Annexure 2
Chennai Smart City: Self Assessment

<table>
<thead>
<tr>
<th>Feature</th>
<th>Definition</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
<th>Scenario 4</th>
<th>Scenario 5</th>
<th>Scenario 6</th>
<th>Scenario 7</th>
<th>Scenario 8</th>
<th>Scenario 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizen participation</td>
<td>A smart city constantly shapes and changes course of its strategies incorporating views of its citizen to bring maximum benefit for them. (Guideline 3.1.6)</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Identity and culture</td>
<td>A Smart City has a unique identity, which distinguishes it from other cities, based on some key aspects like 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 this city and not somewhere else?’ A Smart City celebrates and promotes its unique identity and culture. (Guideline 3.1.7)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Economy and employment</td>
<td>A Smart City has a robust and sound economic base and growth strategy that creates high scale employment and increases opportunities for the majority of its citizens. (Guideline 2.4.3 &amp; 3.1.7 &amp; 6.2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Education</td>
<td>A Smart City offers schooling and educational opportunities for all children in the city (Guideline 2.5.10)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Health</td>
<td>A Smart City provides access to healthcare facilities for all citizens. (Guideline 2.5.10)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
1. 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 3.1.3)

Scenario 1 (BASE)

- The city has mixed use spaces and areas are focused either on residential, commercial, or industrial, with little co-existence of uses. The average resident cannot walk to the closest market or shops near his or her home. For almost everyone, going to work or going shopping for basic needs requires a journey by automobile or bus of more than 15 minutes. Land use regulations prevent putting commercial or office locations in residential neighborhoods and vice versa.

- In some parts of the city, there are clusters of land uses that would allow someone to live, work, and shop in close proximity. However, in most areas, there are only small retail stores with basic supplies near housing. Most residents must drive or use public transportation to access a shop for food and daily basic needs. Land use rules support segregating housing, retail, and office uses, but exceptions are made when requested.

- Most parts of the city have low density areas - such as the city center, or historic areas, where buildings are concentrated together and where people can walk easily from building to building and feel as though they are in center of activity. Most of the city consists of areas where buildings are spread out and difficult to walk between, sometimes with low density per hectare. Regulations tend to favor buildings that are separated from one another. With lots of parking at the base and set-back from the streets. The city likely has some pockets of under-utilized land in the center. New formal developments at the periphery tend to be large-scale residential developments, often enclosed with a gate and oriented to the automobile.

- Even parts of the city have housing, retail, and office buildings in close proximity. Some neighborhoods have higher density areas within them (e.g., auto repair, craft production). Land use rules allow for mixed uses.

- Every part of the city has a mix of uses. Everyone lives within a 15-minute trip of office buildings, markets and shops, and even some industrial uses. Land use rules require or encourage developers to incorporate a mixture of uses in their projects.

- Most of the locations with in the city are mixed use where residential and support activity of commercial or retail is interspersed. Chennai growth pattern and land use zoning.

- Chennai wants to adopt a Transit Oriented Development, with high density mixed-use areas (of commercial and office, retail) around nodes of public transportation, within easy reach of all residential areas.

- By choosing the compact mixed-use area of 1 hectare, which is served by multiple modes of public transportation (metro, train and bus station, smart bus feeder) as the Area Based Smart City Development, Chennai Corporation will have the opportunity to create the City’s first International Standard Transit Oriented Development.

- This pilot project for Compact Mixed Use development, can be replicated in other nodes of public transportation around the City.

2. 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

- The city is expanding rapidly at the periphery into undeveloped land, rural or natural areas, or along industrial corridors - both formally and informally. Formal development is occurring in a way that is “sprawling,” meaning that the buildings spread across a wide area and are far from one another. Residents or tenants find it harder or safer to travel by automobile because it takes a long time to walk between destinations and there are busy roads separating buildings. Large postcards of land in the inner-city are vacant. New developments at the periphery tend to be large-scale residential developments, often enclosed with a gate and oriented to the automobile.

- The city has one or two high density areas - such as the city center, or historic areas, where buildings are concentrated together and where people can walk easily from building to building and feel as though they are in center of activity. Most of the city consists of areas where buildings are spread out and difficult to walk between, sometimes with low density per hectare. Regulations tend to favor buildings that are separated from one another. With lots of parking at the base and set-back from the streets. The city likely has some pockets of under-utilized land in the center. New formal developments at the periphery tend to be large-scale residential developments, often enclosed with a gate and oriented to the automobile.

- The city has multiple high density clusters that are easy to walk around where buildings are close together. However, the city activity encourages development to occur on under-utilized parcels of land into high density, walkable areas. When new formal large-scale development projects happen at the periphery, they are not as dense and compact, with buildings that are close together and line the streets. The city activity encourages or incentivizes re-development of under-utilized parcels in the inner-city, especially those located close to public transportation.

- The city is highly compact and dense, making the most of land within the city. Buildings are clustered together, forming walkable and inviting activity centers and neighborhoods. Regulations encourage or incentivize re-development of under-utilized land parcels in the city center. Buildings are oriented to the street, and parking is kept to a minimum, located below ground or at the back of buildings. Public transportation and walking connects residences to most jobs and amenities. Residential density is at an optimal with compact and walkable housing available in most areas.

- Chennai wants to adopt a Transit Oriented Development, with high density mixed-use areas (of commercial and office, retail) around nodes of public transportation, within easy reach of all residential areas.

- Chennai Rapid Transit Ratio (RTR) today: 1 km rapid transit per lakh population (This involves existing MBRTS line, suburban rail corridors with headway of 20 min or less, Metro Ph 1 operations for CMA population)

- Chennai Growth Ratios: 2.5, Higher FSI is permitted based on Operational Metro + 79 km suburban rail (498 PPH in corporation limits), but low FSI with uniform base FSI of 1.5, Higher FSI is permitted based on road width, not transit-access.

- Development regulations require minimum setbacks (high-rise buildings require larger setbacks).

- Development regulations mandate parking minimums.

- Chennai Growth Ratios: 2.5, Higher FSI is permitted based on Operational Metro + 79 km suburban rail (498 PPH in corporation limits), but low FSI with uniform base FSI of 1.5, Higher FSI is permitted based on road width, not transit-access.

- Development regulations require minimum setbacks (high-rise buildings require larger setbacks).

- Development regulations mandate parking minimums.

- Chennai wants to adopt a Transit Oriented Development, with high density mixed-use areas (of commercial and office, retail) around nodes of public transportation, within easy reach of all residential areas.

- Chennai Rapid Transit Ratio (RTR) desired today: 2 km rapid transit per lakh population.

- Chennai persons near Transit (PNT) today: 1.5% of population live near rapid transit (Operational Metro + 79 km suburban rail) today.

- Metro Rapid Transit Ratio (RTR) desired today: 2 km rapid transit per lakh population.

- Chennai transit availability today: 1.5% of population live near rapid transit (Operational Metro + 79 km suburban rail) today.

- Additional data:
  - Chennai is a sprawling city where the population live near rapid transit (Operational Metro + 79 km suburban rail) today.
  - Rapid Transit Ratio (RTR) desired today: 2 km rapid transit per lakh population.
  - Persons near Transit (PNT) desired today: At least 60% of metropolitan population lives within 500 m of a rapid transit station.

- Chennai Rapid Transit Ratio (RTR) desired today: 2 km rapid transit per lakh population.

- Chennai persons near Transit (PNT) today: 1.5% of population live near rapid transit (Operational Metro + 79 km suburban rail) today.

- Chennai growth pattern and land use zoning.

- Chennai wants to adopt a Transit Oriented Development, with high density mixed-use areas (of commercial and office, retail) around nodes of public transportation, within easy reach of all residential areas.

- Chennai Rapid Transit Ratio (RTR) today: 1 km rapid transit per lakh population (This involves existing MBRTS line, suburban rail corridors with headway of 20 min or less, Metro Ph 1 operations for CMA population)

- Chennai Growth Ratios: 2.5, Higher FSI is permitted based on Operational Metro + 79 km suburban rail (498 PPH in corporation limits), but low FSI with uniform base FSI of 1.5, Higher FSI is permitted based on road width, not transit-access.

- Development regulations require minimum setbacks (high-rise buildings require larger setbacks).

- Development regulations mandate parking minimums.

- Chennai transit availability today: 1.5% of population live near rapid transit (Operational Metro + 79 km suburban rail) today.

- Chennai growth pattern and land use zoning.

- Chennai wants to adopt a Transit Oriented Development, with high density mixed-use areas (of commercial and office, retail) around nodes of public transportation, within easy reach of all residential areas.

- Chennai Rapid Transit Ratio (RTR) today: 1 km rapid transit per lakh population (This involves existing MBRTS line, suburban rail corridors with headway of 20 min or less, Metro Ph 1 operations for CMA population)

- Chennai Growth Ratios: 2.5, Higher FSI is permitted based on Operational Metro + 79 km suburban rail (498 PPH in corporation limits), but low FSI with uniform base FSI of 1.5, Higher FSI is permitted based on road width, not transit-access.

- Development regulations require minimum setbacks (high-rise buildings require larger setbacks).

- Development regulations mandate parking minimums.

- Chennai transit availability today: 1.5% of population live near rapid transit (Operational Metro + 79 km suburban rail) today.

- Chennai growth pattern and land use zoning.

- Chennai wants to adopt a Transit Oriented Development, with high density mixed-use areas (of commercial and office, retail) around nodes of public transportation, within easy reach of all residential areas.
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)

- The city has very few usable public open spaces and very few usable green spaces. Available recreational spaces are located far away and dispersed at long distances around the city. The few available public open spaces offer a limited variety of experiences for all sections of population and age groups such as places for sport, places for rest, and places for play.

- A variety of public open spaces are available in some neighborhoods, but are not available in all the areas of the city or located far away from residential areas. Almost all open spaces have access restrictions, or are not well-maintained. A variety of types of public open spaces may be lacking, such as natural areas, green areas, parks, plazas, or recreation areas.

- Most areas of the city have some sort of public open space. There is some variety in the types of public open spaces in the city. However, public open spaces are sometimes not within easy reach of access of more vulnerable populations and are more restricted in poorer neighborhoods.

- Public open spaces are well dispersed throughout the city. Every residential area and work space has access to open space within 10 minutes walking distance. Open spaces are of various types - natural, green, parks, plazas, or recreation areas - which serve various sections of people. Public spaces tend to truly reflect the natural and cultural identity of the city.

Housing and inclusiveness

A Smart City has sufficient housing for all income groups and promotes integration among social groups. (Guidelines 3.1.2)

- Housing is very limited and highly segregated across income levels. Population growth far exceeds the creation of new housing. The poor live in informal settlements with limited to no access to basic services, and are concentrated in a few areas. The wealthy live in separate enclaves. Those in the middle have low, if any options.

- Housing is available at most income levels but is highly segregated across income levels. Population growth slightly exceeds the creation of new housing. The wealthy and the middle class have housing that meets their needs at costs appropriate to their income. The poor live in informal settlements.

- Housing is available at all income levels but is segregated across income levels. The growth of supply of housing almost meets the rate of population growth. Increasingly, lower and middle-income people can find housing in areas that are conveniently located.

- A wide range of a housing is available at all cost levels. The supply of housing is growing at prices that are affordable, moderate, and luxury housing clusters to be segregated across income levels but is highly.

- The number of Katcha housing has slightly exceeded the creation of new housing. The poor live in informal settlements. The middle class live in separate enclaves. Those in the middle have low, if any options.

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)

- Personal automobile centres city with very few modal options. Long trip lengths for daily commuting to work and recreation. Accessing various areas by walking or cycling is difficult. Women and vulnerable sections find it very difficult to move independently in the city. There is limited public transport. Vehicles cause high air and noise pollution levels in the city. The city is designed for motor vehicles that affect their identity of the city.

- The street network system is elaborate but public transport niches are restricted. Public transport can be too expensive or unaffordable for the poor. Pedestrian infrastructure is only available in select areas. The majority of investments focus on reducing traffic congestion through the creation of more roads.

- Network of streets are rarely complete. Public transport covers most areas of the city. However, last mile connectivity remains incomplete and affects transportation options. Footpaths are accessible in most areas, whereas concern of safe crossings and security throughout the day remain.

- Parking zones are demarcated but absence of parking increases over utilization of parking lots.

- Street network is complete and follows a clear structure. Public transportation network covers the entire city and intensity of connectivity relates with the demand. Plenty of options of public transport are available and affordable for all sections of the society. There is multi-modal integration at all mass transit stations and organized priced on street and of street parking. Walking and cycling is prevalent.

- Street network is complete and follows a clear structure. Public transportation network covers the entire city and intensity of connectivity relates with the demand. Plenty of options of public transport are available and affordable for all sections of the society. There is multi-modal integration at all mass transit stations and organized priced on street and of street parking. Walking and cycling is prevalent.

- Network of streets are rarely complete. Public transport covers most areas of the city. However, last mile connectivity remains incomplete and affects transportation options. Footpaths are accessible in most areas, whereas concern of safe crossings and security throughout the day remain.

- Parking zones are demarcated but absence of parking increases over utilization of parking lots.

- Street network is complete and follows a clear structure. Public transportation network covers the entire city and intensity of connectivity relates with the demand. Plenty of options of public transport are available and affordable for all sections of the society. There is multi-modal integration at all mass transit stations and organized priced on street and of street parking. Walking and cycling is prevalent.

- Street network is complete and follows a clear structure. Public transportation network covers the entire city and intensity of connectivity relates with the demand. Plenty of options of public transport are available and affordable for all sections of the society. There is multi-modal integration at all mass transit stations and organized priced on street and of street parking. Walking and cycling is prevalent.

- Street network is complete and follows a clear structure. Public transportation network covers the entire city and intensity of connectivity relates with the demand. Plenty of options of public transport are available and affordable for all sections of the society. There is multi-modal integration at all mass transit stations and organized priced on street and of street parking. Walking and cycling is prevalent.

- Street network is complete and follows a clear structure. Public transportation network covers the entire city and intensity of connectivity relates with the demand. Plenty of options of public transport are available and affordable for all sections of the society. There is multi-modal integration at all mass transit stations and organized priced on street and of street parking. Walking and cycling is prevalent.

- Network of streets are rarely complete. Public transport covers most areas of the city. However, last mile connectivity remains incomplete and affects transportation options. Footpaths are accessible in most areas, whereas concern of safe crossings and security throughout the day remain.

- Parking zones are demarcated but absence of parking increases over utilization of parking lots.

- Street network is complete and follows a clear structure. Public transportation network covers the entire city and intensity of connectivity relates with the demand. Plenty of options of public transport are available and affordable for all sections of the society. There is multi-modal integration at all mass transit stations and organized priced on street and of street parking. Walking and cycling is prevalent.

- Network of streets are rarely complete. Public transport covers most areas of the city. However, last mile connectivity remains incomplete and affects transportation options. Footpaths are accessible in most areas, whereas concern of safe crossings and security throughout the day remain.

- Parking zones are demarcated but absence of parking increases over utilization of parking lots.

- Street network is complete and follows a clear structure. Public transportation network covers the entire city and intensity of connectivity relates with the demand. Plenty of options of public transport are available and affordable for all sections of the society. There is multi-modal integration at all mass transit stations and organized priced on street and of street parking. Walking and cycling is prevalent.

- Network of streets are rarely complete. Public transport covers most areas of the city. However, last mile connectivity remains incomplete and affects transportation options. Footpaths are accessible in most areas, whereas concern of safe crossings and security throughout the day remain.

- Parking zones are demarcated but absence of parking increases over utilization of parking lots.

- Street network is complete and follows a clear structure. Public transportation network covers the entire city and intensity of connectivity relates with the demand. Plenty of options of public transport are available and affordable for all sections of the society. There is multi-modal integration at all mass transit stations and organized priced on street and of street parking. Walking and cycling is prevalent.
### Chennai Smart City: Self Assessment

**Annexure - 2**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Scenario 1 (BASE)</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
<th>Scenario 4 (ADVANCED)</th>
<th>Self-assessment for the full city with regard to each feature</th>
<th>Baseline for assessment and/or quantitative indicator (Optional - only if data exists)</th>
<th>Projections on how the city wants to be in regard to each feature (indicated based on the city vision and strategic blueprint)</th>
<th>Initiative that would move the city from its current status to Advanced status (Scenario 4: Column G)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Walkable</strong></td>
<td>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 &amp; 6.2)</td>
<td>The city is designed mainly for the automobile. Daily life without a car requires long bus rides. Walking is difficult and often dangerous; there are few pavements, existing pavements need repair and lack trees to provide shade for pedestrians, and marked pedestrian crossings are rare. New buildings have their main entrances set-back from the street, sometimes with large driveways or parking lots separating them from the street, and sometimes are enclosed by gates. Traffic signals are often disobeyed. Other areas of the city see a mix of pedestrians, cyclists, and vehicles but newer areas are focused mainly on the automobile. In the new areas, there are few pavements and main entrances to new buildings are not accessible from the front of the street. Large driveways or parking lots often separating them from the street, and sometimes are enclosed by gates. Traffic signals are disobeyed. The city has a good network of pavements and bike lanes. Buildings in most areas of the city are easily accessible from the pavement. However, traffic signals are sometimes disobeyed and it can feel difficult to cross the street. The city is highly walkable. Pavements exist on every street and are maintained. Trees line many sidewalks to provide shade for pedestrians. Buildings in most areas of the city are easily accessible from the sidewalk. Traffic signals control the flow of automobiles and are enforced. A network of bike lanes exists to promote cycling as a means of transport. Traffic rules are followed and enforced with great seriousness.</td>
<td>Scenario 3</td>
<td>Quantitative indicator: NMT infrastructure: 5% (18km or 26 trs) of bus-road routes in the city have wide continuous footpaths (Additional 4% or 20 nos is under construction).</td>
<td>Spends on sustainable transport: More than 20% of the total annual transport budget is likely to be allocated for his initiative. Additional data: Trip lengths by purpose in Chennai City (CTTC): Work trips: 6.8 to 15.7 km Education: 6.3 km Trip length by mode in Chennai City (CTTC 2006): 1.83 km (walk), 4.83 km (cycle), 10.27km (2BHs), 13.8 km (car), 9.28 km (bus), 13.43 km (train)</td>
<td>Pedestrian &amp; cyclist fatalities: 44 % of road deaths are pedestrians &amp; cyclists (RADAMI data, from Traffic Police) Additional data: Despite investments in 45km Metro network, 34% of the roads along their Metro corridor do not have any footpaths. Only 6% of major roads along Metro have footpaths of desirable width &gt;=2.5. Only 2% of access roads to metro stations have footpaths of width 2m or more. 10% of road network along metro corridors do not have footpaths. (CMAA densification study)</td>
<td>Scenario 4</td>
<td>Chennai aims to be a highly walkable and bicycle friendly city. Pavements on every street and threads many sidewalks to provide shade for pedestrians and cyclists. Buildings in most areas of the city are easily accessible from the sidewalk. Traffic signals control the flow of automobiles and are enforced. A network of bike lanes exists to promote cycling as a means of transport. Traffic rules are followed and enforced with great seriousness.</td>
<td>The Area Based Development will be having all main street retrofitted with wide sidewalks and bicycle lanes, and pedestrian friendly squares and parks. A comprehensive and integral Urban design and Heritage Protection, Parking and Mobility plan will be adopted, to make the Area Based Development a Walkable Area. Based on the successful implementation of the Area Based Pedestrian Focused Retrofitting, a Pan City NMT Policy (walking and cycling) will be developed. Build wide continuous footpaths along bus-road routes in the city. Standardise construction of footpaths by adopting and implementing an NMT masterplan for the city, detailing (on standard street sections. Based on street character, FYC, public transport (NMT access, vehicular speeds), construction standards and processes, phasing ad implementation of road works. Test this masterplan in the area-level proposal. Put in place effective institutional structures (a Public Space Management cell) to oversee street design, construction, infrastructure maintenance and operational management of streets. Hire professional urban designers, project management experts etc. to staff this cell. Improve safety in public spaces by installing LED street lights. Develop relevant urban design guidelines that contribute to creation of vibrant streets. Work with other agencies in the city to adopt these guidelines in the Chennai Master Plan. Development Regulations.</td>
</tr>
<tr>
<td><strong>IT connectivity</strong></td>
<td>A Smart City has a robust internet network allowing high-speed connections to all offices and dwellings as desired. (Guideline 5.2)</td>
<td>City has no major plans to bring increased high speed internet connectivity to the public. The city has made plans to provide high speed internet connectivity through the existing framework. The city makes high speed internet connectivity available to all the most parts of the city. The city offers free Wi-Fi service to provide opportunity for all the citizens to connect with high speed internet across the city.</td>
<td>Scenario 3 for Pan-city and area based development</td>
<td>Chennai city has high speed internet access for most of its citizens through public and private service providers. - Wi-Fi access in 21 public places - Major part of the area is under Overhead IT cables and some part has covered underground cables</td>
<td>100% internet connectivity wired and wireless to all its citizens: - Wi-Fi access in all public places - All overhead cables to be underground - Improved speed</td>
<td>Readiness of the city: - High speed internet access for citizens already - Plans are underway to provide Wi-Fi facilities at public places. Initiative to move the city from current status to advanced status: - 1. Installing Wi-Fi zones in all public spaces - 2. Improve average down time of internet and telephonic lines - 3. Convert all overhead communication lines to underground</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Additional data:**

- Spends on sustainable transport: More than 20% of the total annual transport budget is likely to be allocated for his initiative.
- Additional data: Trip lengths by purpose in Chennai City (CTTC): Work trips: 6.8 to 15.7 km Education: 6.3 km.
- Trip length by mode in Chennai City (CTTC 2006): 1.83 km (walk), 4.83 km (cycle), 10.27km (2BHs), 13.8 km (car), 9.28 km (bus), 13.43 km (train).
- Quantitative indicator: NMT infrastructure: 5% (18km or 26 trs) of bus-road routes in the city have wide continuous footpaths (Additional 4% or 20 nos is under construction).

**Additional data:**

- Pedestrian & cyclist fatalities: 44% of road deaths are pedestrians & cyclists (RADAMI data, from Traffic Police).
- Despite investments in 45km Metro network, 34% of the roads along their Metro corridor do not have any footpaths. Only 6% of major roads along Metro have footpaths of desirable width >=2.5. Only 2% of access roads to metro stations have footpaths of width 2m or more. 10% of road network along metro corridors do not have footpaths.

**Scenario 3 for Pan-city and area based development:**

- Chennai city has high speed internet access for most of its citizens through public and private service providers.
- Major part of the area is under Overhead IT cables and some part has covered underground cables.
### Annexure - 2

#### Chennai Smart City: Self Assessment

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Feature</strong></td>
<td><strong>Definition</strong></td>
<td><strong>Scenario 1 (BASE)</strong></td>
<td><strong>Scenario 2</strong></td>
<td><strong>Scenario 3</strong></td>
<td><strong>Scenario 4 (ADVANCED)</strong></td>
<td><strong>Self-assessment for the full city with regard to each feature</strong></td>
<td><strong>Basis for assessment and/or quantitative indicator (Optional - only if data exists)</strong></td>
</tr>
</tbody>
</table>

### 1. 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)

- Essential government services are not linked with online platforms. Paper intensive interactions with the local Government continue. Receiving services and response to citizen complaints take a long time. There is limited availability of data to monitor service delivery.

- Some of the public services are provided online and infrastructure for total digitalization is not in place. Service delays occur regularly in some sectors. Responses to citizen inquiries or complaints are often delayed. No integration between services and billing.

- Most of the services are provided online and offline. Data transparency helps in monitoring. Systems and processes to better coordinate between various Government agencies are being developed.

