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April 14, 2010

Mr. Pat Allen
Northern Aggregate, Inc.
P.O. Box 1566
Willits, CA 95490

Harris Quarry Response to Comments

Dear Mr. Allen;

Whitlock & Weinberger Transportation, Inc. (W-Trans) completed the *Updated Supplemental Traffic Impact Analysis for the Harris Quarry* in the County of Mendocino on January 27, 2010. We have since received comments on this report from Mr. Mark Crane of Crane Transportation Group via email dated March 5, 2010. These comments are reprinted below with our responses.

Comment 1

Reference is made several times to the fact that Caltrans does not apply level of service/delay criteria to private driveway approaches to state highways. Since this statement is not in their Guide for Preparation of Traffic Impact Studies, where did it come from? Is this directly from Marc Birnbaum at Caltrans, or some staff person at District 1? Please detail.

Response: There is no clear direction from Caltrans in the *Guide for Preparation of Traffic Impact Studies* as to the level of service standards for private driveway approaches. We have routinely applied level of service criteria to movements that directly impact State facilities such as left turns from the highway. All calculations are provided within the body of the report and/or appendices if Mr. Crane chooses to report this data in the EIR. The delays and LOS results provided on Tables 13, 14, 16 and 17 in the report represent the delay on the controlled approach, which is the eastbound approach for both intersections. It should be noted that with all proposed mitigations, the controlled approaches are expected to operate acceptably at LOS C or better for all study periods.

Comment 2

Table 6 – Trip Generation Assumptions With Proposed Project shows 58,280 CY of asphalt being produced with only 10,280 CY of aggregate, or 18 percent of the total CY (the other 199,720 CY out of the total 210,000 CY mined or imported being sold as aggregate or transferred to Willits). Is this truly the proportion of aggregate in asphalt? Do Table 6 findings reflect a bulking factor which is not listed in the table?

Response: We recognize that Table 6 provided in the report did not clearly show the bulking factor. To clarify the distribution of material, a revised Table 6 will be provided in the errata.

Comment 3

Table 7 – Trip Generation Assumptions (200,000 CY mined) results do not match with Appendix C, page 2 calculations (258,000 CY versus 268,000 CY). Also, the Appendix C page 1 calculations at the bottom of the

page fail to account for the recycled material. Does this impact your calculations re number of trucks for the different analysis scenarios?

Response: Total truck trips shown in Table 7 do match calculations presented in Appendix C. The reference is to 200,000 CY mined, not the total amount transported, which is 258,000 cubic yards when the bulking factor and recycled material imported are added.

The calculation in Appendix C at the bottom of page 1 is a typographical error; it should read 258,000 cubic yards per year. The 258,000 cubic yards per year was used for all subsequent calculations. An erratum showing the corrected equation will be provided.

Comment 4

Passenger Car Equivalents (page 18). The statement is made that PCEs were only applied to truck turns to/from the quarry. May we assume that a truck percentage was included for the through traffic on US 101? Please confirm.

Response: The analysis software's default setting for heavy vehicles was utilized for all background traffic. Additionally, the PCE factor was applied to all Quarry generated truck trips, including through movements at US 101/Black Bart Drive.

Comment 5

Caltrans Criteria: Have Caltrans District 1 staff agreed to the findings/direction from Marc Birnbaum?

Response: This standard has been successfully applied to projects in various Caltrans districts. As noted in Response to Comment 1, data for all approaches has been provided and the controlled approach is expected to operate acceptably during all study periods with the implementation of all recommended mitigation measures.

Comment 6

Acceleration Lane Warrants. Please detail the methodology for determining the need for the acceleration lanes to accommodate right and left turns from the quarry access. Please supply the worksheets.

Response: Acceleration lane warrants were inadvertently excluded from Appendix G. These warrants are attached to this letter and include methodology references. An erratum will be provided which will include this data.

Comment 7

Significance Criteria: Why were no significance criteria utilized evaluating change in delay due to project traffic at the quarry access and Black Bart Drive intersections with US 101?

Response: As noted in the Responses to Comments 1 and 5, data for all approaches has been provided and the controlled approach is expected to operate acceptably during all study periods with the implementation of all recommended mitigation measures. Overall intersection operation was considered for the intersection of US 101/Black Bart Drive since the project would not change turning movement volumes at that location.

Comment 8

Weather Impacts: Do you think limited visibility during poor weather conditions in conjunction with the projected 50+ percent increase in traffic on U.S.101 over the next 20 to 30 years will ever lead to the need for additional improvements at the quarry access intersection, such as grade separation?

Response: The California State Legislature has placed the responsibility of safe operation of a vehicle on the driver, as evident by the following sections of the California Vehicle Code:

§ 21802 (a) The driver of any vehicle approaching a stop sign at the entrance to, or within, an intersection shall stop as required by Section 22450. The driver shall then yield the right-of-way to any vehicles which have approached from another highway, or which are approaching so closely as to constitute an immediate hazard, and shall continue to yield the right-of-way to those vehicles until he or she can proceed with reasonable safety.

§ 22350 No person shall drive a vehicle upon a highway at a speed greater than is reasonable or prudent having due regard for weather, visibility, the traffic on, and the surface and width of, the highway, and in no event at a speed which endangers the safety of persons or property.

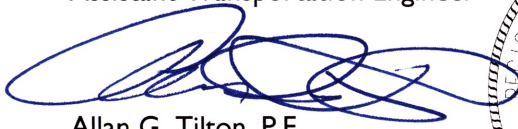
Since the CVC clearly places the burden of safe operation of a vehicle upon the driver, it is not appropriate to shift this responsibility to another party such as the Quarry.

Thank you for contacting W-Trans for these services. Please feel free to call have any questions.

Sincerely,

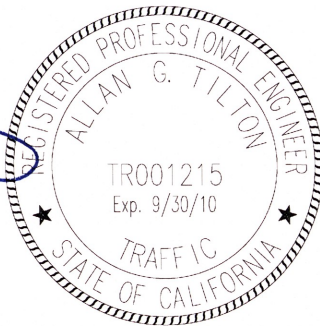


Tony Henderson, EIT
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Senior Associate

AGT/tdh/MEX047.L2

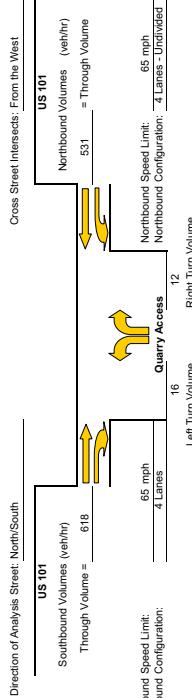


Enclosures: Acceleration Lane Warrants

Copy: Ms. Cathy McKeon, Rau and Associates

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris, Quarry Access
 Study Scenario: 2010 July Peak Blast Permit Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 618
 Advancing Volume Va = 618
 If AV < Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 618
 If AV < Va then warrant is met

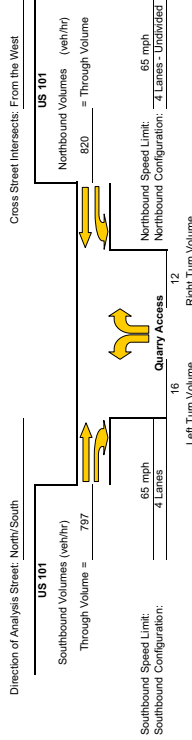
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris, Quarry Access
 Study Scenario: 2010 July Peak Blast Permit Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 797
 Advancing Volume Va = 797
 If AV < Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 797
 If AV < Va then warrant is met

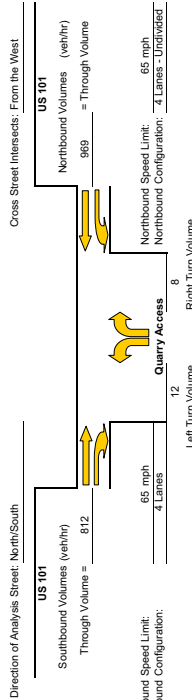
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains, Quarry Access
 Study Scenario: 2010 July Peak Blast Permit Conditions - 1:15-2:15pm



Direction of Analysis Street: North/South
 Cross Street Intersects: From the West

US 101
 Southbound Volumes (veh/hr) = 812
 Through Volume = 812

US 101
 Northbound Volumes (veh/hr) = 969
 Through Volume = 969

Northbound Speed Limit: 65 mph
 Northbound Configuration: 4 Lanes - Undivided

Southbound Speed Limit: 65 mph
 Southbound Configuration: 4 Lanes

Right Turn Volume: 8
 Left Turn Volume: 12

Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LIVol = 11.5 veh/hr
 Left Turn Volume Vt = 12 veh/hr
 If $V_t > LIVol$ then warrant is met

NOT WARRANTED - Less than 40 vehicles

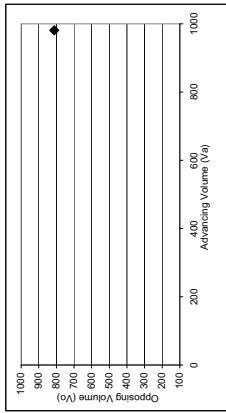
2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 812
 If $AV < Va$ then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
 Advancing Volume Threshold AV = 1066.66667
 Advancing Volume Va = 812
 If $AV < Va$ then warrant is met

Right Turn Taper Warranted: NO



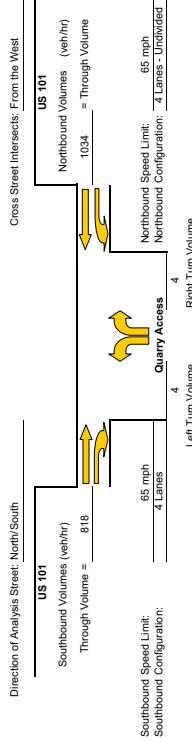
◆ Study Intersection

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains, Quarry Access
 Study Scenario: 2010 July Peak Blast Permit Conditions - 4:45-5:45pm



Direction of Analysis Street: North/South
 Cross Street Intersects: From the West

US 101
 Southbound Volumes (veh/hr) = 818
 Through Volume = 818

US 101
 Northbound Volumes (veh/hr) = 1034
 Through Volume = 1034

Northbound Speed Limit: 65 mph
 Northbound Configuration: 4 Lanes - Undivided

Southbound Speed Limit: 65 mph
 Southbound Configuration: 4 Lanes

Right Turn Volume: 4
 Left Turn Volume: 4

Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LIVol = 11.4 veh/hr
 Left Turn Volume Vt = 4 veh/hr
 If $V_t > LIVol$ then warrant is met

