

**SPS-9A Construction Report  
U.S. Highway 81, Southbound  
80 Miles Southwest of Lincoln, Nebraska  
(4 Miles) North of the Kansas Border**

**Sections 310901 to 310903**

**Federal Highway Administration  
LTPP Division  
North Central Region**

Report Prepared By:

Ronald R. Urbach, CET  
Benjamin J. Worel, PE  
Braun Intertec Corporation  
6875 Washington Avenue South  
P.O. Box 39108  
Minneapolis, Minnesota 55439-0108

June 24, 1996

**BRAUN**<sup>SM</sup>  
**INTERTEC**

**Braun Intertec Corporation**  
6875 Washington Avenue South  
P O Box 39108  
Minneapolis, Minnesota 55439-0108  
612-941-5600 Fax 942-4844

*Engineers and Scientists Serving  
the Built and Natural Environments®*

June 24, 1996

Mr. Richard C. Ingberg  
Regional Engineer  
Braun Intertec Corporation  
6875 Washington Avenue South  
P.O. Box 39108  
Minneapolis, MN 55439-0108

Dear Mr. Ingberg:

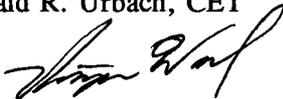
Enclosed is the Construction Report for the Nebraska SPS-9A project.

If you have any questions about this report please call Ronald Urbach or Benjamin Worel.

Sincerely,



Ronald R. Urbach, CET



Benjamin J. Worel, PE

Attachment:  
Report

c: Mr. Monte Symons, FHWA  
Mr. John Miller, PCS/Law  
Mr. Cameron Kruse, Braun Intertec

g:\wpfiles\becky\ron.u\96constr.rep\9a

## Table of Contents

<b>Description</b>	<b>Page</b>
1.0 Introduction . . . . .	1
1.1 Experimental Cell . . . . .	1
1.2 Summary of Supplemental Test Sections . . . . .	1
1.3 Project Location . . . . .	1
1.4 Type of Roadway . . . . .	1
1.5 Traffic Characteristics . . . . .	2
1.7 Geometry . . . . .	2
1.8 Underground Structures Within Test Sections . . . . .	2
1.9 Installation of Weather Station . . . . .	2
1.10 Installation of WIM . . . . .	2
1.11 Scheduling for Opening of Traffic . . . . .	3
1.12 General Problems . . . . .	3
1.14 Material Sampling and Testing . . . . .	4
1.15 Contractor Information . . . . .	4
1.16 Summary of Key Construction Equipment . . . . .	4
2.0 Project Details . . . . .	5
2.1 Construction Activities . . . . .	5
2.2 General Construction Remarks . . . . .	6
2.3 General Comments from the LTPP Representative . . . . .	8

### Attachments

- Attachment A SHRP/LTPP Project Location Site Map
- Attachment B Project Location Map
- Attachment C Test Section Layout
- Attachment D LTPP SPS Project Deviation Report
- Attachment E Pre and Post Construction Sampling and Testing Plan
- Attachment F Samples Taken for Material Reference Library (MRL)

**SPS-9A Construction Report  
U.S. Highway 81, Southbound  
80 Miles Southwest of Lincoln, Nebraska  
(4 Miles) North of the Kansas Border  
Sections 310901 to 310903**

## **1.0 Introduction**

The primary objective of the SPS-9A project is to validate the SHRP binder specifications.

- To do a comparison of the SHRP binder selected based on the average maximum and minimum temperatures and the annual precipitation.
- Compare to local agency mix designs.
- Comparisons to an alternate binder selected to evaluate either a thermal cracking or rutting.
- All three test sections in the core experiment should have the same pavement cross-section for comparison.
- Additional test sections can be added as supplemental test sections, such as stone-matrix asphalt (SMA).

## **1.1 Experimental Cell**

This experiment is in the dry-freeze zone. The subgrade soils are classified as fine grained.

The highest average monthly maximum daily temperature is 90 degrees Fahrenheit to 100 degrees Fahrenheit. Lowest annual temperature is -20 degrees Fahrenheit to -10 degrees Fahrenheit.

