Washington State Department of Transportation

Publications Transmittal

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What's Changed?:
See back of this form for a summary description of the major policy changes, or check out our web site at: http://www.wsdot.wa.gov/eesc/design/policy/designpolicy.htm

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Instructions:
Page numbers and corresponding sheet-counts are given in the table below to indicate portions of the *Design Manual* that are to be removed and inserted to accomplish this revision.

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	Page Numbers	Sheets	Page Numbers	Sheets
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Distributed By	Phone Number	Signature
Directional Documents and Engineering Publications	(360) 705-7430 FAX: 705-6861	David K. Olson

Summary of Changes – Spring 2007 Revisions

Chapter 210 – Public Involvement and Hearings: Rewritten to provide designers improved guidance on public hearings processes and general public involvement activities. New graphics have been added to aid in the planning and preparation of hearings. Renewed emphasis is placed on contacting the HQ Access and Hearings Engineer for support and approvals.

Chapter 330 – Design Documentation, Approval, and Process Review: New statements are provided specifying a three-year shelf life for Design Approval and Project Development Approval, with guidance on what to do if these "expire" on a project. Check out 330.08 and 330.09.

Chapter 440 – Full Design Level: Design guidance is modified to allow the minimum median design width based on the elements of shoulder width, barrier width, and shy distance—as opposed to an arbitrary dimension. (See new Figure 440-4.)

Chapter 915 – Roundabouts: Rewritten based on lessons learned from previous project experiences. Many new figures have been added, showing designers various elements of roundabout design. We'll be watching to see how this new guidance is used and expect to make further revisions as project experiences emerge.

Chapter 1060 – Transit Facilities: Rewritten to update the layout and styles, update titles, replace duplicated information with cross references, and remove metric figures.

Chapter 1120 – Bridges: The *Design Manual* supplement *Vertical Falsework Clearance for Bridges Over Highways* (April 24, 2006) is no longer in effect; it has been incorporated into this chapter.

Chapter 1430 – Limited Access: Revised to make the acquisition of limited access at roundabouts more practical by changing the location where limited access is to be applied. Instead of measuring a prescribed distance from the end of the raised splitter island, new guidance allows the measure point to be from either the circulating roadway edge or from the center of the roundabout, depending on the case. This is similar to limited access applications used at stop- and signal-controlled intersections, where the measurement typically begins near the center of the intersection.

Spot Revisions: Other pages included in this revision package represent minor technical/grammatical corrections, updated references, and office/nomenclature changes, and may not include revision marks. These changes are not policy revisions.

Revision Marks: Please note that revision marks—underlines and side bars—are often used as a convenience to show designers what has changed. When design policy changes, and a chapter (such as 210) is rewritten from front to back, no revision marks are applied; however, a new date appears in the footer of each page. As a new revision indicator, a decimal number has been added to the manual number (as in M 22-01.01) and appears on each revised page of a chapter.

Washington State Department of Transportation

Design Manual Supplements and Instructional Letters

May, 2007

In Effect	Chapter	Date	Type	Subject/Title
Yes Yes	820 850	8/5/2005	DM Supplement	Overhead Sign Illumination (Lighting)
Yes	860	12/30/2005	DM Supplement	Systems Engineering for Intelligent Transportation Systems
No	1120	4/24/2006	DM Supplement	Vertical Falsework Clearance for Bridges Over Highways

Notes:

- Changes since the last revision to the *Design Manual* are shown in bold print.
- Items with **No** in the **In Effect** column were superseded by the latest revision and will be dropped from the next printing of this list.
- The listed items marked *yes* have been posted to the web at the following location:

http://www.wsdot.wa.gov/eesc/design/policy/pdf/DMSupplementLettersList/MAY2007DMSupplementLettersList.pdf

Design Manual

M 22-01

May 2007

Washington State Department of Transportation
Environmental and Engineering Programs
Design Office
PO Box 47329
Olympia, WA 98504-7329

Americans with Disabilities Act (ADA) Information

Materials can be provided in alternative formats: large print, Braille, cassette tape, or on computer disk for people with disabilities by calling the Office of Equal Opportunity (OEO) at 360-705-7097. Persons who are deaf or hard of hearing may contact OEO through the Washington Relay Service at 7-1-1.

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Foreword

The *Design Manual* is for use by Washington State Department of Transportation engineering personnel. It provides policies, procedures, and methods for developing and documenting the design of improvements to the transportation network in Washington. It has been developed for state facilities and may not be appropriate for all county roads or city streets that are not state highways.

The *Design Manual* supplements the engineering analyses and judgment that must be applied to improvement and preservation projects. It provides uniform procedures for documenting and implementing design decisions.

The Federal Highway Administration (FHWA) has agreed to approve designs that follow the guidance in the *Design Manual*; therefore, following the guidance presented is mandatory for state highway projects. When proposed designs meet the requirements contained in the *Design Manual,* little additional documentation is required.

The design environment changes rapidly, often without warning to the practitioner. To track every change, and to make improvements based upon each change, is not feasible. The intent of this manual is to provide recommended values for critical dimensions. Flexibility is permitted to encourage independent design tailored to individual situations. However, when flexibility is applied to a proposed design and the critical dimensions do not meet *Design Manual* criteria, additional documentation is required to record the decision-making process.

The addition of new or modified design criteria to the *Design Manual* through the revision process does not imply that existing features are deficient or inherently dangerous. Nor does it suggest or mandate immediate engineering review or initiation of new projects.

The *Design Manual* emphasizes cost-effective, environmentally conscious, and context sensitive design. Designers are encouraged to view the highway corridor beyond the vehicular movement context, so guidance regarding the use of the highway corridor by transit, pedestrians, and bicyclists is included. To accommodate multimodal use, the criteria provided for one mode is to be appropriately adapted to individual locations.

The complexity of transportation design requires the designer to make fundamental trade-off decisions that balance competing considerations. Although this adds to the complexity of design, it acknowledges the unique needs of specific projects and the relative priorities of various projects and programs. Improvements must necessarily be designed and prioritized in light of finite transportation funding.

Updating the *Design Manual* is an ongoing process and revisions are issued regularly. Comments, questions, and improvement ideas are welcomed. Use the comment form on the following page, or the online version at the Design Policy Internet Page:

http://www.wsdot.wa.gov/eesc/design/policy/designpolicy.htm

Pasco Bakotich III, P.E.
State Design Engineer

Comment Form

From: _____ Date: _____

_____ Phone: _____

_____

To: WSDOT
Headquarters, Design Office
Mail Stop 47329
PO Box 47329
Olympia, WA 98504-7329

Subject: *Design Manual* Comment

Comment (marked copies attached):

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Chapter 141 — Project Development Roles and Responsibilities for Projects with Structures

141.01 General

This chapter presents the project development process used by Washington State Department of Transportation (WSDOT), the Regions and the Bridge and Structures Office together, to determine the roles and responsibilities for projects with structures during the project development phase of a project. This chapter complements the Project Management Online Guide which is located at:
www.wsdot.wa.gov/Projects/ProjectMgmt

See Division 11 chapters and the *Bridge Design Manual* for design procedures.

The primary objective of this process is to provide a consistent means of selecting a bridge design team to perform all or part of the structural design work, whether it be a consultant or the WSDOT Bridge and Structures Office.

If the Local Agency will be requesting any services from WSDOT, the Local Agency will contact WSDOT's Local Program Engineer. The Local Program Engineer will help define the level of WSDOT's involvement in design and construction.

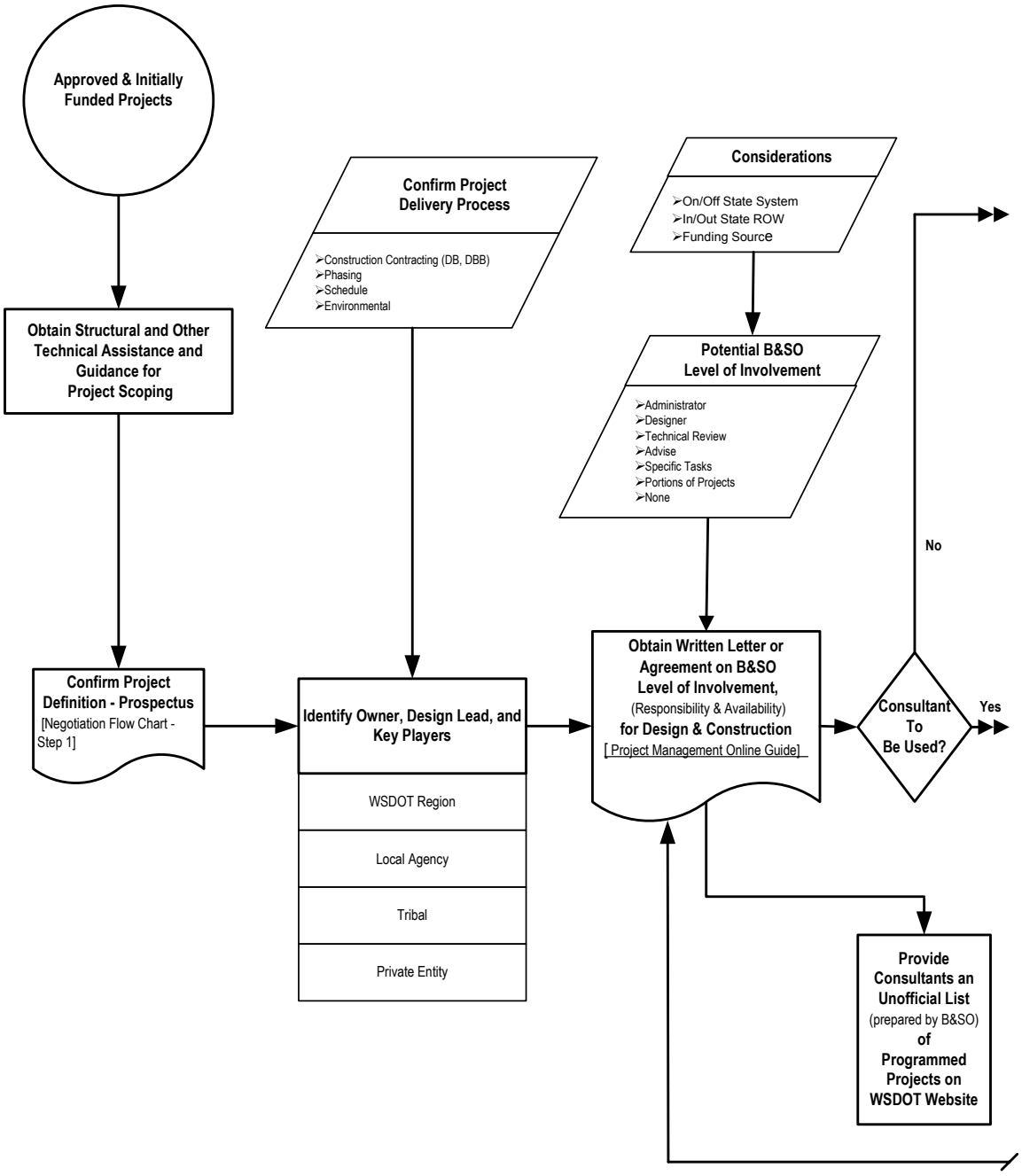
141.02 Procedures

The flow diagram, Figures 141-1a and 141-1b, begins at the left with the initial approval and funding of the project and ends at the right with the start of the project delivery process.

After a project is programmed, WSDOT is tasked with confirming the project scope and defining the structural team's level of involvement in design and construction. If a consultant is not used, all bridge design work will be performed by the Bridge and Structures Office. If a consultant is used, the WSDOT Region and Bridge and Structures Office will determine the level of involvement and responsibility for the design.

Agreements defining the level of involvement and responsibility will be developed and executed between the appropriate Regional office responsible for project development and the Bridge and Structures Office and the appropriate project delivery process will be implemented.

More information on this process and the desired outcomes is available on the Bridge and Structures Office's homepage at:
www.wsdot.wa.gov/eesc/bridge/

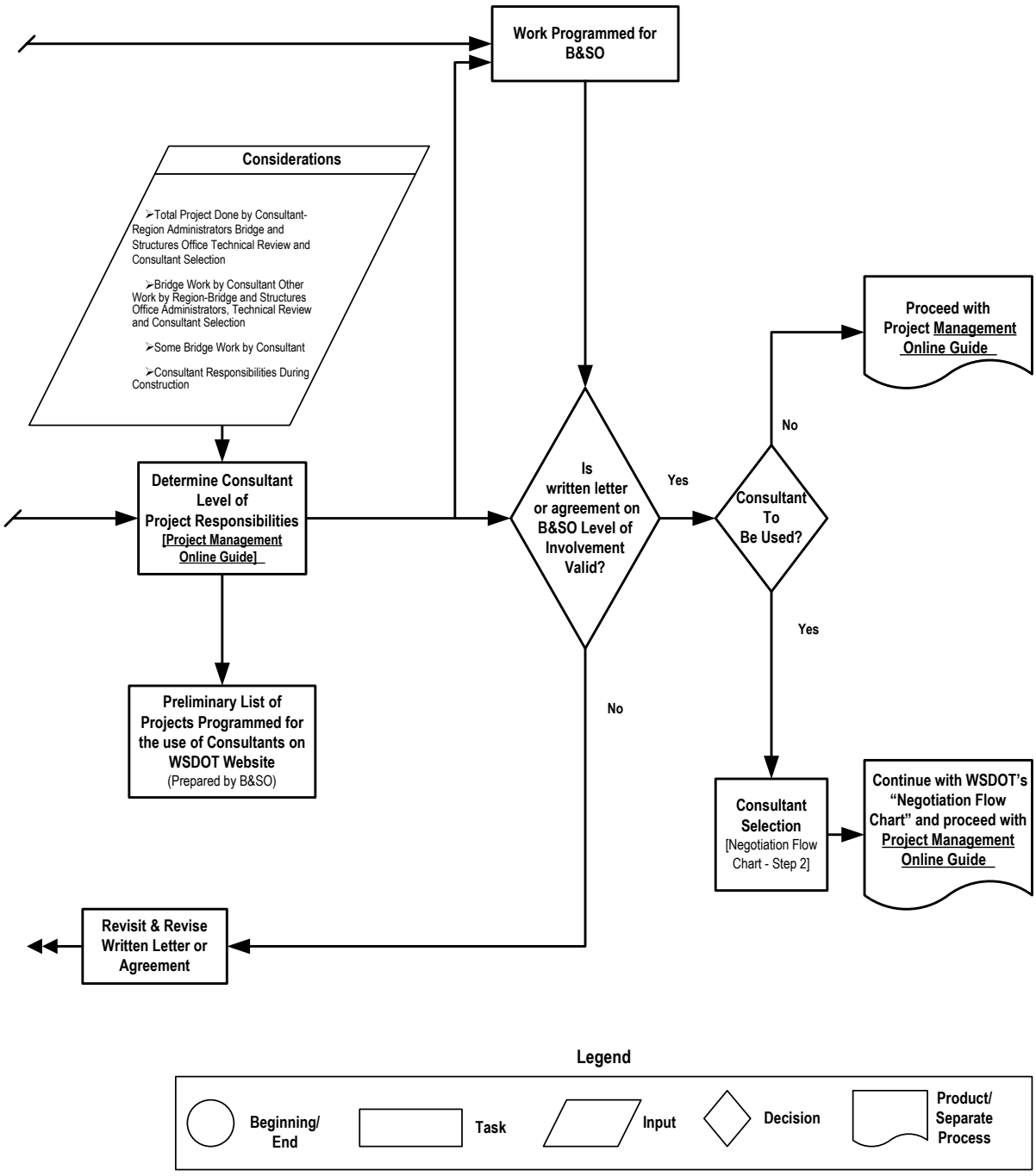


FHWA - Federal Highway Administration
WSDOT - Washington State Department of Transportation
DB - Design Build

DBB - Design Bid Build
B&SO - Bridge & Structures Office
ROW - Right of way

Determination of the Roles and Responsibilities for Projects with Structures (Project Development Phase)

Figure 141-1a



Determination of the Roles and Responsibilities for Projects with Structures (Project Development Phase)

Figure 141-1b

Chapter 210 Public Involvement and Hearings

210.01 General

The Washington State Department of Transportation (WSDOT) strives to involve the public in transportation decision making and make transportation decisions based on the public's best interests.

One of the best ways to achieve WSDOT's goals is to collaborate with the public, community groups, and various agencies. These participants often have differing, sometimes conflicting, perspectives and interests. In addition, many participants and organizations are not able to spend the time and effort required to fully engage in transportation decision making. Despite these challenges, active collaboration:

- Gives us access to important information and ideas that might otherwise be overlooked.
- Puts WSDOT in a position to help solve problems and resolve conflicts.
- Creates a sense of community.
- Fosters greater acceptance of projects.
- Helps build and sustain a credible and trusting relationship between WSDOT and the public.
- Ultimately leads to transportation improvements that better meet public needs and desires.

Public involvement techniques are used to collaborate with the public when making decisions about a transportation project or issue. Examples include more formal techniques, like public hearings, direct mail, and presentations to city councils and legislators; and less formal but equally important techniques, like telephone and e-mail discussions, meetings with community groups, media relations, project Internet pages, and more.

Law requires that many types of capital transportation projects undergo a formal public hearing process. The primary focus of this chapter is the legal procedures for public hearings. The basics of public involvement plans are briefly discussed and supplemented with referrals to WSDOT's communications resources to further guide their development and implementation.

210.02 References

Federal/State Laws and Codes

United States Code (USC) Title 23 – Highways, Sec. 128, Public Hearings

USC Title 23 – Highways, Sec. 771.111, Early coordination, public involvement, and project development

23 CFR 200.7 – FHWA Title VI Policy

23 CFR 200.9(b)(4) – Develop procedures for the collection of statistical data of participants and beneficiaries of state highway programs

23 CFR 200.9(b)(12) – Develop Title VI information for dissemination to the general public

23 CFR 450.212 – Public involvement

28 CFR Part 35 – Nondiscrimination on the basis of disability in state and local government services

49 CFR Part 27 – Nondiscrimination on the basis of disability in programs or activities receiving federal financial assistance

Americans with Disabilities Act of 1990 (ADA)

Civil Rights Restoration Act of 1987

Title VI of the Civil Rights Act of 1964

Section 504 of the Rehabilitation Act of 1973, as amended

Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order 13166 – Improving Access to Services for Persons with Limited English Proficiency

Revised Code of Washington (RCW) 47.50, Highway Access Management

RCW 47.52, Limited Access Facilities

Design Guidance

WSDOT Headquarters (HQ) Access and Hearings Engineer (360) 705-7251, and Internet page: www.wsdot.wa.gov/EESC/Design/Access/default.htm

Design Manual, Chapter 220, for environmental references

Design Manual, Division 14 chapters, for access control and right of way references

Supporting Information

Environmental Procedures Manual, M 31-11 www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/EPM/EPM.htm

Improving the Effectiveness of Public Meetings and Hearings, Federal Highway Administration (FHWA) Guidebook: www.ntl.bts.gov/card_view.cfm?docid=4020

Public Involvement Techniques for Transportation Decision-Making, FHWA September 1996, provides tools and techniques for effective public involvement: www.fhwa.dot.gov/reports/pittd/cover.htm

Relocation brochures: www.wsdot.wa.gov/realestate/

WSDOT *Communications Manual* for public involvement: wwwi.wsdot.wa.gov/Communications/

WSDOT Context Sensitive Solutions Internet site: www.wsdot.wa.gov/biz/csd/ExecutiveOrder.htm. A national site can be found at: www.contextsensitivesolutions.org/

210.03 Definitions

affidavit of publication A notarized written declaration stating that a ***notice of hearing*** (or a ***notice of opportunity for a hearing***) was published in the legally prescribed manner.

affidavit of service by mailing A notarized written declaration stating that the limited access hearing packet was mailed at least 15 days prior to the hearing and entered into the record at the hearing.

auxiliary aids and services (1) Qualified interpreters, notetakers, transcription services, written materials, telephone handset amplifiers, assistive listening devices, assistive listening systems, telephones compatible with hearing aids, open and closed captioning, telecommunications devices for deaf persons (TDD's), videotext displays, or other effective methods of making aurally delivered materials available to individuals with hearing limitations; (2) Qualified readers, taped texts, audio recordings, Brailled materials, large print materials, or other effective methods of making visually delivered materials available to individuals with visual impairments; (3) Acquisition or modification of equipment or devices; (4) Other similar services and actions; and (5) Providing and disseminating information, written materials, and notices in languages other than English, where appropriate.

context sensitive solutions (CSS) A collaborative, interdisciplinary approach used to develop a transportation project that fits its physical surroundings and is responsive to the community's scenic, aesthetic, social, economic, historic, and environmental values and resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist (see 210.02 and 210.04(2)).

court reporter A person with a license to write and issue official accounts of judicial or legislative proceedings.

Findings and Order A document containing the findings and conclusions of a limited access hearing approved by the Environmental and Engineering Programs Director (see 210.09(12) and (13)).

hearing An assembly to which the public is invited to attend and participate. Types of hearings include:

administrative appeal hearing A formal process whereby a property owner may appeal WSDOT's implementation of access management legislation. The appeal is heard by an administrative law judge (ALJ), who renders a decision. (See Chapter 1435 for administrative appeal hearing procedures.)

combined hearing A hearing that is held when there are public benefits to be gained by combining environmental, corridor, design, and/or limited access subjects.

corridor hearing A formal or informal hearing that presents the corridor alternatives to the public for review and comment before a commitment is made to any one route or location. This type of hearing is beneficial on existing corridors with multiple improvement projects programmed over a long duration.

design hearing A formal or informal hearing that presents the design alternatives to the public for review and comment before the selection of a preferred alternative.

environmental hearing A formal or informal hearing documenting that social, economic, and environmental impacts have been considered and that public opinion has been solicited.

limited access hearing A formal hearing that gives local public officials, owners of abutting properties, and other interested persons an opportunity to be heard about the limitation of access to the highway system.

formal hearing format A hearing that is conducted by a moderator using a formal agenda, overseen by a hearing examiner, and recorded by a court reporter, as required by law. Limited access hearings require the use of the formal hearing format (see 210.05(3)).

informal hearing format A hearing where oral comments are recorded by a court reporter, as required by law. An informal hearing often uses the "open house" format (see 210.04(1)(a)). A formal agenda and participation by a hearing examiner are optional.

hearing agenda Used with formal hearings; an outline of the actual public hearing elements. (See 210.05(9)(a) for contents.)

Hearing Coordinator The Access and Hearings Manager within the HQ Access and Hearings Unit – (360) 705-7251.

hearing examiner An administrative law judge from the Office of Administrative Hearings, or a WSDOT designee, appointed to moderate a hearing.

hearing script A written document of text to be presented orally by department representatives at the hearing.

hearing summary Documentation prepared by the region and approved by Headquarters that summarizes environmental, corridor, and design hearings. (See 210.05(10) for content requirements.)

hearing transcript A document prepared by the court reporter that transcribes verbatim all oral statements made during the hearing, including public comments. This document becomes part of the official hearing record.

NEPA National Environmental Policy Act.

notice of appearance A form provided by WSDOT for anyone wanting to receive a copy of the Findings and Order and the adopted Limited Access Plan (see 210.09(3) and (8)).

notice of hearing (or ***hearing notice)*** A published advertisement that a public hearing will be held.

notice of opportunity for a hearing An advertised offer to hold a public hearing.

order of hearing An official establishment of the hearing date by the State Design Engineer.

prehearing packet A concise, organized collection of all necessary prehearing data, prepared by the region and approved by the HQ Access and Hearings Engineer prior to the hearing (see 210.05(4) and Figure 210-3).

project management plan A formal, approved document that defines how the project is executed, monitored, and controlled. It may be in summary or detailed form and may be composed of one or more subsidiary management plans and other planning documents. For further information, see the Project Management Online Guide: www.wsdot.wa.gov/Projects/ProjectMgmt/Process.htm

public involvement plan A plan to collaboratively involve the public in decision making, tailored to the specific needs and conditions of the project, the people, and the communities it serves. It is often part of a broader communications plan.

relocation assistance program The purpose of the program, as defined in the *Right of Way Manual*, is to establish uniform procedures for relocation assistance that will assure legal entitlements and provide fair, equitable, and consistent treatment to persons displaced by WSDOT-administered projects.

résumé An official notification of action taken by WSDOT following adoption of a Findings and Order (see 210.09(14)).

SEPA State Environmental Policy Act.

study plan A term associated with environmental procedures, proposing an outline or "road map" of the environmental process to be followed during the development of a project that requires complex NEPA documentation. (See 210.06 and the *Environmental Procedures Manual*.)

210.04 Public Involvement

Developing and implementing an effective plan for collaboration with the public is critical to the success of WSDOT's project delivery effort. It provides an opportunity to understand and achieve diverse community and transportation goals. Transportation projects with high visibility or community issues or effects often attract the attention of a broad range of interested people. These types of projects will best benefit from early public involvement, which can influence the project's success and community acceptance.

Developing a profile (through demographic analysis) of the affected community is critical to achieving successful public involvement. This will enable the agency to tailor its outreach efforts toward the abilities/needs of the community. Individuals from minority and ethnic groups and low-income households, who are traditionally underserved by transportation, often find participation difficult. While these groups form a growing portion of the population, particularly in urban areas, historically they have experienced barriers to participation in the public decision-making process and are therefore underrepresented. These barriers arise both from the historical nature of the public involvement process and from cultural, linguistic, and economic differences. For example, a community made up of largely senior citizens (with limited mobility/automobile usage) may mean:

- Meetings/open houses are planned in locations easily accessible to them, such as senior centers and neighborhood community centers.
- Meetings are scheduled in the mornings or midday to accommodate individuals who prefer not to leave home after dark.
- Meetings are scheduled in the evenings to accommodate persons who work during the day.

A project's affected area might consist of a population that might be limited in speaking/understanding English. This may entail:

- Developing/disseminating materials in other languages, as appropriate.
- Having a certified translator on hand at the meetings.

Conducting a demographic profile should be the first order of business when developing a public involvement plan.

Effective public involvement must begin with clearly defined, project-related goals that focus on specific issues, specific kinds of input needed, and specific people or groups that need to be involved. The more detailed a public involvement plan, the greater its chances of obtaining information the agency can use in decision making. Extra effort

may be needed to elicit involvement from people unaccustomed to participating, because they often have different needs and perspectives than those who traditionally participate in transportation decision making. They not only may have greater difficulty getting to jobs, schools, recreation, and shopping than the population at large, but also they are often unaware of transportation proposals that could dramatically change their lives. Many lack experience with public involvement, even though they may have important, unspoken issues that should be heard.

Current policies provide general guidelines that allow considerable flexibility. NEPA and SEPA environmental policies and procedures are intended to provide relevant environmental information to public officials, agencies, and citizens, and allow public input to be considered before decisions are made. There are also various other laws, regulations, and policies that emphasize this, including 23 CFR, Title VI of the Civil Rights Act, the Americans with Disabilities Act, and Executive Orders 12898 and 13166.

WSDOT's collaborative process with the public should be open, honest, strategic, consistent, inclusive, and continual. Initiating a project in an atmosphere of collaboration and partnership can go a long way toward providing equal opportunities for all parties (whether they are local, state, tribal, private, nonprofit, or federal) to participate in a project vision. This collaboration requires an intensive communications effort that is initiated during project visioning and extends through construction and eventual operation of the facility.

Department specialists in public communications, environmental procedures, traffic engineering, real estate services, and limited access control are routinely involved with public outreach efforts and project hearings. Depending on the scale and complexity of a project, the region is encouraged to engage the participation of interdisciplinary experts when developing a public involvement plan and communicating project details. Agency representatives convey WSDOT's image to the public; therefore, they should be confident, well-informed, conscientious of their roles, and skillful communicators.

(1) Public Involvement Plan

The region develops a public involvement plan for its own use and guidance. To engage the public, share the decision-making process, identify issues, and resolve concerns, the region communicates with the affected community through group presentations, open house meetings, newspaper articles, fliers, and other methods. The public involvement plan includes methods that will elicit the best participation from the community, including traditionally underrepresented groups.

Developing an effective public involvement plan is a strategic effort. WSDOT must identify audiences, messages, strategies, and techniques that will meet the unique needs of a proposed transportation project, as well as the needs of the public.

The ultimate goal of the public involvement plan is to allow members of the public opportunities throughout the process to learn about the project, provide information and options, collaborate, and provide input intended to influence WSDOT decisions. The plan will outline ways to identify and involve the communities affected by the project; provide them with accessible information through reader-friendly documents, graphics, plans, and summaries; and involve them in decision making.

An effective public involvement plan:

- Is tailored to the project.
- Encourages interactive communication.
- Demonstrates to residents that their input is valued and utilized.
- Includes all affected communities.
- Identifies and resolves issues early in the project development process.
- Ensures public access to relevant and comprehensible information.
- Informs the public of the purpose, need for, and benefits of the proposed action.
- Informs the public about the process that will be used to make decisions.
- Gains public support.
- Provides equal opportunity, regardless of disability, race, national origin, color, gender, or income.

The region communications and environmental offices can provide expertise in developing a public involvement plan tailored to a specific project. The HQ Access and Hearings Unit specializes in procedures for public hearings. The real estate services office can provide expertise regarding acquisition, relocation assistance, and other related programs. Enlisting the support of these groups is essential to the success of WSDOT projects.

WSDOT recognizes local, state, federal, and tribal staff and elected officials as active sponsors of proposed projects. Those officials might help develop and implement the public involvement plan. Early and continued contact with these resources is key to the success of a project.

The public involvement plan might include the following:

- Objectives
- Strategies
- Tactics, or a list of proposed activities
- Proposed time schedule to accomplish each project
- Methods to track public comments
- Methods used to consider comments during the decision-making process, including follow-up procedures
- Personnel, time, and funds needed to carry out the plan
- Identification of the project partners and stakeholders

Early use of demographics can help identify the public to be involved. After identification, a variety of methods can be chosen to encourage the most effective public involvement. The public involved (affected directly or indirectly) might include any or all of the following:

- Adjacent property owners and tenants
- Indian tribes
- Low-income groups
- Minority groups
- Cooperating and participating agencies
- Local, state, and federal government staff and elected officials
- Community groups, such as clubs, civic groups, business groups, environmental groups, labor unions, disability advocacy groups, and churches
- Commuters and the traveling public
- Emergency and utility service providers
- Adjacent billboard owners and clients
- The general public and others known to be affected
- Others expressing interest

The following are examples of common outreach methods:

- Public meetings and open house meetings
- Drop-in information centers or booths
- Advisory committee meetings
- Design workshops
- Meetings with public officials
- Individual (one-on-one) meetings
- Meetings with community groups
- Project Internet pages
- WSDOT project e-mail alert lists
- Surveys
- Questionnaires
- Telephone hot lines
- Using established media relations and contacts
- Internet blogs
- Direct mail
- Individual e-mails and letters
- Advisory committees and groups
- Public hearings

(a) **Public Meetings and Open Houses.** Public meetings range from large informational workshops to small groups using one-on-one meetings with individuals. They are less formal than hearings. The region evaluates the desired outcome from a meeting and how the input will be tracked, and then plans accordingly.

- Open house meetings can be effective for introducing a project to the public and stimulating an exchange of ideas.
- Small meetings are useful for gaining information from community groups, underrepresented groups, neighborhood groups, and advisory committees.

- Workshop formats, where large groups are organized into small discussion groups, serve to maximize the participation of all attendees while discouraging domination by a few groups or individuals.

(b) **Follow-Up Procedures.** Effective public involvement is an ongoing collaborative exchange, and it is necessary to provide follow-up information several times during a large project to maintain a continuing exchange of information.

At significant stages, the region provides a wide range of general information about the project. Follow-up information conveys, as accurately as possible, how public input was considered during development of the project.

It may become necessary to revise the public involvement plan as the project evolves, conditions change, oppositional groups emerge, or new issues arise. Sometimes innovative methods must be used to ensure the inclusion of affected community members. This is especially important for underrepresented groups such as minority and low-income groups and in communities where a significant percentage of the affected population does not speak English. Consider the need for translators, interpreters, and providing written information in languages other than English. Reference to information on limited English proficiency is provided in 210.04(2)(d). A resident advisory committee can often help identify community issues and concerns as well as recommend effective methods for public involvement.

(2) Public Involvement References

There are a number of publications, references, and training courses available to assist regions in developing public involvement plans for their projects. The following are recommended references:

(a) **WSDOT Project Management Online Guide**

A project's public involvement plan is an essential element of the overall project management plan. The *WSDOT Project Management Online Guide* is an Internet resource intended to support delivery of transportation projects through effective project management and task planning. The guide includes best practices, tools, templates, and examples to enhance the internal and external communication processes. The process, tools, and templates can be found at:
www.wsdot.wa.gov/Projects/ProjectMgmt

(b) **WSDOT Communications Intranet Page**

The *WSDOT Communications Intranet Page* provides guidance for effective communications. This resource includes a "*Communications Manual*," key messaging, and WSDOT's communications philosophy, an excellent resource for developing a public involvement plan:
wwwi.wsdot.wa.gov/communications/

(c) **Context Sensitive Solutions and Community Involvement**

A proposed transportation project must consider both its physical aspects as a facility serving specific transportation objectives and its effects on the aesthetic, social, economic, and environmental values within a larger community setting. Context Sensitive Solutions is a collaborative, interdisciplinary approach that involves the community in the development of a project. WSDOT's philosophy encourages collaboration and consensus-building as highly advantageous to all parties to help avoid delays and other costly obstacles to project implementation. WSDOT endorses the Context Sensitive Solutions approach for all projects, large and small, from early planning through construction and eventual operation of the facility. For further information, see WSDOT Executive Order E-1028.01 on Context Sensitive Solutions:
www.wsdot.wa.gov/biz/csd/ExecutiveOrder.htm

wwwi.wsdot.wa.gov/docs/

Additionally, the following WSDOT HQ Design, Highways and Local Programs, and Environment Internet pages offer an excellent array of publications, training, and resources for public involvement:
www.wsdot.wa.gov/eesc/design/Urban/Default.htm

www.wsdot.wa.gov/TA/Operations/LocalPlanning/contextsensitivesolutions.html

www.wsdot.wa.gov/TA/Operations/LocalPlanning/Research.html

www.wsdot.wa.gov/Environment/EJ/

(d) **Federal Highway Administration References**

- *Improving the Effectiveness of Public Meetings and Hearings,* FHWA Guidebook. Provides a variety of techniques and processes based on the practical community involvement experience of its authors: www.ntl.bts.gov/card_view.cfm?docid=4020
- *Public Involvement Techniques for Transportation Decision-Making*, FHWA September 1996, provides tools and techniques for effective public involvement: www.fhwa.dot.gov/reports/pittd/cover.htm
- *How to Engage Low-Literacy and Limited-English-Proficiency Populations in Transportation Decision Making,* FHWA 2006, provides tools and techniques for identifying and including these populations: www.fhwa.dot.gov/hep/lowlim/index.htm
- 23 CFR 630 Subpart J, Final Rule on Work Zone Safety and Mobility, Work Zone Public Information and Outreach Strategies. The following Internet guide is designed to help transportation agencies plan and implement effective public information and outreach campaigns to mitigate the effects of road construction work zones: www.ops.fhwa.dot.gov/wz/info_and_outreach/index.htm

(3) Legal Compliance Statements

All public announcements shall include the required statements relative to the Americans with Disabilities Act (ADA) and Title VI legislation. Region communications offices and the WSDOT Communications Office Intranet page can provide the current version of both of these statements for legal compliance.

(a) **ADA Compliance**

The ADA and Section 504 of the Rehabilitation Act require WSDOT to inform the general public of its obligation to ensure that programs and activities are accessible to and usable by persons with disabilities. For publications, the notice must provide a way to obtain the materials in alternative formats (such as Braille or taped). For public meetings and hearings, the notice must inform the public that reasonable accommodations can be made for a variety of needs.

The public meeting/hearing facility must always meet minimum ADA accessibility standards (such as ramps for wheelchair access, wide corridors, and accessible rest rooms). Additionally, WSDOT must provide, upon request, reasonable accommodations to afford equal access to information, meetings, etc., to persons with disabilities. Reasonable accommodations can include services and auxiliary aids (such as qualified interpreters, transcription services, assistive listening devices for persons who are deaf or hard of hearing, or additional lighting for persons with visual impairments.) The WSDOT Office of Equal Opportunity can provide assistance for reasonable accommodation provisions.

(b) **Title VI**

Title VI of the Civil Rights Act of 1964 requires that WSDOT inform the general public of its obligation to ensure that no person shall, on the grounds of race, color, national origin and/or sex, be excluded from participation in, be denied the benefits of, or be otherwise discriminated against under any of its federally funded programs and activities.

210.05 Public Hearings

By state and federal law, certain capital transportation projects propose actions that require a public hearing. The remainder of this chapter provides guidance on public hearing procedures.

The common types of public hearings associated with WSDOT projects include environmental, design, corridor, and limited access hearings, which are discussed in subsequent sections. The guidance in this chapter discusses project actions that trigger a hearing and the procedures for effectively planning, conducting, and completing the hearing process.

While there are several different types of public hearings, they follow similar steps for planning and preparation of project materials and information. These steps facilitate efficient

reviews and approvals required for the hearing to proceed as planned. Special attention to the scheduling of deliverables and notifications leading up to the hearing help the process progress smoothly.

Public hearing formats are either formal or informal. Limited access hearings are always conducted as formal hearings. An informal process can be used for most other hearings.

Hearings are often conducted in accordance with NEPA/SEPA procedures for public involvement during the environmental documentation phase of the project. The region reviews the requirements for hearings during the early stages of project development and before completion of the draft environmental documents.

(1) General Information for Hearings

Preparing for and conducting a successful public hearing requires considerable coordination and effort. You can best do this by establishing a support team to identify and carry out the tasks and arrangements. It is crucial to identify and schedule tasks and deliverables well in advance of a public hearing. A project team might enlist the support of region specialists from communications, environmental, government relations, right of way, real estate, and traffic offices, as well as the HQ Hearing Coordinator, HQ NEPA Policy staff, Office of Equal Opportunity, and others involved with the project. The following figures and narrative help identify whether a public hearing is required and how to prepare.

(2) Selecting the Hearing Type

By law, certain project actions or proposed conditions require that specific types of public hearings are conducted. Figure 210-1 identifies project conditions and their associated hearing requirements. If one or more of the conditions in Figure 210-1 occurs, a notice of opportunity for a hearing is required by federal and state law (USC Title 23 §771.111 and RCW 47.52) and by WSDOT policy. Consult the Hearing Coordinator in the HQ Access and Hearings Unit, as well as project environmental specialists, for hearing requirements.

(3) Selecting the Hearing Format

The types of public hearing formats used by WSDOT are known as formal and informal. Hearing formats are different than hearing types. In some cases the hearing type will dictate the required format, such as with limited access hearings. The following text and Figure 210-2 provide guidance on formats.

(a) **Formal Hearings.** A formal hearing is conducted by a moderator using a formal agenda, overseen by a hearing examiner, and recorded by a court reporter, as required by law. Limited access hearings and administrative appeal hearings require the use of the formal hearing format. For projects that require a formal public hearing, it is common for WSDOT to hold a public open house preceding the hearing.

The following are required for all formal hearings:

- Hearing notice with a fixed time and date (see 210.05(5) and (6))
- Fixed agenda and script
- Hearing examiner
- Hearing moderator (may be the hearing examiner)
- Court reporter
- Specified comment period
- Hearing summary (see 210.05(10))

In addition to providing oral comments, people can write opinions on comment forms available at or after the hearing and submit them before the announced deadline.

(b) **Informal Hearings.** An informal hearing is also known as an open format hearing. Individual oral comments are recorded by a court reporter. The presence of a hearing examiner and a formal agenda are optional.

These events are usually scheduled for substantial portions of an afternoon or evening so people can drop by at their convenience and fully participate. Activities usually include attending a presentation, viewing exhibits, talking to project staff, and submitting written or oral comments.

The following items are features of an open format (or informal) hearing:

- Open format hearings can be scheduled to accommodate people's work schedules.
- Brief presentations about the project and hearing process are advertised at preset times in the hearing notice. Presentations can be live, videotaped, or computerized.
- Agency or technical staff is present to answer questions and provide details of the project.
- Information is presented buffet-style, allowing participants access to specific information.
- Graphics, maps, photos, models, videos, and related documents are frequently used.
- People have the opportunity to clarify their comments by reviewing materials and asking questions before commenting.
- People can comment formally before a court reporter, or they can write opinions on comment forms and submit them before the announced deadline.

(4) Hearing Preparation

When region staff has determined that a formal or informal public hearing will be held, they should contact the HQ Hearing Coordinator to discuss preliminary details. The HQ Hearing Coordinator specializes in assisting with preparations for the hearing and will usually attend. Other WSDOT groups involved with the project and tasked with developing and implementing the public involvement plan can assist with hearing preparations and provide assistance at the hearing.

The figures in this chapter can be used as checklists to identify important milestones and work products needed. Important elements include setting an initial target date for the hearing and agreement on staff roles and responsibilities at the hearing.

(a) **Setting the Hearing Date and Other Arrangements.** The State Design Engineer sets the hearing date at the recommendation of the HQ Hearing Coordinator. This is known as the order of hearing. Final arrangements for the hearing date can be handled by telephone or brief check-in meetings between the HQ Hearing Coordinator and the region.

The region proposes a hearing date based on the following considerations:

- Convenient for community participation. Contact local community and government representatives to avoid possible conflict with local activities. Consider times and locations that are most appropriate for the community.
- For corridor and design hearings, at least 30 days after circulation of the draft environmental impact statement (DEIS) or the published notice of availability of any other environmental document.
- In most cases, more than 45 days after submittal of the prehearing packet.

The region makes other arrangements as follows:

- Reviews the location of the hearing hall to ensure it is easily accessed by public transportation (whenever possible), convenient for community participation, and ADA accessible.
- Arranges for a court reporter.
- Requests that the HQ Hearing Coordinator provide a hearing examiner for all limited access hearings and for other hearings, if desired.
- Develops a hearing agenda for all limited access hearings and for other types of hearings, if desired.
- If requested in response to the hearing notice, provides communication auxiliary aids and other reasonable accommodations required for persons with disabilities. Examples include interpreters for persons who are deaf; audio equipment for persons who are hard of hearing; language interpreters; and the use of guide animals and Braille or taped information for persons with visual impairments.
- All public hearings and meetings require the development of procedures for the collection of statistical data (race, color, sex, and national origin) of participants in, and beneficiaries of, state highway programs such as relocatees, impacted citizens, and affected communities. Public Involvement Forms should be available for meeting attendees to complete. The Public Involvement Form

requests attendees to provide information on their race, ethnicity, national origin, and gender. The form is available in English, Spanish, Korean, Russian, Vietnamese, Tagalog, and Traditional and Simplified Chinese at: www.wsdot.wa.gov/oeo/titlevi.htm

- If demographics indicate that 5% or 1000 persons or more in the affected project area speak a language other than English, vital documents, advertisements, notices, newspapers, mailing notices, and other written and verbal media and informational materials may need to be translated into other languages to ensure that social impacts to communities and people are recognized and considered throughout the transportation planning and decision-making process. In addition, language interpreters may need to be present during the hearings or public meetings to ensure that individuals and minority communities are included throughout the process.

(b) **Developing the Prehearing Packet.** The region prepares a prehearing packet, which is an assemblage of organized project information containing public notices, prepared news releases, exhibits, and handouts to be used at the hearing. The project team members and specialists enlisted to support the public involvement and hearing processes typically coordinate to produce the prehearing packet elements. Much of the information needed in the prehearing packet will come from the project's public involvement plan.

You should prepare a prehearing packet at least 45 days in advance of the public hearing and send it to the HQ Access and Hearings Unit. The HQ Hearing Coordinator reviews and concurs with the region's plans, and recommends the State Design Engineer's approval of the hearing date. Headquarters concurrence with the prehearing packet typically requires two weeks after receipt of the information.

The following information is included in the prehearing packet:

1. **Project Background Information and Exhibits.** A project vicinity map and pertinent plans and exhibits for the hearing. The prehearing packet also contains a brief written narrative of the project. Usually, this narrative is already prepared and available in Project File documents, public involvement plans, or on a project Internet page.
2. **Proposed Hearing Type, Format, and Logistics.** The prehearing packet identifies the type of hearing required. A hearing support team provides various planning details and helps with arrangements (date, time, place, and announcements). A public open house is often scheduled on the same day, preceding a formal hearing, to provide opportunity for involvement by the community.
3. **News Release.** The region communications office can assist in preparing announcements for the hearing and other public events.
4. **Legal Hearing Notice.** Notices must contain certain legal statements provided by the HQ Access and Hearings Unit. (See 210.05(5) and (6) for guidance on notices.)
5. **List of Newspapers and Other Media Sources.** The media listing used to announce the hearing. The region communications office has developed relations with reporters and media outlets, including minority publications and media, and is accustomed to working these issues. Enlist the office's support for hearing preparations.
6. **List of Legislators and Government Agencies Involved.** Special notice is sent to local officials and legislators announcing public hearings. At formal hearings, the moderator and agenda typically identify those officials so they can interact with the public. The HQ Government Relations Office can assist with identifying and notifying legislators and key legislative staff within the project area.
7. **The Hearing Agenda and Script.** These are required for formal hearings and are prepared by the region. The HQ Access and Hearings Unit can provide sample agendas and scripts to support regions in their hearing preparations.

Figure 210-3 provides a checklist of prehearing packet contents, including additional items needed for limited access hearings.

(5) Public Hearing Notices – Purpose and Content

There are two types of public notices for hearings: notice of hearing and notice of opportunity for a hearing. Consult the HQ Hearing Coordinator for specific project hearing requirements and implementation strategies.

(a) **Notice of Hearing.** A notice of hearing is prepared and published when a hearing is required by law and cannot be waived.

(b) **Notice of Opportunity for a Hearing.** In select cases, a notice of opportunity for a hearing is prepared and published in order to gauge the public's interest in having a particular hearing. This kind of notice is only used if the requirements for a hearing can be legally waived. In these cases, documentation is required as set forth in 210.05(7).

(c) **Content Requirements.** The HQ Access and Hearings Unit provides sample notices to the regions upon request. Public notices include statements that are required by state and federal statutes. Some important elements of a notice include the following:

- A map or graphic identifying project location and limits.
- For a notice of opportunity for a hearing, include the procedures for requesting a hearing and the deadline, and note the existence of the relocation assistance program for persons or businesses displaced by the project.
- For an environmental, corridor, design, or combined corridor-design hearing, or for a notice of opportunity for a hearing, announce the availability of the environmental document and accessible locations.
- Project impacts to wetlands; flood plains; prime and unique farmlands; Section 4(f), 6(f), or 106 properties; endangered species or related habitats; or affected communities.
- Information on any associated prehearing presentation(s).
- Americans with Disabilities Act and Title VI legislation statements.

(6) Publishing Hearing Notices – Procedure

To advertise a legal notice of hearing or a notice of opportunity for a hearing, use the following procedure for appropriate media coverage and timing requirements:

1. **Headquarters Concurrence.** As part of the prehearing packet, the region transmits the proposed notice and a list of the newspapers in which the notice will appear to the HQ Hearing Coordinator for concurrence prior to advertisement.
2. **Region Distribution of Hearing Notice.** Upon receiving Headquarters concurrence, the region distributes copies of the hearing notice and news release as follows:
   - Send a copy of the hearing notice and a summary project description to appropriate legislators and local officials one week before the first publication of a hearing notice. Provide the HQ Government Relations Office with a copy of all materials that will be distributed to legislators, along with a list of legislative recipients.
   - Advertise the hearing notice in the appropriate newspapers within one week following the mailing to legislators. The advertisement must be published in a newspaper with general circulation in the vicinity of the proposed project or with a substantial circulation in the area concerned, such as foreign language and local newspapers. If affected limited-English-proficient populations have been identified, other foreign language newspapers may be appropriate as well. The legal notices section may be used or, preferably, a paid display advertisement in a prominent section of the newspaper, such as the local news section. With either type of advertisement, request that the newspaper provide an affidavit of publication.
   - Distribute the project news release to all appropriate news media about three days before the first publication of a hearing notice, using newspapers publishing the formal advertisement of the notice.

- Additional methods may also be used to better reach interested or affected groups or individuals, including notifications distributed via project e-mail lists, ads in local community news media, direct mail, fliers, posters, and telephone calls.
- For corridor and design hearings, the first notice publication must occur at least 30 days before the date of the hearing. The second publication must be 5 to 12 days before the date of the hearing (see Figure 210-4). The first notice for a corridor or design hearing shall not be advertised prior to public availability of the draft environmental document.
- For limited access and environmental hearings, the notice must be published at least 15 days prior to the hearing. The timing of additional publications is optional (see Figure 210-5).
- For a notice of opportunity for a hearing, the notice must be published once each week for two consecutive weeks. The deadline for requesting a hearing must be at least 21 days after the first date of publication and at least 14 days after the second date of publication.
- A copy of the published hearing notice is sent to the HQ Hearing Coordinator at the time of publication.

3. **Headquarters Distribution of Hearing Notice.** The HQ Hearing Coordinator sends a copy of the notice of hearing to the Transportation Commission, Attorney General's Office, HQ Communications Office, and FHWA (if applicable).

For a summary of the procedure and timing requirements, see Figure 210-4 (for environmental, corridor, and design hearings) or Figure 210-5 (for limited access hearings).

(7) No Hearing Interest – Procedure and Documentation

As described in 210.05(5), in select cases the region can satisfy certain project hearing requirements by advertising a notice of opportunity for a hearing. This procedure can be beneficial, particularly with limited access hearings in cases where very few abutting property owners are affected. If no hearing requests are received after issuing the notice of opportunity, the following procedures and documentation are required to waive a hearing:

(a) **Corridor or Design Hearing.** If no requests are received for a corridor or design hearing, the region transmits a package (the notice of opportunity for a hearing, the affidavit of publication of the notice, and a letter stating that there were no requests for a hearing) to the HQ Access and Hearings Unit.

(b) **Limited Access Hearing.** When a notice of opportunity for a hearing is used to fulfill the requirements for a limited access hearing and there are no requests for a hearing, the following steps are taken:

- The region must secure signed hearing waivers from every abutting property owner whose access rights will be affected by the project, as well as the affected local agency. The HQ Access and Hearings Unit can supply a sample waiver to the region.
- The project engineer must contact every affected property owner of record (not tenant) and the local agency to explain the proposed project. This explanation must include information on access features, right of way acquisition (if any), and the right to a hearing. Property owners must also be advised that signing the waiver will not affect their right to fair compensation for their property, or their access rights or relocation benefits.
- The region transmits the original signed waivers to the HQ Access and Hearings Unit, along with the affidavit of publication of the notice of opportunity for a limited access hearing and a recommendation for approval of the Right of Way Plan. Once the completed package is received by the HQ Access and Hearings Unit, it is submitted to the State Design Engineer for review and approval.

(c) **Environmental Hearing.** Environmental hearings cannot use the process of waivers to satisfy project hearing requirements.

(8) Prehearing Briefs and Readiness

After publication of a hearing notice, the region should expect to receive public requests for information and project briefings, including requests for information in languages other than English.

(a) **Presentation of Material for Inspection and Copying.** The information outlined in the hearing notice and other engineering and environmental studies, as well as information intended to be presented at the hearing, must be made available for public review and copying throughout the period between the first advertisement and the approval of the hearing summary or Findings and Order. The information may also need to be available in languages other than English if demographics indicate. The information need not be in final form, but must include every item currently included in the hearing presentation. The environmental documents must also be available for public review.

These materials are made available in the general locality of the project. The region reviews the variables (the locations of the regional office, project office, and project site; the interested individuals; and the probability of requests for review) and selects a mutually convenient site for the presentation of the information. In accordance with RCW 42.56, Public Records, a record should be kept for future evidence, stating who came in, when, and what data they reviewed and copied.

(b) **Hearing Briefing.** On controversial projects, the HQ Hearing Coordinator arranges for a briefing (held before the hearing) for those interested in the project. Attendants typically include appropriate Headquarters, region, and FHWA personnel, with special notice to the Secretary of Transportation. Region personnel present the briefing.

(c) **Prehearing Presentation.** The region is encouraged to give an informal presentation to the public for discussion of the project prior to the hearing. A prehearing presentation is informal, with ample opportunity for exchange of information between WSDOT and the public. Providing community members with opportunities to talk about their concerns in advance of the hearing promotes positive public relationships, and can make the actual hearing proceed more smoothly. Prehearing presentations can be open house meetings, drop-in centers, workshops, or other formats identified in the public involvement plan.

The prehearing presentation is usually held about one week before the hearing for more controversial projects; modified as needed.

Include the date, time, and place in the hearing notice and ensure it is mailed in time to give adequate notice of the prehearing presentation.

(9) Conducting the Hearing

The hearing is facilitated by the Regional Administrator or a designee. Normally, a hearing examiner is used when significant controversy or considerable public involvement is anticipated. A hearing examiner is required for limited access hearings.

A verbatim transcript of the proceedings is made by a court reporter.

Hearings are generally more informative and gain more public participation when an informal format is used, where people's views and opinions are openly sought in a casual and personal way. The informal hearing format may be used for all hearings except limited access hearings. At least one court reporter is required to take individual testimony. Use displays, exhibits, maps, and tables, and have knowledgeable staff available to answer specific questions about the proposed project.

It is the responsibility of the hearing moderator and other department representatives to be responsive to all reasonable and appropriate questions. If a question or proposal is presented at the limited access hearing that can only be answered at a later date, the region shall reserve an exhibit to respond to the comment in the

Findings and Order. The hearing moderator must not allow any person to be harassed or subjected to unreasonable cross-examination.

(a) **Hearing Agenda Items.** For all limited access hearings, and for other formal hearings, the region prepares a hearing agenda to ensure all significant items are addressed. A hearing agenda includes:

1. **Opening Statement:**
   - Highway and project name
   - Purpose of hearing
   - Description of how the hearing will be conducted
   - Introduction of elected officials
   - Federal/State/County/City relationship
   - Statutory requirements being fulfilled by the hearing
   - Status of the project with regard to NEPA/SEPA documents
   - Description of information available for review and copying
   - For environmental, corridor, or design hearings, notice that written statements and other exhibits can be submitted during the open record period following the hearing
   - Statement that all who want to receive written notification of WSDOT's action as a result of the hearing may add their names to the interest list or file a notice of appearance for limited access hearings
2. **Project History.** Present a brief project history, including purpose and need for the project, public involvement program, future hearing opportunities, and hearings held.
3. **Presentation of Plans.** Develop alternatives that include comparable levels of detail, and present them equally. Include the no-action alternative. Refer to any supporting studies that are publicly available.

   Identify a preliminary preferred alternative, if selected by WSDOT, for more detailed development. When a preliminary preferred alternative has been identified, stress that it is subject to revision and reevaluation based on public comments, additional studies, and other information that may become available.
4. **Environmental, Social, and Economic Discussion.** Discuss all positive and negative environmental, social, and economic effects (or summarize the major effects), and refer to the environmental documentation.
5. **Statements, Plans, or Counterproposals From the Public.** Accept public views or statements regarding the proposal presented, the alternatives, and the social, economic, and environmental effects identified. Avoid evaluating the views presented while conducting the hearing.
6. **Relocation Assistance Program.** Explain the relocation assistance program and relocation assistance payments available. At all hearings, the relocation assistance brochure must be available for free distribution, including (if appropriate) brochures in languages other than English. Real Estate Services personnel should be available.

   If the project does not require any relocations, the relocation assistance discussion may be omitted. Make a simple statement to the effect that relocation assistance is provided, but currently no relocations have been identified for the project. The relocation brochure and personnel should still be available to the public at the hearing.
7. **Acquisition.** Discuss right of way acquisition, estimated cost, and currently proposed construction schedules and critical activities that may involve or affect the public.
8. **Closing.** Summarize the hearing and announce proposed future actions.
9. **Adjournment.** Adjourn the hearing with sincere gratitude for the public's valuable participation.

(10) Hearing Summary and Adoption

Upon completion of a public hearing, a documentation and approval procedure leads to official adoption of the hearing proceedings. After the hearing, a summary is prepared by the region. There are two types of summary documents used, depending on the type of hearing. For environmental, corridor, and design hearings, a hearing summary is produced. Following a limited access hearing, a Findings and Order

document is prepared. Each of these packages is comprised of documentation assembled by the region and approved by Headquarters.

(a) **Hearing Summary Contents.** The hearing summary includes the following elements:

1. Hearing transcript.
2. Copy of the affidavit of publication of the hearing notice.
3. Hearing material:
   - Copies of the letters received before and after the hearing
   - Copies or photographs of, or references to, every exhibit used in the hearing
4. Summary and analyses of all oral and written comments. Include consideration of the positive and negative social, economic, and environmental aspects of these comments.

(b) **Limited Access Hearing Findings and Order.** Following a limited access hearing, the "summary" document is labeled the Findings and Order. Refer to 210.09(12) for the process description and required documentation for Findings and Order documents.

(c) **Adoption and Approval.** For specific hearing types, see subsequent sections in this chapter related to adoption procedures.

Figure 210-6 identifies the Headquarters approval authority for hearing summary and Findings and Order documents.

210.06 Environmental Hearing

Early coordination with appropriate agencies and the public may help to determine the appropriate level of environmental documentation, the scope of the document, the level of analysis, and related environmental disciplines to be analyzed.

Environmental documents address the positive and negative social, economic, and environmental project effects, as described in Chapter 220 and the *Environmental Procedures Manual*. The project environmental documentation is the first step in the environmental hearing procedure. Each step of the hearing procedure is dovetailed into the environmental process and is important in achieving the appropriate project documentation. Corridor and design hearings are not normally required for Environmental Assessments, SEPA Checklists, and categorically excluded projects, but the opportunity for an environmental hearing might be required or advisable for controversial proposals. When an environmental hearing is not required, an informational meeting may serve as a useful forum for public involvement in the environmental process. Consult with region environmental staff and the HQ Hearing Coordinator for specific project requirements.

Projects requiring an Environmental Impact Statement (EIS) must use an evaluation process called *scoping* in the NEPA and SEPA requirements. This process helps the project proponents identify the significant issues and possible alternatives analyzed and documented in the Draft EIS, and must follow the public involvement plan included in the environmental study plan for the project.

After the project has been thoroughly analyzed through the environmental evaluation process and discussed within the community using informal public involvement methods, a hearing is held to present and gather testimony. The hearing is timed to fall within the comment period for the Draft EIS.

For an environmental hearing, the hearing notice must be published at least 15 days prior to the hearing. The timing of additional publications is optional (see Figure 210-4).

Responses to comments on the Draft EIS must be addressed in the Final EIS.

(1) Environmental Hearing Summary

The environmental hearing summary includes the items outlined in 210.05(10).

(2) Adoption of Environmental Hearing

Chapter 220 and the *Environmental Procedures Manual* provide guidance on NEPA and SEPA procedures, documentation requirements, and approvals.

210.07 Corridor Hearing

A corridor hearing is a public hearing that:

- Is held before WSDOT is committed to a preferred alternative establishing the final route corridor.
- Is held to ensure that opportunity is afforded for effective participation by interested persons in the process of determining the need for and location of a state highway.
- Provides the public an opportunity to present views on the social, economic, and environmental effects of the proposed alternative highway corridors.

A corridor hearing is required if any of the following project actions would occur:

- Proposed route on new location
- Substantial social, economic, or environmental impacts
- Significant change in layout or function of connecting roads or streets

When a corridor hearing is held, the region must provide enough design detail on the proposed alignment(s) within the corridor(s) that an informed presentation can be made at the hearing. Justification to abandon an existing corridor must also be presented.

For general procedures and notification requirements, see 210.05 and Figure 210-4.

(1) Corridor Hearing Summary

After the hearing the region:

- Reviews the hearing transcript.
- Responds to all questions or proposals submitted at or subsequent to the hearing.
- Compiles a corridor hearing summary.
- Transmits three copies (four copies for Interstate projects) to the HQ Access and Hearings Unit.

When appropriate, the hearing summary may be included in the FEIS. If not included, submit the complete corridor hearing summary to the HQ Access and Hearings Unit within approximately two months following the hearing.

The corridor hearing summary includes the items outlined in 210.05(10).

(2) Adoption of Corridor Hearing Summary

The HQ Access and Hearings Unit prepares a package that contains the corridor hearing summary and a formal description of the project, and forwards it to the Director of Environmental and Engineering Programs for adoption. The HQ Hearing Coordinator notifies the region when adoption has occurred and returns an approved copy to the region.

210.08 Design Hearing

A design hearing is a public hearing that:

- Is held after a route corridor is established and approved but before final design of a highway is engineered.
- Is held to ensure that an opportunity is afforded for the public to present their views on each proposed design alternative, including the social, economic, and environmental effects of those designs.

A design hearing is required if any of the following project actions will occur:

- Substantial social, economic, or environmental impacts
- Significant change in layout or function of connecting roads or streets
- Acquisition of a significant amount of right of way results in relocation of individuals, groups, or institutions

For general procedures and notification requirements, see 210.05 and Figure 210-4.

(1) Design Hearing Summary

The design hearing summary includes the elements outlined in 210.05(10).

Submit the complete hearing summary to the HQ Access and Hearings Unit within approximately two months following the hearing.

If new studies or additional data are required subsequent to the hearing, the region compiles the information in coordination with the HQ Design Office.

(2) Adoption of Design Hearing Summary

After the hearing, the region reviews the hearing transcript, responds to all questions or proposals submitted at or subsequent to the hearing, compiles a hearing summary, and transmits three copies (four copies for Interstate projects) to the HQ Access and Hearings Unit. When appropriate, the design hearing summary may be included in the final environmental document. The HQ Access and Hearings Unit prepares a formal document that identifies and describes the project and submits it to the State Design Engineer for approval. One approved copy is returned to the region. The HQ Hearing Coordinator notifies the region that adoption has occurred.

On Interstate projects, the State Design Engineer (or designee) submits the approved design hearing summary to the FHWA for federal approval. If possible, this submittal is timed to coincide with the submittal of the Design Decision Summary to the FHWA.

(3) Public Notification of Action Taken

The region prepares a formal response to individuals who had unresolved questions at the hearing. The region keeps the public advised regarding the result of the hearing process, such as project adoption or revision to the plan. A project newsletter sent to those on the interest list is an effective method of notification. Project news items can be sent via e-mail, as well as by more traditional methods.

210.09 Limited Access Hearing

Limited access hearings are required by law (per RCW 47.52) whenever limited access is established or revised on new or existing highways. Decisions concerning limited access hearings are made on a project-by-project basis by the State Design Engineer based on information that includes the recommendations submitted by the region (see Chapters 1410, 1420, 1430, and 1435).

Limited access hearing procedures generally follow those identified in 210.05; however, several unique products and notifications are also prepared. These include Limited Access Hearing Plans and notifications sent to abutting property owners and local jurisdictions. (See 210.09(4) and Figure 210-3 for a listing of these products.) Figure 210-5 presents a summary of the limited access hearing procedures.

Prior to the limited access hearing (per RCW 47.52.131), discussions with the local jurisdictions shall be held on the merits of the Limited Access Report and the Limited Access Hearing Plan(s). These are required exhibits for the limited access hearing. (See Chapter 1430 for guidance on Limited Access Reports.)

The following information applies only to limited access hearings and procedures for approval of the Findings and Order.

(1) Hearing Examiner

The HQ Access and Hearings Unit hires an administrative law judge from the Office of Administrative Hearings to conduct the limited access hearing.

(2) Order of Hearing

The order of hearing officially establishes the hearing date. The State Design Engineer approves the order of hearing. The HQ Hearing Coordinator then notifies the region, the Attorney General's Office, and the hearing examiner of the official hearing date.

(3) Limited Access Hearing Plan

The region prepares a Limited Access Hearing Plan to be used as an exhibit at the formal hearing and forwards it to the HQ Plans Engineer for review and approval approximately 45 days before the hearing. This is a Phase 2 Plan (see Chapter 1410). The HQ Plans Engineer schedules the approval of the Limited Access Hearing Plan on the State Design Engineer's calendar.

(4) Limited Access Hearing Information to Abutters

The region prepares an information packet that must be mailed to abutters, and other entities as specified below, at least 15 days prior to the hearing (concurrent with advertisement of the hearing notice). These items are elements of the prehearing packet as described in 210.05(4)(b) and in Figure 210-3. If some of the limited access hearing packets are returned as undeliverable, the region must make every effort to communicate with the property owners.

The limited access hearing packet for abutters contains the following:

- Limited Access Hearing Plan
- Limited access hearing notice
- Notice of appearance

The region also sends the limited access hearing packet to the following:

- The county and/or city
- The owners of property listed on the county tax rolls as abutting the section of highway, road, or street being considered at the hearing as a limited access facility
- Local agencies and public officials who have requested a notice of hearing or who, by the nature of their functions, objectives, or responsibilities, are interested in or affected by the proposal
- Every agency, organization, official, or individual on the interest list

The limited access hearing packet is also sent, when applicable, to the following:

- State resource, recreation, and planning agencies
- Tribal governments
- Appropriate representatives of the Department of the Interior and the Department of Housing and Urban Development
- Other federal agencies
- Public advisory groups

(5) Affidavit of Service by Mailing

The region prepares an affidavit of service by mailing. This affidavit states that the limited access hearing packet was mailed at least 15 days prior to the hearing and that it will be entered into the record at the hearing.

(6) Limited Access Hearing Plan Revisions

The Limited Access Hearing Plan cannot be revised after the State Design Engineer (or designee) approves the plan without rescheduling the hearing. If significant revisions to the plan become necessary during the period between the approval and the hearing, the revisions can be made and must be entered into the record as a revised (red and green) plan at the hearing.

(7) Limited Access Hearing Notice

The limited access hearing notice must be published at least 15 calendar days before the hearing. This is a legal requirement and the hearing must be rescheduled if the advertising deadline is not met. Publication and notice requirements are the same as those required in 210.05, except that the statutory abutter mailing must be mailed after notification to the appropriate legislators.

(8) Notice of Appearance

The HQ Hearing Coordinator transmits the notice of appearance form to the region. Anyone wanting to receive a copy of the Findings and Order and the adopted Right of Way and Limited Access Plan must complete a notice of appearance form and return it to WSDOT either at the hearing or by mail.

(9) Reproduction of Plans

The HQ Hearing Coordinator submits the hearing plans for reproduction at least 24 days prior to the hearing. The reproduced plans are sent to the region at least 17 days before the hearing, for mailing to the abutters at least 15 days before the hearing.

(10) Limited Access Hearing Exhibits

The region retains the limited access hearing exhibits until preparation of the draft Findings and Order is complete. The region then submits all the original hearing exhibits and three copies to the HQ Access and Hearings Unit as part of the Findings and Order package. Any exhibits submitted directly to Headquarters are sent to the region for inclusion with the region's submittal.

(11) Limited Access Hearing Transcript

The court reporter furnishes the original limited access hearing transcript to the region. The region forwards the transcript to the hearing examiner, or presiding authority, for signature certifying that the transcript is complete. The signed original and three copies are returned to the region for inclusion in the Findings and Order package.

(12) Findings and Order

The Findings and Order is a document containing the findings and conclusions of a limited access hearing, based entirely on the evidence in the hearing record. The region reviews a copy of the transcript from the court reporter and prepares a Findings and Order package. The package is sent to the HQ Access and Hearings Unit.

The Findings and Order package contains the following:

- The draft Findings and Order
- Draft responses to comments (reserved exhibits)
- A draft Findings and Order Plan (as modified from the Hearing Plan)
- All limited access hearing exhibits (originals and three copies)
- The limited access hearing transcript (original and three copies)
- The notice of appearance forms
- Estimate of the number of copies of the final Findings and Order Plan and text the region will need for the mailing

(13) Adoption of Findings and Order

The Environmental and Engineering Programs Director adopts the Findings and Order based on the evidence introduced at the hearing and any supplemental exhibits.

Following adoption of the Findings and Order, the HQ Plans Branch makes the necessary revisions to the Limited Access Hearing Plan, which then becomes the Findings and Order Plan.

The HQ Access and Hearings Unit arranges for reproduction of the Findings and Order Plan and the Findings and Order text and transmits them to the region.

The region mails a copy of the Findings and Order Plan and the Findings and Order text to all parties filing a notice of appearance and to all local governmental agencies involved. Subsequent to this mailing, the region prepares an affidavit of service by mailing and transmits it to the HQ Access and Hearings Unit.

At the time of mailing, but before publication of the résumé, the region notifies the appropriate legislators of WSDOT's action.

(14) Résumé

The résumé is an official notification of action taken by WSDOT following adoption of a Findings and Order. The HQ Access and Hearings Unit provides the résumé to the region. The region must publish the résumé once each week for two consecutive weeks, not to begin until at least ten days after the mailing of the Findings and Order.

(15) Final Establishment of Access Control

When the Findings and Order is adopted, the Findings and Order Plan becomes a Phase 4 Plan (see Chapter 1410). The establishment of access control becomes final 30 days from the date the Findings and Order is mailed by the region, as documented by the affidavit of service by mailing.

(16) Appeal Process

An appeal from the county or city must be in the form of a written disapproval, submitted to the Secretary of Transportation, requesting a hearing before a board of review.

An appeal from abutting property owners must be filed in the Superior Court of the state of Washington, in the county where the limited access facility is to be located, and shall affect only those specific ownerships. The plan is final for all other ownerships.

210.10 Combined Hearings

A combined hearing often alleviates the need to schedule separate hearings to discuss similar information. A combined hearing is desirable when the timing for circulation of the draft environmental document is simultaneous with the timing for corridor and design hearings and when all alternative designs are available for each alternative corridor.

When deciding whether to combine hearings, consider:

- Whether there is controversy.
- Whether alternative corridors are proposed.
- The nature of the environmental concerns.
- The benefits to the public of a combined hearing.

210.11 Administrative Appeal Hearing

Administrative appeal hearings apply only to managed access highways, are conducted as formal hearings, and are initiated by a property owner seeking to appeal a decision made to restrict or remove an access connection. This is also known as an adjudicative proceeding, and the procedure is presented in Chapter 1435.

210.12 Follow-Up Hearing

A new hearing or the opportunity for a hearing is required for any previously held hearing when any one of the following occurs (see USC 23, §771.111):

- Major actions (such as adoption of Findings and Order and approval of hearing summaries) did not occur within three years following the date the last hearing was held or the opportunity for a hearing was afforded
- A substantial change occurs in the area affected by the proposal (due to unanticipated development, for example)
- A substantial change occurs in a proposal for which an opportunity for a hearing was previously advertised or a hearing was held
- A significant social, economic, or environmental effect is identified that was not considered at earlier hearings

210.13 Documentation

All documents generated by hearings are retained in Archives by the Office of the Secretary of State.

