TO: Kirk Hoff

Design Engineer

FR: Darell Arne

Traffic Safety Engineer – Design

DT: MONTH XX, XXXX

RE: Project XX-X-XXX(XXX)XXX – Safety Review

PROJECT LOCATION FROM RIMS

PCN 00000

**23 USC § 407 Documents**

**NDDOT Reserves All Objections**

This project has been reviewed as a Structural Improvement project (as per the Design Guidelines). An obstruction clearance of 20 feet from the edge of the driving lane was used (as per the Design Guidelines). If another strategy is chosen, then the design standards for that strategy shall be used instead of this safety review. This FUNCTIONAL CLASSIFICATION highway is classified as a PERFORMANCE CLASSIFICATION. The traffic volume is:

 RP 000.000 to RP 000.000 RP 000.000 to RP 000.000

 Current (2010) 500 ADT Current (2010) 1,000 ADT

 Forecast (2030) 500 ADT Forecast (2030) 1,000 ADT

The driveway inslopes were evaluated as per the Surveys and Photogrammetry Manual.

In the area with an ADT greater than 750, the driveway inslopes that are steeper than 6:1 shall be flattened to 8:1. Any pipes that are within 60’ of the centerline shall be relocated outside the 60’. If it is not feasible to relocate the pipes, they shall be extended and the openings made traversable. The estimated cost for this work is **$00,000**.

…AND/OR…

In the area with an ADT less than 750, the driveway inslopes that are steeper than 4:1 shall be flattened to 8:1. Any pipes that are within 60’ of the centerline shall be relocated outside the 60’. If it is not feasible to relocate the pipes, they shall be extended and the openings made traversable. The estimated cost for this work is **$00,000**.

…AND/OR…

In the area with an ADT less than 750, the driveway inslopes that are steeper than 6:1 and flatter than 4:1 were analyzed. It is cost effective to flatten the inslopes listed on the attached spreadsheet to 8:1. Any pipes that are within 60’ of the centerline shall be relocated outside the 60’. If it is not feasible to relocate the pipes, they shall be extended and the openings made traversable. The estimated cost for this work is **$00,000**.

…AND/OR…

In the area with an ADT less than 750, the driveway inslopes that are steeper than 6:1 and flatter than 4:1 were analyzed. It is not cost effective to flatten the inslopes listed on the attached spreadsheet. The estimated cost for this work would be **$00,000**.

The attached spreadsheet evaluates the centerline culverts within the 20’ obstruction clearance.

In the area with an ADT less than 750, the centerline culverts that are within the 20’ obstruction clearance shall have hazard markers installed. The estimated cost for this work is **$00,000**.

…AND/OR…

In the area with an ADT greater than 750, the centerline culverts that are within the 20’ obstruction clearance were analyzed. It is cost effective to extend the pipes out to the 20’ obstruction clearance. The estimated cost for this work is **$00,000**.

…AND/OR…

In the area with an ADT greater than 750, the centerline culverts that are within the 20’ obstruction clearance were analyzed. It is cost effective to extend the pipes out to the 20’ obstruction clearance. The estimated cost for this work would be $00,000. It is also cost effective to install traversable end sections. The estimated cost for this work is **$00,000**.

…AND/OR…

There are no box culverts surveyed within the 20’ obstruction clearance.

There is no guardrail located on this project.

…OR…

The “NAME” Bridge at RP 000.000 has a XX’ clear roadway, conc/curb (code E) bridge rail and is protected with w-beam guardrail and end terminals. The bridge rail, guardrail, and end terminals conform with NCHRP Report 350 crash test criteria. The length of need and taper rate are functionally adequate based on the existing ADT and posted speed less 10 mph. The height is adequate. If the overlay at the guardrail reduces the existing height to less than 26 ½ inches, then recommend the guardrail be brought up to current standards.

…AND/OR…

The “NAME” Bridge at RP 000.000 has a XX’ clear roadway, conc/curb (code E) bridge rail and is protected with w-beam guardrail and end terminals. The bridge rail, guardrail, and end terminals do not conform with NCHRP Report 350 crash test criteria. The length of need and taper rate are substandard based on the existing ADT and posted speed less 10 mph. The height is substandard. Recommend removing the existing guardrail and resetting it with enough new guardrail to meet the required length of need. Recommend removing the existing end treatments and installing new end terminals. The estimated cost for this work is **$00,000**.

