



## Board of County Commissioners - Staff Report

**Meeting Date:** March 19, 2019

**Presenter:** Amy Ramage

**Submitting Dept:** Public Works

**Subject:** Consideration of a contract with Cambridge

Systematics, Inc. for development of a TransModeler microsimulation model

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**Statement / Purpose:** To consider a contract with Cambridge Systematics, Inc. for development of a TransModeler microsimulation model (traffic model phase 2).

**Background / Description (Pros & Cons):** The Travel Demand model project was completed in January 2019. Cambridge Systematics was selected through an RFP process to prepare this model in 2017. They delivered the final project on budget and have demonstrated proven performance abilities in both their work product and presentations. There is now a need to take the travel demand model and utilize additional software to do microsimulation that allows for closer analysis of intersection functionality and behavior under different test circumstances. This is a critical tool as both the Town and the County endeavor to work on implementing the Integrated Transportation Plan and work on complex transportation planning efforts.

Both a summer model and a winter model will be developed as both seasons are now important in transportation planning. School generated traffic in the greater South Park area is also important to analyze and is not part of usual summer traffic counts. Data will be collected in Summer 2019 and Winter 2020.

**Stakeholder Analysis & Involvement:** County and Town of Jackson staff formally requested that WYDOT contribute to this second phase of the project via their Planning funds which were previously used on the phase 1 of the travel model. According to Keith Compton, WYDOT District Engineer, they are unable to grant this request due to limited pool of funds for the entire district and because funds have already been committed to other recent Teton County projects (travel model phase 1 and Wilson Planning efforts). WYDOT is very supportive of the project moving forward.

County and Town staff have worked together on developing this scope of work. The Town of Jackson has committed and has budgeted funds in place for this project. County staff will send invoices to the Town for ½ of the invoices upon receipt. This is the same way that phase one of the travel model was administered.

**Fiscal Impact:** \$181,866. The Town of Jackson will be compensating Teton County for ½ of the project cost. Adequate funds are available in County Engineer budget line item 10-4-008-350-001 for Professional Charter in both FY19 and requested in FY20. This project will span FY19-FY20.

**Staff Impact:** County Engineering staff will have a moderate amount of time managing this project.

**Legal Review:** Gingery

**Staff Input / Recommendation:** Staff recommends approval of the contract with Cambridge Systematics, Inc.

**Attachments:** consulting agreement proposed work plan

**Suggested Motion:** I move to approve the contract with Cambridge Systematics, Inc. for development of a TransModeler microsimulation model in the amount not-to-exceed \$181,866.

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## CONSULTING AGREEMENT

This Agreement is made by and between Teton County, Wyoming, a duly organized county of the State of Wyoming, P.O. Box 3594, Jackson, Wyoming 83001 (hereinafter "Client"), and Cambridge Systematics, Inc., with offices at 101 Station Landing, Medford, MA 02155 (hereinafter "CS" or "Consultant") with reference to the following:

WHEREAS, Consultant is engaged in the business of rendering transportation consulting services; and

WHEREAS, in connection therewith, Client wishes to retain Consultant to develop a TransModeler microsimulation model; and

WHEREAS, Consultant is willing and able to render said services.

NOW, THEREFORE, in consideration of the mutual terms, conditions and covenants set forth herein, the parties agree as follows:

1. Consultant's Services. Consultant agrees to render services to Client in accordance with the Work Plan dated March 7, 2019, attached hereto as Exhibit 1 and incorporated by reference.
2. a. Compensation. In consideration of the services set forth in Exhibit 1, Client shall pay Consultant in accordance with the Budget contained in the Work Plan dated March 7, 2019, attached hereto as Exhibit 1 and incorporated herein by reference.  
  
b. Additional Compensation.
  - i. Consultant may be entitled to an adjustment in compensation in the event that changes are made to the scope of work or level of effort as further set forth in paragraph 6 herein.
  - ii. Client further agrees that in the event that the Consultant is required to provide documents, assistance or testimony in response to claims, demands or actions by third parties in connection with this project, Consultant shall be compensated for its professional fees, costs and associated expenses. This includes, without limitation, any assistance required by the Client relative to any claims made or any actions brought in connection with the project. The foregoing is intended to apply to third party claims, demands or actions that arise from or relate to the Client's project.
- c. Manner of Payment. Once each month during the term hereof, Consultant shall prepare and submit to the Client an invoice together with such supporting documentation as may be reasonably required by Client. Invoices shall be

submitted on a time and materials basis and shall be based on percent complete. Client shall pay Consultant within thirty (30) days after receipt of the invoice and any required supporting documentation.

3. a. Status as Independent Contractors. This Agreement shall not constitute, create, or otherwise imply an employment, joint venture, partnership, agency or similar arrangement. Consultant shall act as an independent contractor, and neither party shall have the power to act for or bind the other party except as expressly provided for herein.

b. Ineligible for Employee Benefits. Consultant shall not be eligible for any benefit available to employees of Client, including, but not limited to, workers compensation insurance, state disability insurance, unemployment insurance, group health and life insurance, vacation pay, sick pay, severance pay, bonus plans, pension plans, savings plans and the like.

4. Term. This Agreement shall be effective as of the date of execution and shall continue in effect through the date of completion unless earlier terminated as provided in paragraph 5 below or the period of performance is extended pursuant to an amendment hereto signed by both parties.

5. Termination. Client shall have the right to terminate this Agreement for convenience upon thirty (30) days' written notice to Consultant. Either party shall have the right to terminate this Agreement if the other party is in default of any obligation hereunder and such default is not cured within thirty (30) days of receipt of a written notice from the non-defaulting party specifying such default unless otherwise agreed in writing. Client shall compensate Consultant for work performed up to the effective date of the termination based on the percent complete.