- All major services are provided through online and offline platforms. Citizens and officials can access information on accounting and monitor status of projects and programs through data available online.

- Robust data infrastructure system shares information and enhances internal governmental coordination.

- City has most of e-governance services as web based

- Implementation of Disaster management system including Emergency rescue operation plans

- 24x7 customer care services

- Integration of smart parking system and integration of smart bus feeder system operation with the city mobility plan

- Improving multi-modal integration by providing seamless connectivity across different transport modes using customer-centric on-street parking & cycle sharing systems

- These systems feature cashless transactions, real-time data available to customers through apps’ websites so that they can plan their trips better

- Matrix: 400 charged on-street parking spaces per 1 lakh population with 100% based customer-oriented parking management systems.

- Total parking supply (on-street and off-street) remains at 2015 levels or reduces in the future.

- Smart cycle sharing system with 200 cycles per 1 lakh population

- Redesign of the city

- Has web & mobile based e-governance system in place

- Initiative to move the city from current status to advanced status:

  - Smart Chennai

    1. All government services in a Single Window System; Web based and mobile apps based utility services, Public grievance redressal system using mobile app and SMS based systems

    2. Personalised public services and transparency in public administrations

    3. Capacity building process with government officials and citizens

    4. GIS mapping of all utilities

    5. Improve public space management by creating a “Streets Portal” an IT-based, geo-spatial project monitoring system to oversee design, construction and implementation of streets improvement projects.

    Create a unified payment portal: e-wallet for citizens to pay for various public transport services. Such a portal must be linked to on-street parking management system and cycle-sharing system, so that citizens can access real-time data on available parking spaces, maps of the cycle-sharing systems, station locations, applicable rates etc. A citizen complaint redressal system can also be integrated with this app. CoC will work with other agencies to ensure relevant transit information and other services are also a part of this app.

### 2. Energy supply

A Smart City has reliable, 24x7 electricity supply with no delays in requested holographs. (Guideline 2.4)

- There is only intermittent electricity supply with regular power shedding. Many residents have to plan their days around when power is available.

- Electricity supply and loads are managed as per demand and priority for various functions with clear scheduling, with electricity being available in many areas for most hours of the day.

- Electricity is available in most parts of the city for most hours of the day but some areas are not so well-served. Smart metering exists in some parts of the city but not all.

- Electricity is available 24 x 7 in all parts of the city with smart metering linked to online platforms for monitoring and transparency.

- Scenarios: 3 for Pen-city and area based

- No scheduled power cuts

- 100% power supply through underground lines at most locations

- 4. Downtown is 3 hr for consumer service connection

- 5. Many initiatives to utilise renewable energy resources

- 6. Smart metering introduced for 55 customers as a pilot project. This is planned to be implemented at PAN city level

- Uninterrupted Power supply (24x7) with no outage

- 100% power supply through underground cables

- Average downtime of power supply in city to be less than 1 hr for consumer service connection

- Implementation of Smart Bi-directional net meters (100% in city) at consumer level

- Micro grid based monitoring system

- Minimum 10% of solar energy to be tapped

- Readiness of the city

  - 1. 100% Smart meters are already installed

    Initiative to move the city from current status to advanced status:

    1. Smart Energy Management

    2. Use of solar power

    3. Introduction of smart bidirectional net meters for 100% in city households

    4. Introduction of Micro-grid based distribution management system

    5. Convert all overhead lines to underground cables with RDF logging
A Smart City has at least 10% of its electricity generated by renewables. (Guideline 6.2) 

**Feature** | **Definition** | **Scenario 1 (BASE)** | **Scenario 2** | **Scenario 3** | **Scenario 4 (ADVANCED)** | **Self-assessment for the full city with regard to each feature** | **R audit for assessment and/or quantified indicator (Optional - only if data exists)** | **Proposition 5: Where the city wants to be with regard to the lecture framework based on the city vision and strategic blueprint** | **Initiative that would move the city from its current status to Advanced status (Scenario 4: Column G)** |
---|---|---|---|---|---|---|---|---|---|
**1. Energy source** | A Smart City has a reliable, sustainable energy supply system. | | | | | | | | | |
| | The city has a good energy supply system with limited water availability. There are no clear targets to achieve higher quality and optimised quantity standards. Unaccounted energy loss is above 40%. | | | | | | | | | |
| | The city does not have any renewable sources of energy, and there is no commitment to promote this for the foreseeable future. | | | | | | | | | |
| | The city is preparing plans for ensuring that it gets more energy from renewable sources and is in the process of making commitments in this regard. | | | | | | | | | |
| | The city is undertaking long-term strategic projects to increase renewable energy sources. | | | | | | | | | |

**2. Water supply** | A Smart City has a reliable, 24/7 supply of water that meets national and global health standards. (Guideline 2A & 2B) | | | | | | | | | |
| | The city has a poor water supply system with limited water availability. There are no clear targets to achieve higher quality and optimised quantity standards. Unaccounted water loss is above 40%. | | | | | | | | | |
| | The city has implemented water supply and availability. However, it is setting targets and processes in place to try to improve its water supply. Unaccounted water loss is less than 30%. | | | | | | | | | |
| | The city has a 2.4 x 7 water supply in most areas but the quality of water does not meet international health standards. Unaccounted water loss is less than 30%. | | | | | | | | | |
| | The city has a 24 x 7 water supply in most areas but the quality of water does not meet national and global standards and also available in sufficient quantity and affordable across all sections of the society. Unaccounted loss less than 15%. | | | | | | | | | |

**3. Water management** | A Smart City has advanced water management programs, including smart meters, rainwater harvesting, and green infrastructure to manage stormwater runoff. (Guideline 6.3) | | | | | | | | | |
| | The city does not measure all its supply. It does not recycle waste water to meet its requirements and rain water harvesting is not prevalent. Flooding often occurs due to storm water run-off. | | | | | | | | | |
| | The city has meters for all its water supply but lacks mechanisms to monitor. Water leakage is very high. Some, but not much, rainwater harvesting exists. | | | | | | | | | |
| | The city has meters for all its water supply with some smart mechanisms to monitor. Rainwater harvesting systems are installed and storm water is collected and stored in water bodies. However, recycling of waste water and reusage of storm water is limited. | | | | | | | | | |
| | The city has meters for all its water supply. It includes smart mechanisms to monitor water quality, rainwater harvesting systems are installed and utilised through the city and storm water is collected and stored in water bodies and treated to use. Recycled waste water is supplied for secondary uses. | | | | | | | | | |

**Annexure - 2**

**Chennai Smart City: Self Assessment**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Feature</strong></td>
<td><strong>Definition</strong></td>
<td><strong>Scenario 1 (BASE)</strong></td>
<td><strong>Scenario 2</strong></td>
<td><strong>Scenario 3</strong></td>
<td><strong>Scenario 4 (ADVANCED)</strong></td>
<td><strong>R audit for assessment and/or quantified indicator (Optional - only if data exists)</strong></td>
<td><strong>Proposition 5: Where the city wants to be with regard to the lecture framework based on the city vision and strategic blueprint</strong></td>
<td><strong>Initiative that would move the city from its current status to Advanced status (Scenario 4: Column G)</strong></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>1. Energy source</strong></td>
<td>A Smart City has at least 10% of its electricity generated by renewables. (Guideline 6.2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The city has a good energy supply system with limited water availability. There are no clear targets to achieve higher quality and optimised quantity standards. Unaccounted energy loss is above 40%.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The city does not have any renewable sources of energy, and there is no commitment to promote this for the foreseeable future.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The city is preparing plans for ensuring that it gets more energy from renewable sources and is in the process of making commitments in this regard.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The city is undertaking long-term strategic projects to increase renewable energy sources.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**2. Water supply** | A Smart City has a reliable, 24/7 supply of water that meets national and global health standards. (Guideline 2A & 2B) | | | | | | | | | |
| | The city has a poor water supply system with limited water availability. There are no clear targets to achieve higher quality and optimised quantity standards. Unaccounted water loss is above 40%. | | | | | | | | | |
| | The city has implemented water supply and availability. However, it is setting targets and processes in place to try to improve its water supply. Unaccounted water loss is less than 30%. | | | | | | | | | |
| | The city has a 2.4 x 7 water supply in most areas but the quality of water does not meet international health standards. Unaccounted water loss is less than 20%. | | | | | | | | | |
| | The city has a 24 x 7 water supply in most areas but the quality of water does not meet national and global standards and also available in sufficient quantity and affordable across all sections of the society. Unaccounted loss less than 15%. | | | | | | | | | |

**3. Water management** | A Smart City has advanced water management programs, including smart meters, rainwater harvesting, and green infrastructure to manage stormwater runoff. (Guideline 6.3) | | | | | | | | | |
| | The city does not measure all its supply. It does not recycle waste water to meet its requirements and rain water harvesting is not prevalent. Flooding often occurs due to storm water run-off. | | | | | | | | | |
| | The city has meters for all its water supply but lacks mechanisms to monitor. Water leakage is very high. Some, but not much, rainwater harvesting exists. | | | | | | | | | |
| | The city has meters for all its water supply with some smart mechanisms to monitor. Rainwater harvesting systems are installed and storm water is collected and stored in water bodies. However, recycling of waste water and reusage of storm water is limited. | | | | | | | | | |
| | The city has meters for all its water supply. It includes smart mechanisms to monitor water quality, rainwater harvesting systems are installed and utilised through the city and storm water is collected and stored in water bodies and treated to use. Recycled waste water is supplied for secondary uses. | | | | | | | | | |
### Chennai Smart City: Self Assessment

**Annexure - 2**

#### Chennai Smart City: Self Assessment

<table>
<thead>
<tr>
<th>Feature</th>
<th>Definition</th>
<th>Scenario 1 (BASE)</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
<th>Scenario 4 (ADVANCED)</th>
<th>Basis for assessment and/or quantitative indicator (Optional - only if data exists)</th>
<th>Projection of 'where the city wants to be' with regard to the feature (indicators based on the city vision and strategic blueprint)</th>
<th>Recommendations that would move the city from its current status to Advanced status (Scenario 4: Column G)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wastewater Management</td>
<td>The city does not have plans, policies or programs to improve the air quality. Systems to monitor air quality are absent.</td>
<td>City has programs and projects to monitor air quality and spatiotemporal data to ascertain reasons for degree of pollution in the air. A few strategies to decrease pollution have been implemented.</td>
<td>Scenario 2 for pan city and area based</td>
<td>Pollution control board standard</td>
<td>Scenario 4 for pan city and area based</td>
<td>Pollution monitoring covering the entire city and data of air quality are mapped.</td>
<td>The city has clean air by international standards. Live Air quality monitoring cover the entire city and data of air quality are mapped.</td>
<td>Readiness of the city: 1. Implementation plans in place for NMT policy 2. Emphasis on public mass transportation system already 3. Traffic CCTV camera installation at important junctions. 4. Initiating planned for achieving the advanced status – setting up automatic traffic systems. 5. Comprehensive mobility plan 6. Effective communication to stakeholders 7. Emphasis on mass transportation system 8. Reduce air and noise pollution by promoting non-motorised MNT modes (walking &amp; cycling) through construction of footpaths, cycle sharing systems and improving transit access. Restrict vehicle use by implementing on-street parking management systems. 9. Set up appropriate air-quality and noise pollution monitoring systems in the city. Work with the State Pollution Control Board to ensure air quality meets national standards at multiple locations.</td>
</tr>
<tr>
<td>Air Quality</td>
<td>The city has programs and projects to monitor air quality and spatiotemporal data to ascertain reasons for degree of pollution in the air. A few strategies to decrease pollution have been implemented.</td>
<td>Scenario 1 for pan city and area based</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1. Implementation plans in place for NMT policy 2. Emphasis on public mass transportation system already 3. Traffic CCTV camera installation at important junctions. 4. Initiating planned for achieving the advanced status – setting up automatic traffic systems. 5. Comprehensive mobility plan 6. Effective communication to stakeholders 7. Emphasis on mass transportation system 8. Reduce air and noise pollution by promoting non-motorised MNT modes (walking &amp; cycling) through construction of footpaths, cycle sharing systems and improving transit access. Restrict vehicle use by implementing on-street parking management systems. 9. Set up appropriate air-quality and noise pollution monitoring systems in the city. Work with the State Pollution Control Board to ensure air quality meets national standards at multiple locations.</td>
<td></td>
</tr>
<tr>
<td>Energy Efficiency</td>
<td>The city has no programs or controls or incentive mechanisms to promote or control energy efficiency in buildings.</td>
<td>City has no programs or controls or incentive mechanisms to promote or control energy efficiency in buildings.</td>
<td>Scenario 3 for pan city and area based</td>
<td>Total planning authority has already installed 35,329 Sodium Vapour lamps to smart LED street lighting system</td>
<td>Scenario 4 for pan city and area based</td>
<td>Total energy efficiency is limited to existing buildings in the city. The city has already installed 35,329 Sodium Vapour lamps to smart LED street lighting systems. Data from the city corporation</td>
<td>100% LED street lighting system at Pan-city level and energy efficient practices for buildings resulting in less power demand</td>
<td>Readiness of the city: 1. Creation of 100% energy efficient system 2. Energy audit of Pumping stations; replacement of non-efficient pumps 3. Convert all remaining 5,175 sodium lamps to smart LED lighting 4. Building approvals only after installation of energy efficient practices 5. Energy efficient lighting system at public spaces 6. Public awareness programs</td>
</tr>
<tr>
<td>Underground electric wiring</td>
<td>The city does not have plans for underground electric wiring system.</td>
<td>More than 40% of the city has underground electric wiring system.</td>
<td>Scenario 4 for pan city and area based</td>
<td>Total power distribution is underground lines.</td>
<td>Scenario 4 for pan city and area based</td>
<td>Most of the power distribution is underground lines.</td>
<td>The city has complete Master plan prepared for underground wiring system already. Project is planned to be funded under ABWUT Scheme. 2. Automation of STP and STP already implemented centrally. 3. Initiative planned for achieving the advanced status - setting up automatic traffic systems. 4. Reduction in power consumption by promoting non-motorised MNT modes (walking &amp; cycling) through construction of footpaths, cycle sharing systems and improving transit access. Restrict vehicle use by implementing on-street parking management systems. 5. Set up appropriate air-quality and noise pollution monitoring systems in the city. Work with the State Pollution Control Board to ensure air quality meets national standards at multiple locations.</td>
<td>Readiness of the city: 1. Creation of 100% energy efficient system 2. Energy audit of Pumping stations; replacement of non-efficient pumps 3. Convert all remaining 5,175 sodium lamps to smart LED lighting 4. Building approvals only after installation of energy efficient practices 5. Energy efficient lighting system at public spaces 6. Public awareness programs</td>
</tr>
</tbody>
</table>
### Chennai Smart City: Self Assessment

<table>
<thead>
<tr>
<th>Feature</th>
<th>Definition</th>
<th>Scenario 1 (BASE)</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
<th>Scenario 4 (ADVANCED)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sanitation</strong></td>
<td>A Smart City has no open defecation, and a full supply of toilets based on the population.</td>
<td>Many parts of the city do not have access to sanitation infrastructure and facilities.</td>
<td>Sanitation facilities are available to 70% of the city's population.</td>
<td>Sanitation facilities are available to 90% of the city's population.</td>
<td>The city has sanitation facilities coverage to 75% of toilets of the city population. - Community toilets of more than 800 users. Site visit and data from Corporation of Chennai.</td>
</tr>
<tr>
<td><strong>Waste management</strong></td>
<td>A Smart City has a waste management system that removes household and commercial garbage, and disposits of it in an environmentally sound manner.</td>
<td>Waste collection systems do not pick up waste on a frequent basis and waste often enters into water bodies.</td>
<td>Waste is segregated, collected, recycled and disposed in an environmentally sound manner.</td>
<td>The city reduces land fill caused by waste so that it is minimal. All the solid waste generated is segregated at source and sent to recycling. Organic waste is sent for composting to be used for gardening in the city. The energy created through waste is considered.</td>
<td>1. Waste generated - 5099 MT. 2. Per capita generation - 700 g. 3. Collection efficiency - 100%. 4. Segregation at source - 5%. 5. Transported using vehicle to landfill sites at Kodungaiyur and Perungudi. 6. 36 composting plants handling 36.5 MT and 10 Waste-to-energy plants handling 7.75 MT.</td>
</tr>
<tr>
<td><strong>Safety and security</strong></td>
<td>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.</td>
<td>The city has low levels of public safety - most groups of residents feel insecure in most parts of the city.</td>
<td>The city has moderate levels of public safety - some more vulnerable groups feel insecure in some parts of the day and in some parts of the city.</td>
<td>The city has high levels of public safety - all citizens including women, children and the elderly feel secure in most parts of the city during most time in the day.</td>
<td>1. Accidents - 9705 2. Fatal Incidents - 1247 3. CCTV Cameras installed at few locations. 4. System Integration. 5. Surveillance system performance status: - Penalty aspects 6. Implementation of technology/ Web / App based Security and Safety initiatives.</td>
</tr>
</tbody>
</table>

### Chennai Smart City: Self Assessment - Annexure - 2

- **Sanitation**
  - Scenario 1 for pan city and Scenario 4 for area based
  - Sanitation facilities to 100% of the city's population
  - The city has sanitation facilities coverage to 75% of toilets of the city population.
  - 86.99% of sewage collection
  - Site visit and data from Corporation of Chennai.

- **Waste management**
  - Scenario 2 for pan city and area based
  - Waste generated - 5099 MT.
  - Per capita generation - 700 g.
  - Collection efficiency - 100%.
  - Segregation at source - 5%.
  - Transported using vehicles to landfill sites at Kodungaiyur and Perungudi.
  - 36 composting plants handling 36.5 MT and 10 Waste-to-energy plants handling 7.75 MT.

- **Safety and security**
  - Scenario 4 for pan city and area based
  - Voted as Best City in India twice by India Today - 2014 & 2015.
  - Surveillance systems installed in most parts of the city and patrolling activity.
  - CCTV Camera installed at few locations.
  - State Transport Authority, Government of Tamilnadu.

### Chennai Smart City: Self Assessment - Input/Initiative that would move the city from its current status to Advanced status (Scenario 4: Column G)

- **Sanitation**
  - Scenario 4
  - 100% Clean and Hygiene city
  - Sanitation facilities to 100% of the population
  - Adequate public toilet facilities as per National Urban Sanitation Policy

- **Waste management**
  - Scenario 4
  - Scientific handling of waste
  - 4 R concept including Waste recycling
  - 6.36 composting plants handling 36.5 MT
  - 4. MSW management process - as per global standards.
  - 5. Door to door collection - 100%.

- **Safety and security**
  - Scenario 4
  - Safe and secure city (24 x 7)
  - Voted as Best City in India twice by India Today - 2014 & 2015.
  - Surveillance systems installed in most parts of the city and patrolling activity.

### Chennai Smart City: Self Assessment - Implementation of technology/ Web / App based Security and Safety initiatives

- **Sanitation**
  - System Integration.
  - Surveillance system performance status:

- **Waste management**
  - 4 R concept including Waste recycling.
  - 5. Door to door collection - 100%.

- **Safety and security**
  - Implementation of technology/ Web / App based Security and Safety initiatives.
  - Two-way communication system from central command centre.

### Chennai Smart City: Self Assessment - Readiness of the city

- **Sanitation**
  - Readiness of the city:
    - 1. Reclamation of landfill sites at Kodungaiyur and Perungudi.

- **Waste management**
  - Readiness of the city:
    - 1. Reclamation of landfill sites at Kodungaiyur and Perungudi.

- **Safety and security**
  - Readiness of the city:
    - 1. Proper emphasis on O&M aspect.
    - 2. Ongoing Safety measures taken by traffic department.
  
### Chennai Smart City: Self Assessment - Initiative planned for achieving the advanced status

- **Sanitation**
  - Initiative planned for achieving the advanced status
  - Scientific handling of waste
  - 4 R concept including Waste recycling
  - 6.36 composting plants handling 36.5 MT
  - 4. MSW management process - as per global standards.
  - 5. Door to door collection - 100%

- **Waste management**
  - Initiative planned for achieving the advanced status
  - Scientific handling of waste
  - 4 R concept including Waste recycling
  - 6.36 composting plants handling 36.5 MT

- **Safety and security**
  - Initiative planned for achieving the advanced status
  - Scientific handling of waste
  - 4 R concept including Waste recycling
  - 6.36 composting plants handling 36.5 MT

### Chennai Smart City: Self Assessment - Initiative planned for achieving the advanced status

- **Sanitation**
  - Initiative planned for achieving the advanced status
  - Scientific handling of waste
  - 4 R concept including Waste recycling
  - 6.36 composting plants handling 36.5 MT

- **Waste management**
  - Initiative planned for achieving the advanced status
  - Scientific handling of waste
  - 4 R concept including Waste recycling
  - 6.36 composting plants handling 36.5 MT

- **Safety and security**
  - Initiative planned for achieving the advanced status
  - Scientific handling of waste
  - 4 R concept including Waste recycling
  - 6.36 composting plants handling 36.5 MT
### Chennai Overview

**Geographical Area of Chennai**

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old City Corporation Area</td>
<td>176 Sq.km</td>
</tr>
<tr>
<td>(155 wards)</td>
<td></td>
</tr>
<tr>
<td>New City Corporation Area</td>
<td>426 Sq.km</td>
</tr>
<tr>
<td>(200 wards)</td>
<td></td>
</tr>
<tr>
<td>Chennai Metropolitan Area</td>
<td>1,189 sq.km</td>
</tr>
</tbody>
</table>

**Chennai Factsheet**

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Tamil Nadu</td>
</tr>
<tr>
<td>Area</td>
<td>426 sq.km</td>
</tr>
<tr>
<td>Population</td>
<td>6.5 million (2011)</td>
</tr>
<tr>
<td>Density</td>
<td>15,258 per sq.km</td>
</tr>
<tr>
<td>Time zone</td>
<td>GMT + 5:30</td>
</tr>
<tr>
<td>Climate</td>
<td>Tropical Wet &amp; Dry Climate</td>
</tr>
<tr>
<td>Temperature</td>
<td>Max 40 °C / Min 15 °C</td>
</tr>
</tbody>
</table>

**Demographic Indicator**

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>6.5 million (2011) – 6% of total population of TN</td>
</tr>
<tr>
<td>Decadal Growth Rate of Population</td>
<td>25.99 % (2001-2011)</td>
</tr>
<tr>
<td>Literacy Level</td>
<td>81.26% (2011)</td>
</tr>
<tr>
<td>Sex Ratio (Females for 1000 males)</td>
<td>989 (2011)</td>
</tr>
<tr>
<td>Human Development Index</td>
<td>0.817</td>
</tr>
<tr>
<td>Household Size</td>
<td>4.02</td>
</tr>
</tbody>
</table>

Source:
- Second Master Plan, CMA – 2026
- Census of India
Chennai will be home to **8.75 lakh white collar jobs** by 2015

**Largest automobile hub** in India and among top 10 automobile cluster hub in the world

Growth in **IT / ITeS sector, Medical Tourism, Industrial, Warehousing & Logistics**

Excellent **Business Opportunities** (in resource & knowledge based industry)

Proposed **Smart City, Medical Park, Satellite Townships** will play major role in city’s economy as well as infrastructure

Chennai with its strong presence in planned environment has scored the number one position as “**Most Liveable City**” in India according to Institute for Competitiveness, 2012

**INFRASTRUCTURES**

- Proposed infrastructure including a **45.1 kms of Metro Rail, Green Field Airport, 62 kms of Outer Ring Road, MRTS stretching 45 kms by 2015** and another **55 kms by 2020**, 19 flyovers and underpasses, **15 BRTS corridors by 2020**
- Modern Port and Inland Port infrastructure
Infrastructure Initiatives of Chennai

**National Highways**
NH-4, NH-5, NH-205, NH-45

**State Highways**

**Expressways**
Maduravoyal - Chennai Port Expressway – 19km

**Outer Ring Road**
6 lane road of 62 kms of stretch runs from Minjur to Vandalur via Nemilichery.  
PHASE 1 – 29.5 km (nearing completion)  
PHASE 2 – 32.0 km (land acquisition under process)

**Six Laning of Rajiv Gandhi Salai or IT Expressway**
PHASE 1 - 22 km (Six laning completed)  
PHASE 2 - 29km (yet to commence)

**Ennore - Manali Road Improvement Project**
Widening of roads like Manali Oil Refinery Road, T. P. P. (Thiruvotiyur - Ponneri - Panchetti) Road, Ennore Expressway and Inner Ring Road's northern part.

