Implementing a Quantitative Project Prioritization Approach at VTrans

TRB 7th National Conference on Transportation Asset Management
New Orleans, LA
November 8, 2007
Prepared by Bart Selle, VTrans Policy & Planning Division
Quantitative Project Scoring

• Shift stakeholders’ focus to the overall Transportation Program rather than individual projects

• Support realignment of priorities in the Road to Affordability program.
Vermont Environment

- Small State in geography and population of only 630,000
- Budget of $380 million driven by Fed Funds (54%)
- Large legislature that examines transportation project selection in detail
Vermont AOT Environment

- Management & Engineering is centralized in one building in Montpelier
- Nine District offices are responsible for maintenance
- One MPO serving 150,000 people
- Eleven Regional Planning Commissions (RPCs)
VTrans Transportation Assets

- 2,690 Bridges > 20’ length
- 1,112 Large Culverts
- 3,200 Two-lane Miles of Pavement
- 40,000+ Small Culverts
- 122 Heated and 289 Unheated Buildings
- 10 Airports - State Owned
- Other ancillary assets – park & ride, signs, signals, bike paths, and more.
- State owned rail leased to operators:
  - 305 miles of rail line
  - 268 Rail Bridges
State Bridge Program Example

<table>
<thead>
<tr>
<th>PIN</th>
<th>PROJECT NAME</th>
<th>DESCRIPTION</th>
<th>STATE</th>
<th>FEDERAL</th>
<th>TOTAL</th>
<th>PRIORITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>76E072</td>
<td>ALBURG-SWANTON REPL MISSQUOI BAY B</td>
<td>REPL MISSQUOI BAY BRIDGE BR2 ON VT102 OVER THE</td>
<td>42,030</td>
<td>168,122</td>
<td>210,152</td>
<td>const</td>
</tr>
<tr>
<td>05J200</td>
<td>BARNET-MONROE, NH REHAB BR81/106</td>
<td>REHAB BR81/106 ON TH7 OVER THE CT12 OVER THE CT</td>
<td>20,000</td>
<td>80,000</td>
<td>100,000</td>
<td></td>
</tr>
<tr>
<td>05B126</td>
<td>BRISTOL REPL CULVERT BR 9</td>
<td>REPL CULVERT BR 9</td>
<td>120,000</td>
<td>480,000</td>
<td>600,000</td>
<td>culvert</td>
</tr>
<tr>
<td>04C098</td>
<td>CANAAN REPL BR16 ON VT102 OVER</td>
<td>REPL BR16 ON VT102 OVER WILLARD ST12</td>
<td>117,489</td>
<td>469,957</td>
<td>587,446</td>
<td>38</td>
</tr>
<tr>
<td>78F193</td>
<td>CASTLETON REPL BR8 AND STABILIZE</td>
<td>REPL BR8 AND STABILIZE SLOPE AREA</td>
<td>227,997</td>
<td>911,986</td>
<td>1,139,983</td>
<td>33</td>
</tr>
<tr>
<td>86E054</td>
<td>CHESTER REPL BR43 ON VT11</td>
<td>REPL BR43 ON VT11</td>
<td>24,000</td>
<td>96,000</td>
<td>120,000</td>
<td>1</td>
</tr>
<tr>
<td>84E061</td>
<td>CHESTER REPL BR8 OVER SO. BRANCH</td>
<td>REPL BR8 OVER SO. BRANCH WILLIAMS</td>
<td>9,200</td>
<td>36,800</td>
<td>46,000</td>
<td>2</td>
</tr>
<tr>
<td>85E042</td>
<td>CORNWALL REPL BR9 ON VT125 COVER</td>
<td>REPL BR9 ON VT125 OVER LEMON FAIR</td>
<td>148,812</td>
<td>595,248</td>
<td>744,060</td>
<td>37</td>
</tr>
<tr>
<td>00C162</td>
<td>EAST HAVEN REHAB BR18 ON VT114</td>
<td>REHAB BR18 ON VT114 OVER PASSUMP</td>
<td>26,000</td>
<td>104,000</td>
<td>130,000</td>
<td>23</td>
</tr>
</tbody>
</table>
Project Backlog

- Large backlog of old projects put “on the books” for the wrong reasons
  - Gave false impression we were working on them
- Road to Affordability program postpones projects
- Need to convince stakeholders that we:
  - Choose the most important projects
  - Are fair
• Mandates VTrans to develop a system that:
  – uses “asset management-based factors that are objective and quantifiable”
  – “considers the social & cultural life of surrounding communities”
  – “develop a numerical grading system to assign a priority rating”
Agency Project Priorities

- Each VTrans program manager developed scoring method appropriate for the asset.
- Developed methods for Paving, Structures, Roadway, Park & Ride, Aviation, Bike/Ped, Public Transit, and Enhancements.
Regional/Local Priorities