6. Changes. If any change in the scope of work causes an adjustment in the Consultant's cost of, or time required for, the performance of any part of the work pursuant to this Agreement, the parties shall negotiate an equitable adjustment to the compensation payable hereunder, and this Agreement shall be modified in writing accordingly.

7. Standard of Performance. Consultant agrees to perform the services required hereunder in accordance with the standards of the profession, and to devote such time as is necessary to perform the services required under this Agreement.

8. Conflicts of Interest. Consultant represents that (i) the work hereunder will not create an actual or apparent conflict of interest with any other work it is performing, and (ii) Consultant is not subject to any statute, regulation, ordinance or rule that will limit its ability to perform its obligations under this Agreement.

9. Confidential Information. All data and information provided to Consultant by CLIENT is considered proprietary, privileged and confidential. Consultant agrees not to divulge or publicize in any manner any such data or information which is received from CLIENT, or which is obtained as a result of Consultant's work under this contract unless (1) it was known to Consultant prior to being divulged by CLIENT; (2) it was provided to Consultant by a third party not in breach of any obligation to CLIENT or any other party (3) it was independently developed by Consultant; or (4) Consultant is ordered to divulge the information by a court of competent jurisdiction and has promptly advised CLIENT of such order. Consultant agrees to protect such data and information from unauthorized use and disclosure and to refrain from using such data and information for any purpose other than that for which it was furnished. Consultant shall use at least the same degree of care in protecting CLIENT confidential and proprietary information that it would use in protecting its own confidential and proprietary information. The restrictions set forth in this paragraph shall continue to remain in effect for one year after the expiration of the period of performance hereunder. Consultant may retain a copy of the confidential information for archival purposes only.

10. Work Product. Client agrees that all new materials first developed hereunder by Consultant shall become property of Client. Client agrees that Consultant's pre-existing materials and underlying methodologies and intellectual property remain the property of Consultant. Nothing herein shall prevent the Consultant from marketing, developing, using and performing services or products similar to or competitive with the services and products furnished under this Agreement to the extent that such services and products do not include confidential information of the Client.

11. Insurance. Consultant shall be solely responsible for obtaining workers compensation insurance for its employees and agents and such other insurance as may be required by applicable laws. Consultant agrees to carry, for the term of this Agreement, the following insurance in the amounts indicated:

Professional Liability	\$1,000,000		
Commercial General Liability	\$1,000,000	per	occurrence/
	\$2,000,000	aggregate	
Automobile Liability	\$1,000,000		

Upon request of the Client, Consultant shall furnish certificates evidencing any and all such insurance.

12. Liability. Client agrees that Consultant's total aggregate limit of liability hereunder (whether by contract, statute, in tort or otherwise) for damages on any one or more or all claims (regardless of the number of different or other claims, claimants or occurrences) shall not exceed a total of the fees paid under this Agreement. Client further agrees that Consultant shall not be liable to Client for any indirect, incidental, special or consequential damages, any lost profits or any

claim or demand, arising out of or in connection with this Agreement even if Consultant has been advised of the possibility of such damages. No action, regardless of form (whether statutory, contract, in tort or otherwise), arising out of the transaction under this Agreement, may be brought by either party more than one year after the cause of action has accrued.

13. Miscellaneous.

a. Attorneys' Fees. In the event that suit is brought to enforce or interpret any part of this Agreement, the prevailing party shall be entitled to recover as an element of the costs of suit, and not as damages, reasonable attorneys' fees to be fixed by the Court.

b. Waiver, Modification and Amendment. No provision of this Agreement may be waived unless in writing, signed by all of the parties hereto. Waiver of any one provision of this Agreement shall not be deemed to be a continuing waiver or a waiver of any other provision. This Agreement may be modified or amended only by a written agreement executed by all of the parties hereto.

c. Governing Law. This Agreement shall be governed and construed in accordance with the laws of Massachusetts.

d. Assignment; Subcontracting. Neither this Agreement nor any duties or obligations hereunder may be assigned, transferred, or subcontracted by Consultant without the prior written approval of the Client.

e. Notices.

- i. All notices under this Agreement shall be in writing and shall be delivered by personal service, facsimile or certified mail, postage prepaid, or overnight courier to such address as may be designated from time to time by the relevant party, which initially shall be the address set forth below:

Cambridge Systematics, Inc.  
115 S. LaSalle Street, Suite 2200  
Chicago, Illinois 60603  
Attn: Nick Caccamo

Teton County, Wyoming  
PO Box 3594  
320 S. King St.  
Jackson, Wyoming 83001  
Attn: Amy Ramage, [aramage@tetoncountywy.gov](mailto:aramage@tetoncountywy.gov)

- ii. All notices shall be deemed given when received. No objection

may be made to the manner of delivery of any notice actually received in writing by an authorized agent of a party.

f. Partial Invalidity. If any provision of this Agreement is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions shall nevertheless continue in full force without being impaired or invalidated in any manner.

g. Benefit. This Agreement is exclusively for the benefit of the parties hereto and may not be enforced by any person or entity other than the parties hereto, their respective successors and permitted assigns.

h. Captions. Captions are for informational purposes only and are not intended to replace contents of paragraphs that are captioned.

i. Entire Agreement. This Agreement and the exhibits attached hereto contain the entire agreement and understanding of the parties with respect to the subject matter hereof, and supersedes and replaces any and all prior discussions, representations and understandings, whether oral or written.

IN WITNESS WHEREOF, the parties have executed this Agreement through their duly authorized representatives this \_\_\_\_ day of \_\_\_\_\_, 2019.

