West Linn OR 43
2016 Conceptual Design Plan

Technical Appendices

1. Kickoff Stakeholder Meeting and Corridor Audit
2. June Stakeholder Meeting Materials and Feedback
3. Summary of Interchange Options Considered
4. Public and Stakeholder Involvement Summary
5. Hidden Springs / Cedar Oak Operational Analysis
6. OR 43 Phase 1 - Cost Estimates
7. ODOT Design Exceptions

Appendix 1 Kickoff Stakeholder Meeting and Corridor Audit

Meeting Agenda

Highway 43 / Willamette Drive Concept Design Plan Refinement

Stakeholder Kick-Off Meeting

April 13, 2015

Bolton Room, City Hall, 22500 Salamo Rd, West Linn, OR 97068

BACKGROUND:

The City of West Linn is working on a refinement to the existing Highway 43 Conceptual Design Plan, created in 2008. This refinement will build on the work done to develop the existing plan.

The study area includes Highway 43 from the city limits at the north end to Willamette Falls Drive at the south end. This refinement will take into account corridor constraints, current design practices, and recent community input received through the Highway 43/Willamette Falls Drive Vision, Phase I and the Arch Bridge-Bolton Concept Plan.

The objectives of the refinement are to:

- Refine the bicycle facility design to align with community vision
- Address I-205 interchange area
- Consider modifications to side-street/driveway access to enhance safety
- Maintain 3-lane cross section where possible
- Identify right-of-way needs along the corridor
- Develop implementable design for future development and capital project improvements

MEETING PURPOSE:

The purpose of this meeting is to:

1. Inform stakeholders about the project goals, context, and current conditions
2. Get input from stakeholders on corridor constraints, opportunities and potential design solutions for the corridor
3. Set the stage for corridor field visits on Tuesday and Wednesday (see schedule under "Next Steps").

KICK-OFF MEETING SCHEDULE:

9:30am	Introductions
9:40am	Background
9:50am	Existing Conditions
10:00am	Key Considerations
10:20am	Opportunities and Potential Cross Sections
10:45am	Workshop – a closer look at the corridor
11:15am	Report out and summary of workshop
11:30am	Close

NEXT STEPS:

Corridor Audit Schedule

We will be visiting the corridor over the following two days to gather additional information to help inform the conceptual plan refinement. We'll be biking and driving the corridor at the following times. If you would like to join us, please sign up and bring a safety vest and bicycle (if you can). We will meet outside Starbucks at 22000 Willamette Drive to kick-off each visit.

Primary Corridor Audit: (4/14 at 1:45pm-5:00pm) We will travel the corridor and examine some specific locations in more depth, looking at key constraints and opportunities. We'll gather at 1:45pm and plan on traveling north along the corridor (by bike and car) at 2:00pm and ending by 5:00pm. Meet outside Starbucks at 22000 Willamette Drive.

Supplemental Evening Session: (4/14 at 8:30pm-9:30pm) We will travel the corridor by bike and car to look at changes in traffic and conditions after dark. We won't cover the same level of detail as in the primary corridor audit session. Meet outside Starbucks at 22000 Willamette Drive.

Supplemental Morning Session: (4/15 at 7:00am-9:00am) We will travel the corridor by bike and car to look at the morning peak period. If needed, we can discuss some of the specific locations, constraints, and opportunities, similar to the primary corridor audit. Meet outside Starbucks at 22000 Willamette Drive.

Report Back:

We will schedule a second meeting with this group in the second half of May to share our findings from the corridor audit and review potential refinements to the Highway 43 Conceptual Design Plan.

Willamette Drive Conceptual Plan Update
West Linn, OR
April 2015

MOVINGFORWARDTHINKING

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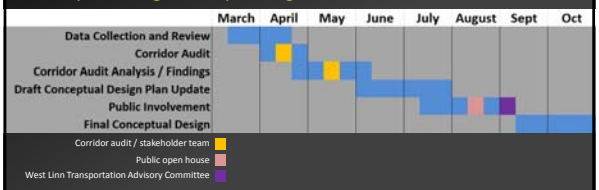
TRANSPORTATION ENGINEERING/PLANNING

Project Schedule and Objective

- Refine 2008 Conceptual Design Plan to reflect corridor constraints, current design practices, and recent community input through other planning efforts.



Presentation Overview

- Refinement Plan goals
- Project context and background
- Key considerations
- Crash history
- Cycle track opportunities and challenges
- Potential revised cross sections
- Workshop

Refinement Plan Objectives

- Refine bicycle facility design
- Address I-205 interchange area
- Consider modifications to side-street/driveway access to enhance safety
- Maintain 3-lane cross section where possible
- Identify right-of-way needs along the corridor
- Develop implementable design for future development and capital project improvements

Highway 43/Willamette Drive Study Area

Project Context and Background

West Linn OR 43
Conceptual Design Plan

Final Report

7 MOVINGFORWARDTHINKING KITTELSON & ASSOCIATES, INC.

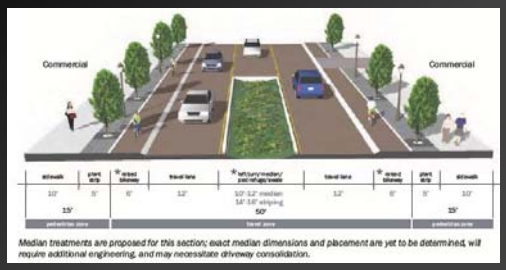
West Linn OR 43 Conceptual Design Plan (2008)

82' total width

*Includes 1' buffer on outside edge; additional buffer may be needed in some locations.

8 MOVINGFORWARDTHINKING KITTELSON & ASSOCIATES, INC.

West Linn OR 43 Conceptual Design Plan (2008)



Median treatments are proposed for this section; exact median dimensions and placement are yet to be determined, will require additional engineering, and may necessitate driveway consolidation.

82' total width*

*Includes 1' buffer on outside edge; additional buffer may be needed in some locations.

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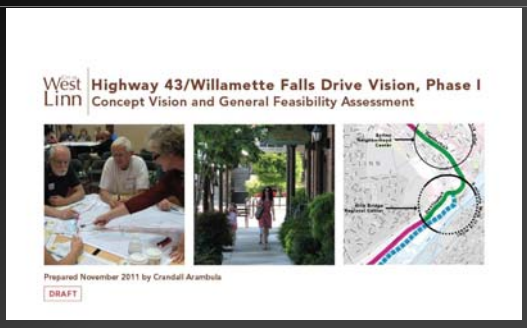
West Linn OR 43 Conceptual Design Plan (2008)

67' total width*

*Includes 1' buffer on outside edge; additional buffer may be needed in some locations.

10 MOVINGFORWARDTHINKING KITTELSON & ASSOCIATES, INC.

Highway 43/Willamette Falls Drive Vision (2011)



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Highway 43/Willamette Falls Drive Vision (2011)

- Community needs identified during outreach
  - Shop locally and access daily needs by biking or walking
  - Enhance pedestrian and bicycle safety
  - Achieve regular, frequent transit service
    - along the corridor
    - connecting to City Hall
    - direct connection to downtown Portland

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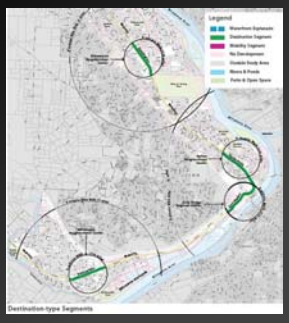
Highway 43/Willamette Falls Drive Vision (2011)



- Destination Segments
  - Support center destinations
  - Prioritize ped/bike circulation and auto access to business
  - Tolerate congestion
  - Reduce auto and transit speeds

Highway 43/Willamette Falls Drive Vision (2011)

- Mobility Segments
  - Support through-vehicle movement
  - Provide safe and comfortable ped/bike circulation
  - Maximize auto and transit capacity and minimize user conflicts

Highway 43/Willamette Falls Drive Vision (2011)

Complete Streets

*"A key component of the complete streets concept is a **continuous protected bikeway** along the length of the corridor that would link the centers."*

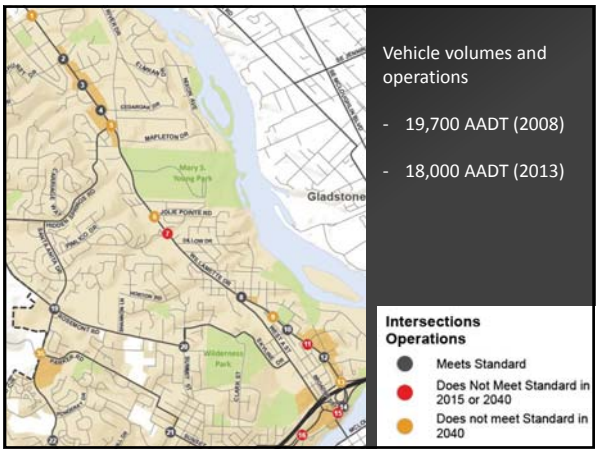
Arch Bridge-Bolton Concept Plan (2014)

- Complete improvements on Willamette Drive
- Redevelop Old Bolton Fire Station
- Encourage some townhouse and mixed use development

Arch Bridge-Bolton Concept Plan

Reconfigured intersection of Willamette Drive/ Willamette Falls

Key Considerations



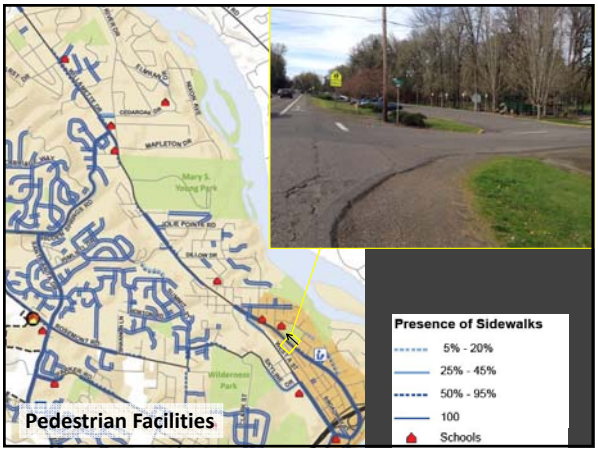
Key Considerations

- Varying existing bicycle, pedestrian, and transit facilities along the corridor.

Key Considerations

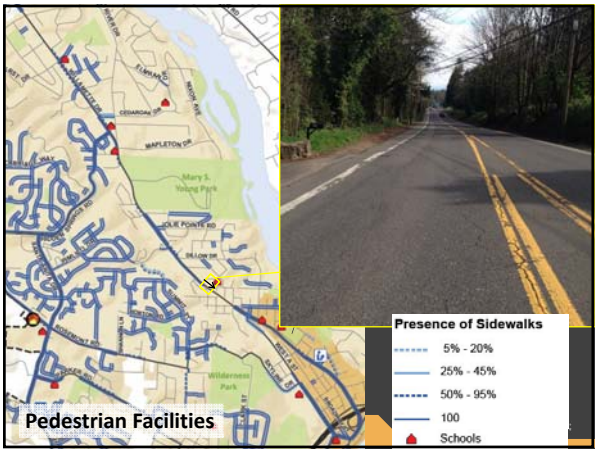
- Vehicle volumes and operations

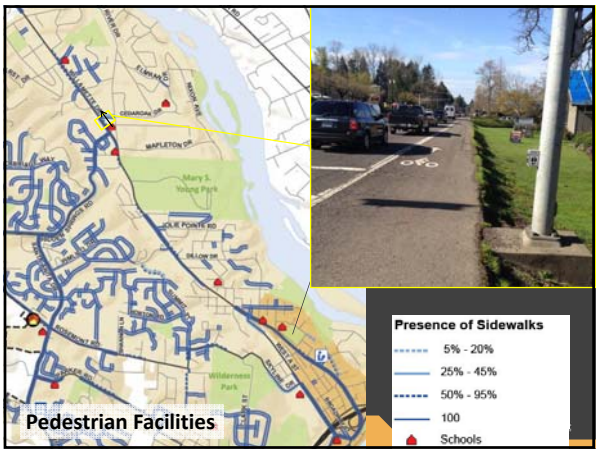
Map ID	Intersection	Existing (2015) LOS	Existing (2015) Average Delay (Sec)	Existing (2015) Volume/ Capacity (v/c)	Future Base Case (2040) LOS	Future Base Case (2040) Average Delay (Sec)	Future Base Case (2040) Volume/ Capacity (v/c)	Mobility Standard Agency	Mobility Standard Minimum	Standard Met?
Signalized Intersections										
2	Highway 43/Marylhurst Drive-Lazy River Drive	B	16.3	0.8	C	26.7	0.94	ODOT	v/c 0.99	Yes
4	Highway 43/Cedaroak Drive	B	10.4	0.65	B	18.3	0.82	ODOT	v/c 0.99	Yes
5	Highway 43/Hidden Springs Road	C	25	0.83	D	42.8	1	ODOT	v/c 0.99	No
8	Highway 43/West A Street	B	12.5	0.74	C	31.1	0.97	ODOT	v/c 1.1	Yes
12	Highway 43/Hood Street-McMillan Street	C	23.6	0.76	E	62.7	1.07	ODOT	v/c 1.1	Yes
13	Highway 43/I-205 SB Ramp	C	26.5	0.85	E	69.1	>1.0	ODOT	v/c 0.85	No
14	Highway 43/I-205 NB Ramp	A	8	0.5	B	10.2	0.41	ODOT	v/c 0.85	Yes
Unsignalized Intersections										
1	Highway 43/Arbor Drive	B/F	>50.0	0.03/0.37	B/F	>50.0	0.04/>1.0	ODOT	v/c 0.99	No
3	Highway 43/Waiting Way	B/E	42.2	0.04/0.21	B/F	>50.0	0.06/0.92	ODOT	v/c 0.99	Yes
6	Highway 43/Jolie Pointe Road	A/E	47.3	0.03/0.22	B/F	>50.0	0.11/>1.0	ODOT	v/c 0.99	No
7	Highway 43/Pimlico Drive	B/F	>50.0	0.18/>1.0	C/F	>50.0	0.37/>1.0	ODOT	v/c 0.99	No
9	Highway 43/Holmes Street	B/F	>50.0	0.02/0.65	B/F	>50.0	0.03/>1.0	ODOT	v/c 0.99	No
10	Highway 43/Lewis Street	B/E	40	0.01/0.15	B/F	>50.0	0.01/0.54	ODOT	v/c 0.99	Yes
11	Highway 43/Bums Street	B/F	>50.0	0.23/>1.0	D/F	>50.0	0.49/>1.0	ODOT	v/c 1.1	No
15	Highway 43/Willamette Falls Drive	A/F	>50.0	0.21/>1.0	D/F	>50.0	0.77/>1.0	ODOT	v/c 0.99	No

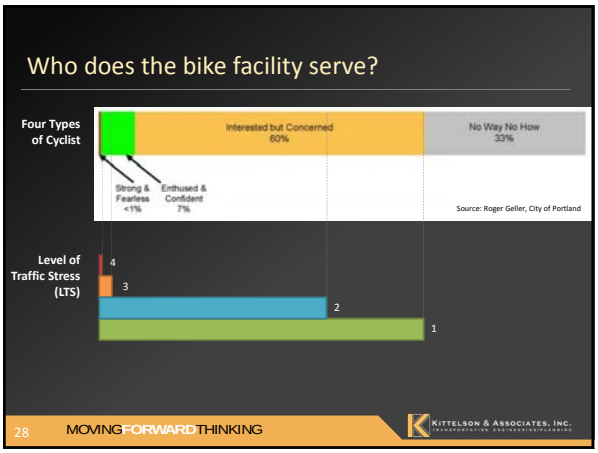


Key Considerations

- Varying right-of-way ranges from 50 to 100 feet.




Presence of Sidewalks
5% - 20%
25% - 45%
50% - 95%
100
Schools
Pedestrian Facilities


Who does the bike facility serve?
Four Types of Cyclist
Interested but Concerned 60%
No Way No How 33%
Strong & Fearless <1%
Enthused & Confident 7%
Source: Roger Geller, City of Portland
Level of Traffic Stress (LTS)
4
3
2
1
28
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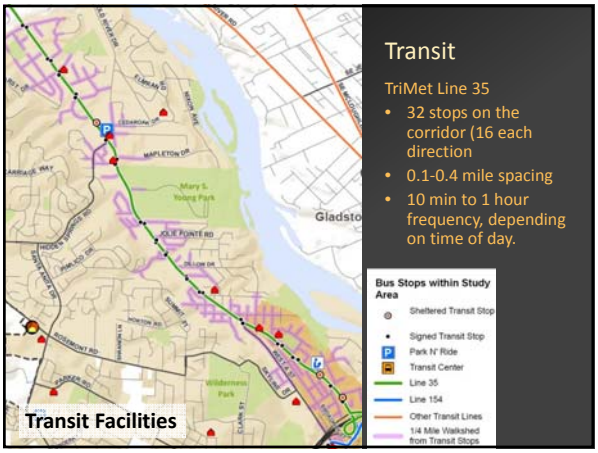
Regional multi-use path
Local multi-use path
Bike lane
Low traffic through street
Moderate traffic through street
High traffic through street
Caution area
Bicycle Facilities


Level of Traffic Stress for Bicycles
LTS Level 1
LTS Level 2
LTS Level 3
LTS Level 4
Schools
Bicycle Facilities


Level of Traffic Stress for Bicycles
LTS Level 1
LTS Level 2
LTS Level 3
LTS Level 4
Schools
Bicycle Facilities


Transit
TriMet Line 35
• 32 stops on the corridor (16 each direction
• 0.1-0.4 mile spacing
• 10 min to 1 hour frequency, depending on time of day.
Bus Stops within Study Area
Sheltered Transit Stop
Signed Transit Stop
Park N' Ride
Transit Center
Line 35
Line 154
Other Transit Lines
1/4 Mile Walkshed from Transit Stops
Transit Facilities

Key Considerations

- Topographical constraints
  - Retaining walls exist in some areas
  - Other locations have steep slops

Key Considerations

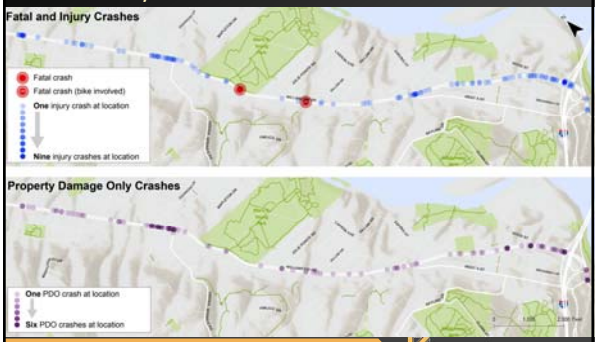
- Frequent side streets and driveway accesses in some parts of the corridor

Crash History

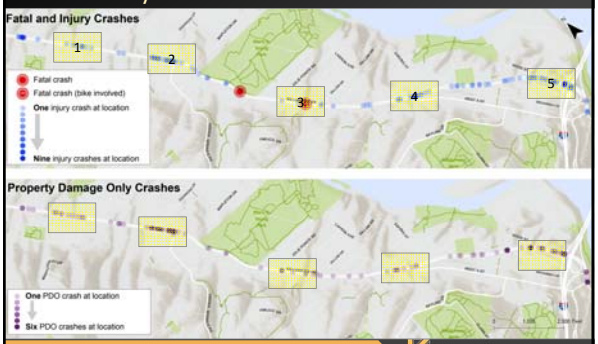
Crash Analysis

- 5 ¼ years of data: January 1, 2009 to March 31, 2014
- 264 total crashes over the 3.3-mile corridor
  - 2 fatal
  - 124 non-fatal injury
  - 138 property damage only (PDO)
- 2 pedestrian crashes
  - No fatalities
- 6 bicycle crashes
  - 1 fatality

Crash Analysis

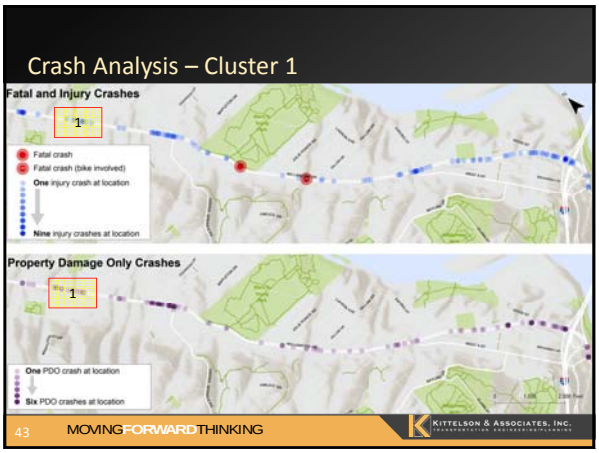


Crash Analysis - Clusters



Crash Clusters

- 5 crash clusters identified from manual review of crashes
- Each crash cluster constitutes an approximately 0.2-mile segment of roadway
- 66% of crashes occur within one of the 5 clusters (only 30% of the study area)


Crash Analysis – Cluster 1
Fatal and Injury Crashes
1
Fatal crash
Fatal crash (bike involved)
One injury crash at location
Nine injury crashes at location
Property Damage Only Crashes
1
One PDO crash at location
Six PDO crashes at location
43
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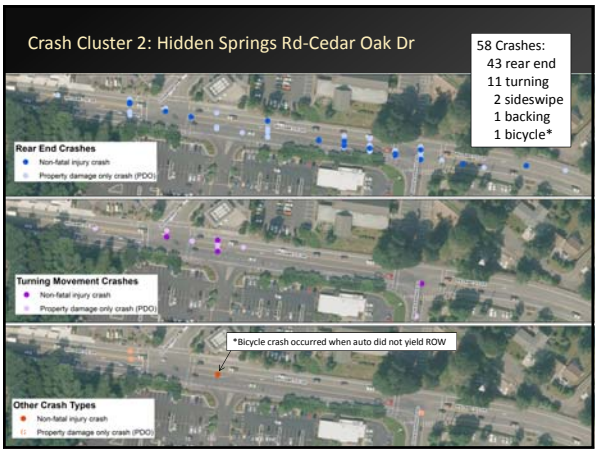
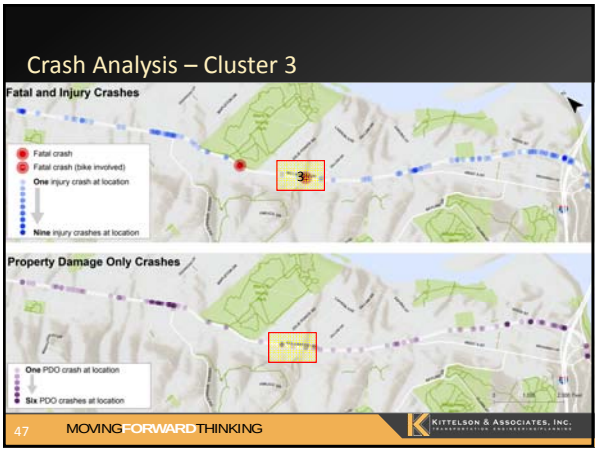

Crash Cluster 2: Hidden Springs Rd-Cedar Oak Dr
58 Crashes:
43 rear end
11 turning
2 sideswipe
1 backing
1 bicycle*
Rear End Crashes
Non-fatal injury crash
Property damage only crash (PDO)
Turning Movement Crashes
Non-fatal injury crash
Property damage only crash (PDO)
*Bicycle crash occurred when auto did not yield ROW
Other Crash Types
Non-fatal injury crash
Property damage only crash (PDO)


Crash Cluster 1: Lazy River Dr-Shady Hollow Way
19 Crashes:
15 rear-end
2 turning
1 fixed object
1 bicycle*
Rear End Crashes
Non-fatal injury crash
Property damage only crash (PDO)
Turning Movement Crashes
Non-fatal injury crash
Property damage only crash (PDO)
*Bicycle crash occurred when auto did not yield ROW
Other Crash Types
Non-fatal injury crash
Property damage only crash (PDO)


Crash Analysis – Cluster 3
Fatal and Injury Crashes
3
Fatal crash
Fatal crash (bike involved)
One injury crash at location
Nine injury crashes at location
Property Damage Only Crashes
One PDO crash at location
Six PDO crashes at location
47
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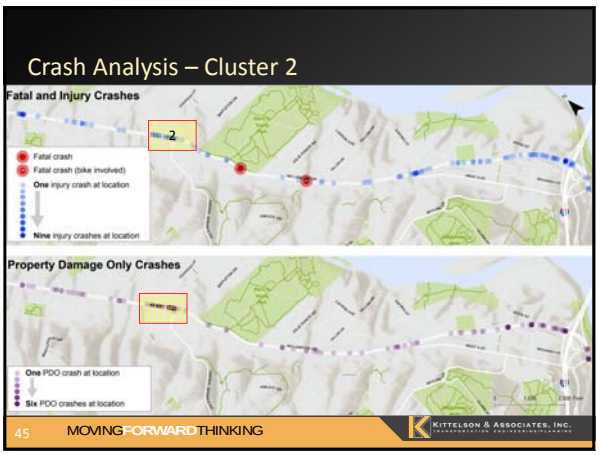
Crash Analysis – Cluster 2
Fatal and Injury Crashes
2
Fatal crash
Fatal crash (bike involved)
One injury crash at location
Nine injury crashes at location
Property Damage Only Crashes
One PDO crash at location
Six PDO crashes at location
45
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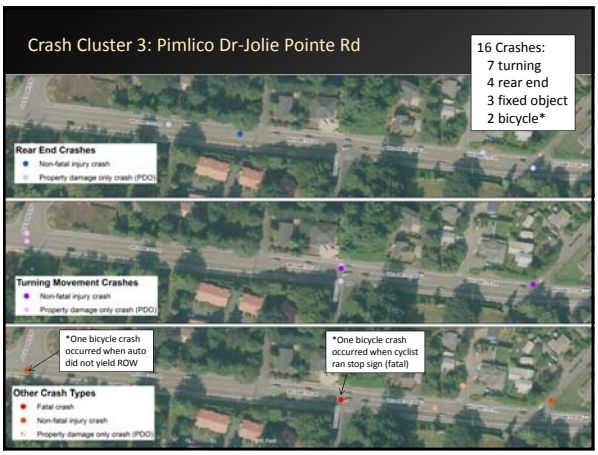
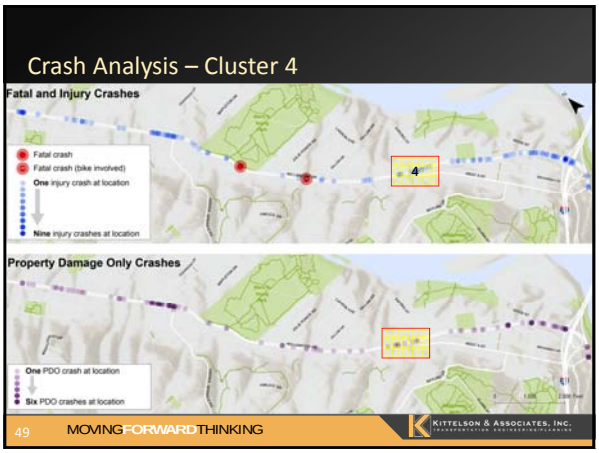

Crash Cluster 3: Pimlico Dr-Jolie Pointe Rd
16 Crashes:
7 turning
4 rear end
3 fixed object
2 bicycle*
Rear End Crashes
Non-fatal injury crash
Property damage only crash (PDO)
Turning Movement Crashes
Non-fatal injury crash
Property damage only crash (PDO)
*One bicycle crash occurred when auto did not yield ROW
*One bicycle crash occurred when cyclist ran stop sign (fatal)
Other Crash Types
Fatal crash
Non-fatal injury crash
Property damage only crash (PDO)


Crash Analysis – Cluster 4
Fatal and Injury Crashes
Fatal crash
Fatal crash (bike involved)
One injury crash at location
Nine injury crashes at location
4
Property Damage Only Crashes
One PDO crash at location
Six PDO crashes at location
49
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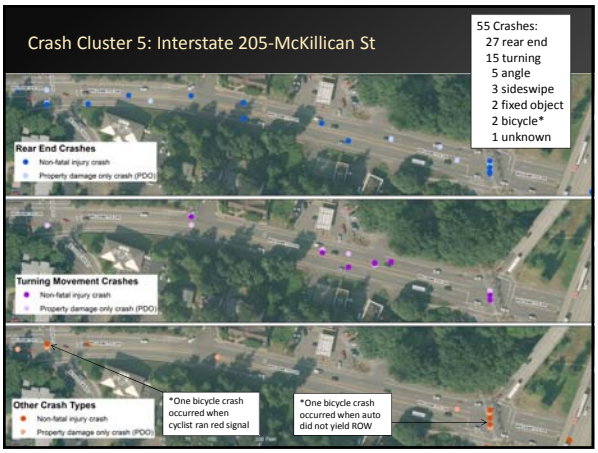
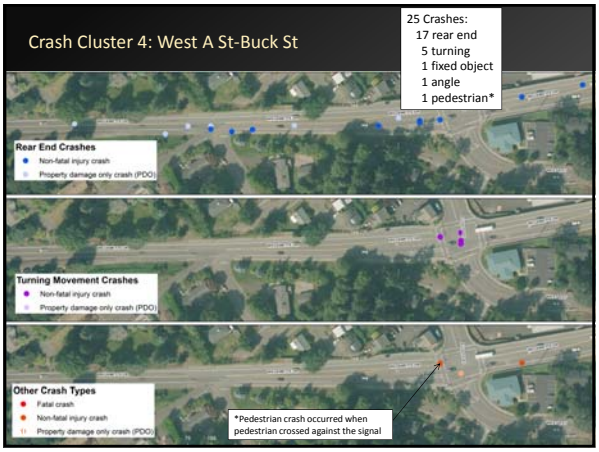

Crash Cluster 5: Interstate 205-McKillican St
55 Crashes:
27 rear end
15 turning
5 angle
3 sideswipe
2 fixed object
2 bicycle*
1 unknown
Rear End Crashes
Non-fatal injury crash
Property damage only crash (PDO)
Turning Movement Crashes
Non-fatal injury crash
Property damage only crash (PDO)
Other Crash Types
Non-fatal injury crash
Property damage only crash (PDO)
*One bicycle crash occurred when cyclist ran red signal
*One bicycle crash occurred when auto did not yield ROW


Crash Cluster 4: West A St-Buck St
25 Crashes:
17 rear end
5 turning
1 fixed object
1 angle
1 pedestrian*
Rear End Crashes
Non-fatal injury crash
Property damage only crash (PDO)
Turning Movement Crashes
Non-fatal injury crash
Property damage only crash (PDO)
Other Crash Types
Fatal crash
Non-fatal injury crash
Property damage only crash (PDO)
*Pedestrian crash occurred when pedestrian crossed against the signal


Bike Facility Opportunities and Challenges
53
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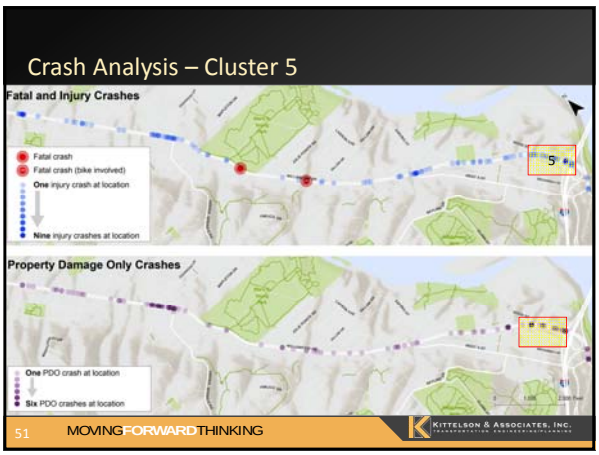
Crash Analysis – Cluster 5
Fatal and Injury Crashes
Fatal crash
Fatal crash (bike involved)
One injury crash at location
Nine injury crashes at location
5
Property Damage Only Crashes
One PDO crash at location
Six PDO crashes at location
51
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What are Separated Bike Lanes? (and Cycle tracks? Protected bike lanes?)
Cycletrack
RIGHT LANE
ONLY

Designing Separated Bike Lanes

- Design resources
  - Separated Bike Lanes Planning and Design Guide (FHWA)
  - Manual on Uniform Traffic Control Devices (FHWA)
  - Urban Bikeway Design Guide (NACTO)
  - Urban Street Design Guide (NACTO)
  - Guide for the Development of Bicycle Facilities (AASHTO)
  - Local agency design guides

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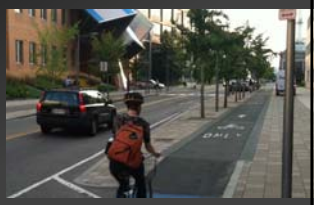
Safety Performance

- Limited sample size
- Bicycle crashes are low
- Lack of standardized data

Overall crashes
Bicycle volumes
Bicycle crashes
Bicycle crash rates



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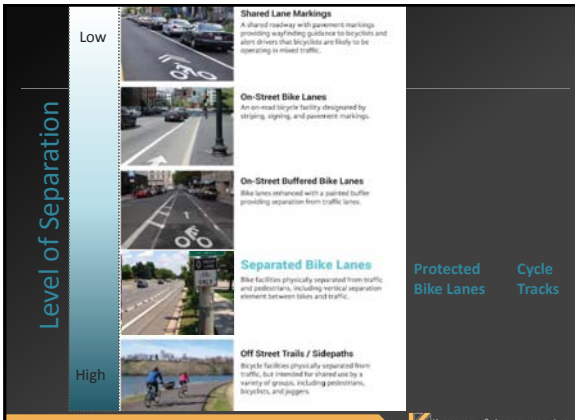

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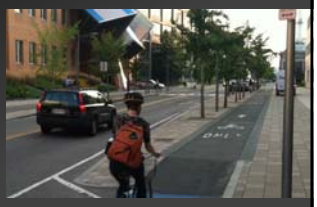
Safety Performance

- Limited sample size
- Bicycle crashes are low
- Lack of standardized data

Overall crashes
Bicycle volumes
Bicycle crashes
Bicycle crash rates



- Increase in portion of bike crashes at intersections

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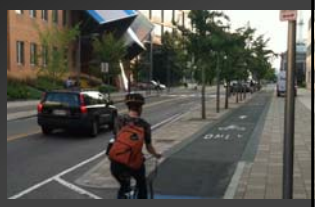
Safety Performance

- Limited sample size
- Bicycle crashes are low
- Lack of standardized data



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Designing Separated Bike Lanes

- Design resources
  - Separated Bike Lanes Planning and Design Guide (FHWA)
  - Manual on Uniform Traffic Control Devices (FHWA)
  - Urban Bikeway Design Guide (NACTO)
  - Urban Street Design Guide (NACTO)
  - Guide for the Development of Bicycle Facilities (AASHTO)
  - Local agency design guides

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Designing Separated Bike Lanes

4-step design process

- Step 1: Establish Directional and Width Criteria
- Step 2: Select Forms of Separation
- Step 3: Identify Midblock Design Challenges and Solutions
- Step 4: Develop Intersection Design

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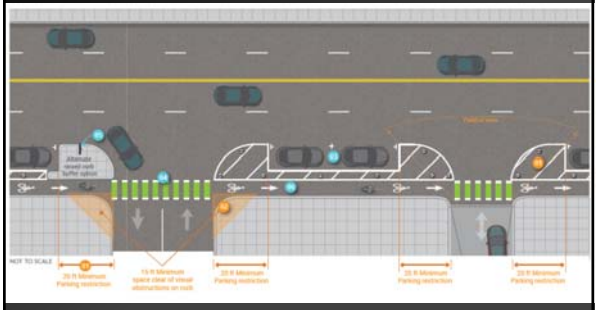
Step 3: Midblock Considerations (Driveways)



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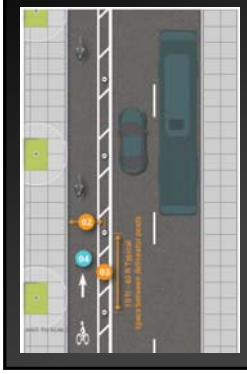
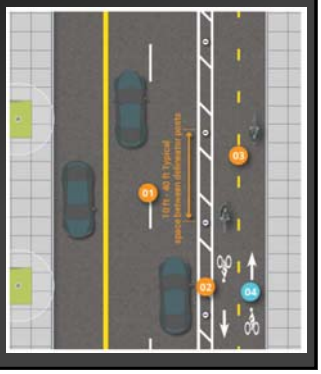
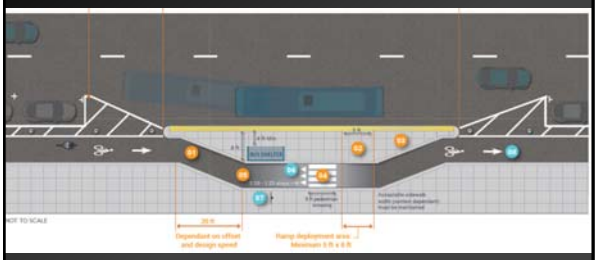
Step 1: Direction and width





Step 3: Midblock Considerations (Loading and Transit)



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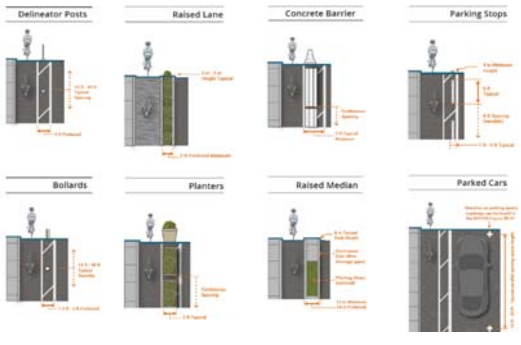
Step 2: Separation



Step 4: Intersections

- Intersection key considerations
  - Focus on the safety of all users
    - Additional consideration on delay, queuing, and user expectations.
  - Provide sufficient sight distance for all users
  - Protect or provide safe interactions between SBL users and conflicting turning movements
  - Include signs and markings to appropriately guide and prompt safe behaviors through intersections

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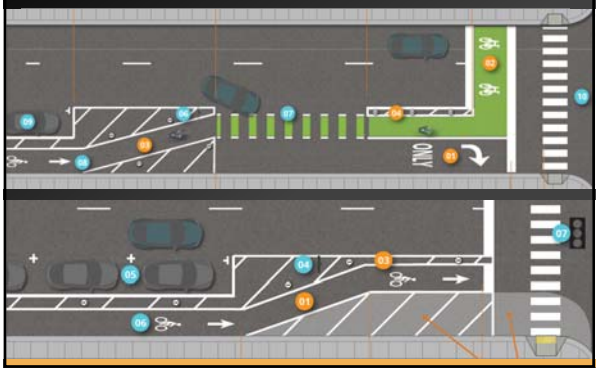
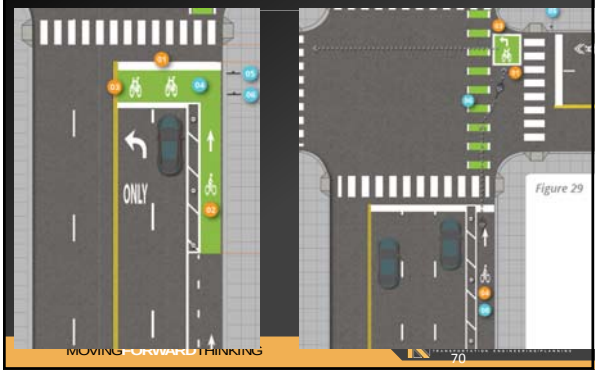
Step 4: Intersection - Bend-in/lateral shift



Step 4: Intersection - Bicycle turning movements



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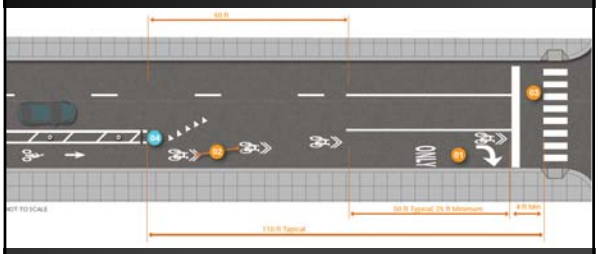
Step 4: Intersection - Mixing zone



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Potential Cross Sections

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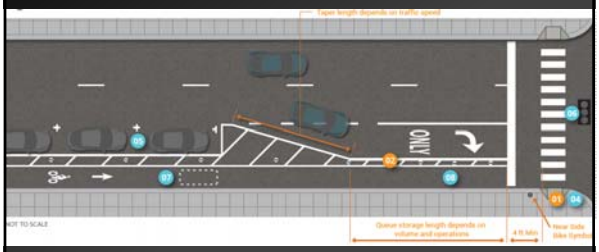
Step 4: Intersection - Bicycle signal



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Full Width Cross Section

78' total width*

*Includes 1' buffer on outside edge; additional buffer may be needed in some locations.

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Reduced Width Cross Section (Narrower lanes and sidewalks)

71′ total width*

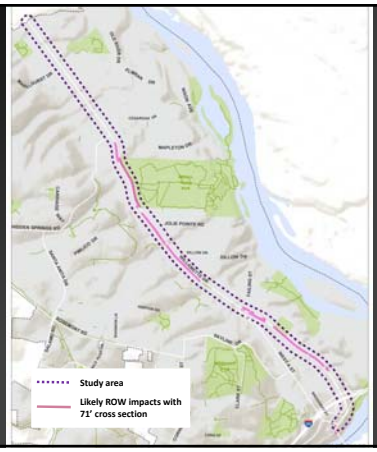
*Includes 1' buffer on outside edge; additional buffer may be needed in some locations.

Minimum Width Cross Section (Remove center left-turn lane)

52′ total width*

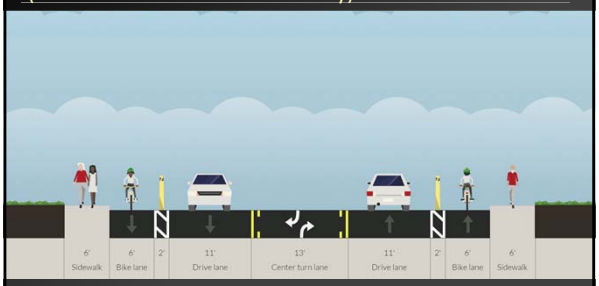
*Includes 1' buffer on outside edge; additional buffer may be needed in some locations.

Approximately half of the corridor has potential right-of-way limitations.



Workshop

Further Reduced Width Cross Section (Narrower buffer and bike facility)



65′ total width*

*Includes 1' buffer on outside edge; additional buffer may be needed in some locations.

Workshop


West Linn

HIGHWAY 43/WILLAMETTE DRIVE CONCEPTUAL PLAN REFINEMENT

Kick-off Meeting
April 13, 2015

Comment Sheet

Key to 11 x 17 handouts.

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Corridor Audit

- Insufficient ROW throughout corridor to achieve preferred cross section
- Topography creates challenges in some locations where ROW *is* available
- Options:
  - Obtain ROW and build retaining walls
  - Reduce widths of cross-section elements (lanes, buffers, sidewalk)
  - Apply "minimum" cross section (no center turn lane)
- What is the best design solution?

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Corridor Audit

- Tuesday: 1:45pm-5pm (meet at Starbucks at 22000 Willamette Drive)
  - Detailed look at potential cross sections in key locations
  - Bring a bicycle to ride the corridor if you are able
- Tuesday: 8:30pm-9:30pm
  - Assess night-time conditions and illumination
  - Bring a bicycle to ride the corridor
- Wednesday: 7am-9am
  - Assess morning commute conditions
  - Bring a bicycle to ride the corridor

Bring a safety vest!

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Corridor Audit

- General questions on background?
- Concerns with the cross-sections?
  - Use cross section tool and 11x17 handouts
- Concerns/questions about specific corridor locations?

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Meeting Agenda

Highway 43 / Willamette Drive Concept Design Plan Refinement

Corridor Audit

April 14-15, 2015

Starting location: Starbucks at 22000 Willamette Drive, West Linn, OR 97068

CORRIDOR AUDIT:

We will be visiting the corridor over the following two days to gather additional information to help inform the conceptual plan refinement. We'll be biking and driving the corridor at the following times. If you would like to join us, please sign up and bring a safety vest and bicycle (if you can). We will meet outside Starbucks at 22000 Willamette Drive to kick-off each visit.

Primary Corridor Audit: (4/14 at 1:45pm-5:00pm) We will travel the corridor and examine some specific locations in more depth, looking at key constraints and opportunities. We'll gather at 1:45pm and plan on traveling north along the corridor (by bike and car) at 2:00pm and ending by 5:00pm. Meet outside Starbucks at 22000 Willamette Drive.

Supplemental Evening Session: (4/14 at 8:30pm-9:30pm) We will travel the corridor by bike and car to look at changes in traffic and conditions after dark. We won't cover the same level of detail as in the primary corridor audit session. Meet outside Starbucks at 22000 Willamette Drive.

Supplemental Morning Session: (4/15 at 7:00am-9:00am) We will travel the corridor by bike and car to look at the morning peak period. If needed, we can discuss some of the specific locations, constraints, and opportunities, similar to the primary corridor audit. Meet outside Starbucks at 22000 Willamette Drive.

