

Project No.

PCN

**N of Sheyenne to Near Jct. of 57**



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Prepared by

**NORTH DAKOTA DEPARTMENT OF TRANSPORTATION  
BISMARCK, NORTH DAKOTA**

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# SCOPING REPORT

Report Completed By: Jared Loegering

## A. GENERAL INFORMATION

**Project Number:**

**District:** Devils Lake

**Location:** N of Sheyenne to Near Jct. of 57

**Reference Point:** RP 139.161-148.879 - 9.718 miles

**Counties:** Eddy and Benson

**Legal Description:** T150N, R66W, Sec 9 to T152N, R66W, Sec 21

**Functional and Funding Roadway Classification:** Interregional Corridor

**National Highway System:** Yes

**Project Schedule:** Proposed to be added to the STIP for a 2019 Major Rehabilitation

**dTIMS Recommendations:**                      Constrained: PM 2019                      Unconstrained: PM 2016

## B. PURPOSE, NEED, AND IMPROVEMENT

**Purpose and Need of Project:**

The IRI score is in the good to excellent range. The distress score is in good range. There are longitudinal, transverse and alligator cracking on the roadway along with patching. This project was added from the 2014 Interregional Review.

**Proposed Improvements:**

A Major Rehabilitation Full Depth Reclamation with widening is proposed to extend the service life and provide operational improvements to the roadway. The safety items that will be addressed are safety hardware that does not meet NCHRP 350 standards or better and safety items within the 20' clear zone. A 90-1 survey will also be completed and areas needing safety improvements will be addressed.

A decision item is included to widen the roadway to 40 feet to allow for 8 foot shoulders. This option would go beyond the design guideline requirements. This option is proposed because traffic is forecasted to continue to increase and to keep roadway width continuity with the surrounding corridor. 8 foot shoulders would also allow trucks the ability to pull off the roadway.

**District Proposed Improvements:**

**Turning Lanes:**

The district has requested that a right and left turning lane be constructed on US 281 at approximately RP 145.236 at 35<sup>th</sup> St. NE (Benson County 28). The traffic operations section will complete a study to find if the requested turning lanes and any additional turning lanes are warranted along the roadway. A decision item is included to address the districted requested turning lanes and a cost is included in the estimate.

### C. TRAFFIC AND CRASH ANALYSIS

**Traffic:**

RP 139.161 to 149.106

	Year	Truck AADT	Total AADT	Flexible ESALs
Current Traffic	2014	245	1,315	210
Forecast Traffic	2034	365	1,810	310

**Speed Limit:**

From RP	To RP	Speed Limit
139.161	139.20	45 mph
139.20	148.879	65 mph

**Crash Analysis:**

There were a total of 7 crashes from 11/1/2009 to 10/31/2014. Animal crashes were not included. The crash rate per 1 million vehicles is 0.3041

No trends were identified and no 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 139.161 to 140.70**

Actual Age	IRI	IRI Rating	SI or SCI	Faulting
22	57	Excellent	0	N/A
Effective Age	Distress	Distress Score	Rutting	Rutting Score
15	94	Good	0.16	Excellent

CONSTRUCTION HISTORY				
Year	Construction	Depth (in)	Width (ft)	Oil
1984	GRADE	-	44.0	-
1984	TRAFFIC SERVICE GRAVE	2.0	42.0	-
1985	AGGREGATE BASE	6.0	42.0	-
1985	RECYCLED HOT BIT PAVM	2.0	28.0	200-300
1985	HOT BIT PAVEMENT	2.0	28.0	85-100
1985	AGGREGATE BASE	3.0	5.0-0.0-5.0	-
1988	CONTRACT CHIP SEAL	-	28.0	HFMS-2
1993	HOT BIT PAVEMENT	3.0	24.0	120-150
2001	DISTRICT CHIP SEAL	-	24.0	MC-3000
2010	HOT BIT PAVEMENT	2.0	27.0	PG 58-28
2014	MICROSURFACING	-	25.0	-