The annual precipitation is 10 to 24 inches.

## **1.2 Summary of Supplemental Test Sections**

The agency has added one supplemental test section to this project. It is a stone-matrix asphalt (SMA). This test section has the same cross-section or pavement thickness as the core experiment test section.

## **1.3 Project Location**

This SPS-9A project is located in the southeast part of Nebraska. It is located on US Highway 81 southbound, about 50 miles south of York, Nebraska, or about 30 miles southwest of Lincoln, Nebraska. Attachment A shows the location of the SPS-9A project on a map which indicates all of the SPS and GPS test sections in Nebraska. Attachment B shows the project location on a Thayer County map.

## **1.4 Type of Roadway**

This project consists of new construction of a realignment west of the existing US 81 roadway and will eventually be used for the southbound two-lane traffic for US 81. The grading was completed in 1994. The realignment will provide two-way traffic in both north and south directions until the existing roadway is reconstructed in 1996. Attachment C shows the test section layout.

## 1.5 Traffic Characteristics

The following traffic characteristics exist for the project as reported by Nebraska.

Annual average daily traffic (two directions):	4,725
Percent heavy trucks and combinations (of AADT):	26 percent
Estimated 18-kip ESAL rate and study lane (ESALs/year):	119,000
Total design 18-kip ESAL applications in design lane:	2,400,000
Design period (years):	20

## 1.6 Known Deviations From Guidelines

The following are deviations that were encountered during construction of this SPS-9A project.

- Two-way traffic on the new roadway will exist until the existing original road has been reconstructed in 1996.
- The SMA pavement materials were placed and extended into the last 75 feet (test section stationing 4+25 through 5+00 of the control test section. This control test section has been assigned section number 310901.

Attachment D contains the project deviation report.

## 1.7 Geometry

This roadway is relatively straight with maximum vertical grades less than 1 percent.

## 1.8 Underground Structures Within Test Sections

The test sections were located to avoid culverts.

## 1.9 Installation of Weather Station

The LTPP weather station will be installed in 1996. It will be located at the agency weigh station that is located about 4 miles north of the SPS-9A project. The foundation and chainlink fence were installed in the fall of 1995.

## 1.10 Installation of WIM

The weigh-in-motion (WIM) equipment was manufactured by International Road Dynamics. Their address is:

702 43rd Street East  
Saskatoon, Saskatchewan  
Pone: (306) 934-6777

The WIM is a bending plate style Model 486SX. This equipment was installed by Kayten Electric from Hodrege, Nebraska. It was installed at project stationing 10663+00. This is about 6 miles north of the SPS-9A project. The traffic pattern at the WIM location should be representative of the SPS-9A project. There are no main highways or towns located between the WIM and the test sections.

### **1.11 Scheduling for Opening of Traffic**

Traffic was placed on this SPS-9A project August 15, 1995.

### **1.12 General Problems**

There were several delays because of rain and equipment breakdowns. Most of the delays with the equipment breakdowns were due to problems with the CMI asphalt mix plant.

### **1.13 Resident Engineer Information**

Mr. George Woolstrum  
Special Project Engineer  
Nebraska Department of Roads  
1500 Nebraska Highway 2  
P.O. Box 94759  
Lincoln, Nebraska 68509-4759  
Phone: (402) 479-4791  
Fax: (402) 479-4325

Mr. William Cuda  
Project Manger  
Nebraska Department of Roads  
R.R. 4, Box 86  
York, Nebraska 68467  
Phone: (402) 362-5934

Mr. Frank Doland  
FHWA - Federal Building  
100 Centennial Mall North  
Lincoln, Nebraska 68508-3851  
Phone: (402) 437-5521  
Fax: (402) 437) 5146

### **1.14 Material Sampling and Testing**

Mr. Donald Mazour, Soils and Aggregate Engineer  
Mr. Mark Hassler, Materials Engineer  
Nebraska Department of Roads  
1500 Nebraska Highway 2  
P.O. Box 94751  
Lincoln, Nebraska 68507-4757  
Phone: (402) 479-4791  
Fax: (402) 479-4325

The field sampling and testing and data collection during construction was performed by:

Mr. Mike Harrison, CT3  
Mr. Tom Anderson  
Nebraska Department of Roads  
R.R. 4, Box 86  
York, Nebraska 68467  
Phone: (402) 362-5934

### **1.15 Contractor Information**

All the work was performed by Constructors Incorporated.

