

ROAD *work*

Design Standards
December 2000

Review and Recommendations for Rural Road Design
Clallam County, Washington

INTRODUCTION

Road construction and sprawl are related issues that have generated controversy in Clallam County, Washington, and nationally. When constructing or reconstructing* roads, conventional engineering practice requires the use of a set of automobile-centered design standards. The focus of these standards is to move the maximum number of motorized vehicles through the system as rapidly as possible. They

ignore the effects of automobile traffic on surrounding environment and neighborhoods.

After decades of this approach with its attendant costs and destructiveness to neighborhoods, communities around the state and nation are changing their road design process. With the encouragement of new federal transportation policies, many communities are questioning the old speed-focused

design standards. People want projects that enhance their neighborhoods. They want safe multi-modal* transportation. Some states have abandoned the conventional design standards altogether in favor of more flexible standards.

New thinking is necessary to protect neighborhoods and communities from the dangers of traffic.



* Terms identified in the text by an asterisk are defined in the Glossary on page 14.

OVERVIEW

After a number of contentious public hearings about proposed road reconstruction projects, the Clallam County Board of Commissioners passed a resolution on August 10, 1999 appointing citizen members to the Clallam County Rural Roads Design Standards Advisory Committee and charged it with two tasks:

Task 1. Formulate recommendations for appropriate levels of community involvement during road project development.

Task 2. Formulate recommendations for design standards used in road construction and reconstruction in rural areas.

After 15 months reviewing the relevant topics (see Appendix A), the committee unanimously submitted its findings and recommendations (see back page) to the commissioners. Our recommendations relate primarily to major and minor rural collectors in the Sequim/Port Angeles area. The committee is not concerned here with major arterials such as Route 101 or the Old Olympic Highway.

We believe the controversy surrounding recent road reconstruction projects reflects and is directly caused by an unintentional but fundamental inconsistency in the Clallam County Countywide Comprehensive Plan. The design standards and performance standards adopted in the transportation section of the plan are incompatible with the policies of the land use section.

The Conflict Between Comprehensive Plan Policies and Current Road Standards

The vision statement and land use policies of the comprehensive plan, reflecting local citizens' concerns, state the following major goals:

- ◆ Preserve rural character.
- ◆ Enhance rural neighborhood safety and quality of life.
- ◆ Reduce sprawl.

The results of current road standards include:

- ◆ More asphalt, increased traffic speed and noise.
- ◆ Degraded rural character and quality of life.
- ◆ Decreased rural neighborhood safety for non-motorists.
- ◆ Increased development pressure in rural areas (sprawl).

The results of this unintentional inconsistency are road projects that are out of character with the neighborhoods they pass through and which undermine our stated community planning policies. For this reason many proposed reconstruction projects have been met with opposition from local residents.

Rural character conservation and rural neighborhood preservation are the central policies of the comprehensive plan. Although Section 31.01.400 of the plan requires internal consistency and states "the transportation element must be consistent with the land use element," it has left in place the old, sprawl-promoting transportation design and performance standards. These are the same design and performance standards that have served the sprawling traffic dominated development in King, Snohomish, Pierce and Kitsap Counties. While the comprehensive plan is essentially an anti-sprawl document, it neglects

to consider that **sprawl is not just remote low-density development, but also the automobile-centered transportation system that serves it.**

Reflecting this automobile-centered design approach, the currently adopted road design (Washington state city/county and AASHTO) and performance (level of service) standards, are concerned primarily with system performance issues such as safely maintaining automobile traffic speed and accommodating future automobile traffic volumes. The standards' major goal is to: *"Provide operational efficiency, safety, comfort, and convenience for the motorist."*¹

In pursuit of this goal the standards widen, flatten, and straighten rural roads to:

- ◆ Accommodate speeding (85th percentile design speed[♦]).
- ◆ Accommodate impaired driving (design driver[♦]).

¹ A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials, 1994, p. xlv

[♦] See the box titled Design Controls on page 4 for definitions.

OVERVIEW

- ◆ Accommodate estimated traffic volumes 20 years in the future (remote design year[†]).
- ◆ Eliminate roadway variations that give local character.

These design goals are more appropriate for a highway or freeway where mobility is the overriding concern. They are not appropriate for neighborhoods where residents want to retain rural character and improve pedestrian safety. As rural roads are reconstructed to bring them up to the Washington state city/county standards, they change from narrow, winding country lanes to wide, straight, flat, faster motorways that resemble highways.

