

REPORT TO SHASTA COUNTY RTPA

SUBJECT	MEETING DATE	ITEM NUMBER
Extend Dowling Associates Agreement and Issue a Request for Proposals for Updating the Shasta County Travel Demand Model	4/26/11	4-6

RECOMMENDATION

It is recommended that the board:

1. Approve the draft request for proposals (RFP) (attached) to update the Shasta County Travel Demand Model (TDM); and
2. Amend the existing agreement with Dowling Associates to increase the on-call services budget by an additional \$20,000 and extend the agreement for two years.

SUMMARY

Enhancements are necessary to the TDM in order to respond to new legislative requirements, including development of the Sustainable Communities Strategy (SCS) per Senate Bill 375 (SB 375). Updates to the model will happen in two phases. The initial phase will update the core inputs and assumptions of the current travel demand model as part of the ongoing maintenance agreement with Dowling Associates. The second phase will provide a comprehensive overhaul of the TDM consistent with a recently approved RTPA grant.

DISCUSSION

Travel Demand Model Update

A travel demand model utilizes relationships between land use, travel behavior, and other key factors to model each person's decision-making process of: why, when, where and how to make a trip, and what route to take. The TDM is used by the agency and partner agencies to forecast the impact of growth on the transportation network. Level-of-service measures help prioritize where and when transportation improvements are needed over a 20 year period, or longer.

Updates are required periodically in order to reflect current and projected land use, transportation network improvements, population growth, and various socio-economic data. The most recent update was completed in February 2008.

The agency was successful in obtaining a Proposition 84 Modeling Enhancements grant to carry out a comprehensive Model Improvement Plan (MIP). The grant-funded scope of work is provided in the attached RFP. Key improvements over the existing model include the following:

- Expand model sensitivities to include the number of vehicles owned per household, identification of bicycle and pedestrian networks, and incorporation of the "4-Ds" characteristics (Density, Diversity, Design and Destination) that affect travel.
- Integrate a transportation/land use modeling tool needed for the SCS process;
- Incorporate smaller units of analysis (transportation analysis zones); and,
- New economic and growth assumptions to 2050.

These improvements will more accurately forecast travel demand, identify the location of future traffic congestion, help the agency respond to new legislative regulations, and support local and regional planning processes. To this end, staff requests the board's approval of the attached

draft RFP. A consultant agreement will be recommended for board approval in June. Development of the new model will be a one- to two-year effort.

Extend Agreement with Dowling Associates and "Update Light"

In the near-term, updates are needed to the agency's current TDM to address recent transportation network improvements, changes in major development assumptions, and newly released 2010 Census data.

Existing on-call services provided by Dowling Associates must be extended to complete the update. The current contract ends June 30, 2011. It is recommended that the board amend the existing agreement to add a two-year term and with an additional \$20,000.

OTHER AGENCY INVOLVEMENT

The Shasta Model Users Group (SMUG) represents members of Caltrans, Shasta County, and the cities of Anderson, Redding and Shasta Lake. SMUG met on March 31 to discuss the necessary enhancements to the TDM, future application needs of the model for each agency, and to review the RFP. SMUG will continue to be involved throughout the model update process.

The Technical Advisory Committee concurs with staff recommendation.

ALTERNATIVES

The board may choose to not authorize the request for proposals. This is not recommended as model updates will meet prior grant commitments approved by the board and support local agency planning and development activities.

The board may choose not to amend the agreement with Dowling Associates. This is not recommended as staff does not have a dedicated travel modeler to provide the needed near-term updates and to maintain the model.

FINANCING

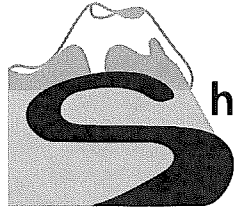
Proposition 84 Modeling Enhancement funds will be used to complete the MIP. The grant will cover 100% of consultant costs and related agency staff time. The estimated cost of the MIP is \$190,000. The \$20,000 for continued on-call services is budgeted in the 2010/11 Overall Work Program using Federal Highway Administration and state Programming Planning and Monitoring funds.



Daniel S. Little, AICP, Executive Director

DSL/SMT/jac

Attachments: Shasta County Travel Demand Model Request for Proposals (RFP)
 Fourth Amendment to Contract with Dowling Associates



Shasta County
Regional Transportation
Planning Agency

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Daniel S. Little, Executive Director

Request for Proposals

Shasta County Travel Demand Model: Model Improvement Plan (MIP)

Inquiries: Questions regarding this solicitation should be directed to:

Shasta County Regional Transportation Planning Agency
Attn: Sean Tiedgen, Assistant Transportation Planner
1855 Placer Street
Redding, CA 96001

(530) 245-6816
stiedgen@co.shasta.ca.us

Submittals: Proposal (7 copies) must be received by 5:00pm, May 27,
2010

The Shasta County Regional Transportation Planning Agency (SCRTPA) is seeking a qualified firm to assist with migrating the SCRTPA's Shasta County Travel Demand Model (TDM) from a '4-step' model to an 'activity-based' model, add an integrated land use modeling component, and other enhancements needed to carry out the agency's work program. Near term applications include development of a Sustainable Communities Strategy (SCS), greenhouse gas (GHG) target setting, and Regional Transportation Plan (RTP) update.

Interested and qualified consultants are invited to submit a technical approach and cost proposal in accordance with the requirements outlined herein. The selected consultant will be asked to enter into a formal agreement for the subject services and to provide insurance certificates and other assurances as noted.

