I-82 / Yakima Avenue / Terrace Heights Drive Interchange

Interchange Justification Report

Yakima County, WA
March 2017

Prepared for:
Yakima County & City of Yakima

Prepared by:
LOCHNER

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INTERCHANGE JUSTIFICATION REPORT

for

I-82/Yakima Avenue/Terrace Heights Drive Interchange
Yakima County, Washington

Prepared for: Yakima County & City of Yakima

In association with

FHWA & WSDOT

Prepared by: H.W. Lochner, Inc.

JANUARY 2017

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INTERCHANGE JUSTIFICATION REPORT

I-82/Yakima Avenue/Terrace Heights Drive Interchange
MP 31.40 to MP 34.77

This **Interchange Justification Report** has been prepared under my direct supervision, in accordance with Chapter 18.43 RCW and appropriate Washington State Department of Transportation manuals.

IJR Engineer of Record

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Date: 1/23 2017

Traffic Analysis Engineer

By: _____ P.E.
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By: _____ P.E.
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WSDOT Approval

By: _____ P.E.
Scott Zeller PE - Assistant State Design Engineer
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FHWA Approval

By: _____ ~~P.E.~~
Don Petersen – FHWA Safety & Design Engineer
Date: 2/22/2017 2017

EXECUTIVE COMMITTEE ACCEPTANCE

Yakima County

Signature

Title: County Commissioner

Date: 01/25/17

WSDOT – South Central Region

Signature Todd V. Trepanier

Title: Regional Administrator

Date: 2/2/17

City of Yakima

Signature

Title: City Council

Date:

Federal Highway Administration

Signature

Title: Division Safety/Design Engineer

Date: 2/22/2017

WSDOT – Access and Hearing

Signature

Title: Assistant State Design Engineer

Date: 2/9/17

Yakima Valley Council of Governments

Signature

Title: Executive Director

Date: 30 Jan., 2017

STAKEHOLDER COMMITTEE ACCEPTANCE

Yakima County

Signature

Title: County Engineer

Date: 1/25/17

WSDOT – South Central Region

Signature

Title: Assistant Regional Administrator

W. Brian White

Date: 1/31/17

City of Yakima

Signature

Title: Community Development Director

Date: 1-25-17

Federal Highway Administration

Signature

Title: SC & SW Area Engineer

Date: 2/21/2017

WSDOT – Access and Hearing

Signature

Title: Development Services & Access Manager

Date: 2/9/2017

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INTERCHANGE JUSTIFICATION REPORT

I-82/Yakima Avenue/Terrace Heights Drive Interchange
MP 31.40 to MP 34.77

Table of Contents

Executive Summary

Policy Point 1 Need for the Access Point Revision

Policy Point 2 Reasonable Alternatives

Policy Point 3 Operational and Collision Analyses

Policy Point 4 Access Connections and Design

Policy Point 5 Land Use and Transportation Plans

Policy Point 6 Future Interchanges

Policy Point 7 Coordination

Policy Point 8 Environmental Process

Appendices

- A Methods & Assumptions Document
- B Summary of November 14-15, 2016 IJR Workshop
- C Operation Analysis Summaries
- D VISSIM Summary
- E Explanation of the CACs, CALs & IALs
- F Collision Summaries by Interchanges
- G ISTAe Collision Analysis Summaries
- H Excerpts for Local Planning Documents
- I Design Documentation
- J Conceptual Cost Estimates for Proposed Alternatives
- K Practical Solutions Approach

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EXECUTIVE SUMMARY

How was this IJR developed?

The development of this I-82 / Yakima Avenue Interchange Justification Report (IJR) was started in September 2011 by Yakima County and the City of Yakima in conjunction with the Washington State Department of Transportation (WSDOT), the Federal Highway Administration (FHWA) and the Yakima Valley Council of Governments (YVCOG) to address traffic concerns at the I-82/Yakima Avenue Interchange and along I-82 and Yakima Avenue.

During 2011, the project team developed a Methods and Assumptions Document, analyzed base traffic conditions in the corridor, developed traffic models based on previous YVCOG and WSDOT studies, and identified potential local improvements that may improve traffic congestion. This information was presented to a Stakeholder Committee[1] (the IJR Technical Group) during meetings in October 2011 and January 2012.

Between January and September 2012, the project team analyzed the base 2010, 2015 and 2035 traffic conditions in the corridor, documented congestion issues along I-82 and at the Yakima Avenue Interchange, analyzed local improvement alternative conditions in 2035, and responded to comments and analysis revisions suggested by stakeholders. This information was presented to the Stakeholder Committee meetings in February, July and September 2012. The Stakeholders agreed that that these local improvements would not be sufficient by themselves to relieve current and anticipated congestion issues at the I-82/Yakima Avenue Interchange.

Between October 2012 and March 2013, the project team and Stakeholders identified three Build Alternatives, prepared model forecasts and conducted preliminary traffic analysis. Based on the results of Build Alternative 2 with collector/distributor (C/D) roads, traffic on I-82 was reduced so that three lanes on I-82 in the vicinity of the C/D roads was not required. It was also concluded that design of the C/D roads should allow for a future widening of I-82. Based on these results the Stakeholders developed several variations to the proposed alternatives. It was decided that three modified Build Alternatives should be analyzed. These alternatives included Alternative 2B and 2C with C/D roads and Alternative 3A with a new connector under I-82 with roundabouts connecting the west bound on ramp to Fair Avenue. These results were discussed with the Stakeholders during the November 2012, January 2013 and March 2013 meetings.

Between April and December 2013, the project team and stakeholders analyzed and evaluated the three alternatives. A Stakeholder meeting was held in April 2013, to review evaluation procedures and traffic analysis results. An additional evaluation meeting was held in May 2013, to review each alternative as developed by the Stakeholder Committee. It was decided that the alternatives would be

[1] The Stakeholder Committee includes a representative from FHWA, one from WSDOT Headquarters, one from the WSDOT South Central Region, one each from Yakima County and the City of Yakima, and one from the YVCOG.

presented at a public open house scheduled for October 2013. Based on the comments received at the open house, the alternatives were modified and re-analyzed. The results of the evaluation and community comments were presented to the Stakeholders and they decided that two alternatives would receive more detailed analysis and conceptual design. These alternatives included a Modified 2C Alternative with C/D roads and a Modified 3A Alternative with a connector road under I-82 with roundabouts at the terminals.

Between January and October 2014, the analysis and evaluation of the selected alternatives were completed and the initial draft of the I-82/Yakima Avenue Interchange IJR was prepared and distributed to the Stakeholders for review.

Between October 2014 and March 2015, the Stakeholders reviewed and commented on the draft IJR. The project team then modified the draft IJR and prepared a second draft which was distributed in March 2015. Based on additional Stakeholder comments received, the project team revised the IJR and resubmitted a third draft in June 2015.

Between June 2015 and September 2016, the project team and Stakeholders held several conference calls to discuss unresolved issues, a revised evaluation process, more detailed cost estimates, and modeling issues. Based on these discussions, a revised draft IJR was prepared and submitted for review in September 2016.

In November 2016, WSDOT facilitated an IJR Workshop for the key Stakeholders during which a Modified 2C Alternative was advanced as the preferred alternative. Based on the results and comments received at the IJR Workshop, a final draft of the IJR was prepared for distribution in January 2017.

What is the project history?

Due to growth in the Yakima urban area and resultant congestion, in the early 1990s a comprehensive evaluation of the I-82/Yakima Interchange was completed. That evaluation recommended various improvements to be constructed in stages, many of which were completed, including:

- Construction of the Fair Avenue Extension between the Lincoln Avenue/Martin Luther King Jr. Boulevard (formerly B Street) Couplet and Spruce Street as a three lane roadway with an undercrossing of Yakima Avenue and the westbound I-82 flyover off-ramp to westbound Yakima Avenue;
- Widening of Fair Avenue to a three-lane section between Spruce Avenue and Pacific Avenue;
- Construction of the Lincoln Avenue/Martin Luther King Jr. Boulevard Couplet;
- Extension of the westbound flyover at Yakima Avenue to pass over the widened Fair Avenue;
- Widening Yakima Avenue to four-lanes with a median or left-turn lane;
- Construction of the J Ramp connecting Fair Avenue with Yakima Avenue;
- Reconstruction of ramp terminals to allow for a wider Yakima Avenue;
- Construction of a temporary I-82 eastbound off-ramp to Fair Avenue;

- Construction of a new I-82 eastbound on-ramp from Fair Avenue; and
- Construction of a new access road between Pitcher Street and the existing Frontage Road south of Yakima Avenue.

However, many elements of the recommended 'ultimate build out plan' have not been implemented, including additional ramps to and from westbound I-82.

In the late 1990's, growth continued in the urban area, east of I-82 and the Yakima River, in anticipation of which Yakima County has implemented several projects to improve traffic operations and flow, including:

- Reconstructing Keys Road from SR 24 to Gun Club Road;
- Reconstructing Keys Road from Gun Club Road to Scenic Road;
- Reconstructing Roza Hill Drive from Maple Avenue to N. 57th Street;
- Constructing sidewalks along 41st Street from Mountain Avenue to Kroum Road; and
- Constructing University Parkway from Terrace Heights Drive to Keys Road.

In addition, the City of Yakima also made improvements to the local street system west of I-82, including:

- Constructing the Lincoln Avenue/Martin Luther King Jr. Boulevard/Fair Avenue Roundabout;
- Constructing a grade separation of Lincoln Avenue and the BNSF railroad;
- Constructing a grade separation of Martin Luther King Jr. Boulevard and the BNSF railroad; and
- Undergrounding the irrigation canal along H Street in anticipation of a future street widening project.

Despite these significant investments, increased traffic levels along Yakima Avenue/Terrace Heights Drive is resulting in a bottleneck and limiting area growth, with failing level-of-service issues at the I-82/Yakima Avenue Interchange.

Why is the Proposed Improvement Needed?

As East-West traffic in the greater Yakima area continues to grow, trips accessing I-82 are funneled into two interchanges: Yakima Avenue and Nob Hill Boulevard. These two interchange serve a variety of trip purposes including inter-regional, intra-state and local. These demands are creating safety and operational issues during peak periods at the Yakima Avenue Interchange, including the following design year (2035) impacts:

- I-82, between the Nob Hill Boulevard Interchange and the Yakima Avenue Interchange will operate at LOS E in both directions;
- The WB off-ramp at the Yakima Avenue Interchange will operate at LOS E;
- The EB left from Yakima Avenue to the WB on-ramp will operate at LOS F;
- The NB left onto Yakima Avenue from the WB off-ramp will operate at LOS E;
- The SB left from the EB off-ramp to Yakima Avenue will operate at LOS F;

- The WB left from Yakima Avenue to the EB on-ramp will operate at LOS F;
- The NB left and right turns from the Yakima Avenue J-ramp to the Fair Avenue loop connector will operate at LOS F;
- Those levels of services will cause back-ups onto the I-82 mainline; and
- There is an average of 96 collisions per year, including I-82 mainline, ramps and cross street collisions; which is above the statewide and South Central Region averages for urban areas.

As growth in the area continues, I-82 and Yakima Avenue are expected to be over capacity within the design horizon year, creating a near term growth management concurrency issue impacting economic development opportunities for Yakima County and the City of Yakima.

What process was used to evaluate the Proposed Improvements?

The development of an evaluation process was conducted at a November 2016 IJR Workshop attended by FHWA, WSDOT, Yakima County and the City of Yakima. During this workshop, the Stakeholder Committee identified evaluation criteria that were most important to each agency. These criteria were then grouped according to their common goal. These evaluation goals and criteria are listed below:

GOAL	**Evaluation Criteria**
Mobility - Interstate	• Preserve space for future widening of I-82 to three lanes in each direction • Maintain level of service/Maintain Interstate mobility
Mobility - Local System	• Yakima Avenue / Terrace Heights Corridor • Mobility to arterial street system/Improvement of local street system • Alternative route providing redundancy for the Terrace Heights Bridge • Yakima Regional Connectivity • System relief (future connection to Fruitvale Boulevard)
Mobility - Multimodal	• Maximizes multimodal opportunities
Safety	• Safety (Maintains/Decreases Fatalities & Serious Injury Collisions) • Safety (Maintains/Decreases total collisions) • Improve safety at Merge /Diverge locations
Economic Vitality	• Enhances direct access to mill site • Enable redevelopment
Environment	• Minimize negative impacts to riparian environment
Constructability / Maintenance	• Ease of constructability • Easily Maintained
Community Support	• Public Support
Cost	• Best value for investment • Stay within budget

During the November 2016 IJR Workshop, the Stakeholder Committee evaluated the Build Alternatives as compared to the No Build Alternative using these evaluation criteria.

What are the Key Findings from the IJR?

The purpose of the Interchange Justification Report (IJR) is to identify operational issues at the I-82/Yakima Interchange and to assess the impacts associated with proposed modifications in accordance with FHWA regulations. Overall, the IJR identified problems at the Yakima Avenue Interchange and analyzed solutions that improve traffic operations and safety for I-82, support the adopted regional and local land use plans, encourage regional economic vitality, and enhance the overall mobility of users in the study area.

Key findings of the analyses, conducted as part of this IJR, show the following:

- Policy Point 1: Need for Access Point Revision
    - The existing transportation system cannot provide adequate access nor can it satisfactorily accommodate the design year traffic demands; and
    - Non-interstate improvements added to the existing transportation system, while relieving some congestion and improving capacity, still fail to adequately handle the design year traffic.
- Policy Point 2: Reasonable Alternatives
    - Reasonable alternatives were developed and initially analyzed using a practical solutions approach.
    - Two alternatives were recommended for further evaluation. These alternatives were:
        - *A Modified 2C - Collector/Distributor Alternative*
        - *A Modified 3A - Roundabout Alternative connected by a new road under I-82*.
- Policy Point 3: Operational and Collision Analysis
    - Results of the operational and collision analyses together with a preliminary environmental review and a geometrical analysis were used in a performance based decision process with the baseline, contextual and cost metrics previously discussed.
    - Based on the performance evaluation, the Stakeholder Committee recommended that the *Modified 2C - Collector/Distributor Alternative with* auxiliary lanes be carried forward into the NEPA environmental process. This alternative will:
        - Combine access to a new East-West Corridor, Yakima Avenue and Fair Avenue with the collector/distributor roadways;
        - Reduce the number of access points from five to four;
        - Separate local destined traffic from more regional traffic;

        - Improve traffic and safety operations by reducing delays at the signalized intersections and reduce vehicle back-ups on I-82 ramps; and
        - Is supported by City and County agencies.
    - These improvements will improve traffic operations on I-82, reduce the collision rate along I-82 in the project vicinity, improve regional connectivity, and meet the project purpose.

- Policy Point 4: Access Connection and Design
    - The proposed interchange improvements will maintain and improve connections to and from public roads to westbound and eastbound I-82, and meet the criteria of connecting with a public road;
    - The proposed improvements meet design standards with selected design variations, consistent with practical design guidance; and
    - Shoulder deviations along portions of the C/D roads and eastbound Yakima Avenue off-ramp at the existing flyover to Yakima Avenue are anticipated for this project.
- Policy Point 5: Consistent with Land Use and Transportation Plans
    - The proposed interchange improvements at Yakima Avenue and I-82 are consistent with regional, county, and local plans; and
    - The proposed interchange improvements at Yakima Avenue and I-82 are consistent with and would support the land use and development plans for the area.
- Policy Point 6: Consistent with Future Interchanges
    - The proposed interchange improvements at Yakima Avenue and I-82 are consistent with the current WSDOT *2007-2026 Highway System Plan*; and
    - The proposed interchange improvements are designed to allow for an eventual widening of I-82 to a six-lane facility.
- Policy Point 7: Coordination
    - The I-82/ Yakima Avenue Interchange improvements are funded by the state legislature as part of The Connecting Washington program that includes $64.413 million for improvements to this stretch of I-82 and both the City and County have committed to another $5 million each to make the project a success.
    - The East-West Corridor project is funded by Yakima County and the City of Yakima. It is a parallel arterial to Yakima Avenue, and proposed as part of the overall interchange improvement, from Bravo Company Boulevard to Butterfield Road, is included in the *Yakima Valley Council of Governments Transportation Plan, Yakima County's 2015 to 2020 Transportation Improvement Program (TIP), the City of Yakima's Six-Year (2015-*

2020) Transportation Improvement Program; and the 2014-2017 Washington State Transportation Improvement Program (STIP).

- Bravo Company Boulevard is funded by the City of Yakima and the initial phase has been completed.
- East H Street from North 1st Street to the new Bravo Company Boulevard will be extended and widened to three lanes and is also included in the City of Yakima TIP.

- Policy Point 8: Environmental Process
  - Based on the preliminary environmental scan of the study area, no significant environmental constraints were identified that would prohibit or affect the proposed implementation of these modifications at the Yakima Avenue and I-82 Interchange.
  - A National Environmental Protection Act (NEPA) Documented Categorical Exclusion (DCE) would appear to provide the appropriate documentation for this project.

What is the Recommended Alternative?

Based on the evaluation at the November 2016 IJR Workshop, the Stakeholder Committee agreed that the Modified Alternative 2C - C/D with four lanes on I-82 is the preferred alternative and will be carried forward into the NEPA evaluation process.

The Modified Alternative 2C was selected because it improves interstate and local system mobility and meets level of service standards. The number of expected fatal and serious injury collisions are consistent with the No Build Alternative even with added lane-miles of highway and intersections. Overall, the predicted total number of collisions slightly increases over the No Build Alternative but the rate of collisions per MVM[2] of travel decreases. This alternative directly supports the economic vitality of the area on both sides of I-82 and directly ties into the future regional transportation system. It reduces the number of direct access points to the I-82 mainline by adding access points to the proposed C/D system.

What are the Proposed Improvements?

While it is anticipated that the proposed improvements will be staged over time to address increases in traffic, the ultimate build alternative, as illustrated in Figure ES-1: Proposed I-82/Yakima Avenue Interchange & Local Street Improvement Projects, will include:

- Collector/Distributor (CD) roadways on both sides of I-82, which reduces the current five access points to the I-82 mainline to four (the CD roads which are expected to carry approximately 1,000 vehicles per direction during the PM peak hour will reduce the demand on I-82 mainline lanes and delay the need to widen this section of I-82 until after the 2035 design horizon);

[2] MVM is Million Vehicle Miles

- Adding auxiliary lanes in both directions of I-82 between the Nob Hill Boulevard ramps and the new CD roadways, as well as between the US 12 ramps and the CD roadways (this is equivalent to widening I-82 to six lanes in these area);
- The existing Fair Avenue Loop Connector (J Ramp) is converted to a one-way connector from Yakima Avenue to Fair Avenue with right-in only from Yakima Avenue and right-out to Fair Avenue;
- The existing I-82 off-ramps to Yakima Avenue and future ramps to the East-West Corridor will be connected to the CD roadways; and
- The existing off-ramp to Fair Avenue will be connected to the new East-West Corridor eastbound on-ramp.

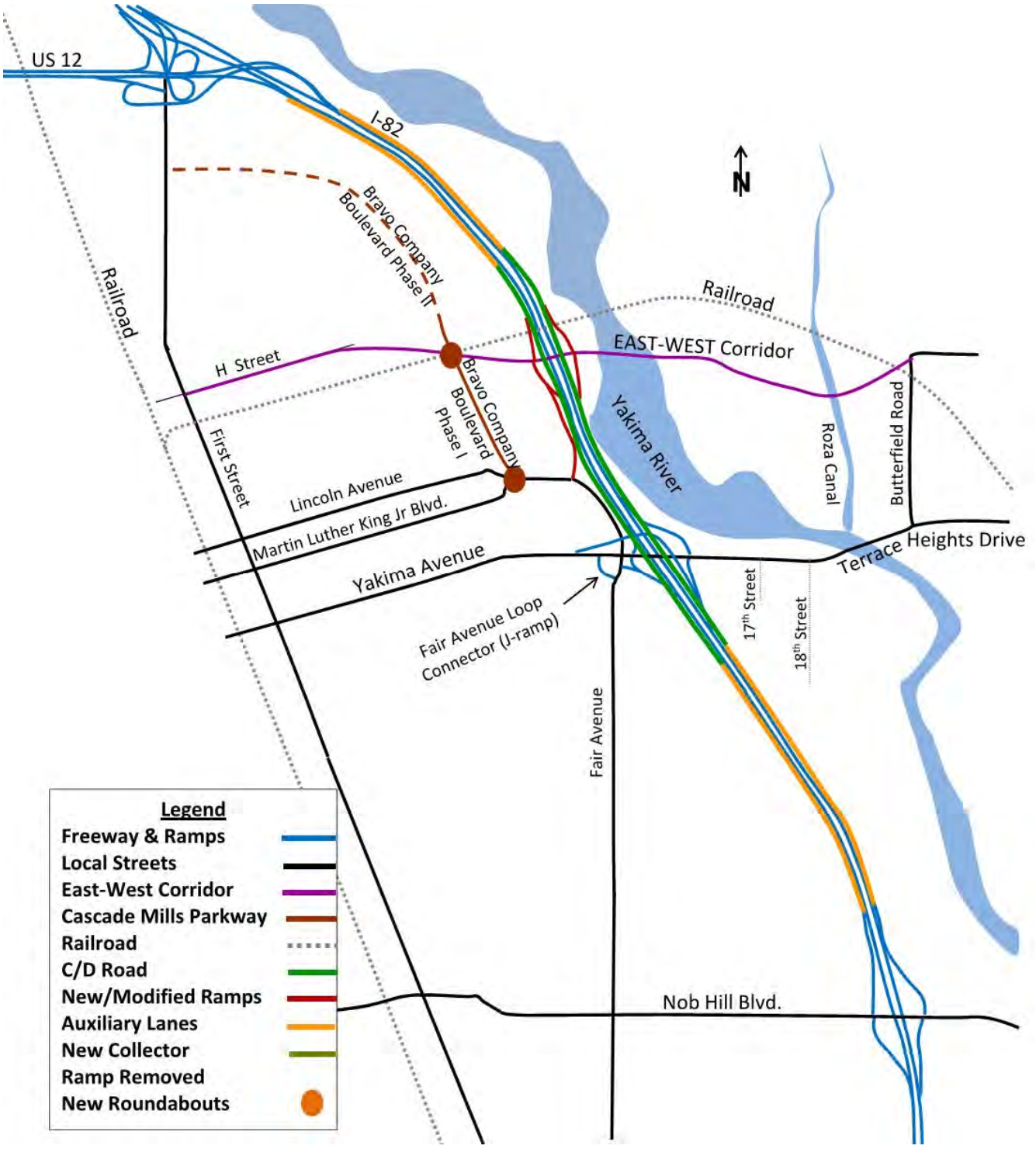
What local improvements are proposed to support the interchange modifications?

As part of their Transportation Improvement Programs, Yakima County and the City of Yakima will construct several new arterials to improve regional and local mobility and circulation and support their land use plans. Three of the funded local street improvements include:

- A new arterial (Bravo Company Boulevard) from Fair Avenue to an extension of H Street
- A new arterial (East-West Corridor) from the new Bravo Company Boulevard to Butterfield Road
- Improve and extend H Street from 1st Street to the new Bravo Company Boulevard

Plans are also being developed to extend Bravo Company Boulevard and the East-West Corridor as developments occur and funds become available.

FIGURE ES-1: Proposed I-82/Yakima Avenue Interchange & Local Street Improvement Projects



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WHY ARE CHANGES TO THE I-82 / YAKIMA AVENUE INTERCHANGE NEEDED?

The traffic operation analyses of the existing transportation networks of I-82 and local streets in the corridor cannot provide adequate access and area mobility without modifications to the existing I-82/Yakima Avenue Interchange to meet design year traffic demands.

Introduction

In 1993, an Access Report was prepared that recommended various improvements to the I-82/Yakima Avenue Interchange. These improvements were to be implemented in two stages. Stage 1 improvements were implemented in the 1990s but Stage 2 improvements have not been implemented. Since that time, new developments have been built and land uses within the vicinity of the I-82/Yakima Avenue Interchange and within Yakima County have changed. In addition, to meet Growth Management requirements, Yakima County and the City of Yakima studies have indicated increased congestion along the Yakima Avenue/Terrace Heights Drive corridor, especially in the vicinity of the I-82/Yakima Avenue Interchange has become a concurrency issue.

Policy Point 1 will:

- Define the purpose of this IJR
- Identify the need for improvements to the I-82/ Yakima Avenue Interchange,
- Define the evaluation metrics used to analyze the proposed improvements,
- Identify key stakeholders,
- Define the project study area,
- Summarize assumptions and analysis tools to be used in the IJR,
- Review previous Access Report strategies,
- Identify existing and proposed demographics and land uses to be used in this IJR,
- Summarize 2010, 2015 and 2035 base conditions,
- Identify potential local improvements,
- Summarize 2035 conditions with local improvements, and
- Identify system management, demand management and multimodal strategies in the project area.

Local agency representatives were actively involved during the development of this IJR through their roles on the Executive Committee and Stakeholder Committee to identify, analyze and evaluate a wide range of improvements. The community was also involved through a public open house, information on the County and City websites, and at public presentations to the City Council.

What is the purpose of the proposed improvements and this Interchange Justification Report (IJR)?

The purpose of this I-82/Yakima Avenue Interchange Justification Report is to identify problem areas and develop solutions for this I-82/Yakima Avenue Interchange that:

- Improves traffic operations and safety for Interstate 82 (I-82) at the Yakima Avenue Interchange and along the I-82 mainline and local arterials between the Nob Hill Boulevard and US 12 interchanges.
- Supports the adopted local and regional land use plans and policies.
- Supports regional economic vitality.
- Enhances overall mobility of all users in the study area.

Why are the proposed improvements needed?

As East-West traffic in the greater Yakima area continues to grow, trips accessing I-82 are funneled into two interchanges: Yakima Avenue (serving local/intra-regional trips) and Nob Hill Boulevard (serving inter-regional and intra-state trips). These demands are creating safety and operational issues during peak periods at the Yakima Avenue Interchange, including the following design year (2035) impacts:

- I-82, between the Nob Hill Boulevard Interchange and the Yakima Avenue Interchange will operate at LOS E in both directions;
- The diverge area for the WB off-ramp at the Yakima Avenue Interchange will operate at LOS E;
- The EB left from Yakima Avenue to the WB on-ramp will operate at LOS E;
- The NB left onto Yakima Avenue from the WB off-ramp will operate at LOS E;
- The SB left from the EB off-ramp to Yakima Avenue will operate at LOS F;
- The WB left from Yakima Avenue to the EB on-ramp will operate at LOS E;
- The NB left and right turns from the Yakima Avenue J-ramp to the Fair Avenue loop connector will operate at LOS F;
- These levels of services will cause back-ups onto the I-82 mainline; and
- There is an average of 96 collisions per year, including I-82 mainline, ramps and cross street collisions; which is above the statewide and South Central Region averages for urban areas.

As growth in the area continues, I-82 and Yakima Avenue are expected to be over capacity within the design horizon year, creating a near term growth management concurrency issue impacting economic development opportunities for Yakima County and the City of Yakima.

These issues are more fully discussed in the following operational section.

How will the proposed improvements be evaluated?

To measure success toward addressing the needs identified above, the Stakeholder Committee, at an IJR Workshop in November of 2016, identified evaluation criteria that were most important to each agency. The measures were then grouped according to their common goal. These evaluation criteria are listed below:

GOAL	Evaluation Criteria
Mobility - Interstate	• Preserve space for future widening of I-82 to three lanes in each direction • Maintain level of service/Maintain Interstate mobility
Mobility - Local System	• Yakima Avenue / Terrace Heights Corridor • Mobility to arterial street system/Improvement of local street system • Alternative route providing redundancy for the Terrace Heights Bridge • Yakima Regional Connectivity • System relief (future connection to Fruitvale Boulevard)
Mobility - Multimodal	• Maximizes multimodal opportunities
Safety	• Safety (Maintains/Decreases Fatalities & Serious Injury Collisions) • Safety (Maintains/Decreases total collisions) • Improve safety at Merge /Diverge locations
Economic Vitality	• Enhances access to mill site • Enable redevelopment
Environment	• Minimize negative impacts to riparian environment
Constructability / Maintenance	• Ease of constructability • Easily Maintained
Community Support	• Public Support
Cost	• Best value for investment • Stay within budget

A summary of the evaluation process identified by the Stakeholder Group at the November 2016 IJR Workshop is contained in Appendix B.

Who are the stakeholders for this IJR?

The stakeholders for this IJR include representatives from the following agencies:

Federal Highway Administration
Washington State Department of Transportation
Yakima Valley Council of Governments
Yakima County
City of Yakima

What is the Study Area for I-82/Yakima Avenue Interchange Analysis?

The study area, illustrated on Figure PP1-1, for the I-82/Yakima Avenue Interchange analysis extends along I-82 from the Nob Hill Boulevard Interchange on the south to the US 12 Interchange on the north and includes the following interchanges:

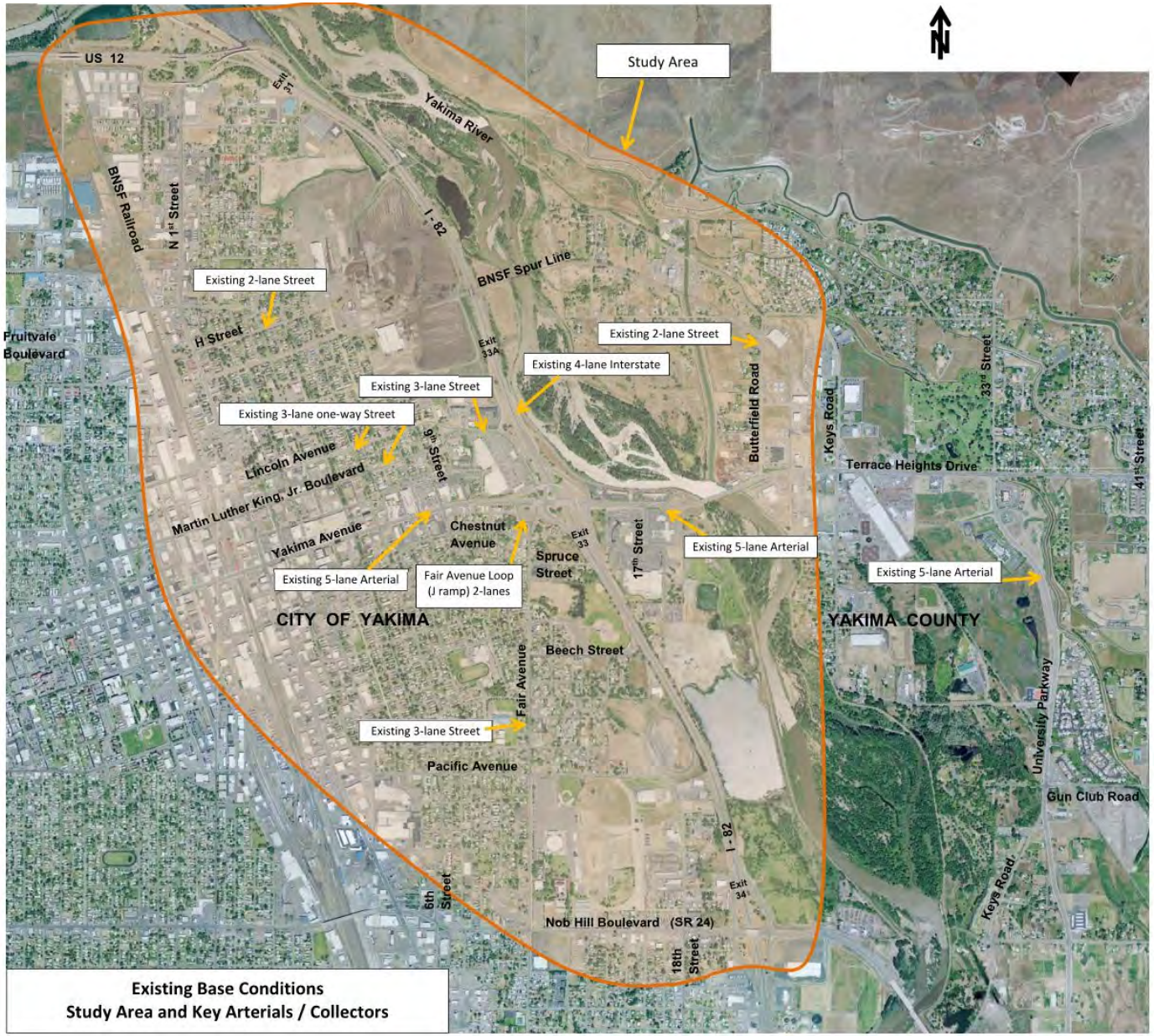
- Exit 31 - I-82/US 12/SR 823/N 1st Street Interchange
- Exit 33 - I-82/Yakima Avenue/Terrace Heights Drive Interchange
- Exit 34 - I-82/SR 24/Nob Hill Boulevard Interchange

There is also an Exit 33A from eastbound I-82 to Fair Avenue.

The overall analysis area for traffic forecasting purposes will include the urbanized area of Yakima County, as defined by the Yakima Valley Council of Governments (YVCOG) travel demand model. The project study area includes the following key streets for existing 2010 conditions:

- Yakima Avenue
- Terrace Heights Drive
- Fair Avenue
- H Street
- Fair Avenue Lop Connector
- Lincoln Avenue
- Martin Luther King Jr. Blvd.
- 9th Street
- 17th Street
- Butterfield Road
- N 1st Street

FIGURE PP1-1: Study Area & 2010 Base Arterials / Collectors



What interchange improvements were proposed in the 1993 Access Report - I-82/Yakima Avenue Interchange and Fair Avenue Projects?

An Access Report was prepared in 1993 to recommend improvements to the I-82/Yakima Avenue Interchange. This study recommended various improvements to be constructed in stages, many of which were completed, including the following Stage 1 improvements:

- Construction of the Fair Avenue Extension between the Lincoln Avenue/Martin Luther King Jr. Boulevard (formerly B Street) Couplet and Spruce Street as a three lane roadway with an undercrossing of Yakima Avenue and under the westbound I-82 flyover off-ramp to westbound Yakima Avenue;
- Widening of Fair Avenue to a three-lane section between Spruce Avenue and Pacific Avenue;
- Construction of the Lincoln Avenue/Martin Luther King Jr. Boulevard Couplet;
- Extension of the westbound flyover at Yakima Avenue to pass over the widened Fair Avenue;
- Widening Yakima Avenue to four-lanes with a median or left-turn lanes;
- Construction of the J Ramp connecting Fair Avenue with Yakima Avenue;
- Reconstruction of ramp terminals to allow for a wider Yakima Avenue;
- Construction of a temporary I-82 eastbound off-ramp to Fair Avenue;
- Construction of a new I-82 eastbound on-ramp from Fair Avenue; and
- Construction of a new access road between Pitcher Street and the existing Frontage Road south of Yakima Avenue.