AUDIT FOCUS LOCATIONS AND SCHEDULE:

The audit will focus on a few key areas that present a variety of challenges:

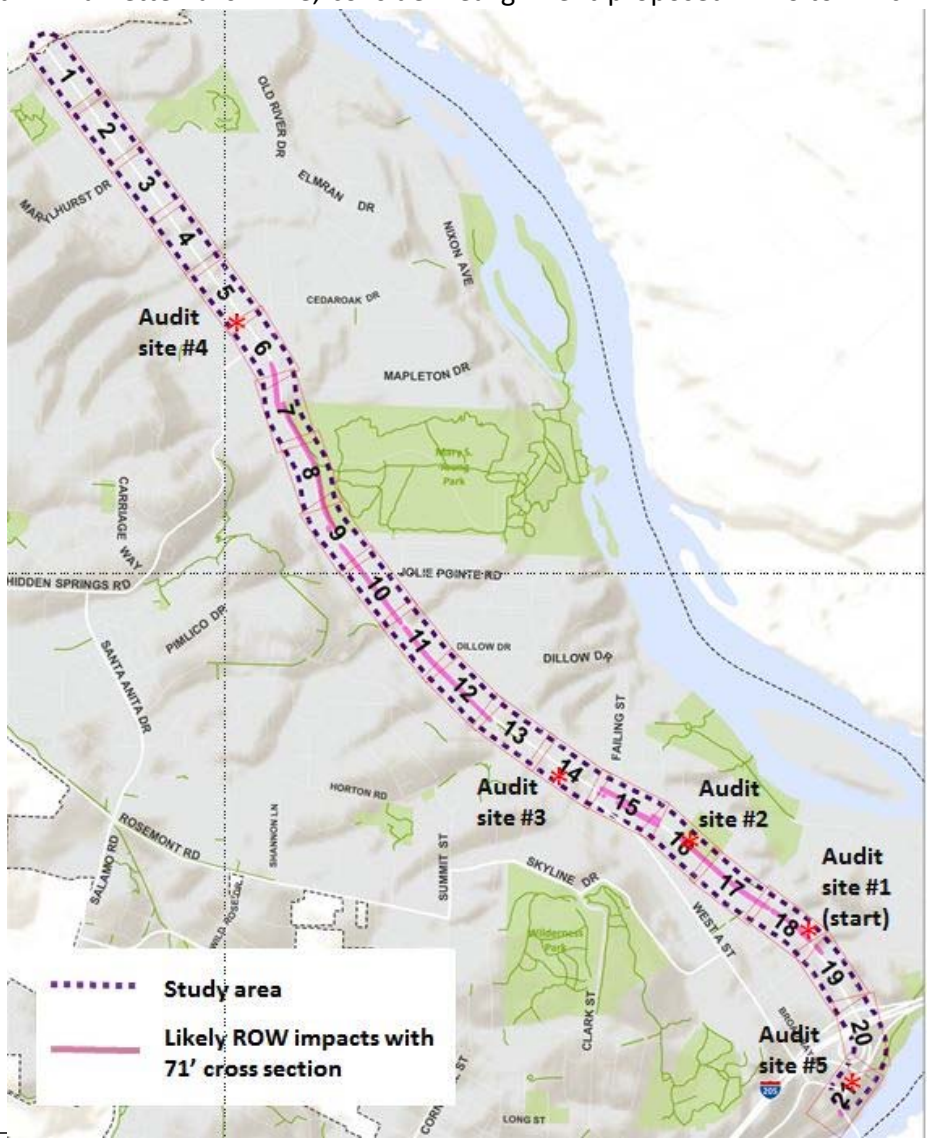
1. **[Map #18]** Start at 22000 Willamette Drive at Starbucks. Prior to departure, observe:
    - Movements of people and traffic in and out of the Central Village shopping area
    - Bus stop locations and roadway configuration in the vicinity of the shopping area
    - Existing bike facilities and sidewalks
    - ROW limitations in the area (approximately 65' available)
2. **[Map #16]** Travel northwest to Hammerle Park
    - Park and gather in northwest end of parking area
    - Observe existing 2-lane configuration, some sidewalks missing. (Some cut-through traffic reported on Holmes St).
    - Walk northwest to commercial parcel at corner of Failing. **[onto Map #15]**
    - Observe slopes and physical constraints in segment.

- Return to Hammerle park parking area, discuss observations

3. **[Map #14]** Travel northwest to Caufield St and Buck St
   - Park on Caufield St and gather.
   - Walk northwest along the separated pathway, observing slops, ROW impacts.
   - Gather at Barlow St, observe transit stop location, side street accesses. **[onto Map #13]**
   - Return to Caufield/Buck.
4. **[Map #5]** Travel northwest to Cedar Oak Drive (observe constraints in corridor in the vicinity of Pimlico Drive, Jolie Pointe Road and adjacent to Mary Young State Park along the way, where ROW is limited).
   - Park in Walmart parking lot, park-n-ride, or along Cedar Oak Drive.
   - Observe Cedar Oak Drive intersection and walk southeast toward Hidden Springs Road, observe intersection.
   - Gather on north side of Highway 43 at the Hidden Springs Intersection. **[onto Map #6]**
   - Observe commercial site accesses.
5. **[Map #21]** Turn around and head southeast again along the corridor to the I-205 Interchange area.
   - Park on Mill Street or behind 76 Station
   - Walk north to intersection with Willamette Falls Drive, consider realignment proposed in Bolton-Arch Bridge Plan.
   - Continue walking northward through I-205 interchange area, observing ramp configurations. **[onto map #20]**
   - Gather at southwest corner of westbound ramps intersection to observe conditions and discuss opportunities.

During the evening corridor audit after dark, and during the morning audit on Wednesday, we will visit additional sites of interest that were raised during the kick-off meeting on 4/13, in addition to the focus areas outlined above.

- Pimlico Drive and surrounding areas
- Mary Young Park
- Key transit stop locations
- Locations with recent development



KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

MEMORANDUM

Date: May 28, 2015

Project #: 18640

To: Lance Calvert, City of West Linn
22500 Salamo Rd
West Linn, OR 97068

CC: Erich Lais, Khoi Le, Zach Pelz, City of West Linn

From: Karla Kingsley and Marc Butorac, PE, PTOE

Project: Highway 43 (Willamette Drive) Conceptual Design Refinement

Subject: Stakeholder Kickoff Meeting and Corridor Audit Summary

This memorandum summarizes the feedback and observations from the Highway 43 (Willamette Drive) Conceptual Design Refinement Stakeholder Kickoff Meeting and Corridor Audit conducted on April 13th through 15th; poses questions and presents options that will solidify the direction of the conceptual design refinement approach; and includes plans for a potential 72-foot cross-section in the corridor.

BACKGROUND

The project study area includes Highway 43 from the city limits at the north end to Willamette Falls Drive at the south end. This refinement will take into account corridor constraints, current design practices, and recent community input received through the Highway 43/Willamette Falls Drive Vision, Phase I and the Arch Bridge-Bolton Concept Plan.

The objectives of the refinement are to:

- Refine the bicycle facility design to align with the community vision for a continuous, protected bicycle facility running the length of the corridor,
- Address I-205 interchange area,
- Consider modifications to side-street/driveway access to enhance safety,
- Maintain 3-lane cross-section where possible,
- Identify right-of-way needs along the corridor, and
- Develop implementable design for future development and capital project improvements

On April 13, 2015, the project team held a stakeholder "kick-off" meeting with three primary objectives:

1. Inform stakeholders about the project goals, context, and current conditions
2. Get input from stakeholders on corridor constraints, opportunities and potential design solutions
3. Set the stage for corridor audit field visits on April 14th and 15th

On April 14 and 15, 2015, the project team led a series of "corridor audit" field visits with participants from the City of West Linn, ODOT, and Metro to look at specific opportunities and constraints in the corridor and identify potential issues with implementing the envisioned cross-section.

STAKEHOLDER KICK-OFF MEETING ATTENDEES

Lance Calvert	City of West Linn, Public Works
Khoe Le	City of West Linn, Public Works
Zach Pelz	City of West Linn, Planning
Erich Lais	City of West Linn, Public Works
Jeff Randall	City of West Linn, Public Works
Marc Butorac	Kittelson & Associates, Inc.
Gary Katsion	Kittelson & Associates, Inc.
Karla Kingsley	Kittelson & Associates, Inc.
Russell Axelrod	West Linn City Council
Doug Baumgartner	ODOT
Gail Curtis	ODOT
Cory Hamilton	ODOT
Canh Lam	ODOT
Mike Strauch	ODOT
Thanh Tran	ODOT
Joyce Jackson	City of West Linn Transportation Advisory Board
Neil Hennelly	West Linn Police
Lori Mastrantonio	Clackamas County
Chris Jewett	PGE
Lake McTighe	Metro
John Mermin	Metro
Jeff Owen	TriMet
Amanda Owings	City of Lake Oswego
Laura Terway	City of Oregon City

AUDIT ATTENDEES

Lance Calvert	City of West Linn, Public Works

Khoi Le	City of West Linn, Public Works
Jeff Randall	City of West Linn, Public Works
Gary Katsion	Kittelson & Associates, Inc.
Karla Kingsley	Kittelson & Associates, Inc.
Doug Baumgartner	ODOT
Jessica Horning	ODOT
John Mermin	Metro

KEY ISSUES AND KEY THEMES

During the kick-off meeting, participants discussed the key issues present in the corridor and the challenges with implementing a project that would expand the existing cross-section of the roadway. The comments are summarized and grouped into a few key recurring themes:

Corridor Function

The corridor needs to serve a wide variety of needs in West Linn, some of which are not currently being met, including:

- Developing as a "Main Street"
- Providing emergency access
- Introducing a high quality / high functional class bike facility that feels safe
- Providing safe, family-friendly bike and pedestrian connections to enable people to get out of their cars and make short trips along the corridor.
- Remembering that the corridor is not an ORS 366.215 facility (state freight route), but serves freight vehicles.
- Achieving a consistent high-quality facility with a full cross-section – think big and do it right

Constraints

The corridor does have a variety of constraints that pose challenges to implementing the envisioned cross section, including:

- Topography
- Right-of-way acquisition
- Driveway accesses on the corridor
- Ability to do maintenance on separated bike facility
- Implementation cost

Connections

The corridor provides important connections for the region, to neighboring cities, and between the neighborhoods and commercial centers in West Linn. These connections include:

- Access to destinations and transit
- I-205 Interchange / ramp terminals
- Access to Willamette Falls Drive
- Clear connection to Arch Bridge and neighboring cities
- Safe crossings
- Relieving auto congestion by connecting corridor destinations with walking and biking facilities.

Design Elements

The corridor could benefit from the following design elements being incorporated into the plan:

- Illumination
- Buffers – vegetated preferred, but don't have to be trees; don't like bollards.
- Bioswales (desired)
- Drainage design that is compatible with separated bike lanes

Opportunities

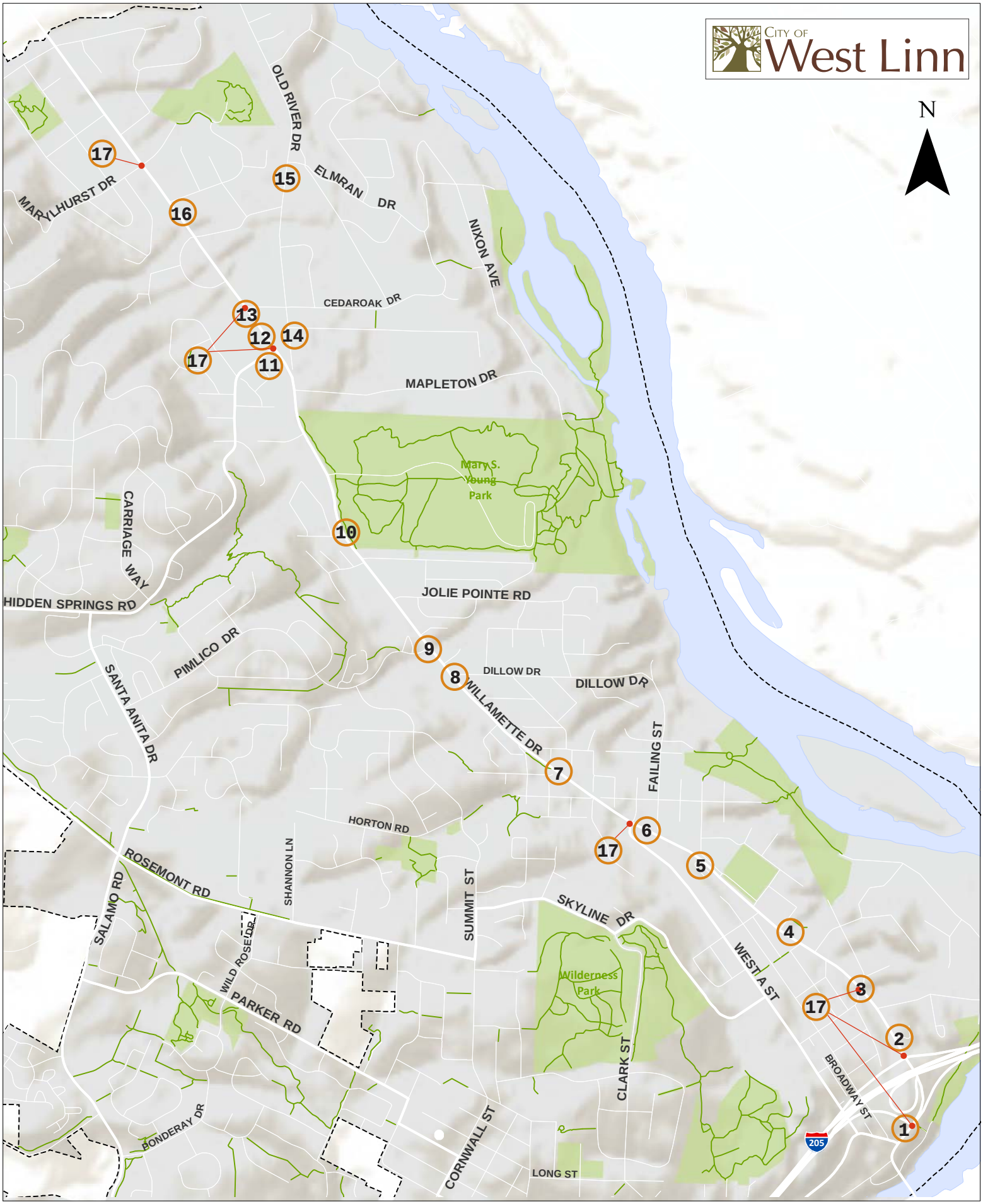
Participants also shared ideas and opportunities for achieving the community vision, including:

- Jurisdictional transfer of the highway from ODOT to the City of West Linn
- Intergovernmental Agreements (IGA) for shared maintenance responsibilities
- Use parallel routes for low-stress bike facilities
- Interim (near-term, potentially temporary) solutions
- Property easements instead of ROW acquisition
- Improve transit ridership with enhanced walking and biking facilities.

CORRIDOR AUDIT OBSERVATIONS AND DISCUSSIONS

During the corridor audit, the audit team visited the corridor during three different time periods: 2:00-5:00 p.m. (afternoon/evening peak), 8:00-9:00 p.m. (after dark), and 7:00-9:00 a.m. (morning peak). The agenda from the initial afternoon audit period is included in Appendix A.

Each of the audit sessions consisted of travel throughout the corridor with stops at specific key locations. At each location, participants stopped to discuss the opportunities and unique challenges and observed the conditions during each audit time period. Specific observations and discussions from each of the locations and audit periods are summarized herein. Figure 1 shows the approximate location of each of the numbered items.



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TRANSPORTATION ENGINEERING/PLANNING

Willamette Drive Corridor Observations
West Linn, Oregon

Figure
1

1. The Willamette Falls intersection is envisioned as a future four-leg signalized intersection in the Arch Bridge Bolton plan. This configuration would facilitate smooth movements for all modes through the area and provide safe crossings for pedestrians and bicyclists. The I-205/Hwy 43 interchange area is currently very difficult to navigate as a pedestrian or bicyclist, due to the multiple highway ramps and lack of continuous pedestrian or bicycle facilities. Audit participants noted a high level of discomfort navigating the interchange area heading southbound on bicycles. The audit team discussed the potential to reconfigure the interchange area into a more typical tight diamond configuration or to consider roundabout interchange terminals. The team noted that there is some support for expanding I-205 to three lanes in each direction in the future and that reconstruction of the interchange could potentially occur at that time.

Photo 1: I-205 interchange looking north

2. The corridor segment between the interchange area and the signalized intersection at McKillican sees more frequent crashes than the rest of the corridor and has been identified by ODOT as a SPIS location in the 2014 SPIS. The stretch of road is characterized by an hour glass shape, tapering from five lanes at the ramp terminal intersections down to two 20-wide lanes and a 5-foot median, and then to three lanes at the approach to McKillican.
3. Near the West Linn Central Village, at the intersection of McKillican, the corridor has a three-lane cross section with bicycle lanes and sidewalks. McKillican has a greater than 20% downward slope approaching the highway, and longer vehicles were observed to scrape against the asphalt in the northeast-bound approach. Participants discussed the possibility of ultimately raising the entire intersection to help address some of the slope issues. North of the intersection the roadway is bounded by a retaining wall on each side. In order to construct the ideal 72-foot cross-section with landscaped buffers and separated bicycle lanes, an additional 4 to 10 feet of width would be needed. At the TriMet bus stop just west of the Central Village right-in/right-out access, participants observed that buses would generally block the traffic lane while stopping for passengers, preventing other vehicles from passing due to the raised concrete median at this location. This median also prevents emergency vehicles from using the center turn lane to bypass traffic.

4. Between the Central Village and Hammerle Park, there are a number of single-family residences situated close to the highway on the south side. On the north side of the highway, the single-family residences are transitioning to small business uses. In this portion of the corridor, right-of-way is limited, and construction of the full ideal cross-section would require additional right-of-way acquisition. However, the corridor audit screening found that no structures would be be impacted by the construction of a 72' cross section. Audit participants observed that as the area transitions to commercial uses, a zero-foot setback from the sidewalk can create a business-friendly "main street" feel. West Linn's zoning code does not prohibit zero setback in this area.

Photo 2: Hwy 43 south of Hammerle Park

5. Webb Street is a common route for accessing Hammerle Park and Bolton Primary School. At Hammerle Park, construction of the ideal cross section would require ROW acquisition. Just beyond the park to the west, the corridor narrows to two lanes, with steep slopes on both sides. Audit participants observed that a retaining wall would be required to be built on the east side and potentially on the west side as well, if the cross section is widened. Participants also discussed the possibility of providing an enhanced sidewalk on only one side of the highway in this section, since there are not destinations adjacent to the highway on the west side, and there are existing signalized crossings at Holmes Street and West A Street. They also discussed the possibility of a shared bicycle and pedestrian facility. ODOT's standard for a shared use facility is 10 feet of width. Participants also discussed the potential to construct a raised bicycle lane in some constrained areas, eliminating the landscape buffer, but still providing a vertical element of separation.
6. Approaching the intersection of West A, the corridor is again bounded by retaining walls on each side. To the east of the corridor is the old Bolton Fire Station, a site for redevelopment. Participants discussed the potential to construct the bicycle and pedestrian facilities on the east side of the retaining wall adjacent to the new development in order to achieve high-quality separated facilities, a three-lane cross-section, and avoid the need to move either of the walls.

Photo 3: At old Fire Station

7. Between Buck and Barlow Streets, the corridor

narrows to a two-lane section with little to no shoulders. In this stretch of roadway, the west side of the corridor has a narrow parallel paved facility that appears to be a multi-use path, but that also provides vehicular access to one property fronting on it. Audit participants observed that garbage collection trucks use this narrow facility in their garbage collection routes. In the implementation of an expanded ideal cross section, this parallel facility would become part of the roadway and the existing access may be impacted. However, participants noted that a new access may be possible off of Buck Street through an existing City-owned parcel. Audit participants also discussed the possibility of closing the access to Barlow Street at Hwy 43, since all other residences have alternate ways of accessing their properties and the Barlow Street approach presents a steep, skewed approach.

Photo 4: On access road between Barlow and Buck

8. Between Barlow Street and Jolie Point Road, there are a number of side streets and driveway accesses that could be consolidated on the east side of the highway. In this area, mostly residential properties abut the highway, but no buildings lie within the proposed 72-foot cross section. However, many of the driveways on the east side of the highway in this section have steep downward slopes. Participants observed that these approaches will need to be carefully designed in conjunction with the bicycle and pedestrian facilities to ensure adequate sight distance during all movements.
9. Pimlico Drive also has a steep approach to the highway. It is unsignalized, and it is difficult for vehicles to make a left-turn during peak periods from Pimlico. Recently, a house has been constructed across from the intersection, but the driveway is not aligned with the intersection. To the south of Pimlico, there is a steep ravine, which the highway crosses on a bridge. Sight distance is also limited for vehicles approaching the highway at this intersection. Participants discussed a number of potential opportunities for improvement, including the addition of a traffic signal, the potential to construct separate right and left-turn approach lanes, and the possibility to improve sight distance by removing some of the earth on either side of Pimlico Drive. Achieving a 72-foot cross-section at the bridge would require replacing the bridge, which is currently approximately 60 feet wide.

Photo 5: At Pimilco Drive

10. At Mary S Young State Park, audit participants traveled on the existing multiuse path through the park. The path is narrow and fairly hilly, but provides separation from vehicular traffic on the east side of the highway in an area where no sidewalks are present.
11. At the Hidden Springs intersection, during the weekday a.m. peak, school buses approach Hwy 43 via Hidden Springs Road, an approach that queues up beyond what is visible. Most of the vehicles at the Hidden Springs approach make left turns onto the highway, and anywhere from 6 to 12 vehicles were able to make this movement during each signal cycle.
12. The Hidden Springs intersection has a near side bus stop in the northwest corner, and a number of people got off the bus in the p.m. peak hour, crossed the highway at the signal, walked north along the east side of the highway and then cut through the landscaping to the Park-N-Ride lot. Participants discussed the potential of a far-side bus stop at this location, but noted that the access to the commercial development south of Hidden Springs may not leave enough room for a bus stop.
13. A right-turn add lane starts before the Cedar Oak Drive intersection and continues past the Walmart access to Hidden Springs. Participants noted that this continuous right-turn lane could be converted into two separate right-turn lanes to better enable a separated bicycle facility. In order to maintain separation, participants discussed the possibility of installing a bike signal with a separate signal phase.
14. Participants discussed the potential to bring Old River Drive up to Hwy 43 at the Hidden Springs intersection, converting the Cedar Oak intersection to an access. This would allow for the removal of the signal at Cedar Oak Drive, potentially helping to address some of the safety-related concerns in the segment. ODOT has identified the area as a SPIS site, and participants witnessed a very near-miss rear-end crash during the weekday p.m. peak hour between Hidden Springs and Cedar Oak.
15. Participants also discussed the possibility of creating an alternate parallel bicycle/pedestrian route on Old River Road, however, noted that this would not provide access to the Robinwood commercial district. There has also been community resistance to the idea of enhancing Old River Road to the level of a regional route.

Photo 6: Hidden Springs during AM peak

Photo 7: Crossing at Hidden Springs intersection, looking east

16. In the Robinwood commercial area, there is generally sufficient right-of-way and space to accommodate the ideal 72’ cross section. During the night time portion of the audit, participants observed the existing lighting the corridor. The corridor has about every other utility pole equipped with new LED illumination. Due to the spacing, the lights create a pattern of alternating lightness and darkness that makes the dark areas appear even darker. Participants also observed a bicyclist riding along the corridor at night, and noted that even with front and rear lights, the person was difficult to see and distinguish as a cyclist until the vehicle was relatively near.

Photo 8: Old River Rd, potential alternate route

17. Participants observed all signalized intersections and discussed the ways that intersections could be designed to provide safe and comfortable crossings for all users. Incorporating separated bicycle facilities into intersections is critical to the design of the facility and must provide clear direction to all road users on how to negotiate areas of potential conflict.

KEY QUESTIONS FROM MEETING AND AUDIT

As the project team continues to analyze input from the audit and other data sources, there were a few key questions raised that warrant further discussion with stakeholders. These questions are summarized herein:

	Question	**Options (*initial recommendation in italics*)**	**Explanation / Discussion**	**Proposed Action**
1	Should there be a single "ideal" cross section for the corridor? What would the City of West Linn want it to be?	• Plan for one ideal cross section with typical intersection and transit stop treatments • ***Plan for one overarching "ideal" cross section and identify areas of the corridor where a "constrained" cross section may be acceptable.*** • Plan for different cross sections in each part of the corridor to reflect the topography, existing utilities, and existing ROW.	The corridor's function as a comfortable multi-modal facility will only be realized with consistent comfortable facilities for bicyclists and pedestrians. A solid overarching ideal section will help this happen. However, in limited areas, a center turn lane may not be necessary, or there may be alternate ways to provide comfortable bicycle and pedestrian access.	The proposed draft concept maintains a consistent 72' cross section, with the exception of two particularly constrained stretches of the corridor.
2	What types of bicyclist does the corridor need to serve?	• Only the strong and fearless • Confident adults • ***Most adults and older children*** • Young children	The corridor currently serves the strong and fearless cyclists, but this represents less than 1% of the population. To provide a feasible connection, the corridor needs to be designed to serve adults of most comfort levels and older children.	The proposed draft concept includes separated or raised bicycle facilities for the full length of the corridor – the type of facility that attracts more bicyclists than typical bike lanes. Proposed intersection concepts are

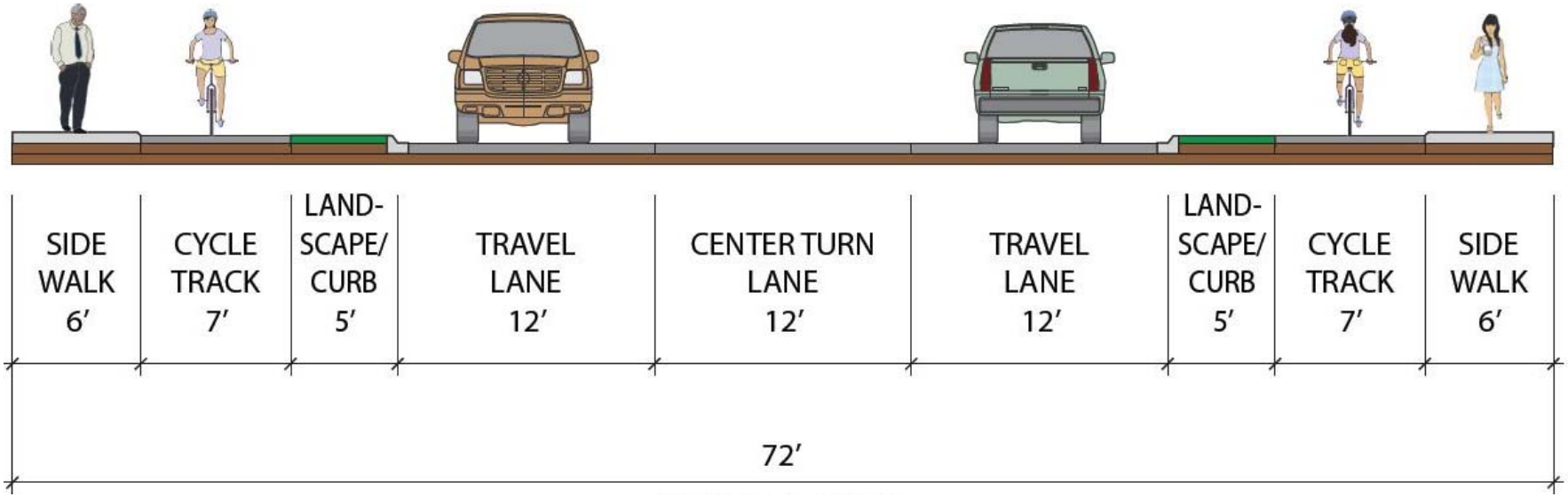
3	What bicycle facility design can serve those bicyclists?	• Standard 6' bike lane • Buffered bike lane (2' buffer, 6' bike lane) • ***Separated/protected bike lane (vertical element of separation, 6' bike lane)*** • Alternate parallel route	Research has shown that increased separation from motor vehicle traffic (on moderate to high traffic volumes streets) can attract higher numbers of bicyclists.	designed to provide options for cyclists of different skill levels and comfort levels.
4	Are there parallel routes that are reasonable alternatives to Hwy 43 that we should consider for walking and biking on portions of the corridor?	• ***Parallel routes should not be considered as a replacement for facilities on Hwy 43*** • Old River Drive • West A Street • Other potential future multi-use trail or street network connections on the north side of the corridor	Parallel routes can offer connectivity, and may ultimately be able to offer higher levels of comfort than facilities on Hwy 43. However, Hwy 43 must also provide bicycle and pedestrian facilities, because the corridor provides the only connection to many neighborhood destinations and the cities of Lake Oswego and Oregon City.	The proposed draft concept includes high quality bicycle and pedestrian facilities for the full length of Highway 43 in West Linn.
5	If separated bicycle lanes are implemented, how will the City of West Linn maintain them?	• ***Work with Metro to cooperatively purchase a street sweeper that will fit in narrow widths that can be scheduled and used by jurisdictions throughout the region.*** • Find a manual solution to sweeping and maintenance, since the corridor is a limited amount of mileage.	Narrow street sweepers (6 to 7 feet wide) are in operation in other cities across the US, successfully sweeping typical one-way separated bicycle lanes.	The City of West Linn is prepared to pursue options for maintaining the separated bicycle facilities.

6	What travel lane and median widths are appropriate for the corridor?	• ***11-12' travel lanes; 12' median/turn lane*** • 12' travel lanes; 14-16' median/center turn lane	Hwy 43 is not subject to ORS 366.215 nor is it a state freight route. Slightly narrower travel lanes will decrease project costs and impacts, support the development of a "main street" corridor feel, and will not compromise capacity or safety performance.	The proposed cross sections include 12' travel lanes and a 12' median/center turn lane. This width would also allow for 11' travel lanes with a 13' or 14' center turn lane.
7	Does the corridor need to have a minimum 18-foot pavement width in each direction (36' total) to achieve Motor Carrier desired widths?	• Yes • ***No***	The corridor does not currently have a minimum 18-foot width in each direction, and is not a state freight route.	The typical and constrained cross sections both provide the desired 36' pavement width. In subsequent design phases, however, it is possible that this pavement width could be narrowed at limited locations that currently do not have 36' pavement width.
8	What interim or short-term improvements are achievable (with upcoming repaving) and what needs to be done to achieve those?	• ***Potential for narrowed travel lanes to accommodate full 6' bike lanes or buffered bike lanes in some parts of the corridor.*** • ***Coordinate early with ODOT project team.***	ODOT will be repaving on Hwy 43 (a 1R project) in 2017. Typically 1R projects restripe the highway without changes, but with advance coordination, some striping changes may be possible.	Initiated discussions with ODOT and the project development team.

9	How will we be able to fund this project?	• ***ODOT may be open to funding improvements in order to allow for jurisdictional transfer.*** • ***Metro may be able to provide some funding.*** • ***City of West Linn SDC funds*** • ***Development along the corridor*** • ***TIGER funding***	Next steps for pursuing funding will be discussed.	Initiated funding discussions.
10	How should we design intersections to be safe for all users? Particularly if there are separated bike lanes in the corridor?	• ***Separate signal cycle for bicycles at some signals*** • ***Use of standard bike lane or buffered bike lane approaching intersection*** • ***Minimize length of right-turn lanes***	There are a variety of treatments that can be used to allow bicyclists to safely navigate intersections. The appropriate treatments will depend on the characteristics of each intersection.	Two proposed intersection concepts are designed to manage conflicts between all users while also providing options for navigating intersections to cyclists of different skill levels and comfort levels.
11	What are the ways that we can address interactions with side street and driveway accesses in the corridor?	• ***Property easements to allow bicycle facility and walking path.*** • ***Green paint and clear signage*** • ***Raised bicycle and pedestrian facilities that do not drop to street level at driveways***	There are a variety of treatments that can be used to allow bicyclists and motorists to safely navigate conflict points. The appropriate treatments will depend on the characteristics of the driveways/side streets, such as approach distance, slope, sight distance, etc.	The proposed draft plan identifies a number of treatments to manage side-streets and accesses on the corridor, including signals, new connections, cul-de-sacs, relocating accesses, and applying design treatments to minimize conflicts.

12	What are the options for increasing bicycle and pedestrian comfort through the I-205 interchange area?	• ***Provide sidewalks and restripe bike lanes to provide continuous demarcated facilities requiring vehicles entering ramps to yield to bicyclists.*** • ***Provide way-finding and an alternate route to and from the Arch Bridge on West A or Broadway.*** • ***Redesign and reconstruct interchange to include roundabouts and separated multi-use paths, compatible with I-205 widening.***	There are a range of near- to longer-term solutions that can improve bicycle and pedestrian comfort through the interchange area. In the longer term, a solution with roundabouts and multi-use paths can maximize benefits to all modes.	The proposed concept design includes a two-roundabout solution that would include separated facilities through the interchange in the form of separated bike lanes/sidewalks or multi-use paths with some grade-separated crossings.
13	Should we further explore the potential to bring Old River Road into the Hidden Springs intersection to allow the Cedar Oak signal to be removed (or converted to pedestrian signal)?	• Yes, this should be part of the TSP so we should assume it for this plan. • ***Yes, but we may need additional analysis to determine the impacts and costs.*** • No, there is not community support for the realignment.	This solution alternative seems possible, however, questions of cost, impacts on traffic operations at the signal, property impacts, and impacts on the neighborhood street network may warrant further study.	The proposed concept design presents three options for consideration, each of which removes the signal at Cedar Oaks and creates a 4-leg intersection at Hidden Springs.

Figure 2: Willamette Drive Proposed "Ideal" Cross Section



NEXT STEPS

Corridor stakeholders will meet in June to discuss the questions arising from the kick-off meeting and audit and to provide input to be considered in the development of the draft refinement plan. Following the June meeting, the project team will determine the preferred direction for the refinement plan and will develop a draft layout, including typical intersection treatments and transit stop treatments.

Appendix 2 June Stakeholder Meeting Materials

Meeting Agenda

Highway 43 / Willamette Drive Concept Design Plan Refinement

Stakeholder Audit Findings Meeting

June 3, 2015

Bolton Room, City Hall, 22500 Salamo Rd, West Linn, OR 97068

BACKGROUND:

The City of West Linn is working on a refinement to the existing Highway 43 Conceptual Design Plan, created in 2008. This refinement will build on the work done to develop the existing plan.

The study area includes Highway 43 from the city limits at the north end to Willamette Falls Drive at the south end. This refinement will take into account corridor constraints, current design practices, and recent community input received through the Highway 43/Willamette Falls Drive Vision, Phase I and the Arch Bridge-Bolton Concept Plan.

The objectives of the refinement are to:

- Refine the bicycle facility design to align with community vision
- Address I-205 interchange area
- Consider modifications to side-street/driveway access to enhance safety
- Maintain 3-lane cross section where possible
- Identify right-of-way needs along the corridor
- Develop implementable design for future development and capital project improvements

The refinement process kicked off with a stakeholder meeting on April 13 and a two-day corridor audit on April 14-15. Stakeholders provided input on constraints, areas of concern, and potential opportunities within the corridor. The *Stakeholder Kickoff Meeting and Corridor Audit Summary Memorandum* summarizes the input from the meeting and the two-day corridor audit.

MEETING PURPOSE:

The purpose of this meeting is to:

1. Share the input and findings from the kick-off meeting and corridor audit.
2. Discuss key questions to be addressed (pages 11-14 of Summary Memorandum).
3. Introduce a high-level concept refinement plan for the corridor.
4. Get input from stakeholders on aspects of the initial concept.

MEETING SCHEDULE:

1:30pm	Introductions
1:35pm	Kick-off meeting/corridor audit input and findings
1:45pm	Discussion of key questions related to refinement, including typical cross section
2:00pm	Concept refinement plan overview
2:20pm	Focused discussion in breakout groups • Signalized intersection design • Hidden Springs / Cedar Oak area • I-205 interchange area
3:10pm	Recap of focused group discussions
3:30pm	Close

NEXT STEPS:

- Produce full draft concept refinement plan for the Willamette Drive corridor.
- Share the plan with the public and solicit input.
- Initiate discussions with local property owners potentially impacted by the refinement plan.
- Produce a final draft concept refinement plan with cost estimates.

Willamette Drive Conceptual Plan Update
West Linn, OR
June 3, 2015 Stakeholder Meeting

MOVINGFORWARDTHINKING

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

Refinement Plan Objectives

- Refine bicycle facility design
- Address I-205 interchange area
- Consider modifications to side-street/driveway access to enhance safety
- Maintain 3-lane cross section where possible
- Identify right-of-way needs along the corridor
- Develop implementable design for future development and capital project improvements

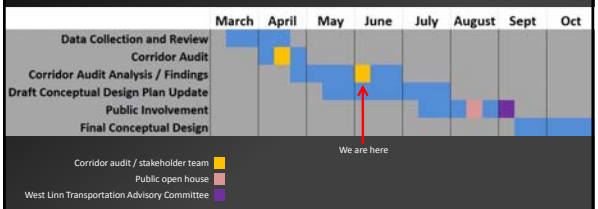
Workshop Objectives

- Share the input and findings from the kick-off meeting and corridor audit.
- Discuss key questions to be addressed (pages 11-14 of Summary Memorandum).
- Introduce a high-level concept refinement plan for the corridor.
- Get input from stakeholders on aspects of the initial concept

Presentation Overview

- Schedule
- Kick-off/corridor audit input and findings
- Key issues
- Proposed cross sections
- Concept refinement overview
  - I-205 interchange area configuration
  - Hidden Springs / Cedar Oak area configuration
  - Signalized intersection design
- Focused Group Discussion
- Recap

Project Schedule

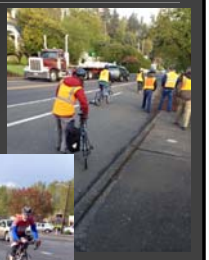


Kick-off/corridor audit input and findings

Corridor Function

Memo Page 3

- "Main Street"
- Emergency Access
- Safe, family-friendly bike and ped connections
- Serves freight



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Constraints

Memo Page 3

- Topography
- Right-of-way acquisition
- Driveway accesses
- Maintenance
- Cost

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Connections

Memo Page 4

- Access to destinations and transit
- Access to I-205 (interchange area)
- Connection to Willamette Falls Drive
- Connection to Arch Bridge and neighboring cities
- Safe crossings

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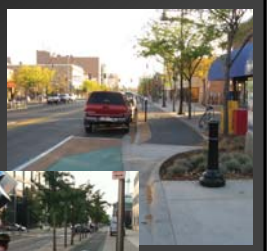
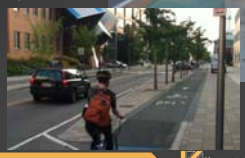
Potential Design Elements

Memo Page 4

- Separated bicycle facilities
- Illumination
- Buffers
- Bioswales
- Drainage design compatible with bike facilities





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Opportunities

Memo Page 4

- Jurisdictional transfer of facility
- Intergovernmental agreements for maintenance
- Low-stress parallel routes for bicyclists
- Interim solutions
- Property easements in some cases
- Increased transit ridership

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Key Observations from Audit

Pages 6-10 in memo

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Today's Key Issues Workshop

- Cross Sections
- Interchange area
- Hidden Springs/Cedar Oaks
- Signalized Intersections

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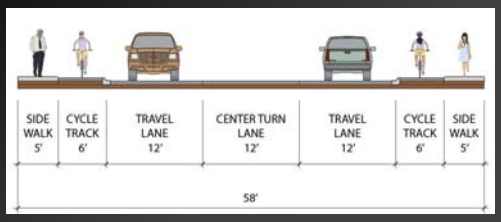
Constrained Cross Section



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Proposed Cross Sections

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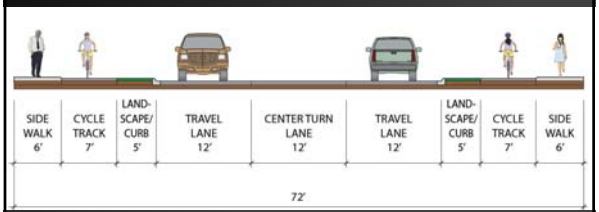
I-205 Interchange Area

17 MOVINGFORWARDTHINKING KITTELSON & ASSOCIATES, INC.

Typical Cross Section



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19
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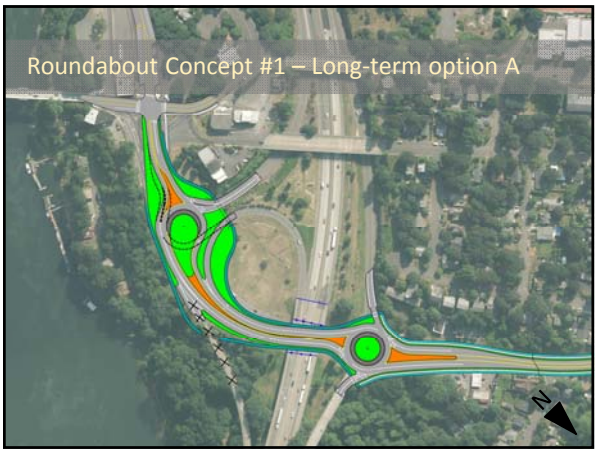
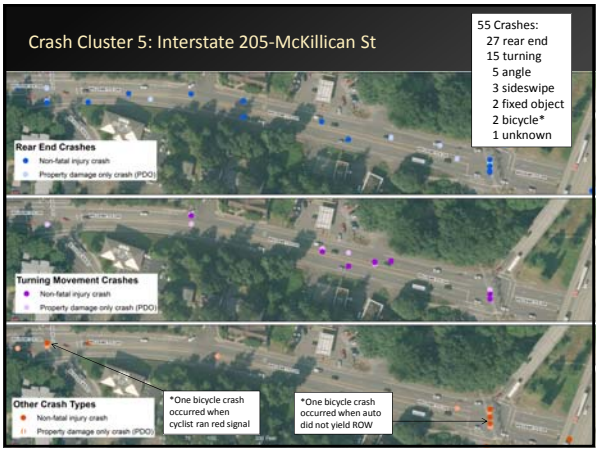
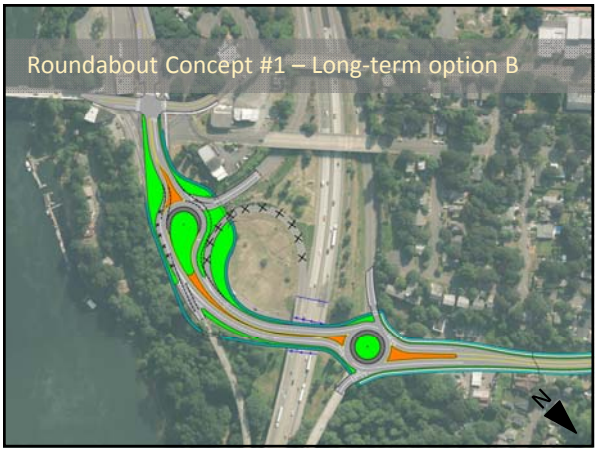
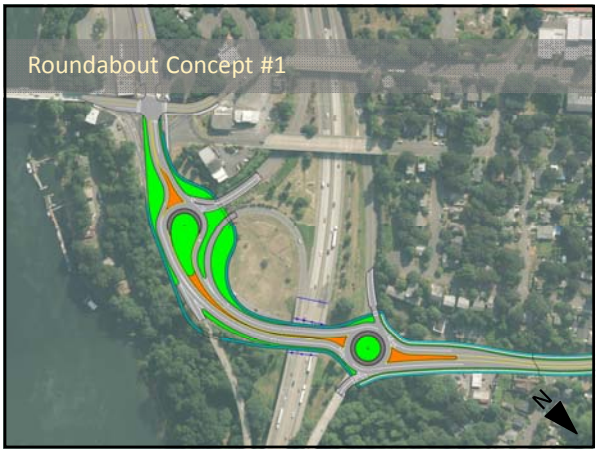
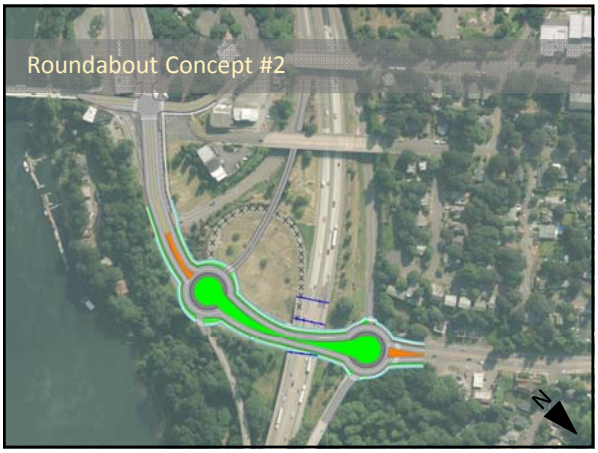

Roundabout Concept #1 – Long-term option A
N


Crash Cluster 5: Interstate 205-McKillican St
55 Crashes:
27 rear end
15 turning
5 angle
3 sideswipe
2 fixed object
2 bicycle*
1 unknown
Rear End Crashes
Non-fatal injury crash
Property damage only crash (PDO)
Turning Movement Crashes
Non-fatal injury crash
Property damage only crash (PDO)
Other Crash Types
Non-fatal injury crash
Property damage only crash (PDO)
*One bicycle crash occurred when cyclist ran red signal
*One bicycle crash occurred when auto did not yield ROW


Roundabout Concept #1 – Long-term option B
N


Roundabout Concept #1
N


Roundabout Concept #2
N

Hidden Springs / Cedar Oak area

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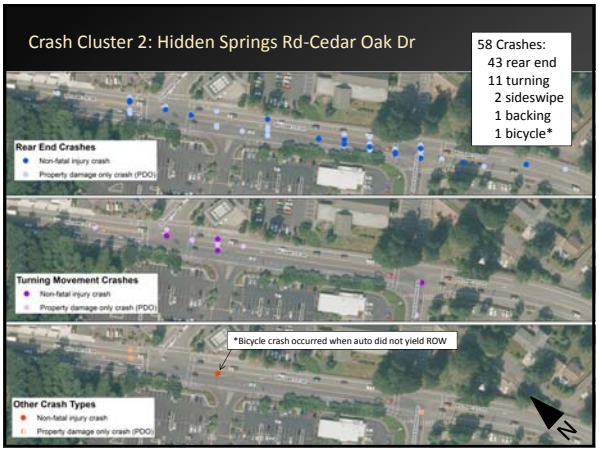
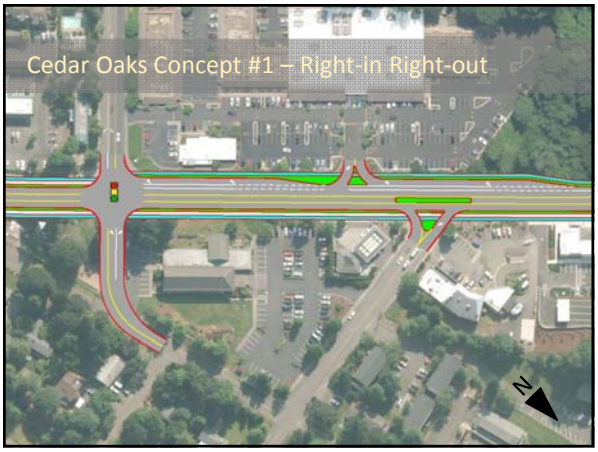
28

Crash Cluster 2: Hidden Springs Rd-Cedar Oak Dr



Cedar Oaks Concept #1 – Right-in Right-out



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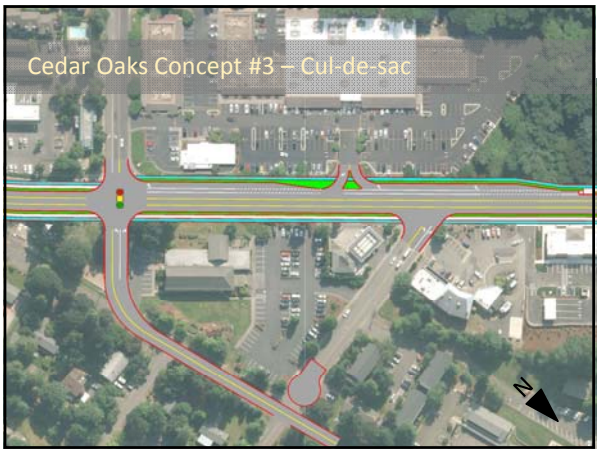
Cedar Oaks Concept #2 – Left-in / RIRO


Cedar Oaks Concept #3 – Cul-de-sac
N


34
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Signalized Intersection Concepts
32
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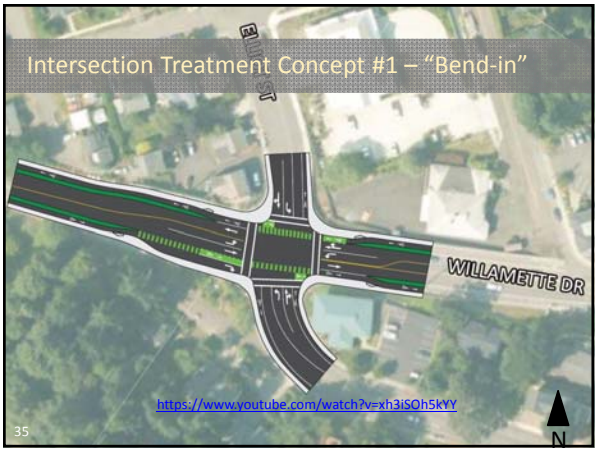
Intersection Treatment Concept #1 – "Bend-in"
ELLIOT ST
WILLAMETTE DR
https://www.youtube.com/watch?v=xh3iSOh5kYY
35
N


N
33
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Intersection Treatment Concept #2 – "Dutch Style"
ELLIOT ST
WILLAMETTE DR
https://www.youtube.com/watch?v=TemAwgUrWJc
36
N

Roundabout Concepts Comparison

	Advantages	Challenges
Concept 1		
Concept 2		

Next Steps

- Agency feedback by June 12
- Refine draft concept design plan by July 31
- Public outreach August / September
- Finalize concept design in September / October

Hidden Springs / Cedar Oaks Concepts Comparison

	Advantages	Challenges
Concept 1		
Concept 2		
Concept 3		

Signalized Intersection Concepts Comparison

	Advantages	Challenges
Concept 1		
Concept 2		

City of West Linn

HIGHWAY 43/WILLAMETTE DRIVE
CONCEPTUAL PLAN REFINEMENT

Stakeholder Meeting
June 3, 2015
Comment Sheet

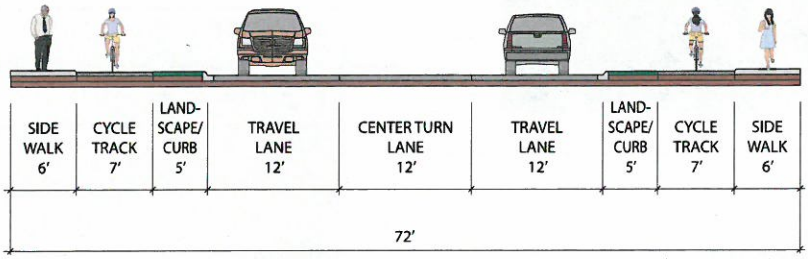
Name Amanda Owings

Organization City of Lake Oswego

Email aowings@lakeoswego.city (← new! old address still works)

Cross Sections

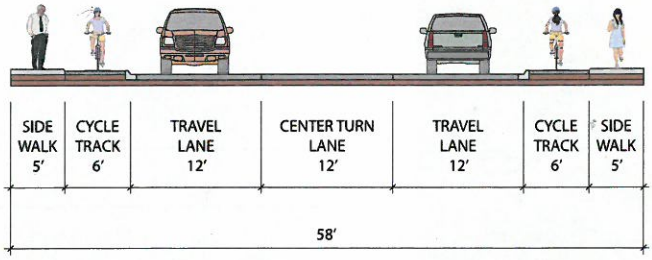
Typical



Comments

What about shy distance to curb?