This solicitation in no way obligates the SCRTPA to award a contract for the services described herein, nor will the SCRTPA assume any liability for the costs incurred in the preparation and transmittal of proposals in response to this solicitation. The SCRTPA reserves the right to not accept any proposal, to reject any or all proposals, to reject any part of any proposal, to negotiate and modify any proposal, and to waive any defects or irregularities in any proposal at the SCRTPA's sole discretion. Furthermore, the SCRTPA shall have the sole discretion to award the contract as it may deem appropriate to best serve the interests of the SCRTPA. In this regard, the SCRTPA may consider demonstrated quality of work, responsiveness, comparable experience, professional qualifications, assigned personnel, references, proposed fees and other factors.

This RFP is organized as follows:

- I. Background
- II. Interim/near-term updates
- III. Comprehensive Model Improvement Plan (MIP)
- IV. Related projects of potential impact to the MIP
- V. Requested proposal approach and content
- VI. Assumptions
- VII. Project schedule
- VIII. Submitting a proposal
- IX. Selection criteria and process
- X. Contract conditions
- XI. Attachments

Questions regarding this solicitation may be directed to:

Sean Tiedgen
Assistant Transportation Planner
(530) 245-6816 or stiedgen@co.shasta.ca.us.

I. Background

The existing Shasta County Travel Demand Model (TDM) is a traditional '4-step' model using the Citilabs CUBE Voyager software (Version 5.0) for all model components. Model networks can only be viewed using the 'CUBE Base' component.

Under contract with Dowling Associates, the TDM received a comprehensive update and release in February 2008 with calibration and validation to 2004 base year conditions. The TDM covers Shasta County, including the three incorporated cities of Anderson, Redding, and Shasta Lake.

The Shasta Model Users Group (SMUG) serves as the TDM's technical advisory committee. SMUG relays changes to development and infrastructure project assumptions, provides suggestions for how to improve model usability, and assists with model updates. SMUG includes representation from the following agencies:

- Shasta County Regional Transportation Planning Agency,
- City of Anderson,
- City of Redding,
- City of Shasta Lake,
- Shasta County Air Quality Management District, and
- Caltrans District 2.

Whereas the SCRTPA has no dedicated modeling staff, the TDM is operated under an on-call service contract with Dowling Associates. Additional users include Caltrans District 2, local agency staff, and consultants under contract to local agencies.

A comprehensive description of the Shasta County TDM is provided via the User's Guide, available online at <http://www.scrtpa.org/RTnotices.html>.

The SCRTPA and local agencies recognize that the model has some deficiencies. First, the current TDM is based on pre-recession growth and development assumptions. A near term update is needed to reflect current conditions. Second, the current TDM lacks sensitivities and capabilities needed to effectively respond to SB 375. Upgrades and enhancements to the model are needed to more effectively communicate and exchange data with the California Air Resources Board (CARB) as well as to carry-out the SCS and RTP update.

II. Interim/near-term updates

Under existing budget and contract with Dowling Associates, the SCRTPA will complete a minor update to the model by August of 2011. It is anticipated that portions of the scope of work described in the attached MIP will be addressed by the following tasks:

- Update road network to reflect all recent improvements/changes and forecast delivery of planned improvements;
- Updates land use development assumptions and forecast build date of anticipated development;
- Update countywide control totals for various horizon years, including extension to 2035 or 2040;
- Revise land use forecast assumptions for areas outside of specific development projects in order to match countywide control totals for each horizon year; and
- Extend model runs in five-year bands through 2040.

III. Comprehensive Model Improvement Plan (MIP)

A Proposition 84 Modeling Enhancements grant was awarded to the Shasta County RTPA to complete a comprehensive Model Improvement Plan (MIP). The following components are funded through this grant:

- 1) GIS data development – Includes spatially rectified and regionally merged parcel and road centerline layers across all four jurisdictions in Shasta County. The following work is presently underway under contract with ENPLAN, with an estimated completion date of September 2011.
 - Update and correct a parcel GIS layer for Shasta County based on 6" orthoimagery from March 20, 2010.
 - Populate the parcel layer with the best currently available land use, housing and employment information.
 - Align road centerline geography to coincide with corrected parcels.

The selected consultant will coordinate activities or tasks with ENPLAN in acquiring the data necessary for updating the model.

- 2) Comprehensive TDM update – Includes steps required to advance the TDM to an activity-based model, add 'D Factor' sensitivities, add an integrated land use modeling component, and other enhancements as described in the attached MIP. The subject of this RFP addresses this component.

IV. Related projects of potential impact to the MIP

The following projects are mentioned here as they may be directly or indirectly related to the MIP. In some cases, data and/or other deliverables might overlap with the MIP scope of work.

- 1) Spatial analysis tools in preparation for SCS development:
 - 'Mobility Assessment Tool' – Calculates the relative degree of mobility across the region through multiple measures of network 'centrality' (betweenness, closeness, straightness) and intersection density.
 - 'Neighborhood Dynamic Scale' – Measures the relative economic mobility of households and private investment patterns within the region. Will be used to identify locations most suitable for growth and development or maintenance and safeguarding actions.
 - 'Community Well-Being Atlas' – Utilizes a composite index of several community health indicators.
 - 'Exurban Growth Tool' – Utilizes wildfire risk factors and emergency response time as a proxy measure for sustainable growth in rural, unincorporated areas.
- 2) Complete Streets Study – Focus on identifying and categorizing the non-motorized network with accompanying level-of-service assessment.
- 3) GIS Platform Implementation – Standardize, merge and upload regional GIS data to shared server with internet-based GIS portal.
- 4) Intelligent Transportation Systems (ITS) Study – Evaluate ITS system needs and develop an ITS infrastructure improvement plan and strategy, including integration with the TDM and regional GIS platform.

