

## SR 14 FROM I-5 TO WASHOUGAL EAST CITY LIMIT

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### **CHARACTERISTICS**

#### **Segment Description:**

This corridor starts from I-5/SR 14 interchange (I-5 MP 0.28 to 0.29) within the City of Vancouver and continues through the City of Camas and ends at the east city limit of Washougal (MP 18.13).

**County/Counties:** Clark

**Cities/Towns Included:** The corridor passes through, Vancouver, Camas, and Washougal.

**Number of lanes in the corridor:** 2 to 6

**Lane width:** 12 to 12 feet.

**Speed limit:** 50 to 60 mph.

**Median width:** 2 to 16 feet.

**Shoulder width:** 8 to 22 feet.

#### **Highway Characteristics:**

This corridor is a Highway of Statewide Significance (HSS), it is in the National Highway system, is classified as a State Scenic Byway, and a urban Major Arterial.

#### **Special Use Lane Information (HOV, Bicycle, Climbing):**

There are two areas that have weaving lanes, accumulated route mile 0.39 to 0.76 and 9.03 to 9.83.

#### **Access Control Type(s):**

This corridor alternates between Full Control and Partial Control limited access.

#### **Terrain Characteristics:**

At the beginning of this corridor the terrain condition is flat and then transitions into rolling.

#### **Natural Features:**

This corridor parallels the Columbia River in the generally urbanized areas of south Clark County.

#### **Adjacent Land Description:**

Residential, commercial, industrial, and recreational lands are adjacent to this corridor.

#### **Environmental Issues:**

Wetlands occur in several areas throughout this corridor adjacent to the many small streams that cross SR 14. West of the 164th interchange, small wetlands occur primarily on the north side of the highway where ditches and cut slopes have intercepted natural groundwater. Large areas of riverine wetland occur east of the Camas interchange associated with the Camas Slough, Washougal River, and Columbia River. Proposed improvements including corridor widening and interchange projects will most likely impact wetlands and riparian habitat to some degree.

Using a linear measurement of wetlands immediately adjacent to the highway, approximately 16,640 linear feet (3.1 miles) of wetlands occur to the north of SR 14, and approximately 9,200 linear feet (1.75 miles) occur to the south of SR 14. These figures are preliminary and subject to change with further analysis and formal wetland delineation.

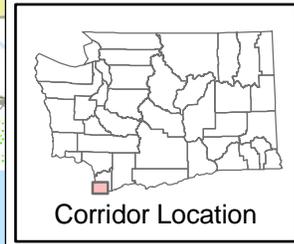
#### **Major Economic Issues:**

This corridor provides connection to two interstate highways (I-5 and I-205) and three cities (Vancouver, Camas, and Washougal). It is the major commuter and freight corridor in the region. The middle-day truck percentage at the east section of the corridor is around 20% of total traffic volume.

# HSP Congested Corridor Analysis

## Characteristics

- HSP Corridor Location
- U.S. Interstate
- U.S. Highway
- State Route
- Local Roads
- Railroad
- Wetlands
- Military Reservation
- Tribal Lands
- City Limits
- Urban Area
- County Line



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### **ASSETS**

#### **Pavement:**

There are 65.73 lane miles of Hot Mix Asphalt on this segment of SR 14.

#### **Signal:**

There are three signalized intersections at the following locations: SE Union, 2nd St., and 15th St.

#### **Structures:**

There are eight structures in this corridor that consist of: one Concrete Box Girder, two Concrete Slab, two Pre-Tensioned Concrete Beam, two Post-Tensioned Box Girder and one Steel Beam.

(Ramps, and locally owned structures (if any exist) are not identified in this section and may not be reflected on maps.)

#### **Features Crossed:**

There are no major features crossed.

#### **ITS Facilities:**

There are existing closed circuit television cameras at four interchanges/intersections within the corridor - I-205, 164th, 6th Avenue, and Union St. Data stations also exist at these locations and others.

There are existing closed circuit television cameras (CCTV) at four interchanges/intersections within the corridor - I-205, 164th, 6th Avenue, and Union St. Data stations also exist at these locations and others.

There are existing closed circuit television cameras (CCTV) at: I-205, 164th, 6th Avenue, and Union St.

There are existing data stations at: Grand, Blandford, Lieser, Ellsworth, 164th, 6th Avenue, and Union St.

