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AGS Feasibility Study
Meeting Notes

Meeting Type & Number: PLT Meeting #12
Meeting Date: July 17, 2013
Meeting Time: 10:00 AM to 1:00 PM
Location: RTD Office, 1560 Broadway, Suite 700, Denver, CO
Prepared by: Mike Riggs
Date published: August 15, 2013 (Revised August 30, 2013)
Attendees:

Attendees (* - PLT Member, ** - PLT Alternate)		
Scott Burton, Jefferson County*	Mary Jane Loevlie, I-70 Coalition*	Flo Raitano, Summit County*
Eva Wilson, Eagle County*	Jim Bemelen, CDOT*	Tom Breslin, Clear Creek County*
Danny Katz, COPIRG*	David Krutsinger, CDOT DTR*	Mike Riggs, AZTEC/TYPSA*
Tim Mauck, Clear Creek County*	Randy Jensen, FHWA*	Mark Imhoff, CDOT DTR
Beth Vogelsang, OV Consulting	Don Ulrich, CH2M Hill	Greg Hall, Town of Vail
Carol Kruse, USFS	Jon Bottom, SDG	Masroor Hasan, SDG
Carl Lawrence, SwiftTram	Jim Baker, Connetics	Susan Rosales, Connetics
Linda Wilson, Romero & Wilson	Mandy Whorton, CH2M Hill	Craig Bannister, Colorado Ski County
Smith Myung, Cambridge Systematics	David Kurth, Cambridge Systematics	Frank Sherkow, AZTEC/TYPSA
Miller Hudson, CMG	Melanie Mills, Colorado Ski Country	Ralph Trapani, Parsons
Brian Middleton, Jacobs		

1. Introduction to the Meeting

David Krutsinger opened the meeting and welcomed the PLT. All attendees introduced themselves.

Mike Riggs reviewed the meeting agenda and outlined the meeting objectives, which included:

- Presentation on Ridership Modeling
- Update on Statement of Financial Information (SOFI)
- Update on Cost Estimate
- Update on AGS/ICS/Co-Development Project Coordination

2. Public Comment

Representative of Colorado Maglev Group passed out their SOFI.

3. Ridership Modeling

Jon Bottom presented an overview of the ridership modeling. He explained that the model is intended to be:

- Open and non-proprietary
- A network model-based forecasting tool

It was developed using the original data collected from this study area as part of this study and also existing data and information from other existing regional studies (e.g. the PEIS – especially for the Mountain Corridor; the I-25 North EIS) and the DRCOG and other MPO models to represent connectivity with RTD and the socio-economic and transportation characteristics of the urban areas.

In addition, Jon explained that new local data collection was done to address gaps in available data and to allow development of the model to reflect study area characteristics. He also noted that there was a significant amount of information exchange with stakeholders and modelers and that the model development process was well documented. For instance a Modeling Framework Report was developed and circulated for review and comment and the ICS Level 2 Analysis Report including a technical appendix on modeling is being circulated.

Jon then presented the scenarios being considered in modeling (ICS and AGS):

- Scenario A-1 is a direct routing through Denver with north-south through Denver Union Station (DUS) and east-west along either US 6 or I-76. If along I-76, a transfer between a station at I-76/72nd Street station and DUS would occur. Travel time from Denver International Airport (DIA) to Eagle County Regional Airport (ECRA) for high speed steel wheel on rail would be 94 minutes if via I-76 and 96 minutes if via US 6.
- Scenario A-5 includes using the E-470 alignment for a north-south alignment around Denver and east-west via either US 6 or I-76. Transfers would happen at DIA. Travel time from DIA to ECRA for high speed steel wheel on rail would be 94 minutes if via I-76 and 96 minutes if via US 6. In addition, the east-west routing also included options for medium speed (120 mph) and high speed maglev. Travel time from DIA to ECRA for medium speed maglev is 125 minutes and for high speed maglev is 93 minutes (hybrid route) and 99 minutes (base route).
- Scenario C-1 shares track with RTD within the Denver Metro area. If this scenario was used, a transfer would be needed at the West Suburban Station if AGS were anything other than conventional train technology (steel wheel on steel rail). The travel time for this scenario (assuming steel wheel on steel rail) is 128 minutes.
- Scenario B-2A (Direct Routing through South) includes a route that travels around the periphery of the Denver Metro area using E470 and C470. This option would allow for direct travel from south Front Range stations to the mountains. Travel time from DIA to ECRA for high speed steel wheel on rail would be 112 minutes.
- Scenario B-4 (Direct Routing through North) is similar to B-2A except a new alignment would be constructed in the NW quadrant of the Denver Metro allowing direct travel from north Front Range stations to the mountains. Travel time from DIA to ECRA for high speed steel wheel on rail would be 109 minutes.
- The last scenario is for a Standalone AGS. Assuming high speed steel wheel on rail, travel time from West Suburban Station to ECRA would be 71 minutes.