V. Requested proposal approach and content

The practical utility and long-term maintenance burden of TDM enhancements described in the MIP are somewhat unknown. Shasta County's MIP scope of work was designed to hedge against the many uncertainties surrounding SB 375 and the state's intentions moving forward.

Rather than spell out a detailed scope of work and deliverables in this RFP, proposers are asked to demonstrate their technical expertise by developing a recommended work flow and approach that best reflects the Shasta County RTPA's available resources and local needs. Proposers who demonstrate a keen understanding of the regional context, knowledge of the specific applications wherein the model will be utilized and effective tools to meet those needs will be viewed favorably.

To facilitate the proposal review and evaluation process, proposers should adhere to the following format:

- A. Transmittal Letter – Include the name, title, address, phone number, and original signature of an individual with authority to negotiate on behalf of and to contractually bind the consultant or consulting firm.
- B. Firm Background – Provide a brief overview of the firm, experience and expertise, and the in-house resources needed to complete the MIP.
- C. Project Team – Provide an organizational chart identifying the designated project manager and all key project staff. It is expected that the proposed project manager and key project team members be committed for the duration of this project. In the event that such a change is required, the consultant shall inform the SCRTPA within 10 days and substitute the team member with an individual of comparable or higher qualifications and experience.
- D. Project References – Describe the nature and outcome of no less than three relevant projects conducted by proposed project manager. Include a brief description of the contracted scope of work, project budget, and start/end dates. Provide the name, title, and contact information for each client.
- E. Statements of Understanding – Beyond the requisite technical competence needed to complete Shasta County's MIP, provide your understanding of the local context and how newly expanded MPO requirements and emerging trends will shape regional travel demand modeling tools and practices. At minimum, proposals shall address the following:
 - a. How the enhancements are tied to the SCRTPA's regional transportation plan, directives, and requirements/responsibilities, including:
 - Regional GHG emissions reduction target setting,
 - SCS planning and implementation,
 - Updated RTP guidelines, and
 - Air quality attainment/non-attainment;
 - b. How the proposed strategy might increase Shasta County's competitiveness for future funding;
 - c. What potential obstacles, challenges, and other factors unique to Shasta County might affect project delivery or quality; and,

- d. How the project will ensure that the updated model accomplishes everything the current model does and expands upon those abilities, with the improvements described in the scope of work.

F. Technical approach/Workflow – Using the provided template to organize your response, provide a recommended workflow and describe how this approach will effectively address the Shasta County RTPA's short-and long-term needs. Where opportunities exist to fill gaps in the MIP, the consultant is encouraged to suggest additional measures or tasks within the provided budget. Conversely, if tasks included in the grant-funded MIP are not deemed useful, not advisable, and/or not cost-effective, proposers are encouraged to flag such tasks and recommend modification/deletion as appropriate.

G. Other considerations – In addition to those tasks specifically mentioned in the MIP scope of work, proposals shall respond to the following questions and considerations sufficient to include within the contracted scope of work.

1. Compare and update census block groups in travel model to match 2010 Census. Rectify TAZs to fit within 2010 Census block groups.
2. Update development, employment, and economic assumptions.
3. Extend planning horizon to 2050 in 5-year increments.
4. Update road network to 2010 Regional Transportation Plan (RTP) constrained and non-constrained projects.
5. Ensure trip generation and mode choice stratification considers all of the following household ownership categories: a) no car, b) 1 car, c) 2 cars, d) 2+ cars, e) owns a bicycle, f) uses transit.
6. Add capability to produce standalone reports, separated out by mode, including non-motorized and transit trips.
7. The ability to differentiate modes of travel, including separating all non-motorized transportation.
8. Integration of TDM with the Shasta Regional GIS Platform, including:
 - a. The ability to incorporate new, high quality aerials as a backdrop for presentation and analysis.
 - b. The software ability to have a user-friendly interface for non-technical, non-GIS -trained staff in order to do basic travel model analysis and comparison with other GIS datasets.
9. Staff would like the TDM to have a user friendly interface for non-GIS trained staff to be able to produce presentation quality maps or simple analysis. Discuss to what extent our current TDM software or proposer recommended software has the ability to be easy to navigate and use for non-technical staff.
10. The ability to do a transit needs assessment pursuant to TDA and assist with planning for various level of service (LOS) transit service scenarios.
11. The ability to model and provide reports on goods movement.
12. Provide a discussion on how real time Intelligent Transportation System (ITS) data could be utilized to enhance the travel demand model.

H. Training – Consultant shall provide a training program with corresponding budget line item. The following workshops must be included:

1. Training for key RTPA and local agency staff to be proficient in the use of the model.
 2. An overview for non-technical staff looking to understand the new TDM's capabilities and limitations.
- I. Meetings – A maximum of 6 meetings may be expected during the project. This would include meetings for the following tasks:
- a. **Initial project meeting:** At the start of the project consultant shall meet with SMUG members; present the scope of work, timelines, and phases; and discuss assistance needs from SMUG members.
 - b. **Status meetings:** 2-4 meetings with SMUG members to discuss progress on the project, request additional information and usage of the model. The consultant should suggest when status meetings should be conducted based on the proposed tasks and timeline.
 - c. **Final acceptance meeting:** After completion of the project the consultant should be prepared to assist staff in the presentation of the model and receive acceptance from the RTPA board.
- J. Documentation – Twenty hard copy user guides and electronic copies (in Microsoft Word (.doc) and PDF format) on compact disk will be provided by the consultant to the RTPA.
- K. Cost Proposal/Summary Sheet
The current consultant budget for this project is \$190,000 dollars, including a minimum 5% cost contingency for unanticipated works task as identified during the project and authorized in writing by the SCRTPA.
- Proposals exceeding \$190,000 must indicate which phases and corresponding tasks can be accomplished within the grant budget, and which tasks are recommended for completion should additional funding become available.
- Sufficient information should be provided to justify the proposed costs and to serve as a basis for negotiating a contract. In this regard, the cost proposal should identify key personnel; estimated number of hours and billing rates; travel and per-diem, materials and supplies, and any direct costs required to complete each work task.
- L. Fee rate schedule guarantee
The successful proposing firm must be willing and able to continue under an on-call services contract upon successful completion of this project. A fee/rate schedule for on-call services for the next three years must be included in the cost proposal, including any annual cost indexing. The fee/rate schedule is not a part of the project costs.