Proposed Project Actions or Conditions	Types of Hearings[1]					
	Environmental	Design	Corridor	Limited Access	Combined	Follow-Up
Proposed route on new location			X	X		
Substantial social, economic, or environmental impacts	X	X	X	X		
Significant change in layout or function of connecting roads or streets		X	X	X		
Acquisition of significant amount of right of way results in relocation of individuals, groups, or institutions	X	X				
Significant adverse impact on abutting real property	X					
An EIS is required or a hearing is requested for an EA	X					
Significant public interest or controversy	X					
Regulatory agencies have hearing requirements that could be consolidated into one hearing process	X					
Limited access control is established or revised				X		
If several hearings are required, consider efficiency of combining					X	
Major actions not taken within 3 years after date last hearing was held						X[2]
An unusually long time has elapsed since the last hearing or the opportunity for a hearing						X
Substantial change in proposal since prior hearing						X
Significant social, economic, or environmental effect is identified and was not considered at prior hearing						X

Notes:

(1) This table presents a list of project actions that correspond to required public hearings. The list is intended as a guide and is not all-inclusive. In cases where several types of hearings are anticipated for a project, a combined hearing may be an effective method. Consult with region and Headquarters environmental staff, the designated Assistant State Design Engineer, and the HQ Access and Hearings Unit to identify specific hearing requirements and strategies.

(2) Posthearing major actions include: FHWA approvals (for Interstate projects); adoption of hearing summaries and Findings and Order; and public notification of action taken, such as publishing a résumé.

Types of Public Hearings

Figure 210-1

Hearing Type	Hearing Format	
	Formal	Informal
Limited Access	Required	Not allowed
Environmental	Either format acceptable	
Design	Either format acceptable	
Corridor	Either format acceptable	
Combined	Format depends on type*	
Follow-up	Format depends on type*	

Notes:

Check with the HQ Hearing Coordinator to identify specific hearing type and appropriate hearing format.

* If a combined or follow-up hearing includes a limited access hearing, then that portion of the hearing must adhere to the formal format.

Public Hearing Formats
Figure 210-2

Prehearing Packet Items	All Hearings	Additional Items for Limited Access Hearings
Brief project description; purpose and public benefit; history; known public perceptions; and support or opposition	X	
Proposed hearing type	X	
Hearing arrangements: proposed date, time, and place	X	
Proposed hearing format: formal or informal	X	(1)
Notice of whether an open house event will precede the hearing	X	
Vicinity map	X	
Plans for corridor and design alternatives with descriptions	X	
News release	X	
Legal notice of hearing	X	X(2)
List of newspapers and other media sources that will cover the news release and hearing notice	X	
List of legislators and government agencies involved	X	
Hearing agenda	(3)	X(3)
Hearing script	(3)	X(3)
Limited Access Report (Chapter 1430)		X
Limited Access Hearing Plan(s) (Chapter 1430)		X
List of abutting property owners		X
Notice of appearance form		X

Notes:

The prehearing packet is prepared by the region and transmitted to the HQ Access and Hearings Unit for review, concurrence, and processing. This information is assembled in advance of the hearing to facilitate timely announcements and a smooth-flowing event. The HQ Hearing Coordinator requires the prehearing packet 45 days (or sooner) in advance of the proposed hearing date.

(1) Limited access hearings are required by law to be formal.

(2) For a limited access hearing, each abutting property owner affected by the project must receive the hearing notice, along with the notice of appearance form and specific Limited Access Hearing Plan(s) showing their parcel(s). Indicate in the prehearing packet the number of affected property owners to whom the packets will be mailed.

(3) A hearing agenda and hearing script are required for a limited access hearing. Any formal hearing requires a fixed agenda and a script. It is recognized that the script may be in draft format at the time of submittal of the prehearing packet. The HQ Hearing Coordinator can assist in its completion and can provide sample scripts and agendas.

Prehearing Packet Checklist
Figure 210-3

Sequence for Corridor, Design, and Environmental Hearings	
Preparatory Work	
Consult with HQ Hearing Coordinator and environmental specialists to determine specific requirements for a hearing or a notice of opportunity for a hearing.	[see 210.05 & Figure 210-1]
Assemble support team; identify and schedule tasks and deliverables.	[see 210.05(4)]
Prepare prehearing packet (news releases, legal notices, exhibits).	[see 210.05(4)(b) & Fig. 210-3]
◆ **Minimum 45 Days Prior to Hearing – Transmit Prehearing Packet to HQ** HQ Hearing Coordinator reviews and concurs; schedules hearing.	[see 210.05(4)(b)]
Public Notifications and News Releases	[see 210.05(5) & (6)]
◆ **35–40 Days Prior to Hearing** (1 week prior to first public ad) Send notice to legislators and local officials.	
◆ **33–35 Days Prior to Hearing** (about 3 days before advertisement) Send letter with news release to media.	
◆ **30 Days Prior to Hearing** Draft EIS becomes available and its open comment period begins.	
Corridor and Design Hearings ◆ **30 Days Prior to Hearing – Publish First Notice** Advertise at least 30 days in advance, but not prior to public availability of draft environmental document. ◆ **5–12 Days Prior to Hearing – Publish Second Notice**	
Environmental Hearings ◆ **15 Days Prior to Hearing – Publish First Notice** Advertise at least 15 days in advance; timing of additional notices optional. (If done in combination with design or corridor hearing, use 30-day advance notice.)	
Prehearing Briefings	[see 210.05(8)]
◆ **5–12 Days Prior to Hearing** Region confers with local jurisdictions; conducts hearing briefings and presentations; and makes hearing materials and information available for public inspection and copying.	
Conduct the Hearing	[see 210.05(9)]
Conduct environmental, corridor, or design hearing.	
Posthearing Actions	
Court reporter provides hearing transcript to region (usually within 2 weeks).	
◆ **2 Months After Hearing – Prepare Hearing Summary and Send to HQ** Region addresses public comments from hearing and throughout comment period; prepares hearing summary and transmits to HQ Hearing Coordinator for processing.	[see 210.05(10)]
HQ Hearing Coordinator transmits hearing summary package to HQ approval authority for approval.	[see Figure 210-6]
HQ Hearing Coordinator notifies region of adoption and returns a copy of approved hearing summary to region.	

Notes:

Important timing requirements are marked ◆

* If the advertisement is a notice of opportunity for a hearing, requests must be received within 21 days after the first advertisement. If there are no requests, see 210.05(7).

Sequence for Corridor, Design, and Environmental Hearings
Figure 210-4

Sequence for Limited Access Hearing	
Preparatory Work	
Consult with HQ Access and Hearings Unit. Determine requirements for a limited access hearing or a notice of opportunity for a hearing.	[see 210.05 & Figure 210-1]
Assemble support team; identify and schedule tasks and deliverables.	[see 210.05(4)]
Prepare Limited Access Report and Limited Access Hearing Plan(s).	[see Chapters 1410 & 1430]
Prepare prehearing packet (legal notice, exhibits, information packets for abutting property owners).	[see 210.05(4)(b) & Figure 210-3]
◆ **Minimum 45 Days Prior to Hearing – Transmit Prehearing Packet to HQ – Transmit Limited Access Report and Hearing Plans for Approval** HQ Hearing Coordinator reviews and concurs; schedules hearing. Transmits Limited Access Report and Limited Access Hearing Plan.	[see 210.05(4)(b) & 210.09]
◆ **45 Days Prior to Hearing** HQ actions: Calendar order of hearing & Limited Access Hearing Plan approved	[see 210.09(2)&(3)]
◆ **24 Days Prior to Hearing – HQ Reproduction of Plans** HQ action: Approved Limited Access Hearing Plan(s) are reproduced in number sufficient for mailing to abutters and other handout needs; one set to be used as hearing exhibit.	[see 210.09(9)]
Notifications, News Releases, Confer With Local Agencies	
◆ **35–40 Days Prior to Hearing** Send notice to legislators and local officials (1 week prior to first public ad).	[see 210.05(6)]
◆ **33–35 Days Prior to Hearing** Send letter with news release to media (about 3 days before advertisement).	[see 210.05(6)]
◆ **15 Days Prior to Hearing – Publish First Notice*** Advertise at least 15 days in advance; timing of additional notices optional.	[see 210.05(6)]
◆ **15 Days Prior to Hearing – Send Hearing Packets to Abutters** (Hearing notice, Limited Access Plan, and notice of appearance form).	[see 210.05(4)]
◆ **15 Days Prior to Hearing – Confer With Local Jurisdictions**	[see 210.05(8)]
Conduct the Hearing	[see 210.05(6)]
Using agenda and script, conduct formal limited access hearing.	
Posthearing Actions	
Court reporter provides limited access hearing transcript to region.	[see 210.09(11)]
Region prepares Findings and Order document and transmits to HQ Hearing Coordinator.	[see 210.09(12)]
Environmental and Engineering Programs Director adopts Findings and Order.	[see 210.09(13)]
Limited Access Hearing Plan becomes Findings and Order Plan.	[see 210.09(15)]
Findings and Order reproduced and mailed to abutters and local jurisdictions.	[see 210.09(13)]
HQ provides résumé to region and region publishes.	[see 210.09(14)]

Notes:

Important timing requirements are marked ◆

* If the advertisement is a notice of opportunity for a hearing, requests must be received within 21 days after the first advertisement. If there are no requests, see 210.05(7).

Sequence for Limited Access Hearing
Figure 210-5

Hearing Summary Document	WSDOT HQ Approval Authority
Limited access hearing Findings and Order	Director, Environmental and Engineering Programs
Corridor hearing summary	Director, Environmental and Engineering Programs
Environmental hearing summary	Director, HQ Environmental Services Office(1)
Design hearing summary	State Design Engineer

Note:

(1) If the environmental hearing summary is included in the Final Environmental Document (FEIS, EA), the HQ Environmental Services Office Director approves the summary. If the summary is separate from the Final Environmental Document, the State Design Engineer approves.

Hearing Summary Approvals

Figure 210-6

315.01 General

Value Engineering is a systematic process designed to focus on the major issues of a complex project or process. The process incorporates, to the extent possible, the values of the design engineer, construction engineer, maintenance engineer, contractor, state and federal approval agencies, local agencies, other stakeholders, and the public.

A Value Engineering study uses a multidisciplined team to develop recommendations for important design decisions.

The primary objective of a Value Engineering study is *value improvement*. The value improvements might relate to scope definition, functional design, constructibility, coordination (both internal and external), or the schedule for project development. Other possible value improvements are reduced environmental impacts, reduced public (traffic) inconvenience, or reduced project cost.

315.02 References

CFR 23 Part 627, Value Engineering

Value Engineering for Highways, Study Workbook, U.S. Department of Transportation, FHWA

Introduction to Value Engineering Principles and Practices, Transportation Partnership in Engineering Education Development (TRANSPEED), University of Washington.

The WSDOT Value Engineering web site:
www.wsdot.wa.gov/eesc/design/VE/

315.03 Definitions

Value Engineering (VE) A systematic application of recognized techniques by a multidisciplined team to identify the function of a product or service, establish a worth for that function, generate alternatives through the use of creative thinking, and provide the needed functions to accomplish the original purpose; thus assuring the lowest life cycle cost without sacrificing safety, necessary quality, or environmental attributes. Value Engineering is sometimes referred to as Value Analysis (VA) or Value Management (VM).

project The portion of a transportation facility that the Washington State Department of Transportation (WSDOT) proposes to construct, reconstruct, or improve, as described in the *State Highway System Plan* or applicable environmental documents. A project may consist of several contracts or phases over several years that are studied together as *one project*.

315.04 Procedure

The VE process uses the Eight-Phase Job Plan shown in Figure 315-1. Only Phases 1 and 7 are discussed in this chapter. A detailed discussion of Phases 2 through 6 can be found in the VE training manual entitled *Introduction to Value Engineering Principles and Practices*.

(1) Selection Phase

(a) **Project Selection**

Projects for VE studies may be selected from any of the categories identified in the Highway Construction Program, including *Preservation* or *Improvement* projects, depending on the size and/or complexity of the project. In addition to the cost, other issues adding to the complexity of the project design are considered in the selection process. These include critical constraints, difficult technical issues, expensive solutions, external influences, and complicated functional requirements.

A VE study is required for any NHS project with an estimated cost of $25 million or more (CFR 23 Part 627). This cost includes design, construction, right of way, and utilities. Other projects that should be considered for value engineering have a preliminary estimate exceeding $5 million and include one or more of the following:

- Projects with alternative solutions that vary the scope and cost
- New alignment or bypass sections
- Capacity improvements that widen an existing highway
- Major structures
- Interchanges on multilane facilities
- Projects with extensive or expensive environmental or geotechnical requirements
- Materials that are difficult to acquire or that require special efforts
- Inferior materials sources
- Major reconstruction
- Projects requiring major traffic control
- Projects with multiple stages

(b) **Statewide VE Study Plan**

On a biennial basis, the state VE Manager coordinates with the region VE coordinators to prepare the Two-Year VE Study Plan, with specific projects scheduled quarterly. The VE Study Plan is the basis for determining the projected VE program needs, including team members, team leaders, and training. The Statewide VE Study Plan is a working document and close coordination is necessary between Headquarters (HQ) and the regions to keep it updated.

The region VE coordinator:

- Identifies potential projects for VE studies from the Project Summaries and the available planning documents for future work.
- Makes recommendations for the VE study timing.
- Presents a list of the identified projects to region management to prioritize into a regional Two-Year VE Study Plan.

The State Design Engineer:

- Reviews the regional Two-Year VE Study Plan regarding the content and schedule of the plan.

The state VE Manager:

- Incorporates the regional Two-Year VE Study plans and the HQ Study plans to create the Statewide VE Study Plan.

(c) **VE Study Timing**

Selecting the project at the appropriate stage of development (the timing of the study) is very important to the success of the VE program. Value can be added by performing a VE study at any time during project development; however, the WSDOT VE program identifies three windows of opportunity for performing a VE study.

1. **Project Definition Stage**

As soon as preliminary engineering information is available and the specific deficiencies or "drivers" are identified, the project scope and preliminary cost are under consideration. This is the best time to consider the various alternatives or design solutions, and there is the highest potential that the related recommendations of the VE team can be implemented. At the conclusion of the VE study, the project scope, preliminary cost, and major design decisions can be based on the recommendations.

When conducting a study in the project definition stage, the VE study focuses on issues affecting project "drivers." This stage often provides an opportunity for building consensus with stakeholders.

2. **Conceptual Design Stage**

At the conceptual design stage, the project scope and preliminary cost have already been established and the major design decisions have been made. Some Plans, Specifications, and Estimates (PS&E) activities might have begun and coordination has been initiated with the various service units that will be involved with the design. At this stage, the established project scope, preliminary cost, and schedule will define the limits of the VE study, and there is still opportunity for the study to focus on the technical issues of the specific design elements.

3. **30% Development Stage**

At the 30% development stage, most of the important project decisions have been made and the opportunity to affect the project design is limited. The VE study focuses on constructibility, construction sequencing, staging, traffic control, and any significant design issues that have been identified during design development.

(d) **Study Preparation**

To initiate a VE study, the project manager submits a Request for Value Engineering Study form (shown in Figure 315-2) to the region VE coordinator at least one month before the proposed study date.

The region VE coordinator then works with the state VE Manager to determine the team leader and team members.

The design team prepares a study package of project information for each of the team members. A list of potential items is shown in Figure 315-3.

The region provides a facility and the equipment for the study (see Figure 315-3).

(e) **Team Leader**

The quality of the VE study is dependent on the skills of the VE team leader. This individual guides the team's efforts and is responsible for its actions during the study. The best VE team leader is knowledgeable and proficient in transportation design and construction and in the VE study process for transportation projects.

For best results, the team leader should be certified by the Society of American Value Engineers (SAVE) as a Certified Value Specialist (CVS) or as a Value Methodology Practitioner (VMP).

The state VE Manager coordinates with the region VE coordinator to select the team leader. Team leadership can be supplied from within the region or from other regions, Headquarters, consultants, or other qualified leaders outside the department. A statewide pool of qualified team leaders is maintained by the state VE Manager.

(f) **Team Members**

The VE team is usually composed of five to ten persons with diverse expertise relevant to the specific study. The team members may be selected from the regions, Headquarters, other state and federal agencies, local agencies, or the private sector.

Team members are selected on the basis of the kinds of expertise needed to address the major functional areas and critical high-cost issues of the study. All team members must be committed to the time required for the study. For best results, the team members should have VE training before participating in a VE study.

(g) **VE Study Requirements**

The time required to conduct a VE study varies with the complexity and size of the project, but typically ranges from three to five days.

The VE study Final Report includes a narrative description of project information; the background, history, list of constraints, drivers, and VE team focus areas, a discussion of the team speculation and evaluation processes; and the team's final recommendations. All of the team's evaluation documentation (including sketches, calculations, analyses, and rationale for recommendations) is included in the Final Report. Include a copy of the Final Report in the Project File. The number of copies of the Final Report is specified by the project manager.

(2) Implementation Phase

The VE team's recommendations are included in the Final Report. The project manager reviews and evaluates the recommendations and prepares a VE Decision Document. This document has a specific response for each of the VE team's recommendations and a summary statement containing the managers' decisions and schedule for implementation regarding further project development.

The VE Decision Document also includes the estimated additional costs or cost savings of the recommendations, as well as the estimated costs to implement the recommendations. A copy of this document is sent to the state VE Manager so the results can be included in the annual VE report to FHWA.

The VE Decision Document is submitted to the State Design Engineer and a copy becomes a vital element in the Project File. Project development then continues based on the decisions developed from the preliminary engineering and VE study recommendations (barring participation agreements funded by other agencies, utilities, developers, and so forth).

315.05 Documentation

A list of the documents that are to be preserved in the Design Documentation Package (DDP) or the Project File (PF) can be found on the following web site:
www.wsdot.wa.gov/eesc/design/projectdev/

1. Selection Phase 315.04(1)	Select the right projects, timing, team, and project processes and elements.
2. Investigation Phase	Investigate the background information, technical input reports, field data, function analysis, and team focus and objectives.
3. Speculation Phase	Be creative and brainstorm alternative proposals and solutions.
4. Evaluation Phase	Analyze design alternatives, technical processes, life cycle costs, documentation of logic, and rationale.
5. Development Phase	Develop technical and economic supporting data to prove the feasibility of the desirable concepts. Develop team recommendations. Recommend long-term as well as interim solutions.
6. Presentation Phase	Present the recommendations of the VE team in an oral presentation and in a written report.
7. Implementation Phase 315.04(2)	Evaluate the recommendations. Prepare an implementation plan (VE Decision Document), including the response of the managers and a schedule for accomplishing the decisions based on the recommendations.
8. Audit Phase	Maintain a records system to track the results and accomplishments of the VE program on a statewide basis. Compile appropriate statistical analyses, as requested.

Note: Phases 2–6 are performed during the study. See *Introduction to Value Engineering Principles and Practices* for procedures during these steps.

Eight-Phase Job Plan for VE Studies
Figure 315-1

Project Title:					
SR No.	**MP**	**To**	**MP**	**Length**	**Subprogram**
PIN			**WIN**		
Assigned Project Engineer					
Proposed Advertising Date					
Estimated Right of Way Costs			**Estimated Construction Costs**		
Design Speed			**Projected ADT**		
Route Conditions/Geometry: **Adjacent Segments** **Overall Route**					
Major Project Elements					
Environmental Issues					
Construction Issues					
Suggested Value Team Composition: ☐ **Architecture** ☐ **Bridge** ☐ **Construction** ☐ **Design** ☐ **Environmental** ☐ **Hydraulics**			☐ **Landscape Architecture** ☐ **Maintenance** ☐ **Planning/Programming** ☐ **Real Estate Services** ☐ **Traffic** ☐ **Other** _____		
Region Contact Person			**Dates requested for VE study**		

Request for Value Engineering Study
Figure 315-2

Project-Related Input* (Study Package)	Study-Related Facilities and Equipment
Design File	Room With Large Table
Quantities	Phone
Estimates	Photo/Video Log Access/SRView
R/W Plans	Van for Field Trip**
Geotechnical Reports	Easel(s)
Plan Sheets	Large Tablet Paper (2x2 Squares)
Environmental Documents	Colored Marking Pens
X-Sections and Profiles	Masking and Clear Adhesive Tape
Land Use Maps	Workbook(s)
Contour Maps	Digital Camera
Quadrant Maps	*Design Manual*
Accident Data	"Green Book"
Traffic Data	*Standard Plans*
Up-to-Date Large-Scale Aerial Photographs	*Standard Specifications*
Vicinity Map	M.P. Log
Hydraulics Report	Bridge List
Aerial Photos	WSDOT Phone Book
Existing As-Built Plans	Scales and Straight Edge
	Red Book – Field Tables
	Unit Bid Prices
	Calculators
	Scissors

* Not all information listed may be available to the team, depending on the stage of the project.
** If a field trip is not possible, provide video of the project.

VE Study Team Tools
Figure 315-3

Risk, Sight Distance projects are improvements intended to improve sight distance at specific locations where the Risk program has identified a high probability of collisions/accidents.

Rural projects are mobility improvements providing uncongested level of service on rural highways within congested highway corridors. (See HOV Bypass above for cross reference regarding "congested.")

Urban (Multilane) projects are non-NHS mobility improvements within congested urban multilane highway corridors. (See HOV Bypass above for cross reference regarding "congested.")

Urban projects are NHS and two-lane non-NHS (main line and interchange) mobility improvements within congested urban highway corridors. (See HOV Bypass above for cross reference regarding "congested.")

(2) Design Elements

The column headings on a design matrix are **Design Elements.** Not all potential design elements have been included in the matrices.

The Design Elements that are included are based on the following thirteen FHWA controlling design criteria: design speed, lane width, shoulder width, bridge width, structural capacity, horizontal alignment, vertical alignment, grade, stopping sight distance, cross slope, superelevation, vertical clearance, and horizontal clearance. For the column headings, some of these controlling criteria have been combined (for example, design speed is part of horizontal and vertical alignment).

If using a design element that is not on the assigned matrix, use full design level as found elsewhere in this manual.

If using a design element that is not covered in this manual, use an approved manual or guidance on the subject and document the decision and the basis for the decision.

The following elements are shown on the design matrices. If the full design level applies, see the chapters listed below. If basic design level applies, see Chapter 410. If the modified design level applies, see Chapter 430.

Horizontal Alignment is the horizontal attributes of the roadway including horizontal curvature, superelevation, and stopping sight distance; all based on design speed. (See Chapter 620 for horizontal alignment, Chapter 642 for superelevation, Chapter 650 for stopping sight distance, and Chapters 440 or 940 for design speed.)

Vertical Alignment is the vertical attributes of the roadway including vertical curvature, profile grades, and stopping sight distance; all based on design speed. (See Chapter 630 for vertical alignment, Chapters 430, 440, 630, and 940 for grades, Chapters 430 and 650 for stopping sight distance, and Chapter 430, 440, or 940 for design speed.)

Lane Width is defined in Chapter 440. (See also Chapters 430, 640, 641, and 940.)

Shoulder Width is defined in Chapter 440. (See also Chapters 430, 640, and 940.) Also see Chapter 710 for shy distance requirements when barrier is present.

Lane Transitions (pavement transitions) are the rate and length of transition of changes in width of lanes. (See Chapter 620.)

On/Off Connection is the widened portion of pavement at the end of a ramp connecting to a main lane of a freeway. (See Chapter 940.)

Median Width is the distance between inside edge lines. (See Chapter 440 and 640.)

Cross Slope, Lane is the rate of elevation change across a lane. This element includes the algebraic difference in cross slope between adjacent lanes. (See Chapter 430 and Traveled Way Cross Slope in 640.)

Cross Slope, Shoulder is the rate of elevation change across a shoulder. (See Chapters 430 and 640.)

Fill/Ditch Slope is the downward slope from edge of shoulder to bottom of ditch or catch. (See Chapters 430 and 640.)

Access is the means of entering or leaving a public road, street, or highway with respect to abutting private property or another public road, street, or highway. (See Chapter 1420.)

Clear Zone is the total roadside border area, starting at the edge of the traveled way, available for use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a nonrecoverable slope, and/or a clear run-out area. (The median is part of a clear zone.) (See Chapter 700.)

Signing, Delineation, Illumination are signs, guide posts, pavement markings, and lighting. (See Chapter 820 for signing and 1120 for bridge signs, Chapter 830 for delineation, and Chapter 840 for illumination.)

Vertical Clearance (See Chapter 1120.)

Basic Safety is the list of safety items in Chapter 410.

Bicycle and Pedestrian See Chapter 1020, Bicycle Facilities, and Chapter 1025, Pedestrian Design Considerations, for definitions.

Bridges: Lane Width is the width of a lane on a structure. (See Chapters 430, 440, 640, 641, 940, and 1120.)

Bridges: Shoulder Width is the distance between the edge of traveled way and the face of curb or barrier, whichever is less. (See Chapters 430, 440, 640, 940, and 1120.) Also see Chapter 710 for shy distance requirements.

Bridges/Roadway: Vertical Clearance is the minimum height between the roadway (including shoulder) and an overhead obstruction. (See Chapter 1120.)

Bridges: Structural Capacity is the load bearing ability of a structure. (See Chapter 1120.)

Intersections/Ramp Terminals: Turn Radii See Chapter 910 for definition.

Intersections/Ramp Terminals: Angle See Chapter 910 for definition.

Intersections/Ramp Terminals: Intersection Sight Distance See Chapter 910 and 940 for definitions.

Barriers: Terminals and Transition Sections — **Terminals** are crashworthy end treatments for longitudinal barriers that are designed to reduce the potential for spearing, vaulting, rolling, or excessive deceleration of impacting vehicles from either direction of travel. Impact attenuators are considered terminals. Beam guardrail terminals include anchorage. — **Transition Sections** are sections of barriers used to produce a gradual stiffening of a flexible or semirigid barrier as it connects to a more rigid barrier or fixed object. (See Chapters 700, 710, and 720.)

Barriers: Standard Run are guardrail and other barriers as found in the *Standard Plans for Road Bridge and Municipal Construction* excluding terminals, transitions, attenuators, and bridge rails. (See Chapter 710.)

Barriers: Bridge Rail is barrier on a bridge excluding transitions. (See Chapter 710.)

(3) Design Level

In the non-Interstate matrices, design levels are noted in the cells by B, M, F, and sometimes with a number corresponding to a footnote on the matrix. For Improvement-type projects, full design level applies to all design elements, except as noted in the design matrices and in other chapters as applicable. In the Interstate matrices, only full design level applies.

The design levels of basic, modified, and full (B, M, and F) were used to develop the design matrices. Each design level is based on the investment intended for the highway system and Project Type. (For example, the investment is higher for an Interstate overlay than for an overlay on a non-NHS route.)

A **blank cell** on a design matrix row signifies that the Design Element will not be addressed because it is beyond the scope of the typical project. In rare instances, a Design Element with a blank cell may be included if that element is linked to the original need that generated the project and is identified in the Project Summary or a Project Change Request Form.

Basic design level (B) preserves pavement structures, extends pavement service life, and maintains safe operations of the highway. See Chapter 410 for design guidance.

Modified design level (M) preserves and improves existing roadway geometrics, safety, and operational elements. See Chapter 430 for design guidance. Use full design level for design elements or portions of design elements that are not covered in Chapter 430.

Full design level (F) improves roadway geometrics, safety, and operational elements. See Chapter 440 and other applicable *Design Manual* chapters for design guidance.

(4) Design Variances

Types of design variances are design exceptions (DE), evaluate upgrades (EU), and deviations. See Chapter 330 concerning the Design Variance Inventory System (DVIS).

A **design exception (DE)** in a matrix cell indicates that WSDOT has determined that the Design Element is usually outside the scope of the Project Type. Therefore, an existing condition that does not meet or exceed the design level specified in the matrix may remain in place unless a need has been identified in the *Highway System Plan* and prioritized in accordance with the programming process. See Chapter 330 regarding documentation.

An **evaluate upgrade (EU)** in a matrix cell indicates that WSDOT has determined that the Design Element is an item of work that is to be considered for inclusion in the project. For an existing element that does not meet or exceed the specified design level, an analysis is required to determine the impacts and cost effectiveness of including the element in the project. The EU analysis must support the decision regarding whether or not to upgrade that element. See Chapter 330 regarding documentation.

A **deviation** is required when an existing or proposed Design Element differs from the specified design level for the project and neither DE nor EU processing is indicated. See Chapter 330 regarding documentation.

DE or EU with /F or /M in a cell means that the Design Element is to be analyzed with respect to the specified design level. For instance, a DE/F is analyzed with respect to full design level and might be recorded as having an existing Design Element that does not meet or exceed current full design level. An EU/M is analyzed to decide whether or not to upgrade any existing Design Element that does not meet or exceed current modified design level.

(5) Terminology in Notes

F/M Full for freeways/Modified for nonfreeway uses the word **freeway** to mean a divided highway facility that has a minimum of two lanes in each direction, for the exclusive use of traffic, and with full control of access. For matrix cells with an F/M designation, analyze freeway routes at full design level and nonfreeway routes at modified design level.

The **HAL, HAC, and PAL** mentioned in note (1) on Design Matrices 3, 4, and 5 are high accident locations (HAL), high accident corridors (HAC), and pedestrian accident locations (PAL).

The **Access Control Tracking System** mentioned in note (3) on Design Matrices 3, 4, and 5 is a list that is available on the web at http://www.wsdot.wa.gov/eesc/design/access/ under the RELATED SITES heading. See Chapter 1420 for access control basics and 1430 and 1435 for limited and managed access, respectively.

The **corridor or project analysis** mentioned in notes (2) and (4) on Design Matrices 3, 4, and 5 is the justification needed to support a change in design level from the indicated design level. The first step is to check for recommendations for future improvements in an approved Route Development Plan. If none are available, an analysis can be based on route continuity and other existing features. See Chapter 330 regarding documentation.

Note **(21) Analyses required** appears only on Design Elements for Risk projects on Design Matrices 3, 4, and 5. These Design Elements are to be evaluated using benefit/cost (B/C) to compare and rank each occurrence of the Design Elements. The B/C evaluation supports engineering decisions regarding which proposed solutions are included in a Risk project.

Most components of a Risk project will have a B/C of 1.0 or greater. Proposed solutions with a B/C ratio less than 1.0 may be included in the project based on engineering judgment of their significant contribution to corridor continuity. Risk program size, purpose and need, or project prioritization may lead to instances where design elements with a ratio greater than 1.0 are excluded from a project. The analysis, design decisions, and program funding decisions are to be documented in the Design Documentation Package. Decisions regarding which design elements to include in a project are authorized at the WSDOT region level.

State Route	NHS Route Description	Begin SR MP	Begin ARM	End SR MP	End ARM
US 2	I-5 to Idaho State Line	0.00	0.00	334.51	326.64
US 2 Couplet	Everett Couplet	0.00	0.00	1.64	0.87
US 2 Couplet	Brown Street Couplet	287.45	0.00	288.08	0.63
US 2 Couplet	Division Street Couplet	289.19	0.00	290.72	1.53
SR 3	US 101 to SR 104	0.00	0.00	60.02	59.81
SR 4	US 101 to I-5	0.00	0.00	62.28	62.27
I-5	Oregon State Line to Canadian Border	0.00	0.00	276.56	276.62
SR 8	US 12 to US 101	0.00	0.00	20.67	20.67
SR 9	SR 546 to Canadian Border	93.61	93.52	98.17	98.08
SR 9 Spur	Sumas Spur	98.00	0.00	98.25	0.24
SR 11	I-5 to Alaskan Ferry Terminal	19.93	19.93	21.28	21.28
US 12	US 101 to Idaho State Line	0.00	0.00	434.19	430.76
US 12 Couplet	Aberdeen Couplet	0.33	0.00	0.68	0.35
SR 14	I-5 to US 97	0.00	0.00	101.02	100.93
SR 14 Spur	Maryhill Spur	100.66	0.00	101.05	0.39
SR 16	I-5 to SR 3	0.00	0.00	29.19	27.01
SR 16 Spur	SR 16 to SR 3	28.74	0.00	29.13	0.39
SR 17	US 395 to I-90	7.43	0.00	50.89	43.40
SR 18	SR 99 to I-5	2.20B	0.00	0.00	0.53
SR 18	I-5 to I-90	0.00	0.53	27.91	28.41
SR 20	US 101 to I-5	0.00	0.00	59.54	59.49
SR 20 Spur	SR 20 to San Juan Ferry	47.89	0.00	55.67	7.78
SR 22	US 97 to I-82	0.70	0.00	4.00	3.31
SR 26	I-90 to US 195	0.00	0.00	133.53	133.61
SR 26 Spur	SR 26 to US 195	133.44	0.00	133.51	0.07
SR 28	US 2 to SR 281	0.00B	0.00	29.77	33.91
I-82	I-90 to Oregon State Line	0.00	0.00	132.60	132.57
I-90	I-5 to Idaho State Line	1.94	0.00	299.82	297.52
I-90 Reverse Lane	Reversible lane	1.99	0.00	9.44	7.45
SR 96	I-5 to McCollum Park and Ride	0.00	0.00	0.52	0.52
US 97	Oregon State Line to SR 22	0.00B	0.00	61.44	61.30
US 97	I-90 to Canadian Border	133.90	118.80	336.48	321.62
US 97 Couplet	Maryhill Couplet	2.59	0.00	2.68	0.09
US 97 Spur	US 97 to US 2 (Orondo)	213.36	0.00	213.62	0.26
SR 99	188th to SeaTac Airport	18.35	14.70	18.77	15.12
SR 99	SR 509 to SR 104	26.04	22.40	43.60	39.84
US 101	Oregon State Line to SR 401	0.00	0.00	0.46	0.46
US 101	SR 4 to I-5	28.89	28.89	367.41	365.78
US 101 Couplet	Aberdeen Couplet	87.49	0.00	91.66	4.17
US 101 Couplet	Port Angeles Couplet	249.65	0.00	251.32	1.67
SR 104	US 101 to I-5	0.20	0.00	29.67	29.14
SR 109	Pacific Beach Access	0.00	0.00	30.25	30.29
SR 125	Oregon State Line to SR 125 Spur	0.00	0.00	6.09	6.08
SR 125 Spur	SR 125 to US 12	6.09	0.00	6.76	0.67
SR 127	US 12 to SR 26	0.03	0.00	27.05	27.05
SR 128	US 12 to Idaho State Line	0.00	0.00	2.30	2.30

NHS Highways in Washington

Figure 325-2a

State Route	NHS Route Description	Begin SR MP	Begin ARM	End SR MP	End ARM
SR 166	SR 16 to Bay St	0.02	0.00	3.40	3.38
SR 167	I-5 to SR 900 / S 2nd St	0.00	0.00	27.28	28.60
I-182	I-82 to US 395	0.00	0.00	15.19	15.19
US 195	Idaho State Line to I-90	0.00B	0.00	95.99	93.37
US 195 Spur	US 195 to Idaho State Line	0.06	0.00	0.60	0.54
I-205	Oregon State Line to I-5	26.59	0.00	37.16	10.57
SR 240	I-182 to Coast St / Bypass Hwy - Hanford Access	30.63	28.86	34.87	33.10
SR 270	US 195 to Idaho State Line	0.00	0.00	9.89	9.89
SR 270	Pullman Couplet	2.67	0.00	2.90	0.23
SR 281	I-90 to SR 28	0.00	0.00	10.55	10.55
SR 281 Spur	SR 281 to I-90	2.65	0.00	4.34	1.69
SR 303	SR 304 to SR 3	0.00B	0.00	9.16	9.32
SR 304	SR 3 to Bremerton Ferry	0.00	0.00	3.51	3.24
SR 305	Winslow Ferry to SR 3	0.02	0.00	13.52	13.50
SR 307	SR 305 to SR 104	0.00	0.00	5.25	5.25
SR 310	SR 3 to SR 304	0.00	0.00	1.84	1.84
US 395	Congressional High Priority Route / I-82 to Canadian Border	13.05	19.81	270.26	275.09
SR 401	US 101 to SR 4	0.00	0.00	12.13	12.13
I-405	I-5 to I-5	0.00	0.00	30.32	30.30
SR 432	SR 4 to I-5	0.00	0.00	10.33	10.32
SR 433	Oregon State Line to SR 432	0.00	0.00	0.94	0.94
SR 500	I-5 to SR 503	0.00	0.00	5.96	5.96
SR 501	I-5 to Port of Vancouver	0.00	0.00	3.83	3.42
SR 502	I-5 to SR 503	0.00B	0.00	7.56	7.58
SR 503	SR 500 to SR 502	0.00	0.00	8.09	8.09
SR 509	12th Place S to SR 99	24.35B	26.13	29.83	33.11
SR 509	Pacific Ave. to Marine View Drive	0.22	1.44	3.20	4.42
SR 512	I-5 to SR 167	0.00	0.00	12.06	12.06
SR 513	Sandpoint Naval Air Station	0.00	0.00	3.35	3.35
SR 516	I-5 to SR 167	2.03	2.02	4.72	4.99
SR 518	I-5 to SR 509	0.00	0.00	3.81	3.42
SR 519	I-90 to Seattle Ferry Terminal	0.00	0.00	1.14	1.14
SR 520	I-5 to SR 202	0.00	0.00	12.83	12.82
SR 522	I-5 to US 2	0.00	0.00	24.68	24.68
SR 524	Cedar Way Spur to I-5	4.64	4.76	5.32	5.44
SR 524 Spur	Cedar Way Spur - Lynnwood Park and Ride to SR 524	4.64	0.00	5.14	0.50
SR 525	I-5 to SR 20	0.00	0.00	30.49	30.72
SR 526	SR 525 to I-5	0.00	0.00	4.52	4.52
SR 529	I-5 to Everett Homeport	0.00	0.00	2.72	2.72
SR 539	I-5 to Canadian Border	0.00	0.00	15.16	15.16
SR 543	I-5 to Canadian Border	0.00	0.00	1.09	1.09
SR 546	SR 539 to SR 9	0.00	0.00	8.02	8.02
I-705	I-5 to Schuster Parkway	0.00	0.00	1.50	1.50
SR 970	I-90 to US 97	0.00	0.00	10.31	10.31

NHS Highways in Washington
Figure 325-2b

⇩ Project Type															Bridges (11)				Intersections			Barriers		
Design Elements ⇨	Horiz. Align.	Vert. Align.	Lane Width	Shldr Width	Lane Tran-sition	Median Width	Cross Slope Lane	Cross Slope Shldr	Fill/ Ditch Slopes	Access (3)	Clear Zone (18)	Sign, Del., Illumin.	Basic Safety	Bike & Ped.	Lane Width	Shldr Width	Vertical Clear.	Structural Capacity	Turn Radii	Angle	I/S Sight Dist.	Term. & Trans. Section (12)	Std Run	Bridge Rail (19)
Preservation																								
Roadway																								
(5-1) HMA/PCCP												B	B	M			F				B	F	B	F
(5-2) BST																								
(5-3) BST Routes/Basic Safety												B	B								B	F	B	F
(5-4) Replace HMA with PCCP at I/S			EU/M	EU/M		DE/M	EU/M					B	B	M			F					F	B	F
Structures																								
(5-5) Bridge Replacement	M	F	M	M	F		M	M	M		F	F		F	F(2)	F(2)	F	F	M	M	F	F	F	F
(5-6) Bridge Repl. (Multilane)	F(2)	F(2)	F(2)	F(2)	F	F(2)	F(2)	F(2)	F(2)		F	F		F	F(2)	F(2)	F	F	F(2)	F(2)	F	F	F	F
(5-7) Bridge Deck Rehab												B	B	M								F(6)	F(22)	F
Improvements (16)																								
Mobility																								
(5-8) Urban (Multilane)	F(2)	F(2)	F(2)	F(2)	F	F(2)	F(2)	F(2)	F(2)	F	F	F		F	F(2)	F(2)	F	F	EU/F	EU/F	F	F	F	F
(5-9) Urban	M	M	M	M	F		M	M	M	F	F	F		F	M	M	F	F	EU/M	EU/M	F	F	F	F
(5-10) Rural	M	M	M	M	F	M	M	M	M	F	F	F		F	M	M	F	F	EU/M	EU/M	F	F	F	F
(5-11) HOV	M	M	M	M	F	M	M	M	M	F	F	F		F	M	M	F	F	EU/M	EU/M	F	F	F	F
(5-12) Bike/Ped. Connectivity	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)		F	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Safety																								
(5-13) Non-Interstate Freeway	F(2)	F(2)	F(2)	F(2)	F(2)	F(2)	F(2)	F(2)	F(2)	F	F	F		F	F(2)	F(2)	F		F(2)	F(2)	F	F	F	F
(5-14) Intersection (1)			M(4)	M(4)	F				M(4)	F	F	F		M					M(4)	M(4)	F	F	F	F
(5-15) Corridor (1)	M(4)	M(4)	M(4)	M(4)	F	M(4)	M(4)	M (4)	M(4)	F	F	F		M	M(4)	M(4)	F		M(4)	M(4)	F	F	F	F
(5-16) Median Barrier				DE/F																		F(20)	F(20)	
(5-17) Guardrail Upgrades				DE/F																		F	F(23)	
(5-18) Bridge Rail Upgrades																						F	F(22)	F
(5-19) Risk: Roadside									M(4)	EU/F	F	F										F	F	F
(5-20) Risk: Sight Distance	F/M(21)	F/M(21)	F/M(21)	F/M(21)					F/M(21)	F(21)	F(21)	F		F	F(21)	F(21)	F(21)		F/M(21)	F/M(21)	F(21)	F	F	F
(5-21) Risk: Roadway Width			F/M(21)	F/M(21)	F	F/M(21)	F/M(21)	F/M(21)	F/M(21)	F	F	F		F	F(21)	F(21)	F(21)		F/M(21)	F/M(21)	F(21)	F	F	F
(5-22) Risk: Realignment	F/M	F/M	F/M	F/M	F	F/M	F(2)	F(2)	F/M	F	F	F		F	F(21)	F(21)	F(21)		F/M(21)	F/M(21)	F(21)	F	F	F
Economic Development																								
(5-23) Freight & Goods (Frost Free) (8)	EU/M	EU/M	EU/M	EU/M	EU/F	EU/M	M	M	EU/M		F	B	B	EU/F(26)	DE/M	DE/M	F		EU/M	EU/M	EU/F	F	B	F
(5-24) Rest Areas (New)	F	F	F	F	F	F	F	F	F	F	F	F		F	F	F			F	F	F	F	F	F
(5-25) Bridge Restrictions	M	F	M	M	F	M	M	M	M		F	F		EU/F(26)	M	M	F	F	M	M	F	F	F	F
(5-26) Bike Routes (Shldrs)			EU/M	(7)	EU/F			EU/M	EU/M			B	B	F	EU/M	EU/M					B	F	B	EU/F

☐ Not Applicable
F Full design level. See Chapter 440.
M Modified design level. See Chapter 430.
F/M Full for freeways/Modified for nonfreeway
B Basic design level. See Chapter 410.
DE Design Exception
EU Evaluate Upgrade

(1) Collision Reduction (HAL, HAC, PAL), or Collision Prevention (At Grade Removal, Signalization & Channelization). Specific deficiencies that created the project must be upgraded to design level as stated in the matrix.
(2) Modified design level may apply based on a corridor or project analysis. See 325.03(5).
(3) If designated as L/A acquired in the Access Control Tracking System, limited access requirements apply. If not, managed access applies. See 325.03(5).
(4) Full design level may apply based on a corridor or project analysis. See 325.03(5).
(5) For bike/pedestrian design see Chapters 1020 and 1025.
(6) Applies only to bridge end terminals and transition sections.
(7) 4 ft minimum shoulders.
(8) If all weather structure can be achieved with spot digouts and overlay, modified design level applies to NHS highways and basic design level applies to non-NHS highways.

(11) See Chapter 1120.
(12) Impact attenuators are considered as terminals.
(16) For design elements not in the matrix headings, apply full design level as found in the applicable chapters and see 325.03(2).
(18) On managed access highways within the limits of incorporated cities and towns, City and County Design Standards apply to areas outside the curb or outside the paved shoulder where no curb exists.
(19) The funding sources for bridge rail are a function of the length of the bridge. Consult programming personnel.
(20) Applies to median elements only.
(21) Analyses required. See 325.03(5) for details.
(22) Upgrade barrier, if necessary, within 200 ft of the end of the bridge.
(23) See description of Guardrail Upgrades Project Type, 325.03(1) regarding length of need.
(26) Sidewalk ramps must be addressed for ADA compliance. See Chapter 1025.

Design Matrix 5
Main Line Non-NHS Routes
Figure 325-7

Chapter 330 Design Documentation, Approval, and Process Review

330.01 General

The Project File (PF) contains the documentation for planning, scoping, programming, design, approvals, contract assembly, utility relocation, needed right of way, advertisement, award, construction, and maintenance review comments for a project. A Project File is completed for all projects and is retained by the region office responsible for the project. Responsibility for the project may pass from one office to another during the life of a project, and the Project File follows the project as it moves from office to office. Portions of the Project File that are not designated as components of the Design Documentation Package (DDP) may be purged when retention of the construction records is no longer necessary.

The Design Documentation Package is a part of the Project File. It documents and justifies design decisions and the design process that was followed. The Design Documentation Package is retained in a permanent, retrievable file for a period of 75 years, in accordance with Washington State Department of Transportation (WSDOT) records retention policy.

For operational changes and developer projects, design documentation is required and is retained by the region office responsible for the project, in accordance with WSDOT records retention policy. All participants in the design process must provide the appropriate documentation for their decisions.

330.02 References

Federal/State Laws and Codes

Code of Federal Regulations (CFR) 23 CFR 635.111 "Tied bids"

23 CFR 635.411 "Material or product selection"

Revised Code of Washington (RCW) 47.28.030, Contracts – State forces – Monetary limits – Small businesses, minority, and women contractors – Rules

RCW 47.28.035, Cost of project, defined

Washington Federal-Aid Stewardship Agreement, as implemented in the design matrices (Chapter 325)

Design Guidance

Advertisement and Award Manual, M 27-02, WSDOT

Directional Documents Index, WSDOT, at: wwwi.wsdot.wa.gov/docs/

Executive Order E 1010.00, "Certification of Documents by Licensed Professionals," WSDOT

Hydraulics Manual, M 23-03, WSDOT

Master Plan for Limited Access Highways, WSDOT

Plans Preparation Manual, M 22-31, WSDOT

Roadside Classification Plan, M 25-31, WSDOT

Route Development Plan, WSDOT

Washington State Highway System Plan, WSDOT

Supporting Information

A Policy on Geometric Design of Highways and Streets (Green Book), AASHTO, 2004

330.03 Definitions

Design Approval Documented approval of the design criteria, which becomes part of the Design Documentation Package. This approval is an endorsement of the design criteria by the designated representative of the approving organization, as shown in Figures 330-2a and 2b.

design exception (DE) Preauthorization to omit correction of an existing design element for various types of projects, as designated in the design matrices. (See Chapter 325.) A DE designation indicates that the design element is normally outside the scope of the project type. (See Figure 330-1.)

design variance A recorded decision to differ from the design level specified in the *Design Manual*, such as an Evaluate Upgrade (EU) not upgraded, a DE, or a deviation. EUs leading to an upgrade are documented but are not considered to be variances. A project or corridor analysis may also constitute a design variance if that analysis leads to a decision to use a design level or design classification that differs from what the *Design Manual* specifies for the project type.

Design Variance Inventory (DVI) A list of design elements that will not be improved in accordance with the *Design Manual* criteria designated for the project.

Design Variance Inventory System (DVIS) A database application developed to generate the DVI form. The DVIS also provides query functions, giving designers an opportunity to search for previously granted variances. The DVIS application can be accessed at: www.wsdot.wa.gov/eesc/design/projectdev/

deviation A documented decision granting approval at project-specific locations to differ from the design level specified in the *Design Manual*. (See Figures 325-3 through 7 and Figure 330-1.)

environmental documents:

- ***NEPA*** National Environmental Policy Act
- ***SEPA*** [Washington] State Environmental Policy Act
- ***CE*** NEPA: Categorical Exclusion
- ***CE*** SEPA: Categorical Exception
- ***EA*** Environmental Assessment
- ***ECS*** Environmental Classification Summary
- ***EIS*** Environmental Impact Statement
- ***ERS*** Environmental Review Summary
- ***FONSI*** Finding Of No Significant Impact
- ***ROD*** Record of Decision

evaluate upgrade (EU) A decision-making process to determine whether or not to correct an existing design element as designated in the design matrices. Documentation is required. (See Figure 330-1.)

FHWA Federal Highway Administration.

HQ The Washington State Department of Transportation Headquarters organization.

Project Change Request Form A form used to document and approve revisions to project scope, schedule, or budget, from a previously approved Project Definition (see Project Summary).

Project Development Approval Final approval of all project development documents by the designated representative of the approving organization prior to the advertisement of a capital transportation project. (See Figures 330-2a and 2b.)

Project File (PF) A file containing all documentation and data for all activities related to a project. (See 330.01 and 330.04.)

- ***Design Documentation Package (DDP)*** The portion of the Project File, including Project Development Approval, that will be retained long term in accordance with WSDOT document retention policies. Depending on the scope of the project, it contains the Project Summary and some or all of the other documents discussed in this chapter. Common components are listed in Figure 330-5. Technical reports and calculations are part of the Project File, but are not designated as components of the DDP. Include estimates and justifications for decisions made in the DDP. (See 330.04(2).) The DDP explains how and why the design was chosen, and documents approvals. (See 330.01.)

Project Summary A set of electronic documents consisting of the Design Decisions Summary (DDS), the Environmental Review Summary (ERS), and the Project Definition (PD). The Project Summary is part of the design documentation required to obtain Design Approval and is ultimately part of the design documentation required for Project Development Approval. (See 330.06.)

- ***Design Decisions Summary (DDS)*** An electronic document that records major design decisions regarding roadway geometrics, roadway and roadside features, and other issues that influence the project scope and budget.
- ***Environmental Review Summary (ERS)*** An electronic document that records the environmental requirements and considerations for a specific project.
- ***Project Definition (PD)*** An electronic document that records the purpose and need of the project, along with program level and design constraints.

scoping phase The first phase of project development for a specific project. It follows identification of the need for a project and precedes detailed project design. It is the process of identifying the work to be done and developing a cost estimate for completing the design and construction. The Project Summary, engineering and construction estimates, and several technical reports (geotechnical, surfacing, bridge condition, etc.) are developed during this phase.

330.04 Design Documentation

(1) Purpose

Design documentation records the evaluations and decisions by the various disciplines that result in design recommendations. Design assumptions and decisions made prior to and during the scoping phase are included. Changes that occur throughout project development are documented. Required justifications and approvals are also included.

The DDP identifies the purpose and need of the project and documents how the project addresses the purpose and need. The "Project Design Documentation Checklist" has been developed as a tool to assist in generating the contents of the DDP and the PF. The use of this tool is optional and can be found at:
www.wsdot.wa.gov/eesc/design/projectdev/

(2) Design Documents

The DDP portion of the PF preserves the decision documents generated during the design process. In each package, a summary (list) of the documents is recommended.

The design documents commonly included in the PF and DDP for all but the simplest projects are listed in Figure 330-5.

Documentation is not required for components not related to the project.

The DVI is *required* for all projects on the National Highway System (NHS) having design variances; it is recommended for all projects having design variances. The DVI lists all EU not upgraded to the applicable design level, DE, and deviations as indicated by the design matrices. Record variances resulting from a project or corridor analysis in the DVI. Use the DVIS database application to record and manage design variances. The DVIS is available at:
www.wsdot.wa.gov/eesc/design/projectdev/

The ERS and the PD are required for most projects. Exceptions will be identified by the Project Control and Reporting Office.

The DDS is not required for the following project types unless they involve reconstructing the lanes, shoulders, or fill slopes. Since these and some other project types are not included in the design matrices, evaluate them with respect to modified design level (M) for non-NHS routes and full design level (F) for NHS routes. Include in the evaluation only those design elements specifically impacted by the project. Although the following list illustrates some of the project types that do not require a DDS, the list is not intended to be a complete accounting of all such projects. Consult with the HQ System Analysis and Program Development Office for projects not included in the list.

- Bridge painting
- Crushing and stockpiling
- Pit site reclamation
- Lane marker replacement
- Guidepost replacement
- Signal rephasing
- Signal upgrade
- Seismic retrofit
- Bridge joint repair
- Navigation light replacement
- Signing upgrade
- Illumination upgrade
- Rumble strips
- Electrical upgrades
- Major drainage
- Bridge scour
- Fish passage
- Other projects as approved by the HQ Design Office

(3) Certification of Documents by Licensed Professionals

All original technical documents must bear the certification of the responsible licensee. (See Executive Order E 1010.00.)

(4) Design Exception (DE), Evaluate Upgrade (EU), and Deviation Documentation

In special cases, projects may need to address design elements, which are shown as blank cells in a design matrix. (See Figure 330-1.) These special cases must be coordinated with the appropriate Assistant State Design Engineer (ASDE) and the HQ Project Control and Reporting Office. When this is necessary, document the reasons for inclusion of that work in your project.

When the design matrices specify a DE for a design element, the DE documentation must specify the matrix and row, the design element, and the limits of the exception. When a DVI is required for the project, the DE locations must be recorded in the inventory.

The EU process determines if an item of work will or will not be done, through analysis of factors such as benefit/cost, route continuity, accident reduction potential, environmental impact, and economic development. Document all EU decisions to the DDP using the list in Figure 330-6 as a guide for the content. The cost of the improvement must always be considered when making EU decisions. EU examples on the Internet can serve as models for development of EU documentation. The appropriate approval authority for EUs is designated in Figures 330-2a and 2b.

Deviation requests are stand-alone documents requiring enough information and project description for an approving authority to make an informed decision of approval or denial. Documentation of a deviation must contain justification and must be approved at the appropriate administrative level, as shown in Figures 330-2a and 2b. Submit the request as early as possible because known deviations are to be approved prior to Project Development Approval or Intersection/Interchange Plan approval.

When applying for deviation approval, it is necessary to provide two explanations. The first identifies the design element and explains why the design level specified in the design matrices was not or cannot be used. The second provides the justification for the design that is proposed. Justification for a deviation must be supported by at least two of the following:

- Accident history and accident analysis
- Benefit/cost analysis
- Engineering judgment
- Environmental issues
- Route continuity

Engineering judgment includes a reference to another publication, with an explanation of why that reference is applicable to the situation encountered on the project.

If the element meets current AASHTO guidance adopted by FHWA, such as *A Policy on Geometric Design of Highways and Streets*, but not the *Design Manual* criteria, it is a deviation from the *Design Manual* that does not require

Matrix Cell Content	Project corrects design elements that do not conform to specified design level	Document to file[1]	Record in DVIS[2]
Blank cell in design matrix		No[3]	No
Cell Entry			
Full (F), Modified (M), or Basic (B) (with no DE or EU qualifiers)	Yes	No	No
	No[4]	Yes[5]	Yes
Design Exception (DE)	Yes[3]	DDP	No
	No	DDP	Yes
Evaluate Upgrade (EU)[5]	Yes	DDP	No
	No	DDP	Yes

DDP = Document to Design Documentation Package

Notes:
[1] See 330.04(3).
[2] See 330.04(2).
[3] Document to the DDP if the element is included in the project as identified in the Project Summary or Project Change Request Form.
[4] Nonconformance with specified design level (see Chapter 325) requires an approved deviation.
[5] Requires supporting justification. See 330.04(4).

Design Matrix Documentation Requirements
Figure 330-1

approval by FHWA or the HQ Design Office. However, it only requires documentation and justification in the DDP to support the use of the AASHTO guidance. The following documentation is required:

- Identify the design element
- Explain why the design level specified in the design matrices was not used
- Explain which AASHTO guidance was used (including the title of the AASHTO guidance, the publication date, and the chapter and page number of the guidance)

Deviation approval is at the appropriate administrative level, as shown in Figures 330-2a and 2b.

Reference a corridor or project analysis as supporting justification for design deviations dealing with route continuity issues. (See Chapter 325.)

Once a deviation is approved, it applies to that project only. When a new project is programmed at the same location, the subject design element must be reevaluated and either (1) the subject design element is rebuilt to conform with the applicable design level, or (2) a new deviation is developed, approved, and preserved in the DDP for the new project. Check the DVIS for help in identifying previously granted deviations.

A change in a design level resulting from an approved *Route Development Plan* or a corridor or project analysis, as specified in design matrix notes, is documented similar to a deviation. Design elements that do not comply with the design level specified in an approved corridor or project analysis are documented as deviations.

To prepare a deviation request, use the list in Figure 330-7 as a general guide for the sequence of the content. The list is not all-inclusive of potential content and it might include suggested topics that do not apply to a particular project. Design deviation examples can be found at: www.wsdot.wa.gov/eesc/design/projectdev/

330.05 Project Development

In general, the region initiates the development of a specific project by preparing the Project Summary. Some project types may be initiated by other WSDOT groups such as the HQ Bridge and Structures Office or the HQ Traffic Office, rather

than the region. The project coordination with other disciplines (such as Real Estate Services, Roadside and Site Development, Utilities, and Environmental) is started in the project scoping phase and continues throughout the project's development. The region coordinates with state and federal resource agencies and local governments to provide and obtain information to assist in developing the project.

The project is developed in accordance with all applicable Directives, Instructional Letters, Supplements, and manuals; the *Master Plan for Limited Access Highways*; the *Washington State Highway System Plan*; the *Route Development Plan*; the Washington Federal-Aid Stewardship Agreement, as implemented in the design matrices (see Chapter 325); and the Project Summary.

The region develops and maintains documentation for each project. The Project File includes documentation of project work including planning; scoping; public involvement; environmental action; design decisions; right of way acquisition; Plans, Specifications, and Estimates (PS&E) development; project advertisement; and construction. Refer to the *Plans Preparation Manual* for PS&E documentation.

All projects involving FHWA action require NEPA clearance. Environmental action is determined through the ECS form. The environmental approval levels are shown in Figures 330-3a and 3b.

Upon receipt of the ECS approval for projects requiring an EA or EIS under NEPA, the region proceeds with environmental documentation, including public involvement, appropriate for the magnitude and type of the project. (See Chapter 210.)

Design approval and approval of Right of Way Plans are required prior to acquiring property. If federal funds are used to purchase the property, then NEPA clearance is also required.

The ASDEs work with the regions on project development and conduct process reviews on projects as described in 330.10.

330.06 Scoping Phase

Development of the project scope is the initial phase of project development. This effort is prompted by the *Washington State Highway System Plan*. The project scoping phase consists of determining a project description, schedule, and cost estimate. The intent is to make design decisions early in the project development process that focus the scope of the project. During the project scoping phase, the Project Summary documents are produced.

(1) Project Summary

The Project Summary provides information on the results of the scoping phase; links the project to the *Washington State Highway System Plan* and the *Capital Improvement and Preservation Program* (CIPP); and documents the design decisions, the environmental classification, and agency coordination. The Project Summary is developed and approved before the project is funded for design and construction, and consists of ERS, DDS, and PD documents, which are electronic forms. Specific online instructions for filling them out are contained in the Project Summary database.

(a) **Environmental Review Summary (ERS).** Lists the environmental permits and approvals that will be required, environmental classifications, and environmental considerations. This form lists requirements by environmental and permitting agencies. If there is a change in the PD or DDS, the information in the ERS must be reviewed and revised to match the rest of the Project Summary. The ERS is prepared during the scoping phase and is approved by the region. During final design and permitting, revisions may need to be made to the ERS and be reapproved by the region.

(b) **Design Decisions Summary (DDS).** Provides the design matrix used to develop the project, and the roadway geometrics, design deviations, EUs, other roadway features, roadside restoration, and any design decisions made during the scoping of a project. The information contained in this form is compiled from various databases of departmental information, field data collection, and evaluations made in development

of the PD and the ERS. Design decisions may be revised throughout the project development process based on continuing evaluations.

The DDS is approved by the appropriate ASDE for new construction and reconstruction projects on the Interstate System before submittal to FHWA. (See 330.07.) The regional design authority approves the DDS for all other types of projects. To approve the Design Decisions Summary, the region must be confident that there will be no significant change in the PD or estimated cost. However, if there is a change to the PD or a significant change in the cost estimate, the DDS is to be revised or supplemented and reapproved. Significant cost changes require a Project Change Request Form to be submitted and approved by the appropriate designee.

(c) **Project Definition (PD).** Identifies the various disciplines and design elements that will be encountered in project development. The PD states the purpose and need for the project, the program categories, and the recommendations for project phasing. This information determines the level of documentation and evaluation that is needed for Project Development Approval. The PD is completed early in the scoping phase to provide a basis for full development of the ERS, DDS, schedule, and estimate. If circumstances necessitate a change to an approved PD, process a Project Change Request Form for approval by the appropriate designee, revise the original PD form, and obtain approval of the revisions.

330.07 FHWA Approval

For all NHS projects, the level of FHWA oversight varies according to the type of project, the agency doing the work, and the funding source as shown in Figures 330-2a and 2b. Oversight and funding do not affect the level of design documentation required for a project.

An FHWA determination of engineering and operational acceptance is required for any new or revised access point (including interchanges, temporary access breaks, and locked gate access points) on the Interstate System, regardless of funding. (See Chapter 1425.)

Documents for projects requiring FHWA review, Design Approval, and Project Development Approval are submitted through the HQ Design Office. Include applicable project documents as specified in Figure 330-5.

330.08 Design Approval

When the Project Summary documents are complete, and the region is confident that the proposed design adequately addresses the purpose and need for the project, a Design Approval may be entered into the PF. Approval levels for design and PS&E documents are presented in Figures 330-2a through 330-4.

The following items must be provided for Design Approval:

- A one- or two-page reader-friendly memo that describes the project
- Project Summary documents
- Corridor or project analysis
- Design Criteria worksheets at: www.wsdot.wa.gov/EESC/Design/projectdev/default.htm
- Design Variances Inventory (for known variances)
- Channelization plans, Intersection plans, or Interchange plans (if applicable)
- Alignment plans and profiles (if project significantly modifies either the existing vertical or horizontal alignment)
- Current cost estimate with a confidence level

Design Approval remains valid for three years. Evaluate policy changes or revised design criteria that are adopted by the department during this time to determine if these changes would have a significant impact on the scope or schedule of the project. If it is determined that these changes will not be incorporated into the project, document this decision with a memo from the region Project Development Engineer that is included in the DDP. For an overview of design policy changes, consult the Detailed Chronology of Design Policy Changes Affecting Shelved Projects at: www.wsdot.wa.gov/eesc/design/policy/designpolicy.htm

330.09 Project Development Approval

When all project development documents are complete and approved, Project Development Approval is granted by the approval authority designated in Figures 330-2a and 2b. The Project Development Approval becomes part of the DDP. (See 330.04 and Figure 330-5 for design documents that may lead to Project Development Approval.) Figures 330-2a through 330-4 provide approval levels for project design and PS&E documents.

The following items must be approved prior to Project Development Approval:

- Required environmental documents
- Design Approval documents (and any supplements)
- Design Variance Inventory (as required)
- Cost estimate
- Stamped cover sheet (project description)

Project Development Approval remains valid for three years. Evaluate policy changes or revised design criteria that are adopted by the department during this time to determine if these changes would have a significant impact on the scope or schedule of the project. If it is determined that these changes will not be incorporated into the project, document this decision with a memo from the region Project Development Engineer that is included in the DDP. For an overview of design policy changes, consult the Detailed Chronology of Design Policy Changes Affecting Shelved Projects at: www.wsdot.wa.gov/eesc/design/policy/designpolicy.htm

330.10 Process Review

The process review is done to provide reasonable assurance that projects are prepared in compliance with established policies and procedures and that adequate records exist to show compliance with state and federal requirements. Process reviews are conducted by WSDOT, FHWA, or a combination of both.

The design and PS&E process review is performed in each region at least once each year by the HQ Project Development Branch. The documents used in the review process are (1) the Design Documentation Checklist, (2) the PS&E Review Checklist, and (3) the PS&E Review Summary. These are generic forms used for all project reviews. Copies of these working documents are available for reference when assembling project documentation. The HQ Design Office, Project Development Branch, maintains current copies at: www.wsdot.wa.gov/eesc/design/projectdev/

Each project selected for review is examined completely and systematically beginning with the scoping phase (including planning documents) and continuing through contract plans and, when available, construction records and change orders. Projects are normally selected after contract award. For projects having major traffic design elements, the HQ Maintenance and Operations Programs' Traffic Operations personnel are involved in the review. The WSDOT process reviews may be held in conjunction with FHWA process reviews.

The HQ Project Development Branch schedules the process review and coordinates it with the region and FHWA.

A process review follows this general agenda:

1. Review team meets with regional personnel to discuss the object of the review.
2. Review team reviews the design and PS&E documents, and the construction documents and change orders (if available) using the checklists.
3. Review team meets with regional personnel to ask questions and clarify issues of concern.
4. Review team meets with regional personnel to discuss findings.
5. Review team submits a draft report to the region for comments and input.
6. If the review of a project shows a serious discrepancy, the region's design authority is asked to report the steps that will be taken to correct the deficiency.
7. The process review summary forms are completed.
8. The summary forms and checklists are evaluated by the State Design Engineer.
9. The findings and recommendations of the State Design Engineer are forwarded to the regional design authority for action and/or information within 30 days of the review.

Project Design	FHWA Oversight Level	Deviation and Corridor/Project Approval[a][b]	EU Approval[b]	Design Approval and Project Development Approval
Interstate				
New/Reconstruction[c] • Federal funds • No federal funds	 (d) (e)	FHWA	Region	FHWA*
Intelligent Transportation Systems (ITS) over $1 million	(f)	HQ Design	Region	HQ Design
All Other[g] • Federal funds • State funds • Local agency funds	 (f) (f) (e)	HQ Design	Region	Region
National Highway System (NHS)				
Managed access highway outside incorporated cities and towns or inside unincorporated cities and towns, or limited access highway	(f)	HQ Design	Region	Region
Managed access highway within incorporated cities and towns[h] • Inside curb or EPS[i] • Outside curb or EPS	 (f) (f)	 HQ Design HQ H&LP	 Region N/A	 Region City/Town

FHWA = Federal Highway Administration
HQ = WSDOT Headquarters
H&LP = WSDOT Highways and Local Programs Office
EPS = Edge of paved shoulder where curbs do not exist

Notes:
(a) These approval levels also apply to deviation processing for local agency work on a state highway.
(b) See 330.04(4).
(c) For definition, see Chapter 325.
(d) Requires FHWA review and approval (full oversight) of design and PS&E submitted by HQ Design Office.
(e) To determine the appropriate oversight level, FHWA reviews the Project Summary (or other programming document) submitted by HQ Design Office, or by WSDOT Highways and Local Programs through the HQ Design Office.
(f) FHWA oversight is accomplished by process review. (See 330.10.)
(g) Reduction of through lane or shoulder widths (regardless of funding) requires FHWA review and approval of the proposal.
(h) Applies to the area within the incorporated limits of cities and towns.
(i) Includes raised medians.
* FHWA will accept design criteria prior to NEPA approval, but will not approve the design until NEPA is complete.

Design Approval Level
Figure 330-2a

Project Design	FHWA Oversight Level	Deviation and Corridor/Project Approval[a][b]	EU Approval[b]	Design Approval and Project Development Approval
Non-National Highway System (Non-NHS)				
Improvement project on managed access highway outside incorporated cities and towns or within unincorporated cities and towns, or on limited access highway (Matrix lines 5-8 through 5-26)	N/A	HQ Design	Region	Region
Improvement project on managed access highway within incorporated cities and towns[h] • Inside curb or EPS[i] • Outside curb or EPS (Matrix lines 5-8 through 5-26)	 N/A N/A	 HQ Design HQ H&LP	 Region N/A	 Region City/Town
Preservation project on managed access highway outside incorporated cities and towns or within unincorporated cities and towns, or on limited access highway[j] (Matrix lines 5-1 through 5-7)	N/A	Region[k]	Region	Region
Preservation project on managed access highway within incorporated cities and towns[h][j] • Inside curb or EPS[i] • Outside curb or EPS (Matrix lines 5-1 through 5-7)	 N/A N/A	 Region HQ H&LP	 Region N/A	 Region City/Town

FHWA = Federal Highway Administration
HQ = WSDOT Headquarters
H&LP = WSDOT Highways and Local Programs Office
EPS = Edge of paved shoulder where curbs do not exist

Notes:
(a) These approval levels also apply to deviation processing for local agency work on a state highway.
(b) See 330.04(4).
(h) Applies to the area within the incorporated limits of cities and towns.
(i) Includes raised medians.
(j) For Bridge Replacement projects in the preservation program, follow the approval level specified for improvement projects.
(k) For guidance on access deviations, see Chapters 1430 & 1435.

Design Approval Level
Figure 330-2b

Item	Approval Authority		
	Region	HQ	FHWA
Program Development			
Work Order Authorization		X	X[1]
Public Hearings			
Corridor Hearing Summary		X[2]	
Design Summary		X[3]	
Access Hearing Plan		X[4]	
Access Findings and Order		X[5]	
Environmental by Classification			
Summary (ECS) NEPA			X
Class I NEPA (EIS)		[7]	X
Class I SEPA (EIS)		X	
Class II NEPA – Programmatic Categorical Exclusion (CE)*	X		
Class II NEPA – Documented Categorical Exclusion (CE)	[6]		X
Class II SEPA – Categorical Exemption (CE)	X		
Class III NEPA – Environmental Assessment (EA)		[7]	X
SEPA Checklist	X		
Design			
Design Deviations	[8]	[8]	[8]
Experimental Features		X	X[9]
Environmental Review Summary	X		
Final Design Decisions Summary	X	X[3]	
Final Project Definition		X[10]	
Interchange Justification Report		[7]	X
Non-Interstate Interchange Justification Report		X	
Interstate Interchange Plans (includes Intersection Plans)		[7]	X[9][11]
Non-Interstate Interchange Plans	X[11]	X[11]	
Intersection Plans	X[11]	X[11]	
Right of Way Plans	[12]	X	
Monumentation Map	X		
Materials Source Report		X[13]	
Pavement Determination Report		X[13]	
Roundabout Geometric Design	X[11]	X[11]	
Design Approval	[8]	[8]	[8]
Project Development Approval	[8]	[8]	[8]

Approvals

Figure 330-3a

Item	Approval Authority		
	Region	HQ	FHWA
Design			
Resurfacing Report		X[13]	
Signal Permits	X[14]		
Geotechnical Report		X[13]	
Tied Bids	X[15]		X[9][15]
Bridge Design Plans (Bridge Layout)	X	X	
Hydraulic Report	X[16][17]	X[16][17]	
Preliminary Signalization Plans		X[6]	
Rest Area Plans		X	
Roadside Restoration Plans	X[18]	X[19]	
Structures Requiring TS&L's		X	X
Planting Plans	X[18]	X[19]	
Grading Plans	X[18]	X[19]	
Continuous Illumination – Main Line		X[20]	
Project Change Request Form	X[21]	X[21]	
Work Zone Transportation Management Plan/Traffic Control Plan	X[22]		

X Normal procedure * If on the preapproved list

Notes:
[1] Federal-aid projects only.
[2] Environmental and Engineering Programs Director approval.
[3] State Design Engineer approval.
[4] Right of Way Plans Engineer approval.
[5] Refer to Chapter 210 for approval requirements.
[6] Final review & concurrence required at the region prior to submittal to approving authority.
[7] Final review & concurrence required at HQ prior to submittal to approving authority.
[8] Refer to Figures 330-2a & 2b for Design Approval and Project Development Approval levels.
[9] Applies to new/reconstruction projects on Interstate routes.
[10] HQ Project Control & Reporting approval.
[11] Include channelization details.
[12] Certified by the responsible professional licensee.
[13] Submit to HQ Materials Laboratory for review and approval.
[14] Approved by region's Administrator or Designee.
[15] See 23 CFR 635.111.
[16] For additional guidance, see the *Hydraulics Manual*, M 23-03.
[17] Region to submit Hydraulic Report. Refer to *Hydraulics Manual*.
[18] Applies only to regions with a Landscape Architect.
[19] Applies only to regions without a Landscape Architect.
[20] Approved by State Traffic Engineer.
[21] Consult HQ Project Control & Reporting for clarification on approval authority.
[22] Region Traffic Engineer.

