ring roads—HMRTC, inner and outer—are under consideration as part of this scheme (INR 15-20,000 cr). The state will make part of the funding along with the Centre. As in the case of the metro, this will also help in holistic solutioning by taking care of bypass traffic, while SCM is used for ICT solutions.

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S.No	Missions/Programmes/Schemes/Projects	How to achieve convergence
5		
6		
7		

27. CONVERGENCE IMPLEMENTATION

Describe how the convergence will be implemented? (max. 350 words)

National River Conservation Project: A sewage treatment project of INR 990 cr has been approved. Pune's population will grow resulting in 300 to 350 MLD increase in total sewage. The NRCP will manage this through:

- Augmentation of 10 STPs located across the city along with 113.6 km of sewerage works to meet capacity requirements up to 2031
 - Installation of SCADA and GIS mapping platform
 - Selling 5-7 MLD of treated water to industry, railways, gardens and business parks.
- A detailed DPR for NRCP is being prepared and all smart elements to be done under SCM will be augmented in the DPR (SCADA, GIS mapping platform, etc.) to achieve full convergence.

AMRUT: Total funding of INR 935.80 cr has been requested from AMRUT to:

- Augment network and storage capacity in areas without piped water supply (INR 212.21 cr)
- Improve water-supply levels in water-scarce fringe areas (INR 309.29 cr)
- Reduce NRW via metering and leak identification (INR 414.30 cr)

Convergence will be achieved with the 10-year 24x7 water supply project across the city:

- The building of key infrastructure (reservoirs and pipelines) will complement the overall network development. The bulk metering and SCADA system will be set up to conduct water audits and identify illegal connections.
- As domestic metering and telescopic tariff pick up pace after the voluntary scheme, funding from AMRUT will help implement 100 percent metering across the city.

MoUD/ MoRTH grants for metro and ring roads

- Phase I of the Pune metro has been granted approval by the MoUD, and the grant of funds is under consideration
- Three ring roads—HMRTC, inner and outer—are under consideration as part of the MoRTH scheme (INR 15-20,000 cr). The state will grant part of the funding, as will the Centre. This will help to achieve holistic solution in the long term, while ICT solutions can be driven under SCM.

28. SUCCESS FACTORS

Describe the three most significant factors for ensuring the success of the pan-city proposal(s). What will your city do if these factors turn out to be different from what you have assumed? (max. 250 words)

1. Clearly defined organization structure, roles and responsibilities of all stakeholders involved (PMC, SPV, PMPML, city traffic police), e.g.:
 - O&M of buses by PMPML and ICT installations by pan-city SPV, adaptive traffic control installation by pan-city SPV, while signals will be controlled by the local traffic police
 - Water O&M to be carried out by PMC, but ICT solutions to be implemented by SPV
- Action Plan in case of variations:
- MoUs with service levels between different agencies for reference in case of challenge

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- Governing board of the SPV to have key people from all these para-statal agencies.
 - Governing board of the SPV to have adequate powers to resolve any disputes, enforce contracts with public or private organizations, if required, redraft contracts as well.
2. Policy changes to complement the projects and initiatives
- Integrated, holistic, planned development (e.g., BRT and Metro in conjunction with existing buses serving as feeders)
 - Implementation of paid parking policies throughout the city
 - “Give up water subsidy” scheme
- Action Plan in case of variations:
- Drive significant change management program wherever policy changes face hurdles.
 - Change scope of ICT solution to fit in exiting policy framework, wherever possible.
 - Ensure effective project management and control link between SPV and other bodies.
3. Adoption and use of technology by citizens
- Penetration of internet, connectivity, smart phones, laptops is a must
 - Improvement in 3G/4G or public wi-fi infrastructure
 - Use of apps from Pune city app store
- Action Plan in case of variations:
- Switch to non-internet SMS-based system where possible.
 - Create multilingual and easy-to-use apps.
 - Undertake skilling initiatives and app awareness drives for citizens.
 - Refine apps by making them open source and making data from ICT solutions public.

29. BENEFITS DELIVERED

How will you measure the success of your pan-city proposal(s) and when will the public be able to ‘see’ or ‘feel’ benefits: immediately, within Year 1, or in the medium or long term, 3-5 years? (max. 150 words)

Less than 12 months:

Transport: Mobile app to track 100% buses, all bus stops that are coded and equipped with SMS-based ETA service, bus aggregators begin operation, 1 MLCP working

Water: Smart commercial metering initiated, improved convenience in the billing process for users, better service through new grievance app, portal and call center

12-24 months:

Transport: Smoother traffic flow as adaptive traffic control implemented, ~190 “smart” bus stops with PIS and security features, smoother bus driving, adherence to schedule and fewer break-downs, traffic apps to pick modes and routes, 3 operational multi-level car park with smart parking, improved decision making through traffic analysis

Water: 24x7 water in pilot DMAs, deficient areas get more water as leakages & NRW drop

24-60 months:

Transport: Significant reduction in congestion, high usage of a high-quality, smart integrated multi-modal transport (Bus, BRT, MRTS) system, 7 smart MLCPs in the city

Water: 3 out of 5 zones (40–50% of Pune’s population) have adequate water supply with smart metering (residential), best-in-class smart metering, automated billing and payment and 24 hour turnaround of complaints. 24x7 water to 100% of Pune in 10 years

30. MEASURABLE IMPACT

What will be the measurable impact of your pan-city proposal(s)? Please describe with respect to the following types given below, as relevant to your city and proposals (max. 150 words)

- a. Governance Impact (eg. government response time to citizen complaints halved, creating faster service delivery overall)

Transport : The vehicle tracking system will enable PMPML to respond to incidents of over-speeding, harsh braking, skipping red lights, etc. Vehicle health monitoring will improve fleet utilization from 68 percent to 75 percent, translating to a 4 to 5 percent (ref 29) increase in revenue and making PMPML healthier (significant financial issues at present). The surveillance system will reduce ransacking and damage of buses/bus stops and ensure faster emergency response system. Using central command centre will ensure faster decision-making in traffic management, forecasting of traffic conditions and volume, and will help in future planning. Intelligent asset management will optimize investments and save 10 to 20 percent (ref 30) of the annual maintenance cost.

Water and sewage: Smart bulk metering will enable PMC to prudently plan the water network prudently based on accurate lpcd consumption data. PMC will also be able to respond to new connection requests in a resource-efficient and time-bound manner. Ground-water levels will be higher as the ground water used by the construction sector will be replaced by STP-treated water. Trifurcation of water department into 3 verticals (Projects, O&M and PR) to lead to greater efficiency and better customer satisfaction.

- b. Impact on public services (eg. real-time monitoring of mosquito density in the atmosphere reduces morbidity)

Transport : Move significantly to a society where poor do not need cars and the rich take public transport to commute. Reliable, on-time and safe public transport that is ITMS-enabled will improve customer convenience and comfort. This will help shed the image of buses as a “poor man’s transport” and increase number of passengers by around 10 to 12 percent. Adaptive traffic control systems will increase traffic speed by 10 to 20 percent and reduce congestion by (up to) 30 percent (ref 31). The PBS network with road design to promote walkability will increase the use of NMT by 5 to 6 percent, reducing the number of private vehicles by a similar value. Public transport ITMS, wi-fi, PIS and apps will improve the image of public transport and increase passenger volume by 6 to 7 percent.

Water and sewage: The move to 24x7 water supply in five DMAs will fundamentally transform the public perception of water availability in Pune. This will be a big driver for making it happen across Pune and also potentially changing the financial model of water distribution. A simple central system comprising IVR, centralized call centre, user-friendly website and mobile-based applications will help to file complaints and transform citizens’ experience. Domestic metering will curb excess consumption, allowing PMC to channel water to deficient areas.

D. IMPLEMENTATION PLAN

31. IMPLEMENTATION PLAN

In Table 5, describe the activities/components, targets, resources and timelines required to complete the implementation of your area-based development and pan-city solution/s. This should include the items mentioned as Essential Features in Q. No. 16 plus other 'smart' solutions, including accessible infrastructure for differently-abled. (max. 50 words per cell)

Table 5							
S - N o	Activity/component	Indicator	Baseline (as on)	Target	Resources required	Likely date of completion	
AREA-BASED DEVELOPMENT							
1	1. Increase in open spaces by converting unused amenity space into gardens, open space innovation.	# of gardens	4	13	INR 1.25 cr	Dec 2016	
		Open vegetable markets	0	2	INR1.6 cr	May 2017	
		Multi-purpose community hall	0	2	INR 10 cr	May 2017	
	2. A marquee riverfront development along with river cleaning to double up open space along with creating world class recreational area	Walking promenade	0	3.5 km	INR 100 cr for full riverfront development; arts village through CSR support, riverfront restaurants will be bid and on commercial basis, river cleaning from JICA funds	Dec 2018	
		Arts village	None	Thriving arts village on river			
		Riverfront restaurants	None	5-7		Dec 2019	
		Treated water	175 MLD sewage	Zero discharge		Dec 2019	
Root-zone cleaning	Nil	4 km riverbed	INR 8 cr	Jun 2017			
2	3. Assured 24X7 electricity supply with significant improvement in sustainability and energy efficiency by implementing - 80%+ LED lighting - Solar roof tops - Smart Grid	% of LED lamps	7%	83%	Private player puts all infrastructure required for LED lighting / dimmers and gets % of savings in return	LED lighting: Sep 2016	
		% of sodium vapor lamps controlled by dimmers	0%	17%			
		Energy savings on street lighting	Nil	30%			
		% energy supply through solar	Almost nil	15%	Solar panels on buildings under PPP model at zero cost - citizens to pay directly	Solar panels: Apr 2016	
		AT&C losses	9%	6%			
		Billing efficiency	98%	100%			
		Collection efficiency	96%	100%			
Power outages (due to failure)	2 hours	Almost nil	INR 364 cr to execute Smart Grid project, INR 304 cr by MSEDCL	Smart grid and net metering: Mar 2019			

Table 5						
S . N o	Activity/component	Indicator	Bas eline (as on)	Target	Resources required	Likely date of completion
3	4. Adequate water supply, smart metering and sewage treatment	% meter coverage Water supply (hrs) Water deficiency% No of reservoirs Km of pipeline Rainwater harvesting Stormwater drains Treated sewage Waste water recycling	0% 1 to 5 60-70% 4 139 <10% 40% of area 48 MLD Nil	100% 8 to 10 0% 8 189 100% across all housing societies 100% of area 97 MLD 10%	INR 87 Cr for reservoirs, 6.4 cr for society level sumps, 43 cr for stormwater drains, 100 Cr for Augmentation of Baner STP by 30 MLD and Bopodi STP by 19 MLD (STP augmentation covered under JICA)	Water supply: Dec 2017 Rainwater harvesting: Mar 2017 Stormwater Dec 2017 STP augmentation Oct 2019
4	5. Create a zero garbage and 100% sanitation society 6. NMT increase, street redesign to reduce congestion, vehicle free road	Waste collected Waste segregated Number of public toilets New/ retrofitted footpaths along with curb ramps Street redesign Junction design Non-motorizes road PBS	70% 55% 10 0 0 0 0 nil	100% 90% 74 70 km 27 km 14 nos 1 (12 hrs) 42 km, 1200 bicycles, 112 stations	INR 16 cr INR 2 cr INR 31 cr INR 189 cr INR 14 cr INR 1 cr INR 9.5 cr	June 2017 May 2017 Dec 2017 Dec 2017 Dec 2017 Dec 2017 June 2018
5	7. Improving public transportation to increase usage from 18% to 40% 8. Start-up hub for job creation	E-buses as feeder network E-rickshaws for connectivity BRT to Hinjewadi ICT enabled bus stops Transit hub for long distance commute ABB - # of jobs (including start-up and new jobs) # of start-ups	0 0 0 0 0 10,000 -	100 e-buses 100 e-rickshaws 8 km BRT 54 bus stops to be retrofitted Large transit hub with 100 buses capacity 45,000 (13,000 from start-up hub) 200	INR 125 Cr, out of which 70 Cr provided by FAME INR 1.1 cr INR 210 cr INR 27 cr Developed by the SPV on PPP model SPV to fully fund start-up hub, potential to earn INR 1000 cr from commercial space	Dec 2016 Dec 2016 Sep 2020 Sep 2020 Nov 2018 Nov 2018

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Table 5							
S . N o	Activity/component	Indicator	Baseline (as on)	Target	Resources required	Likely date of completion	
6	9. Improve social infra by increasing schools and hospitals to benchmark levels	# of schools	13	21	PPP model	June 2019	
		# of hospitals	9	13	PPP model	Dec 2019	
	10. Leverage IOT for citizen services and security and ease of doing business	CCTV coverage	20% (23 cameras)	100% (114 cameras)	INR 27 cr		Jan 2017
		Emergency response	20-30 min	5-7 min			
		Single window e-services	Nil	25	Costing included in pan-city command control center		Dec 2016
		Public wifi	0%	100%	INR 137 cr (PPP mode)		Aug 2017
		Digital literacy	60%	100% in family	INR 2 cr		Dec 2016
		E-enabled business service	Nil	All permissions related to setting up business			
7	11. Drive inclusive development of area through zero slums	# of slums	407	Nil	Through SRA scheme	Dec 2020	
		Skilling of slum youth	Nil	800		June 2017	
		Tablet based "mHealth"	0	1700	INR 2 cr for all slum related smart solutions		Jun 2017
		# of affordable houses	Nil	300-400	INR 40 cr		Dec 2020
	12. Visible improvement in area	Underground wiring	20-30%	100%	As part of smart grid project		Mar 2019
		Smart Parking (vehicles on road)	No MLCP	1 MLCP with 750 vehicle capacity to reduce on street parking	INR 50 cr for construction of mechanical MLCP		Dec 2017
8	13. Other IOT/ smart features in the area	ABB Punetel card	No citizen card across the area	Unique card to cater to unique citizen needs of the area (from utility services to interests)	Included in e-gov cost	Dec 2017	

Table 5						
S · N o	Activity/component	Indicator	Baseline (as on)	Target	Resources required	Likely date of completion
PAN-CITY SOLUTION						
1	Smart Public transport for Pune - Real-time tracking of buses using GPS - Maintenance using vehicle health monitoring system - Passenger information system (PIS) with LED screens in buses and bus-stops - Mobile app to track-bus location and ETA real-time - Ride quality monitoring using smart sensors - In-bus Wi-Fi and entertainment system	Number of buses with GPS/ VTS/PIS/Vehicle Health Monitoring Systems Number of smart bus stops with passenger information systems	0 out of 1440 buses 0 of 1900 Bus Stops	1440 to be fitted with GPS, VTS and health monitoring systems 510 buses with PIS and 190 stops, and terminals with PIS 100% buses trackable with VTS Bus Stop code based SMS ETA service for 100% bus stops	INR 70 cr	April 2018
2	Intelligent Pune Traffic Systems - Signal synchronization - Smart traffic lights with solar panels, UPS back-up, pedestrian switches and PA system -Smart Parking Initiatives -e-Chalaan Systems with smart Chalaan payments	Number of signals synchronized and smart traffic lights and signals Multi-level car parks (MLCPs) in the city enabled with Smart Parking Number of traffic police personnel equipped with e-Chalaan Tablets	0 out of 319 0 out of 7 Nil	100% of signals Adaptive Traffic Management Systems with pedestrian switches 7 smart parking lots with ~4500 slots, apps, PIS and Card based payments 500 cops to be equipped with android based e-chalaan tablets	INR 123 Cr INR 15 Cr (average 16 Crores annually for Opex and Capital refresh) INR 2.5 Cr annually in connectivity and Opex	June 2018 April 2019 Dec 2016
3	Smart Pune Traffic Planning Suite - Integrated Road Asset Management Systems - Traffic pattern analysis using mobile GPS data	Percentage of funds that are allocated based on actual road condition data Transport planning using traffic origin-destination study and analysis	0% No analysis done	100% of fund allocation takes place using real-time road condition data Transport planning using heat maps and changing travel patterns	INR 3 Cr INR 18 Cr	Road Asset Management: Apr 2017 Traffic analysis: Dec 2016

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Table 5						
S . N o	Activity/component	Indicator	Baseline (as on)	Target	Resources required	Likely date of completion
4	Use ICT based solutions to reduce losses/NRW and generate electricity:	NRW	30%+	10-15%		Helium leak identification: Dec 2017
	A. Advanced Helium Leak Identification	No. of invisible leaks identified	Nil	2.5 per Km (expected)	INR 19 Cr	GIS Customer survey: Apr 2017
	B. Customer survey on GIS platform to record all connections	No. of registered connections	150,000 connections	400,000 connection	INR 5.5 Cr	Pilot 24X7: Dec 2017
	C. Make Naidu STP (115 MLD) energy neutral	No. of connections with 24X7 water	Nil	6000	INR 22 Cr	STP electricity generation: Feb 2017
		Electricity Generated annually	0 units	1.92 million units	INR 6 Cr	
5	Smart water metering across all levels:					
	A. Smart Bulk Metering with DMA Isolation and SCADA across entire water network	Water Audit	No information	Proper Audit	INR 83 Cr	Dec 2017
		Pressure Management	No Pressure observed	Partial pressure management		
		Network Planning	None taking place	Based on GIS Platform		
	B. Smart Metering across 100% of commercial establishments	Functional Meters	25%	100%	INR 60 Cr	Ongoing till Dec 2019
		Revenue generated/ year	60 Cr.	90 Cr		
		Consumption	Data N/A	Data with upto 95% accuracy	INR 20 Cr	Continuous
	C. Introduce domestic metering via a voluntary "Give up your water subsidy" scheme along with a telescopic tariff	Average LPCD	219	180		
		Domestic Metering	0%	100%		
6	Develop a comprehensive suite of web and app based solution for easy grievance redressal, complaint lodging and bill payment	Grievances recorded through automated mechanism	1%	80%	Capex and Opex already covered as a part of the IOC (in E-Governance)	Dec 2016
		Record of complaints	No e-records	100% e-records kept		
		Performance review of junior engineers	Nil	Regular reviews		
		No. of options for grievance redressal available to citizens	One i.e. calling up local ward office	Four including IVR, Website, App and 24x7 Call Cente		

32. SCENARIOS

Using information from Table 5, describe the critical milestones, realistic timelines and sequencing of efforts and events that you are projecting as the short-, medium- and long-term scenarios for your smart city. If necessary, include PERT and CPM charts in Annexure 3. (max. 500 words)

By the time Pune gets selected among the top cities, a detailed execution plan will be created for about 50 initiatives across pan-city and local area (within the first 6-8 months of selection) including DPR, vendor/ partner outreach and discussion, finalization of package and potential award of 40-50% of the packages. In order to enable this execution, two things will be critical:

1. SPV top team is in place and key people who would execute the critical packages are in place (SPV structure is detailed in SPV Q# 33). At least 5-6 HODs should be in place within the first month, who are best in class as per market standards.

2. SPV is able to get best expertise based help to execute these packages: Since it will take time before its full team gets ramped up (and also because significant expertise is needed), SPV will aim to get best international help in creating DPR and vendor/ partner selection within the first 6 months of the execution phase. Future Cities Catapult, a leading city solutions organization in the UK, has already written to PMC to support its Smart City initiative. Additionally, Pune has been selected as one of the 3 cities in India, which will get direct support from the UK Government in implementation of Smart City Plans (both Funds and Expertise). Also Cities Development Initiative For Asia (CDIA) has extended support to Pune for setting up a technical assistance cell for the next 2 years. CDIA is an international partnership initiative by ADB and German Government for assistance to mid-size Asian Cities on capability building and implementation.

After the detailed execution plan is in place, all short, medium and long term initiatives will be executed. An initial cut on timelines for all major initiatives for pan city and local area is taken in Exhibit 28 and Exhibit 29 respectively. While doing the initial planning for the timelines and milestones, the following principles were followed:

1. 'Quick-win' initiatives that do not require significant physical infrastructure creation and are more ICT dependent should be fully completed in the first 12-18 months of execution, for example: A) LED lighting: funds not required, just needs replacement, vendors to execute contract on % savings basis – finish early in 6 months (Sep 16), B) Single window clearance for 20-25 citizen services: e-governance module needs to be rolled out with just change in processes and no major capex (Aug 2016) C) Pan-city Smart ITMS public transport: can be quickly rolled-out in existing PMPML buses. Low capex (INR 70 Cr over 2 years) and the impact is high for both for citizens (higher quality of ride and a shift from the perception of buses as a 'poor man's transport') and for PMPML (~10% increase in revenue due to higher number of passengers).

2. Initiatives that require high capex and have a long lead time to impact were phased-out appropriately to ensure projects are not stalled due to lack of funds, e.g. augmenting 46 km road infrastructure in ABB area is a high-capex (~INR 190 Cr) and long lead-time activity (total of 4 years). It has, therefore, been split into 3 phases and arterial roads that are expected to have higher traffic in the future have been prioritized.

- Similarly, Smart parking at 7 new MLCPs that will cost INR 17 Cr and take 4 years to complete is phased-out in 3-phases – with the first one being setup in the transit and start-up hub in ABB to ensure the tighter project management and control and ensuring that the pilot is successful

3. Integrated planning was done for initiatives in convergence with other government projects and schemes, e.g. in local-area, smart grid and metering has been planned in collaboration with MSEDCL's Pune smart-grid project. MSEDCL has agreed to take up ABB area as the pilot for smart-grid project where-in Smart City funds will be used to install smart meters in ABB area while the cost of revamping T&D infrastructure will be borne by MSEDCL.

4. Detailed cash-flow was constructed to ensure cash outflow due to projects matched the cash inflow from funds from the Smart City mission and other sources like land monetization, CSR and other government missions, and also revenue from completed projects offsets the O&M cost, eg, in pan-city water, 100% smart commercial metering is one of the first initiatives that will be taken up. On completion, this will generate additional revenue of INR 30 Cr per year which can be spent on repair of pipelines while conducting leak identification using Helium leak.

33. SPV

The SPV is a critical institution for the implementation of the Proposal. Describe the SPV you propose to create in your city, with details of its composition and structure, leadership and governance, and holding pattern. Based on your responses in Table 6 describe how you envision the SPV to fulfill the role set out in the Mission Guidelines. (max. 500 words)

Table 6 (CHECKLIST: supporting documents for 1-7 must be submitted in Annexure 4)		
S. No.	Activity	Yes/No
1.	Resolution of the Corporation/Council approving Smart City Plan including Financial Plan.	Yes
2.	Resolution of the Corporation/Council for setting up Special Purpose Vehicle.	Yes
3.	Agreement/s with Para Statal Bodies, Boards existing in the City for implementing the full scope of the SCP and sustaining the pan-city and area-based developments.	Yes
4.	Preliminary human resource plan for the SPV.	Yes
5.	Institutional arrangement for operationalisation of the SPV.	Yes
6.	If any other SPV is operational in the City, the institutional arrangement with the existing SPV	Yes
7.	Additional document/s as appropriate	Yes

Pune realizes the importance of SPV in implementing the plan. Therefore, it is moving ahead towards the formation of Smart City SPV for the execution of projects under Smart City mission. The delegation of powers to the SPV is proposed to be done under Section 66(41A) and 66A of the Maharashtra Municipal Corporation Act. Private investment will be suitably accommodated in the SPV structure, while ensuring that the balance of power between the State Government and PMC is maintained (including at sub-SPV level).

Since the SPV aims to increase the revenue and/or reduce the cost of operations of PMC by bringing in innovative practices and improving efficiencies, the incremental benefit / part of freed budget due to efforts of SPV, will be granted to SPV to fill the O&M expenses gap. An escrow account will be opened to receive such revenues. Any Dividends will be ploughed back into the SPV till the time there are no private shareholders in the SPV.

The Governing Board shall convene once every quarter and will take major strategic decisions and approve the annual strategic plan of the SPV. It will comprise of:

- The Municipal Commissioner of PMC who will also be the Chairperson of the SPV
- The Mayor, Chairman of the Standing Committee, the Leader of Opposition and three other Party Leaders (> 10 representatives in House)
- The State Government will be represented by the District Collector, Commissioner of Police, CMD of PMPML, Chief Engineer of MSEDCL, Pune
- 2 eminent citizens
- Representative of MOUD, GOI, and
- The Chief Executive Officer (CEO) of the SPV

The SPV shall also have an Executive Committee that will meet once a month to take month-to-month decisions on the functioning of the SPV that are beyond the authority of the CEO. Executive committee will comprise of: (a) Municipal Commissioner of PMC (b) CEO of the SPV (c) Chief Financial Officer (CFO) of the SPV

The Board shall appoint the CEO from open market with the concurrence of MoUD for a fixed term of 3 years, extendable by 2 years. The compensation of the CEO will be at par with market standards. Other key personnel in the SPV along with the end-state architecture of 45-50 employees is detailed in Annexure 4.4. Further, project management experts may also be appointed by the SPV for designing, developing, managing and implementing projects.