Mr. David Branenhoff, Project Manager  
Mr. Scott Gerrard, Project Manager  
Mr. Abe Anshasi, Quality Control Manger  
Mr. Ron Kutz, Grading Superintendent  
Mr. Stephen Clancy, Asphalt Superintendent

Constructors Incorporated  
P.O. Box 80268  
Lincoln, Nebraska 68501  
Phone: (402) 434-1764

### **1.16 Summary of Key Construction Equipment**

The following key equipment was used during construction.

#### **Subgrade Preparation**

- Bomag, soil conditioner
- Farm-style disk
- Ingersoll-Rand Model SP100F single drum stubnosed sheepsfoot compactor
- caterpillar WP20 5 1/2-foot drum with 8-in. spikes, sheepsfoot compactor
- CMI full width soil profiler Model SP-30-ST

- caterpillar 12-foot soil profiler Model TR225B

#### **Dense-Graded Aggregate Base (DGAB) Placement**

- Cedar Rapids Model BSF520 paver
- Motor Grader
- Ingersoll-Rand DA48 double drum compactor
- CMI full width soil profiler Model SP-30-ST
- Tractor Backhoe

#### **Asphalt Paving**

- CMI Asphalt Drum Plant with a capacity of 385 tons per hour

#### **Placement of Asphaltic Concrete Pavement**

- Blaw Knox Model PF200 rubber tired paver
- Cedar Rapids Model BSF520 track paver
- Blaw Knox Model PF500 track paver
- Breakdown roller double drum caterpillar CB534
- Intermediate roller a pneumatic tired Bomag BU12R
- Finish roller Ingersoll Rand DA48 and a Hyster Model C350A
- Asphalt distributor to place a tackcoat

## **2.0 Project Details**

The materials sampling and testing plans, both pre- and post-construction are shown in Attachment E. These plans are dated May 1, 1995.

### **2.1 Construction Activities**

The following construction activities were performed during the construction of this project. Because of the layer thickness requirements, the contractor used a Stringline for thickness control.

#### **Subgrade Preparation**

The upper 6 inches of the subgrade soils was reworked and compacted, as part of the project specifications.

Prior to starting the subgrade preparation work, the contractor used a caterpillar 12-foot wide soil profiler to trim the subgrade approximately 1 to 2 inches above proposed grade. Some areas required additional fill soils.

A Bomag soil conditioner or a motor grader was used to loosen the existing subgrade soils. A farm-style disk was used to dry the soil, or if water needed to be added, to mix it for more

uniform compaction. A caterpillar WP20 sheepsfoot compactor was used to compact the soil. This compactor had a 5 1/2-foot drum with spikes approximately 8 inches in length. Also, an Ingersoll-Rand Model SP100F stubnosed sheepsfoot was also used for compaction. This had a 5-foot drum and spikes of approximately 3 inches in length.

The soils were compacted until the feet of the sheepsfoot walked out of the compacted soils. After the soils had been replaced and compacted, the caterpillar 12-foot wide profiler was used to trim the top of subgrade elevations.

### **Dense-Graded Aggregate Base (DGAB) Placement**

For ease of placement and thickness control for the DGAB, the contractor used a Cedar Rapids Model BSF520 Track Paver for placement. After the DGAB was placed, an Ingersoll-Rand DA48 Twin Drum Compactor was used to compact the dense-graded aggregate base. Water was added to aid in compaction. Because of the coarse gradation, even though the material was compacted properly, it moved underfoot.

### **Asphalt Concrete Plant**

The asphalt concrete for the project was produced in a CMI Drum Plant that was rated at a capacity of 385 tons per hour. This plant was located so that the longest haul distance was about 2 miles.