NOT WARRANTED - Less than 40 vehicles

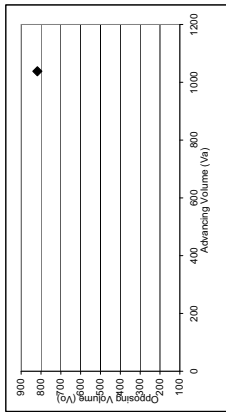
2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 818
 If $AV < Va$ then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
 Advancing Volume Threshold AV = 1200
 Advancing Volume Va = 818
 If $AV < Va$ then warrant is met

Right Turn Taper Warranted: NO



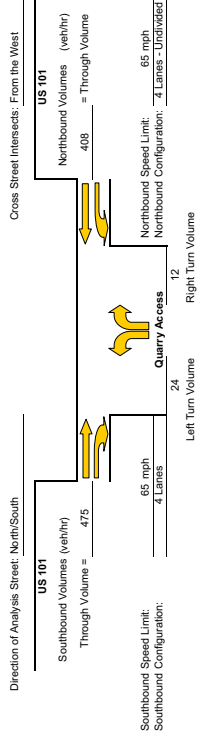
◆ Study Intersection

Left Turn Lane Warranted: NO

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2010 October Peak Base Permit Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 475
 If AV < Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 475
 If AV < Va then warrant is met

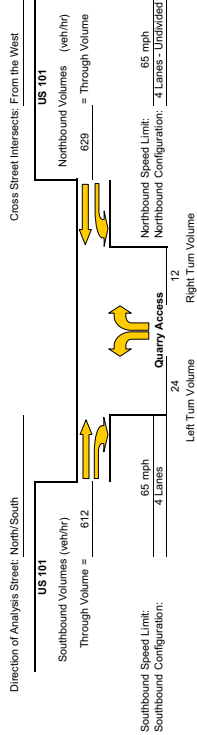
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2010 October Peak Base Permit Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 612
 If AV < Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

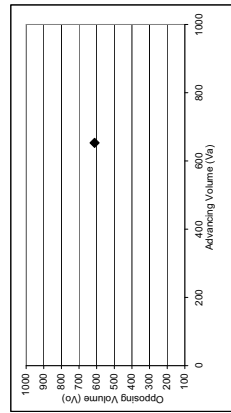
1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 612
 If AV < Va then warrant is met

Right Turn Taper Warranted: NO

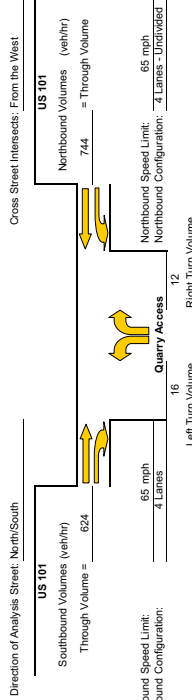
Left Turn Lane Warranted: YES



Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains Quarry Access
 Study Scenario: 2010 October Peak Base Permit Conditions - 1:15-2:15pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 624
 If AV < Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 624
 If AV < Va then warrant is met

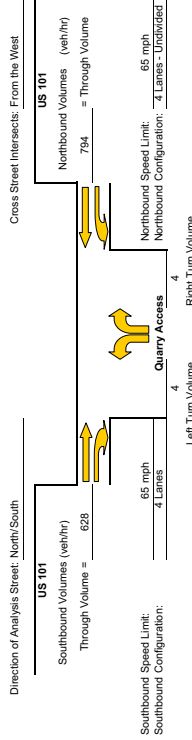
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains Quarry Access
 Study Scenario: 2010 October Peak Base Permit Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 628
 If AV < Va then warrant is met

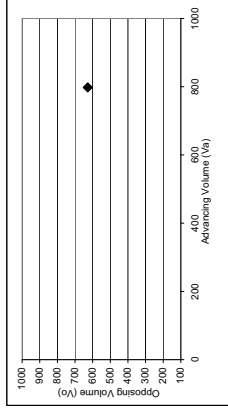
Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
 Advancing Volume Threshold AV = 1200
 Advancing Volume Va = 628
 If AV < Va then warrant is met

Right Turn Taper Warranted: NO

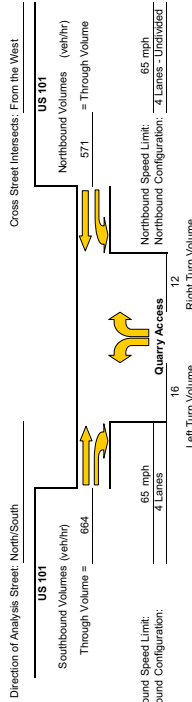
Left Turn Lane Warranted: NO



Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2014 (without Willits Bypass) July Peak Base Permit Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 664
 Advancing Volume Va = 664
 If AV/Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 664
 If AV/Va then warrant is met

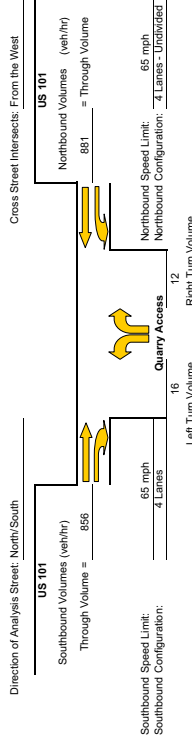
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2014 (without Willits Bypass) July Peak Base Permit Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 856
 Advancing Volume Va = 856
 If AV/Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 856
 If AV/Va then warrant is met

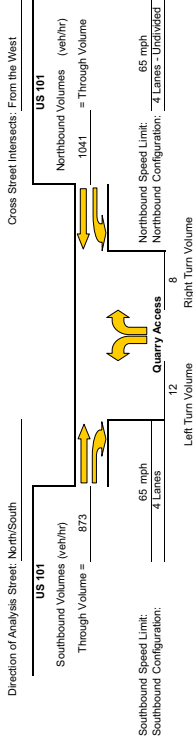
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main, Quarry Access
 Study Scenario: 2014 (without Willits Bypass) July Peak Base Permit Conditions - 1:15-2:15pm
 Direction of Analysis Street: North/South



US 101
 Southbound Volumes (veh/hr) = 873
 Through Volume = 873
 Northbound Speed Limit: 65 mph
 Northbound Configuration: 4 Lanes - Undivided

US 101
 Northbound Volumes (veh/hr) = 1041
 Through Volume = 1041
 Northbound Speed Limit: 65 mph
 Northbound Configuration: 4 Lanes - Undivided

Quarry Access
 Right Turn Volume = 8
 Left Turn Volume = 12

Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria
NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 873
 Advancing Volume Va = -
 If AV < Va then warrant is met
Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)
 1. Check taper volume criteria
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1066.66667
 Advancing Volume Va = 873
 If AV < Va then warrant is met
Right Turn Taper Warranted: NO

Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LTVol = 10.6 veh/hr
 Left Turn Volume Vt = 12 veh/hr
 If Vt > LTVol then warrant is met

Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LTVol = 10.6 veh/hr
 Left Turn Volume Vt = 12 veh/hr
 If Vt > LTVol then warrant is met

1000
900
800
700
600
500
400
300
200
100
0

Advancing Volume (Va)
 Opposing Volume (Vo)

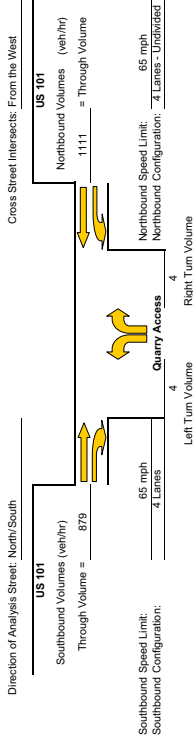
◆ Study Intersection

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main, Quarry Access
 Study Scenario: 2014 (without Willits Bypass) July Peak Base Permit Conditions - 4:45-5:45pm
 Direction of Analysis Street: North/South



US 101
 Southbound Volumes (veh/hr) = 879
 Through Volume = 879
 Northbound Speed Limit: 65 mph
 Northbound Configuration: 4 Lanes - Undivided

US 101
 Northbound Volumes (veh/hr) = 1111
 Through Volume = 1111
 Northbound Speed Limit: 65 mph
 Northbound Configuration: 4 Lanes - Undivided

Quarry Access
 Right Turn Volume = 4
 Left Turn Volume = 4

Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria
NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 879
 Advancing Volume Va = -
 If AV < Va then warrant is met
Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)
 1. Check taper volume criteria
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1200
 Advancing Volume Va = 879
 If AV < Va then warrant is met
Right Turn Taper Warranted: NO

Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LTVol = 10.5 veh/hr
 Left Turn Volume Vt = 4 veh/hr
 If Vt > LTVol then warrant is met

Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LTVol = 10.5 veh/hr
 Left Turn Volume Vt = 4 veh/hr
 If Vt > LTVol then warrant is met

1000
900
800
700
600
500
400
300
200
100
0

Advancing Volume (Va)
 Opposing Volume (Vo)

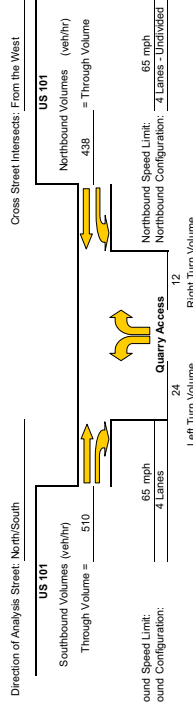
◆ Study Intersection

Left Turn Lane Warranted: NO

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main, Quarry Access
 Study Scenario: 2014 (without Willits Bypass) October Peak Base Permit Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 510
 Advancing Volume Va = 510
 If AV/Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 510
 If AV/Va then warrant is met

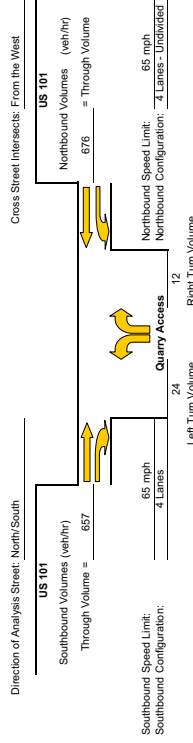
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main, Quarry Access
 Study Scenario: 2014 (without Willits Bypass) October Peak Base Permit Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 657
 Advancing Volume Va = 657
 If AV/Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 657
 If AV/Va then warrant is met

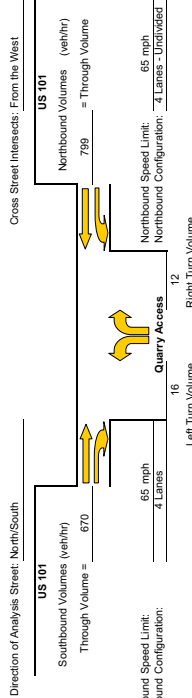
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2014 (without Willits Bypass) October Peak Base Permit Conditions - 11:52-1:50pm



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 670
 Advancing Volume Va = 670
 If AV < Va then warrant is met

Right Turn Lane Warranted: **NO**

Southbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 670
 If AV < Va then warrant is met

