

Project No.

PCN

Bismarck N to Wilton - NB



Prepared by

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

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

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SCOPING REPORT

Report Completed By: Logan Beise

A. GENERAL INFORMATION

Project Number:

District: Bismarck

Location: Bismarck N to Wilton - NB

Reference Point: RP 91.460 to RP 111.327– 19.849 miles

Counties: Burleigh

Legal Description: T139N, R80W, Sec 22 to T142N, R80W, Sec 31

Functional and Funding Roadway Classification: Interregional Corridor

National Highway System: Yes

Freight Level: 1

Speed Limit:

RP 88.9880 to RP 91.3736 = 40 MPH

RP 91.3736 to RP 93.1030 = 55 MPH

RP 93.1030 to RP 111.2000 = 70 MPH

RP 111.2000 to RP 112.2000 = 55 MPH

Project Schedule: Proposed to be added to the STIP for 2020.

dTIMS Recommendations:

Constrained: PM Asphalt 2022

Unconstrained: PM Asphalt 2016

B. PURPOSE, NEED, AND IMPROVEMENT

Purpose and Need of Project:

The IRI score is in the good range. The distress score is in the good to fair range. There are alligator, longitudinal and transverse cracks on the roadway. The 2015 Interregional review recommended a concrete overlay or FDR. During the scoping review the District requested a Minor Rehabilitation Mill and HBP overlay. The Concrete Overlay and FDR were not carried forward.

Proposed Improvement:

A Minor Rehabilitation Mill and HBP overlay is proposed to extend the useful life of the roadway by restoring the pavement structure. The safety items that will be addressed are safety hardware that does not meet NCHRP 230 standards or better. All other safety items will be addressed as part of the Statewide Safety Program. It is proposed to pave the median crossovers with this NB project.

A decision item is included to address adding the urban segment from RP 88.9880 to RP 91.460 to this project. The typical section is the same as the proposed project. This work would have to be coordinated through the urban prioritization system.

A decision item is included to address Ridgedale St. Frontage road. The frontage road is within the NDDOT right of way and the NDDOT is responsible for maintenance of the frontage road.

The district requested performing a 1" mill and 2" asphalt overlay on the frontage road. The frontage road received a 2" overlay in 2010.

Decision items are included to address a district request to install left and right turn lanes at 201st Ave NE (Baldwin). This work would be out of the scope of a minor rehabilitation. There are current turn lanes at this location that were created by striping the shoulders. The existing turn lanes are narrow and short.

A decision item is included to address destination lighting at 201st Ave NE (Baldwin).

C. Traffic and Crash Analysis

Traffic:

RP 89.832 to RP 89.955

| | Year | Truck AADT | Total AADT | Flexible ESALs | Rigid ESALs |
|------------------|------|------------|------------|----------------|-------------|
| Current Traffic | 2015 | 570 | 13,160 | 465 | 705 |
| Forecast Traffic | 2035 | 770 | 17,770 | 625 | 950 |

RP 89.955 to RP 90.450

| | Year | Truck AADT | Total AADT | Flexible ESALs | Rigid ESALs |
|------------------|------|------------|------------|----------------|-------------|
| Current Traffic | 2015 | 515 | 12,015 | 420 | 635 |
| Forecast Traffic | 2035 | 695 | 16,220 | 565 | 855 |

RP 90.450 to RP 92.463

| | Year | Truck AADT | Total AADT | Flexible ESALs | Rigid ESALs |
|------------------|------|------------|------------|----------------|-------------|
| Current Traffic | 2015 | 470 | 10,445 | 385 | 580 |
| Forecast Traffic | 2035 | 635 | 14,105 | 515 | 785 |

RP 92.463 to RP 100.627

| | Year | Truck AADT | Total AADT | Flexible ESALs | Rigid ESALs |
|------------------|------|------------|------------|----------------|-------------|
| Current Traffic | 2015 | 825 | 5,300 | 670 | 1,015 |
| Forecast Traffic | 2035 | 1,115 | 7,160 | 905 | 1,375 |

RP 100.627 to RP 111.327

| | Year | Truck AADT | Total AADT | Flexible ESALs | Rigid ESALs |
|------------------|------|------------|------------|----------------|-------------|
| Current Traffic | 2015 | 835 | 3,855 | 680 | 1,030 |
| Forecast Traffic | 2035 | 1,130 | 5,210 | 915 | 1,390 |

Speed Limit:

RP 88.9880 to RP 91.3736 = 40 MPH

RP 91.3736 to RP 93.1030 = 55 MPH

RP 93.1030 to RP 111.2000 = 70 MPH

RP 111.2000 to RP 112.2000 = 55 MPH

Crash Analysis: There were a total of 55 crashes from 1/1/2011 to 12/31/2015. Animal crashes were not included. The crash rate per 1 million vehicles is 0.3588.