Additional Stage 2 improvements not yet implemented included:

- Widen Fair Avenue from the Lincoln Avenue/Martin Luther King Jr. Boulevard Couplet to Spruce Street to five lanes;
- Construction of a new one-lane westbound I-82 on-ramp from Fair Avenue on a new structure over I-82;
- Construction of a new permanent eastbound off-ramp to Fair Avenue;
- Construction of a new westbound off-ramp to Fair Avenue with new structure over I-82; and
- Redesigned on-ramp and off-ramps in accordance with current standards.

Some of these proposed improvements are no longer practical given the area development and constraints. This IJR will analyze various solutions to provide these traffic movements and connections.

What assumptions and procedures are used for this study?

At the beginning of the study, the stakeholders discussed various assumptions and procedures to be used for this study. The stakeholders agreed on the project area, analyses methods, analyses years, level of documentation, forecast methods and safety issues. These project elements are documented in the Methods and Assumptions Document in Appendix A.

For this study, 2010 traffic counts were available only for some ramps and the interstate segment. To developed base year traffic data, the 2009 traffic counts, collected by WSDOT for the *Cascade Mill District Traffic Analysis Report* prepared in September 2010, were reviewed for possible use. A review of the traffic volumes at the permanent traffic counter on I-82 within the project area showed that little change in traffic volumes along I-82 has occurred between 2008 through 2011. Based on discussions with WSDOT staff, it was concluded that the 2009 traffic volumes, used in the previous report, would be used as the basis for 2010 traffic volumes for analysis purposes. In addition, it was agreed by WSDOT and Yakima County that a 15 percent heavy truck factor was assumed for I-82 and a 10 percent heavy truck factor was assumed for Yakima Avenue for existing and future conditions.

What are the analysis years for the improvement project?

For the IJR, the following analysis years were selected for this IJR by the Interdisciplinary Stakeholder Committee:

- Base Year 2010
- Opening Year 2015
- Design Year 2035

The analysis will include both AM and PM peak hours.

What travel demand model is being use for this analysis?

The YVCOG travel demand model, as modified by WSDOT in 2009 for the previous *Cascade Mill District Traffic Analysis Study, was* reviewed and updated to provide a consistent basis for the selected analysis years and periods. This updated model was used to forecast traffic demand for this IJR. Original traffic data collected for that study was also used for the existing base conditions. Future year conditions were modeled for 2015 and 2035 using revised socio-economic data from the local land use plans and highway improvements from the local Six Year Transportation Improvement Plans.

What are the highway and land use assumptions for the future Base Conditions?

For the IJR, the base future year highway networks include the existing freeway, arterial and collector network. Added to these existing networks are the arterial improvements, identified in Yakima County and the City of Yakima's Transportation Improvement Programs (TIPs). These improvements include the following additions to the 2015 and 2035 Base highway networks, as illustrated in Figure PP1-2:

- Butterfield Road from Terrace Heights Drive to N 33rd Street – 3-lanes with curb, gutters, sidewalk.
- Signalization of Nob Hill Boulevard / 6th Street (completed in 2006).
- Signalization improvements for the Nob Hill Boulevard / 18th Street intersection (to be completed in 2030).
- Signalization improvements for the Nob Hill Boulevard / Fair Avenue intersection (to be completed in 2025).

- Railroad grade separations at BNSF and Martin Luther King, Jr. Boulevard and Lincoln Avenue (Completed in 2010 and 2012).
- New collector arterial road (Bravo Company Boulevard) from Fair Avenue to H Street extension (to be completed in 2018).
- Widen and extend H Street to the new Bravo Company Boulevard (to be completed in 2020).

Because of the land use assumptions for the Cascade Mill District (CMD), the 2035 Base network also assumed that the 2035 Base highway network would include the extension of the new collector arterial road (Bravo Company Boulevard) from H Street extension north to 1st Street.

The land use assumptions for the future conditions were developed from YVCOG's assessment of future conditions and documented in their Comprehensive Plan. It was agreed by the Stakeholders' Stakeholder Committee on October 26, 2011 that the team should use the land use projections for the Cascade Mill site from the 2008 JUB Engineers Study, entitled Yakima Avenue Interchange Analysis Summary, Cascade Mill Redevelopment, Yakima, Washington. YVCOG reviewed the data and updated their current land use assumptions and provided the updated land use data to the project team for modeling purposes. The following is a summary of the number of area households and employment data used in the forecast models by analysis year:

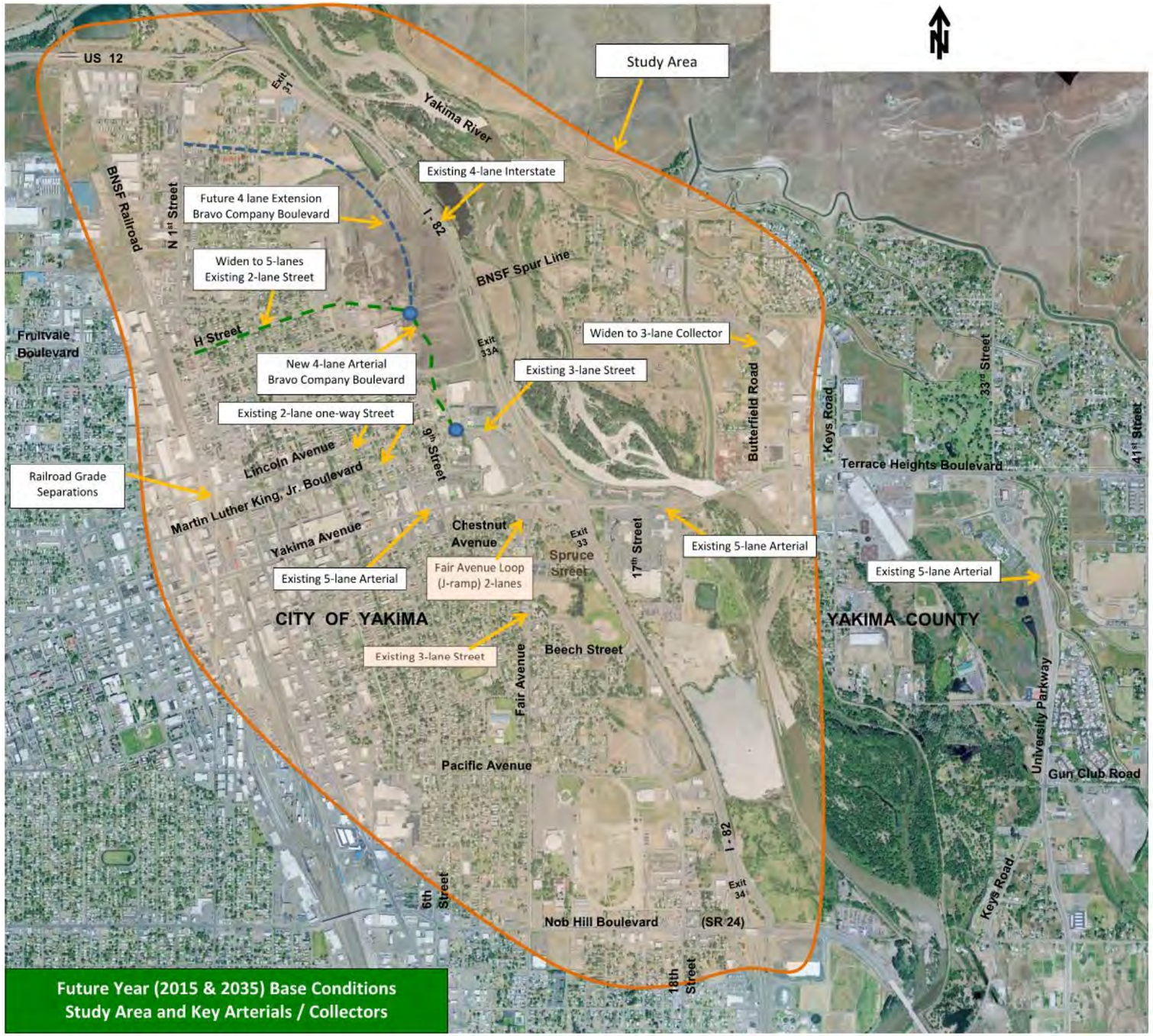
Year	Households (Dwelling Units)	Employment (Employees)
2010	62,869	82,938
2015	71,504	92,072
2035	90,240	114,237

What are the I-82 traffic operation results for the Base Conditions?

Based on the Highway Capacity Manual (HCM) procedures and using the forecasts from the YVCOG Travel Demand Model, all mainline level of service estimates were LOS D or better for the AM and PM peak hours for both 2010 existing analysis and 2015 opening Year analysis. However by the 2035 design year, several I-82 segments, as well as diverge areas, were rated to be below the acceptable LOS D rating. These areas are listed in Table PP1-1. The existing 2010 and projected 2015 and 2035 I-82 mainline and ramp merge/diverge volumes, density and LOS and off-ramp queue lengths for the AM peak hour and PM peak hour conditions are shown in figures and tables contained in Appendix C. Electronic copies of the VISUM models and analyses software were provided separately.

Overall, the I-82 HCM analysis shows that several segments of I-82, as well as several diverge locations, will be at LOS E by 2035, reducing interstate operations below acceptable levels, limiting area mobility and potentially creating a negative impact on freight operations through the project area.

FIGURE PP1-2: 2015 and 2035 Base Condition Highway Assumptions



Future Year TIP Improvements near Project Area

- Butterfield Road from Terrace Heights Drive to N 33rd Street – 3-lanes with curb, gutters, sidewalk.
- Signalization of Nob Hill Blvd. / 6th Street.
- Signalization improvements for the Nob Hill Blvd. / 18th Street intersection.
- Signalization improvements for the Nob Hill Blvd. / Fair Avenue intersection.
- Railroad grade separations at BNSF and Martin Luther King, Jr. Blvd. and Lincoln Avenue.
- New collector arterial road (Bravo Company Boulevard) from Fair Avenue to H Street extension.
- Widen and extend H Street to New Bravo Company Boulevard

Future Project

- Extend new collector arterial road (Bravo Company Boulevard) from H Street extension to 1st Street. (Added to 2035 Base for development access)

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TABLE PP1-1: Selected Segments of I-82 below LOS D during 2035 AM & PM Peak Hours

2035 AM Peak Hour	Baseline 2035 LOS
WB off-ramp at the Yakima Avenue Interchange (Diverge)	LOS E
2035 PM Peak Hour	
WB I-82 south of Nob Hill Boulevard Interchange	LOS E
WB I-82 between Nob Hill Boulevard and Yakima Avenue	LOS E
EB I-82 between Nob Hill Boulevard and Yakima Avenue	LOS E
WB off-ramp at the Nob Hill Boulevard Interchange (Diverge)	LOS E
WB off-ramp at the Yakima Avenue Interchange (Diverge)	LOS E
EB off-ramp at the Nob Hill Boulevard Interchange (Diverge)	LOS E

What are the results of the ramp intersection traffic analysis?

The intersection analysis was performed using Synchro software for intersections, and Sidra software for roundabouts. A summary of the intersection PM peak hour analyses at ramp terminals with the cross streets and key turning movement that were below LOS D is shown on Table PP1-2. Complete tables for all movements for both AM and PM peak hours are contained in Appendix C.

In 2010, most of the intersections operated at LOS D or better except for the Yakima Avenue/Fair Avenue Loop Connector (J ramp) intersection which is a controlled intersection using stop signs for the Fair Avenue Loop. During the PM peak hour, the NB left-turn was rated as LOS F.

By 2015 with optimal timing assumed, the left turning movements from the EB and WB off-ramps to Yakima Avenue will be at LOS E. Traffic from the J-ramp will have a difficult time turning left onto Yakima Avenue.

By the 2035 PM peak hour period, most turning movements at the Yakima Avenue/Fair Avenue Loop Connector/J-ramp, stop control intersection will have long delays, as will left-turning traffic at the signalized left turning movements. In addition, ramp queues at the eastbound off-ramps to Yakima Avenue and Nob Hill Blvd. will extend 500 to 600 feet; while the queue on the J-ramp will extend onto Fair Avenue.

Overall, this intersection traffic analysis shows that there will be congestion issues along Yakima Avenue by 2035 affecting traffic operations, area mobility and access to I-82. In addition traffic back-ups on the off-ramps can extend on to the I-82 mainline causing some lanes to be temporarily blocked or reducing speeds by slowing traffic on I-82 exiting at these congested off-ramps. . A VISSIM model was developed to examine these conditions along Yakima Avenue.

TABLE PP1-2: Selected Intersection and movement during PM Peak Hour

Intersection with Selected Movements	2010		2015		2035	
	LOS	Delay	LOS	Delay	LOS	Delay
I-82 WB Ramps at Yakima Avenue	A	4.5	A	5.3	A	10.0
EB Left (from Yakima Avenue)	A	8.2	B	15.2	**E**	**69.3**
NB Left (from WB Off-ramp)	D	46.2	**E**	**62.1**	**E**	**78.**3
I-82 EB Ramps at Yakima Avenue	B	16.3	C	22.8	D	42.4
WB Left (from Yakima Avenue)	C	31.8	D	46.4	**E**	**77.9**
SB Left (from EB Off-ramp)	D	37.4	**E**	**57.2**	**F**	**101.1**
I-82 WB Ramps at Nob Hill Blvd.	A	6.0	A	5.7	A	5.9
EB-Left (From Nob Hill Blvd.)	B	16.9	C	23.0	**E**	**60.0**
NB Left (from WB Off-ramp)	C	25.8	C	30.8	**E**	**56.8**
I-82 EB Ramps at Nob Hill Blvd	B	12.0	B	14.5	C	33.4
WB Left (from Yakima Avenue)	B	19.3	C	24.1	**E**	**58.2**
SB Left (from EB Off-ramp)	C	22.0	C	30.8	**E**	**76.5**
Yakima Avenue and Fair Avenue Loop Connector (J ramp)						
WB Left (from Yakima Avenue)	C	16.8	C	19.7	**E**	**44.1**
NB Left from (J-ramp)	**F**	**223.6**	**F**	**366.7**	**F**	**Too large**
NB Right (from J-ramp)	C	22.1	**E**	**43.4**	**F**	**580.8**
Fair Avenue and Fair Avenue Loop Connector (J ramp)						
EB Left (from J-ramp)	C	17.4	C	23.1	**F**	**475.4**
Note Bold values are Below LOS D						

What traffic conditions does the VISSIM simulation show along Yakima Avenue for the 2035 Base Conditions?

A VISSIM simulation for travel along I-82 including Yakima Avenue during the 2035 PM peak hour was made for the 2035 Base Conditions. The results showed that about 96 percent of the PM peak hour traffic demand can be accommodated through the system. Because of congestion along the I-82 corridor the remaining four percent needs to travel at other times or on other roads. The PM peak hour unmet demand is delayed until the next period. There is traffic backups at various signals along Yakima Avenue which extend through other intersections causing additional delays. The simulation process included a 20 minute preloading period and a two hour simulation period with 30 minutes before the peak hour and 30 minutes after the peak hour.

The simulations illustrated significant delays along Yakima Avenue, the I-82 eastbound off-ramp to Yakima Avenue, along Fair Avenue Loop (J ramp) and Fair Avenue that last throughout the PM peak hour. The simulations also show reduced travel speeds westbound on I-82 between the Nob Hill Boulevard Interchange and the Yakima Avenue Interchange

What are the local improvements and assumptions?

As part of the County's and City's policies, various local improvements have been suggested to relieve some of the congestion experienced at the Yakima Avenue/I-82 Interchange. Part of this planning effort is to look at other local transportation system improvements to provide adequate regional and local operations.

The following sections summarized the traffic analyses for I-82 operations and intersection operations with selected local improvements, as approved by the Stakeholder Committee, for 2035 conditions. With these local Improvements, the land use data from YVCOG was modified in the Terrace Heights area to reflect the influence of the East-West Corridor, as estimated by Yakima County and agreed to by the stakeholders. The Cascade Mill Development land use as approved by the Stakeholder Committee was also used.

At the February 2012 and July 2012 IJR Stakeholder Committee meetings, other possible local and regional improvements that are unfunded were identified and discussed by the Committee. Based on these discussions, the Stakeholder Committee agreed that the following local improvements will be added:

- East-West Corridor from 1st Street to Butterfield Road, following the alignment from the *Supplemental East-West Corridor Study* with three lanes along the existing H Street and five lanes along the rest of the corridor.
- I-82 will be widened to six-lanes from the I-82/US 12 1nterchange to the I-82/Nob Hill Boulevard Interchange.
- An additional left-turn lane from Fair Avenue to Nob Hill Boulevard will be added.
- The intersection of Yakima Avenue with the Fair Avenue Loop (J ramp) will be revised to right-in/right-out only.
- The I-82 EB on-ramp with the intersection of Fair Avenue and the Fair Avenue Loop (J ramp) will be re-aligned.
- Fair Avenue will be upgraded to five lanes from its intersection with Lincoln Avenue/Martin Luther King Jr. Boulevard to Chestnut Avenue.

These improvements are illustrated on Figure PP1-3. The purpose of these local improvements is to determine if they would improve the 2035 traffic conditions along I-82 and at the I-82 / Yakima Avenue/Terrace Heights Drive Interchange.

What is the change in volume between the 2035 Base Conditions and the 2035 Local Improvement forecasts?

A comparison of the 2035 modeled travel volumes on the area roadway network for the 2035 Base Conditions and the 2035 Conditions with the Local Improvements is illustrated on Figure PP1-4. This comparison is intended to illustrate the general level of traffic pattern shifts between the assumed 2035 highway networks. This analysis assumes that the County's and City's TIP improvements are

already constructed in the Base 2035 network and the recommended local improvements are added to the 2035 Local Improvement network. Both networks assume that by 2035, Bravo Company Boulevard will be extended from Fair Avenue to 1st Street and that H Street is extended to tie into the new Bravo Company Boulevard.

This comparison is intended to illustrate the general shift of traffic volume caused by the addition of Local Improvements. Some of the key traffic shifts are discussed below:

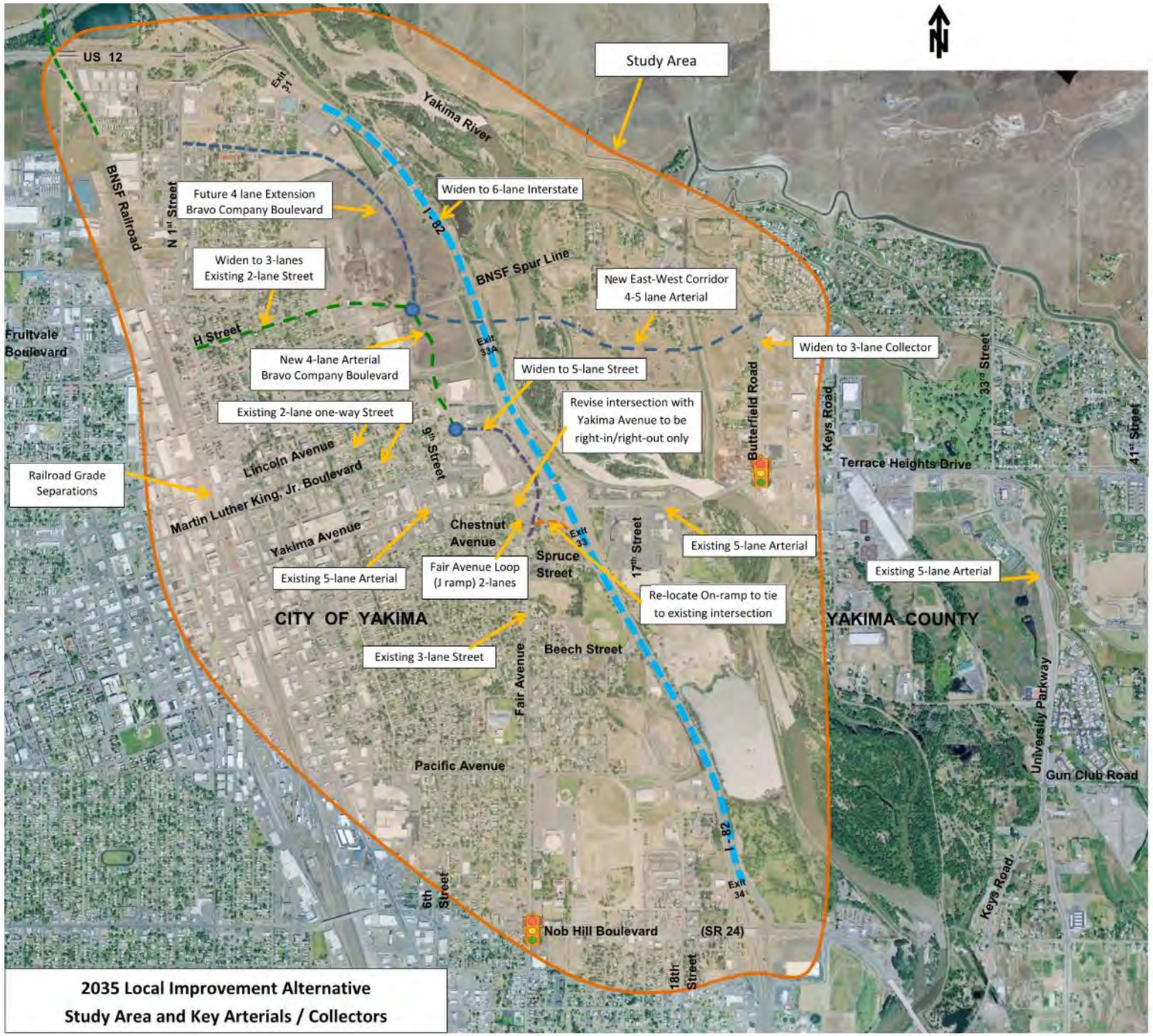
- I-82 Traffic: The increase in traffic volumes on I-82 are mainly due to the widening of I-82 from four-lanes to six-lanes.
- Yakima Avenue Traffic: As expected, traffic on Yakima Avenue/Terrace Heights Drive is reduced with the addition of the East-West Corridor from the new Bravo Company Boulevard to Butterfield Road.
- Fair Avenue Off-ramp Traffic: Some of the I-82 EB traffic will use the Fair Avenue off-ramp and the new Bravo Company Boulevard to access the Terrace Heights neighborhood east of the Yakima River instead of using the Yakima Avenue off-ramp and Yakima Avenue/Terrace Heights Drive.
- Bravo Company Boulevard Traffic: Whereas in the 2035 Base Condition, all traffic to and from the CMD had to use Bravo Company Boulevard or the H Street extension. With the 2035 Local Improvement Alternative, some of the CMD traffic is shifted from portions of the Bravo Company Boulevard to the new East-West Corridor to access portions of the study area east of the Yakima River. Also some portions of the Bravo Company Boulevard show traffic increases, caused by Terrace Heights' traffic shifting from Yakima Avenue to cross the Yakima River on the new East-West Corridor and precede to downtown Yakima and other destinations.
- H Street Traffic: Traffic along the H Street extension is generally reduced because in the 2035 Base Conditions, H Street was one of the primary roads in and out of the CMD. With the 2035 Local Improvement Alternative adding the East-West Corridor and other local improvements, traffic patterns are changed from H Street to other routes.

What is the change in I-82 operations with the Local Improvements?

The interstate traffic analyses for the I-82 mainline segments and interchange ramps merge and diverge areas within the project area were conducted with the local improvements, the Cascade Mill development and the new Bravo Company Boulevard for the 2035 design year. The mainline segment and ramp merge analyses used the same I-82 configuration described for the 2035 base conditions except I-82 was widened to six-lanes.

A comparison of LOS for selected 2035 interstate mainline and ramp diverge areas for the 2035 baseline and the 2035 Local Improvement Alternative is shown on Table PP1-3. With widening of I-82 to a six-lane facility all segments of I-82 between Nob Hill Boulevard and US 12 are expected to operate at LOS D or better.

FIGURE PP1-3: Local Improvement Alternative



2035 Base Condition Improvements:

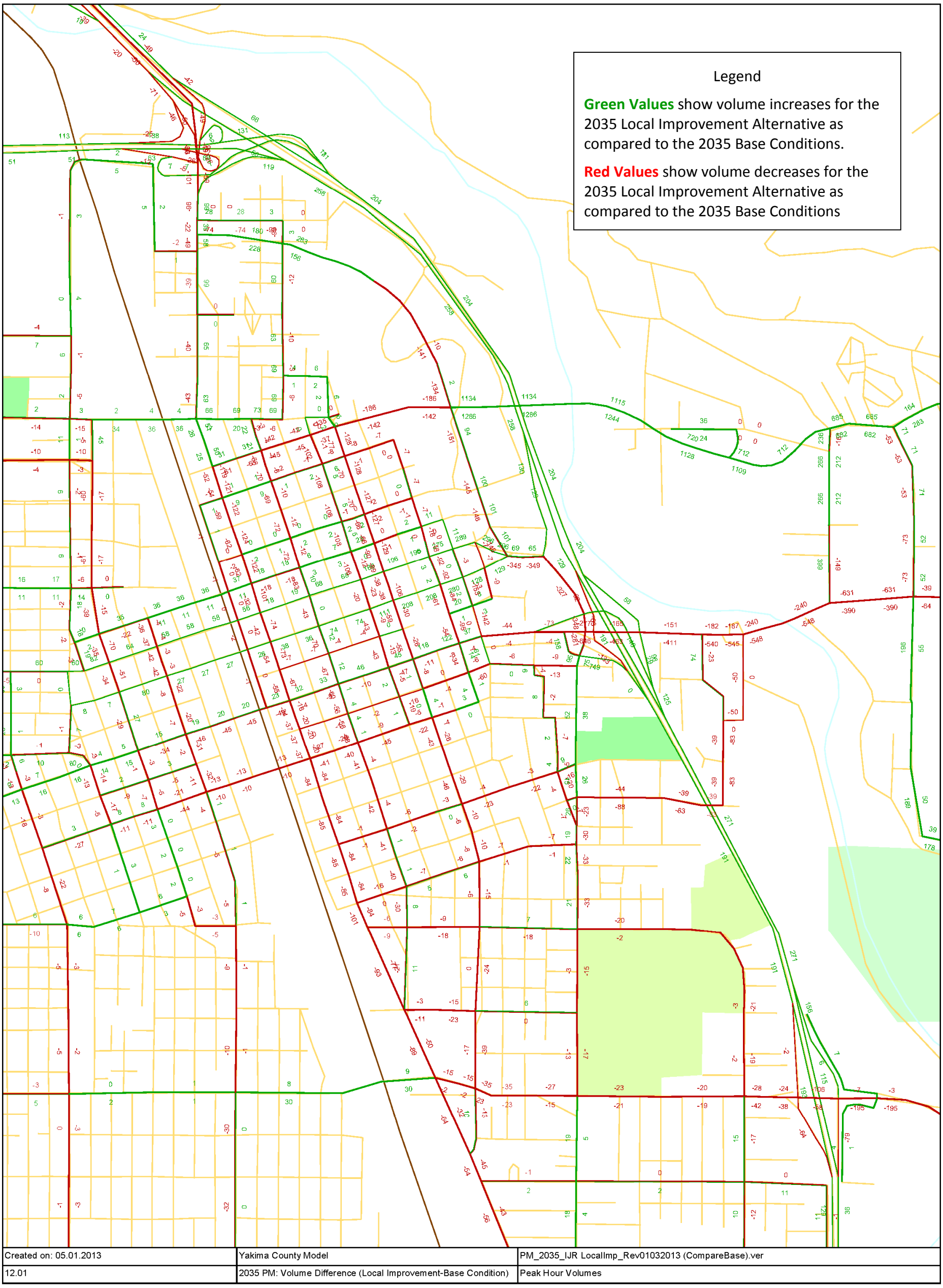
- Extend H Street to roundabout with new Cascade Mill Parkway.
- Extend new Cascade Mill Parkway from Fair Avenue to 1st Street.
- Other Agencies' TIP Improvements

In addition to the above 2035 Base Condition Improvements, the following 2035 Local Improvements are also added:

- East-West Corridor from 1st Street to Butterfield Road.
- Intersection improvement at Fair Avenue and Nob Hill Boulevard.
- Re-align and signalize SB I-82 on-ramp from Fair Avenue with the J ramp intersection.
- Widen Fair Avenue from Martin Luther King Jr. Boulevard/Lincoln Avenue to Chestnut Avenue to 5-lanes.
- Widen I-82 to 6 lanes from US 12 south to the I-82/Nob Hill Road Interchange.
- Revise the J ramp intersection with Yakima Avenue to right-in/right-out only.
- New signal at Terrace Heights Drive and Butterfield Road.

FIGURE PP1-4: PM Peak Hour Traffic Volume Change

Volume Change = 2035 Local Improvement Alternative - 2035 Base Conditions with the Cascade Mill



Created on: 05.01.2013	Yakima County Model	PM_2035_IJR LocalImp_Rev01032013 (CompareBase).ver
12.01	2035 PM: Volume Difference (Local Improvement-Base Condition)	Peak Hour Volumes

TABLE PP1-3: Selected Segments of I-82 below LOS D during 2035 AM & PM Peak Hours

2035 AM Peak Hour	Baseline 2035 LOS	Local Improvements 2035 LOS
WB off-ramp at the Yakima Avenue Interchange (Diverge)	LOS E	LOS D
2035 PM Peak Hour		
WB I-82 south of Nob Hill Boulevard Interchange	LOS E	LOS C
WB I-82 between Nob Hill Boulevard and Yakima Avenue	LOS E	LOS C
EB I-82 between Nob Hill Boulevard and Yakima Avenue	LOS E	LOS C
WB off-ramp at the Nob Hill Boulevard Interchange (Diverge)	LOS E	LOS C
WB off-ramp at the Yakima Avenue Interchange (Diverge)	LOS E	LOS D
EB off-ramp at the Nob Hill Boulevard Interchange (Diverge)	LOS E	LOS C

A summary of the 2035 interstate mainline and ramp merge/diverge volumes, density and levels of service (LOS) and off-ramp queue lengths for the AM peak hour and PM peak hour conditions are presented in Appendix C. It should be noted that these HCS traffic analyses did not consider ramp back-ups in its LOS analysis. Long traffic back-ups at off-ramps can deteriorate I-82 operations.

What is the effect of the Local Improvements on the ramp terminal intersections?

Using the same intersection analysis software from the baseline analysis, the same intersections were analyzed for the 2035 Local Improvement Alternative. A comparison of the 2035 PM peak hour analyses at ramp terminals with the cross streets and key turning movement is shown on Table PP1-4. Complete tables for all movements for both AM and PM peak hours for the Local Improvement Alternative is contained in Appendix C.

Traffic operations at the Yakima Avenue intersections with I-82 ramp are generally improved with the addition of the local improvements; however the northbound left at the westbound ramp intersection and the southbound left at the eastbound ramp intersection are still below LOS D with back-ups on the eastbound off-ramp to Yakima Avenue. With the addition of the local improvements, overall traffic operations at the westbound I-82 ramp / Nob Hill Boulevard intersection generally stays the same with some of the key movements showing improved operations. At the I-82 eastbound ramp intersection with Nob Hill Boulevard the overall intersection operations improves but the eastbound off-ramp left turning movements operates below LOS D.

The changing of the operations at the Yakima Avenue / Fair Avenue Loop Connector (J-ramp) intersection to right-in and right-out operations improves the operations at the intersection; however the NB right turn is still expected to operate at LOS F. The signalization of the Fair Avenue / Fair Avenue Loop Connector (J-ramp) improved the operation of the revised intersection.

TABLE PP1-4: Comparison of LOS and Delay for the 2035 Baseline and the 2035 Local Improvement Alternatives at selected intersection and movement during PM Peak Hour

Intersection with Selected Movements	2035 Baseline		2035 Local Improvement	
	LOS	Delay	LOS	Delay
I-82 WB Ramps at Yakima Avenue	A	10.0	A	6.9
EB Left (from Yakima Avenue)	**E**	**69.3**	D	43.4
NB Left (from WB Off-ramp)	**E**	**78.**3	**E**	**68.6**
I-82 EB Ramps at Yakima Avenue	D	42.4	D	31.1
WB Left (from Yakima Avenue)	**E**	**77.9**	D	54.4
SB Left (from EB Off-ramp)	**F**	**101.1**	**E**	**74.5**
I-82 WB Ramps at Nob Hill Blvd.	A	5.9	A	6.0
EB-Left (From Nob Hill Blvd.)	**E**	**60.0**	D	36.5
NB Left (from WB Off-ramp)	**E**	**56.8**	D	48.3
I-82 EB Ramps at Nob Hill Blvd	D	33.4	C	28.7
WB Left (from Yakima Avenue)	**E**	**58.2**	D	49.5
SB Left (from EB Off-ramp)	**E**	**76.5**	**E**	**65.3**
Yakima Avenue and Fair Avenue Loop Connector (J-ramp)				
WB Left (from Yakima Avenue)	**E**	**44.1**	na	na
NB Left from (J-ramp)	**F**	**Too large**	na	na
NB Right (from J-ramp)	**F**	**580.8**	**F**	**126.9**
Fair Avenue and Fair Avenue Loop Connector (J-ramp)				
EB Left (from J-ramp)	**F**	**475.4**	B	18.6

Based on these analyses, the local improvements do not completely resolve the congestion issues at the I-82 ramps terminal with Yakima Avenue where several movements for the I-82 off-ramps are rated below LOS D and backup will remain along Yakima Avenue and the I-82 ramps

Would Demand Management, System Management and/or Multimodal Strategies satisfy the project needs?

Demand Management Strategies: YVCOG is responsible for Transportation Demand Management and Commute Trip Reduction. A Yakima Valley Region CTR plan was adopted with goals to reduce single occupancy vehicle trips by 10 percent and Vehicle Miles Traveled by 13 percent. The region continues to work toward these goals, but with only two alternative routes for traffic needing to cross the Yakima River, TDM and CTR strategies will not relieve current and anticipated congestion issues.

Transportation System Management (TSM) Strategies: The City of Yakima and Yakima County have been implementing TSM strategies throughout the region to improve traffic operations in the near-term. These TSM strategies have included: improved channelization at critical intersections, coordination of traffic signals to help major traffic flows, and a program to resurface roads in the County and City. These strategies improve near-term issues but do not address long-term traffic needs.

Multimodal Strategies: The City of Yakima has owned, maintained and operated Yakima Transit since 1966. The system provides transit services within the City of Yakima and the City of Union Gap, with service to the City of Selah through an inter-local agreement. Yakima Transit also participates in funding a Yakima-Ellensburg commuter route. There is no fixed route service to Terrace Heights or unincorporated Yakima County at this time.

Both the City and County are actively planning to expand non-motorized service as part of this project, with a dedicated multipurpose trail (including bridge over the Yakima River) connecting Terrace Heights to both downtown Yakima and the Yakima River Greenway.

Pedestrian Linkages: During this stage of East-West Corridor development, the extension of this new multi-purpose trail will extend from Butterfield Road on the east, over the Yakima River on its own dedicated bridge in order to avoid the steep grade needed to cross above I-82, connect with the Yakima River Greenway, then go under I-82 at the existing short-line railroad underpass, and extend to North 1st Street (a distance of nearly two-miles). Long range plans include extending the East-West Corridor to 57th Street in Terrace Heights and Fruitvale Boulevard in Yakima.