*...NOTE ON GUARDRAIL HEIGHT (remove this section upon submittal)…*

* *For the guardrail to be compliant with NCHRP Report 350 then 31” is the maximum height and 26.5” is the minimum height. If one measurement per quadrant is below 26.5”, but above 25” then the guardrail is considered in compliance. If more than one measurement is below 26.5” then that quadrant is not in compliance.*
* *If the guardrail is compliant with MASH then 34” is the maximum height and 28” is the minimum height.*
* *If the guardrail is not in compliance then engineering judgement shall be used to determine if the guardrail should be replaced, reset, or adjusted.*

There are no slopes steeper than 4:1 within the clear zone.

…OR…

The steep slopes from RP 000.000 to RP 000.000 were analyzed on the attached spreadsheet. It is cost effective to install guardrail. The estimated cost for this work would be $00,000. It is also cost effective to flatten the steep slopes. The estimated cost for this work is **$00,000**.

…OR…

The steep slopes from RP 000.000 to RP 000.000 were analyzed on the attached spreadsheet. It is not cost effective to install guardrail. The estimated cost for this work would be $00,000. It is also not cost effective to flatten the steep slopes. The estimated cost for this work would be **$00,000**.

There are no ditch blocks surveyed within the 20’ obstruction clearance.

…OR…

The ditch block at RP 000.000 rt has slopes that are steeper than 8:1 within the 20’ obstruction clearance. These slopes shall be flattened to 10:1. The estimated cost for this work is **$00,000**.

There is no riprap surveyed within the 20’ obstruction clearance.

…OR…

The riprap at RP 000.000 rt is within the 20’ obstruction clearance. It is cost effective to remove the riprap to the 20’ obstruction clearance. The estimated cost for this work is **$00,000**.

There is no water over 2 feet deep surveyed within the 20’ obstruction clearance.

There are no light standards located within the 20’ obstruction clearance.

…OR…

The light standards on this project have break-away bases.

There are no railroad crossings located on this project.

…OR…

The railroad crossing at RP 000.000 has crossbuck signs, yield or stop signs, advanced railroad crossing signs, and pavement marking for both directions of traffic, in accordance with Standard Drawing D-754-81 and D-762-1.  The crossbuck signs are located on 6” x 6” wood posts.  Holes have been drilled in the base of the posts to make them breakaway.

…OR…

The railroad crossing at RP 000.000 has signals, gates, crossbuck signs, advance railroad crossing signs, and pavement marking for both directions of traffic, in accordance with Standard Drawing D-762-1.  The signal units have the required minimum horizontal clearance, as per the MUTCD.  The signal control building was surveyed and is outside the 20’ obstruction clearance.  The crossbuck signs are located on the signal units.

…AND/OR…

The railroad crossing at RP 000.000 has signals, gates, crossbuck signs, advance railroad crossing signs, and pavement marking for both directions of traffic, in accordance with Standard Drawing D-762-1.  The signal units do not have the required minimum horizontal clearance, as per the MUTCD.  The signal units should be moved to provide the required minimum horizontal clearance. The signal control building was surveyed and is inside the 20’ obstruction clearance. The railroad should be contacted to move the signal control building outside the clear zone. The crossbuck signs are located on the signal units.

There are no mailboxes located on this project

…OR…

All of the mailboxes located on this project have a V-Loc Mailbox Support System, an equal crash tested support system, or 4” x 4” wooden supports.

…OR…

Some of the mailboxes located on this project have a V-Loc Mailbox Support System, an equal crash tested support system, or 4” x 4” wooden supports. There are also mailboxes located on this project that have substandard supports. Recommend removing the substandard supports. Recommend returning any custom supports to their owners. Recommend installing an approved mailbox support. The estimate cost for this work is **$00,000**.

The signs were reviewed using a 90-1 sign inventory summary. It is recommended that the signs that are below the required vertical clearance be removed and replaced with new signs on new supports or reset on new supports. The estimated cost to do this work is **$00,000**.

There are no other items identified in the 90-1 survey (such as trees, fences, large rocks, etc).

There is no safety work recommended for this project.

…OR…

The estimated cost for the above recommended safety work is **$000,000**.

Reviewed by:

 Darell L. Arne, P.E. – Traffic Safety Engineer Date

Reviewed by:

 Kirk J. Hoff, P.E. – Design Engineer Date

