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15. Abstract  <b><u>Purpose and Need</u></b> Roadway navigation during low light or night time condition through structures and curves can pose a danger to the driving public. Guardrail and barrier delineation has been identified as a possible method to reduce crashes. Potters Industries Inc. has developed the Ultra Guard™ system to provide additional visibility to guardrail, jersey barriers and bridge railing. The system uses a waterborne paint and glass beads, comparable to those used for pavement marking, to provide nighttime retroreflectivity.  <b><u>Objective</u></b> The objective of this experimental project is to evaluate the performance of the Ultra Guard™ Safety System to increase visibility of guardrail and bridge barriers as a countermeasure to reduce crashes.  <b><u>Summary</u></b> The daytime visibility was acceptable other than in the areas that the material was delaminated. The white lines showed some discoloration, either from ultraviolet exposure or collection of surface dirt, but were still plainly visible. The nighttime visibility is more subjective. There are several variables to consider when evaluating nighttime visibility. The driver's headlights, overhead lighting, adjacent traffic, and the driver's eyes all have an effected on visibility. In our evaluations the Ultraguard was not visible much sooner than the entire guardrail. Some of this could be attributed to the overhead lighting in the area. However, even before the Ultraguard is visible, the curve of the road and the approaching structure and guardrail are clearly delineated by the delineation signs that are place on top of the guardrail.			
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**NORTH DAKOTA  
DEPARTMENT OF TRANSPORTATION**

**MATERIALS AND RESEARCH  
DIVISION**

Experimental Study ND 2012-01

***Evaluation of Ultra Guard™ Safety System  
on Guardrails and Barrier Walls***

**Final Evaluation**

HES-9-999(296)

October 25, 2017

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Experimental Study ND 2012-01

***Evaluation of Ultra Guard™ Safety System  
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**Work Plan**

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October 25, 2017

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## **Disclaimer**

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## Evaluation of Ultra Guard™ Barrier Painting System

### Purpose and Need

Roadway navigation during low light or night time condition through structures and curves can pose a danger to the driving public. Guardrail and barrier delineation has been identified as a possible method to reduce crashes. Potters Industries Inc. has developed the Ultra Guard™ system to provide additional visibility to guardrail, jersey barriers and bridge railing. The system uses a waterborne paint and glass beads, comparable to those used for pavement marking, to provide nighttime retroreflectivity. Photo 1 below shows Ultra Guard™ on a Guardrail.