Additionally the SPV will follow the following principles:

- PMC will have the rights of fixing tariff and all existing taxes and charges will continue to go to it. Revenue created from new infrastructure/ projects will go to SPV
- SPV will discharge all responsibilities under Smart City Mission: A) ICT based pan city initiative and B) Local area development for area selected under smart city
- PMC can transfer the amenity spaces and PMC land in ABB area at no cost to the SPV so that it can develop these areas for citizens
- To ensure smooth functioning as execution arm, SPV to have the ability to do all procurements and hire people and pay market salaries, if required
- SPV to assist in undertaking key municipal functions in SPV area (e.g., collect property taxes, collect user charges, give building permissions)
- SPV to work as developer for slum rehabilitation in ABB
- SPV to have Service Level Agreements (SLAs) with municipal department in SWM, Water etc and the ability to outsource part of these functions within the ABB area
- SPV to undertake development of 70 acre of greenfield private land in the ABB region through a TP land pooling scheme

34. CONVERGENCE

In Table 7, give details of the government (Central, state/ULB) departments, parastatal organizations and public agencies who will be involved with the time-bound execution of each of the project activities/components (both area-based and pan-city) you have identified. (In Annexure 3, include a flowchart showing the network/relationships that the SPV will form with government and non-government agencies, and indicating the nature of connection with each entity.) (max. 50 words per cell)

TABLE 7			
S.No	Activity/Component	Department/agency/organization	Role/responsibility
1	Transit hub and start-up zone: Developing a multi-modal transit hub, a start-up hub and multi-level car park in 10 acres of Octroi Naka land in ABB	- PMC - PMPML - MSRTC	- SPV to develop Transit and Start-up hub, including Multi-level car parking in the 10 acre land in the ABB area (involve bidding process and selecting partners through PPP model) - MSRTC will chart out routes operating out of the transit hub - MSRTC to manage operations of inter-state & inter-city buses - PMPML to manage operations of buses (BRT, feeder) - SPV be the umbrella body coordinating between PMC, PCMC & PMPML
2	Riverfront: Development of 3.5km river strip in ABB to create - Urban farms - Leisure zone - Anchor point - Retail zone - Walking promenade - Mixed use space	- PMC - CWRPRS (Central Water Power Research Station) - MPCB (Maharashtra Pollution Control Board) - Collectorate - Irrigation department - NGT (National Green Tribunal)	- PMC responsible for end-to-end development and O&M of the riverfront - Irrigation department to provide NOC for the project - MPCB to track the pollution levels and impact of development - NGT to monitor the environmental/ green cover impact - CWPRS to look into the hydraulics survey, computerised simulation and modelling of the riverfront - Collectorate to be kept in loop and informed about all activities
3	Smart grid and solar power generation: - Smart grid - Revamp of T&D network - Underground wiring - Solar roof tops	- PMC - MSEDCL (Maharashtra State Electricity Distribution Corporation Limited) - MoP (Ministry of Power) and MNRE (Ministry of New and Renewable Energy)	MSEDCL to prepare plan for smart grid in ABB, appoint PIA to conduct feasibility, prepare DPR, execute projects, put in place mechanisms under net metering program. MoP, MNRE to approve DPR for smart grid, provide funding approvals PMC to grant 'right of way' permissions for implementation, conduct camps to ensure maximum citizens opt for solar energy plans, arrange statutory clearances & work permits, coordinate with all stakeholders.

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TABLE 7			
S.No	Activity/Component	Department/agency/organization	Role/responsibility
4	Sanitation and waste management - Solid waste management - Sanitation - Toilets - Cleanliness of public spaces	PMC	- PMC employees responsible for door-to-door garbage collection with Service Level Agreements (SLAs) with SPV - SPV responsible for waste segregation, transportation and transfer station operation - Organic waste processing plant to be run by either PMC or private operator - SPV responsible for cleanliness, sanitation ABB - Community, school toilets constructed by SPV, O&M by PMC
5	Safety and security - CCTV surveillance - Emergency response center	-PMC - Police department - Hospitals - Fire department	- SPV to setup and manage O&M of the emergency response center - SPV to procure police vehicles, ambulances, fire-fighting equipments etc and provide to Police /Hospitals/Fire station via SLAs - Police/Hospital/Fire department to be responsible for O&M - PMC to provide additional policemen to SPV, SPV will have the option of setting up and managing private security force, if needed
6	E-governance and digital - Integrated operations center - Citizens' desk - Citizen app - Public Wi-Fi	PMC	- SPV responsible for setting up and managing O&M of central command center, utility sensors, communication network and platform - SPV to setup and run the citizen service centre - PMC to provide back-end support to services provided in the Citizens' Service Centre (e.g. birth certificate) via SLAs - SPV to setup optical fiber network and will be responsible for O&M
7	Slum redevelopment and affordable housing	- PMC - SRA	- SPV responsible for redevelopment of 2.25 acres of slums on private land in the ABB region - SRA responsible for overall governance, including consent and eligibility - SPV to undertake socio-economic transformation initiatives in slum areas in ABB and work towards improving healthcare and education facilities and build skills to generate employment; PMC to support SPV in this initiative

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TABLE 7			
S.No	Activity/Component	Department/agency/organization	Role/responsibility
8	<p>Slum redevelopment and affordable housing</p> <p>Water supply and sewage</p> <ul style="list-style-type: none"> - Build infrastructure to provide adequate water supply - Smart metering - River cleaning and Root-zone technology - Rain-water harvesting 	<ul style="list-style-type: none"> - PMC - Housing societies 	<p>SLA with PMC to provide bulk water at pre-defined rate, build key infrastructure to supply 150 lpcd. Major O&M issues taken up by PMC, minor issues by SPV. Water supply, sewage managed by PMC with SLAs. SPV to install & manage root-zone technology & physical river cleaning. SPV to build rain-water harvesting sumps in housing societies, societies responsible for O&M. Baner STP to be augmented and managed by PMC</p>
9	<p>Transportation and mobility</p> <ul style="list-style-type: none"> - BRT network (roads, bus stops) - Electric buses - E-rickshaws - Footpaths and street redesign - Junction redesign - Public bicycle system (PBS) 	<ul style="list-style-type: none"> - PMC - PMPML - PCMC - PMRDA 	<p>SPV to construct roads, bus stops for the BRT network in the ABB area; responsible for O&M of 54 bus stops in ABB. PMPML to manage and run the buses, SPV has the option of contracting additional buses on specific routes, if required. SPV to procure e-buses, e-rickshaws that will be contracted out to private operators. SPV to setup PBS in ABB & University area, PMC to support, facilitate and grant permissions. SPV to undertake road, junction and footpath redesign.</p>
10	<p>Pan-city transport initiatives:</p> <ul style="list-style-type: none"> - Smart ITMS enabled public transport - Intelligent adaptive traffic management - Smart parking at MLCPs - Private bus aggregators - Intelligent road asset management - E-challans 	<ul style="list-style-type: none"> - PMC - PMPML - Traffic Police 	<p>SPV to setup Smart ITMS solutions in PMPML buses and be responsible for O&M. SPV to setup intelligent adaptive traffic management solutions across 319 signals and manage O&M, traffic police to operate. PMC to construct 7 MLCPs, SPV to setup and manage O&M of Smart Parking. Traffic Police to ensure enforcement of parking rules. SPV to setup Intelligent Road Asset Management, PMC to handle O&M. SPV to setup e-challan systems and manage O&M.</p>
11	<p>Pan-city Water and Sewage</p> <ul style="list-style-type: none"> - Smart bulk, commercial and domestic metering - 24X7 water pilot - Helium leak identification - Energy generation at STP - Grievance redressal app - 'I give up water subsidy campaign' 	<ul style="list-style-type: none"> - PMC 	<p>SPV to install smart bulk and smart commercial metering, manage O&M; PMC to manage, use data, collect revenues. SPV to conduct helium leak identification; PMC to plug leaks. SPV to setup grievance redressal system, managed by PMC (including O&M). SPV to launch, manage 'Give up Water subsidy campaign, install smart meters; PMC to manage O&M, billing collections. SPV to install power generation capacity in Naidu STP</p>

35. PPP

In Table 8, give details of all the private companies/corporations/organizations that need to be engaged with the execution and operations & maintenance of the various activities and components envisaged in this proposal, along with a description of their roles and responsibilities as basic TORs. Use appropriate terms such as 'vendor', 'concessionaire', 'JV partner', etc. (max. 50 words per cell)

TABLE 8			
S. No	Activity/Component	Company/corporation/organization	Role/responsibility (basic TOR)
1	Solar panel on roof-tops of buildings	PRAYAAS (PEG) to formulate plan, vendors (Suryatech, Sunpower) to execute solar projects in direct PPA with customer	Advise SPV (and PMC) on ABB solar strategy: 1. Techno-economic analysis, and business model to deploy Rooftop Solar PV (RTPV) 2. Communication and awareness campaign to increased use of solar energy by citizens 3. Develop of citizen friendly tool to promote solar energy 4. Coordinate with stakeholders to ease procedural requirements for faster uptake of RTPV
2	Smart grid and net metering Solid waste management, Public toilets and sanitation	India Smart Grid Forum (ISGF) to plan with MSEDCL executing it along with National Smart Grid Mission Private vendors and small developers	1. Create DPR on T&D strengthening 2. Execute installation of smart meters to improve visualization of energy consumption and power quality management Construct proposed toilets with smart features as rooftop solar panels and manage O&M Operate garbage collection trucks with door to door collectors, operate SWAT service
3	Smart ITMS enabled public transport	Potential vendors are KPIT, L&T, Siemens (PPP also possible) Hard infrastructure revamp of bus stops - builders	Provide systems to PMC as requested by PMPML, including: 1. Bus ITS, VTS and VMS for buses 2. PIS with ETA algorithm for 190 bus stops (hard infrastructure revamp to be done by builders) and code based SMS ETA service for all bus stops 3. Passenger Mobile App, Wi-Fi on 510 buses with 3G, in-bus entertainment system 4. 5 years O&M 5. If PPP, Vendor gets advertising rights

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TABLE 8			
S. No	Activity/Component	Company/corporation/organization	Role/responsibility (basic TOR)
4	Adaptive Traffic Management Systems with Central Traffic control center	Potential vendors - Wipro, KPIT, L&T, Siemens	Adaptive traffic management system and Central Traffic control center 1. Install systems, solar panels, pedestrian button, UPS 2. Setup central traffic control center hardware, application and manage system integration 3. Setup Pedestrian buttons on select junctions 4. Create App based alert systems, emergency corridors, traffic PIS 5. 5 years O&M 6. Training of PMC employees
5	Smart Parking, e-buses and e-rickshaws	Potential Smart Parking vendors - Wipro, KPIT, L&T, MassTrans E-bus and e-rickshaw vendors - KPIT, Hero, Mahindra, E-bus PPP partners - Prasanna Purple, Metrozip E-rickshaw PPP partners – small private operators	Smart Parking vendors : Install sensors, PIS, app cards, manage 5 year O&M, undertake training of PMC employees E-buses and E-rickshaw suppliers: Provide 100 Wi-Fi enabled e-Buses/100 e-rickshaws, setup charging infrastructure and provide 5 years maintenance support E-bus and E-rickshaw operators (PPP): Operate on a revenue-sharing PPP model, via SLAs for on-time service and good maintenance
6	NMT Infrastructure and Public Bicycle Sharing systems (PBS)	Urban Planners like Prasanna Desai Architects, Embarq (NGO) to assist in planning and system design Potential PBS consultants – Embarq, iTrance, Prasanna Desai Architects Potential PPP operators – Kerberon automatics, TAF, Chartered Cabs and Next Bikes	Urban Designers to designs for footpaths, bicycle lanes, junctions and pedestrian zones PBS PPP operator responsible for procurements cycles and stations, plan and setup of stations, user information and registration systems - websites, mobile apps, call centre and static information at station, O&M and fare collection through terminal and other channels, insurance (all risk of vandalism with operator)
7	Smart Traffic Analysis and Management: -Intelligent Road Asset Management Systems (IRAMS) -Traffic Analysis using Mobile GPS feeds - E-Challan Systems with smart e-payments	Intelligent Road Asset Management Systems- Pavetech Traffic Analysis using Mobile GPS Feed - Citiogik for Software, Network operators like Airtel, Vodafone etc for GPS data E-Challan System - MahaOnline for apps, server space and online platform, Vodafone for connectivity, tablets and paper rolls	IRAMS vendor to create GIS data repository of existing roads, deploy systems and software, and train PMC employees Traffic analysis using mobile vendor to provide software solution and perform analysis, also responsible for updating and maintenance support For E-challan, MahaOnline to provide server space and co-host platform, Telcos to provide sim cards to connect android based tablets & printers

TABLE 8			
S. No	Activity/Component	Company/corporation/organization	Role/responsibility (basic TOR)
8	E-governance and digital - Intelligent operations centre - Citizens' desk - Citizen app - Public Wi-Fi	Potential vendors for IOC and Citizen services – Wipro, Oracle, IBM, DigiTel, Siemens, Cisco, Tech Mahindra Potential Public Wi-Fi and optical fibre vendors/PPP partners - Wipro, Vodafone and Reliance	IOC: Procure, install equipment, provide proprietary license, software, monitor services and provide high-end analytics Digitisation of SPV and Citizens' Service Centre: Undertake all digitization initiatives, setup & manage website, app, back-end platform, staffing of citizen desk PuneTel Card: Install systems, implement, integrate, DCP rules, provide support. Public Wi-Fi: Setup optic fibre network across ABB, install Wi-Fi access points, manage O&M and collect revenues
9	Safety and security - CCTV surveillance - Emergency response center	Potential vendors – L&T, Allied Digital, Siemens, Cisco, IBM etc	CCTV vendor to install cameras and manage O&M. Security vehicles vendor to procure and provide maintenance support for vehicles used by police, hospitals etc. Emergency Response Centre vendor to procure and install equipment, provide proprietary license and software, manage services and provide high-end analytics through FTEs. Further deploy FTEs for all 3 shifts in the 911 dispatch centre; under supervision of SPV employees
10	Real-estate and land-development: -Transit+ startup hub construction -Slum Re-development -Affordable Housing for EWS/LIG - Riverfront development - Development of amenities and open spaces	Contract to a developer through tendering process	1. Development and transit hub/start-up hub/slum redevelopment/affordable housing 2. Work as partners with local governance body to ensure benefit is passed on to intended citizens 3. Co-ordinate with all stakeholders (SRA for slum rehabilitation, etc) 4. Ensure timely construction of the space 5. Ensure handover of the space among the beneficiaries
11	Smart Metering: Smart Bulk Metering with DMA Isolation and SCADA across entire water network, Smart Metering across 100% of commercial establishments, Introduce domestic metering via a voluntary "Give up your water subsidy" scheme along with a telescopic tariff Use ICT based solutions to reduce losses/NRW, improve customer service and generate electricity: Advanced Helium Leak Identification, Customer survey on GIS platform to record all connections	Potential metering companies -Kamstrup, Arad, Itron, Sensus Construction companies - Envirozing Consultants, Gonwana Engineers	The construction company will be responsible for DMA Isolation, Inserting new pipelines; Smart metering vendor will be responsible for Procurement and Installation of the Meters, Meter reading and bill generation, O & M for five years

36. STAKEHOLDER ROLES

Attach one A-4 sheet (part of 'Annexure 3'), containing an organogram showing the relationships:

- a) MPs, MLAs, MLCs.
- b) Mayors, Councilors, other elected representatives.
- c) Divisional Commissioner
- d) Collector
- e) Municipal Commissioner
- f) Chief Executive of the Urban Development Authority/ Parastatal
- g) Consultant (Select from empanelled list)
- h) Handholding Organisation (Select from following list: World Bank, ADB, JICA, USTDA, AFD, KfW, DFID, UN Habitat, UNIDO, Other)
- i) Vendors, PPP Partners, Financiers
- j) Others, (eg. community representatives) as appropriate to your city

E. FINANCIAL PLAN

The development of bankable proposals will be a key success factor in the Smart City Mission. In order to arrange appropriate amounts and types of funding and financing for your SCP, you must keep financial considerations always in mind while preparing your overall strategy and the pan-city and area-based proposals. It is anticipated that innovative means of funding and financing the projects will be necessary. For this purpose, you must evaluate the capacity of the ULB and the SPV to undertake self-funded development projects, the availability of funds from other government schemes that will converge in your SCP (refer Questions 13 and 26), and the finance that can be raised from the financial market.

37. ITEMISED COSTS

What is the total project cost of your Smart City Proposal (SCP)? Describe in detail the costs for each of the activities/components identified in Questions 31. (Describe in Max. 300 words)

A comprehensive costing for SCP has been done across all pan-city and area based development. The estimated cost of Pune's Smart City is ~INR 3000 cr (Capex INR 2380 and Opex INR 580 cr). While Opex is covered under question 39, below is split-up of capex: (Exhibit 32)

- Local Area Development - INR 1850 cr: (A) Marquee riverfront development along with river cleaning INR 100 cr (B) 24X7 electricity supply, smart grid and solar panels: INR 364 cr (C) Water and sewage: Reservoirs INR 87 cr, Smart metering INR 22 cr, Society-level sumps INR 6.4 cr, Storm-water drains 43 cr, STP augmentation 100 cr, root-zone technology INR 8 cr (D) Waste and sanitation: SWM INR 16 cr, public toilets INR 2 cr (E) Open spaces and amenities: Gardens INR 1.25 cr, Open vegetable market INR 1.6 cr, community hall INR 10 cr (F) NMT infrastructure: Footpaths INR 30.5 cr, street redesign INR 189 cr, junction redesign INR 14 cr, placemaking INR 30 cr, pedestrian road INR 5 cr, PBS 9.5 cr, roads and road widening INR 190 cr (G) Public transport: BRT INR 210 cr, E-buses INR 125 cr, E-rickshaws 1.1 cr, ICT enabled bus stops INR 27 cr (H) Citizen services, e-governance, security: CCTVs INR 27 cr, IT connectivity INR 146 cr, Digital literacy INR 2 cr, fire-stations INR 3 cr, Smart parking INR 50 cr I) Slum redevelopment and affordable housing: INR 40cr.

- Pan City transportation – INR 270 cr: (A) Adaptive Traffic Management Systems: INR 123 cr (B) Bus system ITMS: INR 70 cr (C) Command Control Center: INR 42 cr (D) Smart Parking initiatives: INR 15 cr (E) Intelligent road management: INR 3 cr (F) Traffic Modeling (Citilogik): INR 18 cr (G) E-challan 1 cr

- Pan City water – INR 240 cr: (A) Smart Bulk meters with DMA isolation and SCADA: INR 83 cr (B) Consumer awareness campaign: INR 20 cr (C) Pilot DMA for 24x7 water supply: INR 22 cr (D) Smart commercial meters: INR 60 cr (E) Domestic Meters (via voluntary “Give up your water subsidy” campaign): INR 20 cr (F) Advanced helium leak identification: INR 19.4 Crores (G) Customer Survey on GIS: INR 5 cr (H) Electricity generation through Naidu STP: INR 6 cr (I) Suite of web and app based solutions: INR 6.5 cr

38. RESOURCES PLAN

Describe the financing sources, the own-sources of income, the financial schemes of the Central or State governments for which your city/SPV is eligible, which can be used to fund the SCP proposals and pay back loans. Briefly describe an action-plan for resource improvement to make the ULB financially self-sustaining. (max. 1500 words)

As discussed in the previous question, implementation of Smart City initiatives will require around INR 3000 cr capex and opex across 5 years. The key elements of funding this are:

- Smart City Mission – INR 1000 cr (this is as per MOUD guidelines, with 500 cr coming from centre and balance from State/ ULB)

- Central government schemes – Based on extensive work done on convergence, at least INR 700 cr from other missions can be used as part of smart city initiative. This will consist of, for example,

- Ministry of Power’s IPDS scheme for Smart Grid: Transmission and distribution (T&D) network strengthening will be taken up under IPDS to ensure that utility services are future-proof (304 cr)

- Atal Innovation Mission for setting up start-up hub: Setting up start-up hub along with NASSCOM in the area can be linked to the Atal Innovation Mission. The project could be partially funded through the funds earmarked for the mission in 2015-16 (150 cr)

- National River Conservation project: About INR 132 cr of the INR 990 crore pan-city project funded under this scheme will be used for the area

- FAME scheme to procure electric buses (likely to get 70 cr)

- Additional schemes like Housing for All, Digital India Mission and Swachh Bharat Mission can provide an additional 100 cr

- Land monetization: While an overall land monetization plan has been created, PMC can monetize 10 acres of own land in ABB area through auction, generating 1000 cr. It also has additional option of land pooling 70 acres of private owned land in ABB area, which is currently unoccupied and can be monetized through land pooling and greater FSI, generating at least 1000 cr more as a cushion, if required

- There are a few projects that can be awarded in PPP/ developer mode, thus ensuring that the fund requirements are taken care of, e.g., IT connectivity project in ABB area (INR 140 – 150 cr) can be done in PPP mode. Similarly, the entire solar project can be done in PPP mode.

- CSR funding: Pune has a very strong CSR culture. Pune has also established Pune City Connect (PCC) to fund critical city initiatives through CSR, and as per early estimates, PCC can raise at least 500 cr through CSR initiatives across Pune. Poonawala group has already committed 100 cr towards solid waste management. As conservative estimates, Pune should be able to get at least 200 cr through CSR initiative

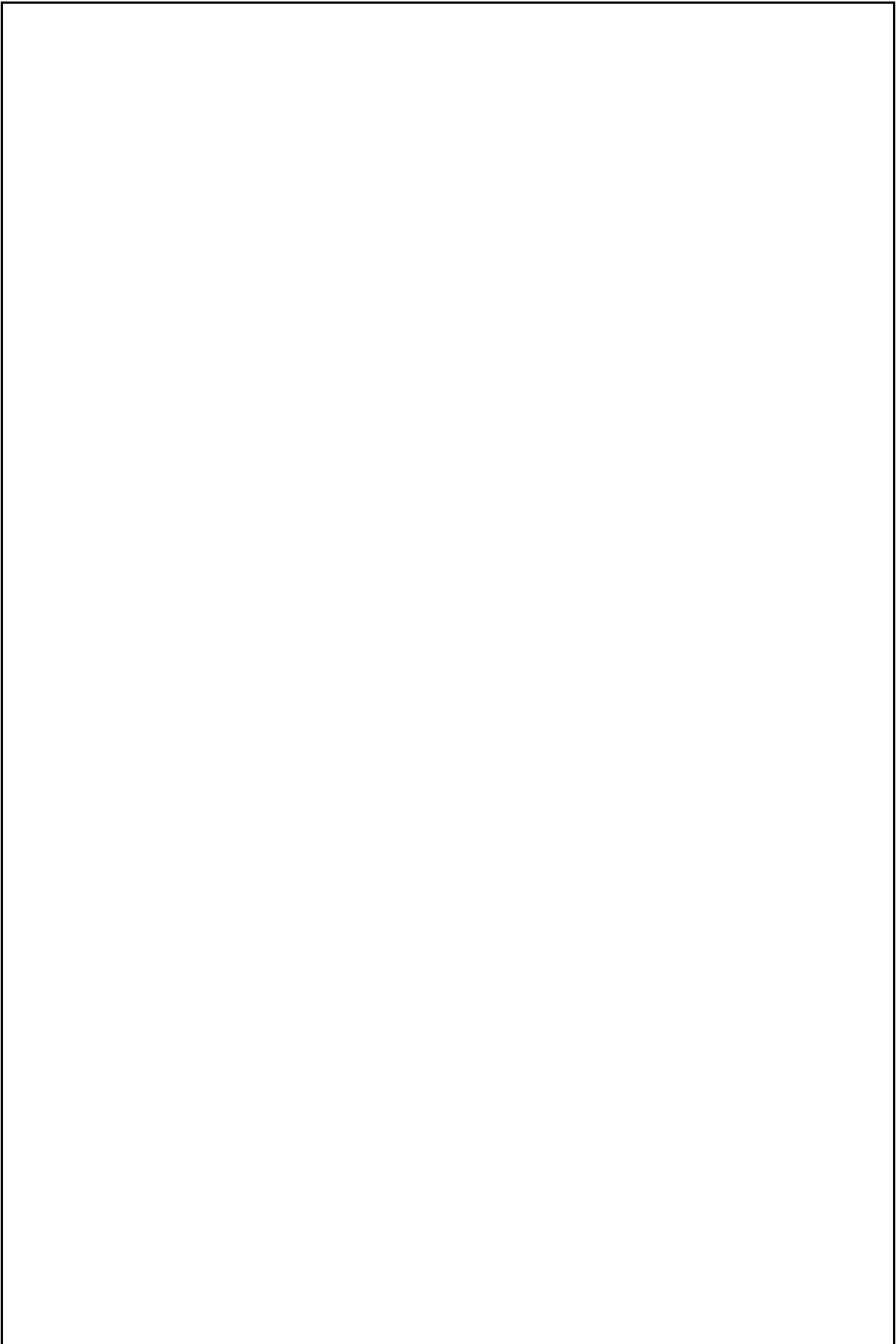
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■ **Additional revenue from better services and collections:** Based on calculations, SPV can earn an additional 210 cr revenue from better services (14 cr from ITMS advertisement revenue, 52 cr from smart parking, ~140 cr from various additional services in ABB region).

Pune has, therefore, created a detailed plan to fund 3000 cr of smart city initiative, with 1000 cr+ buffer through private land monetization. In addition, PMC can also help with two additional sources, if required:

■ **Existing PMC capex budget:** Pune is one of the municipalities in India that has consistently spent on capex. Over last few years, it has spent around 1,400 cr every years on capex. Some of these funds could be diverted (post the approval of General Body and Standing Committee of PMC) to Smart City Project, if required.

■ **Loans (Municipal bonds, Project level infra bonds, ADB, WB, JICA):** Pune has taken several measures that will enable PMC to borrow from the market. Firstly, it has a strong balance sheet that is backed by AA Fitch rating. Secondly, Pune has moved ahead with the creation of a separate Pune Infrastructure Fund, which will ring-fence money from land monetization for exclusive infrastructure development. Based on strong rating and ring-fencing, we believe that Pune can borrow 500-700 cr every year from market at attractive rates. Several infrastructure financing companies have already shown interest in financing Pune's ambitious plans.



