I-70 WEST OPERATIONS PLAN
Operations Strategy Evaluation Criteria - Draft
April 7, 2016

Background

The I-70 West Operations Plan will involve the development of new freeway operations treatments to relieve recurring and non-recurring congestion on the I-70 Mountain Corridor. The Plan will prioritize improvements for the next 1 to 10 years. This memo describes initial draft criteria that could be used to evaluate and prioritize alternative operational strategies as part of the study. There will be two separate operations treatment screenings as part of this evaluation process. The first is intended as a more qualitative assessment of potential strategies to eliminate treatments that do not meet corridor goals or have low implementation feasibility. The second evaluation will involve similar criteria, but will be more quantitative in nature. Listed criteria and metrics are based on *I-70 Mountain Corridor CSS – Alternative Evaluation Guidance*, the *FHWA Guide for Highway Capacity and Operations Analysis of ATDM* strategies*, and comparable operations plans from throughout the Country. (*ATDM: Active Transportation and Demand Management. See: Https://www.ops.fhwa.dot.gov/atdm)

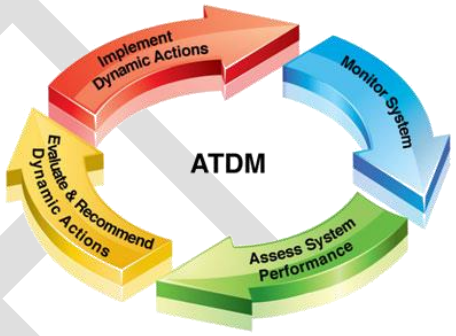

Figure 1: FHWA ATDM Program

The development and acceptance of this evaluation criteria represents the third step in the I-70 Operations Plan process. General activities relating to the development of the I-70 Operations Plan, and their current status, are outlined below.

Activities	Status
Inventory existing operational strategies	Complete
Evaluate effectiveness of existing operational strategies	In process
Develop evaluation criteria for new operational strategies	In process
Develop new operational strategies based on existing case studies	In process
Develop new operational strategies (stakeholder charrettes)	Future
Evaluate new operational strategies based on accepted criteria	Future
Prioritize improvements	Future
Develop phasing and implementation plan	Future

Initial Operational Strategy Screening

Major evaluation categories and individual screening criteria for the initial operational strategy screening are listed below. A determination of an alternative as Good, Fair, or Poor (**5**, **3**, **1**) will be made based on a qualitative assessment, relative to all other alternatives being considered. Scores within each evaluation category will be averaged. Evaluation category scores will then be considered for each alternative to determine which strategies will be carried forward to the next step.

Criteria	*Description*	*Measures*		
		Good "5"	Fair "3"	Poor "1"
Mobility Benefits for Passenger Vehicles, Transit and Commercial Motor Vehicles (Freight)				
Vehicle Throughput	To what level could alternative improve vehicle throughout?	Alternative would likely improve vehicle throughput	Alternative would have minimal impact on vehicle throughput	Alternative could lower overall vehicle throughput
Recurring Congestion	To what level could alternative reduce recurring delay?	Alternative would likely improve recurring delay	Alternative would have minimal impact on recurring delay	Alternative could worsen recurring delay
Non-recurring Congestion	To what level could alternative reduce non-recurring delay due to incidents, special events, and work zones?	Alternative would likely improve non-recurring delay from incidents	Alternative would have minimal impact on non-recurring delay from incidents	Alternative could worsen non-recurring delay from incidents
Freight Mobility	To what level could alternative improve commercial vehicle mobility?	Alternative would likely improve mobility for commercial vehicles	Alternative would have minimal impact on mobility of commercial vehicles	Alternative could worsen mobility of commercial vehicles
Safety Benefits for Passenger Vehicles, Transit and Commercial Motor Vehicles (Freight)				
Hazardous Locations	Does alternative reduce or improve hazardous locations?	Alternative is likely to improve locations	Alternative impact on locations is unclear	Alternative is unlikely to improve locations
Design Standards	Does alternative follow current design standards?	Alternative meets existing design standards	-	Alternative does not meet existing design standards
Improved Traveler Information	Does alternative improve information to driver in order to make better travel decisions: departure time, mode, route, lane choice, speed of travel? (weather, road closures)	Alternative is likely to improve traveler information	Alternative impact on traveler information is unclear	Alternative is unlikely to improve traveler information
Community Benefits				
Support	What level of community support could be expected?	Alternative can expect local community support	Potential reaction of local community unclear	Alternative can expect local community challenges
Local Plans	How compatible is alternative with adopted plans within the study area (Local, DRCOG, & IMTPR)?	Alternative is directly compatible	Alternative could potentially conflict	Alternative directly conflicts
Political Feasibility	How feasible is alternative implementation given political and jurisdictional realities?	Alternative implementation would face little difficulty	Alternative implementation would face moderate difficulty	Alternative implementation would face significant difficulty
System Costs				
Operations & Maintenance Cost	What level of O&M costs are associated with the alternative?	Alternative has relatively low O&M costs	Alternative has relatively average O&M costs	Alternative has relatively high O&M costs
Capital Cost	What level of capital cost is associated with the alternative? (Based on high-level constructability)	Alternative has relatively low capital costs and high constructability	Alternative has relatively average capital costs and moderate constructability	Alternative has relatively high O&M costs and low constructability
Feasibility of Implementation	How challenging is it to implement the alternative given agency processes & approvals? (Permits, MOA's, concepts of operations, schedule to design & construct)	Alternative implementation would face relatively simple processes & approvals	Alternative implementation would face moderate processes & approvals	Alternative implementation would face significant processes & approvals

