PROJECT PREPAREDNESS FRAMEWORK

SUSTAINABLE MOBILITY
Project Preparedness Framework - Sustainable Mobility
City Investments To Innovate, Integrate and Sustain

Amritsar - Development of Sustainable and Green Public Transportation in Amritsar City
Dehradun - Child Friendly and Commuter Centric Dehradun Smart City Sustainable Mobility Plan

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The ‘Supporting Smart Cities Mission for a more inclusive and sustainable urban development in India’ is a joint program of the Ministry of Housing & Urban Affairs (MoHUA), Agence française de développement (AFD), European Union (EU), and National Institute of Urban Affairs (NIUA). It aims at putting in place a complementary instrument for the Smart Cities Mission (SCM) to provide financing incentives and technical support for demonstrative projects that were selected through a competitive process. It supports projects of excellence, and builds the capacity of Urban Local Bodies to implement integrated projects. The program will also develop peer learning activities, develop cooperation between smart cities and enhance the capitalisation of best practices at state and national levels.

A core component of this program is City Investments to Innovate, Integrate, and Sustain (CITIIS). Twelve projects have been selected across twelve smart cities under the program through a challenge process. The CITIIS Program Management Unit (PMU) established at NIUA started visiting the Smart City Special Purpose Vehicle (SPVs) soon after the tripartite agreements were signed in March, 2019. This handbook provides the initial assessment of projects as per the project proposal submitted by the SPV and observations of the CITIIS PMU from the city visits.
A. Project Information
Project Name: Development of Sustainable and Green Public Transportation in Amritsar City

Project Owner: Amritsar Smart City Limited (ASCL)

CITIIS Thematic Area: Sustainable Mobility

City Profile*:
- Population: 11,32,383
- Area: 136 sq. km.
- Density: 8,326 persons per sq. km.
- Literacy Rate: 84.19 percent
- Ease of Living Index Rank, 2018: 76

Additional Information from Site Visits
Key information at the city level is listed under.
- Variable Population Density: (125-800 persons/acre)
- High Population Growth Rate: @2.5 percent per annum
- High floating population: over 70,000 persons per day
  *Census of India, 2011

B. Project Description
The existing bus network in Amritsar-BRTS (Bus Rapid Transit System) and City Bus Network that serve as the means of public transportation in the city. However, this system has limited coverage. Therefore, the Municipal Corporation of Amritsar (MCA) has undertaken several initiatives over the last five years to improve and augment transportation services in the city, including the preparation of a Comprehensive Mobility Plan in 2012, construction of a 31 kilometres long BRTS corridor, and establishment of Amritsar City Transport Services Ltd (ACTSL).

The existing system of public transportation in Amritsar includes:
- BRTS: Span of 31 kilometres, a fleet of 93 AC buses,
and 3 operational corridors;
- Mini Bus System: 60 mini buses run by ACTSL; and
- Approximately 40,000 diesel run and privately-owned auto rickshaws

The proposed project also targets the creation of last mile connectivity for all citizens through introduction of feeder bus service. Additionally, it aims to address the following concerns:
- Absence of public transportation in extended areas of the city.
- Lack of last mile connectivity and absence of an effective feeder network to the BRTS.
- Low modal share (1.5 percent) of public transportation.
- Moderate to poor Air Quality Index (AQI) due to a rise in the number of private vehicles and diesel run auto-rickshaws.
- The reluctance of citizens to switch from affordable modes like privately run auto rickshaws to higher priced modes of transportation like buses.

I. Project Objectives
1. Provide e-mobility experience to all residents and visitors in Amritsar.
2. Increase in modal share of public transport.
3. Reduce air pollution caused by diesel powered public transport and Intermediate Public Transport (IPT) services.
4. Provide a comprehensive system for charging infrastructure.
5. Provide an effective feeder network to the BRTS corridors.
7. Reduce operational expenditure of city bus service fleet by introduction of e-mini buses.

II. Proposed Project Components

<table>
<thead>
<tr>
<th>No.</th>
<th>Area Based Components</th>
<th>Characteristics</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Electric Minibus</td>
<td>30 mini buses to ply on 3 routes (North-South)</td>
<td>Transport</td>
</tr>
<tr>
<td>2.</td>
<td>Electric Three Wheelers</td>
<td>Replacement of 5,000 Unauthorised and 4,000 Authorised Diesel Auto Rickshaws (regularisation) with E-3 Wheeler (speed &lt; 25 Km/hr) and E-3 Wheeler L5 (Level 2)</td>
<td>Transport, Air Quality</td>
</tr>
<tr>
<td>3.</td>
<td>Charging Infrastructure</td>
<td>15 E-Mini Bus Chargers, 225 AC Smart Chargers, and 225 DC Fast Charger</td>
<td>Energy Supply</td>
</tr>
</tbody>
</table>
### III. Selection Criteria

#### Relevance & Feasibility
- The proposal aims at augmenting the public transport fleet (BRTS) in Amritsar city with e-buses. This will significantly increase the modal share from 1.5 to 20 percent.
- Integration of e-rickshaws with e-buses for last mile connectivity.
- Convergence of the project with ICT initiatives launched under the Smart Cities Mission.
- Amritsar Smart City Limited (ASCL) and Amritsar City Transport Services Ltd (ACTSL) shall be responsible for planning and implementation of the project.
- ASCL will be responsible for the procurement of e-buses and ACTSL would be responsible for operations.
- Procured e-buses and vehicle infrastructure is envisaged to be accessible for all, including persons with disabilities.
- The SPV envisages to capture funds through monetisation of land banks, improve collection of property taxes, betterment costs and cess for improved service delivery.

#### Sustainability Aspects
- A key element of this project is equitable access to public transport system to all the city residents.
- The envisioned e-bus services will enable a cost-effective mode of transport. Further the project also provides a comfortable and convenient way of travel for disabled and senior citizens.
- Convergence of the project with other IT related initiatives (e.g. ICCC project) launched under the Smart City Mission, will help in creating a safe and secured environment, especially for women.
- Reservations in the proposed transport system for women.
- ACTSL shall select a suitable private operator who will be responsible for running the buses on the defined routes based upon the predefined rules, regulations and associated covenants.
- Reduction in travel costs. The e-buses and e-3 wheelers will have lower O&M expenditure through which an affordable fare structure has been proposed.

