

STAFF REPORT



MEETING DATE:	6/28/11
SUBJECT:	Personal Services Agreement with DKS Associates to Update the Shasta County Travel Demand Model
AGENDA ITEM:	4-7
STAFF CONTACT:	Sean Tiedgen

SUMMARY:

A travel demand model (TDM) update is needed to bring the TDM base to current conditions, increase the level of accuracy and provide enhancements necessary to meet recently passed legislation.

STAFF RECOMMENDATION:

It is recommended that the board authorize the executive director to execute a personal services agreement (PSA) with DKS Associates (DKS) in the amount of \$189,920 to update and enhance the Shasta County Travel Demand Model.

DISCUSSION:

Background

The TDM was last updated in February 2008. The TDM must be updated to support development of a Sustainable Communities Strategy under Senate Bill 375 (SB 375) requirements, local economic changes and newly available US Census data.

The TDM is used to forecast the impact of growth on the transportation network in support of various planning and project studies. A TDM 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. Level-of-service measures help prioritize where and when transportation improvements are needed over a 20-year period, or longer.

Review Process

On April 26, 2011, the board authorized the executive director to issue a request for proposals (RFP). The RFP was posted on the RTPA website and sent directly to all known consultants. A pre-proposal meeting was conducted on Monday, May 9, 2011, in which four consultants participated. Proposals were submitted by the firms Atkins Global and DKS and were reviewed and scored by members from the Shasta Model Users Group (SMUG). SMUG is comprised of staff members from the cities of Anderson, Redding, and Shasta Lake, Shasta County, RTPA and Caltrans.

Based upon the scoring and interviews, DKS' proposed model and work plan was considered best suited for the model update.

Some of the key benefits the model update will incorporate include:

1. Adding US Census demographic and socio-economic data being released late 2011/early 2012;
2. Expanding model sensitivities to include several transportation datasets, including vehicle ownership, and the location and extent of bicycle/pedestrian networks;
3. Incorporating smaller units of analysis down to the parcel level to assist with development of the Sustainable Communities Strategy; and
4. Training of RTPA and local agency staff in the use of the new model.

Documentation will consist of an updated model user guidebook and technical memos describing all updates/changes to the model. The new activity-based model will utilize current Cube travel modeling software, and be integrated with the new DaySim activity simulator software. The expected project completion date is June 26, 2012, with a consultant cost of \$189,920.

The board may choose to not approve the PSA. This is not recommended as this model update will meet prior grant commitments approved by the board.

SMUG members participated in reviewing proposals and provided a recommendation to the executive director. The Technical Advisory Committee (TAC) concurs with the staff recommendation.

State funds were made available specifically for TDM improvements through Proposition 84 grant funds. This grant will cover 100% of consultant costs and related agency staff time.

Daniel S. Little, AICP, Executive Director

Attachment: Project Schedule
PSA between Shasta County RTPA and DKS

TABLE F-1: PROJECT SCHEDULE

	July August	September October	November December	January February	March April	May June
F.1 Model Data						
Task 1.0 - GIS Data / 2010 Update						
Task 1.1 - Model Geography and Land Use						
Task 1.2 - Population Synthesizer						
Task 1.2 - Transportation Network						
F.2 DaySim						
Task 2.1 - DaySim Development for Shasta						
F.3 DaySim-Cube Integration						
Task 3.1 - Integration						
F.4 Validation and Sensitivity						
Task 4.1 - Validation and Sensitivity						
Task 4.2 - Sensitivity						
G Other Considerations						
Task G 1-12 - Other Considerations						
H - J Training/Meetings/Documentation						
Task H-J Training/Meetings/Documentation						

**PERSONAL SERVICES AGREEMENT BETWEEN THE SHASTA COUNTY REGIONAL
TRANSPORTATION PLANNING AGENCY AND
DKS ASSOCIATES**

This agreement is entered into between the Shasta County Regional Transportation Planning Agency ("SCRTPA") and DKS Associates ("Consultant") for the purpose of updating the Shasta County Travel Demand Model.

1. RESPONSIBILITIES OF CONSULTANT.

- A. Pursuant to the terms and conditions of this agreement, Consultant shall perform the services described in Exhibit A to this agreement which is attached hereto and incorporated within.
- B. As required by Government Code Section 7550, each document or report prepared by Consultant for or under the direction of the SCRTPA pursuant to this agreement shall contain the numbers and dollar amount of the agreement and all subcontracts under the agreement relating to the preparation of the document or written report. If multiple documents or written reports are the subject of the agreement or subcontracts, the disclosure section may also contain a statement indicating that the total contract amount represents compensation for multiple documents or written reports. Consultant shall label the bottom of the last page of the document or report as follows: agency name, agreement number, and dollar amount.

2. RESPONSIBILITIES OF THE SCRTPA.

The SCRTPA shall compensate Consultant as prescribed in Sections 3 and 4 of this agreement and shall monitor the outcomes achieved by Consultant.

3. COMPENSATION.

SCRTPA shall compensate consultant for labor costs and materials costs actually incurred in accordance with Exhibit B, which is attached hereto and incorporated herein.

In no event shall compensation paid by SCRTPA to Consultant pursuant to this agreement exceed \$189,920.

