Chapter 1300 Intersection Control Type

1300.01 General

It is WSDOT practice to analyze potential intersection solutions at all intersection improvement locations in accordance with Business Practices for Moving Washington, and strive to provide the optimum solution within available limited resources. The analysis may be done for individual intersections, or on a corridor basis. This chapter provides guidance on preliminary intersection analysis and selection of control type. Intersection design is completed using Chapter 1310 for the geometrics of intersections, Chapter 1320 for roundabouts, and Chapter 1330 for traffic signals.

Intersections are an important part of highway design. They comprise only a small percentage of the overall highway system miles, yet they account for a high percentage of reported collisions.

Traffic and driver characteristics, bicycle and pedestrian needs, physical features, and economics are considered in selecting traffic control that facilitates efficient multimodal traffic flow through intersections. Signs, signals, channelization, and physical geometric layout are the major tools used to establish intersection control.

Typically, potential project locations will have been identified through the safety improvement priority programming process described in Chapter 321, a necessity for a mobility project for congestion improvement, commercial development, or other improvement project.

An Intersection Control Analysis (ICA) should be completed as early in the design development process as feasible. The level of effort of the ICA should be scalable to the project; for example, evaluation of adding a turn lane to an existing intersection control may take less effort than evaluating new intersection control. This may occur during planning or corridor studies, but should not be initiated later than the scoping stage of a project. Data-based knowledge and scientific evaluation provides the basis for a rational engineered improvement.

When analysis determines that an at-grade intersection cannot provide adequate service, consider a grade separation, or partial or full interchange. Evaluate grade separation alternatives for intersections on rural expressways, both National Highway System (NHS) and non-NHS. The ramp terminal intersections are subject to the analysis requirements of this chapter. (See Chapters 1360 and 550 for further guidance.)
For additional information, see the following chapters:

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### 1300.02 References

#### 1300.02(1) Federal/State Laws, Codes, and Policies

- Revised Code of Washington (RCW) 46.61, Rules of the road
- Washington Administrative Code (WAC) 468-52, Highway access management – access control classification system and standards
- Intersection Control/Modification Process, Highway Safety Executive Committee (HSEC) Policy Paper, April 2012, WSDOT
- Secretary’s Executive Order: E 1082, Business Practices for Moving Washington, August 2012, WSDOT

#### 1300.02(2) Design Guidance

- A Policy on Geometric Design of Highways and Streets (Green Book), AASHTO
- Local Agency Guidelines (LAG), M 36-63, WSDOT
- Manual on Uniform Traffic Control Devices for Streets and Highways, USDOT, FHWA; as adopted and modified by Chapter 468-95 WAC “Manual on uniform traffic control devices for streets and highways” (MUTCD)
- Standard Plans for Road, Bridge, and Municipal Construction (Standard Plans), M 21-01, WSDOT

#### 1300.02(3) Supporting Information

- Highway Safety Manual (HSM), AASHTO
- Roundabouts: An Informational Guide, FHWA-RD-00-067, USDOT, FHWA
**1300.03 Intersection Control Objectives**

Intersections make up the majority of potential transportation conflict areas. Good intersection design is used for reasonably safe and efficient travel by auto, truck, bus, motorcycle, pedestrian, and other travel modes. Coordinate design with existing adjacent intersections.

Intersection control choice requires consideration of all potential users of the facility, including drivers of motorcycles, passenger cars, heavy vehicles of different classifications, public transit, and bicyclists and pedestrians.

Drivers have varying skills and abilities. Elderly drivers in particular are subject to increased reaction time, decreased ability to perceive visual cues, and decreased head and neck flexibility. While there is evidence that older drivers are aware of some decline in their abilities and therefore adjust their driving patterns, some of their changes can lead to more travel on local roads and thus more exposure to intersection conflict. These considerations have been factored into the guidance for intersection design.