• Project choices must consider the “social & cultural life of surrounding communities”
  – 11 Regional Planning Commissions (RPCs) and the MPO prioritized all projects in their territory
  – RPCs work with their citizen Transportation Advisory Committees
  – RPC/MPO scores are 15% to 20% of the total

• Submit results by June 1 for the budget year 13 months away.
<table>
<thead>
<tr>
<th>PIN</th>
<th>FY09 Priority</th>
<th>FY08 Priority Ranking</th>
<th>FY08 Out of</th>
<th>Project Name</th>
<th>Project Number</th>
<th>RPC</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>1</td>
<td>Vergennes</td>
<td>10</td>
<td>BENNINGTON BYPASS NORTH</td>
<td>NH F 019-1(5)</td>
<td>BCRPC</td>
<td>Roadway</td>
</tr>
<tr>
<td>78D307</td>
<td>1</td>
<td>3</td>
<td>10</td>
<td>ESSEX-WILLISTON</td>
<td>NH 033-1(24)</td>
<td>CCMPO</td>
<td>Roadway</td>
</tr>
<tr>
<td>04B094</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>BARRE CITY</td>
<td>FEGC F 026-1(34)</td>
<td>CVRPC</td>
<td>Roadway</td>
</tr>
<tr>
<td>78D082</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>MORRISTOWN</td>
<td>STP F 029-1(2)</td>
<td>LCRPC</td>
<td>Roadway</td>
</tr>
<tr>
<td>78D348</td>
<td>1</td>
<td>15</td>
<td>62</td>
<td>CABOT-DANVILLE</td>
<td>FEGC F 028-3(26)</td>
<td>NVDA</td>
<td>Roadway</td>
</tr>
<tr>
<td>96B032</td>
<td>1</td>
<td>33</td>
<td>62</td>
<td>SWANTON</td>
<td>NH 036-1(9)</td>
<td>NWRPC</td>
<td>Roadway</td>
</tr>
<tr>
<td>04D052</td>
<td>1</td>
<td>31</td>
<td>62</td>
<td>RUTLAND CITY</td>
<td>STP 019-3(57)</td>
<td>RRPC</td>
<td>Roadway</td>
</tr>
<tr>
<td>84B024</td>
<td>1</td>
<td>8</td>
<td>62</td>
<td>CAVENEDISH-LUDLOW</td>
<td>NH F 025-1(30)</td>
<td>SWRPC</td>
<td>Roadway</td>
</tr>
<tr>
<td>86C027</td>
<td>1</td>
<td>40</td>
<td>62</td>
<td>HARTFORD</td>
<td>RS 0113(40)</td>
<td>TWRPC</td>
<td>Roadway</td>
</tr>
<tr>
<td>96D026</td>
<td>1</td>
<td>56</td>
<td>62</td>
<td>BRATTLEBORO</td>
<td>STP 2000(20)S</td>
<td>WRPC</td>
<td>Roadway</td>
</tr>
<tr>
<td>New</td>
<td>2</td>
<td>Middlebury</td>
<td></td>
<td></td>
<td></td>
<td>ACRPC</td>
<td>Roadway</td>
</tr>
<tr>
<td>85B801</td>
<td>2</td>
<td>37</td>
<td>62</td>
<td>NEW HAVEN</td>
<td>NH F 019-3(38)</td>
<td>ACRPC</td>
<td>Roadway</td>
</tr>
<tr>
<td>78D048</td>
<td>2</td>
<td>5</td>
<td>10</td>
<td>BENNINGTON BYPASS SOUTH</td>
<td>NH F 019-1(4)</td>
<td>BCRPC</td>
<td>Roadway</td>
</tr>
<tr>
<td>97D206</td>
<td>2</td>
<td>10</td>
<td>62</td>
<td>COLCHESTER</td>
<td>STP 5600(9)S</td>
<td>CCMPO</td>
<td>Roadway</td>
</tr>
<tr>
<td>85B006</td>
<td>2</td>
<td>53</td>
<td>62</td>
<td>WATERBURGY</td>
<td>FEGC F 013-4(13)</td>
<td>CVRPC</td>
<td>Roadway</td>
</tr>
<tr>
<td>05E396</td>
<td>2</td>
<td>STOWE-CAMBRIDGE</td>
<td></td>
<td></td>
<td></td>
<td>LCRPC</td>
<td>Roadway</td>
</tr>
<tr>
<td>06K164</td>
<td>2</td>
<td>STOWE-CAMBRIDGE</td>
<td></td>
<td></td>
<td></td>
<td>LCRPC</td>
<td>Roadway</td>
</tr>
</tbody>
</table>
Paving Prioritization

- Benefit/Cost Ratio (Deighton’s dTIMS software) 65%
- Pavement Condition Index 17.5%
- Regional Priority 17.5%
Roadway Prioritization

- Highway Sufficiency & Network Designation 40%
- Cost per vehicle mile served 20%
- Regional Priority 20%
- Project Momentum 20%
- “Designated downtown” project - 10 extra points
Structures Prioritization

