



Northwest Rail Corridor and US 36 BRT
Development Oriented Transit Analysis

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TABLE OF CONTENTS

1.0 INTRODUCTION.....	1-1
2.0 PRINCIPLES OF DEVELOPMENT ORIENTED TRANSIT	2-1
2.4 Key Design Principles	2-3
3.0 INFLUENCE OF MODE ON TOD	3-1
4.0 SUMMARY OF WORKSHOP FINDINGS	4-0
4.1 Implication of Project Change.....	4-1
4.2 Corridor Findings	4-3
4.3 Corridor Recommendations.....	4-3
4.4 Station Area Findings	4-6
4.4.1 Longmont.....	4-6
4.4.2 Boulder Transit Village	4-11
4.4.3 Downtown Louisville.....	4-16
4.4.4 McCaslin Boulevard.....	4-20
4.4.5 116th Avenue Station (Broomfield)	4-24
4.4.6 South Westminster	4-28
Appendix A: Workshop Summaries	i
Appendix B: Bus Rapid Transit In The US 36 Corridor	ii
Appendix C: US 36 Economic Findings and Recommendations	iii

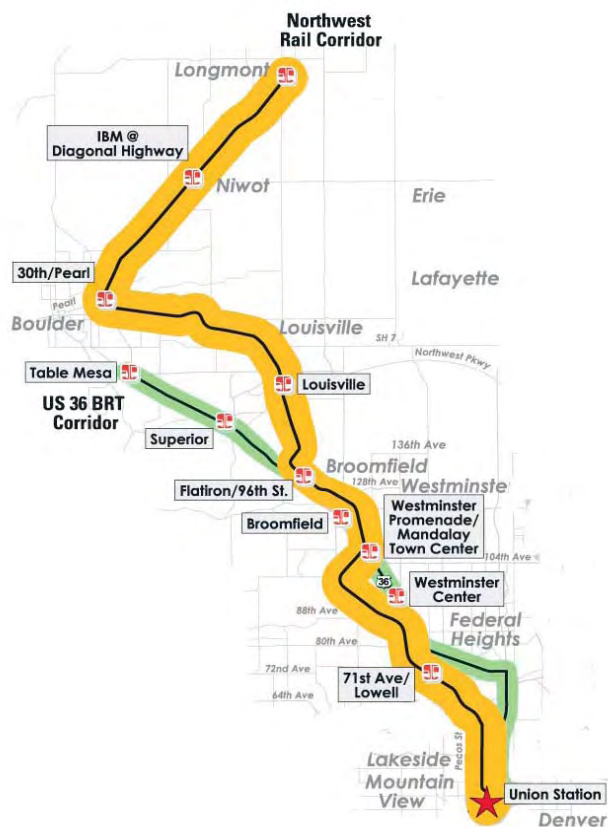
1.0 Introduction

Mass transit improvements along the US 36 Corridor are part of the Regional Transportation District's \$4.7 billion, 12-year FasTracks rail and bus expansion program for the Denver region. The heavily trafficked US 36 highway, which connects the regional employment centers of Denver and Boulder, will benefit from two different transit investments: a new commuter rail line, and an enhancement of existing regional bus service in the form of bus rapid transit (BRT).

The 38.1-mile Northwest Rail Corridor will connect downtown Denver to the City of Longmont via Boulder, while the 18-mile US 36 BRT Corridor will enhance regional bus service from Denver to southern Boulder with local bus service connections provided to downtown and the proposed transit village area (See Exhibit 1-1 for a map of the corridors). An Environmental Evaluation for the Northwest Rail Corridor is about to begin and will evaluate alternatives in detail; service is expected to begin in 2015. The BRT project will be implemented in two phases. The first phase is to be completed by the end of 2008, calls for slip ramps at park-n-Ride locations for buses to leave general purpose lanes to access loading platforms without leaving the highway, with pedestrian bridges connecting the parking on both sides. The second phase, which is linked to reconstruction of the highway by the Colorado Department of Transportation (CDOT), calls for median-loading platforms at each station with some form of dedicated lanes, and is under evaluation as part of the US 36 Corridor Draft Environmental Impact Statement (DEIS), which is due to be published in late 2007. A map of the FasTracks corridors and existing corridors is shown in Exhibit 1-2.