Based on a review by various Stakeholder members, it was concluded that these strategies would not be sufficient by themselves to relieve current and anticipated congestion issues.

Summary

Overall, this intersection traffic analysis shows that even with additional local improvements there will be congestion issues at the I-82 ramp intersections with Yakima Avenue by 2035 affecting traffic operations, area mobility and access to I-82, especially at the eastbound off-ramp. In addition, until ramps are redesigned and constructed, traffic back-ups on the existing I-82 off-ramps can extend on to the I-82 mainline causing some I-82 lanes to be temporarily blocked or reduce travel speeds along I-82 by slowing traffic to exit at these congested off ramps.

As part of the County's and City's policies, it is prudent to continue planning to resolve these future issues. Part of this IJR planning effort focuses on looking at I-82 ramp configurations, and other local transportation system improvements to provide adequate regional and local operations.

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WHAT BUILD ALTERNATIVES DID THE YAKIMA IJR STAKEHOLDERS CONSIDER TO IMPROVE TRAFFIC CONDITIONS AT THE I-82/YAKIMA AVENUE INTERCHANGE?

The IJR stakeholders considered several TSM improvements, including channelization and signalization improvements, transit and HOV facilities and non-motorized features; however these TSM improvements did not solve the ramp terminal operations deficiencies at Yakima Avenue. Transit usage was tested along Yakima Avenue and into the Terrace Heights area but because of low ridership it was canceled. The widening of I-82 with an HOV lane or a general purpose lane will improve operations along I-82 but some intersection operations will remain below LOS D. As a result the stakeholders considered and reviewed several interchange modifications to improve traffic operations at the I-82/Yakima Avenue Interchange. All of the Build Alternatives assumed that by the 2035 design year the new Bravo Company Boulevard from Fair Avenue to First Street and the East-West Corridor from First Street to Butterfield Road would be in operation.

During development of the alternatives, the concept of "practical solutions" was incorporated into design. As defined by WSDOT, "Practical Solutions" is a two-part strategy that includes least cost planning and practical design to enable WSDOT greater flexibility, including sustainable transportation investment decisions. It encourages this by increasing the focus on the project purpose and need throughout all phases of project development:

- Planning
- Program management
- Environmental analysis
- Design
- Construction
- Operation

This strategy engages local stakeholders and the community at the earliest stages of defining scope to incorporate their input at the right stage of project design. It is based on how well the improvements meet the projects purpose and uses a performance based decision process. Local stakeholders, including the City of Yakima, Yakima County, and the Yakima Valley Council of Governments, in conjunction with FHWA and WSDOT, participated in setting the project goals, defining the project purpose, identify project needs, developing and evaluating the various alternatives.

The Yakima community was also involved though out the project, including an open house held on October 24, 2013, to review the proposed alternatives and provide their opinions on how to modify the alternatives to better serve their community. Briefings on the status of the I-82 Yakima Avenue IJR findings were also made at public City of Yakima City Council meetings.

What initial alternatives were reviewed by the Yakima IJR Stakeholders?

Three initial alternatives were developed and approved for analyses by the IJR Stakeholders at the November 27, 2012, Stakeholder Committee meeting. These alternatives were developed in an incremental approach to address the project needs and connect the regional transportation network. These alternative improvements are described below:

- **Build Alternative 1**: This alternative is a modified local improvement alternative and includes the following revisions, as illustrated on Figure PP2-1:
    - A second left turn lane for eastbound traffic on Yakima Avenue to turn onto the I-82 westbound on-ramp is added;
    - The I-82 westbound on-ramp is widened to two lanes;
    - The intersection of Yakima Avenue with the Fair Avenue Loop Connector (J ramp) is signalized; and
    - I-82 is widened to six-lanes from Nob Hill Boulevard to the US 12 Interchange.
- **Build Alternative 2**: This alternative connects the existing I-82/Yakima Avenue Interchange ramps, the existing Fair Avenue ramps and new ramps with a the East-West Corridor to a new collector/distributor (C/D) roadway system and reduces the number of access points with the I-82 mainline from five locations to four locations. The merge and diverge connections for the four Yakima Avenue ramps and the four East-West Corridor ramps will be connected to the C/D roadways. This alternative includes the following improvements, illustrated on Figure PP2-2:
    - A C/D roadway is added on both sides of I-82 from south of the I-82/Yakima Avenue Interchange to north of the I-82 Overpass over the local railroad;
    - A third lane is added to I-82 in both directions from the Nob Hill Boulevard ramps to the US 12 ramps;
    - All existing Yakima Avenue ramps are revised to connect to the C/D roadway;
    - New on and off ramps with the new East-West Corridor are connected to the C/D roadway;
    - The existing I-82 off-ramp to Fair Avenue ramps is removed;
    - The existing I-82 on-ramp from Fair Avenue is removed; and
    - The Fair Avenue Loop Connector is right-in and right-out at Yakima Avenue.
- **Build Alternative 3:** This alternative added a new collector roadway under I-82 from Fair Avenue and revises the westbound Yakima Avenue on-ramp to I-82 - maintaining the existing five access points to I-82. This alternative includes the following improvements, as illustrated on Figure PP2-3:
    - A new, two-way collector will extend east from the intersection of the I-82 eastbound off-ramp with Fair Avenue under I-82 to a new intersection on the eastside of I-82;
    - Roundabouts will be added at each end of the new collector, east and west of I-82;

FIGURE PP2-1: Alternative 1

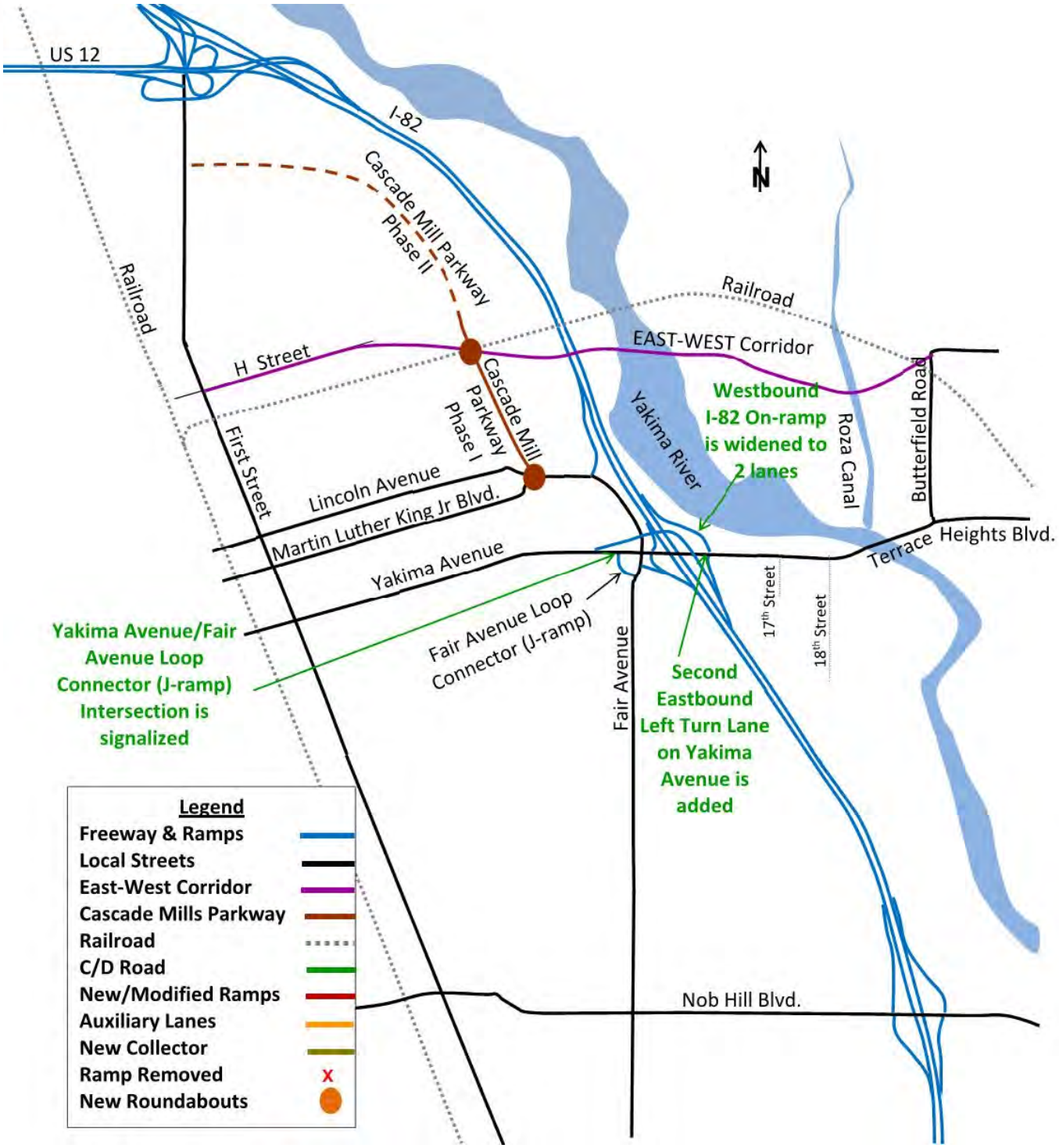


FIGURE PP2-2: Alternative 2

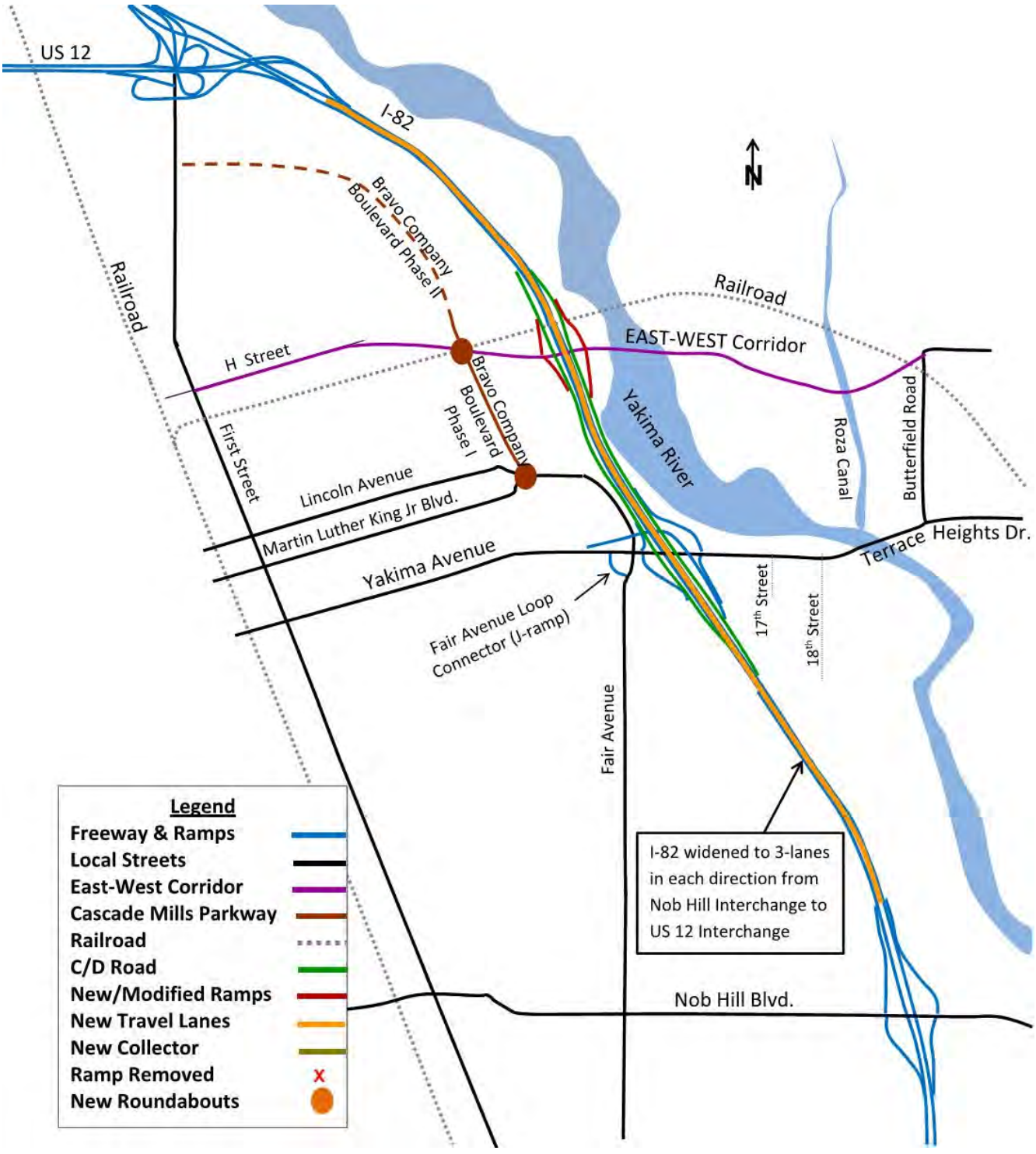
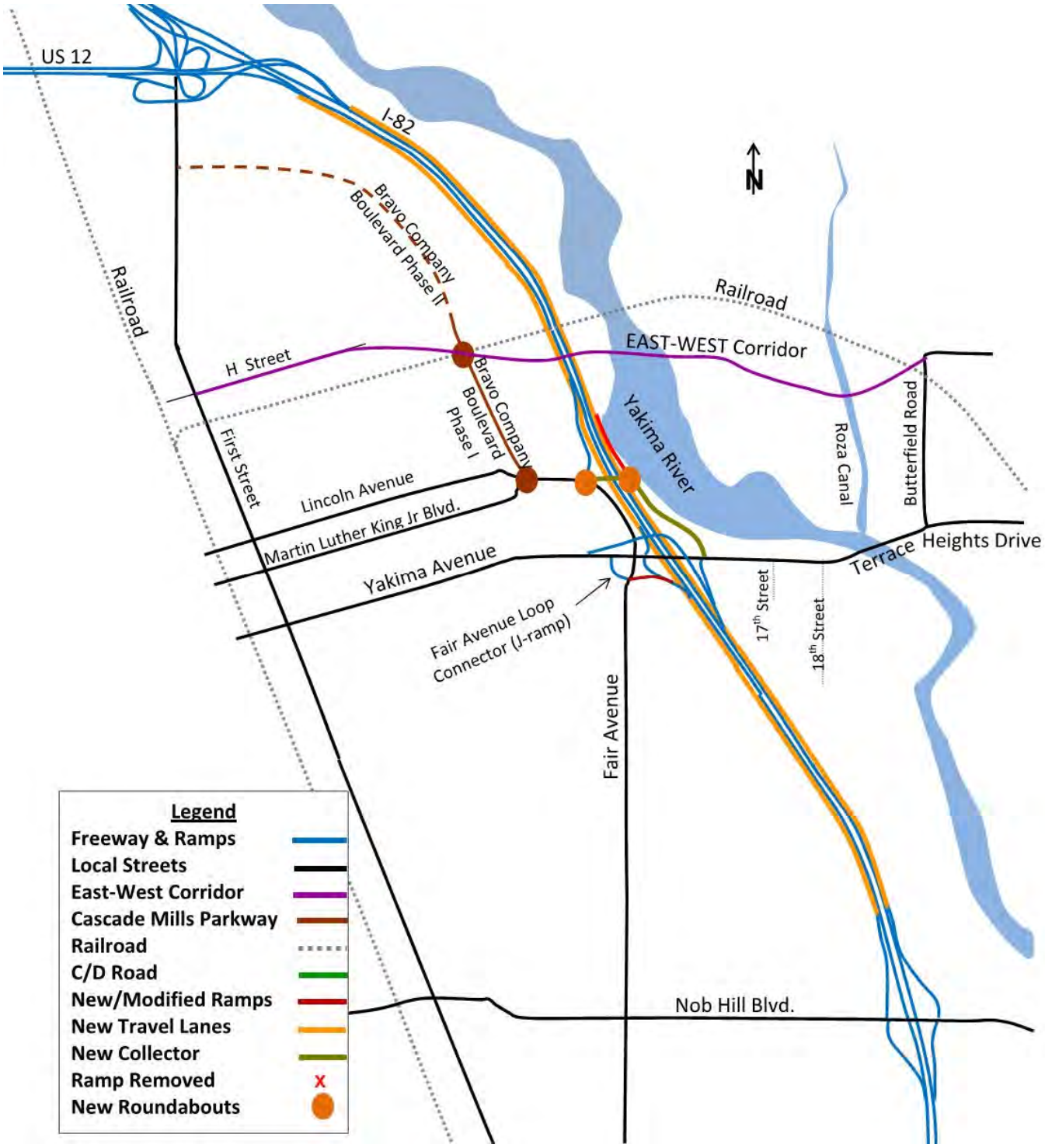


FIGURE PP2-3: Alternative 3



- The existing I-82 on-ramp from Yakima Avenue will be converted into a second two-way collector and will extend from Yakima Avenue to the new collector crossing under I-82;
- The Yakima Avenue westbound I-82 on-ramp will be relocated to begin at the east side roundabout and extend north to connect to I-82;
- The existing signal at the westbound I-82 ramps with Yakima Avenue will be revised to allow through traffic from the existing westbound Yakima Avenue off-ramp across Yakima Avenue to the new collector roadway;
- The existing I-82 off-ramp to Fair Avenue will be connected to the new west side roundabout;
- The existing I-82 on-ramp from Fair Avenue is relocated to begin at the intersection of Fair Avenue and the Fair Avenue Loop Connector; and
- I-82 is widened to six-lanes (three in each direction) from Nob Hill Boulevard Interchange to the US 12 Interchange.

What were the results of the preliminary review of the initial alternatives by the Yakima IJR Stakeholders?

At the IJR Stakeholder's meeting on January 9, 2013, representatives from FHWA, WSDOT Headquarters, WSDOT South Central Region, Yakima County, City of Yakima and the Yakima Valley Council of Governments reviewed these alternatives and conducted a preliminary review of the alternatives. The conclusions from that review are summarized below.

- **Build Alternative 1**: By signalizing the Yakima Avenue/Fair Avenue Loop Connector intersection, traffic back-up along the Fair Avenue Loop Connector and Fair Avenue were reduced, however, longer back-ups were added along Yakima Avenue. The double left-turn lane at the I-82 westbound ramps with Yakima did little to reduce congestion along Yakima Avenue through the interchange area. Because of the lack traffic congestion relief and longer back-ups along Yakima, the stakeholders decided that this alternative would not be carried forward.
- **Build Alternative 2**: For this Build Alternative 2, traffic volumes on I-82 are expected to range from approximately 2,500 to 2,600 vehicles per hour (vph) in each direction during the 2035 PM peak hour, between the East-West Corridor and Yakima Avenue, while volumes on the C/D roadways are forecasted to be approximately 1,100 vph during the same period. Traffic volumes on I-82 north and south of the C/D roadways will range from 3,400 to over 4,260 vph.

  Because of the low volume on I-82 adjacent to the C/D roadway, and in accordance with a "practical solution" approach, it was recommended and agreed to by most stakeholders, including FHWA, that only two lanes in each direction are needed at this location along I-82 at this time. Based on the current traffic analysis, the third lane in each direction of I-82, adjacent to the C/D roadways, will not be needed until after the2035 design horizon.

With the C/D roadways and auxiliary lanes added from the end of the C/D roadways to the Nob Hill Boulevard Interchange ramps and the US 12 Interchange ramps, three lanes in each direction on I-82 are no longer needed, reducing the number of connections to I-82 from five to four, and moves some of the side friction caused by traffic entering and exiting I-82.

Although this alternative improved traffic operations along I-82, several stakeholders viewed this alternative as providing too much I-82 capacity that is not justified at this time. As a result the stakeholders decided to modify this alternative and developed three variations for consideration to provide a more balanced usage. However, the modified alternative should provide sufficient space following practical design guidelines to allow for the addition of a third lane without major reconstruction of the C/D system.

- **Build Alternative 3:** From a review of the preliminary data this alternative increased the traffic through the I-82 westbound ramp intersection and increases delay for thru and left turning traffic from the WB off-ramp. The stakeholders agreed that this alternative should be modified to add a grade-separated connection from the Yakima Avenue flyover to the eastside roundabout.

What are modified alternatives for analysis?

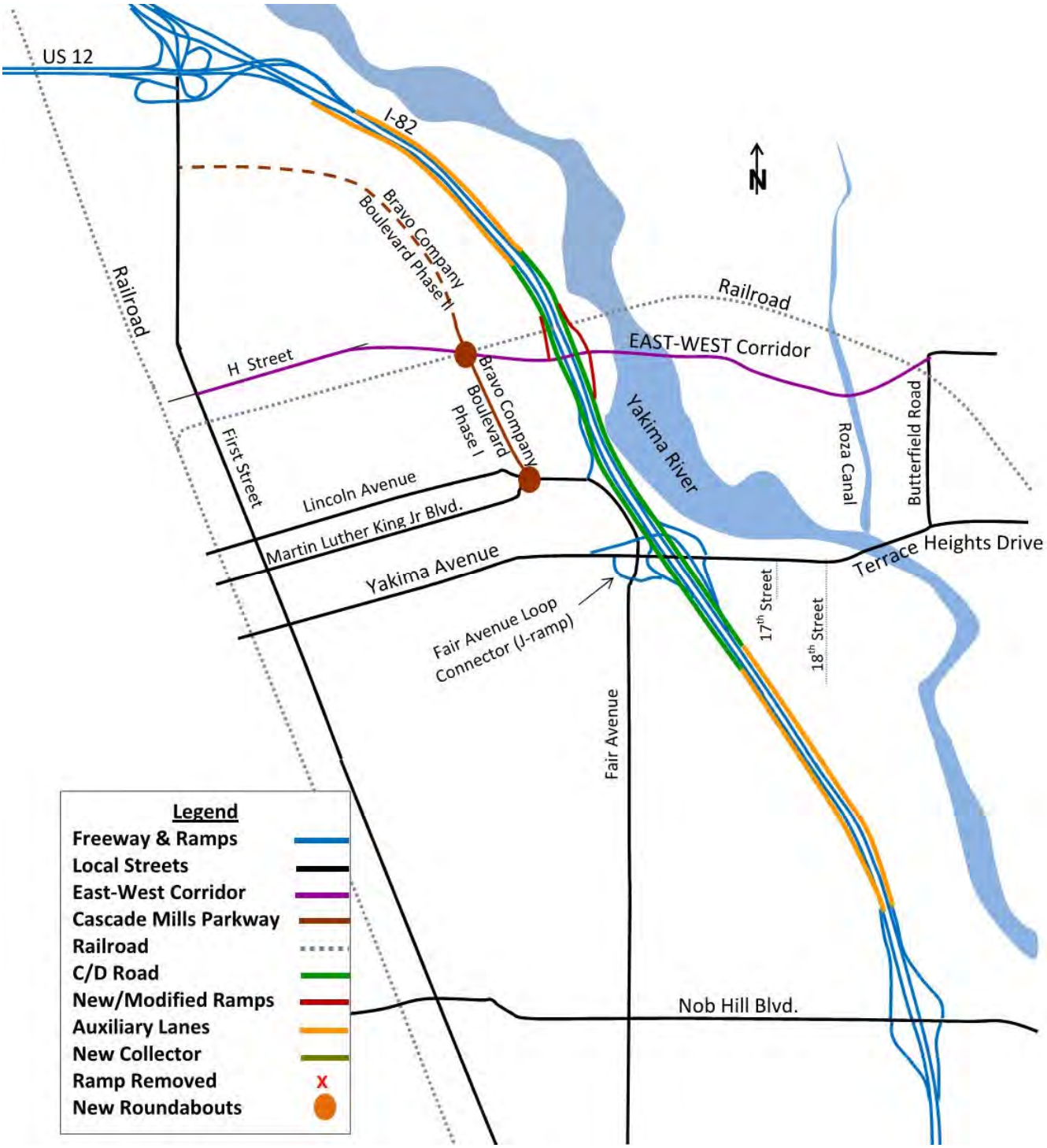
The IJR Stakeholders agreed that the following modified alternatives should be analyzed:

- **Build Alternative 2A**: This alternative connects the existing I-82/Yakima Avenue Interchange ramps, the existing Fair Avenue ramps and new ramps with a the East-West Corridor to a new C/D roadway system and reduces the number of access points with I-82 from five locations to four locations.

  This Alternative 2A includes the following improvements, illustrated on Figure PP2-4:

  - A C/D roadway is added on both sides of I-82 from south of the I-82/Yakima Avenue Interchange to north of the I-82 Overpass over the local railroad and is designed to allow space for a future widening of I-82 to six lanes as a separate project;
  - Auxiliary lanes are added westbound on I-82 from the westbound Nob Hill Boulevard on-ramp to the westbound Yakima Avenue off-ramp and from the C/D roadway to the US 12 off-ramp;
  - Auxiliary lanes are added eastbound on I-82 from the east bound US 12 on-ramp to the east C/D roadway off-ramp and from the C/D roadway on-ramp to the eastbound Nob Hill Blvd. off-ramp;
  - All existing Yakima Avenue ramps are revised to connect to the C/D roadway;
  - New westbound on and off ramps with the new East-West Corridor highway are connected to the C/D roadway;
  - A new eastbound off-ramp to the new East-West Corridor highway is connected to the C/D roadway;

FIGURE PP2-4: Alternative 2A



  - The existing I-82 off-ramp to Fair Avenue ramps is connected to the C/D roadway; and
  - The existing I-82 on-ramp from Fair Avenue is relocated to begin at the intersection of Fair Avenue and the Fair Avenue Loop Connector.

- **Build Alternative 2B**: This alternative is the same as Alternative 2A except for the following changes, as illustrated on Figure PP2-5:
  - A new eastbound on-ramp from the new East-West Corridor highway is connected to the C/D roadway;
  - The existing I-82 off-ramp to Fair Avenue ramps is removed;
  - The existing I-82 on-ramp from Fair Avenue is removed;
  - The existing Fair Avenue Loop Connector (J ramp) is removed; and
  - I-82 remains as a four-lane highway.

- **Build Alternative 2C**: This alternative is the same as Alternative 2A except for the following changes, as illustrated in Figure PP2-6:
  - A new eastbound on-ramp from the new East-West Corridor highway has a braided connection over the Fair Avenue off-ramp and connected to the C/D roadway; and
  - I-82 remains as a four-lane highway.

- **Build Alternative 2D**: This alternative is the same as Alternative 2C except for the following changes:
  - The existing I-82 on-ramp from Fair Avenue is removed; and
  - The existing Fair Avenue Loop Connector (J ramp) is removed.

- **Build Alternative 2E**: This alternative is the same as Alternative 2C except for the following changes:
  - The existing I-82 on-ramp from Fair Avenue is removed.

- **Build Alternative 3A**: This alternative is the same as Alternative 3 except for the following changes, as illustrated on Figure PP2-7:
  - The new two-way collector from Yakima Avenue to the east side roundabout is changed to a one-way collector; and
  - A second one-way collector is added from the existing Yakima Avenue flyover and connects with the east side roundabout.

FIGURE PP2-5: Alternative 2B

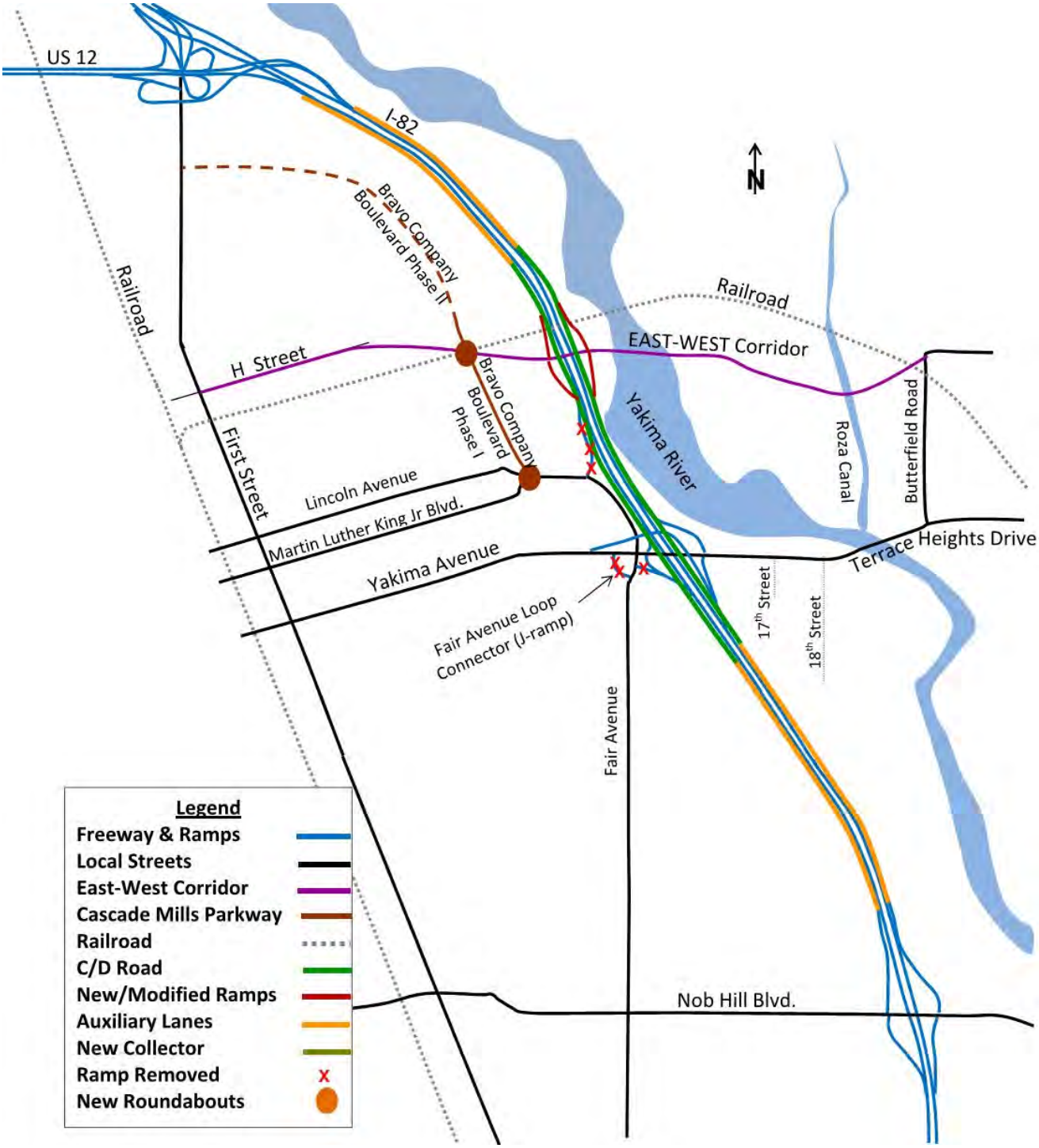


FIGURE PP2-6: Alternative 2C

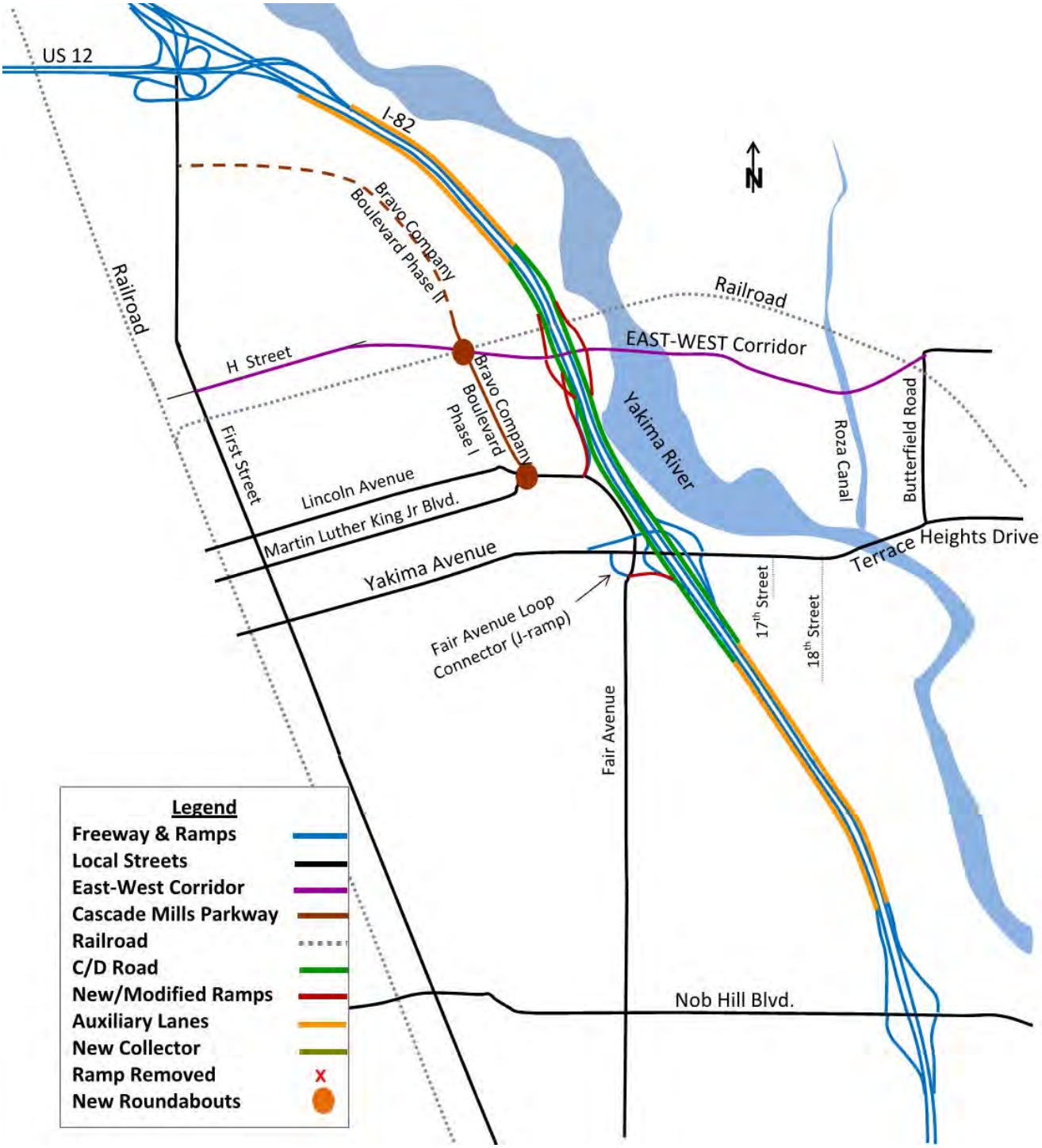
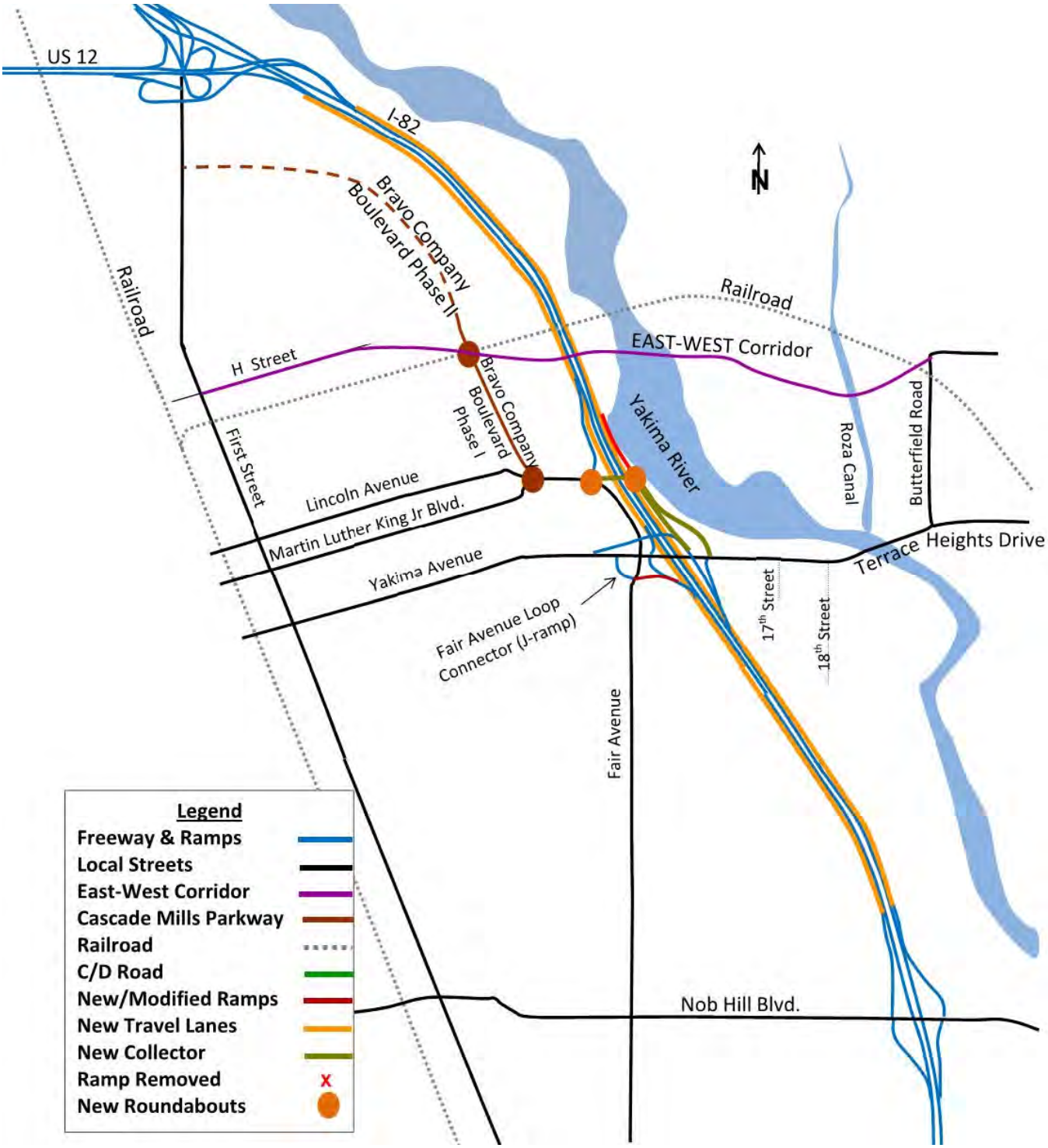


FIGURE PP2-7: Alternative 3A



What was the preliminary review of the Modified Alternatives by the Yakima IJR Stakeholders?

