

WENATCHEE VALLEY URBANIZED AREA FREIGHT STUDY

PREPARED FOR:
Wenatchee Valley Transportation Council



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Freight Study for

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Developing the Wenatchee Freight Study

The Wenatchee urbanized area serves as the hub of a larger economic region with major commercial, agricultural, and industrial activities in central Washington. The region has lacked a well-defined approach for identifying and prioritizing transportation system improvements to support truck freight. This study was prepared to assist the Wenatchee Valley Transportation Council (WVTC) and its member agencies in:

- Defining freight routes in the greater Wenatchee urban area
- Improving signage to direct freight trucks to the desired routes
- Identifying and prioritizing transportation system improvements to enhance freight travel

WVTC studies are *advisory* in nature and do not impose a requirement for implementation or commitment of funding by WVTC member agencies. The Freight Study provides a regional planning level assessment of conceptual improvements to support freight mobility. It will support the region in incorporating freight needs into the Metropolitan Transportation Plans. Appendix A includes the WVTC policy statement related to the use of regional planning studies.

Regional Context and Freight Mobility Issues

Freight truck infrastructure is somewhat limited in the Wenatchee urban area. Currently there are only a few designated freight routes which results in trucks using a variety of roadways, many of which do not adequately accommodate the geometric or operational needs of freight truck traffic.

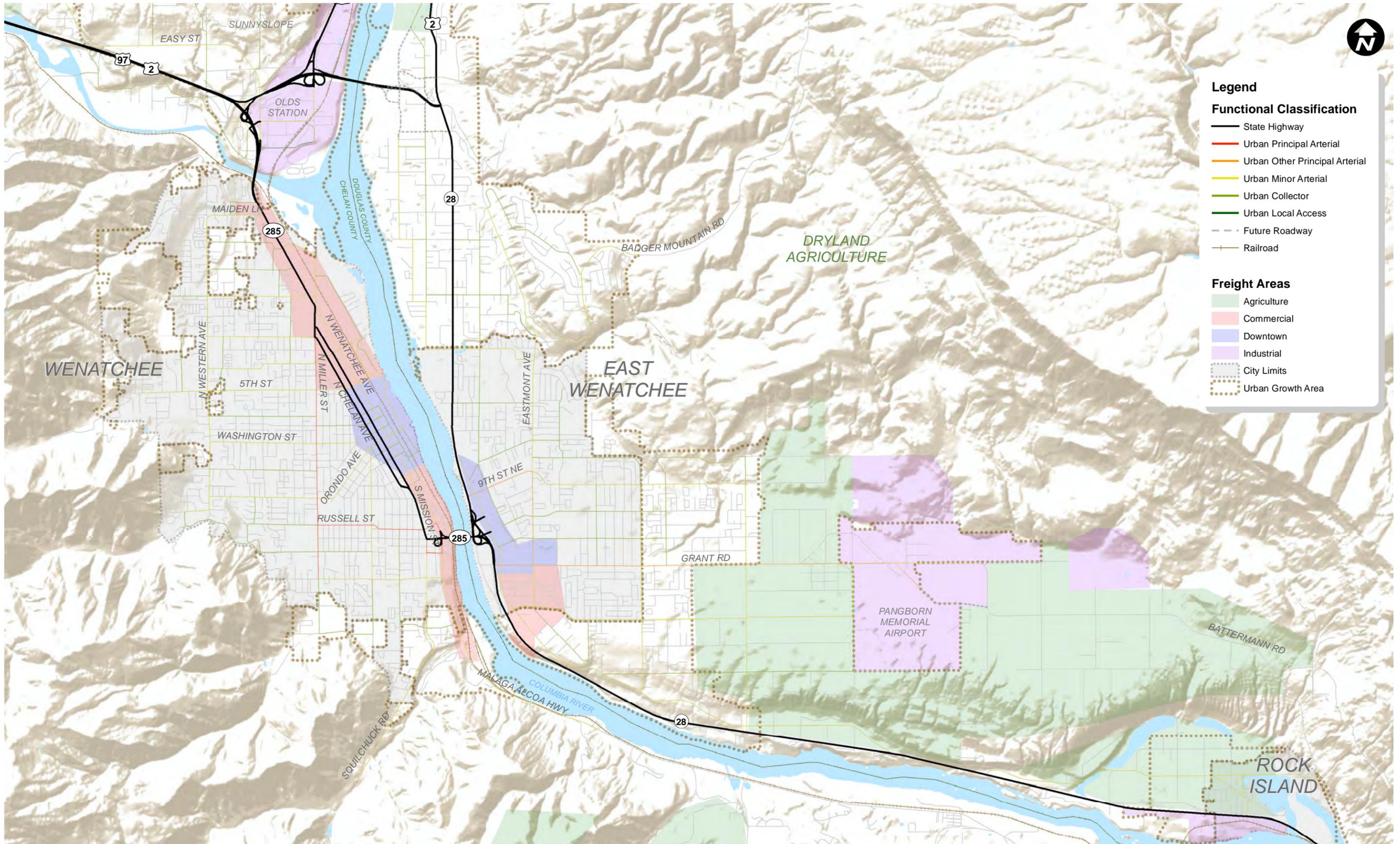
Figure 1 illustrates the general boundaries of freight areas in the region, including agricultural areas in Douglas County, and the industrial areas of Olds Station and Ohme Garden. Industrial uses also are designated at Pangborn Memorial Airport east of East Wenatchee. Commercial land uses also generate freight trucks. These include the downtown commercial areas of Wenatchee and East Wenatchee and other growing commercial districts. Some of the designated commercial areas currently are developed as agricultural related storage and packing plants or smaller scale industrial type land uses.

As shown on Figure 1, many of the freight areas are adjacent to or relatively close to state highways. However, most of the freight-related land uses do not have direct access to/from the highways, requiring use of arterials, collectors or local streets for a portion of their truck trips. This is especially true in Douglas County.

Truck freight traffic in the region, especially on the non-state highway roadways encounters a variety of issues and decision points for truck drivers. These range from physical constraints, congestion, operating in an urban setting mixed with other modes of travel, and lack of signage. Some local area examples of these issues are shown on Figure 2.

Project Objectives

WVTC and its member agencies decided that a systematic approach was needed for addressing freight mobility issues in the region. The Metropolitan Transportation Plan (MTP) and local agency Comprehensive Plans provide some discussion and policy direction to improve truck freight, but there is no region-wide plan or priorities.



Greater Wenatchee Region Freight Areas

FIGURE

Figure 2. Examples of Wenatchee Area Freight Mobility Issues

Issue	Description	Example
Physical constraints	The currently signed truck route in Wenatchee has constraints including small turn radii, short turn pockets, and low underpasses.	
Rail crossings	Rail crossings create both safety concerns and delays.	
Public/private roadways	Worthen Street through the Columbia Colstor complex is largely on private property.	
Delays to freight resulting from general traffic congestion and commercial driveways	Freight movement through the City of Wenatchee's downtown core often conflicts between commercial use and regional freight mobility.	
Overlapping of freight routes with transit service and/or non-motorized uses (transit stops, bike routes, pedestrian crossings coincide with truck routes)	There are often trade-offs between intermodal road uses and the limited rights-of-way that may restrict what can be accommodated.	
Routing decisions	Truck drivers are required to navigate through congested areas and make decisions quickly. Making the wrong turn delays trucks and can affect other travel modes.	
Signage	Although good signage may exist, not all truck drivers follow them.	

The study set out to provide answers to a range of freight related questions:

- How do trucks for each freight zone currently enter and exit the region, and how do they connect within the greater Wenatchee urban area?
- Why do the truck drivers use the routes they use and where do they obtain their information on routing options?

How would the freight community like to get their information and how would they use a new freight route plan once it is available?

In addition to understanding the objectives of freight users, a successful freight route plan also needs to consider the concerns of local communities. These include answers to questions such as:

- What are the issues along existing and de facto truck routes?
- What existing or potential conflicts with other travel modes are most important?
- What are critical elements of local land use plans that must be considered in defining routes?

The resulting product of the study includes the following components:

- Freight Route Plan Map
- Freight Route Signing Plan
- Freight System Transportation Improvements

Agency and User Group Coordination

Development of the study and recommended plans and improvements was guided by the Technical Advisory Committee (TAC) of the WVTC. The Freight Study also was reviewed by the WVTC Executive Council as its role as the region's transportation policy board. In addition, input from the freight users was obtained at key stages in the preparation of the plan. An outreach program to the general public was not conducted as part of the Freight Study. A decision was made at the beginning of the project, and revisited at various stages of the project, to focus the outreach to the freight users who will have the most insights on truck routes, issues, and potential solutions.

Technical Advisory Committee

The WVTC TAC consists of staff from member agencies representing the Washington State Department of Transportation (WSDOT), Chelan and Douglas Counties, and cities in the region. In addition Link Transit and the Port Districts are also represented. WVTC staff led the TAC meetings.



TAC members reviewing potential freight system improvement concepts.

The TAC meets on a monthly basis to discuss a full range of transportation items including the MTP, federal and state programs, regional grants, and major projects. Because the freight study encompasses the greater Wenatchee urban area it involves a broad number of

agencies in the region. Therefore, WVTC and member agencies decided to use the TAC to guide the development of the Freight Study.

The TAC met six times to formally discuss and provide direction on the Freight Study. The meetings were used to define freight related issues and to provide input on designation of freight routes, signing, and improvement projects. The TAC also assisted in developing the interface and coordination with freight users. The TAC also reviewed the draft documentation for the Freight Study prior to review by the WVTC Executive Board.

Executive Council

The WVTC Executive Council is the Wenatchee region's transportation policy board. It is comprised of elected officials and appointed officials from its member agencies. The Executive Council authorized the preparation of the Freight Study.

The WVTC Executive Director updated the Executive Council during the course of the development of the plan. In addition, two formal presentations of the Freight Study were provided to the Executive Council. The first covered the draft freight route plan as developed with the direction of the TAC. The second meeting presented the draft plan, including recommended freight routes, signing plan, and improvement projects.

Adoption of the Freight Study by The WVTC Executive Council will provide the regional framework for defining and prioritizing transportation system improvements in the region. The Freight Study also will provide a basis for future updates of the MTP. The WVTC action does not, however, require member agencies to take specific actions, but will be used in making regional decisions related to transportation funding and priorities.

Freight User Groups

The project team worked with the TAC to identify and contact representatives of different types of freight users. The groups reflected regional and local area freight and distributors, fruit packers and shippers, and retail operations. The following user group representatives provided input on the Freight Study:

Regional Freight Group

- Eagle Systems – Jeff Lang, Creston Knutson

Local Freight Group

- Oak Harbor Freight – Mike Combs
- Eagle Transfer (see Eagle Systems)
- Columbia Distributing – Brad Selland
- Waste Management – Dave Lowe
- Wenatchee Valley Sand and Gravel – Jake Holt

Fruit/Grain Packing and Shipping Group

- Stemilt – Jay Fulbright
- McDougall and Sons – Scott McDougall
- Columbia Colstor – Russ Lytle
- Northwest Wholesale – Greg Rosenau
- Central Washington Grain Growers (Waterville) – Paul Katovich

Retail Group

- Albertsons – Rob Fox
- Wenatchee Downtown Association – Alan Walker
- Chamber of Commerce – Shiloh Schauer

At the beginning of the study, each of the companies/agencies contacted were asked a series of questions to help guide the discussion on current practices, problem areas, navigation tools, and generally any other topic that affects freight mobility in the greater Wenatchee region. The standard list of questions is in the Freight Study Supporting Materials document. When the interview was in person, the freight user representative was presented a map to help identify current freight routes and areas of concern. If the interview was over the phone, the representative would describe verbally their various freight routes and perceived problem areas. The summary of the interviews is included in the Supporting Materials document. Key direction/input from the freight users at the beginning of the study includes:

- Current freight routes are chosen based on safety and efficiency. Whenever possible, trucks avoid areas with narrow lanes, tight turn radius returns, and actual or perceived congestion.
- Most trucks seem to follow Wenatchee Avenue and the currently signed truck route along Worthen Street. Oak Harbor Freight preferred the Chelan Avenue/Mission Street one-way couplet. Congestion was identified as the primary reason for choosing either Wenatchee Avenue or the one-way couplet streets.
- When traveling from one end of the valley to the other (north/south), users typically chose SR 28 (Sunset Highway) as the primary route as opposed to using Wenatchee Avenue or the one-way couplet streets through Wenatchee.
- Several locations were identified as problem areas for moving freight – these are documented in the Supporting Materials document.
- Off-tracking into adjacent lanes and over sidewalks plays a pivotal role in identifying which routes truck drivers will follow.
- Users identified the need to properly sign the truck routes and designate the right turn lane for trucks at multi-lane intersections. This provides the truck the best opportunity to off-track, if necessary.
- Signage is the primary “end-user” tool. Other navigation tools mentioned were phone GPS units and word of mouth.
- Another area of concern mentioned by the freight users was road grade. This was primarily for trucks traveling east/west turning to or from one of the primary north/south roadways.

Freight Mobility Stakeholder Questions	
1.	Are your freight deliveries/shipments managed internally or provided by others?
2.	What issues either support or impede freight mobility in the local area?
Do your freight trips:	
a.	Primarily connect to/from the Wenatchee urban region from/to outside the Wenatchee region?
i.	If yes which is the primary external connection (or provide general percentages)?
1.	US2 (west)
2.	US 97A (north)
3.	US2/US 97 (north)
4.	SR 28 (south)
5.	Malaga Alcoa Highway (south)
6.	Squilchuck Road (south)
7.	Other _____
b.	Intra-regional (origins and destinations in Wenatchee urban area)
c.	Through trips – neither origin or destination within Wenatchee urban area
3.	Using this blank map, identify your current primary truck routes (ingress/egress). Are there seasonal changes?
4.	Which routes do you typically try and avoid and why?
5.	Are there specific problem areas in the valley you are aware of?
6.	If the issues identified in the previous question were “fixed”, would you use that route?
7.	What navigation tools do you use? If there were discrepancies between the navigation tools and signing which would govern?
8.	What policies are in place for your drivers to follow in determining their route (only right turns, etc.)
9.	What end user tools would you want see come out of this study and how would you like to use them (e.g. planning the route for a driver before starting, while in route (like a GPS), or providing input back to agencies on issues)? If a web-based map and delivery tool were created, would you use it? How?
10.	What issues do you encounter with loading/unloading? I.e. curbside/on-road deliveries.
11.	What issues do you encounter with pedestrians, bicyclists, or transit?
12.	Anything else you would like to discuss concerning local freight mobility?

A range of questions were used to solicit initial input from freight user group representatives.

- For the most part, freight users did not express concern with other modes of traffic such as bicyclists and transit except along Worthen Street. One user noted that the recent development along the waterfront has brought additional bicycle and foot traffic along Worthen Street.

Following developing the draft freight route plan and preliminary concepts for potential freight-related improvement projects, a follow-up packet was sent to the freight user group representatives. The representatives were asked to review and comment on the draft freight routes improvements. The comments could be provided in writing or through meetings or phone calls with project team members. The project team reached out to several user group representatives who had not responded in order to incorporate their comments. The questions are included in the Supporting Materials document.

The following feedback was received from the second phase of stakeholder outreach related to the draft freight routes and the initial freight improvement concepts:

- The proposed freight routes seem to adequately support truck freight travel to, from and within the Greater Wenatchee area.
- All of the listed roadway improvements are important for continued growth in freight deliveries. One user mentioned that improvements at Chelan Avenue and Miller Street should have higher priority during the planning of improvements.
- The proposed plan seems to appropriately address the necessary changes to restrict freight traffic through the downtown corridor on Wenatchee Avenue from 2nd Street to Kittitas Street.

One area of concern raised by the freight users relates to the timing, sequencing, and interim routing for trucks during construction of the proposed improvements. These items will need to be detailed during the design and implementation of the improvements, similar to most transportation projects.

General Community

Although not a focus of the outreach program, the general public and other stakeholders were able to provide input on the Freight Study. The WVTC Executive Director has provided updates at the Executive Council meetings, which are open to the public. The Executive Council also formally considered public comments on the Freight Study at their meeting in August 2014. This review included review of public comments on the Freight Study. The public comments supported consideration of pedestrians and bicycle needs in planning for freight mobility. In addition, comments identified specific concerns related to additional truck traffic using Orondo Avenue between Chelan Avenue and Wenatchee Avenue. The WVTC press release and written comments on the public review draft are included in Appendix B.

Additional presentations were made by WVTC during the public review period. These included workshops with the Wenatchee Planning Commission and City Council. The workshops were used to discuss the Freight Study, including the designated routes, improvements, and signing plans. The discussions highlighted the challenges in addressing the potential impacts between trucks, bicycles, and pedestrians. In addition, the desire to minimize impacts on adjacent properties and parking was highlighted.