Notes/Trends:

- There were 2 fatal crashes:
 1. V1 was NB and V2 was SB, V1 swerved into median and onto SB lane, and V1 hit V2 head on.
 2. V1 was NB, swerved into median, jumped a median crossover, and rolled over.
- 19 crashes (35%) occur on Friday and 21 crashes (38%) occurred with ice/snow roadway surface conditions.
- There were 15 rear end crashes, 8 angle, and 4 sideswipe multivehicle crashes.
- There were 13 ran off roadway single vehicle crashes.

Recommendation: None 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 89.832 to RP 100.627

| | | | | |
|---------------|----------|----------------|-----------|---------------|
| Actual Age | IRI | IRI Rating | SI or SCI | Faulting |
| 52 | 77 | Good | 6 | N/A |
| Effective Age | Distress | Distress Score | Rutting | Rutting Score |
| 16 | 86 | Fair | 0.19 | Excellent |

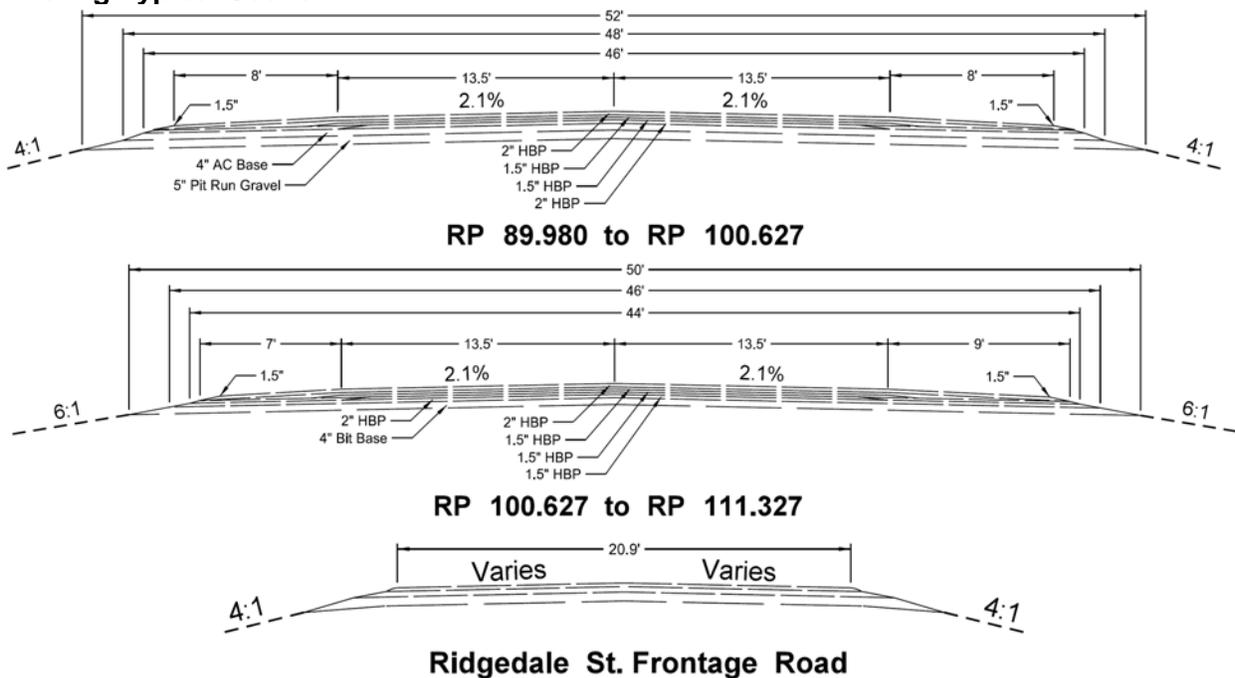
| CONSTRUCTION HISTORY | | | | |
|----------------------|-----------------------|------------|----------------|----------|
| Year | Construction | Depth (in) | Width (ft) | Oil |
| 1964 | GRADE | - | 52.0 | - |
| 1964 | AGGREGATE BASE | 5.0 | 48.0 | - |
| 1964 | PLANT MIX BIT BASE | 4.0 | 46.0 | 120-150 |
| 1964 | HOT BIT PAVEMENT | 2.0 | 24.0 | 120-150 |
| 1975 | PLANT MIX SEAL | - | 24.0 | RC-800 |
| 1983 | HOT BIT PAVEMENT | 1.5 | 27.0 | 120-150 |
| 1983 | HOT BIT PAVEMENT | - | 9.0, 0, 9.0 | - |
| 1984 | CONTRACT CHIP SEAL | - | 29.0 | RC-800 |
| 1997 | CONTRACT CHIP SEAL | - | 3.0, 24.0, 3.0 | MC-3000P |
| 2002 | HOT BIT PAVEMENT | 1.5 | 27.0 | PG 58-28 |
| 2010 | HBP-SUPERPAVE-FAA 45 | 2.0 | 43.0 | PG 58-28 |
| 2011 | FEDERAL AID SAND SEAL | - | 9.0, 0, 9.0 | CRS2P |
| 2011 | MICROSURFACING | - | 25.0 | - |