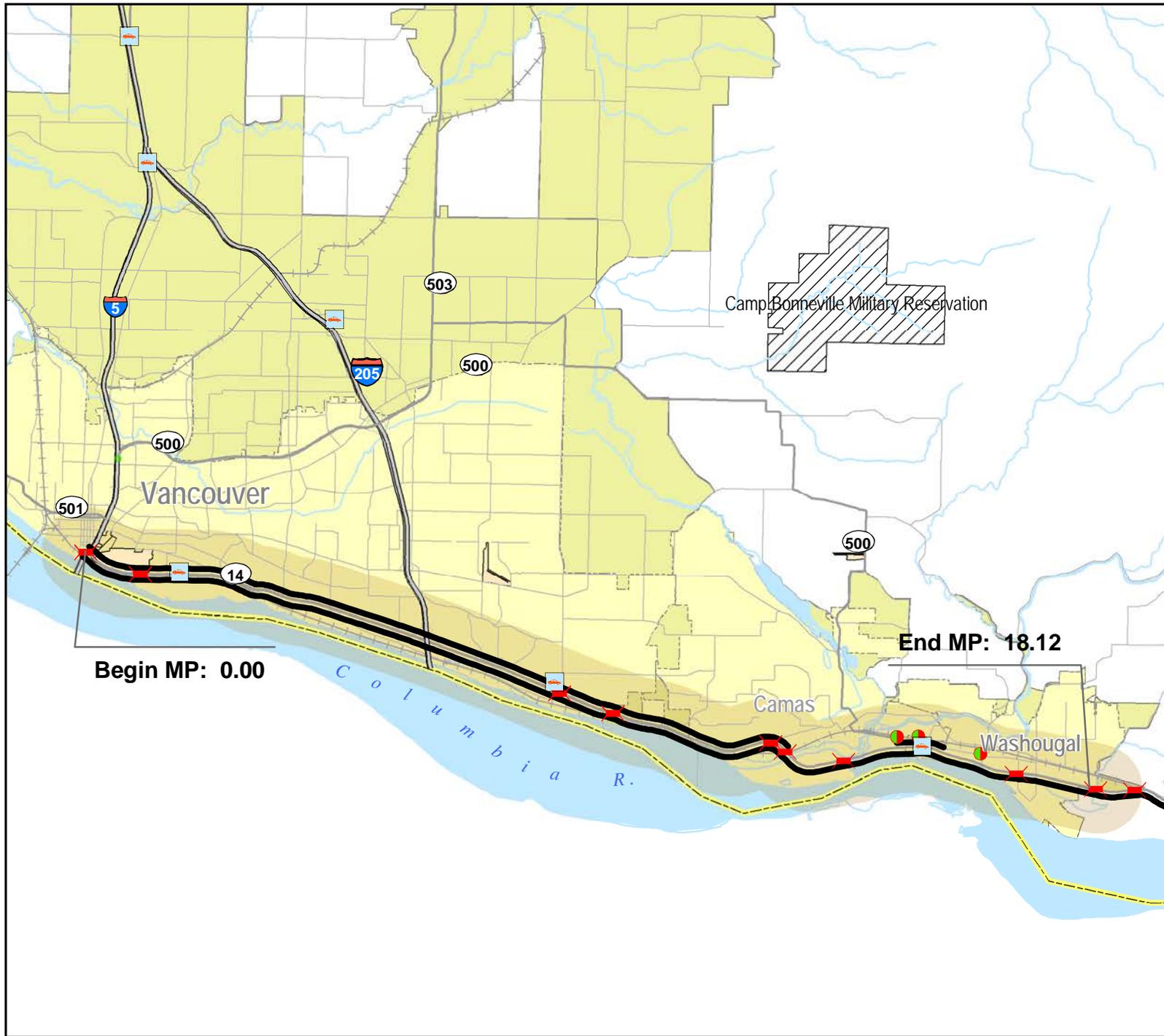
#### **Railroad Crossings:**

There are no at-grade railroad crossings along this corridor.

#### **Asset Other:**

**NONE IDENTIFIED.**

# HSP Congested Corridor Analysis Assets



- Corridor Location
- Assets**
- Signalized Intersection
- At Grade Railroad Crossings
- Bridge
- Weigh Stations
- Rest Area Sites
- Ferry Terminal
- Park and Ride
- Corridor Pavement Type**
- HMA
- BST
- PCCP
- Other Features**
- U.S. Interstate
- U.S. Highway
- State Route
- Local Roads
- Ferry Route
- Railroad
- Military Reservation
- Tribal Lands
- City Limits
- Urban Area
- Airports
- County Line

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## SR 14 FROM I-5 TO WASHOUGAL EAST CITY LIMIT

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### **USAGE**

#### **General Origin and Destination Travel Characteristics:**

This segment of SR 14 serves as the primary east-west route for commuter and local trip traffic for the central Vancouver and east Clark County communities. SR 14 provides connection to both the Interstate 5 and Interstate 205 corridors, the major commuter and freight corridors in the region. Portland and Vancouver are the major employment destinations for AM peak commuter traffic.

#### **Snow/ice Issues:**

There are no sections within this corridor which present a problem for normal snow/ice control.

#### **Annual Average Daily Traffic:**

Ranges from 5,000 to 57,000.

#### **Significant Seasonal Average Annual Daily Traffic Changes:**

There is a minor increase in annual average daily traffic in the summer months due to recreational traffic, but congestion is due to commuter traffic.

#### **General Description of Major Average Annual Daily Traffic Locations:**

The annual average daily traffic (AADT) from Washougal City Limit to SE Evergreen Boulevard is 5,000. The Columbia Shores Blvd. Intersection annual average daily traffic is 57,000. At Columbia Shores Boulevard past I-205 to SE 164th Ave the annual average daily traffic is greater than 50,000.