**Greenfield Airport**
Second airport for Chennai city

**Monorail**
Phase-1 – Total length of 57.09 km

**Operational Metro line in Phase 1**
10.1 KM

**Metro Corridor I**
23 KM
Status: Under construction

**Metro Corridor II**
22 KM
Status: Under construction

**Monorail Corridor I**
23 KM
(Vandalur to Velachery)

**Monorail Corridor II**
16 KM
(Poonamallee to Kathipara)

**Monorail Corridor III**
18 KM
(Poonamallee to Vadapalani)
Status: Bidding Process Stage
Growth Corridors

Southern Suburb

01 ECR
East Coast Road

02 OMR - Old Mahabalipuram Road

03 NH 45
(Chennai-Trichy Highway)

Entertainment & Leisure Corridor
IT/ITES Corridor
Grand Southern Trunk SEZ Corridor

Western Suburb

04 NH 4
(Chennai-Bangalore Highway)
Industrial (Auto & Manufacturing)

Northern Suburb

05 NH 5
(Chennai-Kolkata Highway)
Industrial (Logistics & Warehousing)

Map not to scale; Source: Jones Lang LaSalle
# Infrastructure Gap Assessment

## 1. Transport Facilities

<table>
<thead>
<tr>
<th>Service</th>
<th>Public Transport</th>
<th>Pedestrian Infrastructure</th>
<th>NMT</th>
<th>Usage of Integrated Transport System (ITS)</th>
<th>Travel speed along major corridors</th>
<th>Availability of Parking Spaces</th>
<th>Road Safety</th>
<th>Pollution levels</th>
<th>Integrated Land Use Transport System</th>
<th>Financial Sustainability of Public Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoS (1-4)*</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>-</td>
</tr>
</tbody>
</table>

Implementation of NMT will address all the above parameters (Cycle Sharing system, Parking Management, LED Street Lighting)

## 2. Water & Sewer Network

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Coverage old Water Supply network</th>
<th>Per Capita Supply of Water (Lpcd)</th>
<th>Continuity of Water Supply (Hrs per day)</th>
<th>Coverage of Sewerage Network</th>
<th>Extent of Reuse and Recycling of Sewage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value*</td>
<td>100% (old city) 54.71% (extended limits)</td>
<td>107</td>
<td>3</td>
<td>100%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Water management - Adopting latest treatment technologies, encouraging community participations. Desalination plant creates a reliable water source ensuring 24 hours supply by reducing the existing system losses and improving operational efficiency.

## 3. Solid Waste

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Value*</td>
<td>90%</td>
<td>30%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Solid waste management - Encourage door to door collection, Segregation of waste at source, Improving operational efficiency, incentive schemes for staff, Community participation drives, Exploring options of Waste to Energy, Sale of Recyclable, composting yards and other recovery options.

## 4. Storm Water

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Coverage Of Storm Water Drainage Network %</th>
<th>Incidence Of Water Logging / Flooding (Nos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value*</td>
<td>40%</td>
<td>200 locations</td>
</tr>
</tbody>
</table>

Sustainable storm water management, 100% collection drains with embedded surface rainwater harvesting

LoS: Service level bench marking of MoUD Guidelines
**Citizen Engagement Process**

**DISCUSS**
Series of Consultation.
Collection of feedback

- Public Consultation
- 15 Zonal Consultation
- Stakeholder Consultation
  - Mygov
  - Suggestion via email
  - Social Media Outreach
- Written Suggestions from 15 Zonal Offices
  - Mass SMS

**SUMMARISE**
Narrow down suggestions most preferred

**Pan City Solution**
- Traffic Management
- Non Motorized Transport
- Solid Waste Reduction
- LED street lighting
- Multi Modal Integration
- BRTS
- Transit Oriented Development
- Parking Management
- Storm Water Management

**Area Based Development**
- George Town
- Mylapore
- T Nagar
- Sholinganallur

**Pan City Solution**
ICT for Non-Motorized Transport
Water Management – Flood Monitoring System & Smart Water

**Area Based Development**
T Nagar
Consultation Program Outcome

**Citizen Outreach**

*Total = 9,67,850*

- **Offline Engagement**
  - Polling Booths at zonal offices
  - Suggestion boxes at zonal offices
  - Direct consultation program
  - Radio program
  - Consultation at each zonal office
  - Mass SMS
  - Print Media

- **Online Engagement**
  - Mygov
  - Corporation Website
  - Facebook
  - Twitter
  - Linkedin
  - Youtube
  - Mass E-Mail

**Areas for Development – Voted by Citizens (ONLINE)**

- **T Nagar**
  - 55%

- **Sholinganallur**
  - 29%

- **George Town**
  - 9%

- **Mylapore**
  - 7%

**Areas for Development – Voted by Citizens (OFFLINE)**

- **T Nagar**
  - 67%

- **Sholinganallur**
  - 24%

- **George Town**
  - 6%

- **Mylapore**
  - 3%

**PAN City Solution – Voted by Citizens (Online & Offline)**

*Other solution has very minimal preference*

**Water Management (Flood monitoring and Smart Water) - need of the day**

**Profile of Citizens Engaged**

- **Senior Citizen** 8%
- **Children** 4%
- **Women** 11%
- **Men & Youth** 77%
Residents Meet Corp to Discuss  
Smart City Plans

Express News Service

Chennai: T Nagar residents who attended a meeting on Wednesday with Chennai Corporation representatives on the subject of smart cities and of Chennai being transformed into one. Chennai is one of 12 cities in Tamil Nadu and 69 short-

Chennai in race to become ‘smart city’
▫ Corporation elicits opinion from residents

Chennai Corporation has plans to implement Phase 1 of Smart City Development. In response to a query as to when the results of this initiative would be known, Mayor Sajith D Perumal said that this was a central government initiative and it would have to be coordinated with the State and the exact timelines are still not known.

Residents who attended the meeting said they were happy with the proposals put forward by the Corporation. However, they said they would like to see a detailed plan before they could approve the Smart City plan.

Flood emergency makes proposal smarter

Praadeep Kumar

Chennai: Corporate cities are on the rise, and Chennai is no exception. To combat the flood emergency, T Nagar has been proposed as a Smart City. The residents are happy with the proposal, but they want to see a detailed plan before they can approve it.

T Nagar has ₹1,300cr plans

Praadeep Kumar

Chennai: Corporate cities are on the rise, and Chennai is no exception. To combat the flood emergency, T Nagar has been proposed as a Smart City. The residents are happy with the proposal, but they want to see a detailed plan before they can approve it.

T Nagar Tailor-made to Fit the Smart City Bill, Feel City Residents
Key Issues

- Traffic congestion
- Unorganized parking
- Improper solid waste management
- Aging infrastructure
- Improper storm water management
- No waste water recycling
- Last mile connectivity
- Pollution
- Absence of use of renewable energy
- Pedestrian-vehicular conflict

VISION: “An universal cultural hub for safe and sustainable living with enhanced mobility, smart urban infrastructure and become more resilient to the physical, social, and economic challenges “

<table>
<thead>
<tr>
<th>Retrofitting Area</th>
<th>6.95 sq.km (1.63% of Total City Area – 426 Sq.km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>2.26 lakhs Population (3.38% of City Population – 66.8 lakhs)</td>
</tr>
</tbody>
</table>
Proposal for **Non Motorized Transport System for T Nagar**
Chennai Smart City – ‘City for Everyone’
An universal cultural hub for safe and sustainable living with enhanced mobility, smart urban infrastructure and become more resilient to the physical, social, and economic challenges.

<table>
<thead>
<tr>
<th>Key Issues Identified</th>
<th>Proposals</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pedestrian safety</td>
<td>ICT in NMT</td>
</tr>
<tr>
<td>• Unorganized parking</td>
<td>• Cycle sharing,</td>
</tr>
<tr>
<td>• Last mile connectivity</td>
<td>• Parking management,</td>
</tr>
<tr>
<td>• Pollution</td>
<td>• LED street lighting monitoring &amp; automatic On/Off</td>
</tr>
<tr>
<td>• Quality infrastructure for pedestrians</td>
<td>• City Surveillance</td>
</tr>
<tr>
<td>• Enforcement issues</td>
<td>• Intelligent Traffic Management</td>
</tr>
<tr>
<td>• Traffic Management</td>
<td></td>
</tr>
<tr>
<td>• Energy Efficient Lighting</td>
<td></td>
</tr>
<tr>
<td>• City surveillance</td>
<td></td>
</tr>
<tr>
<td>• Disaster Management like Flooding</td>
<td>ICT for Flood &amp; Tsunami monitoring and warning system</td>
</tr>
<tr>
<td>• Water Management</td>
<td>• Smart Water – Digital Services for Citizen Services</td>
</tr>
</tbody>
</table>

ICT in NMT
• Cycle sharing,
• Parking management,
• LED street lighting monitoring & automatic On/Off
• City Surveillance
• Intelligent Traffic Management

ICT for Flood & Tsunami monitoring and warning system
• Smart Water – Digital Services for Citizen Services
<table>
<thead>
<tr>
<th>AREA BASED PROPOSAL</th>
<th>Total</th>
<th>JNNSM</th>
<th>SBM</th>
<th>PPP</th>
<th>Debt</th>
<th>Smart City</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INR in Crore</td>
<td>INR in Crore</td>
<td>INR in Crore</td>
<td>INR in Crore</td>
<td>INR in Crore</td>
<td>INR in Crore</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical</td>
<td>272.87</td>
<td>1.59</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>271.28</td>
</tr>
<tr>
<td>Water Supply</td>
<td>206.06</td>
<td>0.00</td>
<td>0.00</td>
<td>173.33</td>
<td>0.00</td>
<td>32.72</td>
</tr>
<tr>
<td>Sewerage</td>
<td>22.23</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>22.23</td>
</tr>
<tr>
<td>Sanitation</td>
<td>4.20</td>
<td>0.00</td>
<td>0.99</td>
<td>0.00</td>
<td>0.00</td>
<td>3.21</td>
</tr>
<tr>
<td>Solid Waste</td>
<td>11.16</td>
<td>0.00</td>
<td>2.63</td>
<td>0.00</td>
<td>0.00</td>
<td>8.52</td>
</tr>
<tr>
<td>Storm Water</td>
<td>122.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>122.00</td>
</tr>
<tr>
<td>IT Connectivity and Digitization</td>
<td>50.69</td>
<td>0.00</td>
<td>0.00</td>
<td>10.40</td>
<td>0.00</td>
<td>40.29</td>
</tr>
<tr>
<td>Pedestrian Friendly Pathways &amp; Non-Motorised Transport</td>
<td>175.66</td>
<td>0.96</td>
<td>0.00</td>
<td>99.78</td>
<td>0.00</td>
<td>74.91</td>
</tr>
<tr>
<td>Intelligenet Traffic Management Systems</td>
<td>8.12</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>8.12</td>
</tr>
<tr>
<td>Retrofitting of Parks</td>
<td>4.95</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>4.95</td>
</tr>
<tr>
<td><strong>Sub Total</strong></td>
<td>877.93</td>
<td>2.55</td>
<td>3.62</td>
<td>283.52</td>
<td>0.00</td>
<td>588.23</td>
</tr>
</tbody>
</table>

| PAN CITY PROPOSAL                   |        |       |       |       |       |            |
| ICT for Non Motorized Transport     | 452.32 | 0.00  | 0.00  | 35.00 | 65.55 | 351.77     |
| ICT for Water Management            | 36.00  | 0.00  | 0.00  | 0.00  | 0.00  | 36.00      |
| **Sub Total**                       | 488.32 | 0.00  | 0.00  | 35.00 | 65.55 | 387.77     |

| Grand Total                         | 1366.24| 2.55  | 3.62  | 318.52| 65.55 | 976.00     |
Implementation Plan

A Setting up of SPV & other administrative activities
1. Formation of SPV
2. Setting up of office

B Design Phase
1. Preliminary Design Stage
   i. Preparation of Master Plan
   ii. Preparation of design criteria
   iii. Assess and forecast of infrastructure demand for stage-wise development
   iv. Preparation of conceptual infrastructure plan - pedestrianisation, water supply, drainage, sewage, power, solid waste, ICT, etc.
   v. Discussions with client and other stakeholders
   vi. Preparation and Submittion of Preliminary Design Report along with preliminary cost

2. Detailed Design and Engineering Stage
   i. Detailed design: Infrastructure development with respect to utilities and services - electrical, street lighting, drainage, sewage, water supply network, solid waste, communication network, pedestrianisation, etc.
   ii. Preparation and Submittion of Detailed Design Project Report to Client
   iii. Discussions with client and other stakeholders
   iv. Submission of Final Detailed Design Project Report to Client incorporating client’s observations

3. Bid Process Management for implementation of Identified Infrastructure Components
   i. Preparation of tender documents with all related documents and drawings

C Implementation Phase

AREA DEVELOPMENT (RETROFITTING) - T. NAGAR

<table>
<thead>
<tr>
<th>S.No</th>
<th>PROPOSALS</th>
<th>TYPE OF PROPOSAL</th>
<th>DEVELOPMENT PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Year 1</td>
</tr>
<tr>
<td>1</td>
<td>Microgrid management system at primary distribution substations</td>
<td>Microgrid</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Electrical &amp; ICT utility corridor</td>
<td>Electrical</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Smart metering</td>
<td>Smart</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Installing roof top solar system in public buildings</td>
<td>Solar</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Energy Efficient LED Street Lighting</td>
<td>Street Lighting</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Water supply network augmentation / rehabilitation</td>
<td>Water</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Electromagnetic Flow meter for water supply network</td>
<td>Flow</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Reliable source augmentation (Desalination Plant) for 24 X 7 water supply</td>
<td>Desalination</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Augmentation of existing pump stations including future requirement</td>
<td>Pump</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Water pressure and quality monitoring meter</td>
<td>Monitoring</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Sewerage network augmentation / rehabilitation</td>
<td>Sewer</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Installation of sensors at strategic locations</td>
<td>Sensors</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Rain water harvesting @ every 30 mts intervals</td>
<td>Rain Water</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Solid Waste</td>
<td>Solid</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Collection bins including sensors</td>
<td>Collection</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Vehicle monitoring system</td>
<td>Vehicle</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Gardening of collection bins</td>
<td>Gardening</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Modernisation of transfer stations</td>
<td>Transfer</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>IT Connectivity and Digitization</td>
<td>IT</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>WiFi zones and hot spots</td>
<td>WiFi</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>City surveillance system</td>
<td>City</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Digital signages and billboards</td>
<td>Digital</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Website for e-Governance features</td>
<td>Website</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Integration of all utilities using GIS</td>
<td>Integration</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Sanitation</td>
<td>Sanitation</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Modular e-toilets</td>
<td>E-toilet</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Pedestrian Friendly Pathways &amp; Non-Motorised Transport</td>
<td>Pedestrian</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Pedestrianised streets</td>
<td>Pedestrian</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Traffic calming strips</td>
<td>Traffic</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Differentiated footpath</td>
<td>Differentiated</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Bicycle lanes</td>
<td>Bicycle</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>MLCPs with ICT application</td>
<td>MLCP</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>On-Street Parking Management system with ICT application</td>
<td>Parking</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Cycle Sharing system with ICT Application</td>
<td>Cycle</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Installation of solar charging stations for e-Rickshaws</td>
<td>Solar</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Intelligent Traffic Management Systems</td>
<td>Traffic</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Smart signalling</td>
<td>Smart</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Intelligent transport system</td>
<td>Intelligent</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Retrofitting of Green Open Spaces</td>
<td>Green Open</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Hard landscape</td>
<td>Hard</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Soft landscape</td>
<td>Soft</td>
<td></td>
</tr>
</tbody>
</table>

PAN CITY - CHENNAI
### AREA DEVELOPMENT (RETROFITTING) - T. NAGAR

<table>
<thead>
<tr>
<th>S.No</th>
<th>PROPOSALS</th>
<th>TYPE OF PROPOSAL</th>
<th>DEVELOPMENT PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Year 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>H1</td>
</tr>
<tr>
<td>1</td>
<td>Electrical</td>
<td>Medium Term</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Water Supply</td>
<td>Long Term</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sewerage</td>
<td>Medium Term</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Storm Water</td>
<td>Short Term</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Solid Waste</td>
<td>Short Term</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>IT Connectivity and Digitization</td>
<td>Medium Term</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Sanitation</td>
<td>Medium Term</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Pedestrian Friendly Pathways &amp; Non-Motorised Transport</td>
<td>Long Term</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Intelligenet Traffic Management Systems</td>
<td>Medium Term</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Retrofitting of Green Open Spaces</td>
<td>Continuous Process</td>
<td></td>
</tr>
</tbody>
</table>

### PAN CITY - CHENNAI

<table>
<thead>
<tr>
<th>S.No</th>
<th>PROPOSALS</th>
<th>TYPE OF PROPOSAL</th>
<th>DEVELOPMENT PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Year 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>H1</td>
</tr>
<tr>
<td>1</td>
<td>ICT for Non Motorized Transport</td>
<td>Long Term</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ICT for Water Management</td>
<td>Short Term</td>
<td></td>
</tr>
</tbody>
</table>
## LIFE CYCLE OF THE PROPOSAL

### Year 2

<table>
<thead>
<tr>
<th>Proposal</th>
<th>Capital Cost</th>
<th>O&amp;M Cost</th>
<th>Estimated gross annual revenue for SPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storm Water</td>
<td>6.71</td>
<td>0.82</td>
<td>2.91</td>
</tr>
<tr>
<td>Water Supply</td>
<td>20.51</td>
<td>6.85</td>
<td>10.30</td>
</tr>
<tr>
<td>Sewerage</td>
<td>5.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Storm Water</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Water</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Vibhuti</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Pedestrian Friendly Pathways &amp; Non-Motorised Transport</td>
<td>60.58</td>
<td>7.26</td>
<td>5.72</td>
</tr>
<tr>
<td>Sanitation</td>
<td>5.85</td>
<td>8.32</td>
<td>8.32</td>
</tr>
</tbody>
</table>

### Year 25

<table>
<thead>
<tr>
<th>Proposal</th>
<th>Capital Cost</th>
<th>O&amp;M Cost</th>
<th>Estimated gross annual revenue for SPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT for Non Motorized Transport</td>
<td>0.51</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Intelligent Traffic Management Systems</td>
<td>1.85</td>
<td>0.52</td>
<td>0.52</td>
</tr>
<tr>
<td>Pedestrian Friendly Pathways &amp; Non-Motorised Transport</td>
<td>6.38</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Sanitation</td>
<td>0.53</td>
<td>0.53</td>
<td>0.53</td>
</tr>
</tbody>
</table>

### Year 28

<table>
<thead>
<tr>
<th>Proposal</th>
<th>Capital Cost</th>
<th>O&amp;M Cost</th>
<th>Estimated gross annual revenue for SPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian Friendly Pathways &amp; Non-Motorised Transport</td>
<td>3.14</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Intelligent Traffic Management Systems</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Sanitation</td>
<td>1.95</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Year 31

<table>
<thead>
<tr>
<th>Proposal</th>
<th>Capital Cost</th>
<th>O&amp;M Cost</th>
<th>Estimated gross annual revenue for SPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT for Non Motorized Transport</td>
<td>2.80</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Intelligent Traffic Management Systems</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Sanitation</td>
<td>2.13</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### PAY BACK PERIOD

- Estimated gross annual revenue for SPV: -1,226.63
- PAY BACK PERIOD: 18.80

### Lifetime Cycle of Chennai Smart City Proposal

<table>
<thead>
<tr>
<th>Proposal</th>
<th>Capital Cost</th>
<th>O&amp;M Cost</th>
<th>Estimated gross annual revenue for SPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT for Non Motorized Transport</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Intelligent Traffic Management Systems</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Sanitation</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### PAY BACK PERIOD

- Estimated gross annual revenue for SPV: 187.01
- PAY BACK PERIOD: 14.45

---

**Notes:**
- **PAY BACK PERIOD:** The estimated payback period for the Chennai Smart City Proposal is 18.80 years.
- **Lifetime Cycle of Chennai Smart City Proposal:**
  - **ICT for Non Motorized Transport:**
  - **Sanitation:**

---

**For detailed financial projections and implementation timelines, refer to the original document.**
Stakeholder’s Role

Consultant
- Literature Study and Benchmarking

Interaction, inputs
- Citizen Consultation

Identification of Pan City and Area Development projects, and formulation of vision and goals

Validation of Proposal

Submission of Smart City Proposal
- Preparation of DPR, funding and implementation of project

Political Representatives (elected members, MPs, MLAs)
- Community representatives (citizen councils, NGOs)
- Officials (District Collector and Line Departments)
- Probable Vendors, PPP partners, banks

SPV (SLHPSC, TNSMDC, CSCL, CSCAF)

Consultants

Corporation Commissioner
CoC Officials

Probable Vendors, PPP partners, banks

Handholding Organisation (World Bank, ADB, JICA, DFID)