In seeking to provide the ultimate in comfort and convenience for the

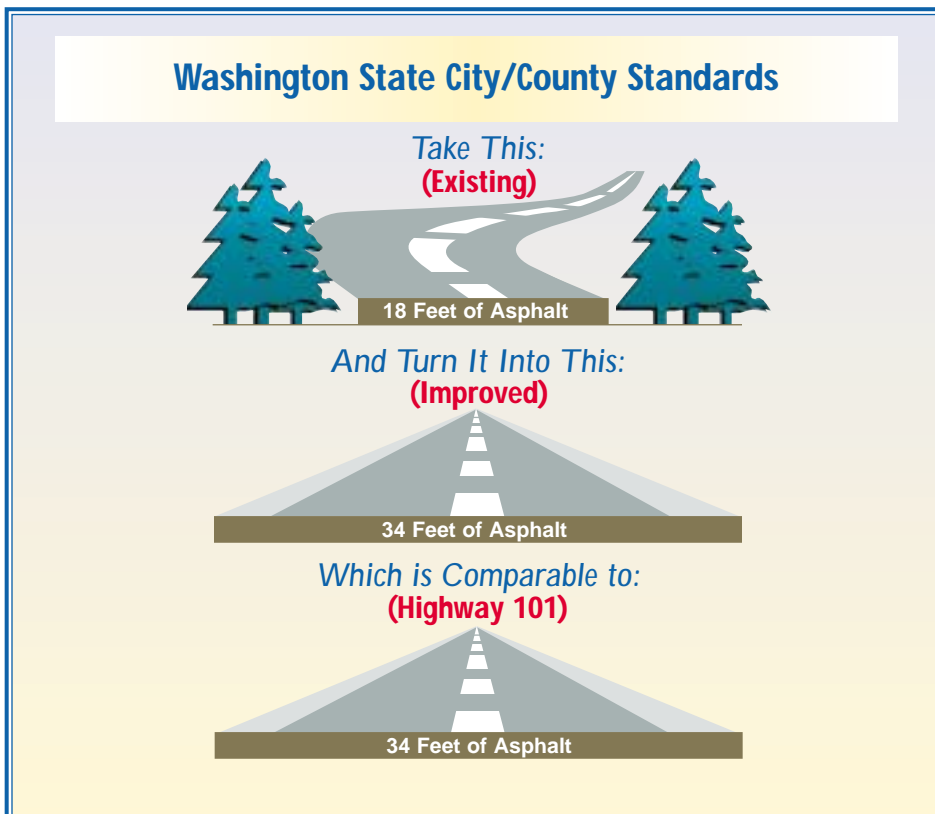
motorist, these design standards completely fail to consider or acknowledge their effect on the rural character, rural neighborhoods, and rural lifestyle that form the heart of the comprehensive plan. **This automobile-centered approach is especially destructive to rural neighborhoods** where local travel patterns are characterized primarily by non-motorized use of the roadways. Children on foot or bicycle are imperiled by the faster traffic on “improved” roads. We believe that while commuter bicyclists can use shoulders, especially when they are marked as bicycle lanes, shoulders are not comfortable or safe places to walk, especially for children. Shoulders are designed as an automobile breakdown space. They are used by pedestrians only because they have nowhere else to walk. The proximity to high speed

traffic makes shoulders uncomfortable and unsafe places to be. **The committee prefers a separate path or access for these users.**

The committee believes the unacknowledged price for rural character preservation and intact rural neighborhoods is slower traffic speed. Sacrificing driver “comfort and convenience” may be necessary in some instances to preserve the integrity and safety of rural neighborhoods as well as rural character.

The most important consideration in designing a safe, multi-modal facility is the speed of the automobile traffic. All users, motorized and non-motorized, have increased safety when motorized vehicle speeds are reduced. We believe the best way to decrease speeds and the detrimental effects of traffic is to retain the existing features of rural roads that tend to slow traffic speeds. These features, including narrow traffic lanes and curves, are the same features that give our rural roads their charm and rural character.

The following sections provide a more in-depth review of the issues surrounding road reconstruction in Clallam County and elsewhere. This report’s audience is the average citizen, but we also hope it is thought provoking for professional planners and transportation officials. The committee believes an informed public will provide guidance to elected officials regarding transportation planning.



Design Standards and Other Engineering Considerations

Clallam County Performance Standards Level of Service Definitions

Level of service A: Describes a condition of free flow with low volumes and high speeds. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high. Stopped delay at intersections is minimal.

Level of service B: Represents reasonably unimpeded traffic flow operations at average travel speeds. The ability to maneuver within the traffic stream is only slightly restricted and stopped delays are not bothersome. Drivers are not generally subjected to appreciable tensions.

Level of service C: In the range of stable flow, but speeds and maneuverability are more closely controlled by the higher volumes. The selection of speed is now significantly affected by interactions with others in the traffic stream, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level.

At this point the county transportation policy requires a reconstruction.

Level of service D: Represents high-density, but stable flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.

(See Levels E and F in the Glossary on p. 14.)

Source: Transportation Research Board, Highway Capacity Manual Special Report 209, Washington, DC

In Clallam County, roads must be designed to the Washington state city/county standards or the AASHTO standards from which they are derived. The bible of conventional road design is titled *A Policy on Geometric Design of Highways and Streets* published by The American Association of State Highway and Transportation Officials (AASHTO) and also known as the “green book”. The Green Book states that “the speed selected for design should fit the travel habits and desires of nearly all motorists.”² It tends to ignore entirely or consider only secondarily other important functions of the road corridor such as safe access for children, bicyclists, pedestrians and other potential users such as equestrians.

Commonly, roads are programmed for reconstruction (widening and straightening) because of capacity concerns. Even where no demonstrated safety problem exists the road may be said to be deficient in its performance because of current or estimated future traffic volumes. Roads are graded (see box to the left) on their ability to achieve a good “level of service”. However, levels of service, while defined broadly, are really just a proxy for **speed**. “The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists or passengers. A level-of-service definition generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.”³

A road may be given a poor grade based on this narrowly defined performance for a brief portion of the day or may even be graded poorly based on projections rather than reality.

After it has been declared deficient in this manner, a reconstruction may be proposed. At this point the design standards become pertinent.

Road design standards regulate the characteristics of the roadway such as width of driving lanes, width of shoulders, steepness of inclines and curvature of curves by using an important set of variables called Design Controls.

Design Controls

Design vehicle: The largest vehicle that typically would be expected to use the road.

Design speed: Typically set at the speed under which 85 out of 100 drivers are travelling (85th percentile speed) regardless of the posted speed limit. Even where drivers are speeding, the road will be designed (widened and straightened) to accommodate them.

Design driver: The 95-99th percentile worst driver on the road.

Design year: Recommended to be at least 20 years in the future.

Design volume: The peak traffic volume estimated to occur in the designated design year. This may be stated as average daily traffic (ADT), or design hourly volume (DHV).

² *A Policy on Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials, 1994, p.64

³ *Highway Capacity Manual, Special Report 209*, Transportation Research Board (TRB), Washington, DC, 1994, p. 1-3

In this manner today's roads are designed for the "operational efficiency (speed), comfort, safety, and convenience" of the worst driver, speeding in the largest vehicle, in the worst traffic 20 years from now.

The result of this speed-centered approach is a roadway that is wider, straighter, flatter, and faster than the road it replaced. The standards never discuss nor acknowledge the trade-offs associated with this approach:

- ❖ Decreased safety for children.
- ❖ Decreased comfort and safety for people walking or bicycling.
- ❖ Loss of right-of-way space for a separate trail or path.
- ❖ Loss of neighborhood integrity.
- ❖ Increased noise.
- ❖ Increased traffic.
- ❖ Increased air and water pollution.
- ❖ Increased development (sprawl).
- ❖ Loss of rural character.
- ❖ Decreased property values for adjoining landowners.