Constrained



Comments

A 5' sidewalk seems very narrow through a business district.

I-205 Interchange

Roundabout Concept #1

Advantages

Challenges

Roundabout Concept #2

Advantages

Could this design "free up" excess right of-way for redevelopment?

Challenges

Can the "extra" NB onramp be eliminated in this design? (by ~~extraction~~

Which concept do you prefer (circle one)? Concept 1 Concept 2

Other comments:

Hidden Springs/Cedar Oak

Concept #1: Right-in Right-out

Advantages

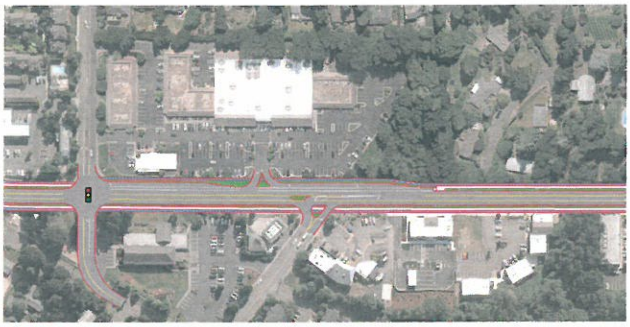
A median barrier in Hwy 43 will ensure that Cedaroak stays as R-in/R-out

Allow FYA @ new signal

Challenges

Signs will have to be clear to allow SB traffic to access biz on east side of Hwy 43.

Concept #2: Left-in



Advantages

Challenges

This will still cause confusion and congestion @ Cedar oak

Concept #3: Cul-de-sac

Advantages

Challenges

Will not solve the safety issue @ Cedaroak

Which concept do you prefer (circle one)? (Concept 1) Concept 2 Concept 3

Other comments:

Signalized Intersections

Concept #1

Advantages

Challenges

Concept #2

Advantages

Protects the target bike rider best

Challenges

How is the stop bar compliance in these situations? Should there be "no right on red" exclusion?

Which concept do you prefer (circle one)? Concept 1 Concept 2

Other comments:

General Comments on Corridor Plan

LO is very interested in the lane widths for Hwy 43! We struggle, too, with accommodating buses, some freight, and bikes in our #2 lanes. Also, center medians may impact lane width, too, for shy distance. We'd like to see consistency in the corridor.

Please provide a formal response from your agency/organization by June 12, 2015. Thank you!

Hwy 43 conceptual plan refinement – Metro comments 6/12/15 (John Mermin, Lake McTighe, Anthony Buczek and Tom Kloster)

Cross Sections

Typical Cross Section

In many places Hwy 43 functions as West Linn's main street. 12 ft lanes do not contribute to the slower auto speeds and multi-modal environment of a main street. 10 ft lanes would be a better design option in a main street setting. The width saved could be used for a wider landscaped strip that could accommodate larger trees. Larger trees have several benefits for air and water quality, and especially for their traffic calming effect (through narrowing the visual envelope of drivers).

Constrained cross section

The proposed alignment shows space narrowed for biking and walking facilities but not for autos. Instead of using 12 feet for a center turn lane, use that width for a landscaped buffer for biking and walking. Also, similar to the comment above, 10 ft travel lanes are sufficient.

I-205 Interchange

We are generally favorable regarding using roundabouts in this situation, but think more work needs to be done to design the crossings of freeway ramps to be safer.

Roundabout Concept 1 – We like that the multi-use path shown paralleling the river appears to follow the contours of the topography.

Question – Is there a seismic retrofit planned for the existing overpasses? This could create an opportunity to make improvements irrespective of whether the freeway is ever widened in this area.

Hidden Springs / Cedar Oak

Concept 1 is preferable to the others, but still has a lot of room for improvement. We like the new four legged intersection proposed at Hidden Springs. In the area of the grocery store driveway on Hwy 43, we think that a longer median should be used.

The right turn only lane heading southbound may not be needed as it worsens the comfort of biking through this area and widens the cross section near the driveway. At the very least, the right turn lane could be a lot shorter than what is shown. The current design shows a "pork chop" waiting island in the middle of the grocery store driveway, which does not seem like it would be a comfortable place for pedestrians to wait. We'd prefer this driveway have a standard design (without the "pork chop"), and that it not be so wide and have such broad turning radii. Broad turning radii will increase the speed of autos making right turns into this parking lot, further degrading the comfort for walking and biking through this area.

Signalized Intersections

We prefer Concept 2's protected intersections for biking (and accompanying bicycle signal phase). However, the right turn only lanes do not seem appropriate and widen these intersections more than needed.

General Comments on Corridor Plan

We strongly encourage the City to pursue a jurisdictional transfer of Hwy 43. Even if ODOT cannot offer enough funding to fully implement improvements as part of the transfer, there is still a large benefit to having design freedom, and in fact a large opportunity cost to not doing this. No longer needing to address state highway design standards and mobility targets would remove significant barriers to designing the facility (and allowing for main street type redevelopment) in a manner consistent with the vision of the community, as expressed in the Hwy 43/Willamette Falls Drive Vision and Arch Bridge-Bolton Concept Plans.

We suggest pedestrian refuge islands be added throughout the corridor at as many intersections as possible. Use a minimum spacing standard, e.g. at least every 530 feet (and at all transit stops), as a starting point.

The idea of a shared sweeper for cycle track maintenance is a good one, whether it be housed at Metro or at the County. Metro is currently inquiring with its parks/trails staff regarding what type of equipment is currently used to sweep Metro-owned trails (in case that could be usable for cycle tracks) and also whether Metro has room to store a new cycle-track sweeper. We recommend that the City follow up with Clackamas County transportation staff (Karen Buehrig) and North Clackamas Parks District staff (Katie Dunham) regarding these same issues. If a new sweeper were purchased, it may be possible for federal transportation funding to be used to pay for it (e.g. through Metro's Regional Flexible Funding allocations).

Kate Brown, Governor

Department of Transportation
Region 1 Headquarters
123 NW Flanders Street
Portland, Oregon 97209
(503) 731.8200
FAX (503) 731.8531

June 12, 2015

MEMORANDUM

To: Lance Calvert, Public Works Director, City of West Linn
Mark Butorac, Kittelson and Associates
Karla Kingsley, Kittelson and Associates

From: Gail Curtis, Planning
Joseph Auth P.E., Preliminary Design
Doug Baumgartner, P.E., Development Review
Basil Christopher, P.E., Bicycle and Pedestrian Unit
Jessica Horning, Active Transportation Planner
Michael Strauch, District 2B Manager
Thanh Tran, Traffic Analysis Unit

Subject: **Draft OR43 Refinement Concept Plan for City of West Linn**

The purpose of this memo is to provide feedback on the Draft OR43 Refinement Concept Plan for City of West Linn dated June, 2015. We appreciate the challenge that retrofitting an urban highway to serve community needs represents. We support your efforts to find solutions that will better serve community needs and increase safety. Region 1 staff, representing a wide variety of disciplines is participating in the concept development including the road safety audit. We understand a primary objective of the refinement plan is to determine road cross section(s) and needed right of way to improve conditions for all modes.

Major Comments

1. Transit: The City of West Linn has policies supporting OR43 being no wider than three vehicular lanes while serving transit, bicyclist and pedestrians. Based on this policy framework more consideration needs to be given to transit. Little detail on the interaction of transit with other modes has been provided. Please address this shortcoming.

2. Maintenance Agreement: Maintenance of the proposed sidewalk and cycle track will be a challenge and is something ODOT will be unable to provide. We request the city have that responsibility and that it is reflected in the concept plan. Otherwise, it will be difficult for us to support the concept plan adoption. Ultimately, an intergovernmental agreement signed by the city and ODOT will be needed to address sweeping, landscape maintenance, drainage and snow and ice removal.

3. I-205/OR43 Interchange: We are willing to work further on the I-205 Interchange design; however, you may wish to table or have a separate effort because it is a much larger discussion that is likely beyond the scope of this project.

4. Proposed OR43 Cross-Section: The proposed typical highway cross-section is too narrow for the various functions.

5. Design Exceptions: Design exceptions will be necessary to gain ODOT approval for several elements of the concept plan cross-section as currently presented. We recommend that several of those elements be changed to meet or exceed standards. For the design elements expected to need design exceptions, we recommend that we continue to work together to gain design concurrence. Design concurrence would result in coordination with our Salem office to determine which design exceptions will likely not be supported and which can be supported. The elements needing design exceptions are:

    - Center turn lane being 12-feet instead of 14-feet
    - No shoulders
    - No shy between the curb and travel lane
    - Sidewalks less than 6-feet in width (exclusive of the curb)
    - Bike lanes less than 6-feet in width (exclusive of the curb)
    - No utility or maintenance access area at back of sidewalk (a minimum of 1 foot)

Detailed Comments

1. Transit: Additional discussion with TriMet, West Linn and ODOT is needed as part of the concept plan or a future phase to discuss bus stop and marked crosswalk locations or other pedestrian crossing treatments. Also, methods to improve transit time within the corridor should be considered and incorporated. Bus stop design concepts should be developed for unconstrained and constrained areas showing how the cycle track will transition to accommodate stopped buses and passenger waiting, boarding, and unloading areas. Bus pullouts should be considered in areas with high boardings since boardings usually have long dwell times that impact the flow of traffic on the highway. Bus stops at signalized intersections should be at the far side of the intersection and include a pullout.

2. Cross-Sections: Our preference is for a consistent cross-section throughout the corridor for user predictability and maintenance. The ODOT minimum for pavement width varies depending on cross section features. The bare minimum width between curb-to-curb without a raised median is 36-feet (standard is 42 feet). Any width less than 36-feet will not be able to obtain a design exception unless it is a preexisting condition. The 36-feet pavement width provides space for emergency vehicles to move around vehicles during an event. It also provides room to keep two lanes moving when the third lane is occupied to do maintenance work. The 36-feet without raised median would be acceptable with two travel lanes and two shoulder / bike lanes. Two travel lanes and a median for left-turning vehicles increases the needed width to 40 feet to provide 2-feet shy distance from the travel lane to the curb. If a raised median is proposed in a segment, 18-feet of pavement width is standard between the curb and the raised median for accommodating Motor Carriers. The standard width is preferred by the ODOT Motor Carrier liaison is a minimum pavement width from curb-to-curb of 36-feet without any raised medians. OR43 is not an ORS 366.215 route. Despite this, we coordinate with Motor Carriers but no formal review is required.

    a. Travel and center lane widths: ODOT design requirement is 15-feet for travel lanes without a shoulder next to a curb. This includes a 13-foot travel lane plus 2-feet for storm drainage. Due to the constrained environment, ODOT may consider 12-feet travel lanes with 2-foot shy distance to

curbs and accommodation for storm drainage. ODOT will not support 11-foot travel lanes in curb-tight segments without a shoulder. Placing the curb next to the travel lane places the motor vehicle tires in the area where water collects potentially resulting in water splashing cyclist and pedestrians or the car hydroplaning. If the 12-foot travel lane width is retained more inlets or other design considerations need to be made in order to avoid water on the highway.

b. Center median width: ODOT design requirements is 14-feet for center lanes plus 2-foot shy distance for raised median elements. Due to the constrained environment, ODOT may consider 12-feet with 2-foot shy distance. A wider than 14-foot median better accommodates access management by installations such as traffic separator and/or raised turn median. (See additional comments about raised median under "Hidden Springs / Cedar Oak" below).

c. Raised bike lane width: The constrained cross-section shows six-feet for a raised bike lane. Six-feet is too narrow for the raised bike lane given a portion of the 6-feet is used for the grade/slope transition. We recommend this concept have the bike lane at the same level as the surface of the roadway or at the same level as the sidewalk in order to provide a continuous shared-use path. While a 10-foot wide shared-use path would satisfy the minimum width guidelines, we don't think this is the best solution because there is the potential for local cyclist to use one-side of the highway to go both directions. Please consider providing a wider area for this reason. Consider adding a 2-foot utility strip for utility poles, signage and signal poles allowing the minimum, ADA clearance of 4-feet. Related additional discussion is below. Also, how mail delivery will work and the placement of mailboxes need consideration. There is a potential for mailboxes to create another obstacle in addition to street signage.

d. Buffered bike lane: Consider buffered bike lanes for constrained areas and throughout the entire corridor length. If the bike facility is placed outside of the roadway and provides a reasonable and acceptable 'alternate' route in lieu of in-roadway facility, ODOT may initiate prohibiting bikes on the roadway. This action would involve a public hearing before the Oregon Transportation Commission.

3. Signalized Intersections

ODOT supports Concept #1.

a. The green bike lanes will need State Traffic Engineer approval.
b. Two-stage left turn queue boxes currently only have FHWA interim approval for use at T-intersections. Applying them at 4-leg intersections will require FHWA permission to experiment and right turn on red restrictions to avoid conflicts between waiting cyclists and turning vehicles.

ODOT opposes Concept #2 for the following reasons:

c. The concept makes the intersection wider creating grade challenges.
d. The concept places pedestrians and bicyclists farther away from the corner of the intersection possibly out of the line of sight for motorists. When pedestrians and bicyclists are placed at the corner of the intersection, the right-turning vehicles does not begin its turn until the pedestrian or bicycle finish passing or crossing the crosswalk. The proposed concept appears to cause the right-turning vehicle driver not to see the bicyclist or pedestrian until the middle of performing the turn. We have concerns the motor vehicle will not be able to stop in time factoring reaction time and braking distance.
e. Bicyclists using the 'Dutch' style design, which would impede on the travel time for bicyclists would be more likely to instead stay on OR43.

f. The green continental crosswalks may need a FHWA exception if it is not listed in the Manual of Uniform Traffic Control Devices and it will need State Traffic Engineer approval.
g. The corner curve radius needs to accommodate the design truck for the side streets and fire engines.
h. The primary use of this design is to reduce user conflicts and facilitate movements at intersections with protected bike facilities on all approaches. It is unclear if this design is as beneficial at intersections with no bike facilities on the side street.
i. Bike signals would be required on any approaches where the bike lane is located to the right of a right turn lane at the intersection. Bike signals are typically provided on all approaches with this design.
j. Bicycle phase for the traffic signal will need approval by the Region / State Traffic Engineer and may need a traffic analysis.

Hidden Springs / Cedar Oak

a. ODOT is neutral about Concept #1 and Concept #2 and offers the following comments:
b. The Walmart shopping center driveway currently operates as a right in/right out/left in access and is drawn here as a right in/right out only access. There have been six crashes in five years with the left in movement and so ODOT encourages the RIRO only concept for the raised median island that restricts Cedar Oak Drive to be extended north to reinforce this restriction or the pork-chop island on the approach would need to be angled to accomplish the intended movement restriction.
c. If a raised median is placed on OR43 in this segment, we need to preserve 18-feet of pavement width between the raised median curb and edge of travel curb to allow space for emergency vehicles to pass and future maintenance work.
d. A bus pullout in the northbound direction near the park-and-ride should be added/considered since this stop likely has long dwell times.
e. The traffic counts show over 100 vehicles per hour turning right from OR43 Northbound onto Cedar Oak. A right-turn crash occurred at this intersection between a bicycle and a car. If the city connects Old River Drive to the Hidden Springs intersection, we would like the conceptual plan to look to see if the Old River Drive connection reduces vehicles making a right-turn from OR43 northbound. If right-turning vehicles are above 100 per hour from OR43 Northbound at either Cedar Oak or Old River Drive, we would like the conceptual plan to consider the idea of including a right-turn lane at the location of the 100 right-turning vehicles in order to place the bike lane between the through and right-turn lane.
f. Pedestrian crossing demand to shopping and transit will likely still be high at Cedar Oak, despite motor vehicle movement restrictions. Raised median should be designed to accommodate pedestrian crossing movements and traffic analysis should be conducted to determine appropriate crossing treatments (e.g. marked crosswalk, RRFB, pedestrian hybrid beacon).
g. Consider signal phasing adjustments at Hidden Springs to improve pedestrian crossing safety and reduce conflicts with left turning vehicles (e.g. leading pedestrian interval, protected lefts, no ped overlap). Consider OR43 southbound transit green light extension.
h. Consider using the existing signal-mast arm for pedestrian signalization and movement.

4. Street Trees: While street trees provide many benefits including traffic calming, place-making, shade and filtering air, they also present challenges. Given the importance of trees to the community, the ultimate corridor design should plan tree placement where potential conflicts are eliminated in order

to maintain intersection sight distance for all street and advisory approaches. One method is to have the landscape area be low maintenance and not include trees in order to maintain clear vision at intersections and driveways. Maintenance issues associated with trees should be anticipated. Trees may cause maintenance issues for the cycle track and roadway from debris to shading issues making sight of bicyclists difficult for motor vehicles turning into driveways or public streets.

ODOT prefers not to have street trees in the landscape area between the travel lane and cycle track. Street trees in this landscaping area could cause sight distance or shading issues making sight of bicyclists difficult for motor vehicles turning into driveways or public streets. Depending on the type of trees, the branches may cause issues for cars and bicyclists. Trees are a roadside hazard if a car crashes into one. Trees may also cause maintenance issues for the cycle track and roadway from debris or preventing sunlight from melting snow.

5. Street Connection Changes: The long aerial photograph shows proposed removal and addition of street connections and a new traffic signal to OR43. ODOT wants to understand how these street connections removal and additions affect operations and safety at intersections. We may need a traffic analysis at some of these intersections if 50 or more trips are added to an intersection due to a street connection closure or modification.

   The proposed location on the diagram shows the new signal being placed in the vicinity of the existing West A St signal. ODOT requires that proposed signals meet MUTCD signal warrants and that an intersection traffic control study be conducted to determine the proper traffic control solution for the intersection. ODOT also requires a progression analysis for any signal that is proposed to be located within a half mile from another signal. The Cedar Oak and Hidden Springs signals are 560 feet from each other and have caused significant congestion and are also the highest crash segment on OR43 in West Linn and so the proposal of placing a new signal close to another existing signal on this corridor must be adequately analyzed for safety and operations.

6. I-205 Interchange: A much larger discussion is needed. It is likely that resolving the I-205/OR43 interchange is beyond the scope of this project. The queuing from the Arch Bridge and ramp meters would need a VISSIM analysis to model the operations of the area accurately. Any modification to the ramp terminals may affect the weaving issues on I-205 where VISSIM or other tools will help us understand the tradeoffs and other 'domino' factors when modifying the area.

   The queues from the Arch Bridge, the ramp meters and the McKilliken/Hood signal may impact the performance of the roundabouts where traffic signals may work better under these queuing conditions.

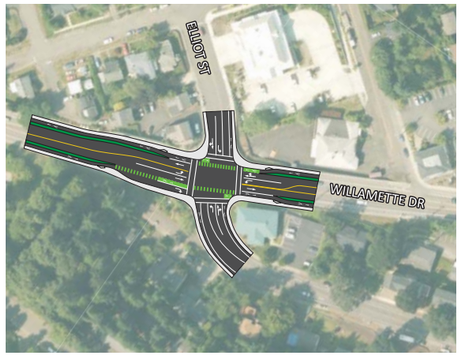
   ODOT is exploring a concept of combining the I-205 northbound entrance and exit ramp into one signalized intersection and removing the I-205 northbound loop entrance ramp from OR43 southbound. This concept should reduce the level of stress for bicycling through this interchange area.

Thank you for closely involving ODOT staff in the refinement of the OR43 concept plan. Please feel free to contact the various staff members directly for clarifications by calling 503-731-8200 or Gail Curtis is available to coordinate larger, meeting discussions and can be reached at 503-731-8206. OR43 is an important community transportation corridor. We appreciate the City of West Linn's leadership in taking steps to plan and implement improvements.

GC/gc P&DShare_Highways_OR43

Signalized Intersections

Concept #1



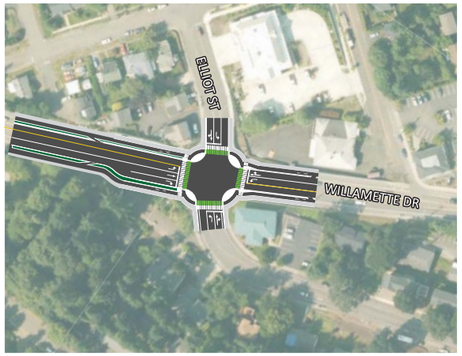
Advantages

Challenges

Transit is not shown --- this MUST happen at the

conceptual level

Concept #2



Advantages

Challenges

See above

Which concept do you prefer (circle one)? Concept 1 Concept 2

Other comments:

General Comments on Corridor Plan

Transit design not noted (or at least not prominently) and potentially incompatible with concepts.

This update does a disservice to Pedestrians and Transit when compared to 2008 plan. While potentially more realistic in terms of available width, it chooses to buffer active transportation users while exposing elderly, disabled, and young users on sidewalks (Cycle tracks are travel lanes). I don't think you can choose a path based on the available options (without re working them first.)

Please provide a formal response from your agency/organization by June 12, 2015. Thank you!

City of West Linn

HIGHWAY 43/WILLAMETTE DRIVE
CONCEPTUAL PLAN REFINEMENT

Stakeholder Meeting
June 3, 2015
Comment Sheet

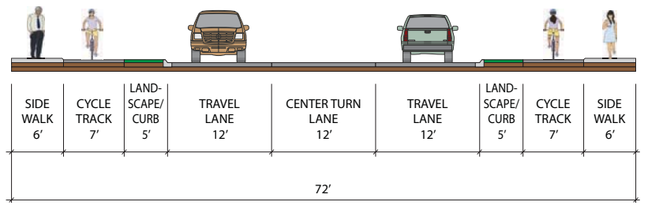
Name Ben Baldwin

Organization TriMet

Email baldwinb@trimet.org

Cross Sections

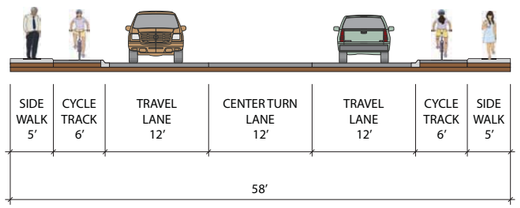
Typical



Comments

Two people walking in opposite directions would bump into each other, have to turn sideways and say pardon me, or step into a cycletrack. with such narrow sidewalks you should have a buffer adjacent to peds not a travel lane (bike), or go with an 8' sidewalk. How will this meet ADA requirements for transit stops? If you want to do transit Islands to buffer a cycle track you must plan for 10' wide transit islands

Constrained

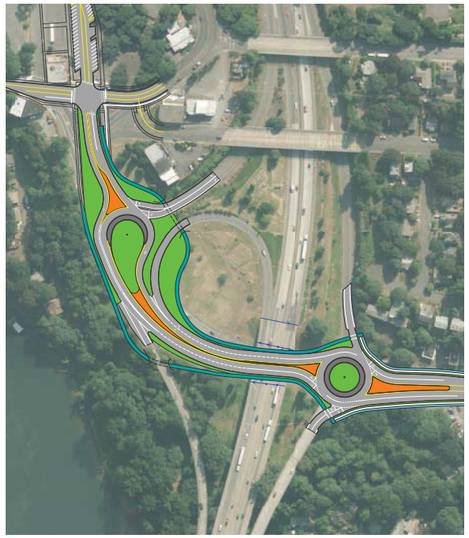


Comments

Please show two people on the sidewalk. It really only works if they are holding hands. Width should come out of the cycle track or center turn lane to accommodate a minimum 6' sidewalk in constrained areas. Bus stops need 8' of sidewalk width at the boarding area to meet ADA standards., (bikes are expected to travel single file, pedestrians shouldn't be.

I-205 Interchange

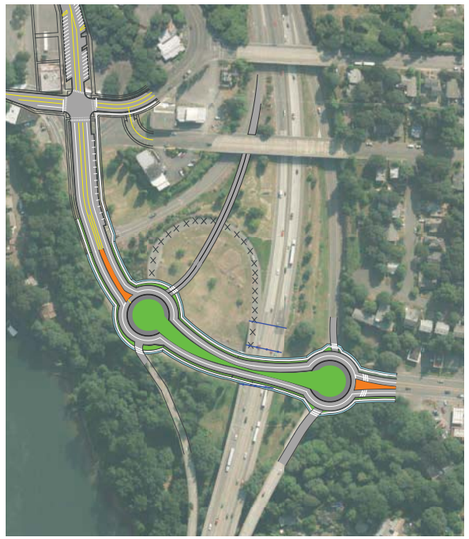
Roundabout Concept #1



Advantages

Challenges

Roundabout Concept #2



Advantages

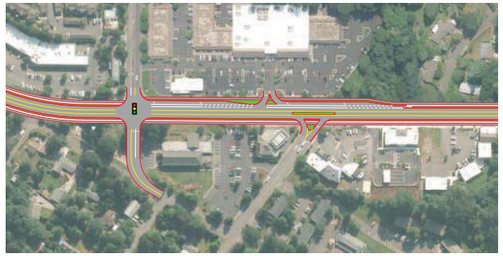
Challenges

Which concept do you prefer (circle one)? Concept 1 Concept 2

Other comments:

Hidden Springs/Cedar Oak

Concept #1: Right-in Right-out

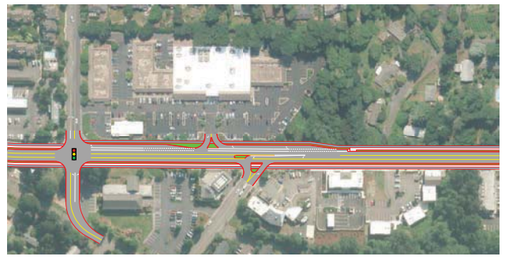


Advantages

Challenges

Must show how transit functions!

Concept #2: Left-in

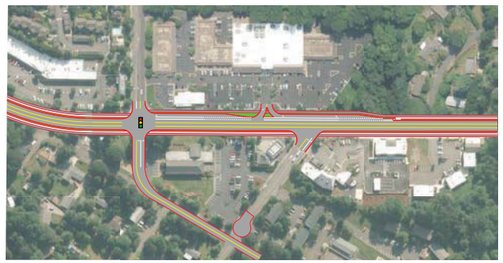


Advantages

Challenges

Must Show Transit!

Concept #3: Cul-de-sac



Advantages

Challenges

Which concept do you prefer (circle one)? Concept 1 Concept 2 Concept 3

Other comments:

Signalized Intersections

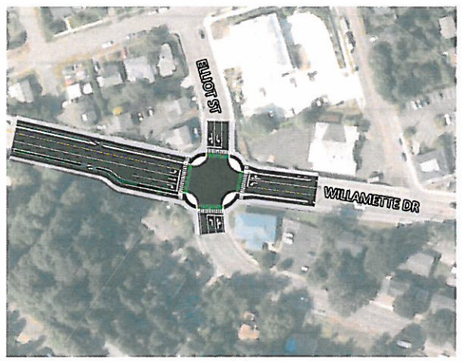
Concept #1

Advantages

WORKS WELL WITH EXISTING

Challenges

Concept #2



Advantages

EASIER WITH SLOPE AND WIDTH
COOL AND GOOD FOR FAMILIES

Challenges

TRUCK TURNING RADIUS
HILLS ON / GRADE
NO BIKE LANES ON ELLIOT
DANGEROUS LEFT BIKE TURN

Which concept do you prefer (circle one)? Concept 1 Concept 2

Other comments: love concept 2, But prefer 1 for this location

General Comments on Corridor Plan

Please provide a formal response from your agency/organization by June 12, 2015. Thank you!

West Linn

HIGHWAY 43/WILLAMETTE DRIVE
CONCEPTUAL PLAN REFINEMENT

Stakeholder Meeting
June 3, 2015
Comment Sheet

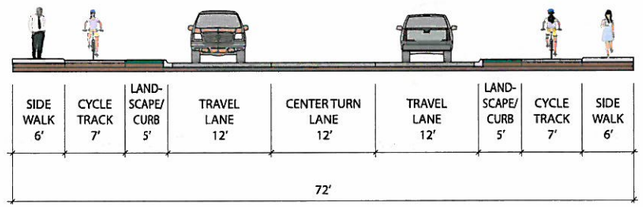
Name KIM BRIA

Organization TRANSPORTATION ADVISORY BOARD

Email KBRIA@EMINDCONSULTING.COM

Cross Sections

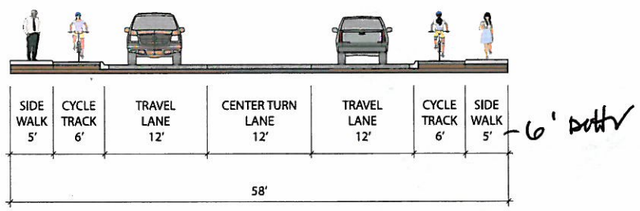
Typical



Comments

INCREASE DRAINAGE? GREAT TO HAVE TURN LANE.

Constrained



Comments

WORKS WHERE NEEDED. SHARED USE CYCLE/SIDEWALK SAVES WIDTH. COULD DELINEATE WITH STRIPING OR MATERIALS

I-205 Interchange

Roundabout Concept #1

Advantages

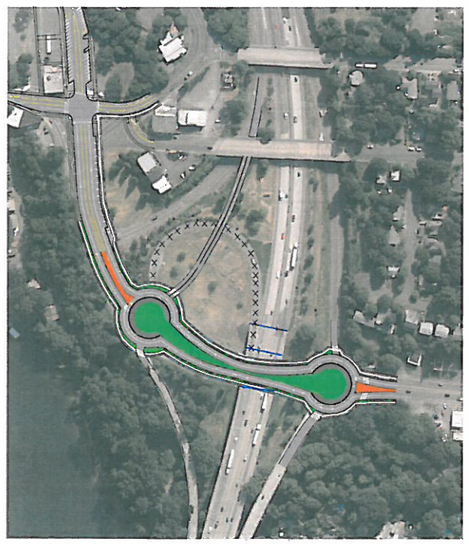
BEST long-term IF widened PEDESTRIAN BRIDGE UNDER ON RAMP KEEPS SEPARATION

Challenges

FUEL DEL TRUCK ACCESS @ GAS STATION

BIKE ACESS? ↑ ↓ VOLUME CUTOFF FOR ROUNDABOUT?

Roundabout Concept #2



Advantages

MAINTAINS USING AREA FOR FUTURE 205 WIDENING TO BRIDGE

Challenges

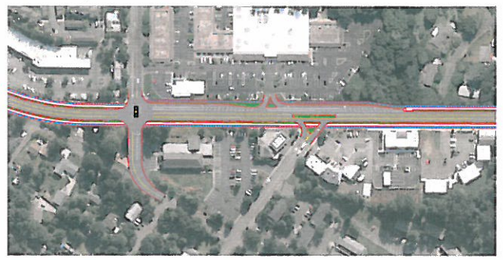
NOT SURE → CONCERNED ABOUT CAPACITY DURING HIGH TRAFFIC TIMES. DOES ROUNDABOUT WORK BETTER THAN SIGNAL FOR PEAK HIGH VOLUME? DO BOTH WORK WITH FUTURE 205 (POSSIBLE) WIDENING? WITHOUT MAKING BRIDGE (205) CAME LONGER?

Which concept do you prefer (circle one)? Concept 1 Concept 2

Other comments:

Hidden Springs/Cedar Oak

Concept #1: Right-in Right-out



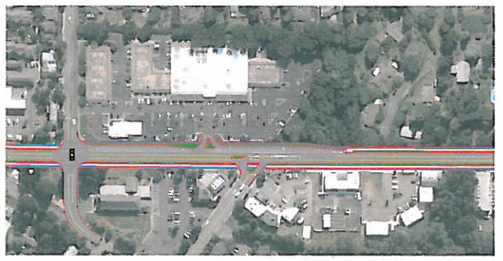
Advantages

all 3-good on 2 separate RT turns before and after Walnut

Challenges

TURNING INTO GAS STATION

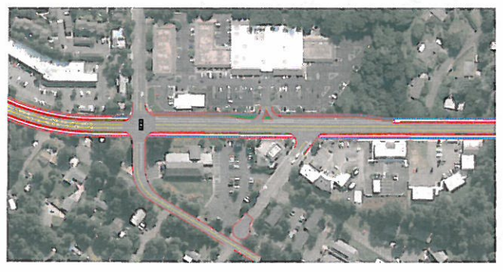
Concept #2: Left-in



Advantages

Challenges

Concept #3: Cul-de-sac



Advantages

SLOWS THINGS DOWN. (BUT NOO)

Challenges

Cul-de-sac restricts movements and displaces local traffic

Which concept do you prefer (circle one)? Concept 1 Concept 2 Concept 3

Other comments:

Signalized Intersections

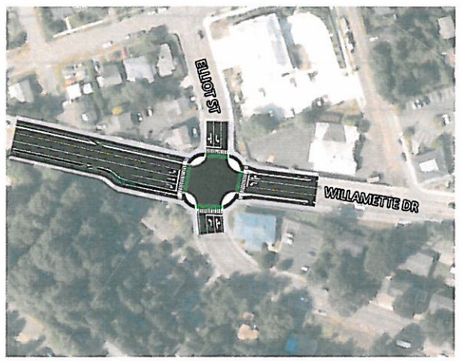
Concept #1

Advantages

Larger turning radius for commercial vehicles & TL+R

Challenges

Concept #2



Advantages

More safety buffer

Challenges

~~More safety buffer~~

White turn radius - too small?

Slope on West/Elliott

Which concept do you prefer (circle one)? Concept 1 Concept 2

Other comments: Two different paths for bikes = driver confusion. Will vehicles expect bikes to stay in the road? Perhaps one lane is preferable

General Comments on Corridor Plan

Please provide a formal response from your agency/organization by June 12, 2015. Thank you!

City of West Linn

HIGHWAY 43/WILLAMETTE DRIVE
CONCEPTUAL PLAN REFINEMENT

Stakeholder Meeting
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Comment Sheet

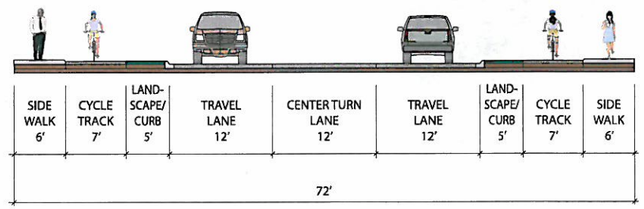
Name Craig S. Bell

Organization West Linn - citizen - Transpo Advisory Board

Email craig.s.bell@gmail.com

Cross Sections

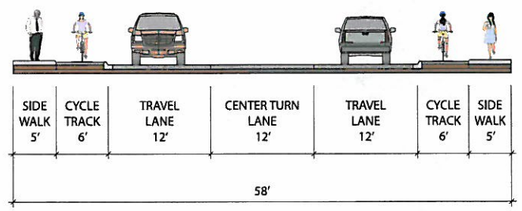
Typical



Comments

Landscape ~~strip~~ curb - wide enough to use for drainage bioswale? Don't want to splash bikers

Constrained



Comments

Perhaps some places necessitate one combined sidewalk ~~cycle~~ cycle on the road?

I-205 Interchange

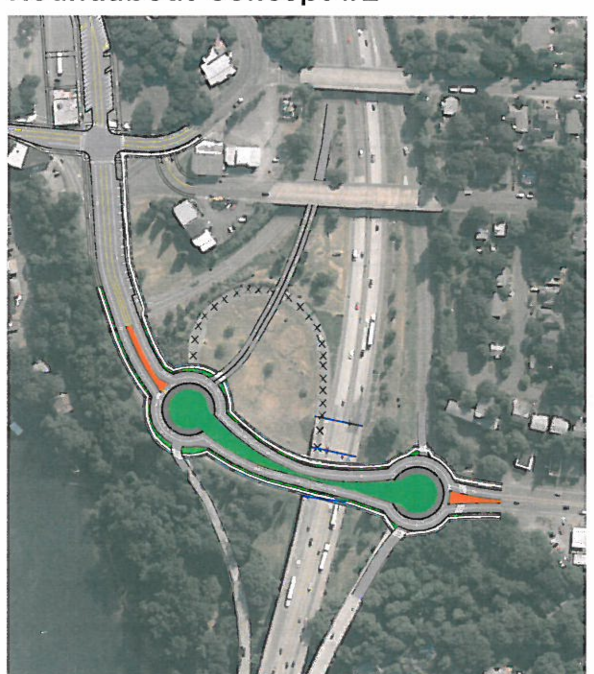
Roundabout Concept #1

Advantages

Challenges

Arch Bridge master plan could realign most streets in this area.

Roundabout Concept #2



Advantages

more buffer from Arch Br.

Challenges

Metering to onramp

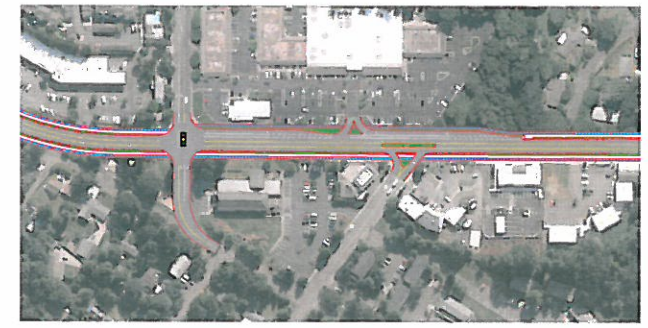
Consider #3 – on/off ramp adjacent like Oregon City

Which concept do you prefer (circle one)? Concept 1 **Concept 2** (circled)

Other comments: McKillican Intersection - steep, acute angle blind curve for SB OR43 traffic, widening ~~only~~ needs to flatten at this intersection

Hidden Springs/Cedar Oak

Concept #1: Right-in Right-out



Advantages

Challenges

Concept #2: Left-in

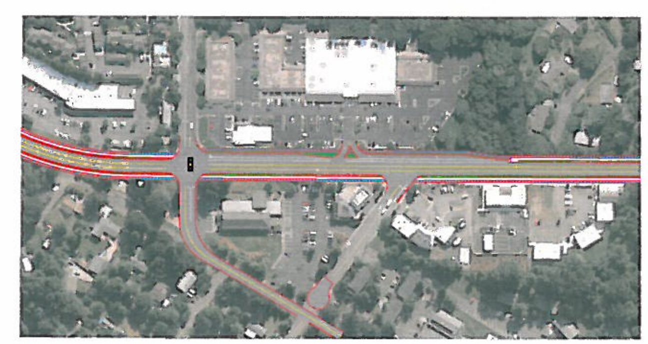
Advantages

Better access from SB 43 to Cedar Oak

Challenges

Move bus stops - people WILL run across to reach the Park & Ride

Concept #3: Cul-de-sac



Advantages

Challenges

Which concept do you prefer (circle one)? Concept 1 **Concept 2** (circled) Concept 3

Other comments: Wal Mart driveway – move North expand refuge SB to Hidden Springs

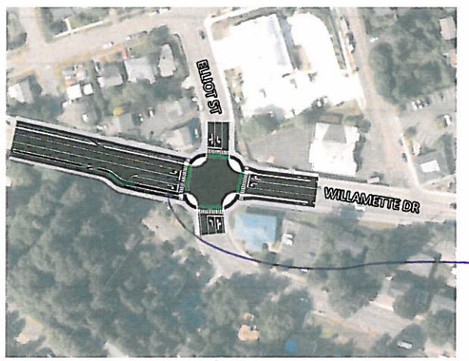
Signalized Intersections

Concept #1

Advantages

Challenges

Concept #2



Advantages

More protected / better for less confident cyclists
Slower speeds of auto traffic
protected bike signal phase

Challenges

right turn lane does not seem necessary & adds cost & width to the ped crossing
topography

Which concept do you prefer (circle one)? Concept 1 (Concept 2)

Other comments:

General Comments on Corridor Plan

(1) Street sweeper issue: Metro could conceivably fund the purchase of a sweeper for cycle tracks. It would make sense for an agency like Clackamas County or N. Clackamas Parks & Rec to own/house the sweeper & loan it out since they have maintenance departments & relationships to city maintenance departments

(2) This kind of design is consistent w/ Metro goals & construction project could be a good candidate for Regional Flexible Funds (process starts in Jan 2016).

Please provide a formal response from your agency/organization by June 12, 2015. Thank you!

(3) Keep idea of jurisdictional transfer to the city alive!

West Linn

HIGHWAY 43/WILLAMETTE DRIVE
CONCEPTUAL PLAN REFINEMENT

Stakeholder Meeting
June 3, 2015
Comment Sheet

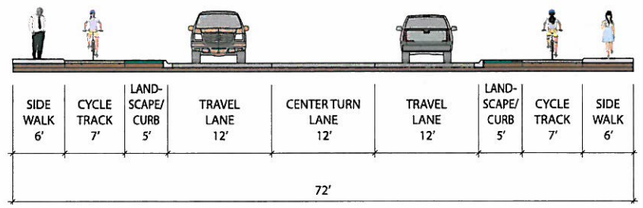
Name John Mermin

Organization Metro

Email john.mermin@oregonmetro.gov

Cross Sections

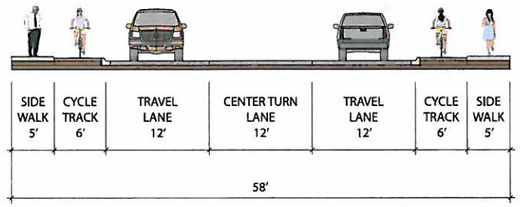
Typical



Comments

11' travel lanes & center turn lane would save $ & create surface for truck traffic & allow us to have as much consistent w/ ODOT's minimum (7')

Constrained



Comments

11'ft travel lanes are preferred. (See comment above) Center turn lane not always needed. Buffer for cyclists could be achieved instead of turn lane.

