

# NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

NELSON COUNTY

PROJECT NO. EX\_PATCH

PCN

PROJECT LOCATION: US 2, FROM JCT ND 1 TO MILE POINT 307

PROJECT DESCRIPTION: HOT BITUMINOUS PATCHING

<b>GOVERNING SPECIFICATION:</b> Standard Specifications adopted by the North Dakota Department of Transportation October 2002; Standard Drawings currently in effect; and other Contract Provisions submitted herein.	
I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of North Dakota.  APPROVED DATE: _____  _____ District DISTRICT ENGINEER NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
_____ DESIGNER	APPROVED DATE: _____  _____ DIRECTOR, OFFICE OF PROJECT DEVELOPMENT

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**LIST OF STANDARD DRAWINGS**

D-704-7, 8	Breakaway System for Construction Zone Signs
D-704-9,10,11,12	Construction Sign Details
D-704-13	Barricade Details
D-704-14	Construction Sign and Barricade Assembly Details
D-704-20,22,26	Construction Sign and Barricade Location Details
D-704-33 & 34	Sign Layout For One Lane Closure
D-706-1	Type C Field Laboratory
D-762-4	Pavement Marking
D-762-6	Short Term Pavement Marking

Standard Drawings are not included in the plans, but can be obtained at the District Offices or the Central Office of the North Dakota Department of Transportation.

**ESTIMATED QUANTITIES**

Item No.	Spec No.	Code No.	Description	Units	Estimated Quantity
1	103	0100	CONTRACT BOND	L SUM	1
2	401	0150	SS1H OR CSS1H OR MS1 EMULSIFIED ASPHALT	GAL	9,810
3	408	0176	HOT BITUMINOUS PAVEMENT CL 27	TON	14,552
4	408	0445	PG 58-28 ASPHALT CEMENT	TON	874
5	704	0100	FLAGGING	MHR	85
6	704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,506
7	704	1052	TYPE III BARRICADE	EA	12
8	704	1060	DELINEATOR DRUMS	EA	48
9	704	1067	TUBULAR MARKERS	EA	295
10	704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	1
11	706	0300	FIELD LABORATORY-TYPE C	EA	1
12	762	0405	SHORT TERM 4IN BROKEN LINE-PNT TAPE OR RSD MRK	LF	14,367
13	762	1104	PVMT MK PAINTED 4IN LINE	LF	129,302

**PLAN NOTES**

408-P01 HOT BITUMINOUS PAVEMENT: The hot bituminous pavement shall be paver laid in one lift. The overlay shall have a 75 ft transition at the beginning and ending of each overlay section. The contractor shall be required to spread hot bituminous mix ahead of the paving operation to level rutting or rough areas designated by the engineer. The additional hot bituminous mix and asphalt cement required for leveling shall be measured and paid for by the ton of "Hot Bituminous Pavement CL 27" and "PG 58-28 Asphalt Cement". This shall be considered full payment for performing this additional work. The leveling course described above shall be compacted with a pneumatic roller prior to placement of the overlay. The hot bituminous pavement shall be placed and accepted according with Section 408, with the following revisions:

- X Compaction shall meet the requirements of Section 408.04 I.2 "Ordinary Compaction".
- X Aggregate gradation tolerances in Section 408.05 A.1 will apply. The pay factor for the day's production will be adjusted regardless of the air voids. The air voids will not be determined as specified in Section 408.05 C.
- X The bitumen uniformity tolerances in Section 408.05 B.2 will not apply.
- X The Contractor will provide bitumen, aggregate, and blend proportions to the Department for a mix design, 7 working days before production begins.

- 408-P02 The shoulder slough shall be paved at the same time as the adjacent driving lane.
- 408-P03 MILLED TAPER: HBP overlays and patches placed after September 15 shall require a 75' milled transition tapered to the depth of the overlay at each end of the overlay. The costs for milling these transitions shall be incidental to the unit price bid for "Hot Bituminous Pavement - CL 27."
- 704-254 TRAFFIC CONTROL FOR UNEVEN PAVEMENT: The contractor shall provide traffic control devices in accordance with department standards prior to paving. The contractor has the option of making the paving lanes even at the end of each day's paving operation or signing for the uneven pavement as follows: Install "Uneven Lanes" signs (Sign No. W8-11-48) and supplemental plates (Sign No. 20-52-54), identifying the distance, on both right and left side of the roadway in advance of the beginning of the uneven pavement and at major intersections. A major intersection shall be defined as a CMC, State, U.S. highway, or Interstate ramp. Pave the alternate lane on subsequent day to make the lanes even. Short-term pavement markings shall be installed before sunset when the lanes are even.

