



U.S. Department
of Transportation
**Federal Highway
Administration**

FHWA – WI Division

May 21, 2010

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In Reply Refer To:
HDA-WI

Secretary Frank Busalacchi
Wisconsin Department of Transportation
4802 Sheboygan Avenue, Room 120B
Madison, WI 53707

Dear Secretary Busalacchi:

We are writing in response to your request for guidance concerning the apparent conflict between State law and Federal policy regarding the recently enacted State Statute 84.01(35), addressing State Policy on Bicycle and Pedestrian ways, which we have enclosed for your reference. Our Headquarters office has reviewed your new statute and has provided us guidance.

Federal emphasis to incorporate pedestrian and bicycle accommodations on improvement projects has recently been elevated in a new US DOT policy as the Federal Government continues to promote livable communities and complete streets. We are pleased with the overall intent of the new law which will increase this national emphasis.

FHWA policy for pedestrian and bicycle accommodations are as follows:

Bicycle and pedestrian ways shall be established in new construction and reconstruction projects in all urbanized areas unless one or more of three conditions are met:

- Bicyclists and pedestrians are prohibited by law from using the roadway. In this instance, a greater effort may be necessary to accommodate bicyclists and pedestrians elsewhere within the right of way or within the same transportation corridor.
- The cost of establishing bikeways or walkways would be excessively disproportionate to the need or probable use. Excessively disproportionate is defined as exceeding twenty percent of the cost of the larger transportation project.
- Where sparsity of population or other factors indicate an absence of need. For example, the Portland Pedestrian Guide requires "all construction of new public streets" to include sidewalk improvements on both sides, unless the street is a cul-de-sac with four or fewer dwellings or the street has severe topographic or natural resource constraints.



State Law 84.01(35) appears less restrictive than federal policy for certain projects. We note three of the state exceptions are fully consistent with our three Federal exceptions. However, there are two additional state exceptions in the Statute that allow an agency not to include adding sidewalks in a case where State exception #3 "Establishing bikeways or pedestrian ways would

have excessive negative impacts in a constrained environment" or State exception #5 "*The community where pedestrian ways are to be located refuses to accept an agreement to maintain them.*" The last exception raises considerable concern and is unacceptable for use on National Highway System (NHS) projects. The NHS projects require FHWA approval of design standards, and lacking proper project design standards jeopardizes federal-aid funds on the entire project per the requirements in 23 CFR 625.2 & 3.

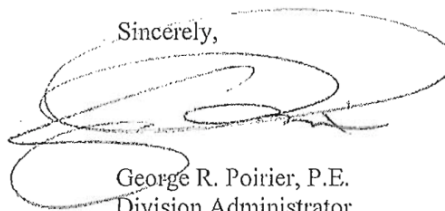
Therefore, if a NHS project proposes not to include sidewalks based on State exception #5, that will cause us not to authorize the project. The prohibition on the use of this State exception on NHS projects should be brought to the attention of local agencies during the planning process in order to preclude the requirement of a possible payback situation for federal-aid funded design work.

In addition, we strongly encourage the WisDOT to minimize the use of the State exception #5 on non-NHS projects. Regarding State policy exemption #3, "*Establishing bikeways or pedestrian ways would have excessive negative impacts in a constrained environment,*" we believe this exception may be addressed in the environmental process and may have applicability to one or more of the three federal exemptions. However, this can be addressed on a project by project basis.

In addition, we want to know if a local government decides to exercise state exception #5, to determine federal eligibility, and we encourage our early involvement in these decisions.

If you have any questions or concerns regarding these terms and conditions please contact John Berg at (608) 829-7515.

Sincerely,



George R. Poirier, P.E.
Division Administrator

Enclosure

ecc: Rubin Anthony (WisDOT)
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 John Berg
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 Tracey McKenney
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Wisconsin State Law

84.01(35) (a) In this subsection:

1. "Bikeway" has the meaning given in s. 84.60 (1) (a).
2. "Pedestrian way" has the meaning given in s. 346.02 (8) (a).
- (b) Except as provided in par. (c), and notwithstanding any other provision of this chapter or ch. 82, 83, or 85, the department shall ensure that bikeways and pedestrian ways are established in all new highway construction and reconstruction projects funded in whole or in part from state funds or federal funds appropriated under s. 20.395 or 20.866.

(c) The department shall promulgate rules identifying exceptions to the requirement under par. (b), but these rules may provide for an exception only if any of the following apply:

1. Bicyclists or pedestrians are prohibited by law from using the highway that is the subject of the project.
2. The cost of establishing bikeways or pedestrian ways would be excessively disproportionate to the need or probable use of the bikeways or pedestrian ways. For purposes of this subdivision, cost is excessively disproportionate if it exceeds 20 percent of the total project cost. The rules may not allow an exception under this subdivision to be applied unless the secretary of transportation, or a designee of the secretary who has knowledge of the purpose and value of bicycle and pedestrian accommodations, reviews the applicability of the exception under this subdivision to the particular project at issue.
3. *Establishing bikeways or pedestrian ways would have excessive negative impacts in a constrained environment.*
4. There is an absence of need for the bikeways or pedestrian ways, as indicated by sparsity of population, traffic volume, or other factors.
5. *The community where pedestrian ways are to be located refuses to accept an agreement to maintain them.*

U.S. Department of Transportation

Federal Highway Administration

1200 New Jersey Avenue, SE Washington DC 20590
202-366-4000

NOTE: Document can be found at: https://www.fhwa.dot.gov/civilrights/programs/doj_fhwa_ta.cfm

Civil Rights



Department of Justice/Department of Transportation Joint Technical Assistance¹ on the Title II of the Americans with Disabilities Act Requirements to Provide Curb Ramps when Streets, Roads, or Highways are Altered through Resurfacing

Title II of the Americans with Disabilities Act (ADA) requires that state and local governments ensure that persons with disabilities have access to the pedestrian routes in the public right of way. An important part of this requirement is the obligation whenever streets, roadways, or highways are *altered* to provide curb ramps where street level pedestrian walkways cross curbs.² This requirement is intended to ensure the accessibility and usability of the pedestrian walkway for persons with disabilities.

An alteration is a change that affects or could affect the usability of all or part of a building or facility.³ Alterations of streets, roads, or highways include activities such as reconstruction, rehabilitation, *resurfacing*, widening, and projects of similar scale and effect.⁴ Maintenance activities on streets, roads, or highways, such as filling potholes, are not alterations.

Without curb ramps, sidewalk travel in urban areas can be dangerous, difficult, or even impossible for people who use wheelchairs, scooters, and other mobility devices. Curb ramps allow people with mobility disabilities to gain access to the sidewalks and to pass through center islands in streets. Otherwise, these individuals are forced to travel in streets and roadways and are put in danger or are prevented from reaching their destination; some people with disabilities may simply choose not to take this risk and will not venture out of their homes or communities.

Because resurfacing of streets constitutes an alteration under the ADA, it triggers the obligation to provide curb ramps where pedestrian walkways intersect the resurfaced streets. See *Kinney v. Yerusalim*, 9 F 3d 1067 (3rd Cir. 1993). This obligation has been discussed in a variety of technical assistance materials published by the Department of Justice beginning in 1994.⁵ Over the past few years, state and local governments have sought further guidance on the scope of the alterations requirement with respect to the provision of curb ramps when streets, roads or highways are being resurfaced. These questions have arisen largely due to the development of a variety of road surface treatments other than traditional road resurfacing, which generally involved the addition of a new layer of asphalt. Public entities have asked the Department of Transportation and the Department of Justice to clarify whether particular road surface treatments fall within the ADA definition of alterations, or whether they should be considered maintenance that would not trigger the obligation to provide curb ramps. This Joint Technical Assistance addresses some of those questions.

