SCOPING REPORT

Project No. **PCN**

Ray E to County Line - WB

Prepared by

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
BISMARCK, NORTH DAKOTA

http://www.dot.nd.gov/

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January 2016

SCOPING REPORT

Report Completed By: Logan Beise **Date:** January 2016

A. GENERAL INFORMATION

Project Number:
District: Williston
Location: Ray E to County Line - WB
Reference Point: RP 54.200 to RP 69.206 – 15.006 miles

Counties: Williams
Legal Description: T156N, R97W, Sec 16 to T156N, R95W, Sec 13

Functional and Funding Roadway Classification: Interregional Corridor
National Highway System: Yes
Freight Level: 1

Project Schedule: Proposed to be added to the STIP as a 2018 Structural Improvement.

dTIMS Recommendations: Constrained: SI 2018 Unconstrained: SI 2018

B. PURPOSE, NEED, AND IMPROVEMENT

Purpose and Need of Project:
US 2 is a major corridor for the development of the energy industry in North Dakota and has seen a significant increase in traffic. It is desirable to increase the structural capacity of the roadway to carry the anticipated increase of traffic. The IRI score is in the good range. The distress score is in the fair range. There are alligator, longitudinal and transverse cracks along with rutting on the roadway.

Proposed Improvement:
Option 1:
A Structural Improvement HBP overlay is proposed to extend the useful life of the highway by restoring the structural integrity of the roadway. The safety items that will be addressed are safety hardware that does not meet NCHRP 230 standards or better and safety items within the 20' clear zone. All other safety items will be addressed as part of the Statewide Safety Program.

Option 2:
A Structural Improvement Concrete overlay is proposed to extend the useful life of the highway by restoring the structural integrity of the roadway. The safety items that will be addressed are safety hardware that does not meet NCHRP 230 standards or better and safety items within the 20' clear zone. All other safety items will be addressed as part of the Statewide Safety Program.

C. TRAFFIC AND CRASH ANALYSIS

Traffic:

RP 54.000 to RP 63.265

	Year	Truck AADT	Total AADT	Flexible ESALs	Rigid ESALS
Current Traffic	2015	1,525	4,685	1,205	1,910
Forecast Traffic	2035	2,505	7,215	1,980	3,135

RP 63.265 to RP 64.207

	Year	Truck AADT	Total AADT	Flexible ESALs	Rigid ESALS
Current Traffic	2015	1,680	6,205	1,330	2,100
Forecast Traffic	2035	2,505	9,250	1,980	3,135

RP 64.207 to RP 69.206

	Year	Truck AADT	Total AADT	Flexible ESALs	Rigid ESALS
Current Traffic	2015	2,025	3,770	1,600	2,535
Forecast Traffic	2035	3,020	5,620	2,390	3,755

Speed Limit:

From RP	To RP	Speed Limit
54.20	63.07	70 mph
63.07	64.51	55 mph
64.51	69.21	70 mph

Crash Analysis: There were a total of 97 crashes from 12/1/2010 to 11/30/2015. Animal crashes were not included. The crash rate per 1 million vehicles is 0.7834.

Notes/Trends:

- There was 1 fatal crash, which was a rear end crash.
- There were 30 intersection related crashes, 6 angle , 9 rear end, 3 left turn, 7 sideswipe same direction, 4 single vehicle, and 1 other crash.
- There were 22 non intersection multiple vehicle crashes, 4 angle, 10 rear end, and 8 sideswipe same direction.
- There were 45 single vehicle crashes, 33 ran off roadway and the rest were not specific.
- 46 crashes occurred with ice/snow roadway surface conditions.
- No other trends were identified.

There was a US 2 turn lane project PCN 19898 in 2013 that covered this segment, so no additional recommendations at this time.