The purpose of the US 36 Development Oriented Transit (DOT) process was to evaluate the opportunities and challenges for Transit Oriented

**Exhibit 1-1:
Northwest Rail and US 36 BRT Corridors**





(TOD) along the corridor, and to make recommendations on how to better integrate transit with the surrounding community.

RTD retained PB PlaceMaking to conduct a two-stage TOD corridor workshop. Participants in the workshop included local jurisdiction staff from Adams County, the City of Boulder, Boulder County, City and County of Broomfield, City and County of Denver, City of Longmont, City of Louisville, City of Superior, and City of Westminster; as well as 36 Commuting Solutions (the corridor's non-profit transit management organization), representatives from RTD, the Northwest Rail and US 36 BRT corridor consulting teams, CDOT, the Denver Regional Council of Governments (DRCOG), and Xcel Energy.

A 2-day forum was held in December 2006 to discuss the principles of DOT, opportunities and challenges of implementation with the commuter rail and BRT corridors, and examples of successful TOD from across the US and around the world. A week-long series of mini-charrettes was then conducted in the last week of January 2007, with each local jurisdiction choosing a specific station for detailed study. This process resulted in an evaluation of TOD opportunities and constraints along the corridor, with recommendations for specific action items including a time frame for implementation and responsible parties, which is outlined in this report.

A summary of the forum and charrettes held as part of the workshop is attached as Appendix A. As part of the DOT analysis, a memo providing strategies to maximize development around BRT stations based on examples from corridors in other parts of the country is attached as Appendix B. Appendix C contains a memo of market observations drafted by Strategic Economics, a San Francisco Bay Area real estate economics firm that is part of the non-profit Center for Transit Oriented Development. This memo contains market data for the corridor as a whole as well as implementation recommendations at the six station areas selected by the local jurisdictions for analysis.

2.0 Principles of Development Oriented Transit

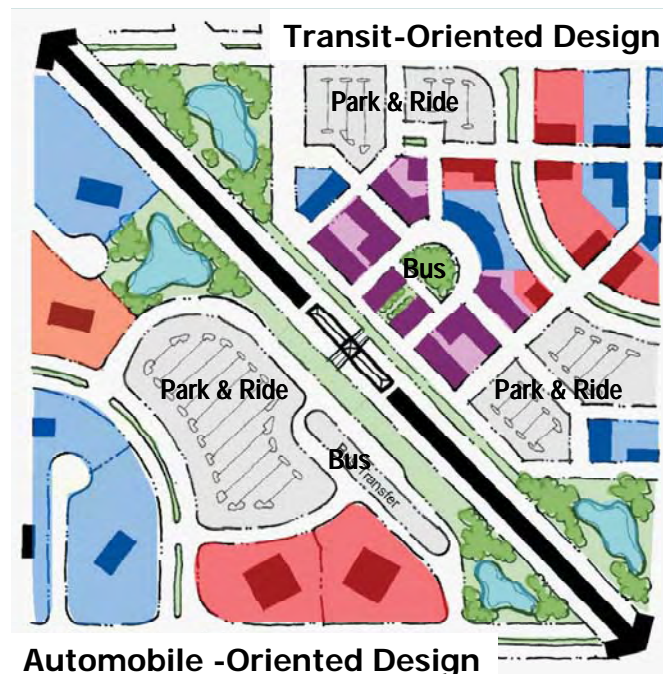
Successful TOD starts with the earliest decisions on the shape and design of transit systems. However, in this transit design, communities and developers are beginning to ask: if TOD is expected to take a transit system into account, why shouldn't transit systems be designed with potential development in mind? The query brings a new and valuable perspective to some of the most fundamental aspects of transit alignment, and public needs and preferences in relation to system operations.

In many cases, transit system design assumes that vehicles, especially automobiles and buses, are the only significant means of passenger access to the system. As a result, stations tend to be surrounded by "mega" parking lots, and feature drop-off locations as close as possible to station platforms. This design approach actually encourages vehicle use and automobile-oriented development within the community—the opposite of TOD goals. Moreover, it increases driver convenience but does little for pedestrians or cyclists, and the huge parking lots have the practical effect of separating the stations from the communities they serve. A comparison of transit oriented design versus automobile oriented design is shown in Exhibit 2-1.