Because conventional road design standards focus primarily on the roads themselves, they treat the surrounding homes, neighborhoods, and countryside as empty space through which motorized vehicles must be transported as rapidly, comfortably, and conveniently as possible. However, rural neighborhoods are full of people who **are** somewhere rather than **going** somewhere. Rural roads are important public spaces where the residents take a walk, jog, meet their neighbors, and let their children walk or bike. It is the front porch values and goals of rural citizens which the land use policies of the comprehensive plan articulates.

Evaluating a Project in Your Neighborhood

To intelligently evaluate the effects of a proposed road project on your neighborhood it is important to know the following details:

- ✓ What are the specific neighborhood needs or goals that the project addresses? Are they based on actual problems or theoretical deficiencies? How will the proposed design meet these needs?
- ✓ Is there an identified safety issue? Is it based on accident data or theoretical deficiencies? Accident reports are kept on file with the county, and should list the important factors (other than road characteristics) such as speeding, reckless driving, and intoxication that frequently cause or contribute to accidents.
- ✓ Is speeding already an issue? How will the project affect this? Would lowering traffic speeds address the safety issue without the need for a reconstruction?
- ✓ Has a traffic study been done? This will give important information about traffic speed and volume.
- ✓ What is the functional classification of the road? Will the proposed project change this?
- ✓ What is the design speed? Is the 85th percentile speed being used? Would decreasing the design speed to the posted limit decrease the impact of the project?
- ✓ What is the design volume? Will the project result in increased traffic through the neighborhood?
- ✓ Who are the potential non-motorized users of the roadway? How will the project affect their future access and safety?
- ✓ Are there children's safety issues associated with the project? How are they being addressed?
- ✓ What are the neighborhood issues associated with the project? Should the design speed and width be decreased on this basis alone?
- ✓ Are there other valuable local character issues (such as rural character) that are beyond the scope of conventional design approaches?

Rural Neighborhoods



Rural neighborhoods grew up around the roads that serve them. These roads physically define and are an integral part of the neighborhood itself. The road is as much a part of rural character and rural lifestyle as the land use activities. This is why their design is so important. ***Nationwide there is an increasing awareness that road design is neighborhood design.***

Historically, rural road usage included children on foot and bicycle, horse-back riders, farmers moving agricultural equipment from field to field, loggers taking timber to market, as well as residents traveling to town in the family truck or car. These activities define a rural lifestyle even today.

In the past all of these different modes of travel could be accommodated because volumes and traffic speeds were low. However, over the past 30 years land use patterns have changed. More people have moved into the countryside but do not work there.

Motorized vehicle trips have increased dramatically in numbers and speed and threaten to drive all other users from the roadway. If the integrity of rural neighborhoods is to be preserved, then the effects of automobile traffic (e.g., speed, noise) must be moderated.

The integrity of rural neighborhoods has important ramifications for public health and safety, local land values, and local economies. High-speed auto traffic represents a neighborhood public health hazard and creates a barrier to local non-motorized transportation activities on which residents depend. The committee wants to restore multi-modal function and safety on county rural roads.

Government agencies make use of limited public resources (e.g. transportation funds, rights-of-way) to serve the public good. In doing so, they must balance competing community values, within the limits of available resources, to accomplish publicly stated goals and policies.

Competing Community Values

- ◆ Safety while walking
- ◆ Safety while cycling
- ◆ Safety while driving
- ◆ Children's safety and mobility
- ◆ Neighborhood access
- ◆ Noise reduction
- ◆ Water and air pollution reduction
- ◆ Local character preservation
- ◆ Historic values
- ◆ Scenic values
- ◆ Property values

By increasing vehicle speed from 30 MPH to 35 MPH, a driver saves 18 seconds per mile. On a three-mile trip this adds up to less than a minute. Are the trade-offs worth it?



There is more to life than increasing its speed.

—Mahatma Gandhi

Public Health and Safety

Pedestrian and bicyclist injuries and deaths are a serious public health problem that has largely been ignored in the United States.

— *Making Walking and Cycling Safer: Lessons from Europe*, p. 7

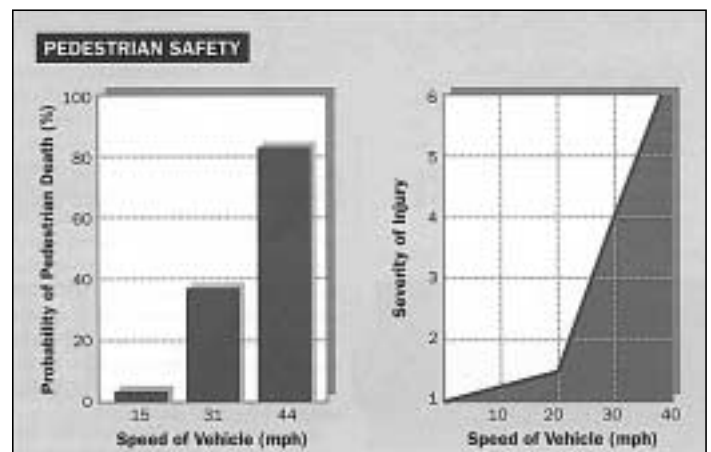
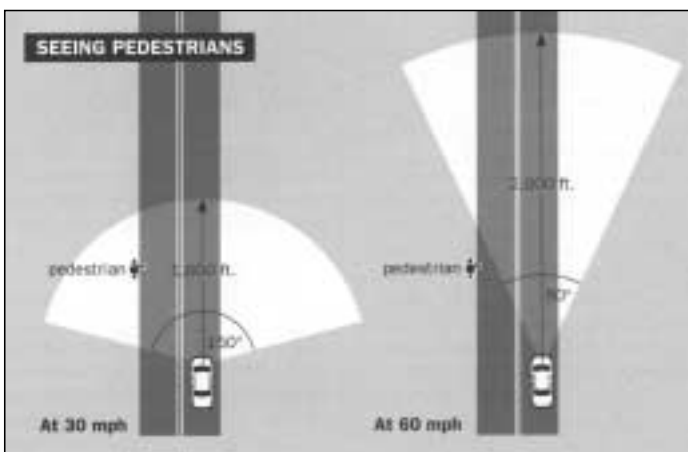
In the U.S. six thousand pedestrians are killed every year; 90,000 are injured. A pedestrian or bicyclist is injured every three and one-half minutes. Sixteen percent of all people killed in motor vehicle accidents are pedestrians or bicyclists. These deaths and injuries are vastly out of proportion to the presence of pedestrians and bicyclists on the nation's streets and roads. Thirty-nine percent of all children aged 12 and younger who are killed in motor vehicle accidents are killed while walking or riding bicycles. In the United States in 1994, 806 children were killed and 30,000 injured as pedestrians. The causes of these depressing statistics are rooted in the way we have been designing our roads. It is time for change.