#### **Freight:**

**Freight Classification:** T1 and T3

**Yearly Tonnage:** 19.1M

**Truck Percentage of Annual Average Daily Traffic:** 8.8% to 15.7%

#### **Additional Usage Comments:**

There are no additional comments.

**Average Annual Societal Cost of All Collisions:** Approximately \$15.58M

#### **Collisions:**

**Severe No of Collisions:** 29

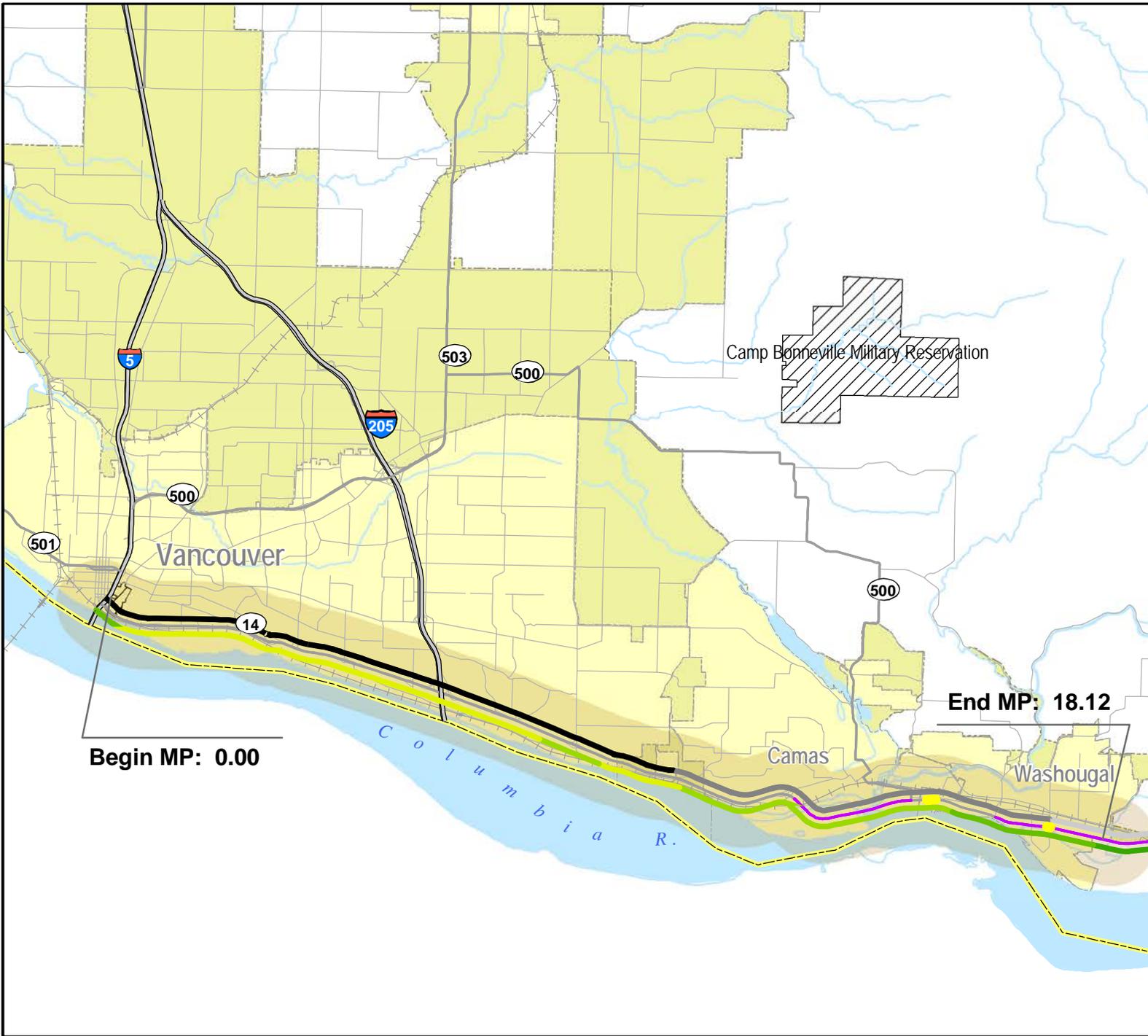
**Less Severe No of Collisions:** 646

**List Data Years:** 2003 to 2005

# HSP Congested Corridor Analysis

## Usage

- HSP Corridor Location
- Safety Analysis Areas**
- PAL Spot 07-09
- PAL Corridor 07-09
- HAC 07-09
- HAL Corridor 07-09
- HAL Spot 07-09
- Freight Classification**
- T-1
- T-2
- T-3
- Traffic Sections AADT**
- < 3,000
- 3,001 - 10,000
- 10,001 - 20,000
- 20,001 - 40,000
- 40,001 - 80,000
- 80,001 - 100,000
- 100,001 - 120,000
- > 120,000
- Trucks 10% and Over
- Other Features**
- U.S. Interstate
- U.S. Highway
- State Route
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### **NEEDS AND STRATEGIES**

#### **Preservation**

##### **Pavement Condition and Needs:**

The existing pavement in this corridor is hot mix asphalt.