VI. Assumptions

Services provided by the RTPA –Due to the technical nature of requested services, the consultant must assume only limited assistance from the SCRTPA, including general direction from the RTPA project manager, and assistance from SMUG members. The current on-call services consultant will be available for current model questions, transferring of datasets or other tasks deemed necessary, per approval of RTPA staff.

Software – Software is not limited to the existing CUBE software. Proposers should, however, clearly explain the costs and benefits of any alternative software/hardware recommendations. Costs associated with recommended software/hardware changes are not a part of this project. Software/hardware purchases will be made by RTPA at a later date.

VII. Project schedule

It is anticipated that a formal agreement will be executed by the SCRTPA Board on June 28, 2011. Following a written notice-to-proceed, the Consultant shall begin work within 10 business days or as otherwise agreed upon. All deliverables, including presentation of final report and recommendations to the SCRTPA Board, shall be completed no later than **June 22, 2012**, or as otherwise agreed upon as a result of Task A (see section IX).

Interested firms are encouraged to attend, or phone in, a pre-proposal conference. Attendance at the pre-proposal conference is not required to submit a proposal.

Pre-Proposal Conference
Monday, May 9, 2010
10:00-12:00 p.m.
Shasta County Public Works Conference Room
1855 Placer Street
Redding, CA 96001

The following deadline dates will be adhered to:

Monday, May 2, 2011	Release RFP
Monday, May 9, 2011	Pre-proposal conference (10am - 12pm)
Friday, May 13, 2011	All questions due to RTPA
Wednesday, May 18, 2011	SCRTPA response to all questions (provided upon request)
Friday, May 27, 2011	Proposal Due Date (by 5:00 PM)
June 1-8	Interviews (if needed)
Friday, June 10-17, 2011	Notification of intent-to-award and negotiate agreement in an Internal Kick-off Meeting (Task A)
Tuesday, June 28, 2011	RTPA Board approval of contract

VIII. Submitting a proposal

All proposals must be received (not postmarked) no later than 5:00 pm on May 27, 2011. Proposals received after the due date will not be reviewed. Faxed copies will not be accepted.

Interested firms are invited to submit seven (7) hard-copy proposals and one (1) electronic PDF version to the following address:

Shasta County Regional Transportation Planning Agency
Attention: Sean Tiedgen, Assistant Planner
1855 Placer St.
Redding, CA 96001

IX. Selection criteria and process

A proposal review panel comprised of members of the SCRTPA and SMUG will evaluate the proposals. Depending on the results of the selection panel review, a short-list of qualified and responsive consultants may be requested to participate in an interview. No interviews will be held if the results of the selection panel review are unambiguous. The highest ranking proposal will be submitted to the SCRTPA board for consideration.

Evaluation criteria utilized to select a proposal/firm will include such considerations as:

- Technical ability and experience of the project manager and firm;
- Demonstrated understanding of the project and the SCRTPA's near and longer term objectives (demonstrated by the approach and phasing);
- References; and
- Value provided for the proposed fee.

Task A – Internal Kick-off Meeting

Following consultant selection, but prior to execution of the contract agreement (June 28, 2011), an internal kick-off meeting will be held to introduce the project team. This would include:

- The SCRPTA project manager;
- SMUG members;
- The consultant project manager; and
- Other key personnel as appropriate.

At this meeting the scope of work will be discussed and finalized, including any additions or subtractions; communication protocol will be established; a project schedule will be finalized; and next steps determined. The consultant will not be reimbursed for this meeting.

X. Contract conditions

The selected consultant will be required to enter a standard SCRTPA contract (attached) and maintain required insurance coverage. Unless indicated otherwise, submission of a proposal indicates that the proposer accepts the terms of the standard agreement.

XI. Attachments

- 1) SCRTPA Proposition 84 scope of work as funded
- 2) Standard agreement between SCRTPA and consultant



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Daniel S. Little, Executive Director

September 23, 2009

Julia Lave Johnston
Deputy Director of Planning Policy
Office of Planning and Research
1400 Tenth Street, Room 212
Sacramento, CA 95814

Ms. Johnston,

The Shasta County Regional Transportation Planning Agency (SCRTPA) is pleased to submit the following application for Proposition 84 funds, pursuant to funding objective #1. The SCRTPA greatly appreciates the transparency and responsiveness to stakeholder input exhibited by the SGC during the preparation of funding program criteria. SCRTPA staff participated in all of the SGC's web broadcasts and teleconferences and supports the need-based approach to funding distribution.

The provided scope of work will greatly improve the SCRTPA's modeling capabilities and aggregate data necessary to identify the most efficient and effective option toward the meeting of planning directives and greenhouse gas emission reduction targets stemming from SB 375.

Funding requested does not represent all of the SCRTPA's modeling and data gathering needs, rather it reflects the highest priority tasks able to be accomplished within the funding distribution agreed upon by MPOs, as outlined in the now familiar Mike McKeever letter dated July 21, 2009.