Segment 2: RP 100.627 to RP 111.327

| | | | | |
|---------------|----------|----------------|-----------|---------------|
| Actual Age | IRI | IRI Rating | SI or SCI | Faulting |
| 47 | 78 | Good | 5 | N/A |
| Effective Age | Distress | Distress Score | Rutting | Rutting Score |
| 16 | 88 | Good | 0.17 | Excellent |

| CONSTRUCTION HISTORY | | | | |
|----------------------|-----------------------|------------|--------------|----------|
| Year | Construction | Depth (in) | Width (ft) | Oil |
| 1968 | GRADE | - | 50.0 | - |
| 1968 | BITUMINOUS BASE | 4.0 | 46.0 | SM-K |
| 1968 | C-C 104 FEET | - | - | - |
| 1969 | BITUMINOUS BASE | 2.0 | 44.0 | SC-3000 |
| 1969 | HOT BIT PAVEMENT | 1.5 | 24.0 | 85-100 |
| 1983 | HOT BIT PAVEMENT | 1.5 | 27.0 | 120-150 |
| 1983 | HOT BIT PAVEMENT | - | 9.0, 0, 7.0 | - |
| 1984 | CONTRACT CHIP SEAL | - | 29.0 | RC-800 |
| 1997 | INT CONT PATCH-1.5" | - | 27.0 | 85-100 |
| 1997 | CONTRACT CHIP SEAL | - | 3.0, 24, 9.0 | MC-3000P |
| 2002 | HOT BIT PAVEMENT | 1.5 | 27.0 | PG 58-28 |
| 2008 | INT CONT PATCH-1.5" | - | 27.0 | PG 58-28 |
| 2010 | HBP-SUPERPAVE-FAA 45 | 2.0 | 41.0 | PG 58-28 |
| 2011 | FEDERAL AID SAND SEAL | - | 9.0, 0, 7.0 | CRS2P |
| 2011 | MICROSURFACING | - | 25.0 | - |

Existing Typical Section:



Existing Foreslopes:

RP 89.980 to RP 100.627 = 4:1
 RP 100.627 to RP 111.327 = 6:1

E. EXISTING GEOMETRY

Horizontal Curves: Use existing.

Vertical Curves: Use existing.

F. EXISTING STRUCTURES

Bridges:

| Bridge No | Description | Feature | Length (ft) | Width (ft) | Rating |
|-------------------------------------|--------------------------|-------------|-------------|------------|--------|
| 0083-091.080 | Single, 8-6X8X271 SPP | Creek | 8 | - | 72.3 |
| Recommended Improvement: Do nothing | | | | | |
| 0083-096.944 | Triple, 10X12X191 RCB | Burnt Creek | 32 | - | 77.1 |
| Recommended Improvement: Do nothing | | | | | |
| 0083-099.833 | Single, 9-6X10-3X322 SPP | Creek | 10 | - | 69.3 |
| Recommended Improvement: Do nothing | | | | | |
| 0083-102.431 | Double, 8X10X240 RCB | Creek | 20 | - | 77.8 |
| Recommended Improvement: Do nothing | | | | | |

Centerline Pipes:

Minor Rehabilitation: Use existing.