All traffic control devices shall be left in place until the lanes are even. These signs for uneven pavement are included in the "Traffic Control Devices List" and will be measured and paid for at the contract unit price for each device. No extra compensation will be allowed for relocation due to work progression.

- 704-P01 TRAFFIC CONTROL FOR BITUMINOUS SURFACING: Traffic control for the thin lift overlay shall consist of a temporary lane closure and flagging. Traffic Control Devices shall comply with the following Standard Drawings:
- 1) Standard D-704-33 & 34: For lane closure and flagging during paving operations. For estimate purposes 1 approach installation was provided and 36 delineator drums were provided for crossing the lane closure.
  - 2) Standard D-704-20, layout G: For construction signing during paving operations. Sign G20-1b-60 will not be required. Signs G20-2a-48, R2-1-48 and R2-1a-24 are include in D-704-33 & 34. Signing will be required at junctions: ND 1, ND 35, and (3) CMC's.
  - 3) Standard D-704-22, layouts K and L: For trucks hauling material.
  - 4) Standard D-704-26, layout GG: For paving operations.
  - 5) Standard Drawings D-704-7, 8, 9, 10, 11, 12, 13, and 14 are applicable.

Quantities have been developed based on a single lane closure and a 5.5 mile limitation for the paving operations. The required traffic control signs and devices are included in the "Traffic Control Devices List" and will be measured and paid at the Contract Unit Price for each device. Additional devices required to accommodate the Contractor's operation shall be the Contractor's responsibility.

**BASIS OF ESTIMATE**

List of Special Provisions: None  
 Scope of Work: U.S. 2, from junction ND 1 to mile point 307 (both roadways).  
 Exceptions: None  
 ADT: Total = 3259, Passenger = 2629, Trucks = 630.

Overlay/Patch Locations:				
Typical Section	Begin Mile Point	End Mile Point	Length* (Miles)	Description
1	295.468	295.831	0.363	Eastbound
1	295.468	300.764	5.296	Westbound
1	301.231	304.856	3.625	Eastbound
1	305.219	306.819	1.600	Westbound
Total Length			10.884	

\* Length does not include the 75 ft begin and end transition tapers.

Typical Sections:

- 1) Locations: All
- Description: 24 ft width, 1.5 in depth, (2) Shoulder sloughs @ 6% slope = 2 @ 3.2 ft width
- Cross Sectional Areas: HBP CL 27 = 3.400 sf

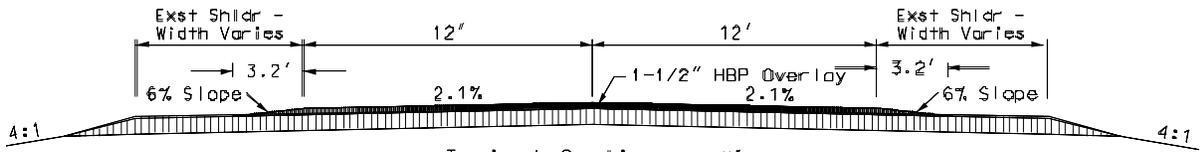
Design Calculations:			
Description	Unit	Width (ft)	Unit/Mile Section 1
<u>Surfacing Quantities:</u>			
SS-1h or CSS-1h or MS-1 Emulsified Asphalt @ 0.05 gal/sy for tack coat	GAL	24+6.4	892
Hot Bituminous Pavement CI 27 @ 2.0 ton/cy	TON	24+6.4	1330
PG 58-28 Asphalt Cement @ 6% of HBP CI 27	TON		79.8
Additional Surfacing Quantities:	SS1-h (GAL)	HBP CI 27 (TON)	120-150 (TON)
Begin and End Tapers:	101	76	5
<u>Pavement Marking Quantities:</u>			
Short Term - 4 Inch Line (Painted, Tape or Raised Markers): 4" white lane lines, 10' line, 30' skip	LF		1320
Pavement Marking Painted - 4 in line 4" white lane lines, 10' line, 30' skip 4" white edge line 4" yellow edge line	LF LF LF		1320 5280 5280