In contrast, a "DOT" design perspective might eliminate parking at some stations or establish multiple parking areas dispersed through the area around the station, at a distance that is convenient for driving commuters but not close enough to dominate the station landscape. This would allow for complementary design strategies that incorporate pedestrian and bicycle pathways. This approach does not sacrifice the need for convenient vehicle access—it simply accommodates other needs at the same time while supporting the principles of sustainability.

The approach has successfully played itself out with modern and established systems. Several stations on the Metra commuter rail system in the Chicago area provide excellent illustrations of this approach—the Elmhurst, La Grange Road and Arlington

**Exhibit 2-1:
Auto Oriented Design vs. Transit Oriented
Design**



The development to the right of the tracks represents Transit Oriented Principles; the development to the south represents auto-centric design.

Heights stations disperse parking between 6 to 18 lots. Portland's TriMet and DART in Dallas have moved parking away from the platform at some stations to accommodate TOD. This addresses the need for vehicle access while maintaining an interesting and attractive environment and inviting pedestrian and bicycle movement.

Many transit systems, including newly developed ones, have stations in areas where there is little potential for sustainable land-use development. A "DOT" approach would incorporate an analysis of potential TOD in the area during the planning stage. What is the community's vision for how it wants to grow? Is the real estate market and political climate receptive to TOD? What are the probable changes in the community's makeup and infrastructure, and how might system elements, including stations, be designed in response? The "Development-Oriented Transit" design perspective is by no means incompatible with an approach that focuses on conventional transit system and passenger requirements. On the contrary, it enhances that approach. It assumes that it is possible to meet user requirements and maintain cost-effective service—while seeking synergies with TOD, encouraging environmentally friendly practices, and creating lively community spaces.

A simple DOT checklist would ask the following questions:

- Are stations located in areas with TOD potential?
- Do the facilities allow for convenient pedestrian and bicycle access while balancing parking requirements?
- Are the facilities integrated into the surrounding community, rather than separated from it by dividers such as giant parking lots?
- Has the design actively taken into account the likely needs and outcomes of TOD in the area?

A DOT design perspective is a logical accompaniment to TOD. If transit systems and adjacent communities are to exist together, then they should complement and enhance each other. Ultimately, DOT makes a transit system an integral element of the community—useful, attractive, and environmentally sensitive—rather than a visitor making a brief stop on the way to some other place.

A “DOT” perspective takes into account concerns directly linked to the goals of livable communities and sustainable development. The design specifically explores ways to integrate stations into community spaces, instead of separating them by vehicle buffer zones. Stations are designed to respond to the community’s social, economic and cultural makeup in a way that identifies the stations as community elements, not just functional structures that might exist anywhere but be at home nowhere.

2.1 Key Design Principles

The principles of DOT below are intended to help guide the design and implementation of rail and BRT along US 36 in a manner that maximizes the effectiveness of the project as an investment in both people moving and community building.

1. **Stations as the Heart of the Community.** Design transit stations to serve as the hub of a community and provide a local identity. In places where there is an established downtown or center, stations should serve to support and enrich the area. A mix of land uses promotes activity around the clock, either within the TOD or easily accessible from the TOD. This in turn promotes the most efficient use of the transit system: travel in both directions, throughout the day. A mix of employment, residential, and recreational uses that provide services during the day, evenings, and weekends expands transit ridership beyond the morning and evening commute to encourage transit use for shopping and entertainment purposes. The Pearl District in Portland (Exhibit 2-2) demonstrates a mix of uses at all hours of the day.
2. **Connect Neighborhoods with Transit.** Link neighborhoods along the US 36/ Northwest Rail Corridors together with transit and transit stations to the community through a well-connected street, bus, bicycle and pedestrian network.

**Exhibit 2-2:
Pearl District, Portland.**



The Pearl District in Portland has a unique identity with a mix of live/work, residential, retail and office space. The mix of uses promotes 24 hour activity in the district.