Approvals
Figure 330-3b

Item	New/ Reconstruction (Interstate only)	NHS and Non-NHS
DBE/training goals* **	(a)	(a)
Right of way certification for federal-aid projects	FHWA(b)	FHWA(b)
Right of way certification for state-funded projects	Region(b)	Region(b)
Railroad agreements	(c)	(c)
Work performed for public or private entities*	[1][2]	Region[1][2]
State force work*	FHWA[3](d)	Region[3](d)
Use of state-furnished stockpiled materials*	FHWA[4]	Region[4]
Stockpiling materials for future projects*	FHWA[4]	Region[4]
Work order authorization	[5](d)	[5](d)
Ultimate reclamation plan approval through DNR	Region	Region
Proprietary item use*	FHWA[4]	[4](c)
Mandatory material sources and/or waste sites*	FHWA[4]	Region[4]
Nonstandard bid item use*	Region	Region
Incentive provisions	FHWA	(e)
Nonstandard time for completion liquidated damages*	FHWA(e)	(e)
Interim liquidated damages*	(f)	(f)

Notes:
[1] This work requires a written agreement.
[2] Region approval subject to $250,000 limitation.
[3] Use of state forces is subject to $60,000 limitation and $100,000 in an emergency situation, as stipulated in RCWs 47.28.030 and 47.28.035.
[4] Applies only to federal-aid projects; however, document for all projects.
[5] Prior FHWA funding approval required for federal-aid projects.

Regional or Headquarters approval authority:
(a) Office of Equal Opportunity
(b) Real Estate Services Office
(c) Design Office
(d) Project Control & Reporting Office
(e) Construction Office
(f) Transportation Data Office

References:
**Plans Preparation Manual*
***Advertisement and Award Manual*

PS&E Process Approvals

Figure 330-4

Document[1]	Required for FHWA Oversight
Project Definition	**X**
Design Decisions Summary	**X**
Environmental Review Summary	**X**
Design Variance Inventory (and supporting information for DEs, EUs not upgraded, and deviations)[2]	**X**
Cost Estimate	**X**
SEPA & NEPA documentation	**X**
Design Clear Zone Inventory (see Chapter 700)	**X**
Interchange plans, profiles, roadway sections	**X**
Interchange Justification Report (if requesting new or revised access points)	**X**
Corridor or project analysis (see Chapter 325)	**X**
Traffic projections and analysis	
Accident analysis	
Right of way plans	
Work zone traffic control strategy	
Record of Survey or Monumentation Map	
Documentation of decisions to differ from WSDOT design guidance	
Documentation of decisions for project components for which there is no WSDOT design guidance	
Paths and Trails Calculations[3]	

Notes:
(1) See Design Documentation Checklist for a complete list.
(2) Required for NHS highways; recommended for all highways.
(3) See *Plans Preparation Manual*.

Common Components of Design Documentation Package
Figure 330-5

1. **Design element upgraded to the level indicated in the matrix**

   (a) Design element information

   - Design element
   - Location
   - Matrix number and row

   (b) Cost estimate(1)

   (c) B/C ratio(2)

   (d) Summary of the justification for the upgrade(3)

2. **Design element not upgraded to the level indicated in the matrix**

   (a) Design element information

   - Design element
   - Location
   - Matrix number and row

   (b) Existing Conditions

   - Description
   - Accident Summary
   - Advantages and disadvantages of leaving the existing condition unchanged

   (c) Design Using the *Design Manual* criteria

   - Description
   - Cost estimate(1)
   - B/C ratio(2)
   - Advantages and disadvantages of upgrading to the level indicated in the matrix

   (d) Selected Design, if different from existing but less than the level indicated in the matrix

   - Description
   - Cost estimate(1)
   - B/C ratio(2)
   - Advantages and disadvantages of the selected design

   (e) Summary of the justification for the selected design(3)

Notes:

(1) An estimate of the approximate total additional cost for the proposed design. Estimate may be based on experience and engineering judgment.

(2) Include only when B/C is part of the justification. An approximate value based on engineering judgment may be used.

(3) A brief (one or two sentence) explanation of why the proposed design was selected.

Evaluate Upgrade (EU) Documentation Content List
Figure 330-6

1. **Overview**

   (a) The safety or improvement need that the project is to meet

   (b) Description of the project as a whole

   (c) Highway classification and applicable design matrix number and row

   (d) Funding sources

   (e) Evidence of deviations approved for previous projects (same location)

2. **Design Alternatives in Question**

   (a) Existing Conditions and Design Data

   - Location in question
   - Rural, urban, or developing
   - Route development plan
   - Environmental issues
   - Right of way issues
   - Number of lanes and existing geometrics
   - Present and 20-year projected ADT
   - Design speed, posted speed, and operating speed
   - Percentage of trucks
   - Terrain Designation
   - Managed Access or Limited Access

   (b) Accident Summary and Analysis

   (c) Design Using the *Design Manual* Criteria

   - Description
   - Cost estimate
   - B/C ratio
   - Advantages and disadvantages
   - Reasons for considering other designs

   (d) Other Alternatives (may include “No-build” alternative)

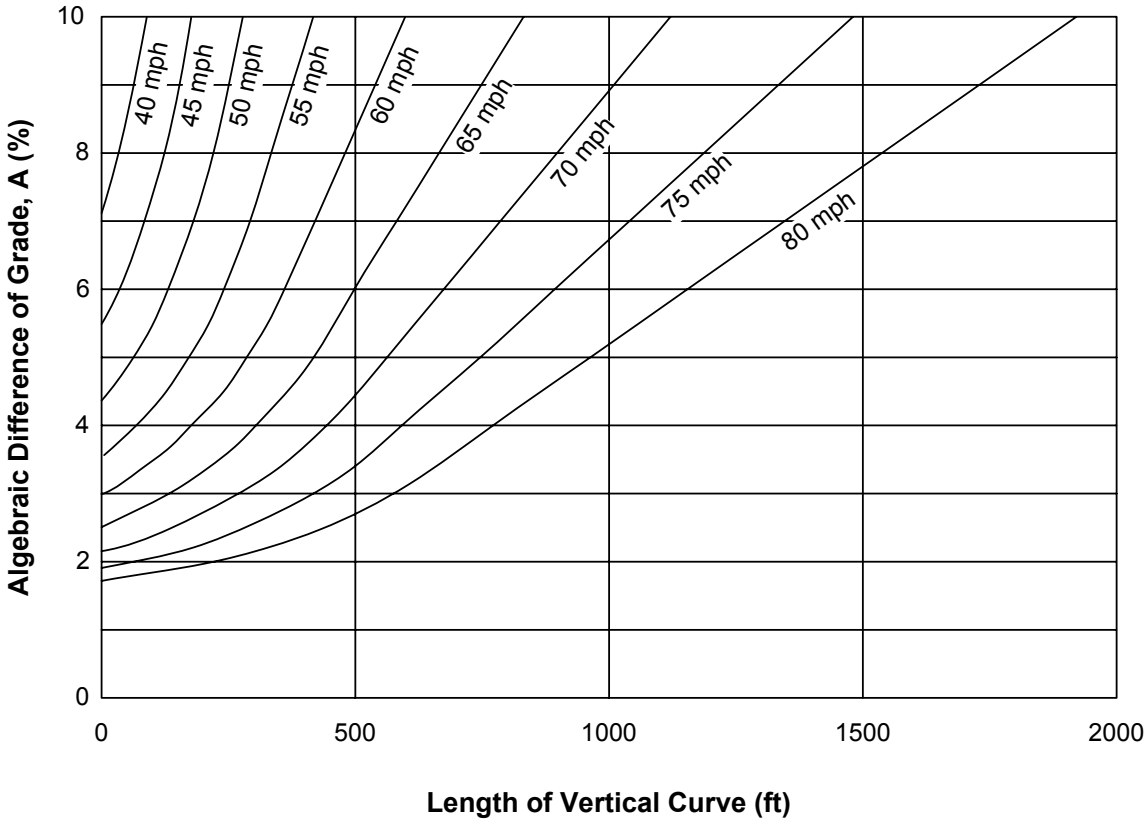
   - Description
   - Cost estimate
   - B/C ratio
   - Advantages and disadvantages
   - Reasons for rejection

   (e) Selected Design Requiring Justification or Documentation to File

   - Description
   - Cost estimate
   - B/C ratio
   - Advantages and disadvantages

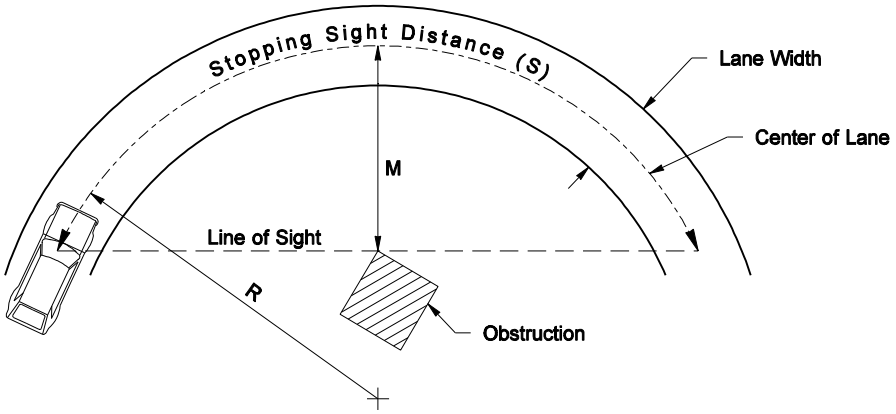
3. **Concurrences, Approvals, and Professional Seals**

Deviation Request Content List
Figure 330-7

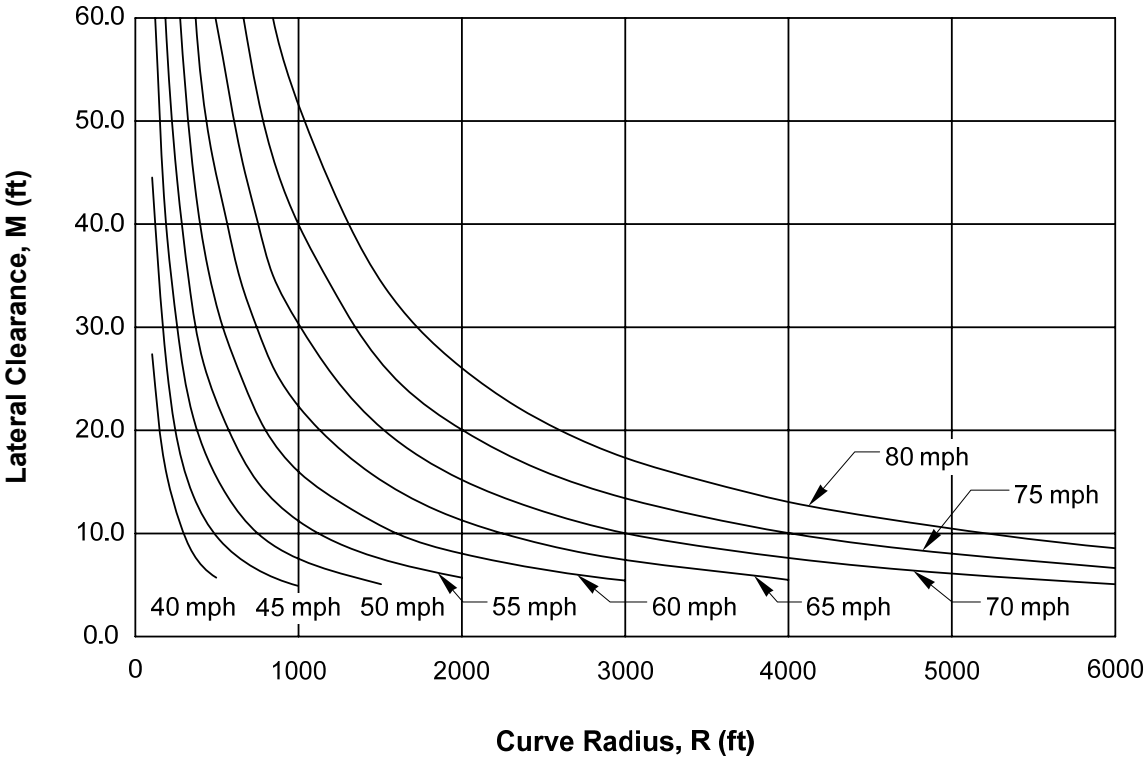


Note:
When the intersection of the algebraic difference of grade with the length of vertical curve is below the selected design speed line, modified design level design criteria is met.

Evaluation for Stopping Sight Distance for Crest Vertical Curves, Modified Design Level
Figure 430-8



M is the distance in feet from the centerline of the inside lane to the obstruction. Obstruction is a cut slope or other object 2.75 ft or more above the inside lane. Objects between 2.75 ft and 2.00 ft above the roadway surface within the M distance might be a sight obstruction, depending on the distance from the roadway. See Figure 430-9b.



Note:
When the intersection of the lateral clearance (M) with the curve radius (R) falls above the curve for the selected design speed, modified design criteria is met.

Evaluation for Stopping Sight Distance for Horizontal Curves, Modified Design Level

Figure 430-9a

440.01 General

Full design level is the highest level of design and is used on new and reconstructed highways. These projects are designed to provide optimum mobility, safety, and efficiency of traffic movement. The overall objective is to move the greatest number of vehicles, at the highest allowable speed, and at optimum safety. Major design controls are functional classification, terrain classification, urban or rural surroundings, traffic volume, traffic character and composition, design speed, and access control.

440.02 References

Federal/State Laws and Codes

Revised Code of Washington (RCW) 46.61.575, Additional parking regulations

RCW 47.05.021, Functional classification of highways

Chapter 47.24 RCW, City streets as part of state highways

Washington Administrative Code (WAC) 468-18-040, Design standards for rearranged county roads, frontage roads, access roads, intersections, ramps and crossings

Design Guidance

Local Agency Guidelines (LAG), M 36-63, WSDOT

Plans Preparation Manual, M 22-31, WSDOT

Standard Plans for Road, Bridge, and Municipal Construction (*Standard Plans*), M 21-01, WSDOT

Standard Specifications for Road, Bridge, and Municipal Construction (*Standard Specifications*), M 41-10, WSDOT

Supporting Information

A Policy on Design Standards – Interstate System, AASHTO, 2005

A Policy on Geometric Design of Highways and Streets (Green Book), AASHTO, 2004

440.03 Definitions

auxiliary lane The portion of the roadway adjoining the through lanes for parking, speed change, turning, storage for turning, weaving, truck climbing, and other purposes supplementary to through-traffic movement.

collector system Routes that primarily serve the more important intercounty, intracounty, and intraurban travel corridors, collect traffic from the system of local access roads and convey it to the arterial system, and on which, regardless of traffic volume, the predominant travel distances are shorter than on arterial routes (RCW 47.05.021).

design speed The speed used to determine the various geometric design features of the roadway.

divided multilane A roadway with two or more through lanes in each direction and a median that physically or legally prohibits left turns, except at designated locations.

expressway A divided highway that has a minimum of two lanes in each direction, for the exclusive use of traffic, and that may or may not have grade separations at intersections.

freeway A divided highway that has a minimum of two lanes in each direction, for the exclusive use of traffic, and with full control of access.

frontage road A road that is a local road or street located parallel to a highway for service to abutting property and adjacent areas and for control of access.

functional classification The grouping of streets and highways according to the character of the service they are intended to provide.

high pavement type Portland cement concrete pavement or hot mix asphalt (HMA) pavement on a treated base.

highway A general term denoting a street, road, or public way for the purpose of vehicular travel, including the entire area within the right of way.

incorporated city or town A city or town operating under either Title 35 or 35A RCW.

intermediate pavement type Hot mix asphalt pavement on an untreated base.

Interstate System A network of routes selected by the state and the Federal Highway Administration (FHWA) under terms of the federal-aid acts as being the most important to the development of a national system. The Interstate System is part of the principal arterial system.

lane A strip of roadway used for a single line of vehicles.

lane width The lateral design width for a single lane, striped as shown in the *Standard Plans* and *Standard Specifications*. The width of an existing lane is measured from the edge of traveled way to the center of the lane line or between the centers of adjacent lane lines.

limited access highway All highways where the rights of direct access to or from abutting lands have been acquired from the abutting landowners.

low pavement type Bituminous surface treatment (BST).

managed access highway All highways where the rights of direct access to or from abutting lands have not been acquired from the abutting landowners.

median The portion of a highway separating the traveled ways for traffic in opposite directions.

minor arterial system A rural network of arterial routes linking cities and other activity centers that generate long distance travel and, with appropriate extensions into and through urban areas, form an integrated network providing interstate and interregional service (RCW 47.05.021).

National Highway System (NHS) An interconnected system of principal arterial routes that serves interstate and interregional travel; meets national defense requirements; and serves major population centers, international border crossings, ports, airports, public transportation facilities, other intermodal transportation facilities, and other major travel destinations. The Interstate System is a part of the NHS.

operating speed The speed at which drivers are observed operating their vehicles during free-flow conditions. The 85th percentile of the distribution of observed speeds is most frequently used.

outer separation The area between the outside edge of traveled way for through traffic and the nearest edge of traveled way of a frontage road or collector-distributor (C-D) road.

posted speed The maximum legal speed as posted on a section of highway using regulatory signs.

principal arterial system A connected network of rural arterial routes with appropriate extensions into and through urban areas, including all routes designated as part of the Interstate System, that serves corridor movements with travel characteristics indicative of substantial statewide and interstate travel (RCW 47.05.021).

roadway The portion of a highway, including shoulders, for vehicular use.

rural design area An area that meets none of the conditions to be an urban design area.

shoulder The portion of the roadway contiguous with the traveled way, primarily for accommodation of stopped vehicles, emergency use, lateral support of the traveled way, and use by pedestrians and bicycles.

shoulder width The lateral width of the shoulder, measured from the edge of traveled way to the edge of roadway or the face of curb.

suburban area A term for the area at the boundary of an urban design area. Suburban settings may combine higher speeds common in rural design areas with activities that are more similar to urban settings. Separate design values are not given for suburban areas. Classify a suburban area as either an urban or a rural design area as best fits the existing or design year conditions.

traveled way The portion of the roadway intended for the movement of vehicles, exclusive of shoulders and lanes for parking, turning, and storage for turning.

two-way left-turn lane (TWLTL) A lane, located between opposing lanes of traffic, to be used by vehicles making left turns from either direction, from or onto the roadway.

undivided multilane A roadway with two or more through lanes in each direction on which left turns are not controlled.

urban area An area designated by the Washington State Department of Transportation (WSDOT) in cooperation with the Transportation Improvement Board and regional transportation planning organizations, subject to the approval of the FHWA.

urban design area An area where urban design criteria are appropriate, that is defined by one or more of the following:

- An urban area.
- An area within the limits of an incorporated city or town.
- An area characterized by intensive use of the land for the location of structures, that receives such urban services as sewer, water, and other public utilities, as well as services normally associated with an incorporated city or town. This may include an urban growth area defined under the Growth Management Act (see Chapter 36.70A RCW, Growth management – planning by selected counties and cities), but outside the city limits.
- An area with not more than 25% undeveloped land.

urbanized area An urban area with a population of 50,000 or more.

usable shoulder The width of the shoulder that can be used by a vehicle for stopping.

440.04 Functional Classification

As provided in RCW 47.05.021, the state highway system is divided and classified according to the character and volume of traffic carried by the routes and distinguished by specific geometric design criteria. The functional classifications used on highways are (from highest to lowest classification) Interstate, principal arterial, minor arterial, and collector. The higher functional classes give more priority to through traffic and less to local access. NHS routes are usually designed to a higher level of design than non-NHS routes.

The criteria used to determine the functional classification consider the following:

- Urban population centers inside and outside the state stratified and ranked according to size
- Important traffic-generating economic activities, including but not limited to recreation, agriculture, government, business, and industry
- Feasibility of the route, including availability of alternate routes inside and outside the state
- Directness of travel and distance between points of economic importance
- Length of trips
- Character and volume of traffic
- Preferential consideration for multiple services, which shall include public transportation
- Reasonable spacing depending upon population density
- System continuity

440.05 Terrain Classification

To provide a general basis of reference between terrain and geometric design, three classifications of terrain have been established:

- **Level**. Level to moderately rolling. This terrain offers few or no obstacles to the construction of a highway having continuously unrestricted horizontal and vertical alignment.
- **Rolling**. Hills and foothills. Slopes rise and fall gently, but occasional steep slopes might offer some restriction to horizontal and vertical alignment.
- **Mountainous**. Rugged foothills; high, steep drainage divides; and mountain ranges.

Terrain classification pertains to the general character of the specific route corridor. Roads in valleys or passes of mountainous areas might have all the characteristics of roads traversing level or rolling terrain and are usually classified as level or rolling rather than mountainous.

440.06 Geometric Design Data

(1) State Highway System

For projects designed to full design level, all highways in rural design areas, and limited access highways in urban design areas, the geometric design data is controlled by the functional class and traffic volume (see Figures 440-5 through 440-8b). The urban managed access highway design class, based on traffic volume and design speed (see Figure 440-9), may be used on managed access highways in urban design areas, regardless of the functional class.

(2) State Highways as City Streets

When a state highway within an incorporated city or town is a portion of a city street, the design features must be developed in cooperation with the local agency. For facilities on the NHS, use *Design Manual* criteria as the minimum for the functional class of the route. For facilities not on the NHS, the *Local Agency Guidelines* may be used as the minimum design criteria; however, the use of *Design Manual* criteria is encouraged where feasible. On managed access highways within the limits of incorporated cities and towns, the cities or towns have full responsibility for design elements, including access, outside of curb, or outside the paved shoulder where no curb exists, using the *Local Agency Guidelines.*

(3) City Streets and County Roads

Plan and design facilities that cities or counties will be requested to accept as city streets or county roads according to the applicable design criteria shown in:

- WAC 468-18-040.
- *Local Agency Guidelines*.
- The standards of the local agency that will be requested to accept the facility.

440.07 Design Speed

Vertical and horizontal alignment, sight distance, and superelevation will vary with design speed. Such features as traveled way width, shoulder width, and lateral clearances are usually not affected. For the relationships between design speed, geometric plan elements, geometric profile elements, superelevation, and sight distance, see Chapters 620, 630, 642, and 650.

The choice of a design speed is primarily influenced by functional classification, posted speed, operating speed, terrain classification, traffic volumes, accident history, access control, and economic factors. However, a geometric design that adequately allows for future improvement is a major criterion, rather than strictly economics. Categorizing a highway by a terrain classification often results in arbitrary reductions of the design speed, when, in fact, the terrain would allow a higher design speed without materially affecting the cost of construction. Savings in vehicle operation and other costs alone might be sufficient to offset the increased cost of right of way and construction.

It is important to consider the geometric conditions of adjacent sections. Maintain a uniform design speed for a significant segment of highway.

The desirable design speed is not less than that given in Figure 440-1. Do not select a design speed less than the posted speed.

For new/reconstruction projects on all rural highways and limited access highways in urban design areas, the design speed is given for each design class in Figures 440-5 through 440-8b.

When terrain or existing development limits the ability to achieve the design speed for the design class, use a corridor analysis to determine the appropriate design speed.

Route Type	Posted speed	Desirable Design Speed
Freeways	All	10 mph over the posted speed
Non-Freeways	45 mph or less	Not less than the posted speed
	Over 45 mph	5 mph over the posted speed

Desirable Design Speed
Figure 440-1

On urban managed access highways, the design speed is less critical to the operation of the facility. Closely spaced intersections and other operational constraints usually limit vehicular speeds more than the design speed.

For managed access facilities in urban design areas, select a design speed based on Figure 440-1. In cases where the Figure 440-1 design speed does not fit the conditions, use a corridor analysis to select a design speed. Select a design speed not less than the posted speed that is logical with respect to topography, operating speed (or anticipated operating speed for new alignment), adjacent land use, design traffic volume, accident history, access control, and the functional classification. Consider both year of construction and design year. Maintain continuity throughout the corridor, with changes at logical points such as a change in roadside development.

440.08 Traffic Lanes

Lane width and condition have a great influence on safety and comfort. The minimum lane width is based on the highway design class, terrain type, and whether it is in a rural or urban design area. Lanes 12 feet wide provide desirable clearance between large vehicles where traffic volumes are high and a high number of large vehicles is expected. The added cost for 12-foot lanes is offset, to some extent, by the reduction in shoulder maintenance costs due to the lessening of wheel load concentrations at the edge of the lane.

Highway capacity is also affected by the width of the lanes. With narrow lanes, drivers must operate their vehicles closer (laterally) to each other than they normally desire. To compensate for this, drivers increase the headway, resulting in reduced capacity.

Figures 440-5 through 440-8a give the minimum lane widths for the various design classes for use on all rural highways and limited access highways in urban design areas. Figure 440-9 gives the minimum lane widths for urban managed access highways.

The roadway on a curve may need to be widened to make the operating conditions comparable to those on tangents. For guidance on width requirements on turning roadways, see Chapter 641.

440.09 Shoulders

Shoulder width is controlled by the functional classification of the roadway, the traffic volume, and the function the shoulder is to serve.

The more important shoulder functions and the associated minimum widths are given in Figure 440-2.

Shoulder Function	Minimum Shoulder Width
Stopping out of the traffic lanes	8 ft
Minimum lateral clearance	2 ft (1)
Pedestrian or bicycle use	4 ft (2)
Large-vehicle off-tracking on curves	See Chapters 641 & 910
Maintenance operations	Varies (3)
Law enforcement	8 ft (4)
Bus stops	See Chapter 1060
Slow-vehicle turnouts and shoulder driving	See Chapter 1010
Ferry holding	8 ft (5)
For use as a lane during reconstruction of the through lanes	8 ft (5)
Structural support	2 ft
Improve sight distance in cut sections	See Chapter 650
Improve capacity	See Chapter 610

Notes:
(1) See Chapters 700 and 710.
(2) Minimum usable shoulder width for bicycles. For additional information, see Chapter 1020 for bicycles and Chapter 1025 for pedestrians.
(3) 10 ft usable width to park a maintenance truck out of the through lane; 12 ft (14 ft preferred) for equipment with outriggers to work out of traffic.
(4) See Chapters 1040 and 1050 for additional information.
(5) Minimum usable shoulder width; 10 ft preferred.

Minimum Shoulder Width
Figure 440-2

In addition to the functions in Figure 440-2, shoulders also:

- Provide space to escape potential accidents or reduce their severity.
- Provide a sense of openness, contributing to driver ease and freedom from strain.
- Reduce seepage adjacent to the traveled way by discharging stormwater farther away.

Contact the region Maintenance Office to determine the shoulder width for maintenance operations. When shoulder widths wider than called for in Figures 440-5 through 440-9 are requested, compare the added cost of the wider shoulders to the added benefits to maintenance operations and other benefits that may be derived. When the maintenance office requests a shoulder width different than the design class, justify the width selected.

Minimum shoulder widths for use on all rural highways and limited access highways in urban design areas are based on functional classification and traffic volume (see Figures 440-4 through 440-8b). Figure 440-9 gives the minimum shoulder widths for urban managed access highways without curb.

When curbing with a height less than 24 inches is present on urban managed access highways, provide the minimum shoulder widths shown in Figure 440-3. For information on curb, see 440.11.

	Posted Speed			
	>45 mph	≤45 mph	>45 mph	≤45 mph
Lane Width	On Left		On Right (3)	
12 ft or wider	4 ft	(1)(2)	4 ft	2 ft
11 ft	4 ft	(1)(2)	4 ft	3 ft (4)

Notes:
(1) When mountable curb is used on routes with a posted speed of 35 mph or less, shoulder width is desirable; however, with justification, curb may be placed at the edge of traveled way.
(2) 1 ft for curbs with a height of 8 inches or less. 2 ft for curbs or barriers with a height between 8 and 24 inches.
(3) When the route has been identified as a local, state, or regional significant bike route, the minimum shoulder width is 4 ft or as indicated in Chapter 1020 for signed bike lanes.
(4) When bikes are not a consideration, width may be reduced to 2 ft with justification.
(5) Measured from the edge of traveled way to the face of curb.

Shoulder Width(5) for Curbed Sections in Urban Areas
Figure 440-3

When traffic barrier with a height of 2 feet or greater is used adjacent to the roadway, the minimum shoulder width from the edge of traveled way to the face of the traffic barrier is 4 feet. Additional width for traffic barrier shy distance (see Chapter 710) is not normally required on urban managed access highways.

Where there are no sidewalks, the minimum shoulder width is 4 feet. Shoulder widths less than 4 feet will require wheelchairs using the roadway to encroach on the through lane. For additional information and requirements regarding pedestrians and accessible routes, see Chapter 1025.

The usable shoulder width is less than the constructed shoulder width when vertical features (such as traffic barrier or walls) are at the edge of the shoulder. This is because drivers tend to shy away from the vertical feature. For traffic barrier shy distance widening, see Chapter 710.

Shoulders on the left between 4 feet and 8 feet are undesirable. A shoulder in this width range might appear to a driver to be wide enough to stop out of the through traffic, when it is not. To prevent the problems that can arise from this situation, when the shoulder width and any added clearance result in a width in this range, consider increasing the width to 8 feet.

Provide a minimum clearance to roadside objects so that the shoulders do not require narrowing. At existing bridge piers and abutments, shoulders less than full width to a minimum of 2 feet may be used with design exception documentation. For design clear zone and safety treatment requirements, see Chapter 700.

For routes identified as local, state, or regional significant bicycle routes, provide a minimum 4-foot shoulder. Maintain system continuity for the bicycle route, regardless of jurisdiction and functional class. For additional information on bicycle facilities, see Chapter 1020.

Shoulder widths greater than 10 feet may encourage use as a travel lane. Therefore, use shoulders wider than this only where required to meet one of the listed functions (see Figure 440-2).

When walls are placed adjacent to shoulders, see Chapter 1130 for barrier requirements.

440.10 Medians

Medians are either restrictive or nonrestrictive. Restrictive medians limit left turns, physically or legally, to defined locations. Nonrestrictive medians allow left turns at any point along the route. Consider restrictive medians on multilane limited access highways and multilane managed access highways when the design hourly volume (DHV) is over 2000.

The primary functions of a median are to:

- Separate opposing traffic.
- Provide for recovery of out-of-control vehicles.
- Reduce head-on accidents.
- Provide an area for emergency parking.
- Allow space for left-turn lanes.
- Minimize headlight glare.
- Allow for future widening.
- Control access.

Medians may be depressed, raised, or flush with the through lanes. For maximum efficiency, make medians highly visible both night and day.

The width of a median is measured from edge of traveled way to edge of traveled way and includes the shoulders. The desirable median width is given in Figure 440-4. The minimum width is the width required for shoulders and barrier (including required shy distance) or ditch.

When selecting a median width, consider future needs such as wider left shoulders when widening from four to six lanes. A median width of 22 feet is desirable on a four-lane highway when additional lanes are anticipated. The minimum width required to provide additional lanes in the median, without widening to the outside, is 46 feet. On freeways or expressways requiring less than eight lanes within the 20-year design period, provide sufficient median or lateral clearance and right of way to permit the addition of a lane in each direction, if required by traffic increase after the 20-year period.

A two-way left-turn lane (TWLTL) may be used as a nonrestrictive median for an undivided managed access highway (see Figure 440-9). The desirable width of a TWLTL is 13 feet, with a

minimum width of 11 feet. For more information on traffic volume limits for TWLTLs on managed access highways, see Chapter 1435. For additional information on TWLTL design, see Chapter 910.

A common form of restrictive median on urban managed access highways is the raised median. The width of a raised median can be minimized by using a dual-faced cement concrete traffic curb, a precast traffic curb, or an extruded curb. For more information on traffic volume limits for restrictive medians on managed access highways, see Chapter 1435.

At locations where the median will be used to allow vehicles to make a U-turn, consider increasing the width to meet the needs of the vehicles making the U-turn. For information on U-turn locations, see Chapter 910.

Widen medians at intersections on rural divided multilane highways. Provide sufficient width to store vehicles crossing the expressway or entering the expressway with a left turn.

For undivided multilane highways, a 4-foot median is desirable in rural design areas and a 2-foot median in urban design areas. When signing is required in the median of six-lane undivided multilane highways, the minimum width is 6 feet. If barrier is to be installed at a future date, median widths for the ultimate divided highway are desirable.

When the median is to be landscaped or where rigid objects are to be placed in the median, see Chapter 700 for traffic barrier and clear zone requirements. When the median will include a left-turn lane, see Chapter 910 for left-turn lane design.

Median Usage	Desirable Width (ft)(1)
Separate opposing traffic on freeways and expressways	
Rural	60(2)
Urban – 4-lane	18
Urban – 6 or more lanes	22
Allow for future widening	46(4)
Left-turn lanes(3)	13(2)
Control access on divided multilane urban managed access highways	
Design speed 45 mph or less with raised medians	3(5)(6)
Design speed greater than 45 mph or barrier separated	10(6)

Notes:
(1) The minimum width is the width required for shoulders and barrier (including required shy distance) or ditch. For barrier requirements, see Chapter 710.
(2) Additional width required at rural expressway intersections for storage of vehicles crossing expressway or entering expressway with a left turn.
(3) For additional information, see Chapter 910.
(4) Narrower width will require widening to the outside for future lanes.
(5) Using a dual-faced cement concrete traffic curb 1 foot face of curb to face of curb.
(6) 12 feet preferred to allow for left-turn lanes.

Median Width
Figure 440-4

440.11 Curbs

(1) General

Curbs are designated as either vertical or sloped. Vertical curbs have a face batter not flatter than 1H:3V. Sloped curbs have a sloping face that is more readily traversed.

Curbs can also be classified as mountable. Mountable curbs are sloped curb with a height of 6 inches or less, preferably 4 inches or less. When the face slope is steeper than 1H:1V, the height of a mountable curb is limited to 4 inches or less.

Where curbing is to be provided, ensure that surface water that collects at the curb will drain and not pond or flow across the roadway.

For all existing curb, evaluate the continued need for the curb. Remove all curbing that is no longer needed.

When an overlay will reduce the height of a vertical curb, evaluate grinding to maintain curb height or replacing the curb, versus the need to maintain the height of the curb.

Curbs can hamper snow-removal operations. The area Maintenance Superintendent's review and approval is required for the use of curbing in areas of heavy snowfall.

For curbs at traffic islands, see Chapter 910.

(2) Curb Usage

Curbing is used for the following purposes:

- Control drainage
- Delineate the roadway edge
- Delineate pedestrian walkways
- Delineate islands
- Reduce right of way
- Assist in access control
- Inhibit midblock left turns

Avoid using curbs if the same objective can be attained with pavement markings.

In general, curbs are not used on facilities with a posted speed greater than 45 miles per hour. The exceptions are for urban design areas where sidewalks are provided or where traffic movements are to be restricted. Justify the use of curb when the posted speed is greater than 45 miles per hour.

Do not use vertical curbs along freeways or other facilities with a posted speed greater than 45 miles per hour. When curb is needed, use mountable curb with the height limited to 4 inches and located no closer to the traveled way than the outer edge of the shoulder. Provide sloping end treatments where the curb is introduced and terminated.

(a) Vertical curbs with a height of 6 inches or more are required:

- To inhibit or at least discourage vehicles from leaving the roadway.
- For walkway and pedestrian refuge separations.
- For raised islands on which a traffic signal or traffic signal hardware is located.

When an overlay is planned, do not reduce the height of the curb to less than 4 inches.

(b) Consider vertical curbs with a height of 6 inches or more:

- To inhibit midblock left turns.
- For divisional and channelizing islands.
- For landscaped islands.

(c) Provide mountable curbs where a curb is needed but higher vertical curb is not justified.

440.12 Parking

In urban design areas and rural communities, land use might require parking along the highway. In general, on-street parking decreases capacity, increases accidents, and impedes traffic flow; therefore, it is desirable to prohibit parking.

Although design data for parking lanes are included in Figures 440-6a through 440-9, consider them only in cooperation with the municipality involved. The lane widths given are the minimum for parking; provide wider widths when feasible.

Angle parking is not permitted on any state route without WSDOT approval (see RCW 46.61.575). This approval is delegated to the State Traffic Engineer. Angle parking approval is to be requested through the Headquarters (HQ) Design Office. Provide an engineering study, approved by the region Traffic Engineer, with the request documenting that the parking will not unduly reduce safety and that the roadway is of sufficient width that the parking will not interfere with the normal movement of traffic.

440.13 Pavement Type

The pavement types given in Figures 440-5 through 440-8b are those recommended for each design class. (See Chapter 520 for information on pavement type selection). When a roadway is to be widened and the existing pavement will remain, the new pavement type may be the same as the existing without a pavement type determination.

440.14 Structure Width

Provide a clear width between curbs on a structure not less than the approach roadway width (lanes plus shoulders). The structure widths given in Figures 440-5 through 440-9 are the minimum structure widths for each design class.

Additional width for barriers is not normally added to the roadway width on structures. When a structure is in a run of roadside barrier with the added width, consider adding the width on shorter structures to prevent narrowing the roadway.

440.15 Right of Way Width

Right of way width must be sufficient to accommodate all roadway elements and required appurtenances necessary for the current design and known future improvements. To allow for construction and maintenance activities, provide 10 feet desirable, 5 feet minimum, wider than the slope stake for fill and slope treatment for cut. For slope treatment information, see Chapter 640 and the *Standard Plans*.

The right of way widths given in Figures 440-5 through 440-8b are desirable minimums for new alignment requiring purchase of new right of way. For additional information and consideration on right of way acquisition, see Chapter 1410.

440.16 Grades

Grades can have a pronounced effect on the operating characteristics of the vehicles negotiating them. Generally, passenger cars can readily negotiate grades as steep as 5% without appreciable loss of speed from that maintained on level highways. Trucks, however, travel at the average speed of passenger cars on the level roadway but display up to a 5% increase in speed on downgrades and a 7% or greater decrease in speed on upgrades (depending on length and steepness of grade as well as weight-to-horsepower ratio).

The maximum grades for the various functional classes and terrain conditions are shown in Figures 440-5 through 440-8a. For the effects of these grades on the design of a roadway, see Chapters 630, 650, 910, 940, and 1010.

440.17 Documentation

The list of documents that are to be preserved in the Design Documentation Package (DDP) or the Project File (PF) can be found on the following web site:
www.wsdot.wa.gov/eesc/design/projectdev/

Divided Multilane							
Design Class	I-1						
Design Year	(1)						
Access Control(2)	Full						
Separate Cross Traffic							
Highways	All						
Railroads	All						
Design Speed (mph)(3)							
Rural	80(4)						
Urbanized	70(5)						
Traffic Lanes							
Number	4 or more divided						
Width (ft)	12						
Median Width (ft)(6)	Minimum width is as required for shoulders and barrier (including required shy distance) or ditch. (See 440.10.)						
Shoulder Width (ft)(7)							
Right of Traffic	10(8)					10(8)	
Left of Traffic	4					10(8)(9)	
Pavement Type(10)	High						
Right of Way(11)							
Rural – Width (ft)	63 from edge of traveled way						
Urban – Width (ft)	As required(12)						
Structures Width (ft)(13)	Full roadway width each direction(14)						
Type of Terrain	**Design Speed** (mph)						
	50	55	60	65	70	75	80
Level	4	4	3	3	3	3	3
Rolling	5	5	4	4	4	4	4
Mountainous	6	6	6	5	5	5	5
Grades (%)(15)							

Interstate Notes:

(1) The design year is 20 years after the year the construction is scheduled to begin.

(2) For access control requirements, see Chapter 1430.

(3) For new/reconstruction projects. For design speed on existing roadways, see 440.07.

(4) 80 mph is the desirable design speed; with a corridor analysis, the design speed may be reduced to 60 mph in mountainous terrain and 70 mph in rolling terrain. Do not select a design speed that is less than the posted speed.

(5) 70 mph is the desirable design speed; with a corridor analysis, the design speed may be reduced to 50 mph. Do not select a design speed that is less than the posted speed.

(6) Independent alignment and grade are desirable in all rural areas and where terrain and development permit in urban areas.

(7) When guardrail is installed along existing shoulders with a width greater than 4 feet, the shoulder width may be reduced by up to 4 inches.

(8) 12-foot shoulders are desirable when the truck DDHV is 250 or greater.

(9) For existing 6-lane roadways, existing 6-foot left shoulders may remain, with design exception documentation, when they are not being reconstructed and no other widening is required.

(10) For pavement type determination, see Chapter 520.

(11) Desirable width. Provide right of way width 10 feet desirable, 5 feet minimum, wider than the slope stake for fill and slope treatment for cut. (See 440.15.)

(12) In urban areas, make right of way widths not less than those required for necessary cross section elements.

(13) For minimum vertical clearance, see Chapter 1120.

(14) For median widths 26 feet or less, address bridge(s) in accordance with Chapter 1120.

(15) Grades 1% steeper may be provided in urban areas and mountainous terrain with critical right of way controls.

Geometric Design Data, Interstate

Figure 440-5

Design Class		Divided Multilane				Two-Lane						Undivided Multilane	
		P-1		P-2		P-3		P-4		P-5		P-6[1]	
		Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
DHV in Design Year[2]	NHS	Over 1500		Over 700[3]		Over 201[4]		61–200		60 and under		Over 700[3]	
	Non-NHS					Over 301		101–300		100 and Under			
Access Control[5]		Full		Partial[6]									
Separate Cross Traffic													
Highways		All		Where Justified		Where Justified		Where Justified		Where Justified		Where Justified	
Railroads[7]		All		All		All[8]		Where Justified[9]		Where Justified[9]		Where Justified[9]	
Design Speed (mph)[10]													
Desirable[11]		80		70		70	60	70	60	60	60	70	60
Minimum[12]		60[13]		50[14]		50	40[14]	50	40[14]	40	30[14]	40	30[14]
Traffic Lanes													
Number		4 or more divided		4 or 6 divided		2		2		2		4	4 or 6
Width (ft)		12		12		12		12		12		12	11[15]
Shoulder Width (ft)[16]													
Right of Traffic		10[17]		10		8		6		4		8	8[18]
Left of Traffic		Variable[19][20]		Variable[19][20]									
Median Width (ft)		Minimum width is as required for shoulders and barrier (including required shy distance) or ditch. (See 440.10.)										(See 440.10)	
Parking Lanes Width (ft) – Minimum		None		None		None		None	10	None	10	None	10[21]
Pavement Type[22]		High				High or Intermediate							
Right of Way[23] – Width (ft)		[24]	[25]	[24]	[25]	120	80	120	80	100	80	150	80
Structures Width (ft)[26]		Full Roadway Width[27]				40		40		32		Full Roadway Width	
Other Design Considerations–Urban						[28]		[28]		[28]		[28]	

Type of Terrain	Rural – Design Speed (mph)								Urban – Design Speed (mph)							
	40	45	50	55	60	65	70	75	80	30	35	40	45	50	55	60[29]
Level	5	5	4	4	3	3	3	3	3	8	7	7	6	6	5	5
Rolling	6	6	5	5	4	4	4	4	4	9	8	8	7	7	6	6
Mountainous	8	7	7	6	6	5	5	5	5	11	10	10	9	9	8	8
Grades (%)[30]																

Geometric Design Data, Principal Arterial
Figure 440-6a

Principal Arterial Notes:

(1) Justify the selection of a P-6 design class on limited access highways.

(2) The design year is 20 years after the year the construction is scheduled to begin.

(3) When considering a multilane highway, perform an investigation to determine whether a truck-climbing lane or passing lane will satisfy the need. (See Chapter 1010.)

(4) Where DHV exceeds 700, consider 4 lanes. When the volume/capacity ratio is equal to or exceeds 0.75, consider the need for a future 4-lane facility. When considering truck-climbing lanes on a P-3 design class highway, perform an investigation to determine whether a P-2 design class highway is justified.

(5) For access control requirements, see Chapters 1430 and 1435 and the Master Plan for Limited Access Highways. Contact the HQ Design Office Access & Hearings Unit for additional information.

(6) Full or modified access control may also be used.

(7) Contact the Rail Office of the Public Transportation and Rail Division for input on railroad needs.

(8) All main line and major spur railroad tracks will be separated. Consider allowing at-grade crossings at minor spur railroad tracks.

(9) Criteria for railroad grade separations are not clearly definable. Evaluate each site regarding the hazard potential. Provide justification for railroad grade separations.

(10) For new/reconstruction projects. For existing roadways, see 440.07

(11) These are the design speeds for level and rolling terrain in rural design areas. They are the preferred design speeds for mountainous terrain and urban design areas. Higher design speeds may be selected, with justification.

(12) These design speeds may be selected in mountainous terrain, with a corridor analysis. Do not select a design speed that is less than the posted speed.

(13) In urbanized areas, with a corridor analysis, 50 mph may be used as the minimum design speed. Do not select a design speed that is less than the posted speed.

(14) In urban design areas, with a corridor analysis, these values may be used as the minimum design speed. Do not select a design speed that is less than the posted speed.

(15) 12-foot lanes are required when the truck DDHV is 150 or greater.

(16) When guardrail is installed along existing shoulders with a width greater than 4 feet, the shoulder width may be reduced by up to 4 inches.

(17) 12-foot shoulders are desirable when the truck DDHV is 250 or greater.

(18) When curb section is used, the minimum shoulder width from the edge of traveled way to the face of curb is 4 feet.

(19) Minimum left shoulder width is to be as follows: 4 lanes – 4 feet; 6 or more lanes – 10 feet. Consider 12-foot shoulders on facilities with 6 or more lanes and a truck DDHV of 250 or greater.

(20) For existing 6-lane roadways, existing 6-foot left shoulders may remain, with design exception documentation, when they are not being reconstructed and no other widening is required.

(21) Restrict parking when DHV is over 1500.

(22) For pavement type determination, see Chapter 520.

(23) Desirable width. Provide right of way width 10 feet desirable, 5 feet minimum, wider than the slope stake for fill and slope treatment for cut. (See 440.15.)

(24) 63 feet from edge of traveled way.

(25) Make right of way widths not less than those required for necessary cross section elements.

(26) For the minimum vertical clearance, see Chapter 1120.

(27) For median widths 26 feet or less, address bridges in accordance with Chapter 1120.

(28) For bicycle requirements, see Chapter 1020. For pedestrian and sidewalk requirements, see Chapter 1025. Curb requirements are in 440.11. Lateral clearances from the face of curb to obstruction are in Chapter 700.

(29) For grades at design speeds greater than 60 mph in urban design areas, use rural criteria.

(30) Grades 1% steeper may be used in urban design areas and mountainous terrain with critical right of way controls.

Geometric Design Data, Principal Arterial

Figure 440-6b

Design Class		Divided Multilane		Two-Lane						Undivided Multilane	
		M-1		M-2		M-3		M-4		M-5[1]	
		Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
DHV in Design Year[2]	NHS	Over 700[3]		Over 201[4]		61–200		60 and Under		Over 700[3]	
	Non-NHS			Over 401		201–400		200 and Under			
Access Control[5]		Partial[6]									
Separate Cross Traffic											
Highways		Where Justified		Where Justified		Where Justified		Where Justified		Where Justified	
Railroads[7]		All		All[8]		Where Justified[9]		Where Justified[9]		Where Justified[9]	
Design Speed (mph)[10]											
Desirable[11]		70		70	60	70	60	60	60	70	60
Minimum[12][13]		50		50	40	50	40	40	30	40	30
Traffic Lanes											
Number		4 or 6 divided		2		2		2		4	4 or 6
Width (ft)		12		12		12		12		12	11[14]
Shoulder Width (ft)[15]											
Right of Traffic		10		8		6		4		8	8[16]
Left of Traffic		Variable[17][18]									
Median Width (ft)		[19]								[19]	
Parking Lanes Width (ft) – Minimum		None		None		None	10	None	10	None	10[20]
Pavement Type[21]		High		As Required						High or Intermediate	
Right of Way[22] – **Width** (ft)		[23]	[24]	120	80	120	80	100	80	150	80
Structures Width (ft)[25]		Full Roadway Width[26]		40		40		32		Full Roadway Width	
Other Design Considerations–Urban				[27]		[27]		[27]		[27]	

Type of Terrain	**Rural – Design Speed** (mph)								**Urban – Design Speed** (mph)							
	40	45	50	55	60	65	70	75	80	30	35	40	45	50	55	60[28]
Level	5	5	4	4	3	3	3	3	3	8	7	7	6	6	5	5
Rolling	6	6	5	5	4	4	4	4	4	9	8	8	7	7	6	6
Mountainous	8	7	7	6	6	5	5	5	5	11	10	10	9	9	8	8
Grades (%)[29]																

Geometric Design Data, Minor Arterial
Figure 440-7a

Minor Arterial Notes:

(1) Justify the selection of an M-5 design class on limited access highways.

(2) The design year is 20 years after the year the construction is scheduled to begin.

(3) When considering a multilane highway, perform an investigation to determine whether a truck-climbing lane or passing lane will satisfy the need. (See Chapter 1010.)

(4) Where DHV exceeds 700, consider 4 lanes. When the volume/capacity ratio is equal to or exceeds 0.75, consider the need for a future 4-lane facility. When considering truck-climbing lanes on an M-2 design class highway, perform an investigation to determine whether an M-1 design class highway is justified.

(5) For access control requirements, see Chapters 1430 and 1435 and the Master Plan for Limited Access Highways. Contact the HQ Design Office Access & Hearings Unit for additional information.

(6) Full or modified access control may also be used.

(7) Contact the Rail Office of the Public Transportation and Rail Division for input on railroad needs.

(8) All main line and major spur railroad tracks will be separated. Consider allowing at-grade crossings at minor spur railroad tracks.

(9) Criteria for railroad grade separations are not clearly definable. Evaluate each site regarding the hazard potential. Provide justification for railroad grade separations.

(10) For new/reconstruction projects. For existing roadways, see 440.07

(11) These are the design speeds for level and rolling terrain in rural design areas. They are the preferred design speeds for mountainous terrain and urban design areas. Higher design speeds may be selected, with justification.

(12) In urban design areas, with a corridor analysis, these values may be used as the minimum design speed. Do not select a design speed that is less than the posted speed.

(13) These design speeds may be selected in mountainous terrain, with a corridor analysis. Do not select a design speed that is less than the posted speed.

(14) When the truck DDHV is 150 or greater, consider 12-foot lanes.

(15) When guardrail is installed along existing shoulders with a width greater than 4 feet, the shoulder width may be reduced up to 4 inches.

(16) When curb section is used, the minimum shoulder width from the edge of traveled way to the face of curb is 4 feet.

(17) The minimum left shoulder width is 4 feet for 4 lanes and 10 feet for 6 or more lanes.

(18) For existing 6-lane roadways, existing 6-foot left shoulders may remain, with design exception documentation, when they are not being reconstructed and no other widening is required.

(19) Minimum median width is as required for shoulders and barrier (including required shy distance) or ditch. (See 440.10.)

(20) Restrict parking when DHV is over 1500.

(21) For pavement type determination, see Chapter 520.

(22) Desirable width. Provide right of way width 10 feet desirable, 5 feet minimum, wider than the slope stake for fill and slope treatment for cut. (See 440.15.)

(23) 63 feet from edge of traveled way.

(24) Make right of way widths not less than those required for necessary cross section elements.

(25) For the minimum vertical clearance, see Chapter 1120.

(26) For median widths 26 feet or less, address bridges in accordance with Chapter 1120.

(27) For bicycle requirements, see Chapter 1020. For pedestrian and sidewalk requirements, see Chapter 1025. Curb requirements are in 440.11. Lateral clearances from the face of curb to obstruction are in Chapter 700.

(28) For grades at design speeds greater than 60 mph in urban design areas, use rural criteria.

(29) Grades 1% steeper may be used in urban design areas and mountainous terrain with critical right of way controls.

Geometric Design Data, Minor Arterial
Figure 440-7b

Design Class		Undivided Multilane		Two-Lane					
		C-1		C-2		C-3		C-4	
		Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
DHV in Design Year[1]	NHS	Over 900[2]		Over 301[3]		201–300		200 and under	
	Non-NHS			Over 501		301–500		300 and Under	
Access Control		[4]		[4]		[4]		[4]	
Separate Cross Traffic									
Highways		Where Justified		Where Justified		Where Justified		Where Justified	
Railroads[5]		Where Justified[6]		All[6]		Where Justified[6]		Where Justified[6]	
Design Speed (mph)[7]									
Desirable[8]		70	60	70	60	70	60	60	60
Minimum[9][10]		40	30	50	40	50	40	40	30
Traffic Lanes									
Number		4	4 or 6	2		2		2	
Width (ft)		12	11[11]	12		12		12	
Shoulder Width (ft)[12]		8	8[13]	8		6		4	
Median Width (ft)		[14]							
Parking Lane Width (ft) – Minimum		None	10	None		None	10	None	10
Pavement Type[15]		High or Intermediate		As Required					
Right of Way (ft)[16]		150	80	120	80	120	80	100	80
Structures Width (ft)[17]		Full Roadway Width		40		40		32	
Other Design Considerations – Urban		[18]		[18]		[18]		[18]	

Type of Terrain	Rural – Design Speed (mph)										Urban – Design Speed (mph)								
	25	30	35	40	45	50	55	60	65	70	20	25	30	35	40	45	50	55	60[19]
Level	7	7	7	7	7	6	6	5	5	4	9	9	9	9	9	8	7	7	6
Rolling	10	9	9	8	8	7	7	6	6	5	12	12	11	10	10	9	8	8	7
Mountainous	11	10	10	10	10	9	9	8	8	6	14	13	12	12	12	11	10	10	9
Grades (%)[20]																			

Geometric Design Data, Collector
Figure 440-8a

Collector Notes:

(1) The design year is 20 years after the year the construction is scheduled to begin.

(2) When considering a multilane highway, perform an investigation to determine whether a truck-climbing lane or passing lane will satisfy the need. (See Chapter 1010.)

(3) Where DHV exceeds 900, consider 4 lanes. When the volume/capacity ratio is equal to or exceeds 0.85, consider the need for a future 4-lane facility. When considering truck-climbing lanes on a C-2 design class highway, perform an investigation to determine whether a C-1 design class highway is justified.

(4) For access control requirements, see Chapters 1430 and 1435 and the Master Plan for Limited Access Highways. Contact the HQ Design Office Access & Hearings Unit for additional information.

(5) Contact the Rail Office of the Public Transportation and Rail Division for input on railroad needs.

(6) Criteria for railroad grade separations are not clearly definable. Evaluate each site regarding the hazard potential. Provide justification for railroad grade separations.

(7) For new/reconstruction projects. For existing roadways, see 440.07

(8) These are the design speeds for level and rolling terrain in rural design areas. They are the preferred design speeds for mountainous terrain and urban design areas. Higher design speeds may be selected, with justification. Do not select a design speed that is less than the posted speed.

(9) In urban design areas, with a corridor analysis, these values may be used as the minimum design speed. Do not select a design speed that is less than the posted speed.

(10) These design speeds may be selected in mountainous terrain, with a corridor analysis. Do not select a design speed that is less than the posted speed.

(11) Consider 12-foot lanes when the truck DDHV is 200 or greater.

(12) When guardrail is installed along existing shoulders with a width greater than 4 feet, the shoulder width may be reduced up to 4 inches.

(13) When curb section is used, the minimum shoulder width from the edge of traveled way to the face of curb is 4 feet.

(14) Minimum median width is as required for shoulders and barrier (including required shy distance) or ditch. (See 440.10.)

(15) For pavement type determination, see Chapter 520.

(16) Desirable width. Provide right of way width 10 feet desirable, 5 feet minimum, wider than the slope stake for fill and slope treatment for cut. (See 440.15.)

(17) For the minimum vertical clearance, see Chapter 1120.

(18) For bicycle requirements, see Chapter 1020. For pedestrian and sidewalk requirements, see Chapter 1025. Curb requirements are in 440.11. Lateral clearances from the face of curb to obstruction are in Chapter 700.

(19) For grades at design speeds greater than 60 mph in urban design areas, use rural criteria.

(20) Grades 1% steeper may be used in urban design areas and mountainous terrain with critical right of way controls.

Geometric Design Data, Collector
Figure 440-8b

Design Class		Divided Multilane		Undivided Multilane		Two-Lane	
		$U_{M/A}$-1	$U_{M/A}$-2	$U_{M/A}$-3	$U_{M/A}$-4	$U_{M/A}$-5	$U_{M/A}$-6
DHV in Design Year(1)		Over 700	Over 700	700–2,500	Over 700	All	All
Design Speed (mph)		Greater than 45	45 or less	35 to 45	30 or less	Greater than 45	45 or less
Access		(2)	(2)	(2)	(2)	(2)	(2)
Traffic Lanes							
Number		4 or more	4 or more	4 or more	4 or more	2	2
Width (ft)	NHS	12(3)(4)	12(3)	12(3)	12(3)	12(3)(6)	12(3)
	Non-NHS	11(4)	11(5)	11(5)	11(5)	11(6)	11(7)
Shoulder Width (ft)(8)							
Right of Traffic(9)		10	10	8	8	8(10)	4
Left of Traffic		4	4				
Median Width (ft)(11)				(12)	(12)		
Parking Lane Width (ft)		None	10(13)	10(13)	8(14)	10(15)	8(14)
Structures Width (ft)(16)		Full Roadway Width(17)		Full Roadway Width		32	30
Other Design Considerations		(18)	(18)	(18)	(18)	(18)	(18)

Urban Managed Access Highways Notes:

(1) The design year is 20 years after the year the construction is scheduled to begin.
(2) The urban managed access highway design is only used on managed access highways. (See Chapter 1435.)
(3) May be reduced to 11 feet with justification.
(4) Provide 12-foot lanes when truck DDHV is 200 or greater.
(5) Consider 12-foot lanes when truck DDHV is 200 or greater.
(6) Provide 12-foot lanes when truck DHV is 100 or greater.
(7) Consider 12-foot lanes when truck DHV is 100 or greater.
(8) When curb section is used, see Figure 440-3.
(9) When guardrail is installed along existing shoulders with a width greater than 4 feet, the shoulder width may be reduced up to 4 inches.
(10) When DHV is 200 or less, may be reduced to 4 feet.
(11) Minimum width is as required for shoulders and barrier (including required shy distance) or ditch. (See 440.10.)
(12) 2 feet desirable. When a TWLTL is present, 13 feet is desirable, 11 feet is minimum.
(13) Prohibit parking when DHV is over 1500.
(14) 10 feet desirable.
(15) Prohibit parking when DHV is over 500.
(16) For minimum vertical clearance, see Chapter 1120.
(17) For median requirements, see Chapter 1120.
(18) For bicycle requirements, see Chapter 1020. For pedestrian and sidewalk requirements, see Chapter 1025. Lateral clearances from face of curb to obstruction are in Chapter 700. For railroad and other roadway grade separation, maximum grade, and pavement type for the functional class, see Figures 440-6a through 440- 8b. Make right of way widths not less than required for necessary cross section elements.

Geometric Design Data, Urban Managed Access Highways

Figure 440-9

- Longitudinal buffer is the space between the protective vehicle and the work activity.

Devices used to separate the driver from the work space should not encroach into adjacent lanes. If encroachment is necessary it is recommended to close the adjacent lane to maintain the lateral buffer space. Refer to Chapter 710 of the *Design Manual* and the MUTCD to determine the appropriate buffer space and shy distance values.

In order to achieve the minimum lateral clearances, there may be instances where temporary pavement widening or a revision to a stage may be necessary. In the case of short-term lane closure operations, the adjacent lane may need to be closed or traffic may need to be temporarily shifted onto a shoulder to maintain a lateral buffer space. During the design of the traffic control plan, the lateral clearance needs to be identified on the plan to ensure that additional width is available; temporary roadway cross sections are a great way to show the space in relation to the traffic and work area.

(3) Lane Closure

One or more of the traffic lanes are closed in this work zone type. A capacity analysis is necessary to determine the extent of congestion that might result.

(4) Alternating One-Lane Two-way Traffic

This work zone type involves using one lane for both directions of traffic. Flaggers or traffic signals are normally used to control the alternation of traffic movements.

(5) Temporary Bypass

This work zone type involves total closure of one or both directions of travel on the roadway. Traffic is routed to a temporary bypass usually constructed within the highway's right of way. An example of this would be the replacement of an existing bridge by building an adjacent temporary structure and shifting traffic onto the temporary structure.

(6) Intermittent Closure

This work zone type involves stopping all traffic in both directions for a relatively short time to allow the work to proceed. After a certain amount of time, driven by the traffic volume, the roadway is reopened. An example of this type of closure would be a girder setting operation for a bridge project; typically, the closure would be limited to a ten-minute maximum and would occur in early morning hours when traffic volumes are at their minimum.

(7) Rolling Slowdown

A rolling slowdown is a legitimate form of traffic control commonly practiced by the Washington State Patrol (WSP), contractors, and highway maintenance crews. Their use is valuable for emergency or *very specific* short-duration closures (for example, to set bridge girders, remove debris from the roadway, push a blocking disabled to the shoulder, or pull power lines across the roadway). The traffic control vehicles form a moving blockade, which reduces traffic speeds and creates a large gap (or clear area) in traffic, allowing very short-term work to be accomplished without completely stopping the traffic.

Other traditional forms of traffic control should be considered before the rolling slowdown and be the primary choice. A site-specific traffic control plan (TCP) must be developed for this operation. The gap in traffic created by the rolling slowdown, and other traffic issues, need to be addressed on the TCP. Also, use of the WSP is encouraged whenever possible.

(8) Reduced Speeds in Work Zones

As part of the design process for construction projects, speed reductions are an option requiring a thorough traffic analysis conducted prior to making a change. Traffic control plans should be designed on the assumption that drivers will only reduce their speeds if they clearly perceive a need to do so. Reduced speed limits should be used only where roadway and roadside conditions or restrictive features are present such as narrow, barrier-protected work areas with major shifts in roadway alignment, and where a reduced speed limit is truly needed to address the safe speed

of the roadway. Work zone design of roadway geometrics, hazards, and worker protection should be accomplished using the existing posted speed limits. Speed reductions should not be applied as a means for selecting lower work zone design criteria (tapers, temporary alignment, device spacing, etc.). However, frequent changes in the speed limit should be avoided. A TCP should be designed so that vehicles can reasonably safely travel through the work zone with a speed limit reduction of no more than 10 miles per hour.

Speed reductions must be approved by the Regional Administrator and included on a traffic control plan prior to implementation. Guidelines for speed changes are outlined in RCW 47.48.020, the *Traffic Manual*, Chapter 5, and Directive D55-20, "Reduced Speed in Maintenance and Construction Zones."

- **Advisory Speeds.** The advisory speed plaque shall not be used in conjunction with any sign other than a warning sign, nor shall it be used alone. In combination with a warning sign, an advisory speed plaque may be used to indicate a recommended safe speed through a work zone. Refer to the MUTCD for additional guidance.

(9) Median Crossover

This work zone type involves routing the traffic from one direction onto a portion of the median and roadway of the opposing traffic. It can also incorporate reduced lane widths in order to maintain the same number of lanes. On higher-speed roadways, temporary barrier is used to separate the two directions of traffic. (See the Temporary Median Crossover requirements in 810.12 for additional information.)

(10) Lane Shift

Traffic lanes may be shifted in order to accommodate a work area when it is not practicable, for capacity reasons, to reduce the number of available lanes. The benefit of this work zone type is being able to maintain traffic flow with the existing number of lanes. Shifting more than one lane of traffic requires the removal of conflicting pavement markings and the installation of temporary markings; the use of devices to separate traffic is not allowed. A warning sign shall be used to show the changed alignment when the lateral shifting distance is greater than one-half of a lane width.

Utilizing the existing shoulder may be necessary to accommodate the shifting movement, but the structural capacity of the shoulder must first be analyzed to determine its ability to carry the proposed traffic. Remove and inlay existing shoulder rumble strips prior to routing any traffic onto the shoulder.

(11) Median Use

This work zone type is similar to the shoulder use type and is used on divided highways where the median and adjacent shoulders are used for the traffic lanes. Barriers are usually necessary to separate opposing traffic. Remove and inlay existing median rumble strips.

(12) Diversion

A diversion is a temporary rerouting of drivers onto a temporary highway or alignment placed around the work area. This work zone type involves total closure of one or both directions of travel on the roadway. Traffic is routed to a temporary bypass usually constructed within the highway's right of way. An example of this would be the replacement of an existing bridge by building an adjacent temporary structure and shifting traffic onto the temporary structure.

(13) Total Road Closure

This work zone type requires the complete closure of the roadway in order to pursue the work operation. Traffic is rerouted to an adjacent street or highway to avoid the work zone. Advance notification of the closure is required and a signed detour route may be required. Clearly sign detours over the entire length so that drivers can easily use existing highways to return to the original highway. Closing a highway, street, or ramp, while not always practicable, is a desirable option from a safety viewpoint. For the traveling public, closing the road for a short time might be less of an inconvenience than driving through a work zone for an extended period of time. (See the *Traffic Manual* and RCW 47.)

915.01 General

Modern roundabouts are circular intersections at grade. They are an effective intersection type with fewer conflict points and lower speeds, and they provide for easier decision making than conventional intersections. They also require less maintenance than traffic signals and have a traffic-calming effect. Well-designed roundabouts have been found to reduce all crashes (especially fatal and severe injury collisions), traffic delays, fuel consumption, and air pollution. For additional information and details on roundabouts, see *Roundabouts: An Informational Guide*.

For every intersection improvement project, evaluate a roundabout as an alternative to a traditional stop-controlled or traffic signal-controlled intersection. Selection of a roundabout as the preferred intersection type is based on an engineering analysis that examines traffic volumes and patterns, including space requirements and right of way availability.

Modern roundabouts differ from older circular intersections in three ways: they have splitter islands that provide entry deflection to slow down entering vehicles; they have yield-at-entry, which requires entering vehicles to yield to vehicles in the roundabout to allow free flow of circulating traffic; and they have a smaller diameter that constrains circulating speeds.

915.02 References

Federal/State Laws and Codes

Americans with Disabilities Act of 1990 (ADA)

Revised Code of Washington (RCW) 47.05.021, Functional classification of highways

Washington Administrative Code (WAC) 468-58-080, Guides for control of access on crossroads and interchange ramps

Chapter 468-95 WAC, "Manual on uniform traffic control devices for streets and highways" (MUTCD)
www.wsdot.wa.gov/biz/trafficoperations/mutcd.htm

Design Guidance

ADA Accessibility Guidelines for Buildings and Facilities (ADAAG), U.S. Access Board
www.access-board.gov/adaag/html/adaag.htm

ADA Standards for Accessible Design, U.S. Department of Justice
www.usdoj.gov/crt/ada/adahom1.htm

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 WAC 468-95

Standard Plans for Road, Bridge, and Municipal Construction (Standard Plans), M 21-01, WSDOT

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Supporting Information

A Policy on Geometric Design of Highways and Streets (Green Book), AASHTO, 2004

Crash Reductions Following Installation of Roundabouts in the United States, Insurance Institute for Highway Safety, March 2000
www.nysdot.gov/portal/page/portal/main/roundabouts/files/insurance_report.pdf

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Highway Capacity Manual (HCM), Special Report 209, Transportation Research Board, National Research Council

NCHRP Synthesis 264, Modern Roundabout Practice in the United States, Transportation Research Board, 1998 at: onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_264.pdf

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Use of Roundabouts, ITE Technical Council Committee 5B-17, Feb. 1992 www.ite.org/traffic/documents/JBA92A42.pdf

The Design of Roundabouts: State of the Art Review, Brown, Mike, Transportation Research Laboratory, Department of Transport. London, HMSO, 1995

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915.03 Definitions

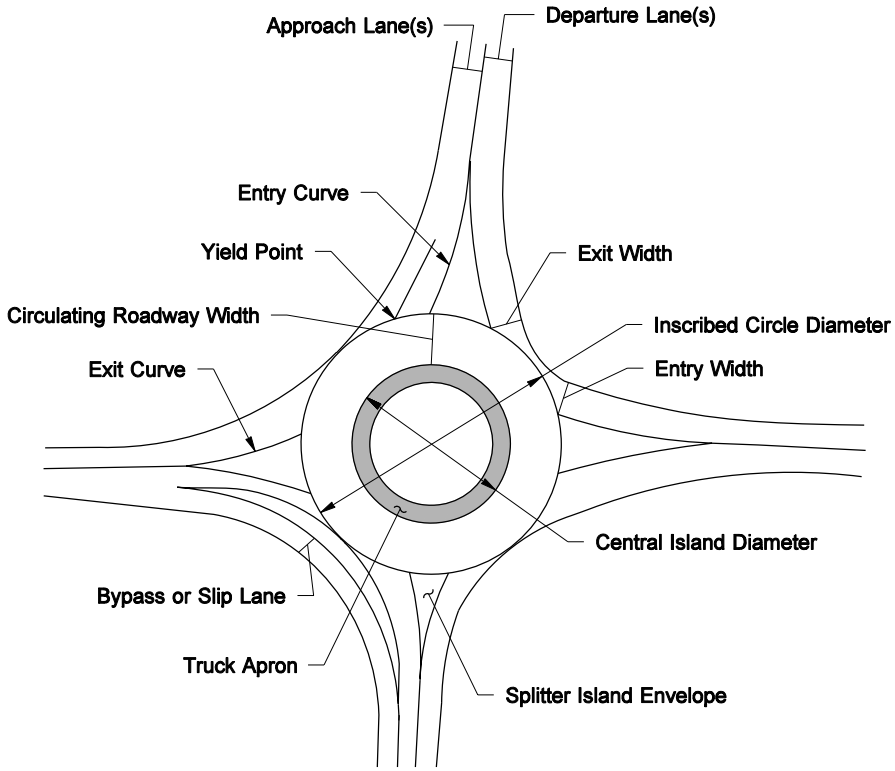
approach design speed The design speed of the roadway leading into the roundabout.

approach lanes The lane or set of lanes for traffic approaching the roundabout (see Figure 915-1).

central island The area of the roundabout including the truck apron that is surrounded by the circulating roadway.

central island diameter The diameter of the central island, including the truck apron (see Figure 915-1).

circulating lane A lane used by vehicles circulating in the roundabout.



Roundabout Elements
Figure 915-1

circulating roadway The traveled lane(s) adjacent to the central island and outside the truck apron; includes the entire 360° circumference of the circle.

circulating roadway width The total width of the circulating lane(s) measured from inscribed circle to the central island (see Figure 915-1).

conflict point A point where traffic streams cross, merge, or diverge.

deflection The change in the path of a vehicle imposed by the geometric features of a roundabout resulting in a slowing of vehicles (see Figure 915-15a).