#### Innovation and Integration Aspects
- For effective maintenance and operation of e-Buses emphasis will be given by maintaining vehicle health monitoring system at the bus depot and terminal points.
- Proposed central command and ITS based intervention will help in real time tracking of e-Buses and improved schedule adherence.
- Public information system will be provided on all the bus station as well as IPT stops to alert the passenger and seamless transfers.
- Interactive mobile applications would help in planing the journey in advance and minimise the waiting time.
- Common smart card for all the modes would help in avoiding the inconvenience of buying a ticket every time of travel.
- The cost of the operation and maintenance shall be borne by the private operator selected through transparent bidding process. The private operator would recover the O&M cost through pre-decided fare system.
- Bundling of projects: convergence with e-bus project will invite minimum bottlenecks while planning and implementation, as both look at ICT based interventions.

#### Participatory Approach
- ASCL has in house team of communication experts who have a larger role of sensitizing the city residents about various projects currently being envisaged under Smart City project.
- ASCL shall appoint a dedicated branding & outreach company.
- Regular consultation with auto rickshaw owners to switch from diesel run autos to e-vehicles.
- Collaboration with NGOs to sensitize citizens about the potential benefits of e-vehicles.
- Discussion with private sector organisations to explore alternative sustainable technologies available in areas of e-buses.

#### Focus on E&S issues
- At the time of Battery storage it will require prior clearance from SPCB as per The Batteries (Management and handling) Rules, 2001.
IV. Tentative Financing Plan and CITIIS Grant Allocation

<table>
<thead>
<tr>
<th>No.</th>
<th>Project Financial Resources</th>
<th>Cost (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>CITIIS Grant Requested</td>
<td>80,00,00,000</td>
</tr>
<tr>
<td>2.</td>
<td>CITIIS Grant Allocated</td>
<td>80,00,00,000</td>
</tr>
<tr>
<td>3.</td>
<td>Other Sources of Finance</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Self-financing in Maturation Phase</td>
<td>3,00,00,000</td>
</tr>
<tr>
<td>5.</td>
<td>Self-financing in Implementation Phase</td>
<td>25,33,00,000</td>
</tr>
<tr>
<td>6.</td>
<td>Co-financing in Implementation Phase (50% contribution on Procurement of E-3 wheelers by Auto Rickshaw Owners)</td>
<td>60,50,00,000</td>
</tr>
<tr>
<td>7.</td>
<td>Total from Other Sources of Finance</td>
<td>88,83,00,000</td>
</tr>
<tr>
<td></td>
<td>Total Project Cost</td>
<td>1,68,83,00,000</td>
</tr>
</tbody>
</table>

C. Preliminary Assessment of Project Proposal

Prior to the first field visit to the Amritsar, the CITIIS PMU carried out a preliminary assessment of the selected project by reviewing the submitted project proposal, supporting documents, and the SPVs presentation made to the CITIIS jury. The objective was to assess several factors, including level of readiness of the SPV, pre-requisites to the project, anticipated risks such as social, environmental, technical, administrative, and institutional risks.

I. List of anticipated Project Risks

<table>
<thead>
<tr>
<th>No.</th>
<th>Risk Type</th>
<th>Risk Anticipated</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Environmental and Social</td>
<td>• Disposal of old diesel run auto rickshaws</td>
<td>CITIIS PMU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Impact on the livelihood of drivers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Battery storage: clearance requirement from State Pollution Control Board</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Technical</td>
<td>• Operation and Maintenance of e-vehicles is an anticipated risk</td>
<td>SPV in Project Proposal</td>
</tr>
<tr>
<td>3.</td>
<td>Institutional</td>
<td>• Integration of common fare collection system between different modes of transport</td>
<td>SPV in Project Proposal</td>
</tr>
<tr>
<td>4.</td>
<td>Social</td>
<td>• Behavioural change of citizens to adapt to new modes of public transportation</td>
<td>SPV in Project Proposal</td>
</tr>
</tbody>
</table>

II. Required Project Specific Clarifications

In addition, the PMU also compiled a list of questions against required clarifications from the SPV during the course of their site visit.

1. As per the project proposal, the auto rickshaw owners would make 50 percent contribution on procurement of E-3 wheelers (Total Estimated Cost: INR 60,50,00,000 or INR 67,000 per driver). Clarification required on whether this contribution is equal to or up to 50 percent. Moreover, there is a risk involved in this plan, as auto drivers might not want to purchase new electric vehicles.
2. Clarification required in understanding the capacities of key actors/stakeholders in the project and proposed partnerships for the project.
3. The project aims at enabling a cost-effective mode of commute in the city through the introduction of e-bus services. Details required on the extent to which fares will reduce from the current system.

D. City Report

The first city visit to Amritsar was organised on 28th March 2019, comprising of a seven-member delegation from Agence Française de Développement (AFD) and National Institute of Urban Affairs (NIUA). The agenda consisted of briefing sessions by the SPV for the delegation, site
visit, address by the delegation, presentations regarding various aspects of planning and implementation of the proposed project. The City Report consists of information obtained through discussion during the filed visits, including information on preparedness and readiness of the SPV, gaps in existing project related documentation, project robustness, institutional processes, and risks associated with the project.

I. City Preparedness
This section aims to highlight problem areas, evaluate capacity and readiness of SPVs, and gauge necessary project requirements at the start of the maturation phase. City preparedness has been categorised under four broad headings.

1. Key Facts from Site Visits
2. Requirement of Project Specific Information
3. Current Organizational Structure of the SPV
4. Stakeholder Connect Status

1. Key Facts from Site Visits
Additional information on public transportation in the city obtained during site visit.
- Total of 200 available but non-functional buses.
- Demand for local commute is high due to a high floating tourist population.
- Comprehensive Mobility Plan for Amritsar City was prepared in 2012. This document could be used for baseline information for the project.
- Parking requirements for auto rickshaws and e-rickshaws would be crucial area of concern for the proposed project.

The proposal aims at increasing the modal share of public transport from 1.5 to 20 percent. Additionally, the project aims to reduce usage of private modes of transport, subsequent improvement in overall air quality and reduction in carbon footprint.