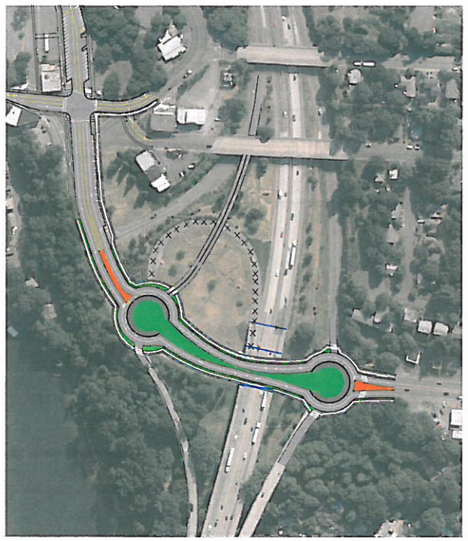
I-205 Interchange

Roundabout Concept #1

Advantages

Challenges

Roundabout Concept #2



Advantages

Challenges

Which concept do you prefer (circle one)? Concept 1 Concept 2

Other comments:

Hidden Springs/Cedar Oak

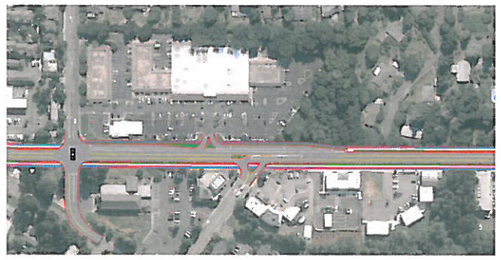
Concept #1: Right-in Right-out

Advantages

Median adds safety

Challenges

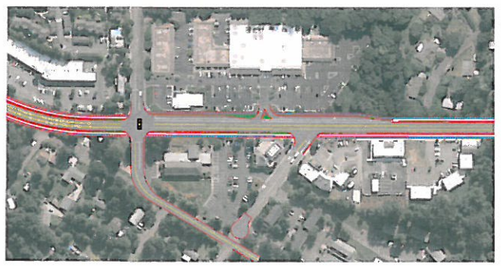
Concept #2: Left-in



Advantages

Challenges

Concept #3: Cul-de-sac



Advantages

Challenges

Which concept do you prefer (circle one)? Concept 1 Concept 2 Concept 3

Other comments:

Signalized Intersections

(503) 825-61?? (503) 535 7436 AHCUIN HR @ AHHORE

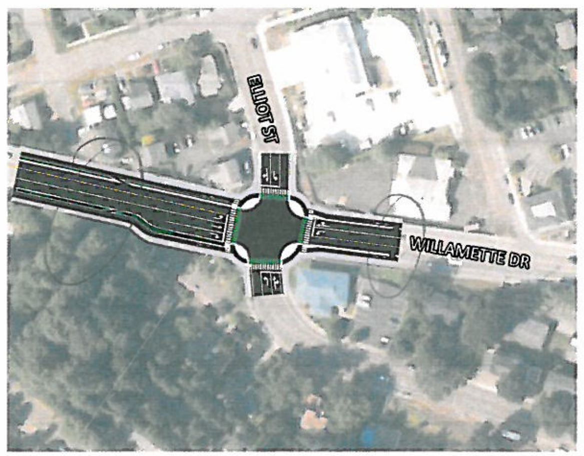
Concept #1

Advantages

Feels more palatable to the public...

Challenges uun 7275

Concept #2



Advantages

A more advanced design!

Can you landscape the new islands?

Challenges

People/drivers will have to learn this. May not expect the bikers cut-in, cut-outs.

Which concept do you prefer (circle one)? Concept 1 Concept 2

Other comments: What are the options for bicyclists on the side street?

General Comments on Corridor Plan

Please provide a formal response from your agency/organization by June 12, 2015. Thank you!

West Linn

HIGHWAY 43/WILLAMETTE DRIVE CONCEPTUAL PLAN REFINEMENT

Stakeholder Meeting
June 3, 2015
Comment Sheet

Name Amanda Owings / Marc's Group discussion

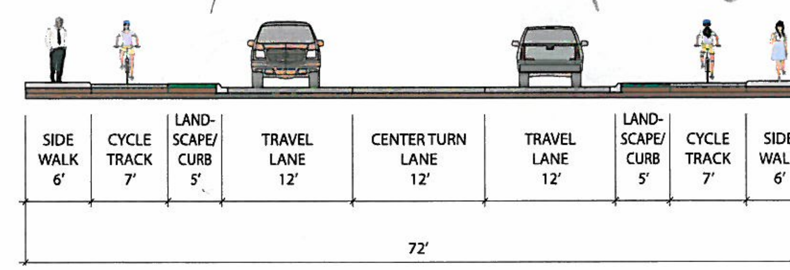
Organization City of Lake Oswego

Email

Cross Sections

Typical

36' — This meets ODOT's minimum, but will also require a design exception



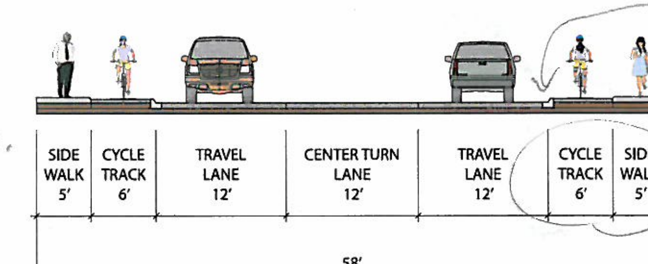
Comments

City wants swales within buffer area. Good for unconstrained areas.
Perhaps swale on one side. Need 8' swale width, typically.
ODOT prefers no trees in buffer due to safety
ODOT wants 8' for cycle track

Constrained

12' lanes is constrained in heavy rain storms. Need more inlets.

this req's a design exception



could combine to one elevation. Needs to be 10-12'+

Comments

Consider retaining landscape buffer + sacrifice the center turn lane where it is not needed. LO maintains all their medians.
Apply "access management" by consolidating driveways and roadways as much as possible = so much safer!
Question about transit accommodation → next level analysis.
TriMet drivers will need to be more agressive in re-entering traffic

I-205 Interchange

Roundabout Concept #1

Advantages

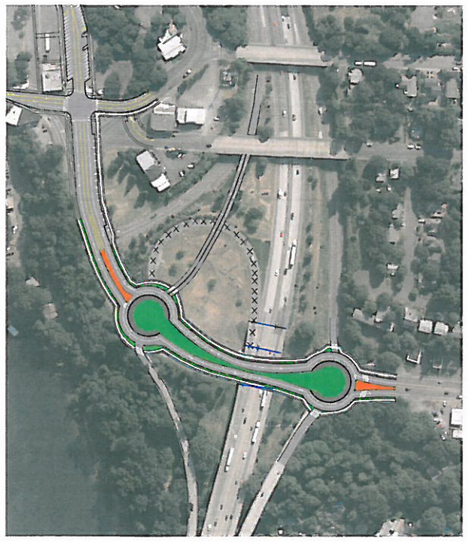
No transient problems in WL - police are on it!

Challenges

Willamette Falls Dr backs up to Old Willamette!

Ramp meters?

Roundabout Concept #2



Advantages

Removes loop on ramp - very good

Removes one on ramp - this helps w/ merge + weave on I 205

Challenges

Concern about back-up from Arch Bridge traffic

Ramp meters?

Which concept do you prefer (circle one)? Concept 1 Concept 2

Other comments: ODOT is considering a revised signal

Possibly combine Arch Bridge + Southern roundabout into 1 roundabout.

Hidden Springs/Cedar Oak

Concept #1: Right-in Right-out

Advantages

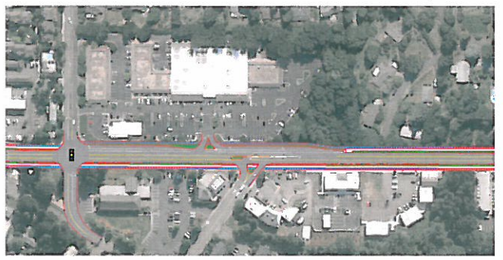
Looks great! Eliminates signal

Consider adding RT lane @ the new intersection

Challenges

Concern for blocking road @ raised median during crash + utility work but only happens once in a while

Concept #2: Left-in



Advantages

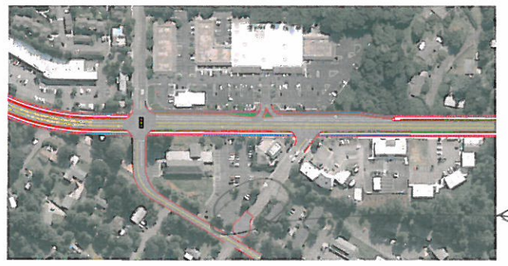
Eliminates signal!

Challenges

Mid block crossing?

Left-in adds another conflict point

Concept #3: Cul-de-sac



Advantages

Challenges

No one likes the cul de sac

Which concept do you prefer (circle one)? Concept 1 Concept 2 Concept 3

Other comments: Walmart dwy - will this ever move? Align w/ street?

Painted medians?

Consider moving transit stops so traffic can flow during dwell time

Signalized Intersections

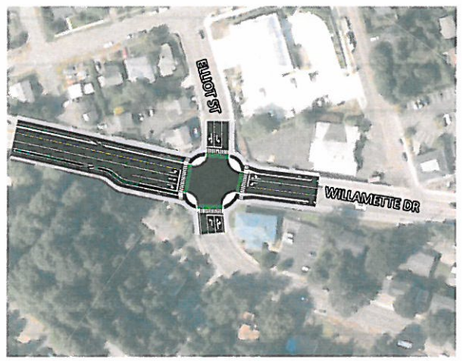
Concept #1

Advantages

I think this design works fine for the more common, lower traffic intersections.

Challenges

Concept #2



Advantages

like this design for sign. intersections like Hidden Springs

Challenges

seems to require more room but prob. ok locations like Hiddenspring

Which concept do you prefer (circle one)? Concept 1 (Concept 2) - for more sign intersections like Hidden Springs

Other comments:

General Comments on Corridor Plan

While we are focused on cycletrack design North-South thru West Linn, another major aspect/issue that we are trying to address is having more + improved design/alternatives for Xing ±3 hwy. As we consider our design we need to incorporate design/plan for our x-highway enhancements we also need.

Please provide a formal response from your agency/organization by June 12, 2015. Thank you!

West Linn

HIGHWAY 43/WILLAMETTE DRIVE
CONCEPTUAL PLAN REFINEMENT

Stakeholder Meeting
June 3, 2015
Comment Sheet

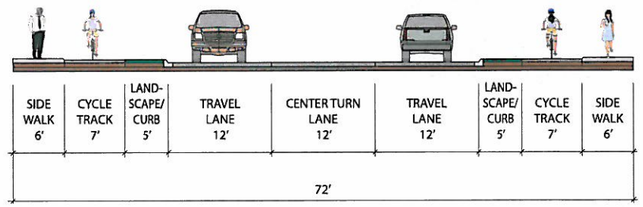
Name Russ Axelrod

Organization West Linn mayor + council

Email raxelrod@westlinnoregon.gov

Cross Sections

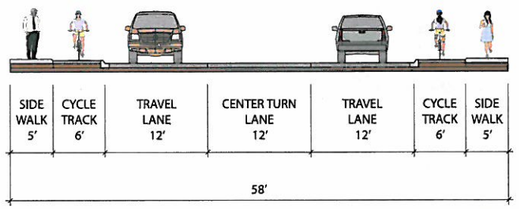
Typical



Comments

Like landscaped buffers with bioswales wherever possible (also reduce SW runoff)

Constrained



Comments

Prefer to work on easements and other options/alternatives to minimize use of constrained design as much as possible. Where no veg. buffer, prefer strongly elevated cycletrack design. Try and get ODOT to consider joint use elevated pathway

I-205 Interchange

Roundabout Concept #1

Advantages

Do not like this design.
Would like to eliminate this cloverleaf be take up so much property + look to dangerous merge on I205 and prob. worse when 3rd lane added to I205

Challenges

Want to eliminate this intersection by bringing WFalls Drive to east

Roundabout Concept #2

Advantages

much preferred

want to evaluate one larger intersection in this area.

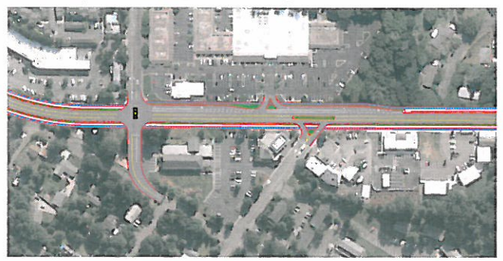
Challenges

Which concept do you prefer (circle one)? Concept 1 (Concept 2)

Other comments:

Hidden Springs/Cedar Oak

Concept #1: Right-in Right-out



Advantages

v much like extending river road to hidden springs to create new intersection and eliminate light at cedar oak

Challenges

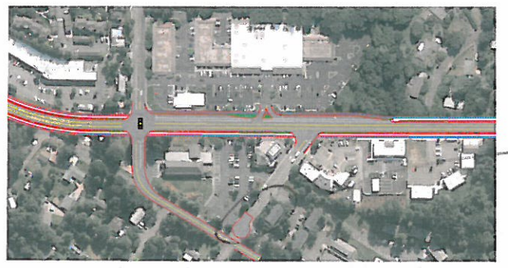
elevated curbing/island at cedar oak concern for some emergency vehicle movement?

Concept #2: Left-in

Advantages

Challenges

Concept #3: Cul-de-sac



don't like cul-de-sac design

Advantages

Challenges

Which concept do you prefer (circle one)? Concept 1 Concept 2 Concept 3

Other comments:

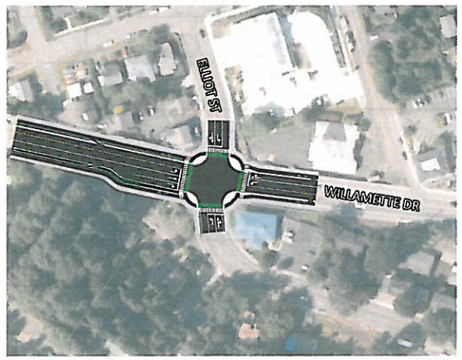
Signalized Intersections

Concept #1

Advantages

Challenges

Concept #2



Advantages

Challenges

Which concept do you prefer (circle one)? Concept 1 Concept 2

Other comments: Concerned about right turns for comm. vehicles

NOT SURE I'M READY TO PICK 1 OR 2.

General Comments on Corridor Plan

Please provide a formal response from your agency/organization by June 12, 2015. Thank you!

West Linn

HIGHWAY 43/WILLAMETTE DRIVE
CONCEPTUAL PLAN REFINEMENT

Stakeholder Meeting
June 3, 2015
Comment Sheet

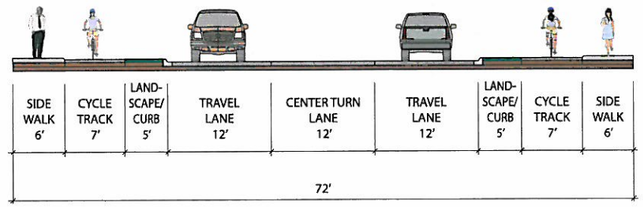
Name NEIL HENNELLY

Organization WEST LINN POLICE

Email nhennelly@westlinnoregon.gov

Cross Sections

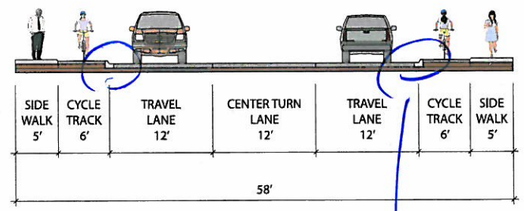
Typical



Comments

BIO SWALE ON DOWNHILL SIDE

Constrained



Comments

CURB HEIGHT ON TRANS. BTW TRAVEL LANE & CYCLO TRACK

I-205 Interchange

Roundabout Concept #1

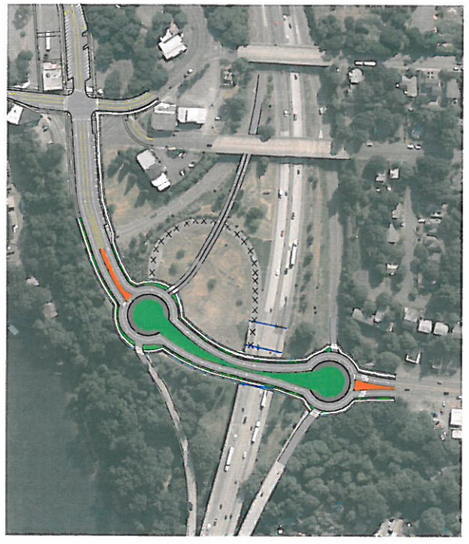
Advantages

BIKE/PED - NORTHBOUND - BRIDGE TO OVERCOME STEEP GRADE + ILLEGAL CAMPING ISSUES

Challenges

BACK-UP FROM OREGON CITY

Roundabout Concept #2



Advantages

Challenges

SAME ISSUES AS ABOVE - CUT FROM OREGON CITY WILL CLOG THIS ROUNDABOUT.

Which concept do you prefer (circle one)? Concept 1 Concept 2

Other comments:

Hidden Springs/Cedar Oak

Concept #1: Right-in Right-out

Advantages

Challenges

Concept #2: Left-in

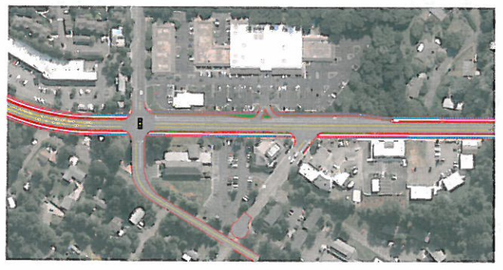
Advantages

BASIS OF NEIGHBORHOOD TRF. FROM HIDDEN SPGS TO CEDAROAK

Challenges

STRIPES NOT MEDIANS

Concept #3: Cul-de-sac



Advantages

Challenges

Which concept do you prefer (circle one)? Concept 1 Concept 2 Concept 3

Other comments: MID BLOCK PED CROSSING

Signalized Intersections

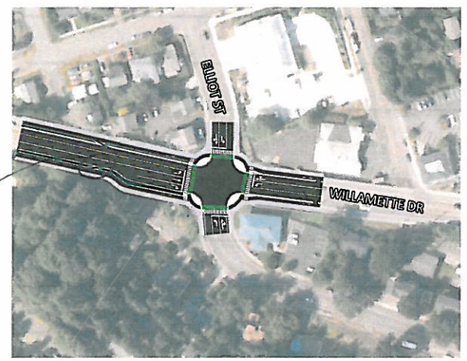
WHAT ABOUT UNSIG. + DWYS? BUS STOP DESIGNS?

Concept #1

Advantages

Challenges

Concept #2



Advantages

IT'S NEATO

Challenges

~~ROW~~ GRADE ISSUES → SPEED DIFFERENTIAL ON DOWNHILL

DOES THIS DESIGN HAVE BENEFITS AT INTERSECTION W/O BIKE FACILITIES ON SIDE STREET? INTENDED FOR INTERSECTIONS W/PROTECTED BIKE FACILITIES ON ALL APPROACHES.

OR HAS MANDATORY SIDEPATH REQ.

Which concept do you prefer (circle one)? (Concept 1) Concept 2

Other comments:

General Comments on Corridor Plan

DOWNHILL GRADES + TOPOGRAPHY ISSUES

BUS STOP DESIGN?

Please provide a formal response from your agency/organization by June 12, 2015. Thank you!

West Linn

HIGHWAY 43/WILLAMETTE DRIVE
CONCEPTUAL PLAN REFINEMENT

Stakeholder Meeting
June 3, 2015
Comment Sheet

Name JESSICA HORNING

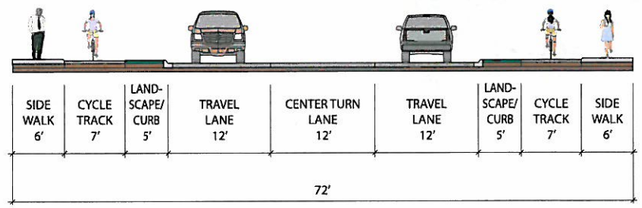
Organization ODOT

Email JESSICA.HORNING@ODOT.STATE.OR.US

Cross Sections

Typical

BUS STOP DESIGN W/ EITHER OPTION?

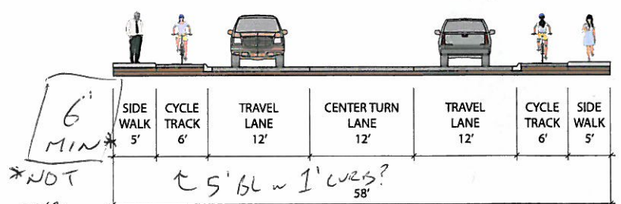


Comments

BOTH OPTIONS - MAKE CYCLE TRACK + SIDEWALK SAME ELEVATION TO IMPROVE FLEXIBILITY OF SPACE + EASE OF MAINTENANCE

USE PAVEMENT STAMP OR TEXTURE TO DIFFERENTIATE?

Constrained



*NOT INCLUDING CURB

Comments

DESIGN EXCEPTIONS FOR NO SHOULDER, ETC. W/EITHER OPTION.

I-205 Interchange

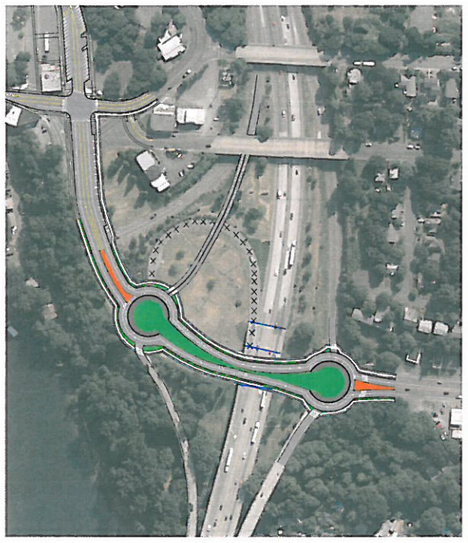
Roundabout Concept #1

Advantages

GRADE SEPARATED CROSSING OF RAMPS

Challenges

Roundabout Concept #2



Advantages

Challenges

Which concept do you prefer (circle one)? Concept 1 Concept 2

Other comments:

Hidden Springs/Cedar Oak

Concept #1: Right-in Right-out

Advantages

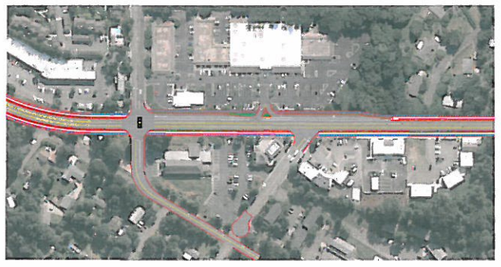
Challenges

Concept #2: Left-in

Advantages

Challenges

Concept #3: Cul-de-sac



Advantages

Challenges

Which concept do you prefer (circle one)? Concept 1 Concept 2 Concept 3

Other comments:

Appendix 3 Summary of Interchange Options Considered

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

TECHNICAL MEMORANDUM

Highway 43 / I-205 Interchange Area

Date: May 1, 2016 Project #:18640
To: Lance Calvert
From: Karla Kingsley and Marc Butorac, PE, PTOE
Subject: Highway 43 Concept Design Plan Update

As part of the Highway 43 Conceptual Design Plan update, the City of West Linn considered a number of different opportunities for improving the Highway 43 / I-205 interchange area. Ultimately the plan does not include a preferred design concept for the portion of Highway 43 in the interchange area; however, this memorandum documents the options that were considered and that could be referenced as part of future interchange development work associated with the Bolton area and widening of I-205 to six lanes. These options have been developed to be consistent with the "ODOT Reconnaissance Report for East Portland Freeway No. 64 (I-205), SW Stafford Rd. – Pacific Highway 1E (OR 99E) Section, Clackamas County" from June 2003.

Currently, the interchange area has a Parclo-A on-ramp for the southbound Highway 43 to northbound I-205 movement, with a separate on-ramp for the northbound Highway 43 to northbound I-205 movement. The I-205 southbound on- and off-ramps make up one half of a tight diamond configuration. In the future, both ODOT and the City of West Linn agree that design treatments in the interchange area are desirable, to address the following current issues:

- Two tightly-spaced merge sections onto northbound I-205.
- The on-ramps to northbound I-205 present challenges to bicyclists continuing on Highway 43; in particular, southbound bicyclists must cross the lane of vehicle traffic just as vehicles are accelerating onto the ramp.

As part of the Highway 43 Conceptual Design planning process, the City of West Linn considered a configuration that includes roundabouts at the ramp terminal intersections. Attachment A shows three concept design drawings exploring potential roundabout configurations, including some staging options. In general, these options seek to achieve the following:

- Continuous pedestrian and bicycle facilities on Highway 43 through the interchange area, with comfortable at-grade or grade-separated crossings.
- Ultimate consolidation of northbound on-ramp terminals.
- Slowing of vehicular traffic while still providing sufficient capacity.
- Tie in and enhance the ultimate vision for the Bolton area (the City of West Linn is still considering various options for this part of the city).

Further planning, study, operational analysis, and collaboration with ODOT will be needed prior to selecting a preferred design for the interchange area to enable the selection of a feasible and cost-effective option. In particular, the following is needed:

- Operational analysis modeling the proposed configuration, including the intersection of Willamette Falls Drive/Highway 43, to understand potential queuing impacts.
- Analysis/evaluation of the pedestrian and bicycle facility design to ensure a high quality connection through the interchange area.
- Coordination with ODOT in sequencing the interchange area improvements with the ultimate envisioned width for I-205.

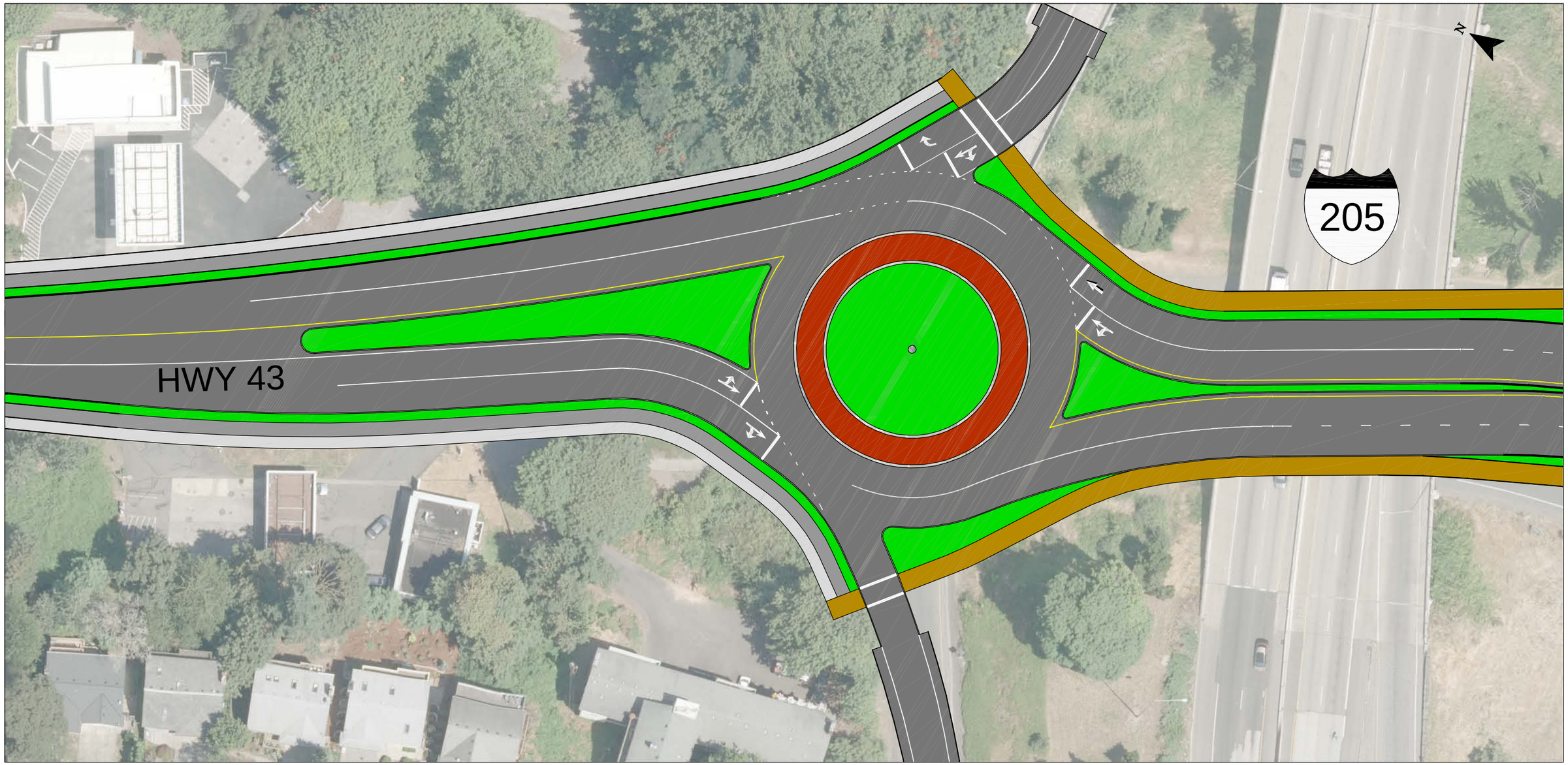
Attachment A Concept Designs

CONCEPT DESIGNS

Option 1 is shown in the pages labeled Figure 23 and 24. In general, it includes two roundabouts and a phasing option that ultimately removes the existing I-205 on-ramp for northbound Highway 43 vehicles, consolidating the two on-ramps into one loop ramp. Pedestrian and bicycle movement is provided with multi-use paths on both sides of Highway 43, with grade-separated undercrossings of the ramps on the south side of I-205.

Option 2 is shown in the pages labeled Figure 25 and 26. In general, it includes two roundabouts and a phasing option that ultimately removes the existing I-205 on-ramp loop for southbound Highway 43 vehicles, consolidating the two on-ramps into the existing ramp joining I-205 at the bridge. Pedestrian and bicycle movement is again provided with multi-use paths on both sides of Highway 43, with grade-separated undercrossings of the ramps on the south side of I-205.

The final concept drawing was produced by the City of West Linn and discussed with ODOT as the preferred option at this planning stage. It is most consistent with Option 1, above, but replaces the multiuse paths with separate bicycle and pedestrian facilities with at-grade crossings of all ramps. The final concept illustrates how the roundabout intersections are envisioned to tie in with future reconfiguration of the Willamette Falls Drive intersection.



Sidewalk

Protected Bike Facility

Buffer/Landscape

Multi-use Path

SCALE

0 50 100

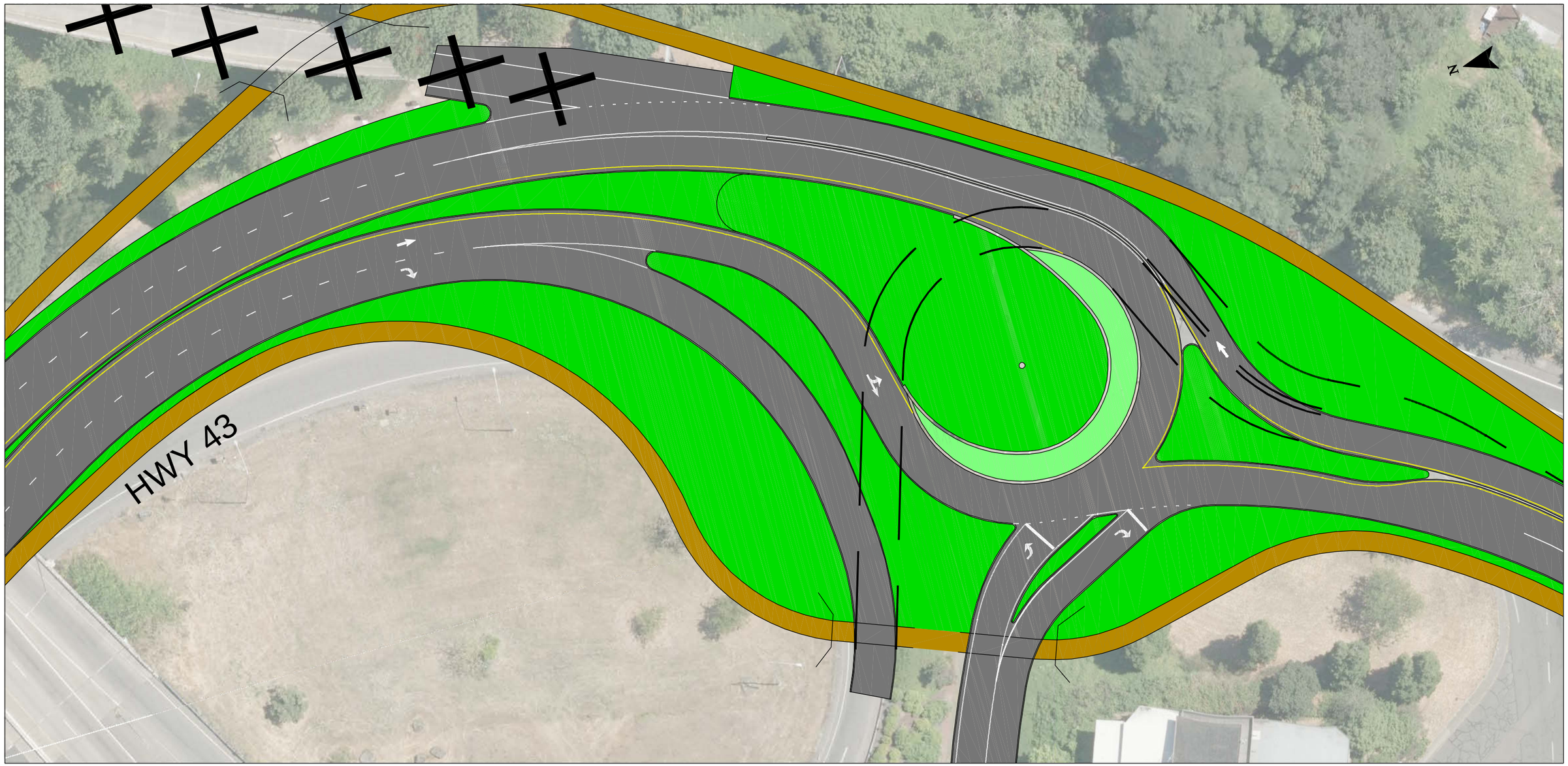
Option 1

West Linn, Oregon

Figure **23**

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

C:\Users\kcullimore\appdata\local\temp\AcPublish_15436\18640_ROUNDABOUT_CONCEPT_FIGURES_.dwg Apr 06, 2016 - 4:10pm - kcullimore Layout Tab: (FIG23)



Sidewalk

Protected Bike Facility

Buffer/Landscape

Multi-use Path

SCALE

0 50 100

Option 1

West Linn, Oregon

Figure **24**

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

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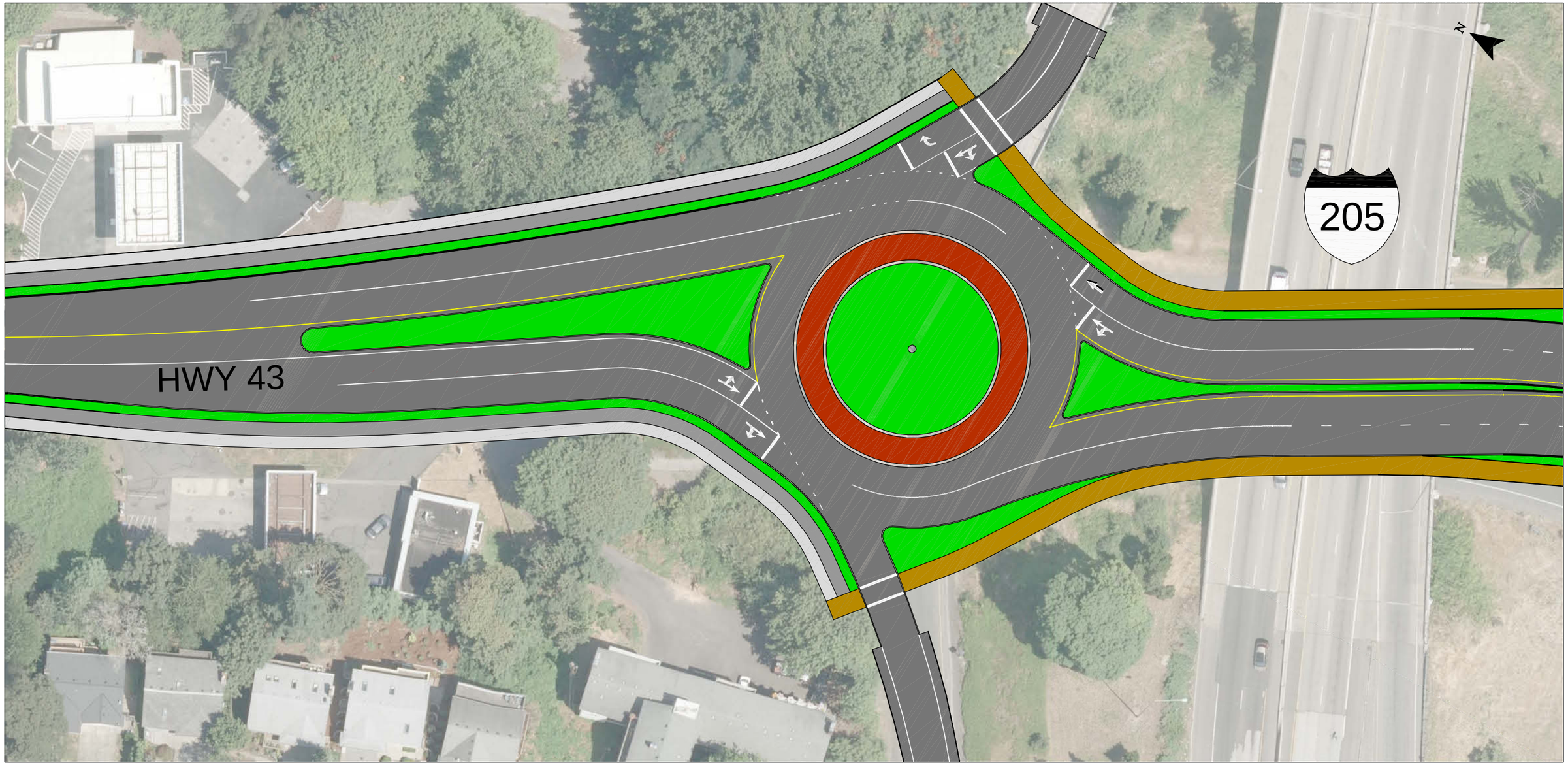

Sidewalk

Protected Bike Facility

Buffer/Landscape

Multi-use Path

SCALE

0 50 100

Option 2

West Linn, Oregon

Figure **25**

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

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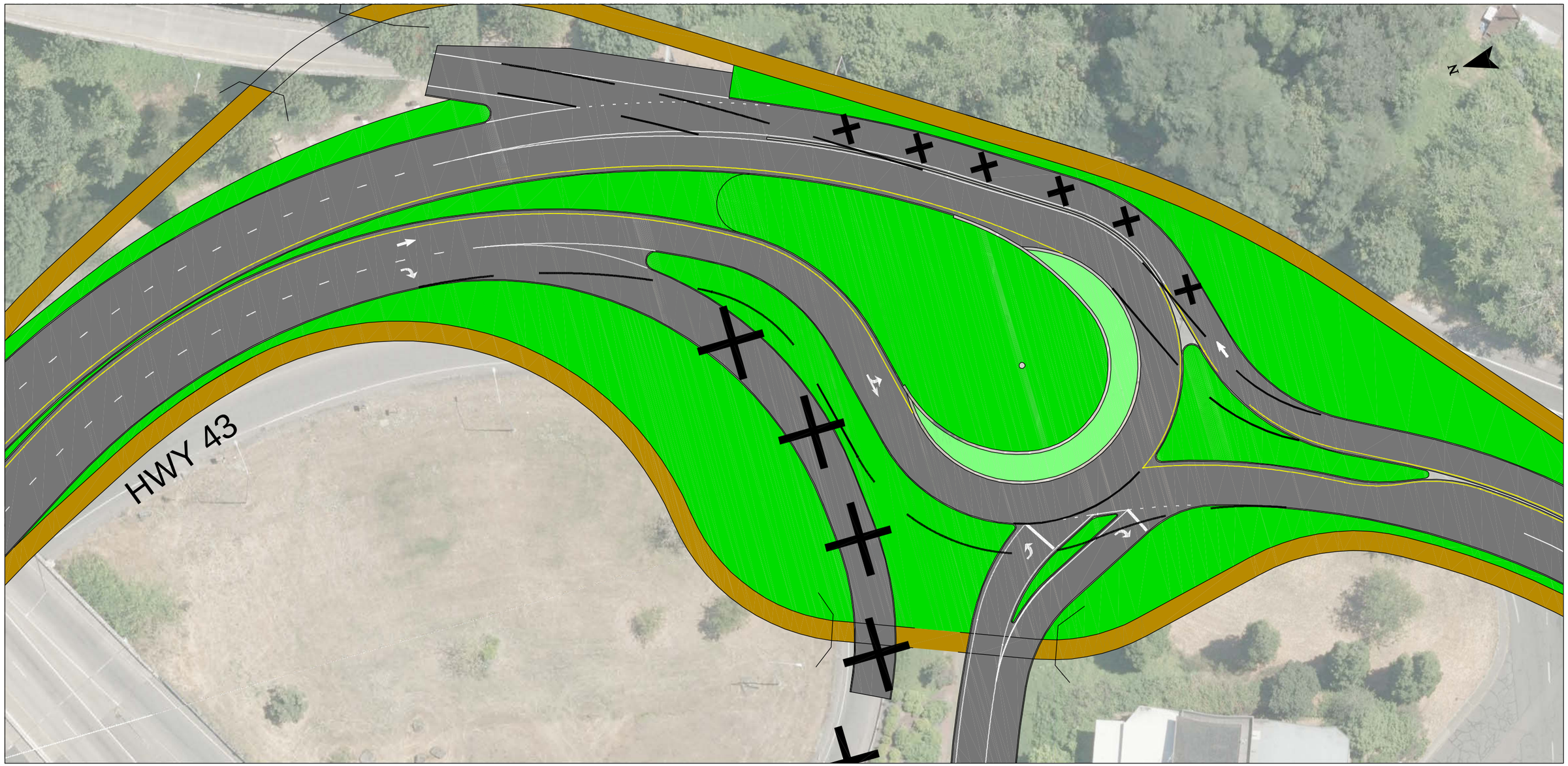

Sidewalk

Protected Bike Facility

Buffer/Landscape

Multi-use Path

SCALE

0 50 100

Option 2

West Linn, Oregon

Figure **26**

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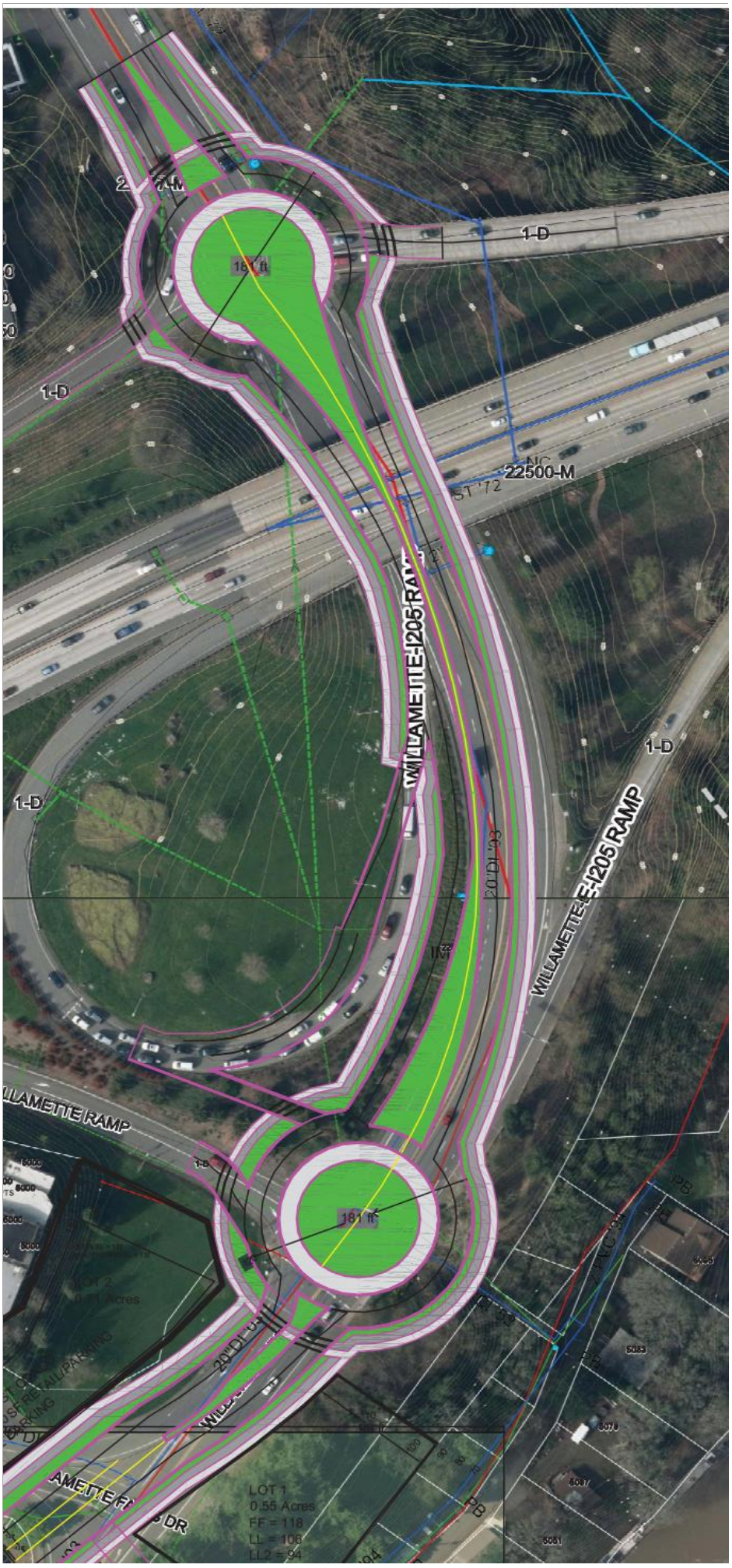
1-D
1-D
1-D
22500-M
WILLAMETTE I-205 RAMP
WILLAMETTE I-205 RAMP
181 ft
181 ft
LOT 1
0.55 Acres
FF = 118
LL = 106
LL2 = 94

Appendix 4 Public and Stakeholder Involvement Summary

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
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TECHNICAL MEMORANDUM

Public and Stakeholder Involvement Summary

Date: March 30, 2016 Project #:18640
To: Lance Calvert
From: Karla Kingsley and Marc Butorac, PE, PTOE
Subject: Highway 43 Conceptual Design Plan Update

As part of the Highway 43 Conceptual Design Plan update, the City of West Linn and the project team conducted outreach to members of the public and agency stakeholders through a variety of channels, including:

- Transportation Advisory Board - Members of the citizen Transportation Advisory Board participated in the stakeholder meetings held in April and June 2015 (further documented in Technical Appendices 1 and 2).
- Virtual Open House - The project team developed an online "virtual open house" sharing the draft layouts, cross section, and design elements with members of the public and requesting input and feedback during the months of November and December 2015. This resulted in 169 comments on the plan, included in Attachment A.
- Social Media and Email - City of West Linn staff received input from community members on the community forum NextDoor and through email, resulting in over 30 additional comments, included in Attachment A.
- In-Person Meetings and Presentations - City of West Linn staff conducted in-person meetings and presentations at transportation advisory board meetings in the Willamette, Robinwood, and Bolton neighborhoods, in the months of December, January, February, and March. The summary notes from these meetings are included in Attachment B.
- One-on-one Meetings with Agency Stakeholders – In addition to the two stakeholder meetings in April and June 2015 (documented in Technical Appendices 1 and 2), the project team held meetings with Metro, ODOT, and TriMet stakeholders to further discuss their input and the project direction.