TRAFFIC CONTROL DEVICES LIST					
Sign Number	Sign Size	Description	Quantity Required	Units Per Sign	Units Sub Total
D3-36	36"x 6"	STREET NAME SIGN (SIGN AND INSTALLATION ONLY)		6	0
G20-1a-60	60"x 36 24"	ROAD WORK NEXT MILES		34	0
G20-1b-60	60"x 24"	WORK IN PROGRESS / NO WORK IN PROGRESS		26	0
G20-2a-48	48"x 24"	END ROAD WORK	2	19	38
G20-4-36	36"x 18"	PILOT CAR FOLLOW ME		18	0
G20-50a-72	72"x 36"	ROAD WORK NEXT MILES RT & LT ARROWS	2	37	74
G20-52a-72	72"x 24"	ROAD WORK NEXT MILES RT or LT ARROW	4	30	120
G20-55-96	96"x 48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT		59	0
M1-1-36	36"x 36"	ROUTE MARKER (POST AND INSTALLATION ONLY)		10	0
M1-4-24	24"x 24"	ROUTE MARKER (POST AND INSTALLATION ONLY)		10	0
M1-5-24	24"x 24"	ROUTE MARKER (POST AND INSTALLATION ONLY)		10	0
M3-1-24	24"x 12"	NORTH (MOUNTED ON ROUTE MARKER POST)		7	0
M3-2-24	24"x 12"	EAST (MOUNTED ON ROUTE MARKER POST)		7	0
M3-3-24	24"x 12"	SOUTH (MOUNTED ON ROUTE MARKER POST)		7	0
M3-4-24	24"x 12"	WEST (MOUNTED ON ROUTE MARKER POST)		7	0
M4-8-24	24"x 12"	DETOUR (MOUNTED ON ROUTE MARKER POST)		7	0
M4-9-30	30"x 24"	DETOUR ARROW RIGHT or LEFT / AHD AND RT or LT		15	0
M4-10-48	48"x 18"	DETOUR ARROW RIGHT or LEFT		23	0
M5-1-21	21"x 15"	ARROW AHD AND RT or LT (MOUNTED ON ROUTE MKR POST)		7	0
M5-2-21	21"x 15"	ARROW AHD UP & RT or LT (MOUNTED ON ROUTE MKR POST)		7	0
M6-1-21	21"x 15"	ARROW RT or LT (MOUNTED ON ROUTE MARKER POST)		7	0
M6-2-21	21"x 15"	ARROW UP & RT or LT (MOUNTED ON ROUTE MARKER POST)		7	0
M6-3-21	21"x 15"	ARROW AHD (MOUNTED ON ROUTE MARKER POST)		8	0
R1-1-30	30"x 30"	STOP	4	16	64
R1-1-48	48"x 48"	STOP	1	32	32