To assist the SGC in evaluating the Shasta County region's modeling and data needs, this application is organized as follows:

- I. Overview of existing Shasta County Travel Model
- II. Understanding of SGC requirements & priorities
- III. Current model versus SB 375 Required Sensitivities
- IV. Model Improvement Plan
- V. Project budget and schedule table

In consideration of this application, it is requested that the following also be taken into consideration:

- Broad regional interest and support – The following scope of work represents consultation and coordination between the SCRTPA, local jurisdictions, and the Far North Regional GIS Council.

- Regional Blueprint foundation – The SCRTPA has successfully managed the technical and public outreach components of the Shasta *FORWARD* >> Regional Blueprint project (www.shastaforward.com). Final deliverables – pending acceptance by the SCRTPA Board in February of 2010 – will serve as the building block for SB 375 compliance.
- Coordination with the Shasta Regional GIS Platform – A key issue exposed through Shasta County's Regional Blueprint process was a near-complete lack of contiguous GIS data sets representing the region in its entirety. Data sources were not always easy to find and varied by type, projection, and currency. Once data sets were located and acquired, major data gaps and format discrepancies made the merging of spatial and attribute data a time and cost-intensive endeavor.

The SCRTPA's pursuit of a seamless, region-wide GIS database (including parcels and matching road centerlines if Proposition 84 funded) is critical to planning efficiencies, decision-making, and expanded opportunities for regional/interregional coordination. The SCRTPA will rely heavily on the results of this effort when meeting SB 375 planning requirements and monitoring progress toward regional GHG emission reduction targets. By design the core architecture of this project will allow the addition and merging of data from neighboring regions and the greater Sacramento Valley in the future.

By this application, the SCRTPA is committed to the following:

- Submittal of quarterly progress reports, including detailed information on the progress of each identified milestone, expenditure to date, and remaining funds;
- Consistency with SB 375, public transparency requirements, and the Regional Transportation Plan Guidelines, and;
- Providing web access to all materials related to the application and award of Proposition 84 funds, including application, status updates and reports, and final deliverables.

Be it also known that as Executive Director of the SCRTPA, I am authorized to submit the following application.

Sincerely,



Daniel S. Little, AICP, Executive Director

OVERVIEW OF EXISTING SHASTA COUNTY TRAVEL MODEL

The Shasta County model is a traditional "4-step" (trip generation, trip distribution, mode choice, assignment) trip-based model. It is based on land uses which are grouped into transportation analysis zones (TAZs) and average rates to determine trip characteristics. The model was calibrated to 2004 base year conditions and model development was completed in early 2008. The following assumptions and inputs are used by the model for all operations:

- **Land Use** – The 2004 base year housing data were compiled from 2000 Census data at the block level and building permits at the address level. The 2004 base year employment data was compiled at the business address level. The base year land use data were not fully integrated with parcel information.

Land use forecasts up to 2030 were allocated to specific vacant or re-developable parcels using a manual process informed by local agency staff input and Strategic Economics consulting firm. The future land use allocations used in detailed traffic forecasts up to 2030 are based on manual interpretations of accessibility and development priorities rather than integrated land use models.

A UPLAN land use allocation model has been developed for Blueprint studies and used for allocation of 2050 land use forecast scenarios to develop regional aggregate transportation performance measures.

- **Trip Generation** – Trip generation is calculated based on six residential and 22 non-residential land use categories. Trips are calculated for seven trip purposes. Trip generation rates were based on the Shasta County portion of the Caltrans 2000/2001 Statewide Travel Survey.
- **Trip Distribution** – Trip distribution uses a standard gravity model for each of the seven trip purposes, with impedances based on free-flow automobile travel times. There is currently no feedback from congested auto travel times or non-auto travel times.
- **Mode Choice** – The Shasta County model uses a standard multinomial mode choice model for three trip purposes (home-work, home-non-work, home-school), six travel modes (drive alone, shared ride 2, shared ride 3+, transit walk access, transit drive access, bike/walk), and trips by three household vehicle ownership categories (zero, one, two-plus).

Driving impedances are based on congested A.M. peak hour speeds derived from a first-pass traffic assignment. Transit impedances are based on specific coding of all fixed-route transit services in Shasta County.

Vehicle ownership is currently set for each TAZ based on the 2000 Census; there is no separate model to estimate vehicle ownership.

I. Understanding of SGC Requirements & Priorities

The Strategic Growth Council (SGC) formed by Senate Bill (SB) 732 is charged with the allocation of Proposition 84 planning grants and planning incentive funds for encouraging the planning and development of sustainable communities with specific requirements, including consistency with Assembly Bill (AB) 32 goals.

In making funding decisions, the SGC will give priority to those activities which support data acquisition and improvements to transportation and land use models that support and assist MPOs in meeting the

requirements of SB 375 and promote the objectives of the SGC. These activities must be detailed in a Model Improvement Plan (MIP). The priorities consist of the following:

- Data collection and model development that assists MPOs and ARB in accurately quantifying and meeting the GHG emission reduction target in its first Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), as required in SB 375, that identify inter-regional/regional trip information and forecasts.
- Accelerating and implementing improved modeling capability via the following step approach:
 1. A 4-step model with post-processing capabilities to include density, diversity, design, destinations, etc. This minimum level of modeling is critical to effectively evaluate all strategies relating to SB 375.
 2. A tour/activity based model with post processing capability. These models illustrate that trips made by a household are not independent of each other but are often connected or chained together for efficiency or convenience.
 3. An inter-regional/regional integrated tour/activity-based transportation models with land use and economic modeling components that support a healthy quality of life.
- Improving the transportation models to be sensitive, at a minimum, to the following:
 - a. Price sensitivity, such as in tolling or congestion-pricing applications
 - b. Evaluation of outcomes in designated transit-oriented development
 - c. Evaluation of effects of different regional development densities (e.g., single family housing versus multi-family, etc.)
 - d. Evaluation of development in known industrial areas
 - e. Evaluation of development of specific "Greenfield" areas, to see how well the model can predict the expansion of the urban area
 - f. Evaluation of outcomes in redevelopment and infill areas
 - g. Equity and environmental justice sensitivities, such as effects of transportation and development scenarios on low-income or transit-dependent households
 - h. Sensitivity to different types of transportation options, including transit, walking and bicycles.