Where must curb ramps be provided?

Generally, curb ramps are needed wherever a sidewalk or other pedestrian walkway crosses a curb. Curb ramps must be located to ensure a person with a mobility disability can travel from a sidewalk on one side of the street, over or through any curbs or traffic islands, to the sidewalk on the other side of the street.

However, the ADA does not require installation of ramps or curb ramps in the absence of a pedestrian walkway with a prepared surface for pedestrian use. Nor are curb ramps required in the absence of a curb, elevation, or other barrier between the street and the walkway.

When is resurfacing considered to be an alteration?

Resurfacing is an alteration that triggers the requirement to add curb ramps if it involves work on a street or roadway spanning from one intersection to another and includes overlays of additional material to the road surface, with or without milling. Examples include, but are not limited to, the following treatments or their equivalents: addition of a new layer of asphalt, reconstruction, concrete pavement rehabilitation and reconstruction, open-graded surface course, micro-surfacing and thin lift overlays, cape seals, and in-place asphalt recycling.

What kinds of treatments constitute maintenance rather than an alteration?

Treatments that serve solely to seal and protect the road surface, improve friction, and control splash and spray are considered to be maintenance because they do not significantly affect the public's access to or usability of the road. Some examples of the types of treatments that would normally be considered maintenance are: painting or striping lanes, crack filling and sealing, surface sealing, chip seals, slurry seals, fog seals, scrub sealing, joint crack seals, joint repairs, dowel bar retrofit, spot high-friction treatments, diamond grinding, and pavement patching. In some cases, the combination of several maintenance treatments occurring at or near the same time may qualify as an alteration and would trigger the obligation to provide curb ramps.

What if a locality is not resurfacing an entire block, but is resurfacing a crosswalk by itself?

Crosswalks constitute distinct elements of the right-of-way intended to facilitate pedestrian traffic. Regardless of whether there is curb-to-curb resurfacing of the street or roadway in general, resurfacing of a crosswalk also requires the provision of curb ramps at that crosswalk.

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1. The Department of Justice is the federal agency with responsibility for issuing regulations implementing the requirements of title II of the ADA and for coordinating federal agency compliance activities with respect to those requirements. Title II applies to the programs and activities of state and local governmental entities. The Department of Justice and the Department of Transportation share responsibility for enforcing the requirements of title II of the ADA with respect to the public right of way, including streets, roads, and highways.
 2. See 28 CFR 35.151(i)(1) (Newly constructed or altered streets, roads, and highways must contain curb ramps or other sloped areas at any intersection having curbs or other barriers to entry from a street level pedestrian walkway) and 35.151(i)(2) (Newly constructed or altered street level pedestrian walkways must contain curb ramps or other sloped areas at intersections to streets, roads, or highways).
 3. 28 CFR 35.151(b)(1).
 4. 2010 ADA Accessibility Standards, section 106.5.
 5. See 1994 Title II Technical Assistance Manual Supplement, Title II TA Guidance: The ADA and City Governments: Common Problems; and ADA Best Practices Tool Kit for State and Local Governments: Chapter 6, Curb Ramps and Pedestrian Crossings under Title II of the ADA, available at ada.gov.

Page last modified on June 28, 2013.

U.S. Department of Transportation

Federal Highway Administration

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NOTE: Document can be found at: https://www.fhwa.dot.gov/civilrights/programs/doj_fhwa_ta_glossary.cfm

Civil Rights



U.S. Department of Justice
Civil Rights Division
Disability Rights Section



U.S. Department of Transportation
Federal Highway Administration

Glossary of Terms for DOJ/FHWA Joint Technical Assistance on the ADA Title II Requirements to Provide Curb Ramps When Streets Roads or Highways are Altered Through Resurfacing

This glossary is intended to help readers understand certain road treatments referenced on page 2 of the DOJ/FHWA Joint Technical Assistance on the ADA Title II Requirements to Provide Curb Ramps when Streets Roads or Highways are Altered Through Resurfacing. The definitions explain the meaning of these terms from an engineering perspective and are provided in the order in which they appear in the Technical Assistance document.

Treatments that are considered alterations of the road surface

Reconstruction – Reconstruction refers to removing all or a significant portion of the pavement material and replacing it with new or recycled materials. This may include full-depth reclamation, where the pavement surface is demolished in place and new pavement surface is applied. In addition, reconstruction may also include grinding up a portion of the pavement surface, recycling it and placing it back, and then adding a wearing surface, such as in cold in-place asphalt recycling. Reconstruction often includes widening or geometrical changes to the roadway profile.

Rehabilitation – Rehabilitation refers to significant repairs made to a road or highway surface, including activities such as full slab replacement, filling voids under slabs (slabjacking), widening, and adding additional structural capacity.

Open-graded surface course – Open-graded surface course, also known as “open-graded friction course,” involves a pavement surface course that consists of a high-void, asphalt concrete mix that permits rapid drainage of rainwater through the course and off the shoulder of the road. The mixture consists of either Polymer-modified or rubber-modified asphalt binder, a large percentage of one-sized coarse aggregate, and a small amount of fibers. This treatment prevents tires from hydroplaning and provides a skid-resistant pavement surface with significant noise reduction.

Microsurfacing – Microsurfacing involves spreading a properly proportioned mixture of polymer modified asphalt emulsion, mineral aggregate, mineral filler, water, and other additives, on a paved surface.

Microsurfacing differs from slurry seal in that it can be used on high volume roadways to correct wheel path rutting and provide a skid resistant pavement surface.

Thin lift overlays – Thin lift overlays are thin applications of mixtures of hot mix asphalt. Thin lift overlays may also require some milling along curbs, manholes, existing curb cuts, or other road structures to assure proper drainage and cross slopes.

Cape seal – A cape seal is a thin surface treatment constructed by applying a slurry seal or microsurfacing to a newly constructed chip seal. It is designed to be an integrated system where the primary purpose of the slurry is to fill voids in the chip seal.

In-place asphalt recycling – In-place asphalt recycling is a process of heating and removing around 1-2 inches of existing asphalt and remixing the asphalt with the addition of a binder additive and possible aggregate to restore the wearing surface for placement and compaction. All of this is performed in a train of equipment.

Treatments that are considered maintenance of the road surface

Crack filling and sealing – Crack filling and sealing involves placing elastomeric material directly into cracks in pavement.

Surface sealing – Surface sealing involves applying liquid sealant to pavement surface in order to stop water penetration or reduce oxidation of asphalt products. Sand is sometimes spread over liquid to absorb excess material.

Chip seals – Chip Seals involve placing graded stone (chips) on liquid emulsified asphalt sprayed on pavement surface. The surface is rolled to enable seating of chips.

Slurry seal – Slurry seals involve spraying a mixture of slow setting emulsified asphalt, well graded fine aggregate, mineral filler, and water on the pavement surface. It is used to fill cracks and seal areas of old pavements, to restore a uniform surface texture, to seal the surface to prevent moisture and air intrusion into the pavement, and to improve skid resistance.