Proposal Preparation Stage

Proposal Implementation Stage
## Itemised Costs - Area Based Development

### Area Development, Retrofitting - T Nagar

<table>
<thead>
<tr>
<th>S.No</th>
<th>ITEMS</th>
<th>Unit</th>
<th>Quantity</th>
<th>Rate (INR Lakhs)</th>
<th>Soft Cost (INR Crores)</th>
<th>Hard Cost (INR Crores)</th>
<th>Total Cost (INR Crores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Electrical Network</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Microgrid management system at primary distribution substations</td>
<td>LS</td>
<td>1.00</td>
<td>80.00</td>
<td>-</td>
<td>0.80</td>
<td>0.80</td>
</tr>
<tr>
<td>b</td>
<td>Electrical &amp; ICT utility Corridor</td>
<td>km</td>
<td>115.00</td>
<td>150.00</td>
<td>-</td>
<td>172.50</td>
<td>172.50</td>
</tr>
<tr>
<td>c</td>
<td>Smart metering</td>
<td>nos</td>
<td>88,500.00</td>
<td>0.10</td>
<td>88.50</td>
<td>-</td>
<td>88.50</td>
</tr>
<tr>
<td>d</td>
<td>Installing roof top solar system in public buildings</td>
<td>nos</td>
<td>15.00</td>
<td>35.40</td>
<td>5.31</td>
<td>-</td>
<td>5.31</td>
</tr>
<tr>
<td>1a</td>
<td><strong>Energy Efficient LED Street Lighting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Converting 250W HPSV luminaires on Main roads to 120W LED luminaries</td>
<td>nos</td>
<td>538.00</td>
<td>0.49</td>
<td>-</td>
<td>2.64</td>
<td>2.64</td>
</tr>
<tr>
<td>b</td>
<td>Converting 40W FTL luminaries on Main roads to 20W LED luminaries</td>
<td>nos</td>
<td>1,561.00</td>
<td>0.20</td>
<td>-</td>
<td>3.12</td>
<td>3.12</td>
</tr>
<tr>
<td>Sub Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>93.81</td>
<td>179.06</td>
<td>272.87</td>
</tr>
<tr>
<td>2</td>
<td><strong>Water Supply</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Water supply network augmentation / rehabilitation</td>
<td>km</td>
<td>47.87</td>
<td>60.00</td>
<td>-</td>
<td>28.72</td>
<td>28.72</td>
</tr>
<tr>
<td>b</td>
<td>Electromagnetic Flow meter for water supply network</td>
<td>nos</td>
<td>10.00</td>
<td>10.00</td>
<td>1.00</td>
<td>-</td>
<td>1.00</td>
</tr>
<tr>
<td>c</td>
<td>Reliable source augmentation (Desalination Plant) for 24 X 7 water supply</td>
<td>MLD</td>
<td>20.00</td>
<td>866.67</td>
<td>-</td>
<td>173.33</td>
<td>173.33</td>
</tr>
<tr>
<td>d</td>
<td>Augmentation of existing pump stations including future requirement</td>
<td>MLD</td>
<td>40.00</td>
<td>5.00</td>
<td>-</td>
<td>2.00</td>
<td>2.00</td>
</tr>
<tr>
<td>e</td>
<td>Water pressure and quality monitoring meter</td>
<td>nos</td>
<td>20.00</td>
<td>5.00</td>
<td>1.00</td>
<td>-</td>
<td>1.00</td>
</tr>
<tr>
<td>Sub Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>2.00</td>
<td>204.06</td>
</tr>
<tr>
<td>3</td>
<td><strong>Sewerage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Sewage network augmentation / rehabilitation</td>
<td>km</td>
<td>15.12</td>
<td>100.00</td>
<td>-</td>
<td>15.12</td>
<td>15.12</td>
</tr>
<tr>
<td>b</td>
<td>Installation of sensors at strategic location</td>
<td>LS</td>
<td>1.00</td>
<td>151.20</td>
<td>1.51</td>
<td>-</td>
<td>1.51</td>
</tr>
<tr>
<td>d</td>
<td>Waste water recycling (Parks, mediane, gardens, etc)</td>
<td>nos</td>
<td>4.00</td>
<td>100.00</td>
<td>-</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>e</td>
<td>Augmentation of existing pump stations</td>
<td>MLD</td>
<td>32.00</td>
<td>5.00</td>
<td>-</td>
<td>1.60</td>
<td>1.60</td>
</tr>
<tr>
<td>Sub Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.51</td>
<td>20.72</td>
<td>22.23</td>
</tr>
<tr>
<td>4</td>
<td><strong>Storm Water Drainage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Augmentation of existing storm water network</td>
<td>km</td>
<td>65.00</td>
<td>180.00</td>
<td>-</td>
<td>117.00</td>
<td>117.00</td>
</tr>
<tr>
<td>b</td>
<td>Installation of level sensors at strategic locations along storm water drains</td>
<td>nos</td>
<td>200.00</td>
<td>0.50</td>
<td>1.00</td>
<td>-</td>
<td>1.00</td>
</tr>
<tr>
<td>c</td>
<td>Rain Water Harvesting @ every 30 mts intervals</td>
<td>nos</td>
<td>40.00</td>
<td>10.00</td>
<td>-</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Sub Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
<td>121.00</td>
<td>122.00</td>
</tr>
<tr>
<td>5</td>
<td><strong>Solid Waste Management</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Collection bins including sensors</td>
<td>nos</td>
<td>270.00</td>
<td>0.30</td>
<td>0.27</td>
<td>0.54</td>
<td>0.81</td>
</tr>
<tr>
<td>b</td>
<td>Vehicle monitoring system</td>
<td>nos</td>
<td>50.00</td>
<td>0.15</td>
<td>0.08</td>
<td>-</td>
<td>0.08</td>
</tr>
<tr>
<td>c</td>
<td>Geofencing of collection bins</td>
<td>nos</td>
<td>270.00</td>
<td>0.10</td>
<td>0.27</td>
<td>-</td>
<td>0.27</td>
</tr>
<tr>
<td>d</td>
<td>Modernisation of transfer station</td>
<td>nos</td>
<td>1.00</td>
<td>1,000.00</td>
<td>-</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Sub Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.62</td>
<td>10.54</td>
<td>11.16</td>
</tr>
<tr>
<td>6</td>
<td><strong>IT Connectivity and Digitization</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>WiFi zones and hot spots</td>
<td>nos</td>
<td>3,800.00</td>
<td>1.00</td>
<td>38.00</td>
<td>-</td>
<td>38.00</td>
</tr>
<tr>
<td>b</td>
<td>City surveillance system</td>
<td>nos</td>
<td>32.00</td>
<td>1.25</td>
<td>0.40</td>
<td>-</td>
<td>0.40</td>
</tr>
<tr>
<td>c</td>
<td>Digital signage and billboards</td>
<td>nos</td>
<td>80.00</td>
<td>3.00</td>
<td>2.40</td>
<td>-</td>
<td>2.40</td>
</tr>
<tr>
<td>d</td>
<td>Website for e-Governance features</td>
<td>LS</td>
<td>1.00</td>
<td>100.00</td>
<td>1.00</td>
<td>-</td>
<td>1.00</td>
</tr>
<tr>
<td>e</td>
<td>Integration of all utilities using GIS</td>
<td>LS</td>
<td>1.00</td>
<td>899.08</td>
<td>8.89</td>
<td>-</td>
<td>8.89</td>
</tr>
<tr>
<td>Sub Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50.69</td>
<td>-</td>
<td>50.69</td>
</tr>
<tr>
<td>7</td>
<td><strong>Sanitation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Modular e-toilets</td>
<td>nos</td>
<td>60.00</td>
<td>7.00</td>
<td>-</td>
<td>4.20</td>
<td>4.20</td>
</tr>
<tr>
<td>Sub Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>4.20</td>
<td>4.20</td>
</tr>
<tr>
<td>8</td>
<td><strong>Pedestrian Friendly Pathways &amp; Non-Motorised Transport</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Pedestrianised streets</td>
<td>sqm</td>
<td>30,000.00</td>
<td>0.033</td>
<td>-</td>
<td>9.90</td>
<td>9.90</td>
</tr>
<tr>
<td>b</td>
<td>Traffic calming streets</td>
<td>sqm</td>
<td>22,500.00</td>
<td>0.033</td>
<td>-</td>
<td>7.43</td>
<td>7.43</td>
</tr>
<tr>
<td>c</td>
<td>Differently-abled footpath</td>
<td>sqm</td>
<td>48,000.00</td>
<td>0.033</td>
<td>-</td>
<td>15.84</td>
<td>15.84</td>
</tr>
<tr>
<td>d</td>
<td>Bicycle lanes</td>
<td>sqm</td>
<td>48,000.00</td>
<td>0.033</td>
<td>-</td>
<td>15.84</td>
<td>15.84</td>
</tr>
<tr>
<td>e</td>
<td>MLCPs with ICT application</td>
<td>Cars</td>
<td>1,200.00</td>
<td>10.00</td>
<td>-</td>
<td>120.00</td>
<td>120.00</td>
</tr>
<tr>
<td>f</td>
<td>On-Street Parking Management system with ICT application</td>
<td>nos</td>
<td>30.00</td>
<td>1.00</td>
<td>0.30</td>
<td>-</td>
<td>0.30</td>
</tr>
<tr>
<td>g</td>
<td>Cycle Sharing system with ICT Application</td>
<td>docks</td>
<td>30.00</td>
<td>0.50</td>
<td>0.05</td>
<td>0.11</td>
<td>0.15</td>
</tr>
<tr>
<td>h</td>
<td>Installation of solar charging stations for e-Rickshaws</td>
<td>nos</td>
<td>10.00</td>
<td>62.00</td>
<td>1.86</td>
<td>4.34</td>
<td>6.20</td>
</tr>
<tr>
<td>Sub Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.21</td>
<td>173.45</td>
<td>175.66</td>
</tr>
<tr>
<td>9</td>
<td><strong>Intelligent Traffic Management Systems</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Smart signalling</td>
<td>nos</td>
<td>32.00</td>
<td>16.00</td>
<td>5.12</td>
<td>-</td>
<td>5.12</td>
</tr>
<tr>
<td>b</td>
<td>Intelligent transport system</td>
<td>LS</td>
<td>1.00</td>
<td>1,000.00</td>
<td>3.00</td>
<td>-</td>
<td>3.00</td>
</tr>
<tr>
<td>Sub Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.12</td>
<td>-</td>
<td>8.12</td>
</tr>
<tr>
<td>10</td>
<td><strong>Retrofitting of Green Open Spaces</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Hard landscape</td>
<td>sqm</td>
<td>9,000.00</td>
<td>0.033</td>
<td>-</td>
<td>2.97</td>
<td>2.97</td>
</tr>
<tr>
<td>b</td>
<td>Soft landscape</td>
<td>sqm</td>
<td>15,000.00</td>
<td>0.013</td>
<td>-</td>
<td>1.98</td>
<td>1.98</td>
</tr>
<tr>
<td>Sub Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>4.95</td>
<td>4.95</td>
</tr>
</tbody>
</table>

Total 159.95 717.97 877.93
<table>
<thead>
<tr>
<th>S.No</th>
<th>ITEMS</th>
<th>Unit</th>
<th>Quantity</th>
<th>Rate (INR Lakhs)</th>
<th>Soft Cost (INR Crores)</th>
<th>Hard Cost (INR Crores)</th>
<th>Total Cost (INR Crores)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ICT for Non Motorized Transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>a</td>
<td>nos</td>
<td>3,000.00</td>
<td>0.50</td>
<td>15.00</td>
<td>-</td>
<td>15.00</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td>kms</td>
<td>619.76</td>
<td>10.00</td>
<td>61.98</td>
<td>-</td>
<td>61.98</td>
</tr>
<tr>
<td></td>
<td>c</td>
<td>nos</td>
<td>2,000.00</td>
<td>1.00</td>
<td>20.00</td>
<td>-</td>
<td>20.00</td>
</tr>
<tr>
<td></td>
<td>d</td>
<td>nos</td>
<td>248,467.00</td>
<td>0.10</td>
<td>248.47</td>
<td>-</td>
<td>248.47</td>
</tr>
<tr>
<td></td>
<td>e</td>
<td>nos</td>
<td>1,718.00</td>
<td>0.40</td>
<td>6.87</td>
<td>-</td>
<td>6.87</td>
</tr>
<tr>
<td></td>
<td>f</td>
<td>LS</td>
<td>1.00</td>
<td>10,000.00</td>
<td>100.00</td>
<td>-</td>
<td>100.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sub total</td>
<td></td>
<td></td>
<td></td>
<td>452.32</td>
<td>-</td>
<td>452.32</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ICT for Water Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a</td>
<td>LS</td>
<td>1.00</td>
<td>2,000.00</td>
<td>20.00</td>
<td>-</td>
<td>20.00</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td>LS</td>
<td>1.00</td>
<td>1,600.00</td>
<td>16.00</td>
<td>-</td>
<td>16.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sub total</td>
<td></td>
<td></td>
<td></td>
<td>36.00</td>
<td>-</td>
<td>36.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>488.32</td>
<td>-</td>
<td>488.32</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AT&amp;C</td>
<td>Aggregate Technical and Commercial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBD</td>
<td>Central Business District</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCTS</td>
<td>Chennai Comprehensive Traffic Study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCTV</td>
<td>Closed Circuit Tele Vision</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMA</td>
<td>Chennai Metropolitan Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMBT</td>
<td>Chennai Mofussil Bus Terminus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMWSSB</td>
<td>Chennai Metro Water Supply and Sewerage Board</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CoC</td>
<td>Corporation of Chennai</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMA</td>
<td>District Meter Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDP</td>
<td>Electronic Data Processing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ERP</td>
<td>Enterprise Resource Planning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HT</td>
<td>High Tension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT</td>
<td>Information &amp; Communication Technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPT</td>
<td>Intermediate Public Transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>km</td>
<td>Kilometer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIS</td>
<td>Management Information System</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MLCP</td>
<td>Multi Level Car Park</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MLD</td>
<td>Million Liters per Day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MRTS</td>
<td>Mass Rapid Transit System</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MW</td>
<td>Mega Watt</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCRB</td>
<td>National Crime Records Bureau</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NGO</td>
<td>Non Governmental Organisation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NH</td>
<td>National Highway</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NMT</td>
<td>Non-Motorized Transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NRW</td>
<td>Non Revenue Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSR</td>
<td>Open Space Reservation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGR</td>
<td>Public Grievance and Redressal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNT</td>
<td>Persons near Transit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPH</td>
<td>Persons per Hectare</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT</td>
<td>Public Transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RADMS</td>
<td>Road Accident Data Management System</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-APDRP</td>
<td>Restructured Accelerated Power Development and Reforms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RE</td>
<td>Renewable Energy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RFID</td>
<td>Radio Frequency Identification</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RoW</td>
<td>Right of Way</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTR</td>
<td>Rapid Transport Ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEZ</td>
<td>Special Economic Zone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SH</td>
<td>State Highway</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STP</td>
<td>Sewage Treatement Plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TANGEDCO</td>
<td>Tamil Nadu Generation and Distribution Corporation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TNHB</td>
<td>Tamil Nadu Housing Board</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TNSCB</td>
<td>Tamil Nadu Slum Clearance Board</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UFW</td>
<td>Unfactored Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UTF</td>
<td>Urban Transport Fund</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Municipal Administration and Water Supply (MAll) Department, Secretariat, Chennai-600 009.


From
Thiru. K. Phanindra Reddy, I.A.S.,
Principal Secretary to Government

To
The Mission Director, Smart Cities Mission/
Additional Secretary to Government of India,
Ministry of Urban Development,
New Delhi - 110 011.

Sir,

Sub: Smart Cities Mission – Smart City Proposals of the 12 Cities of Tamil Nadu – Forwarded - Reg.

I am directed to inform that, the second meeting of the State Level High Powered Steering Committee of the Smart Cities Mission of the State of Tamil Nadu under the Chairmanship of the Chief Secretary to Government, held on 21.12.2015 reviewed the Smart City Proposals of the Mission Cities of the State, viz., 12 City Municipal Corporations and resolved to forward the said proposals for participation in the Stage II National level Challenge. Accordingly, the proposals are forwarded.

Yours sincerely,

[Signature]
for Principal Secretary to Government

Copy to
The Chairperson and Managing Director,
Tamil Nadu Urban Finance and Infrastructure Development Corporation Limited, Chennai-35.
MINUTES OF THE SECOND STATE LEVEL HIGH POWERED STEERING COMMITTEE MEETING HELD ON 21.12.2015 AT 5.30 P.M FOR SMART CITY MISSION

The Second meeting of the State Level High Powered Steering Committee for Smart City Mission was held in the Chief Secretary Conference Hall, Secretariat on 21.12.2015 at 5.30 P.M under the Chairmanship of Thiru K. Gnanadesikan, I.A.S., Chief Secretary to Government.

The following members attended the meeting:

1. Thiru K Shanmugam IAS.  
   Principal Secretary to Govt,  
   Finance Department, Secretariat  
   Chennai-600 009  

2. Thiru K.Phanindra Reddy IAS.  
   Principal Secretary to Government.  
   Municipal Administration and Water Supply Department  
   Secretariat, Chennai-600 009  

3. Thiru S.Krishnan IAS.  
   Principal Secretary to Government.  
   Planning, Development and Special Initiatives Department,  
   Secretariat, Chennai-600 009  

4. Thiru.Vikram Kapoor, I.A.S.  
   Principal Secretary/Commissioner,  
   Corporation of Chennai,  
   Chennai-600 003.  

5. Dr. S. Swarna, I.A.S.  
   Chairperson and Managing Director,  
   TUFIDCO, Nandanam,  
   Chennai - 600 035.
6. Dr. B. Chandra Mohan, I.A.S.,
   Managing Director,
   Chennai Metropolitan Water Supply
   and Sewerage Board,
   Chennai- 600 002

   Member

7. Thiru. Vijayaraj Kumar, I.A.S.
   Managing Director,
   Tamil Nadu Water supply & Drainage Board,
   Chepauk,
   Chennai-600 009.

   Member

8. Thiru G. Prakash, I.A.S.
   Director of Municipal Admin.
   Chepauk,
   Chennai-600 005.

   Member

   Managing Director,
   TNUIFSL,
   Chennai.

   Mentor

10. Thiru M. Kathiravan, I.A.S
    Commissioner,
    Madurai Corporation

   Member

11. Dr. Vijaya Karthikeyan, I.A.S
    Commissioner,
    Coimbatore Corporation

   Member

12. Tmt M. Vijayalakshmi
    Commissioner,
    Trichy Corporation

   Member

13. Thiru N. Manohar
    Commissioner,
    Dindugul Corporation

   Member

14. Thiru P. Kumar
    Commissioner,
    Thanjavur Corporation

   Member

15. Thiru S. Sivasubramanian
    Commissioner,
    Tirunelveli Corporation

   Member
16. Thiru K.R. Selvaraj
Commissioner,
Salem Corporation

17. Thiru R. Mohan
Commissioner,
Erode Corporation

18. Tmt. P. Janaki Ravindran
Commissioner,
Vellore Corporation

19. Thiru A. Laxmanan
City Engineer,
Thoothukudi Corporation

20. Thiru M.V.D. Tamilselvan
Executive Engineer,
Tiruppur Corporation

Member

Representing
Thoothukudi Corporation

Representing
Tiruppur Corporation

The Chairperson and Managing Director, TUFIDCO elaborated the process adopted such as Citizen Engagement, Impact on the population, the rationale behind selection for Area based Development and PAN city Development Strategy by the Corporations for finalizing the 12 Smart Cities proposals before the Committee.

The Committee reviewed the Proposals presented by the 12 Corporations and deliberated in detail. The Committee accepted the rationale behind the strategy adopted by all the 12 Cities. The committee also directed that the technological options presented would have to be evaluated in detail for their technical feasibility and financial sustainability during projectisation stage. On discussion, the committee directed that the proposals be forwarded to Ministry of Urban Development, Government of India on-time.

K. GNANADESIKAN
CHIEF SECRETARY & CHAIRMAN OF HPSC

//True Copy//

Section Officer

To

The Mission Director
Smart Cities Mission,
Ministry of Urban Development,
Government of India,

Dear Sir,

Subject: Submission of Chennai Smart City Proposal: TN_12_CNN

*****

We are pleased to submit herewith the five hard copies and one soft copy in CD of Chennai Smart City Proposal for your kind perusal.

Yours sincerely,

(Vikram Kapur)

Encl. as above
Resolution No.706/2015

Council, Corporation of Chennai has approved the initiative to take up smart city in Chennai vide council resolution 321/2015 dt.06.07.2015 M/s. Jones Lang LaSalle Property Consultants India Pvt. Ltd. in association with Townland Consultants Pvt. Ltd., and Tata Consulting Engineers Ltd has been appointed as consultant for preparing Smart City Proposal (SCP) for Chennai.

As per the G.O.(Ms)No.112 dt.31.07.2015 from MA&WS (MA2) Department, Tamilnadu Government, it has been recommended to form city level Special Purpose Vehicle for Smart City as a limited company under the Companies Act, 2013 and will be promoted by the state and the Corporation of Chennai (ULB) jointly, both having 50:50 equity share holding.

The consultant has prepared Smart City Proposals for Chennai city. As a part of Smart City Proposal based on the outcome of citizen's participation T.Nagar has been selected for Area Based Proposal. Under PAN City initiative, ICT for Non Motorised Transport, disaster management under flood monitoring and warning system and digital solutions for citizen services under smart water has been selected based on outcome of citizen's participation (polling).

It is informed that the Smart City Proposal and formation of Special Purpose Vehicle for Chennai city is agreed and placed vide Subject No.1 and Council Resolution No/706/2015.
Corporation of Chennai

NON MOTORISED TRANSPORT POLICY
<table>
<thead>
<tr>
<th>S.No</th>
<th>Clause</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Definition</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Vision</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Goals</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Corporation Leadership</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Performance measurement</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Principles of Street design and Management</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>Street Design</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>Street Network</td>
<td>12</td>
</tr>
<tr>
<td>9</td>
<td>Built Environment Regulation</td>
<td>12</td>
</tr>
<tr>
<td>10</td>
<td>Street Management, Maintenance and</td>
<td>13</td>
</tr>
<tr>
<td>11</td>
<td>Special Services</td>
<td>15</td>
</tr>
<tr>
<td>12</td>
<td>Public awareness</td>
<td>16</td>
</tr>
<tr>
<td>13</td>
<td>Funding Development and Infrastructure</td>
<td>17</td>
</tr>
<tr>
<td>14</td>
<td>Planning, Implementation and Evaluation</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Approval of Corporation of Chennai Council</td>
<td>22</td>
</tr>
</tbody>
</table>
Corporation of Chennai Non-Motorised Transport Policy

1. Definition

1.1. Non-motorised transport (NMT): walking, cycling, cycle rickshaws, pushcarts, and other forms of mobility that are powered by humans.

2. Vision

2.1. Chennai will be a city with a general sense of well-being through the development of quality and dignified environment where people are encouraged to walk and cycle; equitable allocation of public space and infrastructure; and access to opportunities and mobility for all residents.

3. Goals

3.1. The Corporation of Chennai (COC) aims to increase the use of cycling and walking by creating a safe and pleasant NMT network of footpaths, cycle tracks, greenways, and other facilities to serve all citizens in the COC area. The designs of Chennai streets will be consistent with best practices in pedestrian-oriented, multi-modal street design. They will also incorporate appropriate environmental planning and water management techniques. Together, these measures will achieve the following:

3.1.1. Improved access and mobility for all residents.

3.1.2. Social and economic empowerment through the provision of improved low-cost mobility.

3.1.3. Gender equity through the provision of NMT facilities that are safe for women to use.

3.1.4. Social inclusion in creating NMT facilities that follow principles of universal design and are usable to the greatest extent possible by everyone, regardless of his or her age, ability, or status in life.

3.1.5. Reduced local and global environmental impacts of COC’s transport system through expanded use of zero pollution modes.

3.1.6. A changed culture that accepts the use of cycling and walking as acceptable and aspirational means to move around in the city.

3.1.7. Participation of local residents, businesses, and other stakeholders in the preparation of designs and standards in order to foster the community’s active use and sense of ownership of these spaces.

4. Corporation Leadership

4.1. COC will provide the necessary leadership by emphasising a paradigm shift from current urban transport planning methods to the new focus on NMT and public transport.

4.2. COC will proclaim NMT as priority modes and will issue policy guidelines and instructions to professionals regarding priorities in the design of transport facilities.