4. BILLING AND PAYMENT.

Consultant shall submit to the SCRTPA contract administrator a monthly invoice based upon the time and materials expended. The SCRTPA shall make payment within 30 days of receipt of Consultant's correct and approved statement or invoice.

5. **TERM OF AGREEMENT.**

This agreement shall commence as of the date it has been signed by both parties and shall end June 26, 2012.

6. **TERMINATION OF AGREEMENT.**

- A. If Consultant materially fails to perform Consultant's responsibilities under this agreement to the satisfaction of the SCRTPA, or if Consultant fails to fulfill in a timely and professional manner Consultant's responsibilities under this agreement, or if Consultant violates any of the terms or provisions of this agreement, then the SCRTPA shall have the right to terminate this agreement for cause effective immediately upon the SCRTPA giving written notice thereof to Consultant. If termination for cause is given by the SCRTPA to Consultant and it is later determined that Consultant was not in default or the default was excusable, then the notice of termination shall be deemed to have been given without cause pursuant to Paragraph B of this section.
- B. The SCRTPA may terminate this agreement without cause on 30 days written notice to Consultant.
- C. The SCRTPA may terminate this agreement immediately upon oral notice should funding cease or be materially decreased during the term of this agreement.
- D. The SCRTPA's right to terminate this agreement may be exercised by the Executive Director.
- E. Should this agreement be terminated, Consultant shall promptly provide to the SCRTPA any and all finished and unfinished reports, data, studies, photographs, charts, and other documents prepared by Consultant pursuant to this agreement.
- F. If this agreement is terminated, Consultant shall only be paid for services satisfactorily completed and provided prior to the effective date of termination.

7. **ENTIRE AGREEMENT; AMENDMENTS; HEADINGS.**

- A. This agreement supersedes all previous agreements relating to the subject of this agreement and constitutes the entire understanding of the parties hereto. Consultant shall be entitled to no other benefits other than those specified herein. Consultant specifically acknowledges that in entering into and executing this agreement, Consultant relies solely upon the provisions contained in this agreement and no others.

- B. No changes, amendments or alterations to this agreement shall be effective unless in writing and signed by both parties. However, minor amendments that do not result in a substantial or functional change to the original intent of this agreement and do not cause an increase to the maximum amount payable under this agreement may be agreed to in writing between Consultant and the SCRTPA Executive Director.
- C. The headings that appear in this agreement are for reference purposes only and shall not affect the meaning or construction of this agreement.

8. NONASSIGNMENT OF AGREEMENT; NON-WAIVER.

Inasmuch as this agreement is intended to secure the specialized services of Consultant, Consultant may not assign, transfer, delegate, or sublet any interest herein without the prior written consent of the SCRTPA. The waiver by the SCRTPA of any breach of any requirement of this agreement shall not be deemed to be a waiver of any other breach.

9. EMPLOYMENT STATUS OF CONSULTANT.

Consultant shall, during the entire term of this agreement, be construed to be an independent contractor, and nothing in this agreement is intended nor shall be construed to create an employer-employee relationship, a joint venture relationship, or to allow the SCRTPA to exercise discretion or control over the professional manner in which Consultant performs the work or services that are the subject matter of this agreement; provided, however, that the work or services to be provided by Consultant shall be provided in a manner consistent with the professional standards applicable to such work or services. The sole interest of the SCRTPA is to insure that the work or services shall be rendered and performed in a competent, efficient, and satisfactory manner. Consultant shall be fully responsible for payment of all taxes due to the State of California or the federal government that would be withheld from compensation if Consultant were the SCRTPA employee. The SCRTPA shall not be liable for deductions for any amount for any purpose from Consultant's compensation. Consultant shall not be eligible for coverage under the SCRTPA's workers' compensation insurance plan nor shall Consultant be eligible for any other SCRTPA benefits. Consultant must issue W-2 and 941 Forms for income and employment tax purposes, for all of Consultant's assigned personnel under the terms and conditions of this agreement.

10. INDEMNIFICATION.

Consultant shall hold harmless and indemnify SCRTPA, its elected officials, officers, employees, agents, and volunteers against all claims, suits, actions, costs, expenses (including but not limited to reasonable attorney's fees of the SCRTPA Counsel and counsel retained by the SCRTPA, expert fees, litigation costs, and investigation costs), damages, judgments, or decrees by reason of any person's or persons' injury, including

death, or property (including property of the SCRTPA) being damaged by the negligent acts, errors or omissions of the Consultant or any of Consultant's subcontractors, any person employed under Consultant, or under any subcontractor, or in any capacity during the progress of the work or the provision of services pursuant to this agreement, except when the injury or loss is caused by the negligence or intentional wrongdoing of the SCRTPA. Consultant shall also indemnify the SCRTPA for any adverse determination made by the Internal Revenue Service or the State Franchise Tax Board and/or any other taxing or regulatory agency and shall indemnify and hold harmless the SCRTPA with respect to Consultant's "independent contractor" status that would establish a liability on the SCRTPA for failure to make social security deductions or contributions or income tax withholding payments, or any other legally mandated payment.