D. EXISTING ROADWAY CHARACTERISTICS

	International Roughness Index (IRI)	Distress Score	Rut
Excellent	< =60	≥ 98	< 0.25″
Good	61 – 99	88 – 97	0.25″ to 0.375″
Fair	100 – 145	77 – 87	0.376″ to 0.50″
Poor	> 145	≤ 76	> 0.50″

Segment 1: RP 54.20 to RP 65.1972

Actual Age	IRI	IRI Rating	SI or SCI	Faulting
34	87	Good	9	N/A
Effective Age	Distress	Distress Score	Rutting	Rutting Score
22	79	Fair	0.29	Good

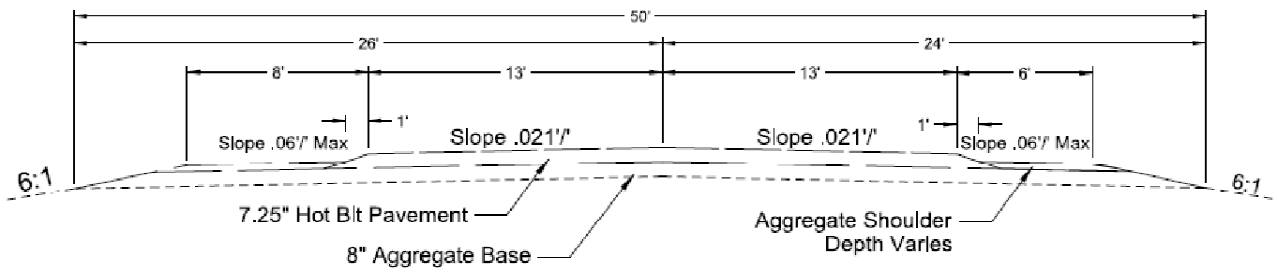
CONSTRUCTION HISTORY				
Year	Construction	Depth (in)	Width (ft)	Oil
1981	GRADE	-	50.0	-
1981	AGGREGATE BASE	8.0	42.0	-
1982	RECYCLED HOT BIT PAVM	3.5	27.0	200-300
1982	AGGREGATE BASE	-	-	-
1990	CONTRACT CHIP SEAL	-	27.0	HFMS-2
1998	HOT BIT PAVEMENT	1.5	26.0	PG 58-28
1998	AGGREGATE BASE	1.5	-	-
2003	DISTRICT CHIP SEAL	-	26.0	CRS-2
2007	HOT BIT PAVEMENT	2.0	26.0	PG 58-28
2011	SLURRY SEAL	-	26.0	-

Segment 2: RP 65.1972 to RP 69.206

Actual Age	IRI	IRI Rating	SI or SCI	Faulting
34	84	Good	8	N/A
Effective Age	Distress	Distress Score	Rutting	Rutting Score
22	82	Fair	0.25	Good

CONSTRUCTION HISTORY				
Year	Construction	Depth (in)	Width (ft)	Oil
1981	GRADE	-	50.0	-
1981	AGGREGATE BASE	8.0	42.0	-
1982	RECYCLED HOT BIT PAVM	3.5	27.0	200-300
1982	AGGREGATE BASE	-	-	-
1990	CONTRACT CHIP SEAL	-	27.0	HFMS-2
1998	HOT BIT PAVEMENT	1.5	26.0	PG 58-28
1998	AGGREGATE BASE	1.5	-	-
2003	DISTRICT CHIP SEAL	-	26.0	CRS-2
2007	HOT BIT PAVEMENT	2.0	26.0	PG 58-28
2011	SLURRY SEAL	-	26.0	-

Existing Typical Section:



Existing Typical Section, RP 54.20 to RP 69.206

Existing Foreslopes: 6:1

E. EXISTING GEOMETRY

Horizontal Curves: Use existing, sign when less than posted speed.

Location	Speed (mph)	Radius (ft)		Superelevation (%)	
		Existing	Required	Existing	Required
RP 54.275	70	19099	2042	NC	NC
RP 54.444	70	19099	2042	NC	NC
RP 59.273	70	14324	2042	NC	NC
RP 59.533	70	14324	2042	NC	NC

Vertical Curves: Use Existing

F. EXISTING STRUCTURES

Bridges:

Bridge No	Description	Feature	Length (ft)	Width (ft)	Rating
0002-057.038	Double, 8X7X252' RCB	Creek	17	-	93.4
Recommended Improvement: Do Nothing.					