Most of the pavement in this corridor is in good condition. There are isolated areas where the pavement is rutted. The ramps at the Lieser Road interchange are in need of paving due to cracking and structural deterioration.

##### **Pavement Management Strategies:**

The pavement type for this corridor will remain hot mix asphalt.

80% of corridor lane miles were paved in 1997-1999; remaining 20% of corridor lane miles reconstructed or had overlay in 2004. Estimated pavement life is 15 years; majority of corridor is due for hot mix asphalt overlay in 2014. One lane will be added in each direction from MP 12.16 to MP 17.05 on the SR 14/ Camas Washougal Widening Project to be advertised in 2009. Southwest Region maintenance will maintain isolated rutted areas up until the time the adjacent pavement sections are due for overlay. Southwest Region would like to pave the Lieser Road interchange ramps as part of a Clark County Ramp Paver in 2009.

##### **Structures Condition and Needs:**

There are 23 structures in this corridor: There are 5 concrete box girder structures, 5 post-tensioned box girder structures, 2 pre-tensioned concrete beam structures, and 3 concrete slab structures with spread footing foundations in this corridor. There is 1 pre-tensioned concrete beam structure with steel piling, 3 pre-tensioned concrete beam structures with concrete piling, 2 concrete slab structures with concrete piling, 1 steel beam structure with steel piling, and 1 post-tensioned box girder structure with piling in this corridor. (This may include ramps and locally owned structures if any exist.)

##### **Structures Management Strategies:**

MP 12.62 14/25 West Camas Slough. A new bridge will be constructed adjacent to this bridge as part of the SR 14/Camas Washougal Widening and Interchange project. MP 13.7 14/27 East Camas Slough. A new bridge will be constructed adjacent to this bridge as part of the SR 14/Camas Washougal Widening and Interchange project.

##### **Additional Condition and Needs:**

There are two unstable slopes in this corridor at the following locations: MP 11.40 to 11.47 L and MP 11.75 to 11.81 L.

##### **Additional Management Strategies:**

Both slopes do not rank high enough on the statewide unstable slope priority list and are not currently programmed.

#### **Improvement**

##### **Mobility Condition and Needs:**

This section of SR 14 is the main east-west corridor in Clark County with high volumes. It is estimated in 2030, the peak hour speeds on the most segments of this corridor will be lower than 60% of the posted speed, if no improvements occur. Currently some sections of the corridor experience peak hour queuing. SW Region has identified three bottlenecks and chokepoints on this corridor: (1) from I-205 to 164th Ave., (2) from NW 6th Ave to SR 500/Union St., and (3) two closely spaced signalized intersections with SR 500 and 2nd St.

##### **Mobility Management Strategies:**

A programmed widening project already addresses the bottleneck from 6th Ave. to SR 500. Two proposed projects will reduce the back-ups at the other two bottlenecks or chokepoints. The first one is to extend the ramps from I-205 to 164th Avenue (both directions). Upon the completion of the project, this segment will have six lanes total. This project is projected to reduce delay by 73% to 75%.

The second one is to complete the interchange at SR 500. The project will remove a signal and thus reduce the delay. Locations other than bottlenecks and chokepoints have been studied as well, such as the proposed signal at Ellsworth Interchange - that project will improve the intersection Level of Service (LOS) from E to B.

Several other proposed projects will improve the overall mobility performance on this corridor. One is the widening and interchanges construction project from SR 500/Union St. to 32nd St. This project will widen the roadway to four lanes, build two new interchanges at 15th St. and 32nd St., and manage the access points. It is estimated the project will reduce delay by 80%. Another widening project proposes to widen the roadway to six lanes from I-5 to I-205. It is a response to the new Columbia River

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Crossing project. We predict this widening project will reduce future delay by 61% to 65%.

Besides the widening projects, the proposed Intelligent Transportation Systems (ITS) facilities will bring significant mobility benefits to the whole corridor.

### **Safety Condition and Needs:**

Reduce frequency and severity of accidents along this corridor. Specifically, the following are of concern: 5% of accidents resulted in death or disability with an estimated societal costs of \$33 million. 28% of accidents occur within one half mile of I-5 interchange Intersection related accidents in the entire corridor account for 33% of accidents; between Union and 32nd, intersection related accidents rise to 71%. 45% of accidents along the corridor are read-end collisions. Under 23 United State Code-Section 409, this data cannot be used in discovery or as evidence at trial in any action for damages against the WSDOT or the State of Washington. This disclaimer is for all accident data mentioned in this report.

### **Safety Management Strategies:**

Increasing roadway capacity for existing demand and expected growth between I-5 and I-205 through widening. Completing access control measures from Union to 32nd. Throughout the corridor, adding length to transition lanes and ramps as well as ensuring consistent direction of traffic through ITS technology and new or improved intersections. Beyond the fixes listed in this plan, monitor corridor for future high accident locations and high accident corridors. Review accidents as they occur and develop solutions commensurate to the severity and causes.