- Bridge Condition 30%
- Remaining Life 10%
- Functionality (alignment, safety) 5%
- Load Capacity and Use/Posted 15%
- Waterway Adequacy and Scour 10%
- Project Momentum 5%
- Regional Input and Priority 15%
- Asset – Benefit Cost Factor 10%
Road to Affordability
(Preservation first strategy)

- Over committed in Roadway projects
- Use prioritization to:
  - Postpone several roadway/capacity projects
  - Increase funding and projects for:
    - Bridge maintenance
    - Interstate bridge
    - Critical culverts
    - Paving
### Challenges to Prioritization

**“Do my project first”**

Jumping the queue – but we can show what gets bumped

<table>
<thead>
<tr>
<th>Proj ID</th>
<th>Region</th>
<th>VTrans Priority</th>
<th>Out of</th>
<th>Budget Book Status</th>
<th>Program</th>
<th>Project Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>85B006</td>
<td>CVRPC</td>
<td>53</td>
<td>62</td>
<td>CANDIDATE</td>
<td>Roadway</td>
<td>WATERBURY</td>
</tr>
<tr>
<td>99A114</td>
<td>NWRPC</td>
<td>11</td>
<td>62</td>
<td>CANDIDATE</td>
<td>Roadway</td>
<td>ST. ALBANS-SWANTON</td>
</tr>
<tr>
<td>85B912</td>
<td>CVRPC</td>
<td>13</td>
<td>62</td>
<td>CANDIDATE</td>
<td>Roadway</td>
<td>CABOT-DANVILLE</td>
</tr>
<tr>
<td>94A198</td>
<td>CCMPO</td>
<td>16</td>
<td>62</td>
<td>CANDIDATE</td>
<td>Roadway</td>
<td>WINOOSKI</td>
</tr>
<tr>
<td>00A218</td>
<td>NWRPC</td>
<td>18</td>
<td>62</td>
<td>CANDIDATE</td>
<td>Roadway</td>
<td>SWANTON-HIGHGATE</td>
</tr>
<tr>
<td>91A222</td>
<td>WRPC</td>
<td>20</td>
<td>62</td>
<td>CANDIDATE</td>
<td>Roadway</td>
<td>GUILFORD</td>
</tr>
<tr>
<td>87A022</td>
<td>NVDA</td>
<td>22</td>
<td>62</td>
<td>CANDIDATE</td>
<td>Roadway</td>
<td>LYNDON-DERBY</td>
</tr>
<tr>
<td>02B194</td>
<td>RRPC</td>
<td>26</td>
<td>62</td>
<td>CANDIDATE</td>
<td>Roadway</td>
<td>PITTSFORD</td>
</tr>
<tr>
<td>85B801</td>
<td>ARPC</td>
<td>37</td>
<td>62</td>
<td>CANDIDATE</td>
<td>Roadway</td>
<td>NEW HAVEN</td>
</tr>
<tr>
<td>83C102</td>
<td>CCMPO</td>
<td>41</td>
<td>62</td>
<td>CANDIDATE</td>
<td>Roadway</td>
<td>COLCHESTER</td>
</tr>
<tr>
<td>87E707</td>
<td>RRPC</td>
<td>47</td>
<td>62</td>
<td>CANDIDATE</td>
<td>Roadway</td>
<td>WALLINGFORD</td>
</tr>
<tr>
<td>85E043</td>
<td>TRORC</td>
<td>48</td>
<td>62</td>
<td>CANDIDATE</td>
<td>Roadway</td>
<td>Newbury</td>
</tr>
</tbody>
</table>
Local and VTrans Priority Alignment

Why don’t the RPC/MPO priorities count more?

RPC/MPO Nbr 1 & 2 Priorities
Agency is committed to 77% of the projects

- 58 Projects Construction Planned (48%)
- 36 Projects in Engineering & ROW, (29%)
- 28 Candidate Projects (23%)
Challenges to Prioritization
What if you did the oldest projects first?

Roadway Projects Ten or More Years Old (50 Projects)

- Inactive Candidate
  - 7 (14%)
- Agency High Priority Candidates
  - 5 (10%)
- Active Candidate
  - 6 (12%)
- Construction Planned
  - 16 (32%)
- Design & ROW
  - 16 (32%)
Issues

• Project “momentum” is still an important factor. Too late to stop legacy priority projects underway, but we are working thru them.

• Modal stovepipes of Rail, Public Transit, Aviation, and Enhancements compete for funds. Difficult to prioritize between these modes.

• Earmarks don’t consider asset management principles.
Lessons Learned

• Transparency is crucial – Must be consistent and fair
• Test prioritization results against what makes sense
• Account for “project momentum”
• Get buy-in before publishing effect on projects
• Stakeholders must understand the process even though they might not like the results
• Stakeholders will challenge the factors