3. **Create a Pedestrian Environment.** Within a TOD, non-auto trips increase when a mix of uses is easily accessible and arranged in a way that emphasizes travel on foot rather than car. Provide lively, safe and convenient sidewalks and paths connecting RTD stations to homes, jobs, schools, parks and shopping. Buildings should face those connections. A pedestrian scaled environment with active street frontage is critical as shown in the image of the Clarendon Metro Station Area (Exhibit 2-3).
4. **Manage Traffic.** Many major streets do not connect communities. The coming of Commuter Rail and BRT provides an opportunity to re-connect communities by calming traffic and designing parking lots and associated street improvements so that traffic operates at speeds compatible with a more pedestrian-oriented environment.
5. **Balance Parking.** Parking must not separate transit from the community. Move, share, wrap and deck parking to provide the right balance of parking to support the economic viability of the station area and make the area pedestrian friendly. A strategy should be developed to balance the parking needs of retail and commercial uses, existing and proposed residential uses, and transit.
6. **Create Partnerships.** Secure public-private partnerships and intergovernmental partnerships that will maintain the success of the US 36/Northwest Rail corridors and the communities they will serve to capture and enhance the public investment made in transit improvements.
7. **Complete Community Objectives.** Help realize the vision and economic and social vitality of each community with quality development that provides a mix of uses close to transit. The center must create a destination: a sense of place and community. Each station center along the corridor should be distinctive and unique to the neighborhood or area.

**Exhibit 2-3:
Clarendon Metro TOD**



Development surrounding the Clarendon Metro station in Virginia creates an environment oriented to and scaled for the pedestrian.

3.0 Influence of Mode on TOD

One of the recurring questions in the DOT workshops was “how will the transit mode impact the possibilities for TOD?” In other words, would experience elsewhere suggest any appreciable difference for development at a station whether it is BRT or Commuter Rail? It is difficult to accurately define the expectations for development based on mode. In the Denver region, the predominance of experience with TOD has been with light rail. To date, there is no TOD experience in Denver with either of the modes proposed for the corridor – Bus Rapid Transit (BRT) or Commuter Rail. This section describes lessons learned from systems in place in other parts of the country.

Research shows that the US experience with TOD is largely with rail, while BRT is still early in its project evolution cycle. The Ottawa BRT system provides a comparable case study with similarities to the US 36 Corridor. The Ottawa Transitway is 37 miles, part of which is within the highway median. The transitway integrates vehicular and pedestrian connections (overpasses) to nearby shopping centers and business parks as shown in Exhibit 3-1. Pedestrian linkages are key throughout the system to connect transit with development. The St. Laurent Mall, located along the corridor, has the highest gross per square feet in the City and has a 30% modal split (vehicle and transit).

A challenge for implementing TOD when BRT is in a highway context is pedestrian connectivity. As with any controlled highway, pedestrian bridges are needed to access both sides and the distances may discourage 360-degree development around the station. The overpasses in Ottawa help mitigate this condition.

The following are BRT lessons learned from across the country:

- Establish a planning vision and supportive policies
- Location is key
- Design for the pedestrian
- Ridership will happen, but might not help TOD
- More permanent investment equates to more TOD return

**Exhibit 3-1:
Ottawa, Ontario Transitway**

The Ottawa Transitway system connects various land uses in the corridor through pedestrian overpasses and a series of pathways.



There is a large body of TOD experience with commuter rail to learn from across the U.S. In the DOT workshops, numerous examples were provided, including Arlington Heights, Illinois, as illustrated in Exhibit 3-2. The same TOD principles applied to other modes should also be applied to commuter rail.

Specifically, these include:

- A TOD should have a five minute walk to everything, close to home, office, shopping and civic spaces.
- Focus on walkable districts around stations (scale).
- Consider the corridor as an integrated system: people will be traveling within the region via the stations.

A challenge to TOD with commuter rail is that at-grade crossings may be limited due to barriers and fencing. This could create a one-sided TOD opportunity in relation to the station. To enhance connectivity, it is important to consider pedestrian linkages across the alignment.

Overall, both BRT and commuter rail offer exciting opportunities with future development. Successful TOD will happen at stations where market fundamentals are in place and supportive public policy has been adopted to encourage TOD. The specific application of TOD is likely to depend more on the location of development in relation to the transit stop than the mode of transit.

**Exhibit 3-2:
Village of Arlington Heights, IL.**



Through proactive initiatives, Arlington Heights, Illinois, has created a new town center that includes a Metra commuter rail station, a performing arts center, high-density housing, several commercial uses, and public parking decks. The Metra Commuter station has become the community's re-energized hub. The public parking is located two blocks from the station, which allows for private development adjacent to the station. Pedestrian crossings link the station to the surrounding development and encourage double-sided TOD.