### **Environmental Condition and Needs:**

There are no fish barriers There are several stream crossings in this corridor with associated riparian and wetland areas that provide habitat for vegetation, fish and wildlife. There are some additional wetland areas located along the corridor. This corridor runs parallel with the Columbia River. There are 3 identified locations of threatened species in close proximity to the corridor. Several other wildlife species are present in many locations along the corridor. There are approximately 75-100 known stormwater outfalls located along this corridor.

### **Environmental Management Strategies:**

Proposed improvement solutions will take into consideration the existing environmental conditions of the corridor and make every effort to minimize any potential adverse impacts.

### **Restrictions:**

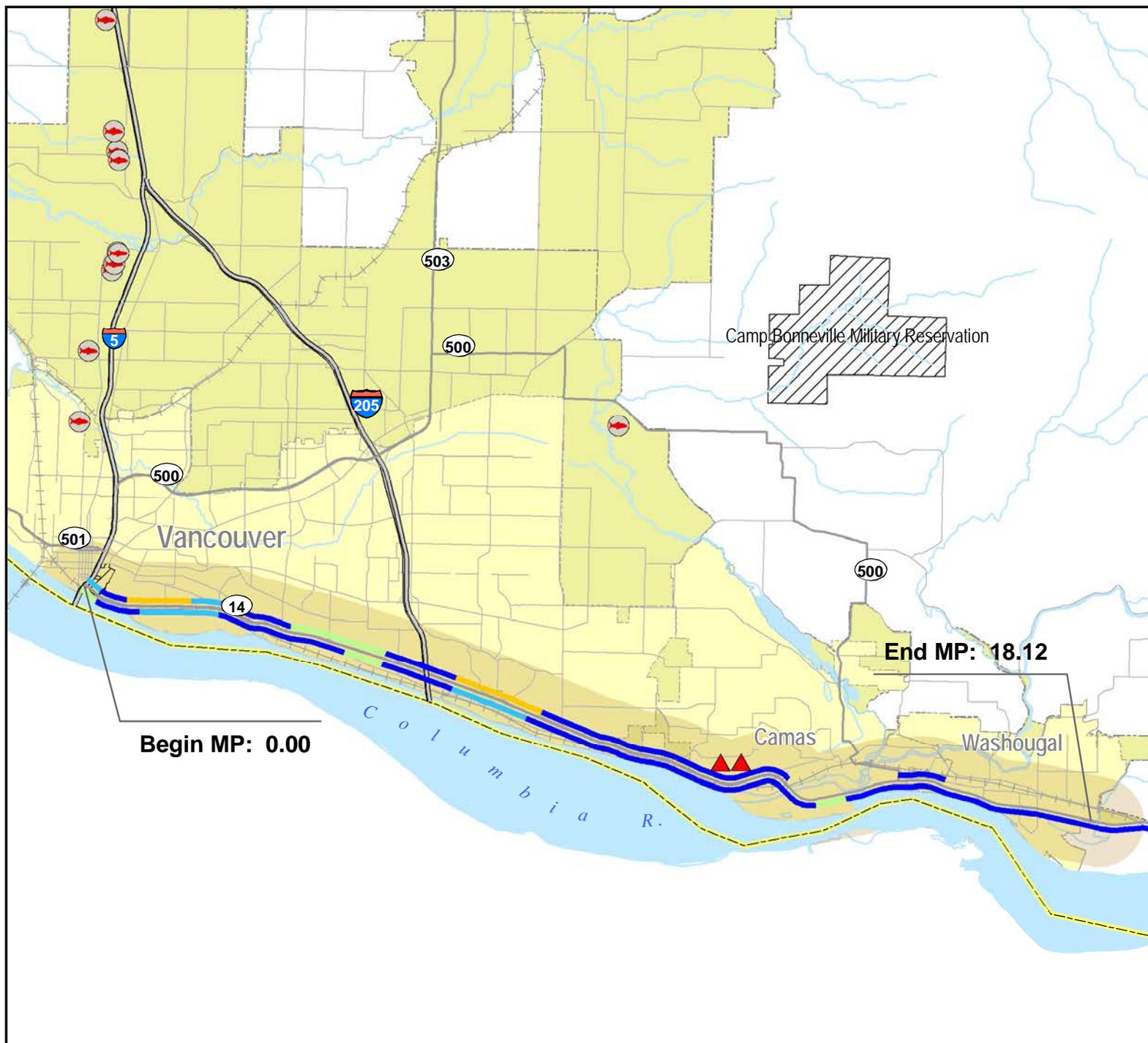
There are none identified.

### **50-Year Configuration:**

SR 14 continues to be the major east-west corridor in Clark County, providing connections between I-5, I-205 and the cities of Vancouver, Camas, and Washougal. Residential, commercial, and recreational developments along the corridor will continue, mainly in the east section of the corridor. Freight and goods trips will grow, especially after the completion of Columbia River Crossing project. Congestion and safety will still be the main concerns. High-investment improvements are needed for this corridor. Presently SWRTC, the SW Regional Transportation Council, is beginning a study to identify a 50-year corridor configuration for Clark County.