Fog seals – Fog seals are a type of surface sealing.

Scrub sealing – Scrub sealing is type of surface sealing

Joint crack seals – Joint crack seals are usually associated with concrete pavement. This work consists of routing and cleaning existing cracks and joints and resealing to prevent water and non-compressibles from entering into the pavement joints and subgrade materials.

Joint repairs – Joint repairs are usually associated with concrete pavement. This work consists of selectively repairing portions of the pavement where the slabs are generally in good condition, but corners or joints are broken. The depth of the patch could be full depth or partial depth.

Dowel retrofit – Dowel retrofits are usually associated with concrete pavement. This work involves the installation of dowel bars connecting slabs in existing pavements. Pavement with dowel bar retrofits can have life extensions of as much as 20 years. Its application is almost exclusively on high-speed Interstate highways.

Spot high-friction treatments – Spot high-friction treatments involve using epoxy based resin liquids as a binder for an aggregate with high-friction properties. These are used in locations where drivers are frequently braking and the pavement surface has less resistance to slipping.

Diamond grinding – Diamond grinding involves using a gang saw to cut grooves in the pavement surface to restore smoothness and eliminate any joint faulting.

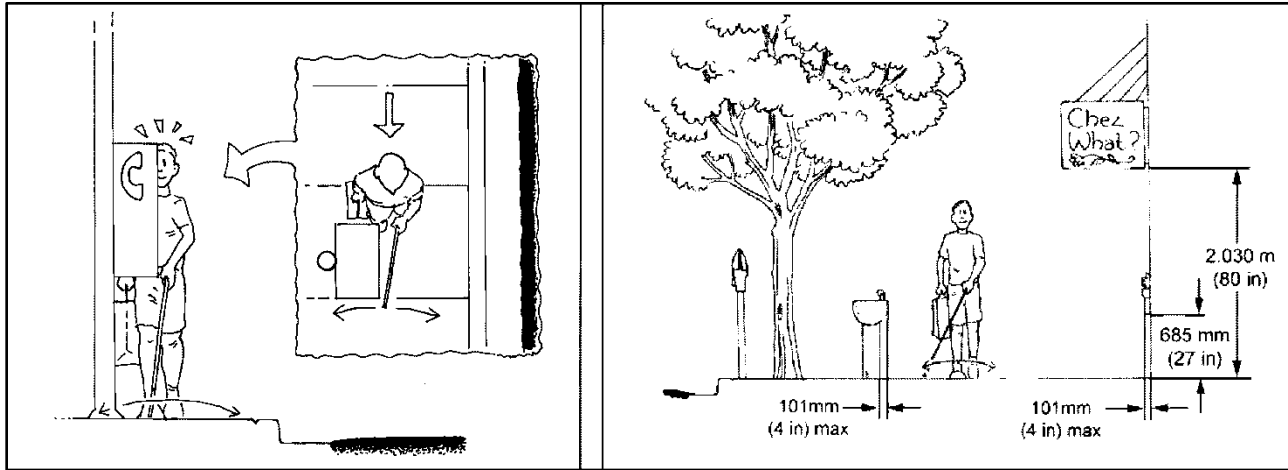
Pavement patching – Pavement patching involves selectively repairing portions of the pavement where the slabs are generally in good condition, but corners or joints are broken. The depth of the patch could be full depth or partial depth.

Page last modified on May 15, 2019.

Sidewalk Design Concepts

From "Designing Sidewalks and Trails for Access / Part II of II: Best Practices Design Guide", September 2001, (<http://www.fhwa.dot.gov/environment/sidewalk2/pdf.htm>)

Protruding Objects and Vertical Clearance

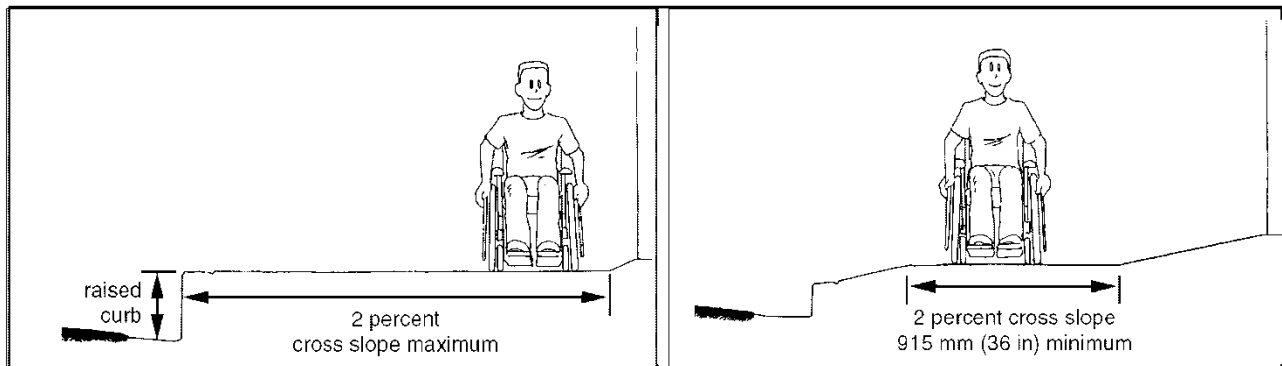


The two most important issues for people with vision impairments along the pedestrian corridor are protruding objects and vertical clearance. Objects that protrude into the sidewalk corridor but are higher than 6.7 ft are not a problem for people with vision impairments because most people require less than 6.7 ft of headroom. In addition, people who use long white canes to navigate will usually detect and avoid objects on the sidewalk that extend below 2.3 ft. Guide dogs take their owners around obstacles.

- Objects mounted on a post should protrude only 4 in.
- Wall mounted objects should protrude only 4 in.
- Signs mounted between two posts with a clear distance greater than 12 in. should be connected with a bar 15 in above the walking surface.

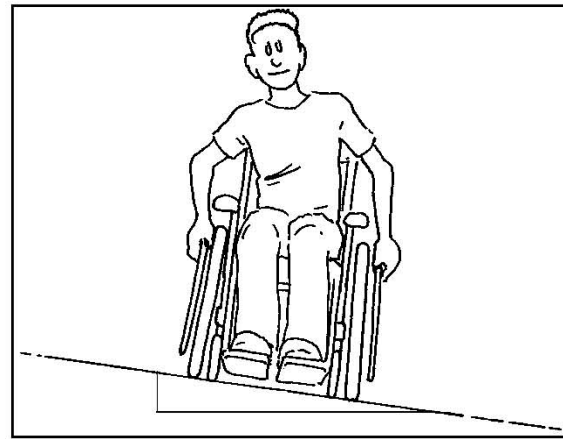
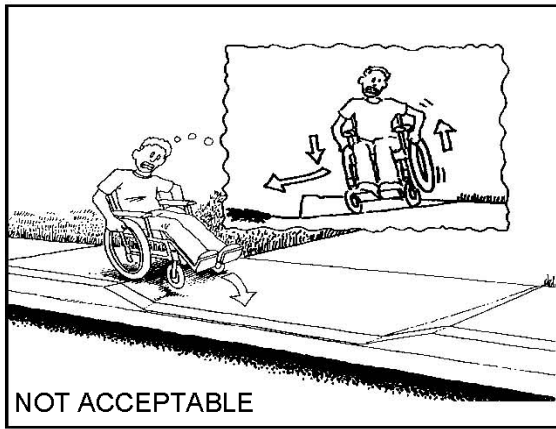
In all scenarios, the least amount of protrusion should be used. Furthermore, because people with vision impairments cannot detect the abstract division of the zones, protruding objects should be eliminated from the entire paved portion of the corridor.