Meeting the needs of one user group can result in compromising service to others. The selection process balances these competing needs, resulting in appropriate levels of operation for all users.
With consideration for sustainable transportation practices, four basic elements should be well thought out in intersection design:

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</tr>
<tr>
<td>➢ Ability of drivers to make decisions ➢ Pedestrian use and habits</td>
</tr>
<tr>
<td>➢ Driver expectancy         ➢ Bicycle traffic use and habits</td>
</tr>
<tr>
<td>➢ Decision and reaction time ➢ Demand for alternative mode choices</td>
</tr>
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<td><strong>Traffic Considerations</strong></td>
</tr>
<tr>
<td>➢ Classification of each intersecting roadway ➢ Vehicle speeds</td>
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<tr>
<td>➢ Design and actual capacities ➢ Transit involvement</td>
</tr>
<tr>
<td>➢ Design-hour turning movements ➢ Crash experience</td>
</tr>
<tr>
<td>➢ Size and operating characteristics of vehicle ➢ Bicycle movements</td>
</tr>
<tr>
<td>➢ Variety of movements      ➢ Pedestrian movements</td>
</tr>
<tr>
<td>(diverging/merging/weaving/crossing)</td>
</tr>
<tr>
<td><strong>Physical Elements</strong></td>
</tr>
<tr>
<td>➢ Character and use of abutting property ➢ Traffic control devices</td>
</tr>
<tr>
<td>➢ Vertical alignments at the intersection ➢ Illumination</td>
</tr>
<tr>
<td>➢ Sight distance            ➢ Roadside design features</td>
</tr>
<tr>
<td>➢ Angle of the intersection ➢ Environmental factors</td>
</tr>
<tr>
<td>➢ Conflict area             ➢ Crosswalks</td>
</tr>
<tr>
<td>➢ Speed-change lanes        ➢ Driveways</td>
</tr>
<tr>
<td>➢ Geometric design features ➢ Access management treatments</td>
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<tr>
<td><strong>Economic Factors</strong></td>
</tr>
<tr>
<td>➢ Cost of improvements, maintenance, and life cycle costs</td>
</tr>
<tr>
<td>➢ Effects of controlling right of way on abutting properties where channelization restricts or prohibits vehicular movements</td>
</tr>
<tr>
<td>➢ Energy consumption</td>
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1300.04 Common Types of Intersection Control

1300.04(1) Uncontrolled Intersections

- Uncontrolled intersections do not have signing, and the normal right of way rule (RCW 46.61.180) applies.

- Most uncontrolled intersections are found on local roads and streets where the volumes of the intersecting roadways are low and roughly equal, speeds are low, and there is little to no collision history.

- Uncontrolled intersections are generally not appropriate for intersections with state routes.

1300.04(2) Yield Control

- Intersections with yield control assign right of way without requiring a stop.

- It is mainly used at roundabouts, ramps, and wye (Y) intersections.

Refer to the MUTCD for information on the locations where yield control may be appropriate.

1300.04(3) Two-Way Stop Control

- Intersections with two-way stop control are a common, low-cost control, which require the traffic on the minor roadway to stop before entering the major roadway. It is used where application of the normal right of way rule (RCW 46.61.180) is not appropriate for certain approaches at the intersection.

- Where U-turn opportunities exist within a corridor, consider limiting access at two-way stops to “right-in, right-out only.”
1300.04(4) Multi-Way Stop Control

Intersections with multi-way stop control:

• Normally require all traffic to stop before entering the intersection.
• Increase traffic delays, fuel consumption, and air pollution.
• Are most effectively used on low-speed facilities with approximately equal volumes on all legs and total entering volumes not exceeding 1,400 vehicles during the peak hour.
• Are often used as an interim measure when a traffic signal is warranted and has been determined to be the best solution, but has yet to be installed.

Guidance for consideration of the application of multi-way stop control is provided in the MUTCD.

On multilane facilities, they present more operational issues than on two-lane two-way facilities and are not recommended on multilane state routes. Multi-way stop control is less desirable at intersections with very unbalanced directional traffic due to the delay introduced on the major-volume leg.

1300.04(5) Roundabouts

Roundabouts are traditionally near circular at-grade intersections, but can be a variety of shapes and sizes. Properly designed, located, and maintained roundabouts are an effective intersection type that normally offer the following:

• Fewer conflict points.
• Lower speeds.
• An alternative for areas where wrong-way driving is a concern.
• Reduced fatal- and severe-injury collisions.
• Reduced traffic delays.
• Traffic-calming.
• More capacity than a two-way or all-way stop.
• More consistent delay relative to other intersection treatments.
• The ability to serve high turning volumes.
• Improved operations where space for queuing is limited.
• At ramp terminals where left-turn volumes are high, improved capacity without widening the structure.
• Facilitation of U-turn movements.