Potential Environmental Impacts				
Rights-of-Way	What level of ROW impact is associated with the alternative?	Alternative would have little to no ROW impact	Alternative would have moderate ROW impact	Alternative would have above average ROW impact
Historic Context	Does alternative conflict with local objectives for historic features?	Alternative is directly compatible	Alternative could potentially conflict	Alternative directly conflicts
Aesthetic Guidance	Does alternative conform to CSS Aesthetic Guidance?	Alternative is directly compatible	Alternative could potentially conflict	Alternative directly conflicts

Level 2 Operational Strategy Evaluation

Major evaluation categories and individual screening criteria for the level 2 operational strategy evaluation are listed below. Criteria include a mix of qualitative measures carried over from the initial screening, and more quantitative measures based on the FHWA ATDM sketch tool. A determination of an alternative as Good to Poor (5, 4, 3,2, 1) will be made based on a qualitative assessment, or where appropriate, a quantitative scoring relative to all other alternatives being considered. Some criteria will be scored based on improvement against a baseline condition. In this case, the baseline will be defined as a typical weekend peak at peak season (winter & summer), in order to gauge how the strategy could improve traffic performance during the poorest conditions. Scores within each evaluation category will be averaged, with potential weighting applied to arrive at a total alternative performance score.

The project team will rely upon two primary tools to evaluate the Level 2 strategies – the Highway Capacity Manual and the Highway Safety Manual – with modifications as guided by the Federal Highway Administration for the consideration of Active Traffic and Demand Management operational strategies. Guidance for the use of operations strategies within HCM and HSM are provided online: http://www.ops.fhwa.dot.gov/atdm/index.htm

The outcome of the level 2 operational strategy evaluation will yield a ranked list of strategies by total score. A Benefit to Cost Ratio will then be calculated for the operational strategies that scored highest overall (up to 10), in order to gauge potential return on investment. The specific calculation used to determine the Benefit to Cost Ratio is still being refined, but will include estimated operations, maintenance, and capital costs, as well as a calculation of monetized benefit based on estimated improvement in vehicles hours of delay (VHD) and reduction in crashes. This BCA analysis will better inform the prioritization of improvements.

For evaluation of key metrics, the project team may separate mobility and safety benefit / cost impacts for select strategies by vehicle type: individual passenger vehicles, commercial passenger vehicles, light freight, and heavy freight. This will be determined following the screening of strategies in Level 1.