2. Requirement of Project Specific Information
1. Details required on location of bus stations and charging infrastructure.
2. Requirement of study on financial sustainability of the project, and approximate revenue generation per annum.
4. Understanding the inter and intra city traffic and mobility pattern, mapping the travel behaviour of people, and the movement pattern of goods are a crucial requirement of the proposed project. A list of required surveys is mentioned below. The list could be considered by the mentor as a start to build upon and prepare an exhaustive survey requirement list.
   - Baselines Studies
     - To establish the exact number of public transport vehicles (buses/auto rickshaws/e-
Rickshaws) and categorize w.r.t., a) Type; b) Operational routes; c) Intercity or intra city; d) Age of vehicles; d) In use or not in use; e) Type of Ownership; f) Status of registration.

- To understand the scale of livelihoods dependant on auto rickshaws as mode of transportation.
- To understand peoples’ willingness to pay for the newly introduced e-vehicles.

Additionally, clarity as well as further assessment/studies would be required in the proposed project components. Few are listed as under.

- Location and demand of charging infrastructure for e-vehicles.
- Type of technology deployed for batteries (Lithium Ion to be explored for usability, relevance, financial sustainability, and availability in the country).
- Long duration of time for environmental clearance processes. Clearance would be required for battery disposal, old vehicle disposal, and ensuring battery safety.
- Financing plan that aligns with the socio-economic status of the rickshaw owners.
- Phasing plan for the project to detail out how the existing system would be converted into e-rickshaws.
- Alternative Implementation Plans and Models could be explored (As an example, one time Amnesty Plan) that focuses on ensuring long term sustainability and replicability of the project.

3. Current Organizational Structure of the SPV

- Strong leadership. The SPV comprises of the Additional Municipal Commissioner, the District Commissioner, and the Divisional Commissioner).
- Presently the positions of CEO and the Additional Municipal Commissioner of Amritsar Municipal Corporation are held by the same person.

Please refer to Annexure I for a detailed Staffing Plan of the SPV.

4. Stakeholder Connect Status

- Presence of some primary network members in the initial meetings. However, no official City Level Advisory Forum (CLAF) members were present.
- Strong reliance on the local language (Punjabi).
- Need of token participation has been identified to prevent vandalism and take ownership of assets.

II. Project Robustness

This section aims to gauge the robustness of proposed project components and establish if any alteration/modifications would affect project implementation.
and subsequently its success. The SWOT (Strength, Weakness, Opportunities, and Threats) analysis given below lists the current situation of the project, assesses the impact of internal and external factors on the project, as well as current and future potential.

1. Components

The proposed project components are in line with the overarching CITIIS principles of inclusion, sustainability, and participatory planning.

2. SWOT Analysis

<table>
<thead>
<tr>
<th>No.</th>
<th>SWOT</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| 1.  | Strengths | • Openness and prior success at experimentation.  
|     |        |   - The BRT is being run for free to bring in public acceptability.  
|     |        |   - Willingness to initiate stakeholder discussions (stakeholders including the traffic commissioner, RTO chief, NGO representative, State Pollution Control Board representatives were present at initial meeting).  
|     |        |   - Understanding of the magnitude and sensitivity of the problem with respect to enforcing e-vehicles.  
|     |        |   - Willingness to experiment again despite prior failures (shutting down of public transportation network).  
|     |        |   - Willingness to learn from peer cities and mentoring resources .  
| 2.  | Weaknesses | • Organisational weaknesses:  
|     |        |   - Project Management Consultants (PMC comprises experts from various domains, including transport planning, and social development. However, SPV staffing capacity is very low, comprising of only 2-3 persons.  
|     |        |   - E&S Nodal officer has been designated from another organization (Amritsar Improvement Trust). Project may require a designated E&S Nodal Officer, with expertise in environmental and social planning.  
|     |        |   - Weak participatory mechanisms and network.  
|     |        |   - Low capacity to maintain assets (buses purchased under JNNURM are not operational)  
|     |        |   - Gender skewing towards men in planning and administration.  
|     |        |   - Low or no consideration to E&S yet. Lack of informed representatives.  
|     |        |   - Low or no parking regulations and no consideration to bicycles yet. Also, heavily commercialised streets especially in the old city- low speeds and heavy on street parking.  
|     |        |   - Existing identified charging infrastructure stations are poorly managed, poor safety mechanisms, low utilisation of available resources in crowded locations. The planning of entry and exit routes of vehicles would be crucial.  
| 3.  | Opportunities | • Integration of all modes as one system (e-buses, e rickshaws, rickshaws and the defunct bus system).  
|     |        |   - To build a robust capacity building program driven by the strong leadership of the SPV Commissioner.  
|     |        |   - Integrate the proposal on pedestrianization in the Smart City Proposal (SCP) with public transportation proposal in CITIIS.  
|     |        |   - To bring new technology (Lithium ion batteries and for disposal and scraping of rickshaws) through AFD partnerships, not done in the city before.  
|     |        |   - Targeting women empowerment through making women drive the vehicles as well as own them and infusing gender sensitive planning in the project.  
|     |        |   - Integrate public transportation with parking reforms and air quality improvements  
|     |        |   - Introduce seamless transition methods or smart cards to improve the travelling experience.  
| 4.  | Threats | • Presence of a strong auto rickshaw union was cited. A strong rationale for the selection methodology would be required. Getting them on board is crucial for the success of the project.  
|     |        |   - Lack of acceptance for regularisation or route rationalisation.  
|     |        |   - Behavioural change- unacceptance of increased fare immediately post rationalisation.  

III. Environmental Risk Assessment for each of the components
1. Electric Minibus: 30 mini buses to ply on 3 routes (North-South)

<table>
<thead>
<tr>
<th>No.</th>
<th>Inputs</th>
<th>Process Steps*</th>
<th>Output notes/Questions*</th>
<th>Risks and Potential Negative Impacts on Environment and Communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Purchase of electric buses</td>
<td>Assessing the total demand of the buses.</td>
<td>Rationale for selection and prioritisation of the routes needs to be established</td>
<td>Social impact on discontinuation of some bus routes if any, needs to be verified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Would the purchase of new vehicles lead to phasing away of old vehicles?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>If yes, then how many buses are to be phased out, on what routes and the details</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>If Yes, then the disposal mechanism can lead to environmental impacts.</td>
</tr>
</tbody>
</table>

Note: *Some of these aspects are not yet clear. These questions need to be explored with the SPV through meetings and/or the baseline should include these questions.