II. CURRENT MODEL VS. SB 375 REQUIRED SENSITIVITIES

For each of the required model sensitivities listed above, the capabilities and needed improvements to the current Shasta County Travel Model are identified below:

a. Price Sensitivity

Current Model Capabilities

- Average auto per mile operating costs and parking costs at destination TAZs are used for mode choice analysis.
- Cost sensitivity in mode choice is stratified by three vehicle ownership categories, each with different median income levels.

Needed Improvements

- Add network cost attributes for tolls and congestion pricing.
- Recalibrate trip distribution to be based on cost as well as travel time.
- Stratify trip distribution based on household income categories.

- Add activity-based modeling capability that separately estimates the travel behavior of each individual or household and their sensitivity to cost based on income and other demographics.

b. Evaluation of Outcomes in Designated Transit-Oriented Development

Current Model

- Conventional mode choice evaluation based on average TAZ accessibility

Needed Improvements

- Implement small TAZ analysis of TOD areas.
- Replace fixed household vehicle ownership percentages from Census with vehicle ownership model that considers accessibility to transit and walk/bike destinations
- Recalibrate trip distribution to be based on multimodal travel time instead of just auto travel time.
- Implement adjustments to account for urban form (density, pedestrian environment, etc...) within TAZs or groups of TAZs.
- Add activity-based modeling capability that separately estimates the travel behavior of each individual or household.

c. Evaluation of Effects of Different Regional Development Densities

Current Model

- Trip generation varies according to six residential categories, including single family, multi-family, mobile homes, senior housing and recreational homes.
- Trip characteristics do not vary for different densities of single-family or multi-family, other than average accessibility for TAZs.

Needed Improvements

- Implement small TAZs for high-density areas.
- Use data (Census and updated statewide household travel survey) to identify different demographic characteristics of different housing densities; use for population and trip generation estimates.
- Add activity-based modeling capability that separately estimates the travel behavior of each individual or household.

d. Evaluation of Development in Known Industrial Areas

Current Model

- Development assumptions in industrial areas were based on local agency staff inputs.

Needed Improvements

- Modify land use forecasting procedures to consider redevelopment of industrial areas as well as vacant land development.
- Add land use forecasting modeling capability that considers real estate and development potential characteristics of each parcel.

e. Evaluation of Development of Specific "Greenfield" Areas

The land use forecasting procedures should be tested to see how well the model can predict the expansion of the urban area.

Current Model

- Development assumptions in 'greenfield' areas are based on local agency staff inputs and designations of vacant land.

Needed Improvements

- Modify land use forecasting and allocation procedures to consider redevelopment of developed areas as well as vacant land development.
- Enhance land use forecast allocation procedures to consider relative local costs of development in different areas such as infill, redevelopment and greenfield development areas.
- Add land use forecasting modeling capability that considers real estate and development potential characteristics of each parcel and infrastructure development costs as well as transportation accessibility measures.

f. Evaluation of Outcomes in Redevelopment and Infill Areas

Current Model

- n/a

Needed Improvements

- Parcel and attribute data for all development.
- Use data (Census and updated statewide household travel survey) to identify different demographic characteristics of different housing densities; use for population and trip generation estimates.
- Add activity-based modeling capability that separately estimates the travel behavior of each individual or household.
- Modify land use forecasting procedures to consider redevelopment of industrial areas as well as vacant land development.
- Add land use forecasting modeling capability that considers real estate and development potential characteristics of each parcel.

g. Equity and Environmental Justice Sensitivities

The modeling should be sensitive to issues such as effects of transportation and development scenarios on low-income or transit-dependent households.

Current Model

- Mode choice analysis uses estimated average income stratifications based on household vehicle ownership categories.
- Transportation evaluation measures are calculated in aggregate but are not stratified for specific household types.

Needed Improvements

- Stratify trip estimates by household income and auto ownership categories, through distribution, mode choice and possibly assignment.
- Compile aggregate accessibility and performance measures by income and/or transit dependency category.
- Add activity-based modeling capability that separately estimates the travel behavior of each individual or household and can track travel characteristics of specific low income and transit dependent individuals at a disaggregate level.

h. Sensitivity to Transportation Options

The modeling should be sensitive to different types of transportation options including transit, walking and bicycles.

Current Model

- Mode choice analysis includes transit (drive access and walk access) and bike/walk (combined).

Needed Improvements

- Separate the bicycle and walk modes.
- Implement smaller TAZs in areas with high likelihood of non-motorized travel.
- Create separate bicycle and walk networks to include non-automobile bicycle and pedestrian paths.
- Add demographic stratifications which correlate strongly with use of alternative modes (such as college students for bicycle trips).
- Add activity-based modeling capability that separately estimates the travel behavior of each individual or household.

MODEL IMPROVEMENT PLAN

The SCRTPA's proposed Model Improvement Plan (MIP) approach is based on a five-year plan corresponding with the next scheduled update of the Shasta County RTP in 2014. It represents an ambitious but achievable and well-founded program of improvements and enhanced modeling capabilities that will serve the Shasta County region over the long-haul. While a more rudimentary and affordable approach may be possible through incremental development of existing methodology and expanded data, drilling down to the parcel level is believed to provide the greatest long-term return on investment, will most effectively help the region meet the goals of SB 375, and best promotes all objectives embodied by the SGC.