City of West Linn staff and the consultant team documented and reviewed public and stakeholder input, and used it to finalize the content and design concepts contained in the 2016 Plan. The general content of the public comments is summarized below, followed by a summary of one-on-one stakeholder meetings; individual comments are included in Attachment A.

General Comment Summary

- Multiple commenters expressed their appreciation for the chance to weigh in and were supportive of the website and virtual open house as a tool for sharing their input. A couple commenters said they would be interested in serving on committees in the future.
- The majority of commenters are generally supportive of the plan. In particular, most people are supportive of the following plan elements:
    - Bicycle facilities
    - Pedestrian facilities
    - Center two-way left turn lane
    - The Cedar Oak/Hidden Springs reconfiguration
    - Traffic signal at Pimlico
    - Right-turn lanes on side streets
- There were a variety of suggestions included in the comments, some in the form of questions, and many suggestions that will naturally be incorporated into future design phases of the project, including:
    - Pedestrian countdown signals.
    - Street trees/landscaping/art/beautification
    - Improvements to signal timing to make traffic flow more efficient
    - Changes to side street grading to improve sight distance
    - Additional pedestrian crossings, including beacons or signals
    - Bus pull-outs to allow traffic to flow
- Two specific suggestions that came up multiple times were:
    - Include a pedestrian crossing at Mary S. Young Park (6 commenters specifically mentioned this location) *Note: the 2016 plan does not yet include locations for future crossings; however, in the upcoming design phase, the City of West Linn and ODOT will work to incorporate crossing opportunities where they are warranted and can be designed to provide safe crossing.*
    - Widen Highway 43 to four or five lanes (about 8% of commenters). *Note: the City of West Linn engaged the public in extensive conversation about the ultimate width of Highway 43 (three lanes vs. five lanes) during the development of the 2008 Concept Plan, with the wide majority desiring the smaller cross section. The 2016 Plan reflects this earlier decision).*

Attachment A includes the individual comments received by the City of West Linn through the Virtual Open House and via email.

Stakeholder Meetings

The project team met with individuals from Metro, ODOT, and TriMet to discuss specific elements of the plan. Key discussion points are included below:

- Metro may be able to purchase a street sweeper designed for narrow facilities, such as the protected bike lane, that could be shared by jurisdictions across the region to assist with maintenance.

- Bus stop designs that incorporate islands should be 10 feet wide to facilitate movement of people using wheelchairs. TriMet is interested in being involved in the design of the bus stops as the project moves toward implementation.
- If complete sidewalks and bicycle facilities are added along Highway 43, some existing bus stops along the corridor could be consolidated to improve transit travel times and reliability (the 2016 Plan reflects this stop consolidation).
- ODOT and the City of West Linn initiated discussions about jurisdictional transfer of Highway 43 from ODOT to the City of West Linn. A draft jurisdictional transfer framework agreement was developed and discussed, over the course of three meetings. Further discussion and development of the agreement is ongoing.

Attachment A Comments from Virtual Open House and Emails to City Staff

Comments from Virtual Open House

PROJECT EXHIBIT	COMMENT
Draft Proposed Cross Sections	I appreciate being able to see what is being planned. My only concern is how much will be spend and the real impact, or reduction, in automobile traffic. While having bus turn outs and a center lane to move left turning vehicles out of the way, what is the real reduction in traffic congestion? Two lanes in either direction would make a bigger impact. I for one, and probably most others who live here, will not be substituting bus or bicycle travel for auto travel. Sounds nice and progressive, but I think that may draw off funds from other needs.
Draft Proposed Cross Sections	Too much space devoted to sidewalks, bike lanes, buffers. Do we need to have all on both sides of the roads?
Draft Proposed Cross Sections	Buses stop in the traffic lane. Can there be a "pull-off" so traffic can continue to flow?
Draft Proposed Cross Sections	There are number of amenities along the Highway 43 corridor in West Linn that my family would like to get to on foot or bike and don't because of the lack of sidewalks and cycle tracks. The proposed street cross sections provide both as well as some separation for vehicle traffic. My family currently does not feel safe when we walk, cycle, and drive along Highway 43. This proposal appears to provide the much needed space and designated paths for all modes of transit.
Draft Proposed Cross Sections	Generally, this is a big improvement over what we have now. In the cross sections where they both exist, I would suggest switching the position of the landscape curb and the cycle track to allow for idled vehicles (from disablement, being pulled over by police, or fender-bender) a place to pull over with limited impact on traffic. This redesign would provide 9 linear feet for the idled vehicles to pull over. Cyclists could easily ride around the idled vehicles or use the walking path.
Draft Proposed Cross Sections	Is the landscape curb really necessary? I'm concerned it would eat up emergency parking and make the road more crowded- at least in perception, like the "improved " roads in SE Portland. Those bioswales suck.
Draft Proposed Cross Sections	Where is the green planting strips? and what is proposed to be in them? where re the storm water facilities? There is a need to slow the traffic down. people sped on 43
Draft Proposed Cross Sections	HWY 43 desperately needs two lanes in each direction and a center lane for turning. Traffic flow volume is way too high for a two lane road. This road is one of the most frustrating parts of living in West Linn.
Draft Proposed Cross Sections	If trees are included in the landscape areas, then proper preparation of the sub-grade under the cycle track and sidewalk should occur to provide appropriate soil for roots. Otherwise install shrubs in the landscape area for separation between vehicles and peds and cycles.
Draft Proposed Cross Sections	Will cycle track be of a different color or material than the pedestrian side walk?
Draft Proposed Cross Sections	I really like the protection offered bikes and pedestrians by the landscape buffer. People driving along 43 don't seem to believe that either belong - it feels terribly unsafe, yet there are no alternate routes for much of the way.
Draft Proposed Cross Sections	We live on a street that abuts highway 43 with no turn lane and it is a very dangerous intersection. Caufield Street and Buck Street come together into HWY 43 and with no turn lane, we back traffic up for blocks or cars try to go around us when turning and drive into the bike lane. Also, having two roads come out turns into who goes first and sometimes a crash has almost happened when someone is trying to turn left (heading north) onto Caufield while someone on Buck Street is trying to enter the intersection and doesn't wait for the person trying to turn. We need help at that intersection. Also, many times during the day it is almost impossible to get out onto Hwy 43. Please as a minimum put up a sign that says please don't block intersection! Thank you
Draft Signalized Intersection Design	Seems like an inordinate amount of time, design and money is being directed towards cyclists. While I see a few riding around our town, is there really that many bicyclists around here to warrant all the extra cost and time? Or are we operating on the theory that we will try to force people into using bicycles and mass transit rather than improving driving conditions? Seems like somebody from Europe is in charge of this thing....
Draft Signalized Intersection Design	The Dutch videos were great. Emulating their designs is certainly recommended. Love the roundabouts of course - but may not be possible with space we have available.
Draft Signalized Intersection Design	I love the idea of the Dutch design. How many places on 43 could we use it?
Draft Signalized Intersection Design	I'm very impressed with the Dutch design. The videos were interesting to watch and to see how we might all use bikes more often if we felt safer doing so.
Draft Signalized Intersection Design	Having lived 6 years in Europe, only returning two years ago, I am familiar with this design. It is an excellent choice. The key is ensuring cyclists obey the rules of the road and stay behind the curbed roadway and do not travel on the main roadway. This is a problem now as Portland cyclists use the vehicle roadway and not the sidewalk to ride on. Cyclists will also have to obey the light mechanisms and not travel across intersections as they please. Total disregard for rules of the road by cyclists is often seen at the Rosemont and Stafford rotary for example and creates hugely dangerous situations. In Europe both the cars and the bikes obey the rules of the lights and priority of the road, so there are very little issues compared to what I currently see on the road now in Portland.
Draft Signalized Intersection Design	Bus turnout lane should be wide enough for bus. Some such areas in Portland leave the bus sticking out in traffic.
Draft Signalized Intersection Design	There is simply not enough "Bike" or pedestrian traffic on hwy 43 to make such an investment of resources. This is not the Netherlands.

Layout Page 1	The best concept would allow for separate paths: dedicated bus corridor, pedestrian bicycle and commuter/commercial vehicles. A dedicated bus corridor could be shared by emergency vehicles, so that fire, police and ambulance services could operate independently of commuter vehicle lanes. Remotely controlled articulating signals could be used to allow the emergency vehicles to travel from one end of the corridor to the other or at points in between unimpeded by traffic congestion. Commuter vehicles would operate in their own travel lanes and have improved shoulders for emergency parking. Federal block grants can be used to purchase added ROW and when the design incorporates emergency vehicle and security access features it becomes eligible for additional funds.
Layout Page 2	This is better than the current unsafe situation at Arbor and 43 that sends many residents down very poorly developed (narrow, no sidewalks, past a park and children) Upper Midhill. As the new planned 38 homes are built and occupied in the area, the situation will become much worse. A signal at this intersection would be very welcome.
Layout Page 2	This is a difficult intersection for vehicles turning left onto Hwy 43 from Arbor on either side. Having the center turn lane should be helpful.
Layout Page 3	Nice to have the bike lanes and sidewalks. The center lane will ease left turns from side streets onto Hwy 43.
Layout Page 4	THERE IS A DESIRE FOR A RIGHT TURN LANE FROM MARYLHURST ON TO 43 SOUTH.
Layout Page 4	The traffic light at this intersection does not work properly. It does not register traffic waiting to turn left from Lazy River onto SE-bound 43. The traffic light will ONLY respond if there is traffic waiting on Marylhurst. (source: I drive this every day. Have never once seen the light change for getting off Lazy River without Marylhurst traffic. I once waited 7 minutes before turning right, pulling into Burgerville, and using their left turn exit.... I hated having to do this, but it certainly gets worse - I have seen many drivers run the light after not changing... and I have seen one turn right onto 43 then immediately bust a U-turn, almost causing an accident. and this is next to a daycare. This really needs to be a priority.)
Layout Page 4	It takes all the on street parking away. In this business area, with employees having to find parking from many different businesses, we need the on street parking as an option. With the limited bike usage on this road, can there not be just a bike path on one side of the road instead of both? Right now, employees of businesses (most medical building) on Lasy River Dr are parking on the street on hwy 43 as it is and taking away our needed spots.
Layout Page 4	Currently the intersection of HWY 43 and Marylhurst drive only allows one to two cars to move from Marylhurst drive onto HWY 43 during a green light. Often times the wait between green lights is 3- 4 minutes. If a slow moving vehicle (truck or on-coming/opposing turning cars) enters the intersection first, only one vehicle at a time can get through before the light turns red. Please increase the time for cars coming off Marylhurst drive onto HWY 43. Thank you!
Layout Page 4	Marylhurst Dr has a lot of people squeezing on the right side of the lane to make a right turn on to Hwy 43 when people are waiting for the light to turn left. If there is a way to widen the opening, most likely on the north side of Marylhurst, a right turn lane should be added.
Layout Page 5	I'm finding it harder and harder to make a right turn from Hwy 43 - North onto Walling way with the angle of Walling Way at the corner. Is there anyway to make a dedicated right turn lane for safety?
Layout Page 5	There are too many side street access points that allow traffic to cross the highway. Traffic should be limited to turns that flow with the direction of travel and a traffic circle used at control points to allow for changes in direction of travel.
Layout Page 7	I am sure you realize that this intersection at Hidden Springs the one at Cedar Oak Dr. is a major issue during rush hour in the morning. Driving to and from work is a nightmare during rush hour. I don't know what the solution is, but I feel that the addition of the condos that are being built next to the Burgerville are going to exacerbate this issue even further. I am dreading the day they open, in fact. There is no good alternate route to get into downtown from where I live, so I am forced to join the gridlock in the morning. It's not pleasant. We need a better intersection.

	I think I like this design but it could use some clarification. The Conceptual Design Plan (CDP) that I downloaded shows a different configuration. On page 24 of the CDP it shows a new entrance to the Wal Mart parking lot that is aligned with Cedar Oak Dr. This online plan shows Old River Rd being extended and aligned with Hidden Springs. It is not clear to me which would be a better solution although eliminating a traffic light at Cedaroak Dr would help traffic congestion. The one issue that needs to be addressed regardless of which configuration is selected is the entrance to the 7-11 store from Cedaroak Dr. It is only about 30 feet from Hwy 43 and is a hazard in two ways: (1) cars coming out of 7-11 that want to go south on 43 will frequently block the right turn lane which stops traffic, causes tempers to flare, and generally brings everything to a halt, (2) cars going north on Hwy 43 who want to go into the 7-11 parking lot will turn right on Cedaroak Dr and then immediately shoot directly across Cedaroak Dr into the 7-11 parking lot, scaring the bejeebers out of anyone coming up Cedaroak Dr toward Hwy 43. The problem is more severe when traffic on Cedaroak is heavy (e.g. when school is out in the afternoon). Cars will turn right onto Cedaroak from Hwy 43 and then immediately come to a dead stop waiting for traffic to clear so they can make a left turn into 7-11. This surprises everyone behind them and quickly spills out onto Hwy 43 and again brings everything to a halt. If the entrance to 7-11 cannot be closed off completely (there is another entrance to 7-11 off of Hwy 43) then whatever configuration is selected needs to mitigate this problem.
Layout Page 7	
	I like that the light at Cedar Oak Dr is removed and the little island at the entrance to the strip mall. Lately traffic is backed up at the 2 lights and many drivers pull into the exit lane for the strip mall and drive through to the next intersection. This activity
Layout Page 7	raise the chance for accidents as drivers exit the strip mall thinking the others will turn into the strip mall.
Layout Page 7	Does this mean you are removing the light at Cedar Oak and extending River Road through the church parking lot?
	This is very close to the design that was proposed when the Robinwood Shopping Center was originally built. It was modified to the current silly arrangement because one of the more vocal sitting City Councilors was a member of the church that owns the affected property on the east side of HWY 43. It is time for the situation to finally be addressed rationally to the benefit of
Layout Page 7	the entire community and particularly the residents of the Robinwood neighborhood and students/parents at Cedaroak School.
	There still needs to be a traffic signal at Cedar Oak Drive and HWY 43 even though it looks like plans are being drawn up to develop Old River Drive and connect it to Cedar Oak Drive. Traffic will continue to flow in and out of Cedar Oak Drive onto
Layout Page 7	HWY 43. Will there be a stop sign, light or round-about at Cedar Oak Drive and Old River Drive?
Layout Page 7	Intersections should be removed and traffic circles added
	Presently, the pedestrian conditions near the TriMet park and ride at Cedaroak are abyssmal, particularly for alighting passengers from southbound Rte 35 returning to the lot. The intersections at Hidden Springs and Cedaroak are poorly lit and pretty hostile to peds given the high turning volumes. Also there is currently no sidewalk (and a steep bluff) on the eastbound side of Hwy 43 at this location. I'd like to see this as a priority improvement location. By the way, howabout some secure bike storage somewhere along TriMet Route 35 line in West Linn? Park and Ride? Library?
Layout Page 7	Bolton Primary?
	I'm undecided. This is interesting. I like how it gets rid of one traffic light in this very congested and accident prone area, but I am not sure how it will affect traffic flow. For instance, I have seen traffic from Cedaroak School (after school) backed up on Cedaroak past Robinwood Station. That traffic would have to make the left onto Old River and then be backed up. I could even imagine it causing more folks who want to head north turning down my little street (Ridgewood Way) to avoid the bottleneck. It could be somewhat problematic for cyclists who use Old River, but perhaps they would adjust their route. Also, I think the Cedaroak/Old River Dr. intersection will become tricky. Would the church really be willing to give up parking and their
Layout Page 7	playground and have extra traffic passing the church/school?
	The current 3 way intersection between 43 and Cedar Oak is a mess... heavy periodic traffic from Cedar Oak School, plus northbound Hwy 43 drivers making a right on Cedar Oak and immediate left into the 7/11 parking lot, with gas station traffic adding to the mix. On southbound 43 I have seen numerous individuals either miss or ignore a red light condition, putting pedestrians and those turning left from Cedar Oak onto northbound 43 at risk. Some of this would be eliminated with the
Layout Page 7	proposed shift to a 4 way intersection at Hidden Springs and 43 (and Old River).
Layout Page 7	I think the plan to align Old River Drive with Hidden Springs and eliminate the Cedar Oak signal is great and will do a lot to help traffic problems both north and southbound on 43.
Layout Page 7	Appears that the plan makes Cedar Oak a right only intersection (Vs. stoplight). The lack of sync between the light there now and the one at Hidden Springs is cause for much of the northbound AM congestion.
Layout Page 7	I think that directing traffic directly onto Old River Road from the Hidden Springs/43 intersection will degrade the residential neighborhood in that area.
Layout Page 7	The cedar oak change seems funky. It might be better to vacate the street after the church access and use the new Old River road access into the neighborhood.

	Add a northbound Trimet stop at the new stoplight. This is much closer to the park-and-ride, also the shopping center
Layout Page 7	Alternately, move the existing NB stop across Cedaroak.
Layout Page 7a	A light here?
Layout Page 7a	Is the traffic in this area enough to warrant extending Old River Dr to hook up with Hwy 43 and adding 2 traffic signals?
Layout Page 7a	Intersections should be remove, traffic circles added and additional ROW acquired to accommodate dedicated paths for alternative transportation features.
Layout Page 7a	I see this is to be redesigned later. At first, I thought the blue square meant a signal which seems like a mistake, but I am not sure how it should be changed. No real ideas here.
Layout Page 8	No additional comment.
Layout Page 8	There needs to be a good connection from Old River Rd to the bike path on Hwy 43. Most bike and pedestrian traffic on 43 takes the turn onto Old River Road here to go to George Rogers Park. A smooth transition here is very important. In particular, I would like to see a two way bike path from Old River Road to Mary Young park's bike path. This is one area where bikes often are on the wrong side of the street for 100 feet or so until they get to the separate bike path. Also, many running events use this area and extra width would be nice.
Layout Page 8	I like the separation of bike and peds from auto traffic. Also like the landscape buffer.
Layout Page 9	there needs to be a crosswalk here
Layout Page 9	It shows potential right of way impact. With the path already there, is there not enough space for the sidewalks and bike lanes on both sides?
Layout Page 9	This map does not show the separate path along the front of Mary Young Park. Although a bike path on the hwy 43 side is great here, it should be recognized that a very large multiuse path already exists here.
Layout Page 10	I'm not sure I'm at the correct layout page, but would like to address the entrance to Mary S Young Park. On numerous occasions I've seen pedestrians often with children or dogs trying to cross 43 to get to the Park. The closest signal at Hidden Springs is too far away for many. Traffic also backs up at the Park. I realize that more signals along 43 will impede traffic flow, but this is truly an unsafe situation. Even a pedestrian signal, similar to the one at Bolton would help.
Layout Page 10	another section across from the park that is a candidate for a crosswalk
Layout Page 10	At the same time, I wonder if we need the central lane in the areas where there are no potential left turns?
Layout Page 10	We desperately need a crosswalk from Mohawk Way to Mary S. Young park. I live on White Cloud Cir. and my neighbors and I have to cross hwy 43 all the time to get to the park or to the walking/biking path on the other side of the road.
Layout Page 11	Hardest part about turning on/off Mark Lane is obstructed views from the south corner. Beacause of the wide mouth of the street, drivers often wait in the top middle to turn left making right hand turns a challenge.
Layout Page 11	Right now the entrance to Mark Lane at HWY 43 is very wide. This draft looks like the entrance is going to be narrowed substantially. What will happen to the rest of Mark Lane that will no longer be used? I live in that house and want to know if I'll be able to get in and out of my driveway. Also the current street and bike path on the east side of HWY 43 at Mark Ln. and heading north is 3-4 feet higher than my adjoining property. How will that elevation change be managed?
Layout Page 11	1. Buffer landscape could create obstruction of view while leaving Mark Lane or Linwood Dr. 2. Drivers headed north from Linwod Dr. Would need to share the center meridian with drivers headed south and turning left onto Mark Ln. Causing possibilities for head on collisions. 3. Traffic approaching from the north travels to fast to allow safe egress when leaving Mark Ln. To head south on Hwy 43.
Layout Page 11	Linwood Heights needs a crosswalk that allows people to cross to the park with their dogs or to catch the bus. I think 2 crosswalks, one on each end of the park or somewhere within sections 9,10, and 11 is extremely important to keep people safe. I don't live there myself, but have felt the need for a safe crossing here for years.
Layout Page 11	No additional comment.
Layout Page 11	Also consider the need to trim the oaks with heavy branches looming over 43. It is not if, but when these will rot, fall and cause injury to motorist and pedestrians.
Layout Page 12	Good proposal. Retaining the third lane is good and especially the light proposal at Pimlico. Living near there for 12 years I have witnessed and dozen accidents countless near misses. Will there be a public forum scheduled for further discussion on the proposal?
Layout Page 12	A stop light at the intersection of Pimlico Drive and Highway 43 would provide a much safer exit from Pimlico Drive. I strongly urge you to provide this stoplight. Thank you for your help.
Layout Page 12	I hate to add another signal, but I can see how one is needed here. With all the technology, it would be nice to have smart signals keep idling to a minimum.

Layout Page 12	I don't like that a signal at Pimlico and 43 will not be until the 'next' phase. Why does there need to be a constant amount of traffic in order to justify the signal? Isn't that what the vehicle detection system is for? Heading down the hill on Pimlico and making a left (North bound turn) is very scary. I often use the painted median, on 43, to take refuge in. Oncoming traffic can be confused by my actions, but I proceed slowly enough to cross the south bound lane to indicate I'm not going to hit anyone. If there's not going to be a signal - the city needs to support a better solution that is clear for all drivers.
Layout Page 12	I would like to see a signal and cross walk here. I have almost been hit repeatedly by cars using the left-hand turn lane as a passing lane to get around the city bus making a stop. Cars are blind as they pull out to pass the bus. I have seen pedestrians be stranded in the middle passing lane as they attempt to cross the street here. This is a common place to cross to get to MSY park.
Layout Page 12	A light is needed at Pimlico.
Layout Page 13	Light on Pimlico is way over due, as a frequent commuter coming down Pimlico in the morning, it often takes a long time and a prayer to safely make this Left turn onto 43. It is worse since someone came up with the "bright" idea of dividing the downhill lane into 2. This on,t benefits those turning right. For Those of us turning left, we now consistently have our view blocked. So to whomever came up with this idea, thanks. It's made a bad situation worse
Layout Page 13	I understand the pros/cons of adding this traffic light, and I am against it. There is already a traffic light about a half mile down 43 at Elloit/A St. Who is this light for? Those living in Hidden Springs heading toward LO? They can use Hidden Springs just like everyone else. All this will do is encourage drivers to use Dillow/Jolie Point to dodge the traffic light, and these neighborhoods, with minimal/no sidewalk, need to be protected from excess traffic volume.
Layout Page 13	Dillow Dr, exiting onto 43, needs to either have two distinct lanes (left turn, right turn) or NO left turn allowed. There is very little visibility in this high traffic area, and cars waiting to turn left often back up Dillow Dr traffic trying to turn right. These drivers can turn left by going down Dillow/Failing and using the intersection at Elliot/A St - after all, they will be passing through this intersection anyway. I believe there should not be an option to turn left, but if there is, some consideration needs to be taken for cars trying to turn right.
Layout Page 13	I am absolutely delighted to see that a stoplight is in the plan for Pimlico Drive. It is a dangerous intersection and at times, takes several minutes to get onto Highway 43. I am an owner at Springcrest, and also a board member of the association, and this is something that we have all wanted for a long time. We have several elderly people living here and it would greatly improve their safety. Thank you
Layout Page 13	I live at the first house south of the intersection of pimlico and 43 going northbound. I can barely safely get out of my driveway as is during peak hours. I would also have the traffic light coming into my bedroom window.
Layout Page 13	A traffic light at Pimlico and Hwy 43 is high priority. This intersection is just plain scary when cars coming down Pimlico attempt left turns in heavy traffic.
Layout Page 13	Yes, there needs to be a traffic signal at the corner of Pimlico and HWY 43. During peak hours in the morning and evening it is very difficult and dangerous for traffic to get onto 43 from that intersection.
Layout Page 13	I like the proposed improved entry/exit direction on Dillow, a difficult intersection to make turns into and out of.
Layout Page 13	Signal at Pimlico is essential. My driveway is the first one south of Pimlico - open to suggestions for front of property.
Layout Page 13	I live on the hill above the Pimlico/Hwy 43 intersection. I am in favor of a light to manage traffic flow at that intersection.
Layout Page 13	I am a homeowner in the Rosemont Summit part of West Linn. The corner of Pimlico and 43 is very dangerous, particularly to new drivers. At rush hour, it can be very tricky to make a left onto 43. It is particularly hazardous in the rain. I have seen many close calls there. I would hate for there to be a tragedy there due to lack of a stop light. I am in favor of this plan, because it includes a stop light for this intersection.
Layout Page 13	We definitely need a signal at Pimlico and 43. Very dangerous to make a left either way.
Layout Page 14	Overall, the same themes are projected throughout the exhibits. My previous comments apply to the entire concept plan. In addition, I don't see any mention of utilities such as street lights, water fountains etc... and no buffer zones so that residential properties are protected from the noises generated by vehicle traffic.
Layout Page 14	No further comment.
Layout Page 15	Giving cyclists and pedestrians safer space than what is currently available on the northeast side along this corridor will be great.
Layout Page 16	Love, love, love the center turn lane throughout this stretch of Hwy 43, especially at Buck and Caufield. Very much needed! Much safer! Thank you!
Layout Page 16	Improving the entry angle to Buck St. will be useful as will be the center lane. Again, safer space for cyclists and pedestrians is great.

Layout Page 16	Great to separate the two roads, right now it is dangerous! Also, love having a middle turn lane. Now if you can put up signs to not block intersections and get rid of half the cars, we'd be set! (ok, that last part might not happen...). Thanks!
Layout Page 17	Any plans to fix Failing Street? I get that it's a joke, failing, but it is awful, I see cars exiting out of there onto 43 regularly. Also cars going SE bound on 43 make left turns into there. Both of these are dangerous activities. It should be a 2-way, or at least the entrance should be widened/re-shaped to allow cars a smoother entry.
Layout Page 17	Right-of-way impacts might be difficult, but I appreciate the safety for pedestrians and cyclists.
Layout Page 18	I am not certain if the intent is to remove the street that is in front of the elementary school, but it would make sense to move that traffic further south to Lewis street to avoid the pedestrian traffic.
Layout Page 18	Where's the traffic signal at Bolton Elementry? Will it be at the next corner?
Layout Page 18	No further comment
Layout Page 19	Instead of a traffic signal in front of Bolton Elementary, put it at the intersection of HWY 43 and Lewis St.
Layout Page 19	No further feedback.
Layout Page 19	Is the proposed Homes St to Lewis St Connection going to eliminate the parking lot in front of Hammerle Park? Drop off for Bolton Primary is difficult right now with the Christmas Tree stand using half of the lot and I would hope that the plan isn't to eliminate that parking long term.
Layout Page 20	No further feedback.
Layout Page 20	I think some effort should be made to make the Burns St intersection with 43 more level. When you turn onto 43 from Burns, your car is at an angle that makes it hard to see through traffic on 43. The roadbed on 43 is about 6 feet higher than Burns.
Layout Page 21	Existing southwest corner of this intersection is a very steep and sharp right turn from McKillican St. to Hwy 43. Will this be mitigated by smoothing the corner and possibly raising the grade of Hwy 43 somewhat?
Layout Page 21	Holly street needs help at rush hours! And please consider going one intersection past 205 further east - where 43 turns, it is impossible at rush hour.
Layout Page 21	very happy to have a left turn lane onto Holly St from Hwy 43. One concern is traffic coming north to get in the left turn lane to turn up McKillican, will enter that lane in front of or prior to Holly at the same time someone enters to turn left on Holly. That happens now with that little safe area in front of Holly.
Layout Page 21	No further comment.
Layout Page 21	Where is the intersection plan from OC bridge entering into West Linn.(near old police station,gas station &street)Could there be a round about there with planting inside it with a fountain ? Otherwise the whole concept plan looks really good. So glad to see biking & walking trails with planting as in Europe. Safer street system is much needed. I hope West Linn preserves The old Fire station in Hammerle neighborhood & put a stop to growth, will ruin area forever. Portland area is becoming very congested.Over populating instead of preserving land for the future of all generations. This will keep the value in more ways then one..I really hope this happens now. Our area has been waiting for this for years !!! Please follow through ! I hope they will keep the the trees/ shaded look with charm along 43 and not let these incoming fly by builders cut them down for out of place development . Building should compliment the neighborhood, higher standards.Lake Oswego has done a good job and It would be nice to see it all the way through the WL corridor entering into Oregon City. Thank you !
Layout Page 21	Revise grading for right turn from McKillican onto 43!
Layout Page 21	The existing right turn from McKillican onto OR-43 southbound is dangerous. The steep slope, acute angle, and blind corner (for oncoming SB traffic) make this a very tricky turn, in an unexpected place. Please improve sightlines, make the bottom of the slope more gradual, and round off the sharp angle so it is safer to turn here. Thank you.
Leave Feedback Here	Highway 43 is an important arterial in the Portland Metro area and it is not a local arterial serving only West Linn. Whether we like it or not it provides a major link between Oregon City, West Linn and Lake Oswego to and from Portland. It needs to be accomodate the traffic that uses that road. It is also naive to think that bicycles will play a major role in moving those people. Using bikes in West Linn is difficult if not impossible. Once you leave highway 43 and head west you must ride up hills that are 14 to 18% in grade and unless you are a tour de France rider those hills are not negotiable. I am an avid walker and they are extremely difficult to walk up. Unless we wish to continue to see nothing but stacks of cars during the pm peak hour we need to design this facility to accommodate the traffic that uses is. We cannot believe that a significant number of commuters will bike the 14 miles from Oregon City to Portland, or 12 miles from West Linn to work every day. I just visited Amsterdam and bikes are used extensively there. But keep in mind that Amsterdam is nearly flat and the use of bikes is predominately in the central city.

Leave Feedback Here	Traffic on Highway 43 has increased significantly since 2008. There is a definite need for traffic lights at Pimlico. There are long waits a Pimlico throughout the day, not only during peak rush hours. Space may not be sufficient for the Dutch intersections that are illustrated. I lived in the low countries for 6 years and I am familiar with Dutch intersections. First the topography in the Netherland is different that the topography in West Linn. In West Linn there are hills all along the side of Hwy 43. Further, the number of bike riders in West Linn is very low compared to the number of bike riders in the Netherlands.
Leave Feedback Here	Again, it is all nice looking, but it seems like the majority of improvement is for bicycle traffic and not automobile traffic. I do not see the cost benefit to automobile drivers. Looks like this was designed by someone who is more interested in promoting bicycle transportation than auto transportation. I am not interested in turning West Linn into a city from the Netherlands. Thanks for the opportunity to give feedback.
Leave Feedback Here	The primary objective should be significantly better traffic flow. Other the other objectives are ok, but will detract from better traffic flow unless better traffic flow is spelled out and is satisfied first.
Leave Feedback Here	This looks fantastic! Not only will bicyclists be safer, but drivers will feel a lot less stress as well.
Leave Feedback Here	My main concern about Hwy 43 is the spot where Pimlico Drive dead-ends into it. This is a very dangerous intersection, and since I live on Pimlico, I see near-misses daily. I know that lines were re-drawn recently creating a left-turn lane, which does no good since the line where one should stop is too far back to be able to see oncoming traffic. Consequently, I nearly always opt to drive up to Santa Anita, then downhill on Hidden Springs Drive so I can use the stop light there to be safe. This, then, creates more congestion at that intersection. If at all feasible, there needs to be a stop light at Pimlico and Hwy 43!
Leave Feedback Here	Great work! I like the proposals and the website layout. Thanks
Leave Feedback Here	There is an apartment complex across from Mary S Young Park..a lot of residents have to cross 43 inorder to get to the park....it is very dangerous especially with dogs and walkers...a need of a flashing light sign would help traffic....like that at schools.....Thanks. MSY Park Volunteer HWY #43 Revision
Leave Feedback Here	hurrah! i live up in springcrest and it is imposible iduring peak hours to access 43!
Leave Feedback Here	First off I would like to commend the city of West Linn for this presentation and outreach. As a resident, it nice to have an opportunity to review and comment on city projects. I like the overall plan and feel it will benefit the citizens of West Linn. I know this has yet to be addressed specifically, but I sincerely hope this will help the congestion that occurs during the commute hours as I use highway 43 each workday.
Leave Feedback Here	First off, THANK YOU for caring about what the local people have to say. And for caring to make the area accessible for all! Please have better crosswalks around entrance to Dog Park, off 43. More, clearly marked signs on 43 to alert people who are just passing through and do not know how much activity is in the area. If you have anything to do with stop sign area right before the bridge to Oregon City. Where the off ramp meets the on ramp meets traffic coming down hill meets traffic crossing bridge meets kids cutting in from school by the 76 gas station....PLEASE FIX THIS MESS!!!! It is a NIGHTMARE. The off ramp at 205 N to 43 should be closed. It creates massive problems. The stop sign and turn lanes are a joke and a hazard. Majority of drivers don't understand what the lines on the road mean. Please fix it. THANK YOU!!
Leave Feedback Here	I like all these ideas and plans and feel that it will make a big difference in the future of transportation in West Linn. I still am very concerned however about the "lack of connection" between the part of 43 where the proposed changes are taking place and Willamette Drive that connects to the Willamette area. I feel that West Linn is very divided by geography, hills in particular, and the only solution for joining the two parts seems to be improving Willamette Drive, as it's the flattest connection. It doesn't matter how nice that section of 43 will be if we have to drive to get to it and can't enjoy all the changes being made for pedestrians and cyclists. I will not let my children ride or walk on Willamette Drive, requiring us always to drive to 43, because there is no regular public transport to get us there. Sadly having my daughter become a driver has made a big difference in our family's life as she can help with driving. I hate having to be completely dependent upon our cars living in West Linn.

	I like the opportunity for feedback. This design has limitations towards goals and new growth: The draft intersection design does not include roundabouts, even though Draft Cross Sections page refers to Dutch multi-mode intersections that clearly show roundabouts as a main feature. Perhaps goal of keeping within existing right of way is the main reason against roundabouts. Please weigh any opposition of roundabouts against benefits. Reducing complexity for every person entering an intersection will reduce accidents, reduce traffic congestion, and impose natural speed limits toward the goal of keeping traffic at reduced HWY 43 speed limits. Shopping centers will likely entertain any encroachment of traffic from a roundabout that includes a path to their parking lot(s). In the event of an earthquake, ice storms or subsequent loss of power for weeks, roundabouts continue to work without electrical power --totally green/sustainable. Emergency vehicles navigate roundabouts well.
Leave Feedback Here	Check out the intersection of Rosemont Dr and Stafford Rd.
Leave Feedback Here	thoughts should be given to adding right turn lanes to major intersections to help with the flow of traffic.
Leave Feedback Here	This sounds great, but PLEASE consider the basics first - please pave all of the road decently to start, as it's been a very long time since this road was in reasonable shape. Thanks!
Leave Feedback Here	Need four lanes all the way, two in each direction.
Leave Feedback Here	I hate to sound pessimistic but since rampant development has been allowed in West Linn/Oregon City and it's surrounds and there are many tens of thousands of people yet to come I believe that the only answer to traffic problems on hwy. 43 is to go to four lanes all the way. And of course, even that will be inadequate some day. It's called "overpopulation."
	Keep it simple and affordable. Adequate and continuous sidewalk from 205 entrances to the LO line. Covered bus stop shelters at all bus stops. Cross walk with pedestrian activated lights to cross at library and Mary Young.
Leave Feedback Here	If possible a light and cross walk at the bottom of Pimlico as well as a sidewalk linking Hidden Springs to 43 down Pimlico.
Leave Feedback Here	It is to much bike and pedestrian oriented. 43 is a street on which cars are the predominate users. The intersection of Pimlico Drive and 43 as an example. We have been waiting/hoping for a much needed stop light for many years. We are being told to be patient and it will happen. We have seen one fatality at this intersection and still nothing is being done. The last time I spoke with a city official about this problem they said the possibility of a light was extremely remote.
Leave Feedback Here	Since there are traffic issues mentioned as well as some crashes, it would be my preference to do as much as possible to accommodate more vehicles in the street. The vast majority of citizens travel by car and will for a long time to come so maybe ease up the catering to bikes. Portland focuses on the biking minority and not only is it expensive but being so PC is like a slap in the face to larger public. I realize most city leaders today want to get away from fossil fuels and create a solar utopia based on the myth of anthropogenic global warming, etc., but the reality is that we need cars, should use them and will continue to use them well for many years to come. Again, the vast majority benefits from improving car traffic for the masses, even many in West Linn who drive yet lecture the dangers of fossil fuels at the same time. Of course there are many who ride bikes or walk or run who should be accommodated as well but please don't make the mistakes of Portland and other politically correct, foolish, Europe obsessed, emotion rather than fact based cities all over the country. Be bold!...be for the people! Thank you
Leave Feedback Here	I would like the road lights to electronically sense stopped traffic and determine if the signal needs to be longer or shorter. Sometimes there is no traffic in one direction but the signal still stays green even though no one is waiting. I know there are smart signals like this. It will improve traffic movement tremendously. Thx.
Leave Feedback Here	If you come up with a plan that does not have at least two full automobile traffic lanes in each direction, then you should be put to bed with a glass of warm milk and cookies.
Leave Feedback Here	TAB Input
Leave Feedback Here	The one intersection that needs help is Willamette Drive at Hwy 43. It needs a four way stop or light. The traffic backup every weekday is horrible.

BUT.....Even though it is a short section of highway it can be a long bottleneck. I like the crosswalks, intersections, and cross traffic accommodations. But, it looks like the plan is falling short when it comes to keeping traffic flowing through all kinds of potential hindrances.

I don't think it is a good idea for such a narrow roadway to have islands dividing the north and south lanes of traffic. You loose the option to pass by an accident, maintenance crew, or a stalled vehicle. Islands will also take up space that could be used naturally for left turns and a place of refuge for a driver needing to avoid an accident, pedestrian, or animal. No landscaped islands also means no irrigation, irrigation repair and maintenance, no plant maintenance .... four less reasons to hinder the flow of traffic.

The bike lanes should be incorporated with the sidewalks. The bicycles should not be allowed on this section of road for their safety and to maintain the flow of traffic. There would be less risk of vehicle - bicycle contact. Make the sidewalks wider by as much room as would be required normally for a bike lane. Pedestrians and bicycles can safely share the space of a wider sidewalk/bike lane. There are places where pedestrian traffic is heavier...maybe those sections could be a little wider. Left turning bikers can use the cross walks, stop traffic with the cross buttons and do so with less risk of vehicle contact.

I think the Bolton drop off pattern should be implemented at the back of the school instead of the HWY 43 side. This would give waiting vehicles some side roads to wait on instead of the 5 or 6 car left turn lane which will quickly fill up and begin hindering traffic. If it was in the back of the school vehicles could turn left and get out of the way of traffic. When they return to HWY 43 they would have a few more choices of where to get back into 43 traffic. Maybe the busses could still use the front drop off because there are less of those vehicles to deal with.

Last, I don't know how sophisticated the traffic signaling will be, but pedestrians/bikers should be allowed crossing priority (within reason), then give HWY 43 vehicle traffic the the highest priority when it comes to heavy flow times. It seems when drivers figure out that they can jump in the flow by going through side neighborhoods it can really jam up the flow. The side streets need to get in and crossers need to cross, but only allow a regulated number of side traffic interruptions per 15 minutes for the heavy flow periods. Provide bikers with a control button that they could tap on their way by to ensure a green light (with in reason) when they approach a signaled side street. A vehicle already at a side street intersection would only be delayed for a few seconds while the biker passes by.

Leave Feedback Here

I think that the intersection layout will work. Hopefully the new design will reduce speeds.
Bus pullouts are needed. Drivers try to pass the bus when it is stopped, making for dangerous conditions. People seem to always be in hurry.

Leave Feedback Here

THIS IS JUST AN OBSERVATION FROM DRIVING TO AND FROM SW PORTLAND; THE ROAD IS DRIVEN BY MANY CARS, ONLY 2 LANES TO SUPPORT THOUSANDS OF CARS; THIS IS THE ISSUE. UNTIL THE ROAD IS IMPROVED WITH NEW PAVEMENT, AND ADDING 1-2 LANES GOING IN NORTH AND SOUTH, THIS HWY WILL CONTINUE TO BE A SORE SUBJECT. WITH ALL THE TAXES THAT WEST LINN RESIDENTS PAY, AND THE FEDERAL FUNDS GIVEN, I DON'T SEE ANY IMPROVEMENTS, ONLY ALOT OF TALK AND NO ACTION. THIS IS DISSAPOINTING!

Leave Feedback Here

I see that this is all about the bikes, with little about pedestrians or cars. I'm sure it would work well, but only if the bike riders follow the rules of the road. Many bike riders pay little attention to the rules, feel any road infraction is caused by drivers, and do not watch out for pedestrians. And who pays for the changes?? I'm sure it is the drivers that pay for all of this?? The light at Cedar Park/Hwy 43 is very long for the person coming out of Cedar Park and will be more complicated with the alignment of the entry to the Shopping Center. The lights do need to be calibrated for more consistent flow on 43. Are we still going to be able to turn right on red? That helps keep traffic flowing too. I like the idea of separating the bike, ped and car traffic, but then the bikes need to stay in their lane!!

Leave Feedback Here

At the Holly St and Hwy 43 intersection (near I-205) we really really really need a "Do Not Block Intersection" sign installed. This will make that intersection much safer; it could go right on the corner in front of the Performance Properties business (next to the Bus-stop); currently drivers regularly block egress from Holly St. and also treat it as two lanes (there is actually only one). Drivers trying to turn left from Holly onto 43 can't see well and even if someone lets them turn, crashes are caused by someone else coming along acting as if there are two lanes. A "Do Not Block Intersection" sign will help drivers see better and make this situation much safer; there have been several serious crashes there.

Leave Feedback Here

When underground work on Hwy 43 and City streets is completed, typically a local patch is applied. Over time it sinks, chips, degrades and we end up with potholes and damaged roads that require a major expense later on.

It would be good to pass an ordnance requiring that the roads should be resurfaced from curb to curb following digging up and repairing underground utilities.

For example, on the major Hwy 43 water project there were areas that were properly done, but adjacent surface areas are horrible. Areas of Marylhurst Drive are pockmarked with uneven, sunken and potholed surfaces following many digging and repair projects. If the surface had been properly restored it would save money in the long term, and make driving less difficult.

Leave Feedback Here

Leave Feedback Here	Let's start by providing more options under the category thoughts other than, I like this, or I don't like this. Where's the nuance? Second, a conceptual design plan is certainly needed. What is needed more and needed now are repairs to 43 beginning at Marylhurst University past the Mary S Young Park. Planning for a redesign of 43 will have credibility if basic maintenance is attended to. It isn't. Start here. Start now. Sincerely, Robert E. McCarthy
Leave Feedback Here	One thing that I didn't notice on the designs were the potential bus pull out areas, and I think it was mentioned that feedback on this would be sought later. This will be an important aspect, especially as traffic increase in the region, and, hopefully, transit improves.
Leave Feedback Here	You've done a good job addressing many of my thoughts. Here's a few additional items. 1) the drainage grates are terrible for cyclists; is it possible to use a material and pattern that is less slippery and dangerous for the bike wheels? 2) Hwy 43 needs to be a 4 lane with a center turn lane (and bike lanes); is this possible 3) cars use the bike lanes to go around other cars or to turn right. Is it possible to put a bump/barrier as the divide? 4) could a blinking yellow light be added to a busy intersections (instead of a traffic signal light) like Hwy 43 and Mapleton (for left turn) that gets triggered when a car traveling on Mapleton approaches Hwy 43? 5) if a bike lane is added, need to make sure it is keep clean of all the road debris. The lower barrier may help this. 6) Lake Oswego needs to do a better job of paying for the maintenance of Hwy 43. This has been a disruption of the residence and a major expense to all.
Leave Feedback Here	The emphasis on bike and pedestrian safety is very important. Thanks! There is some potential to improve traffic flow with better timing of traffic lights, but there will continue to be pressures on Hwy 43 as populations grow. We do not need another McLaughin Blvd on the west side of the river and I oppose accommodating increased traffic flows. Instead we should invest in better public transportation and support for alternative commuting tactics. The implementation of Dutch intersections would be another improvement that would promote bicycle use and patronage of local businesses.
Leave Feedback Here	I think this stretch of highway needs a big time face lift ascetically. It is very industrial looking and not very inviting to look at. Since it is the main traffic corridor through West Linn, it doesn't give a very good feel to the community. I think planting some trees that bloom in the spring and some plants along the way where possible should be taken into consideration. Resurfacing this road should be the main thing though. This is the roughest road I travel in this whole area. It is terrible. RCR
Leave Feedback Here	People leaving the 7/11 usually block the R turn to highway 43 of drivers going toward Lake Oswego from Cedaroak. It is very annoying. Will you fix that? It is my pet peeve!!
Leave Feedback Here	In reviewing slides 9 and 10 - I did not see a pedistrian/crosswalk for those coming and going from MSW, why?
Leave Feedback Here	In reviewing the slides I could not tell if a solution was developed for when a Trimet bus stops and holds up traffic. There are 'pinch points' or 'bottlenecks' where traffic must stop because a Trimet bus has stopped. This causes much of the congestion during high traffic times. Cars can not drive around the bus to keep traffic flowing, which should be the case.
Leave Feedback Here	Hwy 43 badly needs this type of re-design. The areas adjacent to the highway are great places to live, except for the lack of pedestrian and bicycle access to commercial and other residential areas. Even nearby shops and streets often can only be reached safely by car. This needs to be changed. Thank you for these efforts and for inviting feed back.
Leave Feedback Here	Excellent work. I especially like the design of the sidewalks and bike lanes to make them safer.
Leave Feedback Here	This very vital roadway is currently an eyesore and dangerous in sections. An upgrade is well overdue. I hope this can be funded and implemented in a timely manner. I am open to any help/time that you need.
Leave Feedback Here	We need two lanes in each direction for cars and a center turning lane for cars. This should take precedence over other things that people would like to see added (i.e sidewalks, bike lanes, etc.)
Leave Feedback Here	I think one of the highest priorities on 43 is to up grade 43 at Arbor D. With the accidents, passing on the right closely hitting cars, runners and pedestrians. WE need the left turn lanes both north and south. I have contacted our police task force and the Highway Dept. concerning cross walks to no avail. The highway Dept wants to spend all kinds of money for flashing lights not needed and the police dept could dare less. Must we have a human die to get crosswalks!!!!!!!
Leave Feedback Here	First of all, this is a great website! The stoplights in front of the Robinwood shopping center are ridiculous. Need to be synced to alleviate rush hour back up Stoplight at Pimlico Cross walks with flashing lights at Mary S. Young and Hammerle parks Sidewalks or safer pedestrian areas along the entire road! WL is a family-friendly town with lots of potential walk-ability if safety was ensured. And of course, road top conditions. The rain this week really wreaked havoc and highlighted flood areas, pot holes, etc.