Centerline Pipes:
All pipes met the 20' clear zone for a structural overlay

G. LAND INTERESTS

Communities:
Corporate Limits of Ray, RP 53.267 to 54.268, Population 609
Reservation:
None
Surface Trust Lands:
T156N, R95W, Sec 16, RP 65.21 to 66.21.
Refuge:
None
Adjacent Land Usage:
Agricultural, Commercial

H. ISSUES AND APPURTENANCES CHECKLIST

1. Curb and Gutter? Yes ____ No __X__
2. Sidewalk? Yes ____ No __X__
3. Multi-Use Path? Yes ____ No __X__
4. ADA Ramps? Yes ____ No __X__
5. Detectable Warning Panels? Yes ____ No __X__
6. Lighting? Yes __X__ No _____
   There is overhead lighting at two locations. The first one is at the intersection of Iverson RD/105th Ave. and US. 2 at RP 63.29 and the second one is at the intersection of ND 40 and US 2 at RP 64.24.
   Suggested Improvement: None

7. Signals? Yes __X__ No _____
There are two overhead signal locations. The first one is at the intersection of Iverson RD/105th Ave and US. 2 at RP 63.29. The signal poles at Iverson RD/105th Ave are wood and were installed in 2012. The second location is at the intersection of ND 40 and US 2 at RP 64.24. The signal poles at ND 40 were upgraded to metal in 2015. There are also two W20-50 signs, "Be Prepared to Stop" with attached flashing beacons at these locations.
Suggested Improvement: None

8. Storm Sewer? Yes ____ No __X__

9. Manholes? Yes ____ No __X__

10. Other Underground Work? Yes ____ No __X__

11. Parking Facilities? Yes ____ No __X__

12. Frontage Roads? Yes ____ No __X__

13. Utility Issues? Yes ____ No __X__

14. Landscaping? Yes ____ No __X__

15. Approach or Ditch Block Flattening? Yes ____ No __X__

16. T Intersection Recovery Approaches? Yes ____ No __X__

17. Fence? Yes ____ No __X__

18. Railroad Crossings? Yes ____ No __X__

19. Detours? Yes ____ No __X__

20. Automatic Traffic Recorder Locations? Yes ____ No __X__

21. Weigh-In-Motion Sites? Yes ____ No __X__

22. ITS (Deicing, Snow Gates, VMS, RWIS, etc.)? Yes ____ No __X__

23. Highway Patrol/Truck Pullouts or Rest Areas? Yes __X__ No _____
There is a truck pullout area 1.8 miles east of ND 40 and US 2 from RP 65.0249 to 65.1494.
Suggested Improvement: None

24. Additional Right of Way? Yes ____ No __X__

25. Drainage Issues? Yes ____ No __X__

26. Snow Impact Areas? Yes ____ No __X__

27. Subgrade Issues? Yes ____ No __X__

28. Noise Analysis: Type I Project? Yes ____ No __X__ Maybe _____

29. Maintenance Issues? Yes ____ No __X__

30. Guardrail? Yes ____ No __X__

31. Milling? Yes __X__ No _____
A decision item has been added to the asphalt overlay option to include milling. The milling would eliminate surface distress and the millings would be incorporated into RAP. Milling will be required if the concrete overlay options is selected.

I. Load Restrictions

Travel Information Map Proposed Load Restriction: Legal weight
HPCS Load Restriction: Legal weight
Projected load restrictions after project is completed: Legal weight

J. Roadway Widths

Required Minimum Roadway Widths: 32'
Proposed Roadway Width:
Asphalt Overlay Option = *33.17'
Concrete Overlay Option = *34.4'
*Final typical section dimensions should be determined in the design phase.
Surrounding Roadway Widths:
Ray East 0.3 Miles: 38' (Concrete)
County Line E to Stanley: 35' (Asphalt)

K. PERFORMANCE GUIDELINES

Design Speed: 70 mph
Clear Zone (from edge of driving lane): 20'
Shoulder Surface: Paved

Ride/Distress Goal: Excellent
Operational Reliability: High

Foreslope: 4:1

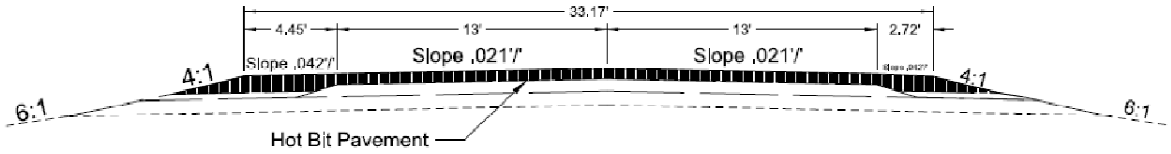
L. PROPOSED IMPROVEMENTS

Option 1:
A Structural Improvement HBP overlay is proposed. The safety items that will be addressed are safety hardware that does not meet NCHRP 230 standards or better and all items within a 20' clear zone. All other safety items will be addressed as part of the Statewide Safety Program.

