2012 UDOT RESEARCH PROBLEM STATEMENT

Problem Title: Understanding the Accuracy of Long Range Transportation Plans **No. :** 12.03-16

Submitted By: Matt Riffkin **Organization:** InterPlan

Email: matt@interplanco.com **Phone:** 801-307-3400

UDOT Champion (suggested): Walt Steinvorth **Group/Region/Division:** Planning Division

1. Describe the problem to be addressed.

Metropolitan and statewide transportation planning are required under federal transportation laws as a pre-requisite to federal transportation funding. In Utah, a comprehensive, cooperative, and continuing planning process has been conducted since the 1960s and Utah has taken a national leadership role in developing the first (and only) statewide Unified Transportation Plan. Utah developed the first Unified Plan in 2007, recently updated this Unified Plan in 2011, and the process is in place for future (Unified) plan updates every four years. Yet, little work has been done either in Utah or nationally to understand the accuracy of past transportation planning efforts. National research has been qualitative at best and has been used to suggest technical, policy and legislative changes in the transportation planning process. No work has been done locally to quantify the range of uncertainty inherent in any long range planning process and to build on an understanding of this uncertainty to implement transportation systems that are resilient to a range of future conditions as opposed to an absolute prediction of the future.

2. Describe why this research is important and how it is unique.

The Utah Department of Transportation has taken a national leadership role in transportation planning through the creation of a Unified Transportation Plan and through ongoing efforts in the UPLAN geographic database. Although UPLAN may take many forms based on the needs of the database users, an important form anticipated by the UDOT Planning Division has been the ability to take a historic review of the transportation related issues in an area and to connect tools that allow for a forecast look at what may happen in that area in the future. This research will allow users of UPLAN forecast information to understand the inherent error in these forecasts and to become informed consumers of a rich source of information. More than helping the planning division learn to communicate planning related information; this research will help Region staff consume planning information in a way that optimizes the function of transportation projects to their constituent communities.

3. List the research objective(s) to be accomplished:

Understanding the accuracy of past plans is a broad topic and efforts will be focused on three specific objectives including:

1. Accuracy of regional land use forecasts including the ability of plans to anticipate population growth, employment growth and socio-economic variables such as household size, automobile ownership, and income on both an aggregate and geographic sub-area level
2. Accuracy of financial issues including the ability of plans to accurately forecast the magnitude of regional spending, the effectiveness of planning for discrete phases, and the accuracy of project cost estimates
3. Accuracy of travel forecasts and travel models to forecast actual traffic levels, regional vehicle miles travelled, and various congestion measures

4. List the major tasks to accomplish the research objective(s):

Research will be developed in two levels and for a time series of plans including the following:

1. Summaries of land use, socio-economic, financial, and travel demand will be developed at the sub-regional level including sub-county and county districts
2. Summaries of travel forecasts and financial cost estimating, and project phasing will be performed at the corridor and roadway level
3. Plans to be considered qualitatively will go back to the original 1964 Salt Lake Area Transportation Study (SLATS) and Ogden Area Transportation Study (OATS) and will include a review of the 1979 Plan Update and the 1986 Plan Update. More quantitative analysis will be performed on the 1993 and 1996 plans, which both forecast to a (rapidly approaching) horizon year of 2015 and were completed under the 1991 ISTEA federal regulations (which are roughly consistent with present regulations including the requirement for financially constrained plans).

Wasatch Front Regional Council (WFRC) staff will play an important role and offer matching funds in the form of staff resources including gathering past plans, defining geographies of past plans with comparable (present) data collection,

developing traffic zone and various model equivalency files to allow backwards data and forecast comparisons, and related data cleaning and data consistency efforts.

5. List the deliverable(s) to come to UDOT from this research study:

All analysis will be presented in a single final report including charts, tables, and graphics summarizing the overall findings. In addition, conclusions and results will be summarized for two defined themes including:

1. Past errors or uncertainties in technical analysis and recommendations on improved display and summary capabilities where planners may offer actionable conclusions while users can be informed of the possible error(s) inherent in these actions
2. Improved methods for planners to develop and convey plans and improved methods for engineers and others in UDOT to use the results of plans in an accurate, meaningful, and cost effective manner.

6. Describe how the results of this study will be implemented at UDOT.

Unlike other research efforts that may offer specific answers to specific questions, this research is intended to build on the overall body of knowledge that will improve policies and procedures over time. For example, understanding the accuracy of planning level cost estimates may lead towards a systematic process of value engineering and risk assessment much earlier in the project delivery process and thereby offering more reliable project cost estimates. Shorter-term implementation will include the presentation of error ranges of various traffic forecasts based on the facility type, growth of the surrounding area, and analysis horizon. This research is timely as UDOT builds tools to display geographic data and information and will allow UDOT to display pro-active forecasts that are based on models or estimates in a consistent geographic display.

7. Estimated cost - Total: $90,000 **UDOT Share:** $60,000 **Matching Funds:** $30,000

Discussions have commenced with Doug Hattery of the WFRC, with responsibility for past and future SLATS and OATS plans. WFRC is interested in offering staff support to leverage UDOT's research funding to offer greater value in analytic research results.

8. Outline the proposed schedule for this study, including estimated start date, duration, and major event dates.

Work can begin immediately and will proceed over a period of approximately seven months to the delivery of a draft final report. Efforts have been planned over the following schedule that will be tracked with monthly progress reports:

Month 1
- Identify Available Plans
- Clarify Roles of WFRC, InterPlan, UDOT Research
- Select Research Team (above plus other MPOs, UDOT Planning, others recommended by UDOT Research)

Month 2
- Literature Review
- Develop Geographic Equivalents
- Develop Real to Nominal Monetary Adjustments
- Develop High Level Plan Summaries

Month 3
- Develop Aggregate Comparison
- Develop Draft Graphics of Plan Comparisons

Month 4
- Preliminary Comparisons
- Meet with Research Team

Month 5
- Disaggregate Comparisons
- Model Comparisons

Month 6
- Summarize Trends and Insights
- Meet with Research Team

Month 7
- Draft Final Report
- Final Report