# HSP Congested Corridor Analysis Needs

- HSP Corridor Location
- Bridge Replacement Priority**
  - Replacement
  - Seismic
  - Special
  - Scour
  - Painting
  - Miscellaneous
  - Bridge Deck
- Other Bridge Issues**
  - 2 Lane BW Narrow Bridge
  - Restricted Bridge
  - Posted Bridge
  - Vert. Clearance 15.5' Or Less
- Fish Barriers**
  - Require Repair
  - Little Gain
  - Undetermined
- Unstable Slope**
  - Debris Flow
  - Erosion
  - Landslide
  - Rockfall
  - Settlement
- Paving Due**
  - Past Due
  - 2005 - 2007
  - 2008 - 2009
  - 2010 - 2011
  - 2012 - 2026
- U.S. Interstate
- U.S. Highway
- State Route
- Local Roads
- Railroad
- Military Reservation
- Tribal Lands
- City Limits
- Urban Area
- County Line



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### ***TIERED PROPOSED SOLUTIONS***

#### **Minimum Fix**

##### **Description:**

Variable message sign (VMS) at ARM 3.00 westbound; ARM 4.6 (west of Ellsworth) westbound; 205 westbound (close to ARM 6); ARM 7.0 westbound (Costs: \$1,292,400). CCTV at intersections, interchanges and blind spots (costs: \$582,000). Data stations every ½ mile and at intersections and interchanges (costs: \$2,205,000). Ramp metering at interchanges between I-5 and 164th Ave (costs: \$606,000). Fiber optic cable from I-205 to ARM 16.2 (Washougal) (Costs: \$1.97 million). ARM 5.58, Signal at Ellsworth interchange eastbound off ramp (Costs: \$523,000; B/C: 1.75; Delay reduction: 68%; Collision reduction: 30% to 50%)

**Delay Reduction:** 16 to 68%

**Collision Reduction:** 15 to 50%

**Deficient Concrete Lane Miles:** None identified.

**Total Estimate Cost:** \$7.2 million

##### **Cost Estimate Explanation:**

All costs include both construction costs and overhead costs. The construction unit price is updated to 2006 standard. The cost estimations for Intelligent Transportation System (ITS) facilities and traffic signal are based on the information provided by SWR Traffic Office.

##### **Minimum Fix Benefits:**

The Benefit Cost Ratio (B/C) for the signal at Ellsworth is 1.75. This project will improve the intersection LOS from E to B, using 2006 traffic volume. Depending on the location, benefits for ITS facilities vary. It is widely acknowledged that ITS has positive impacts on mobility, safety, and environment. For example, nationwide studies indicate ramp metering can increase speed from 16% to 62%, and decrease collisions from 15% to 50%.

#### **Moderate Fix**

##### **Description:**

Re-stripe and extend ramps from I-205/SR 14 to 164th Ave. (ARM 6.95 to 8.3, both directions), including lengthening/widening Westbound on-ramp from 164th (Project Costs: \$25.5 million; B/C: 5.76; Delay reduction: 74%; Collision reduction: 30% to 50%; Yr. 2025 minimum Peak Hour Speed/Posted Speed: 83%). Complete interchange at Union St. (ARM 14.64) (Project Costs: \$25 million; Collision reduction: 30%). Lengthen ramps at old interchanges to today's standard (estimations for construction costs and project benefits go with proposed widening/interchange projects; however, the ramp lengthening can be constructed prior to the widening project)

**Delay Reduction:** Reduce delay from I-205 to 164th Ave by 74% and remove a signal at Union St.

**Collisions Reduction:** 30 to 50%

**Deficient Concrete Lane Miles:** None identified.

**Total Estimate Cost:** \$51 M

##### **Cost Estimate Explanation:**

Cost estimations are based on discussions with Columbia Gorge Area Engineering Office, Southwest Environmental Service Office, and Southwest Real Estate Office. All construction costs are updated to year 2006 dollars.

##### **Moderate Fix Benefits:**

SR 14 is the main east-west arterial in the region; both traffic volumes and accidents are high on this corridor. I-205 to 164th Avenue on SR 14 is one of the identified bottlenecks/chokepoints in the region. The ramp extension from I-205 to 164th Avenue project is the Southwest region's first priority for SR 14. Based on the WSDOT Mobility Projects Prioritization Process (MPPP) estimates, this project will bring \$87 million mobility benefits and \$15 million safety benefits in 20 years, with a B/C ratio of 5.76. The delay reduction is estimated to be 74% (Benefit Collision Delay Program); and the collision reduction is estimated to be 30% to 50% (MPPP software). The ratio of Peak Hour Speed to Posted Speed in 2025 will be increased from 58% under no-build scenario to at least 83% under build scenario (Highway Segment Analysis Program). The funded project 401409W - Camas Washougal Widening and Interchange - will build a partial interchange at Union Street. In the future, full control limited access is needed for this corridor. We propose to complete this interchange before we build other new interchanges on the corridor.