**Segment 2, RP 140.70 to 148.879**

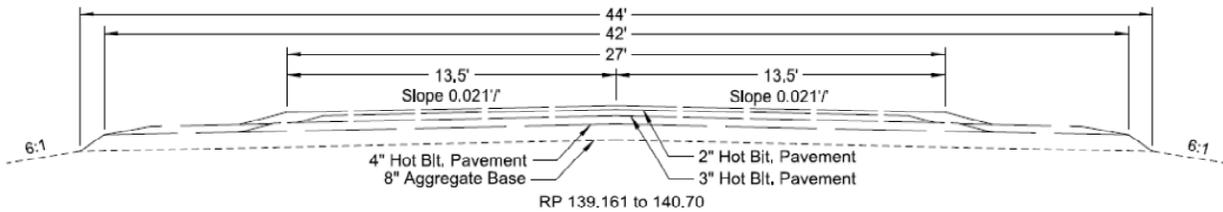
Actual Age	IRI	IRI Rating	SI or SCI	Faulting
17	57	Excellent	1	N/A
Effective Age	Distress	Distress Score	Rutting	Rutting Score
14	96	Good	0.16	Excellent

CONSTRUCTION HISTORY				
Year	Construction	Depth (in)	Width (ft)	Oil
1951	GRADE	-	36.0	-
1951	AGGREGATE BASE	1.0	34.0	-
1952	AGGREGATE BASE	5.0	34.0	-
1952	STABILIZED BASE	2.0	32.0	-
1952	HOT BIT PAVEMENT	2.5	22.0	150-200
1985	RECYCLED HOT BIT PAVM	1.5	28.0	200-300
1985	HOT BIT PAVEMENT	2.0	28.0	85-100
1985	RECYCLED HOT BIT PAVM	1.5	4.0-0.0-4.0	200-300
1985	AGGREGATE BASE	2.5	3.5-0.0-3.5	-
1988	CONTRACT CHIP SEAL	-	28.0	HFMS-2
1997	HOT BIT PAVEMENT	1.5	28.0	120-150
2001	DISTRICT CHIP SEAL	-	24.0	MC-3000
2010	HOT BIT PAVEMENT	2.0	28.0	PG 58-28
2014	MICROSURFACING	-	25.0	-

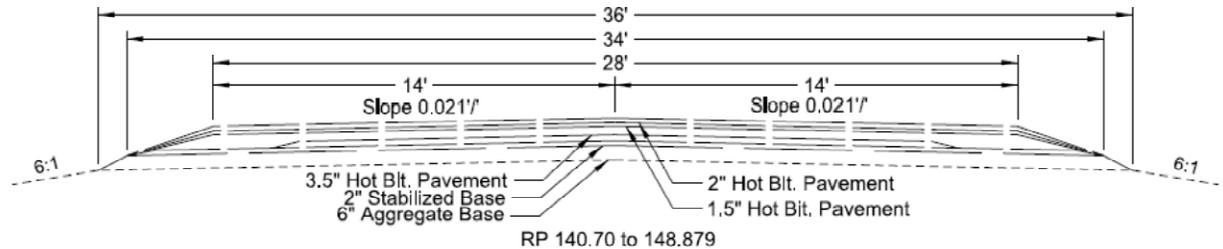
Existing Foreslopes: 6:1

Existing Typical Sections:

**Segment 1, RP 139.161 to 140.700**



**Segment 2, RP 140.70 to 148.879**



## E. EXISTING GEOMETRY

### Horizontal Curves:

Use existing, sign when less than posted speed. None of the horizontal curves need to be addressed.

Location	Radius (ft)		Superelevation (%)	
	Existing	Required	Existing	Required
RP 139.454	4407	1657	4.3	3.7
RP 148.839	2320	1657	5.9	5.3

**Vertical Curves:** On Interregional system when the AADT is less than 2,000 existing vertical curvature is used.

## F. EXISTING STRUCTURES

### Bridges:

Bridge No.	Description	Feature	Length (ft)	Width (ft)	Rating
0281-139.627	1 North of Sheyenne	Sheyenne River	110	35.8	80.5
Recommended Improvement: Barrier End Modification. Estimated Cost: \$15,000					

If it is decided to move forward with the 8 foot shoulder option (40' roadway top), the bridge will need to be replaced due to the fact that it cannot be widened. It is estimated that this would cost approximately \$1,000,000 and this is included in the decision item and cost estimate for the 8 foot shoulder option.

### Centerline Pipes:

There are 21 centerline pipes on the project, eleven 24" RCP, six 30" RCP, three 36" RCP and one 72" RCP. It is assumed that all of the pipes will need to be extended due to the clear zone requirements and roadway widening. A cost is included in the estimate to address the pipe extensions.