Cambridge Systematics, Inc.

Teton County, Wyoming

101 Station Landing  
Suite 410  
Medford, MA 02155

PO Box 3594  
320 S King St.  
Jackson, WY 83001

Telephone (781) 539-6700  
Fax (781) 539-6701

Telephone (307) 733-8094  
Fax (307) 733-4451

By \_\_\_\_\_

By \_\_\_\_\_

Title \_\_\_\_\_

Title \_\_\_\_\_

Natalia Macker, Chair  
Teton County Board of County Commissioners

Attest:

\_\_\_\_\_  
Sherry Daigle, Teton County Clerk

**EXHIBIT 1**  
**WORK PLAN**

# Teton County Operational Simulation Model

## *Work Plan*

*prepared for*

**Teton County and the Town of Jackson**

*prepared by*

**Cambridge Systematics, Inc.**



## Summary

This document presents the work plan, schedule, and budget estimate for the development of a TransModeler microsimulation model of the roads within a defined subarea in the town of Jackson in Teton County, WY.

In Figure 1, the proposed simulation study area is contained by the blue line. Within this area, all roads with classification higher than “local road” will be included in the model. The final set of roadways will be discussed and agreed to before the model development begins.

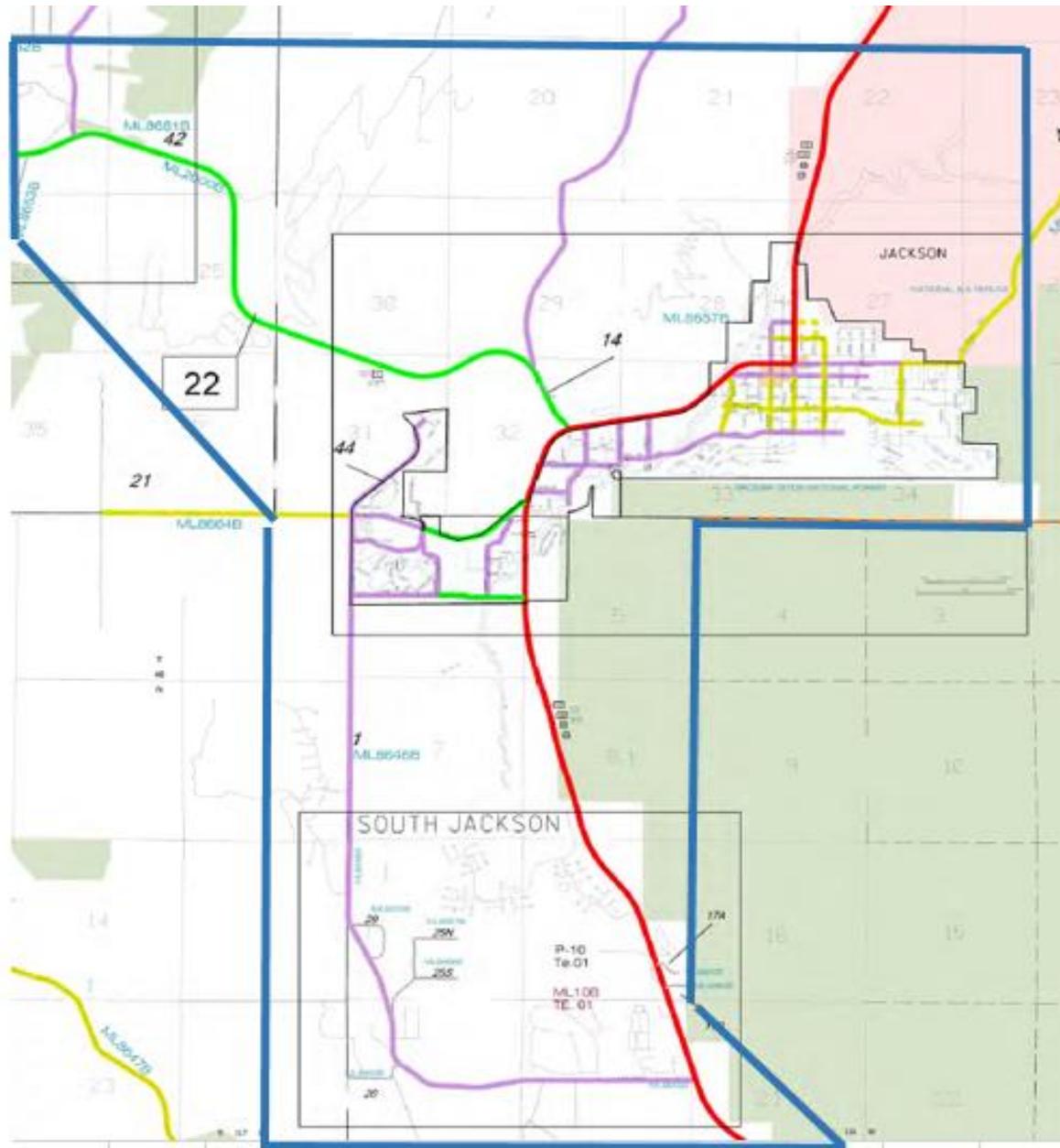


Figure 1. Simulation Study Area

In order to complete the microsimulation model development and an initial alternative analysis, the following tasks will be undertaken.

## Task A: Data Collection

CS will work with All Traffic Data as a subcontractor to perform the data collection needed to develop and calibrate the simulation model. All Traffic Data will collect the intersection turning movement counts and also perform 'floating car' travel time studies of key roadways in the model study area.