Report Organization

The Freight Study for the Wenatchee Valley Urbanized Area consists of two documents. This study report provides an overview of the study process and recommendations including the:

- Freight Route Designations
- Freight Signs
- Freight System Transportation Improvements
- Plan Implementation

In addition to this report, additional documentation is included in the Freight Study Supporting Materials document. This consists primarily of materials prepared for and discussed at the TAC meetings, and the TAC meeting summaries. They also include materials and summaries from the coordination with the freight user group representatives. These materials include summaries of:

- Traffic Volume and Truck Count Data
- Collision Data
- Freight Route Criteria/ Evaluation Process

Freight Route Designations

The WVTC Freight Study was developed to improve the mobility and efficiency of truck freight into, out of, and within the Wenatchee urban area. It identifies the most appropriate, or desired routes for primary truck movements and identifies physical and operational improvements to better accommodate truck freight on the designated truck routes. The plan will provide the framework for prioritizing freight related improvement projects within the MTP and local agency plans, which will in turn support funding decisions.

Framework for Establishing Truck Routes in the Greater Wenatchee Urban Area

Based on the limited level of actual signed and designated truck routes, the project team and TAC decided that the study should begin with a clean slate – that is, the routes currently used by truck freight may or may not be the best truck routes. Just because trucks use a specific route, does not mean that an alternative corridor would not be better, especially if supported with appropriate signing and capital improvements. The Freight Study also identifies and prioritizes transportation system improvements to better facilitate freight mobility and safety. Designating several roadways as freight routes that serve the same freight movements would result in many more improvements which would make funding and implementing the plan more difficult. Therefore, the freight route designations focused on identifying the most appropriate routes to serve particular freight origins and destinations, with a focus on inter-regional freight hauling and large trucks.

The following questions were used to guide the development of criteria in developing the recommended freight route plan:

- What can/should be on the freight route?
- What should not be the freight route?
- Are there specific agency policies restricting a facility from being a freight route?
- Are the freight routes intuitive – will freight companies and truck drivers use them?
- What will it take to upgrade the route to make it a good, intuitive, safe and efficient truck route?

Freight Route Definitions

Given the large number and types of freight users in the region, a system for defining various levels of freight routes was developed. Several types and levels of freight classifications were considered based on the specific types of freight (e.g. agricultural, fruit packing, commercial deliveries) as well as the amount and frequency of truck traffic. Many of the agricultural routes and fruit packing operations are seasonal with high volumes of truck activity during certain times of the year. Others, like commercial deliveries, happen all year round. The resulting freight plan focuses on three categories of roadways -- “Freight Routes”, “Supporting Freight System,” and “Trucks Restricted,” as described below. The freight plan definitions essentially serve as the functional classification for truck freight movement. These definitions were used to guide the development of the freight signing plan as well as Identifying and prioritizing the freight-related transportation system improvement projects.

- **Freight Route** consists of major roadways that are the backbone of the freight mobility system. These roadways are expected to carry the highest volume of truck freight. They connect the Wenatchee urbanized area with the primary regional freight corridors and the rest of the state. They also provide for freight movement through the Wenatchee urban area and provide direct connections with major industrial areas

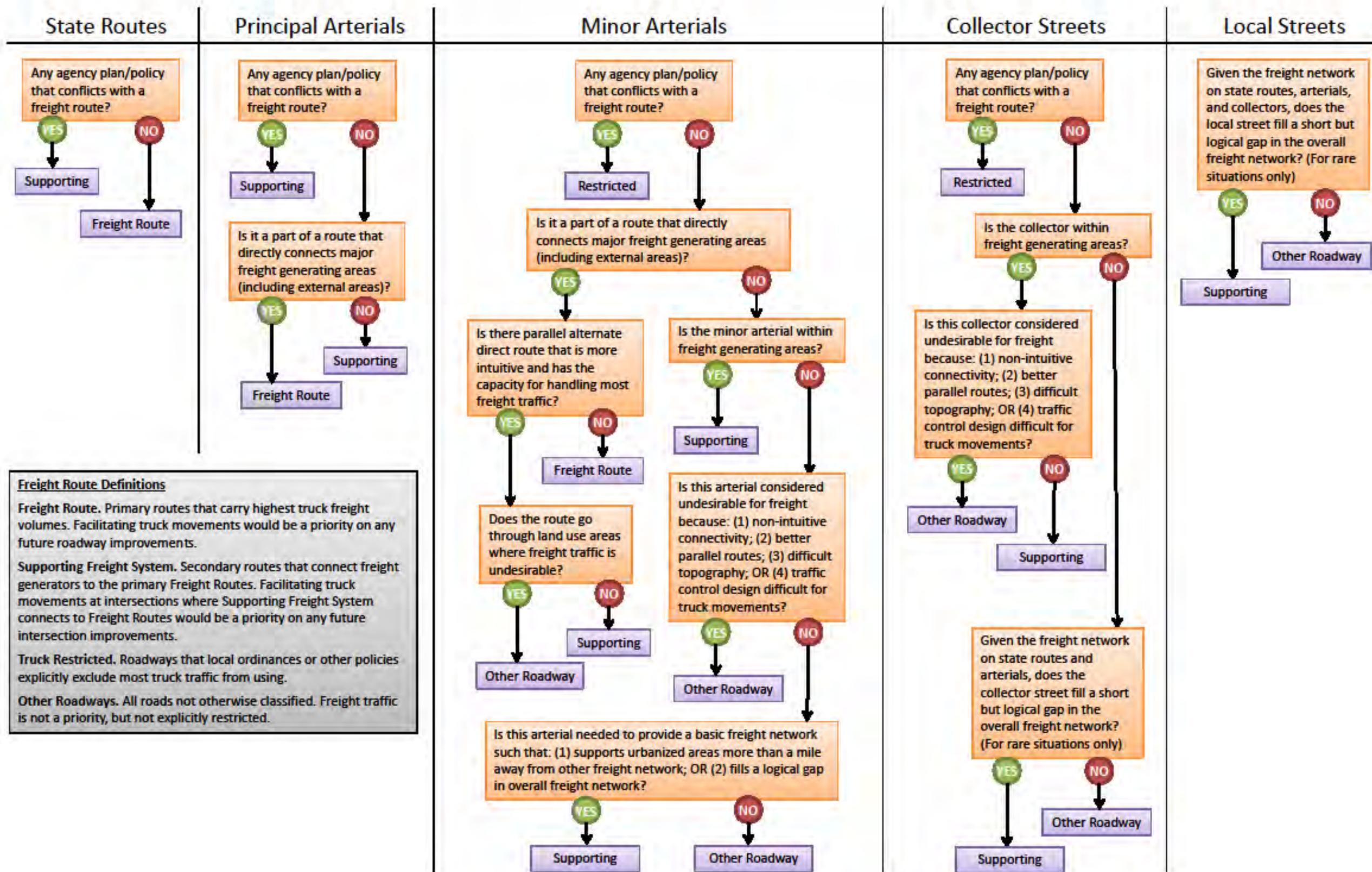
in the region and the airport. Facilitating truck movements would be a priority of the Freight Study for roadway and intersection improvements on these corridors.

- **Supporting Freight System** include other selected roadways that are not classified as a “Freight Route” but serve as important connecting routes between the Freight Routes and key agricultural, industrial, and major commercial areas. Facilitating truck movements at intersections where Supporting Freight System connects to Freight Routes would be a priority for future intersection improvements in the Freight Study. There are two major types of roadways in this category:
 - Roadways (arterials, collectors, or local) located within or adjacent to industrial, commercial, and agricultural areas per designated land use plans.
 - Roadways (primarily minor arterials) that provide the circulation and connecting road system for trucks servicing areas that have limited freight activity (such as western Wenatchee residential areas).
- **Trucks Restricted** roadways are defined as those that freight activity is considered undesirable or problematic. Trucks Restricted designations include roadways that local ordinances or other policies explicitly exclude most truck traffic from using (See 2009 *Manual on Uniform Traffic Control Devices (MUTCD)* Section 2B.39). Local deliveries would be allowed, but the Freight Study would not identify improvements that would support the use of those roadways for through truck traffic. The Freight Study should identify potential improvements or other methods that are appropriate for restricting all trucks except local deliveries on these routes. These roadways would be explicitly identified on a map and freight signing plan.
- **Other Roadways** include all roadways not otherwise classified. Freight traffic is not a priority for these roadways, but also is not explicitly restricted.

Freight Route Criteria and Screening

A “Decision Tree” (see Figure 3) was developed to assist in the classification of roadways within the greater Wenatchee Urbanized Area. It builds from the purpose and objectives of the Freight Study and input from the TAC and freight user group representatives. The Decision Tree incorporates input related to the following criteria:

- **Federal Roadway Functional Classification** – Primary freight movement should be on higher classification roadways which are designed for trucks and higher volumes of traffic.
- **Agency Plans and Policies** – The regional freight route designations need to take into account agency plans that restrict trucks or that identify/prioritize transportation or land uses that would not be compatible with the accommodation of large trucks. Furthermore, the freight system should include roadways that an agency specifically designates as a truck route within their jurisdiction.
- **Land Use** – The freight route designations need to serve major agricultural, commercial, and industrial areas, while minimizing impacts to residential areas, schools, or other similar areas.
- **Directness of Route**–The freight routes should provide logical routes; otherwise they probably will not be used as designated.
- **Traffic Operations and Safety**– Routes should provide for reasonable travel speeds and reduce conflicts with other travel modes; improvements should be identified and prioritized to address traffic safety and operations issues along designated freight routes and the supporting system



Decision Tree for Designating Freight Routes

The Decision Tree was used to screen each roadway for inclusion as a designated Freight Route, part of the Supporting Freight System, or as a Trucks Restricted facility. The screening process typically started at the top – Federal Functional Classification and then worked work down the branches as needed to come to a conclusion. For example, State Highways by design support freight activity and therefore are designated as Freight Routes without the need to review land use or other criteria.

The decision tree basically follows the following assessment for each roadway in the region:

1. Does an agency have policies in place that conflict with the roadway being designated as a freight route?
2. Does the roadway/ corridor directly connect to major freight generating areas (agricultural, commercial, industrial)?
3. Does the route go through or impact areas where truck freight traffic is undesirable?
4. Are there other roadways that better serve the function of this roadway as a freight route or supporting route or would require lower levels of investment to serve freight traffic?
5. Does the roadway fill in a gap in the freight circulation system, including connections not well served by other designated freight routes or supporting freight routes?

Recommended Freight Route Designations

The decision tree process was applied to develop draft route designations for the regional freight route plan. It included review of roadway classifications, land use maps, bicycle and pedestrian system plans, and transportation system conditions. Traffic data related to truck volumes, traffic congestion, and collisions were also reviewed and analyzed. The recommended freight route designations are shown on Figure 4A. Figure 4B provides an enlarged view of the freight routes in the core of the Wenatchee region. It reflects the results of an interactive process to refine the initial decision tree results based on input from the TAC, WVTC Executive Council, and freight user groups.

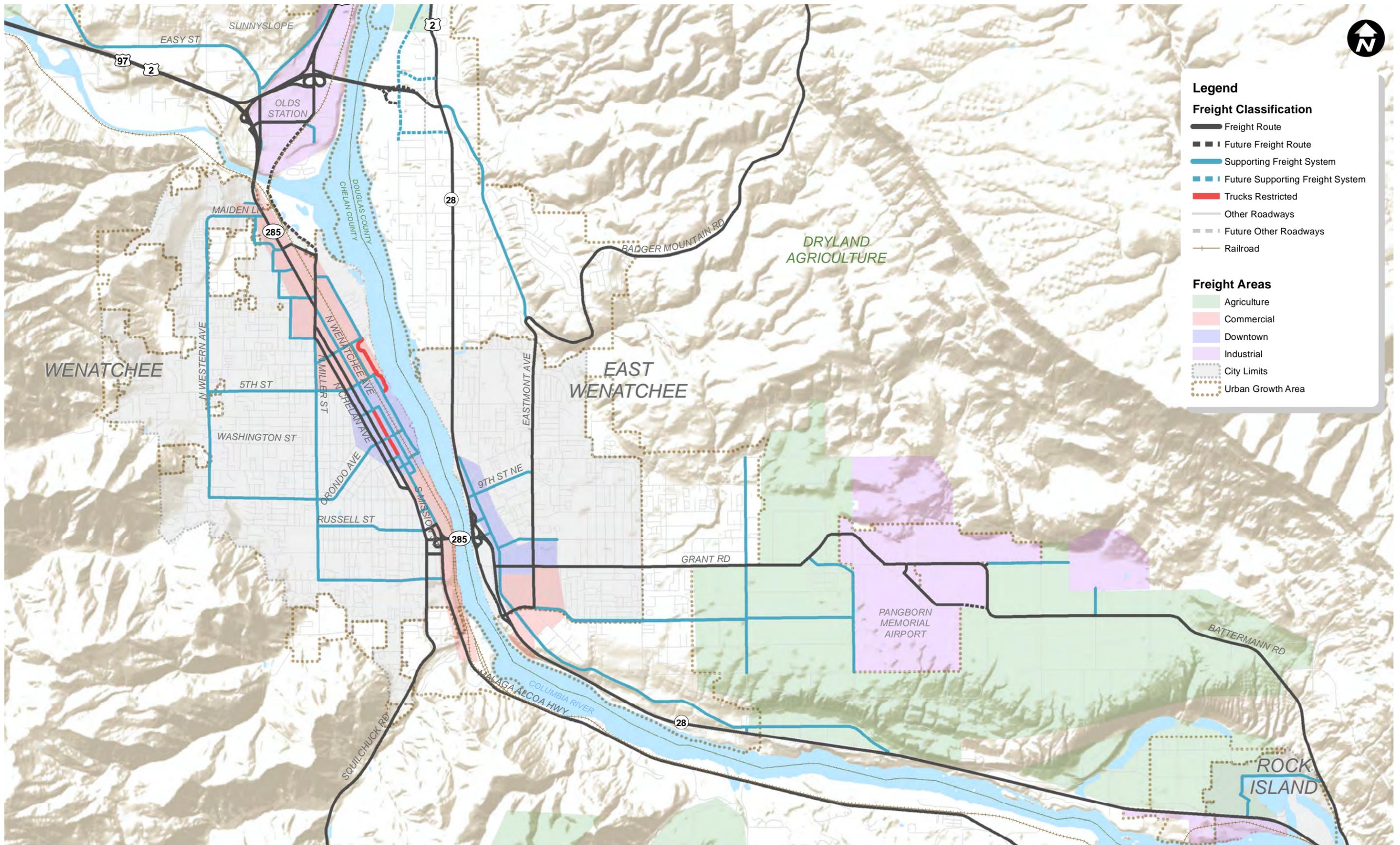
As shown on Figures 4A and 4B, the designated Freight Routes primarily consist of the state highways, including US 2/97, US 97A, SR 285, and SR 28. In addition, the Freight Route designation is applied to major roadways connecting the urban area with the adjacent rural freight areas. These include:

- Squilchuck Road
- Malaga Alcoa Highway
- Battermann Road
- Grant Road
- Eastmont Avenue
- Badger Mountain Road

There are also some key arterials within Wenatchee and East Wenatchee that complete the designated Freight Routes. These include Miller Street, Hawley Street and the proposed Confluence Parkway north of downtown Wenatchee. These facilities provide for major freight movements from the waterfront to SR 285 and eventually to US 2/97. South of downtown Wenatchee, short segments of Ferry



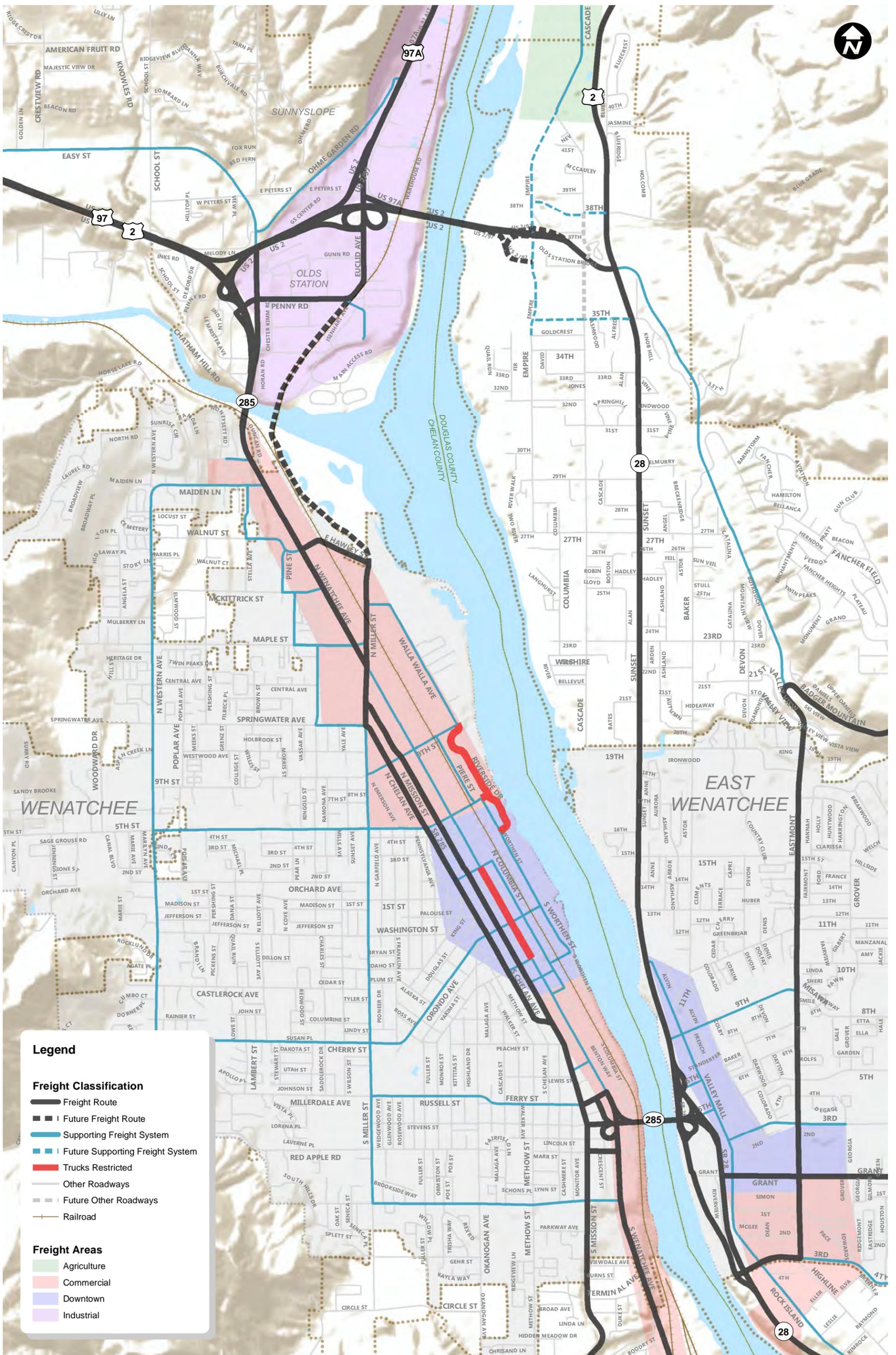
Key arterials entering the Wenatchee urban areas are designated as freight routes.