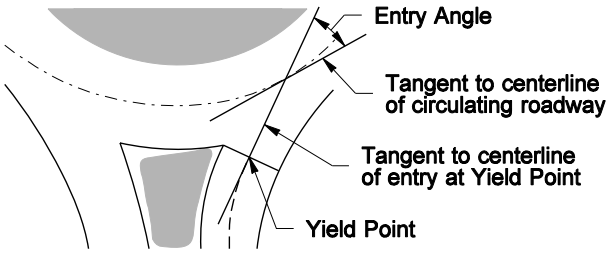
departure lanes The lane or set of lanes for traffic leaving the roundabout (see Figure 915-1).

design speed The speed used to determine the various geometric design features of the roadway.

design vehicle A vehicle, the dimensions and operating characteristics of which are used to establish the layout geometry (see 915.06(2)(a)).

detectable warning surface A feature of a walking surface to warn visually impaired pedestrians of a hazard. Truncated domes are specified by the ADAAG.

double-lane roundabout A roundabout with a two-lane circulating roadway and one or more entry or exit legs with two lanes.



Entry Angle
Figure 915-2

entry angle The angle between the entry roadway and the circulating roadway measured at the yield point (see Figure 915-2).

entry curve The curve of the left edge of the roadway that leads into the circulating roadway (see Figure 915-1).

entry width The width of an entrance leg at the inscribed circle measured perpendicular to travel (see Figure 915-1).

exit curve The curve of the left edge of the roadway that leads out of the circulating roadway (see Figure 915-1).

exit width The width of an exit leg at the inscribed circle (see Figure 915-1).

flare The widening of the approach to the roundabout to increase capacity and facilitate natural vehicle paths.

functional classification The grouping of streets and highways according to the character of the service they are intended to provide, as shown in RCW 47.05.021.

inscribed circle The outer edge of the circulating roadway.

inscribed circle diameter (ICD) The diameter of the inscribed circle (see Figure 915-1).

intersection at grade The general area where a roadway or ramp terminal is met or crossed at a common grade or elevation by another roadway.

intersection sight distance The sight distance for the driver of a vehicle entering an intersection required for safe operation.

island A defined area within an intersection, between traffic lanes, for the separation of vehicle movements or for pedestrian refuge.

lane A strip of roadway used by a single line of vehicles.

lane width The lateral design width for a single lane, striped as shown in the *Standard Plans* and the *Standard Specifications*. The width of an existing lane is measured from the edge of traveled way to the center of the lane line or between the centers of successive lane lines.

natural vehicle path The path that a driver will navigate a vehicle given the layout of the intersection and the ultimate destination.

roadway The portion of a state highway; a federal, county, or private road; or a city street (including shoulders) for vehicular use.

roundabout A circular intersection at grade with yield control of all entering traffic, channelized approaches with raised splitter islands, counter-clockwise circulation, and appropriate geometric curvature to ensure that travel speeds on the circulating roadway are generally less than 25 miles per hour.

sight distance The length of roadway visible to the driver.

single-lane roundabout A roundabout having single-lane entries at all legs and one circulating lane.

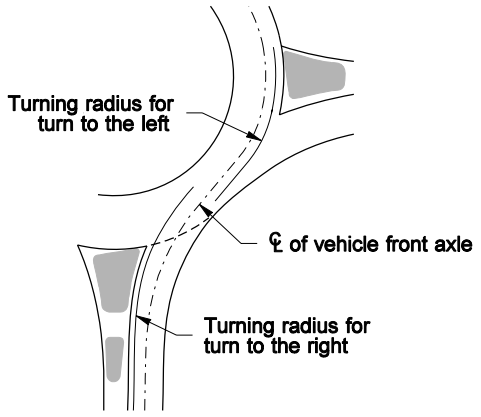
slip lane A lane that separates heavy right-turn movements from the roundabout circulating traffic (see Figure 915-1).

splitter island The raised island at each two-way leg between entering and exiting vehicles, designed primarily to control the entry and exit speeds by providing deflection. They also prevent wrong-way movements, and provide pedestrian refuge.

stopping sight distance The distance required to safely stop a vehicle traveling at design speed.

superelevation The rotation of the roadway cross section in such a manner as to overcome or, in the case of a roundabout, add to the centrifugal force that acts on a vehicle traversing a curve.

truck apron The optional mountable portion of the central island of a roundabout between the raised nontraversable area of the central island and the circulating roadway (see Figure 915-1).



Turning Radius (R)
Figure 915-3

turning radius The radius that the front wheel of the design vehicle on the outside of the curve travels while making a turn (see Figure 915-3).

yield-at-entry The requirement that vehicles on all entry lanes yield to vehicles within the circulating roadway.

yield point The point at which entering traffic must yield to circulating traffic before entering the circulating roadway (see Figure 915-1).

915.04 Roundabout Types

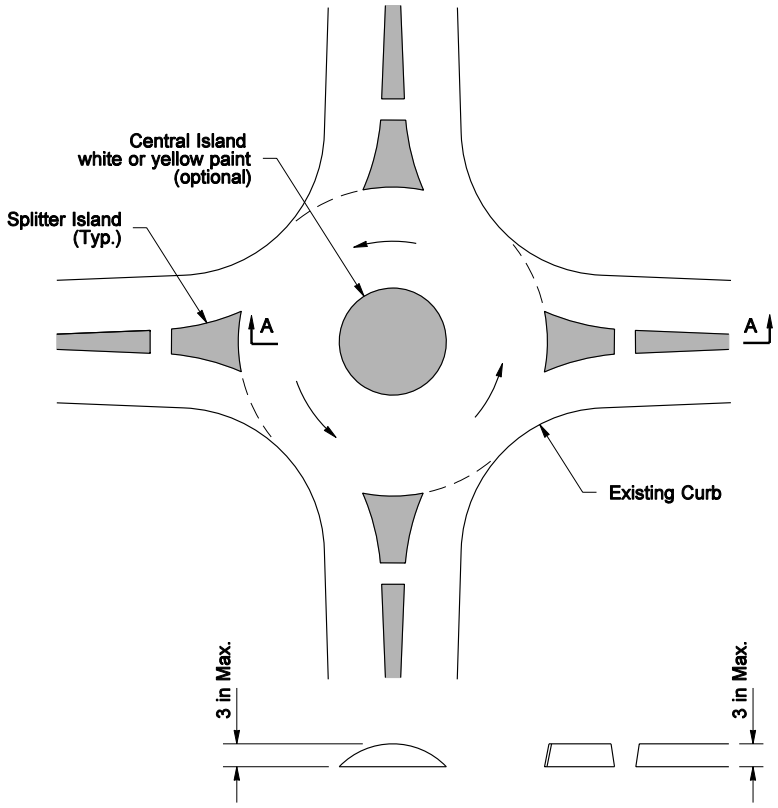
There are four basic roundabout types: mini, single-lane, multilane, and teardrop.

(1) Mini Roundabouts

Mini roundabouts are small single-lane roundabouts that are used in low-speed (25 miles per hour or less) urban environments where the design vehicle is the P vehicle. Because of this, mini roundabouts are typically not suitable for use on state routes. In retrofit applications, mini roundabouts are relatively inexpensive because they normally require minimal additional pavement at the intersecting roads. A 3-inch mountable curb for the splitter islands and the central island is recommended because larger vehicles might be required to cross over it. A common application is to replace an all-way stop-controlled intersection with a mini roundabout to reduce delay and increase capacity. With mini roundabouts, the existing curb and sidewalk at the intersection can be left in place (see Figure 915-4).

(2) Single-Lane Roundabouts

Single-lane roundabouts have single-lane entries at all legs and one circulating lane. They have nonmountable raised splitter islands, a mountable truck apron, and a nonmountable central island (see Figure 915-5).

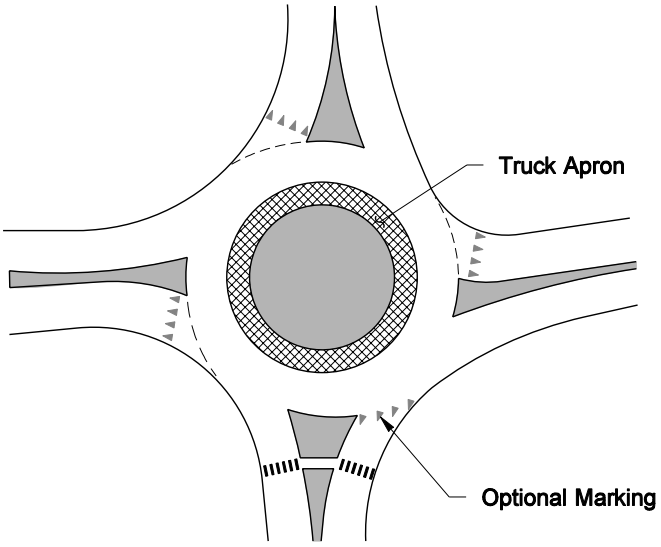


Section A-A
(not to scale)

Notes:

- The central island and splitter island are mountable islands.
- A mini roundabout has similar details as a single-lane roundabout, except all islands are mountable and existing curb and sidewalk at the intersection can remain.

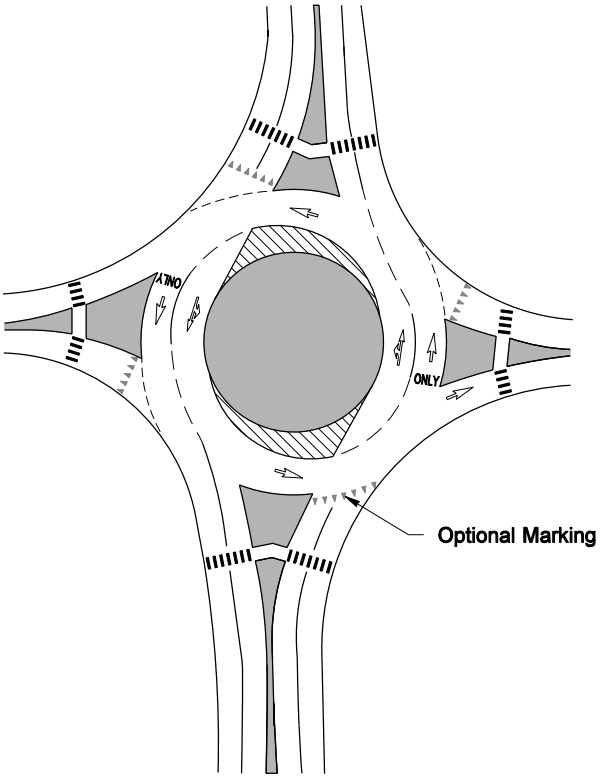
Mini Roundabout
Figure 915-4



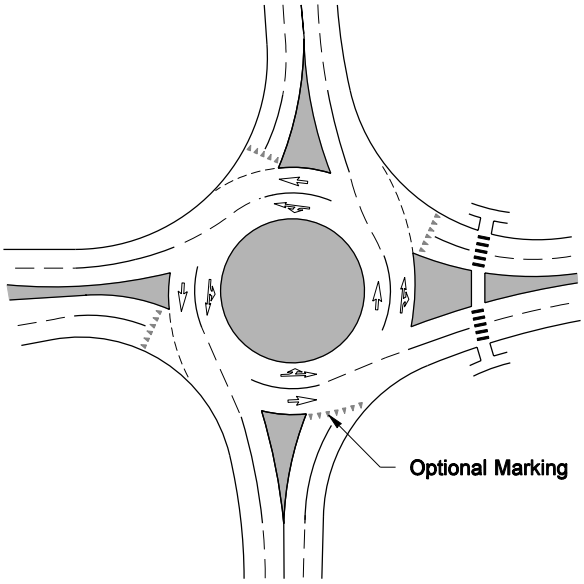
Single-Lane Roundabout
Figure 915-5

(3) Multilane Roundabouts

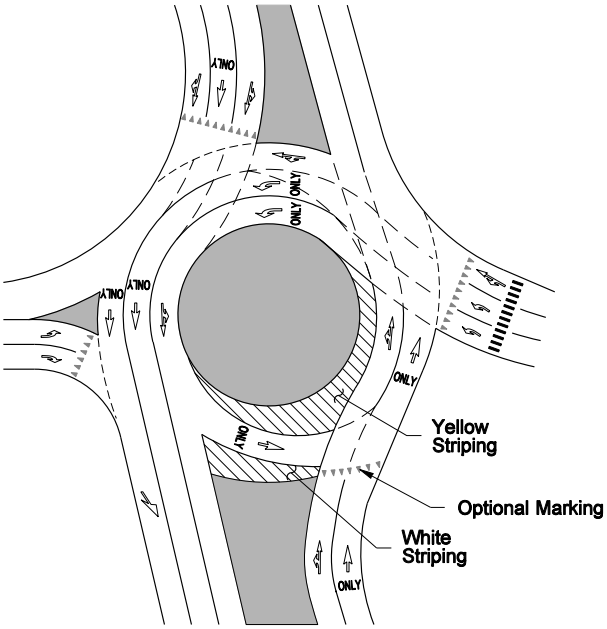
Multilane roundabouts have at least one entry or exit with two or more lanes and more than one circulating lane (see Figures 915-6a, 6b, and 6c). To balance the needs of passenger cars and trucks and provide safety, the current operational practice is normally for trucks negotiating roundabouts to encroach on adjacent lanes (see Figure 915-14b).



Multilane Roundabout
Figure 915-6a



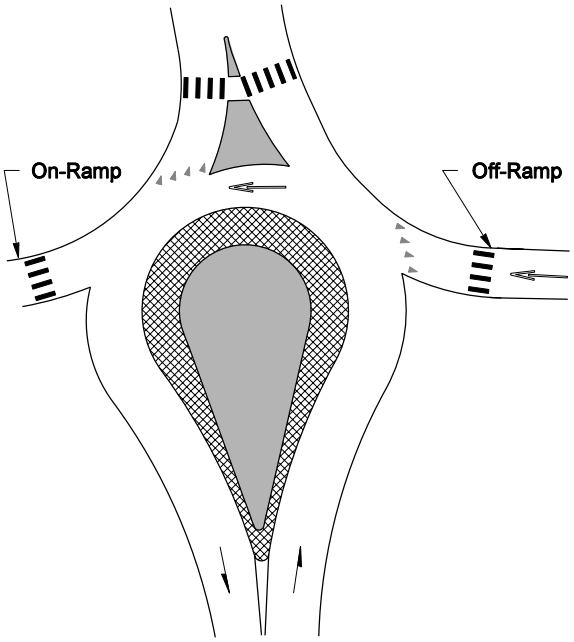
Multilane Roundabout
Figure 915-6b



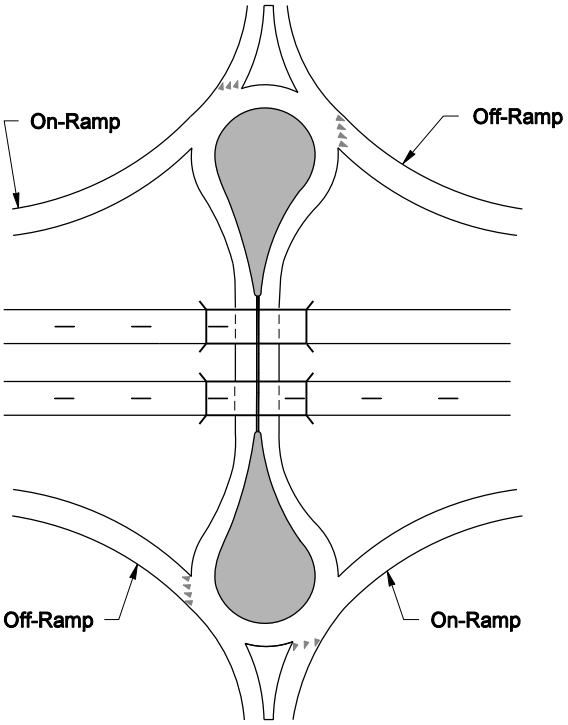
Multilane Roundabout
Figure 915-6c

(4) Teardrop Roundabouts

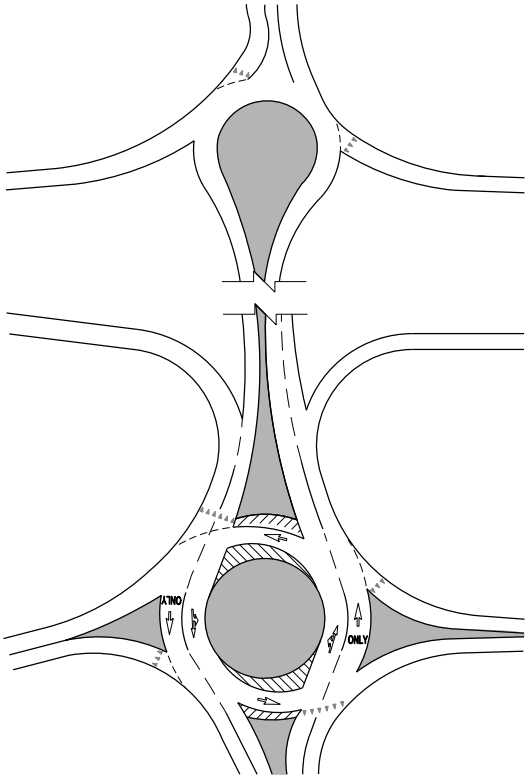
Teardrops are usually associated with ramp terminals at interchanges; typically, at diamond interchanges. Teardrop roundabouts allow the "wide node, narrow link" concept. Unlike circular roundabouts, teardrops do not allow for continuous 360° travel. This design offers some advantages at interchanges. Traffic traveling on the crossroad (link) between ramp terminal intersections (nodes) does not encounter a yield as it enters the teardrop intersections. Because this improves traffic throughput on the crossroad between the ramps, it reduces the need for additional lane capacity, thus keeping the cross section between the ramp terminals as narrow as possible (see Figures 915-7a through 7c).



Teardrop Roundabout at Ramp Terminals
Figure 915-7a



Double Teardrop
Figure 915-7b



Teardrop Roundabout With Ramps
Figure 915-7c

915.05 Capacity Analysis

A capacity analysis is required before a preferred intersection type and configuration is chosen. Perform the capacity analysis to ensure that the number of lanes provides adequate capacity in the design year. Use SIDRA Solutions software or the guidance given in the *Highway Capacity Manual*. Contact the region or Headquarters (HQ) Traffic Office for capacity analysis assistance.

915.06 Geometric Design

(1) Typical Design Process

Roundabout design is an iterative process in which small changes in geometry can result in substantial changes to operational and safety performance. It is advisable to prepare the initial layout drawings at a sketch level of detail. Although it is easy to get caught up in the desire to design each of the individual components of the geometry, it is much more important that the individual components are compatible so that the roundabout will meet its overall performance objectives.

Roundabout design is a performance-based process. Design components are interrelated and changing one affects others, so it is important to evaluate the performance of the entire design as changes are made. There are often several acceptable roundabout designs for a given location that meet design performance objectives; however, this is rarely achieved on the first iteration. The location and size of the roundabout, angle of the approaches, and other design components will change as the adequacy of the roundabout design is assessed. Figures 915-13a and 13b illustrate the steps to take on a scaled drawing when designing a roundabout.

Tools are available to the designer to transfer iteration designs into CADD, which can be useful in verifying the designs will work. Use of CADD for placing the design roundabout inscribed circle diameter and the central island, and establishing the circulating roadway, is a quick way to verify that the design vehicle can "drive" the roundabout.

Design Element	Mini(1)	Single-Lane	Multilane
Number of Lanes	1	1	2+
Inscribed Circle Diameter(2)	45'–80'	80'–150'(3)	150' min
Circulating Roadway Width	N/A	14'–19'	29' min
Entry Widths	N/A	12'–18'	25' min

Notes:

(1) For use on low-speed residential urban streets. Mini roundabouts require a deviation on a state route.

(2) The given diameters assume a circular roundabout.

(3) Diameters less than 100 feet are not appropriate on a state route.

Initial Ranges
Figure 915-8

(2) Design Performance Objectives

General characteristics of different roundabout types are summarized in Figure 915-8. These are not design limits but general guidelines to follow to begin the design process. Final design values will vary.

(a) **Design Vehicle Turning Paths.** One of the elements that controls the geometric design of a roundabout is the physical characteristics of the design vehicle. (See Chapter 910 for guidance on the selection of a design vehicle.) As with other intersections, it is possible that the design vehicle may differ for each movement.

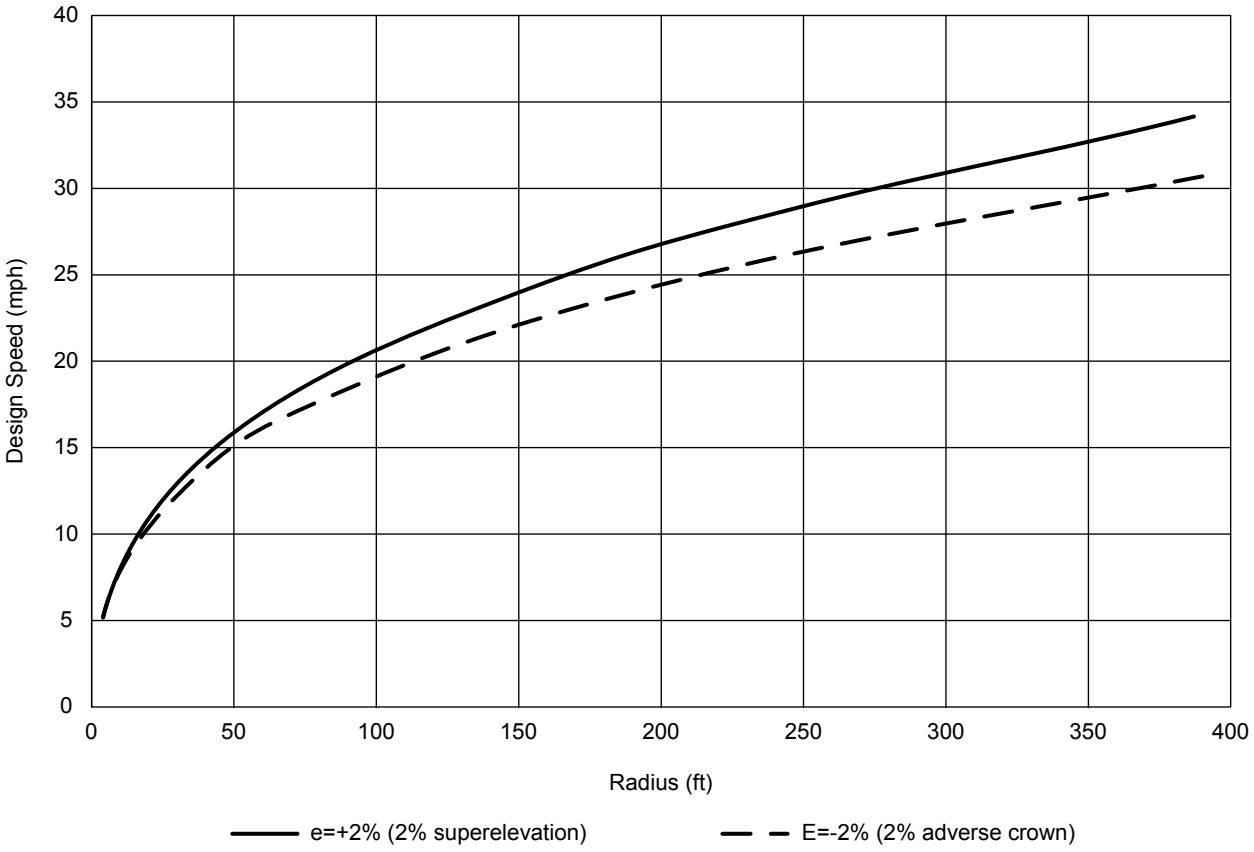
Design a roundabout so that the design vehicle can use it with a 1-foot clearance from the turning radius to any nonmountable curb face. If the curb face is mountable, no clearance is required. The front wheels of the design vehicle must not encroach onto the truck apron. The vehicle path through a roundabout contains multiple curves. Use computer-generated vehicle turning path templates (like Autoturn) to verify that each movement can be made by its identified design vehicle(s), including U-turns. Check the entire path of every route through the roundabout (see Figures 915-14a and 14b).

For multilane roundabouts (two or more circulating lanes), to balance the needs of passenger cars and trucks and provide safety, a design vehicle path may encroach into adjacent entry, circulating, and exit lanes. While the objective is to minimize overlap into the adjacent lanes whenever possible, the current operational practice is normally for trucks negotiating roundabouts to encroach onto adjacent lanes (see Figure 915-14b). A truck apron is not normally required on a multilane roundabout; however, it is acceptable if site-specific considerations show it will improve operations or stop other vehicles from accelerating around a slower-moving vehicle.

(b) **Fastest Vehicle Paths.** For a roundabout to operate safely and efficiently, it must be designed to reduce entry speeds. The most significant feature that will control the speed is adequate entry deflection.

The deflection is evaluated by sketching the radius of the centerline of a vehicle traveling along the fastest path through the roundabout. The vehicle paths are drawn by hand to ensure a more natural representation of the way a driver negotiates the roundabout (with smooth transitions connecting a series of reverse curves). Figures 915-15a, 15b, and 15c illustrate the vehicle's fastest paths and depict all radii.

Figure 915-9 shows the relationship between vehicle path radius and its fastest achievable speed. The speed achievable for larger exit radii (R_3) is usually not as fast as the speed shown in Figure 915-9. In this case, the exit speed is controlled by the circulating radius (R_2) plus acceleration to the exit crosswalk.



Speed vs. Radius
Figure 915-9

Check all the fastest path speeds using Figure 915-9 for curves (R_1 through R_5) from each approach to ensure they do not exceed a maximum speed of 25 miles per hour; otherwise, provide justification. Single-lane roundabouts can usually achieve lower entry speeds than multilane roundabouts.

To maximize safety and capacity, it is important to minimize the relative speed differential between the consecutive geometric elements of each traffic stream, and between conflicting traffic streams at each geometric element. Therefore, speed consistency for the through movement (R_1 to R_2 to R_3) and left-turn movement (R_1 to R_4 to R_3) on each approach is an important performance objective (see Figure 915-16). Ensure that the difference between the corresponding speeds of each consecutive set of radii does not exceed 6 miles per hour; otherwise, provide justification. Also ensure that the speed variation associated with all radii passing through the same point in the roundabout (R_1, R_3, R_4, and R_5) does not exceed 6 miles per hour; otherwise, provide justification. Perform this check at each conflict point (see Figure 915-17).

(c) **Natural Vehicle Paths.** The speed and orientation of the vehicle at the yield point determines its natural path through the roundabout. At the yield point, a vehicle will enter the circulatory roadway along its natural path, and will either exit to the right or continue around the central island to another exit. The key principle in drawing the natural path is to remember that drivers cannot change the direction or speed of their vehicles instantaneously. This means that the natural path does not have sudden changes in curvature; it has transitions between consecutive reversing curves. It also means that consecutive curves have similar radii and are long enough so that vehicles will follow the radii of the curves.

To identify the natural path of a given design, sketch the natural paths over the geometric layout rather than using a computer drafting program. In sketching the path by hand, transitions between consecutive curves will be similar to the way an operator drives a vehicle. Freehand sketching forces the designer to feel how changes in one curve affect the radius and orientation in the next. This sketching technique allows the designer to quickly obtain a smooth natural path and assess the adequacy of the geometry. Entry design that avoids overlapping paths or curb strikes is shown in Figure 915-18.

If the natural path of a vehicle points the vehicle into a raised curb or interferes with the natural path of an adjacent vehicle, sideswipe crashes and curb strikes may occur (see Figure 915-18).

(3) Design Components

(a) **Inscribed Circle Diameter (ICD).** For typical ICD ranges based on the type of roundabout, see Figure 915-8. The capacity analysis will determine the number of circulating lanes needed. When sizing the roundabout, start on the higher end of the range for larger design vehicles, when there are more than four legs, or when two approaches are skewed or close together. It is important to ensure the inscribed diameter accommodates the design vehicle for all movements. A different diameter may be needed if the selected diameter does not accommodate the design vehicle, the fastest paths are not within 6 miles per hour of each other, or a vehicle path is over 25 miles per hour.

The inscribed circle does not always have to be circular with a constant radius circulating roadway. Circular roundabouts are preferred, but ovals can be used when a circle is not possible due to site constraints. Oval roundabouts usually present more trouble with paths that are too fast.

The inscribed diameter consists of the circulating roadway width, a possible truck apron, and a central island. Typical ranges for the circulating roadway width are shown in Figure 915-8.

- For single-lane roundabouts, start by trying an 18-foot-wide circulating roadway and size the truck apron width to accommodate the design vehicle.
- For multilane roundabouts, start by trying 16-foot-wide circulating lanes. Truck aprons are not typically needed on multilane roundabouts because trucks will use all lanes of the circulating roadway.

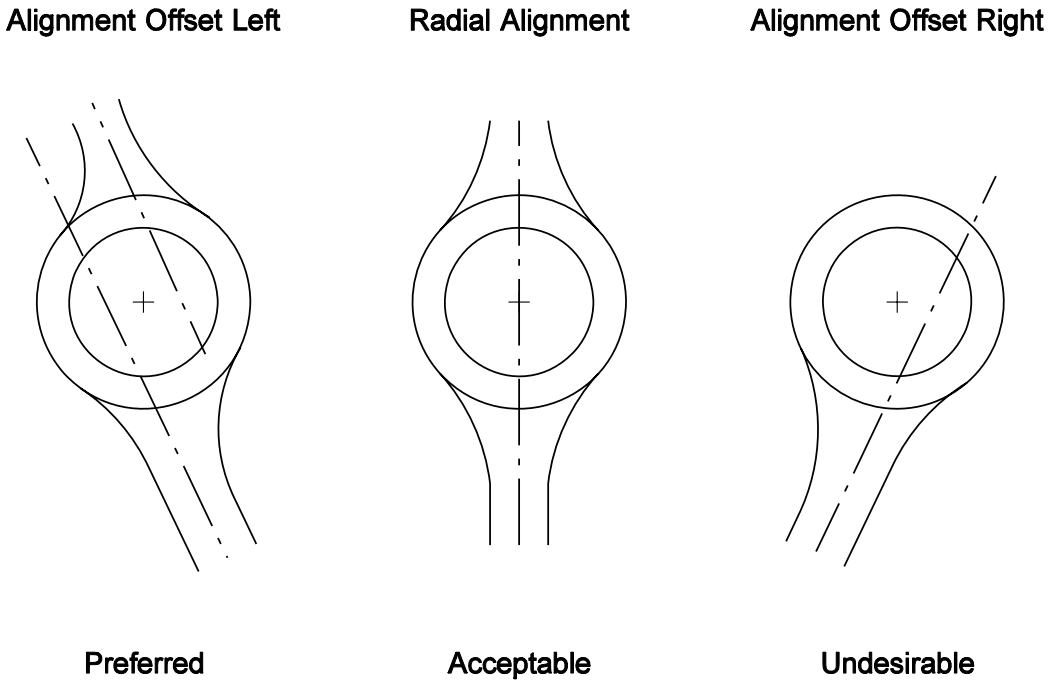
(b) **Approach Alignment.** The preferred alignment of an approach leg to a roundabout is with the centerline passing to the left of the center of the circle (see Figure 915-10). This alignment facilitates adequate entry deflection and angle on the approaches. It will reduce entry speeds and align entering vehicles into the circulating roadway, which is key to safety. An approach alignment offset to the right of the roundabout's center point is undesirable because it makes it more difficult to achieve adequate deflection. This could allow vehicles to enter the roundabout at a higher speed, which usually results in a reduction in safety.

When there are four or more approaches, it is desirable to equally space the angles between entries. When site conditions make equal spacing infeasible, evaluate the effect of closely spaced approaches on the roundabout operation.

When there are three approaches, it is preferred that they be put into a tee configuration instead of a wye configuration. If a wye intersection is converted to a roundabout, attempt to orient the legs into the tee configuration.

(c) **Entry.** The entry is the most critical component of the roundabout. The entry typically has a pedestrian refuge located one vehicle length (approximately 20 feet) back from the yield point. If provided, the pedestrian refuge must meet the minimum ADA requirements. The key to good entry design is an entry curve several vehicle lengths in length that extends to the inside of the circulating roadway just offset from the truck apron. The entry curve needs to be long enough to promote a smooth natural drive path into the roundabout. The entry curve delineates the edge of the splitter island. (See Figure 915-19 for splitter island details.)

Prior to the pedestrian refuge, the minimum approach lane width is 12 feet. The lane will widen from this width until it matches the circulating lane width. Continuous curbing is needed on both sides of the entry roadway to achieve deflection and restrict the entry speed (see Figure 915-19). On high-speed approaches, consider using longer splitter islands and reverse curves to reduce speed prior to the entry. Typically, the higher the speed, the longer the splitter island.



Approach Leg Alignment
Figure 915-10

(d) **Exit.** The exit lane is designed to promote a smooth, natural drive path for a right-turning vehicle. The exit curve starts at the central island where the entry curve to the left ends, and extends past the pedestrian refuge to delineate the edge of the splitter island (see Figure 915-13b, Steps 5 and 6). The lane will narrow from the circulating roadway width past the pedestrian refuge to match the width of the departing lane (see Figure 915-19). Generally, the radius of the exit curve is larger than the entry curve to improve the ease of exit. A design that reduces the probability of a vehicle braking in the circulating lane or at the exit will minimize the likelihood of crashes at the exits. This larger radius does not translate into a faster speed when the exit speed is controlled by the circulating speed (R_4) plus acceleration to the exit crosswalk.

(e) **Central Island.** The central island is a raised, nontraversable area and may include a truck apron (see Figure 915-20). The truck apron is the outer part of the central island, designed to allow for encroachment by the rear wheels of large trucks.

Design the texture and color of the truck apron pavement to be:

- Different from that of the circulating roadway so drivers can easily distinguish the difference.
- Different from that of the sidewalk pavement.

Use a roundabout truck apron cement concrete curb between the circulating roadway and the truck apron (see the *Standard Plans*).

Use roundabout center island cement concrete curb between the truck apron and the nontraversable area (see the *Standard Plans*). A 6-inch mountable cement concrete traffic curb may be substituted for the roundabout center island cement concrete curb, with justification, when oversized trucks might be required to encroach on the nontraversable area of the central island.

Landscape or mound the raised central island to improve the visual impact of the roundabout to approaching drivers. When designing landscaping and objects in the central island, consider sight distance and roadside safety. Contact the region or HQ Landscape Architect for guidance. The central island is not a pedestrian area. Do not place street furniture or other objects (such as benches or monuments with small text) that may attract pedestrian traffic to the central island. Consider maintenance needs for access to the landscaping in the central island.

(f) **Superelevation and Grades.** As a general practice, a cross slope of 2% away from the central island (negative 2% superelevation for circulating traffic) is used for the circulating roadway. Do not use a positive superelevation. If an approach has reverse curves, maintain the normal 2% crown away from the splitter island through the curves. The truck apron cross slope is equal to the 2% cross slope of the circulating roadway or may be increased to 3% (see Figure 915-20).

The maximum allowable grade in the direction of travel along the circulating roadway is 4% (see Figure 915-11). Grades in excess of 4% can result in increased difficulty slowing or stopping and a greater possibility of vehicle rollover. If the intersection is located on a steep slope, "bench" the roundabout to stay within this 4% maximum. When benching a roundabout, the minimum length of the approach landing is the length of the anticipated queue, but not less than 30 feet.

(g) **Clear Zone.** Clear zone requirements are based on the operating speeds determined by the vehicle's fastest paths (R_1 through R_5). Within the circulating roadway, the clear zone is measured from the edge of the traveled way on both the right and left side. The truck apron, if present, is included as part of the clear zone, not part of the traveled way. (See Chapter 700 for clear zone details.) When a 12-inch roundabout truck apron cement concrete curb is provided, additional clear zone in the central island is not required.

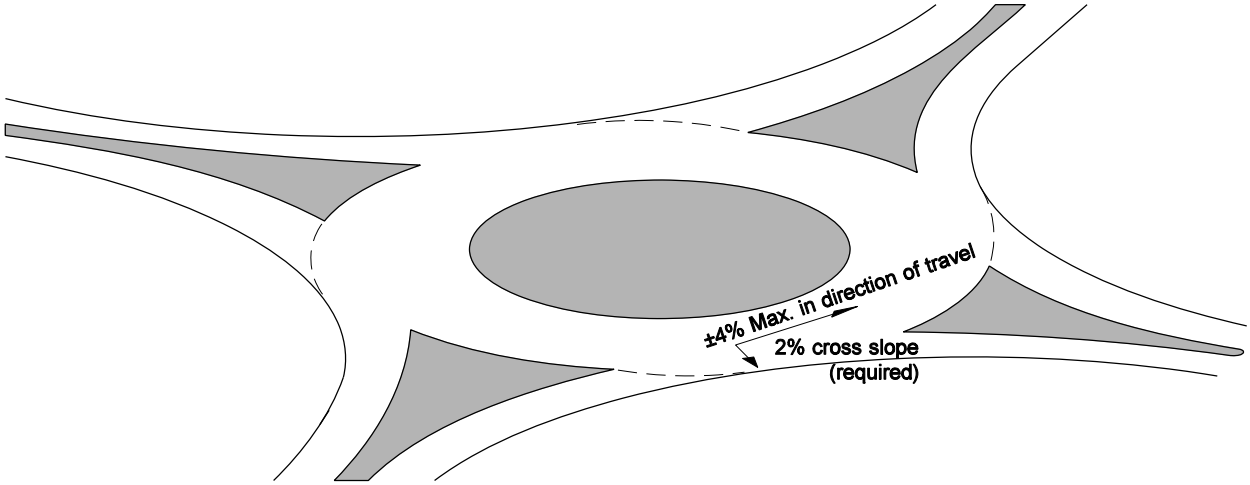
(h) **Sight Distance.** At roundabouts, stopping sight distance and intersection sight distance must be provided. Along with the horizontal sight triangles distance described below, ensure vertical sight distance is adequate as well (see Chapter 650). Momentary sight obstructions (such as poles and signposts) that do not hide vehicles or pedestrians are acceptable in the intersection sight triangles.

Stopping sight distance is calculated and measured using the guidance given in Chapter 650.

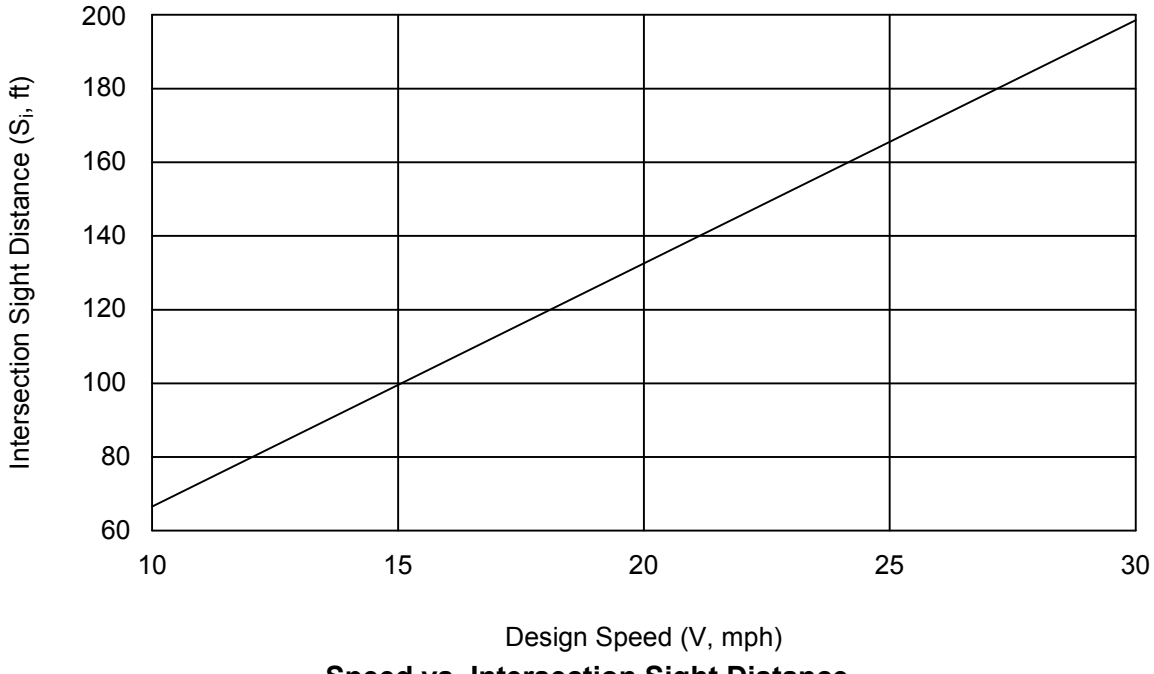
Three critical types of locations need to be evaluated for adequate stopping sight distance:

- Approach stopping sight distance to crosswalk (see Figure 915-21)
- Stopping sight distance on the circulatory roadway (see Figure 915-22)
- Stopping sight distance to crosswalk on the exit (see Figure 915-23)

For intersection sight distance at roundabouts, entering vehicles require a clear view of traffic on the circulating roadway and on the immediate upstream approach in order to judge an acceptable gap (see Figure 915-24). The intersection sight distance at roundabouts is given in Figure 915-12. The S_1 distance is based on the average of the R_1 and R_2 speeds, the S_2 distance is based on the R_4 speed. The sight distance may also be calculated using the intersection's sight distance equation given in Chapter 910 using a time gap (t_g) of 4.5 seconds.



Circulating Roadway Slope
Figure 915-11



Speed vs. Intersection Sight Distance
Figure 915-12

For roundabouts, these distances are assumed to follow the curvature of the roadway; thus are not measured as straight lines but as distances along the vehicular path. The entering vehicle driver needs to determine whether a gap is acceptable 50 feet before reaching the yield point. Research has determined that excessive intersection sight distance results in a higher crash frequency. The 50-foot distance is intended to require vehicles to slow down prior to entering the roundabout, which allows them to focus on the pedestrian crossing prior to entry. It may be advisable to add landscaping to restrict sight distance to the minimum requirements. Figure 915-25 combines stopping and intersection sight distances to identify landscaping height restrictions.

(i) **Right-Turn Slip Lane.** If a capacity analysis shows a heavy right-turn volume, consider using a right-turn slip lane. Right-turn slip lane fastest paths are measured as a right turn (R_5) plus acceleration to the merge point. Two ways to terminate a right-turn slip lane are: as a merge (lane drop) or as a yield (see Figure 915-26). Pedestrian refuge islands included with right-turn slip lanes must be ADA compliant (see Chapter 1025).

(j) **Add and Drop or Bypass Lanes.** When traffic volume requires that a lane be added prior to a roundabout entry, it can be much shorter than what is normally needed at a signal. Instead of the add lane needing to store enough vehicles to maintain two lanes of saturation flow during the signal's green time, the roundabout add lane only needs to be long enough to provide access to gaps in all circulating lanes as they become available (see Figure 915-27). The same principle applies to drop lanes where additional lanes are required at a roundabout exit. Instead of two dense platoons needing distance to spread out and merge downstream of a signal, vehicles exiting a roundabout are usually more evenly spaced, making merging easier and requiring less distance before beginning the taper (see Figure 915-27). A practical way to end or drop the lane as it transitions from two exit lanes to one exit lane is to taper each lane symmetrically in order to tell drivers that the left exit lane is not prioritized over the other (right) exit lane. This type of lane strategy will improve lane utilization for multilane roundabouts in both the entry and exit areas and the circulating roadway.

(k) **Railroad Crossings.** Although it is undesirable to locate any intersection near an at-grade railroad crossing, a crossing is acceptable near a roundabout as long as the roundabout does not force vehicles to stop on the tracks. The distance between the yield point and the tracks is sized to at least accommodate the design vehicle length, unless there is a gate on the circulating roadway that allows the roundabout entry to clear prior to the train's arrival (see Figure 915-28).

The intersection analyses and site-specific conditions will help determine the need for, and optimum placement of, a gate on the circulating roadway. Figure 915-28 shows two example locations for railroad gates on the circulating roadway; however, only one would be used. While a roundabout will have a tendency to lock up as soon as the gates come down on the circulating roadway, the affected leg is very efficient at returning to normal operation.

915.07 Pedestrians

Pedestrian crossings at roundabouts are unique in that the pedestrian is required to cross at a point behind the first vehicle waiting at the yield point. When pedestrian activity is anticipated, include a pedestrian refuge in the splitter island and mark all pedestrian crosswalks. Position the crosswalk one car length (approximately 20 feet) from the yield point and perpendicular to the entry and exit roadways (see Figure 915-21). Consider landscaping strips to discourage pedestrians crossing at undesirable locations. Where possible, provide a buffer between the traveled way and sidewalk.

Provide a barrier-free passageway at least 10 feet wide (desirable) through all islands and buffers. Whenever a raised splitter island is provided, provide a 6-foot island width for pedestrian refuge. This facilitates pedestrians crossing in two separate movements.

Give special attention to assisting visually impaired pedestrians through design elements (for example, providing tactile cues such as truncated domes at curb ramps and splitter islands). Provide appropriate informational cues to pedestrians regarding the location of the sidewalk and the crosswalk.

For additional information on sidewalk ramps and pedestrian needs, see Chapter 1025.

915.08 Bicycles

In most cases, the operating speed of vehicles within roundabouts is similar to the speed of bicyclists, and both can use the same roadway without conflict or special treatment. Less experienced cyclists may not feel comfortable riding with traffic and may want to use a sidewalk instead. End all marked bicycle lanes or shoulders before they enter a roundabout in order to direct bicycles to either enter traffic and use the circulating roadway, or leave the roadway onto a separate shared-use path or shared-use sidewalk. When using a shared-use sidewalk, the width is the same as a separate shared-use path. (See Figure 915-29 for the recommended design for ending a bicycle lane with a shared-use sidewalk at a roundabout, and Chapter 1020 for shared-use path widths.)

915.09 Signing and Pavement Marking

A typical roundabout sign layout is shown in Figure 915-30. A diagrammatic guide sign, as shown in the figure, can be used to provide the driver with destination information. Provide a route confirmation sign on all state routes shortly after exiting the roundabout, but after the pedestrian crossing (if there is one) so that the sign will not distract drivers from watching for pedestrians. For multilane roundabouts, provide a lane use sign after the directional sign, but far enough before the crosswalk that changing lanes will not distract drivers from watching for pedestrians. If there is an add lane and it is short enough, it is preferred to place the lane use sign prior to the add lane so that changing lanes is not necessary.

Provide pavement markings to reinforce appropriate lane use adjacent to the lane use sign if there are two lanes at that point; otherwise, at the point at which there are two lanes and in the circulating roadway where appropriate. If lane use markings are used in the circulating roadway, make them visible to vehicles from the yield point. Contact the region or HQ Traffic Office for additional information when completing the chanilization plan for a roundabout. Examples of pavement marking layouts for single-lane and multilane roundabouts are shown in Figure 915-31. For additional details on signing and pavement marking, see the MUTCD.

915.10 Illumination

Provide illumination for each of the conflict points between circulating and entering traffic in the roundabout and at the beginning of the raised splitter islands. Illuminate all raised channelization or curbing. Position the luminaires on the downstream side of each crosswalk to improve the visibility of pedestrians. Light the roundabout from the outside in toward the center. This improves the visibility of the central island and circulating vehicles to traffic approaching the roundabout. Ground-level lighting within the central island that shines upward toward objects in the central island can also improve their visibility. Figure 915-32 depicts the light standard placement for a four-leg roundabout. For additional information and requirements on illumination, see Chapter 840.

915.11 Access, Parking, and Transit Facilities

No road approach connections to the circulating roadway are allowed at roundabouts, unless they are designed as legs to the roundabout. It is preferred that road approaches not be located on the approach or departure legs within the length of the splitter island. The minimum distance from the circulating roadway to a road approach is controlled by corner clearance using the outside edge of the circulating roadway as the crossroad (see Chapter 1435). If minimum corner clearance cannot be met, justification must be provided. For additional requirements on limited access highways, see Chapter 1430.

If the parcel adjoins two legs of the roundabout, it is acceptable to provide a right-in/right-out driveway within the length of the splitter islands on both legs. This ensures that all movements are possible; design both driveways to accommodate their design vehicle (see Figure 915-33a).

Roadways between roundabouts may have restrictive medians with left-turn access provided with U-turns at the roundabouts (see Figure 915-33b).

Parking is not allowed on the circulating roadway or on the entry or exit roadway within the length of the splitter island.

Transit stops are not allowed on the circulating roadway, in the approach lanes within the length of the splitter island, or in the exit lanes prior to the crosswalk. Locate transit stops on the roadway before or after the roundabout, in a pullout, or where the pavement is wide enough that a stopped bus will not block the through movement of traffic or impede sight distance.

915.12 Approval

The HQ Design Office approves roundabout designs prior to their construction on state highways. Approval for roundabout designs will be in two phases: conceptual and geometric design.

(1) Conceptual Design Approval

Early coordination between the design team, region traffic and project development offices, and HQ traffic and design offices is an essential design function and will help ensure that proposed roundabouts are appropriate for existing and expected future conditions.

Conceptual Meetings are required early in the development of roundabouts. These meetings are intended to review, discuss, and critique alternatives and determine if sufficient information has been provided. If additional information is desired, the team can develop or recommend further design elements.

Designers will need to prepare various alternative sketches and present these to region traffic and project development and HQ traffic and design offices. As a minimum, the following items are required for the Conceptual Meeting:

(a) Accident analysis.

(b) Travel Forecasting, Traffic Analysis, and/or Microsimulation completed for all relevant peak periods (with A.M. and P.M. as a minimum) and all intersection control alternatives (with a signal and a roundabout control as a minimum).

- Use 20 years after the year construction is scheduled to begin as the design year of the analysis.
- Identify and justify growth rate(s) used for design year analyses.
- Provide classified turning movement volumes (for all scenarios).
- Provide a comparison and recommendation for the corridor or network. Include all pertinent reports (such as level of service, queue length, delay, percent stopped, and degree of saturation) generated from the analysis software for the signal and the roundabout. (Currently, Sidra version 3.1 is the accepted software to use for roundabout analyses. Using older versions of Sidra will not be acceptable.)
- Identify the approximate year a single-lane roundabout will likely fail and/or require expansion.

(c) Layout drawings of the intersection to a sufficient scale detailing existing roadway alignment and features, surrounding topographic information (may include above- and belowground utility elements), rights of way (existing), surrounding buildings, environmental constraints (such as wetlands), drainage, and other fixed objects.

(d) Identification of the design vehicle, fastest paths, and wheel paths.

(e) Identification of the truck types and sizes (oversized vehicles) that travel through the area (currently and in the future) and whether the roundabout is on an existing or planned truck route.

(f) Identification of pedestrian or bicycle issues (existing and future).

After completion of the Conceptual Meeting, the designer will submit a request for Conceptual Approval through the region Traffic Office to the HQ Design Office to obtain endorsement of the roundabout design that will be carried forward.

(2) Geometric Design Approval

The geometrics of roundabout designs (including channelization plans) must be submitted to the region Traffic and HQ Design offices for concurrent review and approval. Geometric criteria at the Headquarters level will be approved by the Assistant State Design Engineer.

As a minimum, include the following items in the submittal package:

(a) Channelization plans, completed per the regions' requirements.

(b) A summary of the documented design decisions.

(c) Identified deviations.

(d) Roundabout geometric data, including:

- Approach design speeds for all approach legs
- The design vehicle for each movement
- A table summarizing the roundabout design details, including inscribed diameter, central island diameter, truck apron, and cross slope of the circulating roadway
- Detailed drawings showing the fastest path for each movement, with speed and radius for each curve
- A table summarizing stopping and intersection sight distance on each leg
- Auto turn paths showing design vehicle, WB-67, and largest oversize vehicle movements (freight routes will help identify the oversized loads that could be expected)

(e) Detailed drawings of the splitter islands on each leg.

(f) Signing and illumination plans.

A roundabout review checklist and example submittal package is located on the Project Development web page: www.wsdot.wa.gov/EESC/Design/projectdev/

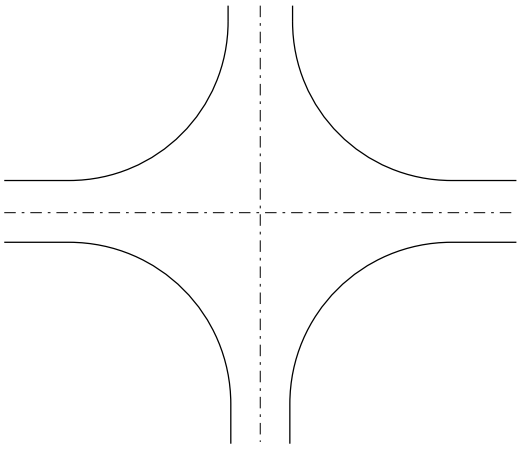
(3) Other Approvals

The designer shall document all design decisions and submit these to the region Project Development Engineer or Engineering Manager for approval and inclusion as part of the DDP.

If there are numerous variances from the standard design elements required for a roundabout design, the designer shall coordinate with the region Traffic Office, the region Project Development Engineer or Engineering Manager, and the Assistant State Design Engineer to determine whether a project analysis may be required. A project analysis shall be approved by the Assistant State Design Engineer.

915.13 Documentation

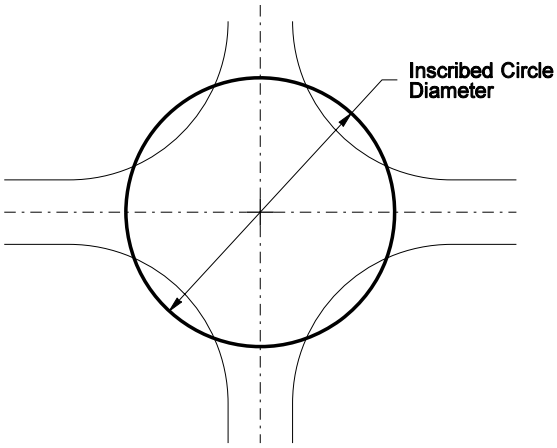
The list of documents that are to be preserved in the Design Documentation Package (DDP) or the Project File (PF) can be found on the following web site: www.wsdot.wa.gov/eesc/design/projectdev/



Step 1

Step 1

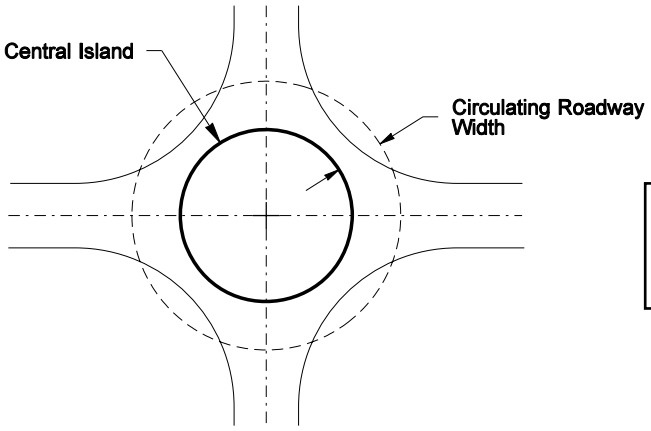
Start with a scale drawing of the intersection.



Step 2

Step 2

Select a trial inscribed circle diameter based on the capacity analysis and Figure 915-8 and place this at the intersection.



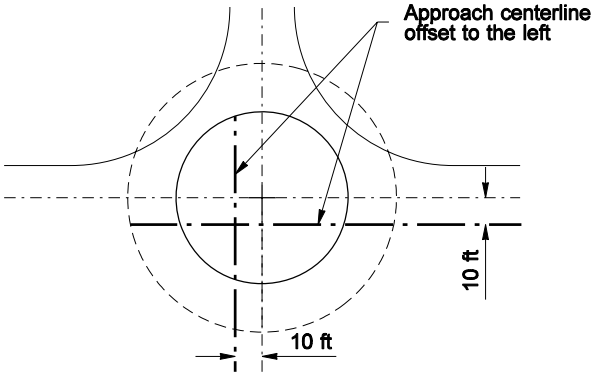
Step 3

Step 3

Establish the central island and circulating roadway width.

Design Iteration Steps

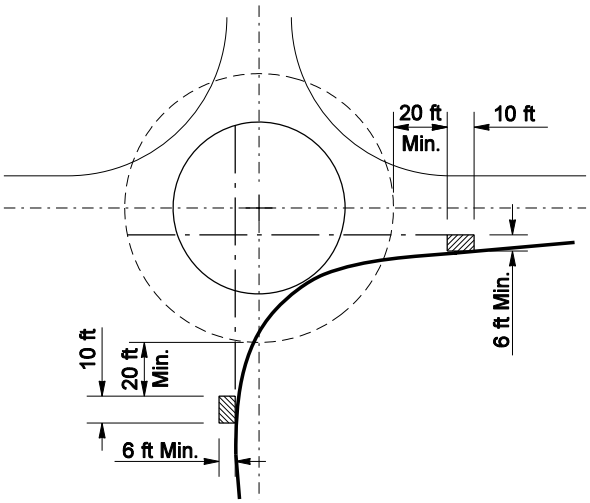
Figure 915-13a



Step 4

Step 4

Draw each approach's centerline 10 feet to the left of the center of the circle.

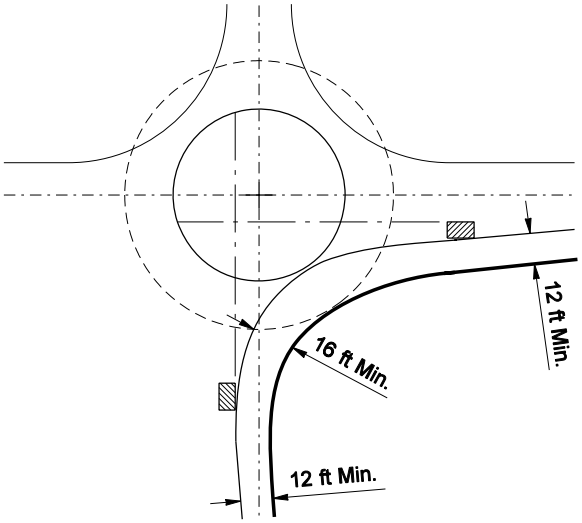


Step 5

Step 5

Draw a 10-foot x 6-foot-wide pedestrian refuge 20 feet from the inscribed circle centered on the leg's centerline.

Draw the design elements of the entry curve and the next exit curve to the right. Start with the entry and exit that are closest together and continue around the circle until completing the exit curve on the initial approach.



Step 6

Step 6

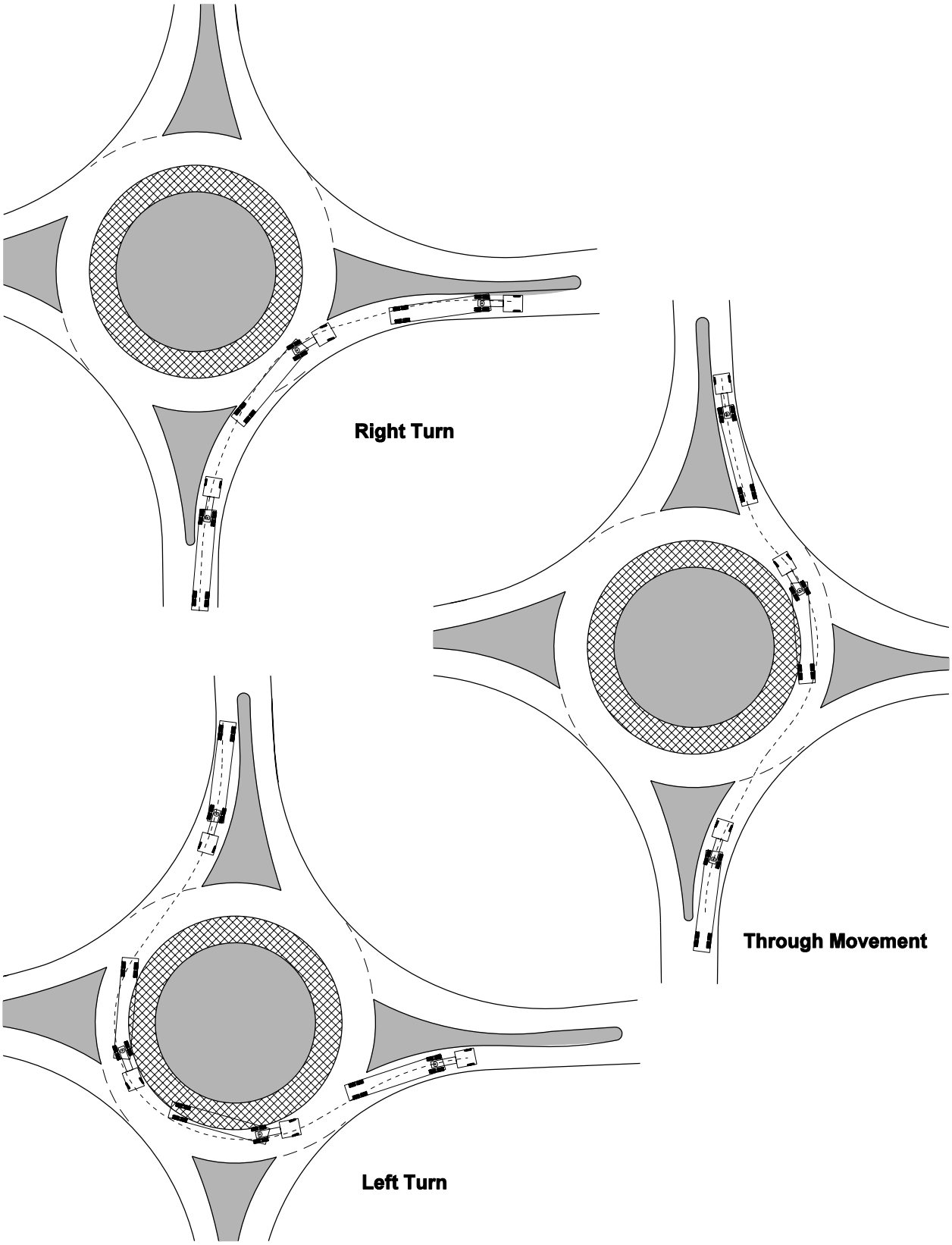
Evaluate the adequacy of the roundabout design (check vehicle turning-path templates, entry angle, fastest paths, and natural vehicle paths).

Revise deficient design element(s), repeating the design steps above until design performance objectives are met.

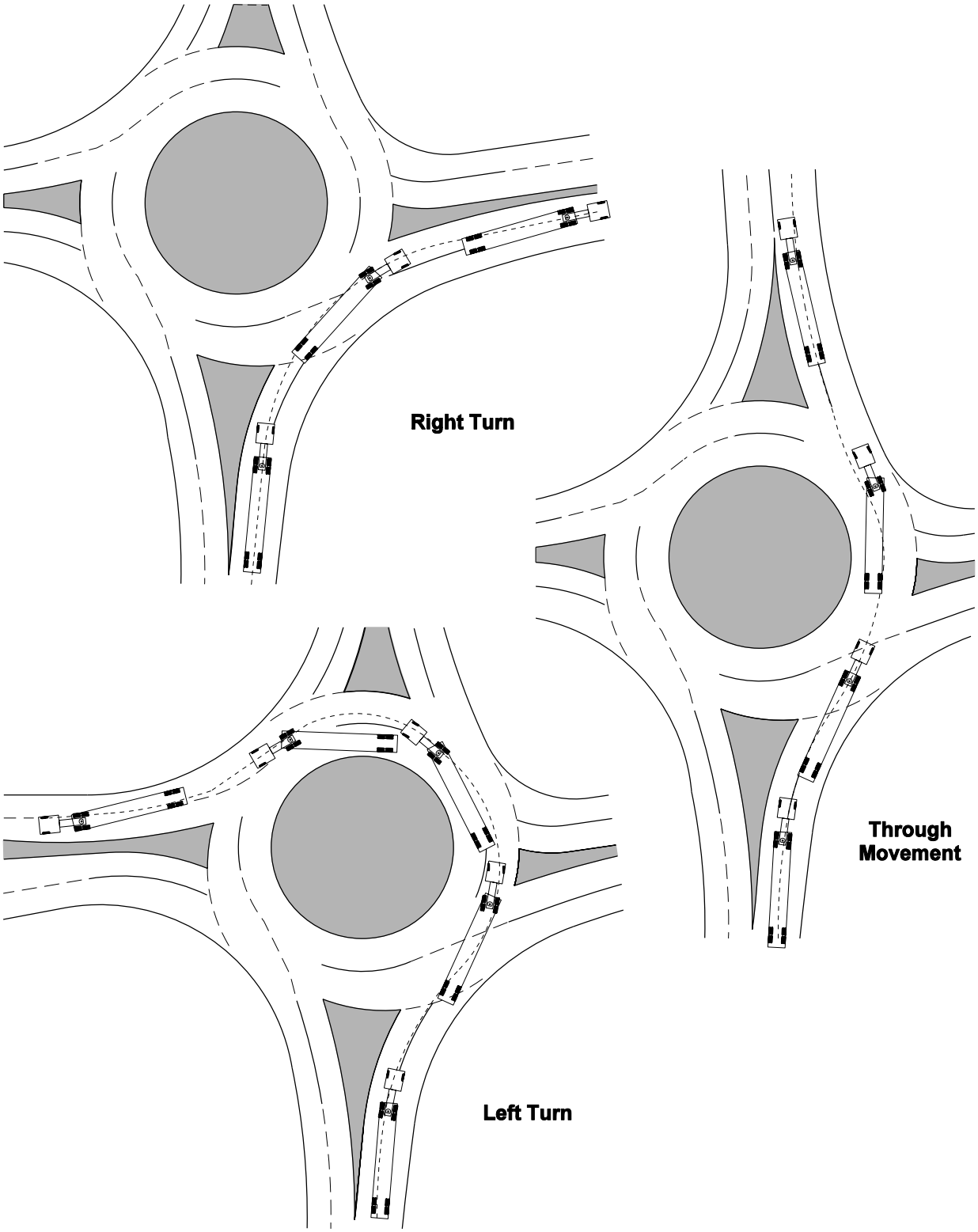
Pedestrian Refuge Area

Design Iteration Steps

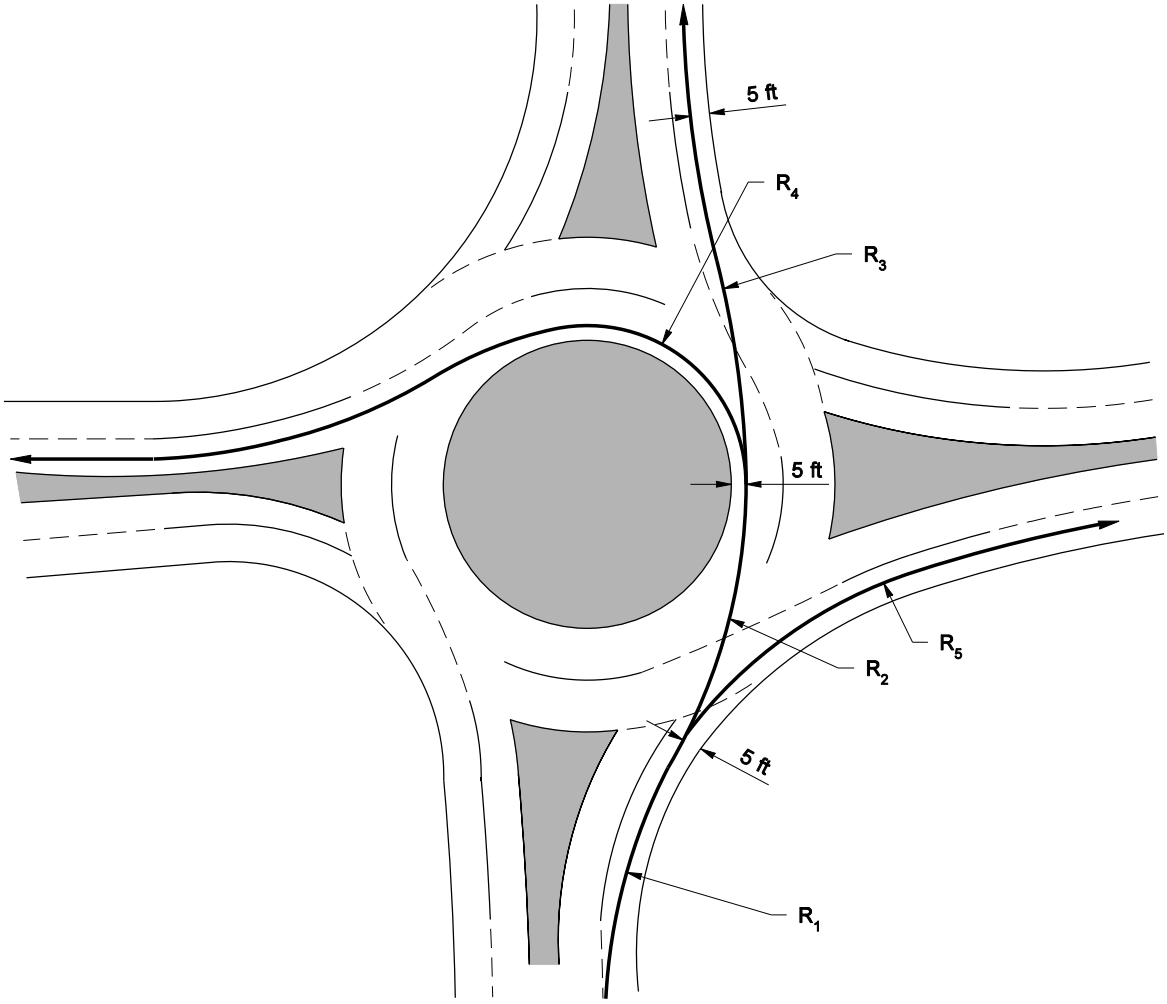
Figure 915-13b



Truck Turning Paths
Figure 915-14a



Truck Turning Paths
Figure 915-14b



Where:

R_1 = Entry path radius

R_2 = Circulating path radius

R_3 = Exit path radius

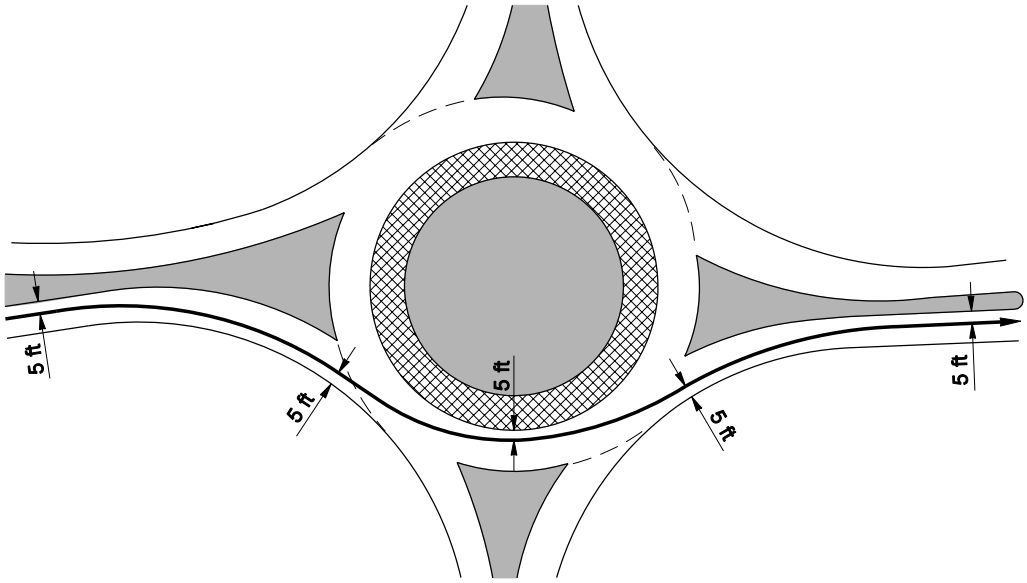
R_4 = Left-turn path radius

R_5 = Right-turn path radius

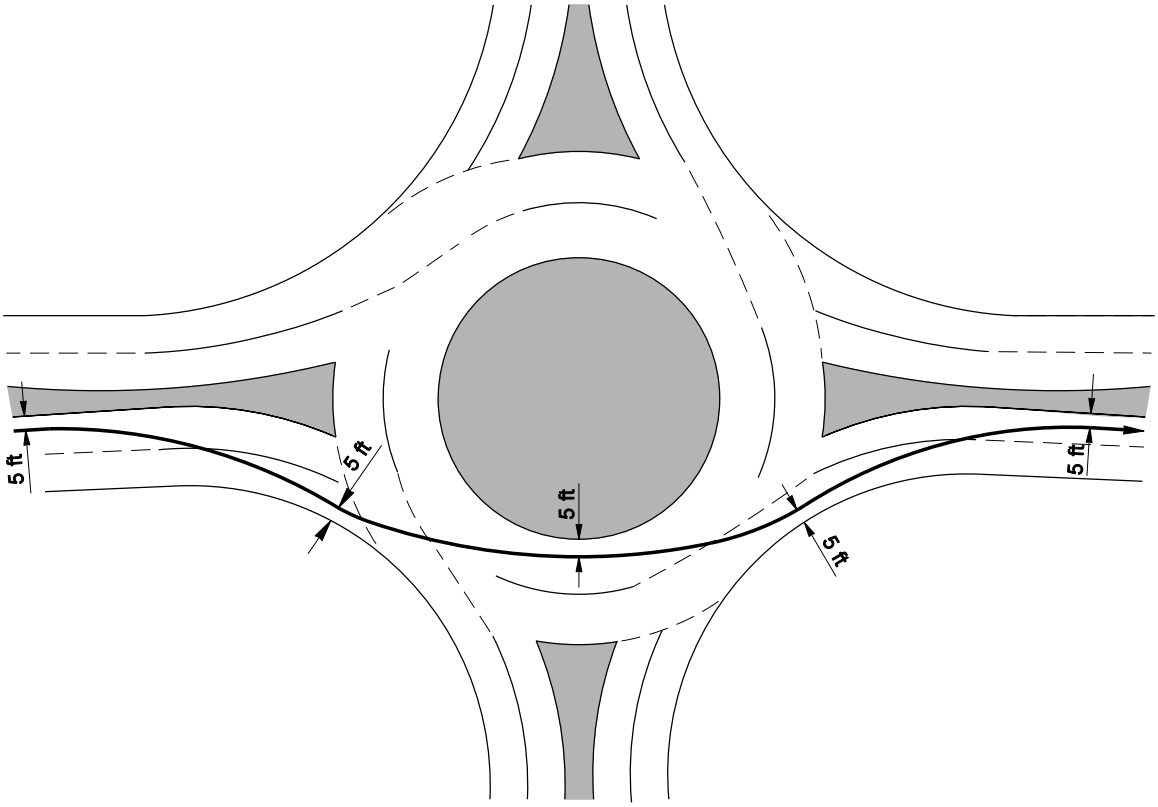
Notes:

- The 5-foot clearance is from raised curbing.
- Edge striping next to a curb is discouraged.