4.0 Summary of Workshop Findings

Charrettes were held in January 2007 to discuss the station areas in detail. Jurisdictional staff selected one station within their jurisdiction to focus on, and provided an overview of station planning efforts to-date. The project team, city staff and RTD discussed the vision for the station area and the program requirements for the station site (station location, parking requirements, etc.). The group evaluated ways to design for transit, and to create the framework for TOD by integrating land use and transportation together. Following the charrettes, a series of detailed recommendations were identified for each station. These recommendations provide a blueprint of action items for the local jurisdictions, EIS/EE team and RTD to implement and act upon. The recommendations fall into three timeframes for implementation: 1) Immediate actions: within the next three months, 2) Short-term actions: prior to the final draft of the Northwest Rail Environmental Evaluation (EE) and US 36 FEIS publication, 3) Long-term: prior to project construction.

4.1 Implications of Project Change

Changes to the transit project for the purpose of transit-oriented development, such as reconfiguring proposed park-n-Ride locations or moving station platforms, will impact the design and construction process. The intent of the matrix shown in Exhibit 4-1 is to identify the cost and schedule implications of proposed changes before and after key project milestones. The sooner necessary changes to transit facilities are identified and accommodated, the less potential additional costs or schedule delay. Responsibility for changes associated with TOD will primarily rest with the local jurisdictions and/or developers after the initial phase of design. Cost-saving measures proposed as part of a TOD project will be considered when evaluating the cost implications. This approach was employed for the West Corridor TOD Workshop and used for the T-REX project, when the City of Greenwood Village, Cherokee, LLC and others paid for design and construction changes associated with TOD ranging from \$250,000 to more than \$7 million.

**Exhibit 4-1:
Corridor Scheduling**

Project	Milestones	Cost/Schedule Impact Responsibility	Schedule for Completion
US 36	DEIS	Minimal impact to design (RTD) Potential for additional construction costs beyond established budget (local jurisdiction/developer)	Fall 2007
US 36 BRT	FEIS	Possible impact to design (All) Potential for additional construction costs beyond established budget (local jurisdiction/developer)	2008
US 36	ROD	Cost impacts for design changes (All) Potential for additional construction costs beyond established budget (local jurisdiction/developer) Requires FTA review/approval	2008
NW Rail	Draft EE	Minimal impact to design (RTD) Potential for additional construction costs beyond established budget (local jurisdiction/developer)	Spring 2008
NW Rail	Final EE	Possible impact to design (All) Potential for additional construction costs beyond established budget (local jurisdiction/developer)	Summer 2008
NW Rail	FONSI (50% Design)	Cost impacts for design changes (All) Potential for additional construction costs beyond established budget (local jurisdiction/developer) Requires FTA review/approval	Summer/Fall 2008
Both Projects	100% Design	High potential for several million dollars in additional design and construction costs based on scope of changes (local jurisdiction/developer) High probability of schedule delays Requires FTA review/approval	2009- 2015
Both Projects	Construction	High potential for several million dollars in additional design and construction costs based on scope of changes (local jurisdiction/developer) High probability of schedule delays Requires FTA review/approval	Phase 1 Opening 2009 Northwest Rail Opening 2015 Phase II BRT: TBD

4.2 Corridor Findings

The success of TOD at each station is, in part, dependent on the success of the US 36 Corridor overall. Through the course of the workshops, research and further discussions, the following key findings are evident:

Coordination between municipalities is critical. Municipalities along the corridor share a common market and struggle with similar development challenges. Existing plans focus only on the individual municipalities rather than a larger corridor wide perspective. The corridor as a whole will benefit if the municipalities work as a group to discuss common challenges and share success stories.

Phasing of transit requires constant diligence. The first phase of BRT is planned for completion in 2009. The Northwest Rail Corridor would be completed 5-6 years later. Coordination will need to occur related to phasing of the infrastructure improvements.

Overburdened retail market. Office, retail, and residential development in the corridor surged from 1990 to 2000, particularly with the dot-com boom. The retail market is overburdened by big-box uses, which are popular due to sales tax revenue, but appear to be competing with each other for market share. Moreover, big box uses in a suburban layout can diminish the opportunity to create TOD. The retail market must shift to more diverse mixed-use near transit stations to maximize ridership and density.