Recommended Freight Route Designations

WVTC Freight Study

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Recommended Freight Route Designations - Regional Core

FIGURE

Street and Marr Street are Freight Routes that support access and circulation between S Wenatchee Avenue and Mission Street, consistent with recent WSDOT improvements for the SR 285/George Sellar Bridge corridor.

Easy Street, Penny Road, and Euclid Avenue are designated as Freight Routes in the Olds Station subarea north of the Wenatchee River. Much of the Olds Station area is designated for industrial development and these roadways provide for the system to connect to the state highway system and the proposed Confluence Parkway

In East Wenatchee and Douglas County, other Freight Routes include 3rd Street SE and Highline Drive. These roadways connect SR 28 with Grant Road and Eastmont Avenue. This route will direct freight trucks away from the more congested intersection of Grant Road/SR 28. It also provides connections to/from the commercial areas south of Grant Road and to Valley Mall Parkway via Rock Island Road. To better accommodate and support trucks connecting to/from the industrial and agricultural areas in the vicinity of Pangborn Memorial Airport, Airport Way and its future extension Van Well Street/4th Street is also designated as a Freight Route.

Figures 4A and 4B also show the designated roadways comprising the Supporting Freight System. As previously defined many of these routes connect industrial, commercial, and agricultural areas to the Freight Routes. These include streets in or near downtown Wenatchee and downtown East Wenatchee. They also provide freight access and circulation to the N Wenatchee Avenue commercial district and within the City of Rock Island. Future Supporting Freight System roadways also are defined for the proposed commercial area in the vicinity of US 2/SR 28.

Other roadways included as part of the Supporting Freight System serve the western portion of the City of Wenatchee, the Sunnyslope subarea north of Wenatchee, and the areas east of East Wenatchee. The recently completed extension of Eastmont Avenue (between SR 28 and Badger Mountain Road) is also designated as part of the Supporting Freight System. These roadways help complete a system of roadways for freight mobility.

The “Trucks Restricted” designation is currently limited to two roadways in and near downtown Wenatchee. The City of Wenatchee has adopted a policy to restrict large trucks on Wenatchee Avenue between 2nd and Kittitas Streets within the downtown core. They are planning on installing “truck diverters” to physically restrict large trucks from entering downtown Wenatchee. Northbound large trucks on Wenatchee Avenue approaching Kittitas Street and southbound trucks on 2nd Street will be physically restricted from entering this section of Wenatchee Avenue. Advance directional signs and regulatory signs will be needed to facilitate the closure of this segment of Wenatchee Avenue to trucks.



The City of Wenatchee will be restricting large trucks traveling on Wenatchee Avenue through its downtown.

The other restricted roadway is Riverside Drive between 9th Street and Worthen Street. This roadway was designed and constructed to provide access to Riverfront Park and provide an alternative to the industrial roadways such as Worthen and Piere Streets. Riverside Drive includes mini-roundabouts (65 to 100 foot diameter) which do not accommodate larger vehicles such as freight trucks.



Large trucks should not use Riverside Drive due to the small radius roundabouts.

The roadway also provides access to parking lots serving the park and the Apple Loop Trail. Trucks have been observed trying to navigate the corridor and being obstructed by the geometric dimensions, especially the mini-roundabouts. These trucks can cause damage to the roadway. Therefore, the Freight Study designates this section of Riverside Drive as restricted to trucks to help direct truck drivers to alternative routes. Additional signing and improvements to further support this restriction are discussed in the next section of this report.

Freight Signs

Simply designating certain roadways as Freight Routes or as part of the Supporting Freight System may not change how freight truck drivers use the local roadways. To better support identification and use of the designated freight routes, a freight signing plan was developed. The signing plan was prepared to reflect the definitions of Freight Routes and the Supporting Freight System. A primary purpose of the signing plan is to direct trucks to the designated Freight Routes and away from the "Trucks Restricted" roadways. Signing to/from the Supporting Freight System is typically more limited to providing guide signs, as opposed to regulation.

Freight Route Signing Methodology

The Manual on Uniform Traffic Control Devices (MUTCD) specifies the shape, sizes, color, symbols and content of traffic signs. The MUTCD states that, to be effective, a traffic control device should meet five basic requirements:

1. Fulfill a need
2. Command attention
3. Convey a clear, simple meaning
4. Command respect from road users
5. Give adequate time for proper response.

Consistent truck related signage in the WVTC area will help meet these requirements. Truck signing should focus on four areas:

- Route designation
- Intersection Signing
- Trailblazer/Guide signing
- Designating truck related restrictions

Route Designation



R14-1

Route designation signing is used to continuously identify truck routes to drivers. The R14-1 sign is considered the standard for delineating and signing a truck route. Typical applications include the posting of a standalone sign or the attachment of directional arrows to designate truck routes. Signing should be placed at regular intervals or where a demonstrated need is identified. It is recommended that all primary freight routes be signed at half mile intervals using an R14-1 "TRUCK ROUTE" sign. Placement of these signs should be coordinated with placement of intersection signing as described below to avoid duplication and minimize the potential for over use of signing.

Intersection Signing

The purpose of intersection signing is to inform drivers of the intersection of two freight routes and designate freight route direction at these intersections. Signing should consist of an R14-1 "TRUCK ROUTE" sign with a supplemental arrow plaque showing directional designation of intersecting freight routes. An example is shown to the right.



The intersection sign should be placed at the intersection of freight routes as well as in advance of the intersection in order to give drivers adequate time for deceleration or lane changes. Advanced signing should be placed a minimum of 150 feet from intersections on arterial and collector roadways with a posted speed of 35 mph or below, and 350 feet for arterial and collector roadways with posted speeds of 40 mph or greater.

Trailblazer/Guide Signing



Trailblazer or guide signing should be used to direct trucks to freight routes or to provide advanced notice of prohibitions or complex situations. An example would be alerting trucks of the need to use a certain lane in preparation for a required turning movement. Trailblazer/Guide signs should consist of white lettering on a green background.

Truck Related Restrictions

Signing should also be provided in areas where specific truck restrictions are in effect. These restrictions would include weight restriction and dimensional clearance warning signs for structures, as well as delineating areas where trucks are prohibited. An example of this would be signing for the prohibition of trucks through the downtown area of Wenatchee Avenue.



Recommended Freight Signage

The freight signing plan builds from existing freight signage, especially on the state highways. It also calls for removing or replacing some existing truck signage as well as addition of regulatory and directional or guide signs. The signing plan focuses on the downtown Wenatchee and downtown East Wenatchee areas.

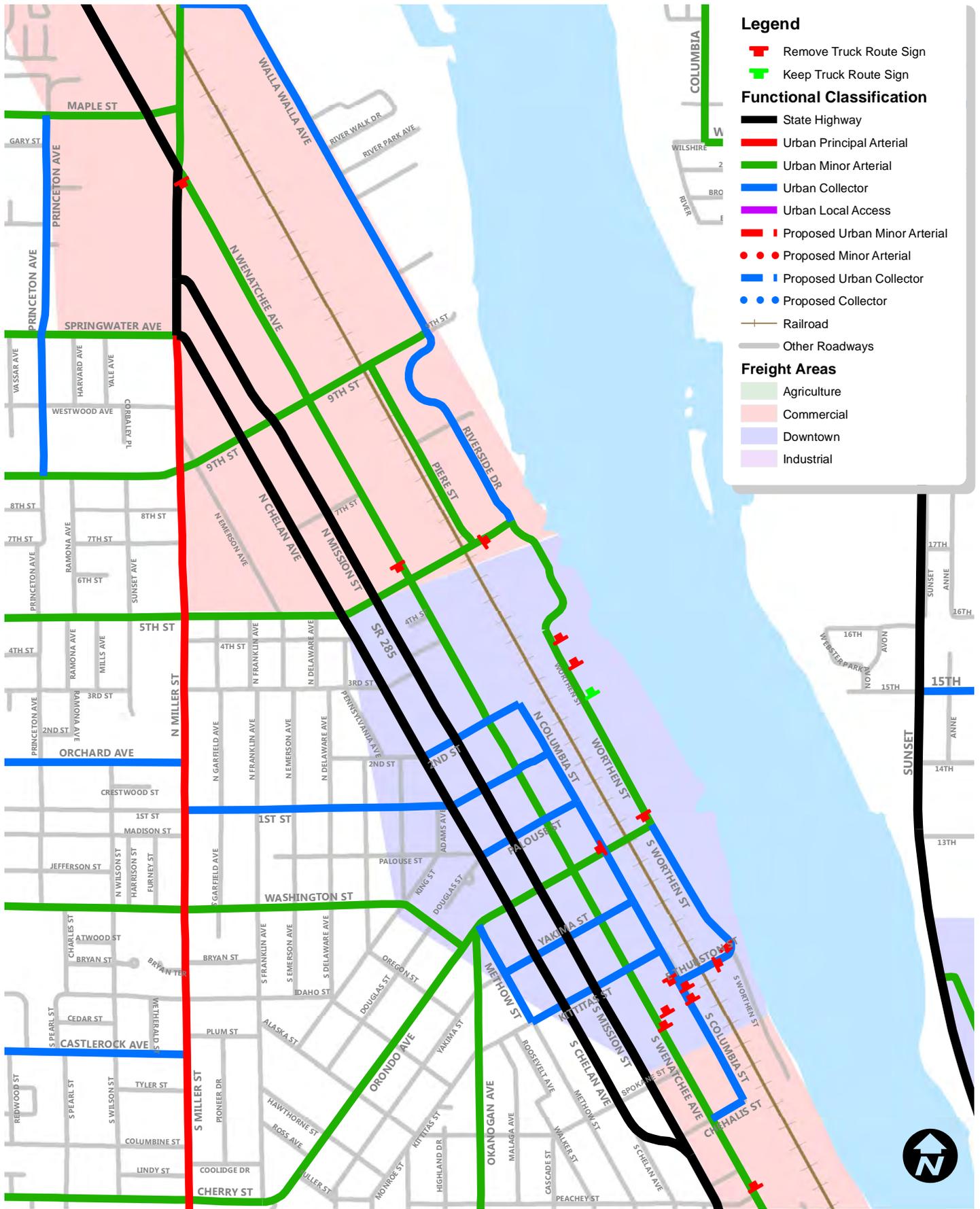
City of Wenatchee Regional Freight Route Signs

Figure 5 shows the existing truck route signs near downtown Wenatchee that should be removed and replaced/updated based on the Freight Study sign plan. Removal of most of the existing truck route signs is in keeping with the “clean slate” approach used in designating the freight routes. It was decided that most of the existing signs did not adequately address the needs for the revised truck routes, especially those related to the “Trucks Restricted” classifications of Wenatchee Avenue in downtown and Riverside Drive.

Figure 6 shows the regional freight route sign plan including existing freight signs such as those recently installed as part of the WSDOT improvements to the SR 285 George Sellar Bridge. A larger version of the Sign Plan is provided in the pocket at the end of this Freight Study report. It should be noted that not all recommended signing is shown in Figure 6. For example, Route designation and some intersection signing is not shown since their installation is more generic and is not meant for a unique situation. In addition, the signing shown is conceptual. Final design and approval of individual signs is needed prior to implementation.

Existing directional/guide signs on the regional highways serving the City of Wenatchee already provide directional information for trucks and general traffic for entering the region to connect to Wenatchee or continuing through the region. Eastbound traffic on US 2/97 is directed to SR 285 to enter Wenatchee or to take the loop ramp to continue to US 97A or across the US 2/97 Odabashian Bridge to Douglas County.





Existing Wenatchee Truck Signage To Be Removed

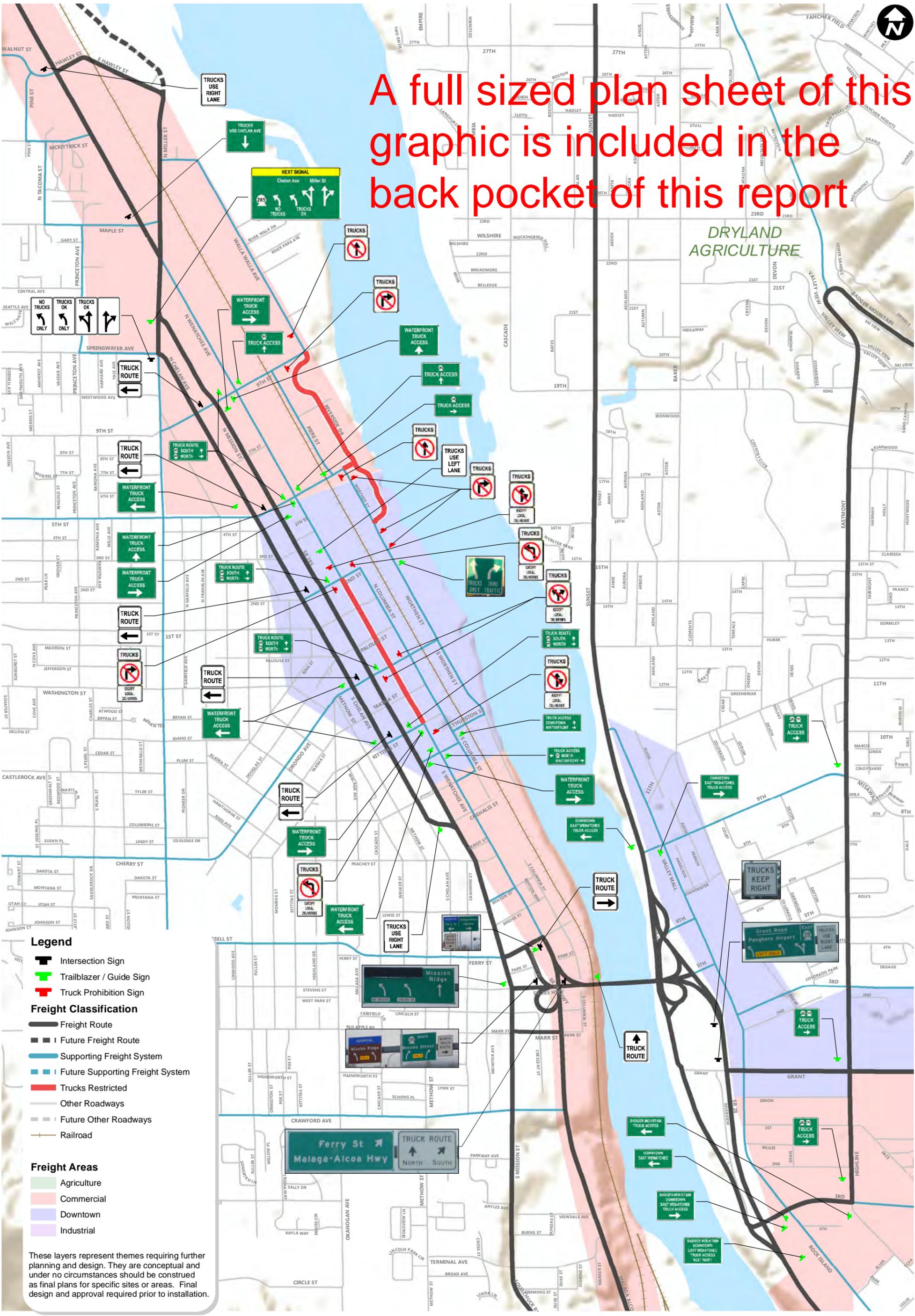
FIGURE

WVTC Freight Study

5



A full sized plan sheet of this graphic is included in the back pocket of this report



Recommended Freight Signs

WVTc Freight Study

FIGURE

Q:\Projects\12112276.00 - WVTc Freight Mobility Study\GIS\MXD\August2014\FIG6_FreightSignage_11x17.mxd

Similarly westbound traffic on US 2/97 crossing the Odabashian Bridge is directed to SR 285 to enter Wenatchee. Northbound vehicles exiting Wenatchee have directional signing to direct them to the east or west on US 2/97. While not specifically designed for freight trucks, the existing highway guide signs provide adequate directional signs to/from the regional routes. Based on discussions with freight users and analysis of truck volume data, regional trucks connecting between US 2/97 west of Wenatchee and East Wenatchee, primarily cross the Columbia River via US 2/97 and connect with SR 28 (Sunset Highway). Therefore, additional signs directing regional freight trucks on US 2/97 to East Wenatchee were not recommended as part of the Freight Study Sign Plan.