There are also two Cattle Passes on the project that require extensions. The district has noted that the joints have separated and need to be sealed. A cost is included to address the cattle passes. They are located at:

RP 140.8285 - Not used for cattle, used for drainage

RP 144.0365 - Not used for cattle, used for drainage

## G. LAND INTERESTS

### Communities:

None

### Reservation:

The majority of the project is on the Spirit Lake Reservation, from RP 139.66 to 148.879

### Surface Trust Lands:

None

### Waterfowl Production Area:

RP 148.236 to 148.492, T152N, R66W, Sec 21

### Adjacent Land Usage:

Agricultural and Residential

## H. ISSUES AND APPURTENANCES CHECKLIST

- |  |   |  |
|--|---|--|
| 1. Curb and Gutter?  | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 2. Sidewalk?   | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 3. Multi-Use Path?   | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 4. ADA Ramps?  | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 5. Detectable Warning Panels?  | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 6. Lighting?   | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 7. Signals?  | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 8. Storm Sewer?  | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 9. Manholes?   | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 10. Other Underground Work?  | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 11. Parking Facilities?  | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 12. Frontage Roads?  | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 13. Utility Issues?  | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 14. Landscaping?   | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 15. Approach or Ditch Block Flattening?<br>All steep approaches are to be addressed under the Major Rehab Strategy.  | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |
| 16. T Intersection Recovery Approaches?  | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 17. Fence?   | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 18. Railroad Crossings?  | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 19. Detours?   | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 20. Automatic Traffic Recorder Locations?<br>There is an existing ATR site at RP 141.48.<br><b>Suggested Improvement:</b> Will require replacement with proposed work. | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |
| 21. Weigh-In-Motion Sites?   | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 22. ITS (Deicing, Snow Gates, VMS, RWIS, etc.)?  | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 23. Highway Patrol/Truck Pullouts or Rest Areas?   | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| 24. Additional Right of Way?   | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |

Additional right of way may be needed to accommodate the widening on the project.

25. Drainage Issues? Yes  No

26. Snow Impact Areas? Yes  No

27. Subgrade Issues? Yes  No

The district has identified two discretionary subcut areas on the project. The first location is between RP 142.6 and 142.8 and the second location is between RP 142 and 143. A cost is included in the estimate to address the subcut areas.

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

29. Maintenance Issues? Yes  No

30. Guard Rail? Yes  No

RP	L/R	Length (ft)	Suggested Improvement
139.6130	R	69	No recommendations at this time.
139.6400	L	69	No recommendations at this time.

31. Riprap? Yes  No

Riprap will need to be added at approximately RP 148.5. A cost is included in the estimate to address the riprap.

32. Milling? Yes  No

It was assumed that 2" will be milled off the roadway. A cost is included in the estimate to address the milling.

33. Local Road Safety Program? Yes  No

**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 Width: 36'

Surrounding Corridor Roadway Widths:

US 281 (North and South of Project):

North of project: Project is planned to widen to 36' or 40'

South of project: Project is planned to widen to 36' or 40'

ND 57 (East of Project): 40' to 44'

**K. PERFORMANCE GUIDELINES**

Design Speed: 45 and 65 mph

Clear Zone (from edge of driving lane): 20'

Ride/Distress Goal: Excellent

Operational Reliability: Highly Reliable

Foreslope: 4:1

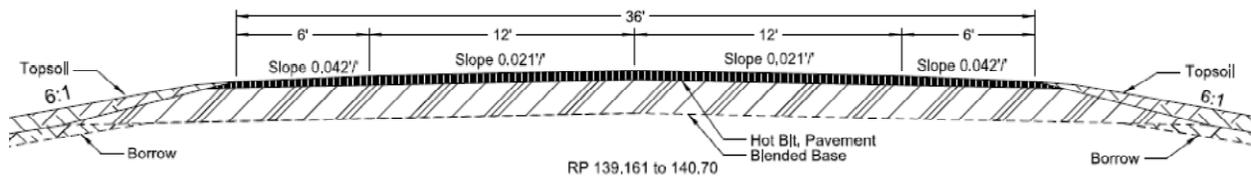
**L. PROPOSED IMPROVEMENTS**

A Major Rehabilitation Full Depth Reclamation with widening is proposed. The safety items that will be addressed are safety hardware that does not meet NCHRP 350 standards or better and safety items within the 20' clear zone. A 90-1 survey will also be completed and areas needing safety improvements will be addressed.