For professional services provided under this agreement, Consultant shall indemnify and hold harmless the SCRTPA, its elected officials, officers, employees, agents, and volunteers from and against any and all claims, demands, actions, losses, liabilities, damage, and costs, including reasonable attorneys' fees, arising out of or resulting from the negligent acts, errors or omissions of the Consultant for professional services provided under this agreement or from recklessness or willful misconduct.

11. INSURANCE COVERAGE.

- A. Consultant and any subcontractor shall obtain, from an insurance carrier authorized to transact business in the State of California, and maintain continuously during the term of this agreement Commercial General Liability Insurance, including coverage for owned and non-owned automobiles, and other insurance necessary to protect the SCRTPA and the public with limits of liability of not less than \$1 million combined single limit bodily injury and property damage; such insurance shall be primary as to any other insurance maintained by the SCRTPA.
- B. Consultant and any subcontractor shall obtain and maintain continuously required Workers' Compensation and Employer's Liability Insurance to cover Consultant, subcontractor, Consultant's partner(s), subcontractor's partner(s), Consultant's employees, and subcontractor(s) employees with an insurance carrier authorized to transact business in the State of California covering the full liability for compensation for injury to those employed by Consultant or subcontractor. Consultant hereby certifies that Consultant is aware of the provisions of Section 3700 of the Labor Code, which requires every employer to insure against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of the Labor Code, and Consultant shall comply with such provisions before commencing the performance of the work or services prescribed in this agreement.

- C. Consultant shall obtain and maintain continuously a policy of Errors and Omissions coverage with limits of liability of not less than \$1 million.
- D. Consultant shall require subcontractors to furnish satisfactory proof to the SCRTPA that liability and workers' compensation and other required types of insurance have been obtained and are maintained similar to that required of Consultant pursuant to this agreement.
- E. With regard to all insurance coverage required by this agreement:
 - (1) Any deductible or self-insured retention exceeding \$25,000 for Consultant or subcontractor shall be disclosed to and be subject to approval by the SCRTPA Risk Manager prior to the effective date of this agreement.
 - (2) If any insurance coverage required hereunder is provided on a "claims made" rather than "occurrence" form, Consultant or subcontractor shall maintain such insurance coverage with an effective date earlier or equal to the effective date of this agreement and continue coverage for a period of three years after the expiration of this agreement and any extensions thereof. In lieu of maintaining post-agreement expiration coverage as specified above, Consultant or subcontractor may satisfy this provision by purchasing tail coverage for the claims-made policy. Such tail coverage shall, at a minimum, provide coverage for claims received and reported three years after the expiration date of this agreement.
 - (3) All insurance (except workers' compensation and professional liability) shall include an endorsement or an amendment to the policy of insurance that names *the SCRTPA, its elected officials, officers, employees, agents, and volunteers as additional insureds* and provides that coverage *shall not be reduced or canceled without 30 days' written prior notice to the SCRTPA*. The additional insureds coverage shall be equal to Insurance Service Office endorsement CG 20 10 for on-going operations, and CG 20 37 for completed operations.
 - (4) Each insurance policy (except for workers' compensation and professional liability policies), or endorsement thereto, shall contain a "separation of insureds" clause which shall read:

"Separation of Insureds.

Except with respect to the Limits of Insurance, and any rights or duties specifically assigned in this Coverage Part to the first Named Insured, this insurance applies:

- a. As if each Named Insured were the only Named Insured; and
 - b. Separately to each suit insured against whom a claim is made or suit is brought.”
- (5) Consultant shall provide the SCRTPA with an endorsement or amendment to Consultant’s policy of insurance as evidence of insurance protection before the effective date of this agreement.
- (6) The insurance required herein shall be in effect at all times during the term of this agreement. In the event any insurance coverage expires at any time during the term of this agreement, Consultant shall provide, at least 20 days prior to said expiration date, a new endorsement or policy amendment evidencing insurance coverage as provided for herein for not less than the remainder of the term of this agreement or for a period of not less than one year. In the event Consultant fails to keep in effect at all times insurance coverage as herein provided and a renewal endorsement or policy amendment is not provided within 10 days of the expiration of the endorsement or policy amendment in effect at inception of this agreement, the SCRTPA may, in addition to any other remedies it may have, terminate this agreement upon the occurrence of such event.
- (7) If the endorsement or amendment does not reflect the limits of liability required by this agreement provided by the policy of insurance, Consultant shall provide the SCRTPA a certificate of insurance reflecting those limits.

12. NOTICE OF CLAIM/APPLICABLE LAW/VENUE.

- A. If any claim for damages is filed with Consultant or if any lawsuit is instituted concerning Consultant’s performance under this agreement and that in any way, directly or indirectly, contingently or otherwise, affects or might reasonably affect the SCRTPA, Consultant shall give prompt and timely notice thereof to the SCRTPA. Notice shall be prompt and timely if given within 30 days following the date of receipt of a claim or 10 days following the date of service of process of a lawsuit.
- B. Any dispute between the parties, and the interpretation of this agreement, shall be governed by the laws of the State of California. Any litigation shall be venued in Shasta County.