At the IJR Stakeholder's meeting held on February 13, 2013, representatives from FHWA, WSDOT Headquarters, WSDOT South Central Region, Yakima County, City of Yakima and the Yakima Valley Council of Governments reviewed these alternatives and conducted a preliminary review of the alternatives. The conclusions from that review are summarized below.

- **Build Alternative 2A**: Although this alternative improved traffic operations along I-82, it did not provide a full interchange with the East-West Corridor and the addition of the C/D roadway with six-lanes along I-82 provided more capacity than was needed to satisfy the 2035 traffic demands. As a result the stakeholders decided to eliminate this alternative in favor of other similar alternatives that provided a more balanced usage.
- **Build Alternative 2B**: This alternative provided good connections to the expanded regional transportation network, provided good interstate and ramp intersection operations, and reduced the number of connecting points to I-82 from five locations to four locations and has the least number of ramp connections to the C/D roadway. The stakeholders agreed that this alternative should be carried forward because it would provide an alternative with good traffic operations, good connections to the expanded regional system, and fewer connections with I-82.
- **Build Alternative 2C:** This alternative is similar to Alternative 2B in that it also provided good connections to the expanded regional transportation network, provided good interstate and ramp intersection operations, and reduced the number of connecting points to I-82 from five locations to four locations and maintained all of the existing I-82 access points using the C/D roadway. The stakeholders agreed that this alternative should be carried forward because it would provide an alternative with all existing access points to the local roadway network.
- **Build Alternative 2D**: This alternative is similar to Alternative 2C except for one less ramp that can be evaluated by reviewing Alternatives 2B and 2C. The stakeholders agreed that this alternative should not be evaluated at this time but could be a modification to Alternative 2C, if necessary.
- **Build Alternative 2E**: This alternative is also similar to Alternative 2C except for one less ramp that can be evaluated by reviewing Alternatives 2B and 2C. The stakeholders agreed that this alternative should not be evaluated at this time but could be a modification to Alternative 2C, if necessary.
- **Build Alternative 3A**: This alternative is similar to Alternative 3 except for an additional connection from the existing westbound flyover to Yakima Avenue to the east side roundabout. This new connection redirects westbound off-ramp traffic out of the Yakima Avenue intersection. The stakeholders agreed that this alternative should be further evaluated. This alternative was also analyzed with four lanes on I-82 instead of six lanes. This analysis showed that I-82 would operate at LOS E between Nob Hill Boulevard and Yakima Avenue in both directions as well as at the westbound exits to Yakima Avenue and US 12 and the eastbound exit to Nob Hill Boulevard. As a result Alternative 3A with four lanes is not being carried forward.

Which Build Alternatives did the Yakima IJR Stakeholders forward for a conceptual analyses?

The IJR Stakeholder Committee representatives decided to carry the following Build Alternatives forward for the preliminary evaluation:

- **Build Alternative 2B**: This C/D alternative with connections to the East-West Corridor and Yakima Avenue Interchanges was selected because it provided good traffic operations, good connections to the expanded regional transportation system, and had fewer connections with I-82.
- **Build Alternative 2C:** This C/D alternative with connections to the East-West Corridor and Yakima Avenue Interchanges was selected because it provided good connections to the regional transportation system and the C/D roadways maintained all existing access point connections with local streets.
- **Build Alternative 3A**: This alternative with a parallel collector roadway was selected because it may provide relief to the Yakima Avenue intersections.

What were the results of the preliminary analysis?

At the IJR Stakeholder's meeting held on May 8, 2013, representatives from the participating agencies reviewed the results of the operational analysis and scored the alternatives using the evaluation criteria approved for this preliminary review.

Based on the data provided and their engineering judgment, each Stakeholder Committee member use a rating of 1, 2, or 3 (1 being low and 3 being high) to judge how they felt each of the three alternatives satisfied the criteria. The scores were then total for each criterion and averaged to determine the overall rating for each criterion for each alternative. The Stakeholder approved weighting system was then applied to determine the weighted performance score for each alternative. The evaluation results are summarized in Table PP2-1.

What were the results of the Yakima IJR Open House?

In October 2013, Yakima County in cooperation with the City of Yakima and WSDOT held a public Open House to discuss congestion relief measures the I-82 / Yakima Avenue Interchange. Proposed improvements to resolve these congestion issues were displayed and discussed with the community. Approximately 40 community members attended the open house and provided comments and expressed their concerns about the alternatives. Their main project comments on Alternative 2B centered on the following issues:

- Maintaining the Fair Avenue Loop (J ramp), especially for trips to the Fairgrounds area;
- Maintaining the I-82 off-ramp to Fair Avenue; and
- Maintaining the On-ramp from Fair Avenue.

TABLE PP2-1: Evaluation Summary

PERFORMANCE SCORING								
No.	**Criteria**	**Average Scoring by Stakeholders**			**Weight**	**Weighted Performance**		
		Alternatives				**Alternatives**		
		2B	**2C**	**3A**		**2B**	**2C**	**3A**
1	Traffic Operations - I-82	2.2	2.2	2.3	**13.6**	29.5	29.5	31.7
2	Traffic Operations – Local Streets	2.5	1.3	2.5	**9.5**	23.8	12.7	23.8
3	Cost Factor	3.0	2.3	1.2	**6.2**	18.6	14.5	7.2
4	Connectivity Existing/ Future	2.2	2.7	1.5	**9.9**	21.5	26.4	14.9
5	Design/Deviations	2.8	2.8	2.4	**7**	19.6	19.6	16.8
6	Safety	2.8	2.2	2.2	**14.5**	41.1	31.4	31.4
7	Environmental Impacts	2.7	2.2	1.5	**10**	26.7	21.7	15
8	Utility Impacts	2.2	2.2	2.0	**3.7**	8.1	8.1	7.4
9	R/W & Access impacts	2.3	1.8	2.0	**4.1**	9.6	7.5	8.2
10	Constructability & Phasing	2.7	2.2	1.2	**9**	24	19.5	10.5
11	Levee Impacts	2.0	2.0	1.2	**5.8**	11.6	11.6	7
12	Maintenance	2.5	2.2	1.7	**6.6**	16.5	14.3	11
TOTAL PERFORMANCE SCORE						**250.6**	**216.8**	**184.9**

What additional analyses were conducted as a result of the Open House?

Because of the concerns expressed at the Open House, additional analysis was conducted to address these issues. Alternative 2B was re-analyzed by adding each of the improvements separately for the Fair Avenue Loop (J ramp), I-82 off-ramp to Fair Avenue, and the I-82 on-ramp from Fair Avenue. The results of these analyses showed that:

- While the one-way J ramp from Yakima Avenue to Fair Avenue alone does not attract significant volumes in the model, many participants at the Open House expressed concern about losing access to Fair Avenue from Yakima Avenue. Overall, converting the J ramp to a one-way, right-in only is a relatively low cost solution.
- The Fair Avenue on-ramp to I-82 does attract reasonable volumes and is desired by the community; however it adds an additional merge and extends the ramp approximately 1,000 feet.
- Variations to provide an off-ramp connection from the C/D road to Fair Avenue were analyzed. The braided ramp variation provides good traffic operations but is expected to be more expensive because of the structure costs. The East-West Corridor to Fair Avenue connector variation provides a lower cost alternative than the braided ramp, but has more operational impacts with added traffic going through the East-West Corridor C/D ramp intersection.

What alternatives were selected for detailed geometric and operational analysis by Yakima IJR Stakeholders?

At the April 2014 IJR Stakeholders' meeting, representatives from FHWA, WSDOT Headquarters, WSDOT South Central Region, Yakima County, and City of Yakima reviewed all of the analysis to date as well as comments from citizens open house and recommended that the following two alternatives be carried forward to detailed geometric and operational analysis.

- **Modified 2C (C/D Alternative) -** This alternative illustrated on Figure PP2-8 will have the following features:
    - A C/D roadway is added on both sides of I-82 from south of the I-82/Yakima Avenue Interchange to north of the I-82 Overpass over the local railroad;
    - Auxiliary lanes are added westbound on I-82 from the westbound Nob Hill Boulevard on-ramp to the westbound Yakima Avenue off-ramp; from eastbound C/D on-ramp to the Nib Hill Boulevard off-ramp, westbound C/D on-ramp to the US 12 off-ramp; and from the eastbound US 12 on-ramp to the C/D off-ramp;
    - All existing Yakima Avenue ramps and Fair Avenue are revised to connect to the C/D roadway;
    - New on and off ramps with the new East-West Corridor arterial are connected to the C/D roadway;

- The existing I-82 off-ramp to Fair Avenue ramps is redesigned as a braided ramp with the EB on-ramp from the East-West Corridor;
- The existing I-82 on-ramp from Fair Avenue will continue to be connected to the eastbound Yakima Avenue on-ramp;
- The existing Fair Avenue Loop Connector (J ramp) is converted to a one-way connector from Yakima Avenue to Fair Avenue with right-in only from Yakima Avenue; and
- The C/D roadway is designed to allow for a future widening of I-82 to six lanes as a separate project.

- **Modified 3A (Roundabout Alternative):** This alternative on Figure PP2-9 added a new collector roadway under I-82 from Fair Avenue and revises the westbound Yakima Avenue on-ramp to I-82 and maintains the existing five access points to I-82. This alternative includes the following improvements:
  - A new, two-way collector will extend east from the intersection of the I-82 eastbound off-ramp with Fair Avenue under I-82 to a new intersection on the eastside of I-82;
  - Roundabouts will be added at each end of the new collector;
  - The existing I-82 westbound on-ramp from Yakima Avenue will be converted into a one-way collector and connects with the east side roundabout;
  - A second one-way collector is added from the existing Yakima Avenue flyover and connects with the east side roundabout;
  - A new eastbound I-82 on-ramp will begin at the eastside roundabout and extend north to connect to I-82;
  - The existing I-82 on-ramp from Fair Avenue will connect to the eastbound Yakima Avenue on-ramp;
  - I-82 is widened to six-lanes from Nob Hill Boulevard to the US 12 Interchange; and
  - The existing Fair Avenue Loop Connector (J ramp) is converted to a one-way connector from Yakima Avenue to Fair Avenue with right-in only from Yakima Avenue.

FIGURE PP2-8: Modified 2C - Collector/Distributor Alternative

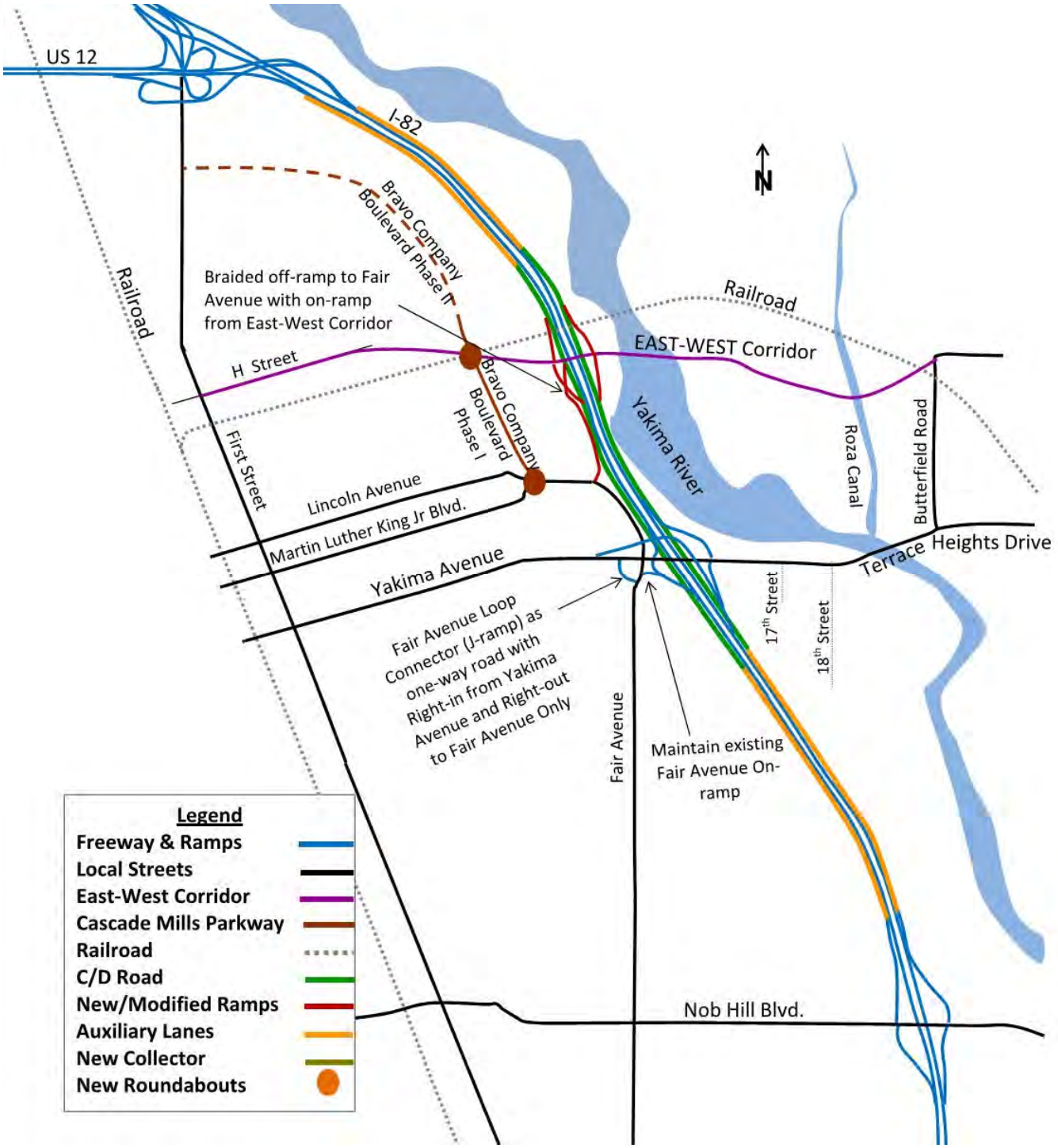
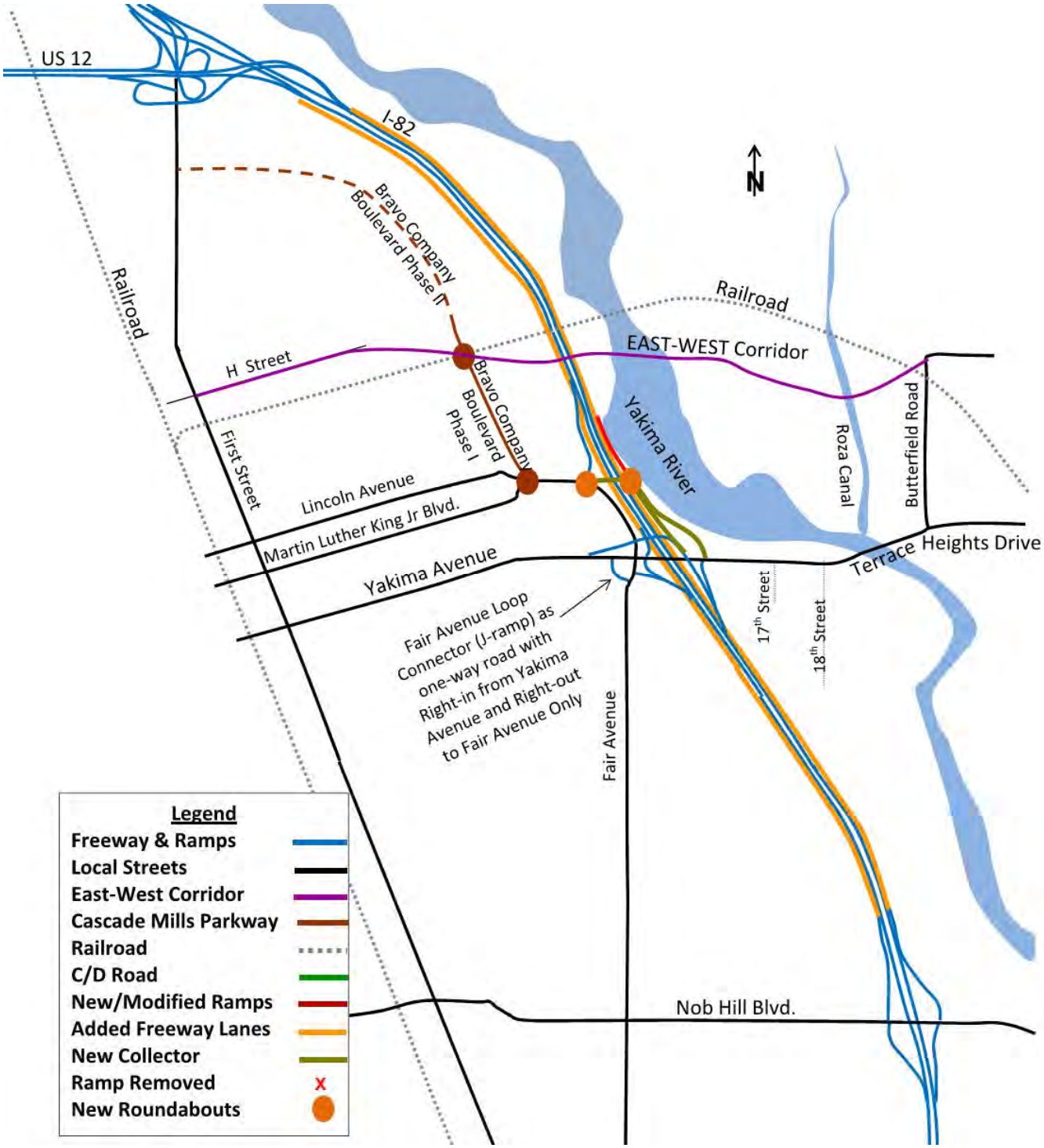


FIGURE PP2-9: Modified 3A - Roundabout Alternative



What other I-82 improvement projects should be considered for the Build Alternatives?

WSDOT has a separate project to widen I-82 to a six-lane facility from Union Gap to north of US 12. For the Modified 2C (C/D Alternative), the preliminary analysis shows that the auxiliary lanes adds the equivalent of six lanes south of Yakima Avenue to Nob Hill Boulevard and north of the East-West Corridor to US 12. The C/D roadways also removes enough demand from I-82 from north of the East-West Corridor to south of Yakima Avenue that six-lanes along I-82 through this section will not be needed until after the 2035 design horizon year.

The preliminary analysis also shows that the six-lanes on I-82 will be needed by the design year (2035) for the Roundabout Alternative, both north and south of the Yakima Avenue Interchanges. As a result, widening I-82 to six-lanes through the study area is assumed to be part of the Modified 3A (Roundabout Alternative).

Based on this review, the Stakeholder Committee agreed that both alternatives as described will be carried forwarded for more detailed analysis in the IJR process. However, they also requested that the C/D Alternative would be analyzed with both the four lanes on I-82 with the C/D roadways and auxiliary lanes, and also with six lanes on I-82 with the C/D lanes. These alternatives will be analyzed and evaluated in Policy Point 3 in order for the stakeholders to select a preferred alternative.

HOW WILL THE PROPOSED INTERSTATE IMPROVEMENTS AFFECT TRAFFIC OPERATIONS AND SAFETY AT YEAR OF OPENING AND DESIGN YEAR?

This policy points presents the operational and safely analyses for the No Build Alternative and two Build Alternatives; namely a Modified 2C - C/D Alternative and a Modified 3A - Roundabout Alternative.

With full funding of the bridges over I-82 and the Yakima River and funding of I-82 improvements through Yakima, Yakima County elected to advance a "Practical Solutions" approach to determining a preferred alternative based on specific performance metrics. The description of the performance categories and corresponding metrics as well as the results of the performance evaluation of the Build Alternative is summarized within this section. The IJR Executive Committee reviewed the results of the operations, safety and performance evaluations to select the Modified 2C - C/D Alternative as the preferred alternative to be carried forward through the environmental process. This proposed improvement provides improved traffic operations, reduces the collision rate along I-82 in the project area, and meets the performance metrics, as discussed below.

What Build Alternatives were considered as part of this analysis?

As discussed in the previous section, the following alternative improvements are to be evaluated:

- **Modified 2C - C/D Alternative -** During the conceptual design of the C/D Alternative, the Fair Avenue braided ramp was revised to extend from the East-West Corridor on-ramp to Fair Avenue, as a cost saving measure, and eliminating the need for a "braided" ramp. The C/D Alternative includes the addition of C/D roadways along both sides of I-82 that connect to I-82 north of the existing railroad bridge and south of the Yakima Avenue Interchange. The Yakima Avenue, and the new East-west Corridor ramps are connected to the C/D roadway. The off-ramp to Fair Avenue will extend from the East-West Corridor on-ramp and the on-ramp from Fair Avenue will continue to be connected to the Yakima Avenue on-ramp.

  The eastbound auxiliary lanes will extend from the US 12 on-ramp to the C/D off-ramp and from the C/D on-ramp to the Nob Hill Boulevard off-ramp. The westbound auxiliary lanes will extend from the Nob Hill Boulevard on-ramp to the off-ramp to the new C/D roadway and from the C/D on-ramp to the off-ramp to US 12. Four mainline lanes on I-82 will be maintained adjacent to the C/D roadway. The C/D roadways are designed to allow for a future widening of I-82 to six lanes, as a separate project.

Because the C/D roadways and auxiliary lanes provide the capacity of six through lanes on I-82 from Nob Hill Boulevard to US 12, additional widening of I-82 will not be needed until after the 2035 design horizon. However, for modeling purposes, a second C/D Alternative was also tested and adds the C/D roadways with a widened I-82 to six-lanes from Nob Hill Boulevard to US 12. The auxiliary lanes will not be needed with this revised C/D alternative with six lanes on I-82.

- **Modified 3A - Roundabout Alternative:** This alternative adds a new collector roadway under I-82 from Fair Avenue by raising I-82, revises the WB Yakima Avenue on-ramp to I-82, rebuilds part of the I-82 WB flyover over Yakima Avenue, maintains the existing five access points to I-82, adds two new roundabouts and widens I-82 to a six-lane facility.

Both of these alternatives include the following local improvements:

- The new East-West Corridor Arterial is added from Butterfield Road to the new Bravo Company Boulevard/H Street roundabout;
- A new Bravo Company Boulevard from Fair Avenue to First Street; and
- A widened three lane H Street.

What are the existing and design year Base conditions along I-82?

As discussed in Policy Point 1, the I-82 traffic analyses show that several segments of I-82, as well as several diverge locations, will be at LOS E by 2035 that will reduce interstate operations below acceptable levels, limiting area mobility and potentially creating a negative impact on freight operations through the project area.

Interstate Operations: As previously shown in Table PP1-1 several segments of I-82 are expected to operate at LOS E during the 2035 PM Peak Hour.

Ramp Terminal Operations: As previously shown in Table PP1-2, several turning movements at the Yakima Avenue Interchange, the Nob Hill Boulevard Interchange and the Fair Avenue Loop Connector (J-ramp) intersection are expected to operate below LOS D.

Do local improvements resolve these issues along I-82?

A summary of the local improvements, identified by the stakeholders, is discussed on page PP1-6. These local improvements, included for the 2035 design year network for analysis, are:

- East-West Corridor from 1st Street to Butterfield Road, following the alignment from the *Supplemental East-West Corridor Study* with three lanes along the existing H Street and five lanes along the rest of the corridor;
- Widening of I-82 to six lanes from the I-82/US 12 1nterchange to the I-82/Nob Hill Boulevard Interchange;
- An additional left-turn lane from Fair Avenue to Nob Hill Boulevard;
- Revision of the intersection of Yakima Avenue with the Fair Avenue Loop (J ramp) to right-in/right-out only;

- Re-alignment of the I-82 EB on-ramp with the intersection of Fair Avenue and the Fair Avenue Loop (J ramp); and
- Upgrade Fair Avenue to five lanes from its intersection with Lincoln Avenue/Martin Luther King Jr. Boulevard to Chestnut Avenue.

With the assumed I-82 widening to six lanes, all segments of I-82 are expected to operate at LOS D or better. However, at the ramp terminal intersections, especially along Yakima Avenue, several left-turning movements from the I-82 off-ramps are expected to remain below LOS D, as previously shown in Table PP1-4.

To alleviate these remaining issues, additional changes to the interstate operations at I-82/ Yakima Avenue Interchange are needed.

What are the design assumptions for the Build Alternatives?

The following is a summary of the design assumptions used to analyze the Build Alternatives:

- The design speed along I-82 is 70mph with a posted speed of 60mph.
- Design speed along the C/D roadway is 50 mph with a posted speed of 45 mph.
- Posted speed along Yakima Avenue and other arterials and collectors is generally 35 mph.
- Interchange spacing along I-82 exceeds the one mile urban area spacing requirement. The interchange spacing is as follows:
    - Nob Hill Boulevard Interchange to Yakima Avenue Interchange is approximately 1.5 miles
    - Yakima Avenue Interchange to the US 12 Interchange is approximately 1.8 miles
    - The new East-West Corridor Interchange to the US 12 Interchange is approximately 1.2 miles
    - The 0.6 mile spacing between the East-West Corridor Interchange and the Yakima Avenue Interchange is allowable because these interchanges are connected to the C/D roads and not the I-82 mainline as stated in the WSDOT Design Manual 1360.02(3).
- Truck percentages are estimated to be 15 percent based on data received from WSDOT at the start of this project for existing and future year analyses. The truck percentage along Yakima Avenue is estimated at 10 percent based on Yakima County data.
- For the Modified 2C Alternative, all mainline grades match the existing grades. For the Modified 3A Alternative, all grades along the I-82 mainline are being designed to be less than four percent. Ramp grades for all alternatives are being designed to be six percent or less.
- All proposed designs will meet design standards, except where design variations are noted.

- For the Modified 2C Alternative, no design variations are anticipated at this time. Based on the conceptual layouts, I-82 is widened to six lanes under a separate project, a shoulder width variation will be needed for the eastbound and westbound I-82 mainline
- For the Modified 3A - Roundabout Alternative, a shoulder width variation will be needed to widen I-82 to six-lanes under Yakima Avenue and the westbound flyover.

The conceptual layout showing lane arrangements and preliminary channelization with a preliminary signing plan for the C/D Alternative is presented in Policy Point 4.

How does the Build Alternatives affect the interstate operation?

The interstate traffic analyses for the I-82 mainline segments and interchange ramps merge and diverge areas within the project area were conducted for each of the Build Alternatives using Highway Capacity Manual procedures. Traffic volumes were forecasted and level of service ratings were estimated for various segments for the C/D Build Alternative and the Roundabout Build Alternative.

Traffic volumes on I-82 are expected to remain about the same for both the Modified 2C and Modified 3A Alternatives. The main difference is along the section where the C/D roadways were added, as discussed below:

- For the Modified 2C - C/D Alternative with 4-lanes on I-82 and auxiliary lanes connecting the CD roadways to Nob Hill Boulevard and US 12, the C/D roadway system carries approximately 1,000 vehicles in each direction during the PM peak hour which would normally use the I-82 mainline lanes. With this reduction in peak hour trips, the level of service along the I-82 mainline with four lanes is LOS C.
- For the Modified 2C - C/D Alternative with 6-lanes on I-82 and no auxiliary lanes, the C/D roadway system also carries approximately 1,000 vehicles in each direction during the PM peak hour traffic. As a result, the reduced traffic levels on I-82 where the C/D roadways are located improves the level of service to LOS B on I-82 during the PM peak hour.
- For the Modified 3A - Roundabout Alternative with six-lanes on I-82, traffic between Yakima Avenue and US 12 ranges from approximately 3,370 to 3,650 vehicles in each direction and operates at LOS C with six lanes on I-82 during the PM peak hour.

The level of service along the I-82 mainlines and merge/diverge areas are all LOS D or better for both Build Alternatives in 2035, as listed in Table PP3-1 and PP3-2. Several sections of I-82 have a freeway density of less than 18 passenger cars/mile/lane (pc/mi/ln) which is LOS B.

Using the capacity analysis procedures from WSDOT for single lane C/D roadways, the results show that all segments of the C/D roadways are expected to operate at LOS D or better.