In its report, "Washington State Pedestrian Collision Data: 1990-1995," the WSDOT states that a disproportionate number of pedestrian fatalities occur on county roads.⁴ This is because the design of county roads does not take pedestrian safety into consideration. If we want pedestrian safety we need to consider their needs equally when we design new roads.

Providing decent conditions for pedestrians and bicyclists is not just a matter of public safety. It is also a matter of fairness and civic responsibility. Many of our citizens cannot drive, because of age, physical disability, or other reasons. These people, and anyone else who decides to go for a walk, should be able to have reasonably safe conditions as they venture out onto the roads that link their homes to those of their neighbors and everything else in

Take Back Your Streets: *How to Protect Communities from Asphalt and Traffic* produced by Transportation for Livable Communities, www.tlcnetwork.org



⁴ <http://www.wsdot.wa.gov/hlrd/>

their community. Bicyclists and pedestrians are also users of the roadway and deserve equal consideration. After all, they are the most vulnerable users of the facility. And of course in every neighborhood the safety and mobility of children must be given the highest priority.

Safety vs. Speed

The most important consideration in designing a safe, multi-modal facility is the speed of the automobile traffic.

By increasing traffic speed, conventional road projects may actually fail to meet the public goals that are said to justify them. Studies have shown that regardless of posted speed limits, motorists drive faster when given the cushion of a wider road and greater sight distances. When motorists drive faster, pedestrian and bicyclist accidents are more likely and more serious.

The likelihood that a pedestrian or bicyclist will be hit increases at higher speeds because a motorist's ability to

take in the surrounding environment becomes more limited. At a speed of 30 miles per hour, motorists have fields of vision spanning approximately 150 degrees, and will fix their vision about 1,000 feet ahead. At 60 miles per hour, motorists' fields of vision are reduced by two-thirds to 50 degrees, and motorists will fix their vision at 2000 feet. From the point of view of pedestrian safety, widening a roadway is counterproductive.

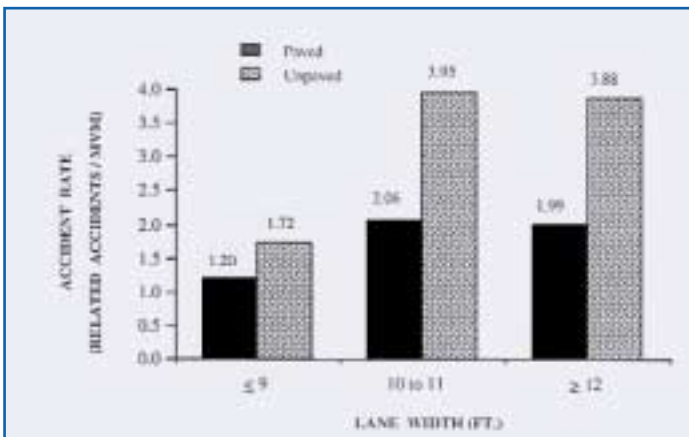
The probability of a pedestrian or bicyclist being killed is 3.5 percent when struck by a vehicle travelling at 15 miles per hour, but increases more than tenfold to 37 percent at 31 miles per hour and increases to 83 percent at 44 miles per hour. Pedestrian injuries also increase in severity with vehicle speed. As a 1994 study puts it, an injury's severity "depends primarily on the car's speed at impact with the pedestrian." The study ranks injuries on a scale of one (no injury) to six (fatality), and states that, in general, injury severity is one and one half at 20 miles per hour, four at 30 miles per hour, and six at speeds greater than 35-40 miles per hour.

Motorists also suffer more serious injuries in higher speed accidents. The safety statistics related to road width show that roads with nine foot travel lanes, like many of our older county roads, are safer for drivers than wider roads. Both fewer accidents and, more importantly, fewer injuries occur on these roads. This is because drivers moderate their speeds on narrower roads.

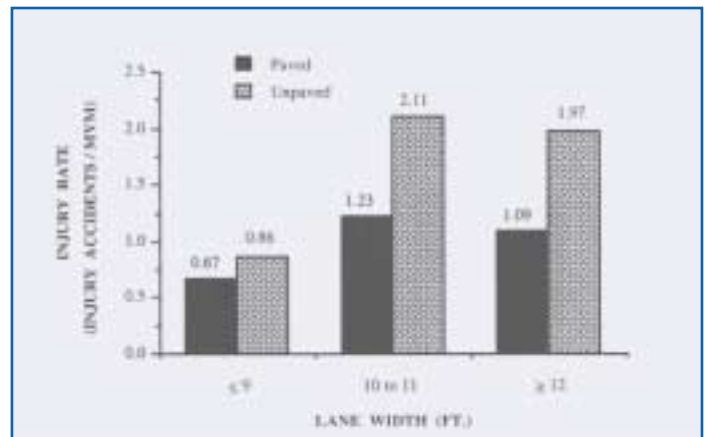
When coupled with the pedestrian safety data these statistics present a compelling argument in favor of rural road design that encourages slower rather than faster automobile speeds.