39. COSTS

What is the lifetime cost estimated for your area-based development and your pan-city solution/s? Add O&M costs wherever applicable. (max 500 words)

Total lifetime cost of SCP is INR 3000 cr (total 5 years' timeline) with capex of INR 2370 cr and opex of INR 580 cr. While capex is covered under question 37, below is split-up of lifetime development cost including opex: (EXHIBIT 32)

■ Local Area Development – life-time cost of INR 2200 cr:

A) Marquee riverfront development along with river cleaning Total INR 105 cr, capex INR 100 cr, opex INR 5 cr

B) 24X7 electricity supply, smart grid and solar panels: Total INR 420 cr, capex INR 364 cr, opex INR 56 cr

C) Water and sewage: (i) Reservoirs Total INR 100 cr, capex INR 87 cr, opex 13 cr (ii) Smart metering Total INR 24 cr, capex INR 22 cr, opex INR 2 cr (iii) Society-level sumps Total INR 10.4 cr, capex INR 6.4 cr, opex INR 4 cr (iv) Storm-water drains total INR 44 cr, capex INR 43 cr, opex INR 1 cr (v) STP augmentation total INR 105 cr, capex INR 100 cr, opex INR 6 cr (vi) Root-zone technology total INR 9 cr, capex INR 8 cr, opex INR 1 cr

D) Waste and sanitation: (i) SWM Total INR 37 cr, capex 16 cr, opex INR 21 cr (ii) Public toilets Total 2 cr, capex INR 1.5 cr, opex INR 0.5 cr

E) Open spaces and amenities: (i) Gardens Total INR 1.5 cr, capex INR 1.25 cr, opex INR 0.25 cr (ii) Open vegetable market Total INR 2 cr, capex INR 1.6 cr, opex INR 0.4 cr (iii) Community hall Total INR 11 cr, capex INR 10 cr, opex INR 1 cr

F) NMT infrastructure: (i) Footpaths Total 36 cr, capex INR 30.5 cr, opex 5.5 cr (ii) Street redesign Total 215 cr, capex INR 189 cr, opex 26 cr (iii) Junction redesign Total INR 17 cr, capex INR 14 cr, opex 3 cr (iv) Placemaking Total 36 cr, capex INR 30 cr, opex INR 6 cr (v) Pedestrian road Total INR 6 cr, capex INR 5 cr, opex 1 cr (vi) PBS Total INR 15 cr, capex 9.5 cr, opex 5.5 cr (vii) Roads and road widening: Total INR 226 cr, capex INR 190 cr, opex 36 cr

G) Public transport: (i) BRT Total INR 210 cr, capex INR 210 cr, opex 6 cr (ii) E-buses Total INR 240 cr, capex INR 125 cr, opex INR 115 cr (iii) E-rickshaws Total INR 1.1 cr, capex INR 1.1 cr (iv) ICT enabled bus stops Total INR 31 cr, capex INR 27 cr, opex INR 4 cr

H) Citizen services, e-governance, security: (i) CCTVs and citizen services: Total INR 35 cr, capex INR 27 cr, opex INR 8 cr (ii) IT connectivity: Total INR 151 cr, capex INR 146 cr, opex 5 cr (iii) Digital literacy Total INR 2 cr, fire-stations Total INR 3 cr (iv) Smart parking Total 50 cr, capex INR 50 cr

I) Slum redevelopment and affordable housing: INR 40 cr, Skilling of youth Total INR 2

■ Pan City transportation – lifetime cost of INR 400 cr:

A) Adaptive Traffic Management Systems: Total INR 123 cr, capex INR 123 cr

B) Bus system ITMS: Total INR 105 cr, capex INR 70 cr, opex INR 34 cr

C) Command Control Center: Total INR 48 cr, capex INR 42 cr, opex INR 6 cr

D) Smart Parking initiatives: Total INR 62 cr, capex INR 15 cr, opex 47 cr

E) Intelligent road management: Total INR 5 cr, capex INR 3 cr, opex 2 cr

F) Citilogik Solution on Traffic Modeling: Total INR 28 cr, capex INR 10 cr, opex 18 cr

G) E-challan: Total 9 cr, capex 1 cr, opex 8 cr

■ Pan City water – lifetime cost of INR 280 cr:

Continue on next page

A) Smart Bulk meter: Total INR 86 cr, capex INR 83 cr, opex 3 cr
 B) Consumer awareness campaign: Total INR 20 cr (yearly 4 cr)
 C) Pilot DMA for 24x7 water supply: Total 34 cr, capex INR 22 cr, opex INR 12 cr
 D) Smart commercial meters: Total 68 cr, capex INR 60 cr, opex INR 8 cr
 E) Domestic Meters (via voluntary scheme): Total INR 28 cr, capex 20 cr, opex 8 cr
 F) Helium leak identification: Total INR 22 cr, capex INR 19 Crores, opex INR 3 cr
 G) Customer Survey on GIS: Total INR 6 cr, capex INR 5 cr, opex 1 INR cr
 H) Electricity generation at Naidu STP: Total INR 7 cr, capex INR 6 cr, opex INR 1 cr
 I) Suite of web and app based solutions: Total INR 6 cr
 All of the capex and opex numbers are based on detailed estimates received from experts and supplier. For example, for SWM, 2020 population of ABB area was modelled, (75,000) and then benchmark garbage generation (650 gm/person/day) was used to get daily garbage (50 tons/day). Typical tipping fee for sweeping to disposal (INR 2000/T) was then used to determine total cost (3.5 cr/yr). Cost of O&M of transfer station, trucks, odor control system etc (4.5 cr/year) was added to get yearly cost (8 cr)

40. REVENUE AND PAY-BACK

How will the area based development and the pan-city smart solutions(s) of your city be financed? If you plan to seek loans or issue bonds, what revenue sources will be used to pay back the loans?

(max. 250 words)

Out of all initiatives, the ones that will actually cost Pune will be INR 3000 cr. Pune has created a comprehensive plan to fund this (as detailed in Question 38) with:

- Smart City Mission – INR 1000 cr
- Central government schemes – INR 700 from convergence
- Land monetization – INR 1000-2000 cr (own land + private land pooling, if required)
- PPP/ developer financing: INR 140-150 cr
- CSR funding: INR 200 cr
- Additional revenue from better services and collections: INR 210 cr additional revenue from different sources

Therefore, Pune will generate at least INR 3100 cr funds from various sources. These funds will be used to award packages to different vendors as per packages described in questions 31 and 37, as well as to cover the O&M cost described in Question 39.

While funding calculation indicates that Pune is self-sufficient and may not be required to raise significant money from the market through either loans or bonds, it is in a very strong position to do so, in case the need arises. This is due to three reasons:

- PMC is perhaps one of the strongest ULBs in India financially. It was recently rated AA by Fitch
- PMC has created a separate Pune Infrastructure Fund with ring fencing, which can be used to raise debt
- Several infrastructure financing agencies have expressed interest in financing Pune, in case the need arises (e.g. World Bank, ADB, Essel Infra)

In case Pune borrows from the market, it intends to pay back from primarily two sources:

- Land monetization: as indicated earlier, Pune has created a comprehensive plan to monetize land, which can be used to pay back loans
- Additional revenues: with projections of 400-500 INR cr of additional revenues, PMC can pay back loans from these additional sources of revenues.

41. RECOVERY OF O&M

What is your plan for covering the Operations & Maintenance costs for each of the activities/components identified in Questions 31? (max. 1000 words)

For the SPV to be sustainable, it is critical to have a model where most of its annual opex is covered by one of six models

- (a) Revenue generated from its own projects or services (e.g. advertising rights on e-buses that are run by the SPV)
- (b) Incremental revenue generated shared by parastatal or other government agencies (e.g. PMPML shares additional revenue from increased ridership because of SPV's public transport ITMS solutions)
- (c) O&M cost is borne by parastatal or government agencies as part of their regular municipal budget (e.g. PMC water department to bear O&M cost of smart commercial and bulk water meters, PMC road department to bear O&M cost of new roads)
- (d) Revenue sharing model with a private operator (e.g. e-rickshaw revenue shared with the SPV)
- (e) Direct agreement between citizens' and project implementation authority (e.g. Solar panel O&M will be borne by the citizens, and directly paid to the third-party solar energy vendor)
- (f) Grants and CSR funds from corporates and NGOs (e.g. O&M of parks and open spaces will be funded by corporate CSR funding through 'adopt a park' initiative)

The total annual opex requirement for the SPV will be INR 160-170 cr, out of this INR 50 cr will be provided by PMC, INR 40 cr from other government agencies and projects, INR 50-60 cr will be revenue generated by projects. Viability gap funding will have to be provided for the balance INR 20-30 cr. The split of yearly opex and revenue generated is as below: (EXHIBIT 32)

■ Local Area Development – opex of INR 115 cr/year, out which INR 36 cr/year provided by PMC, INR 32 cr/year provided by other govt agencies and projects, and revenue from projects will cover INR 37 cr/year. Balance INR 10 cr/year to be borne by the SPV

A) Marquee riverfront development along with river cleaning opex of INR 2.5 cr/year will be borne by corporate CSR funds

B) 24X7 electricity supply, smart grid and solar panels: opex of 18 cr/year will be partly borne by MSEDCL as part of their regular T&D maintenance budget and part will be borne by the user via an agreement with private solar power company

C) Water and sewage: (i) Reservoirs opex of 4.4 cr/year covered by regular PMC budget (ii) Smart metering opex of INR 0.4 cr/year covered by regular PMC budget (incremental revenue accrues to PMC) (iii) Society-level sumps opex of INR 0.8 cr/year paid for by housing societies (iv) Storm-water drains opex INR 0.4/year covered by PMC (v) STP augmentation opex of INR 5 cr/year will be covered by regular PMC budget (vi)

Root-zone technology opex of INR 0.2 cr/year borne by SPV

D) Waste and sanitation: (i) SWM opex of INR 6 cr/year will be recovered INR 2 cr of cess, INR 2 cr of CSR funding and balance INR 2 cr borne by SPV (i) Public toilets opex of INR 0.1 cr/year through CSR and NGO funds

E) Open spaces and amenities: (i) Gardens opex of INR 0.15 cr/year recovered through CSR funds (ii) Open vegetable market opex INR 0.08 cr/year, revenues nil (iii)

Community hall opex INR 1 cr/year, opex of 0.5 cr/year offset by revenue

F) NMT infrastructure: (i) Footpaths opex of INR 1.5 cr/year borne by PMC roads department (ii) Street redesign opex of 7 cr/year borne by PMC (iii) Junction redesign

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opex of 0.7 cr/year borne by PMC (iv) Placemaking opex of INR 0.8 cr/year borne by SPV (v) Pedestrian road opex of INR 0.6 cr/year covered by revenues from leasing out space (total revenue potential of INR 5 cr) (vi) PBS opex of INR 2.2 cr/year is partially borne by revenues INR 0.7 cr/year and balance is borne by SPV (vii) Roads opex of 15 cr/year will be borne by PMC roads department

G) Public transport: (i) BRT opex of INR 11 cr/year is borne by PMPML (ii) E-buses opex of INR 29 cr/year covered by fare and advertising revenues (iii) E-rickshaws opex borne by operator (iv) ICT enabled bus stops opex of 1.4 cr/year borne by SPV and partially offset by revenue from advertising

H) Citizen services, e-governance, security: (i) CCTVs, command center and e-services opex of 2 cr/year will be borne by SPV (ii) IT connectivity opex of INR 1.5 cr/year will be borne by private network operator (iii) Digital literacy one-time cost of INR 2cr borne by SPV (iv) Smart parking opex is included in pan-city costing

I) Slum redevelopment and affordable housing: (i) Affordable housing and slum redevelopment opex of INR 0.8 cr/year recovered from residents (ii) Skilling of youth one-time cost of INR 2 cr borne by SPV

Pan City transportation – opex of INR 30 cr/year out of which INR 15 cr/year will be covered by revenue generated, 11 cr/year from PMC, PMPML and Traffic police, and balance 4 cr/year borne by SPV

A) Adaptive Traffic Management Systems: O&M is packaged in the contract and the vendor will be responsible for 5 years of O&M

B) Bus system ITMS: opex of INR 10 cr/year will be partly covered by advertising revenue (INR 4.2 cr/year) and rest borne by PMPML

C) Command Control Center: opex of INR 2.5 cr/year borne by the SPV

D) Smart Parking initiatives: opex of INR 9 cr/year will be partly covered by revenues (INR 10 cr/year)

E) Intelligent road management: opex of INR 0.5 cr/year will be passed on to the PMC roads department

F) Citilogik Solution on Traffic Modeling: opex of INR 2.5 cr/year will be passed on to PMC

G) E-challan: opex of INR 2 cr/year will be borne by traffic police

F) Connectivity cost of INR 3 cr/year will be borne by the SPV

■ Pan City water – opex of INR 11 cr/year of out which INR 10 cr/year will be covered by PMC and balance INR 1 cr/year will be borne by the SPV

A) Smart Bulk meter: opex of INR 0.8 cr/year will be covered by PMC (as part of regular maintenance budget)

B) Consumer awareness campaign: INR 4 cr/year for 5 years packaged as a contract (included in capex)

C) Pilot DMA for 24x7 water supply: opex of INR 4 cr/year will be passed on to PMC water department

D) Smart commercial meters: opex of INR 2 cr/year will be covered by PMC as part of regular maintenance budget (as PMC gets benefit of additional revenue)

E) Domestic Meters (via voluntary scheme): opex of INR 2 cr/year will be partly recovered from users and balance covered by PMC

F) Helium leak identification: opex of INR 1 cr/year will be covered by PMC (as part of regular maintenance budget)

G) Customer Survey on GIS: opex of INR 0.1 cr/year will be covered by PMC (as part of regular maintenance budget)

H) Electricity generation at Naidu STP: opex of INR 0.2 cr/year will be covered by PMC (as part of regular maintenance budget)

I) Suite of web and app based solutions: opex of INR 1 cr/year borne by SPV

42. FINANCIAL TIMELINE

What is the financial timeline for your smart city agenda? Describe the milestones and target dates related to fund flows, payback commitments, etc. that must be adhered to for the proposal to achieve the vision set out in Table 5 (question 31)? (max. 1 page: A4 size)

	Detailed cash flow including source of funds (smart city mission, other government missions, land monetization, revenue from projects, CSR) and uses of funds (capex by SPV, capex by other government schemes, opex by SPV, opex by other government and private bodies) for 5 years is shown in Exhibit 33.	

43. FALL-BACK PLAN

What is your plan for mitigating financial risk? Do you have any alternatives or fall-back plans if the financial assumptions do not hold? (max. 250 words)

4 types of financial risks exist in the implementation of the SCP. Mitigation plan has been developed for each of the risk and has been outlined below:

1. Delay in receiving SCP funds from the State or the Center

In case of delay in releasing funds from the State or Center, reprioritization of projects will be done and if required, high-capex and long-lead time projects (e.g. Construction of BRT network, revamp of 46 km road in ABB etc) will be pushed out to the next financial year

2. Delay or change in scope of hard infrastructure projects that converge with other missions

In such event the dependent Smart City projects will be re-planned to ensure that they match the new timelines of convergence projects. For example, if the Smart-grid project by MSEDCL is delayed by one year, the smart electricity metering project will also be re-planned accordingly.

3. Cost escalation or delay in execution of Smart City projects

Cost escalation and time delay is common in infrastructure projects. In order to ensure that cost and time escalation is limited for Pune, SPV will be fully enabled and empowered with the right global expertise. However, there is still buffer – thorough additional land monetization and raising loans from the market – that can be exercised.

4. Delay in monetizing 10 acre land parcel in the ABB area

This is a major risk as almost one-third of the Smart City proposal is funded from monetization of land parcels in the ABB area. In such event, the SPV shall seek short-term commercial or multi-lateral loans which shall be from future cash flows from land-monetization.

5. Low revenue from user charges and taxes (development charges, property tax and building permissions)

Low revenue from user charges and taxes will threaten the financial viability and sustainability of the SPV. PMC will run an extensive citizen engagement campaign to ensure that citizens embrace slightly higher charges (if required) for much better services, and ensure that it does not happen. The record of PMC in driving citizen engagement is exemplary.



Annexure 2 – Self Assessment and Aspirations



ANNEXURE 2

Self-Assessment Form

**Attach self-assessment format given in supplementary template (Excel sheet),
with columns I-L duly filled**

ANNEXURE 2 - baselining and aspiration setting

A	B	C	H	I	J	K
	Feature	Definition	Self-assessment of the city (for Pan-City Solution) with regard to each feature	Basis for assessment and/or quantitative indicator (Optional - only if data exists)	Projection of 'where the city wants to be' with regard to the feature/indicator	Input/initiative that would move the city from its current status to Advanced status (Scenario 4: Column G)
1	Citizen participation	A smart city constantly shapes and changes course of its strategies incorporating views of its citizen to bring maximum benefit for all. (Guideline 3.1.6)	Scenario-4	<ul style="list-style-type: none"> - Created 1,50,000 smart volunteers who reached out to ~50% all households (~800,000) in the city getting roughly 3.2 million inputs under the current Smart City Program - Practicing participatory budgeting since 2007 - Online complaints management system - Engagement through facebook, YouTube, Instagram, Monthly newsletter, website, twitter - Citizen-to-administration communication through development of citizen-centric call center and app - PCC has been set up to channelize CSR funding by bringing together corporates and PMC and eminent citizens - Several NGOs (Janwani, Parisar, Prayas, etc) and citizen organizations like PIC, MCCIA working closely with PMC to improve quality of life in Pune 	Building on its strong legacy of involving citizens and current momentum gained under the SCP, Pune aspires to engage all the residents going forward in all major policy and project level decisions and solutions, both through offline and online channels (Scenario 4)	<ul style="list-style-type: none"> - Leverage the unparalleled ecosystem of partners from the corporate sector, media, intelligentsia, common citizens that has been created as part of the SCP to become a global role model in terms of participatory democracy - Create a platform to crowd source ideas and problems citizens may have through app, portal, etc - Create a vision community with maximum citizen participation - Create digital innovation hub in Pune with citizens at the Epicentre - Leverage technology like Punetel card to have two way communication with citizens.
2	Identity and culture	A Smart City has a unique identity, which distinguishes it from all other cities, based on some key aspect: its location or climate; its leading industry, its cultural heritage, its local culture or cuisine, or other factors. This identity allows an easy answer to the question "why in this city and not somewhere else?" A Smart City celebrates and promotes its unique identity and culture. (Guideline 3.1.7)	Scenario 3	<ul style="list-style-type: none"> - PMC gets second highest number of visitors in Maharashtra after, Mumbai - The city has 245 heritage sites spanning across grade 1 to grade 3; 3 of these sites are also preserved by the ASI - Confluence of rich culture, presence of natural endowments like hills and riverfront coupled with favourable climate makes the city an ideal tourist destination - Pune is often referred to as the cultural capital of Maharashtra given it was the seat of power during the Peshawas in the 17-18th century 	Bring out the unique identity of Pune as the most livable city in the country that is a melting pot of best minds in India making it one of the top 10 tourist destination in the country leveraging its massive riverfront potential, both for domestic and foreign travellers (Scenario 4)	<ul style="list-style-type: none"> - Iconic riverfront development - first in 3.5 sqkm in ABB region and later on throughout Mula-Mutha river criss-crossing the city - Create a start-up zone and CBD with multiple dining and retail outlets for a global tourist experience - Advertise the Sawai Gandharv festival, the biggest festival of classical music in India, to generate greater traction from local and global music lovers - Create Pune guides and apps to help tourists navigate the city - Pune city branding portal on the anvil, Pune coffee table book launched
Sc	Economy and employment	A smart city has a robust and resilient economic base and growth strategy that creates large-scale employment and increases opportunities for the majority of its citizens. (Guideline 2.6 & 3.1.7 & 6.2)	Scenario 3	<ul style="list-style-type: none"> - Pune is the 8th biggest city in India in terms of GDP contribution - Manufacturing constitutes ~22% of employment in the city compared to 10-12% for India - 2nd biggest IT hub in the country, accounting for 9% of India's IT exports - >40% of the city's workforce is at least graduate 	Leverage the inherent strengths of the city in terms of existing industrial base coupled with strong human capital to create >500,000 jobs in the next 15 years required for the young entrants to the workforce by making Pune the "Start Up" capital of the country providing the best eco system (Scenario 4)	<ul style="list-style-type: none"> - In its quest to become the "Start Up" capital of India, start with creating a CBD in the ABB area creating ~45000 high end service jobs and then replicate it across multiple places in the city - Create Pune Start-up hub which comprises of incubators, investors, VCs, accelerators to support select Start-ups
4	Education	A Smart City offers schooling and educational opportunities for all children in the city (Guideline 2.5.10)	Scenario 4	<ul style="list-style-type: none"> - 2nd biggest Varsity with more than 800 colleges, often referred to as the "Oxford of the East" - GER (Primary & Upper Primary) is at impressive levels of 102% - Teacher to student ratio is 31:1, almost equivalent to RTE norms 	Leveraging on its headstart, Pune aspires to become a global leader in providing international quality education meeting the 35 sq feet area per student, having one primary school within 10 minutes of walking distance and a secondary school within 15-20 minutes; special e-learning modules for the under-privileged	<ul style="list-style-type: none"> - Utilize amenity spaces fully to construct schools to bring affordable education to a large section of the population - Start by creating 3 world class schools over an area of 6596 sq metre meeting the international benchmark in the ABB area which will then be replicated going forward to other areas throughout the city - Pune City Connect to channel funds from CSR to municipal schools - csrforpmcschools.org launched
5	Health	A Smart City provides access to healthcare for all its citizens. (Guideline 2.5.10)	Scenario 2	<ul style="list-style-type: none"> - High and rising trend of Maternal Mortality Rate; from 86 (Per 100K births) in 2011-12 to 132 by 2014-15, which is considerably higher than 87 for Maharashtra - Infant Mortality of 22/1000 births is significantly better than average of 40 for India - Pune has 2.5 hospital beds/1000 population, against the benchmark of 4 and 3 for urban India, however, ~70% of the beds are in the private sector 	Greater emphasis in PMC budget coupled with increased use of technology, strong civil society and NGO network to strengthen the basic health care in the city, especially for the ~40% slum population in the city (Scenario 4)	<ul style="list-style-type: none"> - Start by creating 3 super speciality hospitals in the ABB area spread across 8211 sq metres to take the beds-to-population ratio to international benchmark of 4/1000 in the local area and then replicate the model across the city - Leverage m-health applications to cover greater population with reduced cost - use of ICT in health to increase outreach and create awareness

Feature	Definition	Self-assessment of the city (for Pan-City Solution) with regard to each feature	Basis for assessment and/or quantitative indicator (Optional - only if data exists)	Projection of 'where the city wants to be' with regard to the feature/indicator	Input/Initiative that would move the city from its current status to Advanced status (Scenario 4: Column G)
6 Mixed use	A Smart City has different kinds of land uses in the same places; such as offices, housing, and shops, clustered together. (Guidelines 3.1.2 and 3.1.2)	Scenario 2	Though Pune allows for mixed use, overtime, the city has gotten segmented into niche areas, forcing people to commute, increasing average trip length, putting pressure on the infrastructure, reducing the speed impacting the quality of life - Jobs are getting created in city peripheries like Hinjewadi increasing the average trip length to almost 10 kms - Koregaon park is the preferred destination for dining and leisure, necessitating residents to travel from across the city	All new developments in the city to have mixed use allowing for housing, retail, and office buildings in close proximity to reduce the need to commute long distances thus increasing the quality of life. Encourage the development of walk-to-work concept in new mixed use development (Scenario 4)	- Mixed use development in the ABB area by creating 10 acre start-up zone and 36acres commercial space to generate 45,000+ jobs (by 2030) - 3.5 kms stretch of the ABB riverfront area to be converted into world class recreation hub - Overtime, this integrated model to be replicated across the city improving the citizen's quality of life significantly - New DC Regulations which have been proposed to the Government which are likely to be approved within 3 months promotes mixed use in the city
7 Compact	A Smart City encourages development to be compact and dense, where buildings are located close to one another and are ideally within a 10-minute walk of public transportation, forming concentrated neighborhoods. (Guidelines 2.3 and 5.2)	Scenario 2	- Pune has few compact areas like the old city core, etc. - Over the last decade however Pune is sprawling; PMC's population grew by 2% between 2001-11, compared to peripheral areas' growth of >5% - Average trip length has gone up to 10 kms from ~9kms in 7 years - Close to double digit growth of private vehicles at least over the last 5-7 years	Push on transit-oriented development, coupled with increased FSI and redevelopment/reclassification of hitherto agricultural land increases the compactness in the city by developing large parcels of un/under utilized land (Scenario 3).	- Local area (ABB) envisioned to be a compact development, with presence of jobs, recreation hubs, education and health, etc. all in the vicinity - New greenfield areas to be developed in future are compact where amenity space is used efficiently to have at least 15% open space, meeting the global benchmarks
8 Public open spaces	A Smart City has sufficient and usable public open spaces, many of which are green, that promote exercise and outdoor recreation for all age groups. Public open spaces of a range of sizes are dispersed throughout the City so all citizens can have access. (Guidelines 3.1.4 & 6.2)	Scenario 2	- Pune currently has just 7% area for public open spaces (including parks, hill tops, forest, etc) against a benchmark of 15% laid down by the ministry of environment	Increase open space in the city to meet the 15% international benchmark by utilizing the amenity spaces fully and leveraging the long riverfront stretch that Pune is endowed with. Open spaces should be well distributed in the city such that each resident is able to reach a garden within 5 minutes, walking on trail of connected footpaths (Scenario 4)	- Increase the public open space in the ABB area from 4% to more than 10% by creating a 3.5 kms long riverfront and developing 7 amenity spaces into gardens - Ensure each resident has 5 minute access to gardens in the city - Blend of riverfront and gardens to be replicated across the entire city leveraging ~40kms of riverfront stretch on Mula-Mutha flowing through the city.
9 Housing and inclusiveness	A Smart City has sufficient housing for all income groups and promotes integration among social groups. (Guidelines 3.1.2)	Scenario 1	- 28% of all households in the city live in slums, compared to 17% for urban India - Close to 60% of the households need some type of viability gap funding to make them afford housing	Slum free Pune by 2030 - - Swifter rehabilitation of slums under SRA through push from PMC and active involvement of civil society - Improved supply and demand conditions wrt affordable housing through higher FSI and better affordability through rising incomes, (Scenario 3)	- Construction of ~20,000 affordable houses every year to rehabilitate the slum population - Start by making the ABB region slum-free by redevelopment of 500 slum households in the area - PMC to push rehabilitation on lands owned by the corporation - Leverage strong citizen participation to build trust between the slum dwellers and developers