Before collecting intersection turning counts, CS will work with the Transportation Advisory Committee (TAC) and local partners to identify any existing recently collected traffic counts that may be available and can be reused to help develop the simulation model. Based on this review of available data, CS will identify up to 35 locations to collect additional turning movement data. This data collection plan will be presented and agreed upon with the TAC before collecting counts. Intersection turning movement counts will be collected during two peak periods, the AM peak and the PM peak periods, during both summer and winter conditions at up to 35 intersections. Each period will collect a three hour window of counts; the exact time frames for this collection will also be discussed and agreed to with the TAC before collection. Following collection and processing, both the newly and previously collected data will be reviewed to ensure consistency between nearby counts and, if necessary, be adjusted to better balance the collected counts before being utilized in the development of the simulation model.

A set of floating car travel time studies is also proposed on up to seven corridors. For each of the seven corridors, ATD will conduct 24 floating car travel time runs. These will consist of 12 runs in each direction, 6 in the AM peak period and 6 in the PM peak period. The proposed corridors for which travel time data will be collected are shown in Figures 2 through 6.

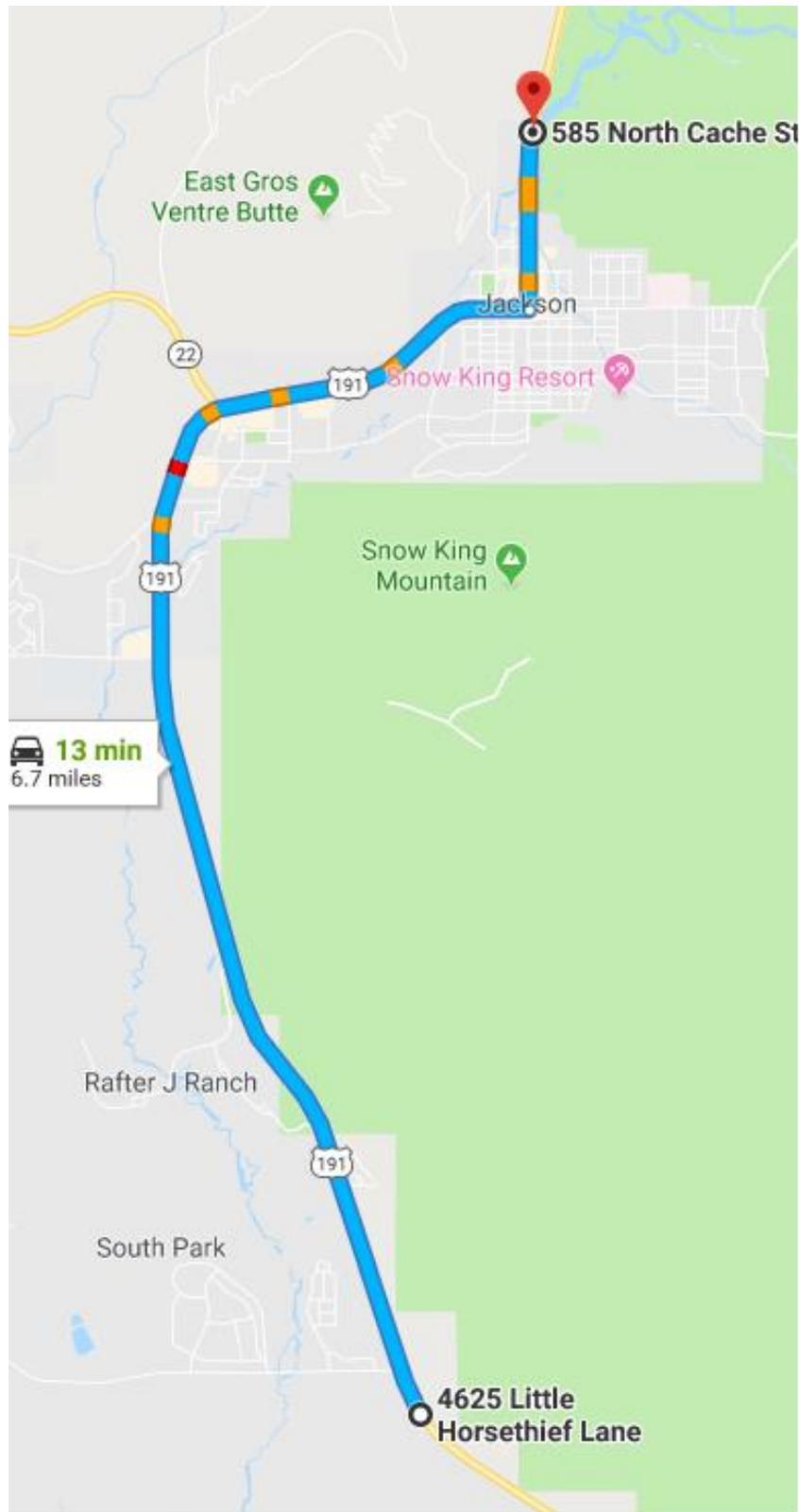


Figure 2. Route 1

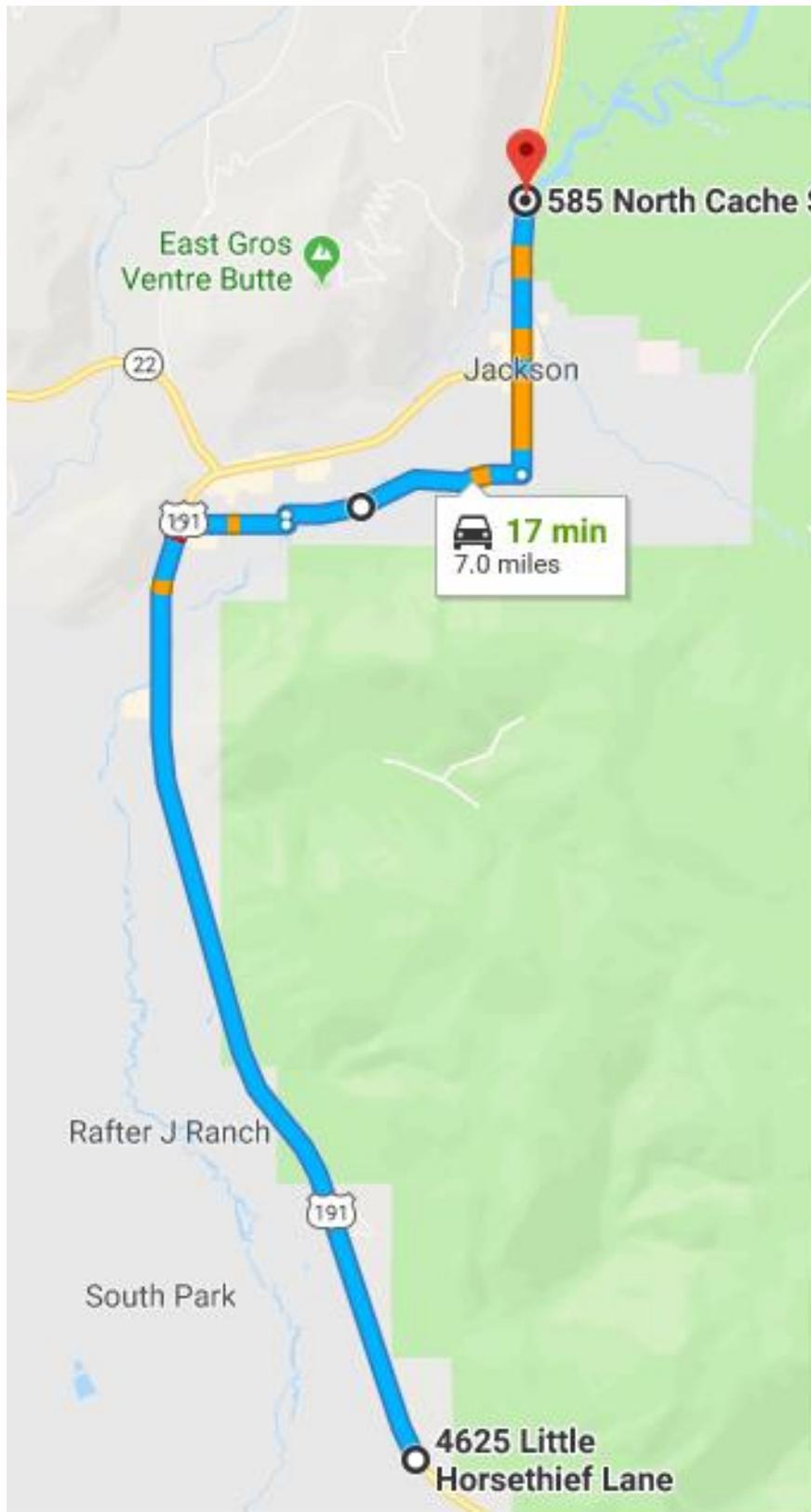


Figure 3. Route 2

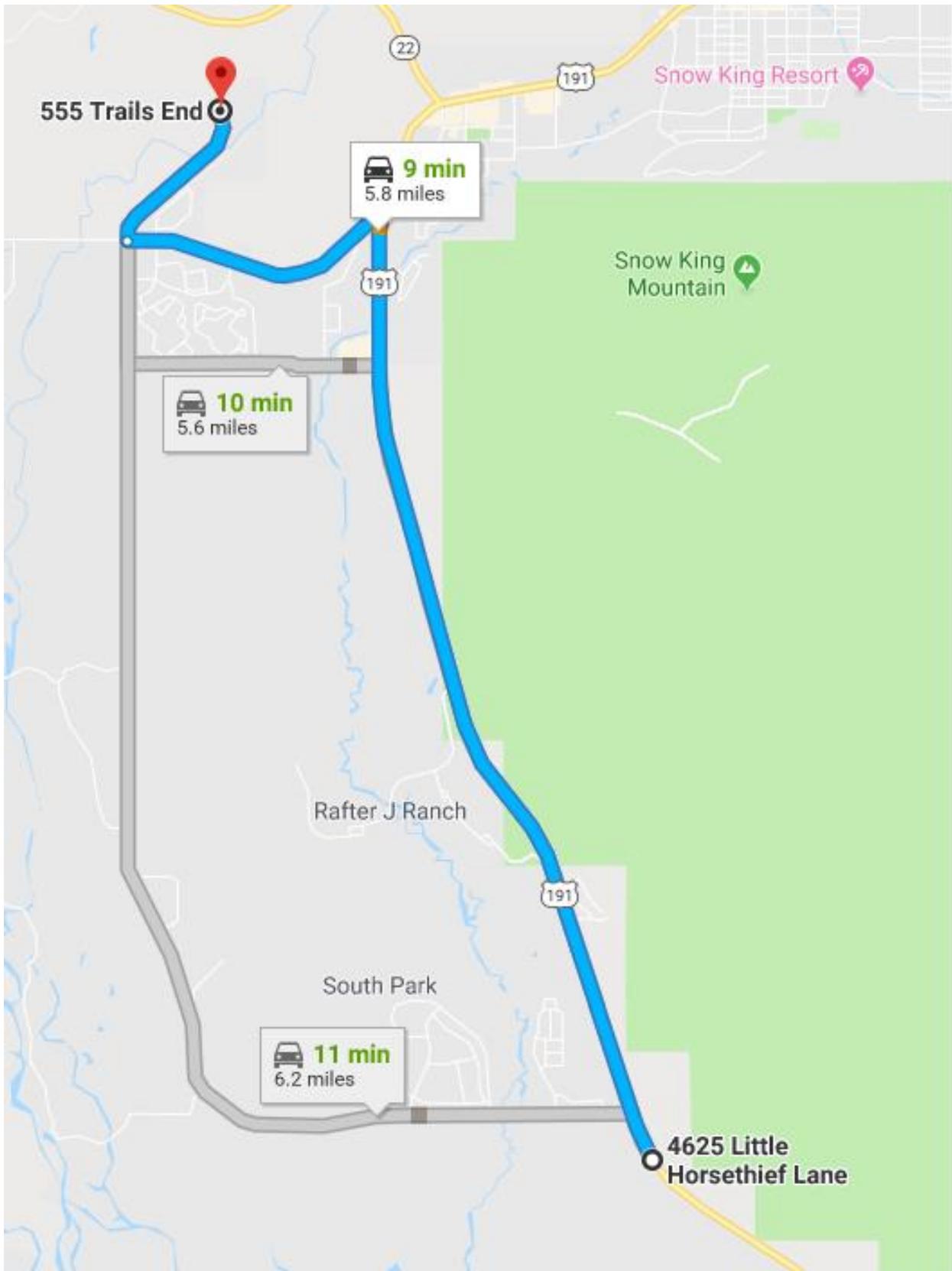


Figure 4. Routes 3,4, and 5 (blue and gray routes)

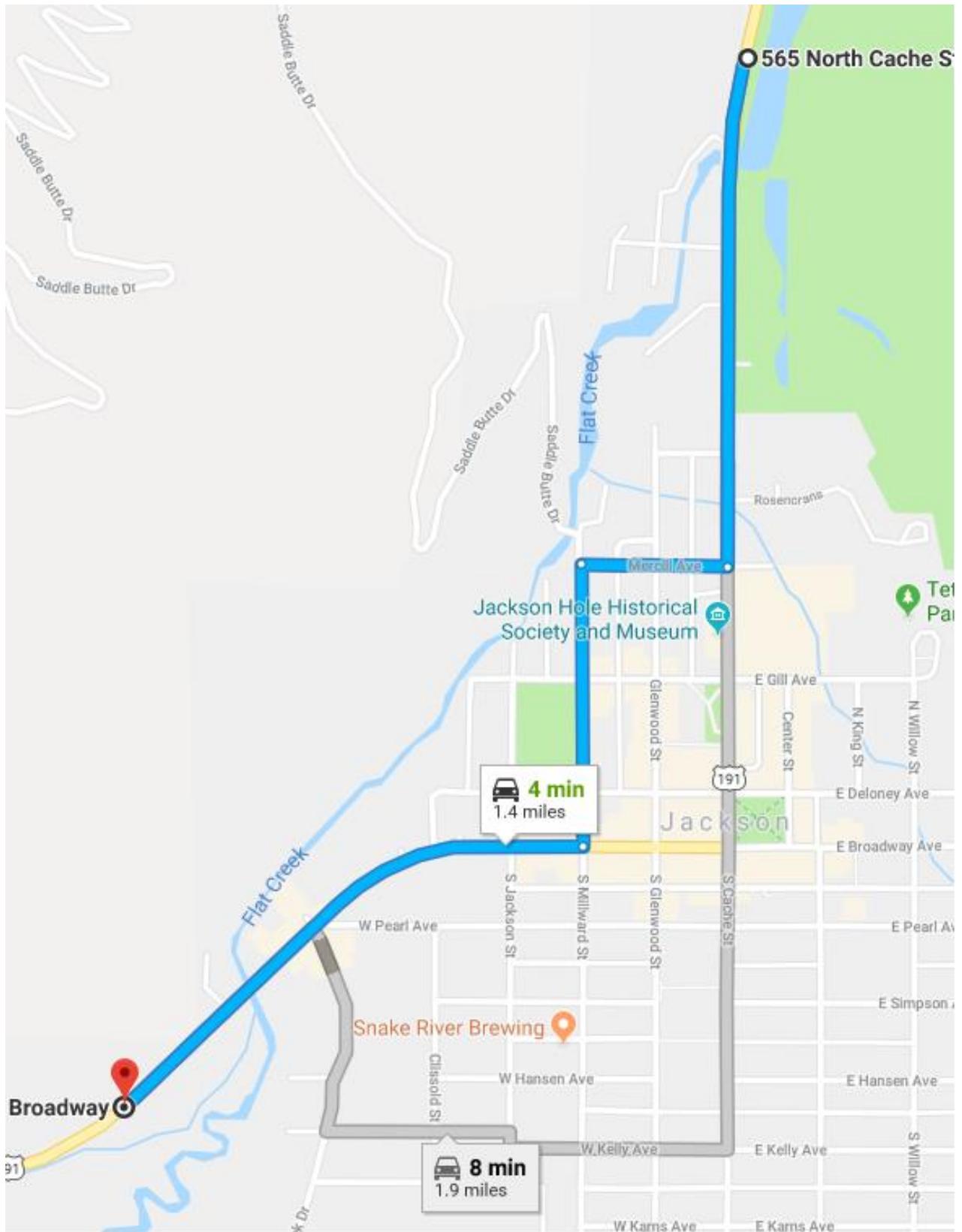


Figure 5. Route 6 (blue route only)