13. COMPLIANCE WITH LAWS; NON-DISCRIMINATION.

- A. Consultant shall observe and comply with all applicable federal, state, and local laws, ordinances, and codes that relate to the work or services to be provided pursuant to this agreement.
- B. Consultant shall not discriminate in employment practices or in the delivery of services on the basis of race, color, creed, religion, national origin, sex, age, marital status, sexual orientation, medical condition (including cancer, HIV and AIDS) physical or mental disability or use of family care leave.
- C. Consultant represents that Consultant is in compliance with and agrees that Consultant shall continue to comply with the Americans with Disabilities Act of 1990 (42 U.S.C. Sections 12101, *et seq.*), the Fair Employment and Housing Act (Government Code Sections 12900, *et seq.*), and regulations and guidelines issued pursuant thereto.
- D. The requirements of 49 CFR Part 26, Regulations of the U.S. Department of Transportation, apply to this contract. It is the policy of the SCRTPA to practice nondiscrimination based on race, color, sex, or national origin in the award or performance of this contract. All firms qualifying under this solicitation are encouraged to submit bids/proposals. Award of this contract will be conditioned upon satisfying the requirements of this bid specification. These requirements apply to all bidders/offers, including those who qualify as a DBE. A DBE contract goal of four percent race-neutral and four percent race-conscious has been established for this contract. The bidder/offeror shall make good faith efforts, as defined in Appendix A, 49 CFR Part 26 (Attachment 1), to meet the contract goal for DBE participation in the performance of this contract.

The bidder/offeror will be required to submit the following information: (1) the names and addresses of DBE firms that will participate in the contract; (2) a description of the work that each DBE firm will perform; (3) the dollar amount of the participation of each DBE firm participating; (4) Written documentation of the bidder/offeror's commitment to use a DBE subcontractor whose participation it submits to meet the contract goal; (5) Written confirmation from the DBE that it is participating in the contract as provided in the commitment made under (4); and (5) if the contract goal is not met, evidence of good faith efforts.

14. ACCESS TO RECORDS/RETENTION.

The SCRTPA, federal, and state officials shall have access to any books, documents, papers, and records of Consultant that are directly pertinent to the subject matter of this agreement for the purpose of auditing or examining the activities of Consultant or

the SCRTPA. Except where longer retention is required by federal or state law, Consultant shall maintain all records for five years after the SCRTPA makes final payment hereunder.

15. CONSULTANT'S COMPLIANCE WITH CHILD, FAMILY AND SPOUSAL SUPPORT REPORTING OBLIGATIONS.

Consultant's failure to comply with state and federal child, family, and spousal support reporting requirements regarding Consultant's employees or failure to implement lawfully served wage and earnings assignment orders or notices of assignment relating to child, family, and spousal support obligations shall constitute a default under this agreement. Consultant's failure to cure such default within 90 days of notice by the SCRTPA shall be grounds for termination of this agreement.

16. LICENSES AND PERMITS.

Consultant shall possess and maintain all necessary licenses, permits, certificates, and credentials required by the laws of the United States, the State of California, the County of Shasta, and all other appropriate governmental agencies, including any certification and credentials required by the SCRTPA. Failure to maintain the licenses, permits, certificates, and credentials shall be deemed a breach of this agreement and constitutes grounds for the termination of this agreement by the SCRTPA.

17. PERFORMANCE STANDARDS.

Consultant shall perform the services required by this agreement in accordance with the industry and/or professional standards applicable to Consultant's services.

18. CONFLICTS OF INTEREST.

Consultant and Consultant's officers and employees shall not have a financial interest, or acquire any financial interest, direct or indirect, in any business, property, or source of income that could be financially affected by or otherwise conflict in any manner or degree with the performance of the work or services required under this agreement.

19. NOTICES.

- A. Except as provided in Section 6.C. of this agreement (oral notice of termination due to insufficient funding), any notice required to be given pursuant to the terms and provisions of this agreement shall be in writing and shall be sent first-class mail to the following addresses:

If to the SCRTPA: Executive Director
Shasta County Regional Transportation
Planning Agency
1855 Placer Street
Redding, CA 96001

If to Consultant: John Long, P.E., Principal
DKS Associates
8950 Cal Center Drive, Suite 340
Sacramento, CA 95826

- B. Written notice shall be deemed to be effective two days after mailing. Any oral notice authorized by this agreement shall be deemed to be effective immediately.

20. AGREEMENT PREPARATION.

It is agreed and understood by the parties that this agreement has been arrived at through negotiation and that neither party is to be deemed the party which created any uncertainty in this agreement within the meaning of Civil Code Section 1654.

21. COMPLIANCE WITH POLITICAL REFORM ACT.

Consultant shall comply with the California Political Reform Act (Government Code Sections 87100, *et seq.*), with all regulations adopted by the Fair Political Practices Commission pursuant thereto, and with the SCRTA's Conflict of Interest Code, with regard to any obligation on the part of Consultant to disclose financial interests and to recuse from influencing any SCRTA decisions which may affect Consultant's financial interests. If required by the SCRTA's Conflict of Interest Code, Consultant shall comply with the ethics training requirements of Government Code Section 53234 *et seq.*

22. CONFIDENTIALITY.

During the term of this agreement, both parties may have access to information that is confidential or proprietary in nature. Both parties agree to preserve the confidentiality of and to not disclose any such information to any third party without the express written consent of the other party or as required by law. This provision shall survive the termination, expiration, or cancellation of the agreement.

