Scope of Work

Tools for HOV to HOT Benefit Analysis

1.0 BACKGROUND

Congestion pricing is a key component of the US DOT Congestion Initiative. Congestion pricing – sometimes called value pricing -- is a way of harnessing the power of the market to reduce the waste associated with traffic congestion. Congestion pricing works by shifting purely discretionary rush hour highway travel to other transportation modes or to off-peak periods, taking advantage of the fact that the majority of rush hour drivers on a typical urban highway are not commuters. Evidence suggests that by removing a fraction (even as small as 5%) of the vehicles from a congested roadway, pricing enables the system to flow much more efficiently, allowing more cars to move through the same physical space. Similar variable charges have been successfully utilized in other industries -- for example, airline tickets, cell phone rates, and electricity rates. There is a consensus among economists that congestion pricing represents the single most viable and sustainable approach to reducing traffic congestion.

Over the next several years, congestion pricing will begin to be considered by more and more States and local agencies as they try to address their congestion problems. Many transportation professionals believe that congestion pricing holds promise for significantly improving traffic flow and reducing levels of congestion. To date, evidence of the effectiveness of congestion pricing on improving traffic flow (i.e. throughput) and reducing traffic congestion have been based upon conjecture and the results of a very limited set of pricing project studies, such as HOT Lanes in Southern California (SR-91) and Minnesota (I-394). There have been an increasing interest in the deployment of HOT lanes and the conversion of HOV facilities to HOT. These lanes represent an increase utilization of underutilized HOV lanes and are a means to reduce congestion. As States and local agencies in the United States begin to consider and possibly advance these concepts, congestion pricing and conversion of HOV to HOT as viable strategies to reduce traffic congestion, transportation professionals will need more technically-sound information and analysis methods upon which to base strategies and design as well as to help “make the case” to decision-makers that they will be beneficial in reducing congestion.

The objectives of this project are to provide a research scan of all currently available, candidate analytical methods, modeling products, and practices that can be used to determine the effects of HOV, HOT and mixed-flow lanes. In addition, case studies will be performed of some of the more potentially useful or popular methods/practices/products to determine how effective and
relevant they are in practice today. The main outcome of this work is to develop guidance pertaining to justification, efficacy, and the pros and cons of each method/practice/product. In effect, the successful contractor will produce a “best practices” guidance of available HOV and HOT analytical approaches. The intent is not to promote or otherwise recommend one method/practice/product over another, but rather to justify when to use such a method/practice/product, and explain the pros and cons of each.

2.0 OBJECTIVE

To this end, the objectives of this project are threefold:

1. To better understand the real impacts of HOV to HOT strategies on travel demand as well as traffic operations through the study of actual projects and through the use of modeling and other analytical methods,
2. To develop a stronger technical basis for making the case to decision-makers that converting HOV facilities to HOT lanes will indeed be beneficial to traffic flow and reduce congestion to the extent stated by many economists and transportation professionals, and
3. To provide a Guidance Document that will enable State and local transportation professionals to analyze their own opportunities and impacts for applying a congestion pricing strategy/HOT lanes to improve traffic flow and reduce congestion.

3.0 SCOPE OF WORK

Task 1 – Project Management

The contractor will schedule a kickoff meeting with the COTM within two weeks of the contract award date. The scope, tasks, and deliverables will be discussed during this meeting. The contractor will submit the kickoff meeting minutes along with a draft Project Plan based on those minutes within two weeks after the kickoff. The Project Work Plan will include scope, task descriptions and deliverables, schedule, management and staffing plan, travel plan, and risks and assumptions. The Project Work Plan shall also include:

- Elaboration and refinement to the technical approach contained in the contract award
- Refined schedules and timelines for tasks, interviews, and products
- Refined staffing plan by task
- Listing of key contacts and references used for interviews and literature reviews
- A proposed milestones and timeline for achieving them

The COTM will review the draft Project Work Plan and provide comments to the Contractor, who will incorporate these comments in a revised Project Plan to be submitted six weeks after contract award.