Walkability will be the key to TOD. Existing employment, retail and residential uses are not presently concentrated where they need to be: around the stations. Pedestrian linkages and accessibility will be critical, particularly across US 36. The barrier presented by US 36 alone is a challenge to pedestrian friendliness, circulation and linkages between uses.

Synergy between transit modes will enhance corridor mobility. There is potential that BRT and commuter rail will operate parallel to each other and even have shared stations along the corridor. This will increase ridership at these locations and enhance the marketability of TOD to residents and employers.

4.3 Corridor Recommendations

Develop a TOD Working Group to establish corridor partnership for TOD. The coming of transit brings an opportunity to consider the corridor as a string of stations that enhance and complement each other. A working group to facilitate corridor-level discussion and information sharing should be established. Formation of a working group provides a forum to communicate as the design of the transit progresses. As land use changes over time, the nature of the corridor will change. This working group can shape the vision of the corridor

together. Participants should include 36 Commuting Solutions, local jurisdictions, the EIS Consultant Team, DRCOG and RTD.

Responsibility: 36 Commuting Solutions, Local Jurisdictions, RTD

Timeframe: Immediate (within the next three months)

Coordination with RTD and the Local Jurisdictions. The timing is right to plan for TOD. The US 36 EIS is underway, and the Northwest Rail EE is beginning. Local governments should establish partnerships with RTD to determine the best station location and station infrastructure components from both an operational and a TOD perspective.

Responsibility: RTD, Local Jurisdictions

Timeframe: Short-term (prior to the final draft of the Northwest Rail EE and US 36 FEIS publication)

Conceptualize BRT Branding and Outreach. Strong branding and outreach are critical for BRT in the corridor, not only with respect to ridership but also in communicating the arrival of BRT. This will enhance the marketability for developers to capitalize on TOD around BRT stations.

Responsibility: Local Jurisdictions, RTD

Timeframe: Short-term to long-term (between the final draft of the Northwest Rail EE and US 36 FEIS publication and to project construction)

Finalize TOD Plans. TOD plans for many stations along the BRT and rail corridors have been initiated. TOD plans should be adopted for all stations prior to the start of construction. The plans should include the following elements:

- An existing conditions description;
- A real estate market assessment;
- A community vision for the area;
- A land use plan map of future land uses;
- Recommendations for transit-friendly zoning;
- A circulation plan and parking strategy for the area;
- An urban design and open space plan.

Responsibility: Local Jurisdictions

Timeframe: Short-term to Long-Term (between the final draft of the Northwest EE and US 36 FEIS publication, and project construction)

Prioritize TOD in all planning efforts. It will not be enough to modify plans to allow transit-supportive development by encouraging density. TOD priorities need to be incorporated into capital improvement budgets and other planning efforts to provide supportive policies and infrastructure for TOD.

Responsibility: Local Jurisdictions

Timeframe: Short-term (prior to the final draft of the Northwest Rail EE and US 36 FEIS publication)

Adopt transit-supportive zoning. With adopted master plans in place, TOD zoning or zoning overlays for stations should be created to address: minimum densities, prohibited auto-oriented uses, reduced parking requirements, and applied urban design & building orientation requirements. For example, Portland's overlay zone limits vehicle repair or sales facilities to a distance of at least 500 feet from stations, and commercial parking (surface or structured) at least 200 feet away. It also sets a minimum floor-area ratio for any new development, and a maximum parking requirement of 150 percent of the regulatory minimum, as well as landscaping and ground-floor window requirements for exteriors and buildings within the zoning overlay.

Responsibility: Local Jurisdictions

Timeframe: Short-term (prior to the final draft of the Northwest EE and US 36 FEIS publication)

Create a tool kit of development finance mechanisms. Financing for TOD can be more complicated than a traditional greenfield development. A financial tool kit would assist the communities along the corridor to plan for and implement TOD supportive projects. The toolkit could evaluate examples of economic development models around transit stations and how private-public partnerships and other financing mechanisms (metropolitan districts, general improvements districts, etc.) have been utilized for development projects. The toolkit could identify existing tools within the local and state law that could apply to station areas along the corridor as well as recommendations for implementing new tools. The creation of new tools would likely require legislation, and would require close coordination between all entities involved.

Responsibility: DRCOG and Local Jurisdictions

Timeframe: Short-term (prior to the final draft of the Northwest Rail EE and US 36 FEIS publication)