Fastest Path Radii
Figure 915-15a

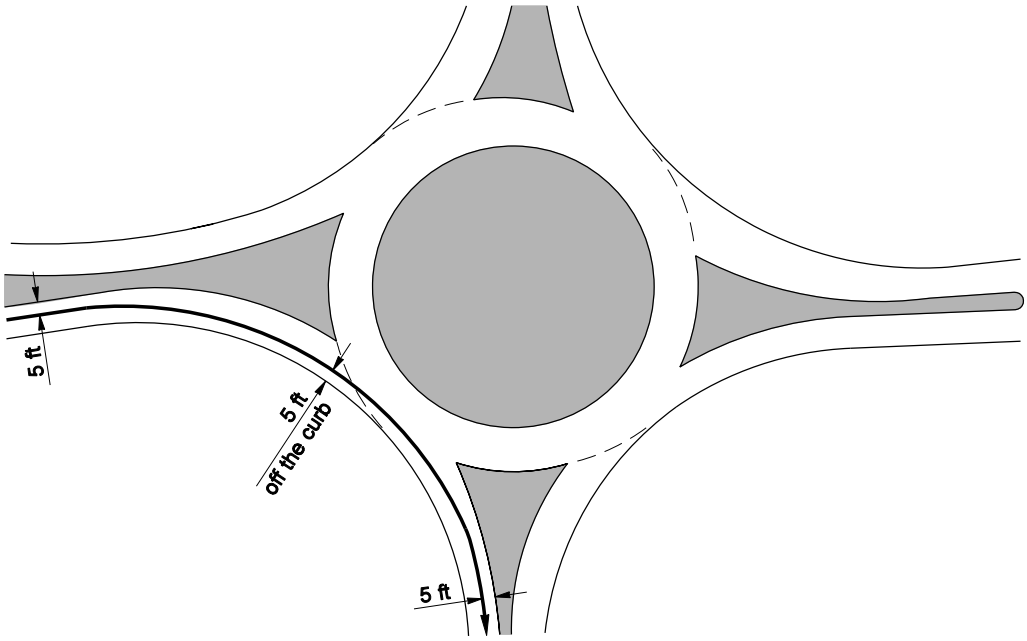


Single-Lane Roundabout

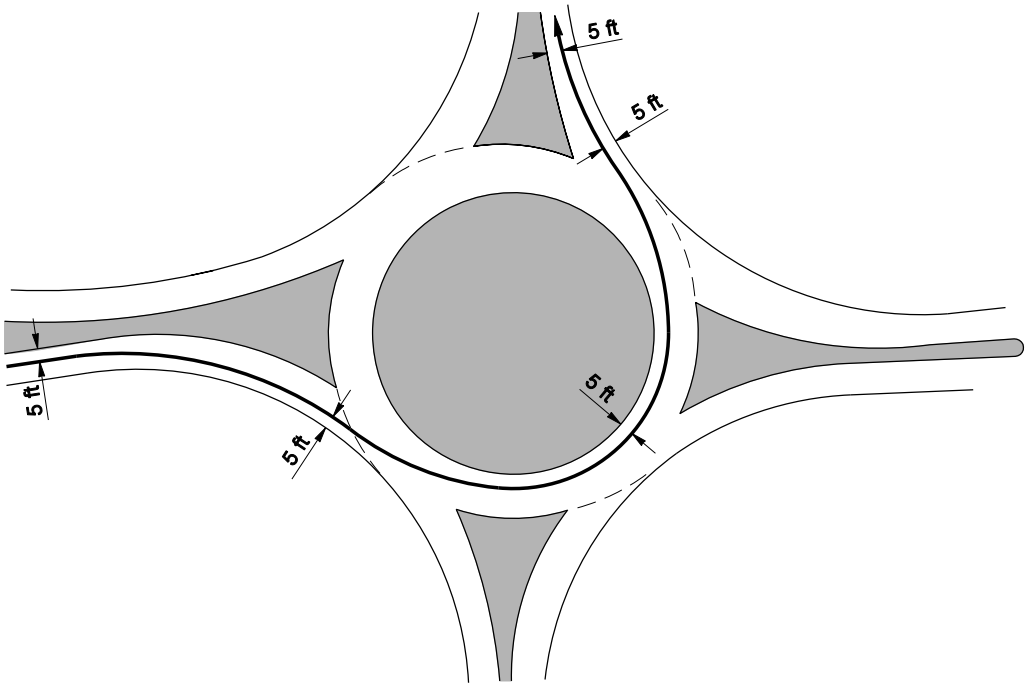


Multilane Roundabout

Fastest Path Radii
Figure 915-15b

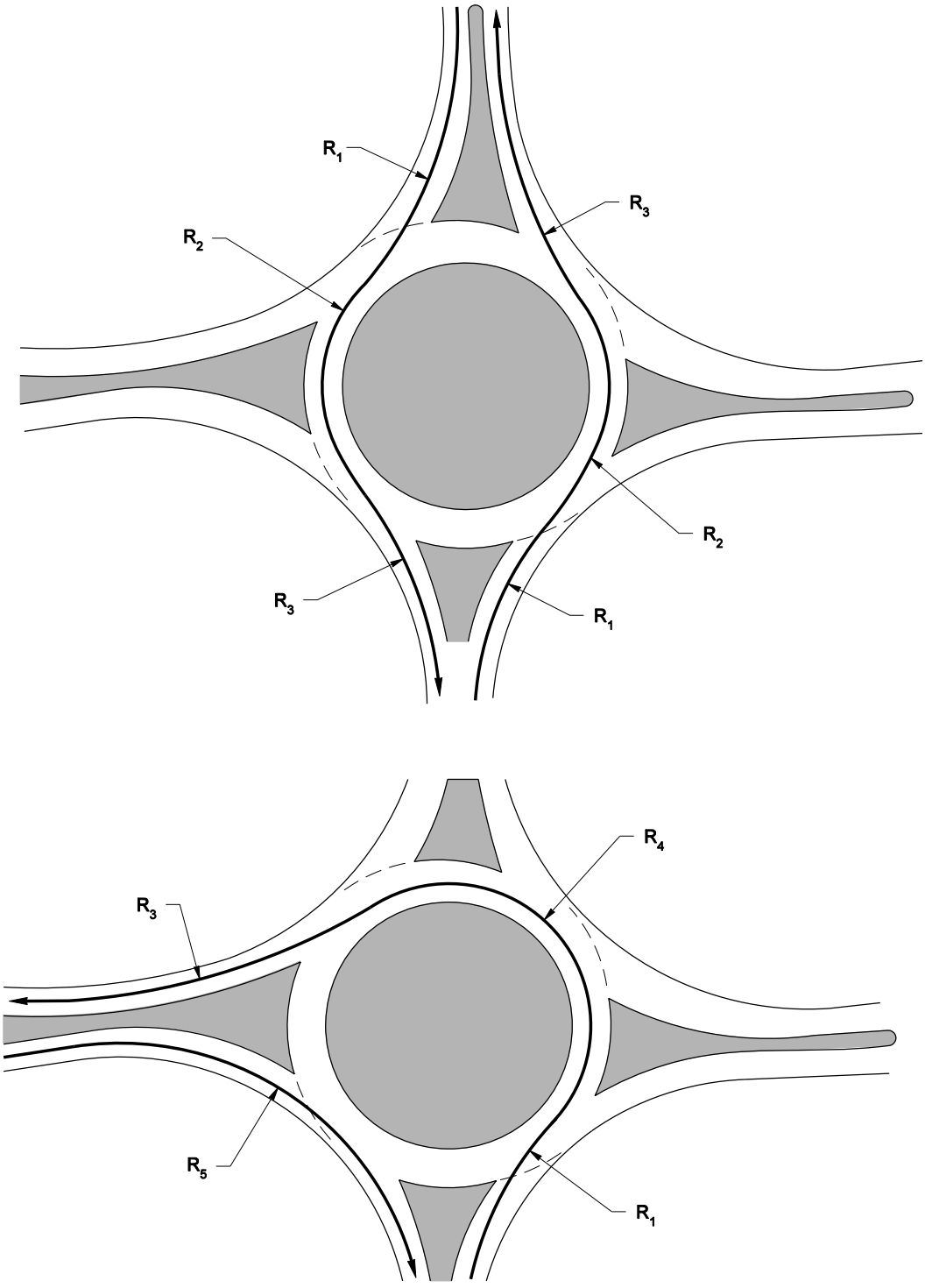


Right-Turn Movement

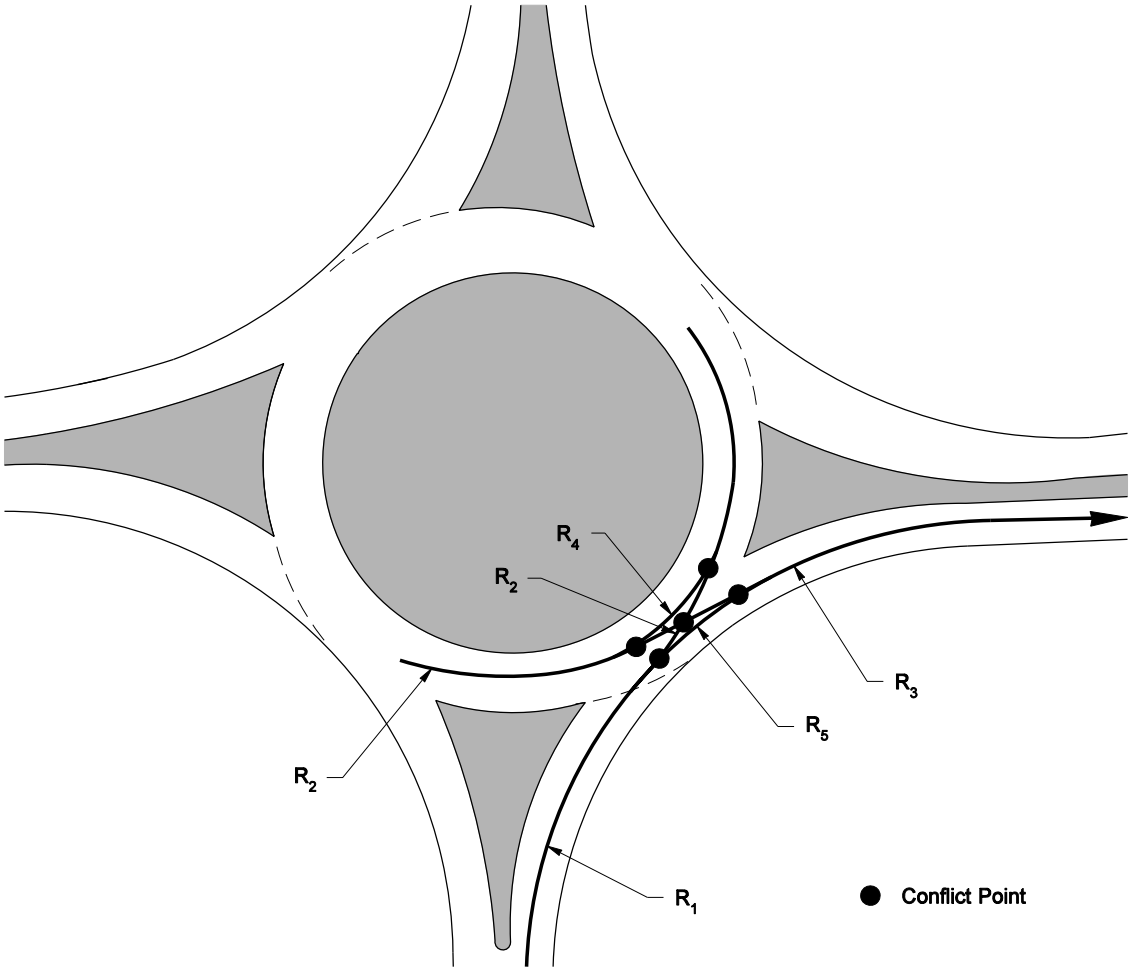


Left-Turn Movement

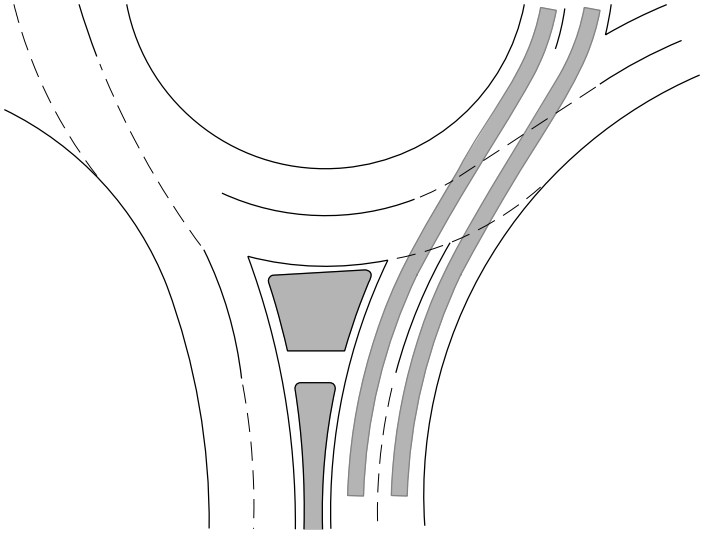
Fastest Path Radii
Figure 915-15c



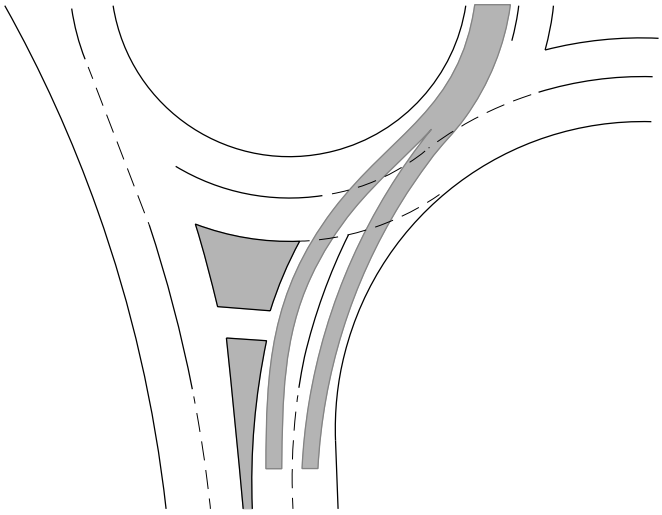
Consecutive Radii
Figure 915-16



Coinciding Radii and Conflict Points
Figure 915-17

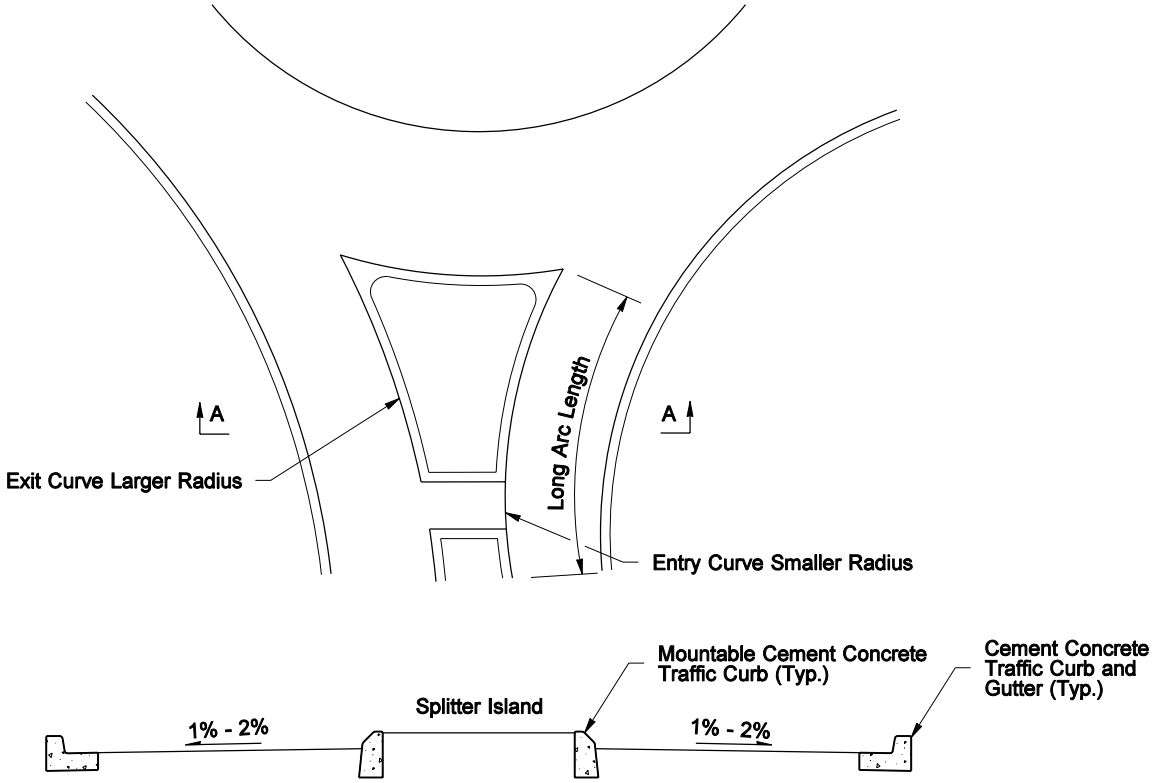


Entry Design Without Path Overlap (Preferred)



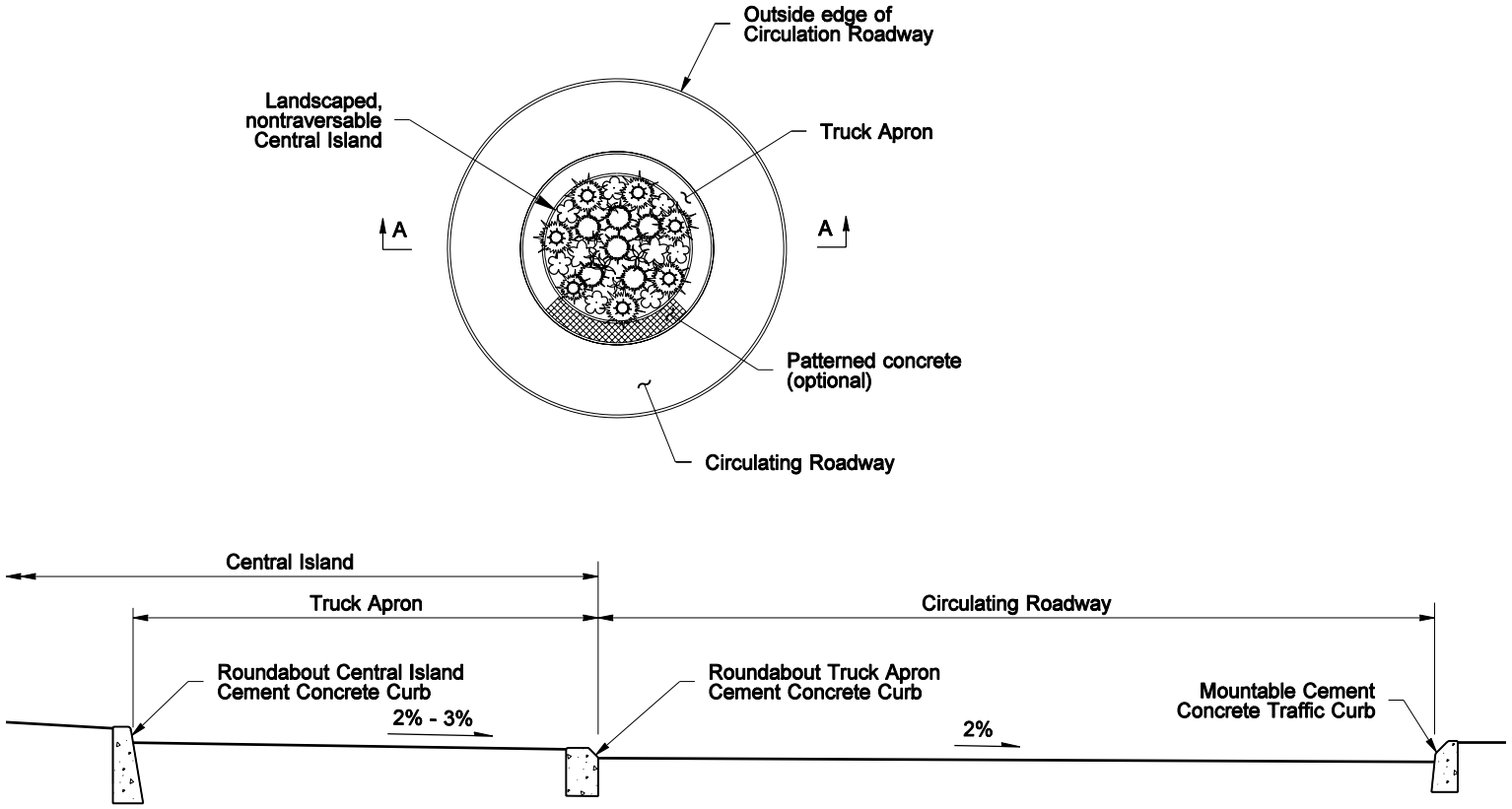
Entry Design With Path Overlap (Undesirable)

Entry Design Path
Figure 915-18



Section A-A
(not to scale)

Entry and Exit Curves
Figure 915-19

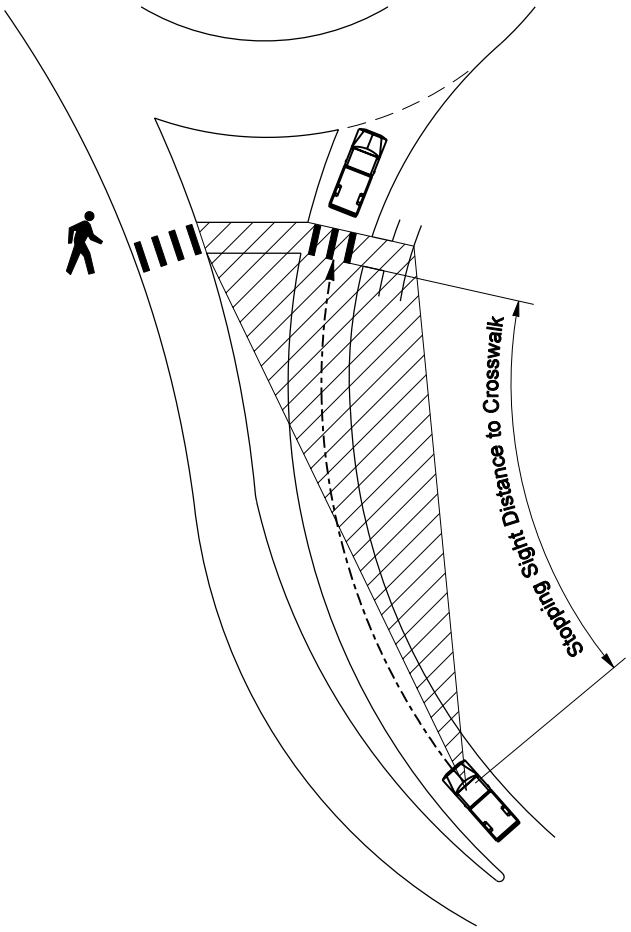


Section A-A
(not to scale)

Note:

See the *Standard Plans* for Roundabout Curb details.

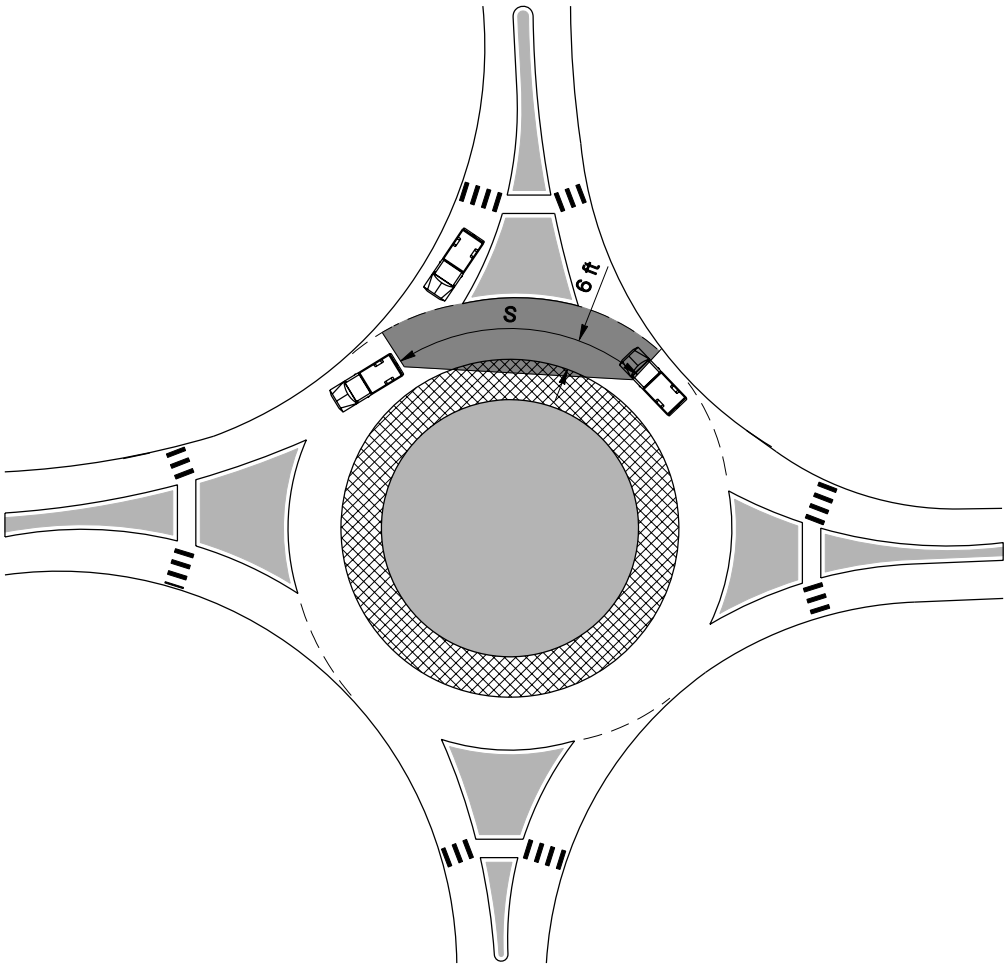
Central Island and Cross Section
Figure 915-20



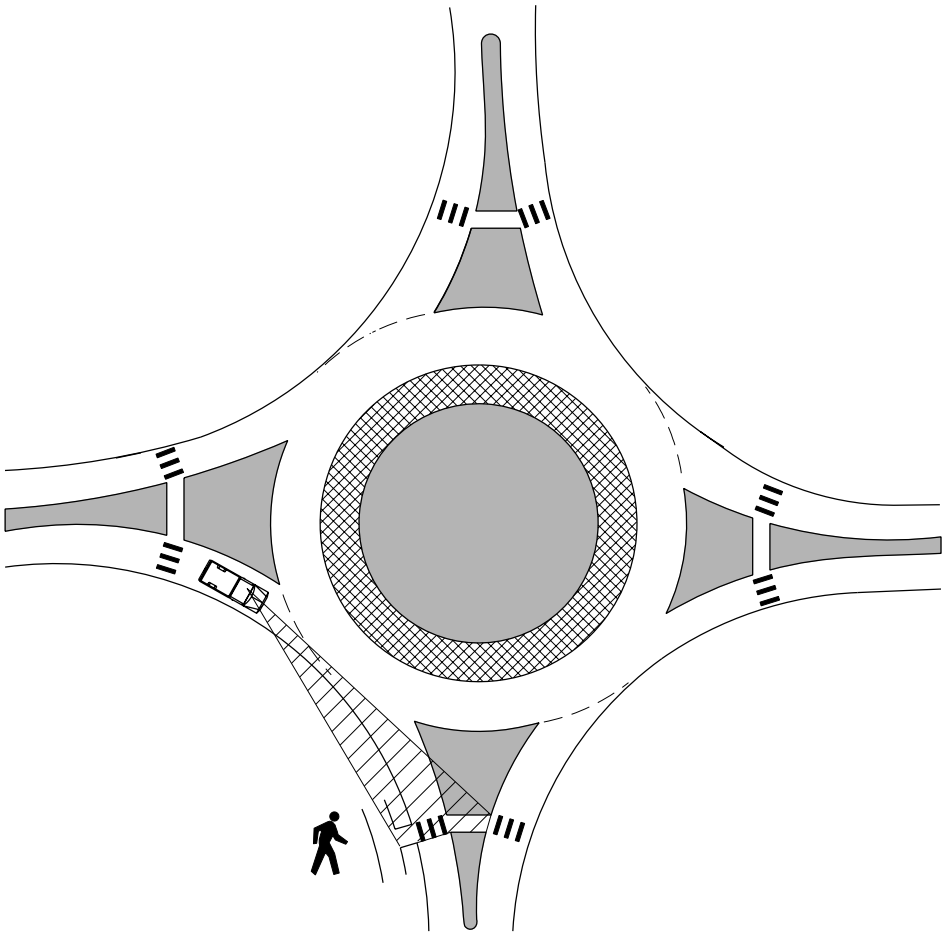
Note:

Position the crosswalk one car length (approximately 20 feet) in advance of the yield point.

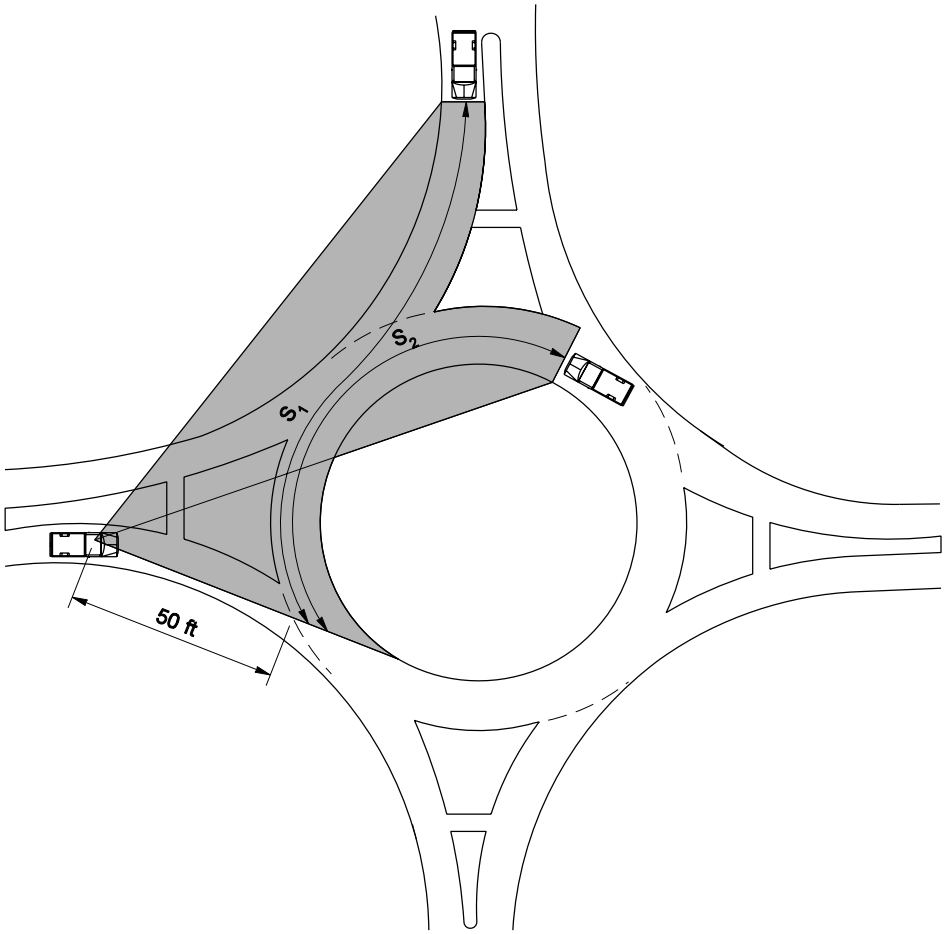
Approach Stopping Sight Distance to Crosswalk
Figure 915-21



Stopping Sight Distance on Circulatory Roadway
Figure 915-22



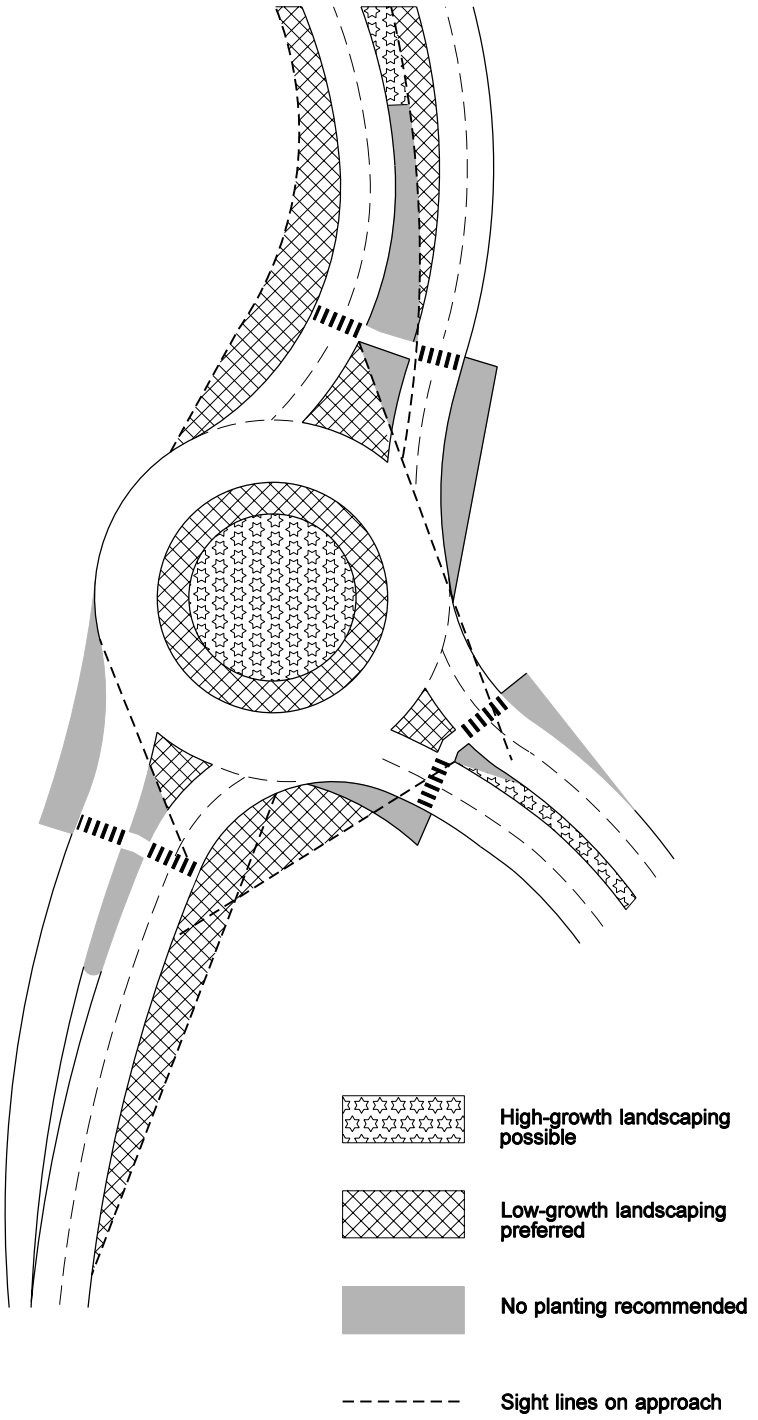
Exit stopping Sight Distance to Crosswalk
Figure 915-23



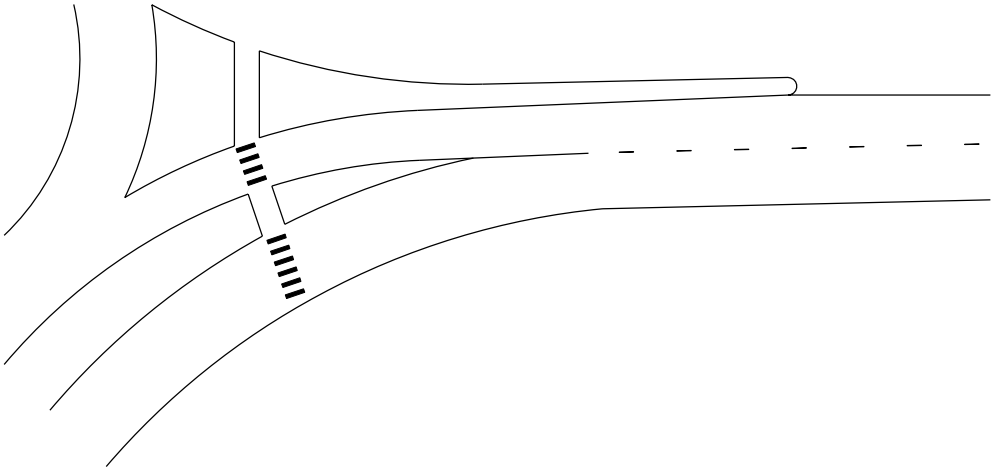
S_1 = Entering stream sight distance

S_2 = Circulating stream sight distance

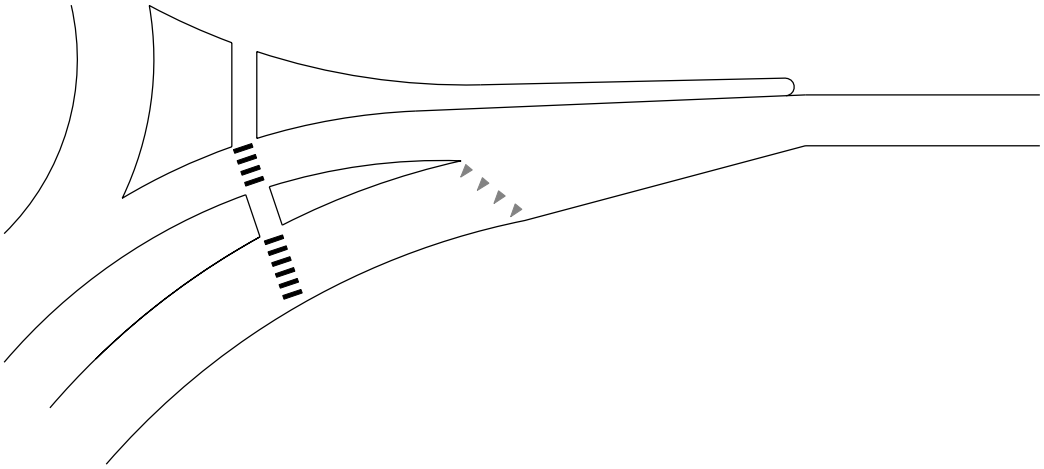
Intersection Sight Distance
Figure 915-24



Landscaping Height Restrictions for Intersection Sight Distance
Figure 915-25

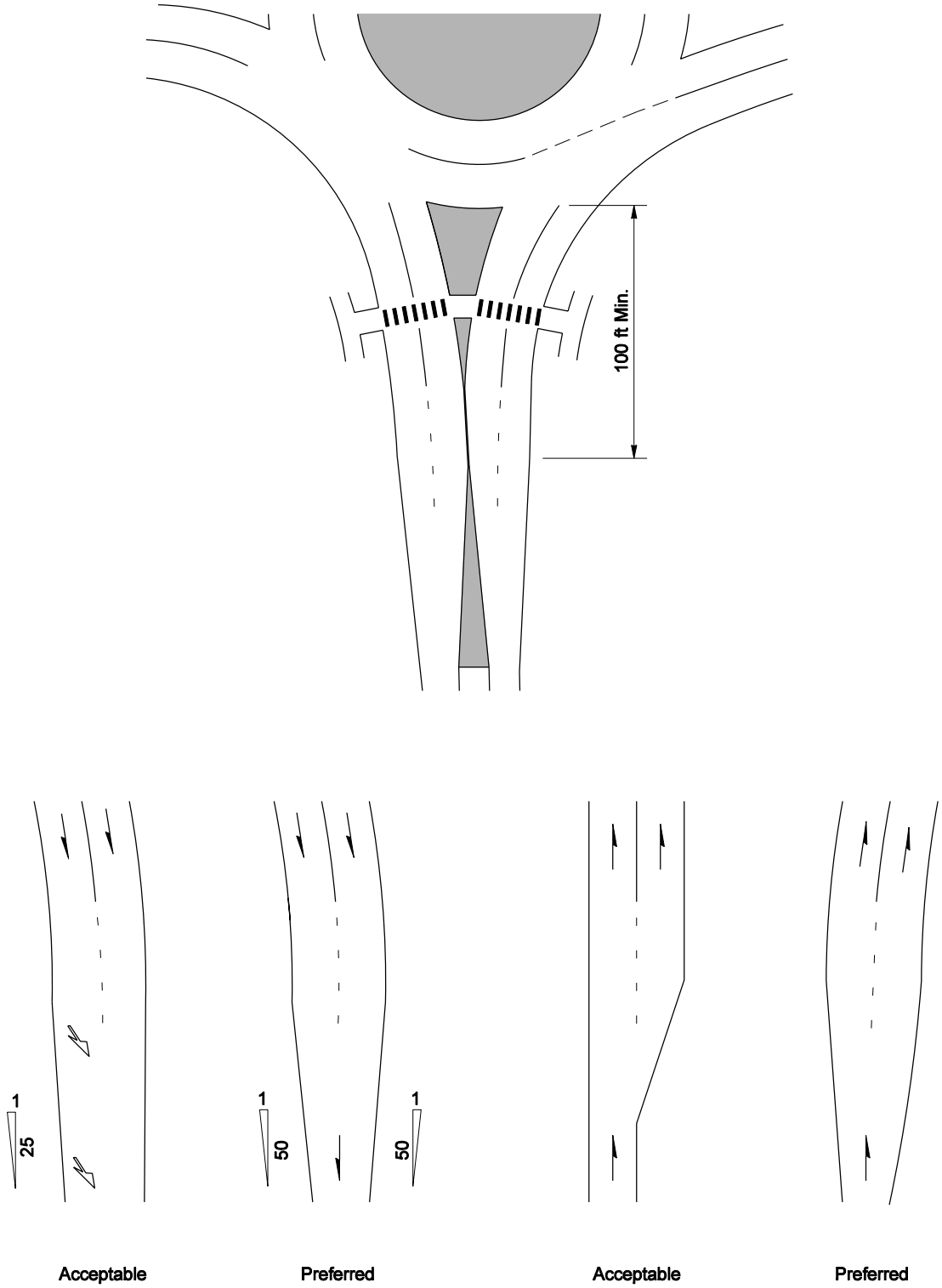


Add Lane

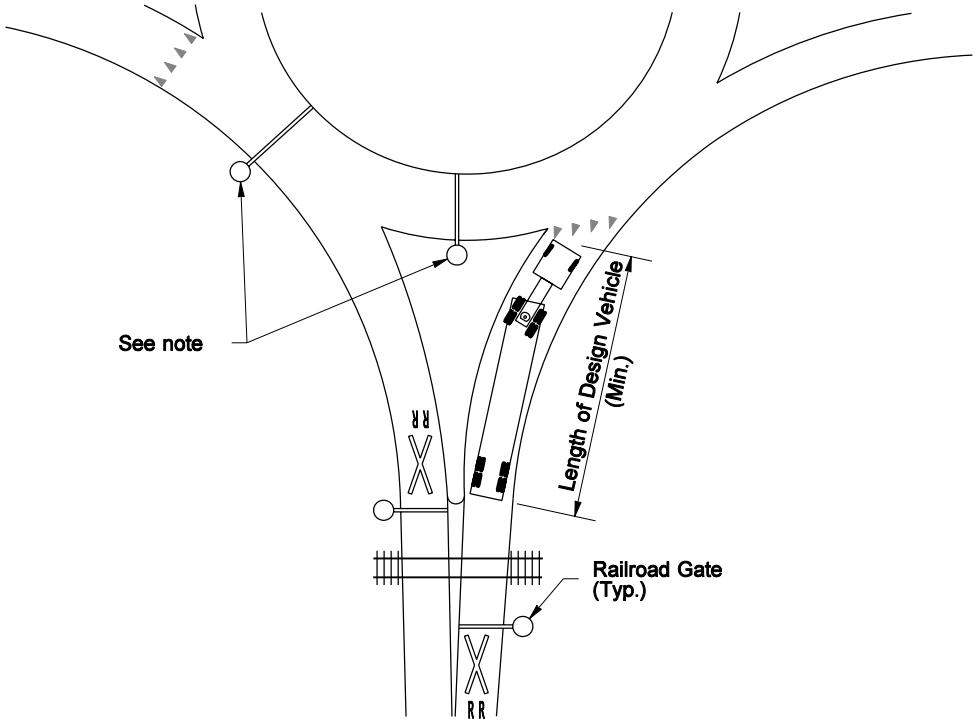


Yield Termination

Right-Turn Slip Lane Termination
Figure 915-26



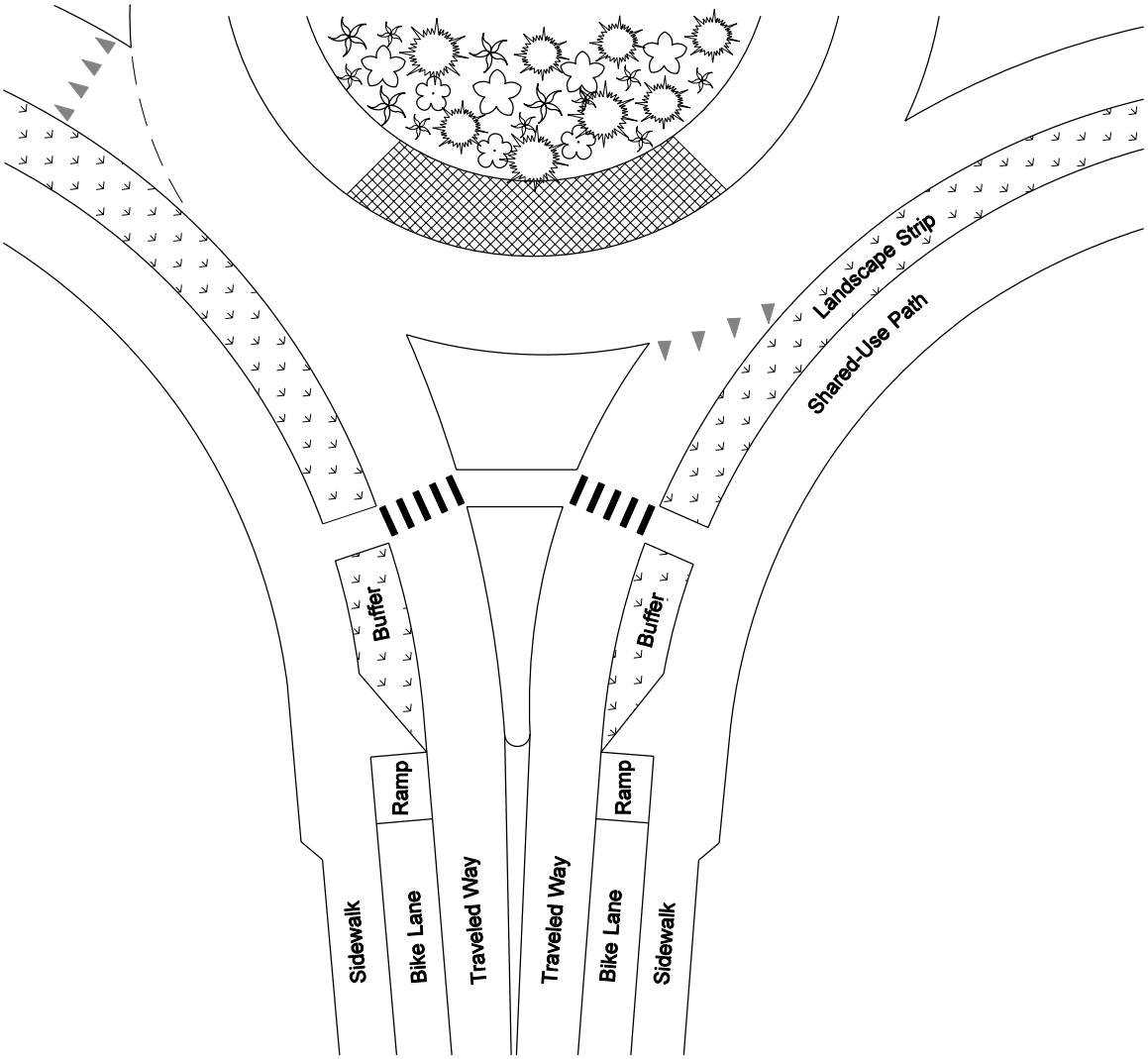
Add Lane
Figure 915-27



Note:

The intersection analysis and site-specific conditions will help determine the need for, and optimum placement of, a gate on the circulating roadway. (See 915.06 (k).)

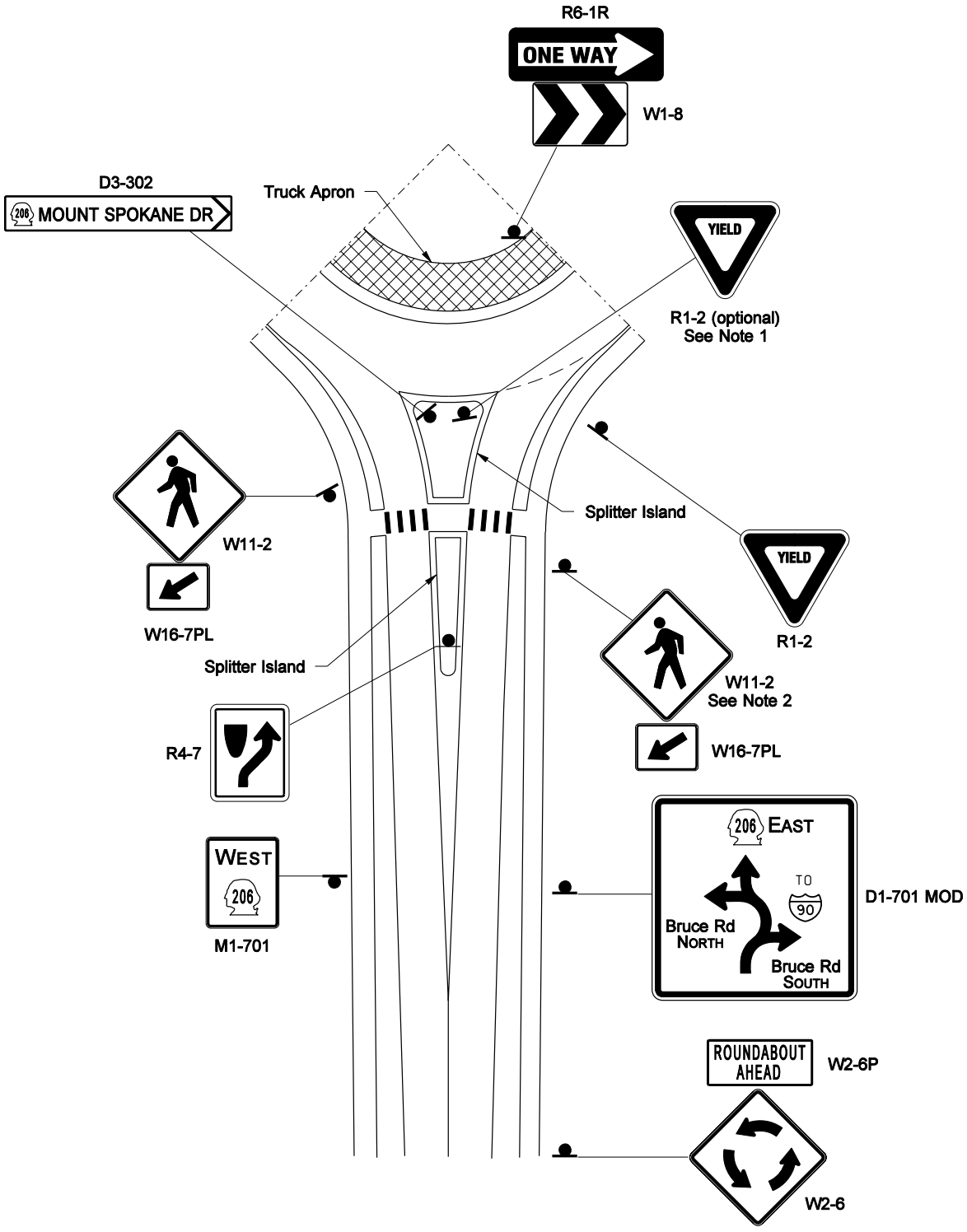
Railroad Gate Configuration
Figure 915-28



Note:

See Chapters 1020 and 1025 for pedestrian and bicycle design guidance.

Bicycle Lanes
Figure 915-29



Notes:

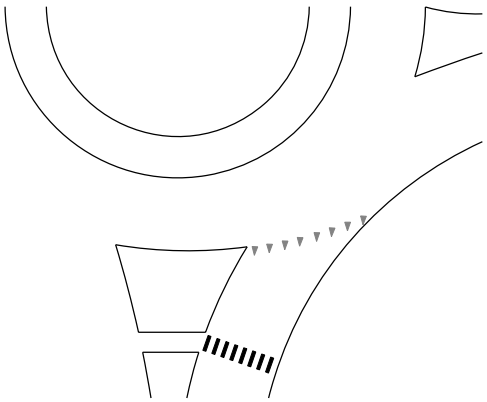
(1) Required on two-lane entries, consider when view of right-side sign might become obstructed.

(2) Locate in such a way as to not obstruct view of yield sign.

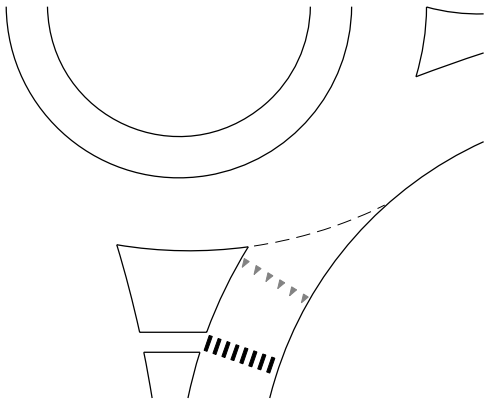
See Chapter 820 for additional information on sign installation.

Roundabout Signing

Figure 915-30



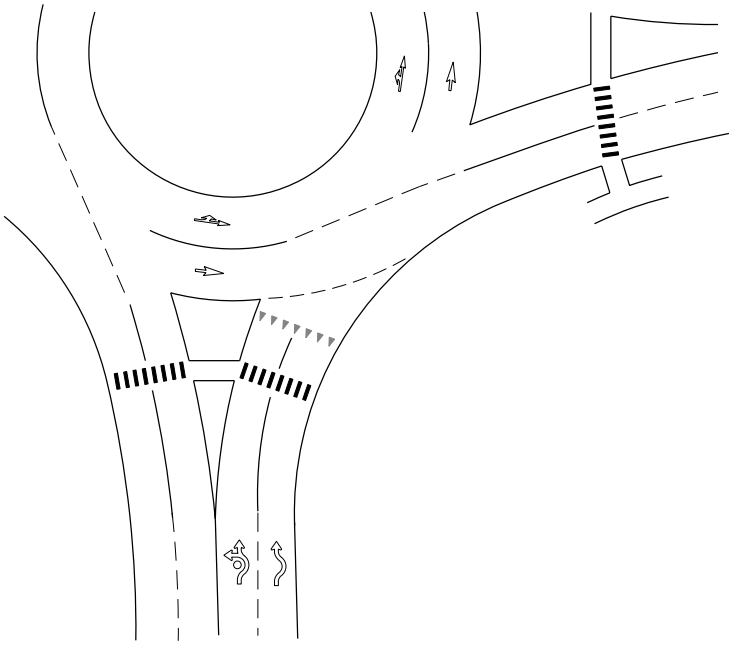
Single-Lane Striping
Option 1



Single-Lane Striping
Option 2

Note:

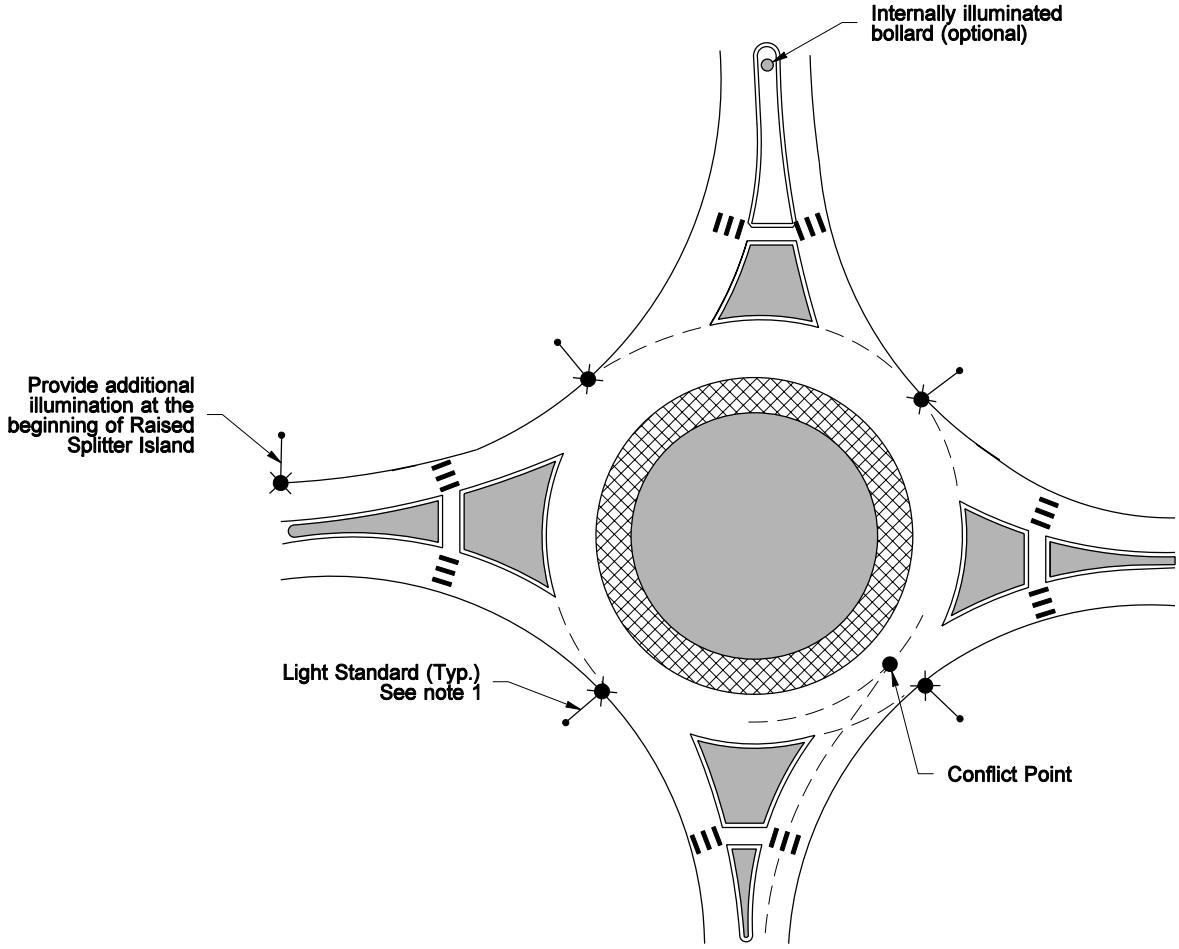
For Single and Multilane Roundabouts use Option 1 or Option 2 for placement of "yield symbols" at or near entry line.



Multilane Striping

Roundabout Striping and Pavement Marking

Figure 915-31



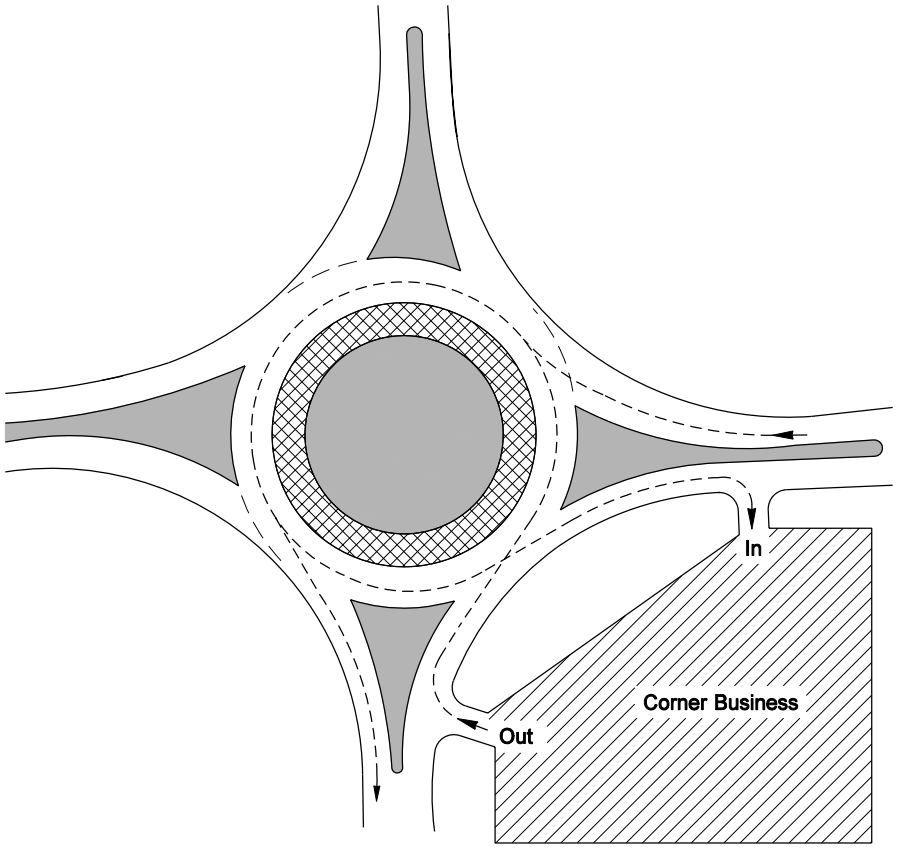
Notes:

(1) Consider additional lighting for walkways and crosswalks to provide visibility for pedestrians.

(2) Also use to provide illumination of the roadway behind the pedestrian from the driver's perspective.

Roundabout Illumination

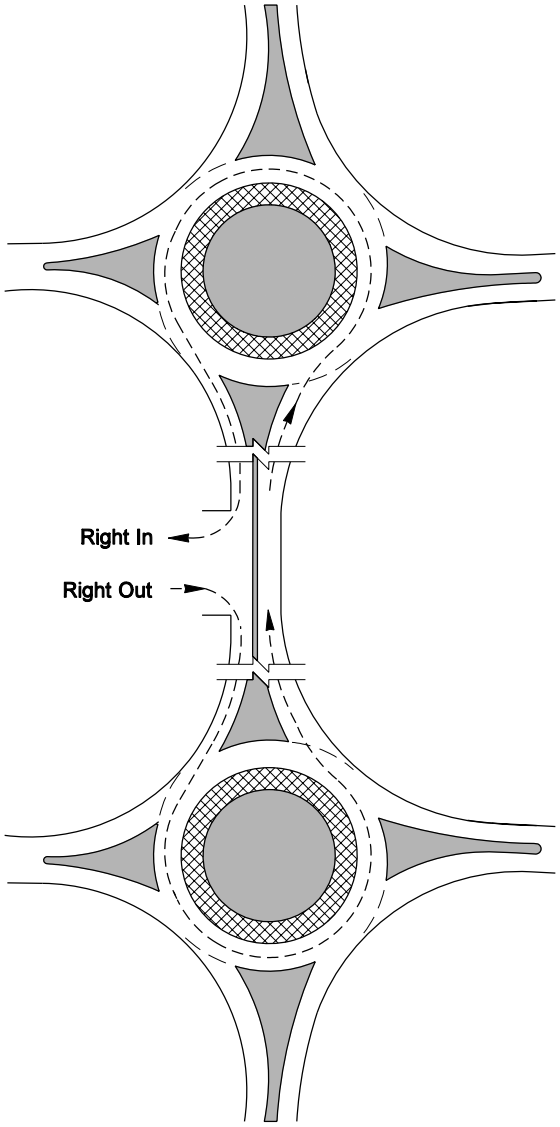
Figure 915-32



Notes:

- See Chapter 1430 for additional restrictions on limited access highways.
- See Chapter 1435 for corner clearance requirements on managed access highways.

Multiple Access Circulation
Figure 915-33a



Note:

Left-turn access between roundabouts using U-turns at the roundabouts.

Multiple Access Circulation
Figure 915-33b

(c) ***Length.*** Lengths will vary depending on speed, grade, and type of design used. The minimum length is 200 feet. Calculate the stopping length using the following equation:

$$L = \frac{V^2}{0.3(R \pm G)}$$

Where:

L = stopping distance (ft)
V = entering speed (mph)
R = rolling resistance (see Figure 1010-1)
G = grade of the escape ramp (%)

Speeds of out-of-control trucks rarely exceed 90 mph; therefore, an entering speed of 90 mph is preferred. Other entry speeds may be used when justification and the method used to determine the speed are documented.

Material	R
Roadway	1
Loose crushed aggregate	5
Loose noncrushed gravel	10
Sand	15
Pea gravel	25

Rolling Resistance (R)
Figure 1010-1

(d) ***Width.*** The width of each escape ramp will vary depending on the needs of the individual situation. It is desirable for the ramp to be wide enough to accommodate more than one vehicle. The desirable width of an escape ramp to accommodate two out-of-control vehicles is 40 feet and the minimum width is 26 feet.

(e) The following items are additional considerations in the design of emergency escape ramps:

- If possible, at or near the summit, provide a pull-off brake-check area. Also, include informative signing about the upcoming escape ramp in this area.
- A free-draining, smooth, noncrushed gravel is preferred for an arrester bed. To assist in smooth deceleration of the vehicle, taper the depth of the bed from 3 inches at the entry to a full depth of 18 to 30 inches in not less than 100 feet.
- Mark and sign in advance of the ramp. Discourage normal traffic from using or parking in the ramp. Sign escape ramps in accordance with the guidance contained in the MUTCD for runaway truck ramps.
- Provide drainage adequate to prevent the bed from freezing or compacting.
- Consider including an impact attenuator at the end of the ramp if space is limited.
- A surfaced service road adjacent to the arrester bed is needed for wreckers and maintenance vehicles to remove vehicles and make repairs to the arrester bed. Anchors are desirable at 300-foot intervals to secure the wrecker when removing vehicles from the bed.

A typical example of an arrester bed is shown in Figure 1010-8.

Include justification, all calculations, and any other design considerations in the documentation of an emergency escape ramp documentation.

