Design Guidelines for Structural Improvements Projects

Traffic Data	Use 20 year projected
Roadway Width	Use appropriate width to meet NDDOT guidelines.
Superelevations	Attempt to correct to NDDOT guidelines. Request design exception if not cost effective.
Design Speed	Use posted speed limit
Driving Lane Cross Slope	HBP or White topping Over Asphalt Roadways: 2.1% HBP or White topping Over Non Interstate Concrete Roadways: 1.5-2.5 % HBP or White topping Over Interstate Concrete Roadways: 1.5-2.5 %
Horizontal Curvature	Use existing, sign when less than posted speed.
Vertical Curvature	Use existing.
Clear Zone	20 foot clear zone.
Inslope	If the proposed inslope is less than 3:1 consider cost effective treatment. In fill sections where the inslope breaks to less than 3:1 outside the clear zone a 4:1 inslope should be used in the clear zone.
Roadway Slough	Use Department Guidelines for sloughs.
Roadway Shoulder Cross Slope	HBP or White topping Over Asphalt Roadways: 8.0 % Max. HBP or White topping Over Non Interstate Concrete Roadways: 8.0 % Max HBP or White topping Over Interstate Concrete Roadways: 6.0% Max
Safety	Safety issues will by identified and addressed as part of the Statewide Safety Program. Safety features will remain as they exist unless a need is identified. Safety hardware that does not meet NCHRP 230 standards or better will be upgraded to meet NCHRP 350 standards. Replace mailbox supports where necessary.

Structural improvement is a planned strategy to extend the useful life of a highway by restoring the pavement structure without necessarily improving existing geometrics. A structural improvement is a white topping project or an HBP overlay in excess of 3" and is designed based on an engineering analysis. A structural improvement will increase the load carrying capacity to meet the HPCS guidelines. The appropriate NEPA process will be followed to address any environmental impacts. Improvements for ADA requirements will be considered and be addressed in the environmental document. All regulatory and warning signs and pavement markings will be verified to comply with current MUTCD standards or brought up to MUTCD standards if necessary, and all railroad crossings will have adequate warning/protective devices in place or be otherwise addressed in the State Railroad Crossing Improvement Program.

This document was originally issued and sealed by Grant Levi, Registration Number P.E. 3110 on 4/12/07 and the original document is stored at the North Dakota Department of Transportation.

Approved by:

\s\ 4/12/07

Grant Levi, P.E. Deputy Director for Engineering — Date
North Dakota Department of Transportation

\s\ 4/26/07

Ronny J. Hartl, Assistant Division Administrator — Date
Federal Highway Administration