### **Asphalt Paving**

The asphalt concrete was placed with three different types of pavers: Blaw Knox Model PF200 rubber-tired; a Cedar Rapids Model BSF520 Track Paver; or a Blaw Knox Model PF500 8-Track Paver. After the asphalt concrete was placed, a Caterpillar Model CB534 dual-drum vibratory compactor was used for the breakdown passes. The intermediate rolling was done with a pneumatic-tired Bomag Model BW12R making several passes over the asphaltic concrete. The finishing of the asphaltic concrete surface was done with an Ingersoll-Rand DA 48 vibratory compactor or a Hyster Model C350A twin-drum vibratory compactor.

A tackcoat of CSS-2 emulsified asphalt was placed between each lift of asphalt mix. The CSS-2 emulsion was placed at a rate of 0.20 gallons per square yard.

## **2.2 General Construction Remarks**

Mr. Mike Harrison and Mr. Tom Anderson from the Nebraska Department of Roads completed the data collection forms that were required for the project.

The operation of the plant was monitored by Mr. Dennis Endorf and Mr. Greg Novotny, also with the Nebraska Department of Roads.

A wrap-up meeting was held in Lincoln, Nebraska on January 25, 1996, with representatives of the agency, the contractor and LTPP. Below is a summary of what was discussed at that

meeting.

The project was delayed for several weeks because of the extremely wet spring and rain during construction.

Constructors Incorporated, the general contractor, indicated that they were not familiar with what the project involved until after they have started the project. They indicated that a pre-bid meeting with a requirement to attend this meeting to be able to bid on the project would have helped.

After the dense-graded aggregate base (DGAB) was placed, construction traffic roughed and loosened up the material after it was placed. This required adding additional water and compacting it just ahead of the paving operation.

The edge drains were considered over-designed because of the dry-freeze designation of the project. The edge drains were designed the same for all SPS-1 projects for uniformity. Mr. George Woolstrum indicated that he visited the project during late summer, 1995, and there was water coming out of some of the edge drain outlets.

The contractor used a straightcut bulkhead for the areas where they stopped and started. It was felt that the straightedge would give a more uniform transition than a taper.

The contractor indicated that there were ten different types of aggregates used on this project. All of the aggregates had to be trucked to the site and some were trucked over 120 miles.

The contractor indicated there was very little delay of the project due to the amount of sampling and testing.

Because of the research nature of the test sections and layer thickness requirements, the operation would have worked out smoother if surveyors had been on-site full-time or the Nebraska Department of Road Survey Crew would have provided the staking. The project staking was done under contract with an independent surveying firm.

As a general overall rating, the contractor rated the project at 1 to 3 out of 10. This was because of the very low productivity and the many surprises that were unforeseen during the bidding process. As indicated previously, a pre-bid meeting and/or a pre-construction meeting with the actual people doing the work in the field would have been a big help.

The Nebraska agency personnel gave a project rating of approximately eight (8). They indicated that the contractor did a relatively good job based upon the problems of constructability they had. They indicated that the staking had a very low rating as was previously indicated by the contractor. The agency personnel on-site indicated that they were surprised at the amount of paperwork and samplings that was required. In spite of all the problems the DOT representative indicated that the contractor did a relatively good job.