TABLE PP3-1: I-82 Mainline Operations for 2035 Base Conditions and Build Alternatives

I-82 - MAINLINE TRAFFIC ANALYSIS SUMMARY -- WESTBOUND -- BUILD ALTERNATIVES

Ramp	Alternative	AM Peak Hour			PM Peak Hour			Lane Assumptions
		Freeway Volume	LOS	Density (pc/mi/ln)	Freeway Volume	LOS	Density (pc/mi/ln)	
I-82 North of US 12	2035 Base *	2,500	B	17.8	3,560	D	28.3	3-lane weave
	2035 CD with 4-Lanes On I-82 *	2,400	B	18.7	3,660	D	32.6	3-lane weave
	2035 CD with 6-Lanes On I-82 *	2,420	B	18.8	3,660	D	32.7	3-lane weave
	2035 Roundabout *	2,380	B	18.5	3,640	D	32.4	3-lane weave
I-82 at US 12	2035 Base	1,760	B	16.6	2,070	C	19.5	2-lanes
	2035 CD with 4-Lanes On I-82	1,690	B	15.9	2,270	C	21.4	2-lanes
	2035 CD with 6-Lanes On I-82	1,700	B	16.0	2,270	C	21.4	2-lanes
	2035 Roundabout	1,640	B	15.5	2,270	C	21.4	2-lanes
I-82 South of US 12	2035 Base	2,800	D	26.4	3,300	D	31.5	2-lanes
	2035 CD with 4-Lanes On I-82 *	2,750	C	21.5	3,820	D	32.4	3-lane weave
	2035 CD with 6-Lanes On I-82	2,760	B	17.4	3,820	C	24.0	3-lanes
	2035 Roundabout	2,600	B	16.4	3,650	C	23.0	3-lanes
I-82 at Yakima Avenue or C/D Roads	2035 Base	2,250	C	21.2	2,500	C	23.6	2-lanes
	2035 CD with 4-Lanes On I-82	2,190	C	20.6	2,610	C	24.6	2-lanes
	2035 CD with 6-Lanes On I-82	2,200	B	13.8	2,630	B	16.5	3-lanes
	2035 Roundabout	2,170	B	13.6	2,560	B	16.1	3-lanes
I-82 South of Yakima Avenue	2035 Base	3,390	D	32.6	3,770	E	38.3	2-lanes
	2035 CD with 4-Lanes On I-82 *	3,610	C	26.8	4,200	D	31.8	3-lane Weave
	2035 CD with 6-Lanes On I-82	3,640	C	22.9	4,300	D	27.0	3-lanes
	2035 Roundabout	3,550	C	22.3	4,060	C	25.5	3-lanes
I-82 at Nob Hill	2035 Base	2,560	C	24.1	2,930	D	27.6	2-lanes
	2035 CD with 4-Lanes On I-82	2,640	C	24.9	3,130	D	29.8	2-lanes
	2035 CD with 6-Lanes On I-82	2,670	C	25.2	3,240	D	31.1	2-lanes
	2035 Roundabout	2,620	C	24.7	3,110	D	29.6	2-lanes
I-82 South of Nob Hill	2035 Base	2,870	D	27.1	3,670	E	36.6	2-lanes
	2035 CD with 4-Lanes On I-82	2,940	D	27.7	3,750	E	38.0	2-lanes
	2035 CD with 6-Lanes On I-82	2,980	D	28.1	3,870	E	40.8	2-lanes
	2035 Roundabout	2,930	D	27.7	3,800	E	29.4	2-lanes

I-82 - MAINLINE TRAFFIC ANALYSIS SUMMARY -- EASTBOUND -- BUILD ALTERNATIVES

Ramp	Alternative	AM Peak Hour			PM Peak Hour			Lane Assumptions
		Freeway Volume	LOS	Density (pc/mi/ln)	Freeway Volume	LOS	Density (pc/mi/ln)	
I-82 North of US 12	2035 Base *	3,300	C	23.5	3,510	C	25.0	3-lane weave
	2035 CD with 4-Lanes On I-82 *	3,260	C	26.2	3,490	C	27.5	3-lane weave
	2035 CD with 6-Lanes On I-82 *	3,296	C	26.0	3,460	C	26.9	3-lane weave
	2035 Roundabout *	3,270	C	26.0	3,490	C	27.0	3-lane weave
I-82 at US 12	2035 Base	1,930	C	18.2	1,890	B	17.8	2-lanes
	2035 CD with 4-Lanes On I-82	1,980	B	17.0	1,980	C	18.7	2-lanes
	2035 CD with 6-Lanes On I-82	2,006	C	18.9	1,950	C	18.4	2-lanes
	2035 Roundabout	1,910	C	18.0+	1,940	C	18.3	2-lanes
I-82 South of US 12	2035 Base	2,890	D	27.3	3,230	D	30.7	2-lanes
	2035 CD with 4-Lanes On I-82 *	3,000	C	22.9	3,390	C	26.4	3-lane weave
	2035 CD with 6-Lanes On I-82	3,156	C	19.8	3,360	C	21.1	3-lanes
	2035 Roundabout	2,950	C	18.5	3,370	C	21.2	3-lanes
I-82 South of Fair Avenue	2035 Base	2,540	C	24.0	2,980	D	28.1	2-lanes
	2035 CD with 4-Lanes On I-82	-	-	-	-	-	-	
	2035 CD with 6-Lanes On I-82	-	-	-	-	-	-	
	2035 Roundabout	2,610	B	16.4	3,000	C	18.9	3-lanes
I-82 at Yakima Avenue or C/D Roads	2035 Base	2,080	C	19.6	2,380	C	22.5	2-lanes
	2035 CD with 4-Lanes On I-82	2,050	C	19.3	2,350	C	22.2	2-lanes
	2035 CD with 6-Lanes On I-82	2,152	B	13.5	2,330	B	14.6	3-lanes
	2035 Roundabout	2,120	B	13.3	2,450	B	15.4	3-lanes
I-82 South of Yakima Avenue	2035 Base	2,800	D	26.4	3,570	E	35.0+	2-lanes
	2035 CD with 4-Lanes On I-82 *	2,920	C	21.1	3,930	D	29.6	3-lane Weave
	2035 CD with 6-Lanes On I-82	2,950	C	18.5	4,000	C	25.1	3-lanes
	2035 Roundabout	2,900	C	18.2	3,820	C	24.0	3-lanes
I-82 at Nob Hill Boulevard	2035 Base	2,340	C	22.1	2,810	D	26.5	2-lanes
	2035 CD with 4-Lanes On I-82	2,370	C	22.4	3,060	D	29.0	2-lanes
	2035 CD with 6-Lanes On I-82	2,400	C	22.6	3,130	D	29.8	2-lanes
	2035 Roundabout	2,370	C	22.4	3,030	D	28.7	2-lanes
I-82 South of Nob Hill	2035 Base	3,010	D	28.4	3,290	D	31.4	2-lanes
	2035 CD with 4-Lanes On I-82	3,010	D	28.5	3,450	D	33.8	2-lanes
	2035 CD with 6-Lanes On I-82	3,050	D	28.9	3,570	E	35.6	2-lanes
	2035 Roundabout	3,030	D	28.7	3,510	D	34.7	2-lanes

Note * HCS weave analysis all others HCS freeway analysis

TABLE PP3-2: I-82 Merge/Diverge Operations for 2035 Base Conditions and Build Alternatives

I-82 - RAMP MERGE / DIVERGE ANALYSIS SUMMARY -- WESTBOUND

Ramp	Alternative	AM Peak Hour				PM Peak Hour			
		Ramp Volume	LOS	Density (pc/mi/ln)	Freeway Volumes	Ramp Volume	LOS	Density (pc/mi/ln)	Freeway Volumes
I-82 / US 12 Off-Ramp	2035 Base	1,040	D	29.2	2,800	1,230	D	34.1	3,300
	2035 CD with 4-Lanes On I-82	DROP LANE				DROP LANE			
	2035 CD with 6-Lanes On I-82	DROP LANE				DROP LANE			
	2035 Roundabout 6-lanes	DROP LANE				DROP LANE			
I-82 / C/D On-Ramp	2035 Base	-	-	-	-	-	-	-	-
	2035 CD with 4-Lanes On I-82	ADD LANE				ADD LANE			
	2035 CD with 6-Lanes On I-82	560	B	15.6	2,200	1,190	C	23.1	2,630
	2035 Roundabout 6-lanes	-	-	-	-	-	-	-	-
Yakima Avenue Off-Ramp	2035 Base	1,140	E	35.9	3,390	1,270	E	39.6	3,770
	2035 CD with 4-Lanes On I-82	DROP LANE				DROP LANE			
	2035 CD with 6-Lanes On I-82	1,440	B	11.7	3,640	1,670	B	15.8	4,300
	2035 Roundabout 6-lanes	1,380	D	15.8	2,170	1,090	C	23.3	2,560
Yakima Avenue On-Ramp	2035 Base	550	C	25.1	2,250	800	D	29.4	2,500
	2035 CD with 4-Lanes On I-82	Connected to C/D				Connected to C/D			
	2035 CD with 6-Lanes On I-82	Connected to C/D				Connected to C/D			
	2035 Roundabout 6-lanes	430	B	15.8	2,170	1,090	C	23.3	2,560
I-82 / Nob Hill Off-Ramp	2035 Base	310	D	30.6	2,870	740	E	38.4	3,670
	2035 CD with 4-Lanes On I-82	300	D	31.3	2,940	620	E	39.2	3,750
	2035 CD with 6-Lanes On I-82	310	C	22.8	2,980	630	D	28.3	3,870
	2035 Roundabout 6-lanes	310	D	31.2	2,930	690	E	39.7	3,800
I-82 / Nob Hill On-Ramp	2035 Base	830	C	25.6	2,560	840	D	28.9	2,930
	2035 CD with 4-Lanes On I-82	ADD LANE				ADD LANE			
	2035 CD with 6-Lanes On I-82	ADD LANE				ADD LANE			
	2035 Roundabout 6-lanes	ADD LANE				ADD LANE			

I-82 - RAMP MERGE / DIVERGE ANALYSIS SUMMARY -- EASTBOUND

Ramp	Alternative	AM Peak Hour				PM Peak Hour			
		Ramp Volume	LOS	Density (pc/mi/ln)	Freeway Volumes	Ramp Volume	LOS	Density (pc/mi/ln)	Freeway Volumes
I-82 / US 12 On-Ramp	2035 Base	960	C	24.2	1,930	1,340	C	27.0	1,890
	2035 CD with 4-Lanes On I-82	ADD LANE				ADD LANE			
	2035 CD with 6-Lanes On I-82	ADD LANE				ADD LANE			
	2035 Roundabout 6-lanes	ADD LANE				ADD LANE			
I-82/ C-D Off-Ramp	2035 Base	-	-	-	-	-	-	-	-
	2035 CD with 4-Lanes On I-82	DROP LANE				DROP LANE			
	2035 CD with 6-Lanes On I-82	1,004	C	20.7	3,156	1,030	C	21.8	3,360
	2035 Roundabout 6-lanes	-	-	-	-	-	-	-	-
Fair Ave Off-Ramp	2035 Base	350	D	29.9	2,890	250	D	33.2	3,230
	2035 CD with 4-Lanes On I-82	Drop Lane from East-West EB on-ramp				Drop Lane from East-West EB on-ramp			
	2035 CD with 6-Lanes On I-82	Drop Lane from East-West EB on-ramp				Drop Lane from East-West EB on-ramp			
	2035 Roundabout 6-lanes	340	C	21.8	2,950	370	C	24.2	3,370
Yakima Ave Off-Ramp	2035 Base	460	C	26.6	2,540	600	D	30.9	2,980
	2035 CD with 4-Lanes On I-82	Connected to C/D				Connected to C/D			
	2035 CD with 6-Lanes On I-82	Connected to C/D				Connected to C/D			
	2035 Roundabout 6-lanes	490	C	20.3	2,610	550	C	22.7	3,000
Yakima Ave On-Ramp	2035 Base	720	C	23.4	2,080	1,190	D	29.9	2,380
	2035 CD with 4-Lanes On I-82	ADD LANE				ADD LANE			
	2035 CD with 6-Lanes On I-82	798	B	11.7	2,152	1,670	B	19.8	2,330
	2035 Roundabout 6-lanes	780	B	16.8	2,120	1,370	C	23.5	2,450
I-82 / Nob Hill Off-Ramp	2035 Base	460	D	29.8	2,800	760	E	37.3	3,570
	2035 CD with 4-Lanes On I-82	DROP LANE				DROP LANE			
	2035 CD with 6-Lanes On I-82	DROP LANE				DROP LANE			
	2035 Roundabout 6-lanes	DROP LANE				DROP LANE			
I-82 / Nob Hill On-Ramp	2035 Base	670	C	22.3	2,340	480	C	24.9	2,810
	2035 CD with 4-Lanes On I-82	640	C	22.3	2,370	390	C	26.3	3,060
	2035 CD with 6-Lanes On I-82	650	B	14.6	2,400	440	B	16.8	3,130
	2035 Roundabout 6-lanes	660	C	22.5	2,370	480	C	26.8	3,030

HCS Analysis for Merge and Diverge Analyses; Add and Drop lanes analyzed as part of mainline weave analysis.

How do the Build Alternatives affect ramp intersection operations with cross streets?

Both the C/D and Roundabout Build alternatives improve traffic operations at the Yakima Avenue ramp terminals to LOS D or better, as shown in Tables PP3-3 and PP3-4, respectively.

For both Modified 2C - C/D Alternatives (with 4-lane on I-82 or with 6-lanes on I-82):

- At the Yakima Avenue ramp terminals, traffic operations are improved and all movements operate at LOS D or better.
- At Nob Hill Boulevard westbound ramp terminal, traffic operation is improved and all movements operate at LOS D or better. At the eastbound ramp terminal at Nob Hill Boulevard, traffic operations generally remain the same as the 2035 Baseline Conditions and the intersection operates at LOS D.
- At the new ramp intersections with the East-West Corridor, overall traffic operations are expected to operate at LOS C or better with all movements at LOS D or better.

For the Modified 3A - Roundabout Alternative:

- Ramp terminals with Yakima Avenue and Nob Hill Boulevard are LOS C or better with all movements LOS D or better.
- At the new roundabout intersections, all movements are expected to operate at LOS C or better.

TABLE PP3-3: Comparison of LOS and Delay for the 2035 Baseline and the 2035 Modified 2C - C/D Alternatives at selected intersection and movement during PM Peak Hour

Intersection with Selected Movements	2035 Baseline		2035 C/D Alternative with 4-lanes on I-82		2035 C/D Alternative with 6-lanes on I-82	
	LOS	Delay	LOS	Delay	LOS	Delay
I-82 WB Ramps at Yakima Avenue	A	10.0	A	6.4	A	6.1
EB Left (from Yakima Avenue)	**E**	**69.3**	D	38.4	D	36.6
NB Left (from WB Off-ramp)	**E**	**78.**3	D	54.5	D	54.5
I-82 EB Ramps at Yakima Avenue	D	42.4	C	20.8	C	22.3
WB Left (from Yakima Avenue)	**E**	**77.9**	D	38.7	D	39.6
SB Left (from EB Off-ramp)	**F**	**101.1**	D	44.8	D	44.8
I-82 WB Ramps at Nob Hill Blvd.	A	5.9	A	5.9	A	6.1
EB-Left (From Nob Hill Blvd.)	**E**	**60.0**	C	33.6	C	31.3
NB Left (from WB Off-ramp)	**E**	**56.8**	D	42.9	D	37.6
I-82 EB Ramps at Nob Hill Blvd	C	33.4	D	32.0	D	33.4
WB Left (from Yakima Avenue)	**E**	**58.2**	D	44.1	D	38.9
SB Left (from EB Off-ramp)	**E**	**76.5**	D	48.2	D	44.7
Yakima Avenue and Fair Avenue Loop Connector (J-ramp)			NA - Changed to right-in only from Yakima Avenue		NA - Changed to right-in only from Yakima Avenue	
WB Left (from Yakima Avenue)	**E**	**44.1**				
NB Left from (J-ramp)	**F**	**Too large**				
NB Right (from J-ramp)	**F**	**580.8**				
Fair Avenue and Fair Avenue Loop Connector (J-ramp)			Change to right-out only		NA – Change to right-out only	
EB Left (from J-ramp)	**F**	**475.4**				
C/D WB Ramps with East-West Corridor	**NA**		B		B	
EB Left (from Yakima Avenue)			All movements		All movements	
NB Left (from WB Off-ramp)			LOS D or better		LOS C or better	
C/D EB Ramps with East-West Corridor	**NA**		C		B	
WB Left (from Yakima Avenue)			All movements		All movements	
SB Left (from EB Off-ramp)			LOS D or better		LOS C or better	

TABLE PP3-4: Comparison of LOS and Delay for the 2035 Baseline and the 2035 Modified 3A - Roundabout Alternatives at selected intersection and movement during PM Peak Hour

Intersection with Selected Movements	2035 Baseline		2035 Roundabout Alternative	
	LOS	Delay	LOS	Delay
I-82 WB Ramps at Yakima Avenue	A	10.0	A	2.0
EB Left (from Yakima Avenue)	**E**	**69.3**	A	0.7
NB Left (from WB Off-ramp)	**E**	**78.**3	D	46.2
I-82 EB Ramps at Yakima Avenue	D	42.4	C	18.5
WB Left (from Yakima Avenue)	**E**	**77.9**	B	15.7
SB Left (from EB Off-ramp)	**F**	**101.1**	D	41.2
I-82 WB Ramps at Nob Hill Blvd.	A	5.9	A	5.8
EB-Left (From Nob Hill Blvd.)	**E**	**60.0**	D	35.0
NB Left (from WB Off-ramp)	**E**	**56.8**	D	41.2
I-82 EB Ramps at Nob Hill Blvd	C	33.4	C	26.5
WB Left (from Yakima Avenue)	**E**	**58.2**	D	40.7
SB Left (from EB Off-ramp)	**E**	**76.5**	D	44.5
Yakima Avenue and Fair Avenue Loop Connector (J-ramp)			NA - Changed to right-in only from Yakima Avenue	
WB Left (from Yakima Avenue)	**E**	**44.1**		
NB Left from (J-ramp)	**F**	**Too large**		
NB Right (from J-ramp)	**F**	**580.8**		
Fair Avenue and Fair Avenue Loop Connector (J-ramp)				
EB Left (from J-ramp)	**F**	**475.4**	NA – Change to right-out only	
Eastside Roundabout with WB on-ramp	**NA**		A All movements LOS C or better	8.8
Westside Roundabout with Fair Avenue	**NA**		B All movements LOS C or better	14.6

Summary HCS and Synchro tables for the Build Alternatives are shown in Appendix C.

What was the collision history along I-82 between 2006 and 2010?

A five-year collision analysis was conducted along the I-82 Mainline from MP 30.90 west of the I-82/US 12 interchange to MP 35.51 east of the Nob Hill Boulevard Interchange, including ramps and cross streets within the limited access area. Collisions varied throughout the corridor, with causes ranging from driver inattention, exceeding reasonable speeds, following too closely, and other factors. The safety analysis, using collision data and classifying the collisions by type and severity, is summarized below.

Under Section 409 of Title 23 of the United States Code, collision data maintained for purposes of evaluating potential highway safety enhancements "shall not subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data."

From January 1, 2006 through December 31, 2010, there were a total of 219 collisions reported along the I-82 mainline with an additional 263 collisions reported along the associated ramps and cross streets, as shown on Figure PP3-1. Several of the collisions reported in 2006-2007 occurred within work zones along I-82.

The collision total throughout the study area varies on a yearly basis, with the average being 44 mainline collisions per year and 96 total collisions per year, including mainline, ramp and cross street collisions.

FIGURE PP3-1: I-82 Collision Summary by Year (2006 to 2010) from MP 30.90 to MP 35.51

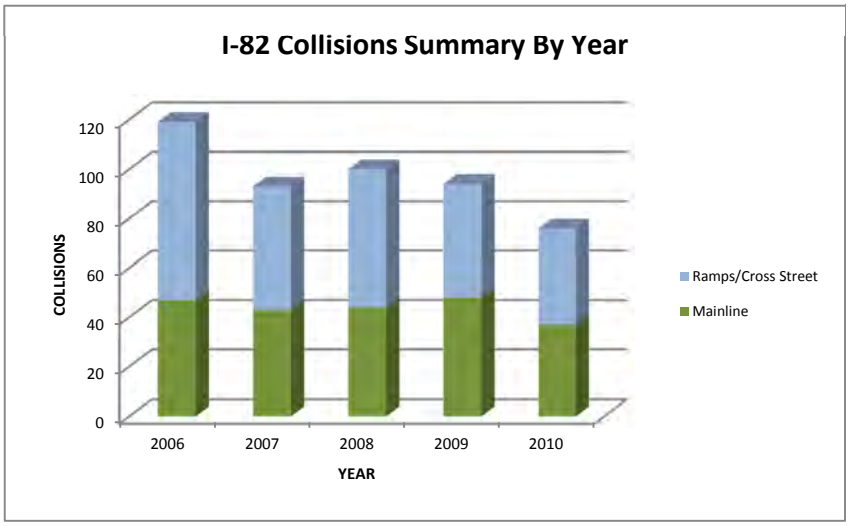


Table PP3-5 shows a comparison of the severity of collisions through the project area with the statewide and South Central Region averages for interstate travel. The estimated collision rates on I-82 through the project area are above the statewide and South Central Region averages for urban areas.

TABLE PP3-5: Comparison of Corridor Collisions with State Average Collision Rates [3]

	Collisions	Collision Rate per MVM [1]	2010 Average Collision Rates [2] Interstate - Statewide			2010 Average Collision Rates [2] Interstate - South Central Region		
I-82 Mainline			**Rural**	**Urban**	**All**	**Rural**	**Urban**	**All**
Fatalities	1	0.0027	0.0035	0.0027	0.0029	.0056	0.0024	0.0049
Injury	59	0.16	0.16	0.39	0.32	0.20	0.34	0.23
Property Damage Only	159	0.43	0.35	0.86	0.71	0.42	0.74	0.49
Total	219	0.59	0.51	1.25	1.03	0.63	1.08	0.72
I-82 Mainline, Ramps, Cross Street								
Fatalities	3	0.008	0.0035	0.0027	0.0029	.0056	0.0024	0.0049
Injury	154	0.41	0.16	0.39	0.32	0.20	0.34	0.23
Property Damage Only	325	0.87	0.35	0.86	0.71	0.42	0.74	0.49
Total	482	1.29	0.51	1.25	1.03	0.63	1.08	0.72

Notes: [1] Based on I-82 collision data between MP 30.90 and MP 35.51 for years 2006 through 2010 as prepared by H. W. Lochner

Based on an AADT of 44,384 vehicles over the 4.61 mile corridor length, there were a total of 74.682 million vehicle-miles annually.

[2] Statewide and South Central Region Collision Rates include mainline, ramp and cross street collisions.

[3] Several of the collisions reported in 2006-2007 occurred within work zones along I-82.

Source 2010 Washington State Collision Data Summary and WSDOT's 2010 Annual Traffic Report

For the 154 collisions with injuries, seven were serious injuries with three along I-82 mainline and four on ramps or at ramp intersections. This safety issue is also verified based on WSDOT's safety assessment completed in 2011 that indicated there were two Collisions Analysis Locations (CALs) along this section of I-82. The two CALs are located between MP 32.87 and MP 33.24, and between MP 34.90 to MP 35.50. No Collision Analysis Corridors (CACs) or Intersection Analysis Locations (IALs) were identified in WSDOT's assessment. More recent analysis completed by WSDOT in 2015 showed these locations are no longer listed as CALs which indicates the safety issue along I-82 is improving. An explanation of the CACs, CALs, and IALs and how WSDOT identifies them is contained in Appendix E.

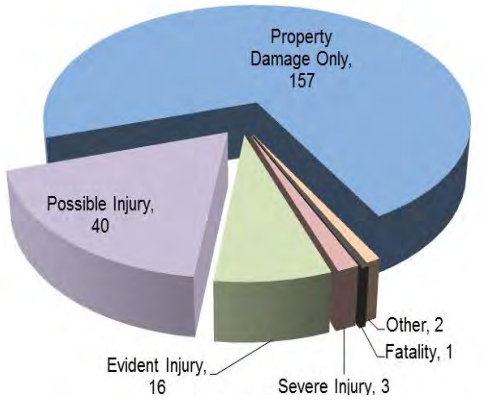
Figure PP3-2, on the following page, illustrates the frequency of collisions by milepost where the mainline collisions have occurred along the interstate over the five year period. As expected, the majority of the collisions are in the vicinity of the interchanges where traffic tends to slow down for entering and exiting vehicles.

What was the severity of I-82 mainline collisions?

For this analysis, collisions are classified by their severity. These classifications include: fatality collisions, severe injury collisions, evident injury collisions, possible injury collisions, and property damage only collisions.

Figure PP3-3 shows a breakdown of the collisions by classification along I-82 mainline between 2006 and 2010. As can be observed, property damage only collisions comprised over two-thirds of all collisions along I-82. There were three collisions involving a fatality over the five year period.

FIGURE PP3-3: Severity of Collisions along I-82



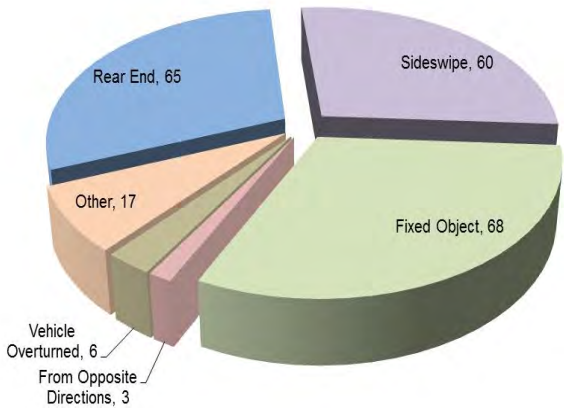
Overall, 11 percent of the collisions involved serious injury, evident injury or a fatality.

What were the types of I-82 mainline collisions?

For this analysis, collisions along I-82 mainline are grouped according to type. The categories are rear-end collisions, sideswipe collisions, fixed object collisions, from opposite direction collision, vehicle overturned collisions, and an encompassing 'other' category, which includes animal related collisions, and unidentified collision types.

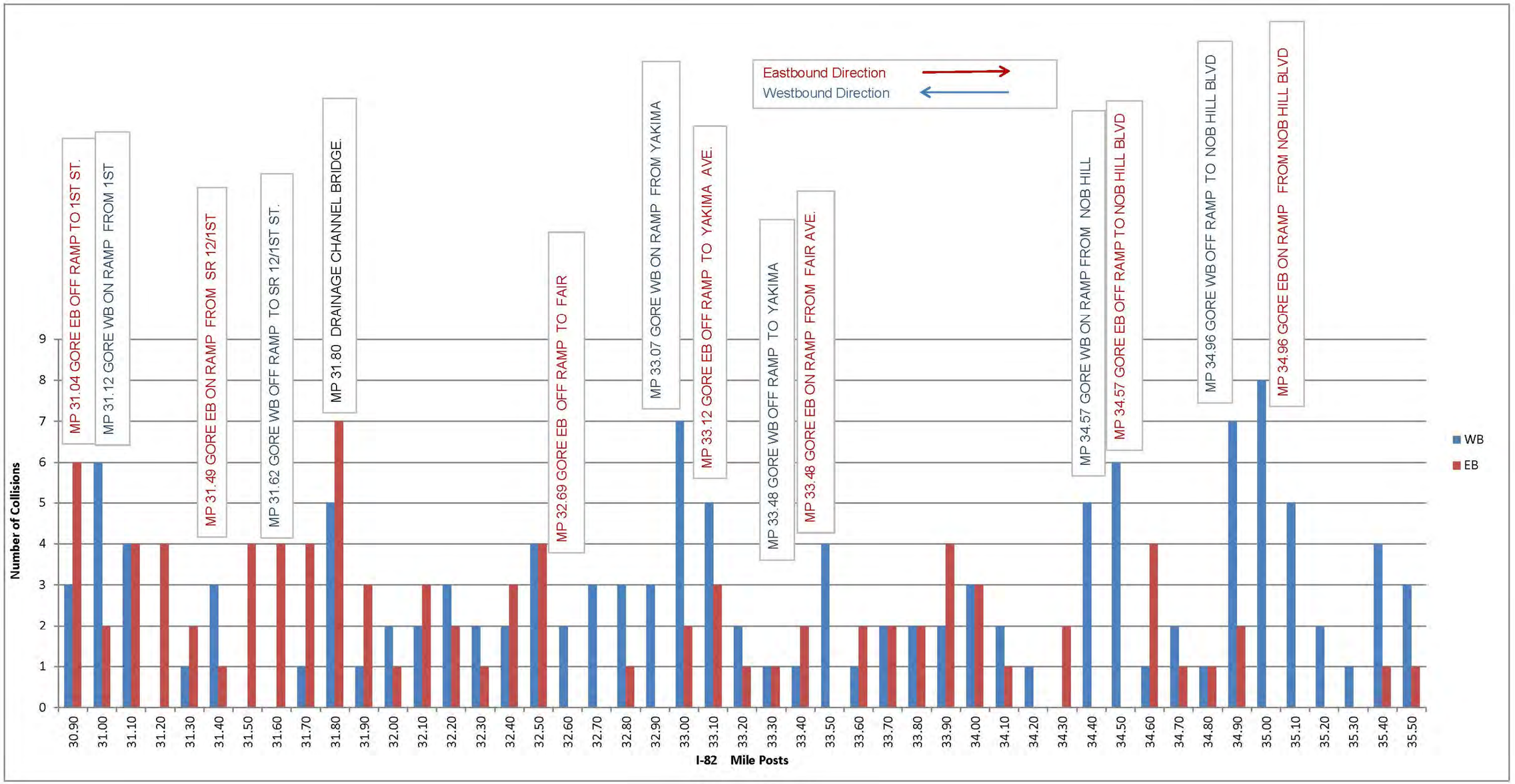
Figure PP3-4 shows a breakdown of the collision types and number along I-82 mainline between 2006 and 2010.

FIGURE PP3-4: Collision Types along I-82



This collision chart indicates that rear-end collisions, sideswipe collisions, and collisions with fixed objects form 88 percent of the mainline collisions.

FIGURE PP3-4: Frequency of Collisions along I-82 Mainline Between MP 30.90 and MP 35.51 from January 2006 through December 2010



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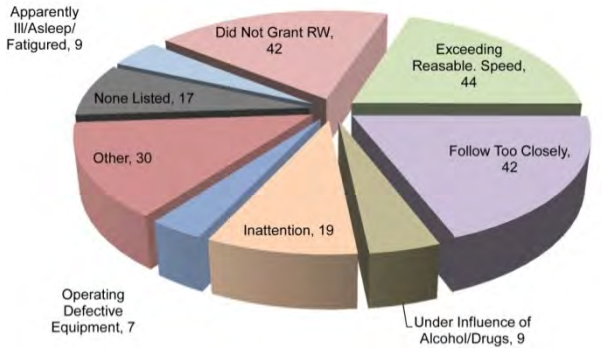
What were the contributing circumstances listed for the I-82 mainline collisions?

There are various contributing circumstances that lead to collisions along I-82. The main contributing circumstances for I-82 mainline collision (as reported by the police officer responding to the collisions) between 2006 and 2010 are summarized in Figure PP3-5.

FIGURE PP3-5: Contributing Circumstances for Mainline Collisions along I-82



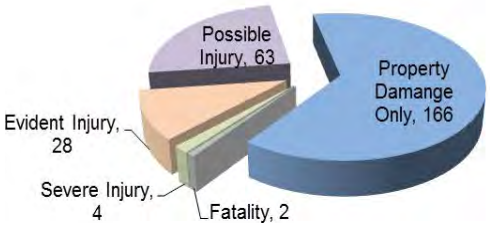
Drivers who are exceeding reasonable speed, following too closely, or did not grant others the right of way combined for nearly 60 percent of the mainline collisions; while four percent of drivers were under the influence of alcohol or drugs and another four percent were ill, asleep or fatigued.

No contributing circumstances (including 'Other' or 'None Listed' categories) were listed to 21 percent of the collisions.

What was the severity of collisions at area interchanges and along cross streets?

The various interchange ramps and cross streets in the limited access area were also analyzed. These interchange areas included the Nob Hill Boulevard, Yakima Avenue and US 12 interchanges. As illustrated in Figure PP3-6, there were a total of 263 collisions during the five-year analysis period from 2006 through 2010 at these three interchange areas.

FIGURE PP3-6: Severity of Collisions at area Interchanges along I-82



Over 63 percent of these collisions were property damage only collisions, which is typical of congested urban areas. There were two collisions involving fatalities over the five years and about 12 percent had severe or evident injury collisions. Another 24 percent had possible injuries.

What were the type of collisions at interchanges and along cross streets?

These collisions were also grouped according to type at the three interchanges along I-82 in the project area. The categories used are rear-end collisions, sideswipe collisions, fixed object collisions, entering at angle, vehicle overturned, vehicle/pedestrian, opposite direction collisions, and an encompassing 'other' category, which includes animal-related collisions, and those collision types not identified.

Figure PP3-7 shows a breakdown of the collision types for the three interchanges. With nearly 50 percent of all collisions, the highest percentage of the collisions at these interchanges are 'Rear end.' This type of collision generally correlates with congestion.

Other major collision types involved 'Fixed Objects' with 19 percent and collisions by vehicles 'Entering at an angle' with 11 percent.

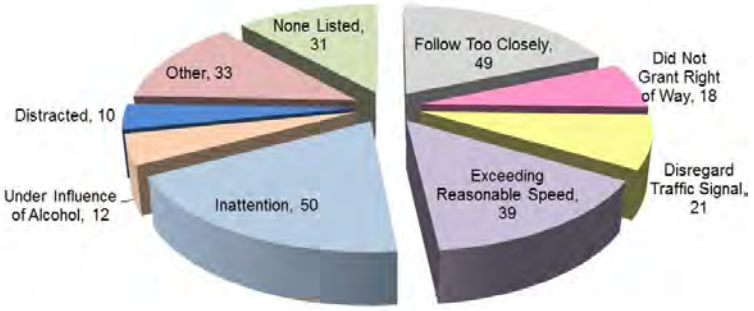
FIGURE PP3-7: Type of Collision at Interchanges along I-82

What were the contributing circumstances listed for collisions at area interchanges and along cross streets?

The primary contributing circumstances, as noted by police officers for collisions at the three area interchanges and cross street intersections, are summarized in Figure PP3-8. The following contributing circumstances were attributed to approximately 68 percent of the collision during this five-year period:

- Inattention 19%
- Following too closely 19%
- Exceeding reasonable speed 15%
- Disregard for traffic signals 8%
- Did not grant right of way 7%

FIGURE PP3-8: Contributing Circumstances for Collision at Interchanges along I-82



The 'Other' and 'None Listed' Categories accounted for approximately 24 percent of all collisions.

Appendix E contains exhibits that summarize the collisions at each interchange and include ramps and cross streets collisions within the limited access area.

How does the Build Alternatives affect Fatal and Serious Injury collisions along I-82?

To determine the effect the proposed alternatives would have on I-82 mainline collisions, the Enhanced Interchange Safety Analysis Tool (ISATe) developed for FHWA was used. The ISATe predicts collisions based on the relationship between geometric design features and system performance. The ISATe is a tool to help make informed judgments about the performance of design alternatives and is not a substitute for engineering judgment. The number of fatal and serious injury collisions, as predicted by the ISATe model, for the No Build and Build Alternatives are summarized in Table PP3-6.

Table PP3-6: Estimated Number of Annual Fatal and Serious Injury Collisions by Alternative in 2035

Alternative	Fatal Collisions				Serious Injury Collisions			
	Mainline	Ramps or C/D	Ramp Intersections	Total	Mainline	Ramps or C/D	Ramp Intersections	Total
No Build 4-lanes	0.40	0.12	0.02	0.5	1.05	0.37	0.33	1.8
No Build 6-lanes	0.45	0.13	0.02	0.6	1.16	0.39	0.33	1.9
Modified 2C 4-lanes	0.40	0.22	0.02	0.6	1.05	0677	0.42	2.1
Modified 2C 6-lanes	0.44	0.22	0.02	0.7	1.14	0.68	0.41	2.2
Modified 3A 6-lanes	0.45	0.14	0.02	0.6	1.19	0.42	0.35	2.0
Assumptions: Mainline length - 4.13 miles between Nob Hill Boulevard and US 12 Interchanges for all alternatives Ramps and C/D - No Build (3.9 miles); Modified 2C (9.2 miles); Modified 3A (4.3 miles) Ramp Intersections - No Build (6 terminals); Modified 2C (8 terminals); Modified 3A (7 terminals)								

The proposed Modified 2C -C/D alternative was analyzed with both a four lane I-82 mainline and a six lane mainline configurations to evaluate changes in possible future year operations. The proposed Modified 3A – Roundabout alternative was analyzed with a six lane I-82 mainline.

Overall, the number of fatal and serious collisions remains about the same for all alternatives or less than one fatal collision per year and about 2 serious injury collisions per year. The fractional higher values for the Build Alternatives are caused by increases in ramp or C/D length and the number of ramp terminals.

How would the Build Alternatives affect overall collisions along I-82?

To compare the effect of the changes in volumes, and variations in channelization and interchange layouts, both the total number of collisions and the frequency of collisions were estimated for mainline operations and ramps or C/D operations on a per million vehicle mile (MVM) basis. For ramp terminals, the frequency of collisions was based on the number of vehicles entering the intersection. The number of collisions and frequencies of collisions are summarized in Table PP3-7. The full analysis reports are contained in Appendix G.

The results of the analysis show that the number of collisions and the frequency of collisions along the I-82 mainline are similar for all alternatives. The Modified 2C alternative with a four-lane I-82 does indicate a slight reduction in number and frequency of collisions along the I-82 mainline.

The number of collisions along the ramps and C/D roadways for the Build alternatives is higher than the No Build alternative because of an increase in the number of and the total length of ramps and/or C/D roads for the Build alternatives. However, the frequency of collisions per million vehicle miles traveled along the ramps and/or C/D roads for the Build alternative is lower than the No Build alternative, especially for the Modified 2C - C/D alternative with either a 4-lane or 6-lane I-82 mainline.