The contractor will provide a monthly progress report to the COTM throughout the duration of the project. Each report will include project progress, findings, costs to date, next steps, problems, and recommended actions. The contractor will also submit the required monthly progress report to the FHWA Contracting Officer.
Estimated time: 1.5 months
**Deliverables:** Kickoff Meeting Minutes, Draft and Final Project Plans, and Monthly Progress Reports

**Task 2 – Review and Summarize Literature on the Available Analysis Methods/Tools/Practices for HOV and HOT Facilities**

The contractor will conduct a review of current state-of-the-practice in the way analytical tools and methods are applied to analyze, evaluate and report HOV and HOT facilities. The review will focus on the scope and location of the studies, the sources and methods of collecting data, the procedures used to analyze the data and model traffic operations, the results generated from the studies, and a description of the applicability and limitations of the results. In addition, a review to identify the state-of-the-art in traffic analysis tools as they are applicable to the analysis of HOV/HOT facilities will be conducted.

A draft task report will be provided to the COTM for review and comments. All recommended changes to the report will be incorporated in a revised task report.

Estimated time: 3.5 months
**Deliverables:** Draft and Revised Task Report containing Literature Review and Summary.

**Task 3 – Characterize Existing Applicable Analytical Procedures/Practices for HOV/HOT Traffic Flow Analyses**

The contractor shall develop guidance on the use of analytical tools and methods to analyze and report HOV and HOT facilities. Using already-documented case studies, or if necessary, by conducting their own test models, the contractor shall produce analytical results that compare the best tools for analyzing HOV and HOT facilities. The assessment of these cases and tools shall address the following issues that that transportation professionals encounter in being able to assess HOV and HOT lanes and to quantify their benefits:

- Is the study/project a Corridor or a Regional study? Scoping the analysis to define what question will be addressed with analysis; will the analysis drive the outcome?
- What is the Operational Problem, Goal and Performance Objective
- Being able to confirm the problem based on data
- Considering Diversions within corridor, facility or network
- Defining existing Vehicle Occupancy and OD Patterns
- Determining optimal service flow rates for special use/HOT lanes
- Merge/weave analysis in/out of special use lane via general purpose lane or special use/direct access facility
- Is it an operational project or a revenue project - they are not mutually supportive of each other
- Understanding operations throughout the peak period, and not just the peak hour; including peak spreading, changes in delays/queues and impact on transit
• Are alternative mode choices available (and analyzed) to support diversions and mitigate concerns that lane is being taken away (but an express bus service for example is being added)?
• Is it barrier or buffer separated? Spacing of access and compliance to buffer to realize assumed operational condition simulated/analyzed.
• Effects of speed differential between special use/HOT lane vs. general purpose lane - what is locally acceptable and safe (simulated vs. field).
• Dynamic Routing vs. Dynamic Assignment functionality of analysis tool
• How often is price changed and how is this considered in the analysis?
• How is willingness to pay and value of time treated in the analysis?
• How is travel choice treated in the model, including route choice, mode choice, departure time, destination?
• How does the pricing component effect the dynamics of demand on the route, corridor or network - including diversions, delayed trips and mode shifts?
• What is the scenario in the Con Ops in the event of an incident in the special use lane and/or the general purpose lane - how does this effect analysis and actual operations?
• What is the ideal saturation flow rate for the facility?
• Bypass lanes for HOT/special use vehicles at entrance or exit ramps to/from facility (if not direct access)?
• Calibration of weaves in a dynamic pricing scenario; calibration of weaves when the back of queue on the general purpose lane propagates upstream throughout the peak period
• Choosing the model - Macro, Meso, Micro level of analysis - which, when - and use of optimization tools?
• What are the techniques, models, and tools available for estimating demand on HOV and HOT Facilities? their strengths and weaknesses
• Consideration of other operational strategies in analysis, such as ramp metering, optimized signals, dynamic merge control, use of hard shoulders, or speed harmonization?
• How will hybrids be considered and what is the current fleet composition in the corridor during the analysis period?
• What measures of effectiveness (MOEs) to use in the analysis? May include: LOS in HOV/HOT lane and mixed flow lanes, travel time, speed, duration of congestion, delay.

The contractor will prepare a draft guidance document that contains the information described above. All comments and recommendations received from the COTM will be incorporated in a revised/final guidance document.

The contractor shall resolve all FHWA comments and incorporate changes in the guidance document. The revised/final document shall be delivered within four weeks after the receipt of comments. The contractor shall not proceed to Task 4 until Task 3 has been accepted by the COTM.

At the task manager’s request, the contractor may be asked to produce outreach materials in the form of a one-pager, website content, a tri-fold brochure, or a CD product which would contain the guidance and any relevant, legal, copyrighted or owner-permissive applications or case studies necessary to demonstrate the justification of the guidance. The contractor may be asked to produce the equivalent of center-stapled, glossy hardcopies of the guidance document such
that they may not duplicate more than 5,000 units of one page or 25,000 units in the aggregate of multiple pages.