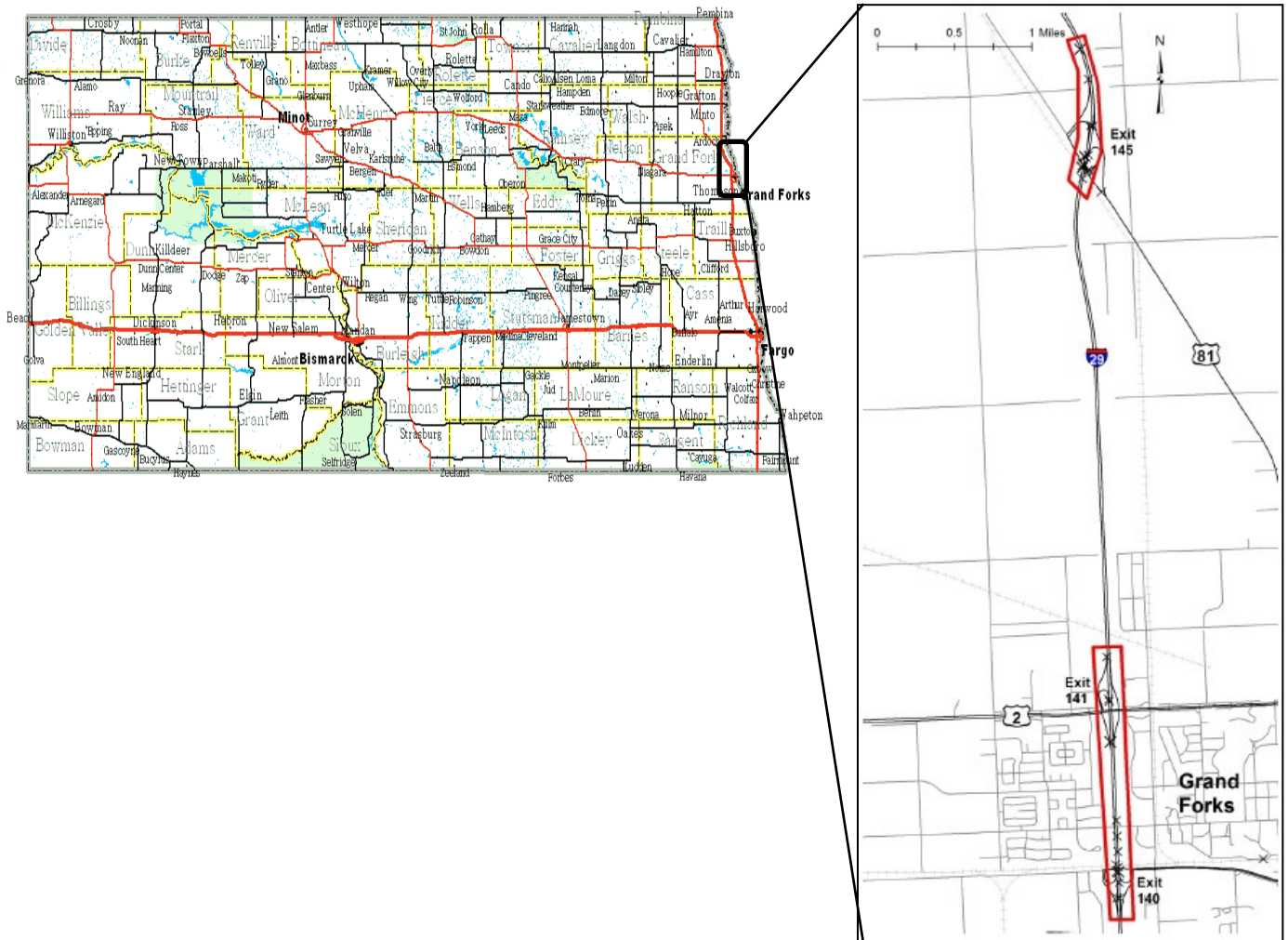


**Photo 1 - Ultra Guard™ placed on a guardrail. Photo courtesy of Potters Industries Inc.**

### Objective

The objective of this experimental project is to evaluate the performance of the Ultra Guard™ Safety System to increase visibility of guardrail and bridge barriers as a countermeasure to reduce crashes.

## Location



## Design

The Programming Division and the Grand Forks District have identified three locations based on crash history, near Grand Forks ND on the I-29 corridor as product evaluation sites. The product will be installed on the guardrail and bridge rail on three interchanges as part of project HES-9-999(296). The Ultra Guard™ system will be installed on all the bridge railing and guardrail at the 140, 141 and 145 interchanges. The 138 interchange will be used as a control section for visual comparison. The manufacturer has provided the following design details:

Manufacturer's Design Details	
White Ultra Guard™	3,674 LF
Yellow Ultra Guard™	3,907 LF
Line Width	6 In
Material	Water Based Paint
Thickness	13 mils (250 ft/gallon)
Glass Beads	Potters Ultra 1.9
Quantity Beads	20 lbs/gallon

**Evaluation**

This project has been evaluated over the last five years under the following criteria:

- Physical condition
- Daytime/Nighttime Visibility
- Crash Statistics

The physical condition of the ultraguard varies throughout the project . For most of the project the ultraguard was intact after five years. The exceptions are some minor flaking and peeling; and a couple hundred feet of material that appears to have either delaminated or was stripped off, possibly during snow removal operations. The ultraguard that was stripped off was in both highway directions but always facing East. An additional location that had no ultraguard present was on a section of guardrail that had been replaced.

The daytime visibility was acceptable other than in the areas that the material was delaminated. The white lines showed some discoloration, either from ultraviolet exposure or collection of surface dirt, but were still plainly visible. The nighttime visibility is more subjective. There are several variables to consider when evaluating nighttime visibility. The driver’s headlights, overhead lighting, adjacent traffic, and the driver’s

eyes all have an effected on visibility. In our evaluations the ultraguard was not visible much sooner than the entire guardrail. Some of this could be attributed to the overhead lighting in the area. However, even before the ultraguard is visible, the curve of the road and the approaching structure and guardrail are clearly delineated by the delineation signs that are place on top of the guardrail already.