Trucks travelling southbound on N Wenatchee Avenue may be destined to the waterfront, downtown Wenatchee, or other destinations accessible via Miller Street or the SR 285 Chelan Avenue/Mission Street one-way couplet. The signing plan accommodates and directs southbound trucks entering Wenatchee with a destination along the Wenatchee waterfront to turn left at Hawley Street. All other southbound trucks on N Wenatchee Avenue will be signed to use the rightmost lane (curb lane) to continue to downtown Wenatchee and other destinations via SR 285 (Chelan Avenue/Mission Street couplet). Use of the southbound curb lane will result in the trucks being able to continue to Miller Street and/or turn onto Chelan Avenue without changing lanes. This signing concept is continued southward along N Wenatchee Avenue at Maple Street and on Miller Street approaching Mission Street. Truck signs for the area south of Miller Street and north of Peachey Street are discussed as part of the Downtown Wenatchee signing plans, discussed below.

New truck route signs are in place to guide trucks entering/exiting Wenatchee to/from East Wenatchee via the George Sellar Bridge. These were designed and constructed as part of the recent WSDOT project. Trucks are directed to/from Mission Street or S Wenatchee Avenue using Ferry Street or Marr Street.

Downtown Wenatchee Freight Route Signs

The City of Wenatchee has adopted a policy to restrict through truck traffic on Wenatchee Avenue in its downtown. The City plans to install truck diverters at Kittitas Street (northbound) and at 2nd Street (southbound). The diverters will, however, allow delivery trucks that enter this section of Wenatchee Avenue from side streets, such as Orondo Avenue, to exit downtown via Wenatchee Avenue at these locations.



With planned improvements along Miller Street, southbound trucks on N Wenatchee Avenue will be guided to Chelan Avenue without changing lanes.



WSDOT's recent improvements to the SR 285 Sellar Bridge includes new truck route and guide signs.

Truck drivers on southbound Wenatchee Avenue approaching 2nd Street will see a sign noting that trucks are not allowed to continue south (except for local deliveries). These truck drivers would have bypassed the truck route signs at 5th Street to turn right to connect to SR 285. The southbound trucks that passed up turning at 5th Street will be restricted from going straight (south) or turning right (west) at 2nd Street. Instead they will be directed to turn left onto eastbound 2nd Street until such time as improvements are made to increase the turn radius on the northwest corner of the intersection of Wenatchee Avenue/2nd Street to accommodate large trucks. The southbound trucks would turn left onto eastbound 2nd Street and then they would turn south on Columbia Street.

Northbound trucks approaching Kittitas Street will be directed to turn left toward SR 285 Chelan Avenue/Mission Street. The north-to-east right turn onto Kittitas Street also will not be allowed due to the insufficient turn radius. Truck traffic approaching this section of Wenatchee Avenue on the intersecting cross-streets also will be signed as being restricted from turning left or right onto Wenatchee Avenue, except for local deliveries.

The remainder of the freight sign plan for downtown Wenatchee and the surrounding vicinity is designed to direct trucks to use the SR 285 Chelan Avenue/Mission Street one-way couplet or S Wenatchee Avenue. These include signs directing southbound trucks on Chelan Avenue to use 5th Street, Orondo Avenue or Kittitas Street to access the waterfront. As noted before, downtown deliveries would use Orondo Avenue to access the businesses.

Northbound truck traffic on Mission Street would be directed to the waterfront via Thurston, 5th, and 9th Streets. Northbound trucks on Mission Street also would be allowed to turn east onto Thurston Street or Orondo Avenue, but these streets would not be signed for truck access to the waterfront.

Several east-west cross-streets will be signed for trucks to connect to northbound Mission Street or southbound Chelan Avenue. These include 9th Street, 5th Street, 2nd Street, Orondo Avenue, and Kittitas Street which are all designated as part of the Supporting Freight System.

Northbound trucks on S Wenatchee Avenue that want to return to SR 285 or other locations south of downtown Wenatchee will be signed to use Thurston Street to connect with Columbia Street and then return via Spokane Street. Northbound trucks on S Wenatchee Avenue also will be directed to SR 285 (Mission Street) via Thurston Street. If the northbound trucks continue north of Thurston Street they will be directed to make a left turn onto westbound Kittitas Street to connect to Chelan Avenue.

The signing plan also includes new or replacement signs to direct trucks away from Riverside Drive. The plan also directs trucks to Chelan Avenue/Mission Street couplet to provide positive directional signage in this area.

East Wenatchee Vicinity Freight Route Signs

Truck signing plans for East Wenatchee are simpler than those for the Wenatchee side of the Columbia River. This is due to the simpler street system as well as the lack of any "Trucks Restricted" streets. One of the primary elements of the freight signing plan for the East Wenatchee Area is to direct trucks around downtown East Wenatchee and Wenatchee Valley Mall while still providing for local commercial deliveries. Figure 6 shows the conceptual freight signing plan for the downtown East Wenatchee and the surrounding area.

Northbound trucks on SR 28 approaching the urban area destined to downtown East Wenatchee or Badger Mountain Road would be signed to turn right onto 3rd Street SE. Trucks accessing downtown Wenatchee and the commercial areas along Valley Mall Parkway would be directed to turn left onto northbound Rock Island Road. This signed route by-passes the east-to-north left-turn restriction from Grant Road to Valley Mall Parkway. The primary Freight Route would be signed to turn north onto Highline Drive to continue to Badger Mountain via Eastmont Drive. Trucks also could turn onto Grant Road via Highline Drive but that would not need to be specifically signed.



Freight route signs in East Wenatchee need to direct trucks for commercial deliveries as well as regional access.

Southbound trucks on SR 28 approaching the downtown commercial district of East Wenatchee would be directed to turn left onto 9th Street and then turn south onto Valley Mall Parkway. Southbound trucks continuing through to Rock Island or Quincy are currently signed to use the right lane approaching Grant Road. Trucks approaching Grant Road can turn left to freight destinations east of East Wenatchee such as Pangborn Memorial Airport or various agricultural areas, but cannot turn left onto Valley Mall Parkway.

Trucks entering east Wenatchee from Badger Mountain will be signed to use Grant Road to connect with SR 28 and SR 285. Trucks continuing to southbound SR 28 would continue south on Highline Drive and turn right onto 3rd Street SE.

Freight System Transportation Improvements

The freight route plan and associated freight signing plan were developed considering the potential need for improvements to enhance the mobility and safety of truck movements in the region. Intersection or roadway improvements can improve freight mobility in the region by making it easier for trucks to use the designated freight routes and supporting freight system. This helps reduce potential negative impacts where trucks are not desired or where existing roadways would need extensive upgrades to accommodate trucks. Furthermore, improvements along the designated freight routes can help reduce safety issues that affect trucks moving into, out of, and through the urban area. In addition, the improvements to support freight mobility and safety need to consider the potential for conflicts with other travel modes.

Identifying the Need for Freight System Improvements

In order to define the appropriate types of transportation system projects to improve freight mobility and safety in the region, the team needed to understand the level of truck traffic, truck travel patterns, and collision data. The improvements also needed to take into account where the freight routes interfaces with the pedestrian and bicycle routes. The improvements also needed to consider state and local agency Transportation Improvement Programs.

Truck Travel Patterns and Volumes

Improvements on the designated freight routes needs to be based, at least in part, on an understanding which routes the larger trucks are currently using and the relative volume of truck traffic in each corridor. Review of data from WSDOT, WVTC, and local agencies provided insights into truck travel patterns and volumes. Graphics summarizing daily traffic counts and truck volumes on state highways and other facilities are included in the freight Study Supporting Materials document.

The highest truck volumes (all sizes) in the urban area are found on the two bridges entering the City of Wenatchee. Approximately 2,800 trucks per day use N Wenatchee Avenue across the Wenatchee River. WSDOT count data show a similar volume of trucks using the SR 285 George Sellar Bridge across the Columbia River. Other roadways with high volumes of trucks include the US 2/97 Odabashian Bridge at the north end of the region and SR 28 in Douglas County. These two state highways carried 1,200 to 1,700 trucks per day in 2012/2013. Approximately 1,500 trucks per day use SR 28 between US 2/97 and East Wenatchee.

As previously noted, the City of Wenatchee is planning to restrict trucks travelling through its downtown on Wenatchee Avenue. Trucks will be directed to the SR 285 one-way couplet streets (Chelan Avenue/Mission Street). The existing count data show 1,300 trucks a day on the couplet in the vicinity of 7th Street. However, only 600 trucks per day use SR 285 south of downtown Wenatchee (Mission Street south of Chehalis Street). Truck volumes On Wenatchee Avenue range from 200 trucks per day north of downtown to 300 trucks per day south of downtown.

As discussed above, the total volume of trucks entering/exiting Wenatchee on SR 285 is higher than the truck volumes on SR 28 north of East Wenatchee. However, evaluating the changes in the volume of trucks on various segments of SR 285 in Wenatchee indicates that the majority of regional “through” truck trips use SR 28 (Sunset Highway). This finding is consistent with the responses from the freight user group representatives during the initial part of the Freight Study. It is also verified by data from the Washington State University Truck Traffic Survey conducted for WSDOT in 2013-2014.

Collision Analysis

To provide a basis for quantifying safety issues, collision data were obtained from WSDOT for a five year period (2007-2011). Summaries of these data are provided in the Freight Study Supporting Materials document. During the five year period, a total of almost 700 collisions were recorded in the greater Wenatchee region. Roadways and intersections with the highest number of collisions were primarily located along the state highway system. These facilities carry the highest volume of traffic so they have a greater potential for collisions to occur. As previously noted, the decision tree designated all state highways in the region as Freight Routes.

Of the nearly 700 total collisions during the five year period, 68 involved trucks. This is an average of 13.6 truck collisions per year. Locations and summaries of truck collision data also are included in the Supporting Materials document. There was no predominate type of collision involving trucks. Approximately one fifth of the 68 truck collisions involved striking a fixed object such as a traffic signal or utility pole, mailbox, fire hydrant, or similar roadside object. The other collisions involving trucks were fairly evenly split between angle-type, rear-end, and sideswipe accidents. Many of the truck collisions appear to be related to turning movements where trucks could not stay in the correct lane. Some of these collisions involve trucks going up on a sidewalk. Other resulted from trucks “off-tracking” into an adjacent lane. Sometimes the off-tracking would be into a travel lane or turn lane in the same direction, while other truck collisions likely involved trucks crossing into a lane for traffic travelling in the opposite direction. These types of truck collisions suggest improvements that enhance the turn radius for trucks at intersections along the freight routes.

Non-Motorized System

By its nature, the street system in the Wenatchee region serves multiple travel modes. Cars, trucks, and buses take up the most room and generally use the same physical space—the travel lanes and driveways. Bikes and pedestrians take up much less room but also may need to travel along or cross the freight routes. In these cases there is potential for conflicts between trucks and bicyclists or pedestrians.

These interactions between modes can result in trade-offs in the level of improvements to serve freight and the improvements needed for bicycles and pedestrians. Improvements to improve the turn radius of trucks will increase pedestrian crossing distances. In addition, improvements to better facilitate trucks may eliminate opportunities to provide a bicycle lane. The design of each roadway to accommodate will need to address these trade-offs, especially if the roadway corridor is restricted by available rights-of-way, existing buildings, utilities, or other constraints.

As discussed earlier in the Freight Study, designating the Freight Routes and Supporting Freight System took into consideration the regional *Bicycle Master Plan* (WVTC, May 2013) which was adopted by WVTC in 2013. As potential improvement concepts were developed to enhance freight, the Freight Study also considered the bicycle routes. The TAC discussed various improvement strategies for each corridor that may best accommodate the different travel modes. The TAC noted that the options and trade-offs will need to be reviewed in more detail during the design and implementation of the improvements.

Recommended Freight Improvement Projects

Based on the freight route designations and associated analysis of traffic volumes, operations, and safety, concepts for potential transportation system projects to improve freight travel in the region were developed. Three levels of projects were identified. The first level included improvements along the designated freight routes that had been recently constructed, were under construction, or were funded for construction. Many of these improvements already address the some of the identified freight issues. The second level

included reviewing improvement projects that had previously been identified as part of other transportation studies in the Wenatchee urban area. These include plans for N Wenatchee Avenue, SR2/97 and SR 28 (Sunset Highway). These also include local roadway improvements identified as part of other local area transportation analyses. The third level includes potential new freight-related transportation system improvement projects identified as part of the Freight Study. Concepts for these projects went through several reviews with the TAC to balance improvements for freight trucks against impacts on other travel modes, project costs, property impacts, and other related factors. The various freight-related improvement concepts also were presented to the freight user group representatives for comment.

Figure 7A shows the locations of the identified transportation improvements along the freight system routes for the overall study area. Figure 7B provides more detail of the same information for the key corridors in Wenatchee and East Wenatchee. The three levels of the improvement projects include:

- Improvements Completed or Schedule for Completion in the Near Term
- Improvements Previously Identified in Other Plans
- Improvements Evaluated as Part of the WVTC Freight Plan

Tables 1, 2, and 3 summarize the projects in each category. Tables 2 and 3 include planning level cost estimates and priorities. Cost estimates and priorities are not included for the projects on Table 1 because they are either already complete or funded for completion in the near-term. Appendix C provides more detailed illustrations of the potential improvement concepts.

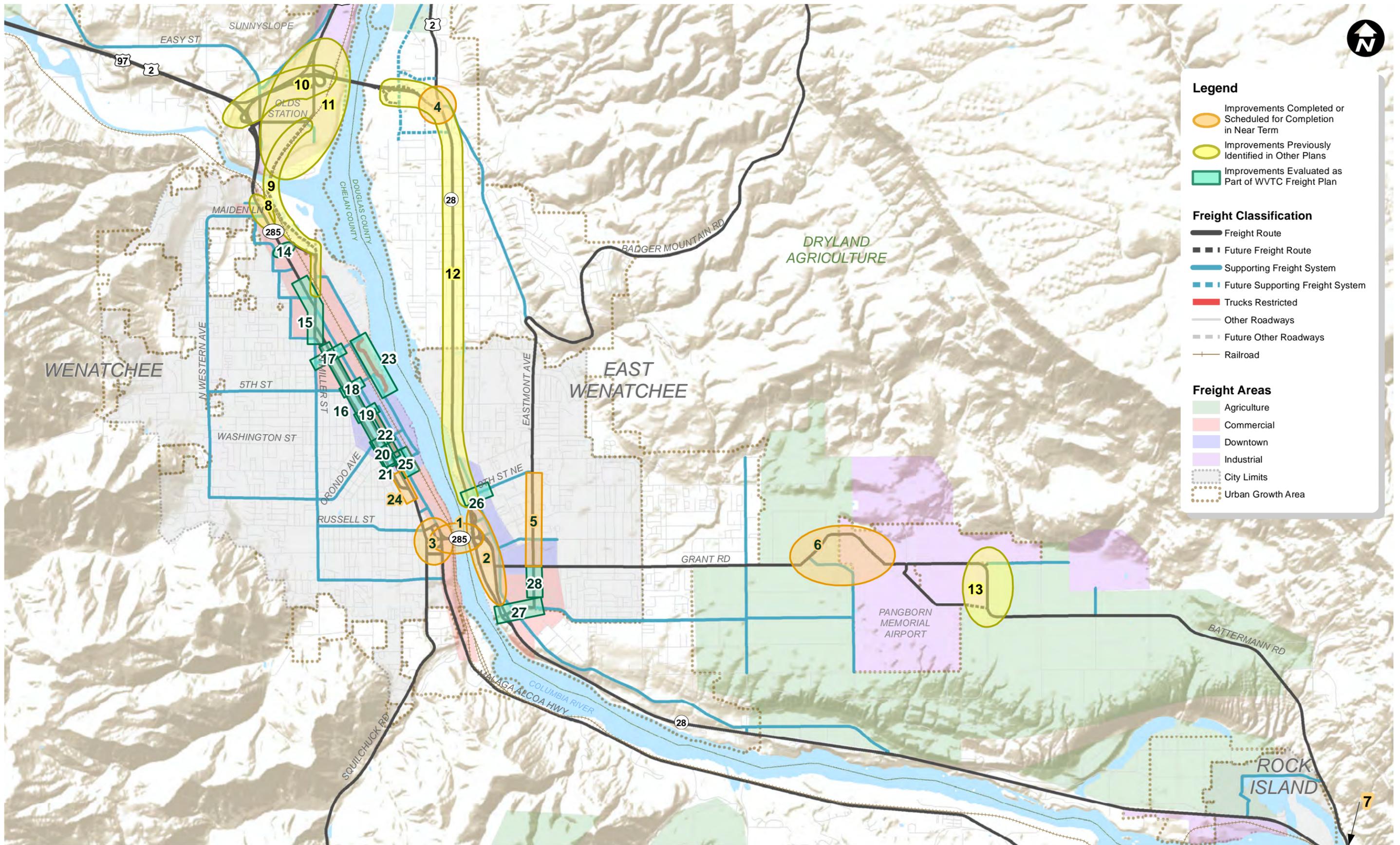
The planning level cost estimates for the projects on Table 2 were obtained from the prior planning documents, as applicable. Planning level cost estimates for the projects identified during the Freight Study (Table 3) were prepared by RH2 Engineering based on concept level designs and local area cost factors. Appendix D includes the project cost estimate worksheets.

