

**ARTICLE 89-14  
PUBLIC HIGHWAY STREAM CROSSINGS**

Chapter  
89-14-01            Stream Crossing Design

**CHAPTER 89-14-01  
STREAM CROSSING DESIGN**

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**89-14-01-01. Standards.**

Except as provided in section 89-14-01-06, all highways constructed or reconstructed by the department of transportation, board of county commissioners, board of township supervisors, their contractors, subcontractors, or agents, or by any individual, firm, corporation, or limited liability company must be designed to meet the standards contained in this chapter. The department of transportation, board of county commissioners, board of township supervisors, their contractors, subcontractors, or agents, or any individual, firm, corporation, or limited liability company that fails to comply with these standards is not entitled to the immunity provided in North Dakota Century Code sections 24-03-06, 24-03-08, or 24-06-26.1.

**History:** Effective May 1, 2001; amended effective July 27, 2001; January 1, 2015.

**General Authority:** NDCC 24-02-01.1, 24-02-01.5, 61-03-13

**Law Implemented:** NDCC 24-03-06, 24-03-08, 24-06-26.1

**89-14-01-02. Definitions.**

1. "Constructed" means to construct a new highway on a new location or corridor.
2. "Highway, street, or road" is defined in North Dakota Century Code section 24-01-01.1.
3. "Reconstructed" means to regrade, add a lane adjacent to the existing alignment, or do full depth road surface replacement on an existing highway location. For purposes of this chapter, reconstructed also includes replacing or installing a stream crossing.
4. "Stream crossing" means an opening to permit the flow of water under, adjacent to, or because of a highway.

**History:** Effective May 1, 2001; January 1, 2015.

**General Authority:** NDCC 24-02-01.1, 24-02-01.5, 61-03-13

**Law Implemented:** NDCC 24-03-06, 24-03-08, 24-06-26.1

**89-14-01-03. Design flood frequency.**

The following table provides the minimum design standard recurrence interval of the event for which each type of stream crossing must be designed. Nothing contained in this chapter is intended to restrict an entity from providing greater capacity.

Type of Crossing	State Highway System						County	
	Urban System		Rural System				Rural System	
	Regional	Urban Roads	Principal Arterial		Minor Arterial	Major Collector	Major Collector	Off <sup>4</sup> System
			Interstate	Other				
Bridges & Reinforced Concrete Boxes	25 year <sup>2</sup>	25 year <sup>2</sup>	50 year <sup>2</sup>	50 year <sup>2</sup>	50 year <sup>2</sup>	25 year <sup>2</sup>	25 year <sup>2,3</sup>	15 year <sup>2,3</sup>
Roadway Culverts	25 year <sup>2</sup>	25 year <sup>2</sup>	50 year <sup>2</sup>	25 year <sup>2</sup>	25 year <sup>2</sup>	25 year <sup>2</sup>	25 year <sup>2,3</sup>	15 year <sup>2,3,5</sup>
Storm Drains	10 year <sup>1</sup>	5 year <sup>1</sup>	10 year <sup>2</sup>	10 year <sup>2</sup>	10 year <sup>2</sup>	10 year <sup>2</sup>		
Underpass Storm Drains	25 year <sup>1</sup>	25 year <sup>1</sup>	50 year <sup>2</sup>	25 year <sup>2</sup>	25 year <sup>2</sup>	25 year <sup>2</sup>		

<sup>1</sup>Discharges must be computed using the rational method or other recognized hydrologic methods.

<sup>2</sup>Discharges must be computed using United States geological survey report 2015-5096 or other recognized hydrologic methods.

<sup>3</sup>If an overflow section is provided, the pipes and the overflow section, in combination, must pass the appropriate design event within the headwater limitations provided in this chapter.

<sup>4</sup>Off system roads include all nonmajor collector public roads open for public travel.

<sup>5</sup>For public roads open for public travel under the jurisdiction of a board of township supervisors of a civil township, the recurrence interval is 10 years.