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### Maximum Fix

#### **Description:**

Widen roadway, construct interchanges, and limit accesses from Union St. to 32nd St. (ARM 14.64 to 17.06) (Costs: \$119 million; B/C: 1.47; Delay reduction: 80%; Collision reduction: 66% to 71%). Widen to 4 lanes from Union to 32nd. Build new interchange at 15th (ARM 16.11). Build new bridge at 27th St. (ARM 16.74) for additional 2-lane traffic, paralleling north to the current RR crossing Bridge (NUM 014/030). Build new interchange at 32nd St. (ARM 17.06) or 27th Street. E. Limit access points. Widen to six lanes and rebuild interchanges from I-5 to 205 (ARM 0.00 to 6) (Total Costs: \$195 million; B/C: 1.32; Delay reduction: 61% to 65%; Collision reduction: 30% - 60%; Yr. 2025 Peak Hour Speed/Posted Speed: above 89%). Widening to six lanes (Costs: \$90.5 million). Rebuild Evergreen interchange, and relocated Westbound off-ramp (ARM 3.00 to 3.70) (Costs: \$47.7 million). Rebuild Lieser Avenue interchange (ARM 3.93 to 4.87) (Costs: \$30.5 million). Rebuild Ellsworth Avenue interchange (ARM 5.10 to 5.27) (Costs: \$25 million)

**Delays Reduction:** 61 to 80%

**Collisions Reduction:** 30 to 71%

**Deficient Concrete Lane Miles:** None identified.

**Total Estimate Cost:** \$314 M

#### **Cost Estimate Explanation:**

Cost estimations are based on discussions with Columbia Gorge Area Engineer Office, SW Environmental Service Office, and SW Real Estate Office. All construction costs are updated to 2006 standard. For example, the bridge cost is estimated as \$400 per square feet. Dollar value is Year 2006 value.

For project (1) - widening from Union St. to 32nd St., two new interchanges will be built along the corridor. One is at 15th St.; another one is at 32nd Street (or 27th Street). A new bridge will be built at 27th Street, paralleling to the current RR crossing Bridge (NUM 014/030), to carry the additional 2-lane traffic flows. The bridge is assumed to be 84' wide and 240' long. East of 15th St., City of Washougal plans to build a bridge/tunnel over/under SR 14 for pedestrians walking to the Steamboat Landing and the Riverfront Trail. Developers are paying for part of the frontage roads.

For project (2) - widening from I-5 to I-205, the project cost estimation includes \$31.45 million noise/retaining wall and \$11.8 million right-of-way. This project also includes reconstruction of three interchanges, Evergreen Boulevard I/C, Lieser Rd I/C, and Ellsworth Rd I/C, to accommodate the additional two-lane roadway widening. The three interchange reconstruction's will: (1) accommodate 6 lanes, (2) realign the vertical grade to improve sight distance, and (3) lengthen ramps to meet the current design standard. For Evergreen Blvd. Interchange, it is assumed a new diamond interchange will be constructed with 40' in width and 400' in length. The current Westbound off-ramp will be replaced with a new 28'-wide-1000'-long bridge. For Lieser Road Interchange, it is assumed the new bridge will be 114' long and 76' wide. The ramp realignment includes 2 lanes with 2 miles. For Ellsworth Road Interchange, it is assumed the new bridge will be 114' long and 76' wide. The ramp realignment includes 2 lanes with 1.5 miles.

#### **Maximum Fix Benefits:**

The benefit estimations are calculated through WSDOT Mobility Projects Prioritization Process (MPPP).

Delay reduction is calculated through the Benefit Collision Delay Program; collision reduction is estimated based on the default assumptions in MPPP program. The ratio of Peak Hour Speed to Posted Speed is calculated through Highway Segment Analysis Program.

The widening and interchange project from Union St. to 32nd St. is second on the region's priority list for SR 14. Upon completion of the project, the whole section from MP 0.00 to 17.06 on SR 14 will become a highway with controlled access; delay will be reduced by 80%. Overall this project will bring \$100 million mobility benefits and \$22 million safety benefits in 20 years. The B/C ratio is 1.93.

The widening and interchange project from I-5 to I-205 is a response to the congestion in the future, especially after the completion of new Columbia River Crossing project. It is estimated the project can bring \$142 million mobility benefits and \$39 million safety benefits in 20 years. The B/C ratio is 1.32. Upon the completion of the project, the ratio of Peak Hour Speed to Posted Speed in 2025 will be increased from 32% ~ 64% to over 89%.

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### Off-System Solutions:

None identified.

### Special Studies/Reports:

SR 14 - Confluence Project Land Bridge (Documented CE) City of Vancouver.

SR 14 - SR 14 Camas/Washougal Potential route development plan.

Southwest Washington Regional Transportation Council Transportation Corridors Visioning (50-year vision for Clark County, in process).

### Required Studies

There are no identified required studies.

### Start/Completion Date of Study:

There are no planned start/completion dates.

### Expected Results

None identified.