1010.09 Chain-Up Areas

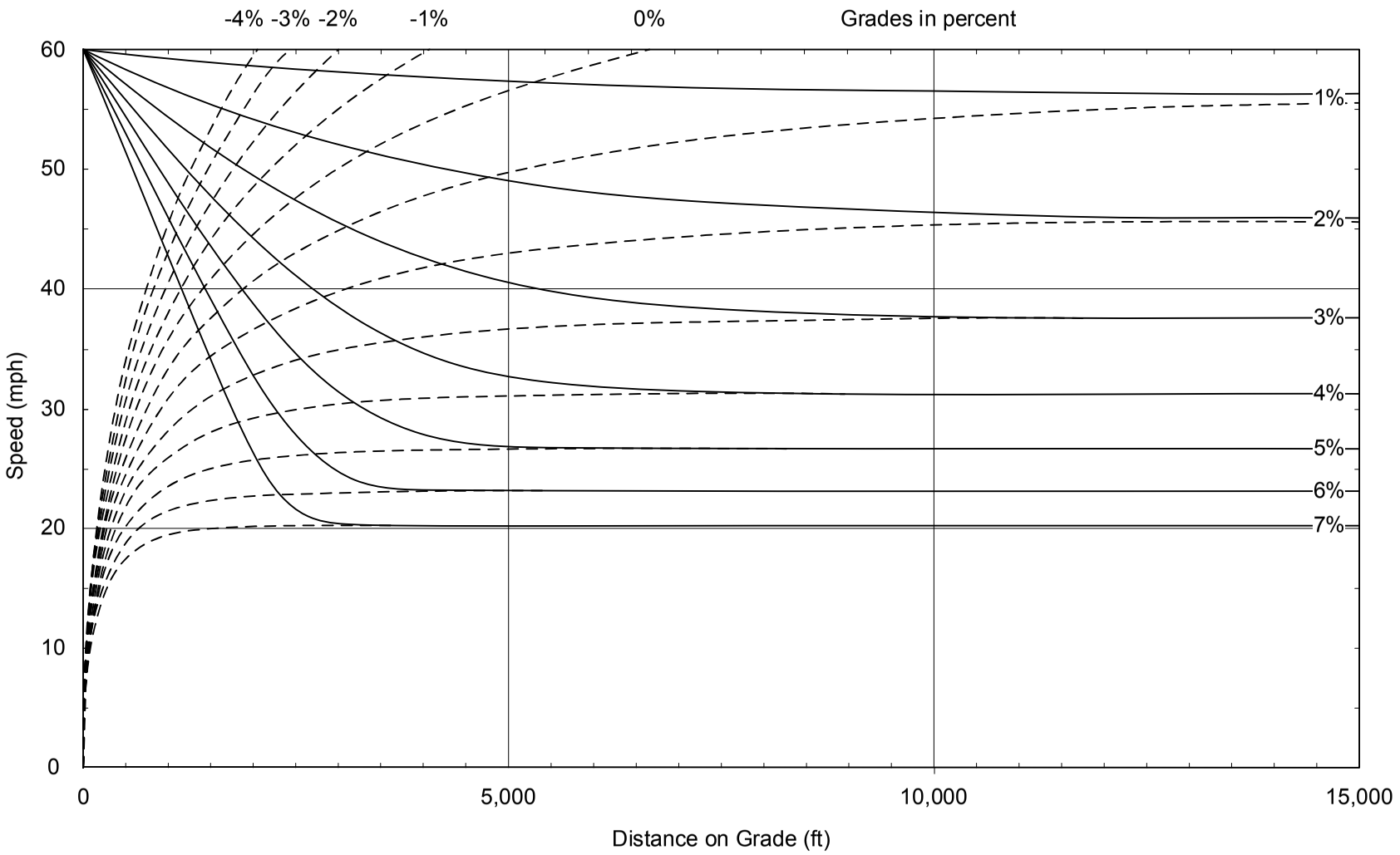
Provide chain-up areas to allow chains to be put on vehicles out of the through lanes at locations where traffic enters chain enforcement areas. Provide chain-off areas to remove chains out of the through lanes for traffic leaving chain enforcement areas.

Chain-up or chain-off areas are widened shoulders, designed as shown in Figure 1010-9. Locate chain-up and chain-off areas where the grade is 6% or less and preferably on a tangent section.

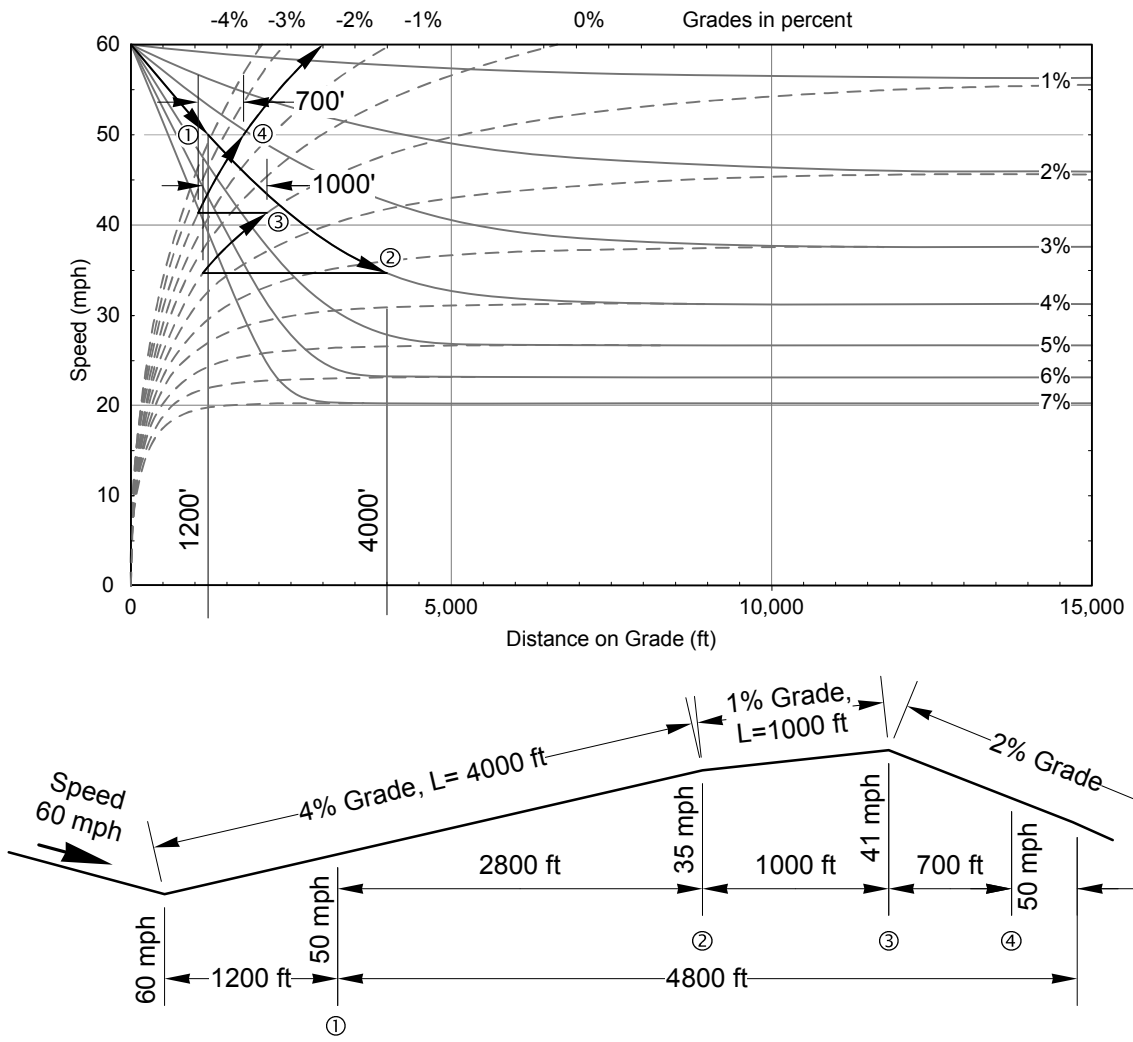
Consider illumination for chain-up and chain-off areas on multilane highways. When deciding whether or not to install illumination, consider traffic volumes during the hours of darkness and the availability of power.

1010.10 Documentation

The list of documents that are to be preserved in the Design Documentation Package (DDP) or the Project File (PF) can be found on the following web site: www.wsdot.wa.gov/eesc/design/projectdev/



Speed Reduction Warrant (Performance for Trucks)
Figure 1010-2a



Given:

A two-lane highway meeting the level of service warrant, with the above profile, and a 60 mph posted speed.

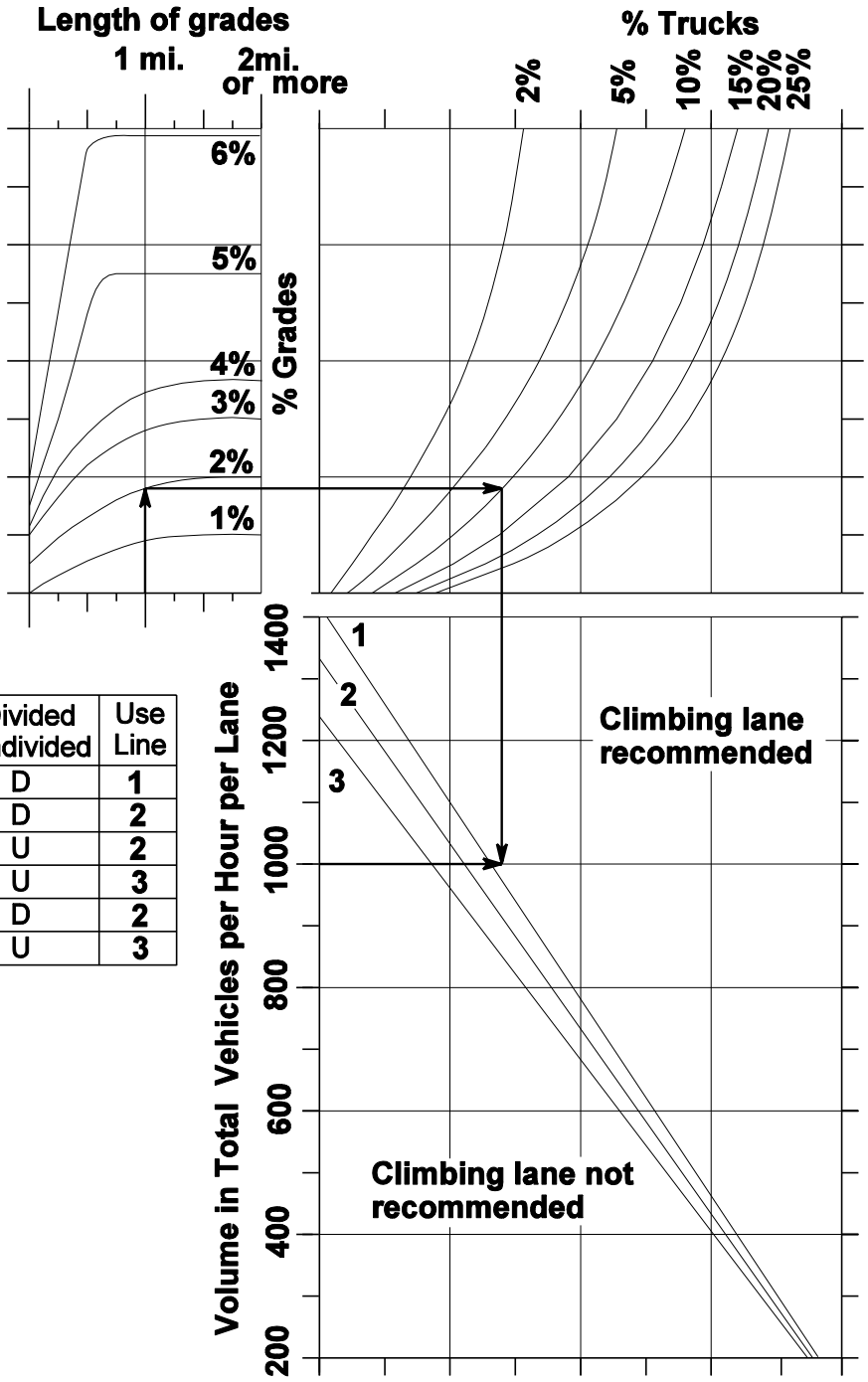
Determine:

Is the climbing lane warranted and, if so, what length?

Solution:

1. Follow the 4% grade deceleration curve from a speed of 60 mph to a speed of 50 mph at 1,200 feet. The speed reduction warrant is met and a climbing lane is needed.
2. Continue on the 4% grade deceleration curve to 4,000 feet. Note that the speed at the end of the 4% grade is 35 mph.
3. Follow the 1% grade acceleration curve from a speed of 35 mph for 1,000 feet. Note that the speed at the end of the 1% grade is 41 mph.
4. Follow the -2% grade acceleration curve from a speed of 41 mph to a speed of 50 mph, ending the speed reduction warrant. Note that the distance required is 700 feet.
5. The total auxiliary lane length is (4,000-1,200)+1,000+700+300=4,800 feet. 300 feet is added to the speed reduction warrant for a two-lane highway. (See the text and Figure 1010-4.)

Speed Reduction Warrant (Example)
Figure 1010-2b



Lane Width	Lateral Clearance	Divided Undivided	Use Line
12	≥ 6	D	1
12	< 6	D	2
12	≥ 6	U	2
12	< 6	U	3
11	All	D	2
11	All	U	3

Example

2% grade for 1 Mile
10% Trucks
12' Lanes
Lateral Clearance
≥ 6'
4 Lane, Divided
DDHV = 2000
From the chart,
climbing lane
is recommended

Level of Service Warrant – Multilane
Figure 1010-3

1055.01 General

This Chapter provides design guidance for left-side direct access facilities for high occupancy vehicles (HOVs) between freeway HOV lanes and public-transportation passenger facilities within the freeway right of way and facilities outside of the right of way. Design right-side HOV only access facilities per Chapter 940.

Direct access eliminates the HOV user crossing the general-purpose lanes from left-side HOV lanes to the right-side general-purpose ramps. Also, transit vehicles will be able to use the HOV lane and provide service to the HOV direct access facility.

Providing the HOV user access to the inside HOV lane without mixing with the general-purpose traffic saves the user additional travel time and aids in safety, enforcement, incident handling, and overall operation of the HOV facility.

Locations for direct access ramps include HOV facilities on intersecting routes, park and ride lots, flyer stops, and locations with a demonstrated demand. Coordination with the local transit agencies will result in the identification of these key locations. Give priority to locations that serve the greatest number of transit vehicles and other HOVs.

(1) Existing Facilities

When designing an HOV direct access facility, the existing general-purpose facilities must not be degraded. However, there may be opportunities to improve existing geometrics. These opportunities can be identified during the project definition phase.

When an HOV direct access facility project includes work on the existing facilities, apply the new/reconstruction row of the Interstate Design Matrices and the HOV row of the other matrices in Chapter 325.

(2) Reviews, Studies, and Reports

The normal project development process is to be followed when developing an HOV direct access project. Most facets of the project development process remain unchanged despite the unusual nature of the projects that are the focus of this chapter. For example, early coordination with others is always a vital part of developing a project. There are also environmental considerations, public involvement, and Value Engineering studies (Chapter 315). These are all necessary to ensure appropriate scope and costs.

There may also be reviews, studies, and reports required by agreements with regional transit authorities or other agencies.

An Interchange Justification Report (Chapter 1425) is required when there is a proposal to add, delete, or change an access point. Provide the operational analysis from the report for all flyer stops. For left-side connections, include the commitment that the connection will be used solely by HOVs or will be closed.

Throughout the project development phase, ensure that the:

- Project definition and cost estimate are correct.
- Project development process is on schedule.
- Project documents are biddable.
- Project will be constructible.
- Project will be maintainable.

Constructibility of HOV direct access facilities is an important consideration during the design phase. These facilities will typically be constructed on existing highways with traffic maintained on-site. Key goals are to:

- Ensure that the project can be built.
- Plan a construction strategy.
- Provide a safe work zone.
- Minimize construction delays.

Access to these facilities by maintenance crews must be considered. Avoid items that require a significant maintenance effort and might result in lane closure for routine maintenance or repair.

(3) Left-Side Connections

Left-side connections are allowed only when they serve HOVs only and connect to an HOV lane. The higher traffic volume associated with general-purpose traffic is not acceptable for left-side connections. If the demand for an HOV direct access decreases to the point that the HOV direct access connection is no longer desirable, the connection must be closed.

1055.02 References

Americans with Disabilities Act of 1990 (ADA)

ADA Accessibility Guidelines (ADAAG), The Access Board, www.access-board.gov/adaag/html/adaag.htm

Manual on Uniform Traffic Control Devices for Streets and Highways, USDOT, FHWA; including the *Washington State Modifications to the MUTCD*, Chapter 468-95 WAC, (MUTCD)

Sign Fabrication Manual, M 55-05, WSDOT

Standard Plans for Road, Bridge, and Municipal Construction (*Standard Plans*), M 21-01, WSDOT

High-Occupancy Vehicle Facilities A Planning, Design, and Operation Manual, Parsons Brinkerhoff Inc

FHWA/PB HOV Interactive 1.0 High Occupancy Vehicle Data Base from the U.S., Canada and Europe (CD ROM), USDOT, FHWA and Parsons Brinkerhoff Inc

A Policy on Geometric Design of Highways and Streets (Green Book), 2001, AASHTO

Guide for the Design of High Occupancy Vehicle Facilities, AASHTO

Transit Implications of HOV Facility Design, WA-RD 396.1, September 1996, WSDOT and USDOT, Federal Transit Administration

NCHRP 155, *Bus Use of Highways, Planning and Design Guidelines*

NCHRP 414, *HOV Systems Manual*

1055.03 Definitions

flyer stop A transit stop inside the limited access boundaries.

high occupancy vehicle (HOV) Vehicles that fit one of the following:

- Rubber tired municipal transit vehicles.
- Buses with a carrying capacity of sixteen or more persons, including the operator.
- Motorcycles.
- Recreational vehicles that meet the occupancy requirements of the facility.
- All other vehicles that meet the occupancy requirements of the facility, except trucks in excess of 10,000 lb gross vehicle weight.

HOV direct access facility A ramp and its connection directly to an HOV lane, exclusively for the use of high occupancy vehicles to move between the ramp and the HOV lane without weaving across general-purpose lanes.

intelligent transportation systems (ITS) A system of advanced sensor, computer, electronics, and communication technologies and management strategies - in an integrated manner – to increase the safety and efficiency of the surface transportation system.

ramp A short roadway connecting a main lane of a highway with another facility, such as a road, parking lot, or transit stop, for vehicular use.

ramp connection The pavement at the end of a ramp, connecting to a main lane of a highway.

ramp terminal The end of a ramp at a local street or road, transit stop, or park and ride lot.

transit stop A facility for loading and unloading passengers that is set aside for the use of transit vehicles only.

transit vehicle A bus or other motor vehicle that provides public transportation (usually operated by a public agency).

The numerous buses using HOV direct access ramps must merge with high speed traffic. Acceleration lanes that are longer than normally required are needed.

For left-side on-connections, provide at least the normal 10 ft (14 ft preferred) wide left shoulder for the main line for a minimum length of 500 ft (1000 ft preferred) beyond the end of the on-connection taper. This gives additional room for enforcement, merging, and erratic maneuvers.

(c) **Gap Acceptance Length**

Gap acceptance length is a minimum distance traveled while a merging driver finds a gap in the through traffic and begins the merge. For left-side parallel on-connections the gap acceptance length is added to the acceleration length. The L_g values are given in Figure 1055-2. These values are larger than for right-side on-connections to account for drivers' visibility constraints.

Highway Posted Speed (mph)	Gap Acceptance Length L_g (ft)
45	550
50	625
55	700
60	775
65	850
70	925

Gap Acceptance Length for Parallel On-Connections

Figure 1055-2

(d) **Design of Urban On-Connections**

Design left-side HOV direct access on-connections in urban areas as follows:

1. Use the parallel design for all left-side on-connections.

2. Add the Gap Acceptance Length for Parallel On-Connections (Figure 1055-2) for a freeway speed of 60 mph to the acceleration length.

3. Use Acceleration Length for Buses (Figure 1055-11) with a 60 mph freeway speed and the ramp design speed [1055.05(2)] for acceleration length.

(e) **Design of Rural On-Connections**

Design left-side HOV direct access on-connections in rural areas using a freeway design speed as determined using Chapter 440.

(7) Off-Connections

(a) **Parallel Off-Connection**

The parallel off-connection (Figure 1055-12) is preferred for left-side direct access off-connections. For freeway to freeway off-connections, provide a parallel lane with a length sufficient for signing and deceleration. The desirable minimum length is not less than the gap acceptance length (Figure 1055-2).

(b) **Tapered Off-Connection**

The tapered off-connection may be used for off-connections with justification. See Chapter 940 for the design of tapered off-connections.

(c) **Deceleration Lanes**

Bus passenger comfort requires longer deceleration lanes. Use the deceleration lane lengths from Figure 1055-14 for HOV direct access facilities.

(d) **Design of Urban Off-Connections**

Design left-side HOV direct access off-connections in urban areas as follows:

1. Either the parallel (preferred) or the taper (with justification) design may be used.

2. Use the longer deceleration length of: the Deceleration Length for Buses (Figure 1055-14) from a 60 mph freeway speed to the ramp design speed [1055.05(2)], or the Minimum Deceleration Length given in Chapter 940 from the freeway design speed to the ramp design speed.

(e) **Design of Rural Off-Connections**

Design left-side HOV direct access off-connections in rural areas using a freeway design speed as determined using Chapter 440.

(8) Vertical Clearance

Vertical clearance for a structure over a road is measured from the lower roadway surface, including the usable shoulders, to the bottom of the overhead structure.

See Chapter 1120 for information on vertical clearance. For a new structure and for a new ramp under an existing structure, the minimum vertical clearance is 16.5 ft. A deviation will be considered for 14.5 ft minimum vertical clearance for a new HOV direct access ramp under an existing bridge.

The minimum vertical clearance for a pedestrian grade separation over any road is 17.5 ft.

(9) Flyer Stops

Design flyer-stop-ramp on-connections as given in 1055.05(6) and design off-connections as given in 1055.05(7). Flyer stop connections are included in the access point spacing discussed in 1055.04(1)(a).

Design the ramp to the flyer stop per 1055.05(3), 1055.05(4), and 1055.05(5).

The minimum width for the roadway at a flyer stop is 24 ft.

When a flyer stop is in the median, provide enough median width for the flyer stop roadway, the passenger facilities, and barrier separation without reducing the width of the through lanes or shoulders. (See 1055.06.)

The approval of a flyer stop requires the operational analysis portion of the Interchange Justification Report (Chapter 1425).

(10) T Ramps

A T ramp example and design is given on Figure 1055-15

1055.06 Passenger Access

When designing transit stops, accessibility (compliance with the ADA), safety, and the comfort of the passengers must be included. Minimize pedestrian/vehicle conflict points. Design the whole facility with security in mind by keeping lines of sight as open as possible. Traffic barriers, fencing, illumination, landscaping, seating, windscreens, shelters, enclosed walkways, telephones, and posted schedules are examples of factors that contribute to passenger safety and well-being. See Chapter 1060 for passenger amenities at transit stops.

(1) Passengers

To encourage use of the passenger access facility for an express transit stop, provide a route that is the shortest distance to travel from the park and ride lot, or local transit stop. Failure to do so might generate the use of undesirable shortcuts. To encourage local use of the passenger access facilities, provide direct access from surrounding neighborhoods.

To access a transit stop in the median or to move about within the facility, grade separations are required for all flyer stop designs except the at-grade crossing flyer stop. Consider stairways, ramps, elevators, and escalators, but provide at least one access for the disabled at every loading platform, as required by the American Disabilities Act of 1990. See Chapter 1025 for guidance when designing pedestrian grade separations.

The ADA Accessibility Guidelines for Buildings and Facilities includes: “Platform edges bordering a drop-off and not protected by platform screens or guard rails shall have a detectable warning … 24 inches wide running the full length of the platform drop-off.” See the *Standard Plans* for the detectable warning pattern.

In transit stops, at-grade crosswalks are only permitted in the at-grade crossing flyer stop layout described in 1055.04(4)(a)2. Use traffic calming techniques, such as horizontal alignment, textured pavement and crosswalk markings, barrier openings, and other treatments, to channelize pedestrian movements and slow the transit vehicle movements. Illuminate transit stop crosswalks. (See Chapter 840.)

Where at-grade crosswalks are not permitted, steps must be taken to minimize unauthorized at-grade crossings. Fencing, taller concrete traffic barrier, enclosed walkways, and ramps are examples of steps that may be taken.

(2) Bicycles

Bike lanes on nearby streets and separate trails encourage people to bicycle from surrounding neighborhoods. Provide these bicyclists direct access to passenger access facilities.

1060.01 General

This chapter provides guidance and information for designing transit facilities in Washington State.

The design criteria presented represent recognized principles and are primarily based on criteria developed by AASHTO. Some situations will be beyond the scope of this chapter, as it is not a comprehensive textbook on public transportation engineering.

When private developers incorporate transit facilities into their designs, it is desirable that they use this chapter as a guide, at the direction of staff from the appropriate public jurisdiction.

Review and consider the following before developing plans for facilities to achieve modal balance:

- The multimodal strategies in the comprehensive plans of applicable local jurisdictions
- The multimodal strategies in the regional plans of applicable Regional Transportation Planning Organizations
- The strategies and plans of the applicable transit providers for the site under development

The design information that follows can help the Washington State Department of Transportation (WSDOT), local jurisdictions, and developers ensure that transit provides efficient and cost-effective services to the public.

For additional information, see the following chapters:

Chapter	Subject
920	Road approach design and spacing
1025	Pedestrian facilities
1050	High occupancy vehicle facilities
1055	HOV direct access
1430	Requirements on limited access facilities

1060.02 References

Federal/State Laws and Codes

Americans with Disabilities Act of 1990 (ADA)

Revised Code of Washington (RCW) 46.61.581, "Disabled Persons' Parking Spaces – Indication, Access – Failure, Penalty"

RCW 70.92.120 "Handicap symbol – Display – Signs showing location of entrance for handicapped"

Washington Administrative Code (WAC) Chapter 468-46, "Transit Vehicle Stop Zones"

Chapter 468-95 WAC, "*Manual on Uniform Traffic Control Devices for Streets and Highways*" (MUTCD)
www.wsdot.wa.gov/biz/trafficoperations/mutcd.htm

Design Guidance

ADA Standards for Accessible Design, U.S. Department of Justice
www.usdoj.gov/crt/ada/adahom1.htm

Standard Plans for Road, Bridge, and Municipal Construction (Standard Plans), M 21-01, WSDOT

Plans Preparation Manual, M 22-31, WSDOT

Manual on Uniform Traffic Control Devices for Streets and Highways, USDOT, FHWA, as adopted and modified by WAC 468-95

Roadside Manual, M 25-30, WSDOT

Traffic Manual, M 51-02, WSDOT

Understanding Flexibility in Transportation Design – Washington, WSDOT, 2005
www.wsdot.wa.gov/eesc/design/Urban/Default.htm

Supporting Information

A Policy on Geometric Design of Highways and Streets, AASHTO, 2004

Bus Use of Highways: Planning and Design Guidelines, National Cooperative Highway Research Program Report 155, Transportation Research Board, 1975

Guide for the Design of High Occupancy Vehicle and Public Transfer Facilities, AASHTO, 1983

Guidelines for the Location and Design of Bus Stops, Transit Cooperative Research Program (TCRP) Report 19, Transportation Research Board, 1996

Revised Draft Guidelines for Accessible Public Rights-of-Way, U.S. Access Board
www.access-board.gov/

1060.03 Definitions

articulated bus A two-section bus that is permanently connected at a joint.

bus A rubber-tired motor vehicle used for transportation; designed to carry more than ten passengers.

bus pullout A bus stop with parking area designed to allow transit vehicle stopping wholly off the roadway.

bus shelter A facility that provides seating and protection from the weather for passengers waiting for a bus.

bus stop A place designated for the purpose of transit vehicles stopping for loading or unloading passengers.

car/vanpool A group of people who share the use and cost of a car or van for transportation on a regular basis.

detectable warning surface A feature of a walking surface to warn visually impaired pedestrians of a hazard. Truncated domes are specified.

drop and ride An area of a park and ride lot or other multimodal facility where patrons are dropped off or picked up by private auto or taxi.

feeder service Bus service providing connections with other bus or rail services.

flyer stop A transit stop inside the limited access boundaries.

high occupancy vehicle (HOV) A vehicle that fits one or more of the following:

- Rubber-tired municipal transit vehicles
- Buses with a carrying capacity of sixteen or more persons, including the operator
- Motorcycles
- Recreational vehicles that meet the occupancy requirements of the facility
- Official, marked law enforcement vehicles equipped with emergency lights and sirens and operated by on-duty state patrol, or local or county law enforcement personnel
- All other vehicles that meet the occupancy requirements of the facility, except trucks in excess of 10,000 lb gross vehicle weight
- Tow trucks may use HOV lanes when en route to an emergency on a specific roadway or roadside

HOV direct access facility A ramp and its connection to an HOV lane, exclusively for the use of high occupancy vehicles to move between the ramp and the HOV lane without weaving across general-purpose lanes.

pedestrian access route A continuous, unobstructed pedestrian route where all components comply with the ADA requirements for accessible design. A pedestrian access route may consist of one or more of the following components: walkways, ramps, curb ramps, parking access aisles, crosswalks, pedestrian overpasses and underpasses, elevators, and platform lifts. Stairways and escalators shall not be part of a pedestrian access route. (See Chapter 1025 and the *ADA Standards for Accessible Design*.)

public transportation Passenger transportation services available to the public, including buses, ferries, rideshare, and rail transit.

sawtooth berth A series of bays that are offset from one another by connecting curb lines; constructed at an angle from the bus bays. This configuration minimizes the amount of space needed for vehicle pull in and pull out.

transit A general term applied to passenger rail and bus service used by the public.

transit facility A capital facility that improves the efficiency of public transportation or encourages the use of public transportation.

1060.04 Park and Ride Lots

Park and ride lots provide parking for people who wish to transfer from private vehicles to public transit or carpools/vanpools. Most park and ride lots located within urban areas are served by transit. Leased lots, such as at churches or shopping centers, may have no bus service and only serve carpools and vanpools. Park and ride lots located in rural areas not served by buses serve carpools and vanpools.

For the larger park and ride lots, consider HOV facilities to improve access for transit and carpools (see Chapter 1050).

Early and continual coordination with the local transit authority and local government agencies is critical. When a memorandum of understanding (MOU) or other formal agreement exists that outlines the design, funding, maintenance, and operation of park and ride lots, it must be reviewed for requirements pertaining to new lots. If the requirements in the MOU or other formal agreement cannot be met, the MOU must be renegotiated.

(1) Site Selection

Current and future needs are the main considerations in determining the location of a park and ride lot. Public input is a valuable tool. The demand for and the size of a park and ride lot are dependent on a number of factors. Many of these factors vary with the state of the economy; energy availability and cost; perceived congestion; and public attitude, and they are somewhat difficult to predict. Therefore, consider sizing the facility to allow for a conservative first-stage construction with expansion possibilities. As a rule of thumb, one acre can accommodate approximately 90 vehicles in a park and ride lot. This allows approximately 40% of the area for borders, landscaping, passenger amenities, bus facilities for larger lots, and future expansion.

Contact the local transit authority for input, which is critical, as the need for a park and ride lot and its location may already have been determined in the development of its comprehensive transit plan. Failure to obtain transit input could result in a site that does not work well for transit vehicle access.

Develop a list of potential sites. This can be simplified by the use of existing aerial photos, detailed land use maps, or property maps. The goal is to identify properties that can be most readily developed for parking and that have suitable access.

Factors influencing site selection and design of a park and ride facility include the following:

- Local transit authority master plan
- Regional transportation plan
- Local public input
- Demand
- Traffic
- Local government zoning
- Social and environmental impacts
- Cost and benefit/cost
- Access by all modes of travel
- Security and lighting impacts
- Maintenance
- Stormwater outfall
- Available utilities
- Existing right of way or sundry site
- Potential for future expansion

Purchasing or leasing property increases costs substantially. Therefore, the first choice is state-owned right of way, assuming the other selection criteria are favorable. Also give prime consideration to the use of city- or county-owned right of way. Select a site that does not jeopardize the current and future integrity of the highway.

Investigate each potential site in the field. The field survey serves to confirm or revise impressions gained from the office review. When conducting the investigation, consider the following:

- Physical characteristics of the site
- Current use and zoning of the area
- Whether the site is visible from adjacent streets to enhance security
- Potential for additional expansion
- Accessibility for motorists and other modes of travel (including transit)
- Proximity of any existing parking facilities (such as church or shopping center parking lots) that are underutilized during the day
- Potential for joint use of facilities with businesses (such as day care centers or dry cleaners) or land uses compatible with park and ride patrons
- Congestion problems and other design considerations
- Avoid locations that will encourage noncommuter use, such as proximity to a high school

The desirable location for park and ride lots along one-way couplets is between the two one-way streets, with access from both streets. When this is not feasible, provide additional signing to guide users to and from the facility.

Establish the best potential sites (with transit agency input) and complete public meetings and environmental procedures prior to finalizing the design. Follow the procedures outlined in Chapters 210 and 220.

(2) Design

Design features must be in compliance with any local requirements that may apply. In some cases, variances to local design requirements may be necessary to ensure the safety and security of facility users.

Include the following design components when applicable:

- Geometric design of access points
- Safe and efficient traffic flows, both internal and external circulation, for all modes: transit, carpools, vanpools, pedestrians, and bicycles
- Parking space layout
- Pavements
- Shelters
- Exclusive HOV facilities
- Bicycle facilities
- Motorcycle facilities
- Traffic control devices, including signs, signals, and permanent markings
- Illumination
- Drainage and erosion control
- Security of facility users and vehicles
- Environmental mitigation
- Landscape preservation and development
- Restroom facilities
- Telephone booths
- Trash receptacles
- Traffic data
- Facilities that accommodate elderly and disabled users and meet barrier-free design requirements

The degree to which the desirable attributes of any component are sacrificed to obtain the benefits of another component can only be determined on a site-specific basis. However, these guidelines present the optimum requirements of each factor.

Large park and ride lots are transfer points from private automobiles to transit buses. The same basic principles are used in designing all park and ride lots.

(a) **Access.** Six basic transportation modes are used to arrive at and depart from park and ride lots: walking, bicycles, motorcycles, private automobiles (including carpools), vanpools, and buses. Provide for all these modes.

It is desirable that access to a park and ride lot not increase congestion on the facility it serves. The desirable access point to a park and ride lot is on an intersecting collector or local street. Locate entrances and exits with regard to adjacent intersections, so that signal control at these intersections can be reasonably installed at a later time (if necessary). Provide storage for vehicles entering the lot, as well as adequate storage for exiting vehicles. Ease of access will encourage use of the facility.

When it is necessary to provide access to an arterial, the location must be carefully considered. Locate the access to avoid queues from nearby intersections.

The minimum width of entrances and exits that will be used by buses is 15 feet per lane. (See 1060.09 for corner radii requirements for buses, and Chapter 920 and the *Standard Plans* for design of other access points.)

Design all entrances and exits to conform to Chapter 920 or other published design guidelines used by the local agency.

Design the access route for transit to a park and ride lot, the circulation patterns within the lot, and the return route to minimize transit travel time. Exclusive direct access connections for buses, vanpools, and carpools between park and ride lots and freeway or street HOV lanes may be justified by time savings to riders and reduced transit costs. (For information on direct access design, see Chapter 1055.) Coordinate all routing for transit with the transit authority.

(b) **Internal Circulation.** Locate major circulation routes within a park and ride lot at the periphery of the parking area to minimize vehicle-pedestrian conflicts. Accommodate all modes using that part of the facility. Take care that an internal intersection is not placed too close to a street intersection. Consider a separate loading area with priority parking for vanpools. Whenever possible, do not mix buses with cars.

Design bus circulation routes to provide for easy movement, with efficient terminal operations and convenient passenger transfers. A one-way roadway with two lanes to permit the passing of stopped buses is desirable, with enough curb length and/or sawtooth-type loading areas to handle the number of buses that will be using the facility under peak conditions (see 1060.05). Close coordination with the local transit authority is critical in the design of internal circulation for buses and vanpools.

Locate the passenger loading zone either in a central location to minimize the pedestrian walking distance, or near the end of the facility to minimize the transit travel time.

Large lots may require more than one waiting area for multiple buses.

In an undersized or odd-shaped lot, circulation may have to be compromised in order to maximize utilization of the lot. Base the general design for the individual user modes on the priority sequence of: pedestrians, bicycles, feeder buses, and park and ride area. Design traffic circulation to minimize vehicular travel distances, conflicting movements, and the number of turns. Disperse vehicular movements within the parking area by the strategic location of entrances, exits, and aisles. Align aisles to facilitate convenient pedestrian movement toward the bus loading zone.

Any area within the internal layout that will be used by buses, including entrance and exit driveways, must be designed to the turning radius of the bus. Additional considerations for internal circulation are:

- Design the lot to be understandable to all users (auto, pedestrian, bicycle, and bus).
- Do not confront drivers with more than one decision at a time.
- Provide adequate capacity at entrances and exits.
- Make signing clear and ADA-compliant.
- Provide for future expansion.

(c) **Parking Area Design.** Normally, internal circulation is two way with 90° parking. However, due to the geometrics of smaller lots, one-way aisles with angled parking may be advantageous.

For additional information on parking requirements for the disabled, see 1060.10. For information on parking area design, see the *Roadside Manual*.

(d) **Pedestrian Movement.** Pedestrian movement in parking areas is normally by way of the drive aisles. Make a pedestrian's path from any parking stall to the loading zone as direct as possible.

Provide walkways to minimize pedestrian use of a circulation road or an aisle, and to minimize the number of points at which pedestrians cross a circulation road. Where pedestrian movement originates from an outlying part of a large parking lot, consider a walkway that extends toward the loading zone in a straight line.

For additional requirements for pedestrian movement, see Chapter 1025 and the *Roadside Manual.*

Facilities for disabled patrons must also be included. For additional information on accessibility for the disabled, see 1060.10.

(e) **Bicycle Facilities.** Encouraging the bicycle commuter is important. Provide all lots that are served by public transit with lockers or with a rack that will support the bicycle frame and allow at least one wheel to be locked. Locate the bike-parking area relatively close to the transit passenger-loading area, separated from motor vehicles by curbing or other physical barriers, and with a direct route from the street. Design the bicycle-parking area to prevent pedestrians from inadvertently walking into the area and tripping. Consider providing shelters for bicycle racks. For bicycles, the layout normally consists of stalls 2.5 feet x 6 feet, at 90° to aisles, with a minimum aisle width of 4 feet. For additional information on bicycle facilities, see Chapter 1020.

(f) **Motorcycle Facilities.** Provide parking for motorcycles. For information on motorcycle parking, see the *Roadside Manual*.

(g) **Drainage.** Provide adequate slope for surface drainage, as ponding of water in a lot is undesirable for both vehicles and pedestrians. This is particularly true in cold climates where freezing may create icy spots. The maximum grade is 2%. Install curb, gutter, and surface drains and grates where needed. Coordinate drainage design with the local agency to ensure appropriate codes are followed. For additional drainage information and requirements, see Chapter 1210 and the *Roadside Manual*.

(h) **Pavement Design.** Design pavement to conform to design specifications for each of the different uses and loadings that a particular portion of a lot or roadway is expected to handle. For pavement type selection, see Chapter 520.

(i) **Traffic Control.** Control of traffic movement can be greatly improved by proper pavement markings. Typically, reflectorized markings for centerlines, lane lines, channelizing lines, and lane arrows will be necessary to guide or separate patron and transit traffic. Install park and ride identification signs. For signing and pavement markings, see Chapters 820 and 830 and the MUTCD.

(j) **Shelters.** Consider pedestrian shelters in areas where environmental conditions justify their use. To satisfy local needs, shelters may be individually designed or selected from a variety of commercially available designs. Consider the following features in shelter design:

- Design shelters to accommodate the disabled (see 1060.10)
- Select open locations with good visibility to minimize the potential for criminal activity
- If enclosed, locate the open side away from nearby vehicle splashing
- Select materials and locations where the bus driver can see waiting passengers
- Doors are not recommended (unless need dictates otherwise) because of maintenance and vandalism potential
- Allow for a small air space below side panels to permit air circulation and prevent the collection of debris.
- Optional features that may be provided are lighting, heat, telephone, travel information (schedules), and trash receptacles.
- Coordinate shelter design and placement with the local transit authority. Shelters are usually provided by the local transit agency, with the state providing the shelter pad.

For additional information on passenger amenities, see 1060.07.

(k) **Illumination.** Adequate lighting is important from a safety standpoint and as a deterrent to criminal activity in both the parking area and the shelters. For guidance, see Chapter 840 and the *Roadside Manual*.

(l) **Planting Areas.** Selectively preserve existing vegetation and provide new plantings to give a balanced environment for the park and ride lot user. For guidance, see the *Roadside Manual*.

(m) **Fencing.** For fencing guidelines, see Chapter 1460.

(n) **Maintenance.** Develop a maintenance plan, either as part of a memorandum of understanding with the local authority or for use by state maintenance forces. Maintenance of park and ride lots outside state right of way is the responsibility of the local transit authority. Encourage the local transit authority to maintain park and ride lots inside state right of way by agreement. Negotiate agreements for maintenance by others during the design phase and document in the Design Documentation Package (DDP). (See Chapter 330.)

Consider the following in the maintenance plan:

- Cost estimate
- Periodic inspection
- Pavement repair
- Traffic control devices (signs and pavement markings)
- Lighting
- Mowing
- Cleaning of drainage structures
- Sweeping/trash pickup
- Landscaping
- Shelters
- Snow and ice control

When the maintenance is not by state forces, include funding source and legal responsibilities.

1060.05 Transfer/Transit Centers

Transfer centers are essentially large multimodal bus stops where buses on a number of routes converge to allow riders the opportunity to change buses or transfer to other modes. Transfer centers are of particular importance in many transit systems, since riders in many areas are served by a "feeder" route; to travel to area destinations not served by the feeder, residents must transfer.

Transit centers are frequently major activity centers. In this case the activity is beyond a simple transfer between buses; it involves the transit center as a destination point.

The design of a transit center requires consideration of such features as passenger volume; number of buses on the site at one time; local auto and pedestrian traffic levels; and universal access (see 1060.10). These factors will dictate the particular requirements of each center.

(1) Bus Berths

Where several transit routes converge and where buses congregate, multiple bus berths or spaces are sometimes required. Parallel and shallow sawtooth designs are the options available when considering multiple berths.

An important aspect in multiple bus berthing is proper signing and marking for the bus bays. Clearly delineate the route served by each bay. Consider pavement marking to indicate correct stopping positions.

Consider using Portland cement concrete pavement where pedestrians will walk, for ease of cleaning.

Where buses are equipped with a bicycle rack, provide for the loading and unloading of bicycles.

Figure 1060-1 shows typical parallel and sawtooth designs for parking 40-foot buses for loading and unloading passengers at a transfer center. The sawtooth design does not require buses to arrive or depart in any order. The parallel design shown may require that buses arrive and/or depart in order. Where space is a consideration, the sawtooth design can be modified for independent arrival but dependent departure.

Figure 1060-2 is an example of a sawtooth transit center. In an in-line berthing design, space requirements are excessive if this same access is to be provided. More commonly in an in-line design, buses pull into the forward-most available berth. Buses must then leave in the order of arrival. Involve the local transit authority throughout the design process; its concurrence with the final design is required.

In the design of parallel bus berths, additional roadway width is required for swing-out maneuvers if shorter bus loading platforms are utilized. The roadway width and the amount of lineal space at the bus loading platform are directly related where designs allow departing buses to pull out from the platform around a standing bus. The shorter the berth length allowed, the wider the roadway must be. Check the final design with a template for the design vehicle.

Considerable length is necessary in a parallel design to permit a bus to pass and pull into a platform in front of a parked bus.

Parallel designs, even when properly signed, require strict parking enforcement, since they give the appearance of general curbside parking areas. Pavement marking is most critical for parallel design. Sawtooth designs offer the advantage of appearing more like a formal transit facility, which tends to discourage unauthorized parking.

(2) Flow/Movement Alternatives

Two primary alternatives for vehicle and passenger movement are possible for transfer centers, regardless of the type of bus berths used. As shown in Figure1060-3, all buses may line up along one side of the transfer center. This type of arrangement is generally only suitable for a limited number of buses, due to the walking distances required for transferring passengers. For a larger number of buses, an arrangement similar to Figure 1060-4 can minimize transfer time requirements by consolidating the buses in a smaller area.

1060.06 Bus Stops and Pullouts

The bus stop is the point of contact between the passenger and the transit services. The simplest bus stop is a location by the side of the road. The highest quality bus stop is an area that provides passenger amenities (such as a bench) and protection from the weather. Bus stops must meet the requirements of universal access (see 1060.10).

Bus pullouts allow the transit vehicle to pick up and discharge passengers in an area outside the traveled way. The interference between buses and other traffic can be reduced by providing bus pullouts.

(1) Bus Stop Designation and Location

It is desirable to locate bus stops uniformly to promote predictability. However, do not substitute uniformity for sound judgment.

Consider the following when locating bus stops:

- Bus stop placement requires the consent of the local transit authority and the jurisdiction with authority over the affected right of way
- The physical location of any bus zone is primarily determined by: safety, operational efficiency, the minimization of adjacent property impacts, and user destination points
- Public transportation agencies are typically responsible for maintenance of transit facilities within the public right of way

On limited access facilities, bus stops are only allowed at designated locations. (See Chapter 1430 for guidance.)

Work with the local transit agencies to ensure that bus stops are placed at acceptable locations. For additional information on bus stop locations, see *Understanding Flexibility in Transportation Design – Washington*.

(2) Bus Stop Placement

On roadways where traffic volume is low, on-street parking is prohibited, and a stopped bus will not impede traffic, the bus stop may simply be a designated location where the bus can pull up to the curb or to the edge of the roadway. The location will be dictated by patronage, the intersecting bus routes or transfer points, the security of the rider, and the need for convenient service.

The specific bus stop location is influenced not only by convenience to patrons, but also by the design characteristics and operational considerations of the highway or street. Bus stops are usually located in the immediate vicinity of intersections. Where blocks are exceptionally long, or where bus patrons are concentrated well away from intersections, midblock bus stops and midblock crosswalks may be used. Consider pedestrian refuge islands at midblock crosswalks on multilane roadways.

The bus stop capacity of one bus will typically be adequate for up to 30 buses per hour.

Where on-street auto parking is permitted, a designated area where the bus can pull in, stop, and pull out must be provided. Figure 1060-5 illustrates the following types of bus stops:

- Far-side, with a stop located just past an intersection
- Near-side, with a stop located just prior to an intersection
- Midblock, with a stop located away from an intersection

In general, a far-side stop is preferred. However, examine each case separately and determine the most suitable location, giving consideration to such things as service to patrons, efficiency of transit operations, and traffic operation in general. Near-side and midblock bus stops may be suitable in certain situations. Bus stops normally utilize sites that discourage unsafe pedestrian crossings, offer proximity to activity centers, and satisfy the general spacing requirements discussed previously. Following are descriptions of the advantages and disadvantages of each type of site.

(a) **Far-Side Bus Stops.** Advantages:

- Right turns can be accommodated with less conflict.
- A minimum of interference is caused at locations where traffic is heavier on the approach side of the intersection.
- They cause less interference where the cross street is a one-way street from left to right.
- Stopped buses do not obstruct sight distance for vehicles entering or crossing from a side street.
- At a signalized intersection, buses can find a gap to enter the traffic stream without interference, except where there are heavy turning movements onto the street with the bus route.
- Waiting passengers assemble at less-crowded sections of the sidewalk.
- Buses in the bus stop will not obscure traffic control devices or pedestrian movements at the intersection.

Disadvantages:

- Intersections may be blocked if other vehicles park illegally in the bus stop or if the stop is too short for occasional heavy demand.
- Stops on a narrow street or within a traffic lane may block the intersection.

(b) **Near-Side Bus Stops.** Advantages:

- A minimum of interference is caused at locations where traffic is heavier on the departure side than on the approach side of the intersection.
- They cause less interference where the cross street is a one-way street from right to left.
- Passengers generally exit the bus close to the crosswalk.
- There is less interference with traffic turning onto the bus route street from a side street.

Disadvantages:

- Heavy vehicular right turns can cause conflicts, especially where a vehicle makes a right turn from the left side of a stopped bus.
- Buses often obscure sight distance to stop signs, traffic signals, or other control devices, as well as to pedestrians crossing in front of the bus.
- Where the bus stop is too short for occasional heavy demand, the overflow will obstruct the traffic lane.

(c) **Midblock Bus Stops.** Advantages:

- Buses cause a minimum of interference with the sight distance of both vehicles and pedestrians.
- Stops can be located adjacent to major bus passenger generators.
- Waiting passengers assemble at less-crowded sections of the sidewalk.

Disadvantages:

- Pedestrian jaywalking is more prevalent.
- Patrons from cross streets must walk farther.
- Buses may have difficulty reentering the flow of traffic.
- Driveway access may be negatively impacted.

(d) Some general guidelines for locating bus stops include:

- At intersections where heavy left or right turns occur, a far-side bus stop is preferred. If a far-side bus stop is infeasible, move the stop to an adjacent intersection or to a midblock location in advance of the intersection.
- It is important that the bus stop be clearly marked as a "NO PARKING" zone with signs and/or curb painting.
- At intersections where bus routes and heavy traffic movements diverge, a far-side stop can be used to advantage.
- Midblock stop areas are recommended under the following conditions: (1) where traffic or physical street characteristics prohibit a near- or far-side stop adjacent to an intersection, or (2) where large factories, commercial establishments, or other large bus passenger generators exist. Locate a midblock stop at the far side of a pedestrian crosswalk (if one exists), so that standing buses will not block an approaching motorist's view of pedestrians in the crosswalk.
- Sight distance conditions generally favor far-side bus stops, especially at unsignalized intersections. A driver approaching a cross street on the through lanes can see any vehicles approaching from the right. With near-side stops, the view to the right may be blocked by a stopped bus. Where the intersection is signalized, the bus may block the view of one of the signal heads.
- For security purposes, the availability of adequate off-street lighting is an important consideration.

(3) Bus Pullouts

Bus pullouts are generally most appropriate when one or more of the following situations exists:

- Traffic in the curb lane exceeds 250 vehicles during the peak hour
- Passenger volume at the stop exceeds 20 boardings per hour
- Traffic speed is greater than 45 miles per hour
- Accident patterns are recurrent

The separation of transit and passenger vehicles is critical in cases of high bus or traffic volumes or speeds. Bus stops in the travel lane might impede the free flow of traffic. Consider bus pullouts at locations with high passenger loading volumes that cause traffic to back up behind the stopped bus.

To be fully effective, incorporate a deceleration lane or taper with the pullout, adequate staging area for all anticipated buses, and a merging lane or taper. As roadway operating speeds increase, increase the taper length accordingly.

Figure 1060-6 illustrates the dimensions and design features of bus pullouts associated with near-side, far-side, and midblock bus pullouts.

There are no absolute criteria for locating bus pullouts. Where a pullout is being considered, the local transit agency must be involved. Factors controlling the appropriate location and eventual success of a pullout include the following:

- Operating speed
- Traffic volume
- Number of passenger boardings
- Available right of way
- Roadway geometrics (horizontal and vertical)
- Construction costs
- Location of curb ramps

Figure 1060-7 illustrates the dimension and design requirements of far-side bus zones and pullouts where buses will stop after making a right turn. Adherence to these designs will allow safe stopping of buses and minimal interference with legally parked vehicles.

It is important in the design of bus pullouts to consider the need to provide structurally adequate pavement for the bus pullout (see Chapter 520); otherwise, the surfacing may be damaged by the weight of the buses.

1060.07 Passenger Amenities

(1) Bus Stop Waiting Areas

Bus passengers desire a comfortable place to wait for the bus. Providing an attractive, pleasant setting for the passenger waiting area is an important factor in attracting bus users.

Important elements of a bus stop include:

- Universal access (see 1060.10)
- Safety from passing traffic
- Adequate lighting
- Security
- Paved surface
- Protection from the environment
- Seating (if the wait may be long)
- Information about routes serving the stop

Providing safety from passing traffic involves locating stops where there is adequate space, so passengers can wait away from the edge of the traveled roadway. The buffering distance required from the roadway increases with traffic speed and traffic volume. Where vehicle speeds are 30 miles per hour or less, 5 feet is an adequate distance. A heavy volume arterial with speeds of 45 miles per hour requires a distance of 10 feet for passenger comfort.

Passengers arriving at bus stops, especially infrequent riders, want information and reassurance. Provide information that includes the numbers or names of routes serving the stop. Other important information may include a system route map, the hours and days of service, schedules, and a phone number for information. The information provided and format used is typically the responsibility of the local transit system.

At busier stops, including park and ride lots, provide a public telephone. For all paved park and ride lots, select a desirable site for a public telephone and provide conduit, whether or not a telephone is currently planned. Where shelters are not provided, a bus stop sign and passenger bench are desirable, depending on weather conditions. The sign indicates to passengers where to wait and can provide some basic route information.

(2) Passenger Shelters

Passenger shelters provide protection for waiting transit users. In accomplishing this task, the shelter itself must be located conveniently for users without creating hazards such as blocking the line of sight of automobile drivers or blocking the sidewalk. Figure 1060-8 illustrates a clear sight triangle that will permit shelter siting with minimal impact on sight distances at urban arterial intersections without traffic controls. The dimensions and locations may vary by local jurisdiction; check local zoning ordinances or with the appropriate officials.

Providing shelters (and footing for shelters) is normally the responsibility of the local transit agency; contact them for shelter design and footing requirements. State motor vehicle funds cannot be used for design or construction of shelters, except for the concrete pad.

Adequate lighting is necessary to enhance passenger security. Lighting makes the shelter visible to passing traffic and allows waiting passengers to read the information provided. General street lighting is usually adequate. Where streetlights are not in place, consider streetlights or transit shelter lights. For information on illumination, see Chapter 840.

A properly drained, paved surface is necessary so passengers will not traverse puddles and mud in wet weather. Protection from the environment is typically provided by a shelter, which offers shade from the sun, protection from rain and snow, and a wind break. Shelters can range from simple to elaborate. The latter type may serve as an entrance landmark for a residential development or employment complex and be designed to carry through the architectural theme of the complex. If a nonpublic transportation entity shelter is provided, its design and siting must be approved by the local transit agency. The reasons for this approval requirement include safety, barrier-free design, and long-term maintenance concerns.

Simple shelters, such as the one illustrated in Figure 1060-9, may be designed and built by the transit agency or purchased from commercial vendors. The State Bridge and Structures Architect may be contacted for more complex designs.

Consider shelters at bus stops in new commercial and office developments and in places where large numbers of elderly and disabled persons wait, such as at hospitals and senior centers. In residential areas, shelters are placed only at the highest-volume stops.

1060.08 Roadway Design and Design Vehicle Characteristics

(1) Roadway Design

(a) **Paving Sections.** The pavement design (type and thickness) of a transit project, whether initiated by a public transportation agency or a private entity, must be coordinated with WSDOT or the local agency public works department, depending on highway, street, or road jurisdiction. These agencies play a major role in determining the paving section for the particular project. Early and frequent coordination is required.

Paving section design is determined by the volume and type of traffic, design speed, soil characteristics, availability of materials, and construction and maintenance costs. Important characteristics of good pavement design are the ability to retain shape and dimension, the ability to drain, and the ability to maintain adequate skid resistance.

For guidance on the design of pavements, see Chapters 510 and 520.

(b) **Grades.** Roadway grades refer to the maximum desirable slope or grade, or the maximum slope based on the minimum design speed that a 40-foot bus can negotiate safely. For roadway grade requirements, see Chapter 440 or the *Local Agency Guidelines*.

Bus speed on grades is directly related to the weight/horsepower ratio. Select grades that permit uniform operation at an affordable cost. In cases where the roadway is steep, a climbing lane for buses and trucks may be needed. Avoid abrupt changes in grade due to bus overhangs and ground clearance requirements.

(c) **Lane Widths.** Roadway and lane width requirements are given in Chapter 440 or the *Local Agency Guidelines*, based on the functional class of highway or road and jurisdiction.

For lanes to be used by HOVs, buses, vanpools, and carpools, the recommended width is 12 feet. Chapter 1050 provides additional information on HOV facilities.

(2) Design Vehicle Characteristics

Most transit agencies operate several types of buses within their systems. Vehicle sizes range from articulated buses to passenger vans operated for specialized transportation purposes and vanpooling.

Vehicles within each of the general classifications may vary dimensions such as wheelbase, height, and vehicle overhang. The total gross vehicle weight rating (GVWR) varies considerably among manufacturers. Because of these differences, obtain more specific design information from the local transit authority.

The principal dimensions affecting design are the minimum turning radius, tread width, wheelbase, and path of the inner rear tire. The effects of driver characteristics and the slip angle of the wheels are minimized by assuming that the speed of the vehicle for the minimum radius (sharpest) turn is less than 10 miles per hour.

(a) **City Buses (CITY-BUS).** These traditional urban transit vehicles are typically 40 feet long and have a wheelbase of approximately 25 feet. Many of these vehicles are equipped with either front or rear door wheelchair lifts, or a front "kneeling" feature that reduces the step height for mobility impaired patrons.

(b) **Articulated Buses (A-BUS).** Because articulated buses are hinged between two sections, these vehicles can turn on a relatively short radius. Articulated buses are typically 60 feet in length, with a wheelbase of 22 feet from the front axle to the midaxle and 19 feet from the midaxle to the rear axle.

(c) **Small Buses.** Some transit agencies operate small buses, which are designed for use in low-volume situations or for driving on lower-class roads. Small buses are also used for transportation of elderly and disabled persons, and for shuttle services. Passenger vans are a type of small bus used for specialized transportation and vanpooling. Since the vehicle specifications vary so widely within this category, consult the local transit authority for the specifications of the particular vehicle in question.

1060.09 Intersection Radii

A fundamental characteristic of transit-accessible development is safe, convenient access and circulation for transit vehicles. It is important that radii at intersections be designed to accommodate turning buses. Adequate radii will reduce conflicts between automobiles and buses, reduce bus travel time, and provide maximum comfort for the passengers.

Take the following factors into consideration in designing intersection radii:

- Right of way availability
- Angle of intersection
- Width and number of lanes on the intersecting streets
- Design vehicle turning radius
- Intersection parking
- Allowable bus encroachment
- Operating speed and speed reductions
- Pedestrians
- Bicycles

Because of space limitations and generally lower operating speeds in urban areas, curve radii for turning movements may be smaller than those normally used in rural areas. It is assumed that buses making turns are traveling at speeds of less than 10 miles per hour. Figures 1060-10 and 11 illustrate the Turning Templates and design vehicle specifications for a city bus and an articulated bus.

Figure 1060-12 gives radii at intersections for four types of parking configurations that may be associated with an intersection. Radii less than the minimum result in encroachment onto adjoining lanes or curbs. As intersection radii increase, pedestrian crossing distances increase.

When other intersection types are encountered, use turning templates (such as given in Figures 1060-10 and 11) to ensure that the design vehicle can make the turn.

To ensure efficient transit operation on urban streets, it is desirable to provide corner radii from 35 to 50 feet (based on the presence of curb parking on the streets) for right turns to and from the through lanes. Where there are curb parking lanes on both the intersecting streets and parking is restricted for some distance from the corner, the extra width provided serves to increase the usable radius.

The angle of intersection also influences the turning path of the design vehicle. Figure 1060-13 shows the effect of the angle of intersection on the turning path of the design vehicle on streets without parking. Figure 1060-13 also illustrates when a vehicle turns from the proper lane and swings wide on the cross street and when the turning vehicle swings equally wide on both streets.

1060.10 Universal Access

Public transportation providers have an obligation under both state and federal laws to create and operate capital facilities and vehicles that are usable by the wide variety of residents in a service area. A major need arising from this obligation is to provide transportation service to the transit dependent, among whom are disabled individuals.

Barrier-free design means more than just accommodating wheelchairs. Care needs to be given not to create hazards or barriers for people who have vision or hearing impairments. The key is to design clear pathways with no obstacles and provide simple signs with large print.

(1) Park and Ride Lots

Locate accessible parking stalls close to the transit loading and unloading area. Two accessible parking stalls may share a common access aisle. For information on the number and design of accessible stalls, see the *Roadside Manual* and the parking space layouts in the *Standard Plans*.

Sign accessible parking stalls according to the requirements of RCW 46.61.581.

Design pedestrian access routes in accordance with the following:

- Pedestrian access routes must meet the requirements for sidewalks (see Chapter 1025)
- If possible, do not cross access roads en route to the bus loading zone
- When feasible, do not route behind parked cars (in their circulation path)

- Curb ramps are required
- Parking stall and access aisle surfaces shall be even and smooth, with surface slopes not exceeding 2%

(2) Bus Stops and Shelters

In order to use buses that are accessible, bus stops must also be accessible. The nature and condition of streets, sidewalks, passenger loading pads, curb ramps, and other bus stop facilities can constitute major obstacles to mobility and accessibility. State, local, public, and private agencies need to work closely with public transportation officials to provide universal access.

Provide a bus stop boarding and alighting "pad" (see Figure 1060-14) for the deployment of wheelchair lifts that meets the following criteria:

- **Surface**. Construct the pad of Portland cement concrete, hot mix asphalt (HMA), or other approved firm, stable, and slip-resistant surface.
- **Dimensions.** Provide a clear area of 10.0 feet in length by 8.0 feet in width. When right of way or other limitations restrict the pad size, it may be reduced (with justification and transit concurrence) to a minimum of 8.0 feet measured perpendicular to the curb or roadway edge by 5.0 feet measured parallel to the roadway.
- **Connection**. Connect the pad to streets, sidewalks, or pedestrian paths with a pedestrian access route (see Chapter 1025).
- **Grade.** Design the grade of the pad parallel to the street or highway the same as the street or highway. The maximum slope perpendicular to the street or highway is not steeper than 2%.

For examples of the pad with and without shelters, see Figure 1060-14.

Involve the local transit agency in the pad design and location to help ensure that lifts can actually be deployed at the site.

In order to access a bus stop, it is important that the path to the stop also be accessible. This can be accomplished by the use of sidewalks with curb ramps. For sidewalk design and curb ramp information, see Chapter 1025 and the *Standard Plans.*

Design bus shelters (when provided) with a minimum clear space of 30 inches by 48 inches, entirely within the shelter. Connect to the bus stop pad by a pedestrian access route.

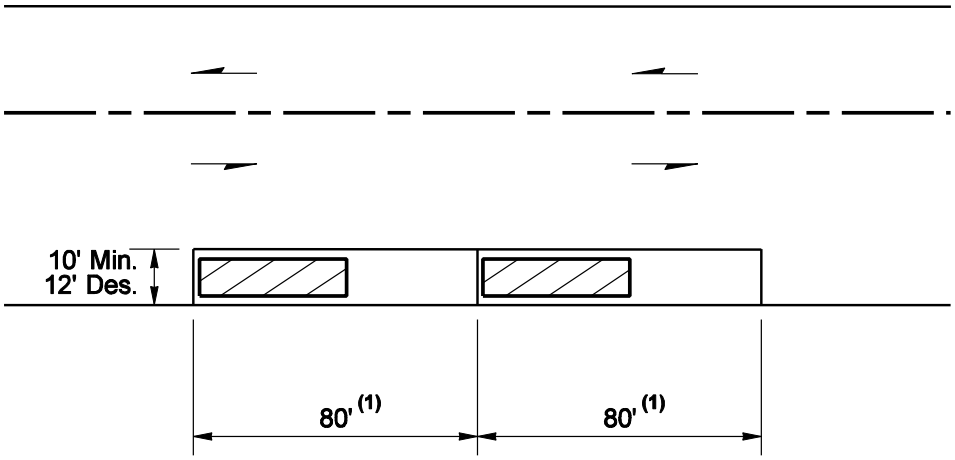
At bus stops where a shelter is provided, the bus stop pad may be located either inside or outside the shelter.

In the design of bus stops and shelters, consider the following:

- Universal access is a requirement for pedestrian facilities within the limits of a project.
- Curb ramps must be properly sloped and sized with detectable warning surfaces (see the *Standard Plans*).
- Identify places that require sidewalks.
- Encourage and emphasize standards that require all new street construction or reconstruction to include sidewalks or pedestrian walkways and curb ramps.
- Identify bus stops with curb painting and/ or bus stop signs.
- When feasible, make bus stops accessible.
- Along a route served by accessible vehicles, mark all bus stop signs with the blue international accessibility symbol conforming to the requirements of RCW 70.92.120, for easier identification by users.
- Existing as well as future park and ride locations must, by state law, include reserved parking for disabled persons, marked with signs as outlined in RCW 46.61.581.

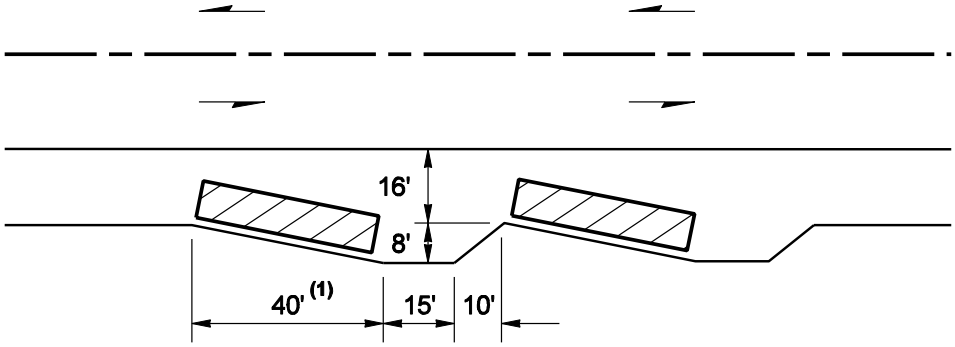
1060.11 Documentation

The list of documents that are to be preserved in the Design Documentation Package (DDP) or the Project File (PF) can be found on the following web site:
www.wsdot.wa.gov/eesc/design/projectdev/



Parallel Design
(Not to Scale)

Bus



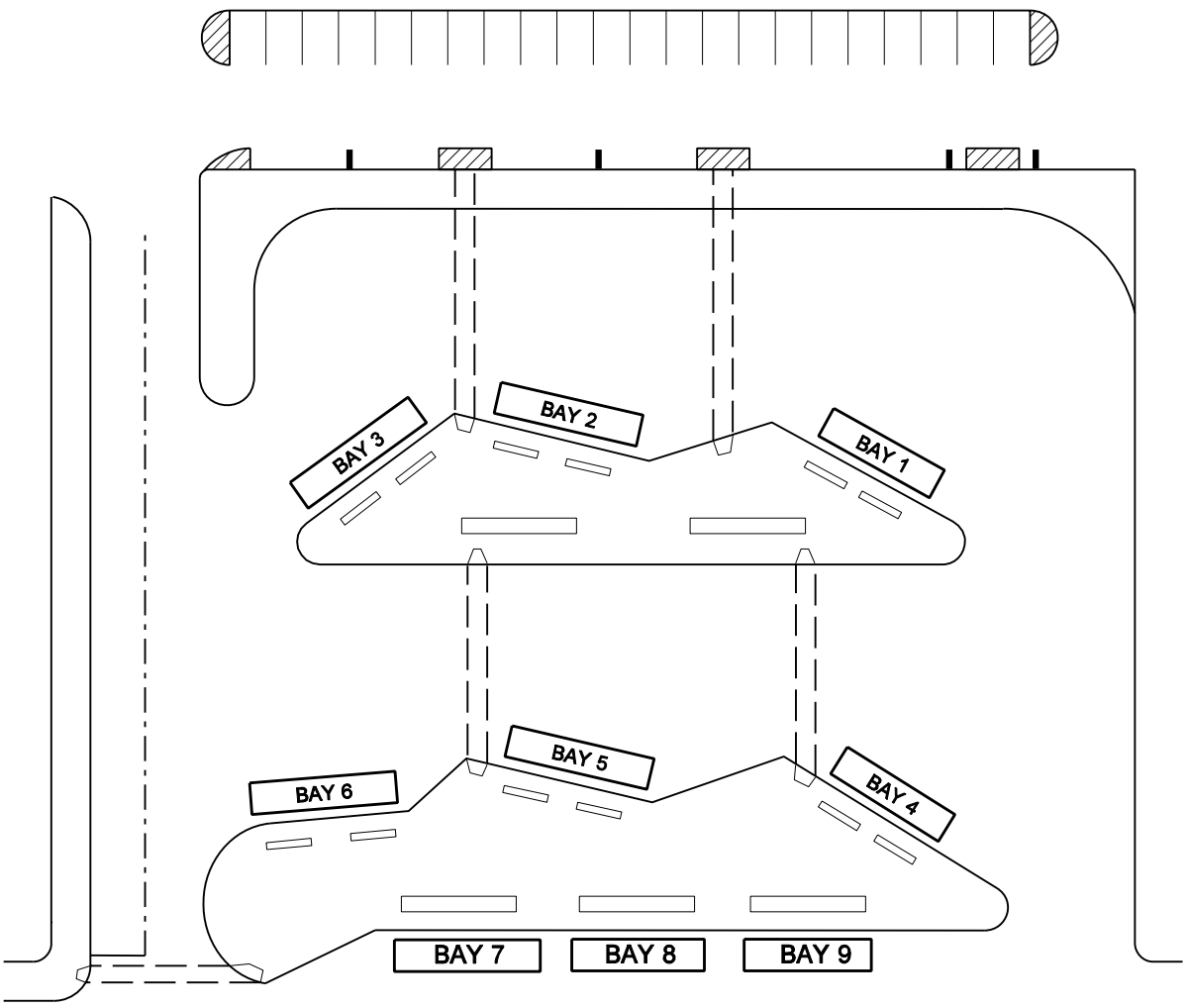
Sawtooth Design (2)

Notes:

(1) Dimensions shown are for a 40-foot bus; adjust the length when a longer bus is required.

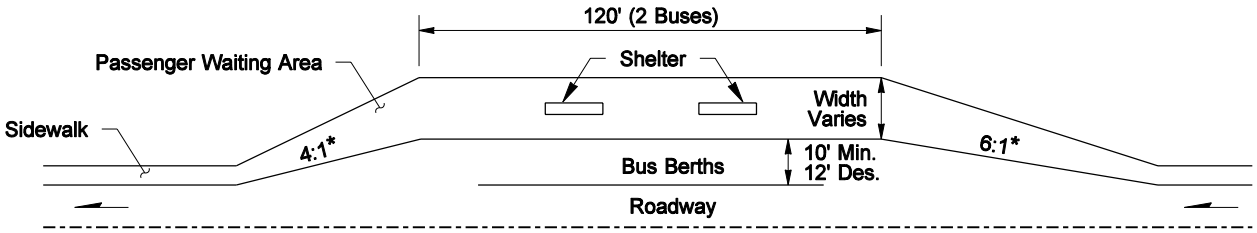
(2) Design shown is an example; contact the local transit agency for additional information.