Elevation Difference between Street and Building



Raise the curb or provide a fillet no more than a foot wide at the edge of the building or the combination of both to make up the elevation difference. Less desirable is to create a level area at least 36 in. wide (5 feet or wider where possible) in the center of the sidewalk and slope the edges.

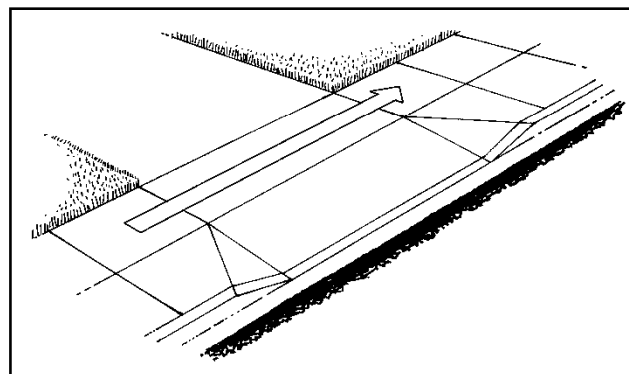
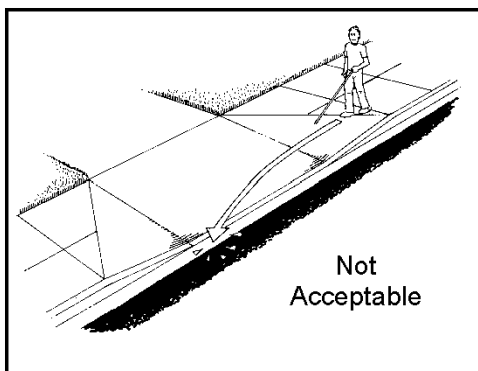
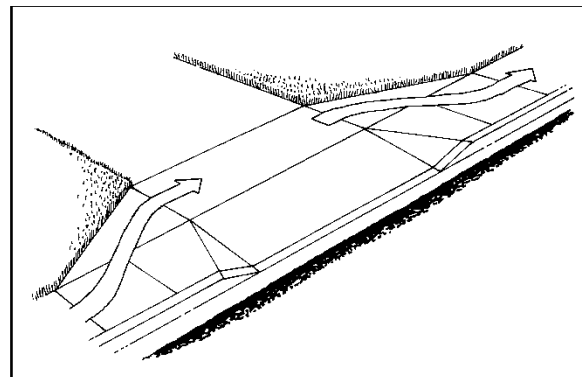
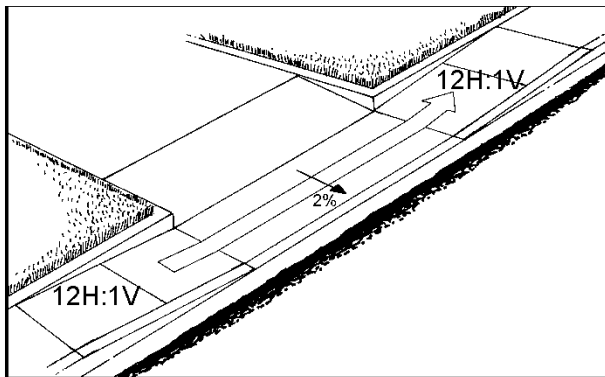
Cross Slope



Unlike grade, cross slope is not determined by the contours of the roadway. In all scenarios, the cross slope of the pedestrian corridor is **2.1 percent maximum**.

It is critical that the masons and carpenters are trained to understand how the **2.1 percent maximum** benefits people with mobility impairments. Unfortunately, in many instances, the cross slope is designed for **2.1 percent**, but then increased during construction either through unintentional error or as a way to improve drainage.

Sidewalks Crossing Driveways



On a narrow sidewalk, where space is at a premium, a sidewalk landing can be maintained by adding additional right-of-way just at the driveway. This can be done by purchasing the additional land or obtaining an easement from the adjacent property owner.

Gradually sloped driveway crossings are beneficial to people with mobility impairments, they can be problematic for people with vision impairments unless there is a detectable difference in slope at the edge of the street. If a person with a vision impairment veers towards the street and is not able to recognize where the driveway ends and the street begins, they may enter the street without realizing it.

Having the steeper driveway apron with a 2% cross slope 36-inches wide at the top serves as an effective way to slow motorists and accommodate pedestrians. Check the apron slope so the vehicle doesn't bottom-out at the front or rear.