The relative project priorities shown in Tables 2 and 3 only reflect the needs of the regional freight system. They were established based on the study objectives and discussions with the WVTC TAC. Input from the freight user group representatives also were incorporated into the project priorities. The ultimate priority of the freight projects for funding and implementation by WSDOT and local agencies will also need to consider their other types of transportation system improvements and availability of funding. WVTC and its partners will use the Freight Study to identify which of the freight-related improvements are appropriate for inclusion in the Metropolitan Transportation Plan (MTP) which supports the regional allocation of federal and state transportation funding.

Improvements Completed or Scheduled for Completion in the Near Term

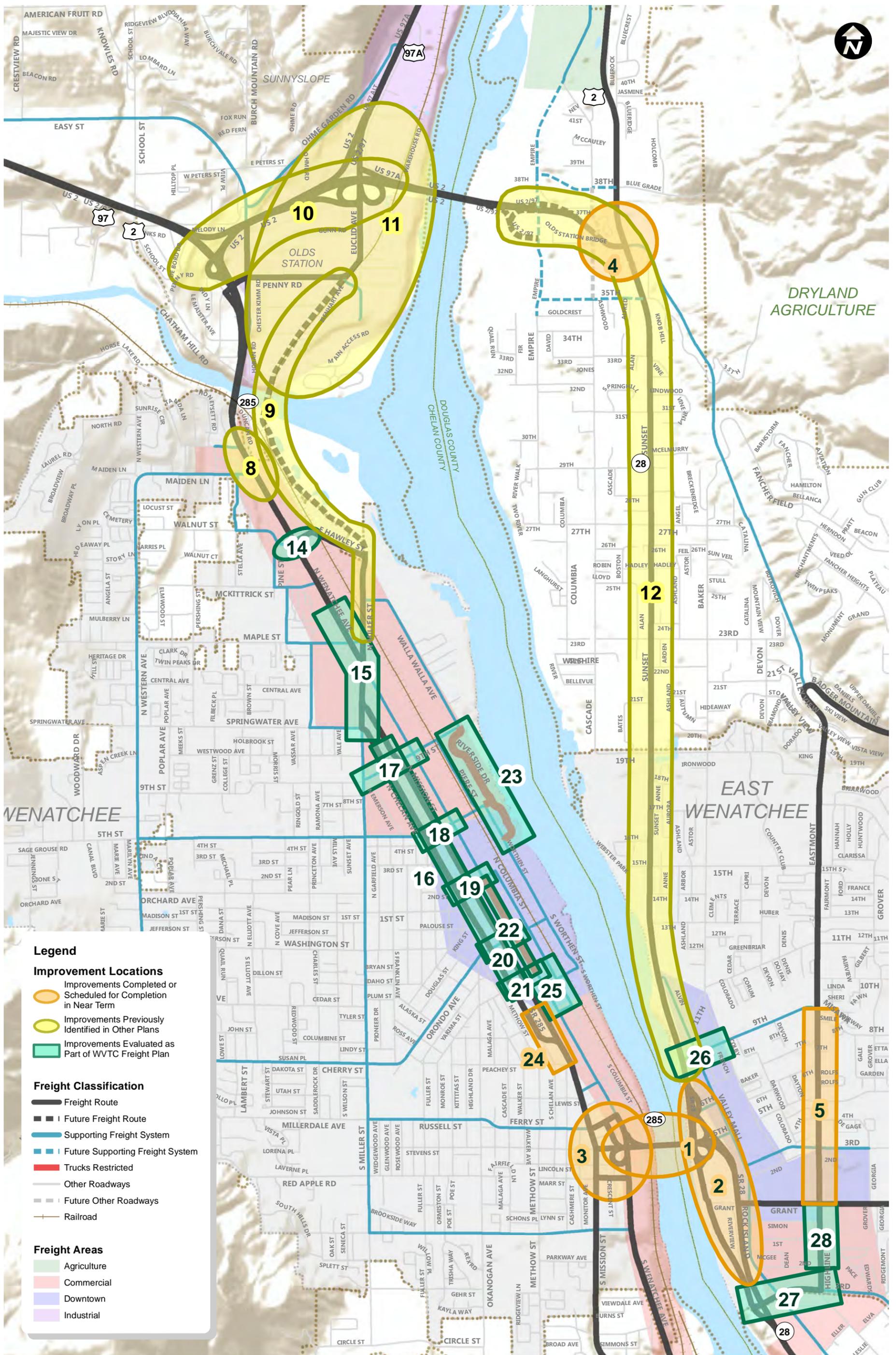
As shown on Table 1, there are seven transportation improvements that have been recently completed (or will be constructed in the near term) on the designated freight system. These are shown in the orange color on Figures 7A and 7B. Projects 1, 2, and 3 were recent WSDOT improvements to the SR 285 George Sellar Bridge connecting East Wenatchee and Wenatchee. This is a key state highway freight route serving the region. The improvements included adding an eastbound lane to the bridge which reduces conflicts associated with merging and weaving movements.

Improvements also were made to the east and west ends of the bridge. Improvements on the East Wenatchee side of the bridge include a southbound bypass on SR 28. Trucks travelling on SR 28 benefit from this improvement due to reduced delays and safety conflicts. The east side project improvements also provide more left turn capacity from southbound SR 28 to eastbound Grant Road, serving freight access to industrial and agricultural areas near Pangborn Memorial Airport.



Locations of Operational and Capital Improvements Along Freight Route System

FIGURE



Locations of Operational and Capital Improvements
 Along Freight Route System - Regional Core
 WVTC Freight Study

FIGURE
 7B

Table 1. Improvements Completed or Scheduled for Completion in the Near Term

Ref Key ¹	Location (Limits)	Description	Benefit to Freight	Comment
1	SR 285 Sellar Bridge (Mission Street to SR 28)	Construct additional eastbound lane.	Additional roadway capacity and reduced merging and weaving.	Complete 2011
2	East End of Sellar Bridge (9th Street to 3rd Street SE)	Construct southbound bypass of Grant Road and modify Grant Road intersection.	Southbound trucks bypass intersection delays; reduces conflicting traffic movements; improved signage.	Complete 2013
3	West End Sellar Bridge (Mission Street to Wenatchee Avenue)	Construct new westbound off-ramp from SR 285, upgrade local streets to facilitate trucks, and improve intersection capacity.	Reduces conflicts and congestion at west end of Sellar Bridge and enhances connections to/from the bridge and local freight areas.	Complete 2013
4	US 2/97 at SR 28 (intersection)	Widen intersection and connect to Eastmont extension.	Reduces congestion and delineates truck lanes at major intersection.	Completed 2013
5	Eastmont Avenue (Grant Road to 9th Street)	Reconstruct arterial to three lanes and install traffic signal at 3rd Street NE.	Improves lane delineation and traffic controls.	Completed 2013
6	Grant Road/Union Avenue (State Avenue to Airport Way)	Realign Grant Road and Union Avenue at north end of Pangborn Airport.	Maintains continuous east-west roadway to serve industrial and agricultural areas.	In design, construction expected to be complete in 2015
7	SR 28/Batterman Road (intersection)	Construct right turn lane and illumination.	Separates turning trucks from through traffic to enhance safety and operations.	Complete 2010

1. Location reference for Figures 7A and 7B.

Table 2. Improvements Previously Identified in Other Plans

Ref Key ¹	Location (Limits)	Description	Cost Estimate Range ²	Freight System Priority ³	Benefit to Freight	Comment
8	N Wenatchee Avenue (South of Maiden Lane to Horse Lake Road)	Construct intersection improvements and new frontage roads.	\$1.6 to \$2.1 million ⁴	Low to Medium	Reduces driveway turn movements and overall congestion.	Identified in <i>North Wenatchee Transportation Master Plan</i> .
9	Confluence Parkway (Miller Street/N Wenatchee Avenue to Euclid Avenue)	Construct new arterial bypass of N Wenatchee Avenue including new bridge over Wenatchee River.	\$70 to \$85 million ⁴	High	Provides more direct connection for freight between US 2/97 and freight areas in Wenatchee and Olds Station; reduces delays and conflicts encountered along N Wenatchee Avenue.	Identified in <i>North Wenatchee Transportation Master Plan</i> . Cost does not include Hawley Street Grade Separation project or improvements at US 2/Euclid Avenue Interchange.
10	US 2 (SR 285 Interchange to Euclid Avenue Interchange)	Implement short term safety improvements at US 2/Easy Street. Construct new interchange at US 2/97/SR 285/Easy Street and modify existing US 2/97 interchange at Euclid Avenue.	\$34.6 to \$41.9 million ⁴	High	Provides more direct east-west route for freight on US 2/97 and improves connectivity to Wenatchee and Olds Station. Reduces existing safety issues.	Identified in <i>North Wenatchee Transportation Master Plan</i> .
11	Olds Station Industrial Area Roadway Improvements	Construct new and upgrade existing roads in Olds Station to improve access and circulation.	\$4.6 to \$5.7 million	Low	Enhances local freight access and circulation.	Identified in <i>North Wenatchee Transportation Master Plan</i> . Improvements would be tied to development in Olds Station.
12	US 2/SR 28/Sunset Highway (Empire Avenue/US 2 to SR 28/9th Street)	Widen SR 28/Sunset Highway to five lanes, improve intersections, and implement access management. Construct grade separation of US 2 at Empire Avenue to serve future local circulation roadways.	\$200 to \$250 million ⁵	High	Adds significant capacity along major Freight Route serving through trucks and local freight. Access management and future interchange at Empire Avenue will improve safety by reducing conflicts.	Recommended in <i>SR 28 – Eastside Corridor Project (2006 EIS)</i>
13	Van Well Street (Grant Road to 4th Street)	Improve roadway and widen shoulders.	Not Available	Low	Wider roadway and shoulders will better serve larger freight vehicles.	Project identified as part of Waste Management improvements. Not a priority for regional freight system.

1. Location reference for Figures 7A and 7B.
 2. Costs in 2013 dollars unless otherwise noted.
 3. Relative priority from a regional freight perspective for resolving existing issues and implementation of recommended freight routes; does not reflect or commit WSDOT or local agency priorities for transportation projects.
 4. Cost from *North Wenatchee Transportation Master Plan (2010 dollars)*.
 5. Cost estimate from 2006 EIS inflated to 2013 at approximately 4 percent per year.

Table 3. Improvements Evaluated as Part of WVTC Freight Study

Ref Key ¹	Location (Limits)	Description	Cost Estimate Range ²	Freight System Priority ³	Benefit to Freight	Comment
14*	Hawley Street/N Wenatchee Avenue (intersection)	Improve turn radii at intersection and modify traffic signal.	\$168,000 to \$234,000	Medium Low	Improved turn radius will reduce off-tracking of trucks into adjacent travel lanes or onto the sidewalk.	Short term improvement which could be integrated with potential project to grade separate Hawley Street at railroad tracks which is identified in <i>North Wenatchee Transportation Master Plan</i> .
15*	Miller Street (N Wenatchee Avenue to Chelan Avenue)	Improve Miller Street/Mission Street intersection radius and lane alignments. Modify Miller Street approaching Chelan Avenue to allow left turns from three lanes (left, left, left/through, through/right). Adjust signal timing to reduce traffic queues.	\$855,000 ⁴	High	Changes allow trucks to stay in same lane while traveling south from N Wenatchee Avenue to Chelan Avenue or Miller Street. Provides additional capacity for left turns from Miller Street to Chelan Avenue, a major freight pattern.	Additional improvements including access management along this section of Miller Street are identified in the <i>North Wenatchee Transportation Master Plan</i> . Project is supported by freight users' group comments.
16	SR 285 Couplet North Segment (9th Street to Kittitas Street)	Revise signal timing to improve progression and reduce traffic stops. Modify roadway striping to provide wider right and center travel lanes at existing "pinch" points.	Low	High	Reduces delays and number of times vehicles will need to stop at signals along the one-way couplet. Improved signal timing also reduces safety conflicts by maintaining more consistent travel speeds. Wider travel lanes will improve safety for trucks on couplet.	Recommendations from City of Wenatchee Safety Study for the couplet.
17*	9th Street (Wenatchee Avenue to Chelan Avenue)	Signing only; no physical improvements recommended.	\$3,000 to \$4,000	High – signing only	Directs trucks away from Wenatchee Avenue which will be closed to through trucks at 2nd Street.	See Freight Study Sign Plan (Figure 6).
18A*	5th Street (Wenatchee Avenue to Chelan Avenue)	Convert 5th Street to three lanes and adjust parking and modify traffic signals.	\$93,000 to \$126,000 ⁵	High	Improvement improves truck turn radii and reduces off-tracking into adjacent lanes.	Cost of curb bulbs not included; the curb bulbs are part of City of Wenatchee Safety Study recommendations.
18B*	5th Street (Wenatchee Avenue to Chelan Avenue)	Maintain existing four lane cross section and allow trucks to off-track into adjacent lanes until additional improvements are made.	\$5,000 to \$10,000 ⁵	High	Signing directs trucks to desired freight routes.	Cost of curb bulbs not included; the curb bulbs are part of City of Wenatchee Safety Study recommendations.
19A*	2nd Street (Wenatchee Avenue to Chelan Avenue)	Modify turn radius for southbound Wenatchee Avenue to westbound 2nd Street.	\$110,000 to \$150,000	High	Downtown truck diverter will require trucks to turn at 2nd Street. Modified southbound right turn radius will better facilitate truck movements.	Some off-tracking of trucks still required to/from 2nd Street as shown in Appendix C.
19B*	2nd Street (Wenatchee Avenue to Chelan Avenue)	Sign to restrict south-to-west right turn for trucks until radius improvements described in project 19A are installed. Direct trucks to use left-turn lane to turn east on 2nd Street to Columbia Street.	\$1,000 to \$2,000	High	Downtown truck diverter will require trucks to turn at 2nd Street. Until southbound right-turn radius improvements are made trucks will be required to turn left onto eastbound 2nd Street to reduce conflicts of off-tracking.	Some off-tracking of trucks still required to/from 2nd Street east of Wenatchee Avenue as shown in Appendix C.
20A*	Orondo Avenue (Wenatchee Avenue to Chelan Avenue)	Convert Orondo Avenue to three lanes with bicycle facilities and parallel parking and modify traffic signals.	\$130,000 to \$175,000 ⁵	High	Downtown truck diverter will require more trucks to use Orondo Avenue between waterfront, downtown, and SR 285 couplet. Improvement reduces off-tracking into adjacent lanes.	Cost of curb bulbs not included; the curb bulbs are part of City of Wenatchee Safety Study recommendations.
20B*	Orondo Avenue (Wenatchee Avenue to Chelan Avenue)	Convert Orondo Avenue to three lanes with bicycle facilities and angle parking and modify traffic signals.	\$130,000 to \$175,000 ⁵	High	Downtown truck diverter will require more trucks to use Orondo Avenue between waterfront, downtown, and SR 285 couplet. Improvement reduces off-tracking into adjacent lanes.	Cost of curb bulbs not included; the curb bulbs are part of City of Wenatchee Safety Study recommendations.
20C*	Orondo Avenue (Wenatchee Avenue to Chelan Avenue)	Maintain existing four lane cross section and allow trucks to off-track into adjacent lanes until additional improvements are made.	\$5,000 to \$10,000 ⁵	High	Signing directs trucks to desired freight routes.	Cost of curb bulbs not included; the curb bulbs are part of City of Wenatchee Safety Study recommendations.