Similarly, the number of collisions associated with the ramp terminals is slightly higher for the Build alternatives as compared to the No Build alternative because the build alternatives have more intersections being analyzed. Taking these changes into account, the frequency of collisions at the ramp terminal is about the same for the Modified 2C alternatives and slightly higher for the Modified 3A alternative.

Table PP3-7: Estimated Number and Frequency of Annual Collisions in 2035

Location	No Build Alternative (4-lane/6-lanes on I-82)		Modified 2C - C/D Alternative 4-lane/6-lanes on I-82)		Modified 3A - Roundabout Alternative (6-Lanes on I-82)	
I-82 Mainline	Collisions	Collisions per MVM [1] along mainline	Collisions	Collisions per MVM [1] along mainline	Collisions	Collisions per MVM [1] along mainline
	55.5/54.7	0.63/0.59	55.3/54.3	0.61/0.59	58.7	0.62
Ramps & CD Roads	Collisions	Collisions per MVM [1] on ramps / C/Ds	Collisions	Collisions per MVM [1] on ramps / C/Ds	Collisions	Collisions per MVM [1] on ramps / C/Ds
	13.2/13.62	1.18/1.17	24.0/25.0	0.94/0.94	15.8	1.10
Ramp Terminals	Collisions	Collision per million vehicles	Collisions	Collision per million vehicles	Collisions	Collision per million vehicles
	37.3/38.3	0.46/0.46	46.4/46.2	0.47/0.48	43.3	0.53

Notes: [1] Million Vehicle Miles

What performance measures were used to compare the Build Alternatives?

As defined in Policy Point 1, the IJR Stakeholder Committee, at an IJR Workshop in November of 2016, identified evaluation criteria that were most important to each agency. The measures were then grouped according to their common goal. These evaluation goals are listed below:

- Mobility along the interstate
- Mobility in the local system
- Multimodal Mobility
- Safety
- Economic Vitality
- Environment
- Constructability/Maintenance
- Community Support
- Cost

At the IJR Workshop, the IJR Stakeholder Committee decided not to use cost measures when evaluating the build alternatives to select a preferred alternative because there is insufficient cost data available. The IJR Stakeholder Committee proceeded to discuss and evaluate the build alternatives based on the data provided in the draft IJR. The following scoring process was used to rate the build alternatives as they compare to the No Build Alternative:

Scoring Process (relative to other alternatives)

+	Benefit
o	Neutral
-	Impact

What were the evaluation results using the performance categories?

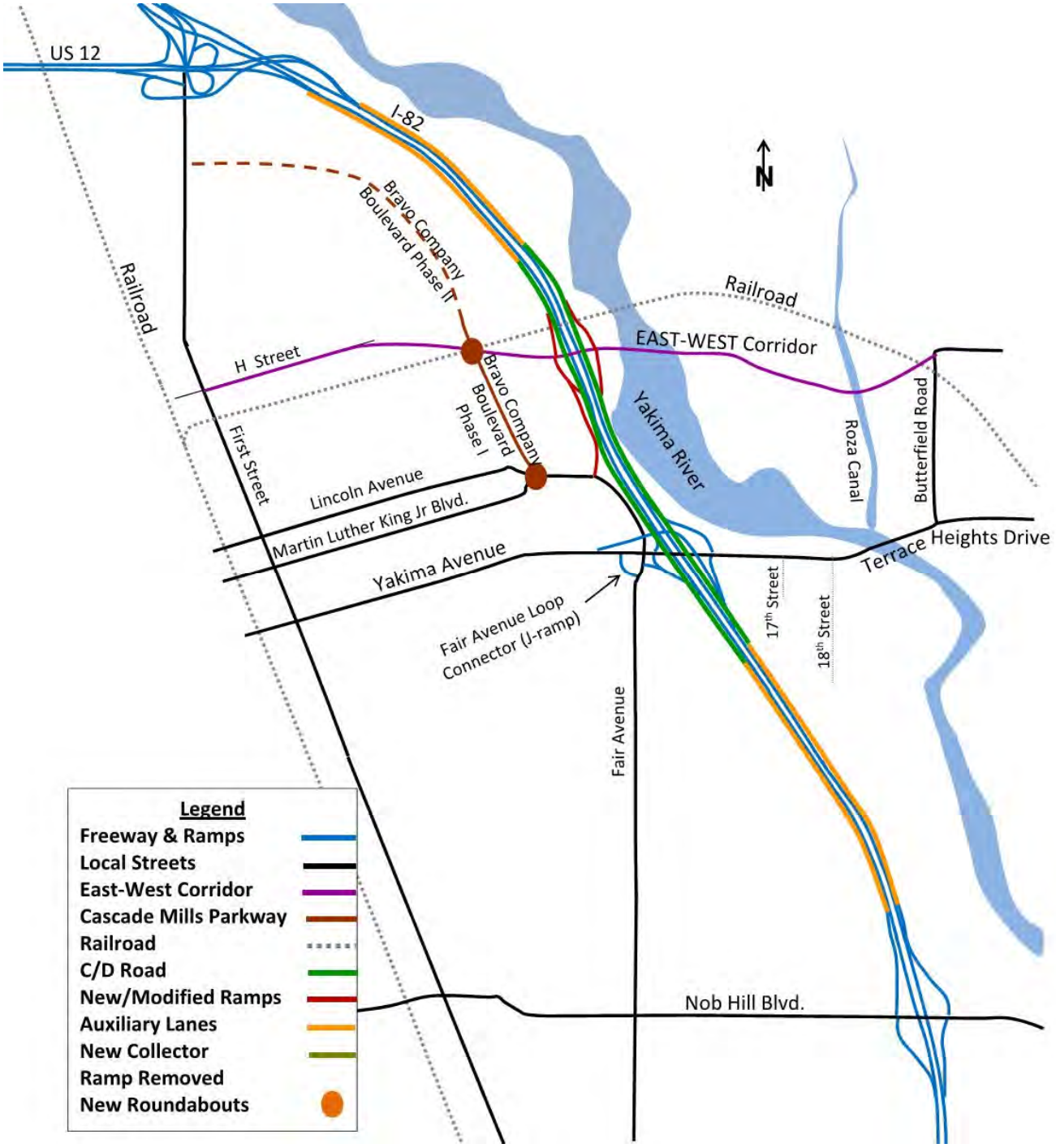
The stakeholders' scoring results are summarized in Table PP3-8. Based on this evaluation, the IJR Stakeholder Committee agreed that the Modified Alternative 2C - C/D with four lanes on I-82 is the preferred alternative and will be carried forward into the NEPA evaluation process.

The Modified Alternative 2C, as illustrated in Figure PP3-9, was selected because it will have the following benefits and impacts: This alternative improves interstate and local system mobility and meets level of service standards. The number of expected fatal and serious injury collision are consistent with the No Build Alternative even with added lane-miles of highway and intersections. Overall, the total number of collisions slightly increases over the No Build Alternative but the rate of collisions per MVM of travel decreases. This alternative directly supports the economic vitality of the area on both sides of I-82 and directly ties into the future regional transportation system. It reduces the number of access points to the I-82 mainline but added access points to the C/D system.

Table PP3-8: Summary of Stakeholder Scoring for the I-82 / Yakima Avenue Alternative Improvements

GOAL	EVALUATION CRITERIA	Modified 2C (C/D Alternative)	Modified 3A (Roundabout Alternative)
Mobility – Interstate	Preserve space for future widening of I-82 to three lanes in each direction	o	o
	Maintain level of service/Maintain Interstate mobility	+	+
Mobility - Local System	Yakima Avenue / Terrace Heights Corridor	+	+
	Terrace Heights Corridor	+	o
	Mobility to arterial street system/Improvement of local street system	+	+
	Alternative route providing redundancy for the Terrace Heights Bridge	+	o
	Yakima Regional Connectivity	+	o
	System relief (future connection to Fruitvale Boulevard)	+	+
Mobility – Multimodal	Maximizes multimodal opportunities	o	o
Safety	Safety (Maintains/Decreases Fatalities & Serious Injury Collisions)	o	o
	Safety (Maintains/Decreases total collisions)	-	-
	Improve safety at Merge/Diverge locations	-	-
Economic Vitality	Enhances access to mill site	+	o
	Enable redevelopment	+	o
Environmental	Minimize negative impacts to riparian environment	o	-
Constructability / Maintenance	Ease of constructability	Alternative 2C is easier to implement than Alternative 3A	
	Easily Maintained	-	-
Community Support	Public Support	+	+
Cost	Best value for investment	NA	NA
	Stay within budget	NA	NA

FIGURE PP3-9: Recommended Modified 2C - C/D Alternative



This alternative does require some existing structures to be widened but none are totally rebuilt. It does require some work over a canal to widen an existing structure and impacts the Kiwanis Park. Because most of the construction is outside the active roadway footprint, traffic disruptions and detours during construction are minimized. This alternative is supported by all local agencies.

Modified Alternative 3A does improve interstate and local mobility but does not directly connect to the regional arterial system, does not improve access to new developments or the Cascade Mill site, requires existing structures to be rebuilt, and is more difficult to construct while maintaining two lanes of traffic on I-82 in each direction. It may also have environmental impacts because it may require the Frank Frederick Pocket Park to be relocated and the east side roundabout may impact the back side of the Yakima River levee. As a result of these economic, regional connectivity, constructability and environmental issues, Modified Alternative 3A is not recommended.

Modified Alternative 2C - C/D with four lanes on I-82 is recommended as the preferred alternative and will be carried forward into the NEPA evaluation process. The remaining policy points will be focused on this alternative.

What was the VISSIM Traffic Analysis for the 2035 No-Build and the 2035 Modified 2C - C/D Alternative?

To confirm the previous operational analysis of the Modified Alternative 2C, future traffic analyses were completed using *VISSIM* (Version 5.40) micro-simulation modeling software. The simulations conducted were for:

- 2035 No-Build Alternative
- Proposed 2035 Modified 2C - C/D Alternative with a 4-lane on I-82
- Proposed 2035 Modified 2C - C/D Alternative with 6-lanes on I-82

The analyses for each of these alternatives were conducted along I-82 from northwest of the US 12 Interchange to southeast of the Nob Hill Boulevard Interchange and included ramp terminals along this segment.

Each alternative was simulated eleven times for both the AM and PM peak periods using random seed numbers 1 through 11. The AM and PM models simulate traffic conditions from 6:30 AM to 8:30 AM and from 3:30 PM to 5:30 PM, respectively. The Measures of Effectiveness (MOEs) for each alternative were then calculated by averaging the results for the eleven model runs. Segment performance for the controlled access mainline was evaluated using volumes, speeds and densities. Intersection operations were evaluated using volumes, queuing and control delays. For comparative purposes, the intersection control delays were assigned LOS values based on the criteria established in the 2000 Highway Capacity Manual.

Key portions of the analysis for each alternative are discussed below. For fully detailed result summaries, please see Appendix D.

Overall Network: On a network wide basis, the 2035 No-Build models show that I-82 has some traffic deficiencies which result in a portion of the traffic not being processed in the PM model run. The AM model runs were able to process 100% of input volumes. During PM peak period, only 96.1% of vehicle inputs are processed by the model. The improvements in the recommended alternative solve many of the issues present in the 2035 No-Build network.

With the proposed C/D Alternatives with either 4-lanes or 6-lanes on I-82, the 2035 models show that I-82 is better able to process the demand volumes. The proposed C/D Alternatives processes 99.6% of the demand during the AM peak period and 99.9% of the demand during the PM peak period.

Analysis Results: As shown in Table PP3-9, the proposed C/D Alternative provides similar level-of-service during the AM peak hour and improved level-of-service during the PM peak hour, as compared to the 2035 No-Build conditions.

The analysis of the proposed Modified 2C - C/D Alternative, discussed above, was conducted with I-82 as a 4-lane and a 6-lane facility adjacent to the C/D system. This analysis was conducted with this portion of I-82 as a 6-lane facility to ensure that the mainline and C/D system would continue to operate acceptably once this portion of I-82 is widened to 6-lanes. Based on the analysis, included in Appendix D, the I-82 corridor will work well under either scenario with I-82 mainline densities averaging between 20 and 30 vehicles per lane per mile (vplpm).

Table PP3-9: Peak Hour Traffic Analysis Results from the VISSIM model for the Modified 2C - C/D Alternatives compared to the No Build Alternative

Alternative	Intersection		Approach	AM Peak Hour		PM Peak Hour	
				Delay (sec/veh)	LOS*	Delay (sec/veh)	LOS*
2035 No-Build	Yakima Avenue / I-82 Interchange	EB Ramps (Signalized)	EB Arterial	22	C	43	D
			WB Arterial	17	B	24	C
			Off-Ramp	55	D	78	E
			Overall Intersection	**25**	**C**	**42**	**D**
		WB Ramps (Signalized)	EB Arterial	8	A	11	B
			WB Arterial	5	A	10	A
			Off-Ramp	2	A	6	A
			Overall Intersection	**6**	**A**	**10**	**A**
2035 Build 4-Lane I-82	Yakima Avenue / I-82 Interchange	EB Ramps (Signalized)	EB Arterial	17	B	19	B
			WB Arterial	13	B	12	B
			Off-Ramp	31	C	34	C
			Overall Intersection	**17**	**B**	**18**	**B**
		WB Ramps (Signalized)	EB Arterial	1	A	3	A
			WB Arterial	2	A	4	A
			Off-Ramp	2	A	3	A
			Overall Intersection	**2**	**A**	**3**	**A**
2035 Build 6-Lane I-82	Yakima Avenue / I-82 Interchange	EB Ramps (Signalized)	EB Arterial	17	B	19	B
			WB Arterial	13	B	13	B
			Off-Ramp	31	C	34	C
			Overall Intersection	**17**	**B**	**19**	**B**
		WB Ramps (Signalized)	EB Arterial	1	A	3	A
			WB Arterial	2	A	4	A
			Off-Ramp	2	A	3	A
			Overall Intersection	**2**	**A**	**3**	**A**

Note * LOS values are based on a comparison of VISSIM delay values with delay limits contained in the HCM.

What are the staging assumptions for the Modified 2C - C/D Alternative and how do they affect interstate operations?

The opening year elements of the Modified 2C - C/D Alternative are proposed to be constructed in two general stages for analysis purposes, as discussed below. This initial staging plan is under review and may change depending on availability of funds.

Stage 1: The initial construction stage of the C/D Alternative includes the following interstate improvements:

- Disconnecting the westbound Yakima Avenue on-ramp and extending it under the East-West Corridor, over the existing rail line and the reconnecting it to I-82.
- The new East-West westbound on and off-ramps are connected to the extended Yakima Avenue on-ramp.
- Disconnecting the eastbound Yakima off-ramp and extending it back along I-82 under the East-West Corridor, over the existing rail line and the reconnecting it to I-82.
- The new East-West eastbound off-ramp is connected to the extended Yakima Avenue on-ramp.
- The eastbound off-ramp to Fair Avenue is also disconnected from I-82 and re-connected to the extended eastbound Yakima Avenue off-ramp.

These elements of the initial construction stage are depicted in Figure PP3-10 with local improvements. The local improvements assumed to be completed with the initial interstate construction include:

- Bravo Company Boulevard from Fair Avenue to the H Street extension (The new roundabout at Fair Avenue / Lincoln Avenue / Martin Luther King Jr. Boulevard is currently under construction).
- H Street improved and extended from 1st Street to the new Bravo Company Boulevard.
- The East-West Corridor from the Bravo Company Boulevard over I-82 to the Yakima River.

Stage 2: The second construction stage of interstate improvements completes the C/D roadway system along both sides of I-82, as illustrated in Figure PP3-11. This construction stage includes:

- Complete the eastbound C/D roadway from the Yakima Avenue eastbound off-ramp to south of the Yakima Avenue eastbound on-ramp and connect to I-82 mainline.
- Connect the eastbound on-ramp from Yakima Avenue to C/D roads.
- Complete the westbound C/D roadway from south of the Yakima Avenue westbound off-ramp and tied into the C/D roadway at the westbound Yakima Avenue on-ramp.
- The Yakima Avenue westbound off-ramp and westbound on-ramp are connected to the new C/D roadway.
- A new eastbound on-ramp from the East-West Corridor is constructed and connected to the C/D roadway. The off-ramp to the Fair Avenue off-ramp is then connected to the new on-ramp from the East-West Corridor.
- An auxiliary lane is constructed westbound along I-82 from the two-lane on-ramp from Nob Hill Boulevard to the new two-lane off-ramp to the C/D road and Yakima Avenue.

FIGURE PP3-10: Initial Construction Stage of the C/D Alternative

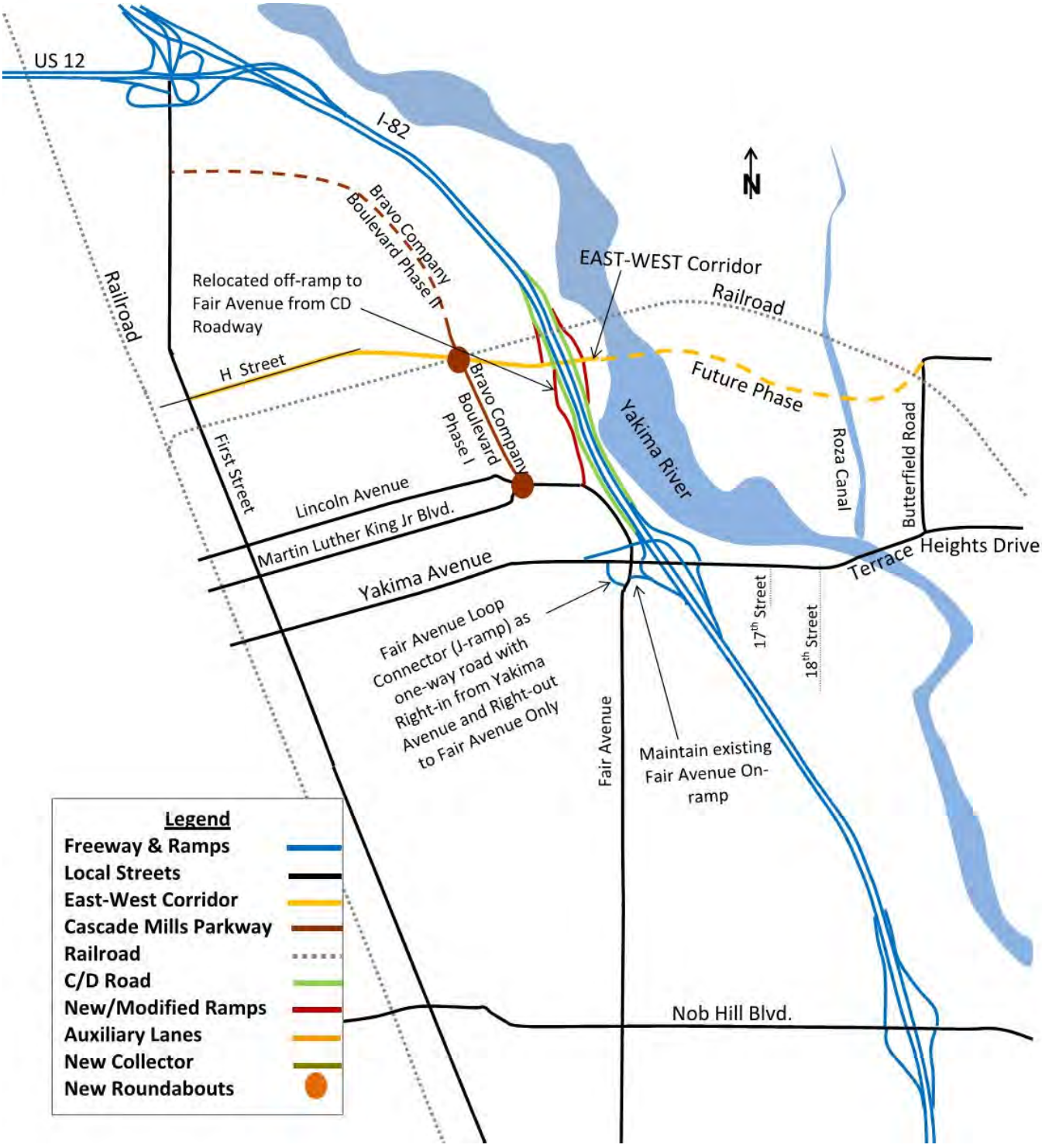
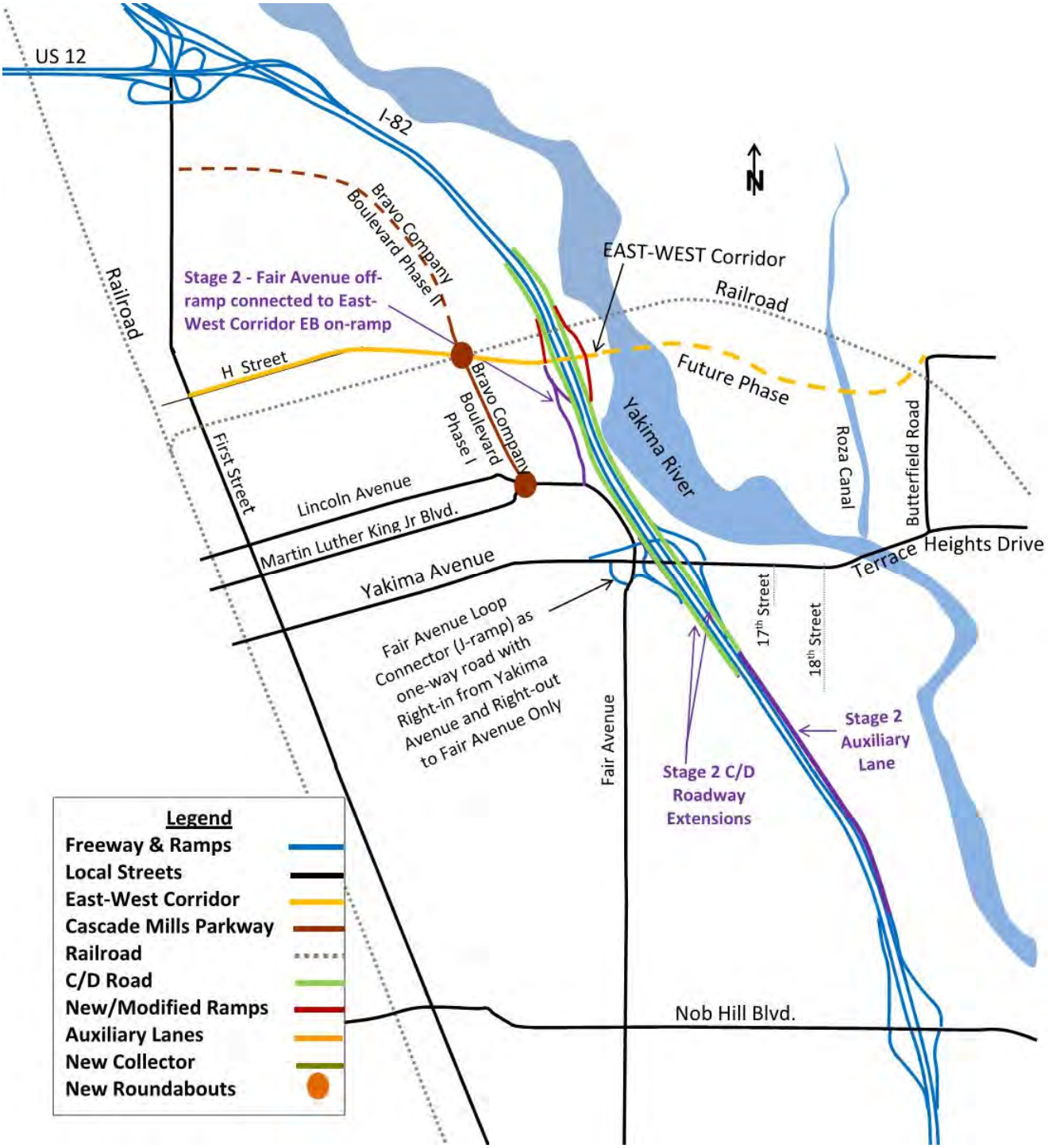


FIGURE PP3-11: Second Construction Stage of the CD Alternative



Future Stages: Future stage will be implemented to add the auxiliary lanes along I-82 westbound from the C/D road to the US 12 off-ramp and along I-82 eastbound between US 12 on-ramp to the north end of C/D roadway and from the south end of the C/D roadway to the Nob Hill eastbound off-ramp. In addition, the East-West Corridor will also be completed over the Yakima River to Butterfield Road.

Interstate Operations during the initial Construction Stages of the C/D Alternative: This analysis assumes that approximately 25 to 30 percent of the Cascade Mill site is developed by opening year (2015 was assumed at the start of the study). Interstate operations for both construction stages remain similar to the base conditions, as shown in Table PP3-10. All segments of I-82 are expected to operate at LOS C or better.

TABLE PP3-10: Comparison of LOS and Density along I-82 for the Opening Year (2015) Baseline and various construction stages of the C/D Alternative

Mainline Section		2015 Base Conditions		C/D Alternative -Stage 1		C/D Alternative -Stage 2	
		AM	PM	AM	PM	AM	PM
I-82 North Of US 12 *	EB	B / 16.1	B / 16.6	C / 21.2	C / 23.2	B / 17.4	C / 23.1
	WB	B / 12.7	C / 18.4	B / 17.5	C / 21.0	B / 17.6	C / 25.1
I-82 at US 12	EB	B / 12.4	B / 11.6	B / 11.0	A / 8.2	B / 11.9	B / 12.5
	WB	A / 10.9	B / 13.5	A / 10.9	B / 14.7	A / 10.9	B / 14.5
I-82 South of US 12	EB	C / 20.4	C / 22.5	C / 20.1	C / 18.5	C / 19.9	C / 22.5
	WB	C / 18.9	C / 23.5	C / 18.5	C / 25.2	C / 18.0	C / 25.0
I-82 South of Fair Avenue Off-ramp	EB	C / 18.0	C / 20.5	B / 13.7	B / 12.4	B / 13.8	B / 16.7
I-82 at Yakima Avenue or (Adjacent to C/D roads)	EB	B / 14.1	B / 15.8	B / 13.7	B / 12.4	B / 13.8	B / 16.7
	WB	B / 15.0	B / 17.2	B / 15.0	B / 17.7	B / 14.7	B / 17.6
I-82 South of Yakima Avenue	EB	C / 18.9	C / 24.3	C / 19.3	C / 24.3	C / 19.4	C / 24.5
	WB	C / 21.0	C / 24.8	C / 21.5	C / 25.5	B / 14.3	B / 17.0
I-82 South of Nob Hill Blvd.	EB	C / 18.9	C / 20.3	C / 19.0	C / 19.7	C / 19.0	C /19.9
	WB	B / 17.6	C / 22.5	B / 17.8	C / 23.0	B / 17.8	C / 22.8
Note * HCS Weave analysis; other HCS freeway analysis							

Intersection Operations for the Construction Stages of the C/D Alternative: Intersection operations with both construction stages remain similar to the base conditions, as shown in Table PP3-11. For both stages of construction, all movements at the Yakima Avenue and Nob Hill Boulevard intersections with ramps are LOS D or better. At the new East-West Corridor, all intersection movements are LOS C or better.

TABLE PP3-11: Comparison of LOS and Delay for the Opening Year Baseline and the C/D Alternative Construction Stages at selected intersection and movement during PM Peak Hour

Intersection with Selected Movements	2015 Baseline	2015 C/D Alternative	
		Stage 1	Stage 2
	LOS / Delay	LOS / Delay	LOS / Delay
I-82 WB Ramps at Yakima Avenue EB Left (from Yakima Avenue) NB Left (from WB Off-ramp)	A / 5.3 B / 15.2 E / 62.1	A / 8.9 C / 302 D / 34.5	A / 3.9 D / 37.6 D / 46.2
I-82 EB Ramps at Yakima Avenue WB Left (from Yakima Avenue) SB Left (from EB Off-ramp)	C / 22.8 D/ 46.4 E / 57.2	B / 15.8 C / 26.0 D / 37.0	B / 17.6 D / 33.6 C / 33.0
I-82 WB Ramps at Nob Hill Blvd. EB-Left (From Nob Hill Blvd.) NB Left (from WB Off-ramp)	A / 5.7 C / 23.0 C / 30.8	A / 6.7 C / 28.5 C / 27.5	A / 6.3 C / 28.3 C / 27.3
I-82 EB Ramps at Nob Hill Blvd WB Left (from Yakima Avenue) SB Left (from EB Off-ramp)	B / 14.5 C / 24.1 C / 30.8	B / 15.7 C / 22.1 C / 26.1	B / 13.0 C / 20.6 C / 24.5
Yakima Avenue and Fair Avenue Loop Connector (J-ramp) WB Left (from Yakima Avenue) NB Left from (J-ramp) NB Right (from J-ramp)	C / 19.7 F / 366.7 E / 43.4	NA - Changed to right-in only from Yakima Avenue	
Fair Avenue and Fair Avenue Loop Connector (J-ramp) EB Left (from J-ramp)	C / 23.1	NA – Changed to right-out only	
C/D WB Ramps with East-West Corridor All-way Stop	NA	B / 11.5 All movements LOS B or better	B / 11.3 All movements LOS B or better
C/D EB Ramps with East-West Corridor Two-way Stop	NA	B / 10.7 All movements LOS B or better	A / 6.8 All movements LOS C or better

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WILL THE PROPOSAL PROVIDE FULLY DIRECTIONAL INTERCHANGES CONNECTED TO PUBLIC STREETS OR ROADS, SPACED APPROPRIATELY, AND DESIGNED TO FULL DESIGN LEVEL GEOMETRIC CONTROL CRITERIA?

The combined Yakima Avenue and the proposed East-West Corridor Interchange, connected to I-82 with collector/distributor (C/D) roads, is designed as a fully-directional interchange, connected to public roads, and designed to meet design standards. With the planning level design completed to date, a shoulder design deviation will be required along the eastbound off-ramp to Yakima Avenue and along the eastbound C/D road in the vicinity of the Yakima Avenue flyover and the Yakima Avenue Bridge. The proposed interchange modifications will meet urban interchange spacing requirements.

What are the I-82/Yakima Avenue/East-West Corridor Interchange Modifications?

The I-82/Yakima Avenue/East-West Corridor C/D Interchange will be a fully-directional interchange with connections for EB and WB on- and off-ramps for all vehicular movements, as illustrated on Figure PP4-1.

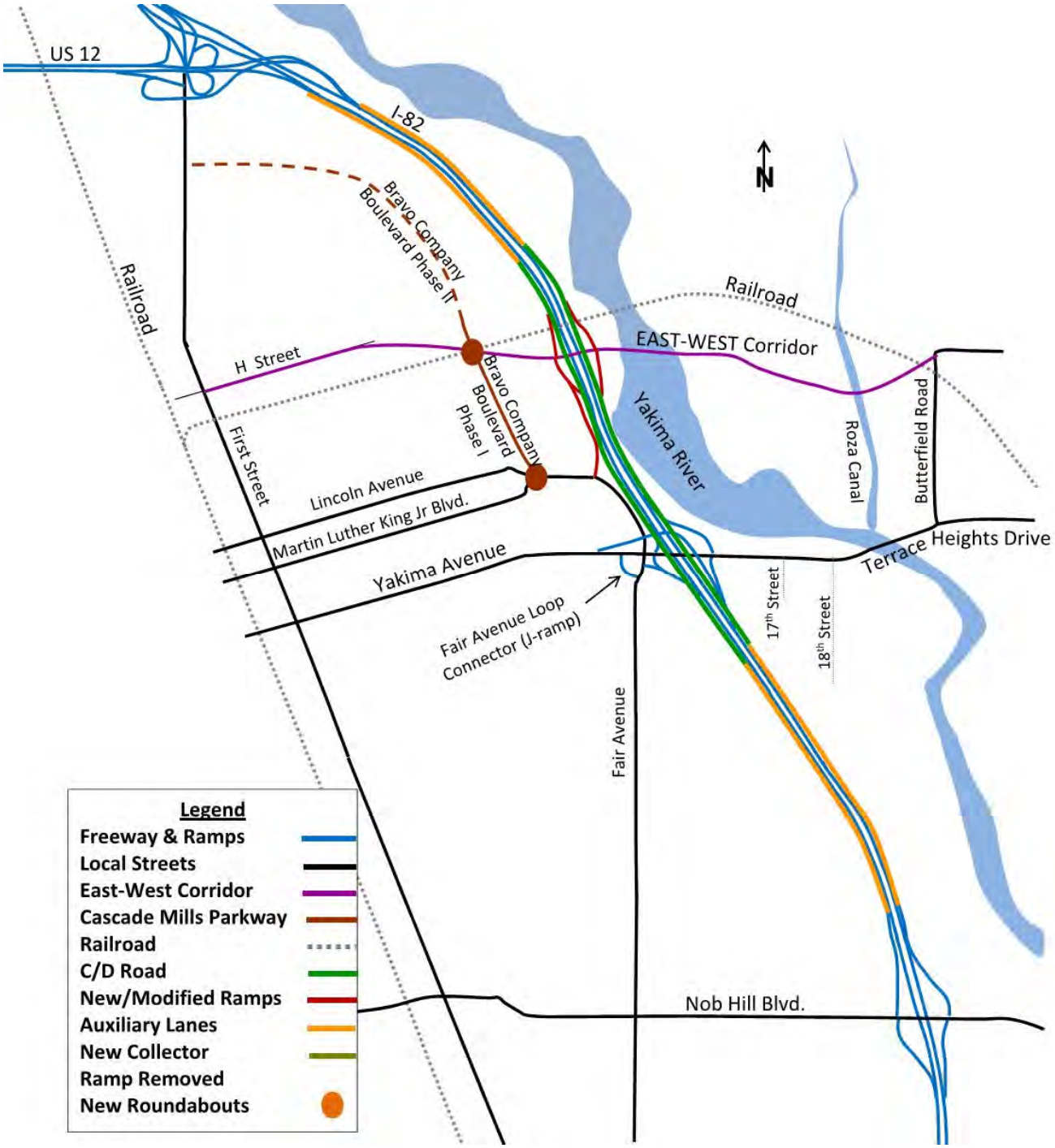
The proposed interchange at the Yakima Avenue/East-West Corridor C/D Interchange will include the following improvements:

- The Yakima Avenue Interchange and East-West Corridor Interchange will be diamond interchanges connected to the C/D roadways;
- The C/D roadways will be on both sides of I-82 and connect to I-82 north of the East-West Corridor Interchange and south of the Yakima Avenue Interchange;
- Auxiliary lanes are added in both directions of I-82 between the Nob Hill Boulevard ramps and the new C/D roadways;
- Auxiliary lanes are added in both directions of I-82 between the C/D roadways and the US 12 ramps;
- The existing I-82 off-ramp to Fair Avenue ramps is revised to extend from the East-West Corridor EB on-ramp and connect to Fair Avenue at the existing intersection;
- The existing I-82 on-ramp from Fair Avenue will connect to the EB Yakima Avenue on-ramp;
- The existing Fair Avenue Loop Connector (J ramp) is converted to a one-way connector from Yakima Avenue to Fair Avenue with right-in only from Yakima Avenue; and
- All ramp lengths and turn lanes will be designed based on the latest traffic analysis.