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10 Transport	A Smart City does not require an automobile to get around; distances are short, buildings are accessible from the sidewalk, and transit options are plentiful and attractive to people of all income levels. (Guidelines 3.1.5 & 6.2)	Scenario 1	<ul style="list-style-type: none"> - Pune only city of its size to not have a meaningful mass rapid transit and has a low bus fleet of 37 per lakh people against a benchmark of 55 - Low trip share of public transport at 19%, as against a norm of ~50% - Peak hour speed is down to ~18kms/hour from 22kms few years back - NMT share is also low at 33% 	Increased share of public transport by 2030 from 19% to 30% as a result of completing the 96kms BRTS network and 2 metro corridors measuring 31 kms, together with augmented bus fleet. NMT share also increases with the development of compact mixed-use development, further improving the traffic situation (Scenario 3)	<ul style="list-style-type: none"> - Reach steady state in the ABB area taking public transportation percentage to 50% from current 19% through 100 e-buses, 26 km BRT route, 54 bus stop overhaul and 100 e-rickshaws; take NMT to 8% from 1% through 27 km bicycle tracks, 60 km footpath redesign, etc - Affordable, clean Mass transit option complemented by augmented, refurbished bus fleets (~3500 buses) with feeder (~500 Mini Buses) by 2021, better route planning, premium options and systems of information dissemination - Policy changes to make parking expensive with stricter enforcements - Procurement of ~2,500/ITMS enable buses - Depot and terminal development - Public bicycle sharing system - Smart Redesign of 50 km of streets - Redesign of 75 Junctions - Full rollout of BRT Network, metro and 2 Ring Roads to be completed
11 Walkable	A Smart City's roads are designed equally for pedestrians, cyclists and vehicles; and road safety and sidewalks are paramount to street design. Traffic signals are sufficient and traffic rules are enforced. Shops, restaurants, building entrances and trees line the sidewalk to encourage walking and there is ample lighting so the pedestrian feels safe day and night. (Guidelines 3.1.3 & 6.2)	Scenario 1	<ul style="list-style-type: none"> - Pune has NMT at 33% and a low share of cycling - Almost half of the footpaths in the city have significant (>7) obstructions per km - Footpath is available on 2/3rd of the road network but needs significant improvement and redesign 	Improved NMT as a result of push on compact mixed use development, supported by better facilities for pedestrians and cyclists in terms of extensive street network coupled with cycle tracks along major stretches (Scenario 3)	<ul style="list-style-type: none"> - Creation and redesigning of 60kms of footpaths and 42kms of cycle track to be created in the ABB area, which then gets replicated throughout the city - Redesign of major streets to accommodate pedestrians and cyclists, with demarcated pedestrian zones on 100% of streets
12 IT connectivity	A Smart City has a robust internet network allowing high-speed connections to all offices and dwellings as desired. (Guideline 6.2)	Scenario 2	<ul style="list-style-type: none"> - 22% households have computers with internet - City is in process to identify zones where wifi and high speed internet spots will be implemented - PMC has involved major ISPs for providing high speed internet connectivity 	High speed optic fibre network to be laid down across the city using provision for Right of Way(RoW) Access points to be strategically chosen to give maximum reach (Scenario 4)	<ul style="list-style-type: none"> - Seamless wi-fi connectivity throughout the 900 acres area with 100+ access points and provision for 10000+ simultaneous devices connections with 1Mbps speed
13 ICT-enabled government services	A Smart City enables easy interaction (including through online and telephone services) with its citizens, eliminating delays and frustrations in interactions with government. (Guidelines 2.4.7 & 3.1.6 & 5.1.4 & 6.2)	Scenario 2	<ul style="list-style-type: none"> - Few major citizen centric services are online : Property Tax Self Assessment & Payment, Building Sanctions / Registrations, LBT Registration, etc - Pune shares significant number of statutory documents like DP, DCR, Budgets, etc on its website - Backend processes of most service delivery is not automated - Inter-departmental collaboration lacks seamlessness 	Implement suite of e-governance solutions across all citizen centric services to become one of the top 10 cities in terms of ease of doing business. PMC website is the single source of information for all government related information, providing real time update on various projects and policy changes. Information flows through the department in a seamless manner to avoid duplication and churn (Scenario 4)	<ul style="list-style-type: none"> - Leverage ICT solutions like integrated data across utilities, Geo enabled city operations for activities such as land management, tax assessment, etc. to set up command and control center which acts as an E-municipality across all functions in the ABB area ; - ABB online portal with multiple activities across all departments with citizen desk for physical verification, etc - Scale up these initiatives across the city to make Pune amongst top 10 ease of doing business places globally
14 Energy supply	A Smart City has reliable, 24/7 electricity supply with no delays in requested hookups. (Guideline 2.4)	Scenario 3	<ul style="list-style-type: none"> - The area within PMC limits doesn't have any official load shedding schedule and electricity goes off only during well announced maintenance or due to some catastrophic failure - In terms of coverage, 98% of households have electricity connections, compared to 93% in urban India 	PMC is able to provide 24*7 uninterrupted power to all its residents. There is 100% smart metering and grid in the city, together with 100% billing and collection efficiency (Scenario 4)	<ul style="list-style-type: none"> - Implement smart grid in the ABB area for 100% power supply and 3% reduction in AT&C losses from 9% to 6% - Pune should roll out smart metering and grid, with 100% households connected to the grid in due course
15 Energy source	A Smart City has at least 10% of its electricity generated by renewables. (Guideline 6.2)	Scenario 2	<ul style="list-style-type: none"> - Pune has pockets of areas using renewables to satisfy energy needs - Magarpatta city has a biogas plant and 7,000 solar water heating panels - PMC runs ~20 biogas plants of 5MT each to provide electricity to parts of the city streets - 300 MT waste to energy plant has just gone live with a capacity to produce 21,000 litres of Compressed Bio Gas 	PMC becomes a leader in India in terms of generating energy from renewal sources, primarily from solar and waste. Close to 15-20% of the city's energy requirements are met with green sources improving the city's pollution levels	<ul style="list-style-type: none"> - ABB area to be made maximum solar city with 15-20% of energy needs getting fulfilled through solar at zero cost, using RESCO model (PPP) - In the long run Pune should aspire to generate 15-20% of its energy requirements from solar

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16 Water supply	A Smart City has a reliable, 24/7 supply of water that meets national and global health standards. (Guidelines 2.4 & 6.2)	Scenario 2	<ul style="list-style-type: none"> - Pune has 1250 MLD of water, enough to meet current and future requirements - ~15% of the population gets less than 135 lpcd - NRW is estimated at 30% - Quality of water is good, with residents able to drink tap water without additional filtering 	<ul style="list-style-type: none"> - Pune is amongst a handful of cities providing 24*7 water to all its residents. Improvement is a result of: <ul style="list-style-type: none"> - Reduction in NRW from 30-35% to 15% due to systemic improvement in infrastructure - Reduction in wastage as a result of installation of water meters coupled with telescoping pricing based on consumption levels (Scenario 4) 	<ul style="list-style-type: none"> - Ensure every one gets 150 lpcd in the ABB area by strengthening core infrastructure like putting in smart meters, building reservoirs at Balewadi and Baner, laying of pipeline of ~50kms in the area, setting-up systems for waste water recycling, etc - In the long run move to DMA will ensure 24*7 water for everyone in Pune, a DPR for which has been prepared and approved by the General Body, implement smart solutions for water management, restructuring of water department into 3 verticals (O&M, Projects and PR)
17 Water management	A Smart City has advanced water management programs, including smart meters, rain water harvesting, and green infrastructure to manage stormwater runoff. (Guideline 6.2)	Scenario 1	<ul style="list-style-type: none"> - Currently only commercial establishments have meters out of which 50% are faulty and 25% are RdNa (Reading Not Available) - There is no bulk or domestic metering throughout the system - Distribution system is manually operated and relies on gravity for transmission of water 	<ul style="list-style-type: none"> - 100% smart metering across all commercial and domestic establishments - Green building codes with provision for rainwater harvesting - Pune manages to increase its storm water drainage to 100% (Scenario 4) 	<ul style="list-style-type: none"> - 100% smart metering across all commercial and domestic establishments in the ABB area; install smart bulk meters at the inlets and outlets of Warje WTP, 7 reservoirs, 3 pumping stations and all DMA's in the region; link all the data received via meters to a centralized dashboard with SCADA - Consumption based tariff to curb excess consumption and wastage - Ensure 100% of household and commercial establishments have rain water harvesting pits - Create society levels 'sumps' in which rain water is collected and then used for gardens, car washing etc. across all households
18 Waste water management	A Smart City treats all of its sewage to prevent the polluting of water bodies and aquifers. (Guideline 2.4)	Scenario 1	<ul style="list-style-type: none"> - More than 90% of the population is covered by Sewage network - Close to 65% of the waste water is treated - 355 MLD of mixed sewage + water is thrown into Mula-Mutha river via nala's and drains - Current BOD levels in Mula-Mutha river range from 50-80 mg3 	<ul style="list-style-type: none"> - Pune manages to utilize the JICA funding and grants under AMRUT to tackle all its sewage related deficiencies in terms of covering the entire population with sewage network, increasing the treatment capacity to tackle all the sewage generated in the city, creating ~120 kms of conveyance system to collect the sewage (Scenario 4) 	<ul style="list-style-type: none"> - Start by recycling 48 MLD sewage generated in ABB every day by enhancing the capacity of Baner STP by 30 MLD - PMC has gotten 990 crore JICA funding to take care of all its sewage and sanitation related infrastructure build out till 2031 through the construction of 10 STP's and 114.6 Km of pipeline, etc
19 Air quality	A Smart City has air quality that always meets international safety standards. (Guideline 2.4.8)	Scenario 2	<ul style="list-style-type: none"> - Pollution due to Particulate Matter (both, 2.5 and 10) and Nitrogen oxides is significantly higher than the prescribed norm (56, ~90 and 59 as against the benchmark of 40, 60 and 40 respectively) 	<ul style="list-style-type: none"> - As a result of multi-pronged strategy to increase public and NMT share of traffic, Pune aspires to bring down its pollution levels of both, particulate matter and poisonous gases to acceptable levels. Further, stress on creating more open spaces, move to renewables, etc all help Pune becomes city with one of the best air quality in the country. (Scenario 3) 	<ul style="list-style-type: none"> - Creation and redesigning of 60kms of footpaths and 42kms of cycle track to be created in the ABB area, supplemented by e-rickshaws and walk to work concept with increased open space will ensure that air quality in the ABB improves significantly - Multipronged strategy to beef up public transportation, facilitate NMT through redesign and augmentation of footpaths and cycle tracks and new philosophy of development maximizing open area
20 Energy efficiency	A Smart City government uses state-of-the-art energy efficiency practices in buildings, street lights, and transit systems. (Guideline 6.2)	Scenario 2	<ul style="list-style-type: none"> - PMC is the first urban local body in the country to take up implementation of environment friendly housing program since 2007 - Adopted green rating system (GRIHA) - which is a green building design evaluation system - Rooftop solar mandatory for certain buildings in PMC area 	<ul style="list-style-type: none"> - Achieve maximum savings on energy utilised and controlled under public realm such as Street lights, government buildings etc. - Promote the use of energy efficient technologies by putting in proper incentive structure (scenario 3) 	<ul style="list-style-type: none"> - Following projects proposed in local area <ul style="list-style-type: none"> - LED street lighting to go from the current level of 7% to 85% - Use of dimmers for sodium vapor lamps which cannot be replaced by LEDs - Incentive structure already in place to promote green buildings (extra FSI depending on the star rating of the building) - Increase in solar through RESCO model
21 Underground electric wiring	A Smart City has an underground electric wiring system to reduce blackouts due to storms and eliminate unsightliness. (Guideline 6.2)	Scenario 2	70% of the city is currently covered by underground distribution network	All electric wiring in the city goes underground, clearing the clutter and makes it safe for the residents (Scenario 4)	<ul style="list-style-type: none"> - Underground electric wiring is a part of DPR prepared from smart grid in ABB - As part of the T&D network strengthening project (Rs. 292 Cr.), 100% of overhead electric cables would be re-laid underground. MoU signed between PMC and MSEDCL wherein PMC has agreed to give 'Right of Way' permission wherever required by MSEDCL
22 Sanitation	A Smart City has no open defecation, and a full supply of toilets based on the population. (Guidelines 2.4.3 & 6.2)	Scenario 3	<ul style="list-style-type: none"> - ~3% population defecates in the open - The city is short of ~29,000 individual toilets 	Pune leverages Swachh Bharat Mission's funding to ensure that everyone has access to toilets - personal or community to eliminate open defecation	<ul style="list-style-type: none"> - Create 74 world class public toilets in the area and complete refurbishment of the 10 existing toilets to create a total of 84 public toilets to cater to 100% of the floating population in the area - 100% of population to have access to toilets (from 96.5% currently) with 29,000 toilets built over the next 2 years

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23 Waste management	A Smart City has a waste management system that removes household and commercial garbage, and disposes of it in an environmentally and economically sound manner. (Guidelines 2.4.3 & 6.2)	Scenario 3	<ul style="list-style-type: none"> - Collection efficiency is 90% - More than 55% of the MSW is segregated - Enough installed capacity to treat all solid waste - PMC in advanced stage of talks to sign an MOU with SWaCH to cover the entire city with door-to-door collection, including slums 	PMC becomes the first city in the country to solve its MSW problem end to end - with 100% collection, treatment and disposal of waste in a scientific manner. (Scenario 4)	<ul style="list-style-type: none"> - In the ABB area, ensure 100% segregation at source, transport in closed containers, 100% recycled, all bio-degradable converted to compost and energy - PMC in agreement with SWaCH to cover 100% households in the city with door-to-door collection of MSW
24 Safety and security	A Smart City has high levels of public safety, especially focused on women, children and the elderly; men and women of all ages feel safe on the streets at all hours. (Guideline 6.2)	Scenario 3	<ul style="list-style-type: none"> - Pune has 200 policemen per lakh population, as opposed to 138 for India average - 1300 CCTV camera's located throughout the city - Pune's share of all million plus cities' crime has decreased - from 2.6 in 2012 to 2.3 in 2014 	Pune is able to reduce the incidence of crime and becomes the safest city in India. It adopts a slew of measures like: <ul style="list-style-type: none"> - Integration of surveillance with centralised emergency response center for reduced response time - Smart Walky talkies, phones and GPS in patrol cars to reduce communications lags - Increase policeman to people ratio - Installation of 400 additional cameas to achieve 100% CCTV surveillance (Scenario 4)	<ul style="list-style-type: none"> - Initiate 811 emergency service with response time of less than 10 minutes - Centralized command and control centre with camera feed from critical areas, emergency services through 5 SWAT vehicles - 100% verification of maids in households for senior citizen safety and special child safety zones around schools, playgrounds - Panic buttons on street light poles - City wide public address systems - Further strengthening of CCTV surveillance



Annexure 3 – List of Exhibits



ANNEXURE 3

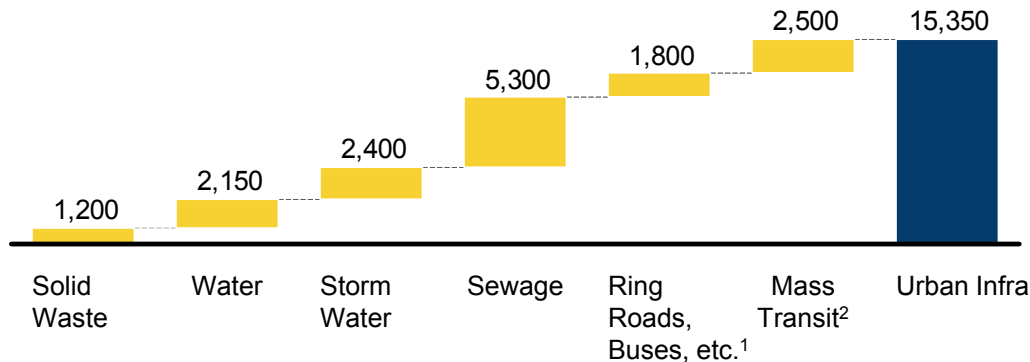
**Twenty sheets (A-4 and A-3) of annexures, including
annexures mentioned in questions 32, 34, 36**

S. No	Particulars	✓
1	Exhibit 1: PMC Funding Requirement between 2015-2030 Exhibit 2: Framework to solve Pune's transport & mobility problem	<input checked="" type="checkbox"/>
2	Exhibit 3: Comprehensive framework to solve water issues Exhibit 4: Land monetization to potentially raise additional INR1250-1450 cr annually	<input checked="" type="checkbox"/>
3	Exhibit 5: Extent of citizen engagement, Exhibit 6: Vision and key issues	<input checked="" type="checkbox"/>
4	Exhibit 7: : Citizen engagement: top issues by area, Exhibit 8: Top issues identified by citizens for solutioning, Exhibit 9: 11 contiguous areas initially shortlisted	<input checked="" type="checkbox"/>
5	Exhibit 10.1: Objective criteria applied by urban planners across 11 areas, Exhibit 10.2: Criteria applied for area selection , Exhibit 11: Aundh Baner Balewadi Area	<input checked="" type="checkbox"/>
6	Exhibit 12: Aspirations for key metrics of livability in ABB	<input checked="" type="checkbox"/>
7	Exhibit 13: Planned 3.5 km of Riverfront Development in ABB	<input checked="" type="checkbox"/>
8	Exhibit 14: Transit hub along with commercial development Exhibit 15: Placemaking & redesign of streets and footpaths	<input checked="" type="checkbox"/>
9	Exhibit 16: Redesign & Placemaking of Junctions	<input checked="" type="checkbox"/>
10	Exhibit 17: Bicycle friendly redesign of roads with integrated Bicycle Network Exhibit 18: Few examples – World class amenity spaces in ABB	<input checked="" type="checkbox"/>
11	Exhibit 19: Google map traffic image at 7:30 pm on Monday Exhibit 20: Challenge of water inequality in Pune	<input checked="" type="checkbox"/>
12	Exhibit 21: Solution components for public transport items, Exhibit 22: Adaptive traffic solution for Pune, Exhibit 23: Parking solutions for Pune	<input checked="" type="checkbox"/>
13	Exhibit 24: 5 DMAs to pilot 24x7 water Exhibit 25: 11 steps to convert 5 DMAs into 24x7 water supply zones	<input checked="" type="checkbox"/>
14	Exhibit 26: Integrated Solutions for Aundh Baner Balewadi (A3-Exhibit)	<input checked="" type="checkbox"/>
15	Exhibit 27: Integrated Pan City Solutions (A3-Exhibit)	<input checked="" type="checkbox"/>
16	Exhibit 28: Critical milestones & timelines of Pan-City initiatives (A3-Exhibit) (Q.32)	<input checked="" type="checkbox"/>
17	Exhibit 29: Implementation Plan for Local Area Solutions (A3-Exhibit)	<input checked="" type="checkbox"/>
18	Exhibit 30: Relationship with government and non-government agencies (Q.34)	<input checked="" type="checkbox"/>
19	Exhibit 31: Organogram with linkages of SPV with ULB & parastatal agencies (Q.36)	<input checked="" type="checkbox"/>
20	Exhibit 32: Detailed funding and costing each project including capex, opex and revenue Exhibit 33: Detailed 5 year cash flow including sources and uses of funds	<input checked="" type="checkbox"/>

Exhibit 1

Funding requirement for PMC between 2015 and 2030

INR Crore



Additional spending of ~20,000 crores on housing

Opex, INR cr



¹ Assuming that Ring Roads will be constructed by PMRDA, PMC will bear 60% of bus cost (40% by PCMC)

² Assuming that PMC will bear the 10% cost of constructing the Metro




SOURCE: McKinsey Urbanization Funding Models, PMC, Expert Interviews

Exhibit 2: Framework to solve Pune's transport & mobility problem

	Short term <12-18 months	Medium term 18 months– 60 months	Long term >5 years
1 ICT solutions	<ul style="list-style-type: none"> Public transport ITMS <ul style="list-style-type: none"> GPS, real-time tracking, health monitoring in buses Smart bus stops with PIS Mobile apps for real time tracking Adaptive Traffic Management System across 319 signals: <ul style="list-style-type: none"> Pedestrian safety buttons Solar Panel & UPS backup Emergency response system Advanced traffic management <ul style="list-style-type: none"> E-challans Mobile GPS based traffic analysis Intelligent road asset mgmt 		
2 "Less is more" solutions	<ul style="list-style-type: none"> Private bus aggregator to complement public buses 	<ul style="list-style-type: none"> Procurement of ~2,500/ ITMS enable buses Depot and terminal development Public bicycle sharing system Smart Redesign of 50 km of streets Redesign of 75 Junctions 	<ul style="list-style-type: none"> Smart street redesign for entire Pune
3 High capex solutions		<ul style="list-style-type: none"> ~60 km of BRT Network ~31 km of Metro 2 Ring Roads to be completed 	<ul style="list-style-type: none"> ~10-20 km BRT network ~44 km metro network

SOURCE: City documents, PMPML, ITDP, PMC Transport Department

Exhibit 3: Comprehensive framework to solve water issues

	Short term <12 months	Medium term 1 year – 5 years	Long term >5 years
1  ICT solutions	<ul style="list-style-type: none"> Customer survey on GIS Platform Smart Bulk Meters with SCADA Grievance redressal and bill payment through website and mobile app Smart Metering for commercial establishments Smart Consumer awareness campaign 	<ul style="list-style-type: none"> Helium technology based Leak Identification across 2688Km. Generate 1.92 million units of electricity annually from Naidu STP 	<ul style="list-style-type: none"> Smart metering for domestic households through a "Give up water subsidy" campaign along with a revised telescopic tariff
2  "Less is more" solutions	<ul style="list-style-type: none"> Sell 5-7 MLD of treated water to industry, construction and railways Use standby lines to treat 355 MLD of mixed sewage water from Nalas/Drains 	<ul style="list-style-type: none"> Restructure water department into three verticals (O&M, Projects, PR) 	
3  High capex solutions		<ul style="list-style-type: none"> Initiate 24x7 water supply pilot across 5 DMA's (6000 connections) 	<ul style="list-style-type: none"> Do phase wise 24x7 water supply project across the city Installation on treatment mechanism to meet gap in installed treatment capacity of 177 MLD

SOURCE: Expert Interviews, PMC Officials, Desk researchx

Exhibit 4: Sources identified for Land Monetization, with potential to raise additional INR ~1250-1450 Cr annually