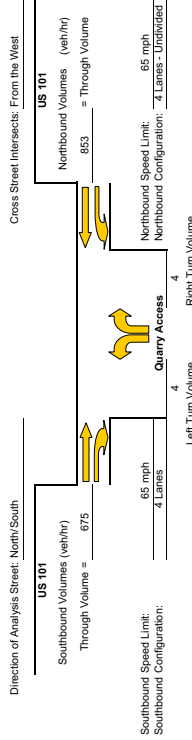
Right Turn Taper Warranted: **NO**

Left Turn Lane Warranted: **YES**

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2014 (without Willits Bypass) October Peak Base Permit Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 675
 Advancing Volume Va = 675
 If AV < Va then warrant is met

Right Turn Lane Warranted: **NO**

Southbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

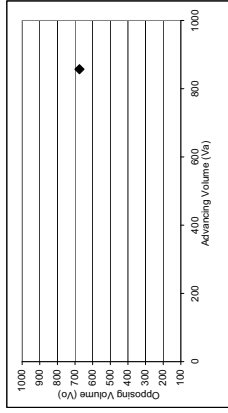
1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1200
 Advancing Volume Va = 675
 If AV < Va then warrant is met

Right Turn Taper Warranted: **NO**

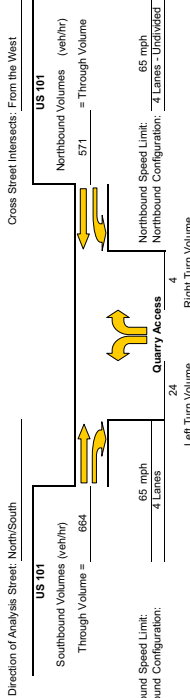
Left Turn Lane Warranted: **NO**



Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mcnic, Quarry Access
 Study Scenario: 2014 (with WHTS Bypass) JWB Peak Base Permit Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 664
 Advancing Volume Va = 664
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1200
 Advancing Volume Va = 664
 If AV > Va then warrant is met

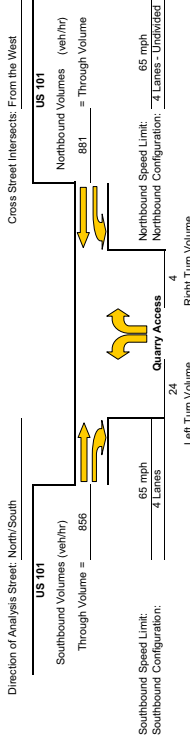
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mcnic, Quarry Access
 Study Scenario: 2014 (with WHTS Bypass) JWB Peak Base Permit Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 856
 Advancing Volume Va = 856
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1200
 Advancing Volume Va = 856
 If AV > Va then warrant is met

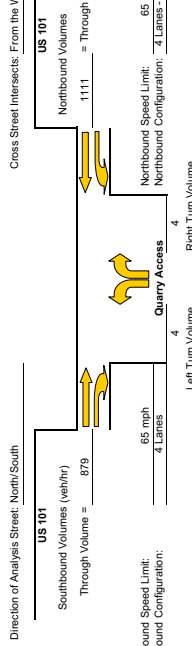
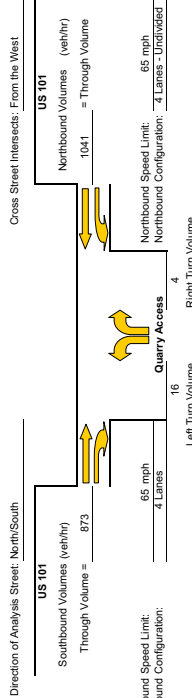
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mcnic, Quarry Access
 Study Scenario: 2014 (with WHTS Bypass) W/P Peak Base Permit Conditions - 1:15-2:15pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 873
 If AV < Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1200
 Advancing Volume Va = 873
 If AV < Va then warrant is met

Right Turn Taper Warranted: NO

Left Turn Volume: 16
 Right Turn Volume: 4
 Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LTVol = 10.6 veh/hr
 Left Turn Volume Vt = 16 veh/hr
 If Vt > LTVol then warrant is met

1000
900
800
700
600
500
400
300
200
100
0

Advancing Volume (Va) 1000 1200

Study Intersection

Left Turn Lane Warranted: YES

Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 879
 If AV < Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1200
 Advancing Volume Va = 879
 If AV < Va then warrant is met

Right Turn Taper Warranted: NO

Left Turn Volume: 4
 Right Turn Volume: 4
 Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LTVol = 10.5 veh/hr
 Left Turn Volume Vt = 4 veh/hr
 If Vt > LTVol then warrant is met

1000
900
800
700
600
500
400
300
200
100
0

Advancing Volume (Va) 1000 1200

Study Intersection

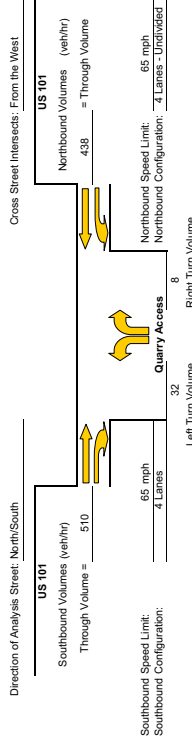
Left Turn Lane Warranted: NO

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/McInis Quarry Access
 Study Scenario: 2014 (with WHTS Bypass) October Peak Base Permit Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 510
 Advancing Volume Va = 510
 If AV/Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1066.66667
 Advancing Volume Va = 510
 If AV/Va then warrant is met

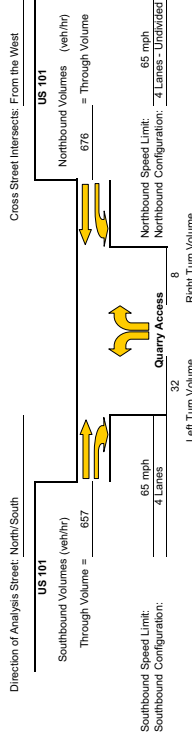
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/McInis Quarry Access
 Study Scenario: 2014 (with WHTS Bypass) October Peak Base Permit Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 657
 Advancing Volume Va = 657
 If AV/Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1066.66667
 Advancing Volume Va = 657
 If AV/Va then warrant is met

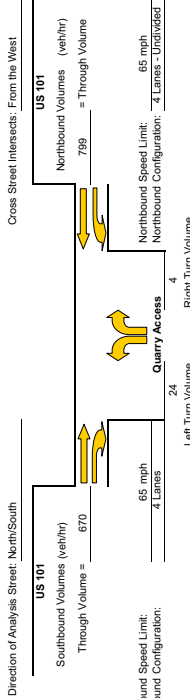
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mcnic, Quarry Access
 Study Scenario: 2014 (with WHTS Bypass) October Peak Base Permit Conditions - 11:52:15pm



Direction of Analysis Street: North/South
 Cross Street Intersects: From the West

US 101
 Southbound Volumes (veh/hr) = 670
 Through Volume = 670 = Through Volume

Northbound Volumes (veh/hr) = 799 = Through Volume

Northbound Speed Limit: 65 mph
 Northbound Configuration: 4 Lanes - Undivided

Right Turn Volume = 4
 Left Turn Volume = 24

US 101
 Northbound Volumes (veh/hr) = 799 = Through Volume

Southbound Speed Limit: 65 mph
 Southbound Configuration: 4 Lanes - Undivided

Right Turn Volume = 4
 Left Turn Volume = 24

Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 670
 If AV<Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1200
 Advancing Volume Va = 670
 If AV<Va then warrant is met

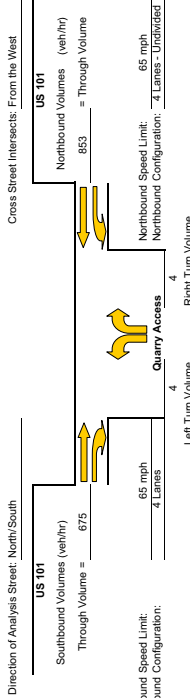
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mcnic, Quarry Access
 Study Scenario: 2014 (with WHTS Bypass) October Peak Base Permit Conditions - 4:45:43pm



Direction of Analysis Street: North/South
 Cross Street Intersects: From the West

US 101
 Southbound Volumes (veh/hr) = 675
 Through Volume = 675 = Through Volume

Northbound Volumes (veh/hr) = 863 = Through Volume

Northbound Speed Limit: 65 mph
 Northbound Configuration: 4 Lanes - Undivided

Right Turn Volume = 4
 Left Turn Volume = 4

US 101
 Northbound Volumes (veh/hr) = 863 = Through Volume

Southbound Speed Limit: 65 mph
 Southbound Configuration: 4 Lanes - Undivided

Right Turn Volume = 4
 Left Turn Volume = 4

Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 675
 If AV<Va then warrant is met

Right Turn Lane Warranted: NO

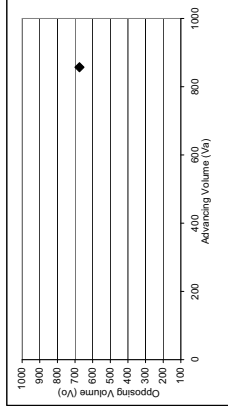
Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1200
 Advancing Volume Va = 675
 If AV<Va then warrant is met

Right Turn Taper Warranted: NO

Left Turn Lane Warranted: NO

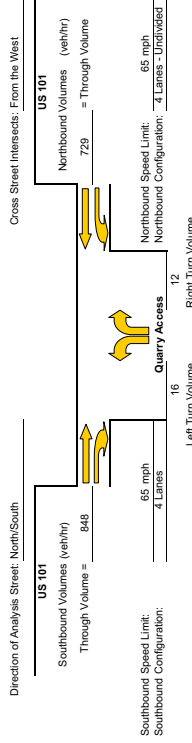


◆ Study Intersection

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains, Quarry Access
 Study Scenario: 2030 July Peak Blast Permit Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 848
 Advancing Volume Va = 848
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 848
 If AV > Va then warrant is met
 Yes No

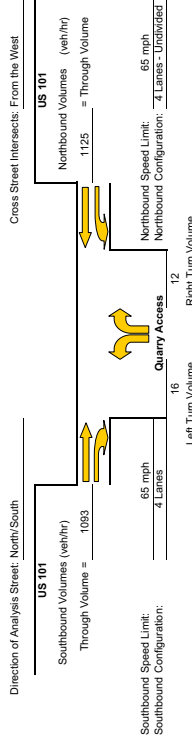
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains, Quarry Access
 Study Scenario: 2030 July Peak Blast Permit Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1093
 Advancing Volume Va = 1093
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 1093
 If AV > Va then warrant is met
 Yes Yes