G. LAND INTERESTS

Communities:

Limits of Bismarck: RP 89.832 to RP 90.459, Pop. 67,034

Project ends near the limits of Wilton, RP 111.660 to RP 111.840, Pop. 732.

Reservation:

None

Adjacent Land Usage:

Commercial, Agricultural, and Residential

H. ISSUES AND APPURTENANCES CHECKLIST

1. Curb and Gutter? Yes No
2. Sidewalk? Yes No
3. Multi-Use Path? Yes No
4. ADA Ramps? Yes No
5. Detectable Warning Panels? Yes No
6. Lighting? Yes No
There is overhead lighting at the Intersection of ND 1804. No proposed improvements. A decision item is included to address destination lighting at 201st Ave NE (Baldwin).
7. Signals? Yes No
There are existing signals and a flashing "Be Prepared to Stop" sign at the Intersection of ND 1804. No proposed improvements.
8. Storm Sewer? Yes No
9. Manholes? Yes No
10. Other Underground Work? Yes No

11. Parking Facilities? Yes No
12. Frontage Roads? Yes No
A decision item is included to mill and overlay Ridgedale St. Frontage road.
13. Utility Issues? Yes No
14. Landscaping? Yes No
15. Approach or Ditch Block Flattening? Yes No
16. T Intersection Recovery Approaches? Yes No
17. Fence? Yes No
18. Railroad Crossings? Yes No
19. Detours? Yes No
20. Automatic Traffic Recorder Locations? Yes No
21. Weigh-In-Motion Sites? Yes No
22. ITS (Deicing, Snow Gates, VMS, RWIS, etc.)? Yes No
There is an existing DMS at RP 91.3. No proposed improvements.
23. Highway Patrol/Truck Pullouts or Rest Areas? Yes No
The Maintenance Plan has a proposed truck inspection site at RP 96.25. This will be handled as part of the Approved Maintenance Plan.
24. Additional Right of Way? Yes No
25. Drainage Issues? Yes No
26. Snow Impact Areas? Yes No
27. Subgrade Issues? Yes No
28. Noise Analysis: Type I Project? Yes No Maybe
29. Maintenance Issues? Yes No
30. Guardrail? Yes No
31. Milling? Yes No
It is proposed to mill 1" to 2" to increase the ride and utilize the millings in RAP.
32. Local Road Safety Program Yes No
The LRSP recommends improvements at the intersection of US 83 and 201st Ave NE (Baldwin). The recommendations include closing median, installing street lights, upgrading stop sign, upgrading junction sign, upgrading stop ahead sign, upgrading stop ahead

marking, upgrading stop bar, and review signs and CST. A decision items are included that address installing intersection lighting and turn lanes.

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: 32'

Surrounding Roadway Widths:

Wilton North: 35'

Jct I-94 North: 36' (Urban)

K. PERFORMANCE GUIDELINES

Design Speed: 70 mph

Clear Zone: Use existing.

Shoulder Surface: Paved

Ride/Distress Goal: Excellent

Operational Reliability: High

L. PROPOSED IMPROVEMENTS

Proposed Improvement:

A Minor Rehabilitation Mill and 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. All other safety items will be addressed as part of the Statewide Safety Program. It is proposed to pave the median crossovers with this NB project.

Decision Items:

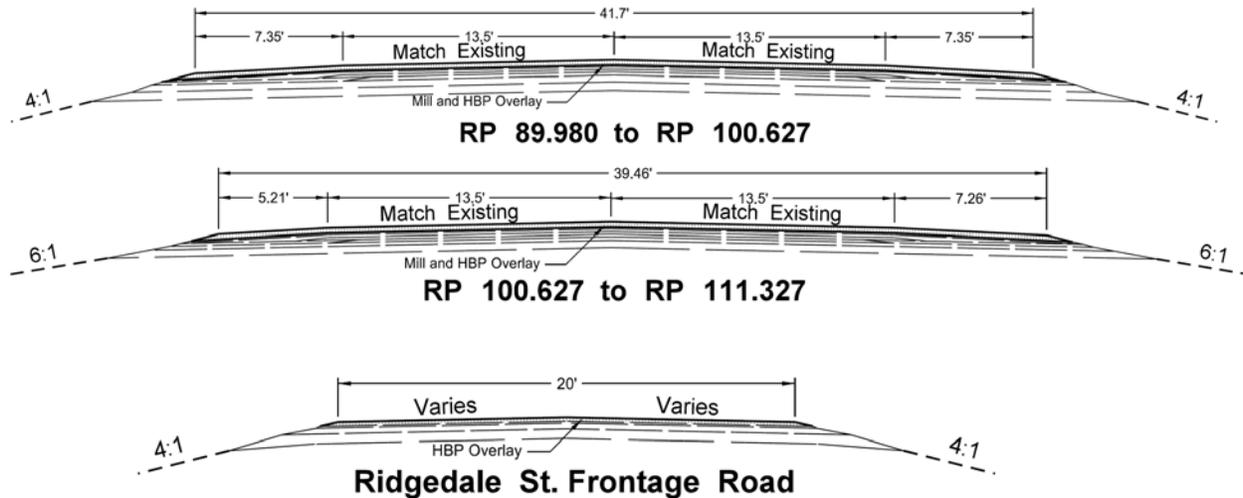
A decision item is included to address RP 88.9880 to RP 91.460. This segment is Urban. The decision item addresses including this segment. The typical section is the same as the proposed project. This work would have to be coordinated through the urban prioritization system.

A decision item is included to address Ridgedale St. Frontage road. The frontage road is within the NDDOT right of way and the NDDOT is responsible for maintenance of the frontage road. The district requested performing a 1" mill and 2" asphalt overlay on the frontage road. The frontage road received a 2" overlay in 2010.

Decision items are included to address a district request to install left and right turn lanes at 201st Ave NE (Baldwin). This work would be out of the scope of a minor rehabilitation. There are current turn lanes at this location that were created by striping the shoulders. The existing turn lanes are narrow and short. The Traffic Operations Section found the Northbound right to be warranted.

A decision item is included to address destination lighting at 201st Ave NE (Baldwin). The Traffic Operations Section found intersection lighting to be warranted.

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



M. ADDITIONAL COMMENTS

District Engineer:

N. COST ESTIMATE

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

| ITEM | ESTIMATED COST |
|---|----------------|
| Contract Bond | \$65,000 |
| Mobilization | \$326,000 |
| Hot Bit Pavement (based on 3") | \$7,500,000 |
| Milling Pavement | \$346,000 |
| Field Lab and Office | \$25,000 |
| Traffic Control | \$150,000 |
| Pavement Markings and Rumble Strips | \$80,000 |
| Subtotal | \$8,492,000 |
| 20% Engineering | \$1,699,000 |
| Total Cost | \$10,191,000 |
| Decision Items (All items include 20% engineering) | |
| Decision 2: Urban Limits (RP 88.988 to RP 91.460) | \$1,200,000 |
| Decision 3: Ridgedale St. Frontage Road | \$96,000 |
| Decision 4: Right Turn Lane at 201st Ave NE (Baldwin) | \$100,000 |
| Decision 5: Left Turn Lane at 201st Ave NE (Baldwin) | \$100,000 |
| Decision 6: Intersection lighting at 201st Ave NE (Baldwin) | \$200,000 |
| Construction and CE Total Cost Including Decision Items | \$11,907,000 |

O. DECISIONS

1. Should this project advance as a Minor Rehabilitation Mill and HBP Overlay for an estimated cost of **\$10,191,000**?

Yes No

* 2. Should the project limits be extended to include the urban area from RP 88.9880 to RP 91.460 for an estimated cost of **\$1,200,000**?

Yes No

3. Should the Ridgedale St. frontage road be included as a mill and overlay for an estimated cost of **\$96,000**?

Yes No

The following Decision Item is considered out of scope for a minor rehabilitation.

4. Should the NB right turn lane (warranted) be installed at 201st Ave NE (Baldwin) for an estimated cost of **\$100,000**?

Yes No

5. Should the NB left turn lane be installed at 201st Ave NE (Baldwin) for an estimated cost of **\$100,000**?

Yes No

** 6. Should intersection lighting be installed at 201st Ave NE (Baldwin) for an estimated cost of **\$20,000**?

Yes No

* DDE Comments: unless the ~~MDA City of Bismarck~~ Unless a larger project is moving forward.

** As a separate HSIP project.


Deputy Director for Engineering

5/9/16
Date