Table 3. Improvements Evaluated as Part of WVTC Freight Study (Cont'd)

Ref Key ¹	Location (Limits)	Description	Cost Estimate Range ²	Freight System Priority ³	Benefit to Freight	Comment
21*	Kittitas Street (Wenatchee Avenue to Chelan Avenue)	Modify curb radius at Wenatchee Avenue/Kittitas Street. Install new traffic signal at Kittitas Street/Chelan Avenue.	\$435,000 to \$575,000	High	Downtown truck diverter will require northbound trucks to turn left onto westbound Kittitas Street requiring improved turn radius. Traffic signal at Chelan Avenue will facilitate trucks accessing southbound SR 285.	Cost does not include pavement upgrades for Kittitas Street.
22	Downtown Wenatchee Avenue (2nd Street to Kittitas Street)	Install southbound truck diverter on Wenatchee Avenue at 2nd Street and northbound diverter at Kittitas Streets. Restripe Wenatchee Avenue and other streets to accommodate sign truck routes to allow only local deliveries.	Not available, City funded.	High	Restricting non-local trucks in downtown Wenatchee will reduce conflicts with local traffic, parking, pedestrians and bicycles. Trucks will be directed to routes that are more compatible for large vehicles.	See Appendix C for concept designs for 2nd Street (project 19) and Kittitas Street (project 21). City of Wenatchee policy direction; diverters planned to be constructed in 2014.
23*	Riverside Drive/Worthen Street (1st Street to 9th Street)	Provide hanging sign to visually restrict large trucks from entering Riverside Drive at 9th Street or 5th Street.	\$20,000 to \$54,000	Medium	Will help keep trucks from entering Riverside Drive which is not designed to accommodate large vehicles.	
24	SR 285 Couplet/Mission Street South Segment (Spokane Street to Peachey Street)	Restripe Chelan Avenue approaching Mission Street to shift lanes to reduce off-tracking. Restrict left turns along Mission Street between Chehalis Street and Peachey Street.	Very Low	High	Reduces off-tracking and conflicts with left turns.	Project complete 2014.
25*	Thurston Street (Kittitas Street to Spokane Street)	Restripe Thurston Street to three lanes to provide left turn lane to northbound Columbia Street. Sign truck access to waterfront via Thurston Street.	\$5,000 to \$7,000	High	Restriping Thurston Street will improve truck turn radius reducing off-tracking. Provides improved alternative route with installation of downtown truck diverters.	
26	9th Street NE (SR 28 to Baker Avenue)	Reconfigure Valley Mall Parkway to three lanes. Install traffic signal at intersection of 9th Street/Valley Mall Parkway.	\$2.00 to \$2.25 million ⁶	Medium	Traffic signal will reduce the percentage of times trucks stop at intersection. Three lane roadways will reduce off-tracking and improve safety.	City of East Wenatchee Transportation Improvement Program projects.
27*	3rd Street SE (SR 28 to Highline Drive)	Install traffic signals at 3rd Street SE/Rock Island Road and 3rd Street SE/Highline Drive.	\$750,000 to \$850,000 ⁷	High	Provides alternative, less congested freight route to Grant Road	City of East Wenatchee Transportation Improvement Program projects.
28	Highline Drive (3rd Street SE to Grant Road)	Upgrade Highline Drive to match Eastmont Avenue north of Grant Road.	\$90,000 ⁷	Medium	Provides consistency in road configuration for freight movement.	City of East Wenatchee Transportation Improvement Program project identifies constructing one segment of sidewalks on west side of roadway.

Conceptual project diagrams included in Appendix C for locations marked with an asterisk (*).

1. Location reference for Figures 7A and 7B.
2. Costs in 2013 dollars unless otherwise noted.
3. Relative priority from a regional freight perspective for resolving existing issues and implementation of recommended freight routes; does not reflect or commit WSDOT or local agency priorities for transportation projects.
4. Cost from City of Wenatchee grant applications (\$315,000 for Chelan Avenue/Miller Street and \$540,000 for Mission Street/Miller Street).
5. Cost does not include curb bulbs which are part of City of Wenatchee Safety Study recommendations.
6. Costs from City of East Wenatchee 2014 to 2019 Transportation Improvement Program including three lanes on Valley Mall Parkway between 6th Street and SR 28.
7. Cost estimate from City of East Wenatchee 2014 to 2019 Transportation Improvement Program.

Improvements on the west end of the Sellar Bridge also directly serve freight trucks. The improvements include developing a system of local streets to provide connections to/from SR 285 with S Wenatchee Avenue and the Malaga-Alcoa Highway. As shown on the Freight Sign Plan (Figure 6) the WSDOT project included new signs directing truck drivers to the designated freight routes.

Other completed or near term improvements are located in Douglas County or East Wenatchee. The most significant of these is the upgraded intersection at US 2/97 with SR 28. The intersection improvement provides additional overall capacity and identifies the proper lanes for northbound trucks to use to turn west. This improvement also provides access to the recently constructed extension of Eastmont Avenue which is designated as part of the Supporting Freight System. These improvements are part of the SR 28 Wenatchee Eastside Corridor project (see project 12).



WSDOT recently completed modifications at the interchange of SR 28 with SR 285 including a southbound by-pass of the Grant Avenue intersection.

The other recent or near-term improvements that help serve freight include the City of East Wenatchee's project to reconstruct and upgrade Eastmont Avenue. This project provides improved lane delineation and surface conditions for freight trucks connecting with Badger Mountain Road and access for deliveries to the Wenatchee Valley Mall.

In the vicinity of Pangborn Memorial Airport, Grant Road and Union Avenue are being realigned around the north side of the airport. This project is in design and will maintain the continuous arterial for east/west traffic and freight in the area.

The intersection of SR 28/Battermann Road also was upgraded to add turn lanes and illumination. This improvement helps separate trucks turning right (west-to-north) from through traffic, thereby improving safety and operations.

Improvements Previously Identified in Other Plans

The Freight Study also builds from and incorporates projects identified in previous planning efforts that will support and enhance the recommended freight route plan. As shown on Figures 7A and 7B, these are primarily located on the state highway system. Table 2 summarizes these improvements.

The *North Wenatchee Transportation Master Plan* was adopted by the WCTC Executive Council in February 2011. It specifically took into account freight mobility and safety in developing its recommendations. The most significant of these recommendations is the construction of a new arterial parallel to SR 285/N Wenatchee Avenue. The new arterial, called the Confluence Parkway, would facilitate freight trucks connecting between US 2/97 and the Wenatchee waterfront. The new arterial would require construction of a new bridge

over the Wenatchee River and would include a grade separation of Miller Street with the railroad tracks. The Confluence Parkway would separate through traffic, including freight trucks, from the commercial traffic along N Wenatchee Avenue. This will greatly enhance freight mobility and safety in the northern part of the City of Wenatchee. The new corridor also will provide additional capacity for freight serving the range of commercial uses along N Wenatchee Avenue by moving through traffic off of the existing SR 285/N Wenatchee Avenue corridor.

The *North Wenatchee Transportation Master Plan* also recommends major upgrades to US 2/97 between US 285 and the Columbia River. These include reconfiguring the US 2/SR 285 interchange so eastbound traffic on US 2 does not need to exit the freeway to continue to the bridge or to US 97A. In addition, these improvements would eliminate the existing traffic signal at US 2/Easy Street which is a safety issue and impacts truck flow by requiring through vehicles to stop at red lights on this major regional highway. More modest reconfigurations of the US 2/Euclid interchange are also included as recommendations in the *North Wenatchee Transportation Master Plan* in order to accommodate the higher volumes of traffic and trucks with the construction of the confluence Parkway. These combined projects are expected to cost up to \$125 million or more so they will require regional coordination and significant levels of federal or state funding.



The North Wenatchee Transportation Master Plan recommends reconfiguring the US2 / SR 285 interchange to facilitate eastbound through traffic flows.

The *North Wenatchee Transportation Master Plan* also identifies improvements to roadways in the Olds Station area. These improvements will be tied to expanded development in the area, as well as the construction of the Confluence Parkway which will directly serve industries in the Olds Station area. Improvements also are identified in the *North Wenatchee Transportation Master Plan* that will reduce congestion and safety conflicts at intersections along N Wenatchee Avenue south of the existing Wenatchee River Bridge.

In the early to mid-2000's, agencies in the Wenatchee region evaluated alternatives for improving traffic operations and safety on the eastside of the Columbia River. The SR 28 – *Eastside Corridor Project* recommends widening of SR 28 to five lanes between US 2/97 and East Wenatchee. The recommendations also identify specific improvements at intersections and implementation of access management along the state highway. This corridor serves some of the highest volumes of truck traffic in the Wenatchee region so it is a very high priority; however, the high cost of the improvements will likely require phasing construction.

Based on existing operations and safety analyses, the initial phases should focus on completing improvements at major intersections similar to improvements at 19th Street NE. The next phases for the corridor should include continuing to construct a center two-way left turn lane between intersections. These would improve freight travel along the corridor by separating through traffic from turning vehicles which will improve safety and help maintain more reasonable traffic speeds.

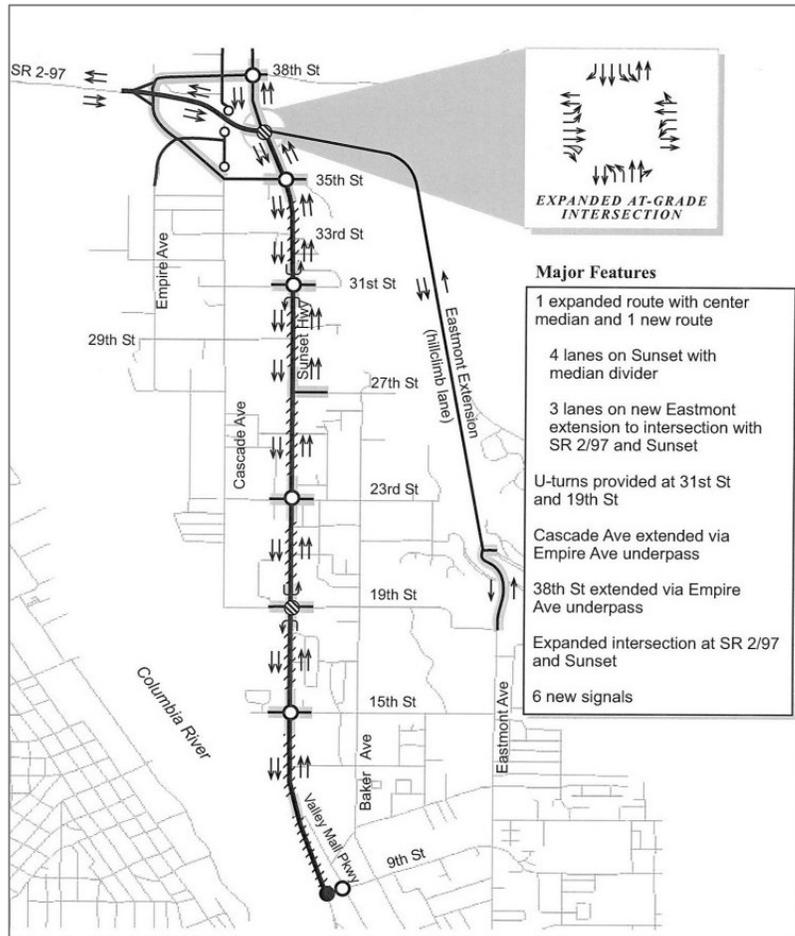
The *SR 28 – Eastside Corridor Project* also recommends construction of an interchange at US 2 with Empire Way west of SR 28. This would allow development of the adjacent area as a commercial center without need for a traffic signal or other controls which would impact regional freight traffic. This improvement is not as important to the regional freight system as the improvements along SR 28 because trucks do not need to stop along this segment of US 2/97. However, installing a traffic signal or other type of traffic control would impact trucks using this major freight corridor.

Prior studies for the Waste Management site east of Pangborn Memorial Airport identified widening and shoulder improvements along Van Well Street. These would improve local area freight but are not a high priority for the regional plan since they primarily serve local freight needs.

Improvements Evaluated as Part of the WVTC Freight Plan

The state highway improvements that have recently been constructed or are adopted as part of other transportation plans address many of the most significant regional issues for freight trucks. These major improvements do not, however, address freight mobility and safety in and around the business districts in downtown Wenatchee and East Wenatchee.

Therefore, the Freight Study focused on defining additional improvements to help facilitate truck travel to/from the state highways and the industrial and commercial districts on both sides of the Columbia River. These are illustrated on Figure 7B and summarized in Table 3. Appendix C includes more details of the improvement concepts and the components of the freight improvements.



Regional plans call for widening SR 28 between US 2/97 and East Wenatchee to five lanes.

The recommended freight system improvements focus in on key intersections along the Freight Routes and at intersections along the Supporting Freight System in both Wenatchee and East Wenatchee (see Figure 4B). The focus areas include intersections where the Freight Routes intersect each other or at the most significant intersections of the Freight Routes with the Supporting Freight System roadways. Many of the improvements include constructing larger curb radii, modifications to existing striping, and changes to intersection traffic controls. The improvements were defined concurrently with and are intended to be supported by and help support the Freight Sign Plan. One of the key constraints in developing the concepts was minimizing the impacts of adjacent properties and buildings and need to acquire right-of-way.

The design vehicle used for defining freight-related improvements was a WB-67. This represents a semi-trailer with a 67 foot wheelbase and is the largest design vehicle used for state highways. At several locations, the recommended improvements will not accommodate the WB-67 vehicle. Some amount of off-tracking will be necessary to minimize the cost and impacts of providing the larger turning radius to serve trucks. In addition, some of the intersection improvements show locations that could allow an even greater amount of off-tracking which would further reduce the need for intersection modifications. This could provide interim solutions for those roadways until funding is secured for more significant improvements.

Planning level cost estimates were developed for the recommended improvements evaluated as part of the Freight Study. The cost estimates include the major elements needed to complete the recommended project with a few assumptions. None of the estimates include costs for road reconstruction or resurfacing. It is anticipated that the options recommending striping changes would likely be done concurrently with the next programmed pavement preservation project. Another assumption is that the existing signal system (controller, foundations, signal standards, mast arms, etc.) can accommodate the necessary modifications needed for the recommended lane re-channelization shown on several exhibits. Curb bulb-outs (shown in blue on the concept drawings in Appendix C) are not included in the planning level estimates. These are shown as a cross-reference to the City's SR 285 Safety Study project improvements. Cost estimate worksheets are included in Appendix D.

City of Wenatchee

The City of Wenatchee will be installing truck diverters on Wenatchee Avenue to prohibit trucks from travelling through its downtown. The Freight Study does not define the design of the diverters, but does identify improvements for the routes where the trucks will be redirected to per the Sign Plan. The Freight Route Plan and associated Freight Sign Plan identify the primary alternative truck route to be the SR 285 one-way couplet along Chelan Avenue (southbound) and Mission Street (northbound). This requires potential improvements along the couplet and the intersecting east-west side streets. Summaries of the projects are included on Table 3 with more information provided below. Conceptual design diagrams are provided in Appendix C for many of the improvements in the City of Wenatchee; these are designated with an asterisk (*) in in first column of Table 3

Some of the truck routes in Wenatchee coincide with primary bike and pedestrian routes. The improvements in these locations attempt to balance the need for larger turning radii to serve trucks without severely impacting the pedestrian and bicycle routes. In order to provide a comprehensive view of the preferred truck corridor, the conceptual design exhibits presented in Appendix C show the locations of possible curb bulbs as proposed by the City of Wenatchee's SR 285 Safety Study project. The recommended freight system improvements will not conflict with these pedestrian safety improvements. Costs for installing the curb bulbs are not included as part of the freight improvements but the safety improvement projects could be funded and constructed at the same time to help reduce total costs.