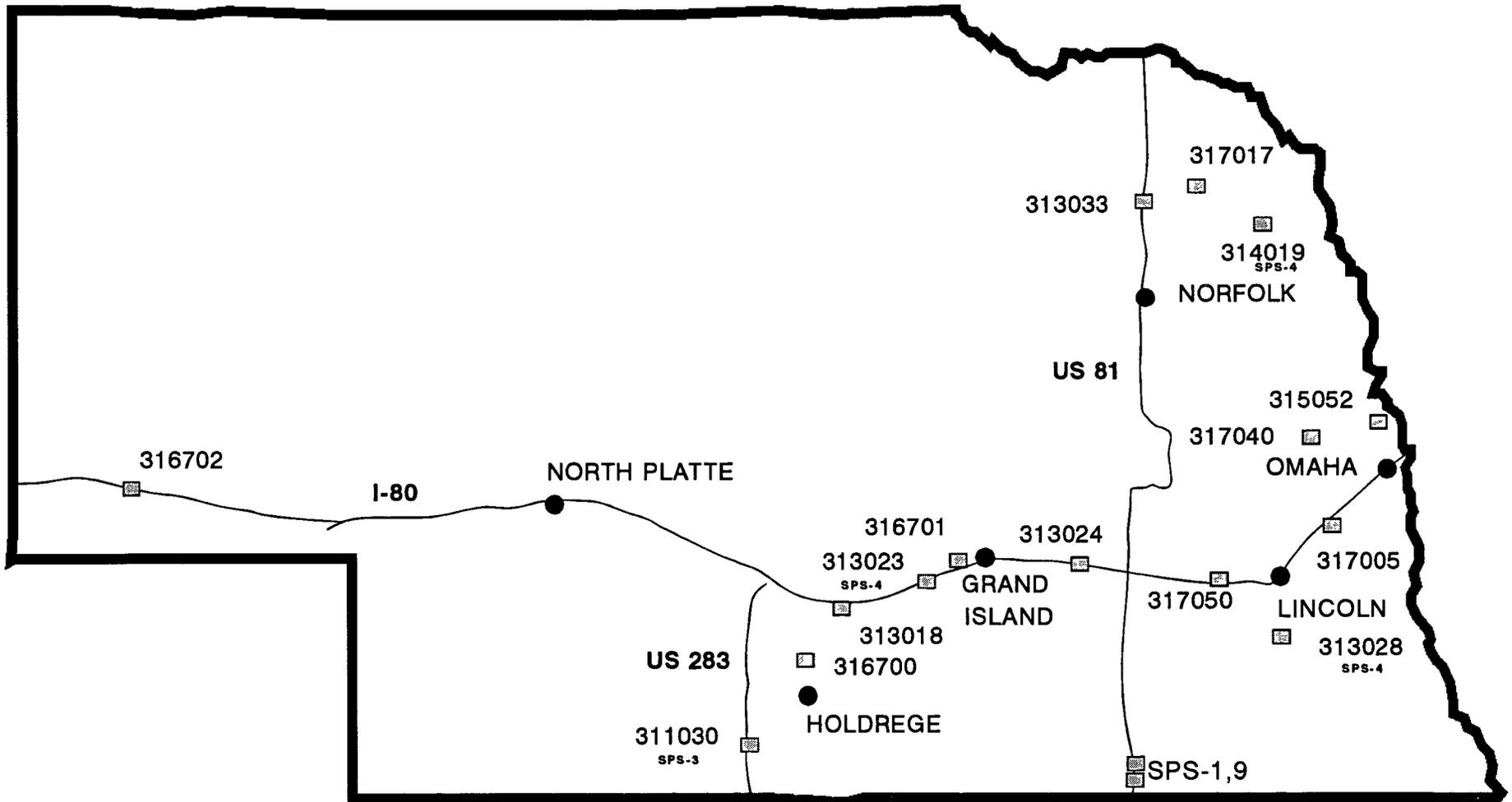
### **2.3 General Comments from the LTPP Representative**

The project went fairly well with all of the problems because of the wet spring and the rains during construction. Mr. George Woolstrum appointed Mr. Don Mazour from materials testing to coordinate the sampling and testing of the soils in the field. Mazour was also responsible for the coordination of the laboratory testing that is being performed by the Department of Roads. This coordination with Mazour worked very well. Mr. Mike Harrison did an excellent job with the data collection in the field.