4.3. COC will conduct extensive training and outreach to COC engineers, administrators, and elected officials on NMT user needs, design principles, and promotion strategies.
Schedule A: NMT goals

COC will strive to meet and urge concerned agencies to take action to meet by 2018 the following goals related to the performance measurement indicators set above (Section 5.1):

A. Increase the mode share for pedestrians and cyclists to at least 40 per cent.
B. Reduce the number of pedestrian and cyclist fatalities to 0 per annum.
C. Ensure that at least 80 per cent of streets have footpaths.
D. Ensure that at least 80% of streets with a right-of-way (ROW) of over 30 m have unobstructed, segregated, continuous cycle track of 2m width.
E. Increase public transport mode share to at least 60 per cent of motorised trips.
F. Stabilise private motor vehicle kilometres travelled (VKT) so that there is 0 per cent annual growth in VKT.
Schedule B: Design process

All projects related to road with a value over Rs. 5,00,000 are subject to design review:

- The Department or Zone office submits detailed design drawings to the Superintending Engineer, Roads and Bridges Department.
- If the designs comply with the CSDM, the Superintending Engineer, Roads and Bridges Department, can approve or reject the designs.
- If the submitting department seeks an exception to the CSDM, the Superintending Engineer, Roads and Bridges Department, can approve or reject the exception.
Schedule C: Draft Chennai Street Design Manual (CSDM) contents

1. Introduction
   1.1. Purpose and need
   1.2. Goals
   1.3. Coordination with other efforts and agencies
   1.4. How to use the manual

2. Street design principles
   2.1. Safety
   2.2. Mobility
   2.3. Pedestrian accessibility
   2.4. Liveability
   2.5. Sensitivity to local context
   2.6. Creative use of street space

3. Priority networks
   3.1. Modal hierarchy
   3.2. Public transport network
   3.3. Cycling network
   3.4. Pedestrian network

4. Typologies
   4.1. Land use typologies
   4.2. Transport typologies
   4.3. Street character typologies
   4.4. Typology tables
   4.5. Typology protocols

5. Standard sections according to typologies

6. Design standards for street elements
   6.1. Footpaths
   6.2. Cycle tracks
   6.3. Carriageway
   6.4. Bus rapid transit
   6.5. Medians and pedestrian refuges
   6.6. Pedestrian crossings
   6.7. Landscaping
   6.8. Bus stops
   6.9. Spaces for street vending
   6.10. Street furniture and amenities
   6.11. On-street parking
   6.12. Service lanes
   6.13. Traffic calming elements
   6.14. Street lighting
   6.15. Storm water drainage
   6.16. Other underground utilities

7. Intersections
   7.1. Geometric and operational policies
   7.2. Standard intersection designs

8. Design process
   8.1. Surveys
   8.2. Design preparation
   8.3. Design review
   8.4. Implementation oversight

9. Evaluation
Approval of Corporation of Chennai Council

Non-Motorised Transport Policy was approved by Corporation of Chennai Council vide Resolution No 518/2014 dated 30.09.2014
### State Level High Powered Steering Committee

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Tamil Nadu State Mission Directorate Committee</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chairman</strong></td>
<td><strong>Mission Director</strong></td>
</tr>
<tr>
<td>Chief Secretary, GoTN</td>
<td>Chairman and Managing Director, TUFIDCO</td>
</tr>
<tr>
<td><strong>Secretary</strong></td>
<td><strong>Members</strong></td>
</tr>
<tr>
<td>Chairman and Managing Director, TUFIDCO / State Mission Director</td>
<td>Commissioners of Corporations</td>
</tr>
<tr>
<td><strong>Member</strong></td>
<td><strong>Members</strong></td>
</tr>
<tr>
<td>Principal Secretary, Municipal Administration and Water Supply Department</td>
<td>CEOs of Special Purpose vehicles in the State</td>
</tr>
<tr>
<td>Principal Secretary, Government of Tamil Nadu, Finance Department</td>
<td>Managing Director, Tamil Nadu Water Supply and Drainage Board</td>
</tr>
<tr>
<td>Principal Secretary, Government of Tamil Nadu, Planning, Development and Special Initiative</td>
<td>Managing Director, Chennai Metropolitan Water Supply and Sewerage Board</td>
</tr>
<tr>
<td>Secretary, Housing and Urban Development Department</td>
<td>Members</td>
</tr>
<tr>
<td>Representative of Ministry of Urban Development</td>
<td>Mayors of Corporation</td>
</tr>
</tbody>
</table>

#### Key Responsibilities

(i) To provide guidance to the mission

(ii) Oversee the process of first stage Intra-State Competition

(iii) Review the smart city proposals and forward to the Ministry of Urban Development

Once the Smart City project takes off, then this committee will have all the powers on the matters that require the approval of the State Government.

#### Roles, Responsibilities & Relationship

- Ensure effective coordination, and to steer ahead the smart city programme
- Assist the State Level High Powered Steering Committee
- Guide the Urban Local Bodies / Smart City Special Purpose Vehicles for planning, mobilization of funds and for implementation of the smart city programme
**Chennai Smart City Limited (CSCL)**

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chairman</td>
<td>Commissioner, Corporation of Chennai</td>
</tr>
<tr>
<td>Director 2</td>
<td>Representative from Ministry of Urban Development</td>
</tr>
<tr>
<td>Director 3</td>
<td>Representative from Finance Department of Government of Tamil Nadu</td>
</tr>
<tr>
<td>Director 4</td>
<td>Managing Director, CMWSSB</td>
</tr>
<tr>
<td>Director 5</td>
<td>Deputy Commissioner (Works), Corporation of Chennai</td>
</tr>
<tr>
<td>Director 6</td>
<td>CEO, Chennai Smart City Limited</td>
</tr>
<tr>
<td>Director 7 &amp; 8</td>
<td>Two Independent Directors. If none of the directors 1-6 are women member, then one of the Independent directors will be a Women Director</td>
</tr>
</tbody>
</table>

**Roles, Responsibilities & Relationship**

CSCL will be a public limited company with limited liability under the Companies Act, 2013. The authorized share capital of the company is proposed to be Rs 250 crore, while the issued and subscribed capital is planned at Rs 120 crore.

Initially the share holding pattern of the SPV will be 50:50 by the Government of Tamil Nadu, and Corporation of Chennai. The Board of Directors of the Chennai Smart City Limited will have all the approval / decision making powers in its command area, equivalent to the powers available to the Municipal Administration Department.
Chennai Smart City Limited (CSCL): Project Structure

**State Level High Powered Steering Committee**

**Tamil Nadu State Mission Directorate**

---

**Chennai Smart City Limited (CSCL)**

---

**Project Monitoring Unit (PMU)**

---

**Pan City Projects**

- Projects under CSCL
  1) City Surveillance
  2) Street Light Monitoring
  3) Intelligent Traffic Management
  4) Disaster Management
  5) Smart Water

- Projects under PPP
  1) Cycle Sharing System
  2) On Street Parking Management

**Area Development Projects**

---

**Projects under CSCL**

1) Pedestrianisation and street furniture
2) Retrofitting of Green Open Spaces
3) Electrical Component
4) Water Supply
5) Sewerage
6) Storm Water Drainage
7) Solid Waste
8) SCADA System for Utilities
9) ICT and Digitization
10) Intelligent Traffic Management

**Projects under PPP**

1) Cycle Sharing System
2) On Street Parking Management
3) MLCPs
4) WiFi Hot Spots
5) E-Rickshaws
6) Desalination Plant – Water Supply
MANAGING DIRECTOR


To

The Deputy Commissioner,
Corporation of Chennai,
Ripon Building,
Chennai – 600 003.

Sir,

Sub: CMWSSB – P&D – Smart City Mission – Preparation of Smart City proposal – Concurrence required for Smart City proposal – Reg


With reference to above, CMWSSB hereby confirms its participation on the Smart City Proposal for Chennai City

[Signature]

MANAGING DIRECTOR.
Tamil Nadu Generation and Distribution Corporation Limited

From
Er.M.A.Helen,M.E.,
Chief Engineer/Planning & RC
144, Anna Salai,
Chennai - 600 002.

To
The Deputy Commissioner (Works),
Corporation of Chennai,
Ripon Building,
Chennai-600 003.

Lr.No SE/Plg/EE/GP/AEE 1/F.Details /D.247 /2015 dt 18.12.15

Sir,

Sub: Smart City Mission—Corporation of Chennai-Concurrence for Smart City Proposal –Reg

***

Adverting to the above reference, it is informed that TANGEDCO concurs to be a part of smart city proposal of Chennai provided financial assistance is given by GoTN/GoI for all the required initiatives of TANGEDCO.

Yours faithfully,

Chief Engineer/Planning & RC
2/2
18 December 2015

Tamil Nadu Urban Infrastructure Financial Services Limited operates three externally aided projects for funding urban infrastructure projects implemented in Tamil Nadu as detailed below:

i) KfW assisted Sustainable Municipal Infrastructure Financing in Tamil Nadu – Phase-II – Part-1 (SMIF-TN-II-1) Program with an outlay of Euro 80 mn (equivalent to about Rs.578.16 crores). The entire amount is allotted for investment in urban infrastructure projects.

ii) KfW assisted Sustainable Municipal Infrastructure Financing in Tamil Nadu – Phase-II – Part-2 (SMIF-TN-II-2) Program with an outlay of Euro 107.75 mn (equivalent to about Rs.877.39 crores). Of the above Euro 100 mn (equivalent to about Rs.814.30 crores) is allotted for investment in urban infrastructure projects.

iii) World Bank assisted Tamil Nadu Sustainable Urban Development Project (TNSUDP) with an outlay of US $ 600 mn (equivalent to about Rs.3831 crores) of which the World Bank financing is US $ 400 mn (equivalent to about Rs.2554 crores). Of the above US $ 384 mn (equivalent to about Rs.2451.84 crores) is allotted for investment in urban infrastructure projects.

Further, resources may also be mobilized from the capital markets on pooled finance mechanism for funding urban infrastructure projects. A sum of Rs.222.30 crores has already been mobilized and utilized for implementing urban infrastructure projects within the State. Further resources under the pooled finance mechanism will be mobilized based on the requirement for implementing urban infrastructure projects by the Urban Local Bodies in Tamil Nadu.
WINNER
SUSTAINIA AWARD
CORPORATION OF
CHENNAI
INSTITUTE FOR TRANSPORTATION & DEVELOPMENT POLICY AND CHENNAI CITY CONNECT FOUNDATION

2015

The Sustainia Award honors outstanding performance within sustainability. Your solution has been awarded for its ability to make a positive social, environmental and economic impact on societies, contributing to a more sustainable future.

THE WINNER OF THE SUSTAINIA AWARD IS SELECTED BY THE SUSTAINIA AWARD COMMITTEE:

ARNOLD SCHWARZENEGGER
Honorary Chairman of the Sustainia Award Committee and Former Governor of California

CHRISTIANA FIGUERES
Executive Secretary of the UN Framework Convention on Climate Change (UNFCCC)

CONNIE HEDegaard
Former European Commissioner for Climate Action

DR. RAJENDRA PACHAURI
Nobel Laureate and Former Chair, Intergovernmental Panel on Climate Change (IPCC)

The Sustainia Award honors outstanding performance within sustainability. Your solution has been awarded for its ability to make a positive social, environmental and economic impact on societies, contributing to a more sustainable future.

THE WINNER OF THE SUSTAINIA AWARD IS SELECTED BY THE SUSTAINIA AWARD COMMITTEE:

ARNOLD SCHWARZENEGGER
Honorary Chairman of the Sustainia Award Committee and Former Governor of California

CHRISTIANA FIGUERES
Executive Secretary of the UN Framework Convention on Climate Change (UNFCCC)

CONNIE HEDegaard
Former European Commissioner for Climate Action

DR. RAJENDRA PACHAURI
Nobel Laureate and Former Chair, Intergovernmental Panel on Climate Change (IPCC)
Global Water Intelligence

Water Leaders Award
Chennai Metropolitan Water Supply And Sewerage Board

"Has fast-tracked its innovative resilience plan amidst acute water scarcity"

Christopher Cannan
Publisher, Global Water Intelligence

WINNER
Global Water Awards
2015

www.globalwaterintel.com
Global Water Intelligence

WINNER

Water Leaders Award
2015

Chennai Metropolitan Water Supply And Sewerage Board
Chennai Metropolitan Water Supply and Sewerage Board was awarded the prestigious "Water Leaders Award – 2015" at the Global Water Awards Ceremony held on 27th April, 2015 at the Nasioutzik Museum, Athens, Greece. The award was given by Mr. Jose Manuel Barroso, President of the European Commission (2004-2014) and Prime Minister of Portugal (2002-2004).

The Water Leaders Award is the only non profit Global Water Award which rewards exemplary performance & improvements in public water utilities in the developing world over the past year (2014). The Global Water Leaders group is a CEO level nonprofit organization that brings together leaders from the water sector – Utility Directors, Water Ministers, Mayors, and Regulators to face world’s water challenges.

CMWSS Board was given the Global water leaders award for the various initiatives taken to manage the acute water scarcity brought in by two years of successive drought in the year 2014.

During the year 2014, Chennai received deficit rainfall for the second consecutive year and reservoir levels were very low at 25% of the capacity.

The Hon'ble Chief Minister reviewed the situation and took many decisions to meet the situation. The decisions taken by the Hon'ble Chief Minister were immediately implemented on a war footing by CMWSSB. These were coupled with necessary field inspections and monitoring which ensured that the drought was managed successfully during the year 2013-14.
The various decisions of the Hon'ble Chief Minister are:


2. Creation of new ground water sources in the well fields at Tamarapakkam, Minjur and Poondi.

3. Creation of facilities for tapping water from Neyveli Lignite Mines at Paravanar and Mine IA.


5. Supply of treated water to industries.

6. Approval for establishment of two 45 MLD Tertiary Treated Reverse Osmosis Plants at Koyambedu and Kodungaiyur.

7. Water supply through GPS enabled water tankers.

8. Modernized SMS based 24x7 Call Centre for grievance redressal.

These decisions of the Hon'ble Chief Minister have now been globally recognized. The efforts by CMWSSB resulted in successfully managing the drought in Chennai city during the year 2013-14. For this achievement, CMWSSB has been awarded the "Global Water Leaders Award-2015".
Welcome to Corporation of Chennai

The Chennai Corporation is the civic body that governs the city of Chennai, India. It is headed by Mayor, who presides over 200 councillors each of whom represents one of the 200 wards of the city.

more...

Media

Flood Relief
From
Dr. R. Palaniswamy, IAS.,
Managing Director,
Tamil Nadu Slum Clearance Board,
No. 5, Kamarajar Salai,
Chennai - 600 005.

To
The Deputy Commissioner (Works),
Ripon Building,
Corporation of Chennai,
Chennai - 600 003.

Lr. No. M1 / 11463 / 2015

Date: 21.11.2015

Sir,

Sub: Corporation of Chennai - Special Projects Department -
Smart City Mission - Information to be collected from line
Department Officials - requested - reg:


---------

I invite your kind attention to the reference cited above and report as
follows.

Tamil Nadu Slum Clearance Board has been constructing tenements in
alternate locations to resettle the slum families living in objectionable areas like
river margin, road margin etc. It is programmed to make Chennai City Slum
Free under “Vision 2023”. Under this programme houses with infrastructure and
land tenure will be provided for all the slum families. The details of tenements
constructed and resettlement schemes taken up in Chennai city and Housing
programmes proposed for implementation in Chennai City under Housing for All
are furnished in the annexures - I and II enclosed.

Tamil Nadu Slum Clearance Board has not provided community toilets
under Swatch Bharath.

Encl: Annexure - I & II.
ANNEXURE - IA

TAMIL NADU SLUM CLEARANCE BOARD

TENEMENTS CONSTRUCTED DURING 2011 - 2012 TO 2014 - 2015

<table>
<thead>
<tr>
<th>Year</th>
<th>Zone</th>
<th>Private Sector</th>
<th>Government Initiative TNSCB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Approved Units (Nos)</td>
<td>Supply of Units ready for occupation (Nos)</td>
</tr>
<tr>
<td>2011 - 2012</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2012 - 2013</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2013 - 2014</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2014 - 2015</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

for Managing Director
## ANNEXURE - I B

**TAMIL NADU SLUM CLEARANCE BOARD**

**REHABILITATION AND RESETTLEMENT SCHEMES IN CHENNAI CITY**

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Location</th>
<th>Name of the Schemes</th>
<th>No. of slum tenements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>South Chennai</td>
<td>Okkium Thoraipakkam</td>
<td>23904</td>
</tr>
<tr>
<td>2.</td>
<td>South Chennai</td>
<td>Semmencherry</td>
<td>6764</td>
</tr>
<tr>
<td>3.</td>
<td>North Chennai</td>
<td>Thiruvottiyur AIR land</td>
<td>5440</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>36108</strong></td>
</tr>
</tbody>
</table>

---

*Chief Engineer*

21/11
**Tamil Nadu Slum Clearance Board**

**Slum Free City Plan**

**Chennai**

**Housing for All - Houses proposed for constructions during 2015-2023**

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Description</th>
<th>No of slums surveyed</th>
<th>No of households surveyed</th>
<th>No of households proposed for intervention</th>
<th>Cost (Rs. In lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenable</td>
<td>896</td>
<td>243150</td>
<td>115484</td>
<td>13561.23</td>
<td></td>
</tr>
<tr>
<td>Untenable</td>
<td>235</td>
<td>61830</td>
<td>61830</td>
<td>8418.84</td>
<td></td>
</tr>
<tr>
<td>I Curative Strategy</td>
<td>1131</td>
<td>304980</td>
<td>177314</td>
<td>21980.07</td>
<td></td>
</tr>
<tr>
<td>II Preventive Strategy</td>
<td></td>
<td>72657</td>
<td>10389.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1131</td>
<td>304980</td>
<td>249971</td>
<td>32369.97</td>
<td></td>
</tr>
</tbody>
</table>

Chief Engineer
### Tamil Nadu Slum Clearance Board
### Details of Slum Free City Plan of Action (SFCPoA)
### Investment: Requirement

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name of the City</th>
<th>No of Slums surveyed</th>
<th>No of slum households surveyed</th>
<th>No of HHs proposed for intervention</th>
<th>No of slums</th>
<th>No of HHs</th>
<th>Housing Cost</th>
<th>Infrastructure Cost</th>
<th>other Cost</th>
<th>Total Cost</th>
<th>No of HHs</th>
<th>No of HHs proposed for intervention</th>
<th>No of slums</th>
<th>No of HHs</th>
<th>Housing Cost</th>
<th>Infrastructure Cost</th>
<th>other Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chennai</td>
<td>1131</td>
<td>304980</td>
<td>177314</td>
<td>896</td>
<td>243150</td>
<td>115484</td>
<td>10281.64</td>
<td>628.75</td>
<td>2650.84</td>
<td>13561.23</td>
<td>235</td>
<td>61830</td>
<td>61830</td>
<td>1244.04</td>
<td>5529.14</td>
<td>1645.66</td>
<td>8418.84</td>
</tr>
</tbody>
</table>
Tamil Nadu Slum Clearance Board

Details of Slum Free City Plan of Action (SFCPoA)

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name of the City</th>
<th>Curative Strategy</th>
<th>Preventive Strategy</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No of HHs</td>
<td>Housing Cost</td>
<td>Infrastructure Cost</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>21</td>
<td>22</td>
<td>23</td>
</tr>
<tr>
<td>1</td>
<td>Chennai</td>
<td>304380</td>
<td>177314</td>
<td>15810.78</td>
</tr>
</tbody>
</table>

Chief Engineer

31/11
From
Er. M. Pandi,
Director /Distribution
144, Anna Salai,
Chennai – 600 002.

To
The Principal Secretary/Commissioner,
Tamilnadu Urban Finance and
Infrastructure Development
Corporation Limited
No. 490/1-2 Anna Salai, Nandanam
Chennai-600 035.

**LR.No SE/Plg/EE/GP/AEE 1/F.Details /D.235/2015 dt 9.12.15**

Sir,

Sub: Smart city Mission – Details - Furnished - Reg

Ref: LR No. TUFIDCO/Smart City/44/AM(B)/2015 dated 16.11.15

****

Adverting to the above reference, the details for the smart city mission
for Corporation of Chennai are furnished.

Yours faithfully,

(M.A. Helen)
Chief Engineer/Planning & RC
for Director/Distribution

Encls: as above
1. Non conventional Energy sources

i. Existing RE generation capacity against total power demand (MW) for Chennai city.

RE Installed capacity in Tamil Nadu (As on 31.10.2015)
1. Wind – 7498.555MW
2. Solar – 358.26MW
3. Bagasse based Cogen – 659.4MW

ii. Details of existing RES in Chennai:

a) Rooftop Solar PV system based power generation – Installation status and future planning

TANGEDCO is encouraging establishment of HT/LT grid – interactive rooftop solar power plants for captive use. So far 20 MW capacity solar rooftop SPV plants have been energized. Many proposals are being received for commissioning of rooftop solar PV power plants in Chennai.

b) Biomass / Biogas based power generation - Installation status and future planning

The potential of Biomass fuel in the state is 500MW. At present, the installed capacity of Biomass/ Biogas power plants is 230MW. There are NO proposals under pipeline since the potential of Biomass fuel has already been exploited in the State.

c) Any other RES already installed or planned for.

The other sources of renewable energy are Wind & Bagasse based cogeneration plants. At present, the installed capacity of bagasse based cogeneration power plants and Wind Electric Generator (WEG) is 659.4MW and 7498.555MW. 183 MW capacity of Cogeneration power projects is under pipeline.

iii. Status of installation of rooftop solar PV system: So far 20 MW capacity solar rooftop SPV plants have been energized. Many proposals are being received for commissioning of rooftop solar PV power plants in Chennai.
2. RESTRUCTURED ACCELERATED POWER DEVELOPMENT & REFORMS PROGRAMME

The objectives of the R-APDRP Scheme are to provide quality and reliable power supply to the consumers and to bring down the Aggregate Technical & Commercial losses (AT&C) below 15%. The project is implemented in two parts, Part-A & Part-B. Funds allotted by Ministry of Power / GoI for implementation of R-APDRP Scheme and measures taken by TANGEDCO are detailed as below.

Details of projects covered under R-APDRP:

Part A

An amount of Rs.417 Crores towards Part-A (Information Technology) implementation in 110 towns (with 30,000 population as per 2001 census) and Rs.182.17 Crores for SCADA / DMS implementation in 7 towns (having a population of 4 Lakhs consumers and annual consumption of 350 Million units) have been sanctioned and the works are expected to be completed by June 2016.

IT Implementation is being carried out in Chennai MA:

1. IT Implementation i.e., Setting up of common Data Centre with 17 application modules like Metering, Billing, Collection, New Service connection, Disconnection and Dismantling, Customer care, Asset and Maintenance Management, Energy Audit, Meter Data Management etc.
2. Setting up of a Centralized Customer Care Centre to cater to the needs of nearly 32.77 lakhs consumers of Chennai & nearly 60 lakh consumers of another 109 towns spread across Tamilnadu.
3. Provision of Common Automatic Meter Reading modems in nearly 22,100 Distribution Transformers, 1600 HT Services & 25 Ring fencing points
4. Setting up of IT infrastructure viz., Router, Switches, PC, Printers etc in 387 offices (Section office, Sub-Division office, Division office etc)
5. Setting up of Data Concentrator Unit & connecting up of all meters in the Sub-stations (149 nos) and sending the meter data to Data Centre at Chennai.
6. GIS (Geographical Information System)

Baseline data of Chennai MA is created in GIS platform. DGPS survey of Chennai MA is nearing completion and Consumer Indexing asset mapping is expected to be completed by June 2016. The cost of survey and mapping in PGDB is alone Rs 5 cr. On completion of survey the CMA GIS data as a single town will be loaded in Production server and will be accessible to TANGEDCO personnel though a web portal.

Using the base data it will be possible to query Geographical attributes of a specified location or specified network. Existing Consumers connected to a Distribution Transformer / No of Distribution Transformers in a specified area. It shall be possible to Zoom in and zoom out of a particular consumer to obtain the relevant information.

Chennai Metropolitan Area : 1204 Sq.Km
Satellite Imagery : World View-02,1:1000 scale
Total no of Distribution sections : 244
Total no of High Tension Feeders : 1243
Total no of Distribution Transformers : 23891
Total no of Consumers : 32,77,224

The GIS data will be utilised by Centralised Customer Care Services to locate the called consumers, visualising the area of outages and will be customer friendly. Management information reports can be generated from any part of the network. GIS data will be utilised for network management which includes Network planning, Network Construction, Network Operations, Maintenance and attending to outages.

The Base line AT&C loss now for Chennai UA is at 17.61%, which expected to be less than 15% on completion of the project.