**History:** Effective May 1, 2001; amended effective July 27, 2001; January 1, 2015; January 1, 2023; July 1, 2024.

**General Authority:** NDCC 24-02-01.1, 24-02-01.5, 61-03-13

**Law Implemented:** NDCC 24-03-06, 24-03-08, 24-06-26.1

#### **89-14-01-04. Floodplain consideration - Upstream development.**

All stream crossings must comply with applicable floodplain regulations and regulatory floodway requirements per North Dakota Century Code chapter 61-16.2. If a stream crossing is being replaced and buildings or structures are located upstream from the crossing, the stream crossing must not be reconstructed in a manner that increases the likelihood of impacts to those upstream buildings or structures, even if the capacity of the crossing being replaced was greater than the capacity otherwise required by this chapter. Any stream crossing constructed as part of a newly constructed roadway must be constructed to pass the federal emergency management agency identified one-percent annual-chance flood event flow without the resulting increase in headwater impacting any existing buildings or structures. Structures, for the purposes of this section, include grain bins, silos, feedlots, and corrals. Structures do not include pasture fencing.

**History:** Effective May 1, 2001; amended effective January 1, 2015; January 1, 2023.

**General Authority:** NDCC 24-02-01.1, 24-02-01.5, 61-03-13

**Law Implemented:** NDCC 24-03-06, 24-03-08, 24-06-26.1

#### **89-14-01-05. Allowable headwater.**

The allowable maximum headwater when passing the design discharge must be measured from the bottom of the channel. For arch pipes, the maximum allowable headwater must be based on the rise of the pipe, and the pipe size category must be the equivalent round pipe size. For multiple pipe installations, the pipe diameter used to calculate the allowable headwater must be the diameter of the largest pipe. Tailwater resulting from downstream conditions, either natural or manmade, must be accounted for in the determination of the crossing's capacity and the resulting headwater. Additional guidance is provided in the North Dakota department of transportation design manual. If a crossing results in less than one-half foot [15.24 centimeters] of headloss when passing the appropriate design discharge, this section does not apply.

Streambed Slope (feet/mile)	Pipe Size	Allowable Headwater
<5	24" - 54"	pipe diameter + 2 feet
	≥ 60"	1.5 pipe diameters
5 to 10	24" - 36"	pipe diameter + 2 feet
	42" - 54"	1.5 pipe diameters
	≥ 60"	2 pipe diameters
>10	≥ 24"	2 pipe diameters

**History:** Effective May 1, 2001; amended effective January 1, 2015.

**General Authority:** NDCC 24-02-01.1, 24-02-01.5, 61-03-13

**Law Implemented:** NDCC 24-03-06, 24-03-08, 24-06-26.1

**89-14-01-06. Deviations.**

The board of county commissioners, board of township supervisors, their contractors, subcontractors, or agents, or any individual, firm, corporation, or limited liability company may deviate from the standards contained in this chapter if the deviation is approved in writing by the department of water resources and the department of transportation. A request to deviate from the standards must be made in writing and must set forth the reasons for the proposed deviation. The department of water resources and department of transportation may grant a deviation for good and sufficient cause after considering public safety, upstream and downstream impacts, and other relevant matters.

The department of transportation may deviate from these standards if the department determines it is appropriate to do so and the crossings are designed under scientific highway construction and engineering standards. The basis for the department's decision must be documented in writing.

Roads constructed as part of a surface coal mining operation for use solely as part of the mining operation are not subject to the requirements of this chapter. Roads constructed because of a surface coal mining operation for use by the public are bound by the requirements of this chapter, but deviations may be requested under this section.

**History:** Effective May 1, 2001; amended effective January 1, 2015; January 1, 2023.

**General Authority:** NDCC 24-02-01.1, 24-02-01.5, 61-03-13

**Law Implemented:** NDCC 24-03-06, 24-03-08, 24-06-26.1