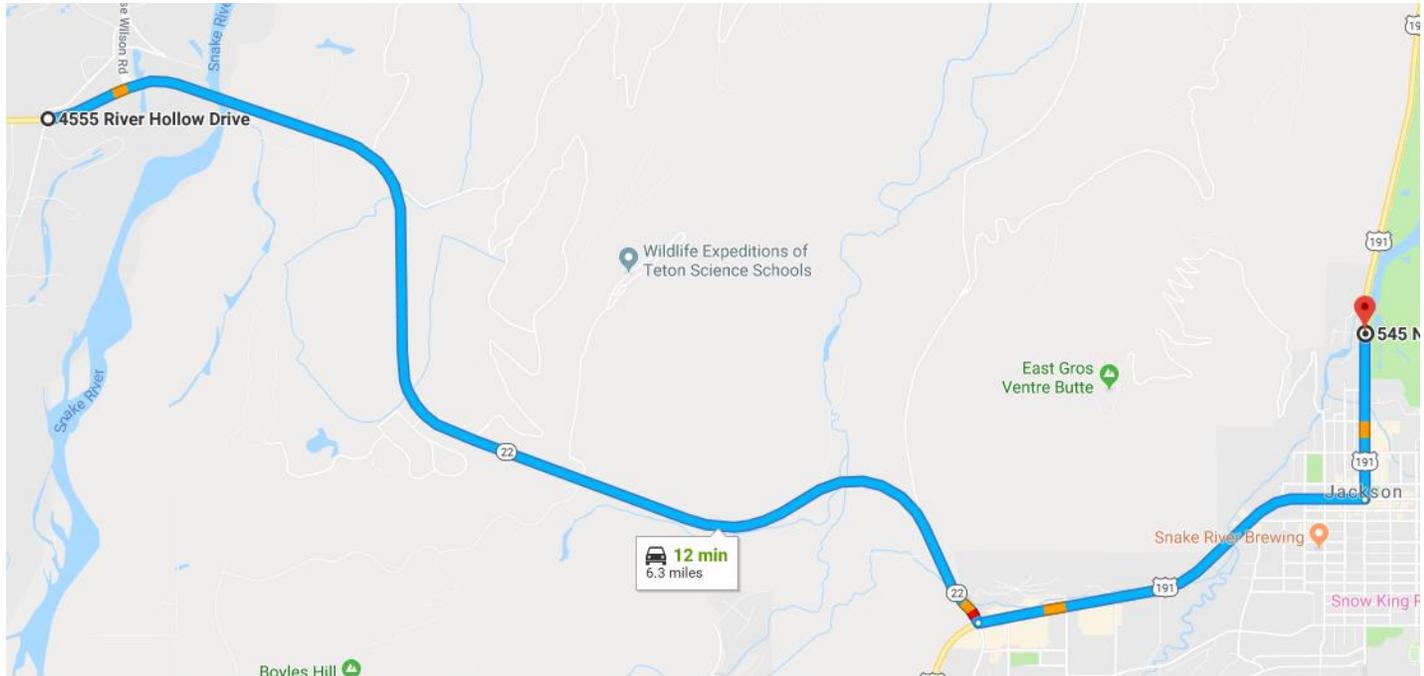


Figure 6. Route 7

## Task B: Model Development and Calibration

### Network Development

Based on conversations with the TAC and determining their needs, TransModeler was chosen as simulation analysis platform. Having a microsimulation dynamic route choice model engine, this software can be used to reasonably calibrate the model to reflect the current traffic situation and forecast the traffic condition under different future network configurations. Within a TransModeler microsimulation model, a detailed lane-based network is used, as are accurate signal phasing and timings, reduced speed areas, left turn bays, bike lanes, and other geometric details of the roadway network.

CS will develop a TransModeler highway network by using the existing draft TransModeler network that was created recently by Caliper as a demonstration. The resulting network will include all roads with functionality of collector and higher. After converting the network we will add additional detailed information about medians, signs and signals, roadway speed limits, turning bays, school zone speeds, and grades as needed. This detailed information will initially be populated based on a review of aerial photography and information provided by Town and County staff. We will provide maps of network attributes for review and comment, and make revisions to the highway network based on staff feedback.

CS will input signal timing plans by time of day as implemented in the field. Timing plans were provided by WYDOT in April of 2018. We will work with WYDOT to confirm that these signal timing plans are still accurate, and to obtain updated timing plans if necessary. Other stop and yield controls locations will also be included in the network as available through existing GIS datasets; otherwise they will be observed via available online ground level photos (e.g. Google StreetView).

CS will also populate the network with directional traffic count data and intersection turning movement data collected and gathered in Task A.

## Travel Demand

CS will extract a vehicle origin-destination trip table from the TransCAD travel model to serve as an initial estimate of travel demand for the microsimulation model. We will assign this demand to the simulation network, and then utilize an origin-destination matrix estimation (ODME) procedure to further refine demand based on the collected traffic count data on an hourly or finer basis. Through this process, assignment of the adjusted travel demand to the simulation network will replicate the collected intersection turning movement counts to a reasonable degree while still matching the overall regional travel demands as predicted by the travel demand model.

## Model Calibration

The 2019 Base Model will be calibrated for two peak periods, and AM peak period and a PM peak period. CS will calibrate the model by assigning the adjusted travel demand and making adjustments to model parameters such as driving behavior, desired speed distribution, and level of compliance to traffic signs and signals. Primary calibration and validation targets will include replication of route travel times and visual replication of special-temporal patterns of congestion. The model calibration and validation will be completed following the industry's best practices and guidance from WYDOT (as available) and FHWA for microsimulation model development.