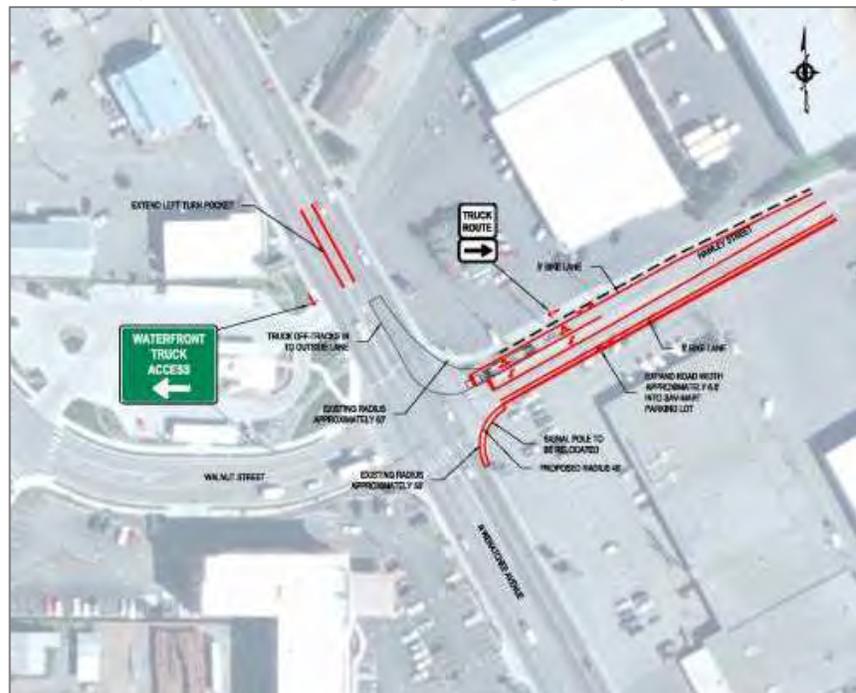
The Freight Study also considered the existing pavement conditions along the freight routes. Although a pavement analysis was not conducted, the existing pavement along the various freight corridors visually appears to be in relatively good condition and should be able to withstand the increase in the volume of trucks, at least in the near-term. The primary areas of concern are along Kittitas Street and Orondo Avenue where the roadways consist of a brick overlay. These roadways, however, are not major Freight Routes or even the highest volume Supporting Freight System corridors. These two roadways will primarily serve the truck drivers who missed the primary turns along the preferred, signed freight routes or trucks making local deliveries in downtown Wenatchee which are typically smaller trucks. Thus, the brick overlays should not encounter the total volume of freight travel, but instead only a relatively minimal amount. The existing pavement will eventually need a full pavement analysis due to age and increase in traffic, but for now, the existing pavement will be adequate to serve the new freight route.

Hawley Street / N Wenatchee Avenue (project 14). The Freight Study examined the intersection of the Hawley Street and N Wenatchee Avenue to determine possible revisions to help improve the truck mobility while addressing the pedestrian and bicycle connections between N Wenatchee Avenue and the Apple Loop Trail. Increasing the curb radius on either the northeast or the southeast quadrant will help to improve the ability for trucks to make the west-to-north right turn onto N Wenatchee Avenue and reduce impacts of off-tracking. Changing either radius return will require modifications to the existing signal system. This

widening will affect the adjacent property owners by eliminating some parking. The concept also includes lengthening the southbound left turn lane from N Wenatchee Avenue to Hawley Street to provide additional storage for trucks.

This project could be constructed as a standalone improvement. However, the *North Wenatchee Transportation Master Plan* includes recommendations for the Confluence Parkway which would reduce the volume of trucks needing to make these turn movements

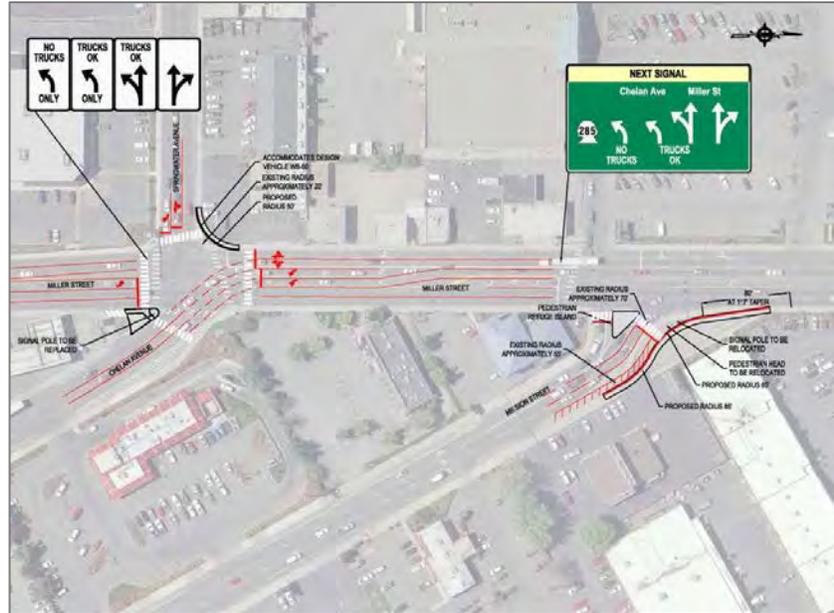
at this intersection. In addition, the *North Wenatchee Transportation Master Plan* identifies an improvement to grade-separate Hawley Street with the railroad tracks east of N Wenatchee Avenue. It is likely that the potential grade-separation project also would require other modifications at this intersection. Therefore, the project is listed as a medium-low priority. The priority would increase if the region decides not to pursue the Confluence Parkway or Hawley Street grade-separation project in the future.



The curb radius at the intersection of Hawley Street with N Wenatchee Avenue needs to be increased to reduce the off-tracking of large trucks.

Miller Street (project 15). In order to better direct and accommodate traffic and trucks between N Wenatchee Avenue and the SR 285 one-way couplet east of downtown Wenatchee, the City has applied for and received grants for improvements at the intersections of Miller Street with Chelan Avenue and with Mission Street. These improvements include restriping and signing/signal modifications to allow southbound trucks on Miller Street to make left-turns onto southbound Chelan Avenue from three lanes. The project will convert the center through lane into a shared through/left-turn lane. This improvement is supported by the Freight Sign Plan that will direct trucks to use the curb lane on southbound N Wenatchee Avenue to access Chelan Avenue or Miller Street without needing to change lanes.

Other considerations for improvements at this intersection included removing one of the southbound through lanes on Miller approaching Chelan Avenue and widening the remaining three lanes to support truck turning radius needs. The WVTC TAC felt this would not provide sufficient storage at the intersection for the southbound through traffic movements. The City's grant application also included a modification of the curb radius at the northwest corner of this intersection to better accommodate delivery trucks to the shopping center.

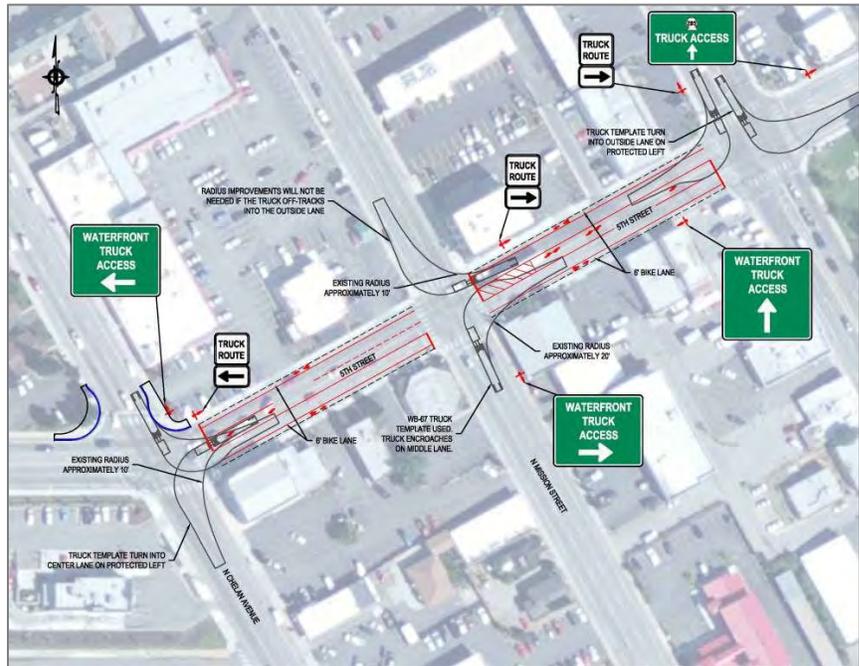


The City of Wenatchee is designing improvements on Miller Street to allow left-turns onto southbound Chelan Avenue from three lanes.

The City also was awarded a grant for improvements at Mission Street/ Miller Street. These improvements provide a larger radius for the northbound right turns from Mission Street to Miller Street. It also provides an upgraded pedestrian crossing. Other alternatives for this location were evaluated but they did not provide any major improvements over the City's current plan for the intersection.

SR 285 Couplet North Segment (project 16). To better facilitate all traffic, including the larger freight trucks, the City of Wenatchee has prepared a study for updating the timing of the coordinated traffic signals along the north part of the one-way couplet (9th Street to Kittitas Street). The City study indicated that updating the signal timing would result in a slight increase in travel speeds along the couplet and would greatly reduce the number of vehicles needing to stop at signals along the corridor. This is accomplished by improving the "green band" on the one-way couplet. Reducing the proportion of vehicles that need to stop at red lights provides for more consistent travel times and also improves safety. Implementation of the signal timing revisions is a near-term priority to support increase freight use of the corridor.

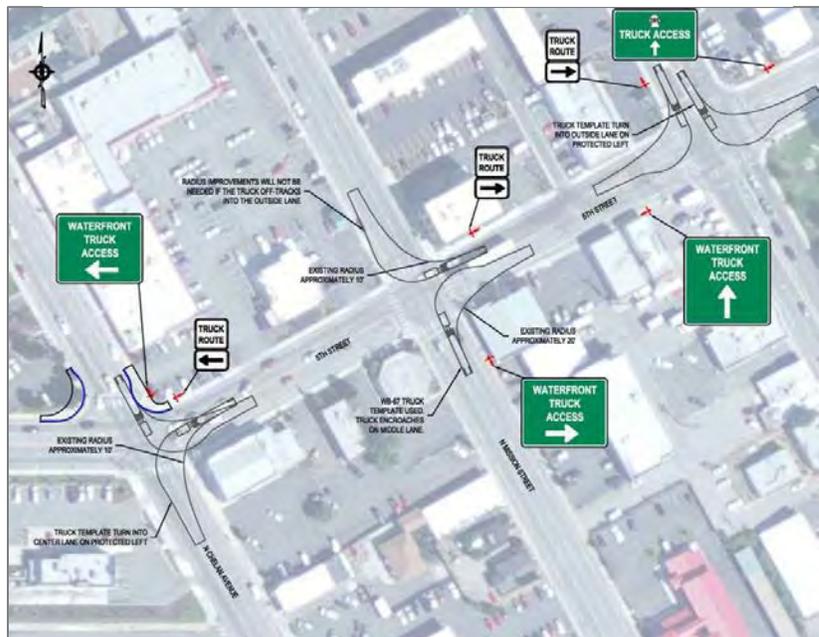
9th Street (project 17). Several improvement strategies were evaluated for 9th Street between Wenatchee Avenue and Chelan Avenue. These include modifying curb radii and converting the existing four lanes to three lanes to accommodate truck turning needs. Based on the relatively low volume of large trucks and the associated impacts on adjacent properties, as well as costs, no physical improvements are recommended on this segment of 9th Street as part of the Freight Study. Additional truck signing is, however, identified to/from the couplet and the waterfront.



5th Street (project 18A/ 18B). The Freight Study recommends converting 5th Street from four lanes to three lanes between

The Freight Study recommends converting 5th Street in Wenatchee from four lanes to three lanes between Chelan Avenue and Wenatchee Avenue to accommodate turn movements of large trucks.

Wenatchee Avenue and Chelan Avenue (project 18A). Unlike 9th Street, 5th Street carries significant volume of trucks because of its grade-separation with the railroad east of Wenatchee Avenue. Restriping the two blocks between Chelan Avenue and Wenatchee Avenue to one eastbound lane, two westbound lanes, and bicycle lanes on both sides of the roadway provides additional turning width for trucks entering and exiting 5th Street. This greatly reduces the potential impacts of truck off-tracking into an adjacent travel lane on 5th Street. The SR 285 Safety Study prepared for the City of Wenatchee shows that a 3-lane configuration will function without a noticeable loss in level of service at the three affected traffic signal locations on 5th Street. The proposed re-timing of the traffic signals along the Chelan Avenue/ Mission Street couplet (project 16) will allow more green time of



As an alternative, large trucks turning to/from on 5th Street would be allowed to continue to off-track into adjacent travel lanes.

the 5th Street approaches to these intersections which will reduce the potential for traffic queues to block adjacent intersections even with the lane reduction.

Even with the proposed changes, not all WB-67 truck turning movements at this intersection are possible without encroachment into some of the conflicting lanes. This is especially the case for the left turn from southbound Chelan Avenue to eastbound 5th Street. The TAC felt that this will not be a high volume truck movement and that infrequent encroachment is acceptable at this time.

The intersection of 5th Street and Mission Street also does not fully accommodate the WB-67 design vehicle with the proposed improvements. Restriping the block between Mission Street and Wenatchee Avenue will allow the design vehicle to make a right turn from Mission Street onto 5th Street by providing a single driving and bicycle lane in each direction and a center turn lane. The center turn lane could have a buffer at the intersection that would allow the truck to off-track. With this concept, the southeast corner will not need any radius alterations. The north-to-east right turn movement will require large trucks to encroach into the center northbound travel lane on Mission Street. This turn radius could be improved by shifting the travel lanes on Mission Street to the west; however, this will reduce the radius for trucks making the north-to-west left-turn movement. In order to modify the southeast corner to fully accommodate large trucks making the north-to-east right turn movement would require taking out the existing building at that location. The City should monitor the traffic operations and safety at this intersection to determine if modifications should be made over time. Some encroachment on the center through lane on Mission Street also will be needed to make the west-to-north right-turn movement. This is not expected to be a large volume movement for the large truck because they will likely turn north at Wenatchee Avenue. The northeast quadrant could include slight radius improvements. Alternatively, allowing trucks to off-track into the far outside lane (westernmost lane) on northbound Mission Street could avoid radius improvements in the northeast quadrant. The plan allows the off-tracking into the far lane, but the City may consider the radius improvements as the project is designed and implemented.

Prior to implementation, the City of Wenatchee would need to further explore the restriping this section of 5th Street from four lanes to three lanes as shown on project 18A. Project 18B maintains the existing four lane cross section. The concept diagram in Appendix C for project 18B shows the additional off-tracking of trucks under this configuration. The largest impact is for the north-to-east right turn from Mission Street to 5th Street. Traffic operations and safety at these intersections and roadway segments should be monitored to identify if additional issues develop with the additional off-tracking under this interim configuration.

2nd Street (project 19A/ 19B). The Freight Study examined the three intersections along 2nd Street at Chelan Avenue, Mission Street, and Wenatchee Avenue. 2nd Street will be the location of the north truck diverter on Wenatchee Avenue. With the new diverter, southbound trucks on Wenatchee Avenue will be required to turn eastbound or westbound onto 2nd Street. The south-to-east left turn requires off-tracking into the westbound lane on 2nd Street. This is anticipated to be a fairly low volume of large trucks because 2nd Street primarily serves parking lots for the convention center and access to the Apple Loop Trail. To better accommodate the southbound to westbound right turn the curb radius in the northwest corner needs to be increased which will encroach into the adjacent property owner's property. Reconfiguring the lanes on Wenatchee Avenue will reduce the level of encroachment into the adjacent property (project 19A). This reconfiguration will include restriping the left turn lane into a through and left lane, making the current through lane a right turn lane, and changing the current right turn lane into a striped or raised (mountable) truck apron for off-tracking.

From there, truck route signage guides trucks to turn north on Mission Street or turn south on Chelan Avenue. In both cases, expanding the curb radii was evaluated to reduce off-tracking which would require additional right of way. To expand the curb on the northeast quadrant of 2nd Street and Mission Street, the signal pole and fire hydrant will need relocation. In addition, the backside of the new sidewalk will require a barrier curb to accommodate the

grade change. Likewise, the southeast corner of 2nd Street and Chelan Avenue will require relocation of the signal pole, fire hydrant, and signal controller cabinet. This improvement will require a retaining wall due to the grade change. Alternatively, radius modifications or right of way impacts can be avoided at both the Chelan Avenue and Mission Street intersections by allowing the trucks to off-track into the outside lane. This is the recommendation for the base Freight Study. Truck volumes and impacts should be monitored, and if appropriate, one or more of these curb radii improvements could be considered in the future.

As previously noted for project 18A, truck route signs on southbound Wenatchee Avenue will first direct trucks to 5th Street to connect with SR 285. Prior to constructing the south-to-west right turn radius improvement shown on project 19A, the Freight Study recommends restricting trucks from making that right turn due to off-tracking into the eastbound traffic lanes on 2nd Street (or driving up and over the sidewalk). Signs would be installed to direct trucks to the southbound left-turn lane to turn east onto 2nd Street and connect with Columbia Street. This option should be monitored and could become the long-term freight route if no problems develop, reducing the need for the larger turn radius (project 19A).

Orondo Avenue (project 20A/ 20B/ 20C). Orondo Avenue is a unique road on the freight network in that it is both a primary pedestrian route as well as part of the Supporting Freight System. Orondo Avenue also serves several LINK Transit routes. It connects to the center of downtown Wenatchee. With the addition of truck diverters on Wenatchee Avenue, Orondo Street will be the primary freight route for downtown delivery trucks.