Bus Berth Designs
Figure 1060-1



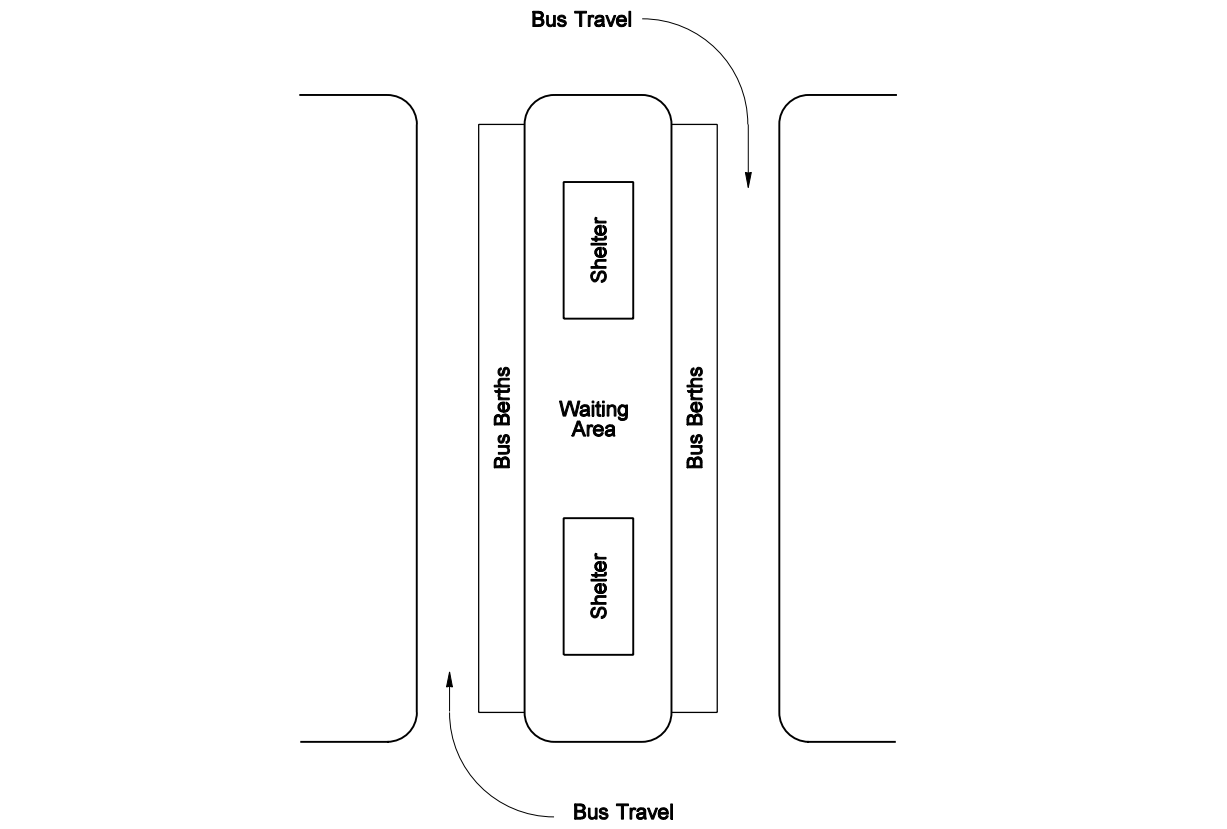
Not to Scale

Transit Center Sawtooth Bus Berth
(Design Example)
Figure 1060-2

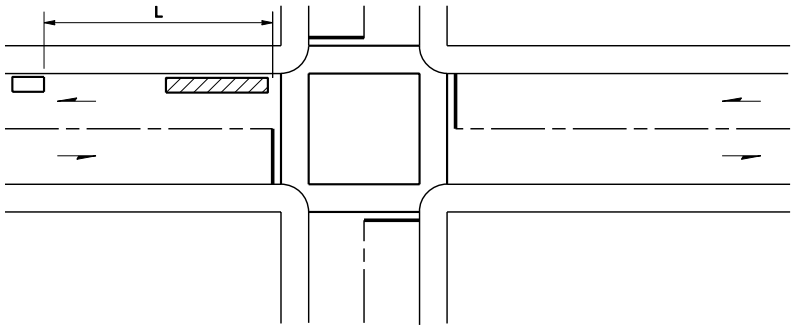


* On higher-speed facilities it may be necessary to provide a greater acceleration/deceleration transition

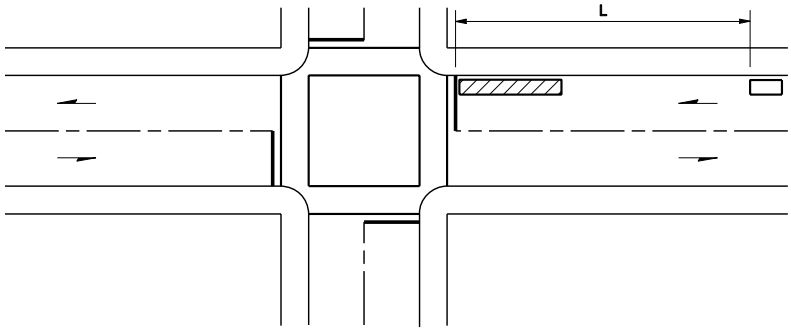
Bus Turnout Transfer Center
Figure 1060-3



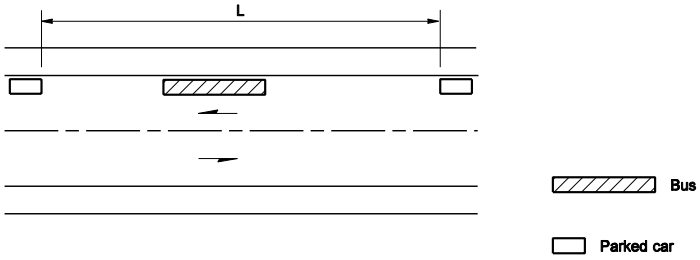
Off-Street Transfer Center
Figure 1060-4



Far-Side Bus Stop



Near-Side Bus Stop



Mid-Block Bus Stop

Minimum Lengths for Bus Curb Loading Zones (L)(1)						
Approx Bus Length	Loading Zone Length (feet)					
	One BUS Stop			Two BUS Stop		
	Far Side(2)	Near Side(2)(3)	Mid-block	Far Side(2)	Near Side(2)(3)	Mid-block
25	65	90	125	90	120	150
30	70	95	130	100	130	160
35	75	100	135	110	140	170
40	80	105	140	120	150	180
60	100	125	160	160	190	220

Notes:

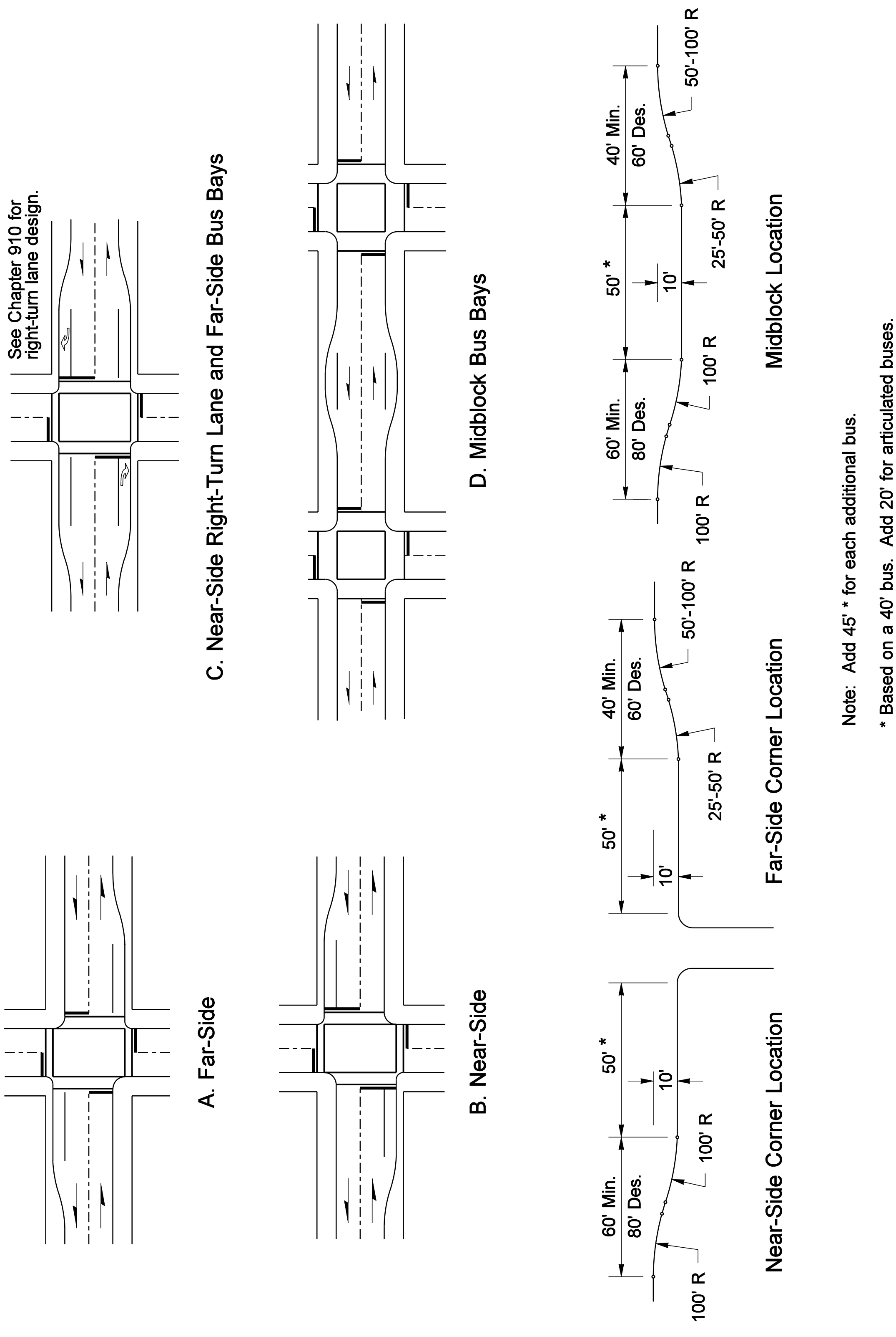
(1) Based on bus 1 foot from curb. When bus is 0.5 foot from curb, add 20 feet near side, 15 feet far side, and 20 feet midblock. For buses on streets 40 feet wide, add 15 feet when street is 35 feet wide and 30 feet when street is 32 feet wide.

(2) Measured from extension of building line or established stop line. Add 15 feet where buses make a right turn.

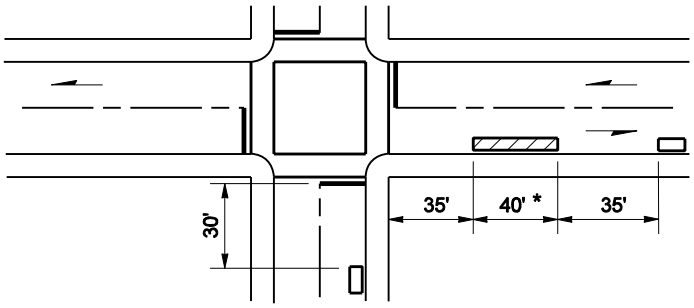
(3) Add 30 feet where right-turn volume is high for other vehicles.

Minimum Bus Zone Dimensions

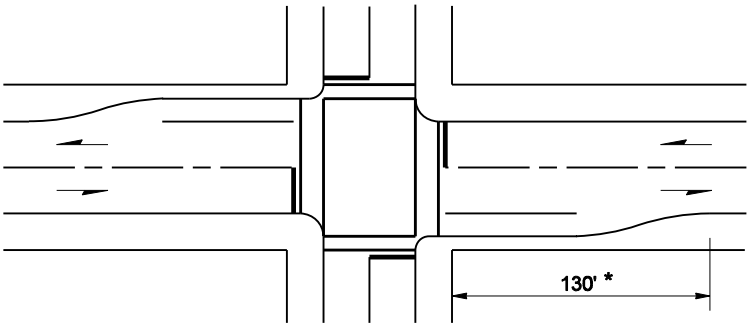
Figure 1060-5



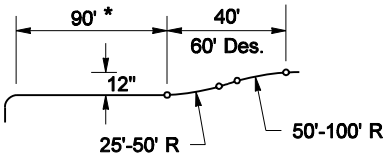
Bus Stop Pullouts, Arterial Streets
Figure 1060-6



Far-Side Bus Stop



Far-Side Bus Pullout
After Right Turn

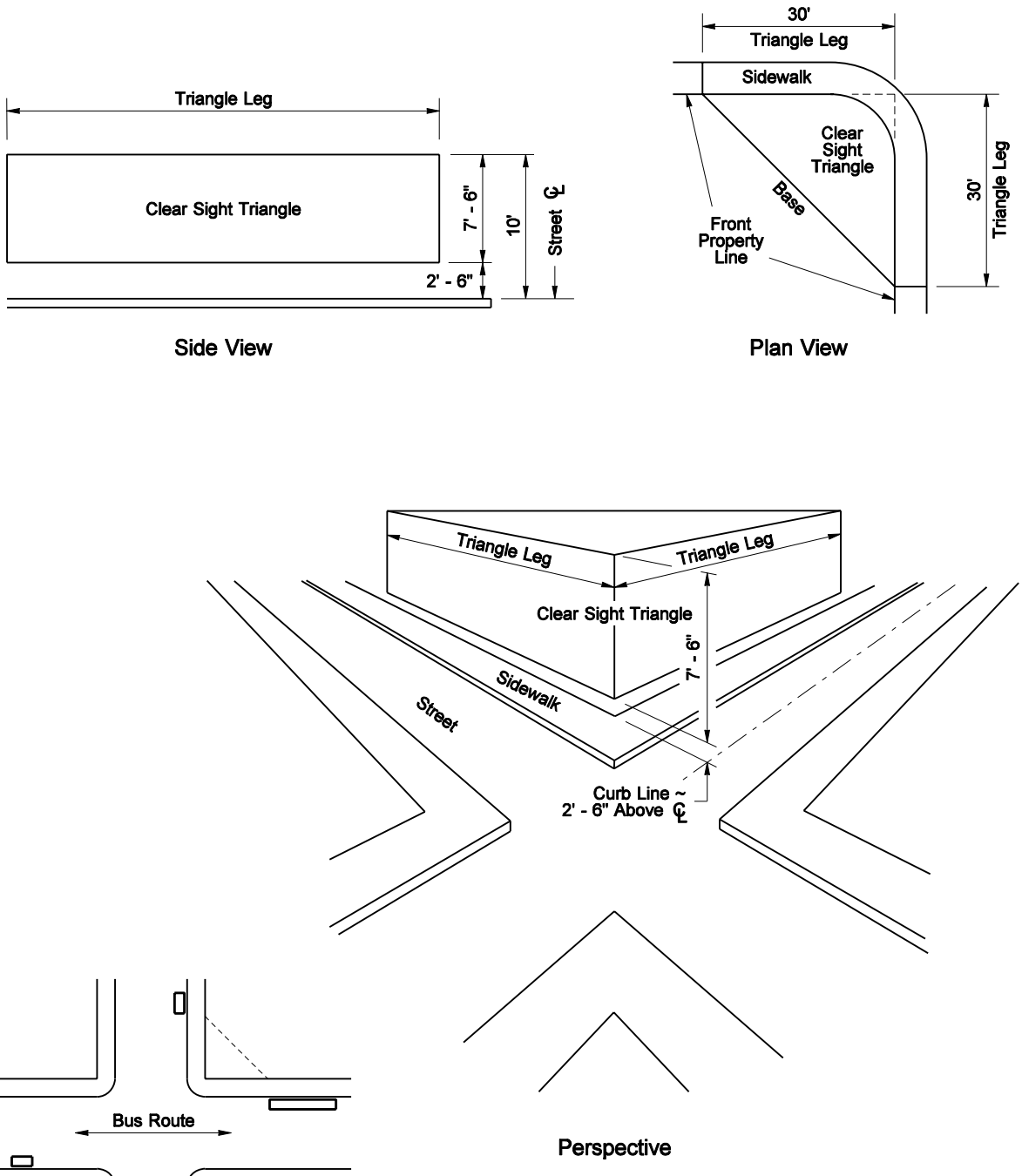


Bus Parked Car

* Based on a 40' bus. Add 20' for articulated buses.

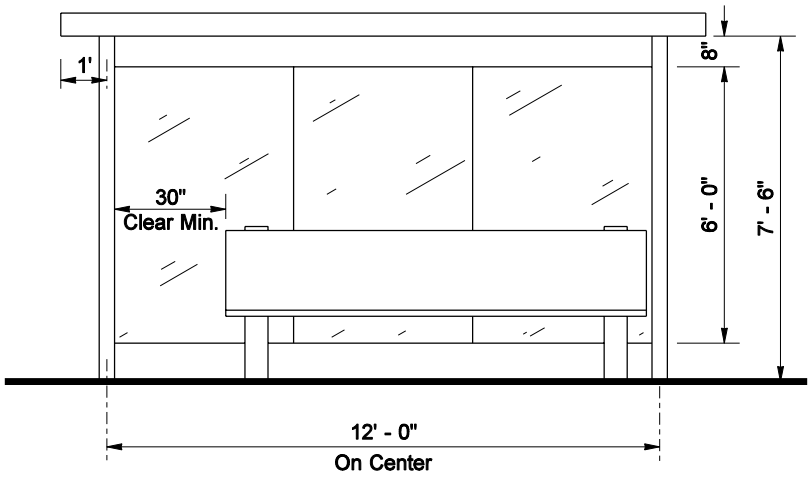
Minimum Bus Zone and Pullout After Right-Turn Dimensions

Figure 1060-7

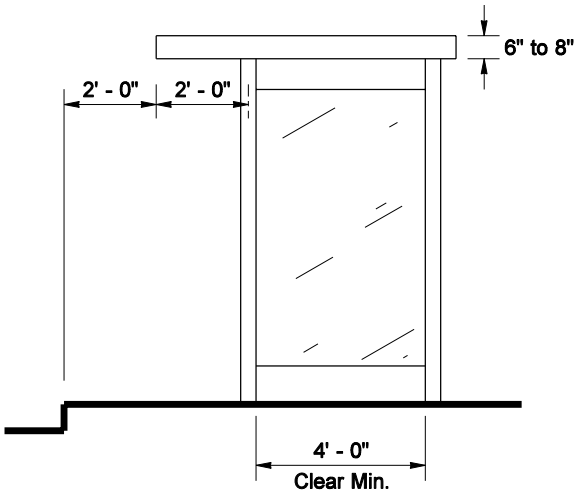


Shelter Siting

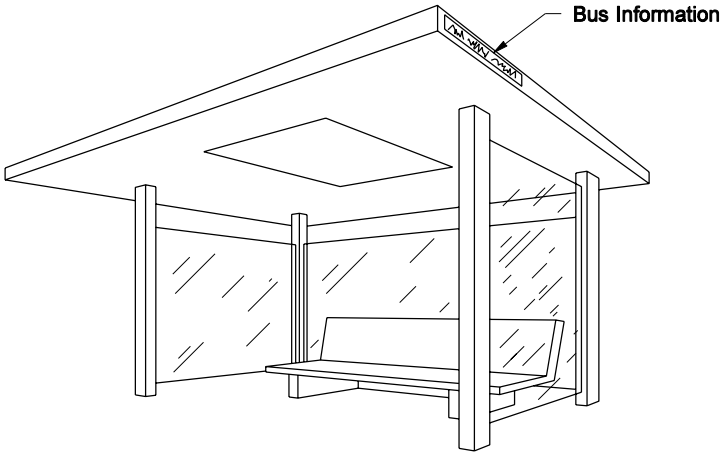
Figure 1060-8



Front View



Side View

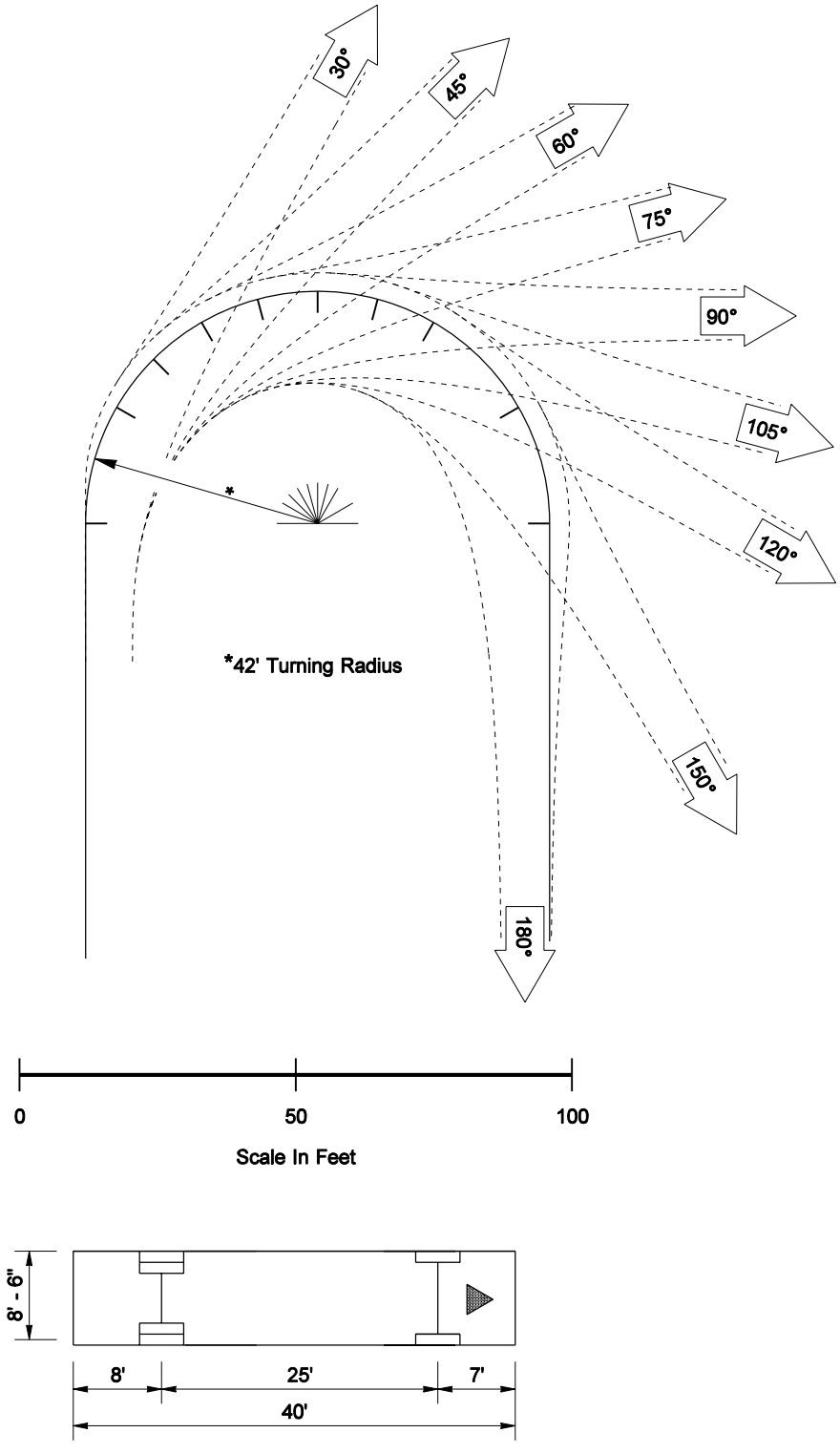


Note:

Bench style can vary.

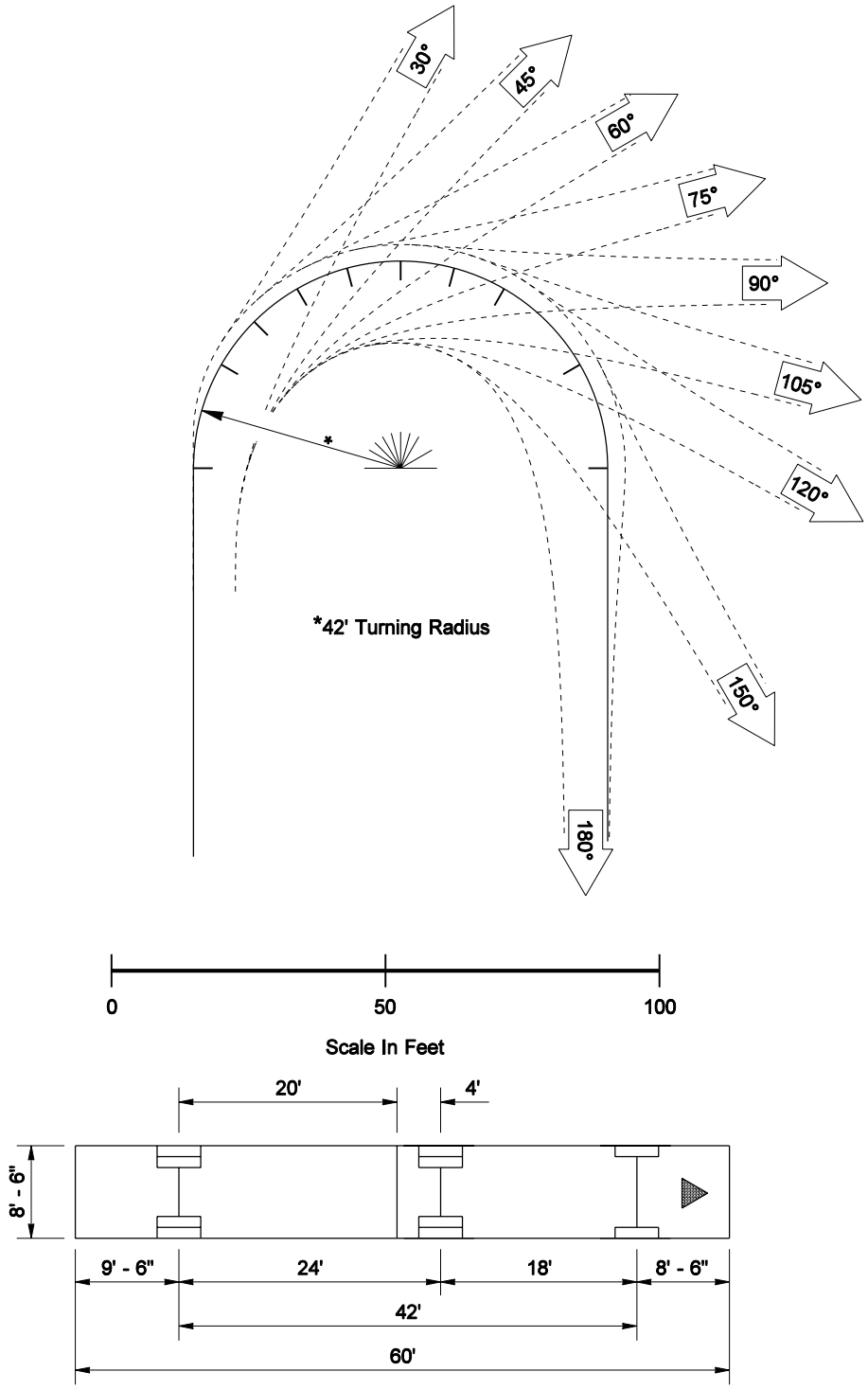
Typical Bus Shelter Design

Figure 1060-9

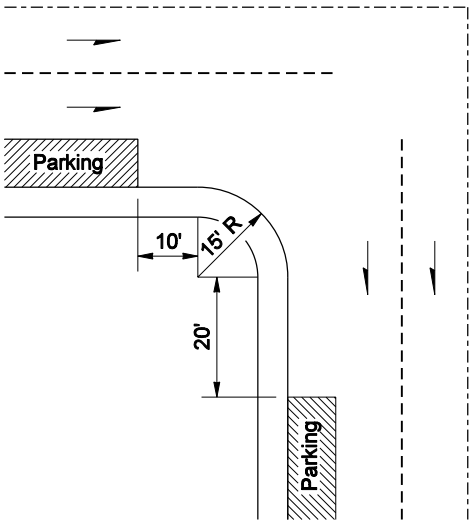


Design Vehicle Turning Movements

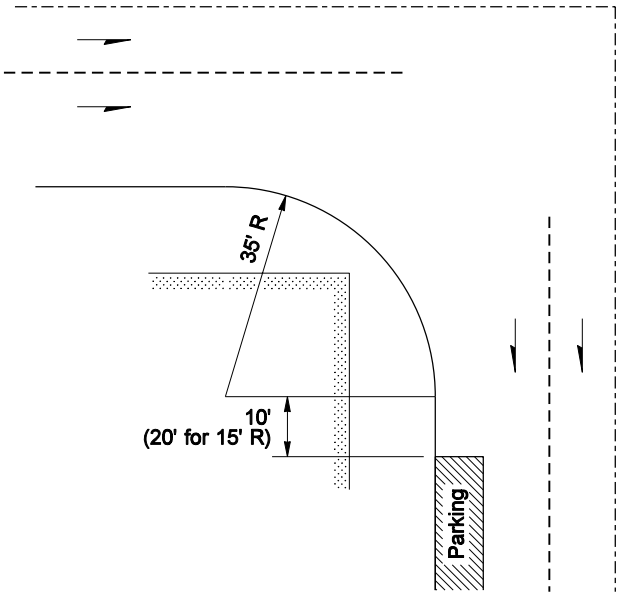
Figure 1060-10



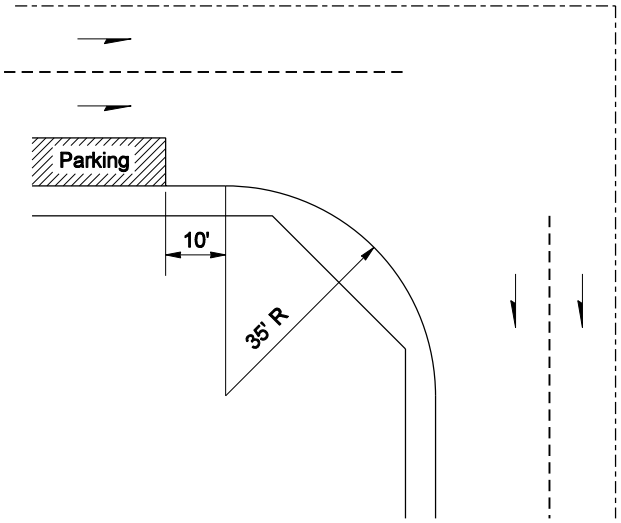
Turning Template for Articulated Bus
Figure 1060-11



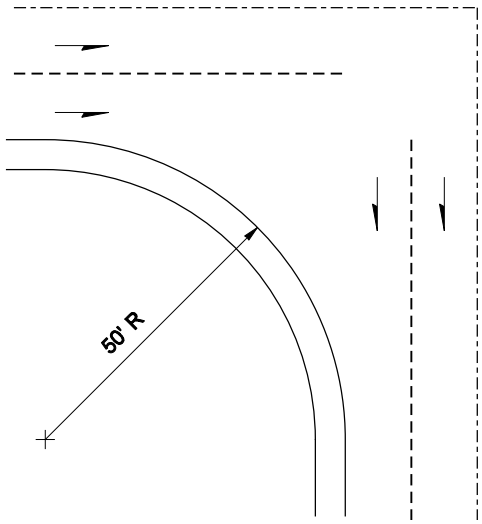
On-Street Parking Before and After Turn



On-Street Parking After Turn



On-Street Parking Before Turn

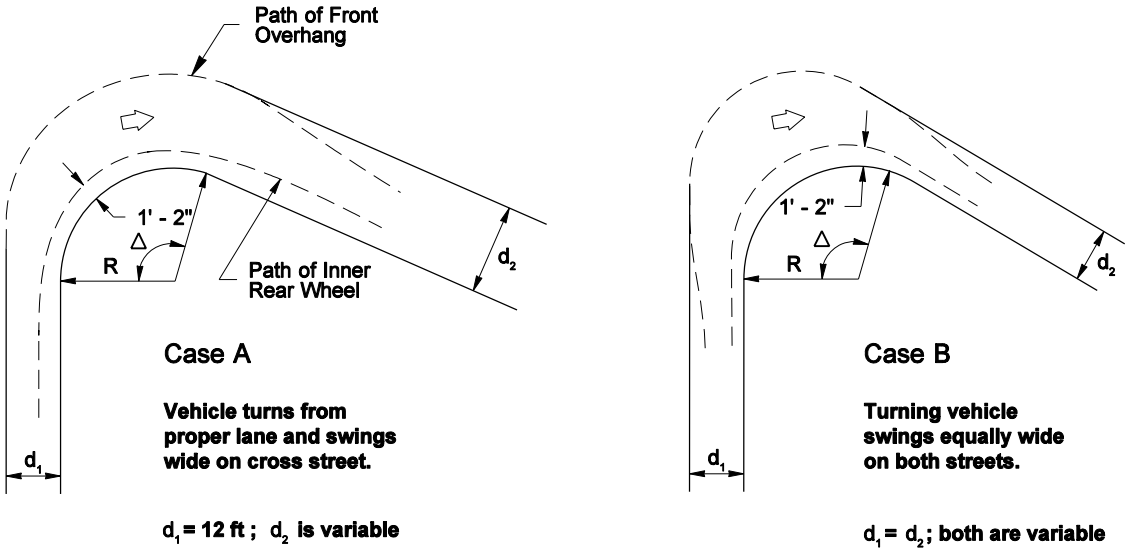


No On-Street Parking

Intersection Design
Figure 1060-12

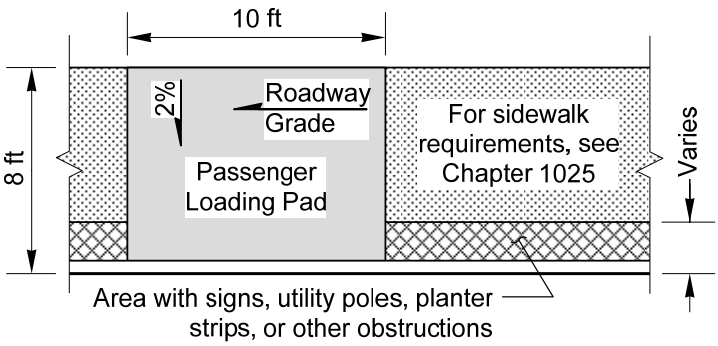
d_2 (ft.) for Cases A and B Where:

△	R=15'		R=20'		R=25'		R=30'		R=40'	
	A	B	A	B	A	B	A	B	A	B
30°	22	17	19	17	19	17	19	17	18	17
60°	28	21	26	20	24	20	23	19	22	18
90°	38	23	33	22	30	22	25	21	21	18
120°	46	28	40	25	32	23	26	19	19	18
150°	48	28	40	25	32	23	22	18	17	16

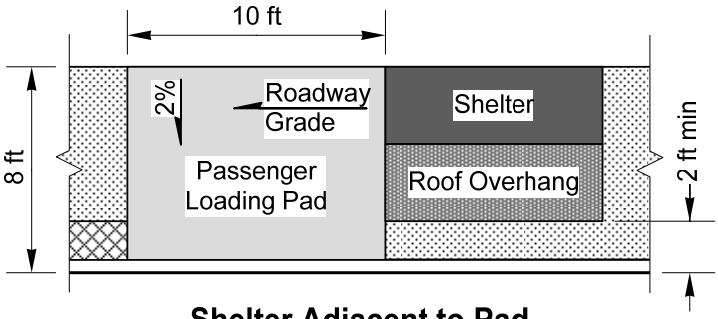


Cross-Street Width Occupied by Turning Vehicle for Various Angles of Intersection and Curb Radii

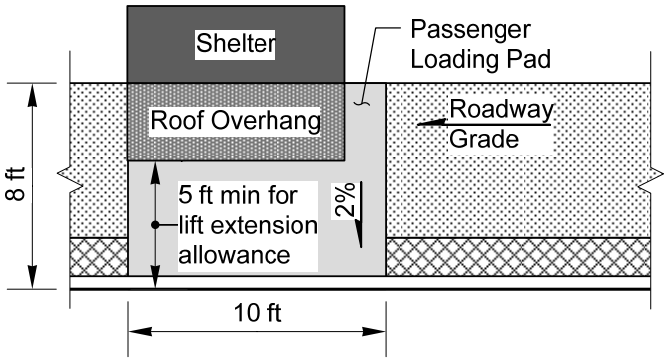
Figure 1060-13



Without Shelter



Shelter Adjacent to Pad



Shelter Behind Pad

Notes:

- The passenger loading pad must be free of obstructions. For additional information, see 1060.10(2).
- A minimum width pedestrian access route must be maintained. For pedestrian requirements, see Chapter 1025.
- Shelter dimensions may vary. For additional information, see 1060.07(2). For an example shelter design, see Figure 1060-9.

Passenger Loading Pad

Figure 1060-14

1120.01 General

The National Bridge Inspection Standards (NBIS) published in the Code of Federal Regulations (23CFR650, Subpart C) defines a bridge as, *"A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening."*

Bridge design is the responsibility of the Headquarters (HQ) Bridge and Structures Office, which develops a preliminary bridge plan for a new or modified structure in collaboration with the region. This chapter provides basic design considerations for the development of this plan. Unique staging requirements, constructibility issues, and other considerations are addressed during plan development. Contact the HQ Bridge and Structures Office early in the planning stage regarding issues that might affect the planned project. (See Chapter 141, "Roles and Responsibilities for Projects with Structures.") A Project File (PF) is required for all bridge construction projects.

1120.02 References

Federal/State Laws and Codes

Code of Federal Regulations (CFR) Title 23, Part 650, Subpart C – National Bridge Inspection Standards

Chapter 468-95 *Washington Administrative Code* (WAC), "Manual on uniform traffic control devices for streets and highways" (MUTCD)
www.wsdot.wa.gov/biz/trafficoperations/mutcd.htm

Chapter 480-60 (WAC), Railroad Companies – clearances

Design Guidance

Bridge Design Manual, M 23-50, WSDOT

Geotechnical Design Manual, M 46-03, WSDOT

Local Agency Guidelines (LAG), M 36-63, WSDOT

LRFD Bridge Design Specifications, third edition, Washington DC, AASHTO, 2004

Manual on Uniform Traffic Control Devices for Streets and Highways, USDOT, Washington DC, including the *Washington State Modifications to the MUTCD*, WSDOT (MUTCD)
www.wsdot.wa.gov/biz/trafficoperations/mutcd.htm

Standard Plans for Road, Bridge, and Municipal Construction (*Standard Plans*), M 21-10, WSDOT

Standard Specifications for Road, Bridge, and Municipal Construction (*Standard Specifications*), M 41-10, WSDOT

Traffic Manual, M 51-02, WSDOT

Supporting Information

A Policy on Geometric Design of Highways and Streets (Green Book), AASHTO, 2004

Manual for Railway Engineering, American Railway Engineering and Maintenance of Way Association (AREMA), 2006

1120.03 Bridge Location

Bridge location is chosen to conform to the alignment of the highway. The following conditions can simplify design efforts, minimize construction activities, and reduce structure costs:

- A perpendicular crossing
- The minimum required horizontal and vertical clearances
- A constant bridge width (without tapered sections)
- A tangential approach alignment of sufficient length not to require superelevation on the bridge
- A crest vertical curve profile that will facilitate drainage
- An adequate construction staging area

1120.04 Bridge Site Design Elements

(1) Structural Capacity

The structural capacity of a bridge is a measure of the structure's ability to carry vehicle loads. For new bridges, the bridge designer chooses the design load that determines the structural capacity. For existing bridges, the structural capacity is calculated to determine the "load rating" of the bridge. The load rating is used to determine whether or not a bridge is "posted" for legal weight vehicles or if the bridge is "restricted" for overweight permit vehicles.

(a) **New Structures.** All new structures that carry vehicular loads are designed to HL-93 notional live load in accordance with AASHTO's *LRFD Bridge Design Specifications*.

(b) **Existing Structures.** When the Structural Capacity column of a design matrix applies to the project, request a Structural Capacity Report from the Risk Reduction Engineer in the HQ Bridge and Structures Office. The report will state:

- The structural capacity status of the structures within the project limits.
- What action, if any, is appropriate.
- Whether a deficient bridge is included in the 6-year or 20-year plans for replacement or rehabilitation under the P2 program and, if so, in which biennium the P2 project is likely to be funded.

Include the Structural Capacity Report in the Design Documentation Package (DDP).

The considerations used to evaluate the structural capacity of a bridge are as follows:

1. On National Highway System (NHS) routes (including Interstate routes):
   - Operating load rating is at least 36 tons (which is equal to HS-20).
   - The bridge is not permanently posted for legal weight vehicles.
   - The bridge is not permanently restricted for vehicles requiring overweight permits.
2. On non-NHS routes:
   - The bridge is not permanently posted for legal weight vehicles.
   - The bridge is not permanently restricted for vehicles requiring overweight permits.

(2) Bridge Widths for Structures

(a) **New Structures.** Full design level widths are provided on all new structures (see Chapter 440). All structures on city or county routes crossing over a state highway must conform to the *Local Agency Guidelines*. Use local city or county adopted and applied criteria when their minimum width exceeds state criteria.

(b) **Existing Structures.** For guidance, see the design matrices in Chapter 325.

(3) Horizontal Clearance

Horizontal clearance for structures is the distance from the edge of the traveled way to bridge piers and abutments, traffic barrier ends, or bridge end embankment slopes. Minimum distances for this clearance vary depending on the type of structure. The *Bridge Design Manual* provides guidance on horizontal clearance.

For structures involving railroads, contact the HQ Design Office Railroad Liaison.

(4) Medians

For multilane highways, the minimum median widths for new bridges are as shown in Chapters 430 and 440. An open area between two bridges is undesirable when the two roadways are separated by a median width of 26 feet or less. The preferred treatment is to provide a new single structure that spans the area between the roadways. When this is infeasible, consider widening the two bridges on the median sides to reduce the open area to 6 inches. When neither option is feasible, consider installing netting or other elements to enclose the area between the bridges. Consideration and analysis of all site factors are necessary if installation of netting or other elements is proposed. Document this evaluation in the Design Documentation Package and obtain the approval of the State Design Engineer.

(5) Vertical Clearance

Vertical clearance is the critical height under a structure that will safely accommodate vehicular and rail traffic based on its design characteristics. This height is the least height available from the lower roadway surface (including usable shoulders) or the plane of the top of the rails to the bottom of the bridge. Usable shoulders are the design shoulders for the roadway and do not include paved widened areas that may exist under the structure.

Construction of new bridges and the reconstruction or widening of existing structures often require the erection of falsework across the traveled way of a highway. The erection of this falsework can reduce the vertical clearance for vehicles to pass under the work area. The potential for accidents to occur by hitting this lower construction stage falsework is increased.

(a) **Vertical Falsework Clearance for Bridges Over Highways**.

1. On all routes that require a 16-foot-6-inch vertical clearance, maintain the 16-foot-6-inch clearance for falsework vertical clearance.
   - On structures that currently have less than a 16-foot-6-inch vertical clearance for the falsework envelope, maintain existing clearance.
   - On new structures, maintain the falsework vertical clearance at least to those of the below-referenced minimum vertical clearances.
2. Any variance from the above must be approved by the Regional Administrator or designee in writing and made a part of the Project File (PF).

(b) **Minimum Clearance for New Structures.** For new structures, the minimum vertical clearances are as follows:

1. **Bridge over a roadway**. The minimum vertical clearance is 16.5 feet.
2. **Bridge over a railroad track.** The minimum vertical clearance is 23.5 feet (see Figure 1120-2). A lesser clearance may be negotiated with the railroad company based on certain operational characteristics of the rail line; however, any clearance less than 22.5 feet requires the approval of the Washington State Utilities and Transportation Commission (WUTC) per WAC 480-60. Vertical clearance is provided for the width of the railroad freight car. Coordinate railroad clearance issues with the HQ Design Office Railroad Liaison.
3. **Pedestrian bridge over a roadway**. The minimum vertical clearance is 17.5 feet.

(c) **Minimum Clearance for Existing Structures.** The criteria used to evaluate the vertical clearance of existing structures depend on the work being done on or under that structure. When evaluating an existing structure on the Interstate System, see 1120.04(5)(e), Coordination. This guidance applies to bridge clearances over state highways and under state highways at interchanges. For state highways over local roads and streets, city or county vertical clearance requirements may be used as minimum design criteria. (See Figure 1120-1 for a table of bridge vertical clearances.)

1. **Bridge over a roadway**. For a project that will widen an existing structure over a highway or where the highway will be widened under an existing structure, the vertical clearance can be as little as 16.0 feet on the Interstate System or other freeways, or 15.5 feet on nonfreeway routes. An approved

deviation is required for clearance less than 16.0 feet on Interstate routes or other freeways, and 15.5 feet on nonfreeway routes.

For a planned resurfacing of the highway under an existing bridge, if the clearance will be less than 16.0 feet on the Interstate System or other freeways and 15.5 feet on nonfreeway routes, evaluate the following options and include in a deviation request:

- Pavement removal and replacement
- Roadway excavation and reconstruction to lower the roadway profile
- Providing a new bridge with the required vertical clearance

Reducing roadway paving and surfacing thickness under the bridge to achieve the minimum vertical clearance can cause accelerated deterioration of the highway and is not recommended. Elimination of the planned resurfacing in the immediate area of the bridge might be a short-term solution if recommended by the Region Materials Engineer (RME). Solutions that include milling the existing surface followed by overlay or inlay must be approved by the RME to ensure that adequate pavement structure is provided.

For other projects that include an existing bridge where no widening is proposed on or under the bridge, and the project does not affect vertical clearance, the clearance can be as little as 14.5 feet. For these projects, document the clearance in the Design Documentation Package. For an existing bridge with less than a 14.5-foot vertical clearance, an approved deviation request is required.

2. **Bridge over a railroad track.** For an existing structure over a railroad track, the vertical clearance can be as little as 22.5 feet. A lesser clearance can be used with the agreement of the railroad company and the approval of the Washington State Utilities and Transportation Commission. Coordinate railroad clearance issues with the HQ Design Office Railroad Liaison.

(d) **Signing.** Low-clearance warning signs are necessary when the vertical clearance of an existing bridge is less than 15 feet 3 inches. Other requirements for low-clearance signing are contained in the *Manual on Uniform Traffic Control Devices* and the *Traffic Manual*.

(e) **Coordination.** The Interstate System is used by the Department of Defense (DOD) for the conveyance of military traffic. The Military Traffic Management Command Transportation Engineering Agency (MTMCTEA) represents the DOD in public highway matters. The MTMCTEA has an inventory of vertical clearance deficiencies over the Interstate System in Washington State. Contact the MTMCTEA, through FHWA, if any of the following changes are proposed to these bridges:

- A project would create a new deficiency of less than a 16.0-foot vertical clearance over an Interstate highway
- The vertical clearance over the Interstate is already deficient (less than 16.0 feet) and a change (increase or decrease) to vertical clearance is proposed

Coordination with MTMCTEA is required for these changes on all rural Interstate highways and for one Interstate route through each urban area.

Project Type	Vertical Clearance	Documentation Requirement (see notes)
Interstate and Other Freeways(1)		
New Bridge	> 16.5 ft	(2)
Widening Over or Under Existing Bridge	> 16 ft	(2)
	< 16 ft	(4)
Resurfacing Under Existing Bridge	> 16 ft	(2)
	< 16 ft	(4)
Other With No Change to Vertical Clearance	> 14.5 ft	(3)
	< 14.5 ft	(4)
Nonfreeway Routes		
New Bridge	> 16.5 ft	(2)
Widening Over or Under Existing Bridge	> 15.5 ft	(2)
	< 15.5 ft	(4)
Resurfacing Under Existing Bridge	> 15.5 ft	(2)
	< 15.5 ft	(4)
Other With No Change to Vertical Clearance	> 14.5 ft	(3)
	< 14.5 ft	(4)
Bridge Over Railroad Tracks(7)		
New Bridge	> 23.5 ft < 23.5 ft	(2) (4)(5)
Existing Bridge	> 22.5 ft < 22.5 ft	(2) (4)(5)
Pedestrian Bridge Over Roadway		
New Bridge	> 17.5 ft	(2)
Existing Bridge		(6)

Notes:

(1) Applies to all bridge vertical clearances over highways and under highways at interchanges.

(2) No documentation required.

(3) Document to Design Documentation Package.

(4) Approved deviation required.

(5) Requires written agreement between railroad company and WSDOT, and approval via petition from the WUTC.

(6) Maintain 17.5-foot clearance.

(7) Coordinate railroad clearance with the HQ Design Office Railroad Liaison.

Bridge Vertical Clearances
Figure 1120-1

(6) Pedestrian and Bicycle Facilities

When pedestrians or bicyclists are anticipated on bridges, provide facilities consistent with guidance in Chapters 1020 and 1025.

(7) Bridge Approach Slab

Bridge approach slabs are reinforced concrete pavement installed across the full width of the bridge ends. They provide a stable transition from normal roadway cross section to the bridge ends and compensate for differential expansion and contraction of the bridge and the roadway. Bridge approach slabs are provided on all new bridges. If an existing bridge is being widened and it has an approach slab, slabs are required on the widenings. The region, with the concurrence of the State Geotechnical Engineer and the State Bridge Engineer, may decide to omit bridge approach slabs.

(8) Traffic Barrier End Treatment

Plans for new bridge construction and bridge traffic barrier modifications include provisions for the connection of bridge traffic barriers to the longitudinal barrier approaching and departing the bridge. Indicate the preferred longitudinal barrier type and connection during the review of the bridge preliminary plan.

(9) Bridge End Embankments

The design of the embankment slopes at bridge ends depends on several factors. The width of the embankment is determined not only by the width of the roadway, but also by the presence of traffic barriers, curbs, and sidewalks, all of which create the need for additional widening. Examples of the additional widening required for these conditions are shown in the *Standard Plans*.

The end slope is determined by combining the recommendations of several technical experts within WSDOT. Figure 1120-3 illustrates the factors taken into consideration and the experts who are involved in the process.

(10) Bridge Slope Protection

Slope protection provides a protective and aesthetic surface for exposed slopes under bridges. Slope protection is normally provided under:

- Structures over state highways.
- Structures within an interchange.
- Structures over other public roads, unless requested otherwise by the public agency.
- Railroad overcrossings, if requested by the railroad.

Slope protection is usually not provided under pedestrian structures.

The type of slope protection is selected at the bridge preliminary plan stage. Typical slope protection types are concrete slope protection, semiopen concrete masonry, and rubble stone.

(11) Slope Protection at Watercrossings

The HQ Hydraulics Branch determines the slope protection requirements for structures that cross waterways. The type, limits, and quantity of slope protection are shown on the bridge preliminary plan.

(12) Protective Screening for Highway Structures

The Washington State Patrol (WSP) classifies the throwing of an object from a highway structure as an assault, not an accident. Therefore, records of these assaults are not contained in the WSP's accident databases. Contact the RME's office and the WSP for the history of reported incidents.

Protective screening might reduce the number of incidents, but will not stop a determined individual. Enforcement provides the most effective deterrent.

Installation of protective screening is analyzed on a case-by-case basis at the following locations:

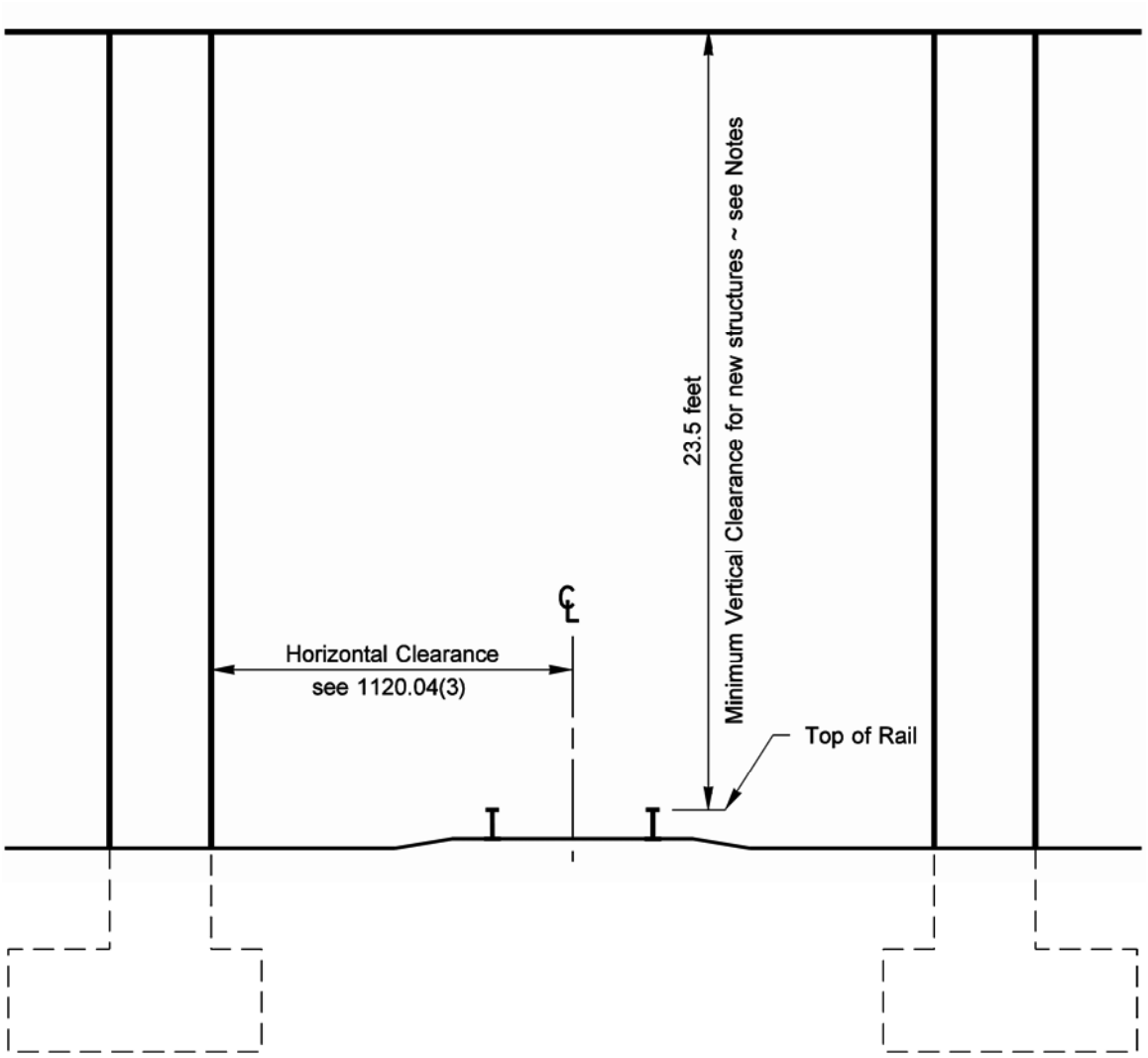
- On existing structures where there is a history of multiple incidents of objects being dropped or thrown and enforcement has not changed the situation
- On new structures near schools, playgrounds, or areas frequently used by children not accompanied by adults
- In urban areas on new structures used by pedestrians where surveillance by local law enforcement personnel is not likely
- On new structures with walkways where experience on similar structures within a 1-mile radius indicates a need
- On structures over private property that is subject to damage, such as buildings or power stations

In most cases, the installation of a protective screen on a new structure can be postponed until there are indications of need.

Submit all proposals to install protective screening on structures to the State Design Engineer for approval. Contact the HQ Bridge and Structures Office for approval to attach screening to structures and for specific design and mounting details.

1120.05 Documentation

The list of documents that are to be preserved in the Design Documentation Package (DDP) or the Project File (PF) can be found on the following web site: www.wsdot.wa.gov/eesc/design/projectdev/

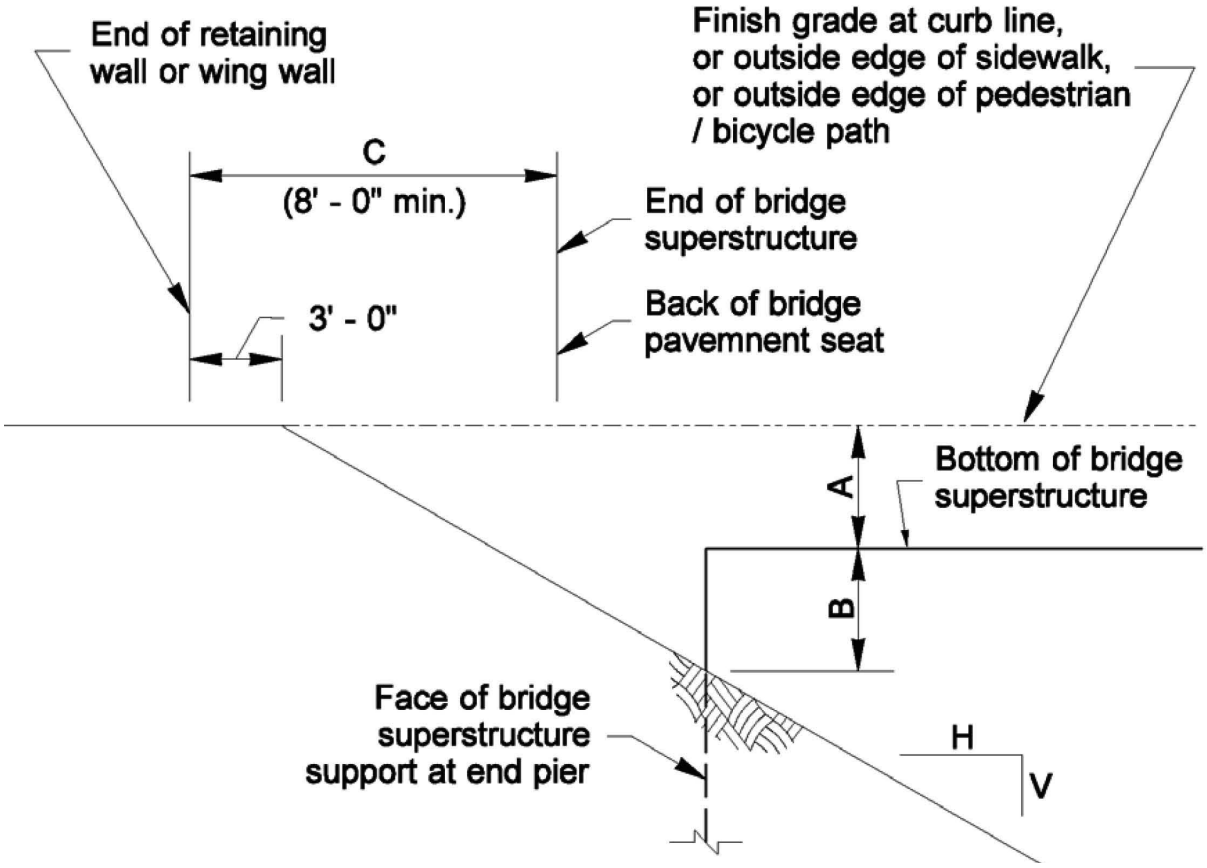


Notes:

- Use 22.5-foot vertical clearance for existing structures.
- Lesser vertical clearance may be negotiated (see 1120.04(5)).
- Horizontal clearance will be increased when the track is curved.
- Coordinate railroad clearance issues with the HQ Design Office Railroad Liaison.

Highway Structure Over Railroad

Figure 1120-2



BRIDGE END ELEVATION

Applies to retaining wall or wing wall (or combination) extending beyond bridge superstructure (barrier omitted for clarity).

LEGEND

A = Superstructure depth: Recommended by HQ Bridge and Structures Office

B = Vertical clearance from bottom of superstructure to embankment: Recommended by Bridge Preservation Engineer

C = Distance from end of retaining wall or wing wall to back of pavement seat: Recommended by HQ Bridge and Structures Office

H & V = Embankment slope: Recommended by Geotechnical Engineer

Embankment Slope at Bridge Ends

Figure 1120-3

- Define the study areas. The study area normally includes one interchange upstream and downstream from the proposed system revision. If the proposal's area of influence extends beyond those interchanges, the study area will be expanded accordingly.
- Collect and analyze current traffic volumes to develop current year, year of opening, and design year peak hour traffic estimates for the regional and local systems in the area of the proposal. Use regional transportation planning organization-based forecasts, refined by accepted travel demand estimating procedures. Forecasts for specific ramp traffic can require other methods of estimation procedures and must be consistent with the projections of the travel demand models. Modeling must include increased demand caused by anticipated development.
- Using existing information, identify the origins and destinations of trips on the local systems, the existing interchange/ intersections, and the proposed access.
- Assign the appropriate travel demand to improvements that might be made to:
- The local system (widen, add new surface routes, coordinate the signal system, control access, improve local circulation, or improve parallel roads or streets).
- The existing interchanges (lengthen or widen ramps, add park and ride lots, or add frontage roads).
- The freeway lanes (add collector-distributor roads or auxiliary lanes).
- Transportation system management and travel demand management measures.
- Describe the current, year of opening, and design year level of service at all affected locations within the study area, including local systems, existing ramps, and freeway lanes.

(2) Policy Point 2: Reasonable Alternatives

Describe the reasonable alternatives that have been evaluated.

Describe all reasonable alternatives that have been considered: the design options, locations, and transportation system management-type improvements such as ramp metering, mass transit, and HOV facilities that have been assessed and that meet the proposal design year needs.

After describing each of the alternatives that were proposed, explain why reasonable alternatives were omitted or dismissed from further consideration.

Future projects must be coordinated as described in Policy Point 7.

(3) Policy Point 3: Operational and Accident Analyses

How will the proposal affect safety and traffic operations at year of opening and design year?

Policy Point 3 documents the procedures used to conduct the operational and accident analyses and the results that support the proposal.

The preferred operational alternative is selected, in part, by showing that it will not have a significant adverse impact on the operation and safety of the freeway and the affected local network, or that the proposal impacts will be mitigated.

Document the results of the following analyses in the report:

- "No-Build" Analysis – An operational analysis of the current year, year of opening, and design year for the existing limited access freeway and the affected local roadway system. This is the baseline "no-build" condition, including state transportation plan and comprehensive plan improvements expected to exist. All of the alternatives will be compared to the no-build condition.
- "Build" Analysis – An operational analysis of the year of opening and design year for the proposed future freeway and the affected local roadway system.

- An accident analysis for the most current data year, year of opening, and design year of the existing limited access freeway and the affected local roadway system for the "no-build." An accident analysis should also be performed for the "build" as well.

The data used must be consistent with the data used in the environmental documentation. If not, provide justification for the discrepancies.

(a) ***Operational Analyses.*** Demonstrate that the proposal does not have a significant adverse impact on the operation of the freeway or the adjacent affected local roadway system. If there are proposal impacts, explain how the impacts will be mitigated.

Document the selected operational analysis procedures. For complex urban projects, a refined model might be necessary. As a minimum, an analysis using the current version of the latest accepted *Highway Capacity Manual* (HCM) is necessary. Any procedure used must provide a measure of effectiveness compatible with the HCM. WSDOT currently supports the following traffic analysis and traffic simulation software:

- HCS
- Synchro
- Vissim
- Corsim

Refer to Chapter 610, "Traffic Analysis," for more detail.

FHWA must conduct its independent analysis using HCS. In those instances where HCS is not the appropriate tool to use and a simulation-type software is chosen, early coordination with FHWA is necessary.

All operational analyses shall be of sufficient detail, and include sufficient data and procedure documentation to allow independent analysis during FHWA and HQ evaluation of the proposal. For Interstates, HQ must provide concurrence before it transmits the proposal to FHWA with its recommendation.

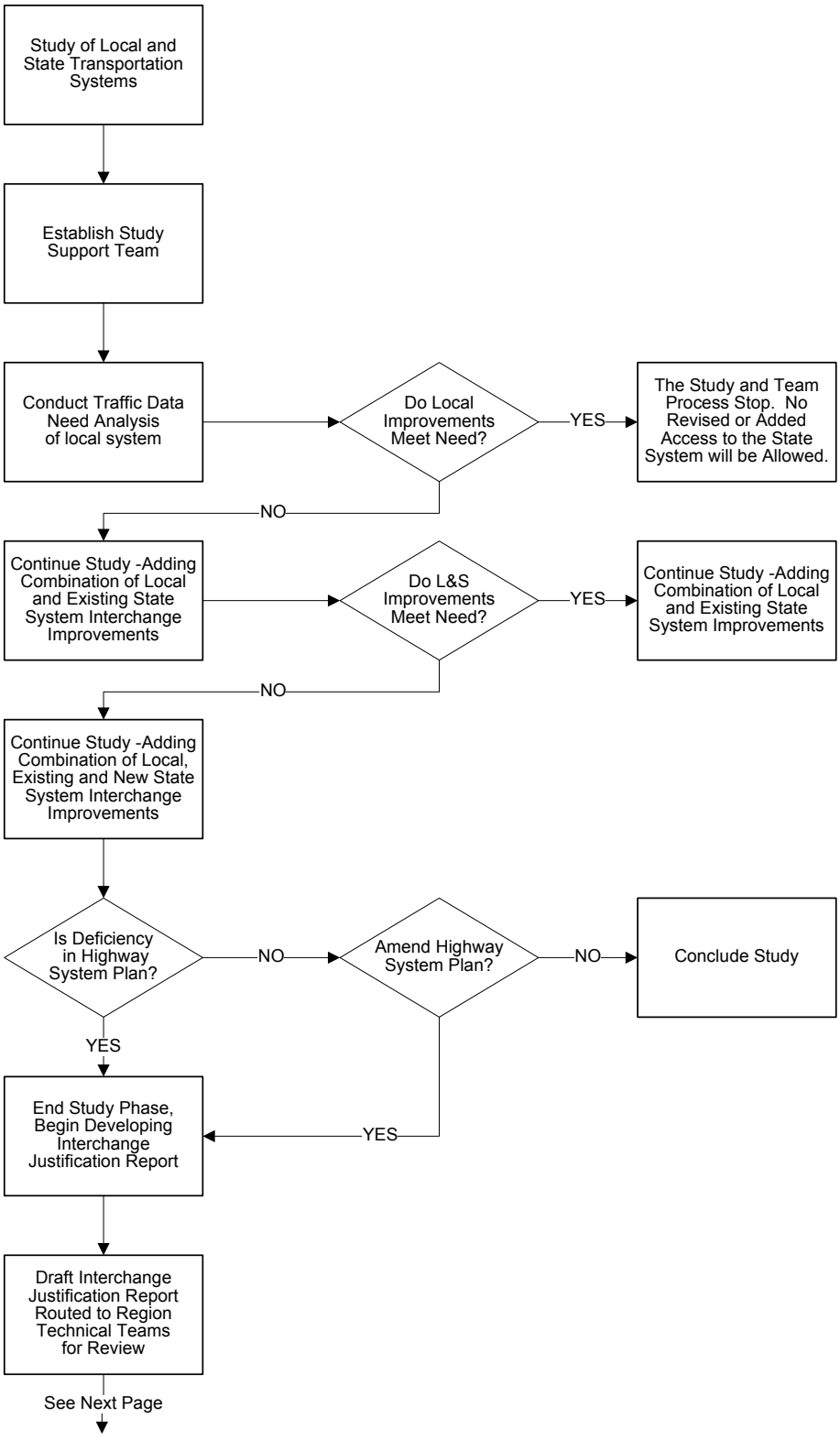
Prepare a layout displaying adjacent interchanges/intersections and the data noted below. The data should show:

- Distances between intersections or ramps of a proposed interchange, and that of adjacent existing and known proposed interchanges.
- Design speeds.
- Grades.
- Truck volume percentages on the freeway, ramps, and affected roadways.
- Adjustment factors (such as peak hour factors).
- Affected freeway, ramp, and local roadway system traffic volumes for the "no-build" and each "build" option. This will include: A.M. and P.M. peaks (noon peaks, if applicable); turning volumes; average daily traffic (ADT) for the current year; and forecast ADT for year of opening and design year.
- Affected main line, ramp, and local roadway system lane configurations.

The study area of the capacity analysis on the local roadway system includes documenting that the local network is able to safely and adequately collect and distribute any new traffic loads resulting from the access point revision. Expand the limits of the study area, if necessary, to analyze the coordination required with an in-place or proposed traffic signal system. Record the limits of the analysis as well as how the limits were established in the project assumptions document.

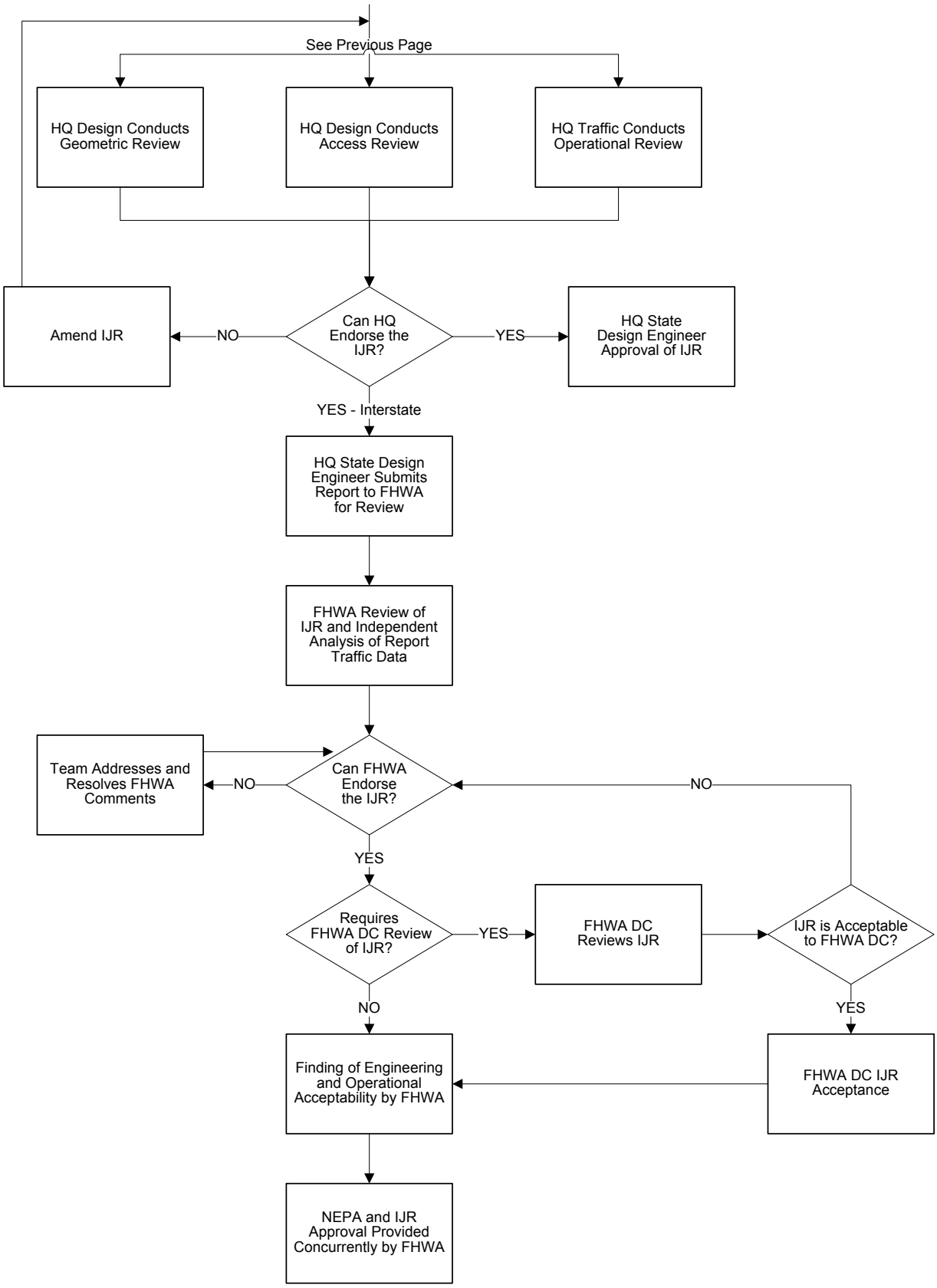
Document the results of analyzing the existing access and the proposed access point revision at all affected locations within the limits of the study area, such as weave, merge, diverge, ramp terminals, accident sites, and HOV lanes; along the affected section of freeway main line and ramps; and on the affected local roadway system. In the report, highlight the following:

- Any location for which there is a significant adverse impact on the operation or safety of the freeway facility, such as causing a reduction of the operational efficiency of a merge condition at an existing ramp; introducing a weave; or significantly reducing the level of service on the main line due to additional travel demand. Note what will be done to mitigate this adverse impact.