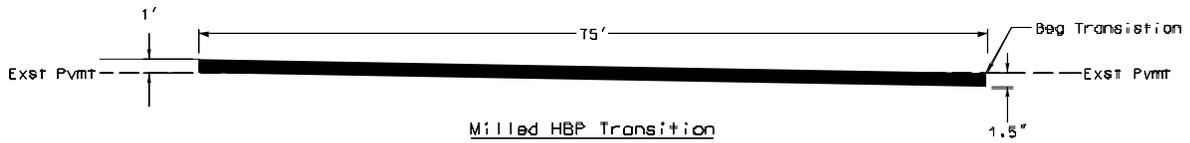
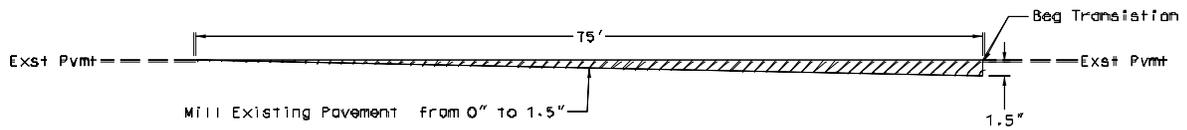
TRAFFIC CONTROL DEVICES LIST					
Sign Number	Sign Size	Description	Quantity Required	Units Per Sign	Units Sub Total
R1-1a-18	18"x 18"	STOP and SLOW PADDLE Back to Back	1	5	5
R1-2-48 60	4860"x4860	YIELD		29	0
R2-1-48	48"x 60"	SPEED LIMIT	7	39	273
R2-1a-24	24"x 18"	MINIMUM FEE \$40 80 (MOUNTED ON SPEED LIMIT POST)	6	10	60
R2-5a-48	48"x 60"	REDUCED SPEED AHEAD	2	39	78
R3-7-48	48"x 48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	0
R4-1-48	48"x 60"	DO NOT PASS	2	39	78
R4-7-48	48"x 60"	KEEP RIGHT SYMBOL		39	0
R5-1-48	48"x 48"	DO NOT ENTER		35	0
R6-1-36	36"x 12"	ONE WAY RIGHT or LEFT		13	0
R7-1-12	12"x 18"	NO PARKING		11	0
R10-6-24	24"x 36"	STOP HERE ON RED		16	0
R11-2-48	48"x 30"	ROAD CLOSED		28	0
R11-2a-48	48"x 30"	STREET CLOSED		28	0
R11-3a-60	60"x 30"	ROAD CLOSED _____ MILES AHEAD LOCAL TRAFFIC ONLY		31	0
R11-3c-60	60"x 30"	STREET CLOSED _____ MILES AHEAD LOCAL TRAFFIC ONLY		31	0
R11-4a-60	60"x 30"	STREET CLOSED TO THRU TRAFFIC		1	0
W1-3-48	48"x 48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	0
W1-4-48	48"x 48"	RIGHT or LEFT REVERSE CURVE ARROW		35	0
W1-4b-48	48"x 48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	0
W1-6-48	48"x 24"	LARGE ARROW		26	0
W3-1a-48	48"x 48"	STOP AHEAD SYMBOL		35	0
W3-3-48	48"x 48"	SIGNAL AHEAD SYMBOL		35	0
W4-2-48	48"x 48"	RIGHT or LEFT LANE TRANSITION SYMBOL	4	35	140
W5-1-48	48"x 48"	ROAD NARROWS		35	0
W5-8-48	48"x 48"	THRU TRAFFIC RIGHT LANE		35	0
W5-9-48	48"x 48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	0
W6-3-48	48"x 48"	TWO WAY TRAFFIC SYMBOL		35	0
W8-1-48	48"x 48"	BUMP		35	0
W8-3a-48	48"x 48"	PAVEMENT ENDS		35	0
W8-7-48	48"x 48"	LOOSE GRAVEL		35	0
W8-9a-48	48"x 48"	SHOULDER DROP-OFF		35	0
W8-11-48	48"x 48"	UNEVEN LANES		35	0
W8-12-48	48"x 48"	NO CENTER STRIPE		35	0
W8-53-48	48"x 48"	TRUCKS ENTERING HIGHWAY		35	0
W8-54-48	48"x 48"	TRUCKS ENTERING AHEAD or _____ FT	2	35	70
W8-55-48	48"x 48"	TRUCKS CROSSING AHEAD or _____ FT	2	35	70
W8-56-48	48"x 48"	TRUCKS EXITING HIGHWAY		35	0
W9-3a-48	48"x 48"	CENTER LANE CLOSED SYMBOL		35	0
W12-2-48	48"x 48"	LOW CLEARANCE SYMBOL		35	0
W13-1-24	24"x 24"	_____ MPH ADVISORY SPEED PLATE (MOUNTED ON WARNING SIGN POST)		11	0
W13-4-48	48"x 60"	RAMP ARROW		39	0
W14-3-64 48	48"x 36"	NO PASSING ZONE		23	0
W20-1-48	48"x 48"	ROAD WORK AHEAD or _____ FT or _____ MILE	5	35	170
W20-2-48	48"x 48"	DETOUR AHEAD or _____ FT		35	0
W20-3-48	48"x 48"	ROAD or STREET CLOSED AHEAD or _____ FT		35	0
W20-4-48	48"x 48"	ONE LANE ROAD AHEAD or _____ FT		35	0
W20-5-48	48"x 48"	RIGHT or LEFT LANE CLOSED AHEAD or _____ FT	4	35	140
W20-7a-48	48"x 48"	FLAGGING SYMBOL	1	35	35
W20-7b-48	48"x 48"	BE PREPARED TO STOP		35	0
W20-7k-24	24"x 18"	_____ FEET (MOUNTED ON WARNING SIGN POST)		10	0
W20-8-48	48"x 48"	STREET CLOSED		35	0
W20-51-48	48"x 48"	EQUIPMENT WORKING		35	0
W20-52-54	54"x 12"	NEXT _____ MILES (MOUNTED ON WARNING SIGN POST)	4	12	48