All users have increased safety when motorized vehicle speeds are reduced. The committee believes the best way to decrease speeds and the detrimental effects of traffic on rural roads is to retain their existing features that tend to slow traffic speeds. These features, including narrower traffic lanes and curves, are the same features that give rural roads their charm and rural character.

The National Cooperative Highway Research Program, Report #362



Accident rates for roads by lane width.



Injury rates for roads by lane width.

Rural Character

San Juan County has published a scenic roads manual to describe, protect, and enhance their rural roads scenic qualities.⁵ The citizens of San Juan County believe these roads are economically valuable, safe, and improve their overall quality of life.

The roads of San Juan County mean much more to our citizens than simply a way to get from one place to another. Our county roads are part of the scenic element and rural character that should be preserved.

—San Juan County Commissioners, March 1995

One of San Juan County's most valuable resources is the scenic quality of its rural landscape. The attractiveness is derived from a variety of elements which compose its land use pattern. Open fields, wooded uplands, shorelines, farms, villages, and other natural and man-made features provide a visually rich environment for its residents.

An integral scenic element of the rural countryside is the County road system. These by-ways are characterized by narrow roadways with diverse and contrasting features in close proximity. The characteristics provide a unique visual experience when traveling through the rural landscape. The details of color, texture, and form are easily recognized. Combined with a sequence of apertures in the roadside canopy, there exists an intimacy and awareness of the landscape not obtainable on higher speed roads.

The value of our County roads is found in the unique visual experience they offer. The appeal to a large tourist population accounts for a substantial portion of the County's economy. It is from the County road system that the majority of visitors view the Islands. These roads further define the rural character of the islands, many of them beginning as farm to market or farm to dock roads.

Some of San Juan County's roads have been widened, straightened, paved, or otherwise "improved" to accommodate increased traffic or safety concerns. Often, these modifications have caused changes to environmental features and in turn have degraded the scenic and cultural values associated with a rural road. Such occurrences usually resulted from an inability to balance safety issues with the scenic qualities inherent to rural roads. Degradation also occurs because the standards and specifications which presently guide these modifications often do not consider the relationship of the rural road to the surrounding features of the landscape.

—From San Juan County Scenic Roads Manual

Rural character conservation is one of the central policies of the Clallam County Comprehensive Plan. Yet nowhere in the plan has rural character been defined. Based on the intent of the comprehensive plan to preserve rural quality of life for local residents, the committee believes the following to be true with regards to rural character:

◆ The proper perspective for defining rural character is the front porch perspective, that is, the perspective of each of us from our home environment and neighborhood as we work or sit and enjoy a summer afternoon or go for a walk with our family. It is not the perspective of the commuter or tourist. *The comprehensive plan intends to preserve rural quality of life and the context of rural neighborhoods from the perspective of local residents.*



San Juan County approach to safety.

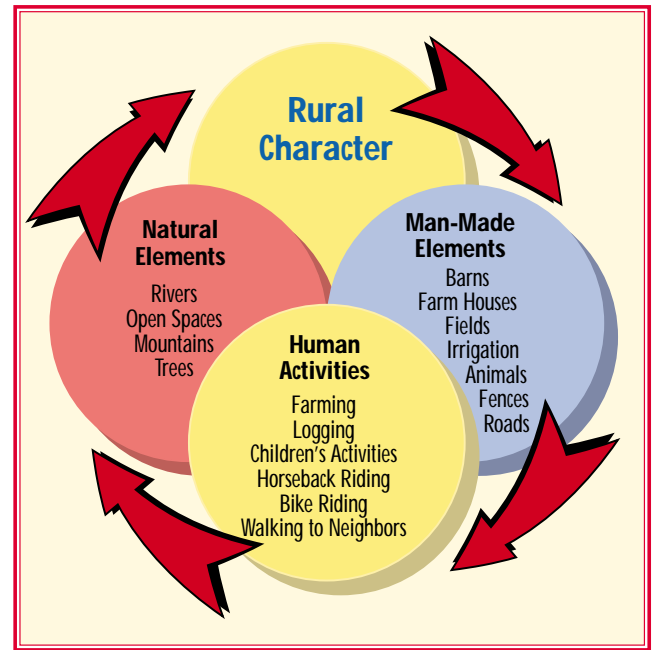
⁵ San Juan County Scenic Roads Manual, A Guide for the Protection and Enhancement of Our Rural Roads Scenic Qualities, April 1995, www.co.san-juan.wa.us/publicworks/sr-manual/scenic-road.html

◆ Rural character is a scenic landscape of open spaces, and also is composed of the human activities upon that landscape that define rural life. Restoring the multi-modal function of rural roads should be the first priority of any contemplated improvement project, giving non-motorized users equal consideration in rural neighborhoods and where otherwise appropriate. *Drivers passing through rural areas need to be alert and moving slowly enough to react safely to the occasional slowly moving tractor, horseback rider, or group of school children walking from the school bus stop.*

◆ Because rural roads are an integral

part of the rural landscape and rural neighborhoods, their design will either improve or degrade rural character.

◆ Preservation of rural character requires slower, not faster traffic speeds. On faster roads the city/county standards call for clearing a wide swath through the landscape, removing trees and other vegetation, lowering hills, and straightening



Essential Features Of Roads With Rural Character

- ◆ Safety for all users.
- ◆ Narrow travel lanes with close roadside features.
- ◆ Curving roads conforming to natural landscape.
- ◆ Slow traffic speeds.

curves to provide increased stopping sight distances and clear zones. *Wider expanses of asphalt, higher vehicle speeds, and removal of vegetation are the antithesis of rural character.*

- ◆ Rural character has economic value for the residents and property owners of rural Clallam County.

The New Old-Fashioned Country Road

The highest priority safety problem on many of our county roads is not the theoretical need for more road width and capacity for high-speed automobile traffic 20 years from now. It is the crowding of children and other vulnerable users (e.g., pedestrians, bicyclists) into the motorized vehicle traffic stream today. Solving this problem while preserving our valuable rural character requires new thinking and approaches.