g:\wpfiles\becky\ron.u\96constr.rep\9a

**Attachment A**  
**SHRP/LTPP Project Location Site Map**

**SHRP-LTPP TEST SITE LOCATIONS  
NEBRASKA  
GENERAL PAVEMENT STUDIES**

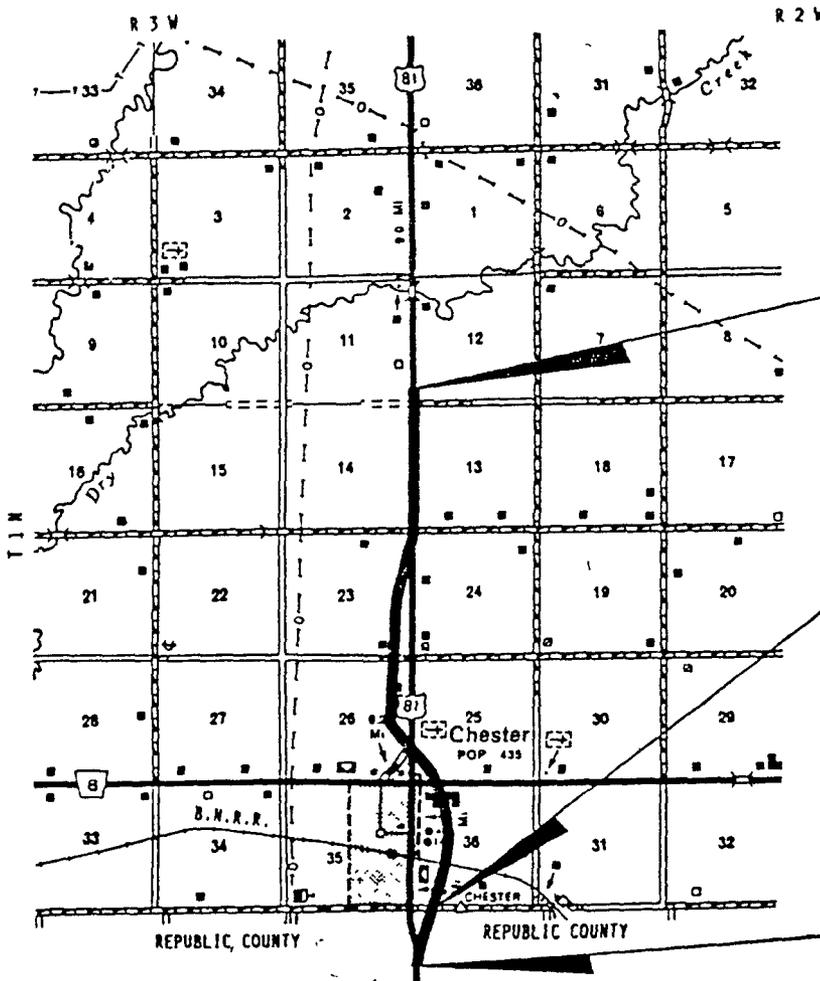
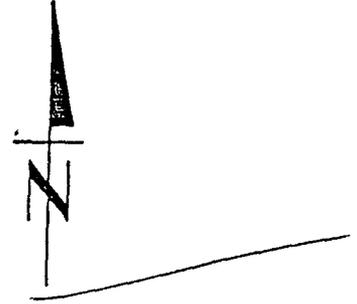


**Attachment B**  
**Project Location Map**

STATE OF NEBRASKA  
DEPARTMENT OF ROADS

PLANS FOR CONSTRUCTION  
CHESTER NORTH  
& SOUTH

THAYER COUNTY (NEBRASKA)  
REPUBLIC COUNTY (KANSAS)