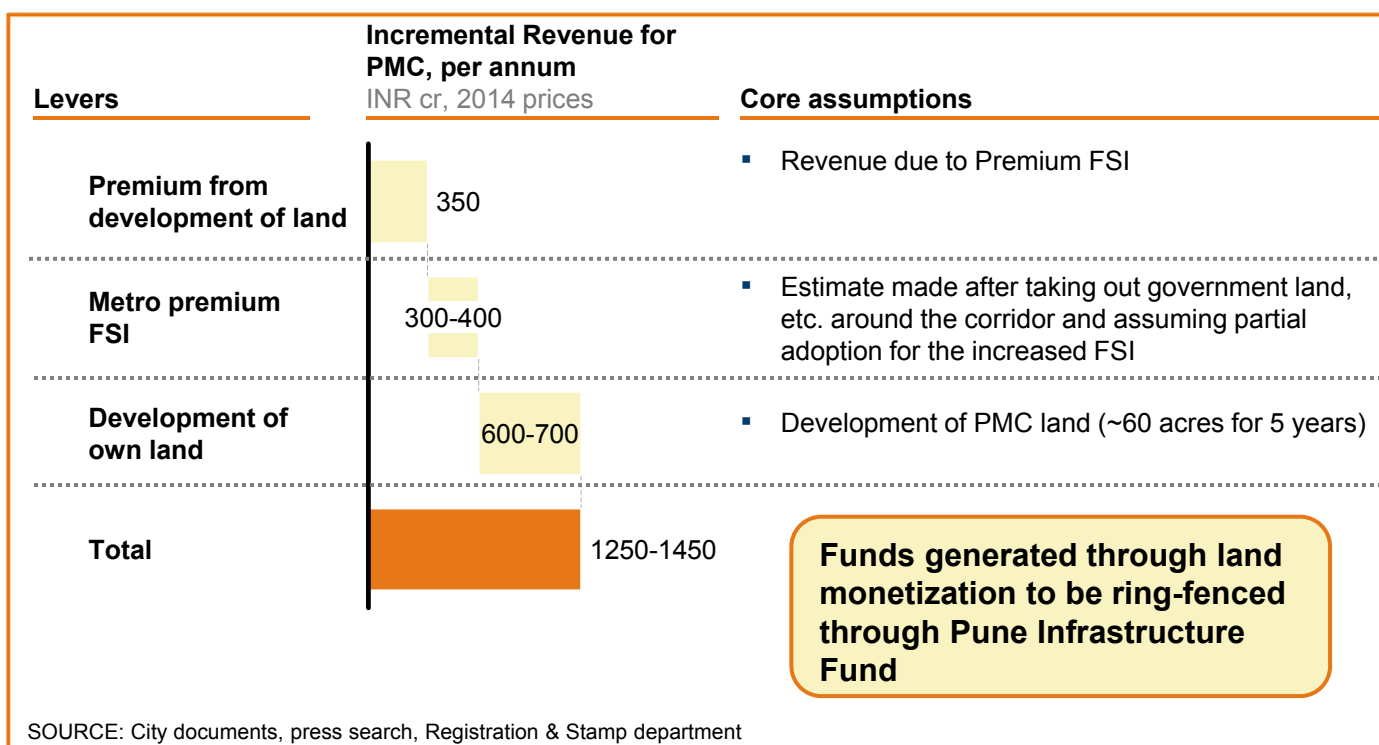


Exhibit 5: Extent of citizen engagement



Exhibit 6: Vision and key issues



Exhibit 7: Citizen engagement: top issues by area

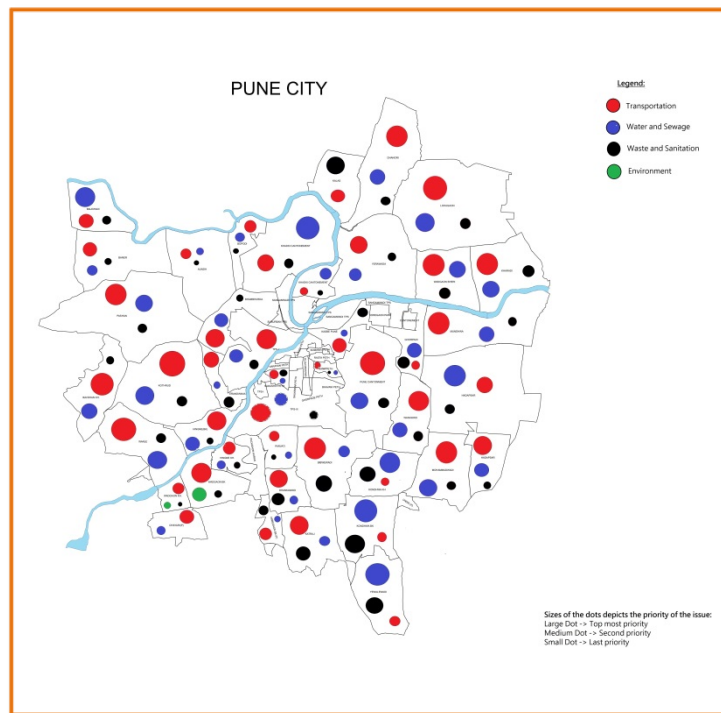


Exhibit 8: Top issues identified by citizens for solutioning



Exhibit 9: 11 contiguous areas initially shortlisted

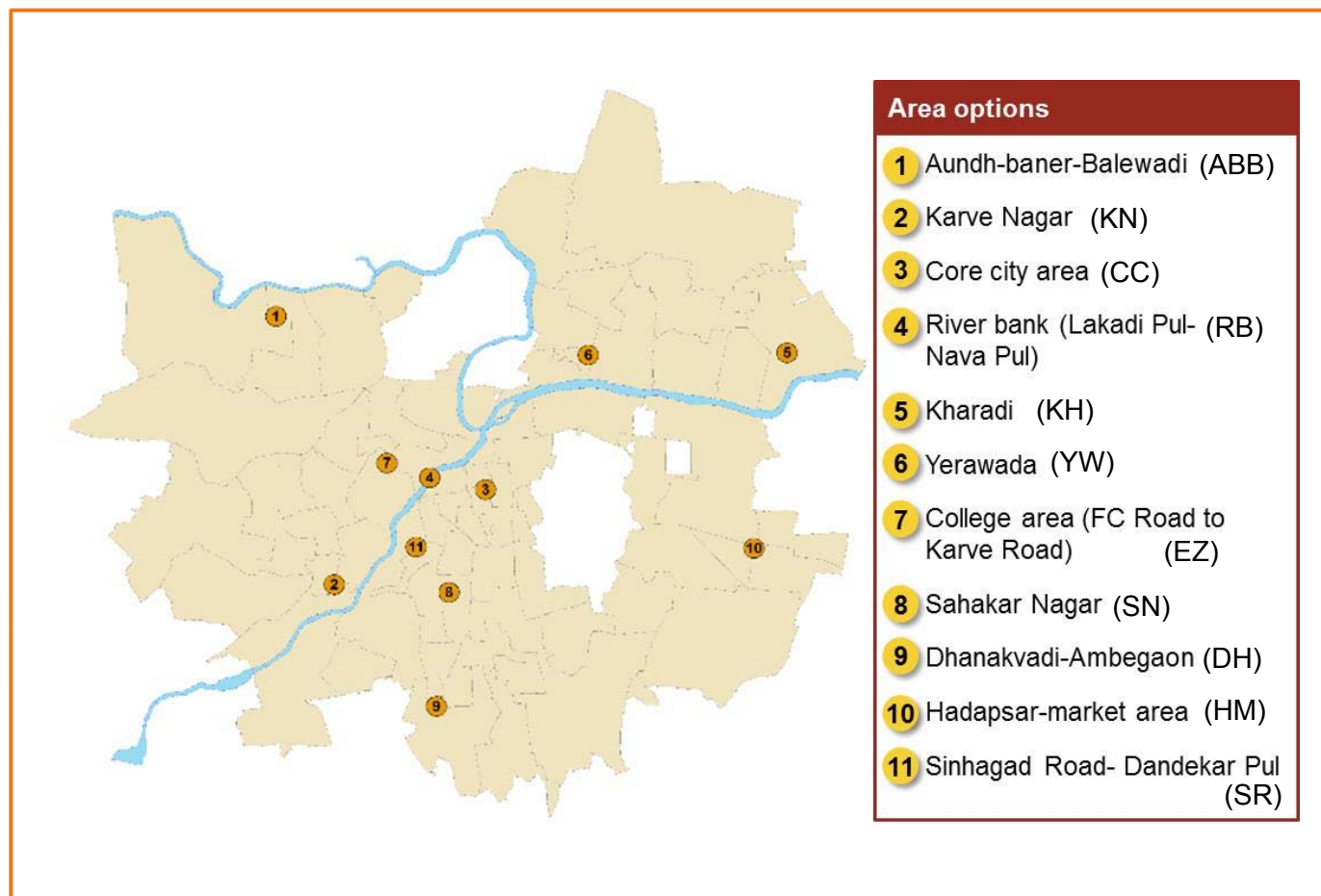


Exhibit 10.1: Criteria applied for area selection during citizen engagement

Area important for identity of Pune		Area you would like to live in		Area you would like to invest		Favourite destination for youth of Pune		Which area will benefit a larger cross section of society		Recreational hub for Pune	
Area Name	%	Area Name	%	Area Name	%	Area Name	%	Area Name	%	Area Name	%
CC	26%	ABB	17%	ABB	17%	EZ	21%	CC	15%	ABB	16%
ABB	20%	CC	15%	CC	14%	ABB	15%	ABB	12%	CC	13%
KN	10%	KN	13%	KH	13%	CC	11%	RB	10%	RB	12%
EZ	9%	EZ	8%	HM	10%	KH	8%	DH	10%	SR	10%
KH	7%	KH	8%	DH	8%	SR	7%	HM	9%	EZ	8%

Exhibit 10.2: Objective criteria applied by urban planners across 11 areas

Criteria for area selection	CC	RB	SN	KN	EZ	ABB	DH	SR	HM	YW	KH
1.Population density	H	M	M	M	L	M	H	M	M	M	L
2.Mixed Use	H	M	L	M	H	M	L	L	M	M	M
3.Identity / Heritage	H	H	M	M	H	M	L	L	M	M	L
4.Slums	L	L	L	L	L	M	M	H	H	H	M
5.Criticality to the city	H	L	M	M	H	M	H	M	M	M	L
6.Existing degree of liveability	L	M	M	H	H	H	L	M	M	L	M
7.Future proposals coming up	H	H	M	M	M	M	L	M	M	M	M
8.Replicability	H	H	H	H	L	H	M	M	M	L	H
9. Environmental concern	L	H	H	H	H	M	M	H	L	L	M
10. Ease of implementation	M	M	H	H	M	H	M	M	M	H	H
Probability of final selection	H	H	L	M	H	H	M	M	M	M	M

Legend: L: Low, M: Medium, H:High

Exhibit 11: 'Aundh-Baner-Balewadi' (ABB): 900 acres identified with many potential interventions possible

- Total area: ~900 acres
- Total population: ~40K

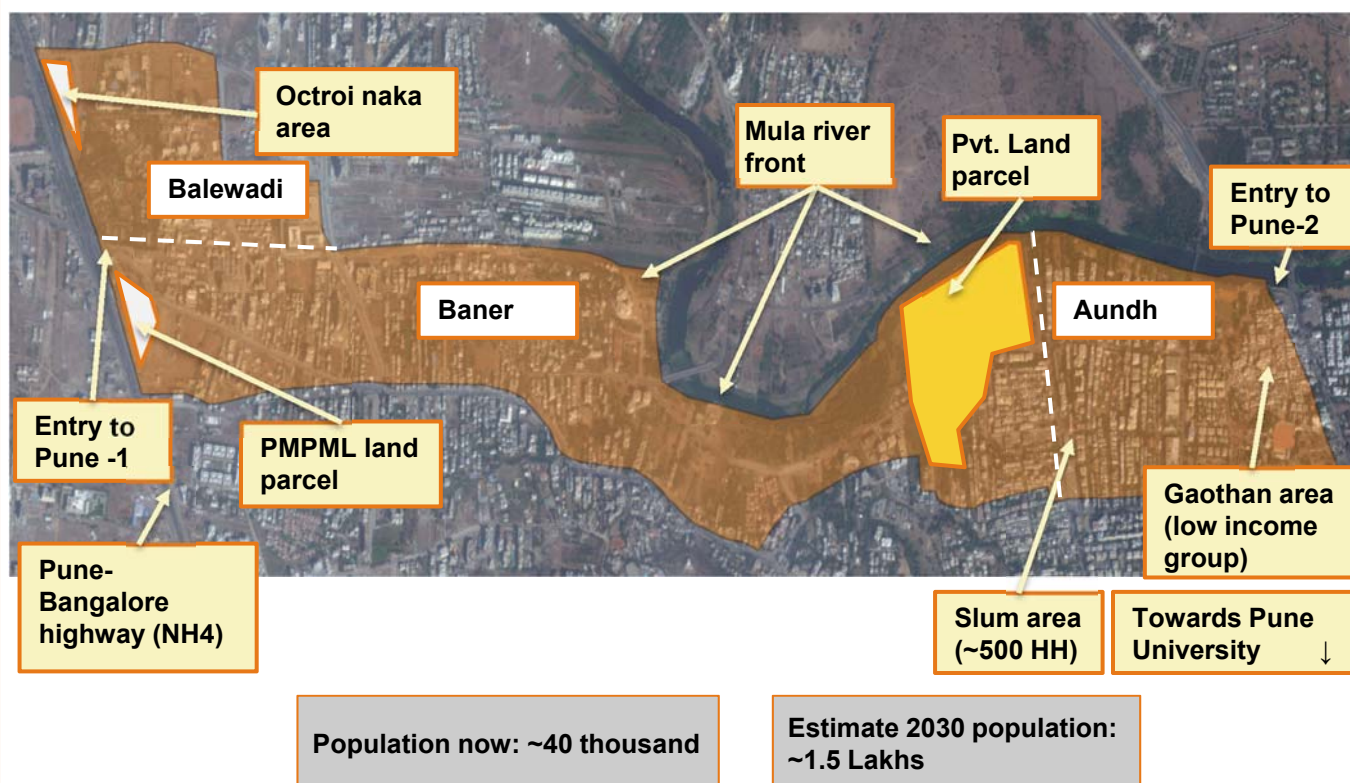


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Area important for identity of Pune		Area you would like to live in		Area you would like to invest		Favourite destination for youth of Pune		Which area will benefit a larger cross section of society		Recreational hub for Pune	
Area Name	%	Area Name	%	Area Name	%	Area Name	%	Area Name	%	Area Name	%
CC	26%	ABB	17%	ABB	17%	EZ	21%	CC	15%	ABB	16%
ABB	20%	CC	15%	CC	14%	ABB	15%	ABB	12%	CC	13%
KN	10%	KN	13%	KH	13%	CC	11%	RB	10%	RB	12%
EZ	9%	EZ	8%	HM	10%	KH	8%	DH	10%	SR	10%
KH	7%	KH	8%	DH	8%	SR	7%	HM	9%	EZ	8%

Exhibit 10.2: Objective criteria applied by urban planners across 11 areas

Criteria for area selection	CC	RB	SN	KN	EZ	ABB	DH	SR	HM	YW	KH
1.Population density	H	M	M	M	L	M	H	M	M	M	L
2.Mixed Use	H	M	L	M	H	M	L	L	M	M	M
3.Identity / Heritage	H	H	M	M	H	M	L	L	L	M	L
4.Slums	L	L	L	L	L	M	M	H	H	H	M
5.Criticality to the city	H	L	M	M	H	M	H	M	M	M	L
6.Existing degree of liveability	L	M	M	H	H	H	L	M	M	L	M
7.Future proposals coming up	H	H	M	M	M	M	L	M	M	M	M
8.Replicability	H	H	H	H	L	H	M	M	M	L	H
9. Environmental concern	L	H	H	H	H	M	M	H	L	L	M
10. Ease of implementation	M	M	H	H	M	H	M	M	M	H	H
Probability of final selection	H	H	L	M	H	H	M	M	M	M	M

Legend: L: Low, M: Medium, H:High

Exhibit 11: 'Aundh-Baner-Balewadi' (ABB): 900 acres identified with many potential interventions possible

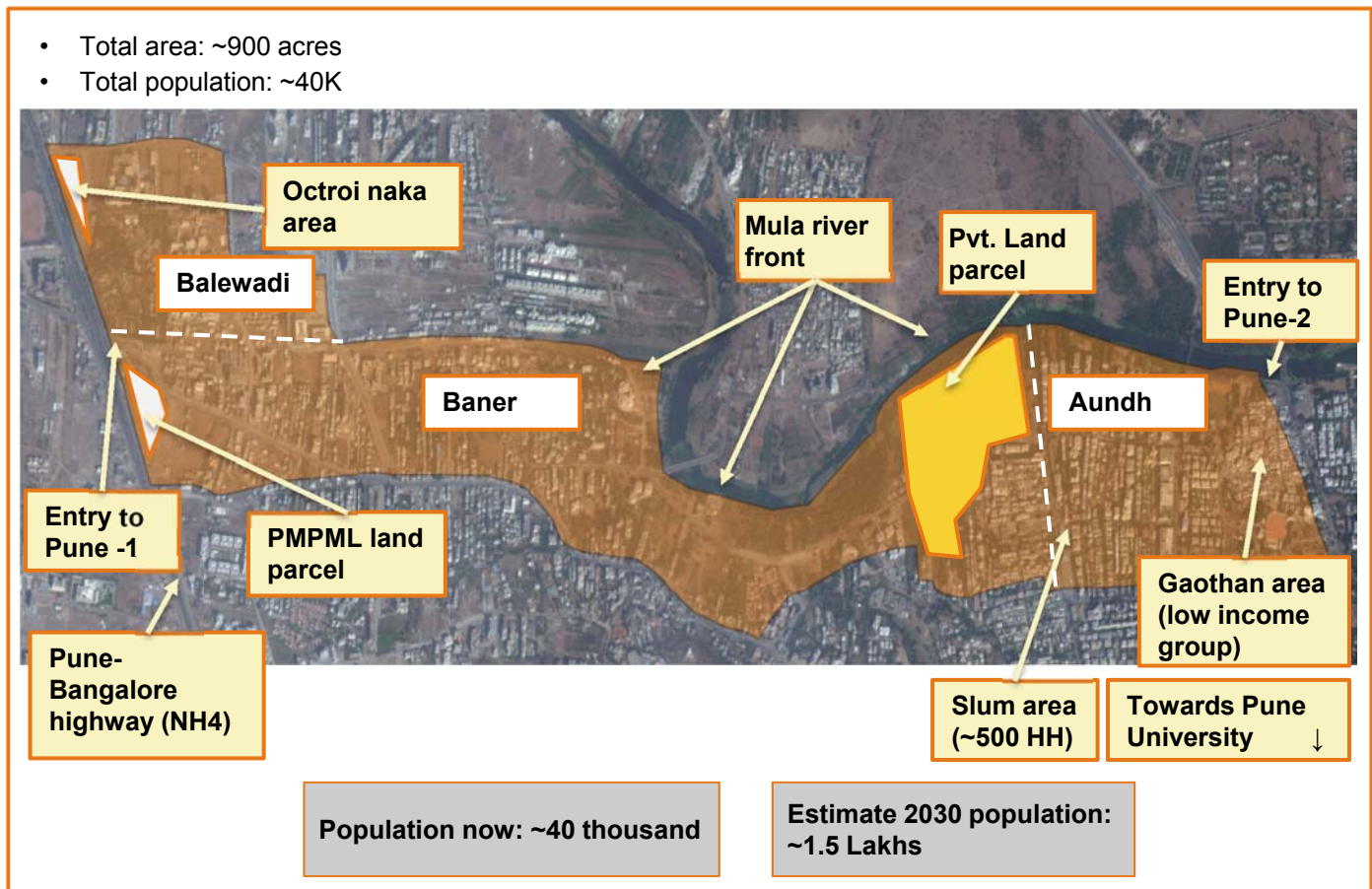


Exhibit 12: Aspirations for key metrics of livability in ABB












Sector	Metric	From	To	Benchmark
1 Transport and mobility 	• Public transport usage (% of trip share)	• 18%	• 40%	• >50%
	• Number of buses (# per Lakh population)	• 46	• 79	• >55
	• Non-motorized vehicles (NMT) usage (%)	• 30%	• 50%	• >50%
	• Average traffic speed (km/hr)	• 18	• 22-23	• -
2 Water and Sewage 	• Average water supplied (lpcd)	• 90-120	• 150	• >135
	• Water deficient areas (%)	• 60-70%	• 0%	• 0%
	• Sewage discharged into the river without treatment (%)	• 30%	• 0%	• 0%
	• Leakage and Non-revenue Water (%)	• 30%	• 15%	• <15%
	• Households with rain water harvesting	• 0%	• 100%	• 100%
3 Sanitation and waste 	• Door-to-door garbage collection coverage (%)	• 0%	• 100%	• 100%
	• Waste segregated at source (%)	• 55%	• 100%	• 100%
	• Public toilets (number per lakh of population)	• 23	• 50	• >50
4 Energy and Solar 	• Energy from renewable sources (0%)	• 0%	• 15-20%	• 20%
	• Energy efficient street-lights (% of total)	• 0%	• 100%	• 100%
5 Amenities 	• Open spaces (% of total area)	• 3%	• 10%	• 10%
	• Number of pedestrian roads	• 0	• 1	• -
	• Roads with adequate footpaths (>2 m footpath)	• 40%	• 0%	• 0%
6 Safety and security 	• CCTV security coverage	• 20%	• 100%	• 100%
	• Response time (minutes)	• 20-30	• <10	• <10
	• Number of security personnel per Lakh of population	• 60	• 120	• 136
7 E-governance and digital 	• Number of services provided via single window	• 0	• 20-25	• -
	• Public Wi-fi coverage	• 0%	• 100%	• 100%
	• Digital literacy	• 60-70%	• 100%	• 100%
8 Slum re-development 	• Number of HH living in slums	• 483	• 0	• 0
	• Unemployment (especially in slums, %)	• 6%	• 2%	• 2%
9 Affordable housing 	• # of affordable houses in the region	• 0	• 400-500	• 400-500
	• % of affordable houses in the region	• 0%	• 2%	• 10%
10 Health 	• Hospital beds per 10,000 population	• 104	• >40	• >40
11 Education 	• School area per student (sq ft of school area available per student)	• 29	• 35	• 35

Exhibit 13: Planned 3.5 km of Riverfront Development in ABB

Now (from)



To

- Urban Farming • 18 Acres *
- Iconic Residential Mixed Use • 32 Acres
- Performance Gallery & Public Zone • 9 Acres
- River Promenade • 7 Acres
- Exhibition Retail Area • 9.7 Acres
- Public Utility & Green Area • 9.4 Acres
- Residential And Mixed Use • 29.6 Acres

SCULPTURAL BUILT MASS AS ANCHOR POINTS
Viewing decks/ rooftop for solar energy harnessing

LANDSCAPED PARKS AND PATHWAYS
FOR PEDESTRIAN COMFORT

HARDSCAPING IN SEMI PERMEABLE MATERIALS
(to allow ground water percolation)

STEPPED PLAZA FOR CASUAL SEATING
(creation of Amphitheater for cultural purposes)

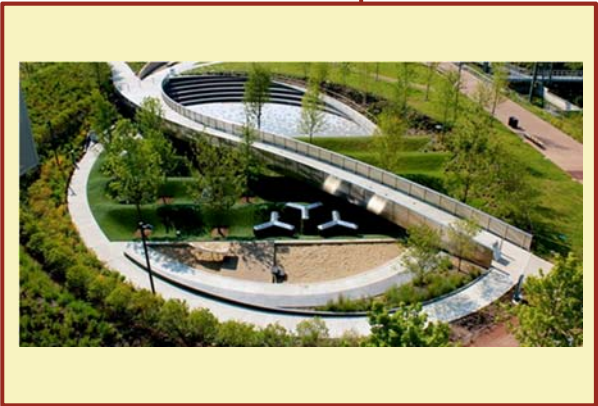


Exhibit 14: Transit hub along with commercial development



Exhibit 15: Street redesign, road widening and placemaking

PERSPECTIVE OF PROPOSED BUS BAY, PARKING AND GREEN SPACE

BEFORE

PELICAN CROSSING

BEFORE

BEFORE

IMPROVED BUS BAY WITH SOLAR PANEL, PUBLIC INFORMATION SYSTEM, WI-FI AND TOILETS

BEFORE

BEFORE

SMART POLE WITH VEHICLE ACTUATED SIGNAL, CCTV & STREET LIGHT WITH SOLAR PANEL

BEFORE

BEFORE

TRAFFIC INFORMATION SYSTEM AND DIGITAL SINAGES

BEFORE

PLAN INDICATING PROPOSED IMPROVEMENTS FOR BUS BAY

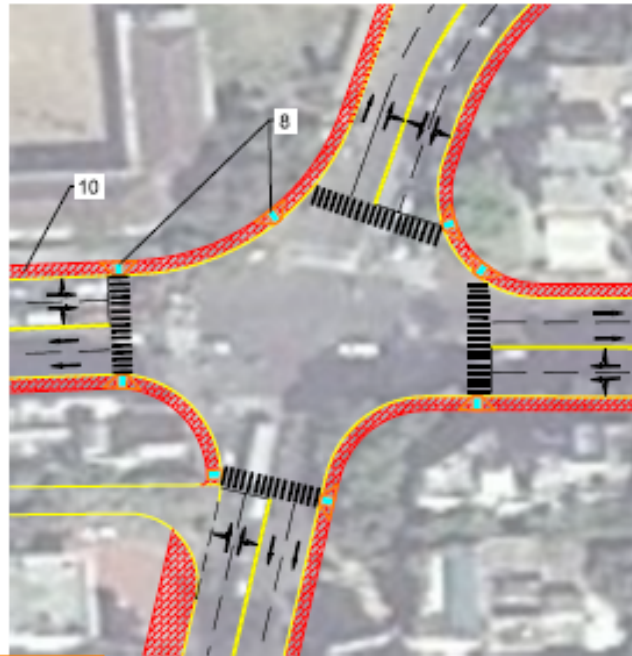
WALTER P MOORE ENGINEERING INDIA PVT. LTD.
 Down Town City Centre,
 Office No. 7B, 7th Floor,
 S, No 8-23/1/2, Near Mhatre Bridge,
 Erandwane, Pune - 411 004, INDIA
 91 9021182151

NOTES:
 THE INFORMATION SHOWN IS FOR CONCEPTUAL USE ONLY AND NOT FOR ESTIMATION & CONSTRUCTION. THESE OPTIONS WERE PREPARED WITHOUT ANY TOPOGRAPHICAL, TRAFFIC & GEOTECHNICAL DATA. THESE DRAWING SHALL NOT BE USED OR FURTHER DEVELOPED WITHOUT PRIOR CONSULTATION OF WALTER P MOORE ENGINEERING INDIA PVT.LTD.