Estimated time: 7 months  
Deliverables: Draft and Revised/Final Guidance Document

4. LEVEL OF EFFORT AND PERIOD OF PERFORMANCE

The proposal to be submitted by the Contractor shall be based on the direct costs and fixed fee for performing all of the tasks and related activities identified and associated with this task order. It is expected that the Contractor will be available to begin this task order within 14 calendar days of receiving the official start notice for the Contractor and/or subcontractors to initiate work on this task order. All work and services required hereunder shall be completed on or before 14 months after the effective date of the contract.

5. STAFFING AND COST PROPOSAL

The Contractor shall propose a team of individuals with experience in traffic analysis and simulation. The team that is proposed should include the staff from the appropriate subcontractors that are a part of the firm’s present indefinite quantities contract team. These individuals should have first hand knowledge, experience, and ability with the following key areas of the project: (No priority or importance implied with order)

- Familiarity with traffic analysis and simulation tools and analyses, including calibration, alternative analyses, and deductive reasoning.
- Production of, and success probability, of varying promotional or program-specific literature that promotes the program and the FHWA in this area.
- Technical ability to design, brainstorm, and complete production of promotional outreach products.

The proposal that is submitted in response to this task order should include the relevant experience, expertise, and qualifications that the Contractor, Subcontractor, and key individuals have in this area. The information that is provided for the key technical personnel identified in this proposal should include: a brief summary of their relevant experiences and qualifications; identification of current and planned work commitments for the length of this task order; and level of effort (% FTE) for each of these commitments.

The Contractor shall provide a nationally recognized expert to serve as the Task Order Lead (TOL) to manage, provide technical direction, and successfully complete the requirements of this task order. The TOL should have sufficiently identified experience in microsimulation tools.

The Contractor’s proposal shall contain an estimate of the number of hours, rate or loaded rate, and cost for all individuals, grouped by the prime and each subcontractor, involved with each task. The total estimate of hours and cost should also be provided for each sub-task, task, and all of the work to be performed on the contract. The proposal should also contain a summary of the total estimate of the hours to be completed by sub-task and task for each month of the contract.
6. DELIVERABLES

Deliverables will be occasional and may require accelerated production. The contractor and their sub-contractors shall be flexible to turn around products as they are requested.

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Due Weeks/Months from Date of Award</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Progress Reports</td>
<td>15th of each Month</td>
</tr>
<tr>
<td>Quarterly Status Meetings</td>
<td>TBD</td>
</tr>
<tr>
<td>Kick-Off Meeting</td>
<td>2 Weeks</td>
</tr>
<tr>
<td>Kick-Off Meeting Minutes</td>
<td>4 Weeks</td>
</tr>
<tr>
<td>Draft Project Work Plan</td>
<td>4 Weeks</td>
</tr>
<tr>
<td>Final Project Work Plan</td>
<td>6 Weeks (1.5 Months)</td>
</tr>
<tr>
<td>Draft Literature Review Task Report</td>
<td>4 Months</td>
</tr>
<tr>
<td>Final Literature Review Task Report</td>
<td>5 Months</td>
</tr>
<tr>
<td>Draft Guidance Document</td>
<td>11 Months</td>
</tr>
<tr>
<td>Final Guidance Report</td>
<td>12 Months</td>
</tr>
<tr>
<td>Proof pages / Web graphic files</td>
<td>13 Months</td>
</tr>
<tr>
<td>Final Deliverables with 508 Compliance</td>
<td>14 Months</td>
</tr>
</tbody>
</table>

All documents (e.g., draft reports, final reports) that will be developed in this project shall be made available to be submitted to the U.S. DOT in both a hard copies (as a reproducible) and electronic versions using Microsoft Word 2000 (or later) format and Adobe Acrobat pdf format. The final deliverables produced by this task order must also meet the requirements and comply with intent of Section 508 as it pertains to the Americans with Disabilities Act. The contractor shall include in the submittal letter, a statement certifying that all submitted deliverables will comply with or satisfy the 508 compliant standards. The standards define the types of technology covered and set forth provisions that establish a minimum level of accessibility. The application section (1194.2) outlines the scope and coverage of the standards. The final electronic versions of the report submitted must be in Microsoft Word 2000, HTML, and PDF formats, and the appropriate software required by the Government Printing Office to print documents.