Leave Feedback Here	Overall, the concept of separated and protected bike lanes, improved walking paths, safer crosswalks, and consistent three lanes for turns and emergency access is very good. I hope the actual end result is as good as the potential.
Leave Feedback Here	I appreciate the effort to encourage biking and walking. Even a short walk to the nieghborhood grocery can seem perilous when walking along 43. I would not lik eto see the road widened. It would make the highway too unfriendly to the neighborhoods, and also discourage anything but auto traffic.
Leave Feedback Here	Overall the plan is sound, however, I am concerned with some of the detail surrounding OR-43 and Walling Circle. The plan indicated that decisions on how that will be approached will be addressed in a future design plan. When will we have an opportunity to provide feedback into those specifics?
Leave Feedback Here	Hi- thank you so much for the opportunity to share our ideas, feedback, thoughts, vision for the livability of West Linn. I am glad the issue of pedestrian and bicycle safety is part of this discussion when it comes to Highway 43! My husband and I have lived in the Robinwood neighborhood since 1989 and one of the reasons we chose to live in this part of West Linn is that we could walk to services. I am originally from Germany where bicycle riding and walking are a big part of the lifestyle. Iâ€™d love to see that happen here. There are obvious things that need to happen to help make it more pedestrian friendly, specifically having car drivers slow down and be careful at intersections. Please! Try walking yourself and you will see what it is like! A couple of specific suggestions: 1.When the light at an intersection says â€œWalk,â€ do NOT allow cars to drive. Ever been in that situation? I have. Cars see a green light, pedestrians see a walk signal. These two groups of people should not have to compete with one another. 2.Create more â€œlightâ€ cross walks- like they have in front of West Linn high school! These types of intersections remind drivers that there are more people out there than just drivers- Watch out for pedestrians. 3.Keep Highway 43 two lanes with a center lane for making left hand turns- do NOT make it five lane as some folks have suggested. That would make it like McLaughlin in Milwauikie- which is virtually un-walkable. 4.Do not pass in the bicycle lane- - police need to cite folks for doing this so people would stop. 5.Add more sidewalks- and do not let sidewalks just end like that- and make bike paths not end like that either- - itâ€™s crazy- we donâ€™t just end streets where drivers drive. If we value pedestrians and bicyclists, we cannot just end their lanes either. 6.Sponsor a couple of walk only- pedestrian only days (eg. Car free days)-â€¦make if fun- if people would get out and walk they would see how fun it can be- Thanks_ Iâ€™d be happy to serve on any committee to help- this year I have been focusing, along with my husband, on recovering from being hit by a Yukon SUV while trying to cross at a cross walk! -â€¦ We are so grateful to be alive yet we want to keep other pedestrians from being struck by drivers by making drivers aware of pedestrians out there! Friends, letâ€™s make West Linn more walkable by helping make folks aware that there are others besides themselves out there- get out and walk sometime -Cornelia Seigneur
Leave Feedback Here	With current traffic and anticipated traffic growth, any expansion should at very least include a third turn lane; A center vegetation lane might be attractive, but useless with our heavy 2-lane traffic, Best solution: 4 traffic lanes, plus bike/walk lanes.
Leave Feedback Here	What you do today must meet tomorrow's traffic needs.
Leave Feedback Here	I do not see the area that concerns me. Just as LO turns into W Linn and "merges" into one lane just past the old foundary. It is a nightmare at rush hour. People do not merge but leave the left lane and race forward on the right stopping traffic. I have seen fights there, cars ditched and pedestrions almost run over. It happens again in front of Marylhurst. People use it to race forward and block the left lane. It is not just rude, it is very dangerous.!! You just have to look at the scars on the barriers and ditch to see what happens. There should be a camera for awhile ti witness all that happens every evening. Very scary!
Leave Feedback Here	My concerns were for pedestrian and bicycle lanes and the safety of both. It appears that this design has incorporated these concerns nicely. Although I'm not sure where the "Dutch" style intersections were employed, or if the new Hwy 43 layout will be a hybrid of that style.
Leave Feedback Here	The concept of roundabouts and protected bicycle and pedestrian areas is appealing. I would also hope that great care would be taken to increase the aesthetic nature of the highway. Meridians or roundaboutsw with trees and flowers could add such an element of beauty. Lake Oswego has done so well with this, where as WL has not. Our meridian at Central Village was filled with concrete! I would hope that the main thouroughfair would reflect the aesthetic of the community. Please think BEAUTY in the design.
Leave Feedback Here	Highway 43 needs a consistent and appropriate sized bike lane the entire distance from West Linn into Portland. There are numerous places that the bike lane vanishes and those spots are extremely dangerous to both cars and cyclists. One example is just past McVey between Oak and Laurel. Especially southbound when ascending the hill, cyclists are in a no-mans-land that has two large grates. Another spot is from Tewilliger to the Sellwood bridge. There is no place to ride safely on this stretch. On the pedestrian side of the equation there needs to be crosswalks at all bus stops along the route.

	I really like the general approach of creating a dedicated lane on both sides for bikes and for pedestrians. Some questions: - Is there a physical separation for the bike lane when there isn't room for a landscape barrier? From the cross sections it appears that there is a curb and a height difference? - How are you going to have enough space for all of this? Are you going to need to extend the right of way to the sides in any places? Are you reducing traffic lanes or widths from what we currently have? - I like the bike-friendly intersection idea. Where would you be proposing that?
Leave Feedback Here	Thanks for your hard work on this. Feel free to contact me - I'm happy to give additional feedback if you need it.
	I like that integrating stormwater solutions is important in this plan. I love separate lanes for all modes of travel. Please add a traffic light at Pimlico.
Leave Feedback Here	Thanks for allowing feedback!
	Hey all, First of all, this workshop is really outstanding and the designs look great so far. I use HWY 43 to drive to work every week and use parts of HWY 43 to bike to work at least once a week as well, and I'm looking forward to these improvements. I just want to say that widening HWY 43 should be avoided at all costs (with the exception of turn lanes!). There are many studies that show how widening a road never improves congestion and actually causes induced demand. A lot of citizens aren't familiar with the phenomenon of induced demand and, understandably their instinct is to ask for a road to be widened, expecting that widening to relieve the congestion when in practice it doesn't work out like this. But again, I urge you to trust the studies and not widen the road, but instead push for changes that really do relieve congestion such as better public transit, complete sidewalks, etc. Thanks for you time, Scott Hillson
Leave Feedback Here	I would like to see sidewalks the whole length of hwy 43, left turn lanes, and traffic lights that are "smart", allowing traffic to move. The whole highway need repaving. should have been done 15 years ago. NO MORE POTHOLES!
Leave Feedback Here	PLEASE just do some pot hole fixing now!
Leave Feedback Here	It's clear in reading through this website that the bikes and buses are going to get priority which is wrong. Cars do all the heavy lifting and pay the bills. Let's try and not do the politically correct thing and invest in roads for cars as a priority as that is how most people commute and how business and commerce is supported to generate profit, to pay tax, to fund everything. Portland can be as weird as they want, but the reason West Linn is so great is that still has a sense of reason and normalcy in its citizens.
Leave Feedback Here	Provide turn outs to get buses out of the flow of traffic during stops.
Leave Feedback Here	I love the goal of walking/biking being a design factor along the entire corridor. We live on Kenthorpe Way. Biggest improvement I see (impacting us) will be a safe walking/biking route from our house to Mary S Young. Currently one needs to walk on the shoulder of 43 to get there and at night/rain, it is not safe. The drawings show painted cross walks on most intersections, but not one across Mapleton where it meets 43 - will it be well marked (needs to be)? Also the new intersection plan (Layout 7) looks pretty good, will be nice to have only one light, although the Kenthorpe/Old River will be busier - will need good signage to keep speeds down as traffic comes down the hill, across the light and onto Old River, past Kenthorpe. Cars tend to go fast in the neighborhood (like around Cedar Oak Elem.), especially downhill and there is a significant bend in the road - maybe one of those flashing speed signs or another car-slowing measure? Anyhow - I am sure it is hard making this all work with the various factors & input -- good work. Thanks.
Leave Feedback Here	More than anything right now, you need to repave the parts of the road that weren't included in the Lake Oswego water project repaving. It is a nuisance and also a very embarrassing blot for the city.
	I have lived in West Linn for 23 years and travel down Pimlico hill, primarily turning left on Hwy 43 towards Lake Oswego. There is no question that a traffic light needs to be installed at this location to prevent more crashes and possible deaths. I feel like I'm taking my life in my hands every time I turn there due to the massive amount of traffic coming from both directions.
Leave Feedback Here	Please work with the state to do something about this finally.

Leave Feedback Here	I like the medians and I love the idea of more crosswalks. Lighted/illluminated street signs should be incorporated on all main intersections, please! Large walkways for encouraging more walking into and from neighborhoods as well as bike lanes! The high school and elementary school intersections are not safe enough when morning and afternoon traffic commences. Bus lanes would be a good thing to incorporate for the areas where buses stop to drop off or add riders. This is important because so many commuters will try to race past the buses and nearly wipe out pedestrians or riders! A wish list of our family is that we can have holiday decorations included or considered when creating the medians and at main intersections as well as offer space for local artists to display their art along the roadway to keep our community supporting our local talent. Please consider asking scouting groups for assistance, they would like the opportunity to help with the project in any area that is suitable for them. I love how West Linn is moving forward to make our roads safer and more accessible to different types of commuters! Thank you for the hard work!
Leave Feedback Here	I believe a comprehensive plan needs to exist for West Linn. ODOT owes West Linn another lane in both directions on Interstate 205 between Stafford Road and the Abernethy Bridge. The lack of these lanes cause much traffic congestion in West Linn and Old Willamette, which also puts stress on Highway 43. The plan looks like it will improve Highway 43 through the main part of West Linn's commercial areas from the Lake Oswego boundary to the Hood Street commercial area. Two major questions are what about the intersection of Highway 43 and Willamette Falls Drive and the stretch of Interstate 205 between the Abernethy Bridge and Stafford Road Exit? These are a major causes of local traffic flow issues through Old Willamette via Willamette Falls Drive and at the intersection at Highway 43. There is a major traffic nightmare during rush hour on Willamette Falls Drive. There is no traffic light located for Northbound Willamette Falls Dr. traffic at the left hand turn stop sign at Highway 43. The traffic from the Old Highway 43 Bridge from Oregon City, traffic coming off the Northbound exit from I-205 and traffic from Northbound Willamette Falls Dr. converge with only a stop sign. This is exacerbated by the lack of North and South third lanes on I-205 through West Linn to the Oregon City side of the interstate that pushes much rush hour traffic through Old Willamette toward Highway 43 along Willamette Falls Drive. Northbound Willamette Falls Drive traffic that is stopped at the stop sign at Highway 43 can only turn left if there is no traffic from the Northbound bridge lane or from traffic proceeding through the light at the Northbound I-205 exit intersection with Highway 43. This causes huge backups of traffic onto Willamette Falls Drive. For residents in the neighborhoods adjacent to Sunset Avenue there are few good options for getting onto I-205 Northbound or onto Northbound Highway 43 because of the long line of traffic created by the stop sign at the intersection of Highway 43 and Willamette Falls Drive. I would want the new plan/design to also contain some type of way to address this traffic control scenario to improve traffic flow for all local residents and anyone travelling on Willamette Falls Drive. One thing that would help reduce the traffic at Willamette Falls Drive/Highway43 intersection would be a third lane in both directions on I-205 from the Abernethy Bridge over the Willamette River to the Stafford Exit, which is through West Linn. Because there are essentially three lanes of traffic feeding from both directions onto this two lane interstate section, many motorists get off I-205 while travelling Northbound at the I-205 Stafford Road exit and then take either SW Borland or SW Ek Roads to Willamette Falls Drive and then they end up at the troubled section of Willamette Falls Drive and at the intersection of Highway 43 and Willamette Falls Drive when trying to turn left to get back on I-205. The lack of three lanes in both directions on I-205 from Abernethy Bridge to Stafford also causes a traffic build up in downtown Old Willamette for those seeking to bypass this extremely congested section of I-205. For residents in adjoining neighborhoods in Old Willamette, close to 10th Street and I-205 area and the Sunset Neighborhood in West Linn, the lack of three lanes in both directions on I-205 causes much needless interstate bypass traffic that adds tremendous congestion to West Linnâ€™s neighborhoods and reflects poorly upon West Linn.

Comments Compiled from City Staff Emails

Comment
Didn't see any roundabouts - used so effectively at Rosemont and Stafford. How about at Mary S Young access?
I favor the bike and pedestrian improvements proposed. And, a left turn lane would certainly improve traffic flow. I'm concerned about the additional traffic that's being added, or potentially added, to Hwy 43 in West Linn. During the morning and evening rush hours it is nearly impossible make a left turn onto 43 from Arbor (uphill side of 43). If I'm not at the intersection by 6:40am, it can take up to 5 minutes to turn left (northbound) - and I can't imagine what it will be like after the apartments by Burgerville are completed or if the housing development off Upper Midhill is approved. I've heard that a traffic signal can't be added to that intersection. There is already a tremendous amount of traffic that comes down Skyline from further up the hill, and there is generally an absolutely steady stream of vehicles driving toward Portland on Hwy 43 in the morning from south of Arbor. The southbound traffic in the afternoon is really stacked up on Hwy 43 between Bolton Primary and I-205. I don't know if this is due to: too much traffic in general or people trying to turn left off 43. Maybe there has been a traffic study to look at this issue? I appreciate the opportunity you are providing for public comment!
I really like the general approach of creating a dedicated lane on both sides for bikes and for pedestrians. Some questions - Is there a physical separation for the bike lane when there isn't room for a landscape barrier? From the cross sections it appears that there is a curb and a height difference? - How are you going to have enough space for all of this? Are you going to need to extend the right of way to the sides in any places? Are you reducing traffic lanes or widths from what we currently have? - I like the bike-friendly intersection idea. Where would you be proposing that?
ADD ANOTHER LANE IN EACH DIRECTION PERIOD. WEST LINN RESIDENT
It would be nice to have transit stops by/near parking areas for transit riders.
Would like tree trimming & repairs to be done on off days like Sat! traffic congestion is frustrating!
Just make it be smooth…
Get Trimet to add an express line at commute times. A quicker commute to downtown will encourage more riders.
Protected bike lanes and more street trees
Hwy 43 unless its changed is a state hwy. About 35 years ago I talked to the Oregon Hwy Dept and was shut down with no money and prohibited widening cost. I think the last comment I got was "It ain't gonna happen". I like bike lanes but crowding the limited space with all the traffic we now have it would be nice to have that extra space. I think the frustration level of the average driver will get worse as the years go by so in my opinion emphasis should be placed on increasing smooth flow of traffic both ways which involves proper phasing of control lights and so on. Good luck.
Hell0 I found your emails on the city's website regarding Highway 43 improvements for pedestrians and bicycle riders. Thank you for the chance to give our input. I'd love to be more involved. My husband and I have lived here 25 years and are frequent pedestrians and bicycle riders- We have five kids - we love to walk places.... Last January, my husband and I were hit by a car while crossing at a crosswalk and were almost killed. We were rushed to OHSU- I was unconcsious and lost my right ear in the end. I want to continue to walk in this city- I saw a link in the Robinwood Neighborhood blog regarding what we want- several people noted making the road 5 lane- I think they are missing the point of the project- Making that five lanes will ruin that area! It will become another McLoughlin (Milwaukie) Oregon- very pedestrian un-friendly- and bike anywhere? forget it.... A couple of ideas: _ cross walks that are more clearly marked- eg. by McDonalds and Starbucks, Walling Way, you made that much more easy to see- - Walk signals - for only walkers- that is, when it says walk, cars still have red light- so you are not fighting with cars for access ... - Clearer bike lanes- and making it clear you cannot pass in the bike lane (do police need to ticket drivers?) -- Don't end sidewalks or bike lanes- like that--- - Add blinking lights like they have by safeway for pedestrians- - -- I would like to be on the advisory board- is there such a thing- I care a lot-let me know how I can help Thanks

Hi Kirsten,I think you do great job. It's unfortunate that the radical minority gets in power in West Linn every other cycle. If they had their way nothing would ever change. It's the mill town mentality that just won't go away. Good luck in your pursuit of getting justice.
I have lived very near HWY 43 for 30 years in Bolton neighborhood. My suggestions: Make it a little wider for vehicle traffic, bike lanes and for bus stops. Maybe build some traffic turn lanes on some of the local streets. Please do not build for light rail or trolley. This will cause a real traffic mess and hurt local businesses. HWY 43 is still best way to get downtown. Improvement efforts should be directed at HWY 205, 10th ST and most important the Arch Bridge area. The mayor and one other councilor want to stop the Arch Bridge project and also gum up the Bolton Reservoir build-out. Good luck.Let me know if you need any support from me.Thanks,

Repave from Hidden Springs to Lake Oswego!

The city should take note of the areas with poor drainage during our heavy rains this month and consider larger ground drainage infrastructure in those areas. The list of improvements should include attempting to put in better lighting, add curbing and bike lane, and traffic calming islands in pedestrian crossing areas.

Since many people take Trimet to downtown areas, the bus stops should be safer and possibly sheltered. Also, many school bus stops are on 43 and should be clearly marked for drivers to keep the children safe. Added bike lanes whenever possible. Traffic lights could be programed to stay green longer during rush hours. I would not mind waiting for a longer light on the side streets if it kept traffic moving more efficiently thru West Linn including the Willamette area. When I worked on Barber Blvd, there was a committee of local business's invited to the Planning meetings that included, a panel of local planners, engineers, Trimet, and more to listen to ideas and cost effectiveness so a good plan could be proposed, Residents were also encouraged to participate. Might be a good idea to contact the Planning agency that was part of this study for feedback. Thank you

May I inquire if there are any plans to provide safe bicycle transportation on Willamette Falls Drive? I think more bicycle friendly options on HWY 43 is great but for those of us in the Willamette area, there is no safe route to get to HWY 43.

If it is not practical to widen the road, try to add left hand turn lanes to reduce traffic blockage

I read with great interest and even greater concern on some of the proposed items tied into the overall "fixing" of Hwy 43. I live in West Linn and have for some 30 plus years. I have watched and read about many of the issues we have had with past councils and city government. When I read the current issue of the Tidings and some some of the proposals being bantered around for 43 I could not believe what I was reading and what some of the
proposals were. My understanding of an efficient hwy is to be able to move as much car traffic as efficiently as possible. Is that not why we build roads and highways? Why on earth would anybody even think of wasting the time and money to do a Dutch intersection for bikes???? Has anyone even done a count as to how many bikes use the existing bike paths? I drive 43 pretty much everyday and have watched it become more and more congested.
We need this highway to move car traffic!!!!! PERIOD----everything else is not necessary and totally cost prohibitive. Look at Sam Adams mess in Portland. If people want alternative travel then take the bus.
I would like to know who suggested this Dutch thing. Can you provide me with that persons name so I can talk to them directly. All West Linn has to do is look at the traffic flow and the number of lanes in Lake Oswego.
That seems to keep the traffic moving a lot better than what West Linn has. We need efficiencies and intelligent spending by our government officials not fly by night off the wall systems that have little chance of
improving our citizens livability.
Please feel free to pass this on to the city council and mayor.

Hi Lance
Thanks for showing up at the Robinwood meeting Tuesday. Nice to meet.

You wanted comments on the 43 plan. The new connection with Hidden Springs is very troublesome. I will not be able to get out of Kenthorpe and turn left when the buses are backed up in the morning. On the 2008 plan the Walmart driveway was supposed to be squared up with Cedaroak. The problem is the left turns and won't go away unless a lot more time is given for the light to stay green. This has been done at the request of LOTWP and has resulted in far fewer backups in the last two years. I don't see a real advantage and a real disadvantage for my street.

You might want to reach out to the people who are really negatively affected by this. I feel Chris Jordan probably had something to do with this and it is his payback to the Kenthorpe people who fought LOTWP. The residents of Kenthorpe who were there were shocked. We all thought the 43 plan was about sidewalks, left turn lanes, etc.,not realigning Old River.

Please rethink this part of the plan.

Thanks

Attachment B Transportation Advisory Board
Summary Meeting Notes

22500 Salamo Rd.
West Linn, OR 97068
www.westlinnoregon.gov

WEST LINN
SUMMARY NOTES

Transportation Advisory Board

Wednesday, December 2, 2015
6:00 - 7:30pm
Police Department
Community Room

Providing advice regarding: the TSP, CIP transportation projects, TDM improvements, general transportation issues, and encouraging alternative transportation systems along with other duties as assigned by the City Council

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1. **Call to Order and Introductions:** by Joyce at 6:07 pm
   Members Present: Joyce Jackson, Craig Bell, David Kleinke. No quorum present.
   Staff Present: Lance Calvert

2. **Business:**

   a. **Pavement Condition Index Update presentation**

- Board members received a presentation from consultants Capital Asset and Pavement Services which assisted with the update. Final report is available on the website as requested by the board.

   b. **Highway 43 Concept Plan Presentation**

- Lance provided an update regarding progress on the plan. He stated that the City is in working to improve traffic flow and multi-modal access along the route in the plan. Next steps include reviewing and finalizing the layout which integrates all the typical cross sections from Lake Oswego to I-205 interchange. Coordination with ODOT will be necessary for any future work on Hwy 43. Phase 1 of the project is focused is on the corridor between Lake Oswego to Hidden Springs Rd.

   c. **Final review/approval of 2015 Annual Report**

- The board reviewed the report information and approved unanimously for submittal to City Council (without a quorum).

3. **Staff Updates**
- None

4. **Board Discussion/Announcements**
- Board discussed going back to consistent meeting schedule.

5. **Adjournment**
- 7:30pm

For special assistance under the Americans with Disabilities Act, please call City Hall 48 hours prior to the meeting date, 503-657-0331 or TDD 503-657-7845.

City of West Linn

Transportation Advisory Board

Date: 12-2-15

	Riad Alharithi	503-305-6386	Riad.alharithi@comcast.net
✓	Joyce Jackson	503-703-8607	Joycejackson3215@comcast.net
✓	Craig Bell	971-295-0497	Craig.s.bell@gmail.com
	Kim Bria	503-705-3624	kbria@ewindconsulting.com
✓	David Kleinke	503-657-0762	dakleinke@comcast.net
ill- not attending	Andrew Rodgers		Andyrogers9@gmail.com
	Kimberly Steele	503-318-6818	prettyinpink@steelefamily.us
	Councilor Thomas Frank	503-568-3571	tfrank@westlinnoregon.gov
✓	Lance Calvert – Public Works Director	503-722-5500	lcalvert@westlinnoregon.gov

22500 Salamo Road
West Linn, Oregon 97068
http://westlinnoregon.gov

Summary Notes
Transportation Advisory Board

Wednesday, January 27, 2016

6:00 – 7:00 pm – Robinwood Station

Providing advice regarding: the TSP, CIP transportation projects, TDM improvements, general transportation issues, and encouraging alternative transportation systems along with other duties as assigned by the City Council.

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1. **Call to Order and Introductions:** by Dave at 6:08pm
   Members Present: Riad Alharithi, Kim Bria, Craig Bell, David Kleinke, Andrew Rogers
   Staff Present: Lance Calvert
   Guests Present: Kevin Bryck (Secretary Robinwood NA)

2. **Review and approval of December 2015 Summary Notes**
   - Motion to approve made by Kim and seconded by Andrew. Summary notes passed unanimously.

3. **Business:**

   a. **Election of 2016 Chair and Vice-Chair**
   Dave made motion to nominate Craig to Chair. Motion was passed unanimously. Craig nominated Kim Bria to Vice-Chair. Motion was passed unanimously.

   b. **Discussion of 2016 meeting schedule**
   To be determined at February Meeting

4. **Highway 43 Concept Plan Update**

Lance provided update on progress of Highway 43 Concept Plan Update including community outreach. Robinwood NA was contacted and invited to meeting (meeting was held at Robinwood Station to make access more convenient for residents). Lance shared the comments received through the virtual open house which was open through December of 2015. Both Hwy 43 and the Transportation System Plan are available for review on the City's website. The TSP will go before the Planning Commission in February before going before Council for review and approval. After TSP approval the Highway 43 draft plan will go to the

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Planning Commission. In May or June the Council would start review/approval process for the Highway 43 Concept Plan Update. The board members discussed the current Highway 43 plan including but not limited to review of cross sections, bus transit locations, sidewalks, new signalized intersections, realignment of Cedaroak, and possible jurisdictional transfer of Highway 43 from ODOT to the City of West Linn.

5. **Capital Projects Update**
Work continues on the Transportation System Plan Update. The goal is have the TSP go into effect 120 days after adoption which will allow time for any necessary code changes and/or adjustments to be made. Skyline Dr./Bolton Reservoir construction is under way. Road improvements are planned to be substantially complete prior to school year 2016. An uphill shoulder will be added for bicyclists to get out of the car lane. Downhill side will have a shared bike/car lane with an added sidewalk. Storm drainage improvements will be made including rain gardens where appropriate. It is the City's largest capital projects ever and is completely funded which included consolidating outstanding bonds to a lower interest rate. Water pipe is currently being installed, landscaping will continue behind curbs/sidewalk and the tank onsite will be under construction over the course of the next year.

6. **Board Discussion/Announcements**
None

7. **Adjournment**
Adjournment at 7:30pm

Meeting Notes:

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22500 Salamo Road
West Linn, Oregon 97068
http://westlinnoregon.gov

TRANSPORTATION ADVISORY BOARD MEETING SUMMARY NOTES

Wednesday, February 24, 2016

6:00 pm – West Linn Public Library – Community Room

Providing advice regarding: the TSP, CIP transportation projects, TDM improvements, general transportation issues, and encouraging alternative transportation systems along with other duties as assigned by the City Council.

Members Present: Kim Bria, Craig Bell, Kimberly Steele, Andrew Rodgers
Staff Present: Lance Calvert
Members Absent: Riad Alharithi, David Kleinke, Martin Plotner (Thomas Frank, Council Liaison)
Guests Present: Jill Ashcraft, Brad Lee

1. Call to Order and Introductions
- Meeting called to order at 6:10

2. Review and approval of December 2015 Summary Notes
- Motion to approve made by Andrew and seconded by Kim Bria. Summary notes were passed unanimously.

3. Business:

a. Discussion of 2016 meeting schedule
- Move to a bi-monthly meeting schedule (April, June, August, October, and December). December meeting should be moved to the beginning of the month (1st Wednesday) to not conflict with holidays. Motion made by Andrew and seconded by Kimberly Steele. The motion was passed unanimously.

4. Highway 43 Concept Plan Update
Lance provided information regarding the OR 43 Concept Plan. This plan was originally developed in 2008 and is currently being updated in conjunction with the Transportation

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System Plan 2016 update. The updated TSP will include the updated OR 43 Plan as an amendment. Both documents will go before the Planning Commission and the City Council for review and adoption. A virtual workshop was held in November and December 2015 and the city received over 150 comments on the OR 43 plan during that time. A final draft plan will incorporate all outreach, text, cross-sections, traffic analysis, technical information and cost estimates. The City has applied for funding through the STIP program which is very competitive ($11million available for the entire Portland/Metro area). The City's application has been moved to the short list for consideration of funding. This funding would pay for improvements from the City's north limits to South of Hidden Springs Rd (1st phase of corridor improvements). Receiving STIP funding will make City more competitive for other future State grants. There is more right of way acquisition required in the other segments pass Hidden Springs Rd. Public vote would be required for impacts along Hammerle Park.

5. Capital Projects Update

- Summer road program design is underway. Proposed street improvement plan for the historical Willamette area is being done separate from the road plan and the City wants feedback from the NA and residents of that area. Drainage improvements would need to be done as part of this. Skyline Dr./Bolton Reservoir construction is under way. Associated road improvements are planned to be substantially complete prior to school year 2016. An uphill shoulder will be added for bicyclists to get out of the car lane. Downhill side will have a shared bike/car lane with an added sidewalk.

6. Board Discussion/Announcements

- None

7. Adjournment

- Kimberly left at 7:40pm. Meeting was called to adjournment at 7:46pm.

Meeting Notes:

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CITY OF West Linn

Transportation Advisory Board

Date: 2-24-16

	Riad Alharithi	503-305-6386	Riad.alharithi@comcast.net
KB	Kim Bria	503-705-3624	kbria@ewindconsulting.com
CSB	Craig Bell	971-295-0497	Craig.s.bell@gmail.com
	David Kleinke	503-657-0762	dakleinke@comcast.net
	Martin Plotner		Mrp0625@gmail.com
✓	Kimberly Steele	503-318-6818	prettyinpink@steelefamily.us
✓	Andrew Rogers	541-525-3503	Andyrogers9@gmail.com
	Councilor Thomas Frank		tfrank@westlinnoregon.gov
LC	Lance Calvert	503-722-5516	lcalvert@westlinnoregon.gov

	Name		Email address
	Jill Ashcraft	Heater Ct	SZQ928@comcast.net
	BRAD LEE	WILLAMETTE DRIVE	BRAD.LEE1024@GMAIL.COM
	ANDREW ROGERS		
	1		

Draft Minutes of Willamette Neighborhood Assoc. 3/9/2016

The meeting was brought to order at 7:08 p.m. We did not have a quorum.

Treasurer's Report: $3981.85 to start with. 3 reams of paper= $19.97 leaving $3961.88

Items discussed:

TSP: Lance Calvert from WL Public Works came to enlighten us on the TSP. It is a broad concept with general context. It is not a nuts and bolts document. It is for development and re-development issues. The City Council is the body that funds and enacts the TSP recommendations. It is funded in the bi-annual budget under transportation and safety. Nothing has changed since 1/20/16. WNA would like flashing lights at Fields Bridge. There is a moratorium, at the staff level, for flashing lights due to the feds continually changing their minds. Site must meet ADA requirements for flashing lights. The lights would need to be in the next bi-annual budget. Sidewalks are funded in the Street budget or General budget. The TSP should be approved with the old Highway 43 needs, then amended this summer with the new 43 needs.

Willamette Falls Drive= deterrence of ODOT traffic (brick pavers, mainline meters (like on the on/off ramps of the freeway). Go to the Transportation Advisory Board (meets every other month 4th Wed.) then go to the City Council to lobby for deterrence and for the funding. Money already allocated in present TSP is for drainage, road, and curb improvements (ADA ramps). A suggestion from Lance was reworking WFD. He included raised tracks for bicyclists and another for pedestrians. The bicycle track would be raised off the street level and be 7 ft. wide and made of asphalt, then the pedestrian track would be raised above the bicycle level and be 6 ft. wide and made of concrete, thus allowing for passing .We asked Lance to come back when we have more people attending to present this again.

TRIMET = bus line 154 to Clackamas Heights (north east of Oregon City). Our line will become much less reliable and does not meet up with any other line.

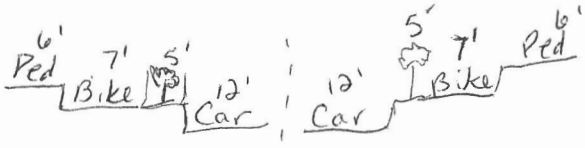
There seems to be a conflict between 2 departments about where to put the wood signs that have already been purchased. Lance will check into this and get back to us.

David Baker has volunteered to be our "Safety" coordinator/educator.

There is an application in for 46 housing units off Parker Rd. (April 7th).

Meeting adjourned at 8:55 p.m.

Submitted by Kathie Halicki WNA secretary



Appendix 5 Hidden Springs / Cedar Oak Operational Analysis

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

TECHNICAL MEMORANDUM

Hidden Springs Operational Analysis

Date:	April 12, 2016	Project #:18640
To:	Lance Calvert	
From:	Karla Kingsley and Marc Butorac, PE, PTOE	
Subject:	Highway 43 Concept Design Plan Update	

As part of the Highway 43 Conceptual Design Plan update, the City of West Linn has proposed a reconfiguration of two intersections along Highway 43:

- Highway 43/Cedar Oak Drive
- Highway 43/Hidden Springs Road

This memorandum summarizes a planning level operations analysis of the proposed reconfiguration.

EXISTING CONFIGURATION AND CHARACTERISTICS

Currently, both of these intersections operate as three-leg, signalized intersections. Existing lane configurations and volumes are shown in Figure 1. In the current configuration, people traveling in vehicles (including school buses) from neighborhoods west of Highway 43 to areas east of Highway 43, such as the Cedaroak Park School, travel eastbound on Hidden Springs, make a left turn at Highway 43, and then turn right at Cedar Oak Drive. Vehicles heading the other direction must to the reverse. Approximately 22 percent of left turning vehicles from Hidden Springs Road are also turning right on Cedar Oak Drive in the weekday AM peak hour and 28 percent are doing so in the weekday PM peak hour. Approximately 34 percent of left turning vehicles from Cedar Oak Drive are also turning right on Hidden Springs Road in the AM peak hour, and 33 percent are doing so in the PM peak hour.

These turn movements create the potential for increased turning movement conflicts and require additional side street green time at the two signalized intersections, which impacts overall throughput capacity on the highway. In addition, the Walmart driveway on the west side of Highway 43 creates the potential for additional conflicts between the two relatively tightly spaced intersections. The segment of Highway 43 between Hidden Springs Road and Cedar Oak Drive appears on ODOT's Safety Priority Index System and has a high number of rear-end crashes, compared to other locations in the corridor.

The 2008 Highway 43 Concept Design Plan analyzed the operations of the existing configuration. The results of that analysis are shown in Table 1.

Table 1: Existing Configuration – Operations from 2008 Concept Plan

Intersection	AM Peak Hour			PM Peak Hour		
	LOS	Delay (sec)	V/C ratio	LOS	Delay (sec)	V/C ratio
Highway 43 / Cedar Oak Drive	C	22.9	0.90	B	10.4	0.65
Highway 43 / Hidden Springs Road	B	18.7	0.73	C	25.0	0.83

Source: 2008 West Linn OR 43 Conceptual Design Plan Appendix: Technical Memo #1.

PROPOSED RECONFIGURATION

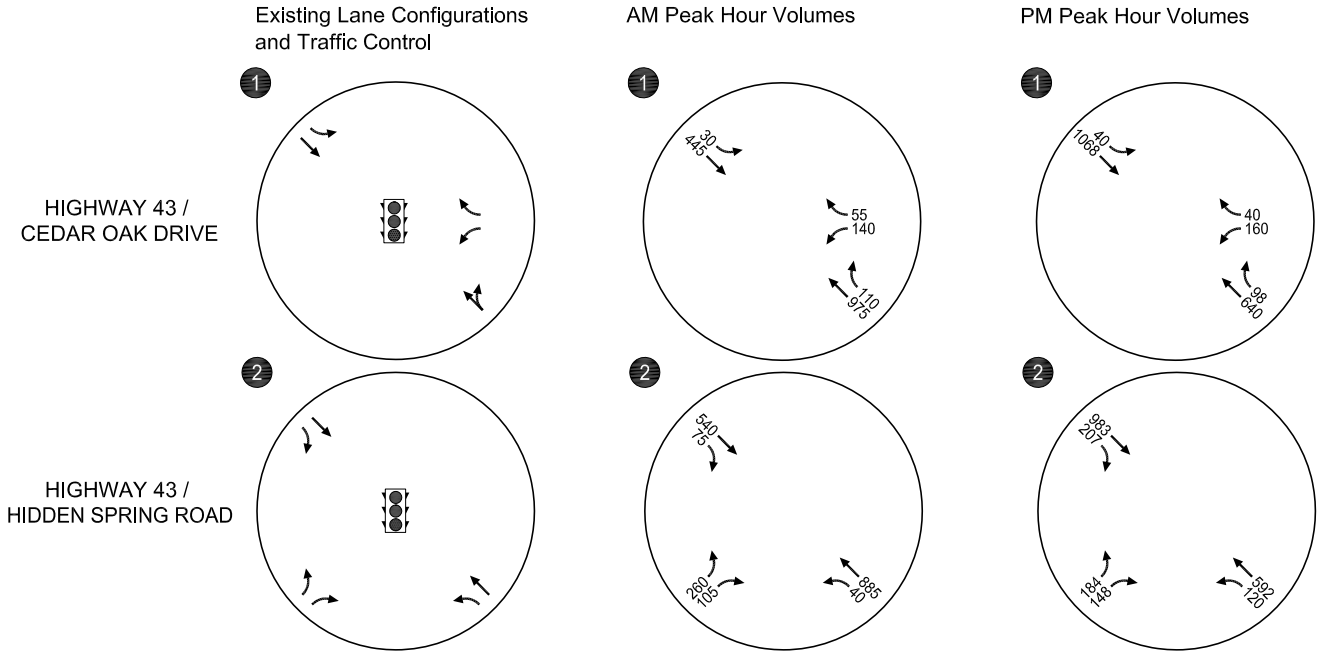
The City of West Linn is proposing a reconfiguration of the intersections, shown in Figure 2, including:

- A four-leg signalized intersection at Hidden Springs Road / Highway 43, accomplished by connecting Old River Road into the intersection as the fourth leg (through an existing parking lot on the east side of Highway 43).
- Removal of the signal at Cedar Oak Drive by converting westbound Cedar Oak Drive to a stop-controlled right-out only. Turning movements from Highway 43 to Cedar Oak Drive would still be permitted.

TRAFFIC VOLUMES

The City of West Linn provided traffic counts from 2014 during the weekday PM peak for the two intersections, as shown in Figure 1 and included in Attachment A. In addition, the City of West Linn provided the portion of the eastbound left-turning vehicles at Hidden Springs that make a right turn onto Cedar Oak, as well as the reverse pattern for both the weekday AM and PM peak periods, also included in Attachment A. Existing weekday AM peak hour, 2040 weekday AM peak hour, and 2040 weekday PM peak hour volumes were developed based on volumes from the 2008 Highway 43 Concept Design Plan. The AM existing volumes were assumed to be the same as the AM existing volumes in 2008, and future year 2040 volumes were assumed to be the same as the 2030 forecast volumes in the 2008 Plan. This approach is in alignment with the 2016 Transportation System Plan, which conducted a limited number of updated traffic counts and found that volumes had not substantially changed between 2008 and the initiation of the study in 2015.

With this information, future traffic volumes were reassigned for the proposed reconfiguration, assuming that Hidden Springs-to-Highway 43-to-Cedar Oak (and vice versa) vehicles would travel straight through the proposed future intersection at Hidden Springs Road. In addition, the majority of southbound left turning vehicles were reassigned to the Hidden Springs Road/Highway 43 intersection, where they would have a protected left-turn phase. A portion of westbound right turn movements were also reassigned from Cedar Oak Drive to the new four leg intersection at Hidden Springs Road. Reassigned existing peak hour volumes for the proposed reconfiguration are shown in Figure 2. Figure 3 shows the 2040 weekday AM and PM peak hour volumes forecast with the existing configuration and reassigned with the proposed reconfiguration.



- STOP SIGN
- TRAFFIC SIGNAL

Existing Lane Configurations, Traffic Control, & Peak Hour Volumes
West Linn, Oregon

Figure 1

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

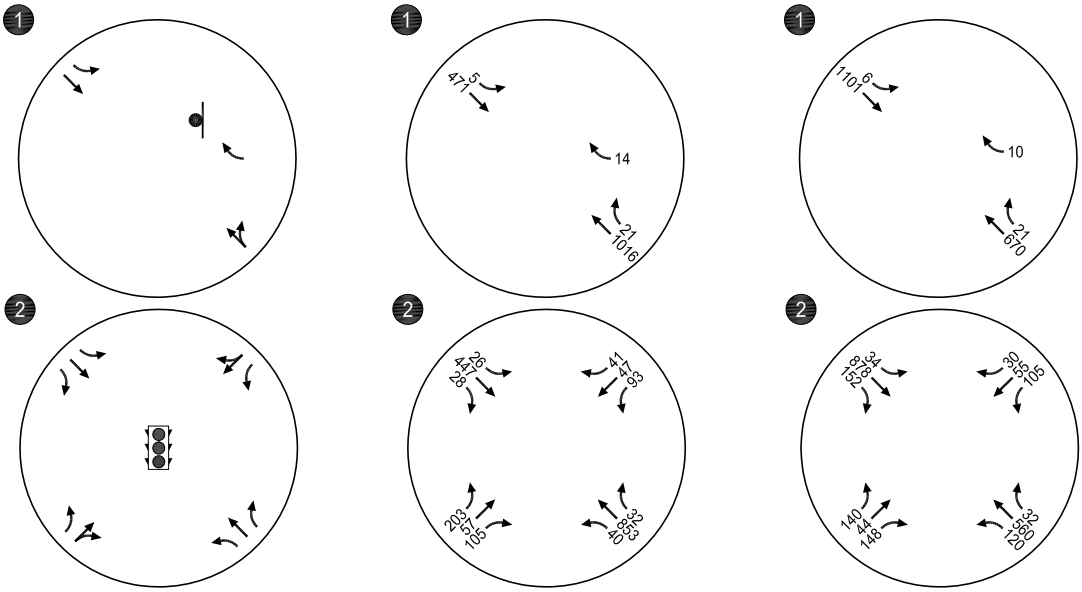
Proposed Lane Configurations and Traffic Control

AM Peak Hour Volumes
Proposed reconfiguration

PM Peak Hour Volumes
Proposed reconfiguration

HIGHWAY 43 / CEDAR OAK DRIVE

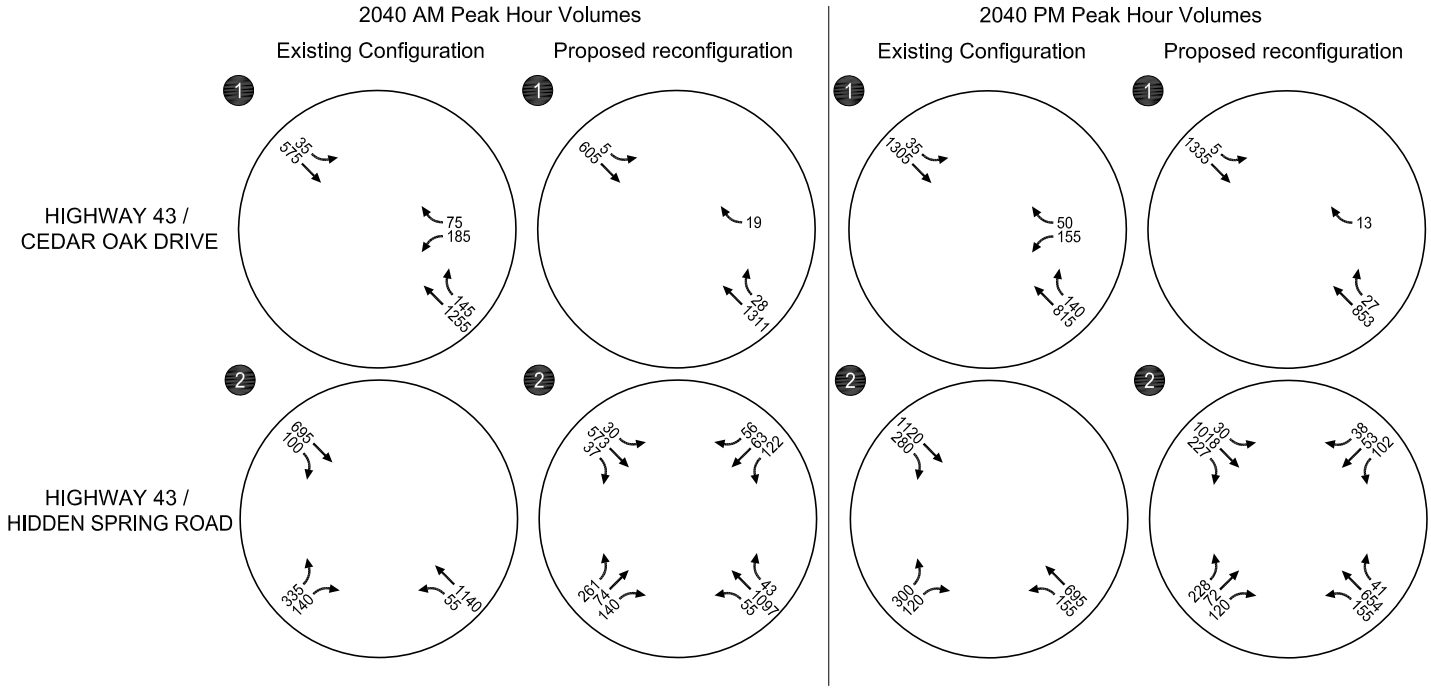
HIGHWAY 43 / HIDDEN SPRING ROAD



- STOP SIGN
- TRAFFIC SIGNAL

Proposed Lane Configurations, Traffic Control, & Peak Hour Volumes West Linn, Oregon

Figure 2



- STOP SIGN
- TRAFFIC SIGNAL

Proposed Lane Configurations, Traffic Control, & Peak Hour Volumes
West Linn, Oregon

Figure 3

FUTURE TRAFFIC OPERATIONS

An operational analysis was performed on the proposed intersection configuration, using the reassigned weekday AM and PM peak hour traffic volumes. Synchro 9 software was used for the intersection operations analysis for the proposed intersections, in accordance with the *2000 Highway Capacity Manual*. Pedestrian calls for all crossing phases were assumed for half of the signal cycles in the weekday PM peak hour.