The following local improvements will also be constructed to support the proposed Build alternative:

- The new East-West Corridor arterial is added from Butterfield Road to the new Bravo Company Boulevard;
- H Street will be widened and extended to the new Bravo Company Boulevard; and
- Bravo Company Boulevard will be constructed as a new arterial from Fair Avenue to the extended H Street and then extended to 1St Street as demand and funding allows.

FIGURE PP4-1: Recommended Modified 2C - C/D Alternative



What are the conceptual layout and signing plans for the I-82/Yakima Avenue/East-West Corridor Interchange modifications?

The conceptual layout and signing plans for the I-82/Yakima Avenue/East-West Corridor Interchange are illustrated on Figure PP4-2 which is continued on several pages. This conceptual layout shows the proposed lane arrangement and preliminary signing plan to direct drivers through the revised interchanges. These conceptual plans were developed meeting current design standards for lane and shoulder widths, horizontal and vertical clearances, and ramp design. Based on the current design layout, the proposed design for the CD system with four lanes on the I-82 mainline meets WSDOT Design Manual minimums with no design exceptions. A technical memo documenting design criteria and assumptions was prepared as covering all elements of the project which is included as Appendix I.

The weaving distances, merge and diverge, and channelization were based on current traffic analysis. These plans will be refined during the design phase of the project. Signing plan discussions will be held with the local jurisdictions to decide what other information signing should or could be included.

During the environmental documentation phase, the preliminary design of the proposed interchange improvements will be further refined.

How does the proposed I-82/Yakima Avenue/East-West Corridor Interchange relate to present and future interchange configurations?

The proposed I-82/Yakima Avenue/East-West Corridor Interchange meets spacing criteria for urban interchanges. The distance between the East-West Corridor overpass and the US 12 overpass to the north is approximately 1.2 miles. The distance between the Yakima Avenue Overpass and the Nob Hill Boulevard Overpass to the south is approximately 1.5 miles.

The distances between the gore areas for adjacent ramps along I-82 between US 12 to the C/D roadway ranges from 2,800 to 3,000 feet and between Nob Hill Boulevard ramps and the C/D ramp range from 2,530 to 4,350 feet, which exceeds the minimum requirements. The distances between gore areas for adjacent ramps along the C/D roadways also surpass the minimum requirements.

Can the proposed I-82/Yakima Avenue/East-West Corridor Interchange accommodate a six-lane I-82 facility?

The proposed I-82/Yakima Avenue/East-West Corridor Interchange will be designed to accommodate a six-lane I-82 roadway. Figure PP4-3 illustrates typical cross sections of I-82 with C/D roads between the East-West Corridor overpass and the Yakima Avenue overpass. This figure shows the existing I-82 mainline cross section with two lanes in each direction, and a cross section with the proposed C/D roads on the outside existing cross section. Following design guidelines, additional cross sections were developed to show how the four-lane I-82 mainline could be widened to three lanes in each direction with an inside shoulder design variation where the C/D roadways are proposed and where the mainline

passing under the existing Yakima Avenue Westbound Fly-Over and the existing Yakima Avenue undercrossing structures. Alternatively, full inside shoulders could be provided by reducing the separation between the I-82 mainline and the C/D roadways. A summary of anticipated design exceptions based on the November 2015 WSDOT Design Manual is provided in Table PP4-1.

Table PP 4-1 Summary of Proposed Design Exceptions with Six I-82 Travel Lanes

Design Element	Display	Proposed Design (ft)	Location	WSDOT Minimum Standard (ft)	Comment
I-82 WB Mainline (ML LINE) Left Shoulder	FIGURE PP4-3,4,5,6	4	Within CD System Limits	10	Maintains Existing Shoulder Width
I-82 EB Mainline (MR LINE) Left Shoulder		4		10	Maintains Existing Shoulder Width
I-82 WB Mainline (ML LINE) Left Shoulder	FIGURE PP4-6	6	Yakima Avenue Fly-over Structure	10	Existing Bridge Pier Conflict
I-82 WB Mainline (ML LINE) Right Shoulder		6		10	Existing Bridge Pier Conflict
I-82 EB Mainline (MR LINE) Right Shoulder		6		10	Existing Bridge Pier Conflict
I-82 WB Mainline (ML LINE) Left Shoulder	FIGURE PP4-5	4	Yakima Avenue Structure	10	Existing Bridge Pier Conflict
I-82 EB Mainline (MR LINE) Left Shoulder		4		10	Existing Bridge Pier Conflict

Typical cross sections were also developed for I-82 as it passed under the proposed East-West Corridor (Figure PP4-4), under Yakima Avenue (PP4-5) and under the Yakima Avenue Flyover (PP4-6). In these areas, three mainline lanes can be accommodated under these structures with mainline shoulder design variations.

In the areas along I-82 north or south of the C/D roadways, the proposed auxiliary lanes can be easily converted to through lanes, as illustrated in PP4-7.

The only major construction issue would be the rebuilding of the existing I-82 mainline structures over the existing rail line to accommodate three lanes in each direction. These structures are classified as functionally obsolete and may need to be rebuilt depending on structural condition and design parameters to add a third lane in each direction. During the construction of the new structures, mainline traffic could be re-routed onto the C/D roadway to allow traffic to by-pass the construction area.

FIGURE PP4-2: I-82 / Yakima Avenue / East-West Corridor Collector/Distributor Interchange Layout (Nob Hill Boulevard Interchange to US 12 Interchange)

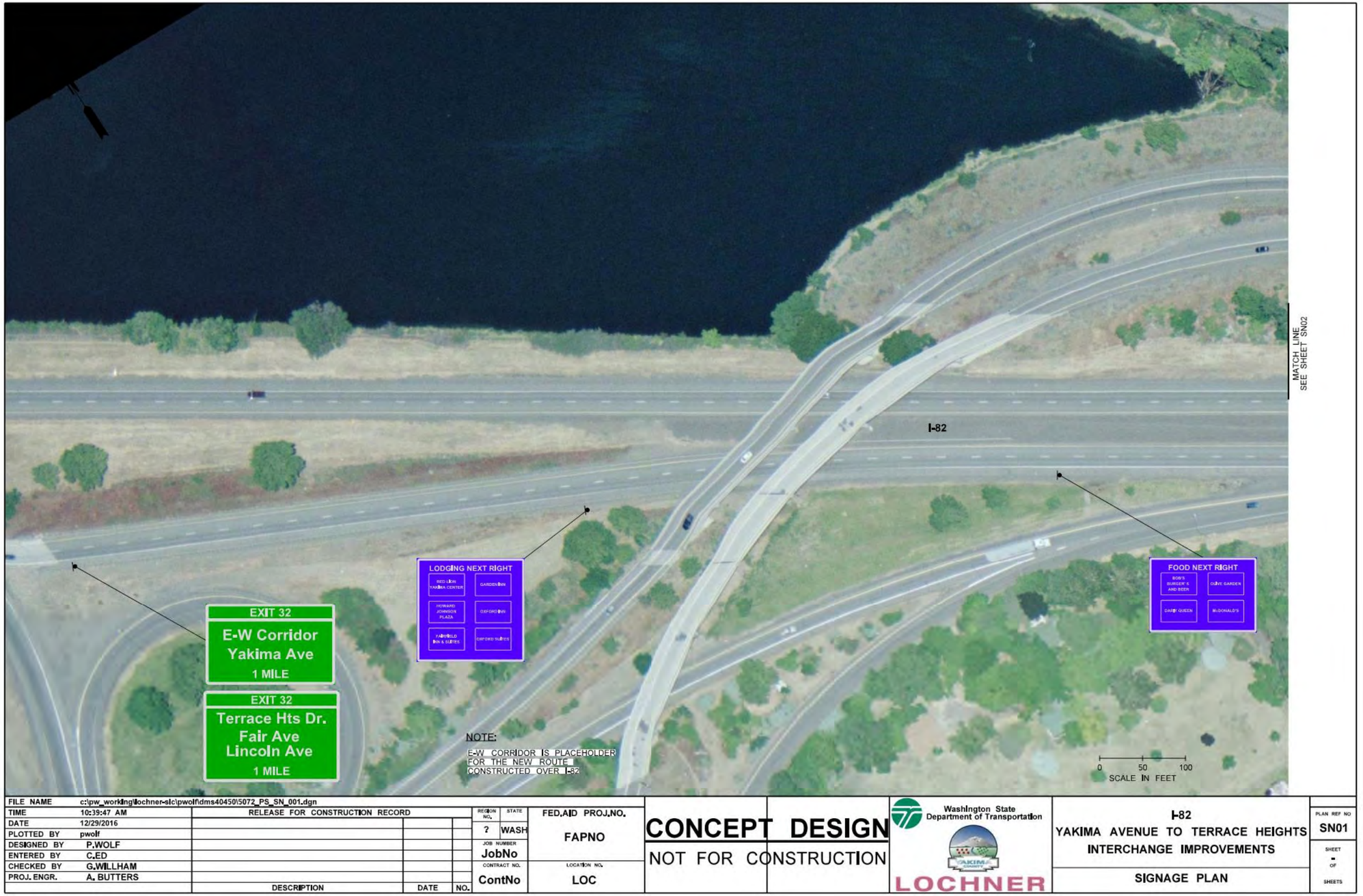


FIGURE PP4-2: I-82 / Yakima Avenue / East-West Corridor Collector/Distributor Interchange Layout (Nob Hill Boulevard Interchange to US 12 Interchange) Continued

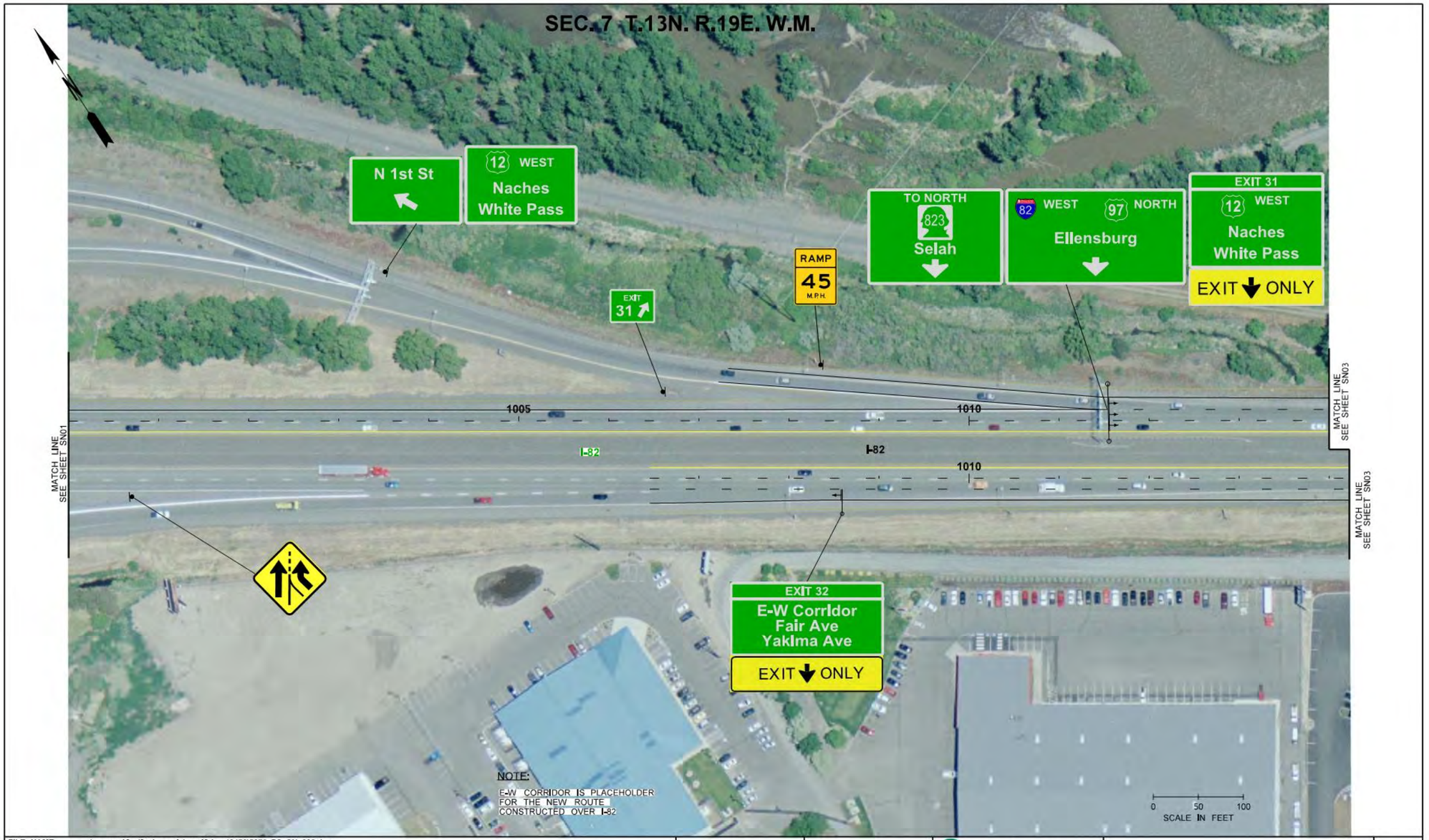


FIGURE PP4-2: I-82 / Yakima Avenue / East-West Corridor Collector/Distributor Interchange Layout (Nob Hill Boulevard Interchange to US 12 Interchange) Continued

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ENTERED BY	C.ED						
CHECKED BY	G.WILLHELM				CONTRACT NO. ContNo	LOCATION NO. LOC	
PROJ. ENGR.	A. BUTTERS						
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Washington State Department of Transportation
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I-82
YAKIMA AVENUE TO TERRACE HEIGHTS INTERCHANGE IMPROVEMENTS
SIGNAGE PLAN

PLAN REF NO SN03
SHEET - OF SHEETS

FIGURE PP4-2: I-82 / Yakima Avenue / East-West Corridor Collector/Distributor Interchange Layout (Nob Hill Boulevard Interchange to US 12 Interchange) Continued

FIGURE PP4-2: I-82 / Yakima Avenue / East-West Corridor Collector/Distributor Interchange Layout (Nob Hill Boulevard Interchange to US 12 Interchange) Continued

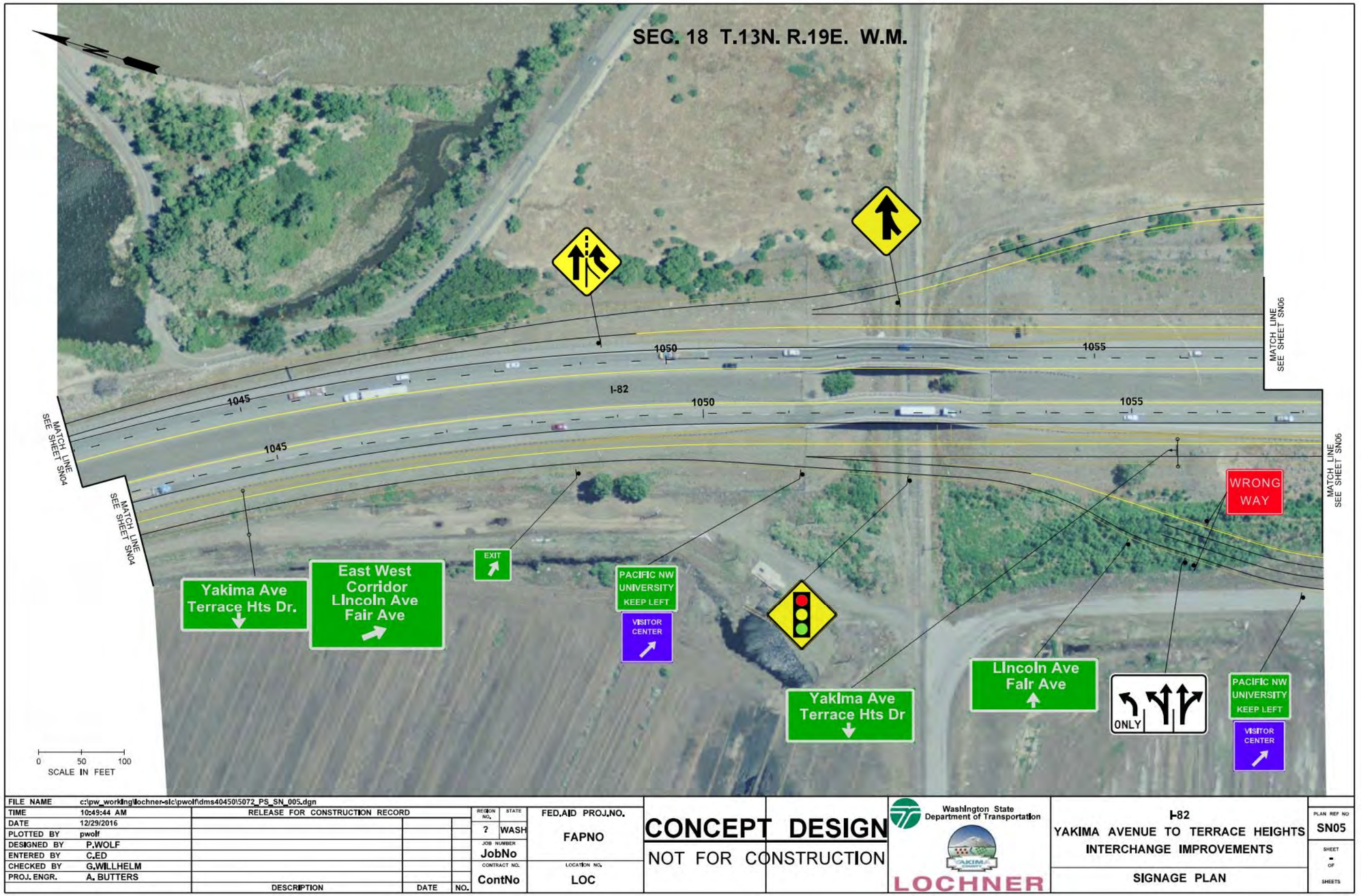
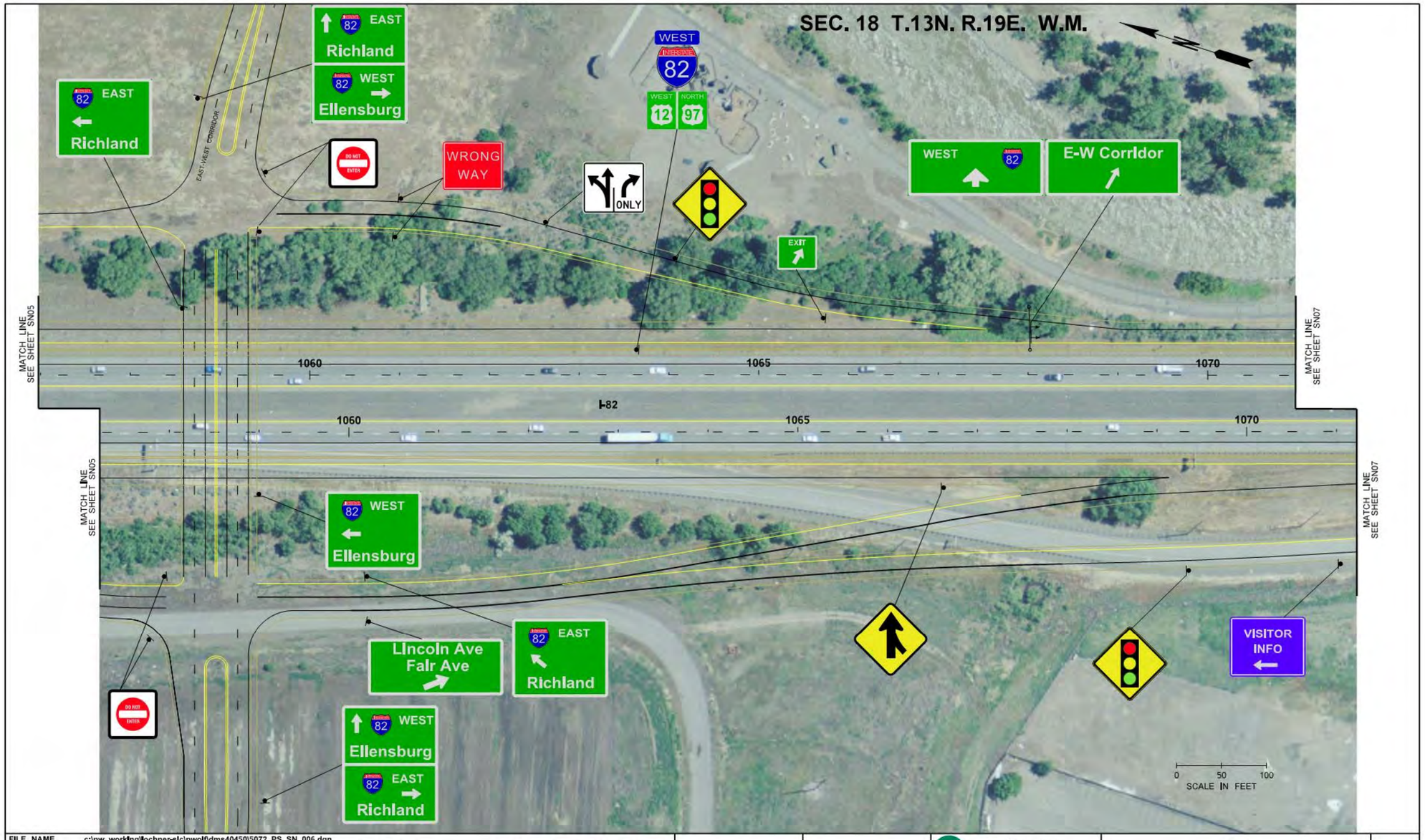


FIGURE PP4-2: I-82 / Yakima Avenue / East-West Corridor Collector/Distributor Interchange Layout (Nob Hill Boulevard Interchange to US 12 Interchange) Continued



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ENTERED BY	CED						I-82 YAKIMA AVENUE TO TERRACE HEIGHTS INTERCHANGE IMPROVEMENTS
CHECKED BY	G.WILLHELM						SIGNAGE PLAN
PROJ. ENGR.	A. BUTTERS						PLAN REF NO: SN06
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FIGURE PP4-2: I-82 / Yakima Avenue / East-West Corridor Collector/Distributor Interchange Layout (Nob Hill Boulevard Interchange to US 12 Interchange) Continued)

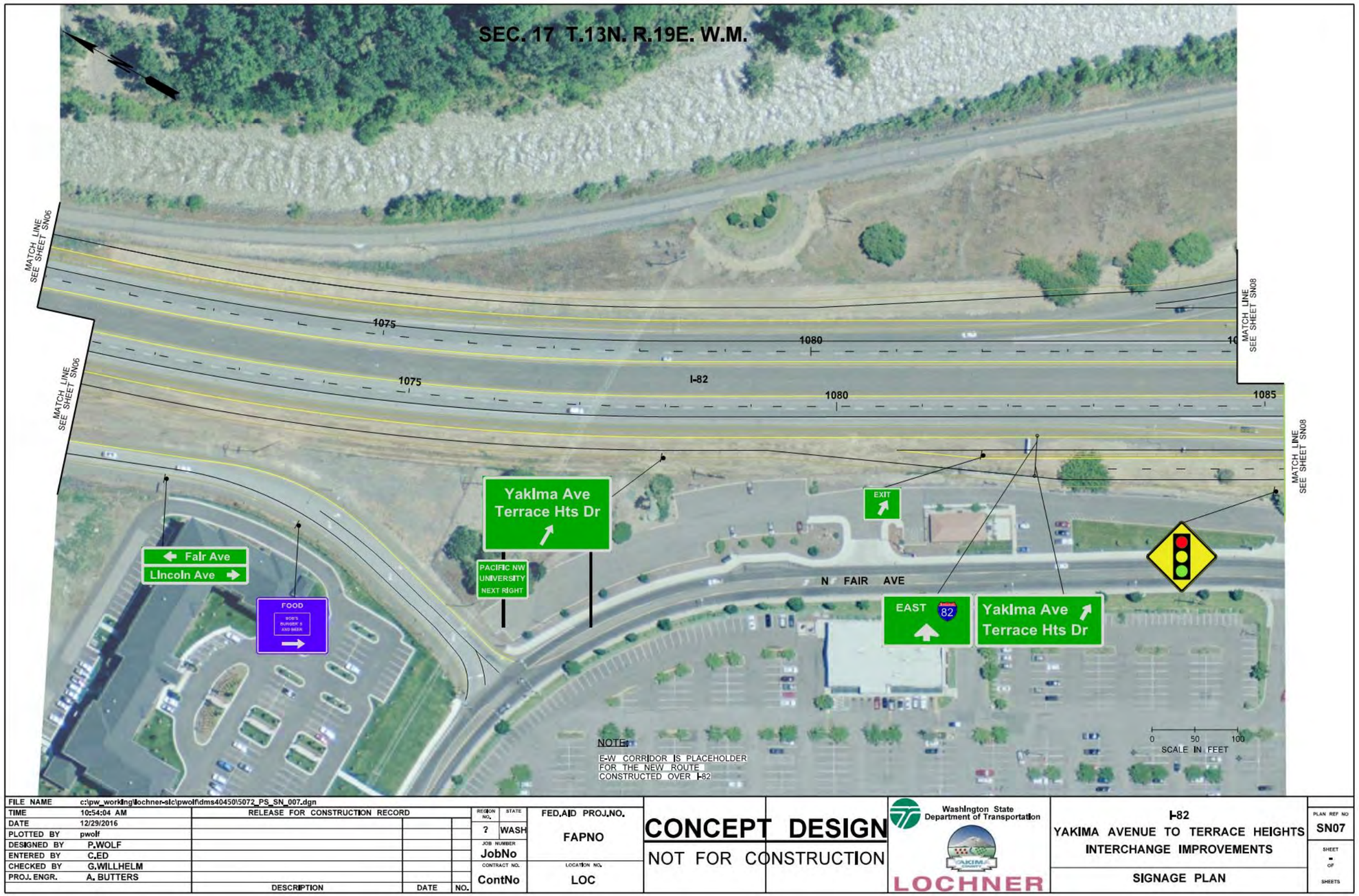

FIGURE PP4-2: I-82 / Yakima Avenue / East-West Corridor Collector/Distributor Interchange Layout (Nob Hill Boulevard Interchange to US 12 Interchange) Continued

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I-82
YAKIMA AVENUE TO TERRACE HEIGHTS INTERCHANGE IMPROVEMENTS

SIGNAGE PLAN

PLAN REF NO SN08

SHEET - OF SHEETS

FIGURE PP4-2: I-82 / Yakima Avenue / East-West Corridor Collector/Distributor Interchange Layout (Nob Hill Boulevard Interchange to US 12 Interchange) Continued

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CHECKED BY	G.WILLHELM						
PROJ. ENGR.	A.BUTTERS						
		DESCRIPTION	DATE	NO.			

CONCEPT DESIGN
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I-82
YAKIMA AVENUE TO TERRACE HEIGHTS INTERCHANGE IMPROVEMENTS
SIGNAGE PLAN

PLAN REF NO. SN09
SHEET - OF SHEETS

FIGURE PP4-2: I-82 / Yakima Avenue / East-West Corridor Collector/Distributor Interchange Layout (Nob Hill Boulevard Interchange to US 12 Interchange) Continued

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PROJ. ENGR.	A.BUTTERS						
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Washington State Department of Transportation

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I-82
YAKIMA AVENUE TO TERRACE HEIGHTS INTERCHANGE IMPROVEMENTS

SIGNAGE PLAN

PLAN REF NO: SN10

SHEET - OF SHEETS

FIGURE PP4-2: I-82 / Yakima Avenue / East-West Corridor Collector/Distributor Interchange Layout (Nob Hill Boulevard Interchange to US 12 Interchange) Continued

FIGURE PP4-2: I-82 / Yakima Avenue / East-West Corridor Collector/Distributor Interchange Layout (Nob Hill Boulevard Interchange to US 12 Interchange) Continued

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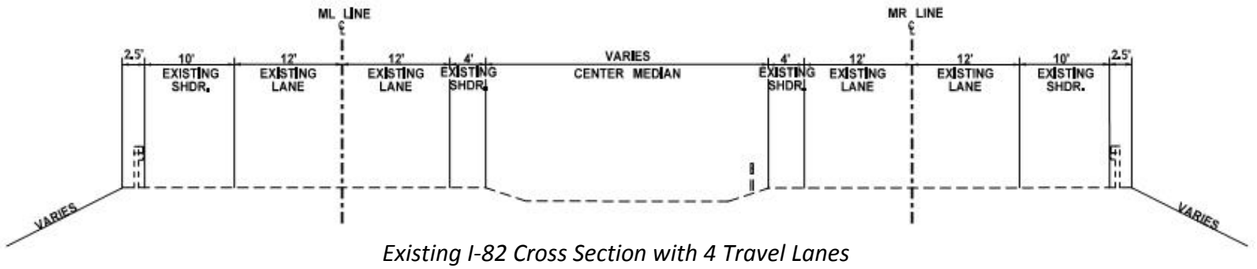
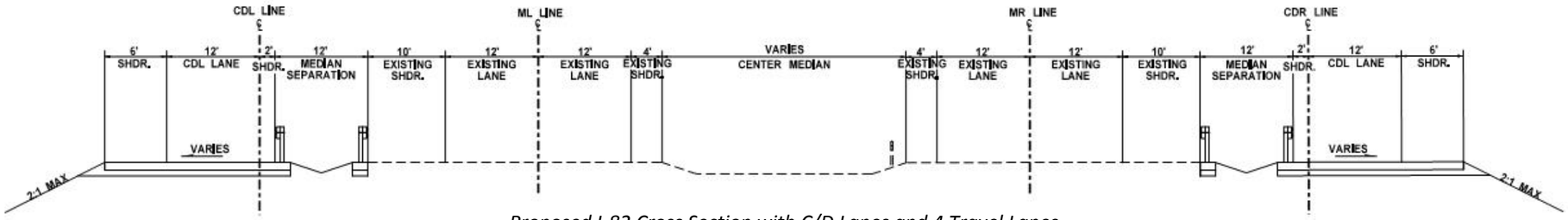
ENTERED BY	C.ED				CONTRACT NO.	LOCATION NO.	I-82 YAKIMA AVENUE TO TERRACE HEIGHTS INTERCHANGE IMPROVEMENTS
CHECKED BY	G.WILLHELM				ContNo	LOC	SIGNAGE PLAN
PROJ. ENGR.	A.BUTTERS						LOCHNER
		DESCRIPTION	DATE	NO.			PLAN REF NO SN12

FIGURE PP4-2: I-82 / Yakima Avenue / East-West Corridor Collector/Distributor Interchange Layout (Nob Hill Boulevard Interchange to US 12 Interchange) Continued

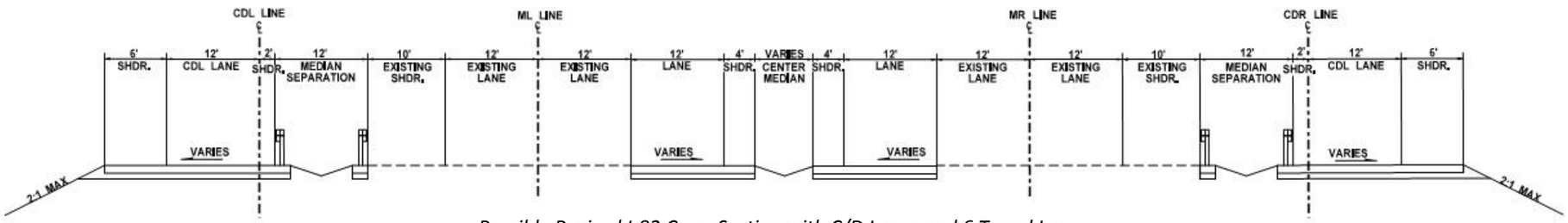
FIGURE PP4-3: Typical Cross Section between East-West Corridor Structure and Yakima Avenue Structure



Existing I-82 Cross Section with 4 Travel Lanes

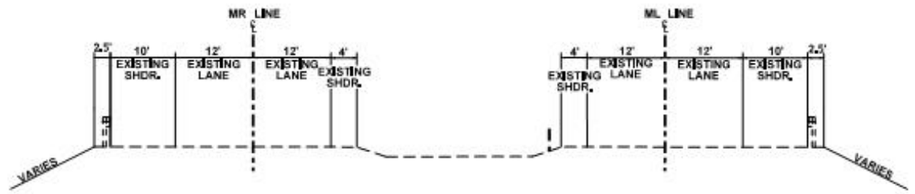


Proposed I-82 Cross Section with C/D Lanes and 4 Travel Lanes

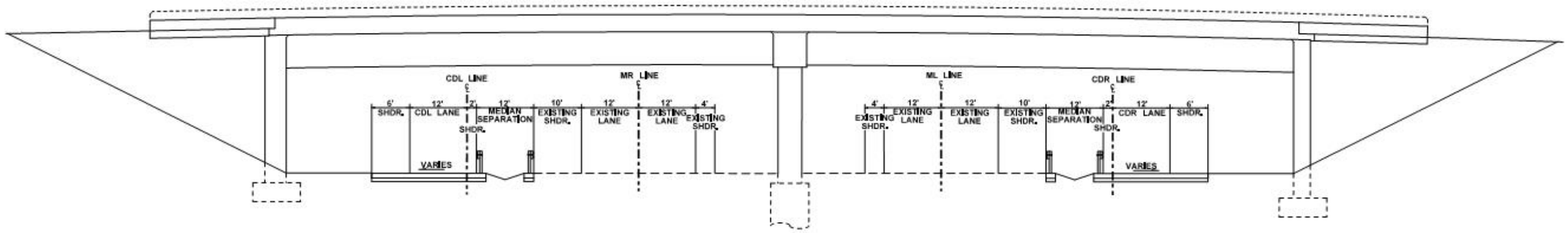


Possible Revised I-82 Cross Section with C/D Lanes and 6 Travel Lanes

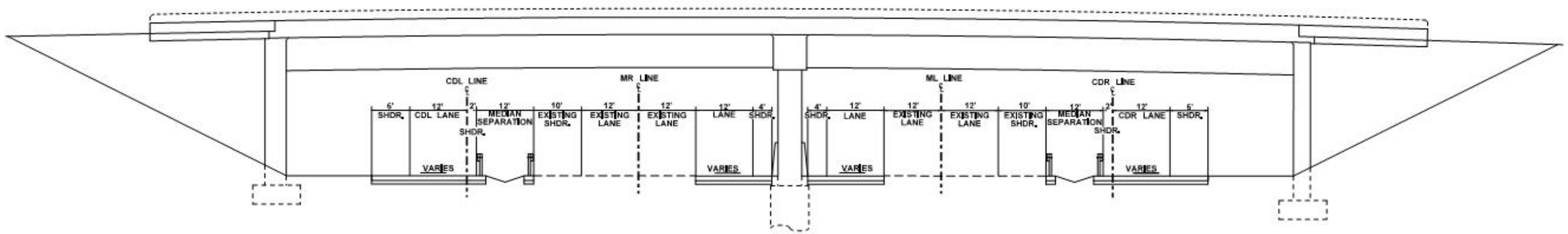
FIGURE PP4-4: Typical Cross Section at East-West Corridor Structure



