Planning for Mass Transit and Alternate Analysis

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Mass Rapid Transit

- Highest performance and quality public transport mode
  - Majority of service on a dedicated, exclusive transitway
  - Permanent, substantial stations and terminals
  - Permanently integrated system by design
  - Unique identity, quality image
Factors Impacting Selection of a Specific Rapid Transit Mode

• Strategic goals, objectives
  – Transport
  – Land use
  – Social, environment, economic
  – Other

• Current and future general and RT travel market

• Current, future multi-modal transport network size, condition, performance

• Current and future land use patterns, plans

• Available rights-of-way

• Costs, benefits, impacts

• Financial resources, current and future needs
## Capital costs of mass transit systems

<table>
<thead>
<tr>
<th>City</th>
<th>Type of system</th>
<th>Length, Km</th>
<th>Cost per km (mil S/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Janamarg, Ahmedabad</td>
<td>BRT</td>
<td>82</td>
<td>2.4</td>
</tr>
<tr>
<td>Kuala Lumpur (PUTRA)</td>
<td>Elevated rail</td>
<td>29</td>
<td>50.0</td>
</tr>
<tr>
<td>Kuala Lumpur Monorail</td>
<td>Monorail</td>
<td>8.6</td>
<td>38.1</td>
</tr>
<tr>
<td>Bangkok (BTS)</td>
<td>Elevated rail</td>
<td>23.7</td>
<td>72.5</td>
</tr>
<tr>
<td>Beijing Metro</td>
<td>Metro rail</td>
<td>113</td>
<td>62.0</td>
</tr>
<tr>
<td>Shanghai Metro</td>
<td>Metro rail</td>
<td>87.2</td>
<td>62.0</td>
</tr>
<tr>
<td>Bangkok MRTA</td>
<td>Metro rail</td>
<td>20</td>
<td>142.9</td>
</tr>
<tr>
<td>Hong Kong Subway</td>
<td>Metro rail</td>
<td>82</td>
<td>220</td>
</tr>
</tbody>
</table>

No Dominant, Magic “Silver Bullet”

Capital Cost, Capacity Comparisons

Montassar DRAIEF – SYSTRA*

BusRT – BRT Modeling software
September 2006

Choosing Rapid Transit Alternatives (C4/M1)
O/M Cost Comparisons

Capital Cost, Capacity Comparisons

Montassar DRAIEF – SYSTRA*

Choosing Rapid Transit Alternatives (C4/M1)
User & Non-User Satisfaction Survey*: Los Angeles

* Quantifying the Importance of Image and Perception to Bus Rapid Transit, Alastair Cain and Jennifer Flynn, et al; U. South Florida CUTR, USDOT March 2009
Metropolitan Strategy
- Priority RT investment
- Corridor(s), alternatives
- Strategic policies

Level of Engineering Definition, Analysis

AA Starting Point

Number of Alternatives

- Highest
- Lowest
- Minimal

Project Identification (Alternatives Analysis)

Project Preparation
- Feasibility Study
- Preliminary Design

Final Design

20% Design

Detail

Design

Final
Alternatives Analysis Process

Established Goals and Objectives; Transportation, Quality of Life

Evaluate Current Problems, Future Challenges

Identify Investment Alternatives

Evaluate Alternatives

Decision on Mode, Alignment, Design Concept

Go!

From Strategic Planning, etc.
Alternatives Analysis Guidelines

1. Develop and implement a formal communications process;
2. Establish goals, objectives, evaluation process and criteria;
3. Understand the process and causes of problems;
4. Consider the right alternatives;
5. Develop decision support information;
6. “Make the case” for the selected alternative.
Do Not Slant Analysis to Favor Pre-determined Solutions! Avoid:

- Biased assumptions
  - e.g., fares, capacity standards
- Non-competitive alternatives
  - “Straw-men”
- Under-estimated costs
- Inflated benefits
- Ignored risk
Forecasting Cautions

• Ridership forecasts
  – **Avoid compound optimism**
    • e.g., population, employment forecasts, walking distances, transfer penalties, speeds, capacities, fares and other user fees, model bias constants that favor pre-selected option

• All cost forecasts
  – **Apply different contingency factors to costs by project component, type of construction, and level of engineering**
    • Conceptual planning factors higher than preliminary engineering ones
    • Tunneling factors much higher than for surface or elevated construction
    • Reflect utility and other uncertainties
6. Make the Case

• All investment decisions are and should be “political;”

• A. A. provides the decision support information and stakeholder buy-in to support the decision made;

• Once the selection is made, use process results and stakeholder relationships to build momentum for the project;
  – Proceed into project preparation, implementation confidence
Metropolitan Strategy, Priority Corridors, Alternatives

Next Step

Project Identification (Alternatives Analysis)

Project Preparation
- Feasibility Study
- Preliminary Design

Level of Engineering Definition, Analysis Detail

Number of Alternatives

Highest

Lowest

Minimal

20% Design

Final Design

LUTP
Key Messages

• Many factors need to be considered in rapid transit investment decision making
  – Each corridor or small area presents a unique combination of these factors

• There is no single, dominant RT mode

• A detailed, objective Alternatives Analysis following strategic planning is critical to identifying the proper investment alternative

• Effective Alternate Analysis include a strong, extensive communications process as well solid technical procedures and data
  – Communications, transparency make process work
THANK YOU

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