Roundabouts are site-specific solutions. There are no warranting conditions; each is justified on its own merits as the most appropriate choice (see Chapter 1320 for more information on roundabout types and design). However, there is modeling software for roundabouts, making the comparison of intersection control types and justification possible from an operations perspective.

1300.04(6) Traffic Control Signals

Properly designed, located, operated, and maintained traffic control signals may offer the following:

• Allow for the orderly movement of traffic.
• Increase the traffic-handling capacity of the intersection.
• Reduce the frequency of severe collisions, especially right-angle collisions.
• Can be coordinated to provide for continuous or nearly continuous movement of traffic at a definite speed along a given corridor under favorable conditions.
• Can be used to interrupt heavy traffic at intervals to permit other traffic, vehicular or pedestrian, to cross.
• Can be preempted to allow emergency vehicle passage.

Traffic control signals are not the solution for all intersection traffic concerns. Indiscriminate installation of signals can adversely affect the safety and efficiency of vehicle, bicycle, and pedestrian traffic.

As a result, installation of a traffic control signal must meet specific “warrants,” which are found in the MUTCD. A signal warrant is a minimum condition in which a signal may be installed. Satisfying a signal warrant does not mandate the installation of a traffic signal; it only indicates that an engineering study, as described in this chapter, is needed to determine whether the signal is an appropriate traffic control solution.

Some collisions are usually not correctable with the installation of a traffic signal; in fact, the installation of a signal often increases rear-end collisions. These types of collisions are only used to satisfy the collision warrant in special circumstances. If they are used, include an explanation of the conditions that support using them to satisfy the crash experience warrant.
State statutes (RCW 46.61.085) require WSDOT approval for the design and location of all conventional traffic signals and for some types of beacons located on city streets forming parts of state highways. The Traffic Signal Permit (DOT Form 242-014 EF) is the formal record of the department’s approval of the installation and type of signal. For traffic signal permit guidance, see Chapter 1330.

1300.04(7) Alternative Intersections

A number of alternative intersections have been developed to reduce the delay to through traffic, the number of conflict points, and the number of signal phases for signalized intersections.

Alternative intersections work mainly by rerouting U and left turns, and/or separating movements. Alternative intersections include:

- Median U-turn
- Jug handle
- Bowtie
- Restricted crossing U-turn
- Continuous flow intersection
- Continuous green tee (T)
- Split intersection
- Quadrant roadway intersection
- Single quadrant interchange
- Echelon
- Center turn overpass

Like any intersection control solution, alternative intersection designs are site specific in how well they operate. Performance must be addressed during the intersection control selection process prior to proceeding with the actual design. Trade-offs in selecting alternative intersections may include higher construction costs, driver education, longer left-turn travel distance, circuitous access to adjacent property, and less direct pedestrian crossing.

Two types of alternative intersections are reviewed in the sections below: Median U-Turn and Restricted Crossing U-Turn (Superstreets). For more information about these and other intersection design solutions, see the Federal Highway Administration (FHWA) Alternative Intersections/Interchanges: Informational Report (AIIR):

1300.04(7)(a) Median U-Turn

The Median U-Turn (MUT) intersection treatment is an approach to simplifying operations at an intersection by removing left-turning movements from the major and/or minor approaches. Left-turning drivers proceed straight through the at-grade intersection, and then must execute a U-turn at some distance downstream from the intersection location in place of the traditional left-turning movement. The MUT intersection design is best applied in situations where:

- The intersection is failing due to congestion.
- There is an existing median (on at least one of the roadways) and/or sufficient or low-cost right of way needs can be accommodated.
- Minimal bicycle accommodations are needed.
- There is a need to improve pedestrian mobility.
- There is a need to reduce vehicle and pedestrian/vehicular conflict points.
- There is a need to shorten cycle lengths of signal timing or improve progression.

Refer to FHWA’s Alternative Intersection/Interchanges: Informational Report (AIIR) for geometric design considerations and recommendations. (See 1310.05 for geometrics when designing the U-turn movement for the MUT intersection.)