23. SCOPE AND OWNERSHIP OF WORK.

The scope of work shall be as prescribed in Paragraph 1. All research data, reports, and every other work product of any kind or character arising from or related to the scope of work of this agreement shall become the property of the SCRTA and be delivered to the SCRTA upon completion of its authorized use pursuant to this agreement. The SCRTA may use such work products for any purpose whatsoever. All works produced under this agreement shall be deemed works produced by a contractor for hire, and all copyright with respect thereto shall vest in the SCRTA without payment of royalty or any other additional compensation. Notwithstanding anything to the contrary contained in this agreement, Consultant shall retain all of Consultant's rights in Consultant's own

proprietary information, including, without limitation, Consultant's methodologies and methods of analysis, ideas, concepts, expressions, know how, methods, techniques, skills, knowledge, and experience possessed by Consultant prior to, or acquired by Consultant during the performance of this agreement and Consultant shall not be restricted in any way with respect thereto.

24. USE OF SCRTPA PROPERTY.

Consultant shall not use SCRTPA premises, property (including equipment, instruments and supplies), or personnel for any purpose other than in the performance of Consultant's obligations under this agreement.

25. SEVERABILITY.

If any portion of this agreement or application thereof to any person or circumstance is declared invalid by a court of competent jurisdiction or if it is found in contravention of any federal or state statute or regulation or SCRTPA ordinance, the remaining provisions of this agreement, or the application thereof, shall not be invalidated thereby and shall remain in full force and effect to the extent that the provisions of this agreement are severable.

IN WITNESS WHEREOF, the SCRTPA and Consultant have executed this agreement on the day and year set forth below. By their signatures below, each signatory represents that he/she has the authority to execute this agreement and to bind the party on whose behalf his/her execution is made.

**Shasta County Regional
Transportation Planning Agency**

Date: _____

Daniel S. Little, AICP
Executive Director

John P. Long, P.E.
Consultant

Tax I.D. 94-258 3153

Approved as to form:

John Kenny, Counsel
Shasta County Regional
Transportation Planning Agency

John Kenny

Exhibit B – Cost Proposal

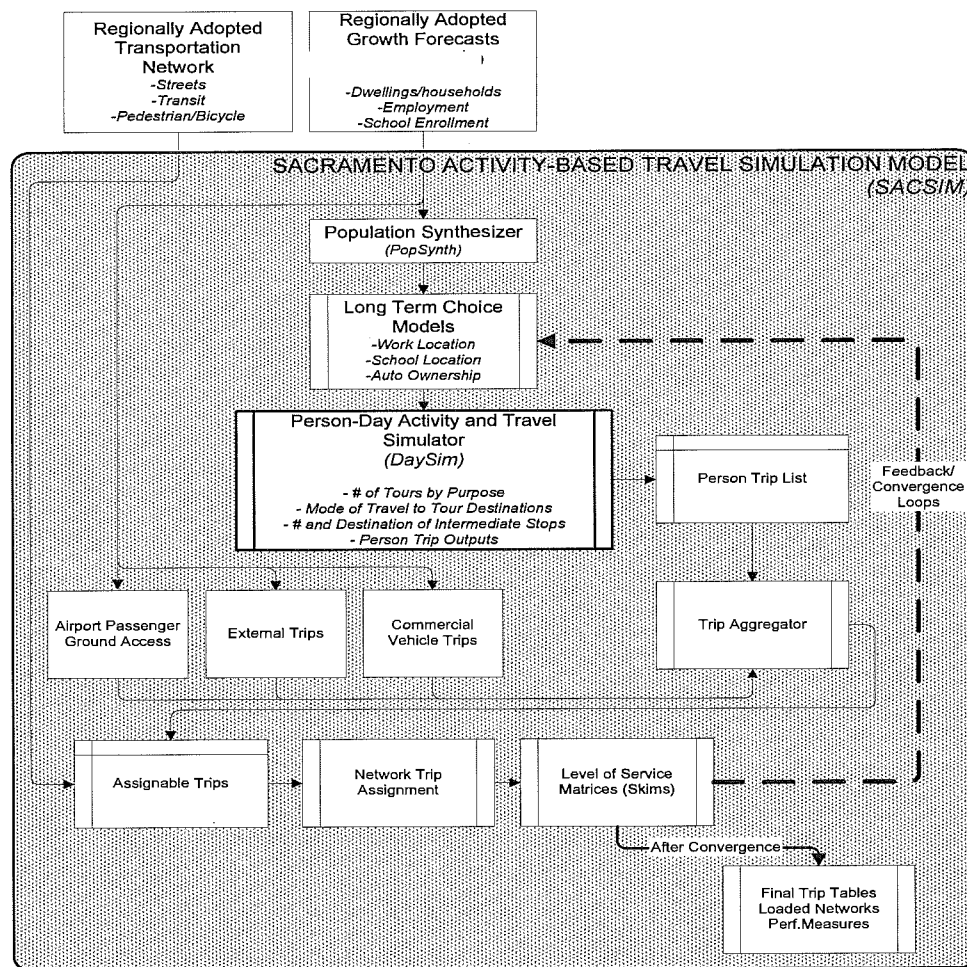
Task	DKS				Sub-Consultants			Total
	J.Long	B.Fugitt	J.Gibb	M.Mauch	Bowman	Bradley	RSG	
	\$235	\$105	\$165	\$185	\$230	\$230	\$160	
Model Data								
Task 1.0 - GIS Data / 2010 Update		40						\$4,200
Task 1.1 - Geography / Land Use		40						\$4,200
Task 1.2 - Population Synthesizer		40						\$4,200
Task 1.3 - Transportation Network		20						\$2,100
DaySim								
Task 2.1 - DaySim Development		80	80		80	80	114	\$76,640
DaySim-Cube Integration								
Task 3.1 - Integration		40	60					\$14,100
Validation and Sensitivity								
Task 4.1 - Validation and Sensitivity		20	60					\$12,000
Task 4.2 - Sensitivity		40						\$4,200
Other Considerations								
G.1 - 2010 Census		20						\$2,100
G.2 - Update development		20						\$2,100
G.3 - 2040 Horizon		40						\$4,200
G.4 - 2010 roadway RTP		20						\$2,100
G.5 - Household Ownership		24						\$2,520
G.6 - Model Summaries (a)		24						\$2,520
G.7 - Model Summaries (b)		24						\$2,520
G.8 - GIS Platform		40		20				\$7,900
G.9 - Model Output Visuals		40		20				\$7,900
G.10 - Transit Assessment								\$0
G.11 - Goods Movement								\$0
G.12 - ITS Discussion								\$0
Training/Meetings/Documentation								
Training		24						\$2,520
Meetings	20	20						\$6,800
Documentation	20	40						\$8,900
Other	20							\$4,700
Travel/Materials								\$2,000
Contingency (5%)								\$9,500
Total	60	656	200	40	80	80	114	\$189,920