SCALE: NTS

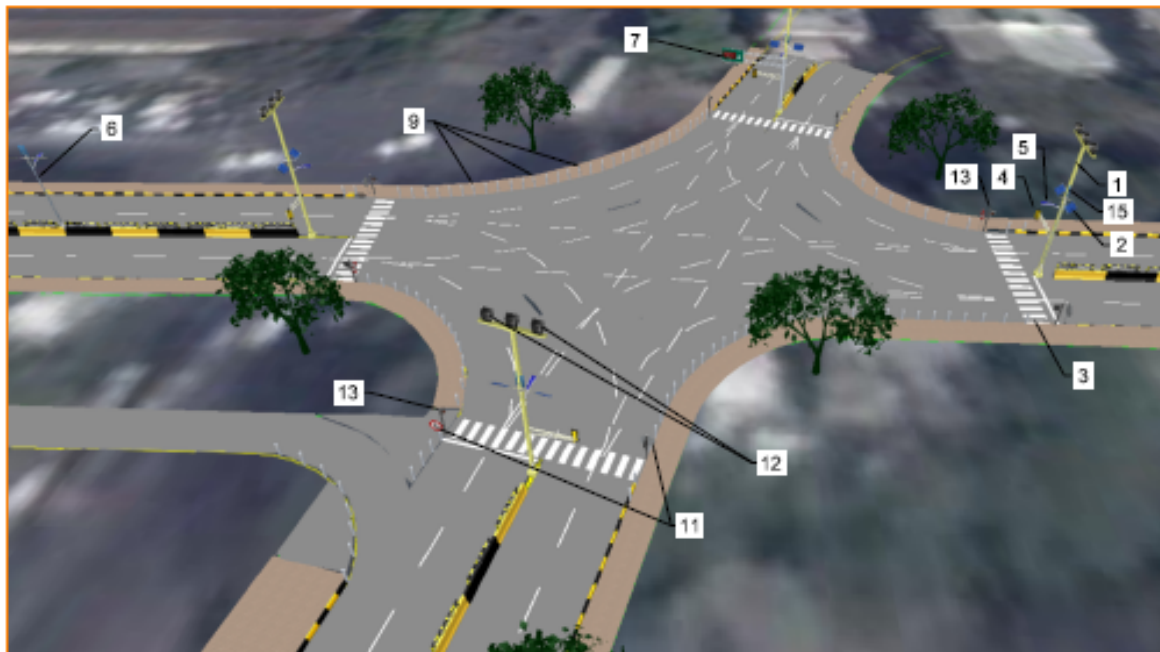
Exhibit 16: Redesign & Placemaking of Junctions

PARIHAR CHOWK INTERSECTION



LEGEND	
①	HIGH SMART POLE
②	SOLAR PANELS
③	CROSS WALK
④	SYNCHRONIZED SIGNAL & CCTV
⑤	TRAFFIC CAMERA
⑥	SMART LIGHT POLE
⑦	ITS SIGN BOARD
⑧	HANDICAP RAMP
⑨	BOLLARD
⑩	PEDESTRIAN FRIENDLY SIDEWALK
⑪	REGULATORY SIGN
⑫	STREET LUMINARIES
⑬	FLASHING CAUTION LIGHT
⑭	CIRCULATORY ISLANDS
⑮	SERVICE AREA
⑯	SOLAR BUS STOP

PROPOSED IMPROVEMENTS OVER EXISTING CONDITION



PERSPECTIVE OF PROPOSED CONDITION

Exhibit 17: Bicycle friendly redesign of roads with integrated Bicycle Network

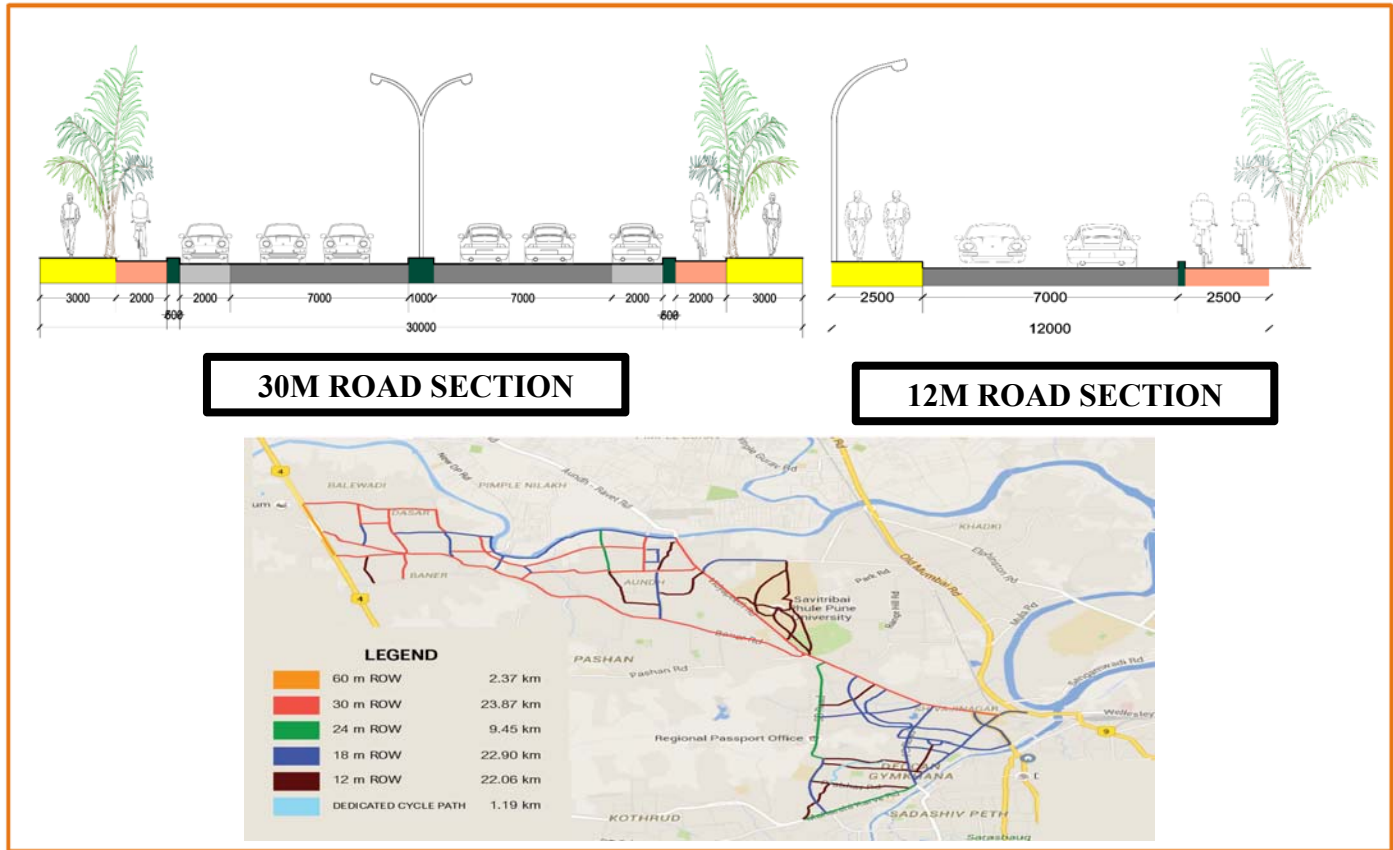


Exhibit 18: Few examples – World class amenity spaces in ABB

‘Aundh-Baner-Balewadi’ (ABB): ~7 acres of additional amenity space is planned to be used to ensure we meet the international benchmarks on Public social infrastructure

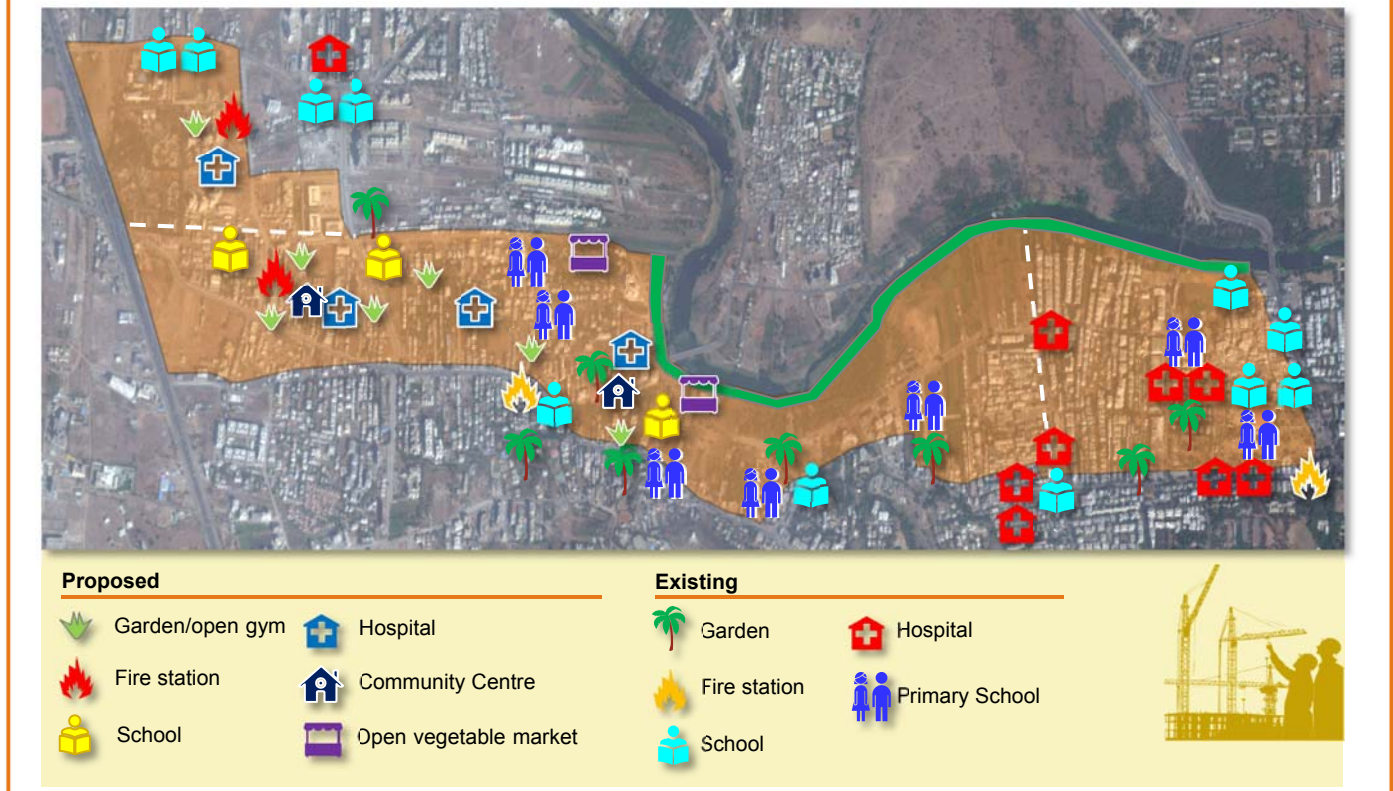


Exhibit 19: Google map traffic image at 7:30 pm on Monday

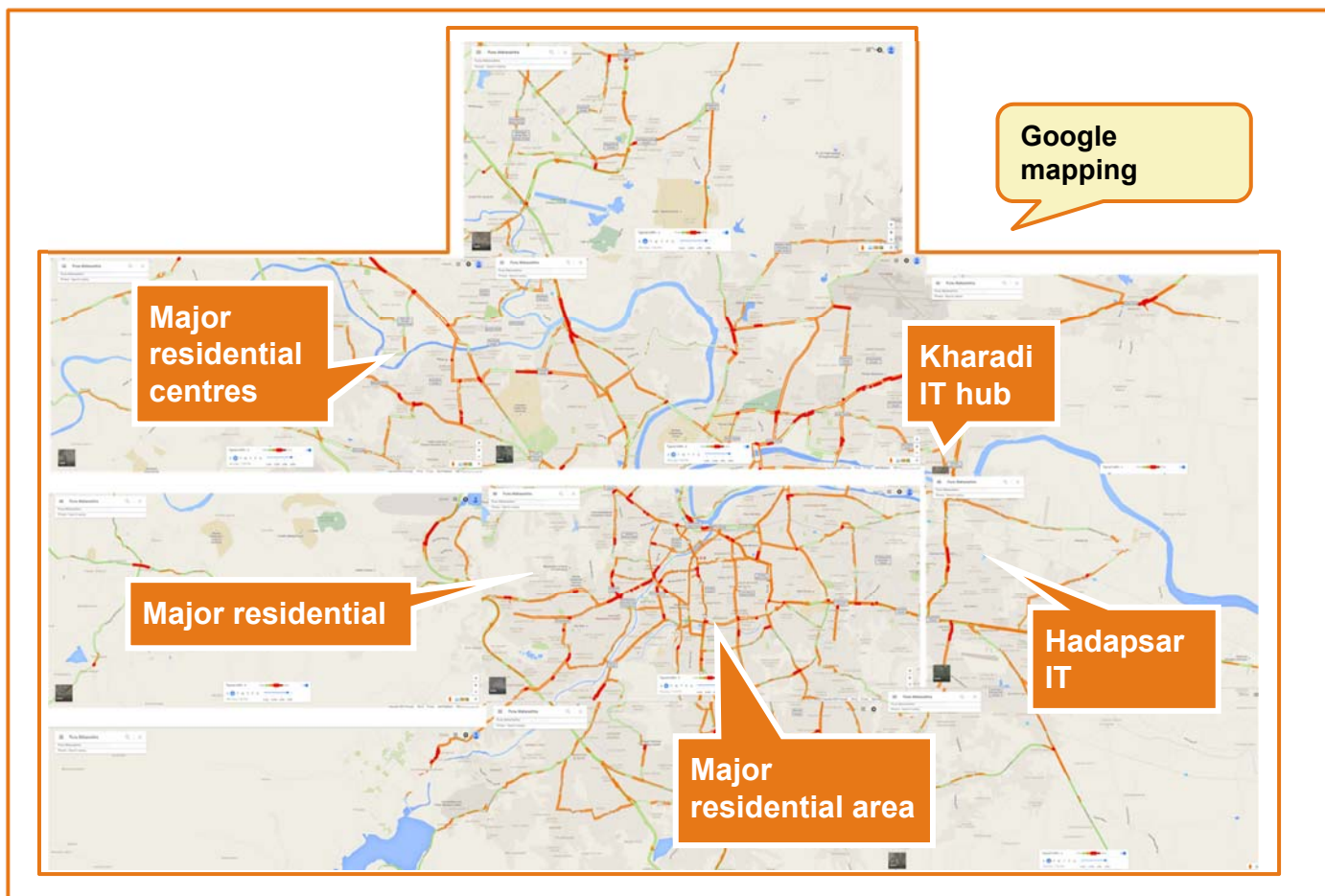


Exhibit 20: Challenge of water inequality in Pune

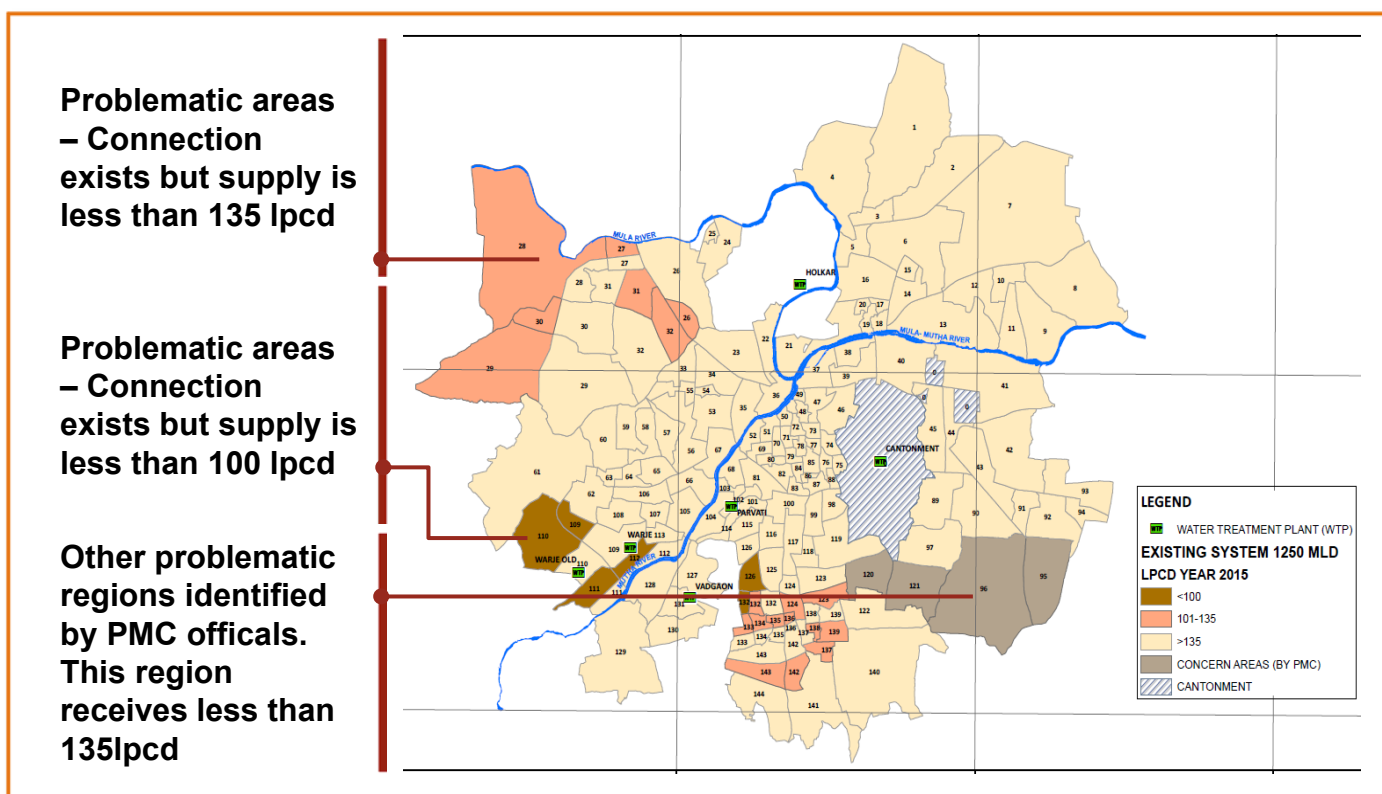


Exhibit 21: Solution components for public transport items

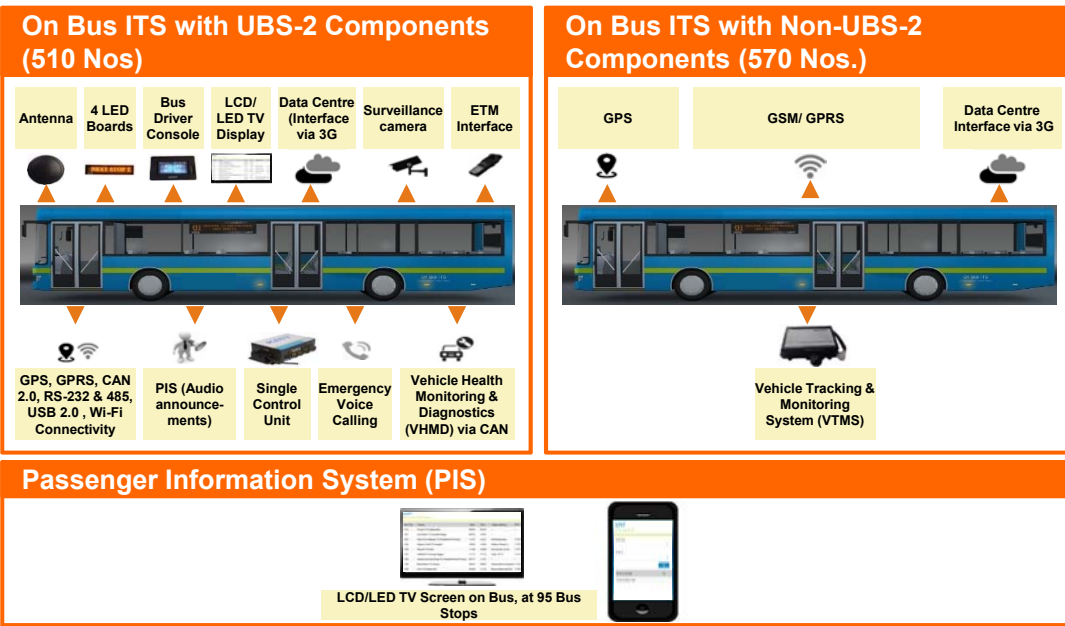


Exhibit 22: Adaptive traffic solution for Pune

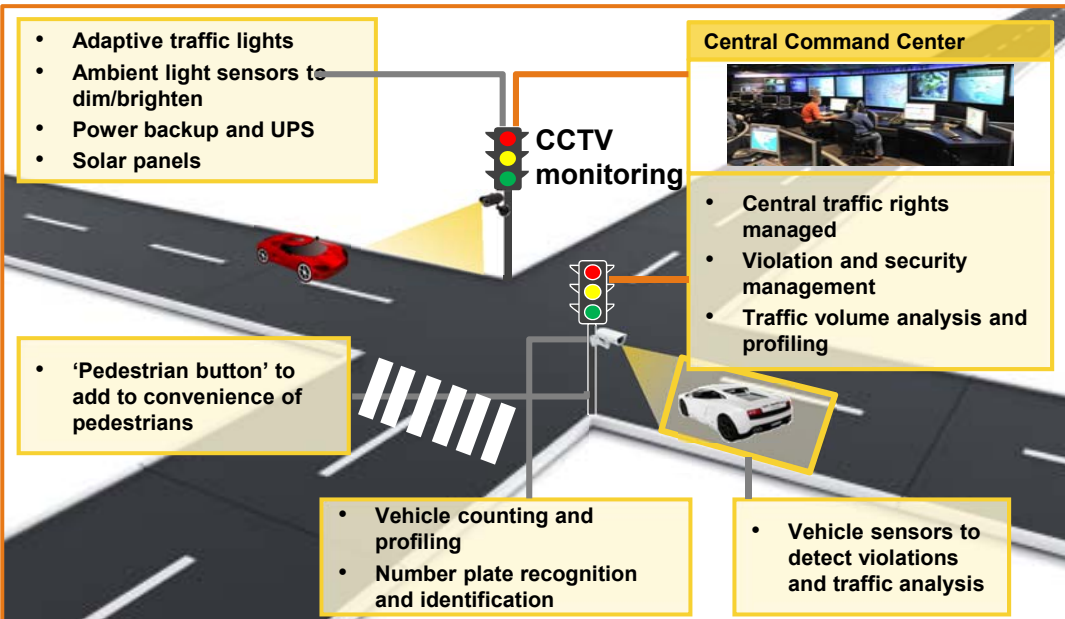
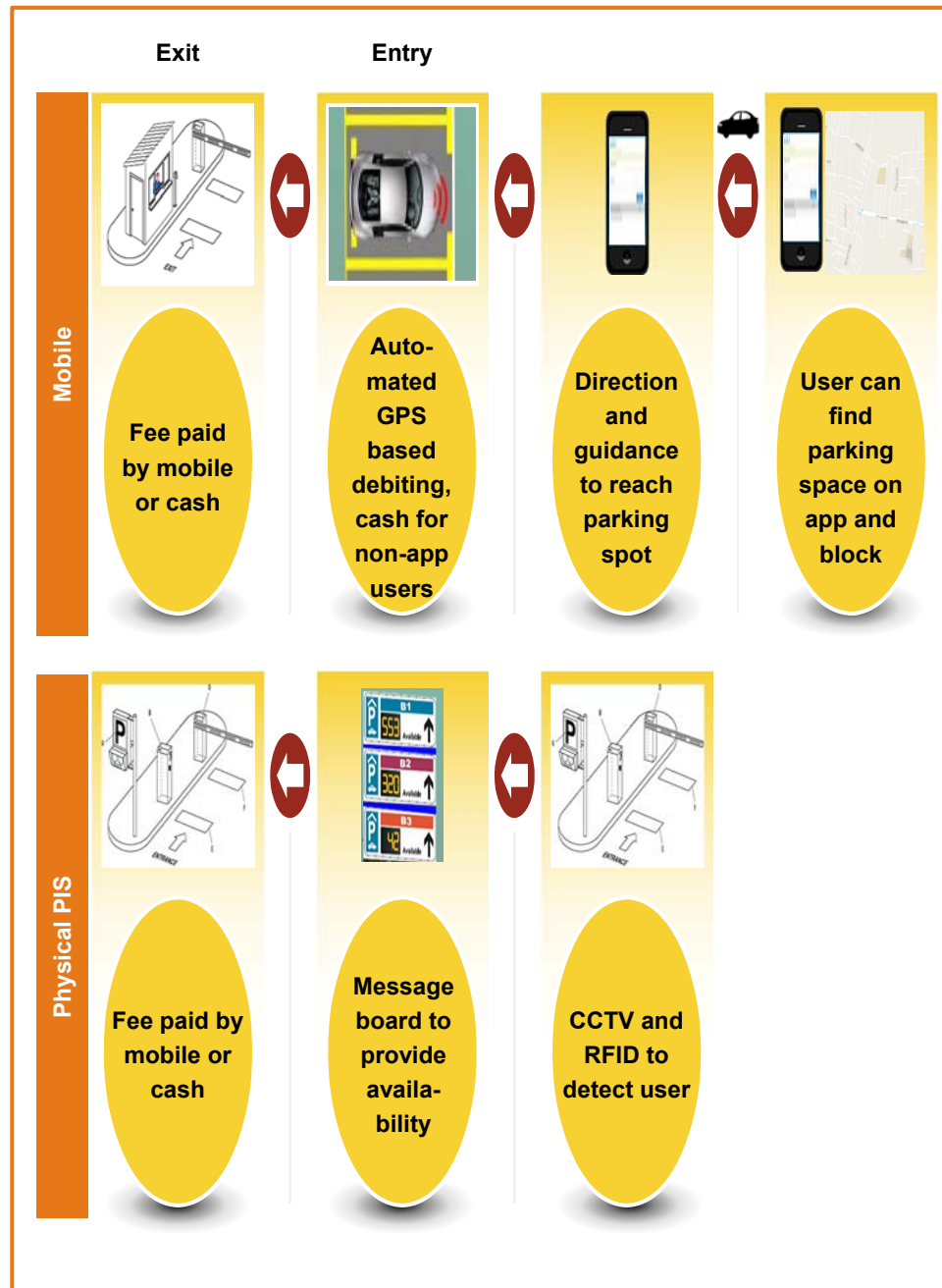