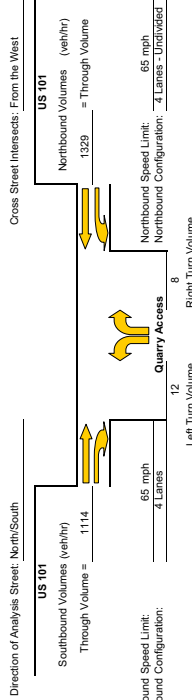
Right Turn Taper Warranted: YES

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris Quarry Access
 Study Scenario: 2030 July Peak Blast Permit Conditions - 1:15-2:15pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1114
 Advancing Volume Va = 1114
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

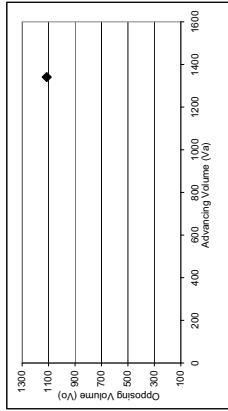
1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1066.6667
 Advancing Volume Va = 1114
 If AV > Va then warrant is met Yes

Right Turn Taper Warranted: YES

Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LIVol = 7.7 veh/hr
 Left Turn Volume Vt = 12 veh/hr
 If Vt > LIVol then warrant is met



◆ Study Intersection

Left Turn Lane Warranted: YES

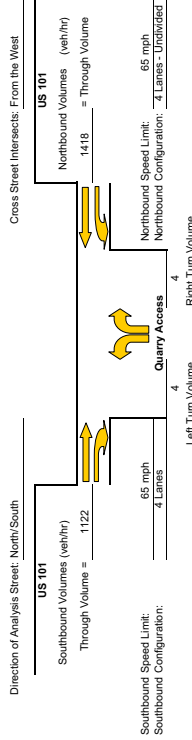
Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottel in 1981.

The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris Quarry Access
 Study Scenario: 2030 July Peak Blast Permit Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1122
 Advancing Volume Va = 1122
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

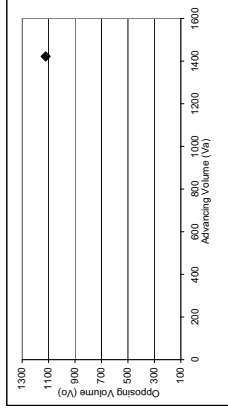
1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1200
 Advancing Volume Va = 1122
 If AV > Va then warrant is met No

Right Turn Taper Warranted: NO

Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LIVol = 7.6 veh/hr
 Left Turn Volume Vt = 4 veh/hr
 If Vt > LIVol then warrant is met



◆ Study Intersection

Left Turn Lane Warranted: NO

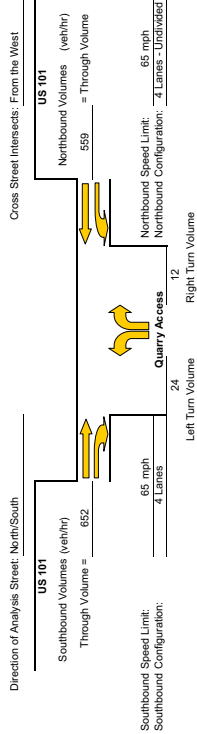
Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottel in 1981.

The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2030 October Peak Base Permit Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 652
 Advancing Volume Va = -
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 652
 If AV > Va then warrant is met

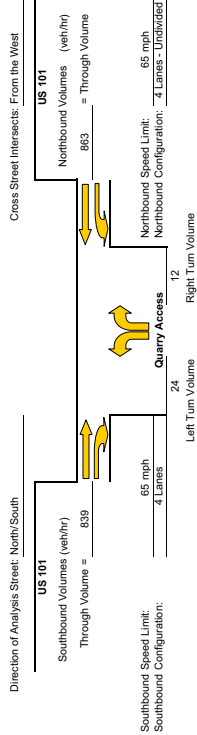
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2030 October Peak Base Permit Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 839
 Advancing Volume Va = -
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

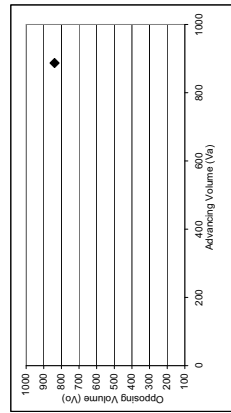
1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 839
 If AV > Va then warrant is met

Right Turn Taper Warranted: NO

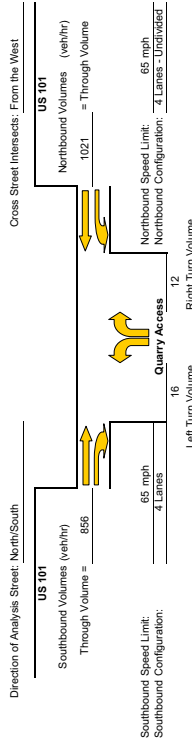
Left Turn Lane Warranted: YES



Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris Quarry Access
 Study Scenario: 2030 October Peak Base Permit Conditions - 11:15-2:15pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria
 Left Turn Volume Threshold LTVol = 10.8 veh/hr
 Left Turn Volume Vt = 16 veh/hr
 If $V_t > LTVol$ then warrant is met

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 856
 Advancing Volume Va = -
 If $AV < Va$ then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 856
 If $AV < Va$ then warrant is met

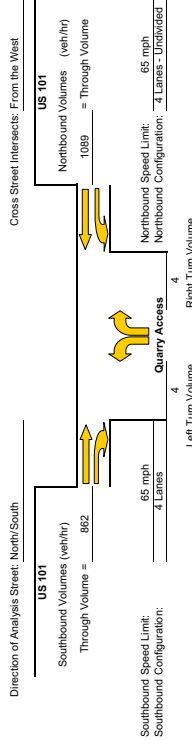
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris Quarry Access
 Study Scenario: 2030 October Peak Base Permit Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria
 Left Turn Volume Threshold LTVol = 10.7 veh/hr
 Left Turn Volume Vt = 4 veh/hr
 If $V_t > LTVol$ then warrant is met

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 882
 Advancing Volume Va = -
 If $AV < Va$ then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
 Advancing Volume Threshold AV = 1200
 Advancing Volume Va = 882
 If $AV < Va$ then warrant is met

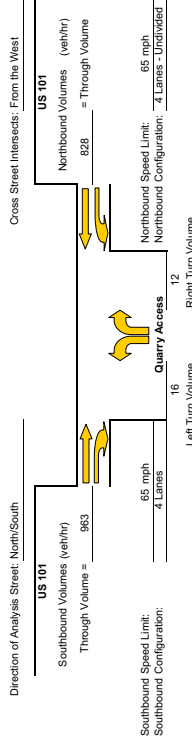
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: NO

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris, Quarry Access
 Study Scenario: 2042 July Peak Blast Permit Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 963
 Advancing Volume Va = -
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 963
 If AV > Va then warrant is met
 Yes

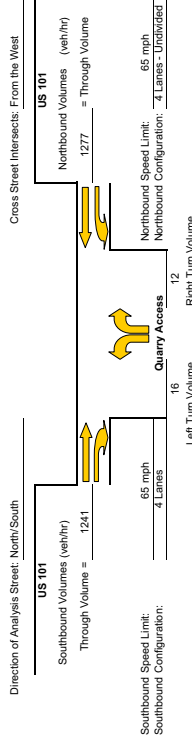
Right Turn Taper Warranted: YES

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris, Quarry Access
 Study Scenario: 2042 July Peak Blast Permit Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1241
 Advancing Volume Va = -
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 1241
 If AV > Va then warrant is met
 Yes

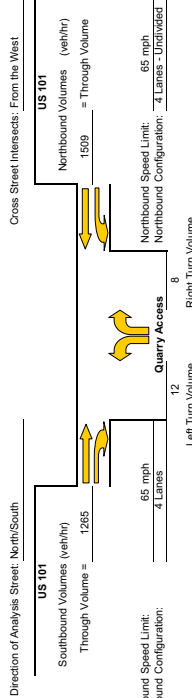
Right Turn Taper Warranted: YES

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris, Quarry Access
 Study Scenario: 2040 July Peak Blast Permit Conditions - 1:15-2:15pm



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1265
 Advancing Volume VA = 1265
 If AV < VA then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1066.66667
 Advancing Volume VA = 1265
 If AV < VA then warrant is met
 Yes

Right Turn Taper Warranted: YES

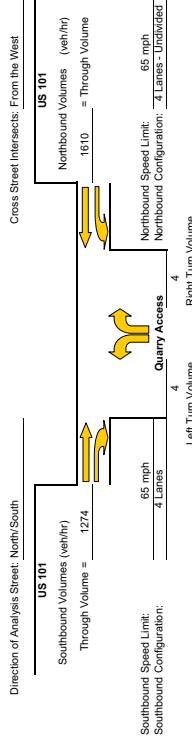
Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.

The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris, Quarry Access
 Study Scenario: 2040 July Peak Blast Permit Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1274
 Advancing Volume VA = 1274
 If AV < VA then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1200
 Advancing Volume VA = 1274
 If AV < VA then warrant is met
 Yes

Right Turn Taper Warranted: YES

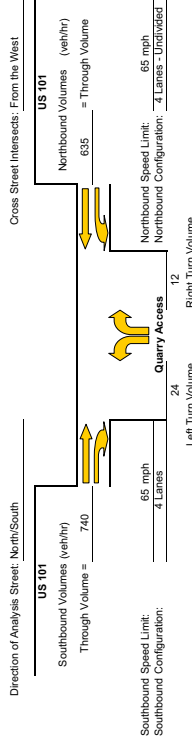
Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.