### Funded Projects within Corridor Limits

Project No	Title
401409W	Camas Washougal Widening and Interchange
401499A	SR 14/192nd Ave. Interchange (Brady Rd)
401408S	SR 14/Lieser Road Interchange Ramp Signalization
401404A	SR 14/32nd St. Intersection Improvement
401406B	SR 14/Two Bridge Rail Retrofits Vancouver East

### Additional Comments:

None identified.

### Data Sources and Contacts used:

Washington State Highway System Plan: 2003-2022, dated February 2002

GIS Environmental and Transportation Workbench

Capital Improvement and Preservation Program

Transportation Data Office

Washington State Highway Log 2005B

WSDOT Columbia Gorge Area Engineering Office

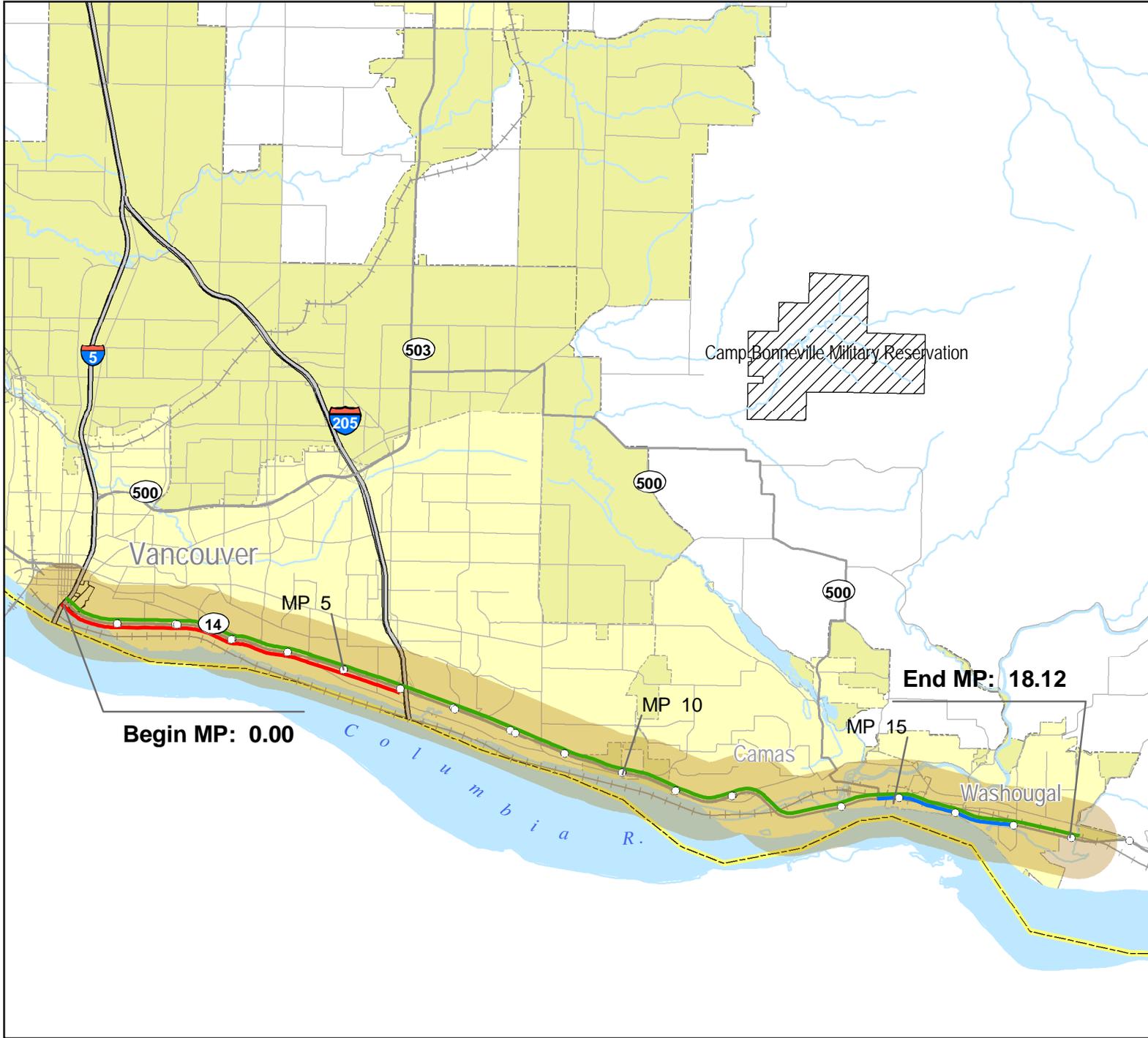
WSDOT SWR Environmental Service Office

WSDOT SWR Real Estate Office

WSDOT SWR Traffic Office

WSDOT BidTabs Professional Database

Washington State Pavement Management System, 2005



### HSP Congested Corridor Analysis Solutions

- HSP Corridor Location
- Solutions**
- Tier 1
- Tier 2
- Tier 3
- Other Features**
- U.S. Interstate
- U.S. Highway
- State Route
- Milepost Marker
- Local Roads
- Railroad
- Tribal Lands
- Military Reservation
- City Limits
- Urban Area
- COUNTY

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