More specifically, the following scope of work helps the SGC achieve its long-term view toward development of fully functional, regional integrated tour/activity-based models; models that will be used to evaluate and build consensus for land use strategies that most effectively reduce GHG emissions attributable to the transportation sector. Deliverables identified herein are essential to the development of a technically sound and defensible Sustainable Communities Strategy (SCS) and may reduce the likelihood of needing an Alternative Planning Strategy (APS).

Viewed in conjunction with the Shasta County Regional Blueprint (www.shastaforward.com) and the Shasta Regional GIS Platform project, Shasta County's MIP will open the door to improved analysis and regional planning required for the Shasta County region to effectively address additional other objectives shared by the SGC and the SCRTPA, including: improved air and water quality, protection of natural resource and agriculture lands, increased availability of affordable housing, improved public transportation services, and enhanced public health.

The following Shasta County MIP is divided into the following elements:

- I. Enhancements to Existing Model
- II. Modeling Sensitivities (Four D's)
- III. Parcel-based Disaggregated Analysis Tool
- IV. Collection and Merging of Spatial & Attribute Data
- V. Project Schedule & Cost table

I. Enhancements to Existing Model

Improvements to the existing Shasta County model which can address the required sensitivities.

Task 1.1 – Model Geography

- Implement smaller TAZs in areas which have high potential for transit-oriented development, high-density development, or high likelihood of walk trips.
- Implement procedure developed for San Joaquin Valley Blueprint studies which includes manual TAZ "tagging" to identify individual TAZs, districts of TAZs or corridors with "different

than typical” urban form characteristics (high density, adjacent mixed uses, adjacent transit services, enhanced pedestrian/bicycle environments, etc...).

Task 1.2 – Land Use

- Update manual land use forecast allocation procedures to be sensitive to policies which encourage infill development and redevelopment and/or update the UPLAN procedures used for the 2050 Blueprint to precisely reflect the specific development information used for the travel model land use allocations up to 2030.
- Update manual land use forecast allocation procedures (or updated UPLAN model) to consider multimodal transportation accessibility.
- Add demographic stratifications which correlate strongly with use of alternative modes (such as college students for bicycle trips).

Task 1.3 – Transportation Networks

- Add network cost attributes for tolls and congestion pricing.
- Add existing and future bicycle and pedestrian paths to master network.
- Create separate bicycle and walk networks during model processing to provide separate TAZ-to-TAZ travel times for the bicycle and walk modes.

Task 1.4 – Vehicle Ownership

- Replace fixed household vehicle ownership percentages from Census with vehicle ownership model that considers accessibility to transit and walk/bike destinations

Task 1.5 – Trip Generation

- Use available data (Census and updated Statewide Travel Survey) to identify different demographic characteristics of different housing densities and use for population and trip generation estimates.
- Stratify trip generation estimates by demographic categories including at minimum household income and auto ownership categories.
- Develop tool for incorporating and accounting for effect of interregional trips originating in neighboring Tehama County.

Task 1.6 – Trip Distribution

- Stratify trip distribution based on household income categories.
- Recalibrate trip distribution to be based on multimodal travel time and cost (including parking costs, tolls and congestion pricing) instead of just auto travel time.
- Include impedance adjustments for urban form (adjacent mixed uses, etc...) in trip distribution calculations.

Task 1.7 – Mode Choice

- Include toll and congestion pricing inputs in mode choice calculations.
- Separate the bicycle and walk modes and use inputs from bicycle and walk networks.
- Stratify mode choice based on household income category trips from stratified trip generation and distribution steps.
- Include adjustments for urban form (adjacent mixed uses, enhanced bicycle/pedestrian environment, etc...) in mode choice calculations.

Task 1.8 – Evaluation Measures

- Compile aggregate accessibility and performance measures by income and/or transit dependency category.

II. Modeling Sensitivities

Improvements are needed to ensure that the enhanced modeling fully addresses the required sensitivities. The model will be tested for its ability to predict reductions in travel relative to researched characteristics such as (but not limited to) the “4Ds” of Density, Diversity, Design and Destination accessibility. A system will be set up either within the model or as a post processor to ensure that the model is fully responsive to the “D factors.”

Task 2.1 – Select Appropriate D Factors

Options include review of: a) the results of national syntheses and expert panel recommendations, b) values derived from analysis of the Sacramento region household travel survey and used in the SACOG Blueprint, c) similar analysis performed for the San Diego Association of Governments and others, d) the results of any national study of mixed use trip generation, or e) a blend of one or more of the above sets of values.

Task 2.2 – Test Model Sensitivity

The enhanced Shasta County model will be tested to quantify the degree to which it already captures some or all of the research-based D factor elasticities. Expected outcomes will be identified for each test (change in vehicle volumes, vehicle miles traveled, mode choice). There could be up to fifteen tests of the following types: changes in development level or density in all TAZs, small and moderate changes in land use density within select TAZs, small and moderate change in land use mix in select TAZs, changes in secondary street connectivity in select sub-areas, changes in automobile operating costs.

Task 2.3 – Calibrate D Factor Elasticities.

If the model already contains some of the smart growth sensitivity contained in the selected D factor elasticities, calibrate the elasticities to be applied in the model in a manner that avoids double counting.

Task 2.4 – Estimate Local Input Variables.

Review MPO data sources to develop regional averages for the following key input variables:

- Residential density
- Non-residential employment density
- Total employment and retail employment per household
- Street density
- Accessible attractions per parcel

These local input variables will form the basis for the D factor adjustments made to the version of the model.