Exhibit 23: Parking solutions for Pune



Credits: KPIT, Wipro, Supplier Workshops

Exhibit 24: 5 DMAs to pilot 24x7 water

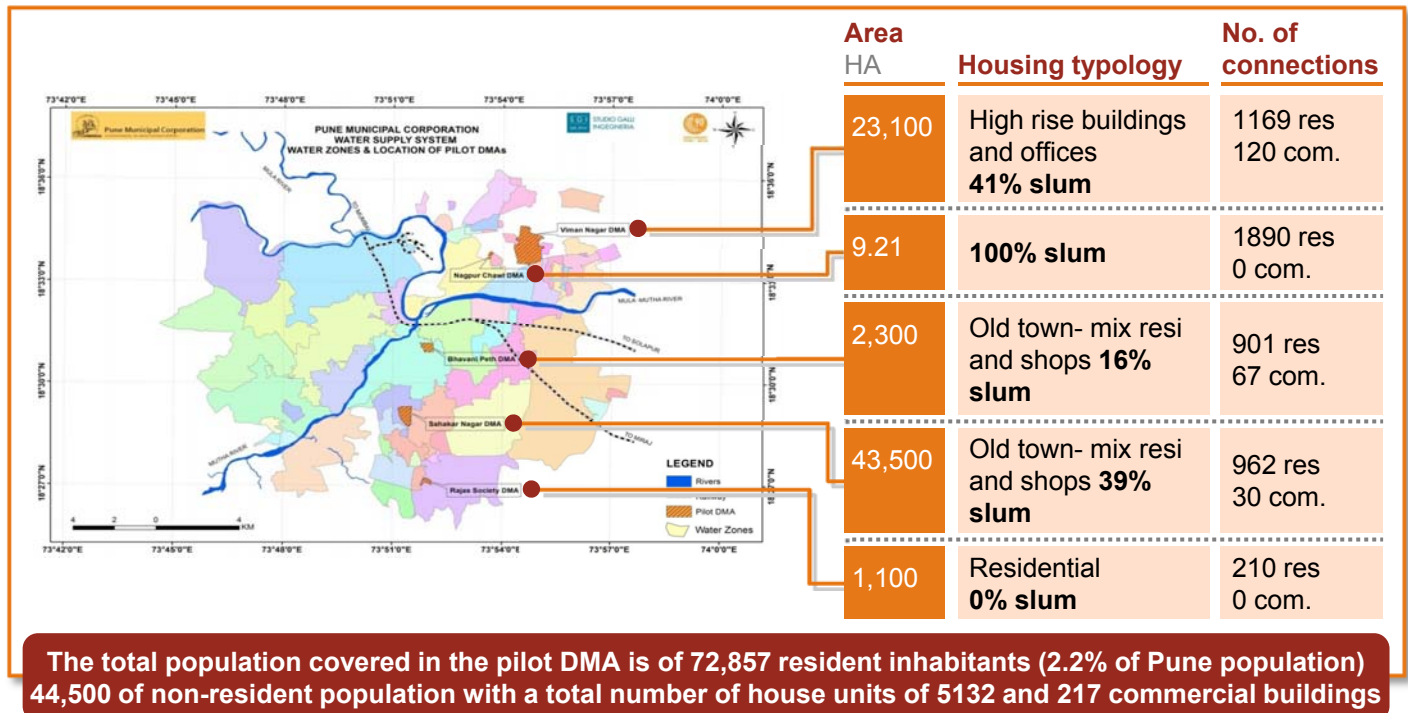
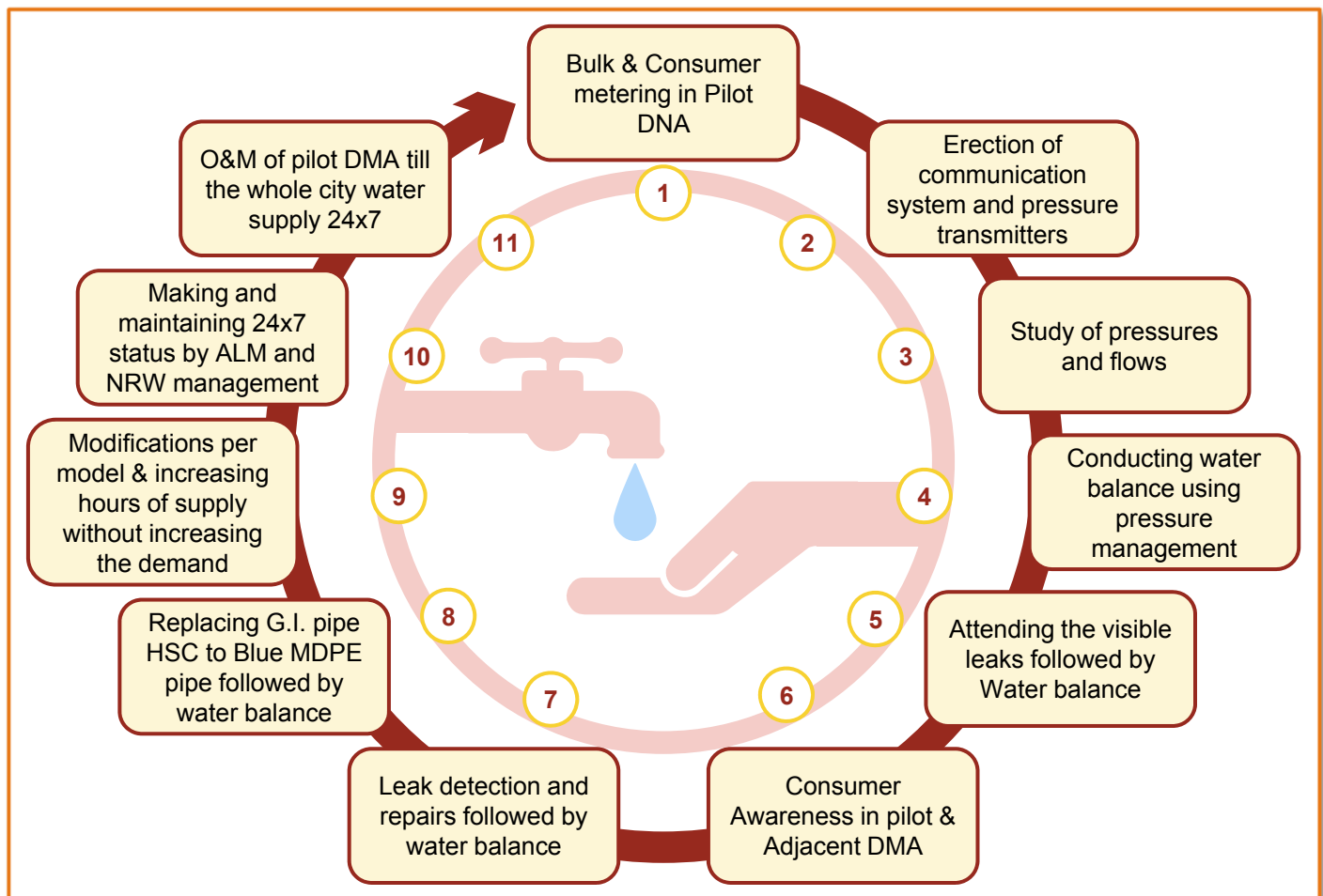


Exhibit 25: 11 steps to convert 5 DMAs into 24x7 water supply zones



SOURCE: McKinsey Team, PMC Employee Interviews, 24x7 Water Supply DPR prepared by SGI
 1 This is without accounting for hard infrastructure requirements such as reservoirs, pipelines and pumping stations

Exhibit 26: Integrated Solutions for Aundh Baner Balewadi

- Total area: ~900 acres
- Total population: ~40K

Transit hub at entry point of Pune with access to long distance buses



A suite of citizen apps for grievance redressal and IOC



8 KM BRT extension with direct access to Hinjewadi (IT hub)



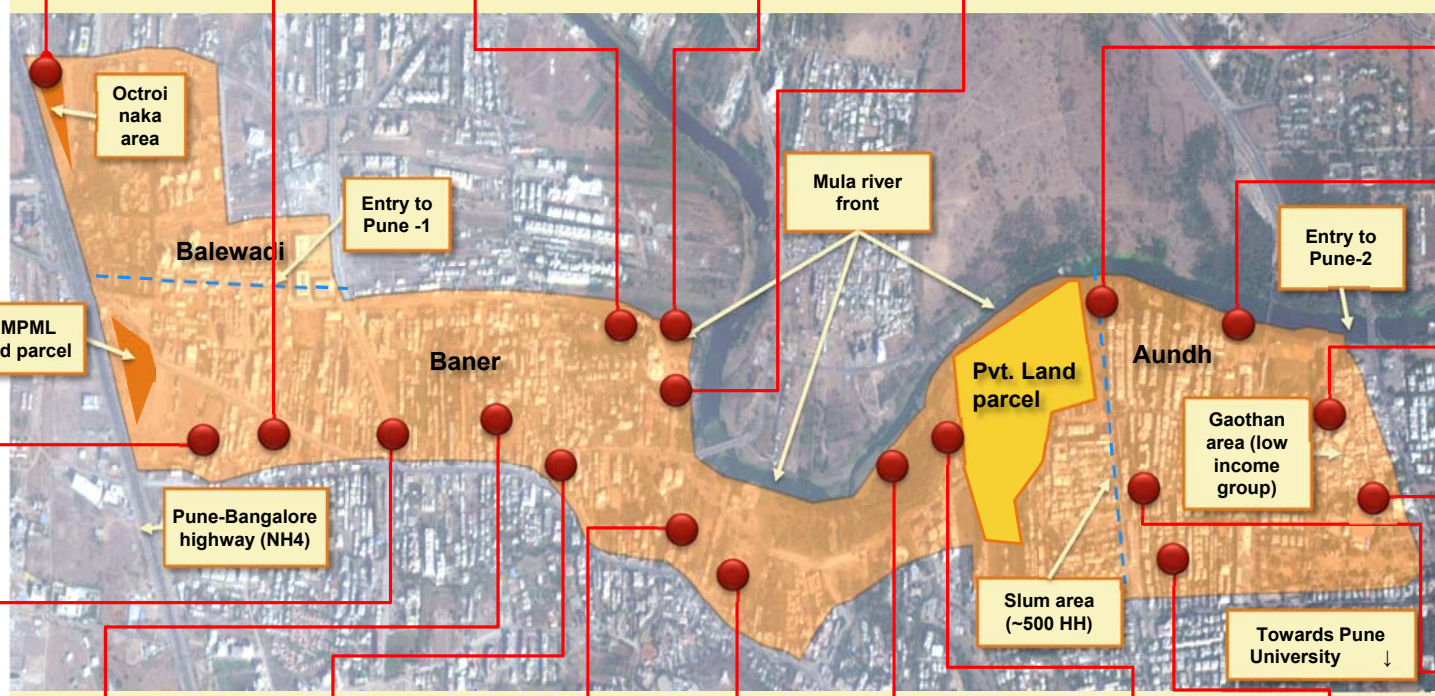
100 electric buses to complement existing buses for ABB-Hinjewadi connectivity



NMT focus through PBS with 40 stations, dedicated 42 km cycle tracks, and redesign of 60 km footpath, 15 junctions and 27 km of streets



100% differently-abled friendly pathways



100% smart bulk, commercial and domestic metering



Rainwater harvesting in certain buildings



Zero waste and garbage (RFID tracking of garbage trucks)



10 acre start-up zone and 36 acres commercial space to create 45,000+ jobs by 2030 to promote mixed use development and walk-to-work



World class amenity spaces in ABB



ABB-Punetel Card for a connected community



Seamless wi-fi connectivity at 1Mbps – 100+ access points for 10,000 simultaneous logins



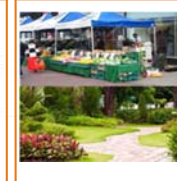
Solar roof tops to contribute 15% of energy requirements



Smart street lights with 85% LED lamps to bring 30% energy savings CCTV camera



Drive open space innovation: open space increase from 4% to 10%



3.5 km riverfront - walking promenade, recreation and entertainment zone



Slum free ABB region by redevelopment of 500 slum households



Additional 3 schools with international standards

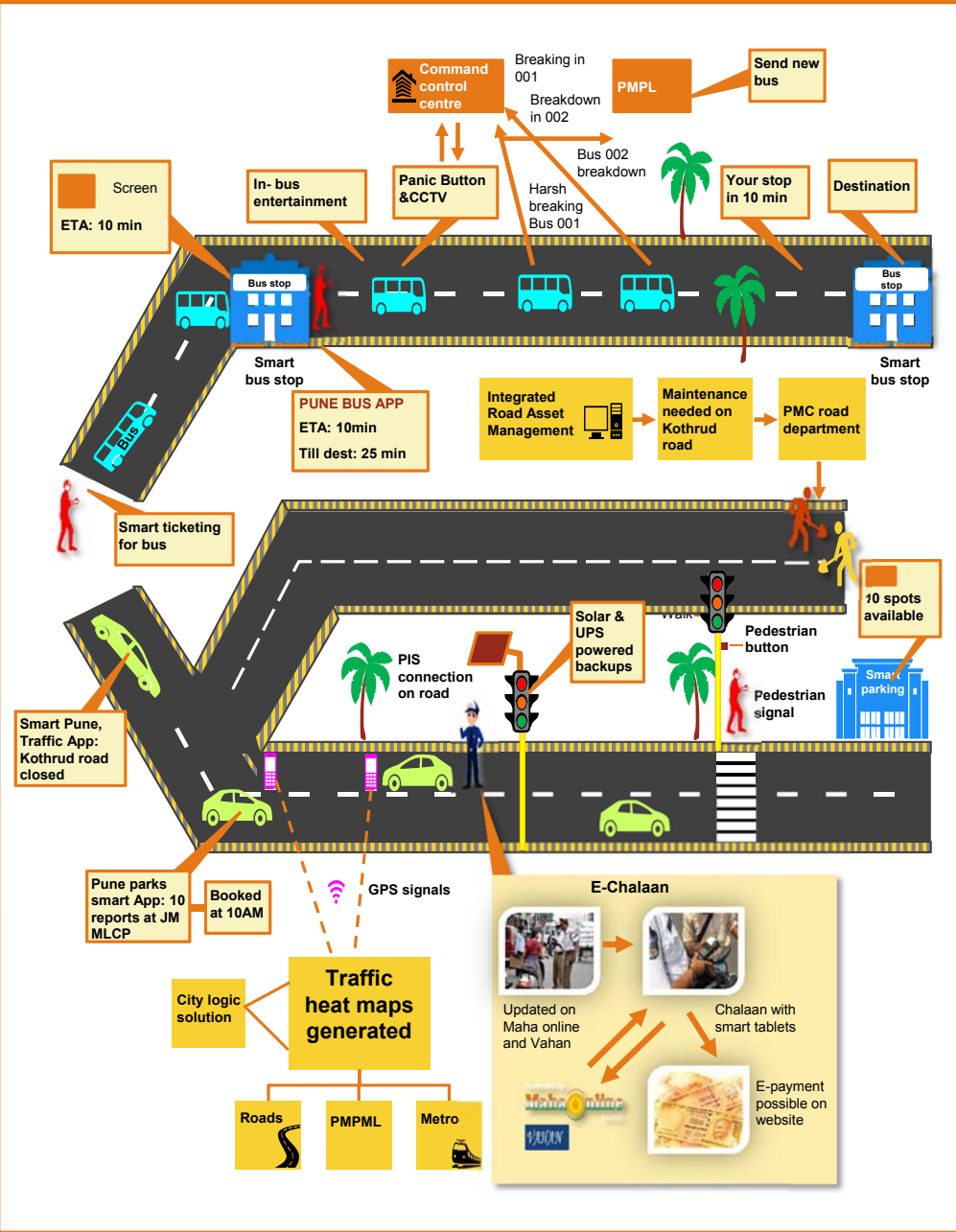


Population now: ~40 thousand

Estimate 2030 population: ~1.5 Lakhs

Exhibit 27: Integrated Pan City Solutions

27.1: Transport



27.2: Water

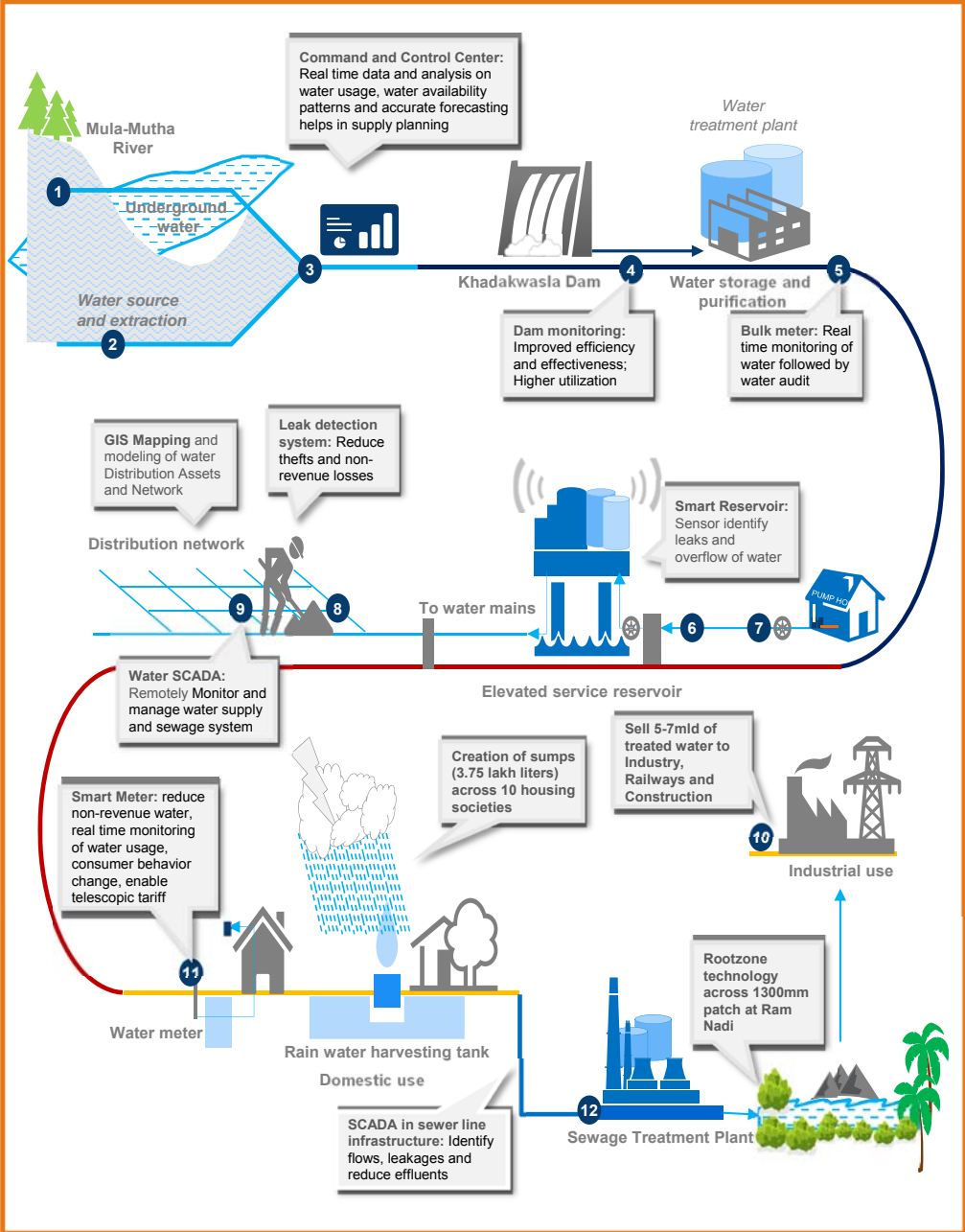
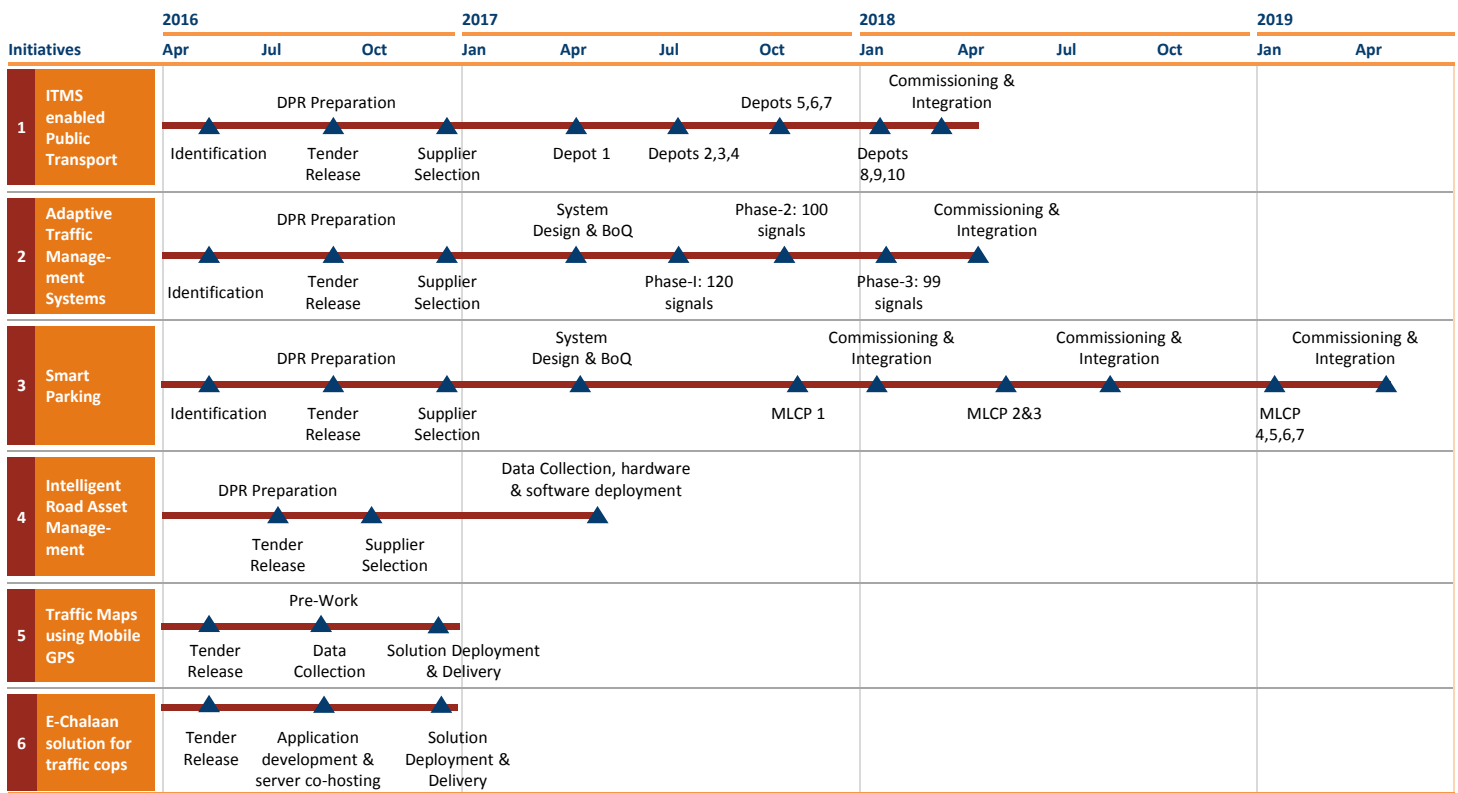
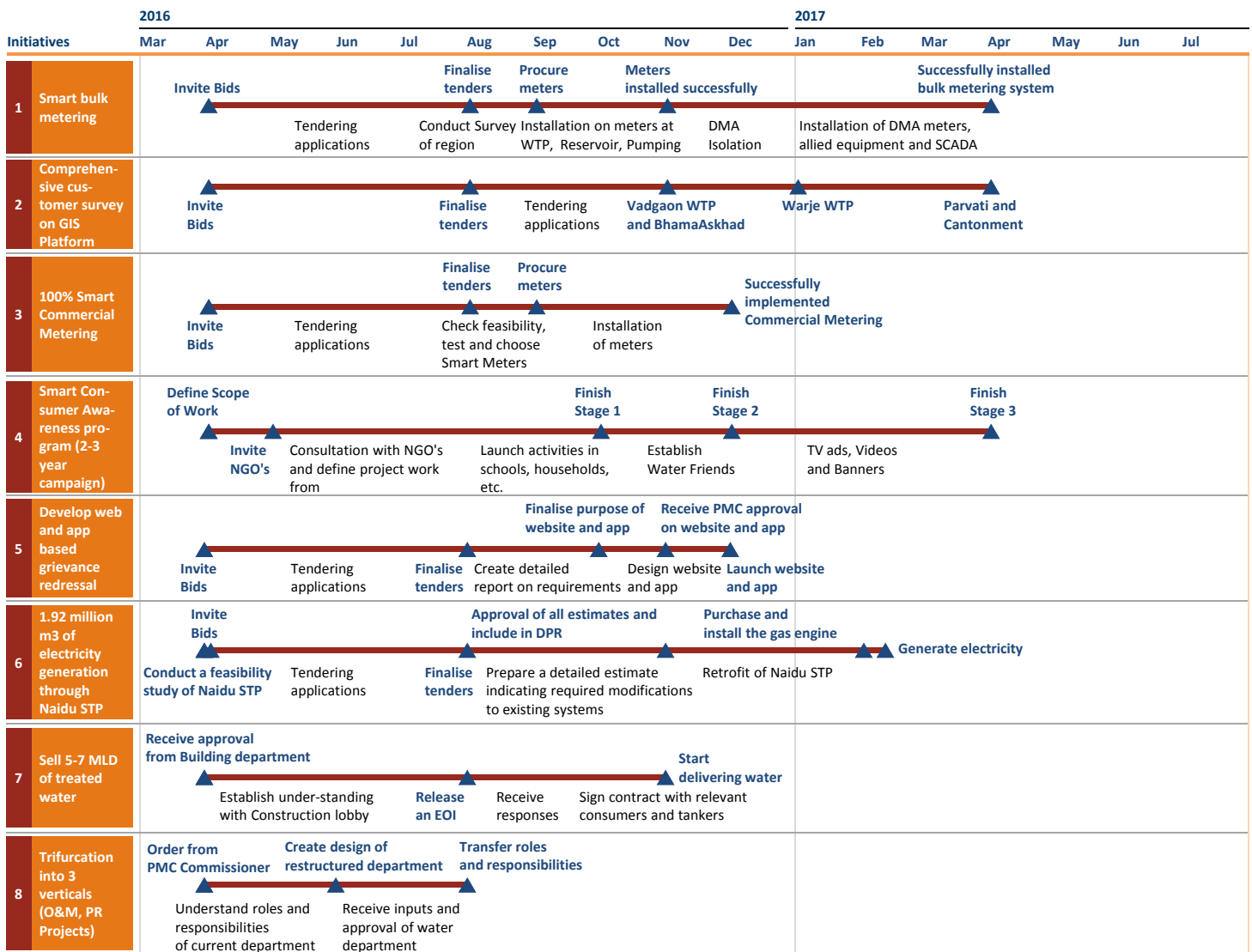