## Task C: Future Model Development

CS will extract forecast year travel demand from the travel demand model and add the growth in vehicle demand to the adjusted base year demand developed in Task B. Additionally, any committed roadway improvements, if any, that are expected to be completed in a 'No Build' condition will be added to the roadway network. Details of the No Build projects (if any) will need to be provided to CS. Given these forecasted demands and provided committed No Build improvement projects, CS will develop the AM and PM peak period No Build scenario models.

Since travel demand models allow demand to exceed capacity in some cases, they may over-estimate the growth of traffic during peak congestion periods. Therefore, some feedback may be necessary between TransModeler and TransCAD to assure the forecasted demand can be reasonably handled by the network. Additionally, minor adjustments to the existing signal timing details (phasing and splits) may be needed to accommodate areas of significant growth. These changes would be similar in scope to routine retiming of signals that would occur given changing future land use growth, and are not intended to fully mitigate any potential increases in congestion.

## Task D: Alternative Analysis

Once the model has been calibrated to represent current traffic conditions, it can support testing of different combinations of network and/or demand alternatives. For model application, calibrated parameters will remain unchanged, and the change in traffic patterns will be solely affected by changes in the network configuration and/or changes in travel demand.

Under this scope of work, CS will perform scenario analysis for one transportation network alternative (e.g. one combination of network and/or demand changes). The alternative analysis will be performed using both base year and forecast year demands. To account for changes in demand resulting from adjustments to the roadway network, simulation demand will be adjusted based on demand obtained from the TransCAD model for the base and forecast year alternative and no-alternative scenarios.

## Task E. Documentation

CS will prepare a technical memorandum documenting the simulation model development process, calibration results, and results of the forecast year and network alternative model run. Additionally, a presentation will be prepared to summarize the model development and the alternative analysis results.

## Task F: Meetings

CS staff will participate in conference calls throughout the model development process and will attend up to three in-person meetings with the client during the course of this project. In person meetings will be held at project kickoff during the winter, mid-project during the peak summer condition, and upon completion of the simulation model. During the kickoff and mid-project meetings, CS staff will also use the opportunity to observe traffic conditions and inform the simulation process.

## Task G: Additional Winter Model Development

The development of a winter period simulation model will require that some tasks are repeated. Tasks that must be repeated for the winter analysis include data collection and analysis, demand estimation, and alternative analysis. However, some tasks such as network development and calibration will require much less effort since work performed for one season can largely be applied to the other.

If both winter and summer simulations are to be developed, it would be most efficient to develop the winter simulation first, as winter count data can be collected before summer count data.

## Schedule

Since data collection must be conducted before the model development can be done, the project should begin in time to collect the required data in an appropriate seasonal peak time frame. Assuming that both winter and summer models are to be developed, Figure 7 presents the proposed schedule for the project completion.

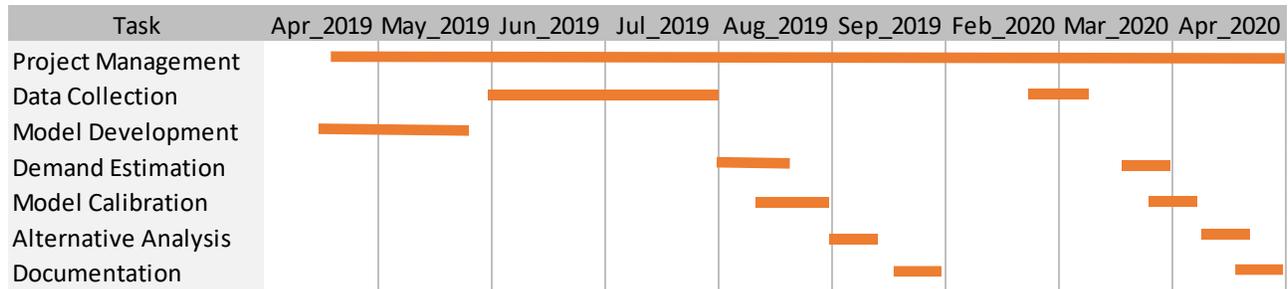


Figure 7. Schedule

## Cost

CS will perform the above described tasks on a Time and Materials Basis for a cost not to exceed \$181,866. Work will be performed according to the cost estimate shown in Table 1, which also includes fully loaded rates for the staff proposed to complete the work. If the Town and County would like to modify or expand the data collection effort described in the work plan, or would like to include additional alternatives analysis, we can provide an updated budget that reflects such changes.

Task	Cambridge Systematics			Caliper Corp.		Total	
	Rira Shabanian	Keir Opie	Sean McAtee	Paul Ricotta	Michael Armstrong		
	\$167.99	\$311.42	\$222.27	\$215.00	\$175.00		
A Data Collection & Analysis		20	2	5	0	0	\$5,094
B Model Development & Calibration		110	15	20	12	14	\$32,746
C Future Model Development		25	2	15	0	0	\$8,157
D Alternative Analysis		35	5	0	0	0	\$7,437
E Documentation		40	5	4	0	0	\$9,166
F Meetings		24	12	12	0	0	\$10,436
G Winter Models & Analysis		90	26	20	12	14	\$32,811
<b>Labor Total</b>	<b>344</b>	<b>67</b>	<b>76</b>	<b>24</b>	<b>28</b>		<b>\$105,846</b>
Travel (CS, 5 person trips @ \$1,800/trip)							\$9,020
Traffic Counts (35 intersections at \$600 per intersection, Two seasons)							\$42,000
Travel Time Runs (7 corridors at \$1,500 per corridor, two seasons)							\$21,000
Travel (All Traffic Data, 2 trips @ \$2000/trip)							\$4,000
<b>Total Direct Costs</b>							<b>\$76,020</b>
<b>Total Cost</b>							<b>\$181,866</b>

Table 1. Proposed Costs