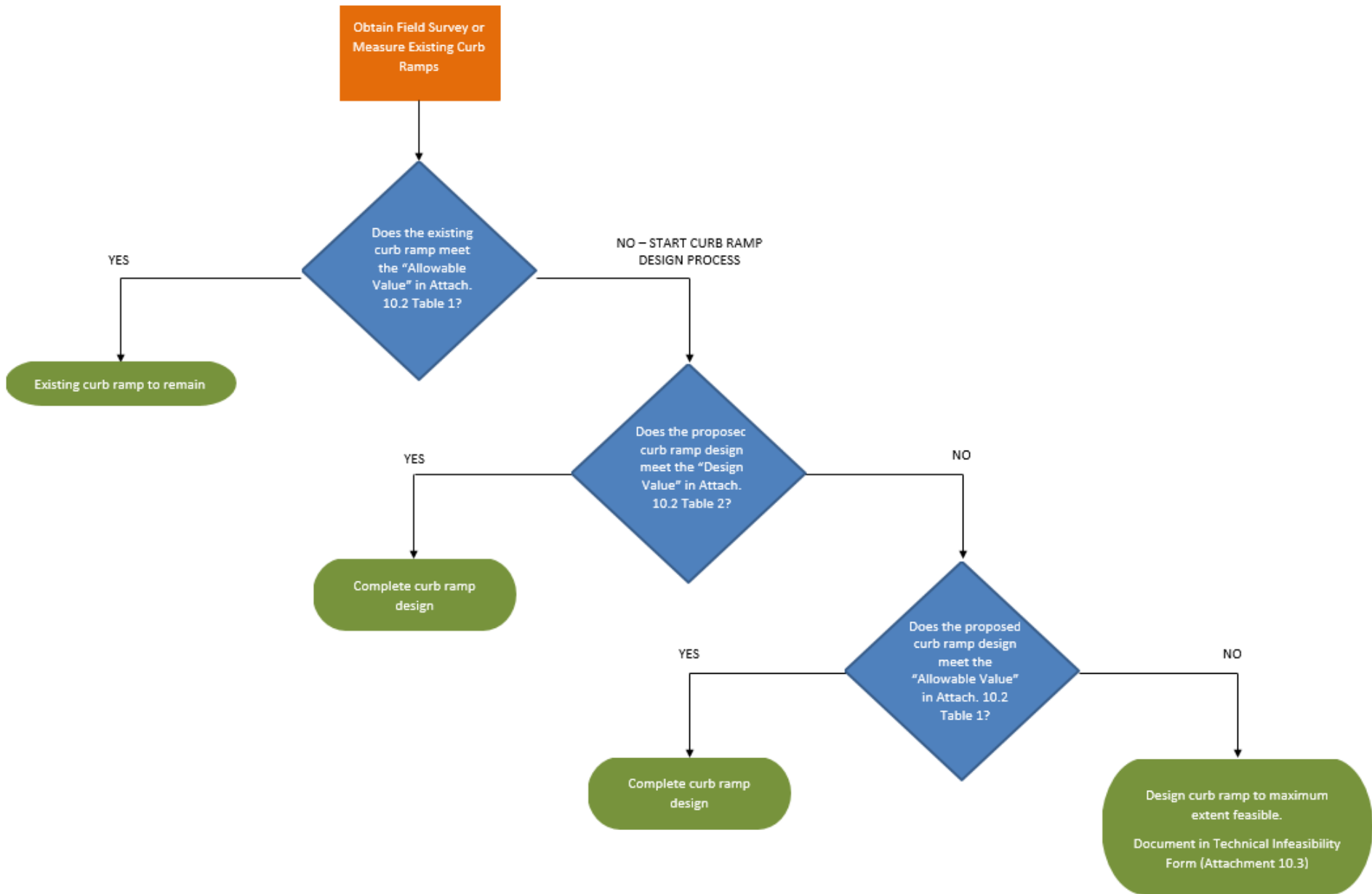


Table 1 – Component Summary – Evaluation of Existing Curb Ramp

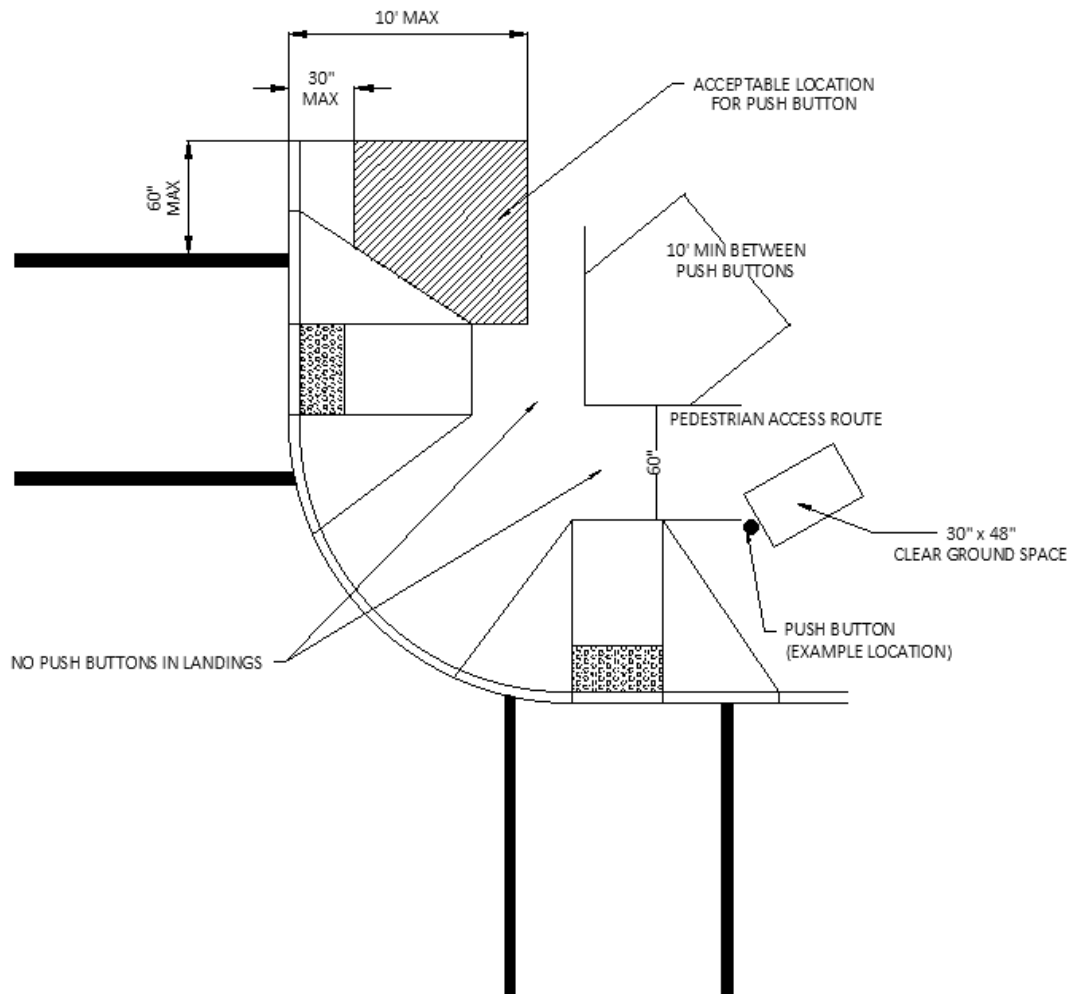
Component	Allowable Value for Existing Curb Ramps	Discussion
Running Slope	8.3% Max	When curb ramps are located at the back of curb, the running slope of the ramp and gutter cross slope are evaluated in tandem. The maximum grade break between the gutter pan and ramp allowed is 13.3% .
Sidewalk and Curb Ramp Cross Slope	2.1% Max**	Maximum ramp or sidewalk cross slope is 2.1% ** Cross slope of curb ramp is permitted to be equal to or less than the slope of the adjacent crosswalk.
Landing Slopes	Equal to or less than the slope of adjacent crosswalk***	*** Where a landing serves one curb ramp the slope measured perpendicular to the curb ramp run shall be equal to or less than the cross slope of the curb ramp run, and the slope measured parallel to the curb ramp run shall be 2.1% maximum. Where a landing serves two curb ramps, the landing slope in either direction of travel shall not exceed the cross slope of the crosswalk parallel to the direction of travel.
Curb Ramp Opening Width	4' Min	
Gutter Counter Slope	Maximum gutter counter slope is dependent upon the existing ramp running slope.	When curb ramps are located at the back of curb, the running slope of the ramp and gutter cross slope are evaluated in tandem. The maximum grade break between the gutter pan and ramp allowed is 13.3% .
Grade Breaks	13.3% Max	13.3% is the maximum grade break for wheelchair users to traverse without incident.
Landing	4'x4' Min	
Flares	Non-Traversable – 6:1 Max Traversable – 10% Max	Non- traversable flares may be grass or paved. Paved non- traversable flares are only allowed adjacent to non- traversable surfaces that are not part of the pedestrian access route. If the only deficiency of a ramp is that non-traversable flare slope exceeds 6:1, the ramp may be left in place.
Curb Returns	Adjacent to non- traversable terrace only	
Detectable Warning Fields	2' minimum dimension in direction of pedestrian travel. Detectable warning fields shall extend the full width of the curb ramp. A 2" maximum concrete border may extend between the edge of the detectable warning field and the edge of the curb ramp.	The 2" maximum border typically is required for proper detectable warning field installation. For existing detectable warning fields installed in median cut-throughs or in traffic islands, the existing warning field may remain in place if the edge of the warning field is 6 inches or less from the edge of the pedestrian path and the remaining features of the ramp are ADA compliant
Change in Level	1/4-Inch	