Task 2.5 – Develop D Factor Post-Processing Spreadsheet

Prepare a spreadsheet model to apply the D factor elasticities to the zone-by-zone output from applications of the model, producing estimates of zone-specific vehicle trips and vehicle miles traveled. This process will involve calculating the zonal change in the D factor variables described above on a zone-by-zone basis, comparing a business-as-usual future condition with alternatives such as a Sustainable Communities Strategy. The spreadsheet will allow efficient calculation of vehicle trips and vehicle miles traveled for each development scenario, allowing quick response comparison of travel consequences of regional development scenarios.

Task 2.6 – Implement D Factor Adjustments in Travel Model

This process will involve calculating the change in the variables described above on a zone-by-zone basis. The calculations will result in adjustments to zonal trip ends by trip purpose, which will be applied within the model through matrix factoring, producing adjusted zone-to-zone trip tables that can then be assigned to the model network. This will allow the change in vehicle trips to be reflected in changes in traffic volumes on the roadway network.

Task 2.7 – Calibrate and Test D Factor Component.

After the D factor data has been calculated and the D factor component enabled, calibrate the parameters in the D factor component to ensure accurate and reasonable results. Some of the parameters that will be adjusted include “ceiling” and “floor” values for changes in D factor input variables, the maximum expected change in vehicle trips, and the range of applicability for D factor adjustments. The calibration process will involve iterative tests of changes in input variables. For example, one test could change the density of an area to determine the impact on vehicle trips and vehicle miles traveled, while another could test the sensitivity to the pedestrian circulation design of an area

Task 2.8 – Documentation

A memorandum will be prepared summarizing the development of the D factor component of the travel demand forecasting model. The memorandum will document the assumptions and methodologies used to formulate the D factor adjustments, as well as how the parameters were calibrated and how the local input data were developed. In addition, the memorandum will explain how to apply the D factor component in the context of the regional model, as well as discuss the limitations of the D factors.

Task 2.9 – Training

Training in the understanding and use of the D factor process will be conducted in order that the RTPA and other local agencies will have staff that is proficient in the use and application of the upgraded models and D factor processes.

III. Parcel-based Disaggregated Analysis Tool

The following improvements will move Shasta County RTPA’s land use modeling to a more refined tour/activity based analysis tool with parcel-level accuracy.

Task 3.1 – Land Use Modeling

- Update and fully correct a parcel GIS layer for Shasta County.
- Populate the parcel layer with current land use, housing and employment information.
- Implement a land use forecast and allocation model such as PECAS or UrbanSim which considers development costs and transportation accessibility.

Task 3.2 – Travel Modeling

- Implement activity-based modeling in place of the current trip-based modeling for trip generation, trip distribution and mode choice.
- Develop recommended procedures for application of the activity-based model for local studies.

Task 3.3 – Integrated Modeling

- Set up automated two-way linkages between the land use modeling and the travel model to provide for iterative evaluation of land use and transportation interactions.
- Improved road centerline geography.

IV. Data Collection & Management

Core datasets identified through the Shasta Regional GIS Platform project study will be prepared for use during SB 375 related modeling and be used for tracking of progress toward Shasta County’s regional GHG emission reduction target. Data will be collected from existing local sources. Any new data needed to fill gaps will be obtained via agreement(s) with existing consulting firms.

Task 4.1 – Collect, Fill Gaps, and Merge Core Datasets

- Compile and merge core land use, transportation, and GHG emission related GIS spatial and attribute data.

**Shasta County RTPA Proposition 84 Grant Application
Project Schedule & Budget**

SGC Objective #1 Work Tasks	Cost Total	Local Share	Funding Requested	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15
1 - Enhancements to Existing Model	\$200,000	\$50,000	\$150,000		↔					
2 - Modeling Sensitivities	\$40,000	\$0	\$40,000		↔					
3 - Parcel-based Disaggregation	\$210,000	\$25,000	\$185,000		↔					
4 - Data Collection & Management	\$40,000	\$15,000	\$25,000		↔					
	\$490,000	\$90,000	\$400,000							

Related Non-Prop 84 Work Tasks	Funding Source	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15
Shasta Regional GIS Platform	Regional Blueprint grant, SB 406, local contributions		↔					
Development of SCS/APS	SB 406			↔				
Shasta County RTP Update	FHWA, PPM					↔		

**FOURTH AMENDMENT TO AGREEMENT BETWEEN
SHASTA COUNTY REGIONAL TRANSPORTATION PLANNING AGENCY
AND DOWLING ASSOCIATES, INC.**

This fourth amendment is entered into between the Shasta County Regional Transportation Planning Agency ("RTPA") and Dowling Associates, Inc., ("Consultant").

The Personal Services Agreement between the RTPA and Consultant executed on November 11, 2007, is hereby amended in the following respects:

1. The Term of the Agreement, set forth in paragraph 5, is extended to and shall terminate on June 30, 2013.
2. The RTPA and Consultant desire to amend the Agreement to increase the budget by an additional \$20,000 to support RTPA staff in model coordination.

All other terms of the Personal Services Agreement remain unchanged by this amendment.

IN WITNESS WHEREOF, the parties hereto have executed this Fourth Amendment to the Agreement.

**SHASTA COUNTY REGIONAL
TRANSPORTATION PLANNING AGENCY**

Date: _____

Daniel S. Little, AICP
Executive Director

DOWLING ASSOCIATES, INC.

Michael V. Aronson
Vice President

Kym Sterner
Vice President

Tax I.D.#: 94-3255191

Approved as to form:

John Kenny, Counsel
Shasta County Regional
Transportation Planning Agency

By: _____
Counsel