1300.04(7)(b) Restricted Crossing U-Turn Intersection

Restricted crossing U-turn (RCUT) intersections, also known as superstreets, work by moving the minor road through and left-turning movements up- and downstream from the intersection location itself. (Exhibit 1300-1 shows an example of an RCUT intersection.)

RCUT intersections:
- Operate by forcing drivers entering from the minor road to turn right onto the major road, and then make a U-turn maneuver at a one-way median opening downstream.
- Provide potential increased traffic safety advantages, due to the reduction of conflict points as compared to a more traditional intersection approach.
- May or may not warrant signalization due to traffic volumes, and those with signalization may require fewer phases and shorter cycles than a similar four-way intersection.

RCUT intersections are best applied in situations where:
- There is a rural expressway or urban arterial.
- There is partial control or managed access facilities.
- Major and minor traffic flows intersect.
- There is a high ratio of through movements to left turns on the main line.
- There are low through traffic volumes on the minor road.
- The major roadway is multilane.
- The major roadway contains sufficient median width, or total right of way width, to support the U-turn movements.
The RCUT intersection may be a competitive alternative compared to a grade-separated interchange, at locations meeting grade-separated considerations identified in 530.04(3). Refer to FHWA’s Alternative Intersection/Interchanges: Informational Report (AIIR) for geometric design considerations and recommendations. (See 1310.05 for geometrics when designing the U-turn movement for the RCUT.)

1300.05 Design Vehicle Selection

When selecting a design vehicle for an intersection, address the needs of all users, including bicyclists and pedestrians, and the costs associated with the intersection control type. The primary use of the design vehicle is to determine radii for each of the intersections. It is possible for each turning movement to have a different design vehicle. Exhibit 1300-2 shows commonly used design vehicle types in Washington State. Additional design vehicle types can be found in the AASHTO Green Book.
Evaluate the existing and anticipated future traffic to select a practical design vehicle that is the largest vehicle that will frequently use the intersection. Exhibit 1300-3 shows the minimum design vehicles for expected uses. Justify the decision to use a smaller vehicle, which may be practical; include a traffic analysis showing that the proposed vehicle(s) is appropriate. Consider oversized vehicles for intersections that are commonly used to route oversized loads.

**Exhibit 1300-2  Design Vehicle Types**

<table>
<thead>
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<th>Vehicle Type</th>
<th>Design Symbol</th>
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<tbody>
<tr>
<td>Passenger car, including light delivery trucks</td>
<td>P</td>
</tr>
<tr>
<td>City transit bus</td>
<td>CITY-BUS</td>
</tr>
<tr>
<td>Articulated bus</td>
<td>A-BUS</td>
</tr>
<tr>
<td>Single-unit truck</td>
<td>SU-30</td>
</tr>
<tr>
<td>Semittrailer truck, overall wheelbase of 40 ft</td>
<td>WB-40</td>
</tr>
<tr>
<td>Semittrailer truck, overall wheelbase of 67 ft</td>
<td>WB-67</td>
</tr>
</tbody>
</table>

**Exhibit 1300-3  Minimum Intersection Design Vehicle**

<table>
<thead>
<tr>
<th>Intersection Types and Use</th>
<th>Minimum Design Vehicle</th>
</tr>
</thead>
<tbody>
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<td>Junction of Major Truck Routes, Junction of State Routes, Ramp Terminals, Roundabouts</td>
<td>WB-67</td>
</tr>
<tr>
<td>Other Rural &amp; Industrial</td>
<td>WB-40</td>
</tr>
<tr>
<td>Commercial &amp; Residential</td>
<td>SU-30[1][2]</td>
</tr>
</tbody>
</table>

**Notes:**

[1] To accommodate pedestrians, the P vehicle may be used as the design vehicle when justified in a traffic analysis.

[2] When the intersection is on a transit or school bus route, use the CITY-BUS design vehicle as a minimum. (See Chapter 1430 for additional guidance on transit facilities.)

**1300.06  Procedures**

For new intersections, determine and document traffic control according to the applicable procedures in this chapter.

For intersection improvement projects involving pavement construction and/or reconstruction, or signal replacement/rehabilitation, evaluate intersection control in accordance with this chapter unless there is documentation that this analysis has already been completed and is referenced in the Project Summary.