Table 2 - Component Summary - Replacement or New Curb Ramps

Component	Design Value for Replacement or New Curb Ramps	Discussion
Running Slope	7% design maximum	Design value accommodates an 11% design maximum grade break with a standard WisDOT 4% gutter cross slope and provides construction tolerances to the 13.3% PROWAG maximum grade break and 8.3% PROWAG maximum running slope. In certain circumstances, the running slope may be a maximum of 8.3%. When the running slope exceeds 7%, the gutter counter slope must be set to not exceed the 11 design maximum (13.3% PROWAG maximum) grade break.
Sidewalk and Curb Ramp Cross Slope	1.5%**	The sidewalk cross slope shall be 1.5% with a construction tolerance of ±0.6%, as stated on SDD 8D5. The cross slope may be increased to a maximum of 2.1% in certain circumstances. ** Cross slope of curb ramp shall be permitted to be equal to or less than the slope of the adjacent crosswalk.
Landing Slopes	Equal to or less than the slope of adjacent crosswalk***	*** Where a landing serves one curb ramp the slope measured perpendicular to the curb ramp run shall be equal to or less than the cross slope of the curb ramp run, and the slope measured parallel to the curb ramp run shall be 2.1% maximum. Where a landing serves two curb ramps, the landing slope in either direction of travel shall not exceed the cross slope of the crosswalk parallel to the direction of travel.
Curb Ramp Opening Width	5' Minimum or width of approaching sidewalk or shared-used path	A 4' opening is allowed in constrained areas.
Gutter Counter Slope	4% for new section of curb & gutter	Design value accommodates an 11% design maximum grade break with a 7% design maximum running slope and provides construction tolerances to the 13.3% PROWAG maximum grade break. The gutter counter slope may exceed 4% to match the existing gutter cross slope. When the counter slope exceeds 4%, the running slope of the ramp must be set to not exceed the 11 design maximum (13.3% PROWAG maximum) grade break.
Grade Breaks	11% design maximum	The design value provides a construction tolerance to the 13.3% PROWAG maximum grade break.
Landing	5'x5'	A 4'x4' minimum landing may be used in constrained areas.
Flares	Non-Traversable – 6:1 Max Traversable – 10% Max	Non- traversable flares may be grass or paved. Paved non- traversable flares are to be used only adjacent to non- traversable surfaces that are not part of the pedestrian access route.
Curb Returns	Adjacent to non- traversable terrace only	

Table 2 Continued - Component Summary - Replacement or New Curb Ramps

Component	Design Value for Replacement or New Curb Ramps	Discussion
Transition area	See FDM 11-46-10.4.1.8 for criteria	Transition areas are the last square or squares of concrete before sidewalk being reconstructed as part of curb ramp improvements matches into the existing sidewalk. Transitions from a compliant cross slope to the existing cross slope occurs in the transition area.
Detectable Warning Fields	2' Minimum dimension in direction of pedestrian travel Detectable warning fields shall extend the full width of the curb ramp	A 2" maximum concrete border may extend between the edge of the detectable warning field and the edge of the curb ramp.
Change in Level	1/4-Inch	



Pedestrian Signal Push Button Locations

The push button location can have a significant impact on accessibility for wheelchair users and other people with disabilities. At signalized intersections consider a 2-stage crossing. For this reason, the PROWAAC¹ report established the following requirements for locating push buttons (*U.S. ATBCB², 2001: <http://www.access-board.gov/>*). Note: References to pedestrian push buttons include accessible pedestrian signals (APS).

- Adjacent to landing - locate the push button adjacent to a level landing (maximum slope = 2% in all directions) at least 2.5 ft x 4.5 ft.
- Direction of control face - mount the control face parallel to the direction of the corresponding crosswalk and no closer than 2.5 ft to the curb.
- Mounting height - mount push button 3.5 ft above the sidewalk.
- Close to crosswalk - mount no further than 5 ft from the extension of the crosswalk lines and within 10 ft of the curb line, unless the curb ramp is longer than 10 ft. On median islands mount within 2 ft of the crosswalk and accessible from a wheelchair.
- Proximity to curb ramp - place the push button within 2 ft horizontally of the top corner of the ramp. At a parallel ramp, the push button should be adjacent to the lower landing.
- Separation - where there are two crosswalks at the same corner, mount the push buttons on poles separated by at least 10 ft.

¹ Public Rights-of-Way Access Advisory Committee

² U.S. Architectural and Transportation Barriers Compliance Board (the Access Board)

Trail-Highway Crossing Guidance for Rural 2-Lane Highway Facilities ^{1,2} Grade Separation Alternatives ^{3,4}

Hourly Exposure Factor (In Thousands)	Trail Use	Does Not Meet WisDOT Warrants ⁶	May be Justified ⁶	Meets WisDOT Warrants ⁶
4th Highest Exposure Factor 5	Non-Motorized	<25	25-35	>35
	Motorized	<35	35-50	>50
Highest Exposure Factor 5	Non-Motorized	<40	40-60	>60
	Motorized	<55	55-80	>80

Notes:

1. For non-freeway, non-expressway divided highways with medians; each direction of traffic shall be considered separately. Exposure factors for divided highways to be 120% of the requirements listed above.
2. This table is applicable to rural highways with posted speed limits ranging from 40 to 55 mph.
3. Use existing box culvert, waterway structure, or roadway grade separation for trail, whenever practical.
4. Structure warrants: Minimum ADT on highway should be 3500 or greater.
5. Exposure factor is the product in thousands of the highway volume times the trail volume for the same hourly time period.
 - 4th Highest Exposure factor is the 4th Highest such product for a given counting period.
 - Highest Exposure Factor is the highest such product for a given counting period.
6. Trail Counts:
 - For Perpetuation and Resurfacing, or Spot Improvements to Include New or Existing Trail Crossings: Use existing highway and trail counts. For new trails, estimate trail counts based on similar trails in the local area.
 - For Modernization: Use projected highway and trail counts for the design year. Estimate a 1 – 2% per year-projected growth for the trail over the design year period.

Use link for a working copy of this worksheet: [FDM 11-46 A20.2 File 1](#)

GRADE SEPARATION WARRANT WORKSHEET

Project ID		Road Description *		Date of count		
Road Name		Lane width (ft)		Day of week		
County		Shoulder width (ft)	USE Proposed Design values for roadway	Begin time		
Project type		Median width (ft)		End time		
Trail Name		Posted speed (mph)		weather cond.		
Trail Owner		road ADT (current)	(year)		Traffic counts to use for determining grade separation warrants	
Crossing Location		road ADT (design year)	(year)			ACTUAL UNADJUSTED (enter Y or N)
Rails-to-Trails? (Y or N)		road ADT (count year)	(year)	interpolated		DESIGN YEAR - ADJUST counts to reflect estimated traffic growth (enter Y or N)
		Trail description				Estimated yearly rate of growth for trail traffic (%)
		Trail width (ft)				

* e.g. 2-lane roadway ; or 4-lane divided roadway ; or 4-lane undivided roadway																					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Hour No.	From time	to time	UNADJ. Exposure factor (col. 7 x col. 18 / 1000)	ADJ. Exposure factor (col. 8 x col. 19 / 1000)	RANK of ADJ. Exposure factors	Road User Counts - cars, trucks, motorcycles		(3) Trail User Counts (ACTUAL)							(4) Hourly total - all trail users (UNADJ.) (sum col.'s 9 - 17)	(5) Hourly total - all trail users (ADJ.)	(6) Overall Trail Use (based on UNADJ. Counts)				
						(1) ACTUAL COUNTS (UNADJ)	(2) ADJUSTED	Low Speed (non-motorized)			Medium Speed (non-motorized)			High Speed (motorized)			non-motorized		motorized		
								Disabled / Ped	Equestrian	Jogger/ Runner	X Country Skiing	Roller Blader	Bicycle	ATV			other motorized vehicles	Snowmobile	Low Speed (sum col.'s 9-11)	Medium Speed (sum col.'s 12-14)	High Speed (sum col.'s 15-17)
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
13																					
14																					
TOTALS																					