Exhibit A

Scope of work for the Shasta County Travel Demand Model: Model Improvement Plan (MIP) Between the Shasta County Regional Transportation Planning Agency (SCRTPA) and DKS Associates (DKS)

The following scope of work was developed based on DKS Associates' understanding of the project components and experience on similar projects. The planned Scope of Work follows a similar task structure as identified in the prop 84 application. As mentioned above, the DKS team proposes the Shasta County RTPA move forward in development of an activity-based model. The proposed activity travel model will share a Day-pattern activity simulator as used in SACOG's SACSIM and also the activity-based models currently being planned for development in the San Joaquin Valley. **Figure 1** shows the SACSIM structure which is proposed activity model system for Shasta County. Because the DKS team is proposing a parcel-based disaggregated activity travel model, the planned scope of work follows a different task structure as identified in the prop 84 application.

FIGURE 1: PROPOSED ACTIVITY MODEL SYSTEM



1. MODEL DATA

TASK 1.0 - GIS DATA AND 2010 MODEL UPDATE

ENPLAN is currently under contract with SCRTPA to update a parcel and roadway GIS layer across all four jurisdictions in Shasta County. The MIP team will coordinate with ENPLAN to acquire parcel level land use data necessary for the travel model. As with all travel models, land use data must be categorized for trip making purposes. The County's current four-step model divides residential into six categories and non-residential into 22 categories. The DKS team proposes the new activity-based model use similar residential and non-residential categories as the current model.

Dowling is also currently under contract with SCRTPA to validate the current four-step model to 2010 conditions. The scope of work addresses updates to the roadway network and land use development. The new activity-based model will share the same roadway and transit networks as the four-step. Land use will be at a parcel level, but with the ability to easily aggregate to the TAZ as in the four-step. The Dowling scope includes updates to various future year roadway and land use assumptions.

Both the tasks completed by ENPLAN and Dowling will be compatible with the proposed activity travel model.

TASK 1.1 - MODEL GEOGRAPHY AND LAND USE

The proposed model land use input file will be based on the GIS parcel database. The DKS team will develop a spreadsheet tool that reads the GIS parcel database and outputs the model land use input file. Household demographics such as: persons per household, workers per household, students per household, and income are created in task 1.2 - population synthesizer.

The DKS team will work with the SCRTPA to best estimate future year land use at a parcel level. DKS has used methods such as gridding growth areas and analyzing local jurisdictional approved development.

The proposed model land use input includes smart characteristics like street pattern, parking availability, and transit. The proposed model land use input also includes buffering/proximity values which represents the quantity or type of use within one-quarter or one-half miles of a parcel. For example, the number of bus stops within a half mile or number of retail employees within a quarter mile. The DKS team has developed tools (GIS, spreadsheets, and programs) to aid the County in creating the model land use inputs. For simplicity, the County may choose to use a default value for the most areas and a true calculation for the smarter areas.

Deliverables

- a) Technical memo of land use data incorporated and changes from current Shasta County 4-step model to new activity-based model.
- b) Technical memo discussing current and future model geography and land use data, including detailed account of future year land use estimates.
- c) Development of tools to aid the SCRTPA in creating model land use input data.
- d) Development of a spreadsheet tool that reads the GIS parcel database and outputs the model land use input file. Associated outputs will be included in the technical memo.