The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main, Quarry Access
 Study Scenario: 2040 October Peak Base Permit Conditions - 9:00-10:00am



Direction of Analysis Street: North/South

Cross Street Intersects: From the West

US 101
 Southbound Volumes (veh/hr) = 740
 Through Volume = 740
 Northbound Volumes (veh/hr) = 655 = Through Volume

Southbound Speed Limit: 65 mph
 Southbound Configuration: 4 Lanes

Northbound Speed Limit: 65 mph
 Northbound Configuration: 4 Lanes - Undivided

Right Turn Volume: 12
 Left Turn Volume: 24

Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria
NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 740
 If AV < Va then warrant is met
Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 740
 If AV < Va then warrant is met
Right Turn Taper Warranted: NO

Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LIVol = 12.6 veh/hr
 Left Turn Volume Vt = 24 veh/hr
 If Vt > LIVol then warrant is met

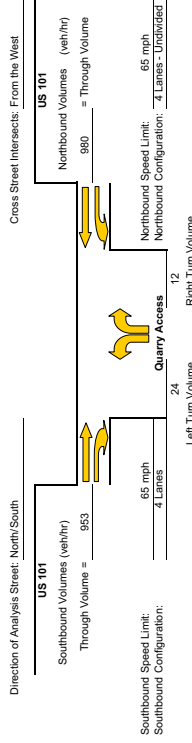
Study Intersection
 Advancing Volume (Va) = 833.333333
 Opposing Volume (Vo) = 1000

Left Turn Lane Warranted: **YES**

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main, Quarry Access
 Study Scenario: 2040 October Peak Base Permit Conditions - 11:00am-Noon



Direction of Analysis Street: North/South

Cross Street Intersects: From the West

US 101
 Southbound Volumes (veh/hr) = 953
 Through Volume = 953
 Northbound Volumes (veh/hr) = 980 = Through Volume

Southbound Speed Limit: 65 mph
 Southbound Configuration: 4 Lanes

Northbound Speed Limit: 65 mph
 Northbound Configuration: 4 Lanes - Undivided

Right Turn Volume: 12
 Left Turn Volume: 24

Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria
NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 953
 If AV < Va then warrant is met
Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 953
 If AV < Va then warrant is met
Right Turn Taper Warranted: YES

Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LIVol = 9.5 veh/hr
 Left Turn Volume Vt = 24 veh/hr
 If Vt > LIVol then warrant is met

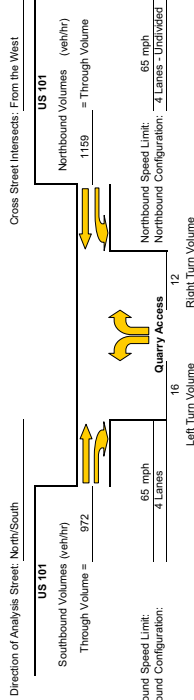
Study Intersection
 Advancing Volume (Va) = 833.333333
 Opposing Volume (Vo) = 1000

Left Turn Lane Warranted: **YES**

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris Quarry Access
 Study Scenario: 2040 October Peak Base Permit Conditions - 11:15-2:15pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 972
 Advancing Volume Va = -
 If AV < Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

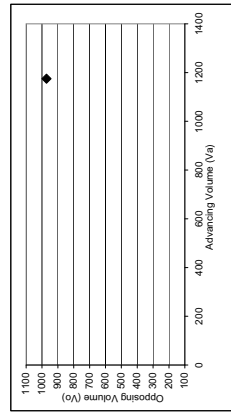
1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 833.333333
 Advancing Volume Va = 972
 If AV < Va then warrant is met Yes

Right Turn Taper Warranted: YES

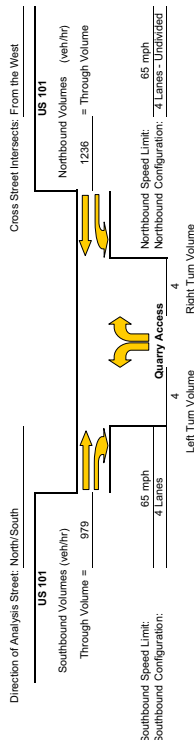
Left Turn Lane Warranted: YES



Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris Quarry Access
 Study Scenario: 2040 October Peak Base Permit Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 979
 Advancing Volume Va = -
 If AV < Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

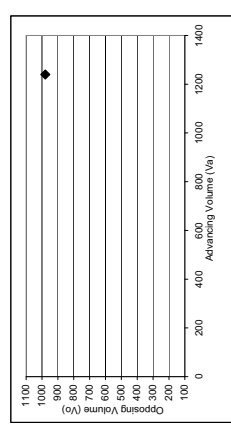
1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1200
 Advancing Volume Va = 979
 If AV < Va then warrant is met No

Right Turn Taper Warranted: NO

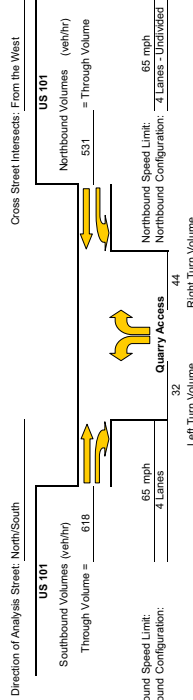
Left Turn Lane Warranted: NO



Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris, Quarry Access
 Study Scenario: 2010 July Peak Project Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1144
 Advancing Volume Va = 618
 If AV > Va then warrant is met
 No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -133.33333
 Advancing Volume Va = 618
 If AV < Va then warrant is met
 Yes

Right Turn Taper Warranted: YES

Left Turn Lane Warranted: YES

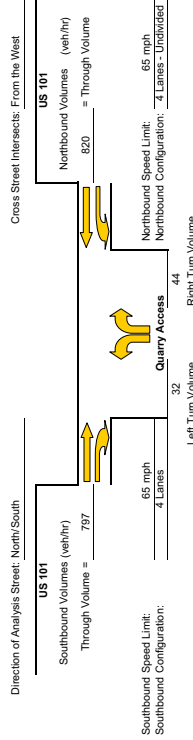
Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottel in 1981.

The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris, Quarry Access
 Study Scenario: 2010 July Peak Project Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1144
 Advancing Volume Va = 797
 If AV > Va then warrant is met
 No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -133.33333
 Advancing Volume Va = 797
 If AV < Va then warrant is met
 Yes

Right Turn Taper Warranted: YES

Left Turn Lane Warranted: YES

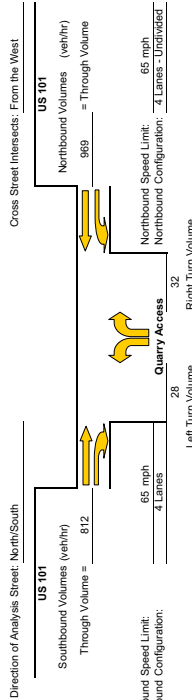
Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottel in 1981.

The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main, Quarry Access
 Study Scenario: 2010 July Peak Project Conditions - 11:15-2:15pm



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 812
 Advancing Volume VA = 812
 If AV < VA then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

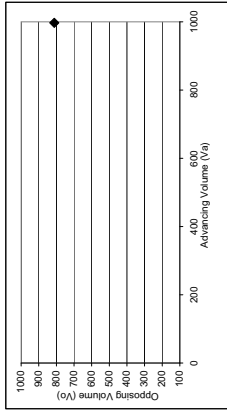
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 266.666667
 Advancing Volume VA = 812
 If AV < VA then warrant is met Yes

Right Turn Taper Warranted: YES

Northbound Left Turn Lane Warrants

Left Turn Volume Threshold LIVol = 11.5 veh/hr
 Left Turn Volume VI = 28 veh/hr
 If VI > LIVol then warrant is met



◆ Study Intersection

Left Turn Lane Warranted: YES

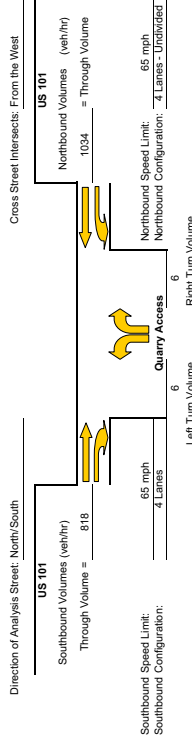
Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottel in 1981.

The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main, Quarry Access
 Study Scenario: 2010 July Peak Project Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 818
 Advancing Volume VA = 818
 If AV < VA then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

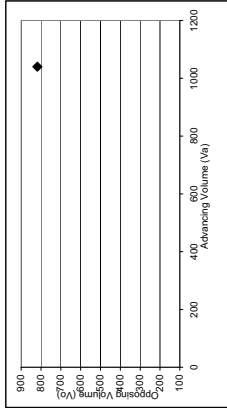
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1133.33333
 Advancing Volume VA = 818
 If AV < VA then warrant is met No

Right Turn Taper Warranted: NO

Northbound Left Turn Lane Warrants

Left Turn Volume Threshold LIVol = 11.4 veh/hr
 Left Turn Volume VI = 6 veh/hr
 If VI > LIVol then warrant is met



◆ Study Intersection

Left Turn Lane Warranted: NO

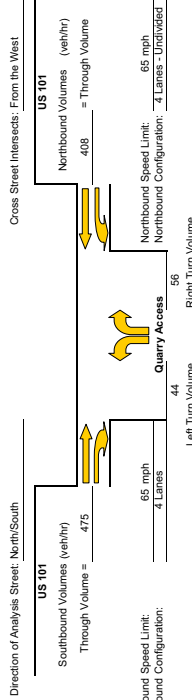
Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottel in 1981.

The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains Quarry Access
 Study Scenario: 2010 October Peak Project Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 475
 Advancing Volume Va = 475
 If AV < Va then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

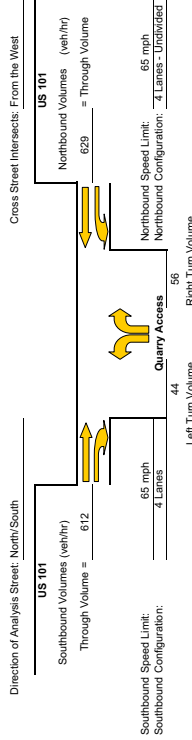
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -533.33333
 Advancing Volume Va = 475
 If AV < Va then warrant is met Yes

Right Turn Taper Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains Quarry Access
 Study Scenario: 2010 October Peak Project Conditions - 11:00am-3pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 612
 Advancing Volume Va = 612
 If AV < Va then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

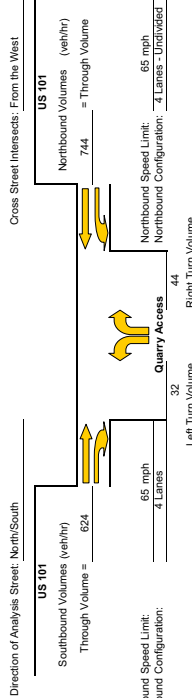
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -533.33333
 Advancing Volume Va = 612
 If AV < Va then warrant is met Yes

Right Turn Taper Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2010 October Peak Project Conditions - 1:15-2:15pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1144
 Advancing Volume Va = 624
 If AV/Va then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -133.33333
 Advancing Volume Va = 624
 If AV/Va then warrant is met Yes

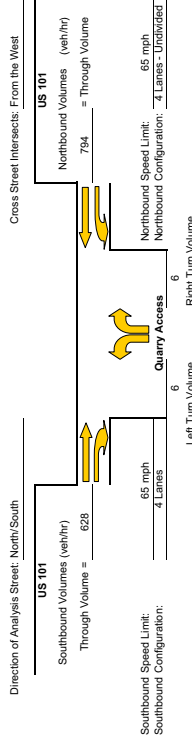
Right Turn Taper Warranted: YES

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2010 October Peak Project Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 628
 If AV/Va then warrant is met -

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1133.33333
 Advancing Volume Va = 628
 If AV/Va then warrant is met No