Interchange Justification Report Process Flow Chart

Figure 1425-4



Interchange Justification Report Process Flow Chart

Figure 1425-4 Continued

1430.01 General

Limited Access is established to preserve the safety and efficiency of specific highways and to preserve the public investment. Limited Access is achieved by acquiring access rights from abutting property owners, and by selectively limiting approaches to a highway. (For an overview of access control, and the references list and definitions of terminology for this chapter, see Chapter 1420, "Access Control.")

Requirements for the establishment of Limited Access highways are set forth in *Revised Code of Washington* (RCW) 47.52. The level of Limited Access is determined during the early stages of design in conformance with this chapter.

Highways controlled by acquiring abutting property owners' access rights are termed Limited Access highways and are further distinguished as having *Full, Partial, or Modified* Control. The number of access points per mile, the spacing of interchanges or intersections, and the location of frontage roads or local road/street approaches are determined by:

- The functional classification and importance of the highway.
- The character of the traffic.
- Current and future land use.
- The environment and aesthetics.
- The highway design and operation.
- The economic considerations involved.

The Federal Highway Administration (FHWA) has jurisdiction on the Interstate System. The Washington State Department of Transportation (WSDOT) has full jurisdiction on all other Limited Access highways, whether they are inside or outside incorporated city limits.

WSDOT keeps a record of the status of Limited Access Control, by state route number and milepost, in the Access Control Tracking System database, under the RELATED SITES heading: www.wsdot.wa.gov/eesc/design/access

The acquisition of Full, Partial, or Modified Control is to be evaluated when right of way is being acquired on an existing highway if the route is shown on the Access Control Tracking System list as either "established" or "planned for Limited Access." The matrices in Chapter 325 list several project types for which acquisition is indicated as a Design Element.

The cost of acquiring Limited Access must be evaluated with the consideration of future accident costs, future development, and the improved level of service of Limited Access highways. This cost will be evaluated against the cost to realign the highway in the future if Limited Access is not acquired at current prices.

Nothing in this chapter is to be construed in any way that would prevent acquisition of short sections of Full, Partial, or Modified Control of Access.

1430.02 Achieving Limited Access

(1) Process

All Washington State highways are Managed Access highways (see Chapter 1435), except where Limited Access rights have been acquired. The Right of Way and Limited Access Plans show the acquired Limited Access boundaries along the highways shown on the Access Control Tracking System as "Established Limited Access." The Tracking System list also shows the highways that are "Planned for Limited Access."

To achieve Limited Access Control, the following procedure is followed:

(a) The Secretary of Transportation (or a designee) first identifies a highway as "Planned for Limited Access."

(b) To establish or revise Limited Access on new or existing highways, Limited Access Hearings are held. (See Chapter 210, "Public Involvement and Hearings" regarding hearings, and Chapter 1410 for the phases of appraisal and acquisition.)

- **Phase 1.** The region develops a Limited Access Report and a Limited Access Report Plan for department approval and presentation to local officials. The plan notes the level of Limited Access proposed to be established.
- **Phase 2.** The region develops a Limited Access Hearing Plan for State Design Engineer (or designee) approval and for presentation at the hearings.
- **Phase 3.** After the hearing, the region develops the Findings and Order and revises the Limited Access Hearing Plan to become the Findings and Order Plan. The Findings and Order is processed to the Headquarters (HQ) Access and Hearings Unit for review and approval.

(c) The Director, Environmental and Engineering Programs adopts the Findings and Order and thus establishes the limits and level of Limited Access Control to be acquired.

(d) The Findings and Order Plan is now revised by the Right of Way Plans Branch for approval by the State Design Engineer (or designee) as a Phase 4 final Right of Way and Limited Access Plan.

(e) Real Estate Services acquires Limited Access rights from individual property owners based on final design decisions and updates the Right of Way and Limited Access Plans, and also updates the property deed.

(f) These highways or portions thereof are now Limited Access highways and no longer fall under the Managed Access program.

Highways are shown in the Access Control Tracking System as "L/A" in the CURRENT ACCESS column, and are further listed under ESTABLISHED L/A, PLANNED L/A, or L/A ACQUIRED, based on the current Right of Way and Limited Access Plan. If not listed under L/A ACQUIRED, the highway section is a Managed Access highway section until the acquisition is final.

(2) Access Report

The Access Report is developed by the region to inform local governmental officials of the proposed Limited Access highway and the principal access features involved, and to secure their approval. This report is not furnished to abutting property owners. Three copies of the report are submitted to the HQ Access and Hearings Unit for review and approval prior to submission to local authorities.

The Access Report consists of:

(a) A description of the existing and proposed highways, including data on the history of the existing highway, which may include references to High Accident Locations (HAL), High Accident Corridors (HAC), Pedestrian Accident Locations (PAL), and Risk locations, and development of the proposed highway(s).

(b) Traffic analyses pertaining to the proposed highway, including available information concerning current and potential future traffic volumes on county roads and city streets crossing or severed by the proposed highway, and reference sources such as origin-destination surveys.

Traffic data developed for the Design Decision Summary, together with counts of existing traffic available from state or local records, is normally adequate. Special counts of existing traffic are obtained only if circumstances indicate that the available data is inadequate or outdated.

(c) A discussion of factors affecting the design of the subject highway, including:

- Design level.
- Level of Limited Access, with definition.
- Roadway section.
- Interchange, grade separation, and intersection spacing.
- Pedestrian and bicycle trails or paths.
- Operational controls with emphasis on proposed fencing, the general concept of illumination, signing, and other traffic control devices.
- Locations of utilities and how they are affected.
- Proposed plan for landscaping and beautification, including an artist's graphic rendition or design visualization.

(d) Governmental responsibility, and comprehensive planning, land use, and community service relative to the new highway.

(e) The disposition of frontage roads, city street and county road intersections, and excess right of way.

(f) An appendix containing:

- A glossary of engineering terms.
- A traffic volume diagram(s).
- Pages showing diagrammatically or graphically the roadway section(s), operational controls, and rest areas (if rest areas are included in the project covered by the report).
- A vicinity map.
- An Access Report Plan and profiles for the project.

The Limited Access Report Plan shows the effects of the proposed highway on the street and road system by delineating the points of public access. (See the *Plans Preparation Manual* for a list of the minimum details to be shown on the plan and for a sample plan.)

(g) Notifications and Reviews. Upon receipt of the State Design Engineer's approval of Phase 1 (see Figure 1410-1), the region publishes the necessary copies, submits the Limited Access Report to the county and/or city officials for review and approval, and meets with all involved local governmental agencies to discuss the report. Providing a form letter with a signature block for the local agency to use to indicate their approval of the Limited Access Report can help expedite the review and approval process.

Including local agencies as stakeholders from the onset of the project helps establish project expectations and positive working relationships, making reviews and approvals run as smoothly as possible. The region reviews any requests for modification and submits recommendations, with copies of any correspondence or minutes relating thereto, to the HQ Access and Hearings Unit.

(3) Access Hearing Plan

The region prepares a Limited Access Hearing Plan to be used as an exhibit at the public hearing (see Chapter 210 for hearings) and forwards it to the HQ Right of Way Plans Branch for review. (See the *Plans Preparation Manual* for a list of data to be shown on the Access Hearing Plan in addition to the Access Report Plan data.)

When the plan review is completed by Headquarters, the Access Hearing Plan is placed before the State Design Engineer for approval of Phase 2 authority (see Figure 1410-1).

(4) Documentation

Documentation for the establishment of Limited Access Control is in Chapter 210.

1430.03 Full Control (Most Restrictive)

(1) Introduction

Full Control Limited Access highways provide almost complete freedom from disruption by allowing access only through interchanges at selected public roads/streets, rest areas, viewpoints, or weigh stations, and by prohibiting at-grade crossings and approaches. Gated approaches are occasionally allowed, but only with approval of a request that includes an Interchange Justification Report (see Chapter 1425).

At times, on state highways (except Interstate) where Full Access Control has been established, staged acquisition of Limited Access may be used (subject to the approval of an access deviation), with initial acquisition as Partial or Modified Control and with ultimate acquisition of Full Control planned on the highway. Where there is no feasible alternative within reasonable cost, the decision to defer acquisition of Limited Access Control must be documented and is subject to the approval of an access deviation.

(2) Application

Terminate Full Control Limited Access sections at apparent logical points of design change. The following guidelines are to be used for the application of Full Control on Limited Access highways:

(a) **Interstate.** Full Control is required on Interstate highways.

(b) **Principal Arterial.** Documentation assessing the evaluation of Full Control is required for principal arterial highways requiring four or more through traffic lanes within a 20-year design period, unless approved for Partial or Modified Control on existing highways.

(c) **Minor Arterial and Collector.** Minor arterial and collector highways will not normally be considered for development to Full Control.

(3) Crossroads at Interchange Ramps

The extension of Limited Access Control beyond an intersection is measured from the centerline of ramps, crossroads, or parallel roads (as shown in Figures 1430-1a, 1b, and 1c), from the terminus of transition tapers (see Figure 1430-2), and in the case of ramp terminals at single point urban interchanges, as shown in Figure 1430-3. (See Chapter 940 for guidance on interchange spacing.)

(a) **Ramps.** At-grade intersections and approaches are prohibited within the full length of any interchange ramp. The ramp is considered to terminate at its intersection with the local road or street.

(b) **Frontage Roads.** Direct access from the highway to a local service or frontage road is allowed only via the interchange crossroad. (See Figures 1430-1a, 1b, and 1c.)

(c) **Interchange Crossroads.** In both urban and rural areas, Full Control Limited Access must be established and then acquired along the crossroad at an interchange for a minimum distance of 300 feet beyond the centerline of the ramp or the end of the transition taper.

If a frontage road or local road is located at or within 350 feet of a ramp, Limited Access will be established and then acquired along the crossroad and for an additional minimum distance of 130 feet in all directions from the centerline of the intersection of the crossroad and the frontage or local road (see Figures 1430-1a and 1b).

For interchanges incorporating partial cloverleaf and/or buttonhook ramps (see Figure 1430-1b), Limited Access is required for all portions of the crossroad and frontage roads between the ramp terminals, and for a distance of 300 feet beyond the ramp terminals. If an at-grade intersection for a local road or street is served directly opposite the ramp terminals, Limited Access will be extended for a minimum of 300 feet along that leg of the intersection.

When the intersection in question is a roundabout, see Figure 1430-1c. This shows extension of Full Control to be 300 feet, measured from the center of the roundabout for an intersection with a ramp terminal. Figure 1430-1c also shows that if a frontage road or local road is located at or within 350 feet of a ramp terminal, Limited Access will be established and then acquired along the crossroad (between the roundabouts) and for an additional minimum distance of 130 feet in all directions along the local frontage roadway, measured from the outside edge of the circulating roadway of the roundabout.

Figure 1430-2 shows the terminus of transition taper and that Full Control Limited Access is extended a minimum distance of 300 feet beyond the end of the farthest taper.

For a single point urban interchange (SPUI) with a right- or left- turn "ramp branch" separated by islands, Limited Access Control is established and acquired for a minimum distance of 300 feet from the intersection of the centerline of the ramp branch with the centerline of the nearest directional roadway (see Figure 1430-3.)

(d) **Levels of Limited Access, Location of Approaches.** Provide Full Control for 300 feet from the centerline of the ramp or terminus of a transition taper. (See Figures 1430-1a, 1b, and 1c, and 1430-2 and 3.)

If the economic considerations to implement Full Control for the entire 300 feet are excessive, then provide Full Control for at least the first 130 feet and Partial or Modified Control may be provided for the remainder, for a total minimum distance of 300 feet of Limited Access. Contact the HQ Access and Hearings Unit when considering this option.

An approved access deviation is required if the Limited Access Control falls short of 300 feet and for any approach that has been allowed to remain within the first 130 feet.

Ensure that approaches are far enough away from a frontage road intersection to provide efficient intersection operation.

(4) Location of Utilities, Bus Stops, and Mailboxes

(a) **Utilities.** Connecting utility lines are allowed along the outer right of way line between intermittent frontage roads. (See the *Utilities Accommodation Policy* regarding the location of and access to utilities.)

(b) **Bus Stops.** Common carrier or school bus stops are not allowed, except at:

- Railroad crossings (see Chapter 930).
- Locations provided by the state on the interchanges (such as flyer stops).
- In exceptional cases, along the main roadway where pedestrian separation is available.

(c) **Mailboxes.** Mailboxes are not allowed on Full Control Limited Access highways. Mail delivery will be from frontage roads or other adjacent local roads.

(5) Pedestrian and Bicycle Crossings and Paths

All nonmotorized traffic is limited as follows:

- At-grade pedestrian crossings are allowed only at the at-grade intersections of ramp terminals.
- Pedestrian separations or other facilities provided specifically for pedestrian use.
- Bicyclists using facilities provided specifically for bicycle use (separated paths).
- Shared-use paths for bicyclists, pedestrians, and other forms of nonmotorized transportation.
- Bicyclists using the right-hand shoulders, except where such use has been specifically prohibited. Information pertaining to such prohibition is available from the Traffic Operations Office of the HQ Maintenance and Operations Division.

Pedestrians and bicycles are allowed, consistent with "Rules of the Road" (RCW 46.61), within the limits of Full Control Limited Access highways. When paths are allowed they must be documented on the Right of Way and Limited Access Plan. The plan shows the location of the path and where the path crosses Limited Access, and provides movement notes. (See 1430.10(1).)

1430.04 Partial Control

(1) Introduction

Partial Control may be established, when justified, on any highway except Interstate. Partial Control provides a considerable level of protection from traffic interference and protects the highway from future strip-type development.

Upon acquisition of Partial Control Limited Access rights, the number, type, and use of access approaches of abutting property are frozen. The abutting property access rights and type of use are recorded on the property deed. The rights and use may not be altered by the abutting property owner, the local jurisdiction, or the region. This authority resides with the State Design Engineer. (See 1430.10.)

(2) Application

Partial Control will not normally be used in urban areas, or inside corporate limits on existing principal arterial highways where traffic volumes are less than 700 design hourly volume (DHV).

Terminate Limited Access sections at apparent logical points of design change.

(a) **Principal Arterial.** Partial Control is required when the estimated traffic volumes exceed 3000 average daily traffic (ADT) within a 20-year design period on principal arterial highways requiring two through traffic lanes. For multilane principal arterial highways, see 1430.03(2)(b).

(b) **Minor Arterial.** The minimum route length is: urban, 2 miles; rural, 5 miles; and combination urban and rural, 3 miles.

Partial Control is required on:

- Rural minor arterial highways at both new and existing locations.
- Urban minor arterial highways at new locations, requiring four or more through traffic lanes within a 20-year design period, or requiring only two through traffic lanes where the estimated traffic volumes exceed 3000 ADT within a 20-year design period.

Other rural minor arterial highways with only two lanes may be considered for Partial Control if any of the following conditions apply:

- The Partial Control can be acquired at a reasonable cost.
- The route connects two highways of a higher functional classification.
- The potential land development can result in numerous individual approaches, such as encountered in recreational or rapidly developing areas.
- The highway traverses publicly-owned lands where Partial Control is desirable.

(c) **Collector (New Alignment).** Partial Control is required on collector highways in new locations requiring four or more through traffic lanes in a 20-year design period.

(d) **Collector (Existing).** Existing collector highways will normally be considered for Partial Control Limited Access only when all of the following conditions apply:

- The highway serves an area that is not directly served by a higher functional classification of highway.
- Existing or planned development will result in traffic volumes significantly higher than what is required for Partial Control on minor arterials.
- Partial Control can be established without a major impact on development of abutting properties within the constraints of established zoning at the time the Partial Control is proposed.

(3) Interchanges and Intersections

(a) **Interchanges.** When an interchange occurs on a Partial Control Limited Access highway, Full Control applies at the interchange and interchange ramps. Refer to 1430.03(3) and see Figures 1430-1a, 1b, and 1c for required minimum lengths of Access Control along the crossroad. (See Chapter 940 for guidance on interchange spacing.)

(b) **Intersections.** At an at-grade intersection on a Partial Control Limited Access highway, control will be established and acquired along the crossroad for a minimum distance of 300 feet from the centerline of the highway. (See Figure 1430-4.)

If another frontage or local road is located at or within 350 feet of the at-grade intersection, Limited Access will be established and then acquired along the crossroad, between the intersections, and:

- For an additional minimum distance of 130 feet in all directions from the centerline of the intersection of the frontage or local road (see Figure 1430-4).
- Or, in the case of a roundabout, for an additional minimum distance of 300 feet along the crossroad, measured from the center of the roundabout as shown in Figure 1430-5a.

On multilane highways, measurements will be made from the centerline of the nearest directional roadway.

An approved access deviation is required if the Limited Access Control falls short of 300 feet and for any access that has been allowed to remain within the first 130 feet.

At-grade intersections with public roads are limited to the number allowed for the functional classification of highway involved, as follows:

- **Principal Arterial.** If the ADT of the crossroad is less than 2000, one-mile spacing (minimum), centerline to centerline. If over 2000 ADT within 20 years, plan for grade separation.
- **Minor Arterial.** If the ADT of the crossroad is less than 2000, one-half-mile spacing (minimum), centerline to centerline. If over 2000 ADT within 20 years, plan for grade separation.
- **Collector.** Road (or street) plus property approaches, not more than six per side per mile.

With approval from the State Design Engineer, shorter intervals may be used where topography or other conditions restrict the design. When intersecting roads are spaced farther apart than one per mile, median crossings may be considered for U-turns, in accordance with Chapter 910. Keep U-turns to a minimum, consistent with requirements for operation and maintenance of the highway.

To discourage movement in the wrong direction on multilane highways, locate private approaches 300 feet or more from an at-grade intersection. At a tee intersection, a private approach may be located directly opposite the intersection or a minimum of 300 feet away from the intersection. Ensure that a private approach directly opposite a tee intersection cannot be mistaken for a continuation or part of the public traveled way.

(4) Access Approach

Partial Control is exercised to the level that, in addition to intersections with selected public roads, some crossings and private driveways may be allowed.

(a) **Approach Types.** Partial Control Limited Access highways allow at-grade intersections with selected public roads and private approaches using Type A, B, C, and F approaches. (See Chapter 1420 for the definitions of approach types.)

Type D, commercial approaches, are not allowed direct access to Partial Control Limited Access highways. Commercial access is allowed only by way of public roads.

The type of approach provided for each parcel takes into consideration current and potential land use and is based on an economic evaluation. (See 1430.05(4) for a list of considerations.)

(b) **Design Considerations.** The following considerations are used to determine the number and location of access approaches on Partial Control Limited Access highways.

1. Access approaches must be held to a minimum. The number is limited as follows:
   - Principal arterial: two per side per mile
   - Minor arterial: four per side per mile
   - Collector: six per side per mile, including at-grade intersections
2. Approaches in excess of the number listed above may be allowed as stage construction if approved by the State Design Engineer.
3. Approaches are not allowed for parcels that have reasonable access to other public roads, unless a parcel has extensive highway frontage.
4. Relocate or close approaches located in areas where sight limitations create undue hazards.
5. Allow only one approach for each parcel, except for very large ownerships, or where terrain features do not allow the property to be served by a single approach. This includes contiguous parcels under a single ownership.
6. Where possible, locate a single approach to serve two or more parcels.
7. The approved design is to provide for future development of frontage roads that will eliminate an excessive number of approaches.

(5) Location of Utilities, Bus Stops, and Mailboxes

(a) **Utilities.** Connecting utility lines are allowed along the outer right of way line between intermittent frontage roads. (See the *Utilities Accommodation Policy* regarding the location of and access to utilities.)

(b) **Bus Stops.** Bus stops for both common carriers and school buses are not allowed on either two-lane or four-lane highways, except as follows:

- At railroad crossings (see Chapter 930)
- At locations of intersections with necessary pullouts to be constructed by the state
- Where shoulder widening has been provided for mail delivery service
- For a designated school bus loading zone on the traveled lane or adjacent thereto, which has been approved by WSDOT

Buses are not allowed to stop in the traveled lanes blocking at-grade intersections or private approaches to load or unload passengers.

School bus loading zones on Partial Control Limited Access highways must be posted with school bus loading zone signs, in accordance with the latest edition of the *Manual on Uniform Traffic Control Devices* (MUTCD).

(c) **Mailboxes.** Locate mailboxes on frontage roads or at intersections, with the following exceptions for properties that are served by Type A or B approaches:

- Locate mailboxes on a four-lane highway only on the side of the highway on which the deeded approach is provided.
- Locate mailboxes on a two-lane highway on the side of the highway that is on the right in the direction of the mail delivery.

Whenever mailboxes are allowed on a Partial Control Limited Access highway, provide mailbox turnouts to allow mail delivery vehicles to stop clear of the through traffic lanes. (See Chapter 700 for additional information concerning mailbox locations and turnouts.)

(6) Pedestrian and Bicycle Crossings and Paths

Pedestrian crossings are allowed when grade-separated.

At-grade pedestrian crossings are allowed:

- Only at intersections where an at-grade crossing is provided in accordance with Chapter 1025.
- On two-lane highways at mailbox locations.
- On two-lane highways not less than 100 feet from a school bus loading zone (pullout) adjacent to the traveled lane, if school district and WSDOT personnel determine that stopping in the traveled lane is hazardous.
- On two-lane highways where the school bus is stopped on the traveled lane to load or unload passengers and the required sign and signal lights are displayed.

On Partial Control Limited Access highways, pedestrian and bicycle traffic is allowed, consistent with "Rules of the Road" (RCW 46.61), except when unusual safety conditions support prohibition. Information pertaining to such prohibitions is available from the Traffic Operations Office of the HQ Maintenance and Operations Division.

When paths are allowed, they must be documented on the Right of Way and Limited Access Plan. The plan shows the location of the path and where the path crosses Limited Access, and provides movement notes. (See 1430.10(1).)

1430.05 Modified Control (Least Restrictive)

(1) Introduction

Modified Control is intended to prevent further deterioration in the safety and operational characteristics of existing highways by limiting the number and location of access points.

Upon acquisition of Modified Control Limited Access, the number, type, and use of access approaches of abutting property are frozen. The abutting property access rights and type of use are recorded on the property deed. The rights and use may not be altered by the abutting property

owner, the local jurisdiction, or the region. This authority resides with the State Design Engineer. (See 1430.10.)

(2) Application

In general, Modified Control is applied where some level of control is desired, but existing and potential commercial development precludes the implementation of Full or Partial Control.

(a) **Existing Highways.** Modified Control may be established and acquired on existing highways other than Interstate. Priority is given to highway segments where one or both of the following conditions applies:

- Commercial development potential is high, but most of the adjoining property remains undeveloped.
- There is a reasonable expectation that the adjoining property will be redeveloped to a more intensive land use, resulting in greater traffic congestion.

(b) **Design Analysis.** Selection of highways on which Modified Control may be applied is based on a design analysis that includes the following factors:

- Traffic volumes
- Level of service
- Safety
- Design class
- Route continuity
- Population density
- Local land use planning
- Current and potential land use
- Predicted growth rate
- Economic analysis

(c) **Exceptions.** Where Modified Control is to be established, developed commercial areas may be excepted from control when all or most of the abutting property has been developed to the extent that few, if any, additional commercial approaches will be required with full development of the area. Contact the HQ Access and Hearings Unit when considering this option. If this exception is within the limits of Access Control requirements, an approved access deviation is required.

(3) Intersections

At an intersection on a Modified Control Limited Access highway, Access Control will be established and acquired along the crossroad:

- For a minimum distance of 130 feet, measured from the centerline of a two-lane highway (see Figure 1430-6).
- For a minimum distance of 130 feet, measured from the centerline of the nearest directional roadway of a four-lane highway (see Figure 1430-6).
- For a minimum distance of 130 feet, measured from the outside edge of the circulating roadway of a roundabout (see Figure 1430-5b).

Approaches are allowed within this area only when there is no reasonable alternative. An approved access deviation is required for any access that has been allowed to remain within the first 130 feet.

(4) Access Approach

The number and location of approaches on a highway with Modified Control must be carefully planned to provide a safe and efficient highway compatible with present and potential land use.

(a) **Approach Types.** Modified Control Limited Access highways allow at-grade intersections with selected public roads and with private approaches using Type A, B, C, D, and F approaches. (See Chapter 1420 for definitions of the approach types.)

The type of approach provided for each parcel takes into consideration present and potential land use and is based on an economic evaluation that considers the following:

- Local comprehensive plans, zoning, and land use ordinances
- Property covenants and/or agreements
- City or county ordinances
- The highest and best use of the property
- The highest and best use of adjoining lands
- A change in use by merger of adjoining ownerships
- All other factors bearing upon proper land use of the parcel

(b) **Design Considerations.** The following considerations are used to determine the number and location of approaches:

1. Parcels that have access to another public road or street are not normally allowed direct access to the highway.
2. Relocate or close approaches located in areas where sight limitations create undue hazards.
3. Hold the number of access approaches to a minimum. Access approaches are limited to one approach for each parcel of land, or when adjoining parcels are under one contiguous ownership.
4. Encourage joint use of access approaches where similar use of land allows.
5. Additional approaches may be allowed for future development consistent with local zoning. Once Limited Access has been acquired, this will require a value determination process. (See 1430.10.)
6. Close existing access approaches not meeting the considerations above.

(5) Location of Utilities, Bus Stops, and Mailboxes

(a) **Utilities.** Connecting utility lines are allowed along the outer right of way line between intermittent frontage roads. (See the *Utilities Accommodation Policy* regarding location of and access to utilities.)

(b) **Bus Stops.** Bus stops and pedestrian crossings are allowed as follows:

- In rural areas, bus stops and pedestrian crossings are subject to the same restrictions as in 1430.04(5) and (6).
- In urban areas, bus stops for both commercial carriers and school buses are allowed. (See Chapter 1060 for requirements.)

(c) **Mailboxes.** Locate mailboxes adjacent to or opposite all authorized approaches as follows:

- On a four-lane highway only on the side of the highway on which the deeded approach is provided.
- On a two-lane highway on the side of the highway that is on the right in the direction of the mail delivery.

Where mailboxes are allowed, a mailbox turnout is recommended to allow mail delivery vehicles to stop clear of the through traffic lanes. (See Chapter 700 for additional information concerning mailbox locations and turnouts.)

(6) Pedestrian and Bicycle Traffic and Paths

Pedestrians and bicyclists are allowed, consistent with "Rules of the Road" (RCW 46.61), on Modified Control Limited Access highways, except where unusual safety considerations support prohibition. Information pertaining to such prohibitions is available from the Traffic Operations Office of the HQ Maintenance and Operations Division.

When paths are allowed, they must be documented in the Right of Way and Limited Access Plan. The plan shows the location of the path and where the path crosses Limited Access, and provides movement notes. (See 1430.10(1).)

1430.06 Access Approaches

(1) General

Access approaches may be allowed on Limited Access highways consistent with the requirements outlined in 1430.03, 1430.04, and 1430.05.

For additional information pertaining to approaches, refer to Chapters 915 (roundabouts), 920 (approach design templates), and 1410 (right of way), and the *Plans Preparation Manual*.

(2) Definitions

The widths for the approach types are negotiated, and only the negotiated widths are shown on the Right of Way and Limited Access Plan. (See Chapter 1420 for specific definitions of the approach types.)

1430.07 Frontage Roads

Local agency approval is required for any planned frontage roads, county roads, city streets, or cul-de-sacs. The local agency must also agree in writing to accept and maintain the new section as a county road or city street.

(1) General

Frontage roads are provided in conjunction with Limited Access highways to:

- Limit access to the main line.
- Provide access to abutting land ownerships.
- Restore the continuity of the local street or roadway system.

Refer to Chapter 620 for frontage road general policy, and Chapter 330 for required documentation.

By agreement under which the state is reimbursed for all costs involved, frontage roads that are not the responsibility of the state may be built by the state upon the request of a local political subdivision, a private agency, or an individual.

(2) County Road and City Street

To connect roads or streets that have been closed off by the highway, short sections of county roads or city streets that are not adjacent to the highway may be constructed if they will serve the same purpose as, and cost less than, a frontage road.

(3) Cul-de-sacs

For a frontage road or local street bearing substantial traffic that is terminated or closed at one end, provide a cul-de-sac (or other street or roadway consistent with local policy or practice) that is sufficient to allow vehicles to turn around without encroachment on private property.

1430.08 Turnbacks

When WSDOT transfers jurisdiction of operating right of way to a city, town, or county, a turnback agreement is required. (See the *Agreements Manual* for turnback procedures.)

Locate the turnback limits at points of logical termination. This will allow WSDOT to retain an adequate amount of right of way for maintenance of the highway and for other operational functions.

In areas where Limited Access rights have been acquired from the abutting property owners, the Limited Access rights will continue to be required for highway purposes; thus the Limited Access rights will not be included as part of a turnback agreement.

When a signalized intersection is in the area of a turnback, locate the turnback limit outside of the detector loops if WSDOT is continuing the ownership, operation, and maintenance of the signal system. For a roundabout, locate the turnback limit at the back of the raised approach splitter island if WSDOT is continuing the ownership, operation, and maintenance of the roundabout.

1430.09 Adjacent Railroads

(1) General

A Limited Access highway and a railroad are considered adjacent when they have a common right of way border with no other property separating them. The allowed approaches only apply to adjacent railroad property that is directly used for current railroad operation.

(2) Requirements

It is in the public interest to provide access to the railroad right of way, from Limited Access highways, for maintenance of the railroad and the utilities located on the railroad right of way when other access is not feasible. This applies to both new highways and to existing highways where Limited Access has been acquired.

Direct access is allowed when local roads are infrequent or there are few highway-railroad crossings from which trail-type access for maintenance purposes is feasible, and when unique topography or other unusual conditions justify its use.

Direct access from the highway is considered unnecessary and is not allowed when:

- There are local roads adjacent to or crossing the railroad.
- A trail-type road can be provided by the railroad between crossroads.
- The Limited Access highway is paralleled by a frontage road adjacent to the railroad.
- No highway previously existed adjacent to the railroad.

(3) Restrictions

To justify direct approaches for access to railroad right of way, all of the following conditions must be met:

- A maximum of one approach is allowed for every 2 miles of highway.
- The approach must not adversely affect the design, construction, stability, traffic safety, or operation of the highway.
- Except when the railroad is located in the median area, the approach is to be accomplished in a legal manner by right turns only, to and from the roadway nearest the railroad. Median crossing is not allowed.
- The approach is secured by a locked gate under arrangements satisfactory to the department. (See Approach Type C in Chapter 1420, and Chapter 1425.)
- The parking of any vehicles or railroad equipment is prohibited within Limited Access highway right of way.
- A special emergency maintenance permit must be obtained for periods of intensive railroad maintenance.
- The approach must be closed if the railroad operation ceases.
- Approaches are limited to use by the railroad company, unless specific provisions for other use are shown on the Right of Way and Limited Access Plan and included in the right of way negotiations.

1430.10 Modifications to Limited Access Highways

(1) General

Modifications to Limited Access highways can only be made by the application of current design requirements, and with the approval of the E&EP Director (or designee) and FHWA (when appropriate).

Any change is a modification to Limited Access; for example, new fence openings, closing existing fence openings, adding trails that cross into and out of the right of way, and widening existing approaches. The Right of Way and Limited Access Plan must be revised and, if private approaches are involved, deeds must be redone.

Consider the following factors when evaluating a request for modification of a Limited Access highway:

- Existing level of control on the highway
- Functional classification and importance of the highway
- Percentage of truck traffic
- Highway operations
- Present or future land use
- Environment or aesthetics
- Economic considerations
- Safety considerations

Evaluate all revisions to Limited Access highways to determine if Access Hearings are required.

For requirements to be met for selected modifications to Full Control Limited Access highways, such as the Interstate System and multilane state highways, see Chapter 1425, "Interchange Justification Report."

(2) Modifications for Private Access Approaches

(a) **Requirements.** Examples of access modifications requested by abutting property owners include additional road approaches, changes in the allowed use, or additional users of existing road approaches.

Plan revisions that provide for additional access to abutting properties after WSDOT has purchased the access rights are discouraged. However, these revisions may be considered if all of the following can be established:

- There are no other reasonable alternatives
- The efficiency and safety of the highway will not be adversely impacted
- The existing situation causes extreme hardship on the owner(s)
- The revision is consistent with the Limited Access highway requirements

(b) **Procedures.** The region initiates a preliminary engineering review of the requested modification to or break in Limited Access. This preliminary review will be conducted with the HQ Access and Hearings Unit to determine if conceptual approval can be granted for the request. If conceptual approval can be granted, then:

- The region initiates an engineering review of the requested modification.
- The region prepares and submits to the HQ Plans Branch a preliminary Right of Way and Limited Access Plan revision, together with a recommendation for approval by the E&EP Director. When federal-aid funds are involved in any phase of the project, the proposed modification will be sent to FHWA for its review and approval.
- The recommendation will include an item-by-item analysis of the factors listed in 1430.10(1) and 1430.10(2)(a).

(c) **Valuation Determination.** Upon preliminary approval, region Real Estate Services prepares an appraisal for the value of the access change using a before and after appraisal.

- The appraisal follows the requirements set forth in the *Right of Way Manual*.
- The appraisal is reviewed by the HQ Real Estate Services Office. If the appraisal data does not support a value of $1,500 or more, a minimum value of $1,500 is used.
- The appraisal package is sent to the HQ Real Estate Services Office for review and approval.
- If federal-aid funds were involved in purchasing access control, the HQ Real Estate Services will send a copy of the appraisal package to FHWA for its review and approval.

(d) **Final Processing**

- Region Real Estate Services informs the requestor of the approved appraised value for the change.
- If the requestor is still interested, the region prepares a "Surplus Disposal Package" for HQ Real Estate Services Office review and approval.
- At the same time, the preliminary Right of Way and Limited Access Plan revision previously transmitted is processed for approval.
- After the department collects the payment from the requestor, the region issues a permit for the construction, if required.
- If an existing approach is being surrendered, region Real Estate Services obtains a conveyance from the property owner.
- The HQ Real Estate Services Office prepares and processes a deed granting the change to the access rights.

(3) Modifications for Public At-Grade Intersections

(a) **Requirements**

- Public at-grade intersections on Partial Control Limited Access highways serve local arterials that form part of the local transportation network.
- Requests for new intersections on Limited Access highways must be made by or through the local governmental agency to WSDOT. The region will forward this request, including the data referenced in 1430.10(1) and 1430.10(2)(a) to the HQ Access and Hearings Unit.
- New intersections require full application of current Limited Access acquisition and conveyance to WSDOT. The access acquisition and conveyance must be completed prior to beginning construction of the new intersection. The new intersection will meet WSDOT design and spacing requirements.

(b) **Procedures**

- The region evaluates the request for modification and contacts the HQ Access and Hearings Unit for conceptual approval.
- The region submits an intersection plan for approval (see Chapter 910) and a Right of Way and Limited Access Plan revision request (see the *Plans Preparation Manual*). This plan includes the Limited Access design requirements along the proposed public at-grade intersection.
- The State Design Engineer approves the intersection plan.
- The E&EP Director (or designee) approves the access revision.
- The region submits the construction agreement to the State Design Engineer. (See the *Agreements Manual*.)

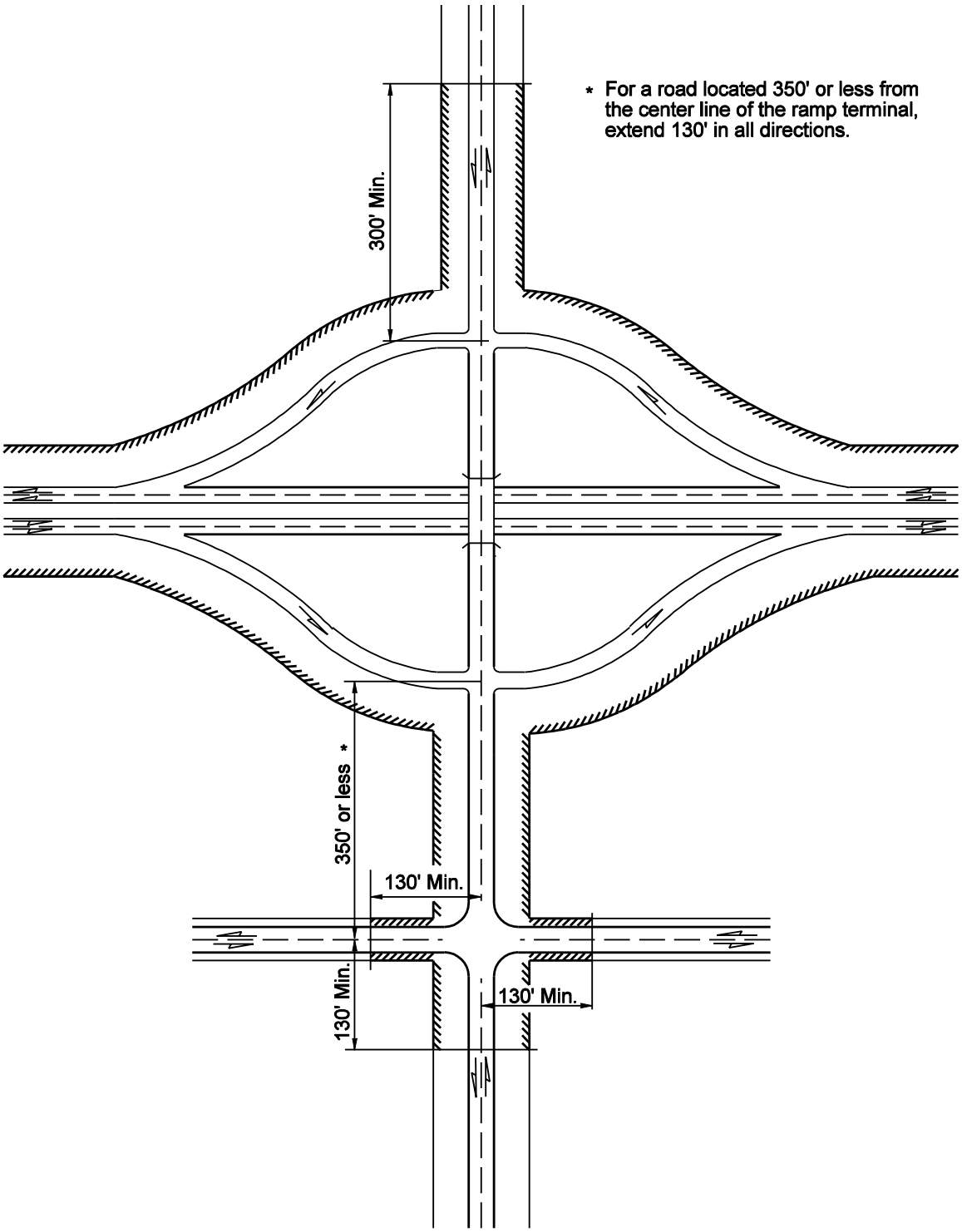
- The E&EP Director (or designee) approves the construction agreement.

(c) **Valuation Determination**

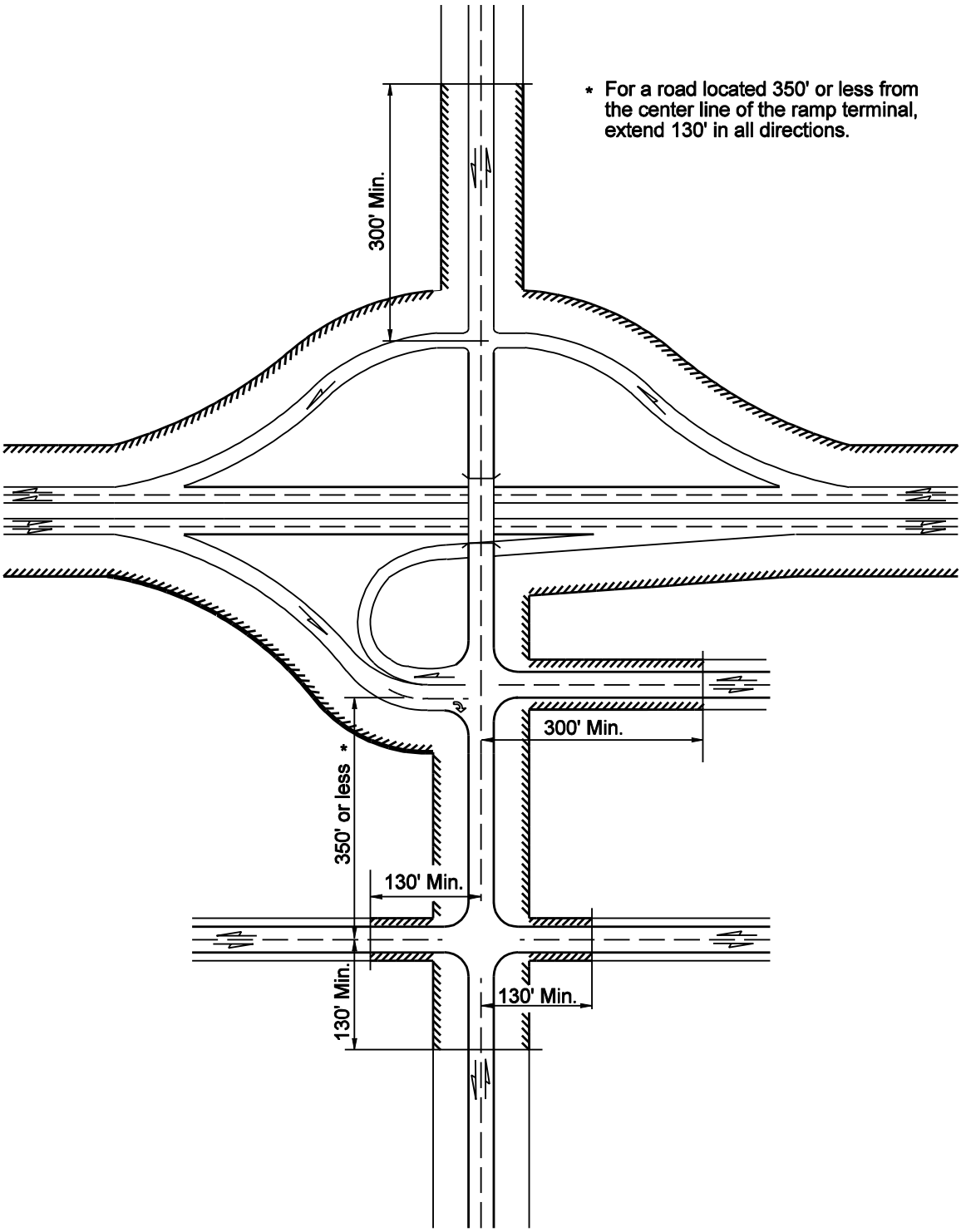
- When a requested public at-grade intersection will serve a local arterial that immediately connects to the local transportation network, compensation will not be required.
- When a requested public at-grade intersection will serve only a limited area, does not immediately connect to the local transportation network, or is primarily for the benefit of a limited number of developers, compensation for the access change will be addressed in the plan revision request. In these situations, compensation is appropriate and a value will be determined as outlined in 1430.10(2)(c).

1430.11 Documentation

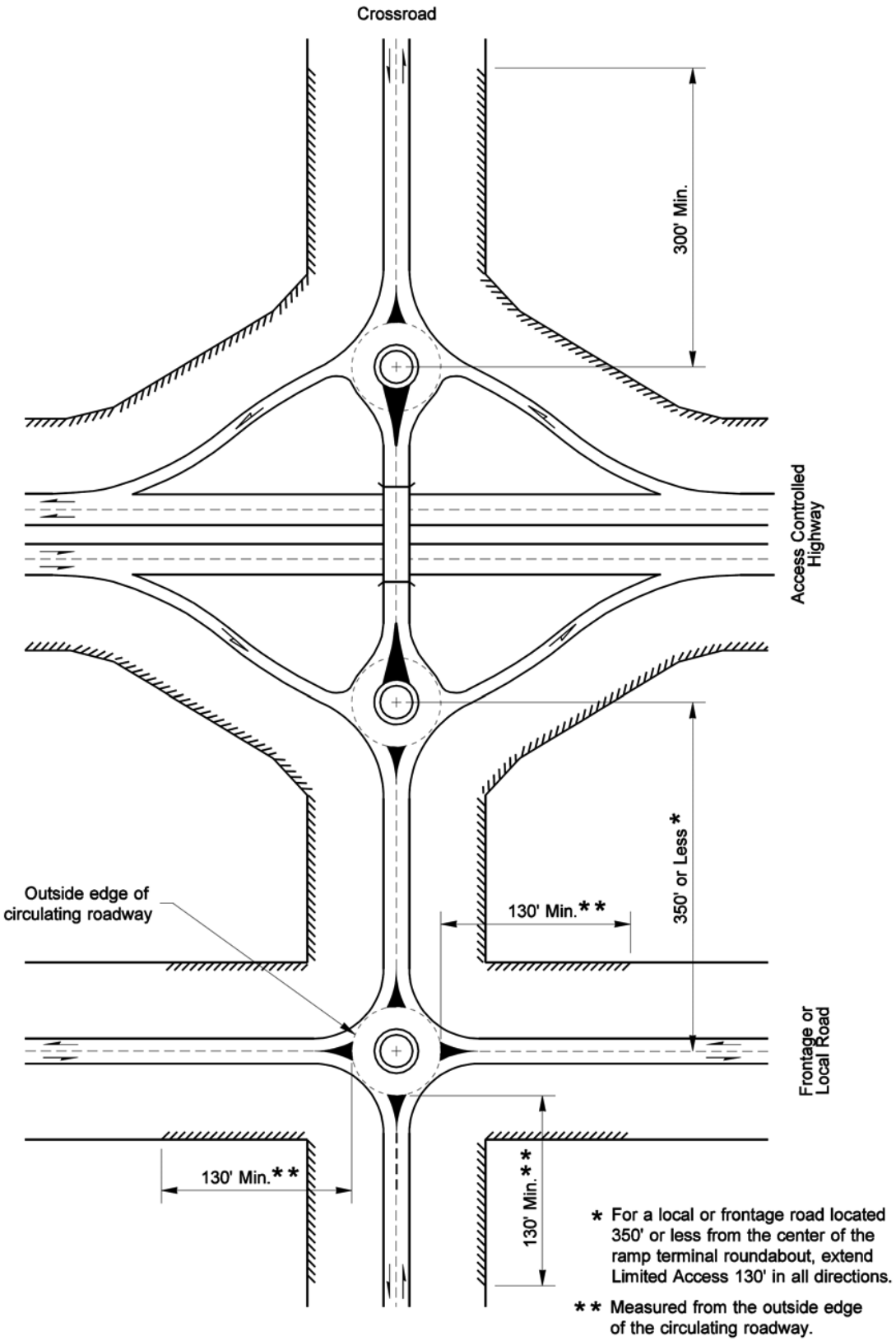
The list of the documents that are to be preserved in the Design Documentation Package (DDP) or the Project File (PF) can be found on the following web site:
www.wsdot.wa.gov/eesc/design/projectdev/



Full Access Control Limits – Interchange
Figure 1430-1a

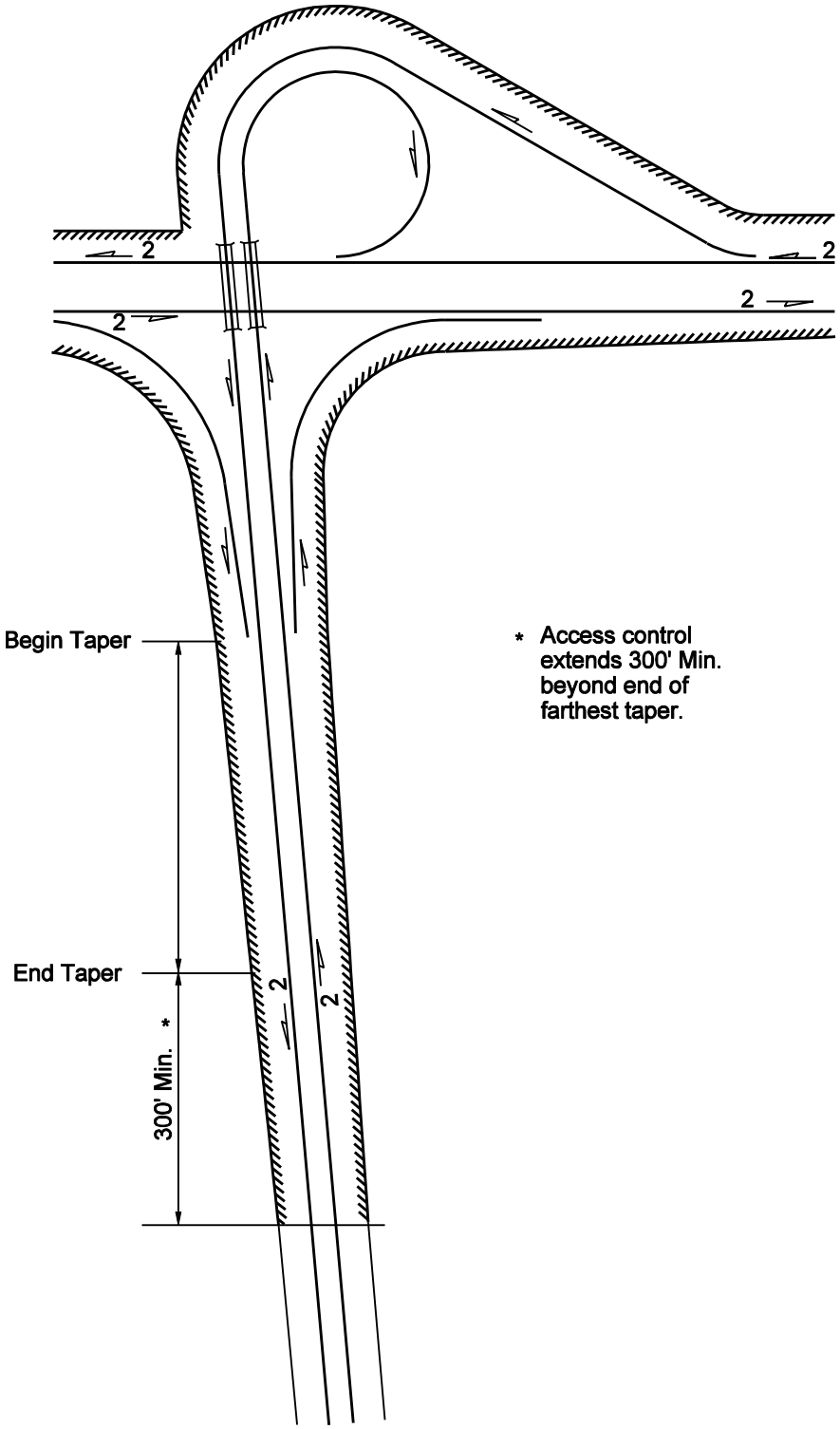


Full Access Control Limits – Interchange
Figure 1430-1b

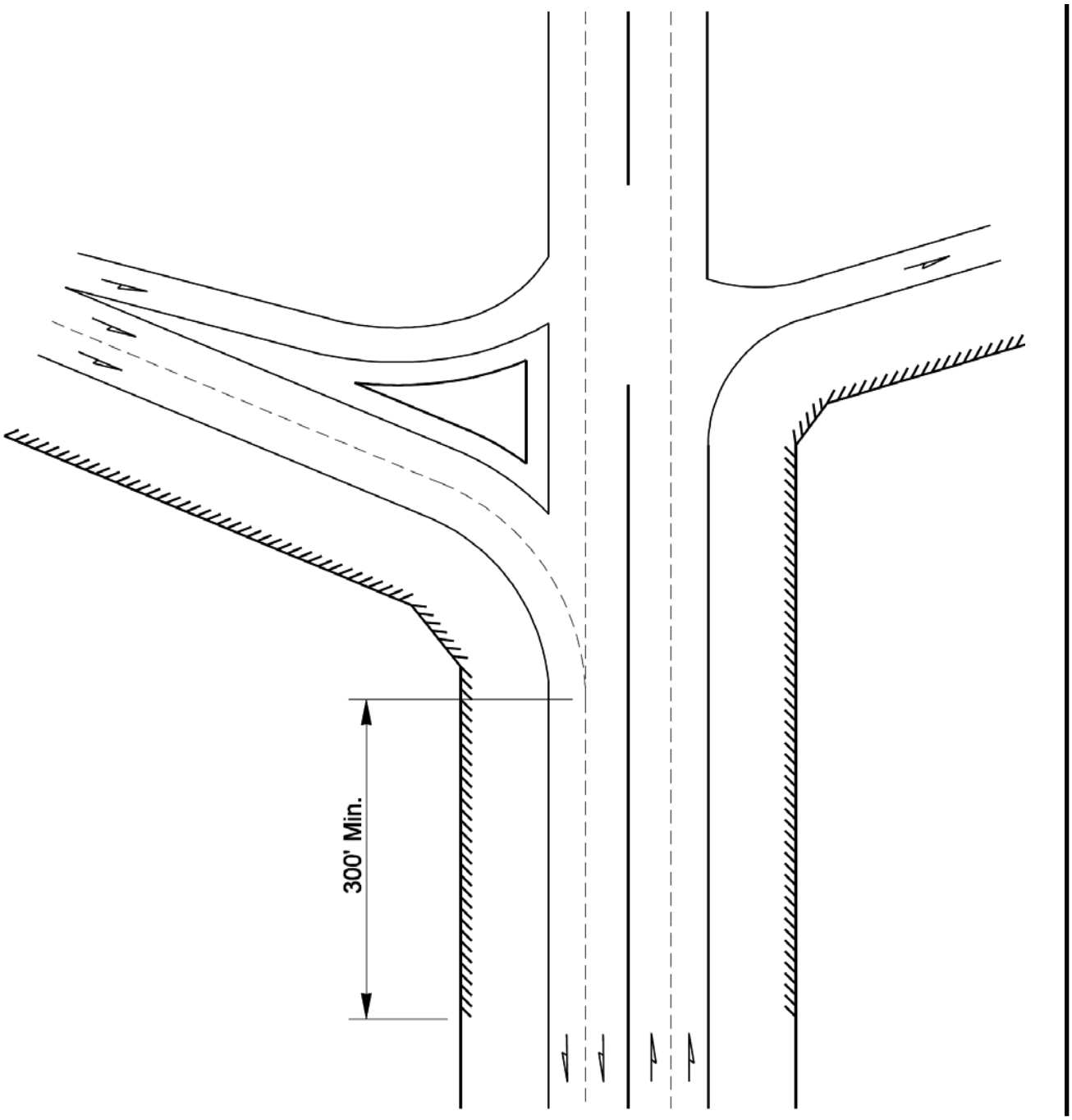


Full Access Control Limits – Interchange <u>With Roundabouts</u>

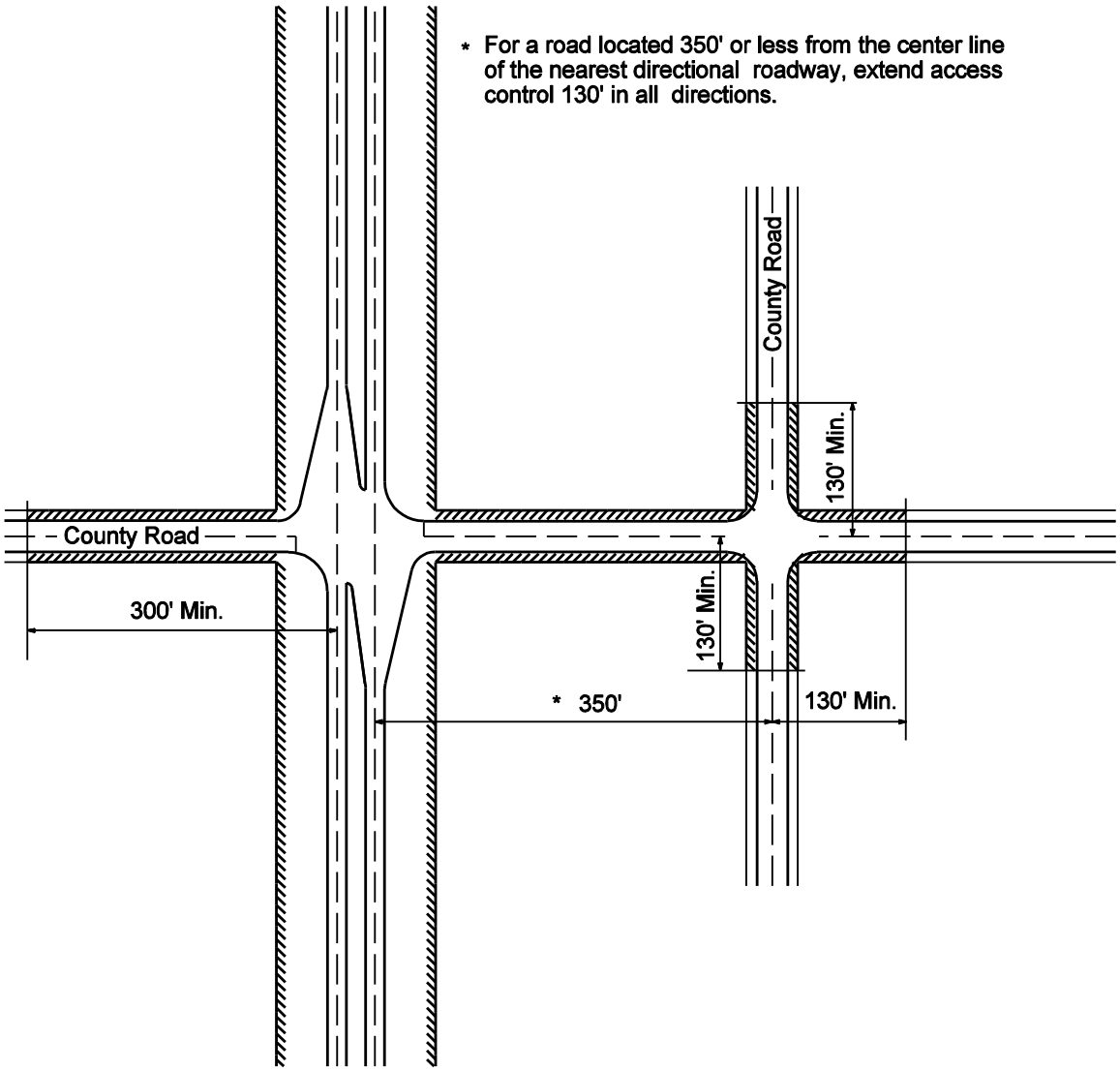
Figure 1430-1c



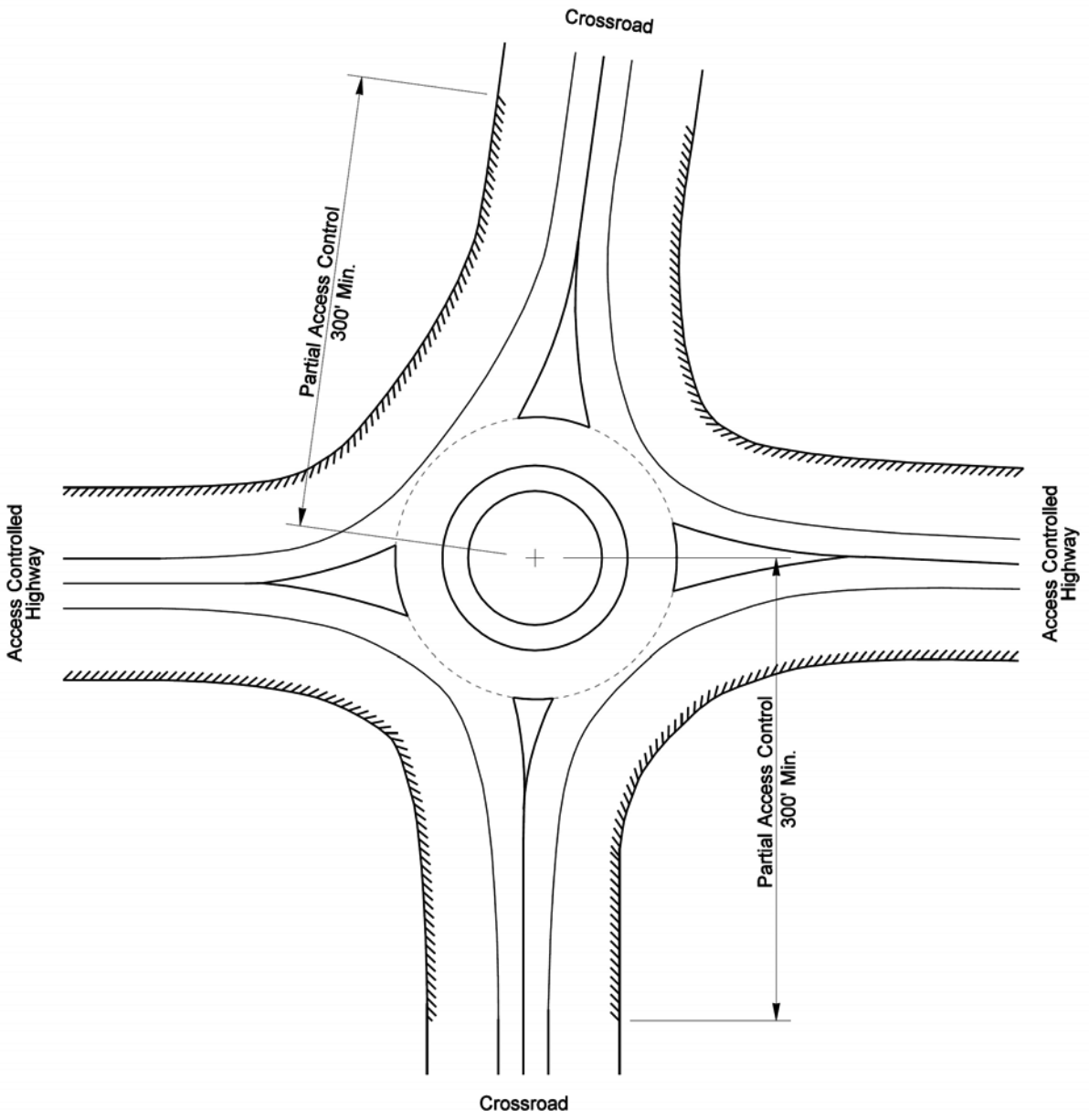
Full Access Control Limits – Ramp Terminal With Transition Taper
Figure 1430-2



Full Access Control Limits – Single Point Urban Interchange
Figure 1430-3



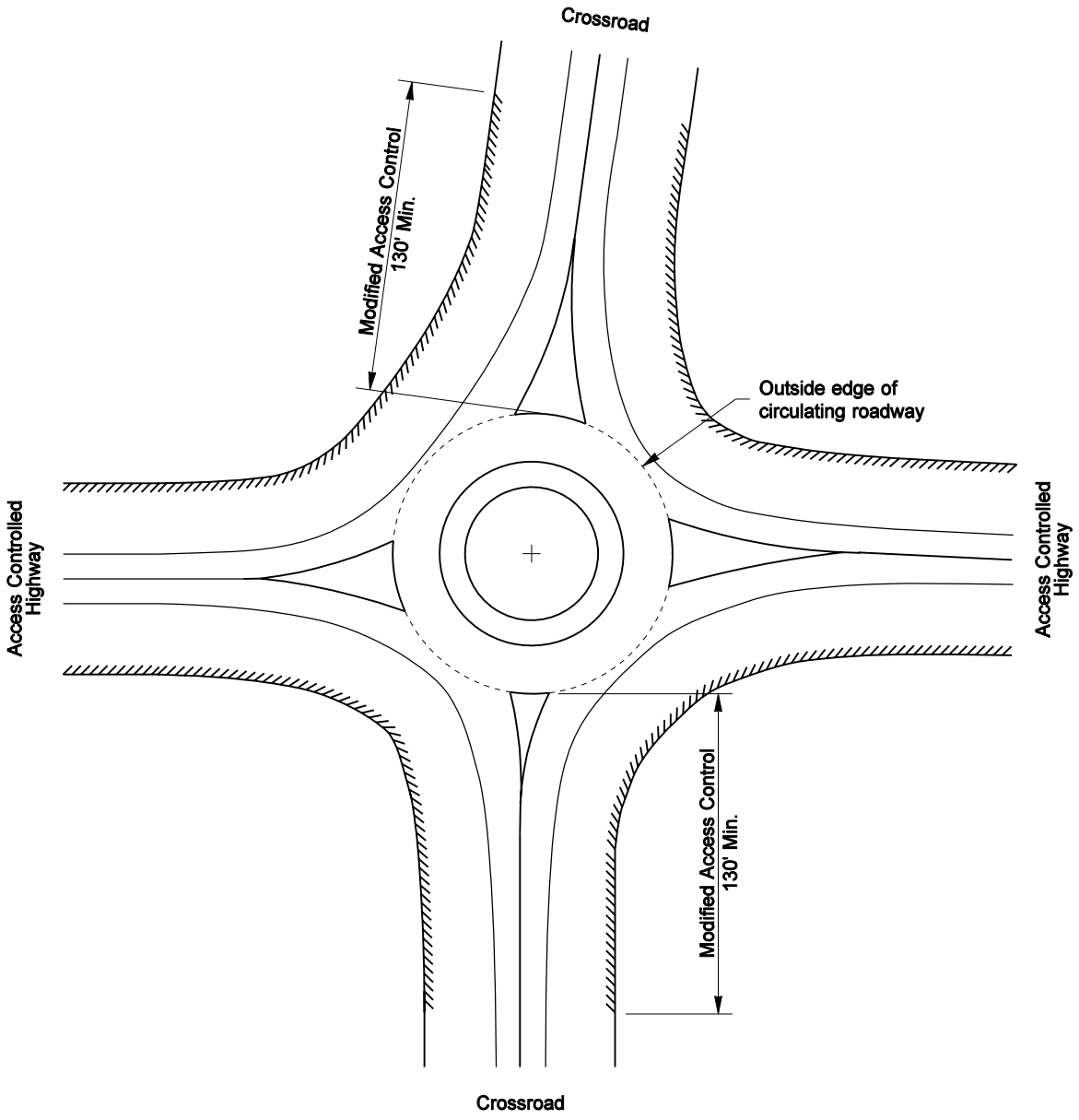
Partial Access Control Limits – At-Grade Intersections
Figure 1430-4



Note:

Partial access control is measured from the center of the roundabout.

Partial Access Control Limits – Roundabout Intersections
Figure 1430-5a

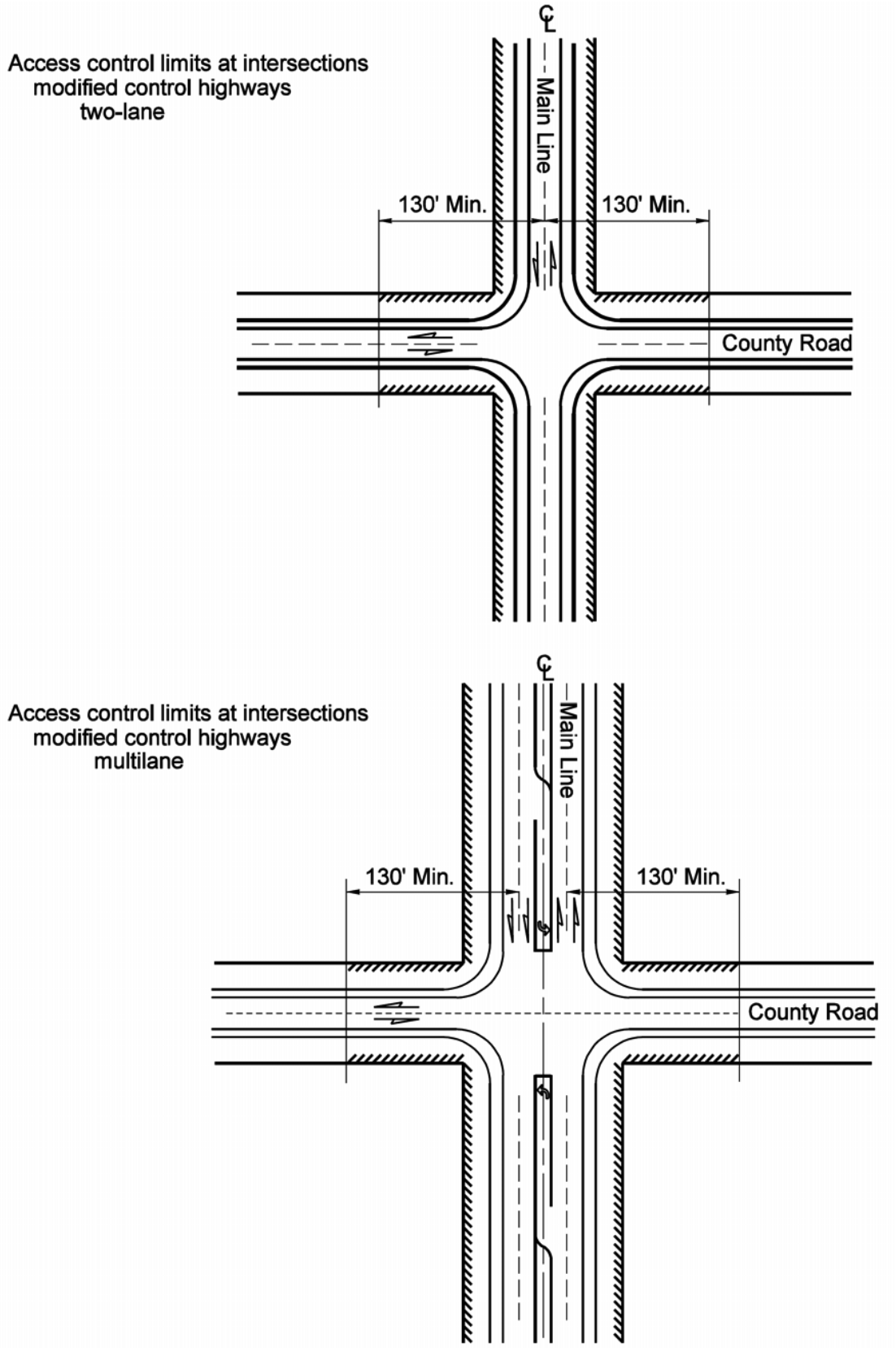


Note:

Modified access control is measured from the outside edge of the circulating roadway.

Modified Access Control Limits – Roundabout Intersections

Figure 1430-5b



Modified Access Control Limits – Intersections
Figure 1430-6

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