The “new old-fashioned country road” is a concept that the committee puts forward as a solution to this problem. The concept seeks to restore safely the multi-modal function of historical

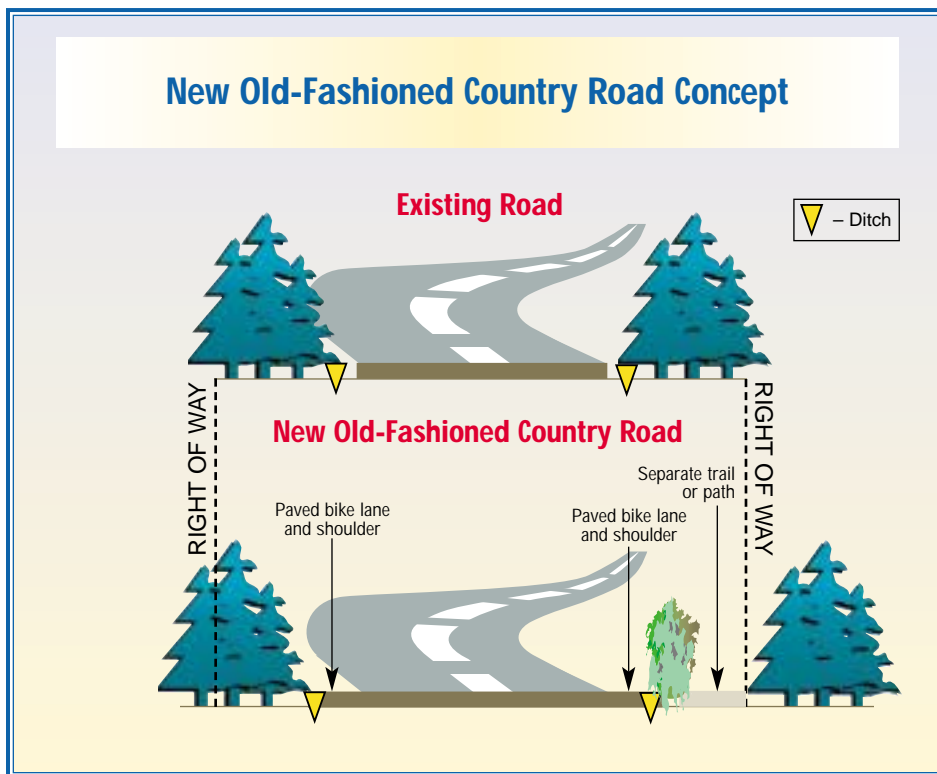
county roads, balancing competing community interests, and preserving our valuable rural character. We intentionally do not specify cross sectional dimensions, leaving this to future project-specific planning teams. **These projects could be done within existing rights-of-way as a reconstruction using the more flexible State of Vermont Design Standards. Alternatively they could be done as 3-R* projects, side-stepping the standards issue.**

We specify the following **design goals**:

- ◆ Reduce automobile speeds to the posted limit.
- ◆ Provide safe, comfortable access for children and pedestrians.
- ◆ Provide safe, comfortable access for bicyclists.
- ◆ Provide safe access for motorists.
- ◆ Preserve or enhance rural character.
- ◆ Preserve or enhance rural neighborhood quality of life.

New federal transportation policies encourage a “throw out the manuals” approach to project design which focuses on neighborhoods and community rather than on commuting. They further recommend that designers use an “outside-in” approach to designing roads, focusing first on the needs of children, bicyclists, and pedestrians and then on people driving motorized vehicles.⁶

Compare the new old-fashioned road to the conventional improved road in the figure on page 3.



⁶ Accommodating Bicycle and Pedestrian Travel: A recommended approach, a joint statement on integrating bicycling and walking into transportation infrastructure, U.S. Dept. of Transportation, 1999

Legal Issues

Road engineers sometimes become concerned that deviation from the design standards will bring a legal judgment of negligence* and liability* against them. They may be tempted to be very conservative in their approach to road design and avoid innovative and creative approaches to design problems.

However, there is little reason for concern that a well-engineered project which meets well-defined public goals defined through a well-documented public process would result in a judgment of negligence or other wrongdoing against a county road department. There is even less reason for county employees to fear a personal liability judgement against them. The county indemnifies its employees against personal liability except in cases where they have acted outside the scope of their employment.

Moreover, it is not negligent for a public official or agent to use professional judgement in accomplishing stated public goals defined by documented public policy. It is proper and necessary for them to do so.

In any case, adherence to accepted standard practices such as the AASHTO Green Book guidelines, does not automatically establish that reasonable care was exercised. Conversely, deviation from the guidelines, through the use of a design exception, does not automatically establish negligence.

The best protection (none is perfect) from liability exposure is to document the decision-making process (balancing competing community values) and the design process which guided project development. For designs which deviate or appear to deviate from standards, the best defense is to present persuasive evidence that the guidelines were not applicable to the circumstances of the project or that the guidelines could not be reasonably met. (An economic defense is not the most effective.) If the justification documented by a designer completely describes the physical and environmental factors that make the exception for any design necessary, it is likely that this will be legally persuasive, that the correct procedures were followed, and ultimately that the appropriate decision was made. In addition, it is helpful to have statements by other design experts who concur with the decision in the documentation.⁷

Regarding standards, **safe county roads do not need to be upgraded to current standards that did not exist at the time that they were built solely because standards have changed.** The Green Book states "The fact that new design values are presented herein does not imply that existing streets and highways are unsafe, nor does it mandate the initiation of improvement projects."⁸

The Washington state Supreme Court agrees: "Municipalities including quasi-municipalities such as counties are not insurers against accidents, nor guarantors of the safety of travelers, but they must exercise ordinary care to keep their public ways in a reasonably safe condition for persons using such ways in a proper manner and exercising due care for their own safety."⁹



⁷ *Flexibility in Highway Design*, U.S. Department of Transportation, Federal Highway Administration, Publication Number: FHWA-PD-97-062; Ch. 2, p. 40

⁸ *A Policy on Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials, ISBN 1-56051-001-3, p. xliii

⁹ *Bergland v. Spokane County*, 103 P.2d 355, 4 Wash. 2d 309

Appendix A

The following is a list of publications we reviewed and used as reference or resource materials.