TASK 1.2 - POPULATION SYNTHESIZER

A population synthesizer creates a population database which is used later in the model. The population dataset is consistent with regional residential, employment and school enrollment forecasts in quantity, location, and key demographic variables like age and income. Population datasets are generated for each forecast land use alternative, and are treated as inputs files for testing transportation network alternatives. The population dataset can be directly modified (e.g. changing locations of specific households, changing income or age characteristics, etc.) to test the effects of different land use forecasts or demographic trend assumptions.

For the Shasta County, the DKS team recommends use of Arizona State University's PopGen. PopGen a new open-source synthetic population generation software system that implements enhanced procedures which allow one to simultaneously control for household-level and person-level control variable distributions in the population synthesis process. The synthetic population generation process essentially involves expanding a sample to meet target population numbers while ensuring that known census distributions of key household and person variables of interest are replicated as closely as possible in the synthetic population. PopGen is a user-friendly open source software package.

Deliverables

- a) Technical memo detailing the development of the population synthesizer for Shasta County and population dataset outputs

TASK 1.3 – TRANSPORTATION NETWORK

Like the four-step, the proposed activity travel model uses coded representations of the Shasta region's highway network, which provides the basis of estimating zone-to-zone travel times and costs for the trip distribution and mode choice models and for trip routing in the vehicle assignments. The highway network serves not only as the basis of highway travel times and traffic assignments, but also as the basis of bus running times and zonal walk- and drive-access for transit travel time and assignment.

The transportation networks will be consistent with the four-step networks updated by Dowling in task 1.0. The DKS team will enhance the network to include additional transit and pedestrian access. Transit access includes:

- Additional nodes and links for transit lines which do not travel on the road network
- Park-and-ride lots and connecting access links
- Walk access links to the shortest-path transit stop
- Timed transfer points

For walk and bike trips, the proposed model will calculate travel time using parcel to parcel orthogonal distances.

Deliverables

- a) Technical memo of network data incorporated and changes from current Shasta County 4-step model to new activity-based model and enhancements made to the transportation network, with associated outputs.

2. DAYSIM

For Shasta, most of the amount budgeted for model and software development will go toward implementing the Shasta-specific component. It can be done for this price only by borrowing the client-specific component of SACOG and doing the minimum required Shasta-specific adjustments. Bowman, Bradley and RSG will implement the basic client-specific component, and DKS will provide customizations if necessary (such as simplifications of the modes), with support from Bowman, Bradley and RSG.

TASK 2.1 – DAYSIM DEVELOPMENT FOR SHASTA

The DaySim model is the activity simulator for the intra-regional travel of all residents. DaySim is the main engine of the proposed activity model. DaySim computes:

- Auto availability
- Work/school location (long term choice)
- Activity pattern
- Tour purpose
- Tour destinations
- Intermediate stops (trips)
- Tour mode / Trip mode
- Trip time of day

Bowman, Bradley and RSG of the DKS team will lead the software development of the basic client-specific DaySim engine. DKS will then tailor the DaySim engine to the travel behavior of Shasta County. This is an iterative process of adjusting model parameters. DKS will also simplify components of the DaySim model for Shasta County. For example, SACOG's DaySim engine includes light-rail in mode-choice.

The Bowman, Bradley, RSG, DKS team is currently enhancing the DaySim engine with tolling capabilities for SACOG and PSRC. The DaySim structure will allow for Shasta County to cost-effectively benefit from such enhancements.

Deliverables

- a) Technical memo detailing the development of the DaySim model for Shasta County and associated outputs.

3. DAYSIM-CUBE INTEGRATION

TASK 3.1 – INTEGRATION

The DKS team recommends the SCRTPA use Citilabs Cube software to run the proposed activity-model. The DaySim executable is called from within the Cube application. Cube then aggregates the DaySim trip list into Origin/Destination trip tables and combined with the other trip types by time of day. Assignments of vehicle trips and transit person trips will be done using Cube. The components of the travel forecasting model system will be integrated with an iterative equilibration between traffic

assignment and the tour and trip generating components. This will be done within the Cube Application Manager framework.

Within Cube, DKS will also incorporate the County's current four-step through-trips, external-trips, and special generators into the proposed activity-based model.

Deliverables

- a) Technical memo detailing integration of the DaySim model with current Cube software, including all trip and special generator information and associated results and outputs.

4. VALIDATION AND SENSITIVITY TEST

TASK 4.1 – CALIBRATION AND VALIDATION

The Population Synthesizer will be calibrated to the 2009-2007 American Community Survey (ACS) data. ACS data includes person records related to travel such as age, student, and worker. ACS data also includes household records related to travel such as income, household size, and vehicles available. Also available is the 2010 Census Demographic Profile Summary, which is also an excellent source for population calibration and will be utilized where appropriate.

The DaySim engine has been calibrated to Sacramento and will need a few modest adjustments for Shasta. The DKS team will use the 2000/2001 California Statewide Travel Survey data to calibrate mode choice and the time of day components. The DKS team will then validate traffic assignment to vehicle counts by facility type. The DKS team will use ridership counts to validate the transit assignment.

Deliverables

- a) Technical memo detailing model calibration and validation for the Population Synthesizer, DaySim engine, mode choice, time of day components, and traffic assignment, with associated outputs.