Control for existing intersections that are unaffected by the project or are receiving minor revisions such as signal phasing changes (as shown through the analysis) may remain in place without further evaluation. Document the impacts and recommended revisions to all intersections affected by the project.
1300.06(1) Intersection Control Analysis (ICA)

Use the following steps when screening intersection control alternatives for selection, or to support the need for modifications to existing intersection control:

- **Determine the right of way requirements and feasibility.** Discuss the right of way requirements and the feasibility of acquiring that right of way in the analysis. Include sketches or plan sheets with sufficient detail to identify topography (including utilities), environmental constraints, drainage, buildings, and other fixed objects. An economic evaluation will be useful if additional right of way is needed. Include the right of way costs in the benefit/cost analysis.

- **Check signal warrants.** Evaluate existing peak period counts to determine the need for additional count data. If these counts do not meet a warrant, obtaining 12- or 24-hour count information is likely unnecessary. In some cases, the project may alter traffic patterns at an existing signal enough that it may no longer meet a warrant. For a list of the traffic signal warrants and information on how to apply them, see the MUTCD.

For new intersections, project hourly volumes, and movements using established methodology, see Chapter 320.

If warrants are met, evaluate multi-way stop, roundabout, and signal. If warrants are not met, evaluate yield, two-way stop, multi-way stop, and roundabout. Alternative configurations can also be considered if standard forms of control do not satisfy the objectives.

- **Determine environmental impacts.** Evaluate the impacts and permit requirements of each intersection control option (see the Environmental Manual). Any environmental risks that may substantially increase the cost of the project should be identified early in the process. Risk impacts to each alternative should be quantified for comparison.

- **Analyze alternatives and document the selection.** In addition to documenting the screening process for selecting the alternatives to be analyzed, the Intersection Control Analysis should include the following information: Existing Conditions, Delay Analysis, Operational Considerations, including a Safety Analysis if appropriate (see Chapter 321), Benefit/Cost Analysis, Bicycle and Pedestrian Facilities, Context-Specific/Sustainable Design, and any Additional Information that is relevant. The single-lane roundabout is the preferred alternative. If selected, no comparison with other alternatives is required.

1300.06(1)(a) Existing Conditions

The physical characteristics of the site include posted speed, traffic counts (Tuesday through Thursday average and peak hour manual counts), sight distance, channelization, pedestrian and bicycle facilities, and design vehicle.

Analyze the collision history and use current diagnostic tools described in Chapter 321 to determine the expected and predicted collision rates for the existing conditions. Identify any problematic movements.
1300.06(1)(b)  Delay Analysis

Since two or more traffic streams cross, converge, or diverge at intersections, the capacity of an intersection is normally less than the roadway between intersections. (See Chapter 320 for additional details about traffic analysis.)

Provide a plan of the intersection used for modeling. Include recommendations for channelization, turn lanes, and acceleration and deceleration lanes for the preferred option for each intersection. Turn prohibitions may be used to increase intersection capacity. Analyze all relevant peak periods (with A.M. and P.M. as a minimum) for all intersection control alternatives. Holidays and special or seasonal events of short duration are generally not considered in the level of service (LOS) determination, although there are situations where a minor leg peak hour determines the hour used in analysis. Evaluating the 24-hour volumes may be necessary to maximize capacity and support the choice of intersection control that performs with the least overall delay.

Include the following in the delay analysis:

- Use 20 years after the year construction is scheduled to begin as the design year of the analysis for WSDOT projects. The design year will vary for developers and local agency projects (see Chapter 320).
- Identify and justify any growth rate used for design year analyses.
- Provide turning-movement volumes for all scenarios.
- Discuss the steps taken to arrive at the peak hour volume determination and how it relates to design hourly volume (DHV).

When the intersection improvements will be staged (for example, a roundabout opened as a single lane roundabout with plans to expand to a multilane roundabout when needed for capacity), include the anticipated date when the second stage will be required.

There are several deterministic and microsimulation programs for analyzing delay and intersection performance. Traffic volumes and the proximity of the project to other access points will dictate the modeling effort required. Contact the region Traffic Office to determine the appropriate approved program. With each iteration, ensure the proposed design for the intersection is in agreement with what is being modeled. For example, in modeling signals, a free right turn affects timings and also removes those vehicles from consideration in warrant analysis.

