

**NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT**

Project Title:	Feasibility of Lane Closures Using Probe Data		
RFP Number: 2012-05	NJDOT Project Manager: Paul Thomas		
Task Order Number: TO-104	Consultant: New Jersey Institute of Technology		
Customer: Dhanesh Motiani (former), Bill Kingsland	Principal Investigator: Chien, Steven I-Jy		
Project Starting Date: 4/15/2013	Period Starting Date: 01/01/2015		
Original Project Ending Date: 12/15/2014	Period Ending Date: 03/31/2015		
Modified Completion Date: 12/15/2015			

Task	% of Total Budget	Total Budget	% of Task this quarter	Cost this quarter	% of Task to date	Cost To Date
Literature Review	5.00%	22,517.00	0.00%	\$0.00	100.00%	\$22,517.00
Evaluation of Real Time Surveillance Technologies	4.00%	\$18,014.00	0.00%	\$0.00	100.00%	\$18,014.00
Data Sources and Data Collection	9.00%	\$40,531.00	15.00%	\$6,079.65	85.00%	\$34,451.35
Database Development	15.00%	\$67,551.00	15.00%	\$10,132.65	50.00%	\$33,775.50
NJLCAM Development	21.00%	\$94,571.00	15.00%	\$14,185.65	50.00%	\$47,285.50
Case Study	5.00%	\$22,517.00	5.00%	\$1,125.85	5.00%	\$1,125.85
Benefit/Cost Analysis	12.00%	\$54,041.00	0.00%	\$0.00	0.00%	\$0.00
NJLCAM Software Tool	20.00%	\$90,068.00	8.00%	\$7,205.44	8.00%	\$7,205.44
Presentation, Implementation, and Training	5.00%	\$22,517.00	5.00%	\$1,125.85	20.00%	\$4,503.40
Final Report	4.00%	\$18,014.00	0.00%	\$0.00	0.00%	\$0.00
TOTAL	100 %	\$450,341.00		\$39,855.09		\$168,878.04

Project Objectives:

The objective of this research project is to develop a methodology for integrating probe-vehicle data into the traffic impact analysis model, and to develop a user-friendly software tool that would implement the calculation methodology.

Project Abstract:

NJDOT must develop an adequate traffic operations management and congestion mitigation plan for every roadway maintenance and construction project requiring lane closures. To do this properly, NJDOT needs accurate and

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reliable estimates of traffic impacts associated with pertinent maintenance and construction projects, and the corresponding roadway capacity reductions. The current analytical model used by NJDOT for this purpose is based on traditional volume/capacity formulae and deterministic traffic queuing modeling method. NJDOT recognizes the shortcomings of these methods that often result in inaccurate estimates of the impact of lane closures in terms of vehicle delays and queue lengths. These estimates may be significantly improved by utilizing probe-vehicle traffic data. Probe-vehicle traffic data is based on the "actual" vehicle travel times and speeds, measured in reference to roadway segment in question, traveled distance, and time of travel. It is expected that use of this data can significantly improve accuracy of the estimated vehicle delays associated with lane closures. The objective of this research project is to develop a methodology for integrating probe-vehicle data into the traffic impact analysis model, and to develop a user-friendly software tool that would implement the calculation methodology.

1. Progress this quarter by task:

Task 1 – Literature Review:

Completed.

Task 2 – Technologies Evaluation:

Completed.

Task 3 – Data Sources/Collection:

- Continuously collected, processed, and stored additional 2014 work zone data required for the model development:

- INRIX US highway arterial speed data in September, October, and December 2014; and

- OpenReach work zone related records in the rest of 2014.

- Evaluated the accuracy of INRIX arterial speed data by comparing Bluetooth and GPS data.

Task 4 – Database Development:

- Continuously added data collected in this quarter to the database hosted at CUNY. Updated and verified the data consistency.

- Extracted and prepared data of US highway arterial work zone (processed in Task 3) for model development.

Task 5 – WIMAP-P Model Development:

- Developed an ANN model for arterial work zone speed estimation using 2013 and the fourth quarter of 2014 US highway arterial work zone data.

- Finalized the elements of road user costs estimation.

Task 6 – Case Study:

- Identified two freeway work zone sites in New Jersey. In each case study the user costs were determined by implementing both NJDOT Road User Cost Manual and

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the proposed WIMAP-P model.

Task 7 – Benefit/Cost Analysis:

- Not started yet.

Task 8 – WIMAP-P Software Tool:

- Continuously developing WIMAP-P web-based software tool by integrating probe-vehicle data and delay estimation model. It allowed user to investigate the upstream speed changes caused by proposed work zone activities.

Task 9 – Implement/Training:

- Presenting WIMAP-P to the research panel at STMC on March 30, 2015.

Task 10 – Final Report:

- Not started yet.

2. Proposed activities for next quarter by task:

Task 3 – Data Sources/Collection:

- Continue to collect, process, and store the rest of 2014 freeway and arterial work zone data required for the model development.

Task 4 – Database Development:

- Continue to develop the proposed database that will effectively integrate the data sets determined in Task 3.

- Continue to extract and prepare work zone data on arterials in the rest of 2014 for model development.

Task 5 – WIMAP-P Model Development:

- Continue to tune the non-linear model using work zone data on both freeways and arterials in the rest of 2014.

Task 6 – Case Study:

- The road user cost estimation model for arterials that utilizes probe-vehicle data will be conducted.

Task 8 – WIMAP-P Software Tool:

- Continue to develop WIMAP-P web-based software tool by integrating arterial delay estimation model. It will allow users to view reports based on expected work zone activities.

3. List of deliverables provided in this quarter by task (product date):

- Two papers were accepted for presentation at 2015 TRB annual meeting.

Task 4 – Database Development:

- Draft report outlines database development and specifications (e.g. data model, list of tables and queries).

4. Progress on implementation and training activities:

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None yet

5. Problems/proposed solutions:

6. Budget summary:

Total Project Budget	\$231,060.00
Modified Contract Amount	\$450,341.00
Total Project Expenditure to date	\$168,878.04
% of Total Project Budget Expended	37.50 %

NJDOT Research Project Manager Concurrence: _____ Date: _____