END PROJECT F-81-1(1016)  
STA. 10490+26.74

EQUATION  
STA. 430+10.43 BK = STA. 10428+18.11 AH

END PROJECT 81-79 K-4473-01 (IN KANSAS)  
STA. 269+28.50

WORK ON THIS PROJECT IS AUTHORIZED PUP  
CONDITIONS STIPULATED IN THE ARMY CORP  
NATIONWIDE PERMIT NUMBERS AT THE FOLL

STA. 10444+57.00	ME-2SB-OXT-2
STA. 10449+76.00	ME-2SB-OXT-2
STA. 10483+16.00	ME-2SB-OXT-2
ENTIRE PROJECT	ME-2SB-OXT-2

BEGIN PROJECT F-81-1(1016)  
BEGIN PROJECT 81-79 K-4473-01 (IN KANSAS)  
STA. 242+00.00

KANSAS TO KANSAS  
TO BELLEVILLE, KANSAS

REFERENCE POST NO. 0+00 TO REFERENCE POST 4+13

RAILROAD EXCEPTION: FROM STA. 289+27.41 TO STA. 289+43.41

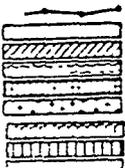
TOTAL LENGTH OF EXCEPTIONS

FEET



APPROVED Feb. 3, 19

*Monty W. Fredrickson*



**Attachment C**  
**Test Section Layout**

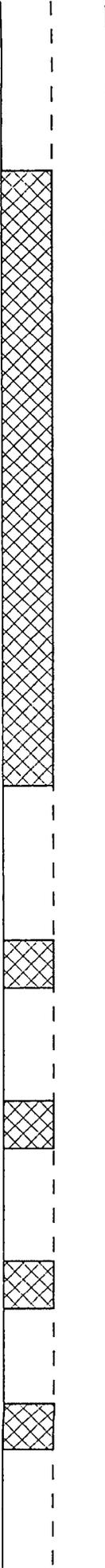
**SPS-9  
THAYER COUNTY, NE  
US-81 SOUTHBOUND**

UPDATED 06/7/95

**SPS-1 SECTIONS**

10489+00-408+50

(EQUATION:  $10428 + 18.11 \text{ BK} = 430 + 10.43 \text{ AH}$ )