Existing infrastructure, including buildings, are right up to the back edge of sidewalk. Potential improvement concepts on this portion of Orondo Avenue focused on re-channelization and not increasing intersection radius returns. This route also overlaps with the SR 285 Safety Study, which recommends curb bulbs on the northwest, southwest and southeast corners of the Mission Street/Orondo Avenue intersection. The installation of curb bulbs will reduce pedestrian crossing distances.

The Freight Study recommends restriping the existing four-lane Orondo Avenue into a three-lane roadway (project 20A) as a way to provide increased turn radii for large trucks. This could include one lane in each direction, a center turn lane, bike lanes on both sides of the street, and parallel parking along the south side between Chelan Avenue and Wenatchee Avenue. Striping a buffer in the center lane at the Mission Street intersection would allow trucks to off-track as they make the north-to-east right turn to continue to the waterfront. Curb bulbs currently exist at the Chelan Avenue/Orondo Avenue intersection and due to this, the left turn from Chelan Avenue to Orondo Avenue will not accommodate the design vehicle WB-67. The ultimate design/configuration of the roadway also should address bus stops on Orondo Avenue and bus turn radii. All other movements from Orondo Avenue to either Chelan Avenue or Mission Street will be required to off-track into outside lanes of the couplet.

An alternative to the recommended configuration for this section of Orondo Avenue would include angle parking on the south side of the street with a striped bike lane in the westbound (uphill) direction. Bicyclists traveling in the eastbound (downhill) direction would share the traffic lane.

Similar to 5th Street, the City of Wenatchee will need to further explore converting Orondo Avenue from four lanes to three lanes. Project concept 20C (Appendix C) illustrates the WB-67 truck turn template under the existing configuration. The north-to-east right turn movement from Mission Street to Orondo Avenue shows a significant off-tracking into the westbound travel lane. Similar to the project 18 discussion for 5th Street, it is recommended that traffic operations and safety at these intersections and roadway segments be monitored to identify if issues develop with the additional off-tracking under the existing configuration.

Kittitas Street (project 21). The Freight Study reviewed the need for improved turn radii at the intersections of Kittitas Street with Chelan Avenue, Mission Street, and Wenatchee

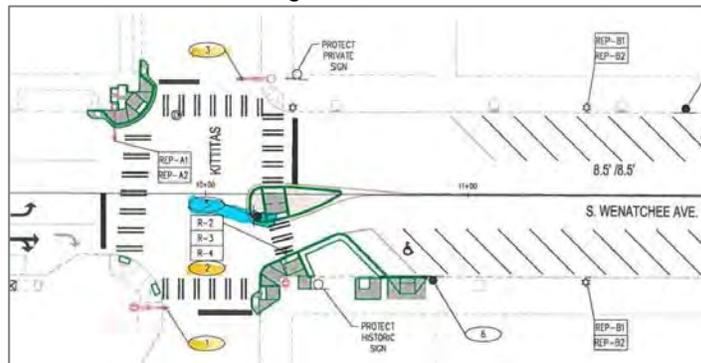
Avenue to support the redirecting truck drivers away from downtown Wenatchee Avenue. The Kittitas Street and Wenatchee Avenue intersection will require radius improvements at the southwest corner of the intersection. This will require some right of way acquisition and relocation of the existing signal pole and light pole. The “truck diverter” planned on the north side of the intersection will restrict trucks from continuing north on Wenatchee Avenue. Signs also will be installed to restrict right turns by northbound trucks onto eastbound Kittitas Street due to the tight radius.

The Freight Study evaluated options for widening the northeast curb return at Mission Street/ Kittitas Street to better accommodate trucks turning right onto Mission Street. This would require a retaining wall and right of way acquisition that will eliminate parking for the adjacent property. These improvements and impacts can be avoided if trucks are allowed to off-track into the outside lanes on northbound Mission Street. This TAC identified this as an appropriate solution for the initial Freight Plan because the potential conflicts for operations and safety appear to be very minimal. Other, more significant, turn radii improvements can be considered if specific issues develop with the off-tracking onto Mission Street.

Improvements to Kittitas Street and Chelan Avenue would require enlarging the southeast curb radius to eliminate off-tracking. This change requires a retaining wall and relocation of a light pole. Like the Mission Street intersection, the curb radius improvement can be avoided if the truck is allowed to off-track into the outside lane. The TAC agreed that the volume of large trucks making the west-to-south left turns will likely be relative low and therefore, no radius improvements are recommended in the Freight Plan at this time. Trucks turning left from Chelan Avenue onto Kittitas Street may have issues entering the traffic stream on Chelan Avenue (especially if off-tracking into other lanes is necessary); for this reason, the Freight Study recommends installing a new traffic signal at this intersection, when warrants are met.

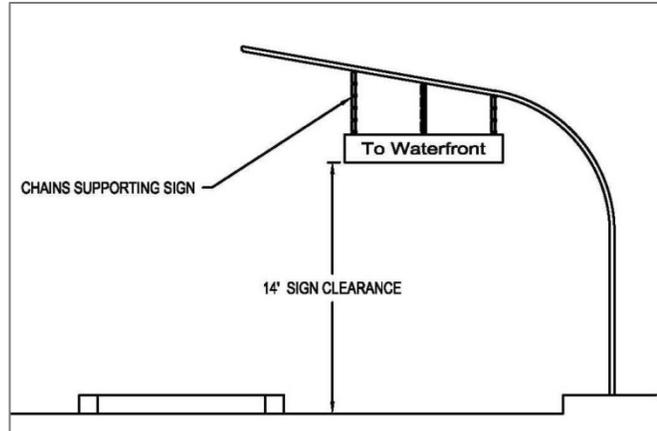
Downtown Wenatchee Avenue (project 22). The City of Wenatchee is planning to install “truck diverters” on Wenatchee Avenue to restrict through truck travel in downtown

Wenatchee. The City is in the process of designing the diverters which will include some type of median that will not accommodate large trucks continuing onto Wenatchee Avenue in downtown. The diverter for southbound travel on Wenatchee Avenue will be at 2nd Street; the northbound diverter will be at Kittitas Street. Truck route signing and improvements along other streets in the area are recommended to direct trucks to appropriate freight routes such as the SR 285 one-way couplet.



Concept for truck diverter for restricting northbound through truck traffic on Wenatchee Avenue approaching Kittitas Street

Riverside Drive/Worthen Street (project 23). Riverside Drive was not designed to accommodate large trucks; it includes two smaller roundabouts that trucks cannot readily traverse. The TAC identified issues with larger trucks inadvertently using the roadway getting stuck on or otherwise impacting the small roundabouts. To help address this issue a simple set of hanging signs, similar to those used as height restrictions in parking garages, be installed. One would be installed on Riverside Drive just south of 9th Street. The other could be installed on 5th Street just east of Piere Street. These would be supported by revised signs as previously discussed.



SR 285 Couplet South Segment (project 24). During the course of the development of the Freight Study, the City of Wenatchee designed and implemented simple improvements on Chelan Avenue and Mission Street south of downtown Wenatchee. These included restriping southbound Chelan Avenue to smooth the lane transition as the couplet streets join together at Chehalis Street. The restriping is intended to reduce off-tracking into adjacent lanes and help reduce the associated safety and operational issues. The City also installed simple dividers that restrict left turns along Mission Street between Spokane Street and Peachey Street. This left-turn restriction affects relatively few vehicles and helps with the southbound lane transition from the one-way Chelan Avenue to the two-way, five-lane Mission Street.



The City of Wenatchee has modified the Chelan Avenue connection with Mission Street to reduce the impacts of off-tracking of large trucks.

S Wenatchee Avenue and Columbia Street (project 25). Alternatives for improvements at this location considered widening the southeast corner of Thurston Street and S Wenatchee Avenue or restriping Thurston Street to include two eastbound lanes. Widening the curb radius will affect the existing property by eliminating parking. However, it would allow large trucks to turn east onto Thurston Street while maintaining the current left-turn lane on Thurston Street approaching S Wenatchee Avenue and Columbia Street. The restriping alternative does not require any changes to the existing curbs or sidewalks; instead it eliminates the westbound-to-southbound left turn lane. Either improvement will provide easier access to the waterfront/downtown freight routes. The Freight Study recommends the restriping option be implemented and monitored prior to considering more expensive improvements.

City of East Wenatchee

The Freight Study also identified additional freight-related improvements in East Wenatchee. These improvements are primarily limited to modifying intersections to provide traffic signals to facilitate left- turn movements and thereby reducing delays and improving safety along designated freight routes. The intersection improvements are compatible with the recent completed WSDOT improvements at the east end of the George Sellar Bridge and are included in the City of East Wenatchee’s 2014-2019 Transportation Improvement Program.

9th Street NE (project 26). A limited volume of large trucks use 9th Street NE between SR 28 and Baker Avenue or Eastmont Avenue. However, 9th Street NE does provide access for some truck deliveries to the downtown East Wenatchee business district and Wenatchee Valley Mall. The City of East Wenatchee has programmed replacing the existing all-way stop at 9th Street NE/Valley Mall Parkway. This would eliminate the need for all trucks entering the intersection to stop, thereby reducing delays. The City also is planning to convert Valley Mall Parkway from four lanes to three lanes between 6th Street NE and SR 28. This would help freight by improving safety through provision of left-turn lanes at the intersection.

3rd Street SE (project 27). As previously noted, the Freight Study identifies 3rd Street SE east of SR 28 as a Freight Route. In order to better serve left turn movements by trucks from 3rd Street SE to the Rock Island Road/Valley Mall Parkway installation of a traffic signal is recommended, when warranted. Similarly, a traffic signal should be installed at the intersection of 3rd Street SE/Highline Drive, when warranted. These signals are included in the City of East Wenatchee Transportation Improvement Program for construction in 2019.

Highline Drive (project 28)
Highline Drive serves as a freight route between 3rd Street SE and the Eastmont Avenue/Grant Road intersection. Most of this segment of roadway includes three travel lanes with sidewalks on both sides. Although not critical for freight movement, the Freight Study includes a project to construct missing sections of sidewalk on the west side of the roadway. This type of improvement will provide a more consistent look and feel for this new freight route. The City of East Wenatchee’s 2014-2019 Transportation Improvement Program includes a project to add sidewalks to a short segment of the roadway. As adjacent properties are developed it is anticipated other missing segments of sidewalks will be constructed.



Traffic signals are recommended to make it easier for trucks to make left turns to/from 3rd Street SE at Rock Island road and Highline Drive.

Plan Implementation

Implementing the Freight Study recommendations will not occur overnight. A systematic process will help assure that the signing plan and freight-related improvements occur together so truck drivers (and other drivers) do not get confused. In most instances, it is recommended that proposed freight-system improvements needed to facilitate truck movements be constructed in advance or, or concurrently prior to installing the related truck route signs. This will help avoid forcing trucks onto existing roadways that cannot safely accommodate large vehicles. As improvement projects are being designed and implemented, it also will be important to seek additional input from affected freight user groups. This will help build support for the plan and associated improvements. The freight user groups also can provide insights into design features based on their experiences. It also is recommended that the freight route designations shown in Figures 4A and 4B be made available to freight users in the region so the desired routes become the routes of choice and habit.

The Freight Study does not commit or require local or state agencies to implement the recommended project. It provides a regional perspective of the priorities for freight mobility in the Greater Wenatchee area. It will be used by WVTC in updating the Metropolitan Transportation Plan (MTP) and in prioritizing projects through transportation funding programs that it administers.

Priorities

The large regional freight related projects such as the Confluence Parkway, US 2/97 interchanges, and SR 28 (Sunset Highway) corridor will require many years to fund and implement. Priorities for these projects will be key parts of the updates of the Metropolitan Transportation Plan (MTP) for the greater Wenatchee area. Freight traveling into, out of, and through the region will benefit greatly from any and all of these projects, as discussed above.

The priorities for the local freight system improvements identified in Table 3 are generally independent from the regional improvements. The exception is the identified project at N Wenatchee Avenue/Hawley Street. This project may not be needed with the construction of the Confluence Parkway. Furthermore, the intersection improvement may be incorporated with the previously identified project to grade-separate Hawley Street and the railroad tracks. The larger, grade-separation Hawley Street project also would better address bicycle and pedestrian system connections as identified in the *North Wenatchee Transportation Master Plan*.

The other local area freight improvements identified in the Freight Study have been grouped into potential phases, as discussed below.

Phase 1. The City of Wenatchee is planning to construct the downtown truck diverters on Wenatchee Avenue in 2014. Critical to the success of the diverters is the signing plan directing truck drivers to the Chelan Avenue/Mission Street corridor. These include the signs to direct southbound trucks to use the curb lane on N Wenatchee Avenue and Miller Street to access Chelan Avenue. The truck route guide signs on the Chelan Avenue and Mission Street also are needed at the time the diverters are installed, otherwise truck drivers may use other local streets that cannot accommodate them or which require more circuitous travel. Truck counts should be conducted after the signs have been installed for a few months to confirm their effectiveness.

The City also should move forward with updating the signal timing plans for the Chelan Avenue/Mission Street one-way couplet signal system to support the revised freight route and signing plan. The City and WSDOT also could evaluate locations for minor lane widening/restriping along the couplet to provide more shy distance for large trucks and buses. This

should help improve the truck driver's experiences along the corridor making it a more attractive route which is important to successful implementation of the overall plan. The Miller Street intersection improvements also should move forward as part of the first phase.

Other key signs needed during Phase 1 will be those on Wenatchee Avenue directing trucks to the east-west cross streets to access the SR 285 couplet. Truck travel patterns on Wenatchee Avenue approaching downtown also should be monitored to see if any modifications are needed to the Freight Sign Plan.



It is also recommended that freight-related improvements on Kittitas Street and 2nd Street be in place concurrent with the installation of diverters. Without the south-to-west right turn restriction (project 18B) or the curb radius improvements (project 18A) it will likely be very difficult for large trucks to effectively navigate the revised freight route to connect with the couplet or to the waterfront.

The two proposed traffic signals along 3rd Street SE are the highest priorities for implementing the Freight Study in East Wenatchee. The ability for truck drivers to make the needed left turns onto Rock Island Road or Highline Drive is critical to the success of the plan in the area. Prior to installation of the signals, traffic signal warrants should be evaluated.

Phase 2. Following the Phase 1 projects, the Freight Study recommends that the City of Wenatchee move forward with the converting 5th Street and Orondo Avenue from four to three lanes to better facilitate truck turning movements at the couplet. The three-lane modifications along 5th Street are most important since it is the key east-west Supporting Freight System route serving the Wenatchee waterfront. This project will require additional design studies, as well as public involvement, in order to finalize the design trade-offs between freight mobility and other travel modes in the corridor.

Similarly, design studies and public involvement activities should be initiated for the Orondo Avenue project. This will help define the ultimate cross section for the roadway which will be the primary route for truck deliveries to downtown, as well as serving as a primary pedestrian corridor and bicycle route.

Timing for Other Freight Improvements. The other identified local freight system improvements identified in Table 3 are fairly independent from other improvements. They can be implemented as funds become available. Many of these projects are very inexpensive requiring restriping, signage, and/or minor physical modifications.

The City of Wenatchee has already implemented the SR 285 South Segment project (project 24). The Riverside Drive and Thurston Street improvements can be implemented at any time; freight signs also should be implemented at the same time or prior to these projects.

The signal and other improvements at 9th Street NE/Valley Mall Parkway in East Wenatchee are not critical to the freight plan. They can be implemented as the City obtains funding.

Funding

The large regional freight supporting projects will require significant funding from state and federal programs. These will be identified in the fiscally constrained Metropolitan Transportation Plan.

Funding for the other projects will likely be the responsibility of the local agencies. This will include seeking grant or other outside funding. Because many of the projects are included as high priorities for freight mobility and safety, the grant applications for these projects can be identified as supporting regional priorities. WVTC also leads the regional prioritization for several grant and funding programs. These freight projects could be included in one or more of these programs.

Distribution of Freight Route Designations

To facilitate and encourage use of the designated freight route system in the greater Wenatchee area, it is important to get the information out to the freight community. As a priority, the Freight Study recommends that the Freight Route Designations (Figures 4A and 4B) be distributed to local and regional freight providers. This will make it simpler to locate than having the users read through the full report. These can be distributed as copies of the maps with a cover letter, or can be emailed to the businesses. In addition, these can be posted as separate hyperlinks on WVTC's web page, making it simple for freight users to access in the future as they need. It is also recommended that links to the maps be available on the web sites of the local cities, counties, and port districts.

The Recommended Freight Signs (Figure 6) also can be made available to freight users to consider in developing or revising their truck routing in the region. While not all of the signs will be installed immediately, this will provide insights to the overall plan so the freight users can be proactive instead of reactive.

As noted above, outreach to the freight users also should be considered as the various improvement projects are moving toward funding and construction. This should help encourage changes in their truck routing as they see improvements that help them use the desired routes.

The final Freight Study also will be available for review via the WVTC web site or at WVTC's Wenatchee office. This will provide the additional background on how the routes were designated, the signing plan, and freight related improvement projects.