SUMMARY			
Trail speed:			
Trail Use:			
Highest exposure factor:		4th Highest exposure factor:	
Hour No.:		Hour No.:	
Grade separation Warrant:		Grade separation Warrant:	
Controlling:		Controlling:	

HIGHEST EXPOSURE		4TH HIGHEST EXPOSURE		GRADE SEPARATION WARRANT
NM	M	NM	M	
0	0	0	0	
40	55	25	35	MAY BE JUSTIFIED
61	81	36	51	MEETS WISDOT WARRANTS

Percent of overall trail use

Notes:

1. Enter road user hourly counts in this column. See traffic count guidance below.
2. Adjust Road User hourly counts so that they are the same percentage of design year ADT as they are of count year ADT.
3. Enter trail user hourly counts in these columns. See traffic count guidance below.
4. Seasonal representative average daily count. This should be representative of normal usage on a typical day. Do not use counts for special events.
5. Adjust trail user hourly counts by applying the estimated yearly rate of growth for trail traffic.
6. The overall trail use is calculated by adding all trail uses within each trail use category (low, medium and high speed). The following thresholds determine the trail class for the at-grade crossing sight distance tables:

If more than 85% of the trail use is high speed, the trail is classified as HIGH SPEED, and trail use is MOTORIZED.

If more than 15% of the trail use is low speed, the trail is classified as LOW SPEED, and trail use is NON-MOTORIZED.

If neither of the above thresholds are met, the trail is classified as MEDIUM SPEED, and trail use is NON-MOTORIZED.

Traffic Counts

Define the appropriate (average) time period to take the counts.

- A. Summer-Use Trails: Take an average weekend day count between Memorial Day and Labor Day (no holiday times or special events). Take a minimum of one 14-hour period count between 6am to 8pm under appropriate weather conditions (i.e., not raining). Consult with the DNR, municipalities, region traffic section, and others as appropriate to determine when to take the count. The count should be taken as if done for a traffic signal.
- B. Winter-Use Trails: Take an average weekend day count between December 1st and April 1st (no holiday times or special events). Take a minimum of one 14-hour count between 10am and 2 am when there is enough snow to allow winter-use trails to be open. Determine how long the trail was in use or officially open for snowmobiles during the last 5-year period. Consult with the DNR, municipalities, region traffic section, and others as appropriate to determine when to take the count. The count should be taken as if done for a traffic signal.

If a trail is used during both summer and winter, take counts during both seasons.

EXAMPLE - Grade separation warrant determination for a resurfacing project using UNADJUSTED counts

Project ID	1000-00-00		Road Description *	2-lane asphalt		Date of count	May 4, 2002		
Road Name	USH 00		Lane width (ft)	12		Day of week	Saturday		
County	Dane		Shoulder width (ft)	6		Begin time	8:00 AM		
Project type	re-surface		Median width (ft)	NA		End time	10:00 PM		
Trail Name	Greenway		Posted speed (mph)	55		weather cond.	70-degrees, sunny, no-wind all-day		
Trail Owner	DNR		road ADT (current)	2000	(year) 2000	Traffic counts to use for determining grade separation warrants			
Crossing Location	2 mi. west of CTH OO		road ADT (design year)	2500	(year) 2020				
Rails-to-Trails? (Y or N)	N		road ADT (count year)	2050	(year) 2002	interpolated		ACTUAL UNADJUSTED (enter Y or N)	Y
			Trail description	asphalt bike / ped trail				DESIGN YEAR - ADJUST counts to reflect estimated traffic growth (enter Y or N)	
			Trail width (ft)	10				Estimated yearly rate of growth for trail traffic (%)	

* e.g. 2-lane roadway ; or 4-lane divided roadway ; or 4-lane undivided roadway

Hour No.	From time	to time	UNADJ. Exposure factor (col. 7 x col. 18 / 1000)	ADJ. Exposure factor (col. 8 x col. 19 / 1000)	RANK of ADJ. Exposure factors	Road User Counts - cars, trucks, motorcycles		(3) Trail User Counts (ACTUAL)									(4) Hourly total - all trail users (UNADJ.) (sum col.'s 9 - 17)	(5) Hourly total - all trail users (ADJ.)	(6) Overall Trail Use (based on UNADJ. Counts)		
						(1) ACTUAL COUNTS (UNADJ.)	(2) ADJUSTED	Low Speed (non-motorized)			Medium Speed (non-motorized)			High Speed (motorized)					Low Speed (sum col.'s 9-11)	Medium Speed (sum col.'s 12-14)	High Speed (sum col.'s 15-17)
								Disabled / Ped	Equestrian	Jogger/ Runner	X Country Skiing	Roller Blader	Bicycle	ATV	other motorized vehicles	Snowmobile					
1	8:00 AM	9:00 AM	3	3	3	100	100				10	2	10				22	22	10	12	
2	9:00 AM	10:00 AM	1	1	9	25	25			5			10				15	15	5	10	
3	10:00 AM	11:00 AM	1	1	9	32	32			1			15				16	16	1	15	
4	11:00 AM	12:00 PM	1	1	9	25	25			1			25				26	26	1	25	
5	12:00 PM	1:00 PM	5	5	2	100	100			10			10	25			45	45	10	35	
6	1:00 PM	2:00 PM	2	2	7	50	50						30				30	30		30	
7	2:00 PM	3:00 PM	2	2	7	50	50						35				35	35		35	
8	3:00 PM	4:00 PM	3	3	3	100	100						25				25	25		25	
9	4:00 PM	5:00 PM	6	6	1	200	200			5			25				30	30	5	25	
10	5:00 PM	6:00 PM	3	3	3	100	100			10			10	5			25	25	10	15	
11	6:00 PM	7:00 PM	3	3	3	75	75			15			10	5			30	30	15	15	
12	7:00 PM	8:00 PM	1	1	9	75	75						5	5			10	10		10	
13	8:00 PM	9:00 PM	1	1	9	75	75						5				5	5		5	
14	9:00 PM	10:00 PM	1	1	9	50	50						5				5	5		5	
TOTALS						1057	1057				57		37	225			319	319	57	262	

SUMMARY				17.87%	82.13%
Trail speed:	Low Speed			Percent of overall trail use	
Trail Use:	Non-Motorized Use				
Highest exposure factor:	6	4th Highest exposure factor:	3		
Hour No.	9	Hour No.	1		
Grade separation Warrant	DOES NOT MEET WISDOT WARRANTS	Grade separation Warrant	DOES NOT MEET WISDOT WARRANTS		
Controlling:		Controlling:			

HIGHEST EXPOSURE		4TH HIGHEST EXPOSURE		GRADE SEPARATION WARRANT
NM	M	NM	M	
0	0	0	0	DOES NOT MEET WISDOT WARRANTS
40	55	25	35	MAY BE JUSTIFIED
61	81	36	51	MEETS WISDOT WARRANTS