An AGS PLT member asked if a Standalone AGS model run assuming maglev had been done. Mike Riggs clarified it had not been done yet but will be done soon.

Jon Bottom then presented the ridership and ticket revenue forecasts accomplished to date. He presented a summary of ridership and revenue for the I-70 corridor as well as overall for the various scenarios. I-70 ridership ranged from 4.3 million to 2.9 million passengers per year. Revenue ranges from $137.4 million to $72.9 million respectively. Jon noted that any trip that involves an origin or destination in the mountains is considered I-70 ridership. This includes trips to and from West Suburban Station, even if they do not go further west along AGS. He also

mentioned that about 20% of all trips have both origins and destinations within the Denver Metro area.

Mike clarified the difference between High Speed Maglev Base and High Speed Maglev Hybrid. Essentially, the High Speed Maglev Hybrid goes through Keystone while the Base goes through Silverthorne/Frisco.

A PLT member asked if the model takes into account the actual costs to travel into mountains by each separate mode (i.e. van service, rental car). Jon answered that costs and sensitivity to cost/price changes are built into the model, but van service and rental cars are not directly modeled.

Jon then discussed the auto diversion on the I-70 corridor. He stated that auto diversions range from 5.9% to 7.6% which are quite high auto diversions based on established standards. Typically, the range is from 3% to 5%

He also stated that diversions are higher when both origin and destination are located on the east-west corridor. Diversion percentages for trips between the east-west and north-south are lower. SDG was asked the reason for the diversion percentages in this study corridor to be higher than the typical ranges. Masroor Hasan explained that 2035 assumes congested traffic conditions and that the fare of $0.35 per mile is somewhat lower than seen in other similar corridors, which also encourages diversion.

A member of the public wanted to know what the diversion would be at time when highway is severely congested. He thought that the percentage should be higher. Masroor answered that the model does take into account average congested conditions and data shows there are 90 days in the year when traffic volumes are very high.

An AGS PLT member thought that there should be information provided as to what the diversion would be during peak traffic conditions. Another PLT member stated that the system needs to be built for peak conditions, not average conditions.

Jon then presented a graph showing the sensitivity of the intercity model. The model is very sensitive to the AGS fare, AGS in vehicle time (IVT), auto IVT and HST fares. Use of autos to access/egress stations dampens impact of increases in IVT (and auto operating cost). It is not particularly sensitive to AGS frequency.

Jon then presented slides comparing AGS ridership against other HST systems, such as the Florida system and the NE Corridor. The AGS is forecast to have higher ridership than comparable systems involving metropolitan areas to and from recreational tourist travel.

Masroor Hasan then presented the demand forecasting methodology through a flowchart slide. The model consists of an intra-urban model, an intercity model and an airport choice model. He explained that the intercity forecasting model is based on average daily conditions and accounts for:

- Highway congestion
- Average daily frequencies for the common carrier services
- Origin-destination specific travel demand

He pointed out that both the intercity and the airport choice models forecast annual ridership. The intra-urban model forecasts daily ridership which is then converted to an annual value.

He then explained in more detail the intercity travel demand forecasting process. Development of this model included new data collection to develop an auto trip table and a modal choice model. It was critical to develop the auto trip tables as this type of data is not available anywhere.

The auto trip table was developed from anonymous cell phone data from Sprint cell phones (processed by a third-party vendor, AirSage). Data was obtained for three periods in 2011:

- February – typical winter
- July – typical summer
- October – typical other

It was segregated into four day types; Monday-Thursdays, Fridays, Saturdays and Sundays. It was classified into three traveler classifications; resident, visitor and through. The data were supplemented with CDOT traffic count data.