<table>
<thead>
<tr>
<th>No.</th>
<th>Risks</th>
<th>Probability of Occurrence</th>
<th>Severity of Occurrence</th>
<th>Risk Prioritization</th>
<th>Rationale for Risk Prioritisation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>The impacts can be mitigated through an appropriate route rationalisation study. Also, the entire system is presently not being replaced.</td>
</tr>
<tr>
<td></td>
<td>Social impact on discontinuation of some bus routes if any, needs to be verified.</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Environmental impacts in case of disposal of old buses</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>The number of buses is not high. A vehicle disposal plan can be prepared as part of the mitigation measures following the &quot;Guidelines for Environmentally Sound Management Of End-Of-Life Vehicles (ELVs)&quot; by CPCB and collaboration with India's first authorised car recycler in India (<a href="https://cerorecycling.com/">https://cerorecycling.com/</a>).</td>
</tr>
</tbody>
</table>

* Categorised as High, Substantial, Moderate, Low Impacts as per AFD and WB risk Categorisation
2. Electric Three Wheelers: Replacement of 5,000 Unauthorised and 4,000 Authorised Diesel Auto Rickshaws (regularisation) with E-3 Wheeler (speed < 25 Km/hr) and E-3 Wheeler L5 (Level 2)

<table>
<thead>
<tr>
<th>No.</th>
<th>Inputs</th>
<th>Process Steps*</th>
<th>Output notes/Questions*</th>
<th>Risks and Potential Negative Impacts on Environment and Communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Purchase of E-3 Wheelers</td>
<td>E-Rickshaw design</td>
<td>Design elements of the rickshaw</td>
<td>Safety features of the E-Rickshaws for commuters Disposal of old E Rickshaws</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E-Rickshaw procurement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Replacement of 5000 unauthorised and 4000 authorised diesel auto rickshaws</td>
<td>Identification of the rickshaws to be replaced. What would be the process? How would the unauthorised rickshaws be identified? What policy level steps are required for regularisation of E-Rickshaws</td>
<td>Phasing plan for diesel operated vehicles required?</td>
<td>Impact on the livelihood of drivers- assessment of impacts required; livelihood transition plan is required with appropriate phasing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Risks</th>
<th>Probability of Occurrence</th>
<th>Severity of Occurrence</th>
<th>Risk Prioritization</th>
<th>Rationale for Risk Prioritisation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Safety elements and standards can be inbuilt as part of the procurement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Substantial</td>
<td>Substantial</td>
<td>Substantial</td>
<td>Innovative solutions need to be derived for disposal of old vehicles. The risk is considered substantial because of the number (9000) of E-Rickshaws to be disposed. Follow “Guidelines For Environmentally Sound Management Of End-Of-Life Vehicles (ELVs)” by CPCB and collaborate with India’s first authorised car recycler in India (<a href="https://cerorecycling.com/">https://cerorecycling.com/</a>)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Substantial</td>
<td>Substantial</td>
<td>Substantial</td>
<td>A phasing plan can ensure loss of livelihoods does not occur. However, critical needs to identify stakeholders and affected persons for effective transition plan.</td>
</tr>
</tbody>
</table>


### 3. Charging Infrastructure: 15 E-Mini Bus Chargers, 225 AC Smart Chargers, and 225 DC Fast Charger

<table>
<thead>
<tr>
<th>No.</th>
<th>Inputs</th>
<th>Process Steps*</th>
<th>Output notes/Questions*</th>
<th>Risks and Potential Negative Impacts on Environment and Communities</th>
</tr>
</thead>
</table>
| 1.  | Identify locations for charging | Assessing the total number required and locations for charging infrastructure | Location assessment of the charging infrastructure with respect to safety, accessibility, availability, viability | Safety of charging infrastructure  
Locational suitability of the charging points with respect to surrounding activities  
Explore Potential to install direct charging solar panels on or near charging points to reduce carbon footprint. |
| 2.  | Battery for storage and disposal | Identify appropriate technology of battery with respect to cost and environmental impacts | Safe battery storage; Battery disposal would require compliance to the The Batteries (Management and Handling) Rules, 2001 and its amendments till date, in case of lead-acid batteries only. |

<table>
<thead>
<tr>
<th>No.</th>
<th>Risks</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>Substantial</td>
<td>Moderate</td>
<td>Low</td>
</tr>
</tbody>
</table>
| 1.  | Safety of charging infrastructure | Low | Low | Low | Low | Location plan can be suitably proposed.  
All proposed sites for charging infrastructure on Municipal land |
| 2.  | Locational suitability of the charging points with respect to surrounding activities | Low | Low | Low | Storage equipment and spaces would need to be well ventilated with gas sensors and acid spill management protocol.  
End of life disposal to be done as per The Batteries Rules, hence, have buy back policy with supplier in place. |
| 3.  | Safe battery storage; Battery disposal would require conformance to The Batteries (Management and Handling) Rules, 2001 and its amendments till date | Moderate | Moderate | Moderate |  |
IV. Measures for Project Risk Management (to be filled by Mentors)
1. Risk Amelioration/Reduction Measures
   This section would aim at risk reduction measures that may include redefining project components, or rejecting components as required.

2. Risk Management Measures
**A. Project Information**

**Project Name:** Child Friendly and Commuter Centric Dehradun Smart City Sustainable Mobility Plan  
**Project Owner:** Dehradun Smart City Limited (DSCL)  
**CITIIS Thematic Area:** Sustainable Mobility

**City Profile:**
- **Population:** 569,578
- **Area (sq. kms.):** 68.18
- **Density (persons per sq. km.):** 8,354
- **Literacy Rate:** 88.36%
- **Ease of Living Index Rank, 2018:** 80
- **No. of Projects (proposed) under Smart Cities Mission:** 28
- **Public mode share -** 18%

*Dehradun is known as hub of green edges and grey hair owing to it being a preferred destination for retirement home. *
*Census of India, 2011*

**B. Project Description**

Dehradun is one of the premier tourist destinations in the country. Around 33 percent of the total trips to the city are for tourism purposes. Work trips and education trips constitute 34 percent and 10 percent respectively. Buses function as the main public transport system with mini buses and Vikrams/tempos plying as feeder routes to the public transport.