Cost involved (approx) 183.67 Crores (for above works in Chennai)
Works completed (approx) 101 Crores.

**SCADA (Supervisory Control and Data Acquisition) in Chennai UA:**

**Benefits of SCADA:**

- Real time Supervision & Control of Network encompassing all Distribution Transformers with complete 33/22/11 KV network in the Project areas
- By Providing feeder RTUs (FRTU) & Fault Passage Indicators (FPI) in the network faults will be located quickly & the healthy circuits energised by isolating the fault from the remote Control centre
- Provides SCADA automation to distribution networks for more observability
- Improves operational efficiency through user interface consolidation (DMS/SCADA/OMS)
- Improves reliability indices and customer satisfaction through faster and more predictable outage restoration
- Reduces energy losses and network operational costs with coordinated Volt/VAR management
- To reconfigure control centre operations dynamically and leverage Distributed Automation devices for closed-loop self healing networks
- Supports Demand Response and Distributed Generation

**The following works are being implemented in Chennai U.A:**

1. Setting up of Control Centre at Chennai HQ.
2. Setting up of Remote Terminal Units in 200 Sub-Stations in Chennai and connecting the same to feeders, Transformers etc and sending real time data to Control Centre.
3. Setting up of 1784 nos Ring Main Units for Distribution Transformers and 121 nos Sectionalizer in the feeders
4. Provision of 2851 nos FRTU (Field Remote Terminal Units) for remote control of Ring Main Units and Sectionalizer.
Cost involved (approx) 77.94 Crores (for above works in Chennai)
Works completed (approx) 20 Crores.
Details on Part-B schemes covered in Chennai U.A

Part-B scheme covers Renovation, modernization and strengthening of 11 KV level Substations, Transformers/Transformer Centres, Re-conductoring of lines at 11KV level and below, Load Bifurcation, feeder separation, Load Balancing, High Voltage Distribution System (HVDS) (11KV), Aerial Bunched Conductoring in dense areas, replacement of electromagnetic energy meters with tamper proof electronics meters, installation of capacitor banks and mobile service centers etc. In exceptional cases, where sub-transmission system is weak, strengthening at 33 KV or 66 KV levels is considered.

Towns eligible for Part-B schemes are the R-APDRP towns with the Aggregate Technical & Commercial (AT&C) losses of more than 15%.

Towns eligible under Part-B scheme are required to reduce the AT&C losses from present level to 15% or below every year for 5 years starting at the latest one year after the year in which the Part A of project area concerned is established and verified by the independent agency appointed by Ministry of Power / Government of India.

Up-to 50% loan against Part-B projects will be converted into grant in equal tranches for 5 years if the AT&C losses in the town is reduced and maintained at 15% or below for every year.

Also, utility staff are eligible for incentive scheme for successful implementation of Part-B schemes.

In this regard, Chennai U.A (Urban Agglomeration) is sanctioned with Part-B schemes for Rs. 1473.74 Crores.

The timelines for completion of Part-B schemes in Chennai has been stipulated as 30.06.2016 by MoP.

Chennai U.A has to bring down the AT&C losses from present level of 17.61% to 15% or below on successful completion of the scheme.

If the AT&C losses are brought down to 15%, approximately 320 Million Units of Energy will be saved per year in Chennai.

Accordingly, an amount of Rs. 160 Crores (@ Rs.5/unit) savings will be secured every year due to the loss reduction in Chennai.

The technical loss reduction as well revenue savings will be available on a sustained basis in future.
The following works have been sanctioned under R-APDRP Part-B schemes in Chennai U.A.

<table>
<thead>
<tr>
<th>S. No</th>
<th>Description of Works</th>
<th>Unit</th>
<th>Quantity</th>
<th>Value (Rs. Cr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Installation of new 33/11KV Sub-stations</td>
<td>No.</td>
<td>27</td>
<td>80.09</td>
</tr>
<tr>
<td>2</td>
<td>Erection of additional Power Transformers in existing 33/11KV Sub-stations</td>
<td>No.</td>
<td>3</td>
<td>4.63</td>
</tr>
<tr>
<td>3</td>
<td>Capacity enhancement of Power Transformers in existing 33/11KV Sub-stations</td>
<td>No.</td>
<td>55</td>
<td>56.66</td>
</tr>
<tr>
<td>4</td>
<td>Extension of new 33KV Overhead Lines</td>
<td>Km</td>
<td>13.00</td>
<td>0.42</td>
</tr>
<tr>
<td>5</td>
<td>Laying of new 33KV Underground (UG) Cables</td>
<td>Km</td>
<td>142.50</td>
<td>87.40</td>
</tr>
<tr>
<td>6</td>
<td>Strengthening of existing 33KV Underground cables with higher size cables</td>
<td>Km</td>
<td>44.45</td>
<td>26.67</td>
</tr>
<tr>
<td>7</td>
<td>Conversion of existing 33KV Overhead Lines into Underground Cables</td>
<td>Km</td>
<td>29.50</td>
<td>17.70</td>
</tr>
<tr>
<td>8</td>
<td>Bay Extension for new 33KV feeders at existing Sub-stations</td>
<td>No.</td>
<td>16</td>
<td>1.56</td>
</tr>
<tr>
<td>9</td>
<td>Extension of New 11 kV Overhead Lines</td>
<td>Km</td>
<td>691.50</td>
<td>21.69</td>
</tr>
<tr>
<td>10</td>
<td>Laying of new 11KV Underground Cables</td>
<td>Km</td>
<td>634.59</td>
<td>130.50</td>
</tr>
<tr>
<td>11</td>
<td>Strengthening of conductor in existing 11 kV Overhead Lines</td>
<td>Km</td>
<td>78.50</td>
<td>16.84</td>
</tr>
<tr>
<td>12</td>
<td>Strengthening of existing 11KV Underground cables with higher size cables</td>
<td>Km</td>
<td>15.52</td>
<td>3.08</td>
</tr>
<tr>
<td>13</td>
<td>Conversion of existing 11KV Overhead Lines into Underground Cables</td>
<td>Km</td>
<td>265.49</td>
<td>2.58</td>
</tr>
<tr>
<td>S. No</td>
<td>Description of Works</td>
<td>Unit</td>
<td>Quantity</td>
<td>Value (Rs. Cr.)</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>------</td>
<td>----------</td>
<td>-----------------</td>
</tr>
<tr>
<td>14</td>
<td>Conversion of existing 11KV Overhead structure into automated Ring Main Units (RMUs) for implementation of SCADA/DMS</td>
<td>No.</td>
<td>1784</td>
<td>242.26</td>
</tr>
<tr>
<td>15</td>
<td>Installation of new automated 11 kV Sectionalisers for implementation of SCADA/DMS</td>
<td>No.</td>
<td>121</td>
<td>5.18</td>
</tr>
<tr>
<td>16</td>
<td>Bay Extension for new 11KV feeders at existing Sub-stations</td>
<td>No.</td>
<td>124</td>
<td>6.93</td>
</tr>
<tr>
<td>17</td>
<td>Installation of new 11KV/433V Distribution Transformers</td>
<td>No.</td>
<td>3349</td>
<td>166.50</td>
</tr>
<tr>
<td>18</td>
<td>Strengthening of conductor in existing Low Tension (LT) Overhead Lines</td>
<td>Km</td>
<td>269.25</td>
<td>3.02</td>
</tr>
<tr>
<td>19</td>
<td>Conversion of existing LT Overhead Lines into Underground Cables</td>
<td>Km</td>
<td>224.62</td>
<td>62.56</td>
</tr>
<tr>
<td>20</td>
<td>Installation of 11KV Capacitor Banks in Sub-stations for improvement of Power Factor</td>
<td>No.</td>
<td>3</td>
<td>0.74</td>
</tr>
<tr>
<td>21</td>
<td>Extension of new 11KV / LT Overhead Lines with Aerial Bunched Cables</td>
<td>Km</td>
<td>329.40</td>
<td>14.04</td>
</tr>
<tr>
<td>22</td>
<td>High Voltage Distribution System (HVDS) to improve HT : LT ratio</td>
<td>No.</td>
<td>2194</td>
<td>27.63</td>
</tr>
<tr>
<td>23</td>
<td>Replacement of existing Consumer Electro-mechanical Energy Meters with tamper proof Static Meters</td>
<td>No. (in Lakhs)</td>
<td>8.35</td>
<td>401.80</td>
</tr>
<tr>
<td>24</td>
<td>Other Works</td>
<td>LS</td>
<td></td>
<td>93.26</td>
</tr>
</tbody>
</table>

Grand Total (in Rs. Crores) 1,473.74
Completed so far (in Rs. Crores) 600.00
3. Smart meters

In respect of smart energy meters, a study has been made by IT wing by conducting Proof of Concept (POC) on smart metering with AMI solution by installing 30 nos of single phase and 25 nos of three phase meters with DCU (Data Concentrator Unit) in the selected LT services in Chinthadripet area, Pudupet section under Chennai Electricity Distribution Circle /Central and the features of smart metering such as power quality monitoring, demand side management, data transfer & collection for analysis on real time basis & billing, remote connection & disconnection, tampering alerts and disconnection, pre-payment facility, generation of reports, etc., have been tested.

Now, the preparation of technical draft specification for smart meters is under progress.
4. Status of Consumer helpline and average response time for power outage inside Chennai city:

The Chennai city consumers can easily register their fuse of calls of electricity failure by dialing the call centre helpline number 1912 from both landline and mobile phone customers of all service providers. Almost, all the service providers have already activated the BSNL number bearing short code 1912 for registering the complaints of Fuse Off Calls of their customers as mandatory service based on TANGEDCO’s request.

This TNEB call centre at Chennai has also provided the flexibility to the consumers of the Chennai city to lodge their complaints on electricity from outside the Chennai Regions by dialing the call centre of 1912 with prefix of Chennai STD code number 044. Since the short code 1912 has not been activated as Toll-free number for freeing of calls received at the TNEB call centre, the consumers have to pay the charges according to the duration of conversion in registering their complaints, depending on the tariff rate fixed by their Access providers.

In case of interruptions to the consumers, average power restoration (response) times are scheduled below:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Interruption due to</th>
<th>Power restoration time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>High Tension supply failure</td>
<td>1 hour</td>
</tr>
<tr>
<td>2.</td>
<td>Fault in pillar boxes or transformer structures</td>
<td>2 hours</td>
</tr>
<tr>
<td>3.</td>
<td>Failure of distribution transformer</td>
<td>24 hours</td>
</tr>
<tr>
<td>4.</td>
<td>Individual service connection faults</td>
<td>3 hours</td>
</tr>
</tbody>
</table>
## DURATION IN (HRS) OF UNSCHEDULED POWER OUTAGES IN CHENNAI CITY-PAST 5 YEARS

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>YEAR</th>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2010</td>
<td>147.08</td>
<td>101.01</td>
<td>153.02</td>
<td>197.38</td>
<td>332.46</td>
<td>282.16</td>
<td>337.06</td>
<td>351.16</td>
<td>251.05</td>
<td>284.38</td>
<td>353.03</td>
<td>338.07</td>
</tr>
<tr>
<td>2</td>
<td>2011</td>
<td>137.06</td>
<td>200.00</td>
<td>169.18</td>
<td>201.25</td>
<td>304.07</td>
<td>344.41</td>
<td>263.16</td>
<td>510.36</td>
<td>552.06</td>
<td>421.38</td>
<td>634.45</td>
<td>511.00</td>
</tr>
<tr>
<td>3</td>
<td>2012</td>
<td>379.31</td>
<td>282.09</td>
<td>360.31</td>
<td>352.09</td>
<td>471.55</td>
<td>611.03</td>
<td>607.09</td>
<td>517.23</td>
<td>789.53</td>
<td>1031.00</td>
<td>544.56</td>
<td>835.13</td>
</tr>
<tr>
<td>4</td>
<td>2013</td>
<td>263.31</td>
<td>279.25</td>
<td>278.51</td>
<td>391.56</td>
<td>454.03</td>
<td>557.02</td>
<td>459.31</td>
<td>385.03</td>
<td>582.48</td>
<td>437.36</td>
<td>463.03</td>
<td>383.06</td>
</tr>
<tr>
<td>5</td>
<td>2014</td>
<td>199.36</td>
<td>355.21</td>
<td>215.00</td>
<td>219.02</td>
<td>444.58</td>
<td>566.51</td>
<td>371.41</td>
<td>420.06</td>
<td>400.28</td>
<td>711.01</td>
<td>349.00</td>
<td>436.26</td>
</tr>
<tr>
<td>6</td>
<td>2015</td>
<td>187.03</td>
<td>157.41</td>
<td>253.35</td>
<td>324.21</td>
<td>291.18</td>
<td>319.03</td>
<td>518.35</td>
<td>463.13</td>
<td>323.13</td>
<td>319.15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## MTC Data

Source: http://mtcbus.org/ (under the menu Strength> Performance)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>TOTAL FLEET</td>
<td>3280</td>
<td>3421</td>
<td>3497</td>
<td>3637</td>
<td>3750</td>
</tr>
<tr>
<td>2.</td>
<td>AVERAGE AGE OF BUS</td>
<td>2.23</td>
<td>2.72</td>
<td>3.44</td>
<td>4.29</td>
<td>5.12</td>
</tr>
<tr>
<td>3.</td>
<td>NEW BUSES PUT ON</td>
<td>774</td>
<td>326</td>
<td>183</td>
<td>143</td>
<td>129</td>
</tr>
<tr>
<td>4.</td>
<td>SCHD SERVICES</td>
<td>3057</td>
<td>3140</td>
<td>3189</td>
<td>3365</td>
<td>3531</td>
</tr>
<tr>
<td>5.</td>
<td>EFFECTIVE KMS (in lakhs)</td>
<td>3329.29</td>
<td>3471.52</td>
<td>3511.49</td>
<td>3442.74</td>
<td>3600.43</td>
</tr>
<tr>
<td>6.</td>
<td>KM/BUS/DAY</td>
<td>308</td>
<td>316</td>
<td>315</td>
<td>309</td>
<td>307</td>
</tr>
<tr>
<td>7.</td>
<td>F.U. %(INCL HNR)</td>
<td>92.11</td>
<td>88.09</td>
<td>88.35</td>
<td>85.09</td>
<td>87.56</td>
</tr>
<tr>
<td>8.</td>
<td>KM EFFICIENCY %</td>
<td>101.08</td>
<td>98.75</td>
<td>98.81</td>
<td>93.91</td>
<td>96.48</td>
</tr>
<tr>
<td>9.</td>
<td>% OF OCCUPANCY</td>
<td>80.22</td>
<td>87.20</td>
<td>84.35</td>
<td>75.83</td>
<td>74.50</td>
</tr>
<tr>
<td>10.</td>
<td>B.D./10,000 KMS.</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>11.</td>
<td>ACCT/1,00,000 KM</td>
<td>1.27</td>
<td>1.05</td>
<td>0.70</td>
<td>0.53</td>
<td>0.60</td>
</tr>
<tr>
<td>12.</td>
<td>TYRE LIFE IN KM(in lakhs)</td>
<td>1.73</td>
<td>1.62</td>
<td>1.56</td>
<td>1.63</td>
<td>1.73</td>
</tr>
<tr>
<td>13.</td>
<td>PASSENGERS/DAY (in lakhs)</td>
<td>52.05</td>
<td>55.19</td>
<td>54.01</td>
<td>48.07</td>
<td>49.50</td>
</tr>
<tr>
<td>14.</td>
<td>MEN/BUS</td>
<td>7.01</td>
<td>6.88</td>
<td>6.33</td>
<td>6.47</td>
<td>6.40</td>
</tr>
<tr>
<td>15.</td>
<td>ABSENTEEISM %</td>
<td>7.29</td>
<td>7.40</td>
<td>7.45</td>
<td>7.49</td>
<td>7.01</td>
</tr>
<tr>
<td>16.</td>
<td>KMPL</td>
<td>4.46</td>
<td>4.39</td>
<td>4.35</td>
<td>4.34</td>
<td>4.33</td>
</tr>
</tbody>
</table>

- 2 additional depots formed at Besant Nagar & Adambakkam on 19/02/2014
# TABLE OF CONTENTS

**EXECUTIVE SUMMARY** ................................................................. E-1

**CHAPTER 1 INTRODUCTION** ....................................................... 1
  1.1 Preamble .............................................................................. 1
  1.2 Study Objectives ................................................................. 2
  1.3 Urban Transport Issues ...................................................... 3
  1.4 Chennai Tomorrow ............................................................ 8
  1.5 Approach ........................................................................... 9
  1.6 Report Layout ................................................................. 10

**CHAPTER 2 CHENNAI - TODAY** ........................................ 11
  2.1 Profile of Chennai Metropolitan Area .................................... 11
    2.1.1 Overview of Urban Transport Systems ......................... 12
  2.2 Data Collection .............................................................. 15

**CHAPTER 3 TRAVEL DEMAND FORECAST** ........................... 26
  3.1 Calibration of Transport Model ............................................ 26
    3.1.1 Calibrated functions .................................................. 32
    3.1.2 Validation .............................................................. 35
  3.2 Land Use Growth and Future Demographics ....................... 38
    3.2.1 Travel Demand Forecast ........................................... 42

**CHAPTER 4 TRANSPORTATION STRATEGIES** ....................... 47
  4.1 Vision and Goals .......................................................... 47
  4.2 Review of Transport Policies ............................................... 48
    4.2.1 National Urban Transport Policy .................................. 49
    4.2.2 Second Master Plan for CMA ...................................... 50
    4.2.3 Chennai City Development Plan (CDP) ......................... 53
    4.2.4 World Bank Strategy ................................................ 53
    4.2.5 London Transport Strategy ........................................ 55
  4.3 Strategy Concepts ......................................................... 57
  4.4 Transport Strategies ....................................................... 59
    4.4.1 Land use and Transport Strategy ................................ 59
    4.4.2 Road Network Strategy ........................................... 66
    4.4.3 Public Transport Strategy .......................................... 69
    4.4.4 Non Motorized Transport Strategy ............................. 73
    4.4.5 Freight Management Strategy .................................... 74
    4.4.6 Demand Management Strategy .................................. 74
    4.4.7 Traffic Management Strategy ..................................... 75
  4.5 Transport Proposals ....................................................... 75
### CHAPTER 5 LONG TERM PROPOSALS ............................................. 78

5.1 Public Transport Proposals .................................................... 78
  5.1.1 Mass Transit Systems .......................................................... 78
  5.1.2 Inter-modal Stations .............................................................. 87
  5.1.3 Inter-city Bus Terminal ......................................................... 88
5.2 Freight Transport Proposals ................................................... 89
  5.2.1 Freight corridors ................................................................. 89
  5.2.2 Truck Terminals ................................................................. 91
5.3 Demand Management Proposals .............................................. 91
5.4 Road Network Improvement Proposals ...................................... 92
  5.4.1 New Links ........................................................................... 94
  5.4.2 Road widening ................................................................. 95
5.5 Block Cost Estimates ............................................................ 98
5.6 Economic Analysis .............................................................. 98
  5.6.1 Approach ........................................................................... 98
  5.6.2 Analysis of Alternatives ....................................................... 99
  5.6.3 Analysis Period ................................................................. 99
  5.6.4 Estimation of Costs ........................................................... 99
  5.6.5 Estimation of Benefits ......................................................... 99
  5.6.6 Economic Analysis for Highway Projects ............................. 100
  5.6.7 Economic Analysis for BRTS projects ................................ 102
  5.6.8 Economic Analysis for LRT/Monorail projects ...................... 103
  5.6.9 Economic Analysis for Metro projects ................................. 105
  5.6.10 Economic Analysis for all long term-term projects ............... 106

### CHAPTER 6 MEDIUM TERM PROPOSALS ................................. 109

6.1 Off-street Parking Facilities ................................................. 109
6.2 Grade Separation at Intersections ......................................... 110
6.3 Pedestrian Subways ........................................................... 116
6.4 RoBs/RuBs ........................................................................ 121
6.5 Traffic Management Systems .............................................. 121
6.6 Block Cost Estimates .......................................................... 125
6.7 List of Committed Flyovers ................................................. 126
6.8 List of Committed ROBs/RUBs ............................................. 127

### CHAPTER 7 SHORT TERM PROPOSALS ................................. 139

7.1 Introduction ........................................................................ 139
7.2 Pedestrian Facilities ............................................................ 139
7.3 Provision of Cycle tracks ...................................................... 142
7.4 Traffic Management ............................................................ 144
  7.4.1 Parking Regulation ........................................................... 144
  7.4.2 Signal Optimization ......................................................... 149
  7.4.3 Junction Improvements ..................................................... 151
7.4.4 Road Markings and Signage .......................................................... 157
7.4.5 One-way Streets .................................................................. 157
7.5 Block cost estimates .............................................................. 158

CHAPTER 8 IMPLEMENTATION PLAN ............................................. 160
8.1 Phasing of investments .......................................................... 160
8.2 Financial Investment Strategy .................................................. 181
  8.2.1 Present Investment Schedule ........................................... 181
  8.2.2 Investment Requirements ................................................. 183

CHAPTER 9 INSTITUTIONAL ARRANGEMENTS .............................. 191
9.1 Introduction ........................................................................... 191
9.2 Case Studies .......................................................................... 192
  9.2.1 Hong Kong and Singapore ................................................ 192
  9.2.2 Greater Vancouver ............................................................ 195
  9.2.3 London ........................................................................... 197
  9.2.4 United States of America ................................................... 199
  9.2.5 Summary of Transport Organizations around the Globe ....... 202
  9.2.6 Case Studies from India .................................................... 202
9.3 Diagnosis of the current Institutional set up in Chennai .......... 206
9.4 Recommended Institutional Framework ................................. 207

CHAPTER 10 CONCLUSIONS ......................................................... 210
and Manali Oil Refinery Road. Off-street multi-level parking lots are yet to get implemented despite earlier studies also recommending the same.

- The average trip length of Intermediate Public Transport (IPT) mode that includes auto rickshaw and taxis has increased three fold over the years, while there is an increased occupancy in either mode.
- Among the three locations where survey was conducted at trucks focal point, it was found that maximum number of truck trips is from Koyambedu and Madhavaram.
- Analysis of household survey data has revealed significant increase in household income, per capita trip rate, vehicle ownership, trip lengths by all modes, share of trips performed by motorized two wheelers & cars, while the drastic reduction in the percentage share of trips by bicycles and more particularly by public transport mode is a cause for grave concern.
- A higher per capita trip rate with 1.60 is observed in 2008 as compared to 1.44 in 2005, 1.28 in 1992-95, 1.14 in 1984 and 0.86 in 1971 study. The observed trip rate in 2008 is higher than the predicted trip rate (1.50) for 2011 from CTTS (1992-95).
- Trips by Non-motorized transport decreased from 42% in 1970 to 34% in 2008.
- Significant increase in the percentage of trips by two wheeler is observed; 25% in 2008 when compared with previous studies (2% in 1970, 3% in 1984 and 7% in 1992-95).
- Substantial decrease in the percentage of trips by public transport (bus & train) as per household survey is observed viz: 31% in 2008 when compared with previous studies that indicated 54% in 1970, 55% in 1984 and 42% in 1992-95.
- Trip lengths for all trip purposes and modes, as could be expected have increased when compared to the previous CTTS of 1992-95.

The findings of several other surveys find place in appropriate sections of the report.

**Travel Demand Forecast**

24. The process of replicating the “real world” transportation system and forecasting the state of the system at some future time is the crux of transport demand modeling adopted in the Study. This is done by the use of advanced state of the art computer package “CUBE”. The general four-step modeling framework has been adopted for Chennai Urban Travel Demand Model (CUTDM) that encompasses:
Executive Summary

- Trip Generation - estimating number of origins and destinations for each zone.
- Trip Distribution - attaching the origins and destinations for each trip to complete trips.
- Mode Choice - determining the mode of travel for each trip (car, auto rickshaws, public transit).
- Assignment - establishing routes and transit paths.