Option 2:
A Structural Improvement Concrete overlay is proposed. The safety items that will be addressed are safety hardware that does not meet NCHRP 230 standards or better and all items within a 20' clear zone. All other safety items will be addressed as part of the Statewide Safety Program. HBP shoulders were used for estimating purposes.

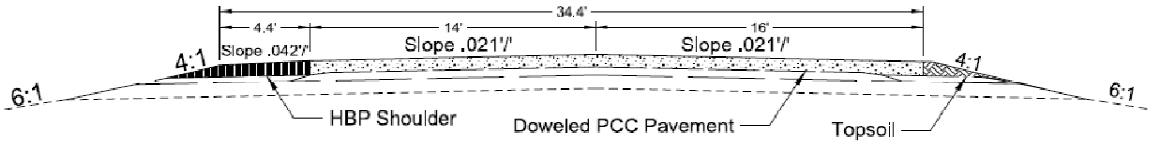
Proposed Typical Sections: Typical Sections shown are for estimating purposes only. Final typical section dimensions should be determined in the design phase.

Option 1, HBP Overlay



HBP Overlay, RP 54.20 to RP 69.206

Option 2, Concrete Overlay with milling down to 5 inches of HBP



Concrete Overlay with HBP Shoulders, RP 54.20 to RP 69.206

M. ADDITIONAL COMMENTS

District Engineer: This roadway has held up rather well through the increased traffic due to energy activity. Option 1: Structural Improvement HBP Overlay, is the District preference with no milling.

Safety Division Director: No comments.

N. COST ESTIMATE

(Inflation factor of 6% was used to estimate costs for bid year)

Option 1: Structural Improvement HBP Overlay

ITEM	ESTIMATED COST
Contract Bond	$91,000
Mobilization	$488,000
Hot Bit Pavement (6" HBP, Includes AC, Tack, Prime and cores)	$11,400,000
Field Lab and Office	$23,000
Traffic Control	$100,000
Pavement Markings and Rumble Strips	$89,000
Subtotal	$12,191,000
20% Engineering	$2,438,000
Total Cost	$14,629,000
Decision Item: Milling (Includes 20% Engineering Cost)	$158,000
Total Cost	$14,787,000

Option 2: Structural Improvement Concrete Overlay with Milling

ITEM	ESTIMATED COST
Contract Bond	$113,000
Mobilization	$603,000
Doweled PCC (7", Includes Material and Placement)	$11,250,000
Hot Bit Pavement (Includes AC, Tack, Prime and cores)	$2,350,000

ITEM	ESTIMATED COST
Field Lab and Office	$23,000
Traffic Control	$200,000
Pavement Markings and Rumble Strips	$93,000
Median Crossover	$200,000
Mill	$230,000
Topsoil	$31,000
Subtotal	$15,093,000
20% Engineering	$3,019,000
Total Cost	$18,112,000

N. DECISIONS

1. Which advancement option(s) should be chosen for this project?
   - ____ Option 1: Structural Improvement HBP Overlay. **Estimated Cost: $14,629,000**
   - ____ Option 2: Structural Improvement Concrete Overlay. **Estimated Cost: $18,112,000**
   - ____ Option 3: Advance None.
   - _X_ Option 4: Advance both options to the Environment Document phase.

The following item(s) should be considered for advancement at addition cost

2. Which advancement option(s) should be chosen for this project?
   - ____ Option 1: Add milling to HBP Overlay. **Estimated Cost: $158,000**
   - ____ Option 2: Do not add Milling.
   - _X_ Option 3: Advance as an option to the Environmental Document phase.

DDE Comments: _____

Deputy Director for Engineering

4/22/16
Date