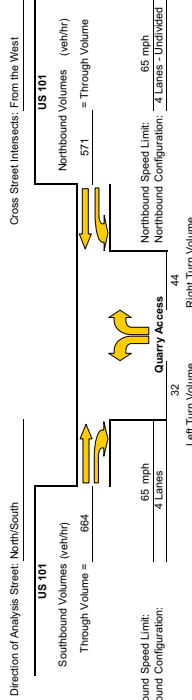
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: NO

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main, Quarry Access
 Study Scenario: 2014 (without Willits Bypass) July Peak Project Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1144
 Advancing Volume Va = 664
 If AV/Va then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

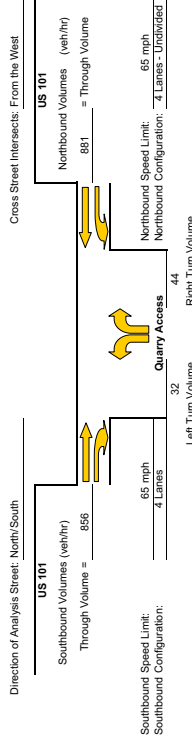
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -133.33333
 Advancing Volume Va = 664
 If AV/Va then warrant is met Yes

Right Turn Taper Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakroborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main, Quarry Access
 Study Scenario: 2014 (without Willits Bypass) July Peak Project Conditions - 11:00am-12:00pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1144
 Advancing Volume Va = 856
 If AV/Va then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

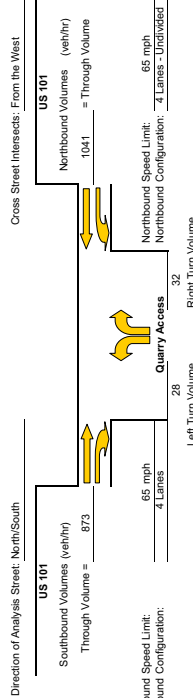
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -133.33333
 Advancing Volume Va = 856
 If AV/Va then warrant is met Yes

Right Turn Taper Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakroborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main, Quarry Access
 Study Scenario: 2014 (without Willits Bypass) July Peak Project Conditions - 11:15-2:15pm



Direction of Analysis Street: North/South

Cross Street Intersects: From the West

US 101
 Southbound Volumes (veh/hr) = 873
 Through Volume = 873

US 101
 Northbound Volumes (veh/hr) = 1041
 Through Volume = 1041

Quarry Access
 Southbound Speed Limit: 65 mph
 Southbound Configuration: 4 Lanes

US 101
 Northbound Speed Limit: 65 mph
 Northbound Configuration: 4 Lanes

Left Turn Volume: 28
 Right Turn Volume: 32

Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria
NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 873
 Advancing Volume Va = 873
 If AV > Va then warrant is met
Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 266.666667
 Advancing Volume Va = 873
 If AV > Va then warrant is met
Right Turn Taper Warranted: YES

Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LTVol = 10.6 veh/hr
 Left Turn Volume Vt = 28 veh/hr
 If Vt > LTVol then warrant is met

1. Check for right turn volume criteria
NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 873
 Advancing Volume Va = 873
 If AV > Va then warrant is met
Right Turn Lane Warranted: NO

Southbound Right Turn Lane Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

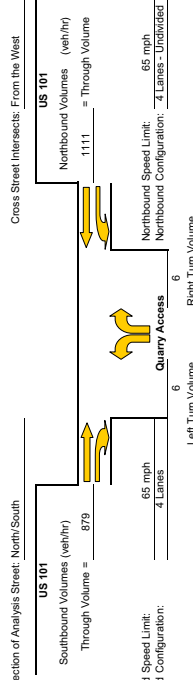
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1133.333333
 Advancing Volume Va = 879
 If AV > Va then warrant is met
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main, Quarry Access
 Study Scenario: 2014 (without Willits Bypass) July Peak Project Conditions - 4:45-5:45pm



Direction of Analysis Street: North/South

Cross Street Intersects: From the West

US 101
 Southbound Volumes (veh/hr) = 879
 Through Volume = 879

US 101
 Northbound Volumes (veh/hr) = 1111
 Through Volume = 1111

Quarry Access
 Southbound Speed Limit: 65 mph
 Southbound Configuration: 4 Lanes

US 101
 Northbound Speed Limit: 65 mph
 Northbound Configuration: 4 Lanes

Left Turn Volume: 6
 Right Turn Volume: 6

Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria
NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 879
 Advancing Volume Va = 879
 If AV > Va then warrant is met
Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1133.333333
 Advancing Volume Va = 879
 If AV > Va then warrant is met
Right Turn Taper Warranted: NO

Northbound Left Turn Lane Warrants
 Left Turn Volume Threshold LTVol = 10.6 veh/hr
 Left Turn Volume Vt = 6 veh/hr
 If Vt > LTVol then warrant is met

1. Check for right turn volume criteria
NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 879
 Advancing Volume Va = 879
 If AV > Va then warrant is met
Right Turn Lane Warranted: NO

Southbound Right Turn Lane Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

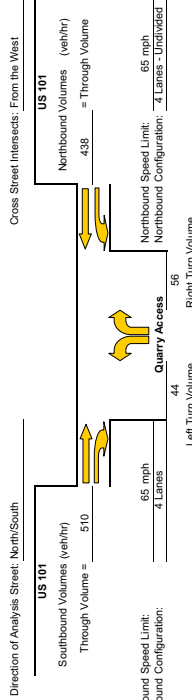
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1133.333333
 Advancing Volume Va = 879
 If AV > Va then warrant is met
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: NO

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2014 (without Willits Bypass) October Peak Project Conditions - 9:05-10:05am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 510
 Advancing Volume Va = 510
 If AV > Va then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

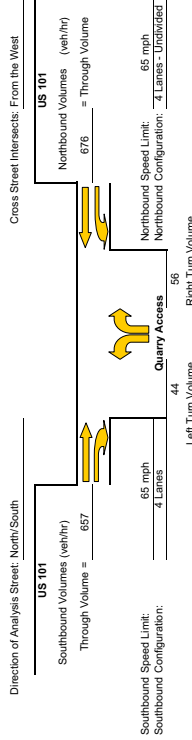
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -533.33333
 Advancing Volume Va = 510
 If AV < Va then warrant is met Yes

Right Turn Taper Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2014 (without Willits Bypass) October Peak Project Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 657.9
 Advancing Volume Va = 657
 If AV > Va then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

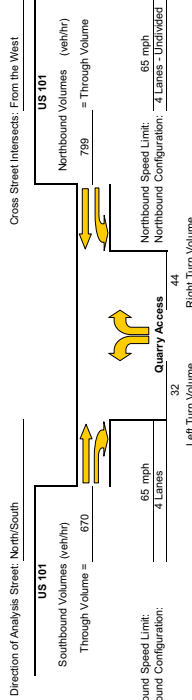
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -533.33333
 Advancing Volume Va = 657
 If AV < Va then warrant is met Yes

Right Turn Taper Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2014 (without Willits Bypass) October Peak Project Conditions - 11:15-2:15pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1144
 Advancing Volume Va = 670
 If AV > Va then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

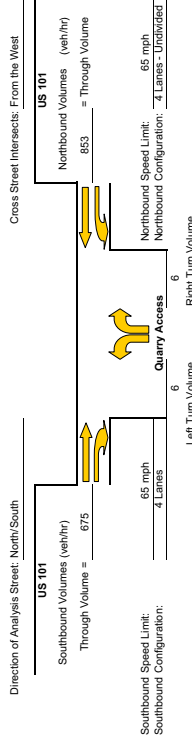
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -133.33333
 Advancing Volume Va = 670
 If AV < Va then warrant is met Yes

Right Turn Taper Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2014 (without Willits Bypass) October Peak Project Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = -
 Advancing Volume Va = 675
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

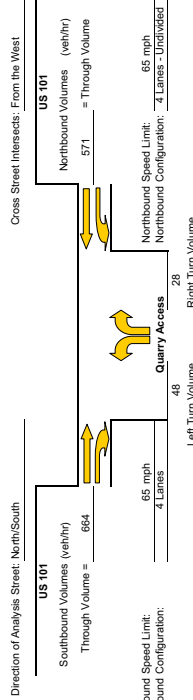
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1133.33333
 Advancing Volume Va = 675
 If AV < Va then warrant is met No

Right Turn Taper Warranted: NO

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mcnic, Quarry Access
 Study Scenario: 2014 (with WHTS Bypass) JWB Peak Project Conditions - 9:05-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 664
 Advancing Volume Va = 664
 If AV/Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

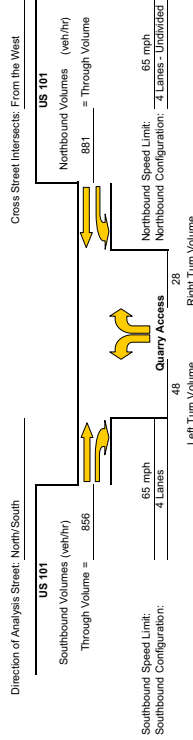
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 400
 Advancing Volume Va = 664
 If AV/Va then warrant is met

Right Turn Taper Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mcnic, Quarry Access
 Study Scenario: 2014 (with WHTS Bypass) JWB Peak Project Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 856
 Advancing Volume Va = 856
 If AV/Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

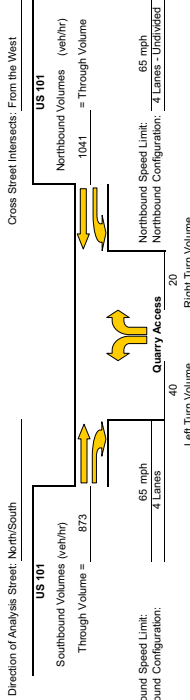
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 400
 Advancing Volume Va = 856
 If AV/Va then warrant is met

Right Turn Taper Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mcnic, Quarry Access
 Study Scenario: 2014 (with WHTS Bypass) JWB Peak Project Conditions - 1:15-2:15pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 873
 Advancing Volume Va = 873
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 666.666667
 Advancing Volume Va = 873
 If AV > Va then warrant is met

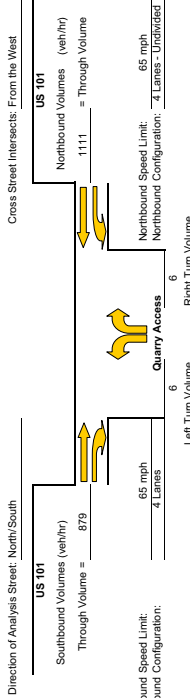
Right Turn Taper Warranted: YES

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mcnic, Quarry Access
 Study Scenario: 2014 (with WHTS Bypass) JWB Peak Project Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 879
 Advancing Volume Va = 879
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