25. The arterials, sub arterial and major collector road are considered in the development of the network. The transit network represents different public transport modes along with their routes, frequency, connectivity, speeds, capacity and accessibility to support estimation of travel times on individual links and passenger volumes on individual transit lines and links. The public transit network comprises of the Bus system, MRTS, and Suburban rail modes and their corresponding routes operated in the study area.

26. Household and roadside passenger interview data were used to develop the observed mode-wise trip matrices. The external trips were constructed based on the O-D survey conducted at the Outer Cordon. The mode wise and purpose wise matrices have also been developed for peak and off peak hours. Data obtained concerning zone-to-zone movements were used to develop travel desire lines illustrating traffic corridors.

27. Model focuses on peak period conditions because these conditions include the most important recurrent congestion period and tend to guide transportation system design. Peak period models provide more accurate indications of directional travel patterns during design conditions. An off-peak model was calibrated to understand the differential behavior during that time period essentially for the purpose of improved accuracy for evaluation of schemes.

28. The observed highway and public transport matrices were assigned on the base year network. The assigned traffic volume has been compared with the observed traffic counts on screen lines and found to be within acceptable range.

29. Trip generation models were built to forecast the number of person trips that begin from or end in each travel analysis zone with in the region for a typical day of the target year. Separate trip- generation models were developed for work, education, business and other purposes. A correlation matrix of trip production to various land uses was done based on which trip production models have been developed.

30. The present study combines the trip distribution and mode choice to form a combined Trip Distribution and Modal Split phase using a conventional doubly constrained gravity model. Synthetic trip matrices were developed by the calibrated
distribution cum mode choice parameters. These synthetic matrices were compared with the observed matrices. Checks were done to examine the validity of the synthetic matrices against the observed matrices and forecast made.

31. The model parameters that have been used to evaluate the scenario are Per Capita Trip Rate, Trips, Modal Split, Vehicle-km, Vehicle-Hours, Passenger-km, Passenger-Hours, Network Speed, Trip Length and Cost.

32. It has been observed that the PCTR (all modes) has been doubled during 1971-2008 period and expected to grow to 2.14 by the horizon year.

33. The growth in daily demand in the past three decades and in the planning period is estimated. The demand has been increased more than four times 1971-2008 period and will be nearly doubled by 2026. The trips assigned in horizon years are 11.13 lakh motorized trips in 2016 and 17.1 lakh motorized trips in 2026.

34. The average trip length for car is 14.17 km and for motorized two wheelers is 10.37 km. The average trip length has been steadily increasing over the years and by the horizon year the average trip length is expected to increase by 1 km from the current levels scenario.

35. Commuter’s desire to travel is readily related to travel speeds on the network. The average network speed estimated for the base year 2008 is 25 kmph and for the Do minimum scenario for the year 2026 is 19 kmph.

36. Kilometer of travel represents the extent and availability of transport network. Passenger Kilometers of Travel & Vehicle Kilometers of travel are expected to be 37.4 lakhs and 25.6 lakhs by 2026.

37. Hours of travel represents the extent and presence of congestion of transport network. Passenger Hours of Travel (PHT) and Vehicle Hours of travel (VHT) are presented for the peak hour in the base year and for the year 2026.

<table>
<thead>
<tr>
<th>Travel Characteristics</th>
<th>2008</th>
<th>2026</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PV</td>
<td>PT</td>
</tr>
<tr>
<td>Average Trip length (km)</td>
<td>10.7</td>
<td>11.71</td>
</tr>
<tr>
<td>Modal split (%)</td>
<td>48</td>
<td>42</td>
</tr>
<tr>
<td>Passenger/Vehicle kilometer (in lakhs)*</td>
<td>22</td>
<td>37.4</td>
</tr>
<tr>
<td>Passenger/Vehicle hours (in lakhs)*</td>
<td>0.7</td>
<td>2.13</td>
</tr>
</tbody>
</table>

* For PV and IPT the numbers are in vehicle km and vehicle hours, for PT the numbers are in passenger km and passenger hours.
Vision

38. Considering the challenges that the CMA is facing, the direction of the urban transport is likely to take its course with appropriate interventions. With the inputs from NUTP and past studies, the following vision is established for the CMA:

“Provide safe, efficient, affordable and modern transport choices to people and businesses integrating economic, land use and transport concerns of Chennai Metropolitan Area to be fully prepared to take on the transport challenges of Chennai - the Megapolis.”

39. This vision is also consistent with the Vision 2026 envisaged in the Second Master Plan by the Chennai Metropolitan Development Authority (CMDA) - “to make Chennai a prime metropolis which will be more livable, economically vibrant and environmentally sustainable and with better assets for the future generations”

Goals

40. The present situation in Chennai will only continue to worsen if nothing is done. Do minimum (considering the committed schemes like Metro rail, MRTS, Commuter rail, Outer Ring Road, bypass, Elevated freight corridor etc.) forecasts also show low network speeds in 2026 (inside the core area).

41. The Goals have been defined based on the vision and the objectives. The goals were set in consultation with CMDA that took the inputs of the Stakeholders in preparing the SMP and approved by the committees constituted for CCTS. The mobility strategies developed are aimed at attaining the goals. On duly obtaining the values of modal share for the year 2008 from the model outputs, the goals set for this study are given below:

<table>
<thead>
<tr>
<th>Category</th>
<th>Index</th>
<th>2008</th>
<th>Goal (2026)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modal Shares (all trips)</td>
<td>Public Transport</td>
<td>27% (41%)</td>
<td>46% (70%)</td>
</tr>
<tr>
<td></td>
<td>IPT</td>
<td>7% (11%)</td>
<td>5% (8%)</td>
</tr>
<tr>
<td></td>
<td>Private Transport</td>
<td>32% (48%)</td>
<td>15% (22%)</td>
</tr>
<tr>
<td></td>
<td>NMT</td>
<td>34%</td>
<td>34%</td>
</tr>
</tbody>
</table>

(The number in bracket indicate modal share of motorized modes)

42. A set of performance indicators has been developed as goals to be achieved in 2026 for the City. The mobility strategies developed aim at attaining the goals.
Strategies

43. The strategies proposed to meet the various goals set for Chennai are

• Land use and transport strategy
• Roadway network strategy
• Public transit strategy
• Non motorized transport strategy
• Freight management strategy
• Demand management strategy
• Traffic management strategy

Alternate network strategies were tested and the alternative that helped in achieving the objective of efficient transportation chosen.

44. The projects that emerge out of the strategies, when implemented, shall fulfill the goals and objectives of the CCTS.

Proposals

45. The transport strategies, when applied scientifically in tandem, have resulted in a number of schemes. These schemes are essential for the efficient operation of the transport system in the whole of the CMA. The individual proposals are widely different from each other in terms of their cost, period at which to be taken up for implementation, construction time and finally the duration up to which their usefulness will last. Accordingly, the transport proposals are categorized into short, medium and long-term measures.
46. A number of medium and long-term proposals have also emerged through the Second Master Plan (SMP) and the Mobility study (MoB). The CCTS reviewed in detail, the list of schemes identified in both SMP and MoB studies. Barring a few, most of the critical schemes listed in the SMP/MoB studies have also been recommended in the current CCTS on being justified as schemes to be taken up for implementation.

47. Some proposals more particularly for the NMT by provision of grade separated pedestrian crossing facilities and foot over bridges have been additionally included ensuring the worthiness of the same based on safety considerations judged by the link volumes and travel speeds. Schemes for pedestrians such as skywalks at major attracting and generating centres, pedestrian subway network, provisions of ramp / escalators to existing subways, lift facility to pedestrian foot over bridges, pedestrian connectors across water courses, exclusive pedestrian crossing facilities bridging the rivers are looked into outside the ambit of modeled output.

48. The long-term, medium-term and the short-term schemes (proposals) have been developed for the CMA through the current CCTS study. The long term proposals comprise Mass Transit Systems (MRTS, Metro, Mono Rail, LRT, Suburban Rail and BRT), Intermodal Stations, Truck Terminals, Intercity Bus Terminals, Elevated Roads, Freight Corridors, Missing Roadway Links and Major Road Widening. The medium term proposals comprise Pedestrian Subways, Multi-level Parking Facilities, Grade Separators (Flyovers), ROBs and RUBs, Traffic Management Centers and Skywalks. The medium term improvements would blend with contemplated long term improvements and the total estimated cost to implement these long term and medium term schemes is Rs 81830 crores. The short term proposals comprise Pedestrian Facilities (footpaths), Bicycle Network, Traffic Management, Parking Regulation, Signal Optimization, Junction Improvements, Road Markings and Signage and One way Streets. The estimated cost to implement these schemes is Rs 290 crores. The total cost of implementing all these measures up to the year 2026 is estimated at Rs.82,120 crores.

49. The highlights of the recommendations of the CCTS are

- The total shelf of schemes estimated at a cost of Rs.82,100 crores recommended for implementation in phases up to 2026 is expected to help realize 66% which is close to the stated objective of the Second Master Plan of achieving a public transport modal share of 70%.
- The major investment proposals include:
  - Development of additional network of metro rail for another 28 km including the extension from Washermanpet to Wimco Nagar segment.
  - Development of a network of Monorail/LRT for a length of about 110 km.
  - Development of a network of BRTS for a length of about 150 km including a stretch of Jawaharlal Nehru Salai from Padi to Madhavaram.
Executive Summary

- Development of additional network of suburban rail for a length of over 200 km. This includes the 4th line from Chennai Beach to Athipattu and 5th and 6th line from Chennai Central to Avadi.
- Development of inter-modal interchanges at 13 locations including at St. Thomas Mount, Porur and Saidapet.
- Construction of multi-level parking at 6 locations. This includes the construction of multi-level parking by Corporation of Chennai at Wallace Garden, Greams Lane.
- Construction of RoBs / RuBs at over 35 locations. This includes the locations at L.C.No. 16 on MKT Road @ Minjur Station, L.C.No. 32 & 33 (Near Standard Motors) and LC 14 in between Tirunindravur - Tiruvallur. (Near Sevaipepet Railway Station).
- Construction of grade separators at over 50 locations. This include the locations at Taramani road x MBI road, Nelson Manickam road x Periyar EVR Salai x Anna Nagar 3rd Avenue, LB road x Tiruvanmiyur road, Arcot road x Jawaharlal Nehru Salai etc. in the first phase.
- Construction of the Outer Ring Road for a length of 62 km as a multi-modal corridor. The first phase of development for a length of 30 km is under way.
- Construction of pedestrian subways at over 80 locations. This includes about 10 locations in the suburban area. The schemes recommended to be taken up in the first phase include Thiruvanmiyur bus stand junction, additional subway opposite Central Station, MEPZ on GST Road, Ashok Pillar on Jawaharlal Nehru Salai, GST road near Chrompet bus stand etc.
- Construction of truck terminal at 9 locations. The limited truck terminal at Koyambedu Wholesale Market Complex and Manjambakkam and a full-fledged truck terminal at Karunakaracheri are proposed in the first phase.
- The other investments include major missing links (14), road widening (over 150 road stretches), elevated roads (7), skywalks and cycle ways.
- A regional network of road (about 190km) and rail (about 160km) to serve the immediate surroundings of the CMA covering Mammallapuram, Chengalpattu, Kancheepuram, Arakonam, Uthukottai and Gummidipoondi has also been proposed.

Implementation of the Plan

50. Development costs for the several schemes of the recommended plan have been computed based on current values and only generalization can be made regarding the land acquisition and costs seventeen years into the future. The cost of proposed plan is of such magnitude as to require construction to be carried out by stages also keeping in view the period at which it would be required enabling funds spread throughout the design period. The total cost has been estimated to be Rs. 82,120 crores. The cost includes proposals from the SMP/MoB studies also.
61. The city has indeed been, slowly strangling itself because of the unrestrained use of personalized modes of transport, over-crowding of public transport and its inability to respond to the challenges of ever-increasing traffic. In the light of persistent and vexatious transport problems, CMDA has commissioned this Chennai Comprehensive Transportation Study during the year 2008.

62. The Comprehensive Transport Study has focused on making Chennai a vibrant global metropolis city by proposing a series of new transport initiatives. The goal of the study is to come up with a transport system that places people at the centre and realizes the 2026 vision, that is to make Chennai a prime metropolis which will be more livable, economically vibrant and environmentally sustainable and with better assets for the future generations.

63. With the objective of achieving a balanced modal mix and to discourage personalized transport, the study has proposed to introduce mass transport by massive investments. The focus, therefore, is on introducing robust mass transport options by providing adequate, accessible and affordable modes that are people-centered. With limited land availability and the need to serve a larger and more diverse population, and to protect our environment, the need to make public transport system a choice mode is imperative. The proposed transit plan will represent the evolution of transit policy in the region and contribute to a quality and livable environment. The benefits of this plan include increased mobility options for residents through new routes and new technologies; a strengthened economy as a result of connecting cluster towns around CMA; and an improved environment from reducing the necessity for use of cars, motorized two wheelers and the ensuing air pollution produced. There will be a gamut of options like BRTS, Metro, MRTS and Commuter Rail systems to meet the different needs of different sections and needs of the people. A high quality integrated public transport is the need for the future and has been suggested.

64. Given the constraints on road expansion, travel demand management will remain a priority. The proposed travel demand management schemes will ensure that the

<table>
<thead>
<tr>
<th>Category</th>
<th>Index</th>
<th>2008 Values</th>
<th>Goals Set 2026</th>
<th>Achievable Goals 2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modal Shares (all trips)</td>
<td>Public Transport</td>
<td>27% (41%)</td>
<td>46% (70%)</td>
<td>43% (66%)</td>
</tr>
<tr>
<td></td>
<td>IPT</td>
<td>7% (11%)</td>
<td>5% (8%)</td>
<td>5% (8%)</td>
</tr>
<tr>
<td></td>
<td>Private Transport</td>
<td>32% (48%)</td>
<td>15% (22%)</td>
<td>18% (26%)</td>
</tr>
</tbody>
</table>
usage of private vehicles is discouraged and consequently, a shift towards public transport is anticipated.

65. The increasing specialization of motor freight transportation and their tremendous growth, with two major ports within CMA, warrants truck terminal facility besides a seamless corridor of travel that has been proposed.

66. From an objective appraisal of estimated travel desire lines, eight corridors were identified in the MATS 1971 based on the trip potential for the design year 1991 of which the Outer Circular Corridor on the periphery of CMA catering to 1.6 lakh trips per day for the year 1991 was one and a road based mass transit system was then recommended. This CCTS of 2008 also proposes a road based system for the horizon year 2026 for the Outer Ring Road. Having conceived the ORR even as early as 1971 in the Madras Area Transportation Study to aid urban sprawl, not planning for adequate road connectivity and development in the environs of the alignment has resulted in this CCTS also proposing a road based mass transit system even over half a century later (1971 to 2026). The lesson learnt is that merely proposing a Mass Transit System in the study report, to be built at a future date would not suffice. It is only the beginning for planning transit oriented developments and associated activities so that system is functional and gets the expected ridership for its optimal use and the scarce resources are rightly expended.

67. A number of proposals have been suggested together with phasing for implementation. Some of the transportation related schemes that have been identified in the SMP and replicated in the CMP with few additional ones have been duly considered and although separate studies from the point of view of obtaining data from primary surveys was not made at this point in time, nevertheless, the schemes as deemed relevant duly considering the modeled traffic flows obtained on the network is included and cost provided for.

68. Some proposals more particularly for the NMT by provision of grade separated pedestrian crossing facilities and foot over bridges have been additionally included ensuring the worthiness of the same based on safety considerations judged by the link volumes and travel speeds, reconnaissance and experience of the Consultants. Schemes for pedestrians such as skywalks at major attracting and generating centres, pedestrian subway network at Central, provisions of ramp / escalators to existing subways, lift facility to pedestrian foot over bridges etc. are looked into outside the ambit of modeled output.

69. Additional facilities by way of providing cycle tracks and footway along the banks of Adyar, Cooum and Buckingham canal apart from some roads envisaged for widening under SMP are contemplated.
70. The proposals need to be viewed holistically and whenever capital intensive projects are taken up for implementation at the appropriate stage, the possibility of dovetailing and the redundancy of some, needs to be examined. A case in point is the provision of pedestrian crossing facilities as subways or foot over bridge in the vicinity of Metro stations. These need not be duplicated although the individual projects could fall under the purview of different agencies and it is prudent to facilitate the optimal utilization of facility though with an associated added marginal cost to one agency.

71. The road widening proposed as per the SMP is taken into the network building exercise and as such needs to be pursued forthwith. Except in respect of higher order MTS that could be taken under ground, all other PT Systems that need dedicated right of way occupy road space to varying degrees and even dense bus corridors need additional road space that facilitates movement of buses. On roads, wherein mass transit systems are contemplated, these need to be widened on priority. While an exclusive bus lane facility would enable conversion to a higher order facility like BRTS, stage construction to other higher order systems is difficult due to the differing requirements in terms of right of way, station dimensions and other geometric considerations such as turning radius, super elevation, turn round etc.

72. Transit Oriented Developments need to be encouraged on corridors proposed as mass transit corridors to have captive public transport ridership. With emphasis on meeting travel demand of the future by public transport, the first step would be to increase bus ridership ensuring adequate supply with a view to ensure people do not resort to privatized modes for want of a transit facility or the inadequacy of it. At the appropriate stage of implementation of the higher order MTS proposed, the established PT clientele would be easily accommodated into the new system and with UMTA hopefully in place, the smooth transfer from one system to another would be ensured.

73. To conclude, the CCTS has drawn up the transport improvement roadmap for Chennai for the future, including transport investment program containing short, medium and long term projects. The Plan has focused on the mobility of the people, and encouraging systems that maximize the throughput of people.

All the plans and strategies emerging out of this study will have a significant impact in alleviating the traffic woes of the CMA in the future years.
Interim Report

Revised City Development Plan for Chennai city

September 2014

ICRA Management Consulting Services Limited
Contents

1. INTRODUCTION ........................................................................................................................................... 1
  1.1. ABOUT CORPORATION OF CHENNAI (CoC) ......................................................................................... 1
  1.2. NEED FOR A REVISED CITY DEVELOPMENT PLAN (CDP) FOR CHENNAI CITY ........................................ 1
  1.3. GUIDING PRINCIPLES .......................................................................................................................... 2
  1.4. CDP FORMULATION PROCESS ............................................................................................................. 3
  1.5. PLANNING FRAMEWORK FOR CDP PREPARATION ............................................................................. 10
  1.6. REPORT ORGANIZATION AND CONTENT ............................................................................................ 13

2. CITY OVERVIEW ........................................................................................................................................ 14
  2.1. HISTORY AND SIGNIFICANCE ................................................................................................................... 14
  2.2. REGIONAL SETTING ............................................................................................................................... 18
  2.3. PHYSICAL ENVIRONMENT ..................................................................................................................... 18
  2.4. ECONOMIC BASE AND GROWTH DRIVERS .......................................................................................... 19
  2.5. SUMMARY .............................................................................................................................................. 24

3. GOVERNANCE AND INSTITUTIONAL FRAMEWORK ................................................................................. 25
  3.1. CHENNAI METROPOLITAN AREA ........................................................................................................... 25
  3.2. GOVERNMENT OF TAMIL NADU AND ITS AGENCIES ........................................................................... 30

4. DEMOGRAPHICS, POPULATION TRENDS AND PROJECTIONS ................................................................. 33
  4.1. POPULATION TRENDS ........................................................................................................................... 33
  4.2. OTHER FINDINGS FROM CENSUS ......................................................................................................... 36
  4.3. POPULATION PROJECTIONS ................................................................................................................... 39

5. REVIEW OF PAST CDPS/PLANS AND RECENT INITIATIVES ..................................................................... 41
  5.1. VISION EXERCISES, CDPS AND OTHER CITY-LEVEL PLANS ................................................................ 41
  5.2. PROJECTS UNDER JNNURM .................................................................................................................. 46
  5.3. SHELF OF DPRS AND ONGOING PREPARATORY STUDIES ................................................................... 48

6. ASSESSMENT OF URBAN SERVICES MANAGED BY CORPORATION OF CHENNAI ................................. 51
  6.1. ROADS AND ALLIED INFRASTRUCTURE ............................................................................................... 51
  6.2. STORM WATER DRAINAGE .................................................................................................................. 58
  6.3. SOLID WASTE MANAGEMENT ............................................................................................................. 67
  6.4. PARKS & PLAYGROUNDS ..................................................................................................................... 74
  6.5. HEALTH AND SOCIAL WELFARE .......................................................................................................... 76
  6.6. EDUCATION ........................................................................................................................................... 81

7. FINANCIAL POSITION OF COC .................................................................................................................. 86

8. REVIEW OF ORGANISATION AND E-GOVERNANCE ............................................................................ 92
  8.1. ORGANIZATION STRUCTURE OF CoC .................................................................................................... 92
  8.2. STAFFING IN CHENNAI CORPORATION ............................................................................................... 96
  8.3. E-GOVERNANCE ................................................................................................................................... 98

9. CAPITAL INVESTMENT NEEDS AND FINANCIAL PLAN – INITIAL ASSESSMENT .................................. 101
  9.1. ASSUMPTIONS FOR FINANCIAL & OPERATING PLAN ......................................................................... 101
  9.2. CAPITAL INVESTMENT PLAN ............................................................................................................... 102
9.3. **DRAFT FINANCIAL AND OPERATING PLAN** ........................................................................................................... 103

10. **NEXT STEPS** ..................................................................................................................................................... 104

**ANNEXURES** ......................................................................................................................................................... 105

- **ANNEXURE I** INCEPTION PRESENTATION MADE TO COC ON 30 APRIL 14 ................................................................. 106
- **ANNEXURE II** INTERIM PRESENTATION MADE TO COC ON 11 SEPTEMBER ’14 ............................................................. 115
- **ANNEXURE III** SANCTIONED VS. EXISTING POSITION IN COC ......................................................................................... 151
- **ANNEXURE IV** DETAILED FINANCIAL OPERATING PLAN- TILL 2026 ................................................................................ 154
4.2.3. Age structure

In the CMA, the proportion of primary school going children percentage has reduced from 12.39% in 1961 to 7.97% in 2001 and the proportion of Secondary school going age group has also reduced from 10.64 in 1961 to 8.95 in 2001. The proportion of old age group has increased from 4.36 to 7.81%. A large percentage of population, 63%, is under the age of 35 years in 2001. Exhibit 4.12 gives the detailed age structure for years 1961 and 2001.

