



Minnesota Department of Transportation

Metro District
1500 West County Road B2
Roseville, MN 55113
Phone: 651-234-7369
Fax: 651-234-7358

Office Memorandum

December 15, 2014

To: **Ron Rauchle**
Design Project Manager

From: **David Wald** *DSW*
District Materials Soils Engineering Specialist Senior

CONCUR: **Tim Clyne, P. E.** *TRC*
Metro District Materials & Program Delivery Engineer

Subject: **SP 2781-462(I-94)**
At 5th St. South exit Ramp in Minneapolis from WB I-94.
(Re-orient 5th St S to 7th St S)- construct new Bridge #27W27, Hennepin County.
R.P. 233+00.680 to RP 233+00.900
Recommendations for Grading, Base, and Surfacing

PROGRAMMED LETTING DATE

May 15, 2015

DESIGNER

Jonathan McPherson – SRF Consulting group

GENERAL PROJECT INFORMATION

Program Category: BR
Fund Designators: TED
Cost: \$9,790,000

This project consists of re-directing traffic from 5th to 7th Street from I-94 WB in Minneapolis. Work will consist of building a new bridge across 35W to 7th Street along with approach work. Minor work may also be needed on lanes or shoulders on 35W, I-94 and TH55 for bridge pier construction and on a section of 5th St. Ramp south of the Bridge some slope work and drainage work will be done.

An Equal Opportunity Employer



TRAFFIC DATA

Official ESAL forecasts have not been provided for this project. The MiniESAL Forecasting Tool has been used to estimate ESALs for the roadway for design purposes based on projected AADT volumes from the staff approved layout. Using the Default 5.9% HCADT provides the following ESAL projections:

LOCATION	20 year Flex	20 year Rigid	35 year Rigid
TH 94 WB Off-Ramp to 5 th St., Minneapolis	1,102,000	1,486,000	2,635,000

LIFE CYCLE COST ANALYSIS

This project is less than 7,500 square yards, so according to Chapter 7 of the MnDOT Pavement Design Manual, a Life Cycle Cost Analysis is not required.

ALTERNATE BID REQUIREMENT

The Alternate Bid requirement is not warranted for this project.

CONSTRUCTION AND MAINTENANCE HISTORY

This segment of I-94 was constructed in 1968. The 5th St. Ramp was originally constructed under S.P. 2781-84. Plans show the pavement consisted of 9 inches of Continuous Reinforced Concrete Pavement over 3 inches of Aggregate Base and 12” of Selected Granular Material. In the last 30 years, multiple mill and overlay Projects have been through the area of the 5th St. Ramp, but the most recent was Project S.P.2781-415 in 2012, which consisted of a 2” mill and 2” overlay.

SOILS INFORMATION

In the fall of 2014, three piezometers were installed, and a total of 8 auger borings were taken by the Metro soils crew. MnDOT Foundations also had additional borings at the bridge.

In place slope dressing thicknesses encountered vary from 4” to 5” with an average of 4”. The designer may use a 4” dimension to establish quantities available for reuse.

On the north end of the proposed bridge at existing 7th street at station 102+00 borings through the pavement encountered 3.5” of bituminous over 12” of Concrete. Loamy Sand and slightly-plastic Sandy Loams were found below the concrete to a depth of 9 feet. The south end of the proposed Bridge around station 112+00 slightly plastic Loamy Sand and Sandy Loam were encountered to a depth of 9 feet. Where the new ramp matches the old ramp (station 112+50 – 114+00) soil borings encountered 2” of bituminous over 10” of concrete. Below the concrete was slightly-plastic Sandy Loams to a depth of 8-9 feet and beneath that was a Loamy Sand.

An Equal Opportunity Employer



Ground Water Data

Ground water elevations were monitored for the piezometers listed below.

Ground water elevations encountered during construction may vary somewhat depending on seasonal and annual rainfall variations.

The following tabulation of piezometer readings should appear in the plans or special provisions to alert the Contractor of existing ground water conditions. Additional readings will be furnished upon request.

Piezometer	x - coordinate	y - coordinate	High Elevation	Low Elevation	Terminate
7009P	533553.265	164861.158	796.90	796.70	A
7010P	533492.037	164658.428	797.00	796.80	A
7011P	533639.304	164384.182	798.20	798.10	A

|| A) Terminate with construction.

Piezometer Abandonment

The designer should include an item in the plans for proper sealing of abandoned piezometers in accordance with MDH rules.

DESIGN RECOMMENDATIONS

All work shall be performed in accordance with the most current English version of MnDOT Standard Specifications for Construction and MnDOT Materials Lab Supplemental Specifications for Construction.

GENERAL GRADING AND BASE

For Excavation and Embankment, use Special Provision 2106 instead of Specification 2105.