Around 250 buses (24 seaters) ply on the existing routes of the city, with an average frequency of 15 minutes against the fixed operational average of 7 minutes as prescribed by the Regional Transport Office. There are also 800 Vikrams (diesel rickshaws) that ply through the city. However, there are many issues associated with operation of buses in the city:

1. Unorganised bus routing and pattern.
2. Lack of basic facilities like bus queue shelter and designated stops along the routes.
3. Due to disorganised bus services, people rely more on pollution causing Vikrams for commute.
4. Lack of quality of public transport system in the city, overloading during peak hours, inconsistent fares, short boarding and alighting time, poor frequency during non-peak hours are some other issues associated with bus services in the city.
6. Lack of a passenger information system to make public transit seamless.
7. Lack of pedestrian infrastructure disrupts first and last mile connectivity.

The project envisages to encourage a modal shift to public transportation systems with feeder services and Non-Motorised Transport (NMT) across the city to reduce air pollution, road accidents, congestion and wastage of time and money for residents, students and tourists.

I. Project Objectives
1. To revamp the existing public transport and para transit system through strategic utilization of existing network routes, plying of buses and IPTs. This would improve traffic congestion and increase the access for everyday commuters, school going children and incoming tourists.
2. To develop public transport boarding and alighting infrastructure to ensure safety and ease of access for users and particularly for school children.
3. To encourage a modal shift to public transport and paratransit by easing journey planning via. Information on real time vehicle arrival, boarding, alighting nodes, fares, frequency, journey time etc. The e-app will include different profile features to aid tourists, children, and other commuters alike.
4. To improve the regulatory system of public and para transport by formulating a unified authority that can regulate and monitor the operation of private buses and IPTs with a fixed fare, route, and frequency.
5. To develop a seamless multi modal daily commute where walkability is encouraged as the first and last mile connectivity to public transport for safe commuting of children, elderly and infirm.
II. Proposed Project Components

<table>
<thead>
<tr>
<th>No.</th>
<th>Area Based Components</th>
<th>Characteristics</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Solar powered, Minimal Designed Bus and IPT Shelters</td>
<td>Bus shelters, digital signage/ advertisement board, information kiosks, rooftop solar panels, LTE antennas, IPT shelters</td>
<td>Energy Efficiency</td>
</tr>
<tr>
<td>2.</td>
<td>Child Friendly Pedestrian Infrastructure</td>
<td>Footpath and sidewalk, bollards, tactile paving, curb ramps, slopes, beautification, play areas</td>
<td>Walkable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Non-Area Based Components</th>
<th>Characteristics</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Route Service Rationalisation of Intermediate Public Transport (IPT) mode and Implementation</td>
<td>Route rationalization study and operation and service plan for the IPT mode to optimise, organise and monitor the IPT mode based on land use; Formulate a unified authority who can set standards and regulate and monitor the operation of private buses and IPT with a fixed fare, route, frequency.</td>
<td>Transport</td>
</tr>
<tr>
<td>2.</td>
<td>Public Transport Passenger Information System</td>
<td>Real-time monitoring of bus and IPT routes via a mobile application, and Journey Planner App</td>
<td>ICT-enabled government services</td>
</tr>
</tbody>
</table>

III. Selection Criteria

**Relevance & Feasibility**

- **Relevance:** The following interventions are proposed using the CITIIS grant to resolve the mentioned mobility problems of passengers:
  - Route rationalization of the bus and IPT modes.
  - Construct of dedicated bus and IPT shelters with adequate infrastructure.
  - Real-time monitoring of bus and IPT routes and enabling services via mobile/web application.
  - Formulate a unified authority who can regulate and monitor the operation of private buses and IPT with a fixed fare, route, frequency.
  - Strategic positioning of bus and IPT shelters near schools, and other educational institutions to encourage children to utilize public transportation services.
  - Developing universally accessible footpaths.
- **Past-experience of the ULB:** The ULB does not have a track record of experience in a similar sector. ULB has adequate human resource and additional can be hired.
- **Capacity:** At present the ICT infrastructure is not well structured. However, the proposed Intelligent Traffic Management System linked to the Integrated Command and Control Centre proposed to be established at the Information Technology Development Agency (ITDA) will serve as the base for all ICT mobility proposals.
- **Innovative finance source:** None envisaged at present.

**Sustainability Aspects**

- Universal design principles will be applied for designing the streets and affiliated infrastructure.
- The ICT-Passenger Information App will have a separate feature for children enabled with privacy of user data and SOS system for safety.
- Security of passengers will be ensured through well-lit bus stops and footpaths.
- The kiosks at bus shelter will be solar powered and they will also generate revenue through advertising space. The passenger information application shall also include advertisements for revenue generation.
The components of public transport and walkability proposal covers several features for differently abled, children, women and elderly. Principles of universal design will be adopted and implemented in the project. 
- Mobile app will also have a separate feature for children.
- Privacy will be maintained at all dataset fields and stakeholder information collection.
- The passenger information app will have an SOS system for their safety. Security will also be ensured with well-lit bus stops/footpaths.
- The proposal aims to optimise the trip and service of buses and IPT and encourage seamless multi modalism integrating buses as the primary public transport, IPT as the feeder service and footpaths as first and last mile connectivity. The switch from private modes to buses will reduce the number of vehicles and is envisaged to bring down pollution levels considerably.
- Project will be operationalised within the capacity of the SPV.
- The passenger information mobile application component can include advertisements to generate revenue for its operations and running.
- Solar powered IPT/Bus shelters kiosks will be fitted with placeholders for advertisement, to generate revenue for maintenance and upgradation of the shelter and kiosk.
- The destinations (parks, institutions, tourist spots, schools) to which the footpaths are linked are encouraged to maintain the footpaths.

