Research Problem Statement

Title[1]

Transferable Sketch Planning Tools, Processes and Data for Community-level Transportation Analysis in Smaller Communities

Background[2]

A wide range of analysis tools have been developed to evaluate strategies to meet transportation needs. These analysis tools help local governments assess impacts and demands to local street networks. One such impact analysis tool, sketch planning, can especially be useful to planners in rural and growing urban areas. Sketch planning is often used as an alternative to developing complex models and procedures for assessing future travel demand and transportation performance at the facility and system levels. Sketch planning is generally easier and less costly to implement than sophisticated software packages used to conduct in-depth engineering and operational analysis. Sketch planning can employ spreadsheet, GIS and other widely available software platforms, and applies similar concepts to aggregated or generalized data. Due to the flexibility, these tools are often developed by agency staff or consultants for a specific project.

Many of the existing impact analysis examples identified in research recently conducted by the Montana Department of Transportation were developed as part of stand-alone planning projects that involved use of procedures, data, and tools (e.g., travel demand models) that may not be widely available in smaller communities, or were tailored to an analysis of individual roadways rather than a community-wide transportation network.

Objective

The objective of the research is to develop specific transferable sketch planning tools, processes, and data for community-level transportation analysis in smaller communities.

Potential Benefits[3]

Numerous national guidance documents and training sessions exist to assist transportation and land use planners in larger metropolitan areas. However, there is limited availability of transferable analytic tool for smaller communities, particularly those that face rapid growth or extreme seasonal peaking due to recreational travel. Further, many of the tools that are available require a minimum level of training and sustained usage that is difficult to achieve in communities that have limited planning and public works staff.

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[1] This section corresponds to "Problem Title" in the MDT and TCRP Research Problem Statements.

[2] This section corresponds to "Problem Statement" in the MDT Research Topic Statement, and "Research Problem Statement" in the TCRP Research Problem Statement.

[3] This section corresponds to "Urgency and Expected Benefits" in the MDT Research Topic Statement, and "Urgency and Payoff Potential" in the TCRP Research Problem Statement.

The proposed research products would facilitate more robust and consistent transportation and land use planning in smaller communities by providing easily adaptable default data and analytic procedures to assess community-wide transportation performance. The research supports technical capacity building for local agency staff of varying levels of background knowledge and day-to-day involvement with transportation planning. The products could serve as companions to material such as NCHRP Report 365 (*Travel Estimation Techniques for Urban Planning*) and TCRP Report 95 (*Traveler Response to Transportation System Changes*) that are oriented towards larger communities.

Relationships to the Existing Body of Knowledge[4]

The Transportation Research Board (TRB) *Research in Progress* database was searched, but no citations were found relating to development or synthesizing of sketch planning tools or procedures for smaller communities.[5] A subsequent search using the Transportation Research Information Services (TRIS) database on the title word "sketch" in the "planning and forecasting" subject area returned 18 records, of which most records addressed large communities and/or freight planning. The paper *Sketch Planning a Street Network* in Transportation Research Record 1722 proposes a method to determine the optimal spacing of through streets as a function of residential density, while accounting for changes in mode share, trip length, time of travel, and intersection capacity as residential density increases. The report *Developing a Sketch-Planning Technique Relating Economic Activity and Urban Mobility in Small and Medium-Sized Urban Areas* proposed prediction models to estimate future traffic congestion levels based on readily available socioeconomic, land use, and traffic congestion data from smaller communities in Texas.

A second TRIS search on the title phrase "small OR medium" and keyword "analysis" in the "planning and forecasting" subject area returned 79 records. Two papers from the *10th National Conference on Transportation Planning for Small and Medium-Sized Communities* reported on sketch-level tools and procedures to support transportation plan development for small communities in North Carolina; the focus of these tools is on long-range planning rather than impact analysis of land development proposals. Several other research papers address specific planning topics such as data collection, socioeconomic forecasts, and travel demand modeling, but none provide a comprehensive transportation planning guide oriented towards smaller communities.

Several research papers and reports describe the Georgia Department of Transportation's Multimodal Transportation Planning Tool (MTPT), including several applications of this sketch planning tool at the statewide and county levels. However, the MTPT is not intended for application in urbanized areas, and the MTPT has a decidedly major highway orientation (in spite of its name) and is not able to explicitly analyze new land development proposals. Previous research products such as NCHRP 8-36, Task 32 (*Tools, Techniques, and Methods for Rural Transportation Planning*) are not structured in a way to facilitate transfer of procedures between communities, while NCHRP Report 582 (*Best Practices to Enhance the Transportation-Land Use Connection in the Rural United States*) does not provide detail on analysis procedures. More technical products like NCHRP Report 365 (*Travel Estimation Techniques for Urban Planning*) or

[4] This section corresponds to "Related Research" in the TCRP Research Problem Statement. This information is included in the "Problem Statement" section of the MDT Research Topic Statement.