1. **Two-Way Stop Control**

   When the through roadway daily traffic is 3,500 or less, delay analysis is not required except in cases where the higher-volume roadway is controlled or where channelization is proposed. This is because adequate LOS for channelization projects does not always correlate to operational safety.

2. **Multi-Way Stop Control**

   Analyze according to the guidance provided in the MUTCD.
3. **Roundabouts**

Provide a capacity analysis to estimate the entry capacity of each roundabout entry leg. Innovative capacity analysis is occasionally needed on projects where metering a heavy leg for short periods of the day allows the most efficient operation 24 hours a day. Contact the region Traffic Office for the specific calibration information to use.

4. **Signals**

When modeling signals, consider the phasing design criteria contained in Chapter 1330. This may be guided by available opposing left-turn clearances at an intersection. Also, evaluate pedestrian movements and accommodate them in the proposed cycle lengths. Check the modeled signal phasing and timing for its ability to be programmed into the signal controller.

Progression of main line traffic is one reason given for using traffic signals; however, there are several reasons why progression may not realistically be obtained or sustained. Signal spacing, left-turn movements, speed, volume (particularly side street volume), and pedestrian movements can all affect the ability to achieve progression.

Consult the region Traffic Office for information on current signal operations practices. (See Chapter 1310 for additional guidance on turn lane considerations.)

5. **Alternative Intersections**

Operational considerations for modeling depend on the intersection design in question. They may include the LOS for turning movements, weaving requirements, the need for vehicle storage, acceleration lanes, and the LOS at the merge points. The analyst and reviewer should agree on what measures of effectiveness will be used.

1300.06(1)(c) **Operational Considerations**

The transportation network has a mix of intersection controls. Delay analysis focuses on determining the peak-hour letter-graded LOS of an individual intersection. Operational analysis is a more encompassing review of the ability of the intersection to provide sufficient capacity in the network, and includes consideration of the environment that users will encounter at all hours of the day.

Intersection control has an influence on approaches and other intersections, even at acceptable LOS. Increased delay affects route choice. A driver’s willingness to accept delay depends on the current circumstances and the driver’s knowledge of the transportation network. The arrival of in-vehicle guidance systems will only increase the tendency of drivers to seek out routes with shorter travel times. Thus, it is important to consider the effects of intersection control on the surrounding network. Document the existing and proposed design. Points that may need to be addressed include the following:

- Use access management alternatives such as rerouting traffic to an existing intersection with available capacity. Check with the WSDOT region Planning Office for future land use plans or comprehensive plans to provide for future growth accommodation. Discuss options and strategies that have been developed through a collaborative planning process with the local agency or, where appropriate, the regional or metropolitan transportation planning organization.
• Consider the volume to capacity (V/C) ratio, the delay, and the queue length of the legs. Roundabout V/C ratios above 0.92 may require additional sensitivity analysis to determine the impacts of small changes in volume. Discuss the results of the capacity analysis and the lanes necessary for each leg of the intersection.

• Compare the geometry/number of lanes required by different alternatives to achieve similar results.

• Consider the effect on other travel modes: rail, bus, pedestrian, and bicycle.

• Examine the effects of existing conditions. Discuss progression through nearby intersections (corridor and network analysis) and known risky or illegal driving maneuvers. Work with the region Traffic Office to verify the network area of influence.

• Determine how the proposed control will meet the objectives for intersection control (see 1300.04) at all hours compared to other alternatives. This is particularly applicable when only the peak hour warrant is met for a signal, since it is used only in rare cases.

• Consider the possibility that traffic from other intersections with lower levels of service will divert to the new/revised intersection.

• Compare the predicted collision frequency of the alternatives using the tools described in Chapter 321. Discuss how each proposed solution might affect safety performance and collision types.

• Identify the design vehicle (see 1300.05). Include truck types and sizes (including oversized vehicles) that travel through the area both currently and in the future. Include verification of turning movements based on turn simulation software (such as AutoTURN®).

• Examine queue lengths in areas where there are intersections or approaches in close proximity. When other intersections are affected, if needed, use a calibrated simulation to fully evaluate the operational effects of the proposed traffic control on the system.

• Evaluate sight distances (stopping, intersection, decision) for the proposed designs prior to selection of an alternative.