1. *Clallam County Countywide Comprehensive Plan*, Chapters 31.01, 31.02, 31.04 and 31.07
2. *A Policy on Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials, 1997
3. *City and County Design Standards for Construction of Urban and Rural Arterials and Collectors*, Washington state, 1999
4. *State of Vermont Design Standards*, <http://www.aot.state.vt.us/projdev/standards/statabta.htm>
5. *Massachusetts Highway Design Manual*, Chapter 8, Design Exceptions, 1997
6. *San Juan County Scenic Roads Manual, A Guide for the Protection and Enhancement of Our Rural Roads Scenic Qualities*, April 1995, www.co.san-juan.wa.us/publicworks/sr-manual/scenic-road.html
7. *County Road Design Policy, Design Criteria for New and Reconstructed Roadways and Bridges with Less than 2500 ADT*, Alabama Dept. of Transportation, revised 7/16/97
8. *The National Cooperative Highway Research Program*, Report #362, Roadway Widths for Low-Traffic-Volume Roads, Transportation Research Board, 1994
9. *Highway Capacity Manual*, Special Report 209, Transportation Research Board, 1994
10. *Case study #19, Traffic Calming Auto Restricted Zones and Other Traffic Management Techniques – Their Effects on Bicycling and Pedestrians*, U.S. Dept. of Transportation, Federal Highway Administration, January 1994
11. Accommodating Bicycle and Pedestrian Travel: A Recommended approach, a joint statement on integrating bicycling and walking into transportation infrastructure, U.S. Dept. of Transportation, 1999
12. Making Walking and Cycling Safer: Lessons from Europe. Authors John Pucher and Louis Dijkstra, *Transportation Quarterly*, Vol. 54, #3, Summer 2000
13. International Traffic Engineers Traffic Calming Definition, *ITE Journal*, July 1997
14. Safety: Accident Exposure, Accident Analysis, Rural Accidents, Accident Counter-measures, Urban Intersection Accidents, Residential Precinct Traffic Management, Traffic Signs, Australian Road Research Board, 8/25/86
15. *Take Back Your Streets: How to Protect Communities from Asphalt and Traffic*, Conservation Law Foundation, January 1998
16. Restoring the Rule of Law and Respect for Communities in Transportation, Stephen H. Burrington, New York University, *Environmental Law Journal*, Vol. 5, #3, 1996
17. *Transportation and Land Use Innovations*, Reid Ewing, American Planning Association, 1997
18. *Saving Historic Roads: Design and policy guidelines*, Paul Daniel Marriott, Preservation Press, 1998
19. *Flexibility in Highway Design*, U.S. Dept. of Transportation, Federal Highway Administration, Publication #FHWA-PD-97-062, 1998
20. Clallam County Pedestrian Safety Roadshow, Summary Report, 6/22/00

Other Web Site Resources

Sprawl Resources and Data

<http://www.sierraclub.org/sprawl/>

Narrow Streets Data Base

<http://www.sonic.net/abcaia/narrow.htm>

FHWA Pedestrian and Bicycle Safety Research Page

<http://www.tfhrc.gov/safety/pedbike/pedbike.htm>

Smart Growth Network

<http://www.smartgrowth.org/index2.html>

Appendix B

Glossary

Road Construction Terms

2-R – Resurfacing and restoration

3-R – Resurfacing, restoration, and rehabilitation

4-R – Resurfacing, restoration, rehabilitation, and reconstruction

New construction – New construction is the building of a new roadway or structure on substantially new alignment, or the upgrading of an existing roadway or structure by the addition of one or more continuous traffic lanes.

Reconstruction – A reconstruction project involves major construction activity in excess of 3-R activity (see the Design Standards for 3-R Projects section). Reconstruction includes significant changes in cross section and/or shifts in vertical or horizontal alignment. If 50 percent or more of the project length involves significant vertical or horizontal alignment changes, the project will be considered reconstruction. Reconstruction may require acquisition of additional right-of-way, and may include all items or work usually associated with new construction.

Resurfacing – The addition of a layer or layers of paving material to provide additional structural integrity, improved serviceability, and rideability.

Restoration – Work performed on pavement or bridge decks to render them suitable for resurfacing. This may include supplementing the existing roadway by increasing surfacing and paving courses to provide structural capability, and widening up to a total of 3 meters (10 feet). Restoration will generally be performed within the existing right-of-way.

Rehabilitation – Similar to restoration except the work may include reworking or strengthening the base subbase, recycling or reworking existing materials to improve their structural integrity, adding underdrains, improving or widening shoulders. Rehabilitation may include acquisition of additional right-of-way.

Additional Levels of Service

Level of service E: Represents operating conditions at or near the maximum capacity level. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle or pedestrian to give way to accommodate such maneuvers. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable, because small increases in flow or minor disturbances within the traffic stream will cause breakdowns.

Level of service F: Describes forced or breakdown flow, where volumes are above theoretical capacity. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations, and operations within the queue are characterized by stop-and-go waves that are extremely unstable. Vehicles may progress at reasonable speeds for several hundred feet or more, then be required to stop in a cyclic fashion.

Legal Terms

Liability – The responsibility to make restitution to the injured or damaged party through an action or payment determined by the court. Entities (public or private) are held liable for damages when they have been found to be negligent and to have caused harm.

Liability for suit, or liability exposure – This is based upon an opinion as to the probability that a tort claim will be made at some future time. This is not to be confused with actual liability, that is, an actual judgement of obligation to pay damages because of negligence.

Negligence – A term used to refer to a classification of tort in which the injury is not intentional, but where there was a failure to use due care in the treatment of others compared to what a “reasonable man” would have done.

Tort – A legal term that refers to a civil wrong that has been committed and which causes injury.

Multi-modal refers to a road’s ability to accommodate differing modes of transportation such as pedestrian, bicycle, and motorized vehicle.