[5] RIP search terms: sketch, planning, process.

TCRP Report 95 (*Traveler Response to Transportation System Changes*) report on technical tools and research findings from larger communities, especially ones with access to travel demand models.

In short, no current product provides simple, transferable, actionable procedures that a smaller community can apply to address community-level transportation and land use planning issues. While the proposed research may reference or adapt some of the specific tools and procedures noted in the literature, a much broader research perspective is proposed that will provide a more comprehensive transportation planning guide and, potentially, sample tools and procedures, oriented towards smaller communities.

Tasks[6]

The development of sketch-planning tools and parameters can be used to analyze cumulative transportation performance impacts at multiple scales in communities experiencing rapid growth. Sketch-planning approaches are typically the simplest, quickest, and least costly transportation analysis techniques. The relative low cost of sketch planning methodology and tool offers an alternative to traditional four-step travel demand models used in large urban areas. Local planners also need a tool to use at the planning and proposal evaluation stages of land development projects to assess impacts on local and state networks. These tools should encourage a transportation system that focuses local traffic on local and collector routes and long-distance traffic on arterials.

One potential research approach taken may include conducting an Internet survey of state, regional and local transportation planners plus follow-up case studies to uncover the keys to successful sketch planning analysis. Development of transferable sketch planning methodology and tools may want to consider the following:

- Tools need to be usable by planners who also fulfill other staffing obligations in their agency, and who may have little training and/or access to GIS-based analysis tools;
- Identify appropriate parameters and input data needed to develop a sketch planning tool using the ITE Trip Generation Manual and NCHRP Report 365 as guides;
- Allow for the evaluation of specific projects or alternatives without conducting an in-depth engineering analysis;
- Develop a spreadsheet- or GIS-based travel demand model to keep the development and maintenance cost for sketch planning affordable; and
- Explore the integration of these new tools for direct use within currently available on-line planning toolkits.

[6] This section corresponds to "Research Proposed" in the MDT Research Topic Statement and the TCRP Research Problem Statement.

Follow-on and Implementation Activities[7]

The end product of this research effort is anticipated to be tools and guidance for use in smaller communities. These tools may include sample spreadsheets, data tables, or an interactive on-line sketch planning application. It is possible that this information could be integrated into existing on-line planning toolkits such as *Montana Transportation and Land Use: Resources for Growing Communities*.[8]

Estimated Funding Requirements[9]

The estimated funding needed for this research project is $300,000. Estimated labor needs for the research team are about 350 hours for a principal investigator, 300 hours for senior-level research support, 600 hours of mid-level research support, and 600 hours of junior-level research support. A research period of 18 to 24 months, including review time for draft products, is anticipated.

Relationship to FTA Strategic Research Goals and/or TCRP Strategic Priorities[10]

The proposed research directly supports both FTA Strategic Research Areas. In terms of livability, the proposed research will provide tools for assessing the potential benefits that can accrue by virtue of increasing ridership in small communities. The proposed research will also identify tools to assist small communities in identifying transit investments that can support improved transportation system performance. Similarly, improved planning tools and data are fundamental for small communities to continuously improve public transportation (TCRP Strategic Priority 3).

Person(s) Developing the Problem[11]

<<To be completed at time of submittal to the research program.>>

Process Used to Develop Problem Statement[12]

This problem statement is the product of the *Local Transportation and Land Use Coordination: Tools and Gaps* research project sponsored by the Montana Department of Transportation.[13] The research topics was one of six high-priority gaps in practice identified by the research team and

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[7] This section corresponds to "Implementation Plan" in the MDT Research Topic Statement. There is no corresponding section in the TCRP Research Problem Statement.

[8] http://www.mdt.mt.gov/research/toolkit/.

[9] This section corresponds to "Estimate of the Problem Funding and Research Period" in the TCRP Research Problem Statement. There is no corresponding section in the MDT Research Topic Statement.

[10] This section only appears in the TCRP Research Problem Statement.

[11] This section only appears in the TCRP Research Problem Statement.

[12] This section only appears in the TCRP Research Problem Statement.

[13] http://www.mdt.mt.gov/research/projects/planning/smart_trans.shtml.

confirmed by a research panel comprised of representatives from city, county and state government agencies as well as transportation stakeholder groups.

IT Component[14]

The necessary software applications to conduct the research are already resident within planning offices. It is possible that a product of this research effort might entail an on-line sketch planning tool for direct incorporation into the *Montana Transportation and Land Use: Resources for Growing Communities* (or a similar on-line planning toolkit). Development of such a product would require scripting and/or application development.

Date and Submitted By[15]

<<To be completed at time of submittal to the research program.>>

[14] This section only appears in the MDT Research Topic Statement.

[15] This section corresponds to "Submitted by" in the MDT Research Topic Statement.