**Innovation and Integration Aspects**
- Prefabricated bus shelters and kiosks will be assembled using recycled material. The design includes retrofitting of rear-end of the shelter with greenery and the rooftop with solar panels to convert the kiosk into a self-sufficient structure for energy and lighting.
- Web/Mobile Application based Public Information System maybe adopted to understand everyday traffic behaviour and the traffic management system.
- Assembling of prefabricated bus shelters/ kiosks with recycled materials.
- Variable signboards and advertisement canvas as well as PIS (Passenger Information system).
- CITIIS projects to be bundled with SCM projects.
- Universal access design principles for pedestrianization and ease of use can be replicated across different areas as an upgradation measure.
- Bus shelters with minimal carbon footprint can be adopted by cities.
- Web/mobile app PIS can be adopted to understand their everyday traffic behaviour and the traffic management system.

**Participatory Approach**
- In-depth stakeholder analysis will be conducted for the development of applications and in assessing the data through a stated preference model.

### IV. Tentative Financing Plan and CITIIS Grant Allocation

<table>
<thead>
<tr>
<th>No.</th>
<th>Project Financial Resources</th>
<th>Cost (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Citiis Grant Requested</td>
<td>58,00,00,000</td>
</tr>
<tr>
<td>2.</td>
<td>Citiis Grant Allocated</td>
<td>46,40,00,000</td>
</tr>
<tr>
<td>3.</td>
<td>Other Sources of Finance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Self-financing in Maturation Phase</td>
<td>2,50,00,000</td>
</tr>
<tr>
<td></td>
<td>Self-financing in Implementation Phase</td>
<td>3,50,00,000</td>
</tr>
<tr>
<td></td>
<td>Additional Amount to be raised by SPV</td>
<td>5,60,00,000</td>
</tr>
<tr>
<td>4.</td>
<td>Total from Other Sources of Finance</td>
<td>11,60,00,000</td>
</tr>
<tr>
<td>5.</td>
<td>Total Project Cost</td>
<td>58,00,00,000</td>
</tr>
</tbody>
</table>
C. Preliminary Assessment of Project Proposal

Prior to the first field visit to the Dehradun, the CITIIS PMU carried out a preliminary assessment of the selected project by reviewing the submitted project proposal, supporting documents, and the SPVs presentation during CITIIS jury. The objective was to assess several factors, including the level of readiness of the SPV, pre-requisites to the project, anticipated risks such as social, environmental, technical, administrative, and institutional risks.

I. List of anticipated Project Risks

<table>
<thead>
<tr>
<th>No.</th>
<th>Risk Type</th>
<th>Risk Anticipated</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Environmental and Social</td>
<td>• Land Acquisition for properties abutting the right of way</td>
<td>CITIIS PMU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Displacement of people and commercial structures</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Clearing of vegetation/trees in certain parts</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Financial</td>
<td>• Direct costs in constructing new facilities for e-solutions, and indirect costs of training programs (capacity building) for public servants involved in the ICT components pose a significant hurdle.</td>
<td>SPV in Project Proposal</td>
</tr>
<tr>
<td>3.</td>
<td>Social</td>
<td>• The adherence of bus and IPT operators in updated routing and traffic network based on route rationalization plays a significant role in the successful implementation of organized routing.</td>
<td>SPV in Project Proposal</td>
</tr>
</tbody>
</table>

II. Required Project Specific Clarifications

General
1. What is the level of maturity and level of acceptance for the establishment of a city-level Unified Transport Authority (UTA) in Dehradun?
2. More clarity is required on how the UTA and SCM converge/relate.
3. The Project feasibility is questionable as currently there is no public transport in the city.
4. The through traffic because of nearby tourist destinations needs to be considered.

Environmental and Social Safeguards
1. What number of trees would require to be felled? Are they on hill slopes?
2. Some acquisition of residential properties for
abutting the RoW is mentioned? What would be the magnitude of such acquisition?
3. Displacement of commercial buildings is mentioned. The number of such buildings and the extent of livelihood loss (to tenants and owners) is not mentioned.
4. What is the magnitude of commercial vendors and squatters that are likely to be displaced?

D. City Report
The first city visit to Dehradun was organised on 24th-25th April 2019, comprising of a four-member delegation from National Institute of Urban Affairs (NIUA).

The agenda comprised of,
- Visit to the following project sites
  - Site 1: St. Thomas College, Darshan Lal Chowk, Dehradun
  - Site 2: St. Joseph’s Academy, Rajpur Road, Dehradun
  - Site 3: Govt. Girls Inter College, Rajpur Road, Dehradun
  - Site 4: Govt. Upper Primary and Secondary School, Parade Ground, Dehradun
- Detailed presentation on CITIIS project by DSCL and PMC
- Detailed presentation and discussion on CITIIS Maturation Phase to DSCL (including CEO and Additional CEO) and representative of the PMC
- Stakeholder meeting

Discussion on E&S plan and risks was not undertaken since the SPV did not have an E&S officer at the time of project visit.

I. City Preparedness
This section aims to highlight problem areas, evaluate capacity and readiness of SPVs, and gauge necessary project requirements at the start of the maturation phase. City preparedness has been categorised under four broad headings.
1. Key Facts from Site Visits
2. Requirement of Project Specific Information
3. Current Organizational Structure of the SPV
4. Stakeholder Connect Status

1. Key Facts from Site Visits
Some key facts with regard to the education infrastructure in Dehradun are given as under.
- 46 government schools, 240 private schools, 6 government colleges.
- Student Distribution: 13,000 in govt. schools and
51,000 in private schools.
- Government Schools timing: 9:30 am - 3:30 pm, Private Schools timing: 8 am - 2 pm.
- 3 Government schools have been selected for implementation of smart schools in ABD area.

The key observations from the site visits are enlisted below.

**Site 1: St. Thomas College, Darshan Lal Chowk, Dehradun**
The main entrance of the school is on a high traffic density route, however, there is a back entrance on a relatively lower utilization road.
- There is no provision for school buses so, most of the students either walk or are dropped by their parents. However, the drop and pick-up point is at the main gate and not inside the school leading to traffic congestion during peak hours.
- There is a Forest Research Institute’s land opposite the main entrance; the school has the permission to use it as a playground.

**Site 2: St. Joseph’s Academy, Rajpur Road, Dehradun**
The school has one entrance on the Subhash Road and the pick-up and drop point for students is at the gate on this road, and not inside the school premises.
- The school has another entrance on Rajpur road which is a high traffic density route, main transit road for tourists to and from Mussoorie, a popular tourist destination.
- The footpath on Rajpur road, is lined with trees intermittently.
- A block of footpath right outside the gate on Rajpur road is completely blocked by a transformer.
- Rajpur road is planned to be developed as a Smart road under Smart City Proposal.