TASK 4.2 – SENSITIVITY TEST

DKS will perform sensitivity test to test the activity-based models capabilities on smart growth. Since the County will also have an updated four-step model, DKS will perform and document a comparison of the two models.

Deliverables

- a) Technical memo detailing sensitivity testing of the activity-based model, including a comparison to the updated 4-step model and changes made to the activity-based model due to the sensitivity testing.

OTHER CONSIDERATIONS

The SCRTPA has included a list of "other considerations" to be included in this work effort.

G.1 - 2010 CENSUS

Since the SCRTPA is moving towards a GIS parcel platform, updating TAZ boundaries is as simple as drawing. DKS will rectify TAZs to fit within 2010 Census block groups.

G.2 - UPDATE DEVELOPMENT

Due to the recent downturn in the economy, DKS will work with the SCRTPA to reevaluate their development, employment, and economic assumptions. DKS has found the State's Department of Finance to be a helpful source. DKS will also work with local agencies to include applicable local adjustment factors.

G.3 - 2040 HORIZON

DKS will analyze historical growth trends and work with the SCRTPA to create a 2040 horizon broken into 5-year increments. Development of future year land use for the new activity model will follow a similar process as developed for the four-step update in task 1.0.

G.4 - 2010 ROADWAY RTP

DKS will update road network to 2010 Regional Transportation Plan (RTP) constrained and non-constrained projects.

G. 5 - HOUSEHOLD OWNERSHIP

The Population Synthesizer will be calibrated household ownership. A key advantage to the activity-based model is that travel behavior (trip generation and mode choice) is stratified to the person type. DKS will 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.

Deliverables:

- a) Household ownership results will be reflected in outputs from task 1.2 – Population Synthesizer.

G. 6 - MODEL SUMMARIES (A)

DKS will develop spreadsheet tools to summarize model output. DKS will develop Cube scripts that outputs desired model results which then imported into excel. Such tools can quickly generated tables and charts. An activity model outputs travel at the person level. This allows for the ability to create far more detailed summaries than a four-step model. For example you can group transit trips by vehicle ownership or bike trips by income class. Summaries are no longer limited to aggregate TAZs.

Deliverables:

- a) DKS will work with SCRTPA to identify helpful model summaries that can be standard output files.

G. 7 - MODEL SUMMARIES (B)

See G.6. DKS will create spreadsheet tools to summarize walk and bike trips.

G. 8 - GIS PLATFORM AND G. 9 - MODEL OUTPUT VISUALS

The Cube platform now has GIS capabilities. The Cube user interface allows for the user to incorporate aeriels with model plots. However, most of the jurisdictions DKS work with do not have access or are trained to use the Cube software. DKS has developed two slick solutions.

- a. Google Earth Builder. Google Earth is free software which DKS has been using with their clients create custom Google Earth and Google Maps layers. DKS can develop KML files for the County to display in Google Earth.
- b. ArcView/ArcGIS. ArcGIS is one of the most power tools for displaying model results, but it requires a level of user knowledge and is expensive. DKS can develop a Shasta Regional template in which model output can be imported. For example, for Regional Transit in Sacramento, DKS developed a thematic map template that can be updated from a spreadsheet.

DKS will work with the SCRTPA to determine which tool or tools would best suit their needs and skill level.

Deliverables:

- a) DKS will assist the RTPA in developing standard output visuals utilizing ArcGIS or other software tools.

G. 10 - TRANSIT ASSESSMENT

The proposed activity-based model has transit assessment capabilities. As scoped task 3.1 – Integration, DKS will build into the transit assignment to output transit line summaries and LOS.

TRAINING

DKS will conduct staff training on running the model. We have trained a number of MPOs, counties and cities on the use of travel models and recognize that the training must be tailored to the background of the individuals that will use the model. DKS recommends that this training be scheduled over a two-day period. The first day will explain how to create model inputs and modify the model forecasts for use, and the second will explain how to run the model and do reasonableness checks on the results. DKS anticipates the need to provide additional support to the MPO and will be available for follow-up related questions, as needed.

Deliverables

- a) A two-day training course on the new activity-based model, including all training materials and user guide.

MEETINGS

DKS Associates will follow the same meeting schedule as in the RFP. 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.

DOCUMENTATION

DKS will prepare a detailed Model User's Manual. The User's Manual will contain step-by-step instructions on how set-up the model up to run. The User's Manual will be design to help the user learn and understand the components of the activity-based travel model. How all of the extensive GIS and modeling capabilities can be used to further modify and analyze the model inputs and outputs. The User's Manual will also demonstrate post-model routines to extract and display model output. The User's Manual will explain additional spreadsheet and GIS tools supplied by DKS.

Deliverables

- a) Twenty (20) hard copy user guides and one (1) electronic copy in Microsoft Word (.doc) and PDF format on a compact disk.
- b) Summaries of the development of the new Shasta County Activity-based Model, including all technical memos will be included in the user guides.

Project Assurances

DKS will provide the following assurances regarding the completion of this project:

1. A fully functional activity-based model that meets the needs and expectations of the SCRTPA.
2. The new activity-based model validation for tasks 4.1 and 4.2 will meet and/or exceed the validation standards as required for the current Shasta County 4-step model (Shasta County Travel Demand Model: Model Users Guide, Chapter 11 – Model Validation).