EXAMPLE - Grade separation warrant determination for a reconstruction project using counts which have been adjusted for projected future traffic

Project ID	1000-00-00	Road Description *	2-lane asphalt			Date of count	January 5, 2002		
Road Name	STH 00	Lane width (ft)	12	USE Proposed Design values for roadway		Day of week	Saturday		
County	Washburn	Shoulder width (ft)	10			Begin time	10:00 AM		
Project type	reconstruct	Median width (ft)	NA			End time	12:00 AM		
Trail Name	arrow way	Posted speed (mph)	55			weather cond.	15 degrees, cloudy, no wind		
Trail Owner	Washburn County	road ADT (current)	3000	(year)	2000	Traffic counts to use for determining grade separation warrants			
Crossing Location	150 ft west of Red River	road ADT (design year)	4500	(year)	2020			ACTUAL UNADJUSTED (enter Y or N)	N
Rails-to-Trails? (Y or N)	Y	road ADT (count year)	3150	(year)	2002			DESIGN YEAR - ADJUST counts to reflect estimated traffic growth (enter Y or N)	Y
		Trail description	Snow mobile					Estimated yearly rate of growth for trail traffic (%)	1.0%
		Trail width (ft)	12	interpolated					

* e.g. 2-lane roadway ; or 4-lane divided roadway ; or 4-lane undivided roadway

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Hour No.	From time	to time	UNADJ. Exposure factor (col. 7 x col. 18 / 1000)	ADJ. Exposure factor (col. 8 x col. 19 / 1000)	RANK of ADJ. Exposure factors	Road User Counts - cars, trucks, motorcycles		(3) Trail User Counts (ACTUAL)										(4) Hourly total - all trail users (UNADJ.) (sum col.'s 9 - 17)	(5) Hourly total - all trail users (ADJ.)	(6) Overall Trail Use (based on UNADJ. Counts)		
						(1) ACTUAL COUNTS (UNADJ)	(2) ADJUSTED	Low Speed (non-motorized)			Medium Speed (non-motorized)			High Speed (motorized)						non-motorized	motorized	
								Disabled / Ped	Equestrian	Jogger/ Runner	X Country Skiing	Roller Blader	Bicycle	ATV	other motorized vehicles	Snowmobile	Low Speed (sum col.'s 9-11)					Medium Speed (sum col.'s 12-14)
1	10:00 AM	11:00 AM	8	13	12	100	143										75	75	90		75	
2	11:00 AM	12:00 PM	15	26	10	150	214										100	100	120		100	
3	12:00 PM	1:00 PM	40	69	4	200	286										200	200	239		200	
4	1:00 PM	2:00 PM	45	77	2	200	286										225	225	269		225	
5	2:00 PM	3:00 PM	45	76	3	222	317										200	200	239		200	
6	3:00 PM	4:00 PM	69	118	1	345	493										200	200	239		200	
7	4:00 PM	5:00 PM	25	43	5	250	357										100	100	120		100	
8	5:00 PM	6:00 PM	25	43	5	250	357										100	100	120		100	
9	6:00 PM	7:00 PM	21	36	7	125	179										166	166	199		166	
10	7:00 PM	8:00 PM	20	35	8	100	143										200	200	239		200	
11	8:00 PM	9:00 PM	20	35	8	100	143										200	200	239		200	
12	9:00 PM	10:00 PM	15	26	10	100	143										150	150	179		150	
13	10:00 PM	11:00 PM	2	3	13	100	143										15	15	18		15	
14	11:00 PM	12:00 AM	1	1	14	100	143										5	5	6		5	
TOTALS						2342	3347										1936	1936	2316		1936	

SUMMARY			
Trail speed:	High Speed		
Trail Use:	Motorized Use		
Highest exposure factor:	118	4th Highest exposure factor:	69
Hour No.:	6	Hour No.:	3
Grade separation Warrant	MEETS WISDOT WARRANTS	Grade separation Warrant	MEETS WISDOT WARRANTS
Controlling:		Controlling:	

HIGHEST EXPOSURE		4TH HIGHEST EXPOSURE		GRADE SEPARATION WARRANT
NM	M	NM	M	
0	0	0	0	DOES NOT MEET WISDOT WARRANTS
40	55	25	35	MAY BE JUSTIFIED
61	81	36	51	MEETS WISDOT WARRANTS

		100.00%
Percent of overall trail use		

Sight Distance for Trail Crossing (feet)

Highway Design Speed (mph)	No. of Lanes Crossed	⁽¹⁾ High Speed Trail Use			⁽²⁾ Medium Speed Trail Use			⁽³⁾ Low Speed Trail Use (85 th percentile users)			⁽⁴⁾ Low Speed Trail Use (elderly or other slower pedestrians)		
		1	2	3	1	2	3	1	2	3	1	2	3
		Crossing time t (sec.)	7.0	7.0	7.5	7.8	9.0	10.2	7.6	11.0	14.4	8.3	12.3
30		310	310	330	350	400	450	340	490	640	370	550	720
35		360	360	390	410	470	530	400	570	740	430	640	840
40		420	420	440	460	530	600	450	650	850	490	730	960
45		470	470	500	520	600	680	510	730	960	550	820	1080
50		520	520	550	580	660	750	560	810	1060	610	910	1200
55		570	570	610	630	730	830	620	890	1170	670	1000	1320
60		620	620	660	690	800	900	670	970	1270	740	1090	1440

NOTE: Vision triangle distance on trail shall be 20 feet back from the traveled edge of pavement on highway.

Based on Intersection Control Case B3 as shown on Page 9-47 of 2018 GDHS, as modified to reflect the values used in the 1995 WisDNR Design Standards Handbook (time rounded up to 7.0 sec for 2-lane crossing).

Based on formula $t = \frac{S}{V} + \frac{V}{2a} + PRT$

t = total crossing time (sec)
 v = velocity (use 9.84 fps)
 a = acceleration (use 2.43 ft/s²)
 PRT = perception reaction time (use 3.5 sec)
 S = crossing width = D+W+L where:
 D = distance from near edge of traveled way to the front of the bicycle (use 4.0 ft assumed)
 W = traveled way width along path of crossing bicycle (ft) = no. of lanes x assumed 12 ft lane width
 L = overall length of bicycle (use 5.9 ft)

Based on formula $t = \frac{S}{V} + \frac{V}{2a} + PRT$

t = total crossing time (sec)
 v = velocity (use 3.5 fps)
 a = acceleration (use 300000 ft/s² basically instantaneous)
 PRT = perception reaction time (use 3 sec)
 S = crossing width = D+W+L where:
 D = distance from near edge of traveled way to the front of the bicycle (use 4.0 ft assumed)
 W = traveled way width along path of crossing bicycle (ft) = no. of lanes x assumed 12 ft lane width
 L = overall length of pedestrian (use 0.0 ft)

Based on formula $t = \frac{S}{V} + \frac{V}{2a} + PRT$

t = total crossing time (sec)
 v = velocity (use 3 fps)
 a = acceleration (use 300000 ft/s² basically instantaneous)
 PRT = perception reaction time (use 3 sec)
 S = crossing width = D+W+L where:
 D = distance from near edge of traveled way to the front of the bicycle (use 4.0 ft assumed)
 W = traveled way width along path of crossing bicycle (ft) = no. of lanes x assumed 12 ft lane width
 L = overall length of pedestrian (use 0.0 ft)