**Site 3: Government Girls Inter College, Rajpur Road, Dehradun**
- The Govt. Girls Inter College is on Rajpur road, which is a high traffic density route, main transit road for tourists to and from Mussoorie.
- This is one of the 3 schools being modelled as smart schools as part of the Smart City Proposal.
- The footpath on Rajpur road, is lined with trees intermittently.
- This is the largest public school in Dehradun.

**Site 4: Government Upper Primary and Secondary School, Parade Ground, Dehradun**
- The school is in the parade ground area, on Subhash road, opposite Gandhi park.
There is a taxi stand right outside the school entrance.
The side of the school on the Subhash Road has an open drainage and vendor carts all along.
There is a busy bus stand on the opposite side of Subhash Road.
As part of the Smart City Proposal, there is a proposed integration of part of the Parade Ground with Gandhi Park, closure of this section of Subhash Road for traffic and a formal vendor zone.

2. Requirement of Project Specific Information
The following is a list of project specific information that is a pre-requisite to further ascertain the robustness of the project:

- Comprehensive traffic and transportation studies to facilitate identification of traffic issues in various parts of the city.
- Mapping of school locations along with key school information including the number of students classified by age, standard and mode of commute.
- Comprehensive detailing of available infrastructure and land at schools in the city for design and planning.
- Land use and land ownership mapping in the immediate vicinity of the schools.
- Public Transportation Study.

3. Current Organizational Structure of the SPV
The SPV has more than 10 technical staff members, excluding the CEO and Additional CEO and a Public Relations Officer.

4. Stakeholder Connect Status
The key stakeholders such as school authorities, transport associations especially IPT modes, traffic police, etc. need to be included as key stakeholders in the project.
Some additional stakeholders, especially citizen groups, identified are as below:
- Vyapar Mandal, an association of business owners
- Sadak Suraksha Samiti, a committee on urban road safety, includes all school principals and is headed by the District Magistrate.
- The SPV has a budget of Rs. one crore for outreach initiatives under Smart Cities Mission.

II. Project Robustness
This section aims to gauge the robustness of proposed project components and establish if any alteration/modifications would affect project implementation and subsequently its success. The SWOT (Strength, Weakness, Opportunities, and Threats) analysis given below lists the current situation of the project, assesses the impact of internal and external factors on the project, as well as current and future potential.

1. Components
Based on the preliminary site visits, the following aspects would be a prerequisite for further design and planning.
- Identification of location for IPT and bus shelters in conjunction with traffic assessment and schools’ location;
- Stakeholder consultation for safe pick-up and drop points for school children coming by private vehicles;
- Traffic management during school hours, including management of IPT transportation used as private school transport; and
- Route rationalization using comprehensive transportation studies.

2. SWOT Analysis

<table>
<thead>
<tr>
<th>No.</th>
<th>SWOT</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Strengths</td>
<td>A. Project Relevance and Necessity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Child Safety</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Most schools in Dehradun are located in crowded/congested/fully saturated neighbourhoods. Schools have not been planned for or do not have adequate infrastructure (especially Government schools) for safe commute to the school by any mode. The site visits to few schools revealed that the schools do not have:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Safe zones for children to board school buses;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hindrance free foot paths to the school;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cycle tracks since school children cycling to school have to merge with fast moving city traffic;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pedestrian crossovers for children with signages; and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Established school zones to prevent noise pollution in the vicinity of schools.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In the above context, there is a need for child friendly transport infrastructure in the city.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B. SPV Organisation structure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The SPV has a good staff strength of more than 10 technical staff members, excluding CEO and Additional CEO.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Strong-willed SPV leadership</td>
</tr>
<tr>
<td>No.</td>
<td>SWOT</td>
<td>Remarks</td>
</tr>
<tr>
<td>-----</td>
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</tr>
<tr>
<td></td>
<td>C. Public Participation</td>
<td>- The SPV already has a mechanism for public consultation and also has a full-time Public Relations Officer</td>
</tr>
</tbody>
</table>
| 2.  | Weaknesses | **A. Environment and Social Safeguards**  
- The E&S nodal officer has not been appointed yet.  
- There are uncovered sewer system and open drains near the schools.  
- The sidewalks and footpaths are poorly designed with Compact substations, traffic signal posts etc. crowding the sidewalks by the school.  
**B. Current State**  
- Private ownership of vehicles is very high, with public transportation share being only 18 percent.  
- There is no mapping of the underlying utilities network.  
- It is highly likely that Department of Education does not have GIS mapped school data since physical files were being consulted for data.  
- Parents have a preference for picking up and dropping their kids to schools, primarily for safety concerns.  
**C. Stakeholder Participation, specific to this project**  
- The project components have stakeholders across departments ranging from transportation, electricity, education, forest etc., however, the project design has not actively engaged either these departments or citizen and school representatives. |
|     | Opportunities | **A. Synergy with other Smart City Initiatives and Projects**  
Under the smart city project,  
- 30 electric buses are being procured (out of the total need of 200 buses); 179 interactive bus stops are being developed of which 25 on existing bus stops, 60 smart poles are proposed on inner dense streets and 94 new bus stops; smart roads, and intelligent traffic management systems are being planned.  
- 3 government schools in ABD area have been proposed as Smart schools;  
- A bicycle sharing system is being introduced;  
- Pedestrianization has been proposed for Paltan Bazaar area (900 m); and  
- Subhash Road, the street in front of St. Joseph’s academy is under proposal as an NMT street. |
|     | Threats | - City Readiness for establishing Unified Metropolitan Transport Authority;  
- Stakeholder support especially schools might be a determinant of project success;  
- Buy-in from school authorities as well as the parents of students might be a hurdle in project, since these are private schools catering to high-income and politically affluent population of the city;  
- Change in overall traffic behaviour in the city is also a prerequisite; and  
- Private transporters and their integration into the transportation system through regularisation, compliance to design and emission standards, is crucial. |
### III. Environmental Risk Assessment for each of the components