The proposed Highway 43 Concept Design Plan includes protected bicycle facilities along Highway 43 with Dutch-style intersection design. These intersections have been implemented in few locations in the United States to date, and signalization strategies have varied. Two signalization strategies were tested as part of the operational analysis for the future reconfiguration:

1. **Bicyclists follow vehicle signal** – this strategy aligns with how intersections with standard bicycle lanes are controlled. Bicyclists typically do not have a separate bicycle signal; they go on green with other vehicle traffic. In this situation, right turning vehicles must yield to through bicyclists. In the Dutch-Style intersection concept applied at the Hidden Springs Road/Highway 43, right-turning vehicles would decelerate in a separate right turn lane and would be required yield to through bicyclists before turning. In this operational strategy, right turns on red could be permitted.
2. **Dedicated bicycle signal** – this strategy includes a bicycle-specific signal for bicyclists traveling along Highway 43 in the northbound or southbound directions. In this scenario, northbound and southbound right-turning vehicles have a red right arrow signal while through vehicles and bicyclists see a green signal. Right turn on red is prohibited. Right-turning vehicles have a green signal as an overlap with the eastbound and westbound protected left turn phase. This strategy creates more delay for northbound and southbound right turning vehicles, but provides a protected bicycle through movement that is not in conflict with right-turning vehicles. A variation of this signalization strategy would be to include both a bicycle phase and a right turn phase that run one after another during the Highway 43 through movement phase.

The volume-to-capacity, level-of-service, and average delay for each scenario is shown in Table 2 and Table 3 below, with analysis worksheets included in Attachment B.

Table 2: Proposed Reconfiguration - Base Year 2014 Volumes[1]

Intersection (traffic control strategy)	AM Peak Hour			PM Peak Hour		
	LOS	Delay (sec)	V/C ratio	LOS	Delay (sec)	V/C ratio
Highway 43 / Cedar Oak Drive (unsignalized)	C	20.3	0.29/0.06	B	12.9	0.67/0.02
Highway 43 / Hidden Springs Road (signalization – bicyclists follow vehicle signal)	C	25.6	0.78	C	31.4	0.78
Highway 43 / Hidden Springs Road (signalization – dedicated bicycle signal)	C	26.5	0.78	C	34.5	0.79

[1]Weekday AM Peak volumes are based on volumes from 2008 Conceptual Design Plan Appendix Technical Memo #1. PM Peak volumes are based on year 2014 counts. Reassignments are based on 2015 observations conducted by the City of West Linn.

Table 3: Proposed reconfiguration - 2040 Future Volumes

Intersection (traffic control strategy)	AM Peak Hour			PM Peak Hour		
	LOS	Delay (sec)	V/C ratio	LOS	Delay (sec)	V/C ratio
Highway 43 / Cedar Oak Drive (unsignalized)	F	65.8	0.37/0.25	C	16.0	0.81/0.04
Highway 43 / Hidden Springs Road (signalization – bicyclists follow vehicle signal)	D	39.0	0.96	D	38.6	0.94
Highway 43 / Hidden Springs Road (signalization – dedicated bicycle signal)	D	40.2	0.96	D	47.7	0.95

[1]2040 future volumes are based on volumes from 2008 Conceptual Design Plan Appendix Technical Memo #1. Reassignments are based on 2015 observations conducted by the City of West Linn.

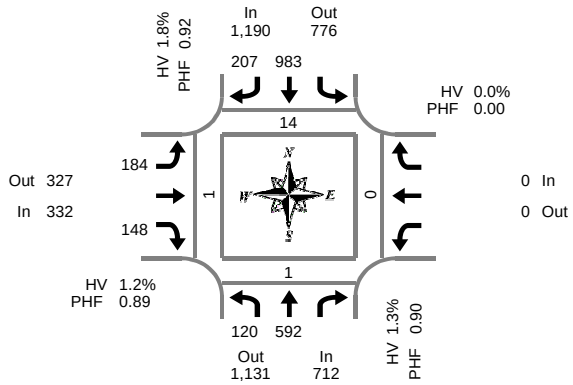
CONCLUSION

The proposed reconfiguration eliminates the two existing closely-spaced signals on Highway 43 that have been identified as a safety priority by ODOT, simplifying turning movements and vehicle flows crossing Highway 43. The proposed reconfiguration meets ODOT's operating standards in the weekday AM and PM peak hour, even when providing a separate bicycle signal phase. The detailed design of the proposed reconfiguration will be refined in the design phase of the project; if changes to the lane configuration and traffic control are made, the City of West Linn may wish to conduct a further operational analysis.

Attachment A Traffic Counts

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

Hwy 43 & Hidden Springs Rd

Tuesday, April 15, 2014
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 43				Southbound Hwy 43				Eastbound Hidden Springs Rd				Westbound Hidden Springs Rd				Interval Total	Pedestrians Crosswalk			
	L	T		Bikes		T	R	Bikes	L		R	Bikes				Bikes		North	South	East	West
4:00 PM	29	119		0		210	37	0	44		28	0				0	467	1	1	0	1
4:15 PM	28	130		0		229	48	0	42		18	0				0	495	0	0	0	2
4:30 PM	27	133		0		219	47	0	44		35	0				0	505	1	0	0	4
4:45 PM	32	160		0		230	44	0	49		44	0				0	559	6	1	0	0
5:00 PM	37	160		0		250	70	0	41		34	0				0	592	0	0	0	1
5:15 PM	31	128		3		278	45	0	51		31	0				0	564	5	0	0	0
5:30 PM	20	144		1		225	48	0	43		39	0				0	519	3	0	0	0
5:45 PM	31	112		0		247	43	0	57		28	0				0	518	0	1	0	2
Total Survey	235	1,086		4		1,888	382	0	371		257	0				0	4,219	16	3	0	10

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound Hwy 43				Southbound Hwy 43				Eastbound Hidden Springs Rd				Westbound Hidden Springs Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	712	1,131	1,843	4	1,190	776	1,966	0	332	327	659	0	0	0	0	0	2,234	14	1	0	1
%HV	1.3%				1.8%				1.2%				0.0%				1.5%				
PHF	0.90				0.92				0.89				0.00				0.94				

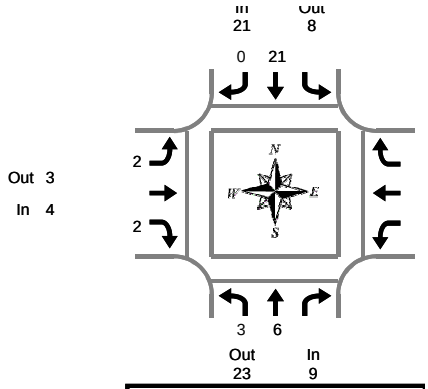
By Movement	Northbound Hwy 43				Southbound Hwy 43				Eastbound Hidden Springs Rd				Westbound Hidden Springs Rd				Total
	L	T		Total		T	R	Total	L		R	Total				Total	
Volume	120	592		712		983	207	1,190	184		148	332				0	2,234
%HV	2.5%	1.0%	NA	1.3%	NA	2.1%	0.0%	1.8%	1.1%	NA	1.4%	1.2%	NA	NA	NA	0.0%	1.5%
PHF	0.81	0.93		0.90		0.88	0.74	0.92	0.90		0.84	0.89				0.00	0.94

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 43				Southbound Hwy 43				Eastbound Hidden Springs Rd				Westbound Hidden Springs Rd				Interval Total	Pedestrians Crosswalk			
	L	T		Bikes		T	R	Bikes	L		R	Bikes				Bikes		North	South	East	West
4:00 PM	116	542		0		888	176	0	179		125	0				0	2,026	8	2	0	7
4:15 PM	124	583		0		928	209	0	176		131	0				0	2,151	7	1	0	7
4:30 PM	127	581		3		977	206	0	185		144	0				0	2,220	12	1	0	5
4:45 PM	120	592		4		983	207	0	184		148	0				0	2,234	14	1	0	1
5:00 PM	119	544		4		1,000	206	0	192		132	0				0	2,193	8	1	0	3

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

Hwy 43 & Hidden Springs Rd

Tuesday, April 15, 2014
4:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 43				Southbound Hwy 43				Eastbound Hidden Springs Rd				Westbound Hidden Springs Rd				Interval Total
	L	T		Total		T	R	Total	L		R	Total				Total	
4:00 PM	2	4		6		8	0	8	1		2	3				0	17
4:15 PM	1	3		4		5	1	6	0		0	0				0	10
4:30 PM	0	3		3		7	1	8	0		1	1				0	12
4:45 PM	1	1		2		7	0	7	0		2	2				0	11
5:00 PM	1	2		3		7	0	7	0		0	0				0	10
5:15 PM	0	2		2		4	0	4	2		0	2				0	8
5:30 PM	1	1		2		3	0	3	0		0	0				0	5
5:45 PM	0	2		2		4	0	4	1		0	1				0	7
Total Survey	6	18		24		45	2	47	4		5	9				0	80

Heavy Vehicle Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound Hwy 43			Southbound Hwy 43			Eastbound Hidden Springs Rd			Westbound Hidden Springs Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	9	23	32	21	8	29	4	3	7	0	0	0	34
PHF	0.17			0.24			0.25			0.00			0.22

By Movement	Northbound Hwy 43				Southbound Hwy 43				Eastbound Hidden Springs Rd				Westbound Hidden Springs Rd				Total
	L	T		Total		T	R	Total	L		R	Total				Total	
Volume	3	6		9		21	0	21	2		2	4				0	34
PHF	0.25	0.15		0.17		0.25	0.00	0.24	0.17		0.17	0.25				0.00	0.22

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

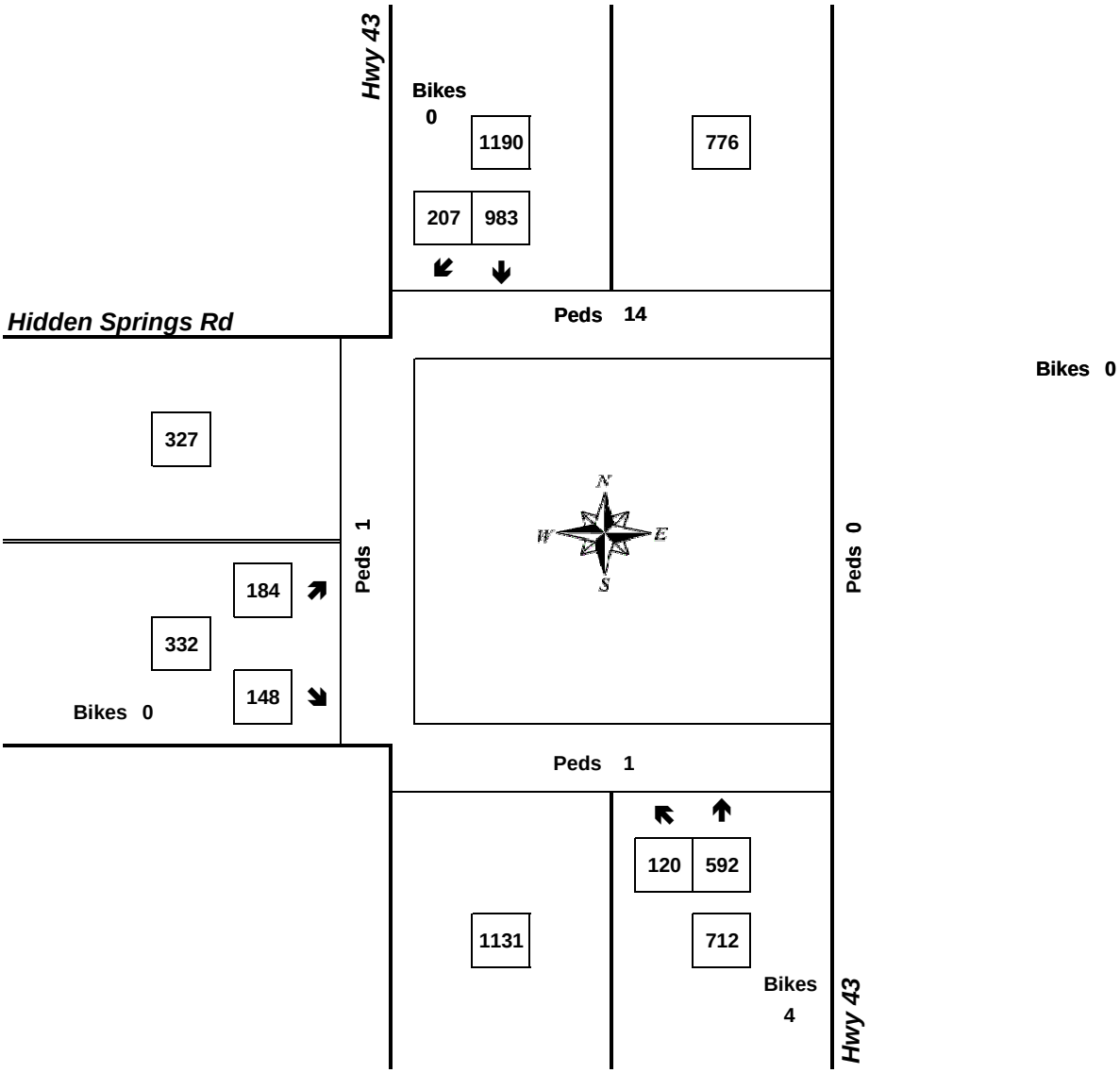
Interval Start Time	Northbound Hwy 43				Southbound Hwy 43				Eastbound Hidden Springs Rd				Westbound Hidden Springs Rd				Interval Total
	L	T		Total		T	R	Total	L		R	Total				Total	
4:00 PM	4	11		15		27	2	29	1		5	6				0	50
4:15 PM	3	9		12		26	2	28	0		3	3				0	43
4:30 PM	2	8		10		25	1	26	2		3	5				0	41
4:45 PM	3	6		9		21	0	21	2		2	4				0	34
5:00 PM	2	7		9		18	0	18	3		0	3				0	30

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 43 & Hidden Springs Rd

4:45 PM to 5:45 PM
Tuesday, April 15, 2014

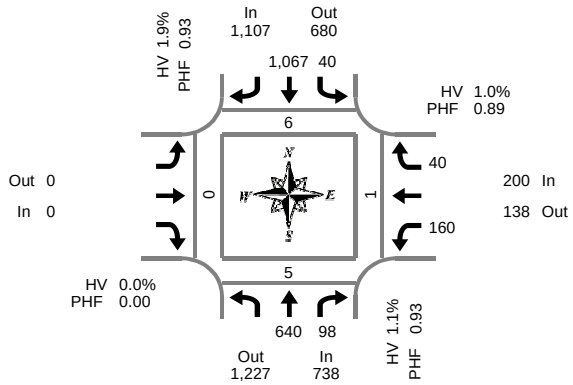


Approach	PHF	HV%	Volume
EB	0.89	1.2%	332
WB	0.00	0.0%	0
NB	0.90	1.3%	712
SB	0.92	1.8%	1,190
Intersection	0.94	1.5%	2,234

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

Hwy 43 & Cedar Oak Dr

Tuesday, April 15, 2014
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 43				Southbound Hwy 43				Eastbound Cedar Oak Dr				Westbound Cedar Oak Dr				Interval Total	Pedestrians Crosswalk			
		T	R	Bikes	L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
4:00 PM		134	27	0	7	223		0				0	31		6	0	428	4	2	1	0
4:15 PM		142	21	0	8	261		0				0	26		4	0	462	1	2	0	0
4:30 PM		138	25	0	5	241		0				0	36		6	0	451	2	1	0	0
4:45 PM		159	35	0	14	259		0				0	48		8	1	523	3	1	1	0
5:00 PM		180	19	0	8	283		0				0	30		9	0	529	2	0	0	0
5:15 PM		143	21	3	8	290		0				0	44		12	0	518	1	3	0	0
5:30 PM		158	23	1	10	235		0				0	38		11	0	475	0	1	0	0
5:45 PM		141	20	0	4	270		1				0	23		8	0	466	0	2	0	0
Total Survey		1,195	191	4	64	2,062		1				0	276		64	1	3,852	13	12	2	0

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound Hwy 43				Southbound Hwy 43				Eastbound Cedar Oak Dr				Westbound Cedar Oak Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	738	1,227	1,965	4	1,107	680	1,787	0	0	0	0	0	200	138	338	1	2,045	6	5	1	0
%HV	1.1%				1.9%				0.0%				1.0%				1.5%				
PHF	0.93				0.93				0.00				0.89				0.97				

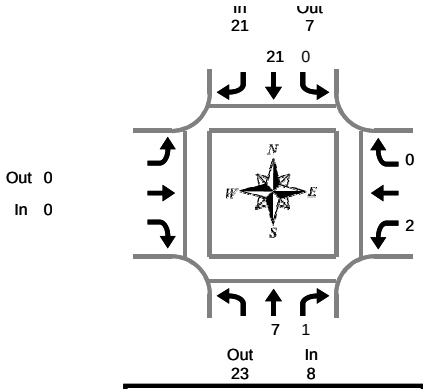
By Movement	Northbound Hwy 43				Southbound Hwy 43				Eastbound Cedar Oak Dr				Westbound Cedar Oak Dr				Total
		T	R	Total	L	T		Total				Total	L		R	Total	
Volume		640	98	738	40	1,067		1,107				0	160		40	200	2,045
%HV	NA	1.1%	1.0%	1.1%	0.0%	2.0%	NA	1.9%	NA	NA	NA	0.0%	1.3%	NA	0.0%	1.0%	1.5%
PHF		0.89	0.70	0.93	0.71	0.92		0.93				0.00	0.83		0.83	0.89	0.97

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 43				Southbound Hwy 43				Eastbound Cedar Oak Dr				Westbound Cedar Oak Dr				Interval Total	Pedestrians Crosswalk			
		T	R	Bikes	L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
4:00 PM		573	108	0	34	984		0				0	141		24	1	1,864	10	6	2	0
4:15 PM		619	100	0	35	1,044		0				0	140		27	1	1,965	8	4	1	0
4:30 PM		620	100	3	35	1,073		0				0	158		35	1	2,021	8	5	1	0
4:45 PM		640	98	4	40	1,067		0				0	160		40	1	2,045	6	5	1	0
5:00 PM		622	83	4	30	1,078		1				0	135		40	0	1,988	3	6	0	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Hwy 43 & Cedar Oak Dr

Tuesday, April 15, 2014
4:00 PM to 6:00 PM

Peak Hour Summary
4:45 PM to 5:45 PM

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 43				Southbound Hwy 43				Eastbound Cedar Oak Dr				Westbound Cedar Oak Dr				Interval Total
		T	R	Total	L	T		Total				Total	L		R	Total	
4:00 PM		5	0	5	0	6		6				0	2		1	3	14
4:15 PM		1	1	2	0	6		6				0	1		0	1	9
4:30 PM		2	1	3	0	4		4				0	3		0	3	10
4:45 PM		1	0	1	0	7		7				0	0		0	0	8
5:00 PM		1	1	2	0	5		5				0	2		0	2	9
5:15 PM		4	0	4	0	5		5				0	0		0	0	9
5:30 PM		1	0	1	0	4		4				0	0		0	0	5
5:45 PM		2	1	3	0	3		3				0	0		0	0	6
Total Survey		17	4	21	0	40		40				0	8		1	9	70

Heavy Vehicle Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound Hwy 43			Southbound Hwy 43			Eastbound Cedar Oak Dr			Westbound Cedar Oak Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	8	23	31	21	7	28	0	0	0	2	1	3	31
PHF	0.20			0.31			0.00			0.07			0.23

By Movement	Northbound Hwy 43				Southbound Hwy 43				Eastbound Cedar Oak Dr				Westbound Cedar Oak Dr				Total
		T	R	Total	L	T		Total				Total	L		R	Total	
Volume		7	1	8	0	21		21				0	2		0	2	31
PHF		0.22	0.13	0.20	0.00	0.31		0.31				0.00	0.08		0.00	0.07	0.23

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

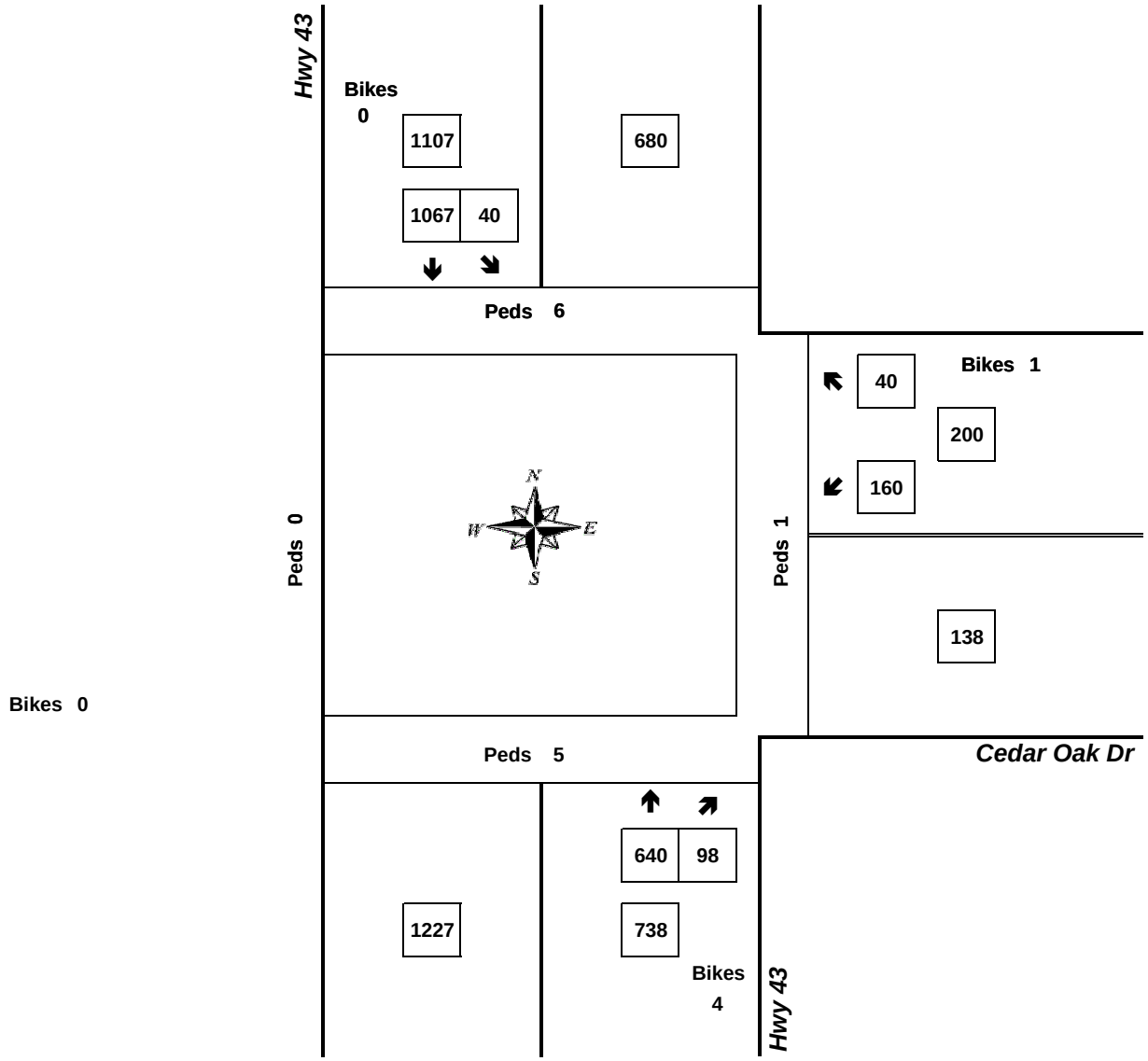
Interval Start Time	Northbound Hwy 43				Southbound Hwy 43				Eastbound Cedar Oak Dr				Westbound Cedar Oak Dr				Interval Total
		T	R	Total	L	T		Total				Total	L		R	Total	
4:00 PM		9	2	11	0	23		23				0	6		1	7	41
4:15 PM		5	3	8	0	22		22				0	6		0	6	36
4:30 PM		8	2	10	0	21		21				0	5		0	5	36
4:45 PM		7	1	8	0	21		21				0	2		0	2	31
5:00 PM		8	2	10	0	17		17				0	2		0	2	29

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 43 & Cedar Oak Dr

4:45 PM to 5:45 PM
Tuesday, April 15, 2014



Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.89	1.0%	200
NB	0.93	1.1%	738
SB	0.93	1.9%	1,107
Intersection	0.97	1.5%	2,045

Count Period: 4:00 PM to 6:00 PM

Checks of "Thru" Movement Hidden Springs to Cedar Oak & Cedar Oak to Hidden Springs

May 14, 2015 from 7:30am to 8:30am

EB Hidden Springs to NB Willamette Dr to EB Cedar Oak

Total Left Turn	Left and Right "Thru"	
10	2	20%
11	2	18%
8	1	13%
9	2	22%
8	0	0%
9	1	11%
8	1	13%
9	1	11%
8	2	25%
6	1	17%
6	1	17%
9	2	22%
9	2	22%
9	3	33%
8	2	25%
10	3	30%
7	2	29%
7	2	29%
8	2	25%
9	6	67%
6	3	50%
7	3	43%
8	3	38%
4	2	50%
9	0	0%
9	1	11%
8	2	25%
8	1	13%
9	0	0%
9	3	33%
10	1	10%
8	1	13%
263	58	

22.3%

WB Cedar Oak Dr to SB Willamette Dr to WB Hidden Springs

Total Left Turn	Left and Right "Thru"	
2	1	50%
4	1	25%
5	0	0%
2	0	0%
3	2	67%
1	1	100%
2	1	50%
1	0	0%
5	1	20%
3	1	33%
2	1	50%
6	2	33%
3	1	33%
6	3	50%
2	0	0%
1	0	0%
3	1	33%
1	0	0%
4	2	50%
5	1	20%
4	1	25%
8	2	25%
6	0	0%
5	1	20%
7	3	43%
10	3	30%
6	3	50%
5	2	40%
6	4	67%
5	2	40%
9	4	44%
4	2	50%
136	46	

33.5%

Checks of "Thru" Movement Hidden Springs to Cedar Oak & Cedar Oak to Hidden Springs

May 19, 2015 from 4:00pm to 6:00pm

	EB Hidden Springs to NB Willamette Dr to EB Cedar Oak			WB Cedar Oak Dr to SB Willamette Dr to WB Hidden Springs		
	Total Left Turn	Left and Right "Thru"		Total Left Turn	Left and Right "Thru"	
4:00pm	8	3	38%	4	1	25%
	7	3	43%	5	3	60%
	2	1	50%	2	1	50%
	7	0	0%	3	0	0%
	7	0	0%	2	1	50%
	4	1	25%	3	2	67%
	4	1	25%	3	1	33%
	6	1	17%	4	2	50%
4:15pm	6	1	17%	5	0	0%
	4	1	25%	5	1	20%
	6	1	17%	4	2	50%
	5	1	20%	5	1	20%
	6	2	33%	2	2	100%
	5	0	0%	5	1	20%
	7	2	29%	3	1	33%
	7	1	14%	3	2	67%
4:30pm	6	2	33%	3	1	33%
	7	0	0%	2	1	50%
	5	0	0%	5	2	40%
	7	2	29%	4	2	50%
	4	1	25%	0	0	0%
	5	2	40%	4	1	25%
	6	1	17%	4	0	0%
	6	0	0%	3	0	0%
4:45pm	8	1	13%	5	4	80%
	7	0	0%	5	2	40%
	7	0	0%	2	0	0%
	1	1	100%	6	2	33%
	5	1	20%	7	3	43%
	6	2	33%	2	1	50%
	5	2	40%	5	1	20%
	3	1	33%	3	2	67%
Total (1 hr)	179	35		118	43	

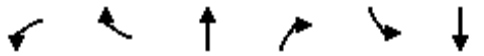
Checks of "Thru" Movement Hidden Springs to Cedar Oak & Cedar Oak to Hidden Springs

May 19, 2015 from 4:00pm to 6:00pm

	EB Hidden Springs to NB Willamette Dr to EB Cedar Oak			WB Cedar Oak Dr to SB Willamette Dr to WB Hidden Springs		
	Total Left Turn	Left and Right "Thru"		Total Left Turn	Left and Right "Thru"	
5:00pm	6	1	17%	3	1	33%
	3	0	0%	7	2	29%
	5	3	60%	7	3	43%
	5	0	0%	3	1	33%
	8	1	13%	6	3	50%
	6	1	17%	4	1	25%
	6	2	33%	6	1	17%
	6	1	17%	5	1	20%
5:15pm	6	2	33%	2	1	50%
	6	0	0%	2	1	50%
	9	0	0%	4	1	25%
	8	3	38%	2	0	0%
	8	2	25%	7	1	14%
	7	3	43%	3	0	0%
	8	2	25%	3	1	33%
	8	1	13%	4	2	50%
5:30pm	8	1	13%	4	0	0%
	9	4	44%	5	2	40%
	9	2	22%	6	3	50%
	9	3	33%	4	4	100%
	4	1	25%	5	1	20%
	8	2	25%	6	3	50%
	8	3	38%	1	0	0%
	7	3	43%	5	1	20%
5:45pm	9	5	56%	2	1	50%
	7	1	14%	3	0	0%
	6	4	67%	0	0	0%
	7	2	29%	6	2	33%
	3	0	0%	3	2	67%
	6	1	17%	3	1	33%
	7	4	57%	7	3	43%
	8	3	38%	4	0	0%
Total (1 hr)	220	61		132	43	
Total (2hr)	399	96		250	86	

2-hour average 4:00-6:00pm	**24.3%**	**34.2%**
Peak hour average 5:00-6:00pm	**27.4%**	**31.9%**

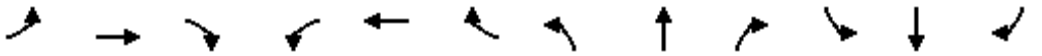
Attachment B Analysis Worksheets



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	14	1016	21	5	471
Future Volume (Veh/h)	0	14	1016	21	5	471
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	14	1047	22	5	486
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (ft)			581			
pX, platoon unblocked	0.46	0.46			0.46	
vC, conflicting volume	1554	1058			1069	
vC1, stage 1 conf vol	1058					
vC2, stage 2 conf vol	496					
vCu, unblocked vol	1617	541			565	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			99	
cM capacity (veh/h)	242	250			464	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	14	1069	5	486
Volume Left	0	0	5	0
Volume Right	14	22	0	0
cSH	250	1700	464	1700
Volume to Capacity	0.06	0.63	0.01	0.29
Queue Length 95th (ft)	4	0	1	0
Control Delay (s)	20.2	0.0	12.8	0.0
Lane LOS	C		B	
Approach Delay (s)	20.2	0.0	0.1	
Approach LOS	C			

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	57	105	93	47	41	40	853	32	26	447	28
Future Volume (vph)	203	57	105	93	47	41	40	853	32	26	447	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	1.00	0.96	1.00	1.00	0.96
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1763	1699		1787	1714		1787	1881	1534	1770	1863	1519
Flt Permitted	0.68	1.00		0.43	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1262	1699		818	1714		1787	1881	1534	1770	1863	1519
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	216	61	112	99	50	44	43	907	34	28	476	30
RTOR Reduction (vph)	0	56	0	0	28	0	0	0	15	0	0	16
Lane Group Flow (vph)	216	117	0	99	66	0	43	907	19	28	476	14
Confl. Peds. (#/hr)	10					10			10			10
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	24.3	14.0		15.5	9.2		11.6	49.1	49.1	2.0	39.5	39.5
Effective Green, g (s)	24.3	14.0		15.5	9.2		11.6	49.1	49.1	2.0	39.5	39.5
Actuated g/C Ratio	0.28	0.16		0.18	0.11		0.13	0.56	0.56	0.02	0.45	0.45
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	414	272		214	180		237	1056	861	40	841	686
v/s Ratio Prot	c0.07	0.07		0.03	0.04		0.02	c0.48		c0.02	0.26	
v/s Ratio Perm	c0.08			0.05					0.01			0.01
v/c Ratio	0.52	0.43		0.46	0.37		0.18	0.86	0.02	0.70	0.57	0.02
Uniform Delay, d1	27.6	33.1		35.2	36.4		33.7	16.2	8.5	42.4	17.6	13.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	1.1		1.6	1.3		0.4	7.1	0.0	42.0	0.9	0.0
Delay (s)	28.8	34.2		36.7	37.7		34.1	23.3	8.5	84.4	18.5	13.3
Level of Service	C	C		D	D		C	C	A	F	B	B
Approach Delay (s)		31.2			37.2			23.3			21.7	
Approach LOS		C			D			C			C	

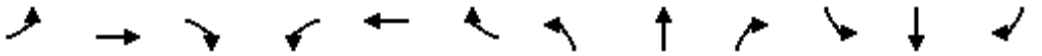
Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	87.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	14	1016	21	5	471
Future Volume (Veh/h)	0	14	1016	21	5	471
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	14	1047	22	5	486
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (ft)			581			
pX, platoon unblocked	0.46	0.46			0.46	
vC, conflicting volume	1554	1058			1069	
vC1, stage 1 conf vol	1058					
vC2, stage 2 conf vol	496					
vCu, unblocked vol	1617	542			566	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			99	
cM capacity (veh/h)	242	250			464	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	14	1069	5	486
Volume Left	0	0	5	0
Volume Right	14	22	0	0
cSH	250	1700	464	1700
Volume to Capacity	0.06	0.63	0.01	0.29
Queue Length 95th (ft)	4	0	1	0
Control Delay (s)	20.2	0.0	12.8	0.0
Lane LOS	C		B	
Approach Delay (s)	20.2	0.0	0.1	
Approach LOS	C			

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	57	105	93	47	41	40	853	32	26	447	28
Future Volume (vph)	203	57	105	93	47	41	40	853	32	26	447	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1763	1699		1787	1714		1787	1881	1599	1770	1863	1583
Flt Permitted	0.68	1.00		0.43	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1262	1699		818	1714		1787	1881	1599	1770	1863	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	216	61	112	99	50	44	43	907	34	28	476	30
RTOR Reduction (vph)	0	56	0	0	28	0	0	0	32	0	0	26
Lane Group Flow (vph)	216	117	0	99	66	0	43	907	2	28	476	4
Confl. Peds. (#/hr)	10					10			10			10
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Over	Prot	NA	Over
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases	4			8								
Actuated Green, G (s)	24.3	14.0		15.5	9.2		11.6	49.1	6.3	1.9	39.4	11.1
Effective Green, g (s)	24.3	14.0		15.5	9.2		11.6	49.1	6.3	1.9	39.4	11.1
Actuated g/C Ratio	0.28	0.16		0.18	0.11		0.13	0.56	0.07	0.02	0.45	0.13
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	414	272		215	180		237	1057	115	38	840	201
v/s Ratio Prot	c0.07	0.07		0.03	0.04		0.02	c0.48	0.00	c0.02	0.26	0.00
v/s Ratio Perm	c0.08			0.05								
v/c Ratio	0.52	0.43		0.46	0.37		0.18	0.86	0.02	0.74	0.57	0.02
Uniform Delay, d1	27.6	33.0		35.1	36.3		33.6	16.2	37.6	42.5	17.7	33.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	1.1		1.6	1.3		0.4	7.0	0.1	53.2	0.9	0.0
Delay (s)	28.7	34.1		36.7	37.6		34.0	23.2	37.7	95.7	18.5	33.4
Level of Service	C	C		D	D		C	C	D	F	B	C
Approach Delay (s)		31.1			37.1			24.2			23.4	
Approach LOS		C			D			C			C	

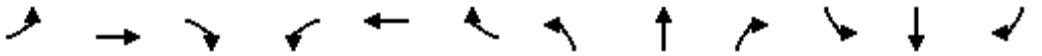
Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	87.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	19	1311	28	5	605
Future Volume (Veh/h)	0	19	1311	28	5	605
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	20	1352	29	5	624
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (ft)			581			
pX, platoon unblocked	0.26	0.26			0.26	
vC, conflicting volume	2000	1366			1381	
vC1, stage 1 conf vol	1366					
vC2, stage 2 conf vol	634					
vCu, unblocked vol	3415	989			1045	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	75			97	
cM capacity (veh/h)	90	79			174	

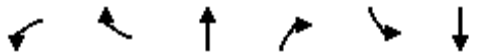
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	20	1381	5	624
Volume Left	0	0	5	0
Volume Right	20	29	0	0
cSH	79	1700	174	1700
Volume to Capacity	0.25	0.81	0.03	0.37
Queue Length 95th (ft)	23	0	2	0
Control Delay (s)	65.8	0.0	26.3	0.0
Lane LOS	F		D	
Approach Delay (s)	65.8	0.0	0.2	
Approach LOS	F			

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	261	74	140	122	63	56	55	1097	43	30	573	37
Future Volume (vph)	261	74	140	122	63	56	55	1097	43	30	573	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1696		1787	1748		1787	1881	1599	1770	1863	1583
Flt Permitted	0.53	1.00		0.32	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1000	1696		602	1748		1787	1881	1599	1770	1863	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	269	76	144	126	65	58	57	1131	44	31	591	38
RTOR Reduction (vph)	0	61	0	0	28	0	0	0	16	0	0	17
Lane Group Flow (vph)	269	159	0	126	95	0	57	1131	28	31	591	21
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	24.5	15.1		19.3	12.5		12.7	71.4	71.4	2.2	60.9	60.9
Effective Green, g (s)	24.5	15.1		19.3	12.5		12.7	71.4	71.4	2.2	60.9	60.9
Actuated g/C Ratio	0.22	0.14		0.17	0.11		0.11	0.64	0.64	0.02	0.55	0.55
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	286	229		176	195		203	1204	1023	34	1017	864
v/s Ratio Prot	c0.08	0.09		0.04	0.05		0.03	c0.60		c0.02	0.32	
v/s Ratio Perm	c0.13			0.08					0.02			0.01
v/c Ratio	0.94	0.70		0.72	0.49		0.28	0.94	0.03	0.91	0.58	0.02
Uniform Delay, d1	43.1	46.0		48.0	46.5		45.2	18.1	7.3	54.6	16.8	11.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	37.5	8.9		13.0	1.9		0.8	13.7	0.0	117.9	0.9	0.0
Delay (s)	80.5	54.9		60.9	48.4		46.0	31.8	7.4	172.5	17.7	11.6
Level of Service	F	D		E	D		D	C	A	F	B	B
Approach Delay (s)		69.0			54.7			31.6			24.6	
Approach LOS		E			D			C			C	

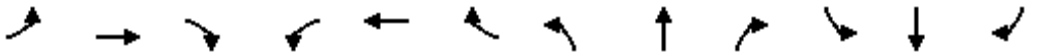
Intersection Summary			
HCM 2000 Control Delay	39.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	111.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	19	1311	28	5	605
Future Volume (Veh/h)	0	19	1311	28	5	605
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	20	1352	29	5	624
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (ft)			581			
pX, platoon unblocked	0.27	0.27			0.27	
vC, conflicting volume	2000	1366			1381	
vC1, stage 1 conf vol	1366					
vC2, stage 2 conf vol	634					
vCu, unblocked vol	3384	998			1052	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	75			97	
cM capacity (veh/h)	90	79			176	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	20	1381	5	624
Volume Left	0	0	5	0
Volume Right	20	29	0	0
cSH	79	1700	176	1700
Volume to Capacity	0.25	0.81	0.03	0.37
Queue Length 95th (ft)	23	0	2	0
Control Delay (s)	65.4	0.0	26.1	0.0
Lane LOS	F		D	
Approach Delay (s)	65.4	0.0	0.2	
Approach LOS	F			

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		



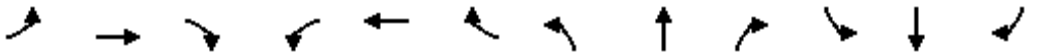
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	261	74	140	122	63	56	55	1097	43	30	573	37
Future Volume (vph)	261	74	140	122	63	56	55	1097	43	30	573	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1696		1787	1748		1787	1881	1599	1770	1863	1583
Flt Permitted	0.53	1.00		0.32	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	999	1696		602	1748		1787	1881	1599	1770	1863	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	269	76	144	126	65	58	57	1131	44	31	591	38
RTOR Reduction (vph)	0	59	0	0	28	0	0	0	41	0	0	35
Lane Group Flow (vph)	269	161	0	126	95	0	57	1131	3	31	591	3
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Over	Prot	NA	Over
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases	4			8								
Actuated Green, G (s)	24.5	14.9		19.7	12.5		12.8	70.7	7.2	2.2	60.1	9.6
Effective Green, g (s)	24.5	14.9		19.7	12.5		12.8	70.7	7.2	2.2	60.1	9.6
Actuated g/C Ratio	0.22	0.13		0.18	0.11		0.12	0.64	0.06	0.02	0.54	0.09
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	288	227		183	196		206	1198	103	35	1008	136
v/s Ratio Prot	c0.08	0.09		0.04	0.05		0.03	c0.60	0.00	c0.02	0.32	0.00
v/s Ratio Perm	c0.13			0.08								
v/c Ratio	0.93	0.71		0.69	0.48		0.28	0.94	0.03	0.89	0.59	0.02
Uniform Delay, d1	42.7	46.0		47.3	46.2		44.9	18.3	48.6	54.3	17.1	46.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	35.7	9.7		10.3	1.9		0.7	14.5	0.1	105.5	0.9	0.1
Delay (s)	78.4	55.7		57.6	48.1		45.6	32.9	48.7	159.8	18.0	46.5
Level of Service	E	E		E	D		D	C	D	F	B	D
Approach Delay (s)		68.2			52.9			34.0			26.3	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	40.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	111.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	10	670	21	6	1101
Future Volume (Veh/h)	0	10	670	21	6	1101
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	10	691	22	6	1135
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (ft)			581			
pX, platoon unblocked	0.75	0.75			0.75	
vC, conflicting volume	1849	702			713	
vC1, stage 1 conf vol	702					
vC2, stage 2 conf vol	1147					
vCu, unblocked vol	1965	438			452	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			99	
cM capacity (veh/h)	254	467			832	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	10	713	6	1135
Volume Left	0	0	6	0
Volume Right	10	22	0	0
cSH	467	1700	832	1700
Volume to Capacity	0.02	0.42	0.01	0.67
Queue Length 95th (ft)	2	0	1	0
Control Delay (s)	12.9	0.0	9.4	0.0
Lane LOS	B		A	
Approach Delay (s)	12.9	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	44	148	105	55	30	120	560	32	34	878	152
Future Volume (vph)	140	44	148	105	55	30	120	560	32	34	878	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97		1.00	0.98		1.00	1.00	0.95	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1606		1787	1754		1787	1881	1521	1770	1863	1506
Flt Permitted	0.61	1.00		0.32	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1145	1606		602	1754		1787	1881	1521	1770	1863	1506
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	144	45	153	108	57	31	124	577	33	35	905	157
RTOR Reduction (vph)	0	112	0	0	19	0	0	0	14	0	0	39
Lane Group Flow (vph)	144	86	0	108	69	0	124	577	19	35	905	118
Confl. Peds. (#/hr)			10			10			10			10
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	22.5	13.5		20.5	12.5		12.7	61.1	61.1	6.5	54.9	54.9
Effective Green, g (s)	22.5	13.5		20.5	12.5		12.7	61.1	61.1	6.5	54.9	54.9
Actuated g/C Ratio	0.21	0.13		0.20	0.12		0.12	0.58	0.58	0.06	0.52	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	300	206		207	208		215	1093	884	109	973	786
v/s Ratio Prot	c0.04	0.05		0.04	0.04		c0.07	c0.31		0.02	c0.49	
v/s Ratio Perm	0.06			c0.06					0.01			0.08
v/c Ratio	0.48	0.42		0.52	0.33		0.58	0.53	0.02	0.32	0.93	0.15
Uniform Delay, d1	35.3	42.2		36.4	42.5		43.7	13.3	9.3	47.2	23.3	13.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	1.4		2.4	1.0		3.7	0.5	0.0	1.7	14.9	0.1
Delay (s)	36.5	43.6		38.8	43.4		47.4	13.8	9.3	48.9	38.2	13.1
Level of Service	D	D		D	D		D	B	A	D	D	B
Approach Delay (s)		40.6			40.9			19.2			34.9	
Approach LOS		D			D			B			C	

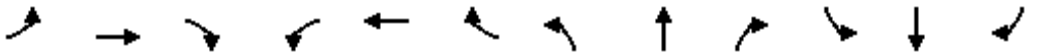
Intersection Summary			
HCM 2000 Control Delay	31.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	105.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	10	670	21	6	1101
Future Volume (Veh/h)	0	10	670	21	6	1101
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	10	691	22	6	1135
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (ft)			581			
pX, platoon unblocked	0.75	0.75			0.75	
vC, conflicting volume	1849	702			713	
vC1, stage 1 conf vol	702					
vC2, stage 2 conf vol	1147					
vCu, unblocked vol	1966	434			449	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			99	
cM capacity (veh/h)	254	467			832	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	10	713	6	1135
Volume Left	0	0	6	0
Volume Right	10	22	0	0
cSH	467	1700	832	1700
Volume to Capacity	0.02	0.42	0.01	0.67
Queue Length 95th (ft)	2	0	1	0
Control Delay (s)	12.9	0.0	9.4	0.0
Lane LOS	B		A	
Approach Delay (s)	12.9	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	44	148	105	55	30	120	560	32	34	878	152
Future Volume (vph)	140	44	148	105	55	30	120	560	32	34	878	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97		1.00	0.98		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1606		1787	1754		1787	1881	1599	1770	1863	1583
Flt Permitted	0.66	1.00		0.37	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1236	1606		697	1754		1787	1881	1599	1770	1863	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	144	45	153	108	57	31	124	577	33	35	905	157
RTOR Reduction (vph)	0	113	0	0	19	0	0	0	30	0	0	74
Lane Group Flow (vph)	144	85	0	108	69	0	124	577	3	35	905	83
Confl. Peds. (#/hr)			10			10			10			10
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Over	Prot	NA	Over
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases	4			8								
Actuated Green, G (s)	22.7	12.4		19.5	10.8		12.5	59.7	8.7	6.6	53.8	10.3
Effective Green, g (s)	22.7	12.4		19.5	10.8		12.5	59.7	8.7	6.6	53.8	10.3
Actuated g/C Ratio	0.22	0.12		0.19	0.10		0.12	0.58	0.08	0.06	0.52	0.10
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	326	192		223	183		216	1086	134	112	969	157
v/s Ratio Prot	c0.04	c0.05		0.04	0.04		c0.07	c0.31	0.00	0.02	c0.49	c0.05
v/s Ratio Perm	0.05			0.05								
v/c Ratio	0.44	0.44		0.48	0.38		0.57	0.53	0.02	0.31	0.93	0.53
Uniform Delay, d1	36.0	42.3		41.7	43.2		42.9	13.3	43.4	46.2	23.1	44.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	1.6		1.7	1.3		3.7	0.5	0.1	1.6	15.4	3.2
Delay (s)	37.0	43.9		43.4	44.5		46.6	13.8	43.5	47.8	38.5	47.5
Level of Service	D	D		D	D		D	B	D	D	D	D
Approach Delay (s)		41.0			43.9			20.7			40.1	
Approach LOS		D			D			C			D	