Exhibit 4.12 Age structure in CMA in %

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Age (Years)</th>
<th>Percentage</th>
<th>1961</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 to 5</td>
<td></td>
<td>13.2</td>
<td>7.31</td>
</tr>
<tr>
<td>2</td>
<td>5 to 9</td>
<td></td>
<td>12.39</td>
<td>7.97</td>
</tr>
<tr>
<td>3</td>
<td>10 to 14</td>
<td></td>
<td>10.64</td>
<td>8.95</td>
</tr>
<tr>
<td>4</td>
<td>15 to 19</td>
<td></td>
<td>8.66</td>
<td>9.55</td>
</tr>
<tr>
<td>5</td>
<td>20 to 24</td>
<td></td>
<td>10.73</td>
<td>10.47</td>
</tr>
<tr>
<td>6</td>
<td>25 to 29</td>
<td></td>
<td>10.21</td>
<td>10.33</td>
</tr>
<tr>
<td>7</td>
<td>30 to 34</td>
<td></td>
<td>7.98</td>
<td>8.46</td>
</tr>
<tr>
<td>8</td>
<td>35 to 39</td>
<td></td>
<td>6.69</td>
<td>8.04</td>
</tr>
<tr>
<td>9</td>
<td>40 to 44</td>
<td></td>
<td>5.49</td>
<td>6.19</td>
</tr>
<tr>
<td>10</td>
<td>45 to 49</td>
<td></td>
<td>4.15</td>
<td>5.5</td>
</tr>
<tr>
<td>11</td>
<td>50 to 54</td>
<td></td>
<td>3.65</td>
<td>4.37</td>
</tr>
<tr>
<td>12</td>
<td>55 to 59</td>
<td></td>
<td>2.1</td>
<td>3.1</td>
</tr>
<tr>
<td>13</td>
<td>60 to 64</td>
<td></td>
<td>2.06</td>
<td>2.83</td>
</tr>
<tr>
<td>14</td>
<td>65 to 69</td>
<td></td>
<td>1.1</td>
<td>1.96</td>
</tr>
<tr>
<td>15</td>
<td>&gt;70</td>
<td></td>
<td>1.2</td>
<td>3.02</td>
</tr>
<tr>
<td>16</td>
<td>not stated</td>
<td></td>
<td>1.93</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Total</td>
<td></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Second Master Plan

4.2.4. Slum Population

Slum population in the Chennai city is 16.14 lakhs with 83% in Chennai erstwhile area. The slum population grew 63.7% in the erstwhile area from 8.2 lakhs in 2001 to 13.42 lakhs in 2011. Around 24% of the total population of Chennai live in slums. Exhibit 4.13 gives the slum population and households in the Chennai city. The number of Slum households in the city is 4 lakhs accommodating 4.05 per household.

Exhibit 4.13 Slum population in Chennai city—Census 2011

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Area</th>
<th>Area (sq.km)</th>
<th>Slum households (Nos.)</th>
<th>Slum Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chennai Erstwhile area</td>
<td>176</td>
<td>329827</td>
<td>1342337</td>
</tr>
<tr>
<td>Municipalities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Alandur</td>
<td>8.1</td>
<td>7,947</td>
<td>30,105</td>
</tr>
<tr>
<td>2</td>
<td>Ambattur</td>
<td>37.8</td>
<td>14,154</td>
<td>55,085</td>
</tr>
<tr>
<td>3</td>
<td>Kattivakkam</td>
<td>4.8</td>
<td>5,039</td>
<td>19,944</td>
</tr>
<tr>
<td>4</td>
<td>Madhavaram</td>
<td>17.4</td>
<td>2,743</td>
<td>10,966</td>
</tr>
<tr>
<td>5</td>
<td>Maduravoyal</td>
<td>4.8</td>
<td>1,190</td>
<td>4,868</td>
</tr>
<tr>
<td>6</td>
<td>Manali</td>
<td>8.6</td>
<td>780</td>
<td>2,968</td>
</tr>
</tbody>
</table>
4.3. Population Projections

The population projection has been done by various methods and the discussions are underway with CMDA to review and validate the projections for a homogeneous view.

4.3.1. Projections by various methods

The proposed developments were considered while doing the population projection for CoC. Population Projection was done using various methods such as Arithmetic Increase method, Geometric progression method and Incremental increase method. Refer Exhibit 4.14 for population projection of the whole city by various methods.

### Exhibit 4.14 Population Projection by various methods

<table>
<thead>
<tr>
<th>Year</th>
<th>Census Population</th>
<th>Arithmetic Increase method</th>
<th>Incremental Increase method</th>
<th>Geometrical Progression method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>4,844,688</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>5,663,267</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>6,678,550</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>7,776,303</td>
<td>7,559,432</td>
<td>8,060,961</td>
<td></td>
</tr>
<tr>
<td>2031</td>
<td>8,874,055</td>
<td>8,531,973</td>
<td>9,852,820</td>
<td></td>
</tr>
<tr>
<td>2041</td>
<td>9,971,808</td>
<td>9,596,171</td>
<td>12,204,182</td>
<td></td>
</tr>
</tbody>
</table>

Source: IMaCS analysis

4.3.2. Population Projection adopted for CDP

Methodology: Considering the growth drivers and in order to arrive at future population for CoC, population projection was done for core area and extended areas separately using various methods. The past growth trend was considered to arrive at a method for projection...
of population in both the areas. The Core area is expected to grow very less and hence incremental increase method is used for the projection and in case of extended area average of the three methods is used which gives higher values based on the past trends of population growth. Refer Exhibit 4.15 for a summary of historical population trends and projected population of core area and extended area

**Exhibit 4.15 Population growth of Core Area and Extended Area projected separately**

<table>
<thead>
<tr>
<th>Year</th>
<th>Core Area</th>
<th>Density</th>
<th>Extended Area</th>
<th>Density</th>
<th>Total CoC</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Population</td>
<td>Average CAGR</td>
<td>Population</td>
<td>Average CAGR</td>
<td>Population</td>
<td>Average CAGR</td>
</tr>
<tr>
<td>1991</td>
<td>3841398</td>
<td>1.0%</td>
<td>1003290</td>
<td>3.6%</td>
<td>4844688</td>
<td>1.6%</td>
</tr>
<tr>
<td>2001</td>
<td>4343645</td>
<td>247</td>
<td>1319622</td>
<td>52</td>
<td>5663267</td>
<td>132</td>
</tr>
<tr>
<td>2011</td>
<td>4646831</td>
<td>264</td>
<td>2031719</td>
<td>80</td>
<td>6678550</td>
<td>155</td>
</tr>
<tr>
<td>2021</td>
<td>5168743</td>
<td>0.9%</td>
<td>2630156</td>
<td>104</td>
<td>7798899</td>
<td>181</td>
</tr>
<tr>
<td>2031</td>
<td>5663343</td>
<td>322</td>
<td>3422940</td>
<td>135</td>
<td>9086283</td>
<td>211</td>
</tr>
<tr>
<td>2041</td>
<td>6133121</td>
<td>348</td>
<td>4457599</td>
<td>176</td>
<td>10590720</td>
<td>246</td>
</tr>
</tbody>
</table>

*Source: Census, IMaCS analysis*

Population of CoCis obtained by summation of the population projected for both the areas. Thus the population is expected to grow at least at a CAGR of 1.5%. In 2041, population density in the core area goes to 348 persons per hectare whereas in extended area it goes to 176.

The density of the extended areas is low and hence there is availability of land for future development. With the proposed investments and availability of Land for development in the extended areas, the city could potentially grow faster and it is important to factor this possibility while planning infrastructure for future growth.

### 4.3.3. Summary

The population of the core area of the city is assumed to grow at an average CAGR of 0.9% whereas the extended area at CAGR of 2.7%. The whole area is expected to grow at an average CAGR of 1.5% and the density of the area to reach 246 persons per hectare.
traffic management are different projects considered for estimating the total investments. The Chennai Corporation has to fund projects of Rs. 2170 crore (2.6% out of the total). Refer Exhibit 5.5 for the agency wise breakup of fund requirement.

Exhibit 5.5  Fund Requirement as envisaged in CCTS 2010

![Chart showing agency wise breakup of investment]

Source: CCTS, CMDA, 2010.IMaCS Analysis

5.1.5. T. Nagar Re-development Plan

The study was initiated in 2009 by Chennai Corporation to formulate a redevelopment plan for T. Nagar, the major commercial area of Chennai, to ensure smooth traffic flow and integrated commercial activities. The Plan will suggest ways and means of property aggregation, effective use of space, specific infrastructure requirement and also methods to integrate them. The study is envisaged to cover an area of 6.85 sq.km, bounded by Arcot Road in the north, Nandanam in the south, Teynampet in the east and Arya Gowder Road in the west.

The study adopted a holistic approach aiming at segregation of formal and informal activities, smooth movement of pedestrians and vehicles through designated zones, provision of parking arrangements and use of land to a minimum extent. It will also emphasize the need for enhanced environmental quality through urban design, green zoning, parks and roadside landscape. The measures suggested in the study for T. Nagar makeover are

1. Pedestrianization of Thyagaraya Road, South Usman Road and areas around Panagal Park
2. Dedicated hawker zones in pedestrian areas
3. Elevated skywalk connecting Mambalam railway station and T. Nagar bus terminus
4. Redesigning of Panagal Park
5. Traffic signals in the area to be integrated
6. Multilevel car parks to be set up at four locations
7. Existing flyovers across three roads to be extended
8. Two additional bus terminus to be built near Valluvar Kottam and Saidapet
9. Storm water network to be improved
10. Public conveniences to get a facelift

The above proposals will help in increasing the pedestrian circulation space from 8,000 sq.m to 28,000 sq.m. The estimated investment for the complete redevelopment of T. Nagar is envisaged to be Rs. 563 crore and the Corporation has applied to the Word bank seeking partial funding of Rs. 50 crore for the various aspects of T. Nagar redevelopment.

5.1.6. Integrated Cooum river Eco-Restoration Plan

Cooum is a river traversing 16km within the city limits which originated from the Cooum tank in Tiruvallur and runs east for a distance of 65 km and confluences into Bay of Bengal. It supports substantial irrigation and additional rain fed agriculture in its upper part and also water supply to Chennai city and adjoining areas and also a major floor carrier of Chennai city. The river was clean before 1960 and was used for various activities like bathing, boating and fishing. As of today, the river is highly polluted as the river receives the municipal and industrial waste and refuse from slums in the city. The pollution has a direct impact on public health, odour concerns and secondary groundwater pollution.

The study is initiated by the Chennai River Restoration Trust, formed as Adyar Poonga Trust in 2006, which is government of Tamil Nadu owned trust primarily entrust with the restoration of the rivers. The plan for eco-restoration of the river is prepared with the following objectives:

1. Effective abatement of pollution and protection of river through comprehensive planning and management
2. Maintain minimum ecological flows in the river to ensure water quality and sustainable development.
3. Create a River Front Development within urban areas
4. Explore possibilities of navigation purpose and use of the river post restoration.

5.2. Projects under JNNURM

JNNURM is a Government of India initiative launched on 3rd December 2005 to fund identifies cities for developing urban infrastructure services. JNNURM came to a closure on 31st March 2014. The aim of the program was to encourage reforms and fast track planned development of identifies cities.
In Tamil Nadu, three cities were identified as mission cities based on JNNURM guidelines and Chennai city is one of the three cities and the funding pattern for Chennai is 35% from GoI, 15% from GoTN and 50% from local body. Exhibits 5.6 to 5.8 show the analysis of the JNNURM projects for Chennai city.

Exhibit 5.6 JNNURM-Sanctioned and Completed number of projects

Exhibit 5.7 JNNURM Approved cost and total expenditure incurred

Exhibit 5.8 JNNURM- Year and sector wise sanction of projects in Chennai

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Year</th>
<th>No. of projects sanctioned</th>
<th>Approved cost (Rs. In crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FY 07</td>
<td>9</td>
<td>625.6</td>
</tr>
<tr>
<td>2</td>
<td>FY 08</td>
<td>9</td>
<td>509.1</td>
</tr>
<tr>
<td>3</td>
<td>FY 09</td>
<td>16</td>
<td>2,214.3</td>
</tr>
<tr>
<td>4</td>
<td>FY 10</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>FY 11</td>
<td>1</td>
<td>116.1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>35</td>
<td>3,465.1</td>
</tr>
</tbody>
</table>
1. **Chennai Vs. Tamil Nadu:** The number of projects sanctioned under JNNURM in Chennai is 35 (73% of the total number in Tamil Nadu) of Rs.3465.2 crore approved cost which 67.5% of the State’s approved cost.

2. **Sanctioned Vs. Completion:** Out of the 35 sanctioned projects, 16 projects have been completed. Fund utilization of 69% has been achieved whereas the State has achieved 74% fund utilization by August 2014.

3. **Sector-wise breakup:** 57% of the total amount approved is toward water supply & sewerage projects and 39% towards improvement of storm water drains in core city.

Some of the important projects under JNNURM are Improvement to Micro and Macro Drainage system in Chennai core city, Improvements to water supply system in Chennai, Comprehensive Water Supply System and sewerage schemes in the parts of extended areas, and Sea Water Desalination Plant in Minjur.

5.3. **Shelf of DPRs and ongoing preparatory studies**

5.3.1. **Shelf of DPRs and Consultancy Works**

A number of Details Projects reports (DPRs), consultancy works have been completed or under progress. The DPRs/ studies completer or under preparation are listed below.

- Feasibility study and DPR for Planning and Construction of
  - Grade separators along 5 routes
  - Rail under Bridge/ Rail under bridge at 3 locations
  - Pedestrian subways at 5 locations

**Source:** JNNURM implementation status. IMaCS Analysis
- DPR for Integrated Storm Water Drainage System in the Extended areas
- Study on the Construction of Multi Level Car Parking at Nungambakkam High Road
- DPR for the Pedestrian Plaza at Theayagaraya Road
- DPR for Paving with Granite foot path to International Standard at Walaja Road
- Architectural design for the beautification of Palavakkam, Kottivakkam and Neelankarai beaches
- DPR for 2 skywalks at T. Nagar and Parrys corner.
- DPR for Construction of Link road connecting Kasturibai nagar, Indra nagar and Thiruvanmiyur MRTS stations.

5.3.2. Key proposals/announcements in core Urban Services

A number of Key announcements were made by the Hon’ble Mayor for Chennai city to meet the vision formulated in Vision 2023 which is "to become India's most prosperous and progressive State with no poverty, and where its people enjoy all the basic services of a modern society and live in harmonious engagement with the environment and with the rest of world."

Infrastructure services

- Linking urban greenery with building plan approvals
- Concrete surfacing of all Bus route roads and BT / CC surfacing of all roads
- World-class roads in select corridors; pilot in Ashok Nagar
- 2 Waste Processing facilities at Minjur and Kuthambakkam
- Remediation and reclamation of Kodungaiyur and Perungudi dumping yards
- Providing facilities for firefighting at dumping grounds.
- Waste to energy projects (bio-degradables) at zonal level
- Formation of a Model park using the segregated recyclable waste materials
- Demarcation of Perungudi dumping ground and Pallikaranai Marsh Land by providing fencing.
- Formation of Green belt in dumping grounds
- Creation of awareness for better environment in solid waste management.
- Conversion of all street lights to Energy efficient street lighting which can save 80% of the energy costs.
The coverage of streetlights is around 1 streetlight for every 23 metres of road length, which is higher than the envisaged norms of a streetlight per 25 metres. However, a majority of the streetlights are not energy efficient adding to the O&M burden of the department. As shown in the exhibit below, around 68 per cent of the lamps are sodium vapour lamps, followed by tube lights (15 percent). Only 13 per cent of the streetlights use energy efficient lights.

Exhibit 6.6 Type of streetlights

The CoC has undertaken/ initiated capital expenditure to achieve the following objective:

1. Increase coverage in extended areas
2. Move towards energy efficient technology
   - LED streetlights
   - Automatic on-off technology for energy saving

The city plans to convert all the streetlights in the city to LED lights over the medium term resulting in considerable cost saving and reduction in carbon footprint of the city. A Detailed Project Report for the same has been prepared and implementation of the project is currently underway.

6.1.8. Institutional perspective

The Highways department is responsible for the maintenance of district roads, highways including arterial roads in the city. The CoC is responsible for the management of Bus route...
roads, Bridges, footpaths and streetlights. The roles and responsibilities allocated to each department with respect to construction of maintenance of infrastructure of are as follows:

- Interior roads is delegated to the Zones
- Bus route roads in the city is delegated to the Regions
- Major works in Bridges department are handled at the Headquarters while the routine maintenance has been delegated to the zone
- Streetlights are handled at the headquarters by the Electrical department

The department is headed by a Superintending Engineer supported by Executive Engineers at the Headquarters and also at a region and zonal level followed by Assistant Executive Engineers and Junior Engineers/ Asst Engineers.

6.1.9. Financial Analysis

The services provided by the department are capital intensive with minimal revenue expenditure. Based on budgetary figures, the revenue expenditure towards BRR, IR, Footpath and Bridges together contribute only Rs 15 – 20 crore in 2013-14. Against this, the estimated revenue generation from road cut charges was around Rs 10 crore for the period. The annual capital expenditure for the period 2013-14 towards the three departments was around 1000 crore out of which 91 percent was towards Interior roads and traffic improvements. The investment on interior roads contributed 65 per cent of the total capital expenditure of the Corporation. The capital expenditure on BRR, Interior roads and bridges grew almost 9 times in the last 3 years from Rs 123 crore in FY 2012 to Rs 1003 crore in FY 2014.

### Exhibit 6.7 Capital outlay 2013-14

<table>
<thead>
<tr>
<th>Department</th>
<th>Capital investment (in Rs crore)</th>
<th>Capital investment per capita (in Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus Route Roads</td>
<td>77</td>
<td>115</td>
</tr>
<tr>
<td>Interior roads/ Traffic improvements</td>
<td>912</td>
<td>1,360</td>
</tr>
<tr>
<td>Bridges</td>
<td>15</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>1003</td>
<td>1,497</td>
</tr>
</tbody>
</table>
6.1.10. SWOT Analysis

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>- High coverage in core area</td>
<td>- Road density saturated in the core area</td>
</tr>
<tr>
<td>- Improved quality of roads and strong connectivity</td>
<td>- High cost for road reforming and relaying</td>
</tr>
<tr>
<td>- Strong focus on quality – A separate QC department</td>
<td>- Encroachments in roads/footpaths</td>
</tr>
<tr>
<td></td>
<td>- Management of multiple contractors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Focus on Non-motorised transport – Pedestrianisation, Cycle tracks and cycle sharing schemes</td>
<td>- Higher initial cost associated with Concretization</td>
</tr>
<tr>
<td>- Move towards concretization of roads – Lower life cycle cost</td>
<td>- Low land availability in the core city area</td>
</tr>
<tr>
<td>- Land pooling and other innovative methods for Land development</td>
<td>- Proliferation of hawkers in roads/footpaths</td>
</tr>
<tr>
<td>- Scope for rationalization of packages and work contracting</td>
<td></td>
</tr>
</tbody>
</table>

6.1.11. Issues/Challenges

Some of the issues associated with the provisioning of services are:

1. Continuous investment to maintain quality of roads: The continuous damage to the BT roads in the city drives the need for continuous investment towards relaying which adds to the cost of the transportation

2. The city roads also face challenges due to the absence of adequate footpaths, and areas for non-motorized transport like cycles. However, focused initiatives have been taken up to address the same.
3. Moderate coverage in the extended areas: The road density in the extended area for IR as well as BRR is low when compared to the projected population in 2020

4. Low availability of land for infrastructure projects especially in the core area leading to delay in land acquisition or escalation of land acquisition cost impacting the feasibility of the projects

5. Encroachments in roads/footpaths by Hawkers

6. Absence of energy efficient streetlights

Another major gap in the service would be with respect to the operation and maintenance of the network. Apart from the continuous work on road relaying undertaken annually, the CoC also has to shell out significant resource towards patchwork. Additionally, there are operational challenges arising at a zonal level due to management of high number of packages and contractors will constrain the monitoring of the project.

6.2. Storm Water Drainage

An effective surface and storm water drainage network is essential in improving the public health and environmental conditions as well as population mobility of the city. Surface water or Storm water management encompasses all methods to handle the precipitation available for the city. It may be either transferred towards temporary storage/groundwater recharge (Rainwater harvesting) or towards a canal/river/sea (storm water drains). The storm water drain network includes the drainage basins, major and macro drains, arterial drains, collector drains. The storm water serves as a channel for transporting the rainwater in the impervious areas across the city to the drainage basins.

6.2.1. Chennai city characteristics

The geographic and topographic characteristics of the city drive the need for an effective storm-water drain network. Although the city lies 2.5 metres above sea level, the problem of storm water drainage is affected by the city’s flat terrain, absence of proper storm water drain network.

The city also receives an average annual rainfall of 140 cm spread across the two monsoon seasons. The city gets most of its seasonal rainfall from the north-east monsoon winds, from mid-October to mid-December. The highest annual rainfall recorded is 257 cm in 2005. Cyclones in the Bay of Bengal sometimes hit the city leading to flooding and other concerns. Major Flood Events in Chennai City were experienced during 1943, 1976, 1985, 1996 and 2005.

6.2.2. The Waterways

In the Chennai City, there are 49 Waterways extending to a total length of 372 KM. Among them, 31 Waterways to a length of 103 KM are maintained by CoC and 18 Waterways to a length of 269 KM is maintained by PWD. Out of the 31 canals Chennai Corporation maintains, 16 canals are in the core city and 15 canals are in the extended areas.
### Exhibit 6.28 Requirements to meet the NUHM norms

<table>
<thead>
<tr>
<th>Infrastructure and manpower requirement</th>
<th>Total Required (nos)</th>
<th>Core area</th>
<th></th>
<th>Extended area</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Available</td>
<td>Required</td>
<td>Available</td>
<td>Required</td>
</tr>
<tr>
<td>Total UPHC</td>
<td>140</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Total No. of U-CHC</td>
<td>15</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Medical Officer (2/UPHC)</td>
<td>280</td>
<td>200</td>
<td>0</td>
<td>0</td>
<td>80</td>
</tr>
<tr>
<td>Staff Nurse (4/UPHC)</td>
<td>560</td>
<td>90</td>
<td>310</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Pharmacist (1/UPHC)</td>
<td>140</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Lab Technician (1/UPHC)</td>
<td>140</td>
<td>65</td>
<td>35</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Public Health Nurse</td>
<td>140</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>ANM (1/10,000 Population)</td>
<td>750</td>
<td>0</td>
<td>550</td>
<td>0</td>
<td>200</td>
</tr>
<tr>
<td>Secretarial/Ministerial Staff</td>
<td>280</td>
<td>0</td>
<td>200</td>
<td>0</td>
<td>80</td>
</tr>
<tr>
<td>Support Staff (3/UPHC)</td>
<td>420</td>
<td>93</td>
<td>155</td>
<td>52</td>
<td>120</td>
</tr>
<tr>
<td>Community Health Volunteers</td>
<td>3,750</td>
<td>0</td>
<td>2,750</td>
<td>0</td>
<td>1,000</td>
</tr>
<tr>
<td>Mahila Arokkia Samiti (MAS)</td>
<td>15,000</td>
<td>0</td>
<td>11,000</td>
<td>0</td>
<td>4,000</td>
</tr>
<tr>
<td>Local Health Visitor (LHV)</td>
<td>140</td>
<td>70</td>
<td>20</td>
<td>10</td>
<td>40</td>
</tr>
</tbody>
</table>

*Source: CoC*

#### Scale up of Amma canteens

The CoC plans to increase the number of canteens to 1000 translating into 5 canteens per ward. As a first step it is planning to increase the number of canteens to 400 by 2015 (2 per ward). The CoC is also planning to integrate the operations of the Amma canteens into a single department so as to improve monitoring and control.

#### Management of Public toilets

The CoC plans to add 350 more Public conveniences. The CoC has initiated a process to privatize the management of public toilets. The project plans for to outsource the management of Public toilets to private players under DBFOT contract. The contractors are expected to raise funds through advertisement revenue. CoC will be responsible for monitoring private contractors with monthly/quarterly review.

#### 6.5.4. Institutional perspective

The Health and social welfare service of CoC is headed by the Deputy Commissioner (Health).

The Health department is headed by the City Health Officer who is supported by an additional health officer followed by officers at a zonal level. The public health department has around 11 zonal health officers, 74 Medical officers, 52 sanitary officers, 129 sanitary inspectors, and 223 Basic health workers.

The Family welfare department is headed by the District Project co-ordinator officer who is supported by District family welfare Medical officers, followed by officers at the zonal level. The EOCs, Maternity centers and Health posts are governed by the Medical officer.