Rural Roads Design Standards Advisory Committee

STUART J. BONNEY, AIA is the owner and principal architect of Olympic Design Works Inc. P.S. He and his wife Catherine, a life long resident, take great interest in local preservation issues and maintaining the rural character of our unique environment.

KRIS HANSON is a third generation Hanson who has lived in the "West End" and traveled it's rural roads for 38 years. He is currently raising two boys, ages 4 and 3, with his wife Lori. For the past 14 years, he has been teaching at Clallam Bay Schools in a variety of settings from Kindergarten to Senior High School. His Interests are working with children and being involved with community organizations.

BILL HENNESSEY and his wife Kathie are raising three children, ages 5, 9, and 11 in rural Clallam County, Washington. Bill has worked variously as a road crew laborer, a commercial fisherman, a forest soils and hydrology technician and has been a small business owner and Family Doctor in Port Angeles for twelve years. He is interested in public health and safety as they relate to road design.

BOB LAKE has traveled the world for the Air Force and CIA, but chose rural Clallam County for his home. He lives on Freshwater Bay with his kayak and family. Bob is a freelance software engineer.

DAVE LE ROUX has been a resident of Sequim for 15 years. As a current and founding member Peninsula Trails Coalition he has an active interest in transportation corridors that are safe for vehicles, pedestrians, and bicyclists.

DON MYERS has 40 years experience in aerospace, electronics, and defense industries. He retired from Northrop Gruman Corporation, B-2 Division where he was the Project Manager for three simultaneous technology studies. Don and Dixie Myers reside in rural Clallam County west of Port Angeles.

RON SCHROMEN-WAWRIN has traveled Clallam County roadways for more than two decades. He presently lives along a gravel road in the countryside south of Port Angeles with his family. Ron is self-employed in the construction industry.

KATHE SMITH has lived on the Olympic Peninsula for 18 years. As a bicycle commuter and a member of the Clallam Transit Advisory Board she has a keen interest in transportation issues.

RUSS WESTMARK has 25 years experience in timber sale administration including timber sale purchasing and appraisal, road construction appraisal and administration, logging administration, and log sales. Russ is currently working at Portac Inc. as a log buyer and administering timber sales.

PAT WILLITS is a member of the Clallam County Planning Commission. She has been teaching biology for 35 years, at all levels from elementary school through elderhostel. Currently she is teaching classes for Peninsula College in subjects ranging from Forest Ecology to marine birds and raptors to intertidal vertebrates.

JIM WINDERS has 43 years experience in construction at various positions. He retired from Sully-Miller Construction Company where he was a Division Manager. Mr. and Mrs. Winders reside in rural Clallam County near Sequim.

The Committee thanks the following people for their help:

County Commissioners:

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Ex-officio Committee members:

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Clallam County citizen:

- Kathy Reuter for editing, design, and layout of this document.

FINDINGS AND RECOMMENDATIONS

Task 1. Findings: Because of a lack of effective public notification and absence of a forum for effective public involvement, public hearings associated with road reconstruction projects in Clallam County have been unnecessarily contentious. The county has no written procedure for notifying and involving citizens in the development and design of road improvement projects.

✓ **Recommendations:** To meet the Growth Management Act (GMA) goal of effective public involvement as stated in section 31.04.155, the committee recommends the county adopt the citizen involvement process described in our publication “Road Work: Citizen Involvement in Rural Road Design, Clallam County, Washington.” We believe this process, which encourages early and continuous citizen involvement, will eliminate much of the discord currently experienced during road project development. It is modeled after the public process recommended by the Federal Highway Administration and meets the GMA requirements for public involvement.

Task 2. Findings: The use of the Washington state city/county standards on road reconstruction projects in Clallam County sabotages county policies on rural lands, rural neighborhoods, and transportation.¹⁰ In doing so these design standards take the county out of compliance with the Growth

Management Act of 1990 (RCW 36.70A) and the Planning Enabling Act (RCW 36.70).

The committee believes the best way to decrease speeds and the detrimental effect of traffic is to retain the existing features of our rural roads that tend to slow traffic. These features, including narrow traffic lanes and curves, are the same features that give rural roads their charm and rural character. We believe the trade-off for preserving rural character, presently unacknowledged in the Clallam County Comprehensive Plan, is reduced speed for motorized vehicles.

✓ **Recommendations:** The committee recommends the county commissioners adopt the more flexible Vermont design standards¹¹ for use on rural collectors and local roads, and consider its use on arterial reconstruction projects passing through defined rural neighborhoods. The Vermont design standards are recognized nationally for their flexibility and ability to preserve rural character, while providing for safe multi-modal travel. These standards also have been adopted in rural Massachusetts.

Vermont, a largely rural state, developed its standards specifically to give road designers greater flexibility to preserve valuable historic, cultural, and scenic resources as they plan transportation improvements. Because of their more flexible approach to design controls and

cross-sectional elements, the Vermont standards can accomplish the following goals:

- ◆ Reduce motorized vehicle speed.
- ◆ Retain rural character.
- ◆ Improve multi-modal safety.
- ◆ Preserve part of the right-of-way for a separate pedestrian path.

These goals are consistent with comprehensive plan policies.

Further recommendations:

In rural neighborhoods or where otherwise appropriate we further recommend the county:

- ✓ Make transportation planning subordinate to community planning.
- ✓ Abandon the use of the 85th percentile design speed.
- ✓ Abandon the use of remote design years.
- ✓ Design roads with safe, comfortable multi-modal access as the primary goal, focusing on the needs of the most vulnerable users of the facility (children, pedestrians, and bicyclists) first. (This is the new federal multi-modal transportation policy.)
- ✓ Rewrite the Clallam County Comprehensive Plan to change the performance standards “within the policies and goals of the comprehensive plan,” allowing a level of service of D where appropriate to protect rural neighborhood safety and integrity. The Vermont State Design Standards allow level of service D or even E to be judged on a case-by-case basis.

¹⁰ Clallam County Countywide Comprehensive Plan, Sections 31.04.230, 31.04.225, 31.04.115

¹¹ State of Vermont Design Standards, <http://www.aot.state.vt.us/projdev/standards/statabta.htm>