TRAFFIC CONTROL DEVICES LIST					
Sign Number	Sign Size	Description	Quantity Required	Units Per Sign	Units Sub Total
W21-1a-48	48"x 48"	MEN WORKING SYMBOL		35	0
W21-2-48	48"x 48"	FRESH OIL		35	0
W21-3-48	48"x 48"	ROAD MACHINERY AHEAD or FT		35	0
W21-5-48	48"x 48"	SHOULDER WORK		35	0
W21-5a-48	48"x 48"	RIGHT SHOULDER CLOSED		35	0
W21-5b-48	48"x 48"	RIGHT SHOULDER CLOSED AHEAD or FT		35	0
W21-6a-48	48"x 48"	SURVEY CREW AHEAD		35	0
W21-50-48	48"x 48"	BRIDGE PAINTING AHEAD or FT		35	0
W21-51-48	48"x 48"	MATERIAL ON ROADWAY		35	0
W22-8-48	48"x 48"	FRESH OIL LOOSE ROCK		35	0
	24"x 24"	TAKE TURNS (6" D letters) (MOUNTED ON STOP SIGN POST)		11	0
		SPECIAL SIGN - NO.1			0
<b>Total Units:</b>					<b>1500</b>
Pay Item Description			Unit	Spec & Code	Quantity
TRAFFIC CONTROL SIGNS			UNIT	704-1000	1500
FLAGGING			MHR	704-0100	
ATTENUATION DEVICE - TYPE B-55			EACH	704-1041	
ATTENUATION DEVICE - TYPE B-65			EACH	704-1043	
ATTENUATION DEVICE - TYPE B-70			EACH	704-1044	
TYPE I BARRICADES			EACH	704-1050	
TYPE II BARRICADES			EACH	704-1051	
TYPE III BARRICADES			EACH	704-1052	12
DELINEATOR DRUMS			EACH	704-1060	48
TRAFFIC CONES			EACH	704-1065	
TUBULAR MARKERS			EACH	704-1067	295
DELINEATOR			EACH	704-1070	
FLEXIBLE DELINEATORS			EACH	704-1072	
VERTICAL PANELS - BACK TO BACK			EACH	704-1081	
SEQUENCING ARROW PANEL - TYPE A			EACH	704-1085	
SEQUENCING ARROW PANEL - TYPE B			EACH	704-1086	
SEQUENCING ARROW PANEL - TYPE C			EACH	704-1087	1
SEQUENCING ARROW PANEL - TYPE C - CROSSOVER			EACH	704-1088	
TYPE B FLASHERS			EACH	704-1095	
PORTABLE PRECAST CONCRETE MED BARRIER			EACH	704-3501	
PRECAST CONCRETE MED BARRIER - STATE FURNISHED			EACH	704-3510	
RAISED PAVEMENT MARKERS			EACH	762-0200	
SHORT TERM 4IN LINE - TYPE R			LF	762-0420	
SHORT TERM 4IN LINE - TYPE NR			LF	762-0430	
OBLITERATION OF PVMT MRK			SF	762-1500	
FLASHING BEACON - POST MOUNTED			EACH	772-2110	

**DETAIL DRAWINGS**



Typical Section - #1  
All Locations  
Eastbound and Westbound  
HBP Area = 3.400 SF



**ENGINEERS ESTIMATE**

EX\_PATCH

U.S. 2, FROM JCT ND 1 TO MILE POINT 307

HOT BITUMINOUS PATCHING

Bid Opening: 01/17/1997

Prepared By: MSG

Date: mm/dd/yyyy

Revised: mm/dd/yyyy

Item No.	Spec No.	Code No.	Description	Units	Estimated Quantity	Unit Cost	Total Cost
1	103	0100	CONTRACT BOND	L SUM	1	\$5,650.00	\$5,650.00
2	401	<del>0152</del> 0150	SS1H OR CSS1H OR MS1 EMULSIFIED ASPHALT	GAL	9,810	0.85	8,338.50
3	408	0176	HOT BITUMINOUS PAVEMENT CL 27	TON	14,552	15.00	218,280.00
4	408	<del>0320</del> 0445	<del>120-150</del> PG 58-28 ASPHALT CEMENT	TON	874	145.00	126,730.00
5	704	0100	FLAGGING	MHR	85	15.00	1,275.00
6	704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,500	3.00	4,500.00
7	704	1052	TYPE III BARRICADE	EA	12	110.00	1,320.00
8	704	1060	DELINEATOR DRUMS	EA	48	45.00	2,160.00
9	704	1067	TUBULAR MARKERS	EA	295	45.00	13,275.00
10	704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	1	1500.00	1,500.00
11	706	0300	FIELD LABORATORY-TYPE C	EA	1	2750.00	2,750.00
12	762	0405	SHORT TERM 4IN BROKEN LINE-PNT TAPE OR RSD MRK	LF	14,367	0.25	3,591.75
13	762	1104	PVMT MK PAINTED 4IN LINE	LF	129,302	0.04	5,172.08
						Sub Total	\$394,542.25
						10 % Eng. Cost	\$39,454.23
						Total	\$433,996.48