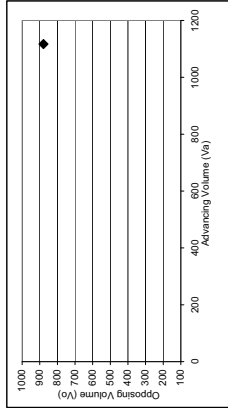
1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1133.33333
 Advancing Volume Va = 879
 If AV > Va then warrant is met

Right Turn Taper Warranted: NO

Left Turn Lane Warranted: NO

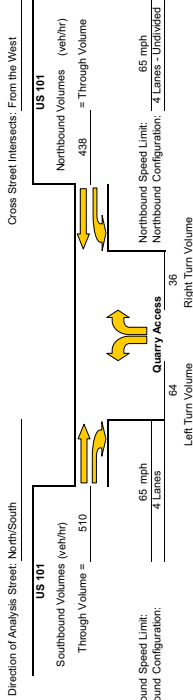


◆ Study Intersection

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mcnic, Quarry Access
 Study Scenario: 2014 (with Warrants by-pass) October Peak Project Conditions - 9:05-10:09am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 510
 Advancing Volume Va = 510
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

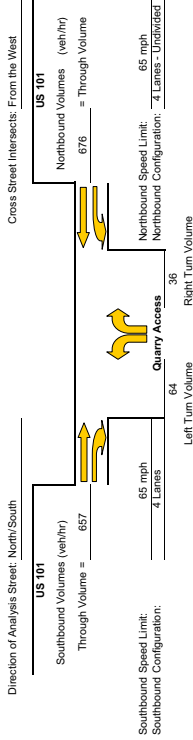
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 133.333333
 Advancing Volume Va = 510
 If AV > Va then warrant is met Yes

Right Turn Taper Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mcnic, Quarry Access
 Study Scenario: 2014 (with Warrants by-pass) October Peak Project Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 657
 Advancing Volume Va = 657
 If AV > Va then warrant is met

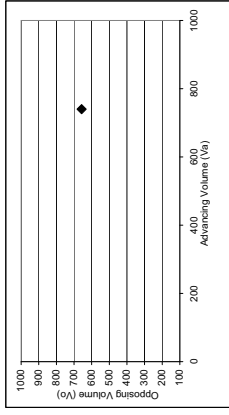
Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 133.333333
 Advancing Volume Va = 657
 If AV > Va then warrant is met Yes

Right Turn Taper Warranted: YES

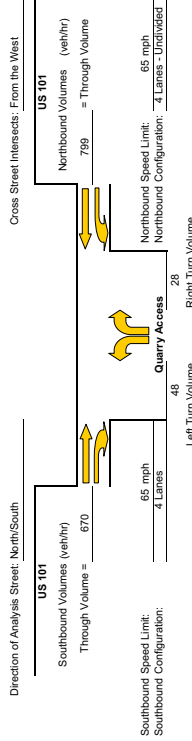


Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mcnic, Quarry Access
 Study Scenario: 2014 (with WHTS Bypass) October Peak Project Conditions - 11:15-2:15pm



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 670
 Advancing Volume Va = 670
 If AV < Va then warrant is met

Right Turn Lane Warranted: **NO**

Southbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 400
 Advancing Volume Va = 670
 If AV < Va then warrant is met

Right Turn Taper Warranted: **YES**

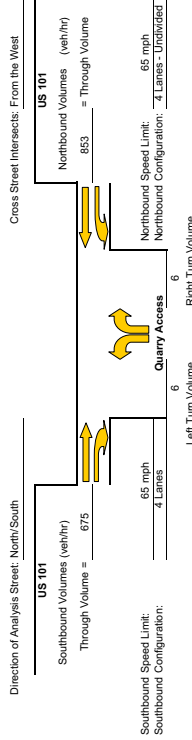
Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottel in 1981.

The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mcnic, Quarry Access
 Study Scenario: 2014 (with WHTS Bypass) October Peak Project Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 675
 Advancing Volume Va = 675
 If AV < Va then warrant is met

Right Turn Lane Warranted: **NO**

Southbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1133.33333
 Advancing Volume Va = 675
 If AV < Va then warrant is met

Right Turn Taper Warranted: **NO**

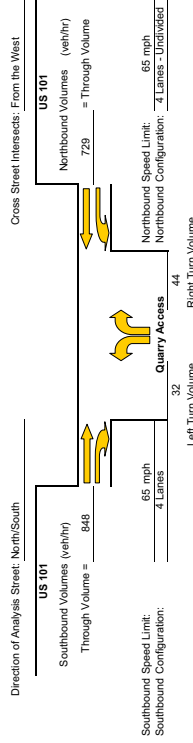
Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottel in 1981.

The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris Quarry Access
 Study Scenario: 2030 July Peak Project Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1144
 Advancing Volume Va = 848
 If AV < Va then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -133.33333
 Advancing Volume Va = 848
 If AV < Va then warrant is met Yes

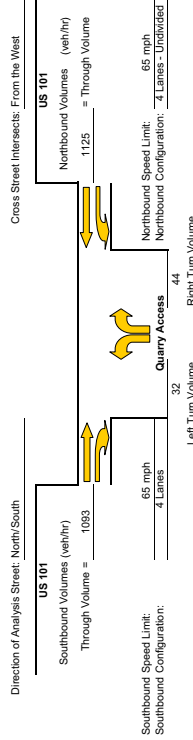
Right Turn Taper Warranted: YES

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris Quarry Access
 Study Scenario: 2030 July Peak Project Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1144
 Advancing Volume Va = 1093
 If AV < Va then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

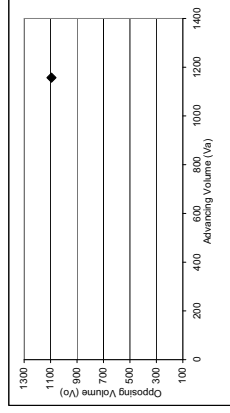
1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -133.33333
 Advancing Volume Va = 1093
 If AV < Va then warrant is met Yes

Right Turn Taper Warranted: YES

Left Turn Lane Warranted: YES

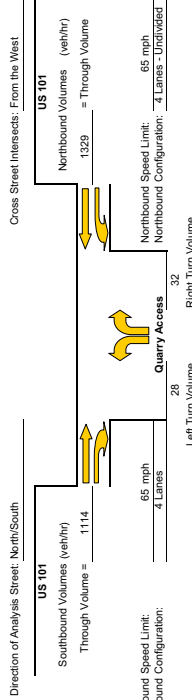


◆ Study Intersection

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains Quarry Access
 Study Scenario: 2030 July Peak Project Conditions - 11:15-2:15pm



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1114
 Advancing Volume Va = 1114
 If AV<Va then warrant is met

Right Turn Lane Warranted: **NO**

Southbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 266.666667
 Advancing Volume Va = 1114
 If AV<Va then warrant is met Yes

Right Turn Taper Warranted: **YES**

Northbound Left Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1122
 Advancing Volume Va = 1122
 If AV<Va then warrant is met

Right Turn Lane Warranted: **NO**

Southbound Right Turn Lane Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

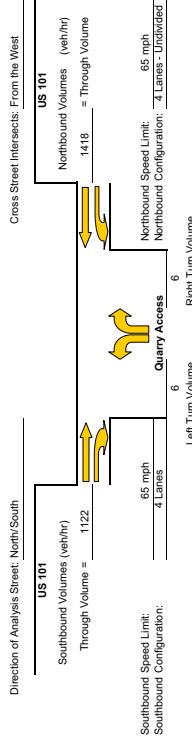
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1133.33333
 Advancing Volume Va = 1122
 If AV<Va then warrant is met No

Right Turn Taper Warranted: **NO**

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains Quarry Access
 Study Scenario: 2030 July Peak Project Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1122
 Advancing Volume Va = 1122
 If AV<Va then warrant is met

Right Turn Lane Warranted: **NO**

Southbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1133.33333
 Advancing Volume Va = 1122
 If AV<Va then warrant is met No

Right Turn Taper Warranted: **NO**

Northbound Left Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1122
 Advancing Volume Va = 1122
 If AV<Va then warrant is met

Right Turn Lane Warranted: **NO**

Southbound Right Turn Lane Warrants

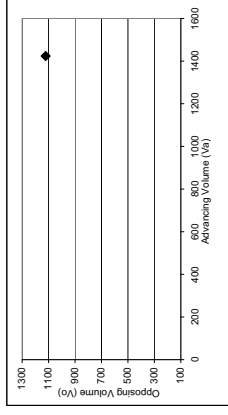
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1133.33333
 Advancing Volume Va = 1122
 If AV<Va then warrant is met No

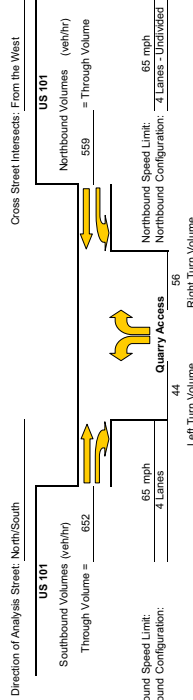
Right Turn Taper Warranted: **NO**



Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris Quarry Access
 Study Scenario: 2030 October Peak Project Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 975.9
 Advancing Volume Va = 652
 If AV > Va then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -533.33333
 Advancing Volume Va = 652
 If AV < Va then warrant is met Yes

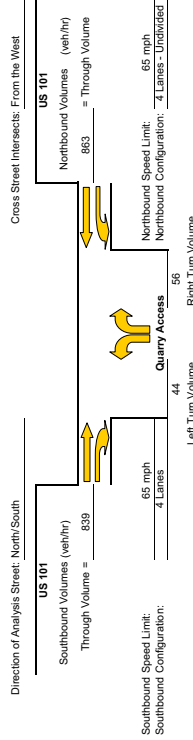
Right Turn Taper Warranted: YES

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Harris Quarry Access
 Study Scenario: 2030 October Peak Project Conditions - 11:00am-3pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 975.9
 Advancing Volume Va = 839
 If AV > Va then warrant is met No

Right Turn Lane Warranted: NO

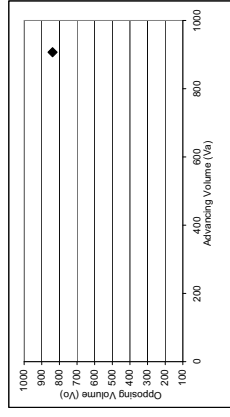
Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -533.33333
 Advancing Volume Va = 839
 If AV < Va then warrant is met Yes