He explained that the intercity trip table validates very well against actual traffic volumes. The data generated using the model shows that predicted vehicle trips were within 7% of CDOT's traffic count data.

A member of the public stated that Sprint service was not good in the mountains and wondered what impact that had on data. The modeling team responded that whether or not there was good voice quality (i.e. dropped calls), it did not affect the origin-destination data.

Based on high-level calculation using CDOT's traffic counts in a relevant section on I-70, Masroor stated that a significant portion of the I-70 trips will be captured by the AGS in the future. In 2035, annual person trips (excluding trucks and through trips) will be about 24 million. If there are 3.6 million riders on AGS, this is about 15 percent of traffic.

Masroor explained that future trip tables were grown from base year tables using historic growth rates.

He then talked about the stated preference (SP) survey which was an internet based survey conducted in December 2012. About 1000 local residents who had previously agreed (through a market research firm) to participate in survey of this type completed the survey.

In order to be considered, the respondent had to have made a qualifying trip within the past three months. A qualifying trip was defined as:

- Made in a personal vehicle or rental car
- Made within past three months
- Used part or all of relevant portions of I-25 and I-70
- Took at least 45 minutes in door-to-door travel time or made trip to DIA in past six months and lives in Denver area

The SP alternatives were:

- Current auto travel option

- Auto travel with tolled facility
- AGS/train travel

Masroor then explained the SP survey design:

- There were eight SP experiments for each respondent
- There were three options for making the trip described
- The experiments forced respondents to make trade-offs
- Travel time and cost values were generated from the actual (reference) trip the respondent made

Masroor showed two pie charts summarizing findings. For the AGS/train option, strongly favor and somewhat favor amounted to 59% of all respondents. Only 5% strongly opposed this option. For tolls on I-25 and I-70, only 25% favored tolls and 27% strongly opposed tolls. Masroor then explained induced demand and indicated that the induced demand calculated for the AGS/ICS study is around 11%. He compared this to other systems/studies around the world where induced demand ranged from 6% to 23%.

A PLT member wondered what impact the AGS as an attraction in itself would have on ridership. Mike Riggs stated that we are trying to be conservative on ridership and that any other riders attracted to the novelty/beauty of the AGS would be a bonus.

A PLT member asked whether latent demand for people living in the Front Range wishing to travel to mountains was captured. SDG responded that it was included in the induced demand and also factored into the 2035 volumes.

Mark Imhoff pointed out that besides the latent demand for Colorado residents, there is latent demand for out-of-state visitors who may be hampered not by traffic but by lack of lodging.

Next, Masroor talked about other travel markets. These include connect-air modeling and intra-urban modeling. For the connect-air travel market, he explained that a connect-air trip consists of air leg (or series of air legs) with one end outside the study corridor (i.e. DIA), connected on the other end within the corridor (i.e. ECRA). The connect-air market is different than on-corridor air trips or airport access trips.

Masroor explained that the intra-urban model was used to forecast local (Denver metro) trips. It allows explicit modeling of connectivity with the RTD system.

SDG then presented the next steps in the ridership modeling. They pointed out that future runs are being split between SDG (as part of the ICS team) and Cambridge Systematics, who are on the AGS consultant team. This allows more efficient use of remaining time and resources. Other activities for SDG include addressing feedback for region modelers, optimizing answers/operating plans and final optimization runs to maximize fare revenue.

David Kurth then made a presentation of Cambridge Systematics' (CS) review of the ICS model and methodology. He began with a review of the SP survey. David stated that their primary concern was that it asked respondents to make choices based on AGS fare, toll cost and cost of gas per gallon. They felt that this did not take into account the true cost of auto operation. However, CS agreed with the survey team that travelers don't perceive "per mile" fuel/operating costs. They concluded that this was not a fatal flaw but they would have preferred additional model testing to investigate impacts.

David Kurth then provided a review of the ICS model design and estimation. He stated that it is a diversion type model, which is a common type for long distance travel. He stated that there are some benefits and liabilities to that type of model. They concluded that reasonable mode choice model coefficients were estimated. Some variables useful for policy analysis were excluded. These included using "rail access time" as proxy for "trip frequency" variable and wait time. There were no variables for "reliability". They concluded there were no fatal flaws but that the model design might limit ability to test impacts of some factors.