Strip all sod and topsoil from areas to be disturbed by construction and reuse as Slope Dressing. Payment for stripping is included in Excavation – Common and payment for Slope Dressing placement is included in Common Embankment.

Do not use a nuclear gauge to determine density or moisture content for Quality Assurance or Verification testing for any material meeting MnDOT 2105, 2106, 2112, 2211, 2212, 2215, 2118, 2221, 2331, 2451, 2502, or 2511. Use of a nuclear gauge for Quality Control testing is allowed according to the Grading & Base Manual.

An Equal Opportunity Employer



In any case where granular embankments or backfill join non-granular soil embankments or backfill, provide a 1:20 (V:H) transition between the change in material to prevent an abrupt soils differential. Construct the 1:20 (V:H) transition such that the granular backfill material overlays the adjacent non-granular soil backfill.

Where connecting to existing roadways at the termini of proposed construction, cut vertically to the bottom of the existing surfacing or to the bottom of the new surfacing design, whichever is deeper, then at a 1:20 (V:H) taper to the bottom of the recommended subgrade excavation.

Where matching into in-place crossroads, cut vertically to the bottom of the in-place surfacing, then at a 1V:4H slope to the bottom of the recommended subgrade excavation.

As a precautionary measure from a soils standpoint, traffic lanes to be used during construction must be delineated to keep vehicles a safe distance away from the adjacent excavation. The delineation should coincide with points established by projecting 1(V):2(H) or greater (flatter) slope between the edge of the traffic surface and the bottom of the excavation.

Provide a saw cut where placing new pavement next to in-place pavement to ensure a uniform joint.

The Provisions of MnDOT 1205 are supplemented with the following:

S-.1 Soil boring logs for this project are available at
<http://www.mndot.gov/metro/materials/results.html>

The Contractor is hereby reminded of his responsibility under State Law to contact all Utilities that may have facilities in the area. Contact must be made through Gopher State One-Call.

Subgrade Excavation

Unless otherwise required, provide for an 18" subcut below the Top of the Grading Subgrade. Backfill with Select Granular Material.

SURFACING RECOMMENDATIONS

Provide for the following pavement designs:

Design #1 – Both ends of the Bridge

Provide for removing the existing bituminous and/or concrete pavement where needed.

*4.0"	Type SP 12.5 Wearing Course Mixture (4,F)	{SPWEB440F}(PMB)
2.0"	Type SP 12.5 Non-Wearing Course Mixture (4,B)	{SPNWB430B}
6.0"	Aggregate Base, Class 6	{Spec. 2211}
18.0"	Select Granular Material	

* Place Wearing Course in 2 – 2" lifts.

Note: Although the traffic forecasting tool predicts between 1-3 million ESALS, a higher traffic level and binder grade are being used because the ramp is from a major interstate.

Design #2 – Impacts for Pier Construction

An Equal Opportunity Employer



Provide for removing the existing bituminous and/or concrete pavement where needed. Provide for a sawcut longitudinally at the lane mid-point (6' from edge of pavement) or at the lane joint (12' from the edge of pavement). Replace the pavement according to the following chart:

Location	INP. PVMT	PROPOSED PVMT.
6th Street Ramp	Mainline	9" Non-reinforced Concrete
	Mainline	3" Class 5
	Mainline	12" Select granular
Ramp from TH55 NB to Washington Ave.	Mainline	9" CRCP Concrete
	Mainline	3" Class 5
	Mainline	12" Selected granular
Ramp from I-35W NB to Washington Ave.	Mainline	9" CRCP Concrete
	Mainline	3" Class 5
	Mainline	12" Selected granular
Ramp from TH55 NB to I-35W NB	Mainline	9" CRCP Concrete
	Mainline	3" Class 5
	Mainline	12" Selected granular
I-35W NB and SB	Mainline	3" Bituminous
	Mainline	9" CRCP Concrete
	Mainline	3" Class 5
	Mainline	12" Selected Granular
	Outside Shoulder	7" Bituminous
	Outside Shoulder	3" Class 5
	Outside Shoulder	12" Selected Granular
RAMP I-35W SB to I-94 WB and TH55 SB	Mainline	9" CRCP Concrete
	Mainline	3" Class 5
	Mainline	12" Selected Granular
	Inside Shoulder	7" Bituminous
	Inside Shoulder	3" Class 5
	Inside Shoulder	12" Selected granular

Place bituminous in lifts not more than 3" thick.

For all concrete pavement sections, provide 1-1/4" epoxy coated dowel bars, 15' non-skewed transverse joints, C2H-D joint detail and L2KTH joint detail between new pavement and curb & gutter. Drill and

An Equal Opportunity Employer



grout #4 epoxy coated tie bars along the longitudinal joint adjacent to existing concrete. Drill and grout 1-1/4" epoxy coated dowel bars along the transverse joint adjacent to existing concrete.