Right Turn Taper Warranted: YES

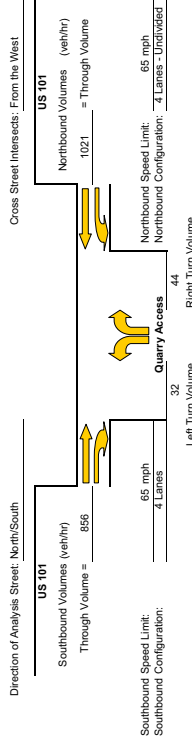
Left Turn Lane Warranted: YES



Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2030 October Peak Project Conditions - 1:15-2:15pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1144
 Advancing Volume Va = 856
 If AV > Va then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 133.3333
 Advancing Volume Va = 856
 If AV > Va then warrant is met Yes

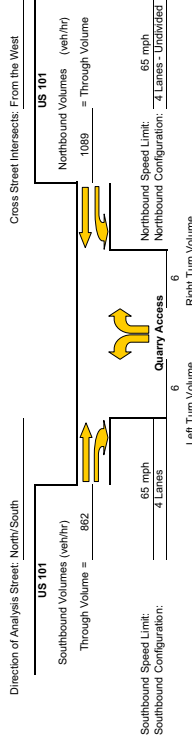
Right Turn Taper Warranted: YES

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2030 October Peak Project Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants
 1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 862
 Advancing Volume Va = 882
 If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1133.3333
 Advancing Volume Va = 882
 If AV > Va then warrant is met No

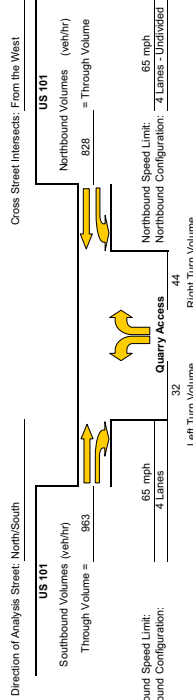
Right Turn Taper Warranted: NO

Left Turn Lane Warranted: NO

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains Quarry Access
 Study Scenario: 2042 July Peak Project Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants
 Left Turn Volume Criteria
 Left Turn Volume $V_l = 32$ veh/hr
 If $V_l > LTV$ then warrant is met

Thresholds not met, continue to next step

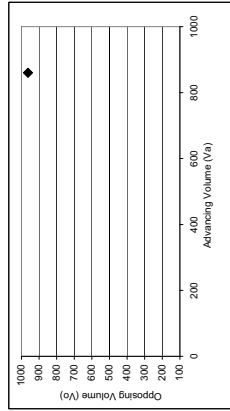
2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold $AV = 1144$
 Advancing Volume $V_a = 963$
 If $AV > V_a$ then warrant is met
 No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
Thresholds not met, continue to next step
 Advancing Volume Threshold $AV = -133.33333$
 Advancing Volume $V_a = 963$
 If $AV < V_a$ then warrant is met
 Yes

Right Turn Taper Warranted: YES



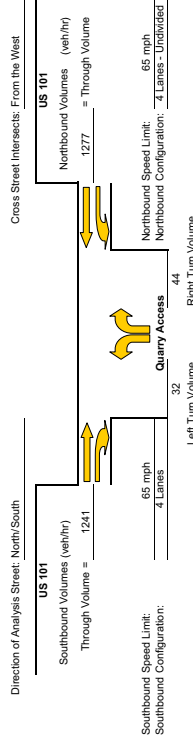
◆ Study Intersection

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains Quarry Access
 Study Scenario: 2042 July Peak Project Conditions - 11:00am-Noon



Southbound Right Turn Lane Warrants
 Left Turn Volume Criteria
 Left Turn Volume $V_l = 32$ veh/hr
 If $V_l > LTV$ then warrant is met

Thresholds not met, continue to next step

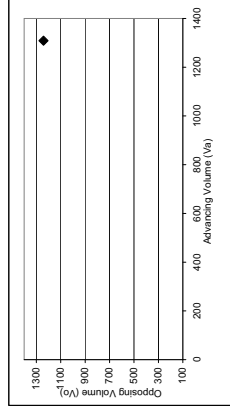
2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold $AV = 1144$
 Advancing Volume $V_a = 1241$
 If $AV > V_a$ then warrant is met
 Yes

Right Turn Lane Warranted: YES

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria
N/A
 Advancing Volume Threshold $AV = -$
 Advancing Volume $V_a = -$
 If $AV < V_a$ then warrant is met
 -

Right Turn Taper Warranted: -



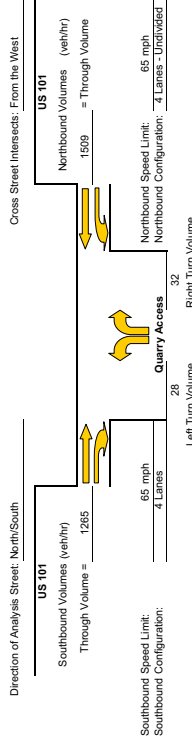
◆ Study Intersection

Left Turn Lane Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains Quarry Access
 Study Scenario: 2042 July Peak Project Conditions - 11:15-2:15pm



US 101
 Southbound Volumes (veh/hr)
 Through Volume = 1265

Northbound Volumes (veh/hr)
 Through Volume = 1599

Northbound Speed Limit: 65 mph

Southbound Configuration: 4 Lanes

Northbound Configuration: 4 Lanes - Undivided

Right Turn Volume: 28

Left Turn Volume: 32

Cross Street Intersects: From the West

US 101

Southbound Left Turn Lane Warrants

Left Turn Volume Threshold L1/V1 = 6.3 veh/hr

Left Turn Volume V1 = 28 veh/hr

If V1 > L1/V1 then warrant is met

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold AV = 1265

Va = -

If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = 266.666667

Va = 1265

If AV > Va then warrant is met

Right Turn Taper Warranted: YES

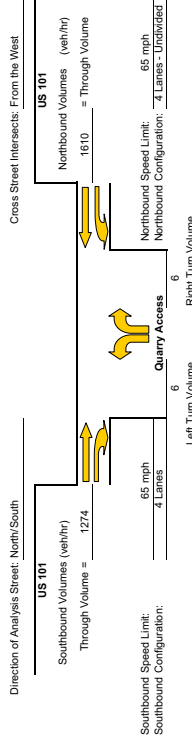
Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.

The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Mtains Quarry Access
 Study Scenario: 2042 July Peak Project Conditions - 4:45-5:45pm



US 101
 Southbound Volumes (veh/hr)
 Through Volume = 1274

Northbound Volumes (veh/hr)
 Through Volume = 1610

Northbound Speed Limit: 65 mph

Southbound Configuration: 4 Lanes

Northbound Configuration: 4 Lanes - Undivided

Right Turn Volume: 6

Left Turn Volume: 6

Cross Street Intersects: From the West

US 101

Southbound Right Turn Lane Warrants

Left Turn Volume Threshold L1/V1 = 6.2 veh/hr

Left Turn Volume V1 = 6 veh/hr

If V1 > L1/V1 then warrant is met

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold AV = -

Va = 1274

If AV > Va then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = 1133.33333

Va = 1274

If AV > Va then warrant is met

Right Turn Taper Warranted: YES

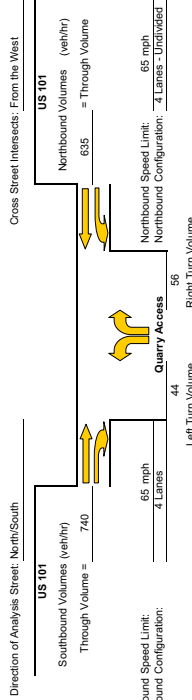
Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.

The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2040 October Peak Project Conditions - 9:00-10:00am



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 975.9
 Advancing Volume Va = 740
 If AV > Va then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

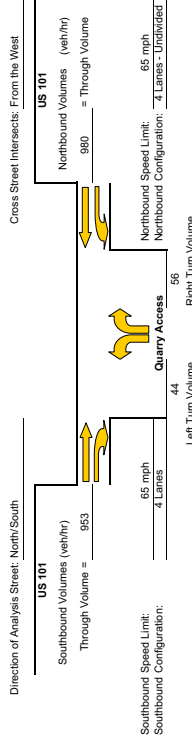
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 533.3333
 Advancing Volume Va = 740
 If AV > Va then warrant is met Yes

Right Turn Taper Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2040 October Peak Project Conditions - 11:00am-3pm



Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 975.9
 Advancing Volume Va = 953
 If AV > Va then warrant is met Yes

Right Turn Lane Warranted: YES

Southbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

N/A

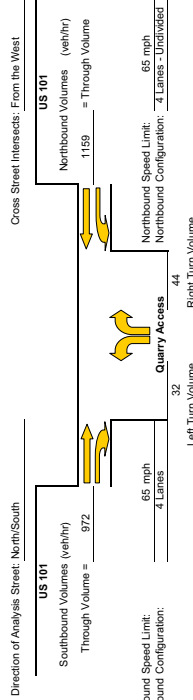
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -
 Advancing Volume Va = -
 If AV > Va then warrant is met -

Right Turn Taper Warranted: -

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottel in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2040 October Peak Project Conditions - 1:15-2:15pm



Southbound Right Turn Lane Warrants
 Left Turn Volume Threshold L/Vol = 9.3 veh/hr
 Left Turn Volume V = 32 veh/hr
 If V>L/Vol then warrant is met

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 1144
 Advancing Volume V/a = 972
 If AV<V/a then warrant is met No

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

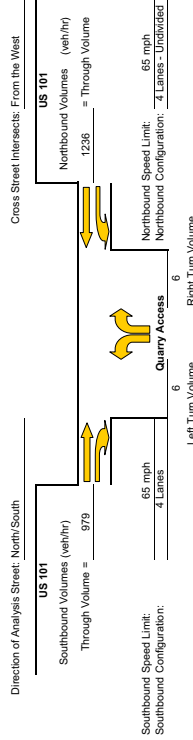
2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = -133.33333
 Advancing Volume V/a = 972
 If AV<V/a then warrant is met Yes

Right Turn Taper Warranted: YES

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.

Acceleration Lane Warrant Analysis - Tee Intersections

Study Intersection: US 101/Main's Quarry Access
 Study Scenario: 2040 October Peak Project Conditions - 4:45-5:45pm



Southbound Right Turn Lane Warrants
 Left Turn Volume Threshold L/Vol = 9.2 veh/hr
 Left Turn Volume V = 6 veh/hr
 If V>L/Vol then warrant is met

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane
 Advancing Volume Threshold AV = 979
 Advancing Volume V/a = 979
 If AV<V/a then warrant is met

Right Turn Lane Warranted: NO

Southbound Right Turn Taper Warrants
 (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for taper
 Advancing Volume Threshold AV = 1133.33333
 Advancing Volume V/a = 979
 If AV<V/a then warrant is met No

Right Turn Taper Warranted: NO

Methodology based on Washington State Transportation Center Research Report Method For Prioritizing Intersection Improvements, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cattell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Hamelink in 1987, and modified by Kikuchi and Chakraborty in 1991.