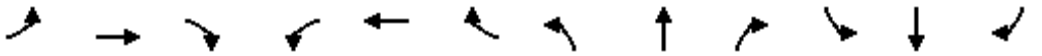
Intersection Summary			
HCM 2000 Control Delay	34.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	103.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	13	853	27	5	1335
Future Volume (Veh/h)	0	13	853	27	5	1335
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	13	879	28	5	1376
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (ft)			581			
pX, platoon unblocked	0.67	0.67			0.67	
vC, conflicting volume	2279	893			907	
vC1, stage 1 conf vol	893					
vC2, stage 2 conf vol	1386					
vCu, unblocked vol	2658	598			619	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			99	
cM capacity (veh/h)	187	339			647	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	13	907	5	1376
Volume Left	0	0	5	0
Volume Right	13	28	0	0
cSH	339	1700	647	1700
Volume to Capacity	0.04	0.53	0.01	0.81
Queue Length 95th (ft)	3	0	1	0
Control Delay (s)	16.0	0.0	10.6	0.0
Lane LOS	C		B	
Approach Delay (s)	16.0	0.0	0.0	
Approach LOS	C			

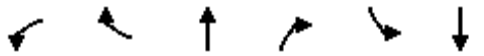
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	72	120	102	53	25	155	654	41	30	1018	227
Future Volume (vph)	228	72	120	102	53	25	155	654	41	30	1018	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97		1.00	0.98		1.00	1.00	0.95	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1651		1787	1762		1787	1881	1524	1770	1863	1509
Flt Permitted	0.66	1.00		0.38	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1236	1651		710	1762		1787	1881	1524	1770	1863	1509
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	235	74	124	105	55	26	160	674	42	31	1049	234
RTOR Reduction (vph)	0	52	0	0	15	0	0	0	15	0	0	50
Lane Group Flow (vph)	235	146	0	105	66	0	160	674	27	31	1049	184
Confl. Peds. (#/hr)			10			10			10			10
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	23.8	14.6		15.8	10.6		13.6	75.4	75.4	5.1	66.9	66.9
Effective Green, g (s)	23.8	14.6		15.8	10.6		13.6	75.4	75.4	5.1	66.9	66.9
Actuated g/C Ratio	0.20	0.13		0.14	0.09		0.12	0.65	0.65	0.04	0.58	0.58
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	296	207		144	160		208	1219	988	77	1071	868
v/s Ratio Prot	c0.06	0.09		0.03	0.04		c0.09	0.36		0.02	c0.56	
v/s Ratio Perm	c0.10			0.07					0.02			0.12
v/c Ratio	0.79	0.70		0.73	0.41		0.77	0.55	0.03	0.40	0.98	0.21
Uniform Delay, d1	43.7	48.8		51.6	49.9		49.8	11.2	7.3	54.1	24.0	11.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.6	10.3		16.8	1.7		15.6	0.5	0.0	3.4	22.3	0.1
Delay (s)	57.3	59.1		68.4	51.6		65.5	11.8	7.3	57.5	46.4	12.1
Level of Service	E	E		E	D		E	B	A	E	D	B
Approach Delay (s)		58.1			61.1			21.4			40.5	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	116.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		

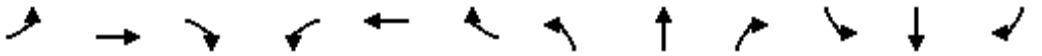
c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	13	853	27	5	1335
Future Volume (Veh/h)	0	13	853	27	5	1335
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	13	879	28	5	1376
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (ft)			581			
pX, platoon unblocked	0.66	0.66			0.66	
vC, conflicting volume	2279	893			907	
vC1, stage 1 conf vol	893					
vC2, stage 2 conf vol	1386					
vCu, unblocked vol	2676	584			605	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			99	
cM capacity (veh/h)	187	340			645	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	13	907	5	1376
Volume Left	0	0	5	0
Volume Right	13	28	0	0
cSH	340	1700	645	1700
Volume to Capacity	0.04	0.53	0.01	0.81
Queue Length 95th (ft)	3	0	1	0
Control Delay (s)	16.0	0.0	10.6	0.0
Lane LOS	C		B	
Approach Delay (s)	16.0	0.0	0.0	
Approach LOS	C			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	72	120	102	53	25	155	654	41	30	1018	227
Future Volume (vph)	228	72	120	102	53	25	155	654	41	30	1018	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97		1.00	0.98		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1651		1787	1762		1787	1881	1599	1770	1863	1583
Flt Permitted	0.66	1.00		0.37	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1234	1651		703	1762		1787	1881	1599	1770	1863	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	235	74	124	105	55	26	160	674	42	31	1049	234
RTOR Reduction (vph)	0	54	0	0	15	0	0	0	39	0	0	106
Lane Group Flow (vph)	235	144	0	105	66	0	160	674	3	31	1049	128
Confl. Peds. (#/hr)			10			10			10			10
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	Over	Prot	NA	Over
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases	4			8								
Actuated Green, G (s)	26.3	14.9		18.1	10.7		13.5	74.1	7.4	4.6	65.2	11.6
Effective Green, g (s)	26.3	14.9		18.1	10.7		13.5	74.1	7.4	4.6	65.2	11.6
Actuated g/C Ratio	0.22	0.13		0.15	0.09		0.12	0.63	0.06	0.04	0.56	0.10
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	332	210		177	161		206	1191	101	69	1038	156
v/s Ratio Prot	c0.07	0.09		0.04	0.04		c0.09	0.36	0.00	0.02	c0.56	c0.08
v/s Ratio Perm	c0.09			0.05								
v/c Ratio	0.71	0.69		0.59	0.41		0.78	0.57	0.03	0.45	1.01	0.82
Uniform Delay, d1	41.9	48.8		49.9	50.2		50.3	12.3	51.4	55.0	25.9	51.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.7	8.9		5.2	1.7		16.6	0.6	0.1	4.6	30.6	27.2
Delay (s)	48.6	57.7		55.1	51.8		66.9	12.9	51.5	59.6	56.5	78.9
Level of Service	D	E		E	D		E	B	D	E	E	E
Approach Delay (s)		52.8			53.7			24.6			60.5	
Approach LOS		D			D			C			E	

Intersection Summary			
HCM 2000 Control Delay	47.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	117.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Appendix 6 OR 43 Phase 1 - Cost Estimates

CITY OF West Linn

Highway 43 Phase I - Cost Estimate

Project #: **Highway 43 Phase I - Arbor to Hidden Springs**
Preliminary Cost Cost Estimate 7/19/16

Item	Description of material and/or services	CONTRACT AMOUNTS Qty	Unit	Unit Price	Total Amount
TEMPORARY FEATURES AND APPURTENANCES					
A-1	MOBILIZATION	1	LS	$ 90,000.00	$ 90,000.00
A-2	TEMPORARY WORK ZONE TRAFFIC CONTROL, COMPLETE	1	LS	$ 95,000.00	$ 95,000.00
A-3	EROSION CONTROL	1	LS	$ 25,000.00	$ 25,000.00
A-4	POLLUTION CONTROL PLAN	1	LS	$ 2,500.00	$ 2,500.00
ROADWORK					
B-5	CONSTRUCTION SURVEY WORK	1	LS	$ 20,000.00	$ 20,000.00
B-6	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	1	LS	$ 30,000.00	$ 30,000.00
B-7	CLEARING AND GRUBBING	1	LS	$ 15,000.00	$ 15,000.00
B-8	GENERAL EXCAVATION	3500	CUYD	$ 30.00	$ 105,000.00
B-9	12 INCH SUBGRADE STABILIZATION	350	SQYD	$ 15.00	$ 5,250.00
B-10	CULVERT EMBANKMENT PROTECTION	4	EA	$ 150.00	$ 600.00
B-11	RIPRAP BASINS	4	EA	$ 500.00	$ 2,000.00
DRAINAGE AND SEWERS					
C-12	ROCK EXCAVATION	150	CUYD	$ 85.00	$ 12,750.00
C-13	MAINLINE VIDEO INSPECTION	2000	FOOT	$ 1.25	$ 2,500.00
C-14	12 INCH STORM SEWER PIPE, 5 FT DEPTH	1000	FOOT	$ 60.00	$ 60,000.00
C-15	24 INCH STORM SEWER PIPE, 5 FT DEPTH	20	FOOT	$ 150.00	$ 3,000.00
C-16	36 INCH STORM SEWER PIPE, 5 FT DEPTH	40	FOOT	$ 175.00	$ 7,000.00
C-17	SLOPED END SECTIONS, 12 INCH	3	EA	$ 700.00	$ 2,100.00
C-18	CONCRETE STORM SEWER MANHOLES	3	EA	$ 3,000.00	$ 9,000.00
C-19	CONCRETE INLETS, TYPE G-2	2	EA	$ 1,500.00	$ 3,000.00
C-20	CONCRETE INLETS, TYPE CG-2	10	EA	$ 1,500.00	$ 15,000.00
C-21	CONCRETE INLETS, TYPE D	2	EA	$ 1,200.00	$ 2,400.00
C-22	ADJUSTING BOXES	35	EA	$ 67.00	$ 2,345.00
C-23	FILLING ABANDONED STRUCTURES	2	EA	$ 225.00	$ 450.00
C-24	ADD OR REPLACE MANHOLE ADJUSTMENT RINGS	4	EA	$ 470.00	$ 1,880.00
C-25	MANHOLES OVER EXISTING SEWERS	2	EA	$ 2,000.00	$ 4,000.00
C-26	TRENCH RESURFACING	676	SQYD	$ 34.00	$ 22,984.00
BRIDGES AND RETAINING WALLS					
D-27	RETAINING WALL, PREFABRICATED MODULAR GRAVITY, COMPLETE	6400	SF	$ 30.00	$ 192,000.00
BASES					
E-28	RECONDITIONING EXISTING ROADWAY	1	LS	$ 5,000.00	$ 5,000.00
E-29	COLD PLANE PAVEMENT REMOVAL, 0-2 INCHES DEEP	6500	SQYD	$ 2.80	$ 18,200.00
E-30	COLD PLANE PAVEMENT REMOVAL, 2 INCHES DEEP	1000	SQYD	$ 3.00	$ 3,000.00
E-31	COLD PLANE PAVEMENT REMOVAL, 6 INCHES DEEP	100	SQYD	$ 5.05	$ 505.00
E-32	AGGREGATE BASE	4500	TON	$ 26.00	$ 117,000.00
E-33	AGGREGATE SHOULDERS	40	TON	$ 80.00	$ 3,200.00
WEARING SURFACES					
F-34	LEVEL 3, 1/2 INCH ACP MIXTURE	3500	TON	$ 84.50	$ 295,750.00
F-35	LEVEL 3, 3/4 INCH ACP MIXTURE	1450	TON	$ 95.50	$ 138,475.00
F-36	3 INCH ASPHALT CONCRETE PAVEMENT REPAIR	680	SQYD	$ 27.00	$ 18,360.00
F-37	ASPHALT BERMS	500	FOOT	$ 5.00	$ 2,500.00
F-38	ASPHALT APPROACHES	38	EA	$ 1,150.00	$ 43,700.00
F-39	ASHPALT PEDESTRIAN LANDINGS	1	EA	$ 850.00	$ 850.00
F-40	CONCRETE CURBS, STANDARD CURB	10000	FOOT	$ 12.00	$ 120,000.00
F-41	CONCRETE CURBS, CURB AND GUTTER	200	FOOT	$ 26.50	$ 5,300.00
F-42	CONCRETE CURBS, MOUNTABLE CURB	20000	FOOT	$ 11.00	$ 220,000.00
F-43	CONCRETE WALKS	61920	SQFT	$ 5.00	$ 309,600.00
F-43	ADA CURB RAMP	48	EA	$ 2,000.00	$ 96,000.00
F-44	6 INCH CONCRETE SURFACING	6000	SQFT	$ 7.00	$ 42,000.00
PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES					
G-45	PAVEMENT LINE REMOVAL	2000	FOOT	$ 0.65	$ 1,300.00
G-46	PAVEMENT BAR REMOVAL	100	SQFT	$ 5.20	$ 520.00
G-47	PAVEMENT LEGEND REMOVAL	2	EA	$ 68.00	$ 136.00
G-48	THERMOPLASTIC, EXTRUDED, SURFACE, PROFILED	15000	FOOT	$ 1.20	$ 18,000.00
G-49	THERMOPLASTIC, EXTRUDED, SURFACE, NON-PROFILED	10000	FOOT	$ 0.90	$ 9,000.00
G-50	PAVEMENT LEGEND, TYPE B-HS: BICYCLE LANE STENCIL	10	EA	$ 280.00	$ 2,800.00
G-51	PAVEMENT LEGEND, TYPE B-HS: SHARED LANE MARKING	1	EA	$ 300.00	$ 300.00
G-52	PAVEMENT BAR, TYPE B-HS	600	FOOT	$ 7.50	$ 4,500.00
G-53	PAVEMENT LEGEND, TYPE B-HS: ARROWS	20	EA	$ 270.00	$ 5,400.00
G-54	RELOCATE SIGNAGE	1	LS	$ 5,000.00	$ 5,000.00
G-55	RELOCATE TRANSIT STOPS	12	EA	$ 900.00	$ 10,800.00
PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS					
H-56	TRAFFIC SIGNAL, REMOVAL	3	EA	$ 5,000.00	$ 15,000.00
H-57	TRAFFIC SIGNAL, COMPLETE	2	EA	$ 298,000.00	$ 596,000.00
H-58	ELECTRIC UTILITY MODIFICATIONS	1	LS	$ 50,000.00	$ 50,000.00
RIGHT OF WAY DEVELOPMENT AND CONTROL					
I-59	LANDSCAPE RESTORATION, COMPLETE	1	LS	$ 35,000.00	$ 35,000.00
I-60	RAIN GARDEN / BIOSWALE	500	SY	$ 80.00	$ 40,000.00
I-61	CL-4 CHAIN-LINK FENCE WITH BLACK VINYL CLAD FABRIC	1200	FT	$ 33.50	$ 40,200.00
I-62	SINGLE MAILBOX SUPPORTS	12	EA	$ 200.00	$ 2,400.00
I-63	MAILBOX CONCRETE COLLARS	12	EA	$ 150.00	$ 1,800.00
	SUBTOTAL FOR SCHEDULE:				**$3,004,155.00**
	SUBTOTAL WITH 20% CONTINGENCY:				**$3,604,986.00**
	DESIGN/CONSTRUCTION ADMIN (30%):				**$1,081,495.80**
	ROW ACQUISITION:				**$513,518.20**
	PROJECT TOTAL:				**$5,200,000.00**

CITY OF West Linn

Highway 43 Phase II - Cost Estimate

Project #: **Highway 43 Phase II - Hidden Springs to Dillow**
Preliminary Cost Cost Estimate 7/19/16

Item	Description of material and/or services	CONTRACT AMOUNTS Qty	Unit	Unit Price	Total Amount
TEMPORARY FEATURES AND APPURTENANCES					
A-1	MOBILIZATION	1	LS	$ 90,000.00	$ 90,000.00
A-2	TEMPORARY WORK ZONE TRAFFIC CONTROL, COMPLETE	1	LS	$ 95,000.00	$ 95,000.00
A-3	EROSION CONTROL	1	LS	$ 25,000.00	$ 25,000.00
A-4	POLLUTION CONTROL PLAN	1	LS	$ 2,500.00	$ 2,500.00
ROADWORK					
B-5	CONSTRUCTION SURVEY WORK	1	LS	$ 20,000.00	$ 20,000.00
B-6	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	1	LS	$ 30,000.00	$ 30,000.00
B-7	CLEARING AND GRUBBING	1	LS	$ 15,000.00	$ 15,000.00
B-8	GENERAL EXCAVATION	3500	CUYD	$ 30.00	$ 105,000.00
B-9	12 INCH SUBGRADE STABILIZATION	350	SQYD	$ 15.00	$ 5,250.00
B-10	CULVERT EMBANKMENT PROTECTION	4	EA	$ 150.00	$ 600.00
B-11	RIPRAP BASINS	4	EA	$ 500.00	$ 2,000.00
DRAINAGE AND SEWERS					
C-12	ROCK EXCAVATION	150	CUYD	$ 85.00	$ 12,750.00
C-13	MAINLINE VIDEO INSPECTION	2000	FOOT	$ 1.25	$ 2,500.00
C-14	12 INCH STORM SEWER PIPE, 5 FT DEPTH	1000	FOOT	$ 60.00	$ 60,000.00
C-15	24 INCH STORM SEWER PIPE, 5 FT DEPTH	40	FOOT	$ 150.00	$ 6,000.00
C-16	36 INCH STORM SEWER PIPE, 5 FT DEPTH	20	FOOT	$ 175.00	$ 3,500.00
C-17	SLOPED END SECTIONS, 12 INCH	3	EA	$ 700.00	$ 2,100.00
C-18	CONCRETE STORM SEWER MANHOLES	3	EA	$ 3,000.00	$ 9,000.00
C-19	CONCRETE INLETS, TYPE G-2	2	EA	$ 1,500.00	$ 3,000.00
C-20	CONCRETE INLETS, TYPE CG-2	10	EA	$ 1,500.00	$ 15,000.00
C-21	CONCRETE INLETS, TYPE D	2	EA	$ 1,200.00	$ 2,400.00
C-22	ADJUSTING BOXES	35	EA	$ 67.00	$ 2,345.00
C-23	FILLING ABANDONED STRUCTURES	2	EA	$ 225.00	$ 450.00
C-24	ADD OR REPLACE MANHOLE ADJUSTMENT RINGS	4	EA	$ 470.00	$ 1,880.00
C-25	MANHOLES OVER EXISTING SEWERS	2	EA	$ 2,000.00	$ 4,000.00
C-26	TRENCH RESURFACING	676	SQYD	$ 34.00	$ 22,984.00
BRIDGES AND RETAINING WALLS					
D-27	RETAINING WALL, PREFABRICATED MODULAR GRAVITY, COMPLETE	6400	SF	$ 30.00	$ 192,000.00
BASES					
E-28	RECONDITIONING EXISTING ROADWAY	1	LS	$ 5,000.00	$ 5,000.00
E-29	COLD PLANE PAVEMENT REMOVAL, 0-2 INCHES DEEP	5600	SQYD	$ 2.80	$ 15,680.00
E-30	COLD PLANE PAVEMENT REMOVAL, 2 INCHES DEEP	1000	SQYD	$ 3.00	$ 3,000.00
E-31	COLD PLANE PAVEMENT REMOVAL, 6 INCHES DEEP	1000	SQYD	$ 5.05	$ 5,050.00
E-32	AGGREGATE BASE	4400	TON	$ 26.00	$ 114,400.00
E-33	AGGREGATE SHOULDERS	40	TON	$ 80.00	$ 3,200.00
WEARING SURFACES					
F-34	LEVEL 3, 1/2 INCH ACP MIXTURE	2800	TON	$ 84.50	$ 236,600.00
F-35	LEVEL 3, 3/4 INCH ACP MIXTURE	1200	TON	$ 95.50	$ 114,600.00
F-36	3 INCH ASPHALT CONCRETE PAVEMENT REPAIR	700	SQYD	$ 27.00	$ 18,900.00
F-37	ASPHALT BERMS	100	FOOT	$ 5.00	$ 500.00
F-38	ASPHALT APPROACHES	12	EA	$ 1,150.00	$ 13,800.00
F-39	ASHPALT PEDESTRIAN LANDINGS	1	EA	$ 850.00	$ 850.00
F-40	CONCRETE CURBS, STANDARD CURB	8400	FOOT	$ 12.00	$ 100,800.00
F-41	CONCRETE CURBS, CURB AND GUTTER	300	FOOT	$ 26.50	$ 7,950.00
F-42	CONCRETE CURBS, MOUNTABLE CURB	16800	FOOT	$ 11.00	$ 184,800.00
F-43	CONCRETE WALKS	49680	SQFT	$ 5.00	$ 248,400.00
F-43	ADA CURB RAMP	22	EA	$ 2,000.00	$ 44,000.00
F-44	6 INCH CONCRETE SURFACING	3500	SQFT	$ 7.00	$ 24,500.00
PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES					
G-45	PAVEMENT LINE REMOVAL	2000	FOOT	$ 0.65	$ 1,300.00
G-46	PAVEMENT BAR REMOVAL	100	SQFT	$ 5.20	$ 520.00
G-47	PAVEMENT LEGEND REMOVAL	2	EA	$ 68.00	$ 136.00
G-48	THERMOPLASTIC, EXTRUDED, SURFACE, PROFILED	12000	FOOT	$ 1.20	$ 14,400.00
G-49	THERMOPLASTIC, EXTRUDED, SURFACE, NON-PROFILED	500	FOOT	$ 0.90	$ 450.00
G-50	PAVEMENT LEGEND, TYPE B-HS: BICYCLE LANE STENCIL	10	EA	$ 280.00	$ 2,800.00
G-51	PAVEMENT LEGEND, TYPE B-HS: SHARED LANE MARKING	1	EA	$ 300.00	$ 300.00
G-52	PAVEMENT BAR, TYPE B-HS	600	FOOT	$ 7.50	$ 4,500.00
G-53	PAVEMENT LEGEND, TYPE B-HS: ARROWS	2	EA	$ 270.00	$ 540.00
G-54	RELOCATE SIGNAGE	1	LS	$ 5,000.00	$ 5,000.00
G-55	RELOCATE TRANSIT STOPS	10	EA	$ 900.00	$ 9,000.00
PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS					
H-56	TRAFFIC SIGNAL, REMOVAL	0	EA	$ 5,000.00	$ -
H-57	TRAFFIC SIGNAL, COMPLETE	1	EA	$ 298,000.00	$ 298,000.00
H-58	ELECTRIC UTILITY MODIFICATIONS	1	LS	$ 50,000.00	$ 50,000.00
RIGHT OF WAY DEVELOPMENT AND CONTROL					
I-59	LANDSCAPE RESTORATION, COMPLETE	1	LS	$ 35,000.00	$ 35,000.00
I-60	RAIN GARDEN / BIOSWALE	500	SY	$ 80.00	$ 40,000.00
I-61	CL-4 CHAIN-LINK FENCE WITH BLACK VINYL CLAD FABRIC	1200	FT	$ 33.50	$ 40,200.00
I-62	SINGLE MAILBOX SUPPORTS	12	EA	$ 200.00	$ 2,400.00
I-63	MAILBOX CONCRETE COLLARS	12	EA	$ 150.00	$ 1,800.00
	SUBTOTAL FOR SCHEDULE:				**$2,374,435.00**
	SUBTOTAL WITH 20% CONTINGENCY:				**$2,849,322.00**
	DESIGN/CONSTRUCTION ADMIN (30%):				**$854,796.60**
	ROW ACQUISITION:				**$495,881.40**
	PROJECT TOTAL:				**$4,200,000.00**

CITY OF West Linn

Highway 43 Phase III - Cost Estimate

Project #: **Highway 43 Phase III - Dillow to Failing St**
Preliminary Cost Cost Estimate 7/19/16

Item	Description of material and/or services	CONTRACT AMOUNTS Qty	Unit	Unit Price	Total Amount
TEMPORARY FEATURES AND APPURTENANCES					
A-1	MOBILIZATION	1	LS	$ 90,000.00	$ 90,000.00
A-2	TEMPORARY WORK ZONE TRAFFIC CONTROL, COMPLETE	1	LS	$ 95,000.00	$ 95,000.00
A-3	EROSION CONTROL	1	LS	$ 25,000.00	$ 25,000.00
A-4	POLLUTION CONTROL PLAN	1	LS	$ 2,500.00	$ 2,500.00
ROADWORK					
B-5	CONSTRUCTION SURVEY WORK	1	LS	$ 25,000.00	$ 25,000.00
B-6	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	1	LS	$ 40,000.00	$ 40,000.00
B-7	CLEARING AND GRUBBING	1	LS	$ 25,000.00	$ 25,000.00
B-8	GENERAL EXCAVATION	12000	CUYD	$ 30.00	$ 360,000.00
B-9	12 INCH SUBGRADE STABILIZATION	350	SQYD	$ 15.00	$ 5,250.00
B-10	CULVERT EMBANKMENT PROTECTION	4	EA	$ 150.00	$ 600.00
B-11	RIPRAP BASINS	4	EA	$ 500.00	$ 2,000.00
DRAINAGE AND SEWERS					
C-12	ROCK EXCAVATION	150	CUYD	$ 85.00	$ 12,750.00
C-13	MAINLINE VIDEO INSPECTION	2000	FOOT	$ 1.25	$ 2,500.00
C-14	12 INCH STORM SEWER PIPE, 5 FT DEPTH	1000	FOOT	$ 60.00	$ 60,000.00
C-15	24 INCH STORM SEWER PIPE, 5 FT DEPTH	200	FOOT	$ 150.00	$ 30,000.00
C-16	36 INCH STORM SEWER PIPE, 5 FT DEPTH	40	FOOT	$ 175.00	$ 7,000.00
C-17	SLOPED END SECTIONS, 12 INCH	3	EA	$ 700.00	$ 2,100.00
C-18	CONCRETE STORM SEWER MANHOLES	3	EA	$ 3,000.00	$ 9,000.00
C-19	CONCRETE INLETS, TYPE G-2	2	EA	$ 1,500.00	$ 3,000.00
C-20	CONCRETE INLETS, TYPE CG-2	10	EA	$ 1,500.00	$ 15,000.00
C-21	CONCRETE INLETS, TYPE D	2	EA	$ 1,200.00	$ 2,400.00
C-22	ADJUSTING BOXES	35	EA	$ 67.00	$ 2,345.00
C-23	FILLING ABANDONED STRUCTURES	2	EA	$ 225.00	$ 450.00
C-24	ADD OR REPLACE MANHOLE ADJUSTMENT RINGS	4	EA	$ 470.00	$ 1,880.00
C-25	MANHOLES OVER EXISTING SEWERS	2	EA	$ 2,000.00	$ 4,000.00
C-26	TRENCH RESURFACING	676	SQYD	$ 34.00	$ 22,984.00
BRIDGES AND RETAINING WALLS					
D-27	RETAINING WALL, PREFABRICATED MODULAR GRAVITY, COMPLETE	11500	SF	$ 30.00	$ 345,000.00
BASES					
E-28	RECONDITIONING EXISTING ROADWAY	1	LS	$ 5,000.00	$ 5,000.00
E-29	COLD PLANE PAVEMENT REMOVAL, 0-2 INCHES DEEP	4500	SQYD	$ 2.80	$ 12,600.00
E-30	COLD PLANE PAVEMENT REMOVAL, 2 INCHES DEEP	1000	SQYD	$ 3.00	$ 3,000.00
E-31	COLD PLANE PAVEMENT REMOVAL, 6 INCHES DEEP	100	SQYD	$ 5.05	$ 505.00
E-32	AGGREGATE BASE	3600	TON	$ 26.00	$ 93,600.00
E-33	AGGREGATE SHOULDERS	40	TON	$ 80.00	$ 3,200.00
WEARING SURFACES					
F-34	LEVEL 3, 1/2 INCH ACP MIXTURE	2600	TON	$ 84.50	$ 219,700.00
F-35	LEVEL 3, 3/4 INCH ACP MIXTURE	1000	TON	$ 95.50	$ 95,500.00
F-36	3 INCH ASPHALT CONCRETE PAVEMENT REPAIR	680	SQYD	$ 27.00	$ 18,360.00
F-37	ASPHALT BERMS	200	FOOT	$ 5.00	$ 1,000.00
F-38	ASPHALT APPROACHES	12	EA	$ 1,150.00	$ 13,800.00
F-39	ASHPALT PEDESTRIAN LANDINGS	1	EA	$ 850.00	$ 850.00
F-40	CONCRETE CURBS, STANDARD CURB	6800	FOOT	$ 12.00	$ 81,600.00
F-41	CONCRETE CURBS, CURB AND GUTTER	400	FOOT	$ 26.50	$ 10,600.00
F-42	CONCRETE CURBS, MOUNTABLE CURB	13600	FOOT	$ 11.00	$ 149,600.00
F-43	CONCRETE WALKS	40920	SQFT	$ 5.00	$ 204,600.00
F-43	ADA CURB RAMP	18	EA	$ 2,000.00	$ 36,000.00
F-44	6 INCH CONCRETE SURFACING	2500	SQFT	$ 7.00	$ 17,500.00
PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES					
G-45	PAVEMENT LINE REMOVAL	2000	FOOT	$ 0.65	$ 1,300.00
G-46	PAVEMENT BAR REMOVAL	100	SQFT	$ 5.20	$ 520.00
G-47	PAVEMENT LEGEND REMOVAL	2	EA	$ 68.00	$ 136.00
G-48	THERMOPLASTIC, EXTRUDED, SURFACE, PROFILED	11000	FOOT	$ 1.20	$ 13,200.00
G-49	THERMOPLASTIC, EXTRUDED, SURFACE, NON-PROFILED	1000	FOOT	$ 0.90	$ 900.00
G-50	PAVEMENT LEGEND, TYPE B-HS: BICYCLE LANE STENCIL	10	EA	$ 280.00	$ 2,800.00
G-51	PAVEMENT LEGEND, TYPE B-HS: SHARED LANE MARKING	1	EA	$ 300.00	$ 300.00
G-52	PAVEMENT BAR, TYPE B-HS	600	FOOT	$ 7.50	$ 4,500.00
G-53	PAVEMENT LEGEND, TYPE B-HS: ARROWS	10	EA	$ 270.00	$ 2,700.00
G-54	RELOCATE SIGNAGE	1	LS	$ 5,000.00	$ 5,000.00
G-55	RELOCATE TRANSIT STOPS	12	EA	$ 900.00	$ 10,800.00
PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS					
H-56	TRAFFIC SIGNAL, REMOVAL	1	EA	$ 5,000.00	$ 5,000.00
H-57	TRAFFIC SIGNAL, COMPLETE	1	EA	$ 298,000.00	$ 298,000.00
H-58	ELECTRIC UTILITY MODIFICATIONS	1	LS	$ 50,000.00	$ 50,000.00
RIGHT OF WAY DEVELOPMENT AND CONTROL					
I-59	LANDSCAPE RESTORATION, COMPLETE	1	LS	$ 35,000.00	$ 35,000.00
I-60	RAIN GARDEN / BIOSWALE	500	SY	$ 80.00	$ 40,000.00
I-61	CL-4 CHAIN-LINK FENCE WITH BLACK VINYL CLAD FABRIC	1200	FT	$ 33.50	$ 40,200.00
I-62	SINGLE MAILBOX SUPPORTS	12	EA	$ 200.00	$ 2,400.00
I-63	MAILBOX CONCRETE COLLARS	12	EA	$ 150.00	$ 1,800.00
	SUBTOTAL FOR SCHEDULE:				**$2,668,130.00**
	SUBTOTAL WITH 20% CONTINGENCY:				**$3,201,756.00**
	DESIGN/CONSTRUCTION ADMIN (30%):				**$960,526.80**
	ROW ACQUISITION:				**$337,717.20**
	PROJECT TOTAL:				**$4,500,000.00**

CITY OF West Linn

Highway 43 Phase IV - Cost Estimate

Project #: **Highway 43 Phase IV - Failing St to Holly St**
Preliminary Cost Cost Estimate 7/19/16

Item	Description of material and/or services	CONTRACT AMOUNTS Qty	Unit	Unit Price	Total Amount
TEMPORARY FEATURES AND APPURTENANCES					
A-1	MOBILIZATION	1	LS	$ 100,000.00	$ 100,000.00
A-2	TEMPORARY WORK ZONE TRAFFIC CONTROL, COMPLETE	1	LS	$ 115,000.00	$ 115,000.00
A-3	EROSION CONTROL	1	LS	$ 25,000.00	$ 25,000.00
A-4	POLLUTION CONTROL PLAN	1	LS	$ 2,500.00	$ 2,500.00
ROADWORK					
B-5	CONSTRUCTION SURVEY WORK	1	LS	$ 25,000.00	$ 25,000.00
B-6	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	1	LS	$ 40,000.00	$ 40,000.00
B-7	CLEARING AND GRUBBING	1	LS	$ 15,000.00	$ 15,000.00
B-8	GENERAL EXCAVATION	3500	CUYD	$ 30.00	$ 105,000.00
B-9	12 INCH SUBGRADE STABILIZATION	350	SQYD	$ 15.00	$ 5,250.00
B-10	CULVERT EMBANKMENT PROTECTION	4	EA	$ 150.00	$ 600.00
B-11	RIPRAP BASINS	4	EA	$ 500.00	$ 2,000.00
DRAINAGE AND SEWERS					
C-12	ROCk EXCAVATION	150	CUYD	$ 85.00	$ 12,750.00
C-13	MAINLINE VIDEO INSPECTION	2000	FOOT	$ 1.25	$ 2,500.00
C-14	12 INCH STORM SEWER PIPE, 5 FT DEPTH	800	FOOT	$ 60.00	$ 48,000.00
C-15	18 INCH STORM SEWER PIPE, 5 FT DEPTH	80	FOOT	$ 150.00	$ 12,000.00
C-16	24 INCH STORM SEWER PIPE, 5 FT DEPTH	40	FOOT	$ 150.00	$ 6,000.00
C-17	SLOPED END SECTIONS, 12 INCH	2	EA	$ 700.00	$ 1,400.00
C-18	CONCRETE STORM SEWER MANHOLES	3	EA	$ 3,000.00	$ 9,000.00
C-19	CONCRETE INLETS, TYPE G-2	2	EA	$ 1,500.00	$ 3,000.00
C-20	CONCRETE INLETS, TYPE CG-2	10	EA	$ 1,500.00	$ 15,000.00
C-21	CONCRETE INLETS, TYPE D	2	EA	$ 1,200.00	$ 2,400.00
C-22	ADJUSTING BOXES	35	EA	$ 67.00	$ 2,345.00
C-23	FILLING ABANDONED STRUCTURES	2	EA	$ 225.00	$ 450.00
C-24	ADD OR REPLACE MANHOLE ADJUSTMENT RINGS	4	EA	$ 470.00	$ 1,880.00
C-25	MANHOLES OVER EXISTING SEWERS	2	EA	$ 2,000.00	$ 4,000.00
C-26	TRENCH RESURFACING	676	SQYD	$ 34.00	$ 22,984.00
BRIDGES AND RETAINING WALLS					
D-27	RETAINING WALL, PREFABRICATED MODULAR GRAVITY, COMPLETE	13500	SF	$ 55.00	$ 742,500.00
BASES					
E-28	RECONDITIONING EXISTING ROADWAY	1	LS	$ 5,000.00	$ 5,000.00
E-29	COLD PLANE PAVEMENT REMOVAL, 0-2 INCHES DEEP	6500	SQYD	$ 2.80	$ 18,200.00
E-30	COLD PLANE PAVEMENT REMOVAL, 2 INCHES DEEP	1000	SQYD	$ 3.00	$ 3,000.00
E-31	COLD PLANE PAVEMENT REMOVAL, 6 INCHES DEEP	1000	SQYD	$ 5.05	$ 5,050.00
E-32	AGGREGATE BASE	4600	TON	$ 26.00	$ 119,600.00
E-33	AGGREGATE SHOULDERS	40	TON	$ 80.00	$ 3,200.00
WEARING SURFACES					
F-34	LEVEL 3, 1/2 INCH ACP MIXTURE	2700	TON	$ 84.50	$ 228,150.00
F-35	LEVEL 3, 3/4 INCH ACP MIXTURE	1500	TON	$ 95.50	$ 143,250.00
F-36	3 INCH ASPHALT CONCRETE PAVEMENT REPAIR	680	SQYD	$ 27.00	$ 18,360.00
F-37	ASPHALT BERMS	500	FOOT	$ 5.00	$ 2,500.00
F-38	ASPHALT APPROACHES	30	EA	$ 1,150.00	$ 34,500.00
F-39	ASHPALT PEDESTRIAN LANDINGS	1	EA	$ 850.00	$ 850.00
F-40	CONCRETE CURBS, STANDARD CURB	6600	FOOT	$ 12.00	$ 79,200.00
F-41	CONCRETE CURBS, CURB AND GUTTER	1000	FOOT	$ 26.50	$ 26,500.00
F-42	CONCRETE CURBS, MOUNTABLE CURB	13200	FOOT	$ 11.00	$ 145,200.00
F-43	CONCRETE WALKS	39560	SQFT	$ 5.00	$ 197,800.00
F-43	ADA CURB RAMP	24	EA	$ 2,000.00	$ 48,000.00
F-44	6 INCH CONCRETE SURFACING	6000	SQFT	$ 7.00	$ 42,000.00
PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES					
G-45	PAVEMENT LINE REMOVAL	4000	FOOT	$ 0.65	$ 2,600.00
G-46	PAVEMENT BAR REMOVAL	100	SQFT	$ 5.20	$ 520.00
G-47	PAVEMENT LEGEND REMOVAL	2	EA	$ 68.00	$ 136.00
G-48	THERMOPLASTIC, EXTRUDED, SURFACE, PROFILED	12000	FOOT	$ 1.20	$ 14,400.00
G-49	THERMOPLASTIC, EXTRUDED, SURFACE, NON-PROFILED	4000	FOOT	$ 0.90	$ 3,600.00
G-50	PAVEMENT LEGEND, TYPE B-HS: BICYCLE LANE STENCIL	10	EA	$ 280.00	$ 2,800.00
G-51	PAVEMENT LEGEND, TYPE B-HS: SHARED LANE MARKING	1	EA	$ 300.00	$ 300.00
G-52	PAVEMENT BAR, TYPE B-HS	600	FOOT	$ 7.50	$ 4,500.00
G-53	PAVEMENT LEGEND, TYPE B-HS: ARROWS	12	EA	$ 270.00	$ 3,240.00
G-54	RELOCATE SIGNAGE	1	LS	$ 5,000.00	$ 5,000.00
G-55	RELOCATE TRANSIT STOPS	12	EA	$ 900.00	$ 10,800.00
PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS					
H-56	TRAFFIC SIGNAL, REMOVAL	2	EA	$ 5,000.00	$ 10,000.00
H-57	TRAFFIC SIGNAL, COMPLETE	1.5	EA	$ 298,000.00	$ 447,000.00
H-58	ELECTRIC UTILITY MODIFICATIONS	1	LS	$ 50,000.00	$ 50,000.00
RIGHT OF WAY DEVELOPMENT AND CONTROL					
I-59	LANDSCAPE RESTORATION, COMPLETE	1	LS	$ 35,000.00	$ 35,000.00
I-60	RAIN GARDEN / BIOSWALE	500	SY	$ 80.00	$ 40,000.00
I-61	CL-4 CHAIN-LINK FENCE WITH BLACK VINYL CLAD FABRIC	4800	FT	$ 33.50	$ 160,800.00
I-62	SINGLE MAILBOX SUPPORTS	12	EA	$ 200.00	$ 2,400.00
I-63	MAILBOX CONCRETE COLLARS	12	EA	$ 150.00	$ 1,800.00
	SUBTOTAL FOR SCHEDULE:				**$3,232,615.00**
	SUBTOTAL WITH 20% CONTINGENCY:				**$3,879,138.00**
	DESIGN/CONSTRUCTION ADMIN (30%):				**$1,163,741.40**
	ROW ACQUISITION:				**$657,120.60**
	PROJECT TOTAL:				**$5,700,000.00**

Appendix 7 ODOT Design Exceptions

Oregon

Department of Transportation
Region 1 Headquarters
123 NW Flanders Street
Portland, Oregon 97209
(503) 731.8200
FAX (503) 731.8531

August 18, 2016

Mayor Axelrod and City Council
City of West Linn
22500 Salamo Road
West Linn, OR 97068

Subject: **Request for Additional Language, West Linn OR43 2016 Concept Plan, PLN-15-03**

Dear Mayor Axelrod and City Council Members,

We applaud the City of West Linn for your leadership in providing a vision for modifying Oswego Highway (OR 43) to better serve the multimodal needs of your community. The City staff and consultant team have worked closely with ODOT throughout the concept plan development. In order to complete this process, we request that additional language be added to the West Linn OR43 2016 Concept Plan as a part of the plan adoption. The additional language pertaining to a future refinement (#2 below) will ensure compliance with the Oregon Highway Plan, an element of the state's adopted transportation system plan.

The requested additional language is supported by City Staff:

1) Add "Final design is subject to ODOT approval" to the cross-sections (shown on page 13) and Figures 1-22 of the concept plan. This will make clear the adoption of the concept plan does not constitute compliance with the Oregon Highway Design Manual and ODOT approval. While this is evident today we want to make sure it is clear in the future.

2) Revise Project M35 (page 248) to read: *Conduct a refinement plan to address the Highway 43 projected 2040 unmet ODOT mobility standard at ~~Highway 43/~~I-205SB; Marylhurst Dr.-Lazy River Way; Hidden Springs Rd.; Arbor Dr.; Pimlico Dr.; and Holmes St.*. Also, we understand the "low" project priority generally corresponds with years 2035-2040. This revised language will comply with Oregon Highway Plan, Policy 1F.3 pertaining to mobility targets.

3) Add this ODOT letter to the adopted plan or plan appendix including the attached May 17, 2016 letter. The attached letter conveys the City will likely need ODOT to consider design exceptions as part of the final design. (Note: We understand the OR43 center lane width has been increased to 13').

Thank you for the coordination. We look forward to working with you on the plan implementation.

Sincerely,

Jon Makler

Jon Makler, ODOT Region 1 Planning Manager

ATTACH: ODOT May 17, 2016 letter

c: Doug Stanley, PE, ODOT

Department of Transportation
Region 1 Headquarters
123 NW Flanders Street
Portland, Oregon 97209
(503) 731.8200
FAX (503) 731.8531

May 17, 2016

Karla Kingsley
Kittleson and Associates
610 SW Alder Street, Suite 700
Portland, Oregon 97205

Re: Design Exceptions for OR43 in West Linn

Dear Karla,

Thank you for your letter requesting clarification on which design elements will require design exceptions for the proposed cross-sections in the Highway 43 Concept Design Plan. In response to the specific items mentioned in your letter, ODOT has the following comments.

1. Center turn lane

The center turn lane being 12-feet instead of 14-feet will require a design exception. ODOT design requirement of 14-feet (Table 6-3 of ODOT's Highway Design Manual) for the median is based on the median striping falling within the median width. The 14-feet median also provides some shy distance between through vehicles and stopped vehicles in the median and allows opportunities for access management treatments. 11-foot travel lanes next to a 12-foot median limits the ability for vehicles to drive closer to the median striping to avoid hitting the curb, inlet frames, stormwater spread, and splashing bicyclists. There may be challenges in obtaining a design exception for a 12-foot median adjacent to 11 foot travel lanes.

2. Shoulder

A design exception request will be needed since the proposed plan provides no shoulder. Table 6-3 of ODOT's Highway Design Manual requires a 6-foot right-side shoulder. ODOT does not consider the 2-foot offset as a shoulder. The offset does meet ODOT design requirements.

3. Shy between curb and travel lane

The two foot shy distance addresses this issue and a design exception will not be needed.

4. Sidewalks

The sidewalk in the 'Typical Cross-Section' and the 'Transit Stop Cross-Section' meets ODOT design requirements if the curb of the sidewalk falls in the portion of the cycle track width. The

'Constrained Cross-Section' may not meet design requirements because utility poles, illumination poles, traffic signal poles, and regulatory/advisory signs would fall in the sidewalk area limiting the space for pedestrians to walk. The clearance for pedestrians from vertical objects on the sidewalk cannot be less than 4-feet in width. Therefore, a design exception may still be needed for the 'Constrained Cross-Section'.

5. Bike Lane
The 6 to 7-feet cycle track meets ODOT design requirements for bike lane.

6. No utility or maintenance access area at back of sidewalk
Adding a 1 foot buffer to the ROW behind the sidewalk avoids costly and time consuming problem of having to obtain construction easements for constructing or repairing the sidewalk. Obtaining these easements after the fact sometimes causes significant delays in construction and repair. No design exception request is needed for this 1-foot buffer, but a discussion is needed on the sidewalk width on how the lack of this 1-foot buffer affects the sidewalk width.

7. Travel lane width
In order to accept 11 foot travel lanes, ODOT will need a 24-hour vehicle classification tube counts conducted on a Tuesday, Wednesday, or Thursday to confirm OR43 carries less than 250 four-axles or larger trucks per day. We will also need more information on whether TriMet buses can function safely within the 11-foot travel lane widths in curves and constrained cross-sections before ODOT can accept 11-foot travel lanes. There would also be some concerns about approving design exceptions for a reduced width shoulder, reduced median, and a reduced travel lane.

Another issue of concern to ODOT which is not addressed in your letter is **Clear Zone.** ODOT will require a design exception request for clear zone for the fixed objects (e.g. trees, illumination poles, and utility poles) or stormwater planter being placed in the planter strip between the cycle track and the roadway curb. The lack of a full shoulder and/or the terrain behind the back of sidewalk may also create a need for design exception requests.

Other design exception requests beside the ones identified in this letter may be needed when a future project moves into detailed design.

ODOT has some design concerns with the proposed cross-section that should be noted:

- The proposed cross-sections have two-tiers for the cycle track and sidewalk. Placing the sidewalk on a second tier may cause ADA challenges in design.
- The terrain may create challenges for ADA in design.
- A 3-foot shy from a vertical object and the edge of pavement of the cycle track should be used. The proposed cycle track in all of the cross-sections in Figure 2 does not provide a 3-foot shy from 3-foot regulatory/advisory signs and other vertical objects.

- Stormwater inlet design for the 'Constrained Cross-Section' in Figure 2 has challenges for maintenance and design.
- Space for sufficient water quality treatment.

For planning studies that have substandard design elements and features that may be constructed within five to ten years, a concurrence process similar to the design exception process will need to be conducted. Approval from the State Traffic/Roadway Engineer will be needed before incorporation of dimensions into the final plan.

Feel free to contact me if you have any questions.

Sincerely,

Jon Makler

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