Criteria	*Description*	*Measures*				
		Good "5"	Good to Fair "4"	Fair "3"	Fair to Poor "2"	Poor "1"
Mobility Benefits						
Hours of delay	Measured improvement in vehicle hours of delay (VHD) compared to baseline condition. Scores based on full range of results. (FHWA ATDM Process)	Total projected reductions in VHD from alternative fall within highest 20% of all scores	Total projected reductions in VHD from alternative fall within 60-80% of all scores	Total projected reductions in VHD from alternative fall within 40-60% of all scores	Total projected reductions in VHD from alternative fall within 20-40% of all scores	Total projected reductions in VHD from alternative fall within lowest 20% of all scores
Average Speeds	Measured improvement in average speed compared to baseline condition (mph). Scores based on full range of results. (FHWA ATDM Process)	Total improvement in average speeds from alternative fall within highest 20% of all scores	Total improvement in average speeds from alternative fall within 60-80% of all scores	Total improvement in average speeds from alternative fall within 40-60% of all scores	Total improvement in average speeds from alternative fall within 20-40% of all scores	Total improvement in average speeds from alternative fall within lowest 20% of all scores
Reliability	Measured improvement in planning time index (PTI) compared to baseline conditions. Scores based on full range of results. (FHWA ATDM Process)	Total improvement in PTI from alternative fall within highest 20% of all scores	Total improvement in PTI from alternative fall within 60-80% of all scores	Total improvement in PTI from alternative fall within 40-60% of all scores	Total improvement in PTI from alternative fall within 20-40% of all scores	Total improvement in PTI from alternative fall within lowest 20% of all scores
Freight Reliability	Measured improvement in truck planning time index (PTI) compared to baseline conditions. Scores based on full range of results. (FHWA ATDM Process)	Total improvement in Truck PTI from alternative fall within highest 20% of all scores	Total improvement in Truck PTI from alternative fall within 60-80% of all scores	Total improvement in Truck PTI from alternative fall within 40-60% of all scores	Total improvement in Truck PTI from alternative fall within 20-40% of all scores	Total improvement in Truck PTI from alternative fall within lowest 20% of all scores
Safety Benefits						
Hazardous Locations	Number of known hazardous locations the alternative seeks to improve (based on existing crash data)	Alternative could address multiple hazardous locations	-	Alternative could address a single hazardous location	-	Alternative does not directly address hazardous locations
Incident Prevention	Measured reduction in crashes compared to baseline condition. Scores based on full range of results. (FHWA ATDM Process)	Total projected crash reductions from alternative fall within highest 20% of all scores	Total projected crash reductions from alternative fall within 60-80% of all scores	Total projected crash reductions from alternative fall within 40-60% of all scores	Total projected crash reductions from alternative fall within 20-40% of all scores	Total projected crash reductions from alternative fall within lowest 20% of all scores
Community Benefits						
Local Support	What level of community support could be expected?	Alternative can expect local community support	-	Potential reaction of local community unclear	-	Alternative can expect local community challenges
Political Feasibility	How feasible is alternative implementation given political and jurisdictional realities?	Alternative implementation would face little difficulty	-	Alternative implementation would face	-	Alternative implementation would face significant difficulty

				moderate difficulty		
Stakeholder Support	How is alternative supported by stakeholders?	Alternative has high level of support from stakeholders	-	Alternative has moderate level of support from stakeholders	-	Alternative has low level of support from stakeholders
System Costs						
Operations & Maintenance	Planning level O&M cost estimate	Annual alternative O&M costs fall within lowest 20% of all alternatives	Annual alternative O&M costs fall between 20-40% of all alternatives	Annual alternative O&M costs fall between 40-60% of all alternatives	Annual alternative O&M costs fall between 60-80% of all alternatives	Annual alternative O&M costs fall within highest 20% of all alternatives
Capital Cost	Planning level capital cost estimate	Alternative capital costs fall within lowest 20% of all alternatives	Alternative capital costs fall between 20-40% of all alternatives	Alternative capital costs fall between 40-60% of all alternatives	Alternative capital costs fall between 60-80% of all alternatives	Alternative capital costs fall within highest 20% of all alternatives
Potential Environmental Impact						
Hours of delay	Measured improvement in vehicle hours of delay (VHD) compared to baseline condition as a proxy for Air Quality. Scores based on full range of results. (FHWA ATDM Process)	Total projected reductions in VHD from alternative fall within highest 20% of all scores	Total projected reductions in VHD from alternative fall within 60-80% of all scores	Total projected reductions in VHD from alternative fall within 40-60% of all scores	Total projected reductions in VHD from alternative fall within 20-40% of all scores	Total projected reductions in VHD from alternative fall within lowest 20% of all scores
Rights-of-Way	High-level assessment of total ROW impact of each alternative (In Acres). Scores based on full range of results.	Total acres of ROW impacted fall within lowest 20% of all alternatives	Total acres of ROW impacted fall within 20-40% of all alternatives	Total acres of ROW impacted fall within 40-60% of all alternatives	Total acres of ROW impacted fall within 60-80% of all alternatives	Total acres of ROW impacted fall within highest 20% of all alternatives
Historic Context	Number of potentially eligible historic properties impacted by alternative	No potentially eligible historic properties will be impacted by alternative	-	-	-	Potentially historic properties could be impacted by alternative
Aesthetic Guidance	Does alternative conflict with CSS Aesthetic Guidance?	Alternative is directly compatible		Alternative could potentially conflict		Alternative directly conflicts