#### 1. Solar powered, Minimal Designed Bus and IPT Shelters

<table>
<thead>
<tr>
<th>No.</th>
<th>Inputs</th>
<th>Process Steps*</th>
<th>Output notes/Questions*</th>
<th>Risks and Potential Negative Impacts on Environment and Communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bus shelters</td>
<td>Locations are yet to be identified.</td>
<td>Need for inclusive rationale for selection of locations of bus shelters</td>
<td>Land requirement for the shelters</td>
</tr>
<tr>
<td>2</td>
<td>Information kiosks</td>
<td>Locations are yet to be identified.</td>
<td>No risks or negative impacts anticipated</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rooftop solar panels</td>
<td></td>
<td>No risks or negative impacts anticipated</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>LTE antennas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>IPT shelter</td>
<td>Locations are yet to be identified.</td>
<td>Need for inclusive rationale for selection of locations of bus shelters</td>
<td>Land requirement for the shelters</td>
</tr>
<tr>
<td>6</td>
<td>Digital signage/advertisement board</td>
<td>Locations are yet to be identified.</td>
<td>No risks or negative impacts anticipated</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rooftop solar panels</td>
<td></td>
<td>No risks or negative impacts anticipated</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** *Please note that some of these aspects are not yet clear. These questions need to be explored with the SPV through meetings and/or the baseline should include these questions*

<table>
<thead>
<tr>
<th>No.</th>
<th>Risks</th>
<th>Probability of Occurrence*</th>
<th>Severity of Occurrence*</th>
<th>Risk Prioritization*</th>
<th>Rationale for Risk Prioritisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Land acquisition requirement for Bus and IPT shelters</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>No major risks anticipated at this stage. The exact impacts would be known only after identification of the locations. Emphasis can be given to locations where land is available with the ULB, no interference with drainage, avoid traffic congestion, avoid tree cutting and have solar ideal insolation for panels.</td>
</tr>
</tbody>
</table>

**Note:** *Categorised as High, Substantial, Moderate, Low Impacts as per AFD and WB risk Categorisation*

#### 2. Child Friendly Pedestrian Infrastructure

<table>
<thead>
<tr>
<th>No.</th>
<th>Inputs</th>
<th>Process Steps*</th>
<th>Output notes/Questions*</th>
<th>Risks and Potential Negative Impacts on Environment and Communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Footpath and sidewalks, bollards, tactile paving, curb ramps, slopes, beautification, play areas</td>
<td>Identification of school locations, Initiation of urban design perspective to ensure implementation in already congested areas</td>
<td>Stakeholders consultations (example, school administration need to be roped in for sustainable and innovative solutions)</td>
<td>Livelihood of partial land Acquisition for properties abutting the right of way/ Impact on commercial structures/ Impact on trees &amp; drainage</td>
</tr>
<tr>
<td>No.</td>
<td>Risks</td>
<td>Probability of Occurrence*</td>
<td>Severity of Occurrence*</td>
<td>Risk Prioritization*</td>
</tr>
<tr>
<td>-----</td>
<td>----------------------------------------------------------------------</td>
<td>---------------------------</td>
<td>-------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>1</td>
<td>Livelihood of partial land acquisition for properties abutting the right of way</td>
<td>Substantial</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

3. Bus route information, real-time bus tracking, fare details, IPT route information, fare details

<table>
<thead>
<tr>
<th>No.</th>
<th>Inputs</th>
<th>Process Steps*</th>
<th>Output notes/Questions*</th>
<th>Risks and Potential Negative Impacts on Environment and Communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bus route information, real-time bus tracking, fare details, IPT route information, fare details</td>
<td></td>
<td></td>
<td>No Social and environmental risks anticipated except e-waste &amp; batteries management that will be required from time to time. Secure systems need to be put for real time bus tracking.</td>
</tr>
</tbody>
</table>

4. Route Service Rationalisation of Intermediate Public Transport (IPT) mode and Implementation

<table>
<thead>
<tr>
<th>No.</th>
<th>Inputs</th>
<th>Process Steps*</th>
<th>Output notes/ Questions*</th>
<th>Risks and Potential Negative Impacts on Environment and Communities</th>
</tr>
</thead>
</table>
| 1   | Route service rationalisation               | Study is required to be done | Need for inclusive and optimisation rationale for routes, IPT modes selection. | Aspects leading to E&S Risks in service rationalisation:  
  - Safety concerns in bus stop and interchange point infrastructure  
  - Fuel efficiency, missed mileage and fleet optimisation. For example, however, if the bus re-routing takes it through narrower or busier routes, it will cause pollution by idling of other fossil fuel based vehicles as they wait for it to move out of its bus stop, also overall speed on a busy road could become slower due to the slower moving bus, which was absent previously. Slower traffic will lead to emissions for a longer time. There can be other complicated issues such as “canyon effect” which can occur when there are high rises on either side and a road behaves like a canyon, making dispersion of pollutants difficult. However, the last aspect can be ignored in the present case since it is unlikely. |
### City Investments to Innovate, Integrate, and Sustain (CITIIS) 25

<table>
<thead>
<tr>
<th>No.</th>
<th>Risks</th>
<th>Probability of Occurrence*</th>
<th>Severity of Occurrence*</th>
<th>Risk Prioritization*</th>
<th>Rationale for Risk Prioritisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Safety concerns in bus stop and interchange point infrastructure</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Appropriate design features can substantially mitigate the adverse impacts</td>
</tr>
<tr>
<td>2</td>
<td>Fuel efficiency, missed mileage and fleet optimisation</td>
<td>Substantial</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Effective planning with these parameters for performance can effectively mitigate these impacts</td>
</tr>
</tbody>
</table>

### 5. Public Transport Passenger Information System

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Inputs</th>
<th>Process Steps*</th>
<th>Output notes/Questions*</th>
<th>Risks and Potential Negative Impacts on Environment and Communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Real-time monitoring of bus and IPT routes via a mobile application, and Journey Planner App</td>
<td></td>
<td></td>
<td>No Social and environmental risks anticipated</td>
</tr>
</tbody>
</table>
IV. Measures for Project Risk Management (to be filled by Mentors)

1. Risk Amelioration/Reduction Measures
   This section would aim at risk reduction measures that may include redefining project components, or rejecting components as required.

2. Risk Management Measures