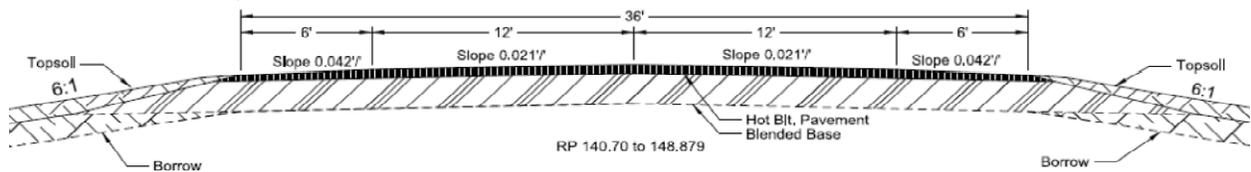
**Proposed Typical Sections:**

**Option 1: 36' Wide Roadway**

**Section 1, RP 139.161 to 140.70**

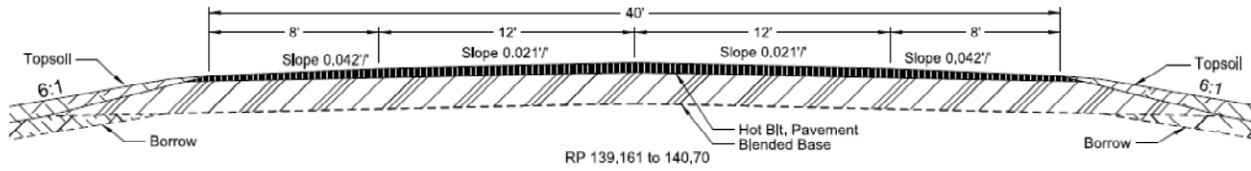


**Section 2, RP 140.70 to 148.879**

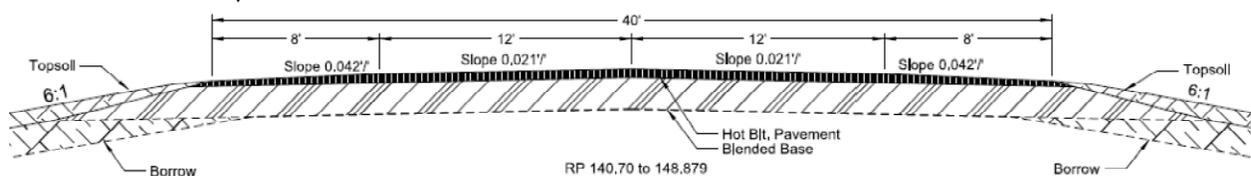


**Option 2: 40' Wide Roadway**

**Section 1, RP 139.161 to 140.70**



**Section 2, RP 140.70 to 148.879**



**District Requests:**

**Turning Lanes:**

The district has requested that a right and left turning lane be constructed on US 281 at approximately RP 145.236 at 35<sup>th</sup> St. NE (Benson County 28). The traffic operations section will complete a study to find if the requested turning lanes and any additional turning lanes are warranted along the roadway. A decision item is included to address the districted requested turning lanes and a cost is included in the estimate.

**M. ADDITIONAL COMMENTS**

**District Engineer:**

Decision 1: Yes.

Decision 2: Check Item 1 and 3.

**Safety Division Director:** No comments.

**N. COST ESTIMATE**

**(Inflation factor of 4% was used to estimate costs for bid year 2019)**

ITEM	ESTIMATED COST
Contract Bond	\$69,000
Mobilization	\$369,000
Hot Bit Pavement (5" HBP, Includes AC, Tack, Prime and cores)	\$4,428,000
Field Lab and Office	\$20,000
Traffic Control	\$200,000
Pavement Markings and Rumble Strips	\$49,000
Borrow and Water	\$779,000
Aggregate Base (18")	\$1,507,000
Seeding, Mulching, and Erosion Control	\$150,000
Topsoil	\$414,000
Mine and Blend	\$499,000
Milling	\$108,000
Discretionary Subcut	\$322,000
Riprap	\$187,000
Centerline Pipe Extensions	\$100,000
Bridge Work	\$15,000
Subtotal	\$9,216,000
20% Engineering	\$1,843,000
Construction and CE Total Cost	\$11,059,000
Decision Items (All items include 20% engineering)	
Decision Item 1: Widen to 40' Roadway Top	\$1,159,000
Decision Item 2: Replace Bridge	\$1,200,000
Construction and CE Total Cost Including Decision Items	\$12,218,000