David Kurth gave a re-cap of the sensitivity of the ICS model and elasticities. Elasticity is defined as the change in travel demand caused by changes in key variables. He found that:

- AGS ridership is very sensitive to changes in fares
- AGS ridership is very sensitive to auto travel time (IVT)
- AGS ridership is sensitive to change in AGS travel time
- AGS ridership is not very sensitive to changes in AGS frequency
- AGS ridership is not very sensitive to changes in auto operating cost

David Kurth commented on the ICS diversion of 5 to 8% of auto traffic to AGS. He compared it to ridership forecasts published in the 2014 Business Plan for the California High Speed Rail Authority. It compares favorably and CS concludes that overall the ICS model results seem reasonable.

Finally, David Kurth provided an explanation of activities that CS will be doing using the ICS model. They include:

- Install ICS inter-urban model on CS computers and ensure that CS can reproduce the SDG results
- Run sensitivity tests
- Run additional alternatives, including MOS and additional/less stations

4. Preliminary Review – Statements of Financial Information

Mike Riggs presented a preliminary review of the SOFI's received on June 28, 2013. He stated that at the August AGS PLT meeting, a more detailed presentation would be made.

Six SOFIs were submitted. All were from technology providers. Mike stated that there were none received from P3 concessionaires or the financial community. Based on informal polling of the P3 concessionaires and the financial community, the primary reason for lack of responses was that the project lacks a committed funding stream, that there is a lack of project definition and there is uncertainty on the timing of the project.

Mike explained that the AGS team will attempt to conduct informal interviews with P3 concessionaires and the financial community and report back what, if anything, they are able to learn at the August PLT meeting.

Mike then presented an overview of the responses. A memo will be submitted to the PLT prior to the August PLT meeting.

A PLT member asked if this effort was worth it. Mark Imhoff said it was.

5. Capital Cost Estimate Update

Mike Riggs presented an update on capital costs. Capital costs were updated based on input from the PLT as well as additional refinements. These included:

- New alignment/technology alternative: high speed maglev on 120 mph maglev (hybrid) alignment
- Right of way costs defined
- Contingencies separated out
- 120 mph maglev propulsion costs corrected
- Station costs consistent with ICS cost estimate

Mike explained that the AGS team had analyzed each of the alignments to determine the amount of right of way (ROW) that would be on public land and on private land. For public lands, it was assumed that costs to acquire ROW would be nominal ($1 per square foot). For tunnels under private land, ROW costs were assumed to be $5/square foot. For at grade or above grade across private land, it was assumed ROW costs would be $22/square foot. These costs were used to refine the ROW cost for each alignment/technology.

As requested by the PLT, the contingencies were separated out as specific line items. Mike presented the revised cost estimates for the three alignments/technologies plus the new high speed maglev on 120 mph maglev (hybrid) alignment. To summarize, the costs were:

120 mph maglev and hybrid alignment: $10.871 billion (reduction of $114 million from original estimate)
High speed maglev on hybrid alignment: $13.337 billion
High speed maglev on greenfield alignment: $25.310 billion (addition of $270 million from original estimate)
High speed rail on greenfield alignment: $32.393 billion (addition of $471 million from original estimate

Mike also presented updated minimum operating segment costs for the four alternatives.

Using the 120 mph maglev MOS costs of about $6 billion, David Krutsinger then showed the level of funding that would be required assuming some excess farebox revenue. Based on that very preliminary analysis, $400 million per year would be needed to fund the capital costs.

6. AGS/ICS/Co-Development Project Coordination

Jim Bemelen talked about the I-70 Traffic and Revenue (T&R) Study. Parsons' contract has been executed. Ernst & Young's contract will be signed soon. CDOT is still negotiating with Louis Berger Group.

Jim also updated the PLT on the I-70 Peak Period Shoulder Lanes project. A task order is in place with HDR to begin work. Technical team meetings are being scheduled.

7. Conclusion, Final Remarks & Next Steps

Next PLT Meeting will be August 14 in Eagle County. Exact location to be determined but will probably be in Avon. Topics will include more detailed information on the SOFIs.