Exhibit 28: Critical milestones & timelines of Pan-City initiatives

Transportation



Water & sewage



Note: Advanced Helium Leak identification across all 2688 Km will happen as a part of developing the distribution system in the 24x7 water supply project across the city

Exhibit 29: Implementation Plan for Local Area Solutions

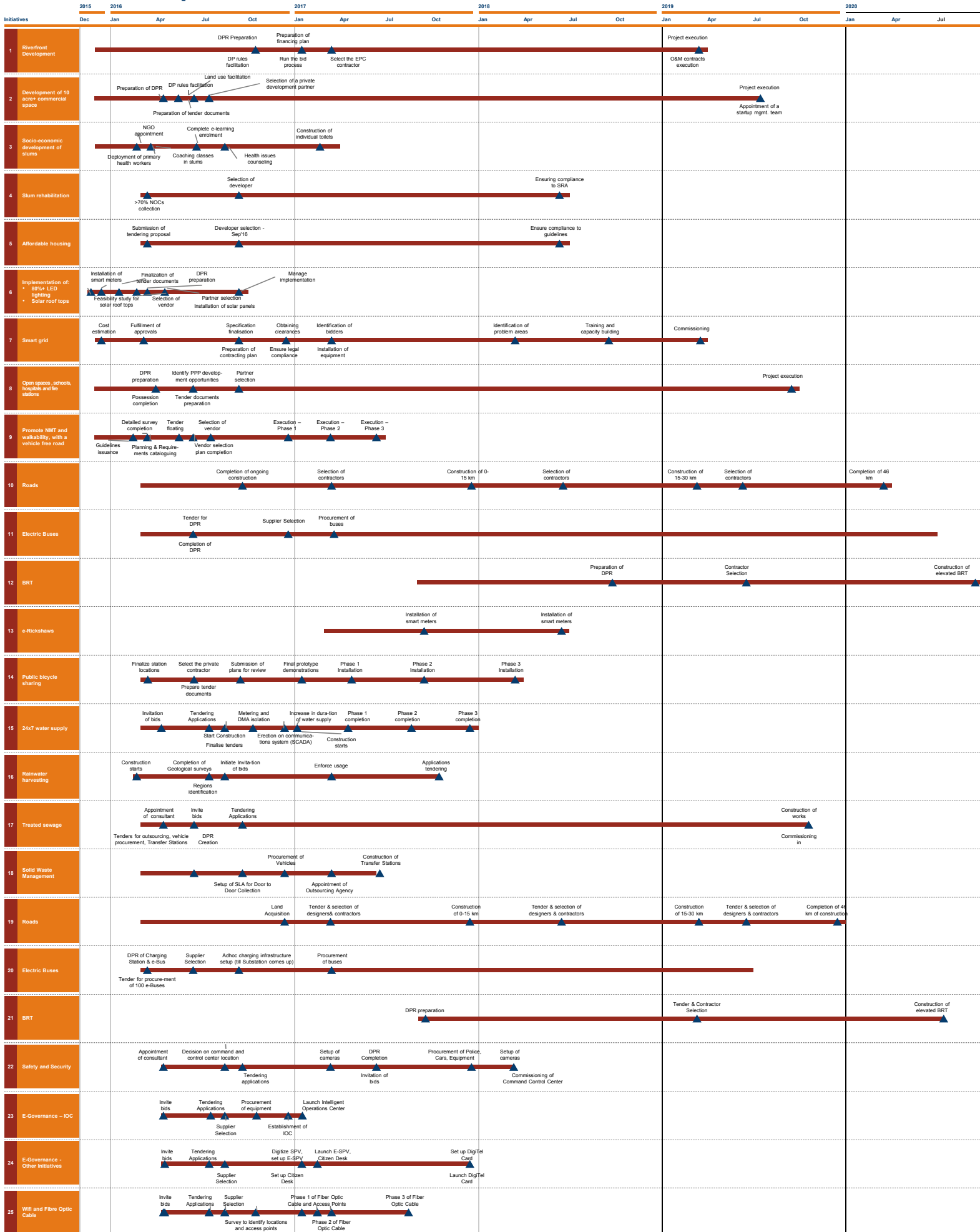


Exhibit 30: Relationship with government and non-government agencies

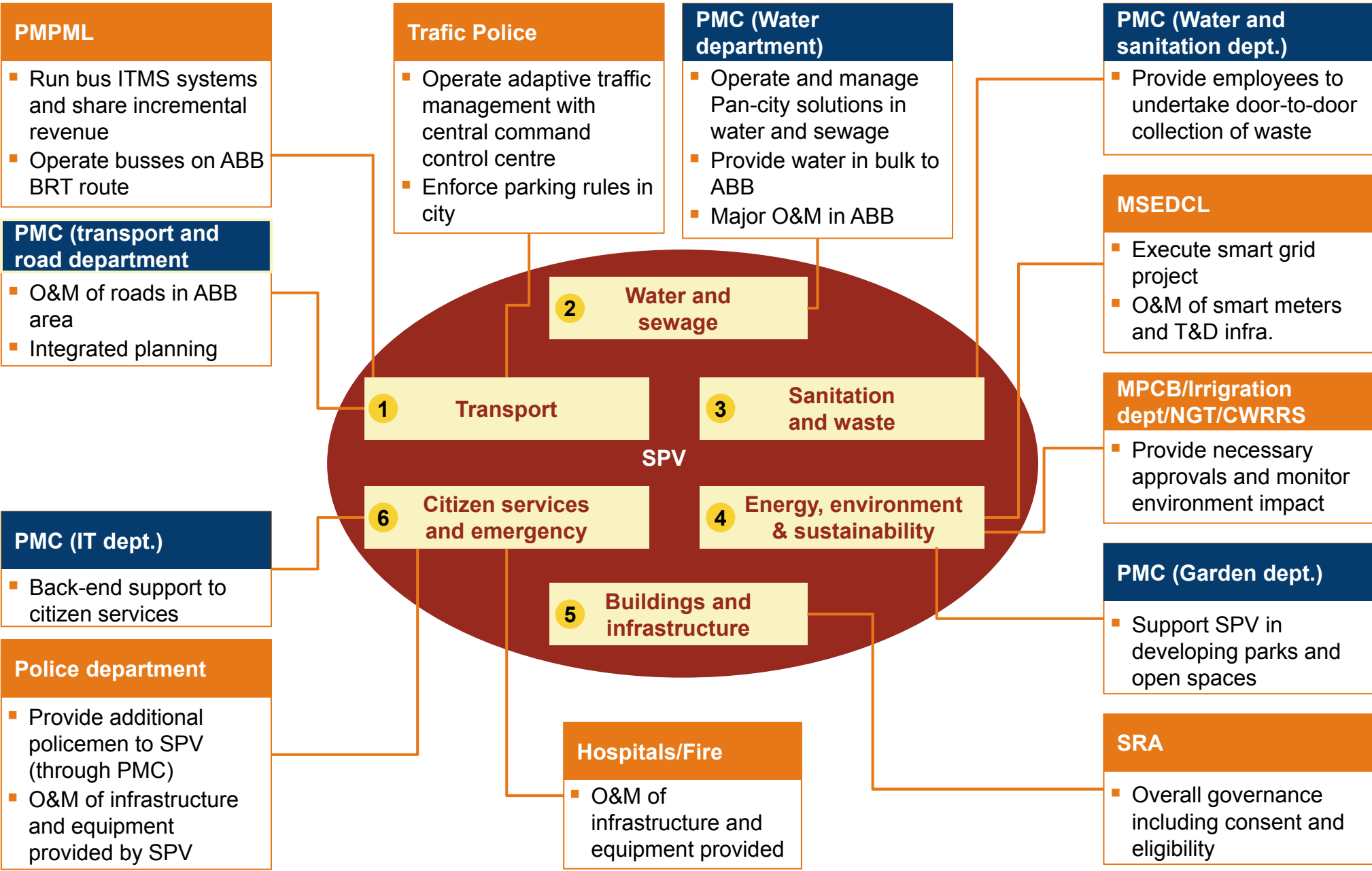


Exhibit 30: Organogram with linkages of SPV with ULB & parastatal agencies (Q.36)

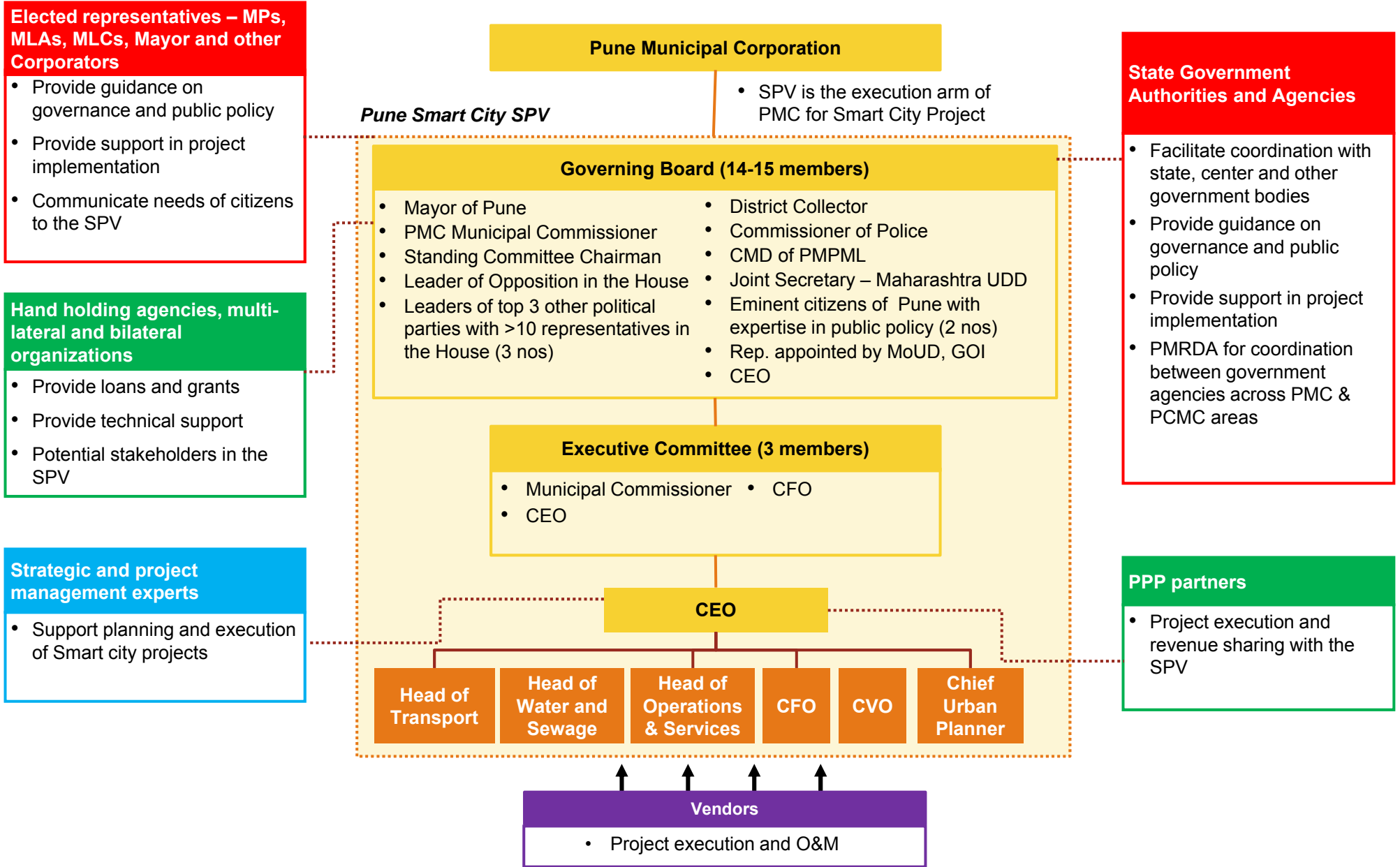


EXHIBIT 32: Detailed funding and costing of each initiative including capex, opex and revenue

FUND REQUIREMENTS	GRAND TOTAL	1,668	700	2,368					168	27	52	89	114	208	242	564	2,932
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39 Others
50 PMC

Local-area development

Category	Smart feature	Capex SPV	Capex Non SPV	Source	Total capex	Completion date	No. of opex years	phased?	Effective # of opex yrs	Total opex / yr	Opex for SPV (cr/yr)	Revenue p.a (if any)	Other opex source p.a.	Opex remarks	Total SPV opex	Opex through revenue	Total opex others	Total opex	Lifetime cost		
1	Transport	Road and road widening	190	-	-	190	Dec-20	-	yes	2.4	15.0	-	-	15.0	PMC roads department	-	-	36	36	226	
2	Transport	100 Electric buses	55	70	FAME	125	Dec-16	4.0	no	4.0	28.7	-	28.7	-	Revenue from operations	-	115	-	115	240	
3	Transport	Redesign of streets	189	-	-	189	Dec-17	3.0	yes	3.8	7.0	-	-	7.0	PMC roads department	-	-	26	26	215	
4	Transport	Smart parking	50	-	-	50	Dec-17	3.0	no	3.0	-	-	-	-	Included in pan-city costing	-	-	-	-	50	
5	Transport	Footpaths (additional and retrofit)	31	-	-	31	Dec-17	3.0	yes	3.8	1.5	-	-	1.5	PMC roads department	-	-	6	6	36	
6	Transport	Placemaking	30	-	-	30	Dec-17	3.0	yes	3.8	0.8	-	0.8	-	SPV	-	3	-	3	33	
7	Transport	Bicycles	10	-	-	10	Jun-18	2.5	no	2.5	2.2	1.5	0.7	-	SPV	4	2	-	6	15	
8	Transport	Bus stops (revamp 54 stations)	27	-	-	27	Sep-20	0.2	yes	2.6	1.4	1.4	-	-	SPV	4	-	-	4	31	
9	Transport	Junction redesign for 14 junctions	14	-	-	14	Dec-17	3.0	yes	3.8	0.7	-	-	0.7	PMC roads department	-	-	3	3	17	
10	Transport	Non-motorised street	5	-	-	5	Dec-17	3.0	no	3.0	0.5	4.3	4.8	-	PMC roads department	-	13	14	-	2	7
11	Transport	BRT	210	-	-	210	Sep-20	0.2	no	0.2	10.5	-	-	10.5	PMPML	-	-	3	3	213	
12	Transport	Express airport services	3	-	-	3	Dec-16	4.0	no	4.0	0.1	-	-	0.1	SPV	-	-	1	1	3	
13	Transport	e-rickshaws	1	-	-	1	Dec-16	4.0	no	4.0	0.1	-	-	0.1	Private operator	-	-	0	0	1	
14	Water	Waste water recycling	-	99	JICA-NRCP	99	Oct-19	1.2	no	1.2	5.0	-	-	5.0	PMC water department	-	-	6	6	105	
15	Water	Storm water use	43	-	-	43	Dec-17	3.0	no	3.0	0.3	-	-	0.3	PMC water department	-	-	1	1	44	
16	Water	Adequate water supply	-	87	AMRUT/ PMC	87	Dec-17	3.0	no	3.0	4.4	-	-	4.4	PMC water department	-	-	13	13	100	
17	Water	Rainwater harvesting	6	-	-	6	Mar-17	3.8	yes	4.3	0.8	-	-	0.8	Housing societies	-	-	3	3	10	
18	Water	Smart metering (water)	22	-	-	22	Dec-17	3.0	yes	3.8	0.4	-	-	0.4	PMC water department	-	-	2	2	24	
19	Water	Rootzone to clean water	8	-	-	8	Jun-17	3.5	yes	4.0	0.2	0.2	-	-	SPV	1	-	-	1	9	
20	Water	Solid waste management	13	3	SBM	16	Jun-17	3.5	no	3.5	6.0	2.0	2.0	2.0	PMC solid waste department	7	7	7	21	37	
21	Water	Sanitation	2	-	-	2	May-17	3.6	no	3.6	0.1	-	-	0.1	NGOs and CSR	-	-	0	0	2	
22	Electricity & Solar	Electricity distribution - Smart grid and metering	60	304	MSEDCL/ IPDS/ NSGM	364	Mar-19	1.8	yes	3.1	18.2	-	-	18.2	MSEDCL	-	-	56	56	420	
23	Electricity & Solar	Solar energy supply	-	-	-	-	Dec-16	4.0	yes	4.5	-	-	-	-	Private operator	-	-	-	-	-	
24	Electricity & Solar	Street lighting	-	-	-	-	Sep-16	4.3	no	4.3	-	-	-	-	Private operator	-	-	-	-	-	
25	Livability	Security	27	-	-	27	Jan-17	3.9	no	3.9	1.9	1.9	-	-	SPV	8	-	-	8	35	
26	Livability	Riverfront development	100	-	-	100	Dec-18	2.0	no	2.0	2.5	2.5	-	-	spv	5	-	-	5	105	
27	Livability	Open spaces	4	-	-	4	Dec-16	4.0	no	4.0	0.2	-	-	0.2	PMC garden department	-	-	1	1	5	
28	Livability	Fire stations - 2	3	-	-	3	Dec-17	3.0	no	3.0	0.2	-	-	0.2	Fire department	-	-	0	0	3	
29	Slum dev and affordable	Low income skill development and healthcare	-	-	-	-	Jun-17	3.5	no	5.0	4.0	4.0	-	-	SPV	20	-	-	20	20	
30	Slum dev and affordable	Build affordable housing	40	-	-	40	Dec-20	-	no	0.8	0.8	-	-	-	SPV	-	-	-	-	40	
31	Egov	e-gov	-	-	-	-	Dec-16	4.0	no	4.0	-	-	-	-	Included in pan-city costing	-	-	-	-	-	
32	Egov	IT connectivity	9	137	PPP	146	Aug-17	3.3	no	3.3	1.5	-	-	1.5	Part of contract upfront	-	-	5	5	151	
33	Transit hub	Transit hub	-	-	-	-	Nov-18	2.1	no	2.1	-	-	-	-	SPV	-	-	-	-	-	
34	Transit hub	Start up zone	-	-	-	-	Nov-18	2.1	no	2.1	-	-	-	-	SPV	-	-	-	-	-	
TOTAL			1,151	700		1,851				115	10	37	68		35	141	169	345	2,196		

Pan-city transport

Category	Smart feature	Capex SPV	Capex Non SPV	Source	Total capex	Completion date	Number of opex	phased?	Effective # of opex yrs	Total opex / yr	Opex for SPV (cr/yr)	Revenue p.a (if any)	Other opex source p.a.	Opex remarks	Total SPV opex	Opex through revenue	Total opex others	Total opex	Lifetime cost	
35	Transport	Adaptive Traffic Control System	123	-	-	123	Jun-18	2.5	yes	3.3	-	-	-	Part of capex	-	-	-	-	-	123
36	Transport	Bus System ITMS	70	-	-	70	Apr-18	2.7	yes	3.4	10.0	-	4.2	5.8	PMPML	-	14	20	34	105
37	Transport	Command Control Center	42	-	-	42	Jun-18	2.5	no	2.5	2.5	2.5	-	-	SPV	6	-	-	6	48
38	Transport	Total Smart Parking	15	-	-	15	Apr-19	5.0	no	5.0	9.3	1.1	10.5	-	SPV	6	52	-	47	62
39	Transport	Intelligent Road Management	3	-	-	3	Apr-17	3.7	no	3.7	0.5	-	-	0.5	PMC	-	-	2	2	5
40	Transport	Citilogik Solution	18	-	-	18	Dec-16	4.0	no	4.0	2.4	-	-	2.4	PMC	-	-	10	10	28
41	Transport	e-Chalan	1	-	-	1	Dec-16	4.0	no	4.0	2.0	-	-	2.0	Traffic police	-	-	8	8	9
42	Transport	Connectivity Costs	-	-	-	-	Jan-16	5.0	no	5.0	3.0	3.0	-	-	SPV	15	-	-	15	15
TOTAL			272	-		272				30	4	15	11		16	67	39	122	393	

Pan-city water

Category	Smart feature	Capex SPV	Capex Non SPV	Source	Total capex	Completion date	Number of opex	phased?	Effective # of opex yrs	Total opex / yr	Opex for SPV (cr/yr)	Revenue p.a (if any)	Other opex source p.a.	Opex remarks	Total SPV opex	Opex through revenue	Total opex others	Total opex	Lifetime cost	
43	Water	Pilot DMA for 24X7 Water	22	-	-	22	Dec-17	3.0	no	3.0	4.0	-	-	4.0	PMC water department	-	-	12	12	34
44	Water	Bulk Meters	83	-	-	83	Dec-17	3.0	yes	3.8	0.8	-	-	0.8	PMC water department	-	-	3	3	86
45	Water	Helium leak identification	19	-	-	19	Dec-17	3.0	no	3.0	1.0	-	-	1.0	PMC water department	-	-	3	3	22
46	Water	Smart Commercial Meters	60	-	-	60	Dec-17	3.0	yes	3.8	2.0	-	-	2.0	PMC water department	-	-	8	8	68
47	Water	Smart Domestic Meters	20	-	-	20	Dec-17	3.0	yes	3.8	2.0	-	-	2.0	PMC water department	-	-	8	8	28
48	Water	Customer Mapping and Survey	5	-	-	5	Dec-15	3.7	yes	4.2	0.1	-	-	0.1	PMC water department	-	-	1	1	6
49	Water	Naidu STP Energy Generation	6	-	-	6	Feb-17	3.8	no	3.8	0.2	-	-	0.2	PMC water department	-	-	1	1	7
50	Water	Mobile app and website	1	-	-	1	Dec-16	4.0	no	4.0	0.7	0.7	-	-	SPV	3	-	-	3	4
51	Water	Online bill payment	1	-	-	1	Dec-16	4.0	no	4.0	0.1	0.1	-	-	SPV	0	-	-	0	1
52	Water	Consultancy service	2	-	-	2	Dec-20	-	no	0.0	0.2	0.2	-	-	SPV	-	-	-	-	2
53	Water	Consumer Awareness	20	-	-	20	Jan-16	5.0	no	5.0	-	-	-	-	-	-	-	-	-	20
TOTAL			240	-		240				11	1	-	10		3	-	34	38	277	

Other Expenses

Category	Smart feature	Capex SPV	Capex Non SPV	Source	Total capex	Completion date	Number of opex	phased?	Effective # of opex yrs	Total opex / yr	Opex for SPV (cr/yr)	Revenue p.a (if any)	Other source	Opex remarks	Total SPV opex	Total revenue	Total opex others	Total opex	Lifetime cost
Admin and Office		5	-		5					12.0	12.0	-	-	SPV	60	-	-	60	65
TOTAL		5	-		5					12	12	-	-	SPV	60	-	-	60	65

Sources of Funds

Source	Amount (cr.)
1 Smart City Mission	1000
2 Other missions	700
3 Additional revenue	208
4 Land Monetisation	1000
5 CSR Funding	200
Total	3108