Existing I-82 Cross Section with 4 Travel Lanes

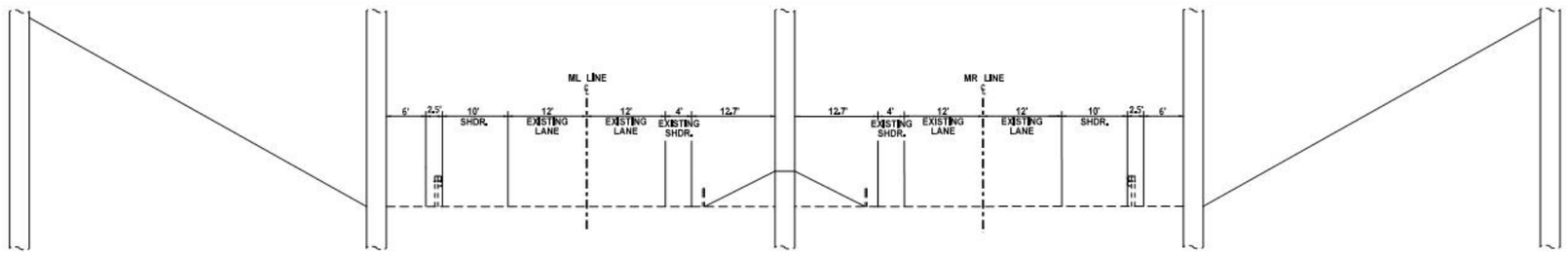


Proposed I-82 Cross Section with C/D Lanes and 4 Travel Lanes

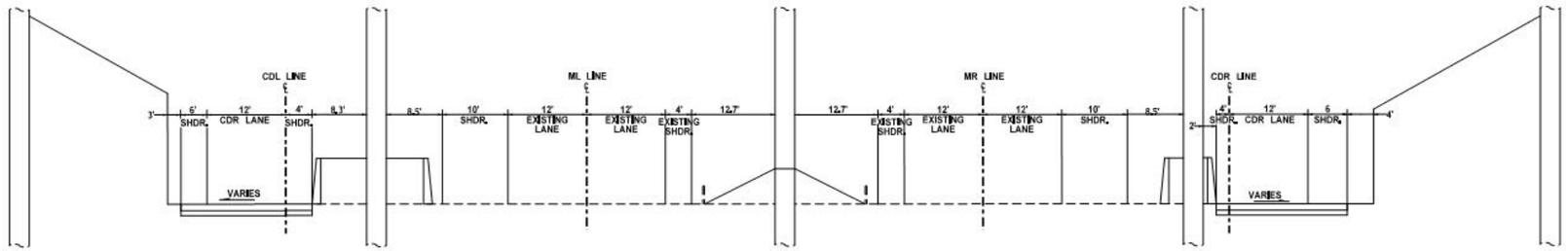


Possible Revised I-82 Cross Section with C/D Lanes and 6 Travel Lanes

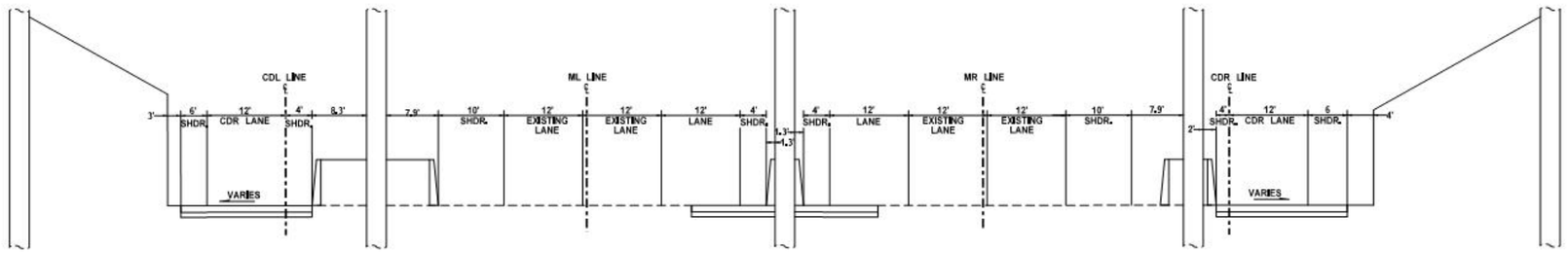
FIGURE PP4-5: Typical Cross Section at Yakima Avenue Structure



Existing I-82 Cross Section with 4 Travel Lanes

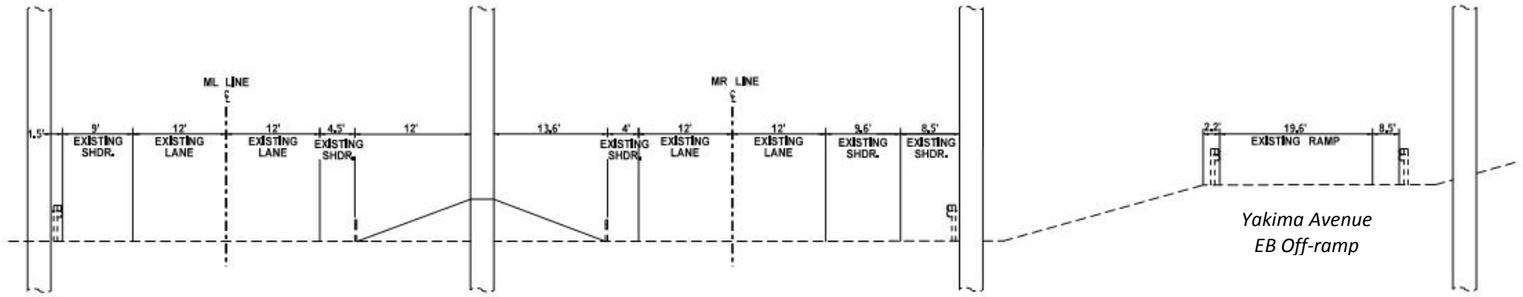


Proposed I-82 Cross Section with C/D Lanes and 4 Travel Lanes

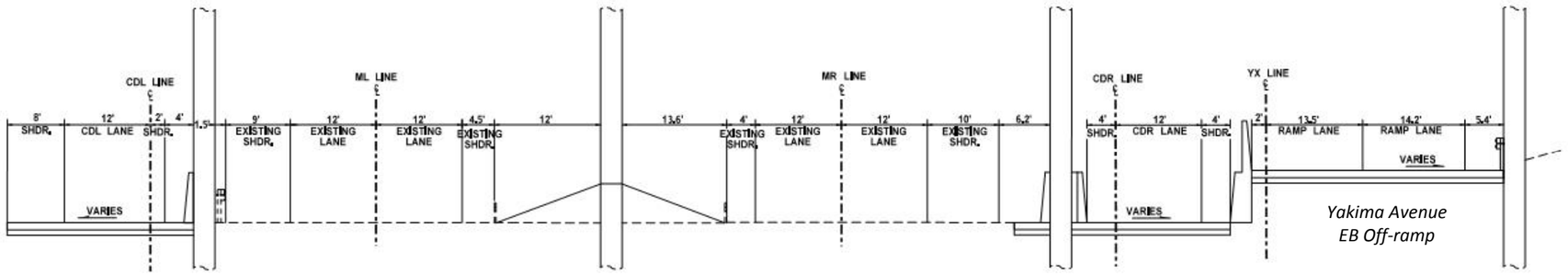


Possible Revised I-82 Cross Section with C/D Lanes and 6 Travel Lanes

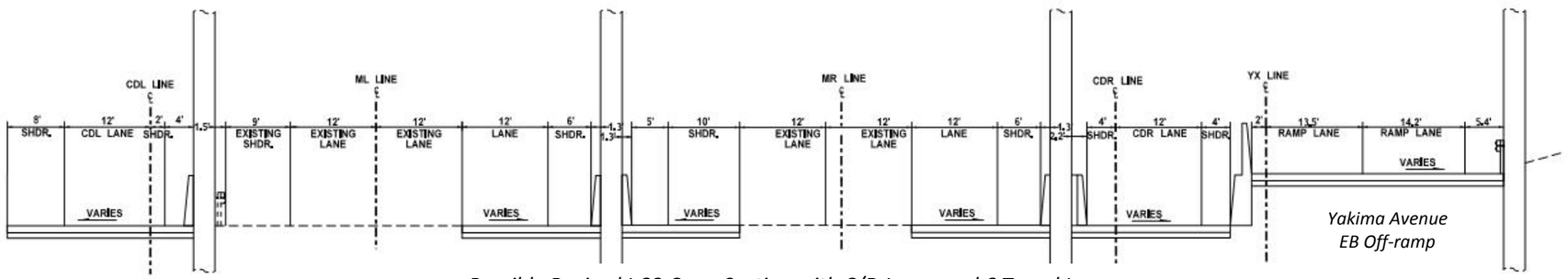
FIGURE PP4-6: Typical Cross Section at Yakima Avenue Flyover Structure



Existing I-82 Cross Section with 4 Travel Lanes

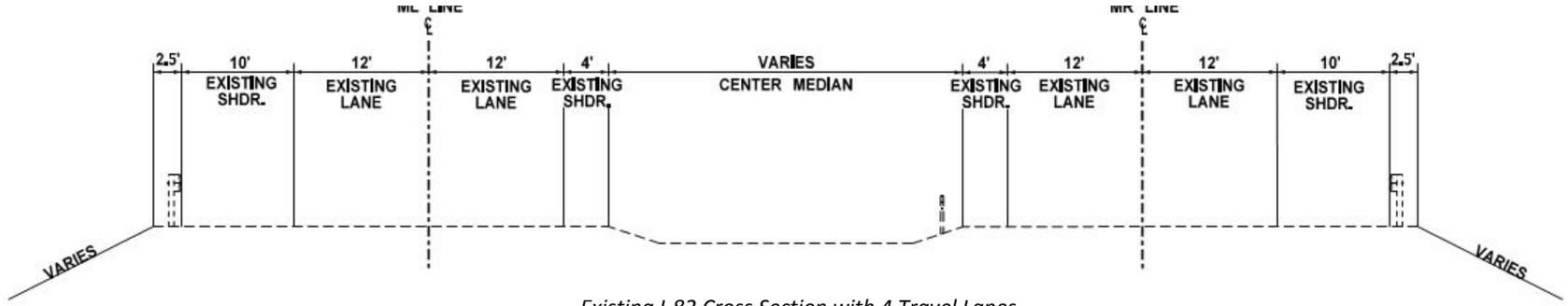


Proposed I-82 Cross Section with C/D Lanes and 4 Travel Lanes

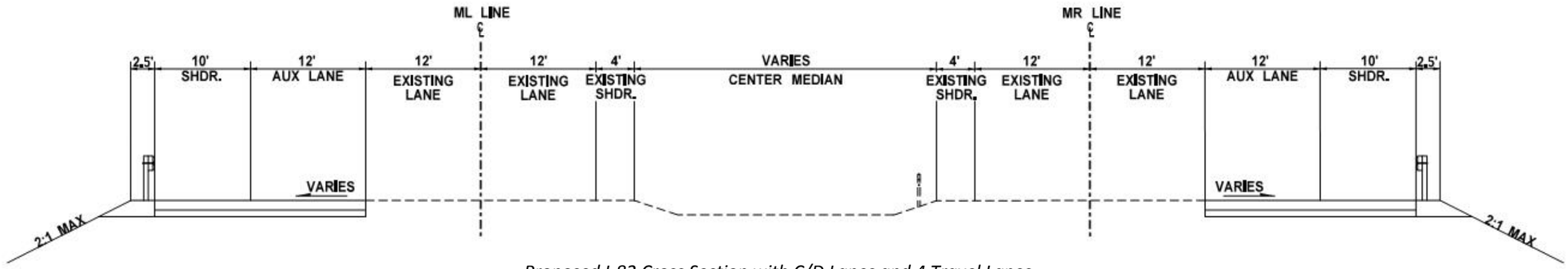


Possible Revised I-82 Cross Section with C/D Lanes and 6 Travel Lanes

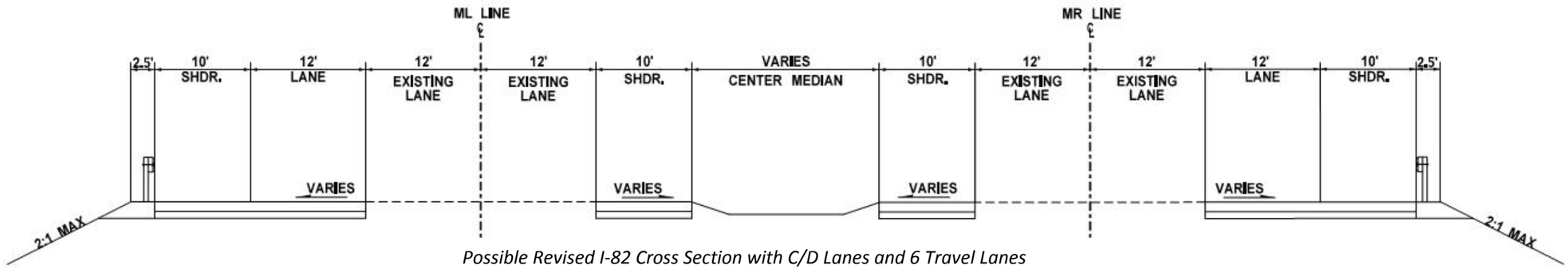
FIGURE PP4-7: Typical Cross North and South of C/D Lanes Where Auxiliary Lanes Are Proposed



Existing I-82 Cross Section with 4 Travel Lanes



Proposed I-82 Cross Section with C/D Lanes and 4 Travel Lanes



Possible Revised I-82 Cross Section with C/D Lanes and 6 Travel Lanes

IS THE PROPOSED ACCESS POINT REVISION COMPATIBLE WITH ALL LAND USE AND TRANSPORTATION PLANS?

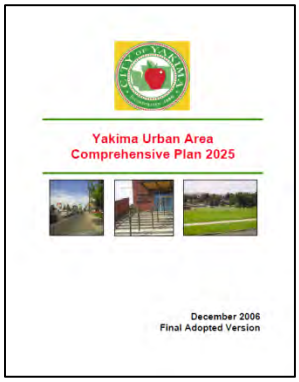
In order to assess the compatibility of the I-82 / Yakima Avenue / Terrace Heights Drive Interchange Justification Report (IJR) with existing land use and transportation plans for the area, the following documents were reviewed:

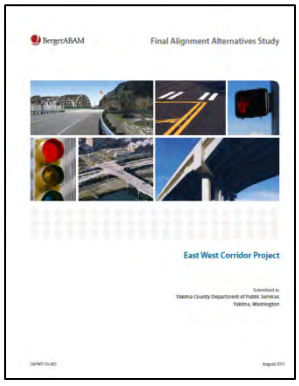
- The 1997 Plan 2015, A Blueprint for Yakima County Progress (updated in 2007);
- The 2005 Yakima Urban Area Comprehensive Plan 2025;
- The 1999 Terrace Heights Neighborhood Plan;
- The 2001 Terrace Heights Corridor Study;
- The 2011 East West Corridor Project Final Alignment Alternatives Study;
- The 2012 East West Corridor Project Alignment Alternatives Study and Supplemental Report;
- The 2012 Addendum to the Yakima Urban Area Comprehensive & Transportation Plan;
- The Yakima Valley Regional Transportation Plan Update, 2012;
- WSDOT's 2007-2026 Highway System Plan – High Benefit Lost Cost;
- The Washington State Transportation Plan (WTP 2007 – 2026, and WTP 2030); and
- The Washington State Transportation Commission, Regional Transportation Priority Projects, 2011.

The design year forecasted travel volumes for the recommended alternative in the IJR is based on the Yakima Valley Council of Governments MPO travel demand model as modified by WSDOT for the Cascade Mill District Traffic Analysis Report. The YVCOG uses long-term land use and population assumptions from area Growth Management Plans, including historical growth data.

The East-West Corridor project, from N. First Street to Butterfield Road is included in the 2014 – 2017 Washington State Transportation Improvement Program (STIP). Additionally:

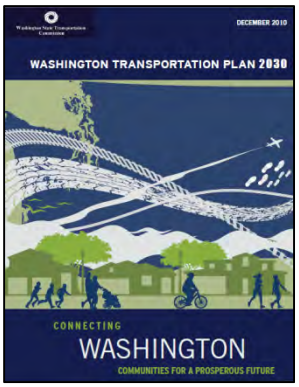
- According to the East West Corridor Project Final Alignment Alternative Study (August of 2011), the level of service on the Yakima Avenue/Terrace Heights Drive corridor has dropped steadily and has now reached a D rating. While this rating is acceptable within the City of Yakima, any level of service lower than a C-rating triggers Yakima County's concurrency requirements.
- The need for the improvements proposed in this IJR is specifically referenced in the 2012 Addendum to the Yakima Urban Area Comprehensive & Transportation Plan (see page 39) and the Yakima Valley Regional



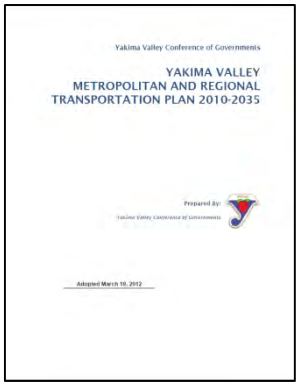


Transportation Plan Update, 2012 (see Section 6, page 89).

- WTP 2030 endorses the funding recommendations made to the Joint Transportation Committee (JTC) and is outlined in the Implementing Alternative Transportation Funding Methods report. This report includes the East-West Corridor, which is integral to the recommendations contained in this IJR, and is listed as a priority project (described as the Gateway Corridor – Project H).



- Additionally, given the way major transportation projects are funded in Washington, it should be noted that the Senate Transportation Committee included $50 million in their funding proposal for the East-West Corridor overpass and bridge over the Yakima River as recently as the Spring of 2015, indicating strong political source to fund the important regional project.



The proposed access modification to the I-82 / Yakima Avenue / Terrace Heights Drive Interchange Justification Report is consistent with the applicable land use and transportation plans.

IS THE PROPOSED ACCESS POINT REVISION COMPATIBLE WITH A COMPREHENSIVE NETWORK PLAN AND WITH OTHER KNOWN ACCESS POINTS AND KNOWN REVISIONS TO EXISTING POINTS?

The proposed project discussed within the I-82 / Yakima Avenue / Terrace Heights Drive Interchange Justification Report (IJR) fits the long-range planning vision for the I-82 corridor in Yakima County. WSDOT is planning a major improvement to I-82 that includes additional through lanes in each direction. This IJR was developed taking these plans into consideration, as well as surrounding network plans. The proposed C/D Build alternative provides the equivalent of six lanes of I-82 from Nob Hill Boulevard to US 12 with the addition of the auxiliary lanes and C/D roadways.

No projects are proposed to the interchanges on either side of the Yakima Avenue Interchange (US 12 and Nob Hill Boulevard). Evaluations were completed of the impact of adjusting the access points for this project and their impact on nearby access points and it was determined that there are no significant impacts. Additionally, this project proposes to reduce the number of access points at the Yakima Avenue Interchange from five to four, reducing the number of potential conflict points on I-82.

The proposed amendments to the I-82/Yakima Avenue Interchange are compatible with existing and known revisions to I-82 and its access points.

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ARE ALL COORDINATING PROJECTS AND ACTIONS PROGRAMMED AND FUNDED?

The analysis completed for this IJR was consistent with planned land use proposed by the City of Yakima and Yakima County and documented in the City of Yakima's Comprehensive plan, Yakima County's Comprehensive Plan and the Yakima Valley Metropolitan and Regional Transportation Plan 2010-2035.

The proposed modifications to the I-82 / Yakima Avenue / Terrace Heights Drive Interchange are being considered in conjunction with other programmed local projects to improve the movement of people and goods throughout the area.

This IJR recommends the following local street improvement projects to be coordinated with the I-82/ Yakima Avenue Interchange Improvements:

- Construction of the East-West Corridor linking Terrace Heights with the City of Yakima with a four-lane arterial, including a separated, shared use path for non-motorized uses.
- Construction of Bravo Company Boulevard as a four-lane arterial, connecting Lincoln Avenue and E. Martin Luther King Jr. Boulevard with the East-West Corridor.
- Improvements to E. H Street from North 1st Street to the new Bravo Company Boulevard including widening to three lanes.

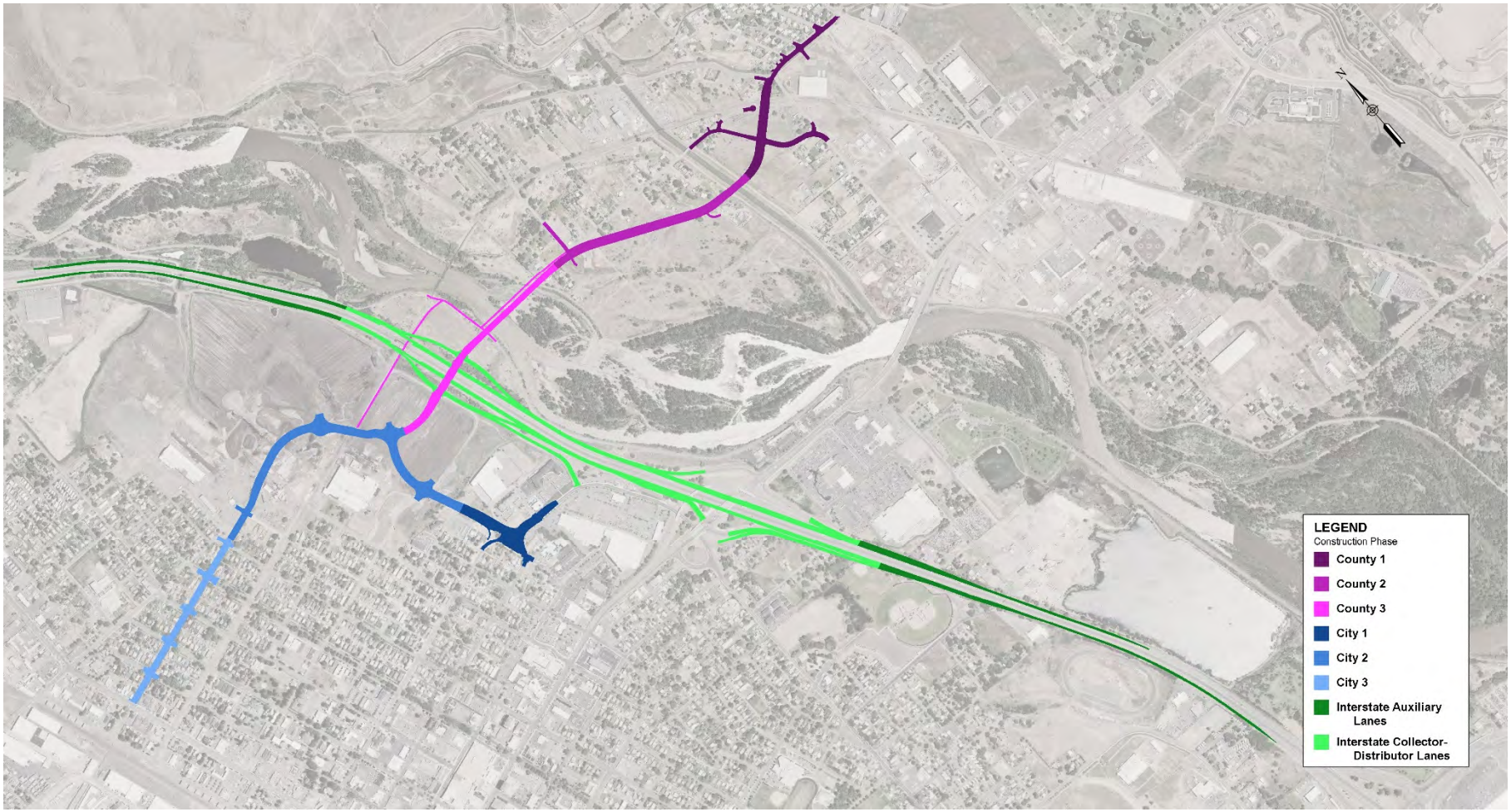
These street improvements will reduce traffic volumes on Yakima Avenue, improve local circulation within the study area, and may slightly change the traffic volumes on I-82 because of reduced congestion at ramps and ramp intersections with cross streets but will maintain LOS D or better along I-82 by providing an alternative route along the East-West Corridor for local trips travelling in and through the area, rather than using Yakima Avenue and I-82. Implementation of these local street improvements will be staged to coincide with the proposed staging options for the proposed I-82 improvements outlined in this report.

How are the improvements phased and funded?

The I-82/Yakima Avenue/Terrace Heights Drive Interchange Justification Report (IJR) brings together three agencies responsible for and committed to improving operations on the regional transportation system: WSDOT (with FHWA), Yakima County, and the City of Yakima. Each of these agencies, together with the Yakima Valley Council of Governments, plan and program capital investments to achieve this common goal.

In order to address the level of service issues identified in this IJR, a significant number of interrelated improvements have been proposed and funded, if taken together, potentially the largest capital project ever undertaken in Yakima County since I-82 was originally constructed. Figure PP7-1, identifies the implementation strategies of this larger "program" to improve system operations in this part of the Yakima Region and the adopted funding commitments. This implementation plan is described below.

FIGURE PP7-1: Implementation Strategy: I-82/Yakima Avenue Interchange and Local Agency Improvements



Local Improvements – City: Local improvements funded through the City and needed as part of the larger regional system improvements to improve operations at the Yakima Avenue Interchange are divided into three phases, as described below.

- **City Phase 1:** This phase replaced the intersections of North Fair Avenue, North 10th Street, East Lincoln Avenue, and East Martin Luther King Jr. Boulevard with a roundabout and extended Bravo Company Boulevard north from the roundabout to the old Boise Cascade Mill site at approximately East D Street. In anticipation of the significant truck traffic resulting from the construction of the remainder of the project, the City completed this Phase in 2015 to provide a truck route out of the site, without the need to go through residential neighborhoods. The approximate cost of Phase 1 was $2.7 million.
- **City Phase 2:** The next phase of the City improvement projects extends Bravo Company Boulevard to the north, constructing a roundabout at approximately East E Street, another roundabout where Bravo Company Boulevard intersects with the East-West Corridor after it crosses I-82, across the Central Washington Railroad tracks to another roundabout, then west to an intersection with East H Street, at approximately North 7th Street. The City has programmed design and right of way (ROW) acquisition for this phase in 2017 and construction in 2018. The City plans to use Local Infrastructure Financing Tool (LIFT) bonds to construct Phase 2. The planning level cost estimate for ROW, design and construction of Phase 2 is approximately $13.5 million.
- **City Phase 3:** The final phase of the local improvements funded by the City is upgrading the existing two-lane East H Street from the new East-West Corridor intersection to North 1st Street, with a three-lane section, including a continuous sidewalk the length of the project on the north side of the street and a multi-purpose trail on the south side. Design and ROW for Phase 3 is programmed for 2017, and construction is programmed for 2019. The East H Street upgrade is anticipated to be funded by a combination of local funds and a Transportation Improvement Board grant. The planning level cost estimate of ROW, design and construction of Phase 3 is approximately $8.7 million; the majority of which will come from the City of Yakima.

Local Improvements – County: The County is the lead agency for the East-West Corridor project, with the responsibility to lead implementation of the corridor from Keys Road in Terrace Heights, west to the roundabout intersecting with Bravo Company Boulevard, including bridges over the Roza Canal, the Yakima River and I-82. As with the local improvements led by the City of Yakima, the County has divided this project into three phases as well.

- **County Phase 1:** The first phase of the County's regional improvement is to reconstruct Butterfield Road from Keys Road to the west, then extend it to the Roza Canal, realignment of the connection to Hartford Road, including improvements to the levee system and relocation of a fish weir in the Roza Canal. The County has programmed this improvement to be designed in 2017 and constructed in 2018. The planning level cost estimate of ROW and construction of County Phase 1 is approximately $1.25 million.

- **County Phase 2:** The second phase of the County's improvements extends the East-West Corridor from just east of the Roza Canal to just west of North 15th Street. Design will begin in 2017, with construction scheduled for 2019. The planning level cost estimate of ROW, design and construction of County Phase 2 is approximately $13.7 million.
- **County Phase 3:** The final phase of the County regional improvement project includes both a vehicular and pedestrian bridge over the Yakima River, a bridge over I-82 and the approach connection to Bravo Company Boulevard. The final bridge alternatives analysis will be begin in 2017 and construction is programmed for 2020. The planning level cost estimate for ROW, design and construction of County Phase 3 is approximately $50.04 million. This phase is fully funded through the Connecting Washington program, approved by Governor Inslee and Washington Legislature in 2015. Funds are currently allocated over three biennia, $5.799 million in 2012-23, $26.989 million in 2023-25, and $17.256 million after 2025.

Interstate Improvements: The preferred alternative for improvements to improve I-82 operations at Yakima Avenue/Terrace Heights Avenue are summarized in PP2, as Modified Alternative 2C. Improvements are described below.

- Consolidate the Fair Avenue and Yakima Avenue exits from I-82 to a single location and connect them to the new East-West Corridor ramps with a C/D roadway system.
- Construct a C/D roadway system on both sides of I-82 from south of the I-82/Yakima Avenue Interchange to north of the I-82 overpass of the Central Washington Railroad, leaving space for the future widening of I-82 to six lanes as a separate project.
- Add auxiliary lanes westbound on I-82 from the east bound US 12 on-ramp to the westbound C/D roadway off-ramp and from the eastbound C/D roadway on-ramp to the eastbound Nob Hill Boulevard off-ramp.
- Existing Yakima Avenue ramps are revised to connect to the C/D roadway.
- New westbound on and off ramps with the new East-West Corridor are connect to the C/D roadway.
- A new eastbound off-ramp from the new East-West Corridor is connected to the C/D roadway.
- The existing I-82 off-ramp to Fair Avenue ramps is extended from the East-West Corridor EB on-ramp and connected to the existing Fair Ave intersection.
- The existing I-82 on-ramp from Fair Avenue is relocated to begin at the intersection of Fair Avenue and the Fair Avenue Loop Connector.

The planning level cost estimate for this project is approximately $74.313 million. This planning level cost estimate includes allowances for construction, design and right-of-way. The total cost can be reduced by having the City, County and developer donate some of the needed rights-of-way and as well as some additional practical design variations, such as reduced separation between the I-82 mainline and the C/D roadways.

Phases in the plan, as shown in Figure PP7-1: Implementation Strategy, are at various levels of design, so cost estimates are varied as well. Cost estimates are provided in Appendix J.

The Connecting Washington program includes $64.413 million for improvements to this stretch of I-82 and both the City and County have committed to another $5 million each to make sure it is a success, for a total of $74.413 million. The legislature also programmed Connecting Washington funds over three biennia; $4.531 million in 2021-23, $44.776 million in $2023-25, $15.106 million after 2025.

Has the public been involved in this Interchange Justification Report (IJR)?

Over the course of the development of the E-W Corridor and the I-82 improvements; Yakima County and the City of Yakima have held a number of open house meetings and provided opportunity for public input. In addition to the open house meetings, newsletters and a project website was created to distribute information about the project and provide a means for ongoing comments from the public to be accumulated. During the development of the E-W Corridor Yakima County held open house meetings in June and November of 2010 and the County Board of Commissioners held an open meeting in October 2011.

In October 2013, a public open house was held specifically to review the alternatives for evaluation in this IJR process. Proposed improvements to resolve these congestion issues were displayed and discussed with the community. Approximately 40 community members attended the open house and provided comments and expressed their opinions about the alternatives. Input received from the open house was used to refine the alternatives moved forward in the IJR.

Have key stakeholders been involved in this Interchange Justification Report (IJR)?

As part of the IJR process, the County and City formed both a Stakeholders Committee and Executive Committee through which to evaluate and narrow options to a final recommendation. The Stakeholders Committee included technical staff from:

- FHWA
- WSDOT Headquarters
- WSDOT Region
- Yakima Valley Council of Governments
- Yakima County
- City of Yakima

The Executive Committee included representatives from the same organizations, with elected representatives from the City and County and Executives from the remaining agencies.

Over the course of the IJR project, the Stakeholders have formally met on numerous occasions between September 2011 and August 2016 to:

- Identify project needs and alternatives under consideration
- Review technical analysis results
- Participate in evaluations of preliminary and final alternatives
- Review and comment on individual chapters of the IJR, as well as the Draft IJR document.

In addition to the formal meetings, informal meetings and/or conference calls were held with the Stakeholder Committee members to review results and resolve issues.

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WHAT ARE THE PROPOSED ENVIRONMENTAL PROCESSES?

The final project approval process requires the completion of environmental documents. The purpose of the environmental documentation is to demonstrate how the proposed alternative avoids or minimizes adverse impacts to the surrounding environment or mitigates for unavoidable impacts. These environmental disciples include assessing impacts to natural resources such as wetlands, fish and wildlife species and their habitats, and water resources. It also includes impacts to the surrounding community in areas such as cultural resources, environmental justice, hazardous materials, visual quality, noise, and air quality.

Based on environmental review to date, it is likely this project is classified as categorically excluded under the National Environmental Policy Act (NEPA) and will require an Environmental Classification Summary with supporting documentation.

The preferred alternative is not expected to have an adverse negative impact on the community or surrounding environment. A preliminary review of the environmental impacts show the following:

- Though it will have an overall increase in noise due to the new C/D roads and/or travel lanes, noise mitigation is not expected to be required or feasible.
- For Section 4(f), the project team will work closely with the Yakima Greenway Foundation to preserve the integrity of the Yakima Greenway Trail.
- The proposed improvements are anticipated to improve air quality overall, as it will reduce congestion, ramp queue times, and therefore vehicle idling.
- The project will not adversely impact protected populations as it will result in a net benefit to all populations equally. It will provide improved mobility to downtown Yakima and improved travel times to jobs and economic centers.
- Hazardous materials studies have been conducted for known major facilities in the area (i.e. the former Boise Cascade Mill site).[1] Based on preliminary findings, it appears as if there are no significant hazardous materials in the right of way impacted by the I-82 modifications referenced in this IJR. There does appear to be areas within the proposed right of way with substantial amounts of old wood waste that will have to be addressed during construction – either by removal or compaction, depending upon final design.
- For the I-82 Yakima Avenue Interchange improvements, the Endangered Species Act consultations are not anticipated given there is no anticipated in or over-water work for this project and there is no other suitable habitats for listed species in the project area. Therefore no listed species are expected to be present within the I-82 Yakima Avenue Interchange project area.

[1] Supplemental Remedial Investigation Report, Closed City of Yakima Landfill Site, September 29, 2015.

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