Products that are delivered must follow the publications guidelines that are available at [http://www.tfhrc.gov/qkref/qrgmain.htm](http://www.tfhrc.gov/qkref/qrgmain.htm) unless otherwise indicate in this task order. Additional details and requirements associated with the format, layout, number of copies to submit, obtaining publication numbers, obtaining government forms to include in the document, and other factors for the Contractor to consider with producing and submitting products will be provided by the COTM once the task order has been initiated.

Section 508 Rehabilitation Act Compliance: “All electronic and information technology (EIT) procured through this Contract must meet the applicable accessibility standards at 36 CFR 1194, unless an agency exception to this requirement exists. 36 CFR 1194 implements Section 508 of the Rehabilitation Act of 1973, as amended, and is viewable at [http://www.access-](http://www.access-).
EIT is defined as any equipment or interconnected system or subsystem of equipment, that is used in the creation, conversion, or duplication of data or information, or used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information. EIT includes, but is not limited to, telecommunications products (such as telephones), information kiosks and transaction machines, World Wide Web sites, multimedia, office equipment such as copiers and fax machines. It includes computers, ancillary equipment, software, firmware and similar procedures, services (including support services), and related resources.”

“All EIT deliverables rendered under this task order must comply with Section 508 of the Rehabilitation Act and the Access Board Standards available for viewing at http://www.section508.gov. Unless otherwise indicated, the Contractor represents by signature on this contract that all deliverables will comply with the Access Board Standards.”

In particular, see Standards of Section 508 Part 1194 as appropriate for the products required in this task order. Special attention should be paid to Parts 1194.22, Web-based intranet and internet information and applications, and 1194.31, Functional Performance Criteria. These standards can be viewed at http://www.access-board.gov/sec508/508standards.htm.

Web Posting: Web site publishing is FHWA’s principal means of publishing reports. All of the products to be developed and ultimately distributed in this task order shall be created in HTML, PDF, and Microsoft Word 2000 or equivalent. PDF documents created with the newest version of Adobe Acrobat can be substantially Section 508 compliant, if the documents are created and formatted to be 508-compliant. Visit http://access.adobe.com/acrobatmain.html to learn more about the Adobe Acrobat accessibility features.

If the document is drafted in Word, it will need to be converted to HTML for viewing on the Internet. Conversion complications arise in documents with double-column pages, complex tables, and multiple graphics. HTML ready format of the Microsoft Word document should only contain free flowing text. If graphics are added to a document, then a brief description of those images should accompany the document. All images, charts, and graphs must have a description to be Section 508 compliant.

Documents for Printing: Documents developed for this task order shall be prepared in electronic GPO-required format for printing. The following programs are used to create a majority of the print publishing work received by GPO:

- Image Manipulation: Adobe Photoshop and Corel PhotoPaint.

These are also the preferred programs of the commercial printing industry. The most recent versions of these software programs should be used. Avoid using any software that is more than one major revision old, due in part to most vendors’ only support recent or near recent
applications. The Contractor should check the software vendors’ web site for current versions and upgrade patches.

Files created using these software programs outputs have fewer problems than files created in programs not designed for print publishing. Other programs may be used, but unless they support prepress functions (e.g., PANTONE colors, trapping, bleeds crop marks and color separation) problems will likely occur. Contractor who uses programs other than those listed below should consider supplying high-resolution PDF files instead of native files. For more information on creating appropriate PDF files references, visit the GPO E-Pub’s web site at: http://www.gpo.gov/procurement/ditsg

Government’s Staffing Estimate by Labor Category

<table>
<thead>
<tr>
<th>Direct Labor</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Manager</td>
<td>24</td>
</tr>
<tr>
<td>Principal Investigator</td>
<td>120</td>
</tr>
<tr>
<td>Senior Transportation Engineer(s)</td>
<td>120</td>
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<tr>
<td>Mid-level Transportation Engineer(s)</td>
<td>280</td>
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<tr>
<td>Junior Level Staff/Researcher (s)</td>
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<tr>
<td>Technical Writer</td>
<td>80</td>
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<tr>
<td>Computer Support</td>
<td>80</td>
</tr>
<tr>
<td>General Support Staff</td>
<td>40</td>
</tr>
</tbody>
</table>

| Other Direct Costs (ODC)                   |       |
| Travel estimate                           | $8,000|