1300.06(1)(d) Benefit/Cost Analysis

Benefit/cost analysis compares the value of benefits against costs. There is considerable debate on what can and should be included in this analysis, particularly in the area of environmental and societal benefits and costs. Generally, and in keeping with the objectives of intersection control, the only societal costs/benefits WSDOT evaluates are those due to collisions and delay. Include the following in the analysis:

• Project costs related to design, right of way, and construction.

• Annual maintenance cost differences between the options. For signals, this also includes the cost to review the signal timings in accordance with current signal operations guidelines. This value can be obtained from the region Traffic Office.

• 24-hour travel time savings. Workbook and annual information can be found at: www.wsdot.wa.gov/mapsdata/travel/mobility.htm

• A predictive method to compare societal benefits or costs calculated from the change in collision severity and/or frequency using the tools described in Chapter 321.

• Salvage value of right of way, grading and drainage, and structures.
1300.06(1)(e) Bicycle and Pedestrian Facilities

Discuss the facilities to be provided for and used by bicycles and pedestrians. Include required ADA accommodations.

For consideration of bicycle and pedestrian needs at intersections, see Chapters 1510, 1515, and 1520. Additional emerging practices information can be found at the Pedestrian and Bicycle Information Center (www.pedbikeinfo.org) and the NACTO Urban Bikeway Design Guide (http://nacto.org/cities-for-cycling/design-guide/).

1300.06(1)(f) Context Sensitive/Sustainable Design

Context sensitive design is a model for transportation project development. A proposed transportation project must be planned not only for its physical aspects as a facility serving specific transportation objectives, but also for its effects on the aesthetic, social, economic, and environmental values, needs, constraints, and opportunities in a larger community setting. Projects designed using this model:

- Optimize safety of the facility for both the user and the community.
- Promote multimodal solutions.
- Are in harmony with the community, and preserve the environmental, scenic, aesthetic, historic, and natural resource values of the area.
- Are designed and built with minimal disruption to the community.
- Involve efficient and effective use of the resources (time, budget, community) of all involved parties.

1300.06(1)(g) Additional Information

Discuss the following in the intersection analysis as needed to further support the selection (is it an item that will have a significant effect on the decision?):

- Information from the Route Development Plan or other approved corridor study.
- Environmental permitting restrictions, such as the ones in place in scenic areas and other locations with similar restrictions.
- Current and future land use and whether or not the intersection control will reasonably accommodate future land use traffic changes.
- Current/proposed speed limits (changes in speed limits can affect signal warrants).
- Public meeting comments.
- Outside agency coordination and comments.
- Medians, lane widths, and parking.
- Effect on future local agency projects.
- Other elements considered in the selection of the intersection control.
1300.06(2) Public Involvement

Public acceptance of stop and signal control is currently such that outreach efforts are seldom required beyond keeping the public informed as to the status of the project. In contrast, roundabouts, particularly the first in an area, require a holistic approach. Technical, public, and political aspects must be considered. Education and outreach efforts, if necessary, are collaborative and are most useful during the analysis and early design stages. (See Chapter 210 for further information.)

1300.06(3) Approval

Refer to Chapter 300 for additional information on approval authorities. Approval of intersection control type (to be completed no later than the scoping phase) requires the following:

• HQ Concurrence
• Region Approval

1300.06(4) Corridor Analyses

Intersections included in approved Route Development Plans or approved Corridor Analyses are eligible for Intersection Control Approval by the Region Traffic Engineer, provided they have been analyzed in accordance with this chapter. Approval is valid for three years.

1300.06(5) Local Agency or Developer-Initiated Intersections

Chapter 320 provides guidance for preparation of a Traffic Impact Analysis (TIA). Early in the design process, coordinate with the region to identify specific intersections for further analysis. The project initiator provides an Intersection Control Analysis (ICA) for approaches and intersections with state routes per 1300.06(1), or references this information in the TIA. The project initiator documents the design considerations and submits the ICA and all documentation to the region for approval (per 1300.06(1)). After the ICA is approved, finalize the intersection design and obtain approval per Chapters 300 (for documentation), 1310 (for intersections), 1320 (for roundabouts), and 1330 (for traffic signals).

Intersections in local agency projects submitted for grants administered by the department are subject to the requirements of this chapter. Intersections on state routes must receive intersection control approval as a condition of application.

1300.07 Documentation

Refer to Chapter 300 for design documentation requirements.