Design #3 – Curb Replacement

If bituminous pavement is removed to replace the curb and gutter, use the following pavement section where needed.

7.0" Type SP 12.5 Wearing Course Mixture (4,F)	{SPWEB440F}(PMB)
6.0" Aggregate Base, Class 6	{Spec. 2211}

Place bituminous in lifts not more than 3" thick.

BITUMINOUS SPECIFICATIONS

|| Include the most recent Special Provisions for (2360) Plant Mixed Asphalt Pavement – Polymer Modified Binder and (3151) Bituminous Material – Polymer Modified Binder from the MnDOT Boiler Plate SP2014.

Include a "PMB" after any mixture designation codes in typical sections, tabulations, and special provisions. An example mixture designation code would be SPWEA340C (PMB).

Include a note in the Statement of Estimated Quantities for the affected 2360 pay items that reads, "(#) Plant Mixed Asphalt Pavement – Polymer Modified Binder (PMB) will need to meet the Percent Recovery requirements indicated in Table 3151.2A of the Special Provisions."

|| This project will not have the ride quality evaluated by specification 2399, instead include in the provisions:

|| The sentence "In addition to the list the above pavement surface must meet requirements of 2399 (Pavement Surface Smoothness) requirements." is deleted from **2360.3.E Surface Requirements**. The requirements of 2360.3.E Surface Requirements will apply.

|| Provide a uniform tack coat between all bituminous layers and prior to placing any bituminous mixtures on existing pavement in accordance with Specification 2357.

|| Compaction of all bituminous mixtures shall be in accordance with 2360.3.D.2, Ordinary Compaction.

|| Joint Adhesive shall be used on longitudinal construction joints in accordance with Special Provision 2331 Pavement Joint Adhesive.

|| Provide the joint adhesive Special Provision found at the MnDOT Bituminous website at: <http://www.dot.state.mn.us/materials/bituminous.html>.

An Equal Opportunity Employer



The first paragraph of 2360.2.G.4.b Sampling and Testing of the attached 2360 (Plant Mixed Asphalt Pavement) Specification is revised as shown below:

Take QC samples at random tonnage or locations, quartered from a larger sample of mixture. Sample randomly and in accordance with the Schedule of Materials Control. Determine random numbers and tonnage or locations using the Bituminous Manual, Section 5-693.7 Table A; ASTM D 3665, Section 5; or an Engineer approved alternate method of random number generation. ~~Sample either behind the paver or from the truck box at the plant site. Other sampling locations can be approved by the engineer. The Contractor must decide and notify the Engineer where samples will be taken before production begins. The Contractor and Engineer must both agree to a change of sampling location once production has begun.~~ Sample mixture from behind the paver. Sampling from the truck box at the plant site is not allowed unless approved by the Engineer. In addition to the QC sample, the Contractor will also bring an additional split of the mixture sample to the plant site and store for the Department for 10 calendar days. The procedure for truck box sampling is on the Bituminous Office website. The Contractor will obtain at least a 130 pound [60 kg] sample. Split the sample in the presence of the inspector. The inspector will retain possession of the Agency portion of each split sample that is taken and randomly submit a minimum of one sample, on a daily basis, to the District laboratory for Verification Testing (see 2360.2.G.3). Store compacted mixture specimens and loose mixture companion samples for 10 calendar days. Label these split companion samples with companion numbers.

CONCRETE SPECIFICATIONS

Include the following Special Provisions:

- 2301 Concrete Pavement
- 2301 Drill and Grout Reinforcement Bar (Epoxy Coated)
- 2406 Bridge Approach Panels
- 2461 Structural Concrete
- 3137 Coarse Aggregate for Portland Cement Concrete
- 3302 Dowel Bars

TURF ESTABLISHMENT

For turf establishment recommendations, the Designer should contact MnDOT Environmental Services, Turf Establishment Unit.

SOILS NOTES

Statements in this memo which have a vertical line drawn along the left margin should appear in the Plans.

SPECIAL PROVISIONS

Statements in this memo which have a double vertical line drawn along the left margin should appear in the Special Provisions.

An Equal Opportunity Employer



- cc: N. Vanaki – Golden Valley Construction *
R. Rauchle – MS 050 *
G. Geib – MS 050 *
T. Andersen – MS 645 *
S. Henrichs – MS 645 *
J. Garrity – MS 645 *
M. Masten – MS 645*
R. Golish – MS 645*
T. Beaudry – MS 645 *
S. Lund – MS 645 *
T. Swanson – MS 692 *
P. Merchlewicz – MS 692 *
T. Otte – MS 050 *

*Electronic copy only