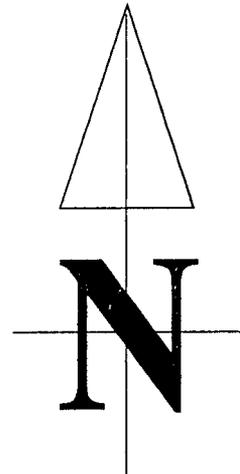


**310901**  
STATE CONTROL  
7" AC, 12" GB  
402+50-407+50

**310904**  
SMA  
7" AC, 12" GB  
396+15-401+15

**310902**  
SUPERPAVE  
7" AC, 12" GB  
388+80-393+80

**310903**  
SUPERPAVE+2 GRADES  
7" AC, 12" GB  
381+25-386+25



**Attachment D**  
**LTPP SPS Project Deviation Report**

<b>LTPP SPS Project Deviation Report Project Summary Sheet</b>	State Code	3	1
	Project Code	0 9	0 0
<b>Project Classification Information</b>			
SPS Experiment Number: SPS-9A		State or Province: Nebraska	
LTPP Region:	<input type="checkbox"/> North Atlantic <input checked="" type="checkbox"/> North Central <input type="checkbox"/> Southern <input type="checkbox"/> Western		
Climate Zone:	<input checked="" type="checkbox"/> Dry-Freeze <input type="checkbox"/> Dry-No Freeze <input type="checkbox"/> Wet-Freeze <input type="checkbox"/> Wet-No Freeze		
Subgrade Classification:	<input checked="" type="checkbox"/> Fine Grain <input type="checkbox"/> Coarse Grain <input type="checkbox"/> Active (SPS-8 Only)		
Project Experiment Classification Designation (SPS 1, 2 and 8): SPS-9A			
Construction Start Date: June 13, 1995		Construction End Date: August 15, 1995	
FHWA Incentive Funds Provided to Agency for this Project:			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Deviation Summary</b>			
Site Location Deviations:	<input type="checkbox"/> No Deviations <input type="checkbox"/> Minor Deviations <input checked="" type="checkbox"/> Significant Deviations		
Construction Deviations:	<input checked="" type="checkbox"/> No Deviations <input type="checkbox"/> Minor Deviations <input type="checkbox"/> Significant Deviations		
<b>Data Collection and Processing Status Summary</b>			
Inventory Data (SPS 5,6,7,9): N/A	<input type="checkbox"/> Complete Submission <input type="checkbox"/> Incomplete <input type="checkbox"/> Data Not Available		
Materials Data:	<input checked="" type="checkbox"/> All Scheduled Samples Obtained and Tested <input type="checkbox"/> Incomplete		
Construction Data:	<input checked="" type="checkbox"/> All Required Data Obtained <input type="checkbox"/> Incomplete/Missing Data Elements		
Historical Traffic Data: N/A	<input type="checkbox"/> All Required Historical Estimates Submitted (SPS 5,6,7,9) <input type="checkbox"/> Required Estimates Not Submitted		
Traffic Monitoring Equipment: Site Related	<input checked="" type="checkbox"/> WIM Installed On-Site <input type="checkbox"/> AVC Installed On-Site <input type="checkbox"/> ATR Installed On-Site <input type="checkbox"/> No Equipment Installed		
Traffic Monitoring:	<input type="checkbox"/> Preferred <input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Minimum <input type="checkbox"/> Below Minimum <input type="checkbox"/> Site Related		
Traffic Monitoring Data:	<input checked="" type="checkbox"/> Monitoring Data Submitted <input type="checkbox"/> No Monitoring Data Submitted		
FWD Measurements:	<input type="checkbox"/> Preconstruction Tests Performed <input type="checkbox"/> Construction Tests Performed <input checked="" type="checkbox"/> Post-construction Tests Performed		
Profile Measurements:	<input type="checkbox"/> Preconstruction Tests Performed <input checked="" type="checkbox"/> Post-Construction Tests Performed		
Distress Measurements:	<input type="checkbox"/> Preconstruction Tests Performed <input checked="" type="checkbox"/> Post-Construction Tests Performed		
Maint. & Rehab. Data: N/A	<input type="checkbox"/> Complete Submission <input type="checkbox"/> Incomplete <input type="checkbox"/> Data Not Available		
Friction Data:	<input type="checkbox"/> Complete Submission <input type="checkbox"/> Incomplete <input checked="" type="checkbox"/> Data Not Available		
<b>Report Status</b>			
Materials Sampling and Test Plan:	<input checked="" type="checkbox"/> Document Prepared <input type="checkbox"/> Final Submitted to FHWA		
Construction Report:	<input checked="" type="checkbox"/> Document Prepared <input type="checkbox"/> Final Submitted to FHWA		
AWS: (SPS 1, 2, & 8) N/A	<input type="checkbox"/> AWS Installed <input type="checkbox"/> AWS Installation Report Submitted to FHWA		





**LTPP Project Deviation Report  
Construction Guidelines Deviations**

State Code  
Project Code

0 9 3 1  
0 0 0 0

Comments Pertain to All Test Sections on Project

Comments Pertain Only to Section(s): (Specify) \_\_\_\_\_

**Construction Guidelines Deviation Comments**

None.



**Attachment E**  
**Pre and Post Construciton Sampling and Testing Plan**

	10489+00	(SPS-1) 310124	10484+00	10480+50	(SPS-1) 310123	10475+50	10474+50	(SPS-1) 310114	10469+50	10468+50	(SPS-1) 310119	10463+50	10462+50	(SPS-1) 310117	10457+50
C1	⊕	+ + + T501 T502 T503	B-51 □		+ + + T504 T505 T506			+ + + T507 T508 T509	B-52 □	o	+ + + T510 T511 T512			+ + + T513 T514 T515	
C2	⊕									o	C15				
C3	⊕		⊕	⊕	C7 C9	⊕	o	C11 C13	o	o	C16 C19	o	⊕	C21 C23	⊕
C4	⊕		⊕	⊕	C8 C10	⊕	o	C12 C14	o	o	C17 C20	o	⊕	C22 C24	⊕

Equation 430+10 43 BK = 10428+18 11 AH

	10455+00	(SPS-1) 310115	10450+00	10449+00	(SPS-1) 310121	10444+00	10443+00	(SPS-1) 310120	10438+00	10434+50	(SPS-1) 310118	10429+50	427+00	(SPS-1) 310116	422+00
C25	⊕	+ + + T516 T517 T518			+ + + T519 T520 T521	B-53 □	o	+ + + T522 T523 T524			+ + + T525 T526 T527		⊕	+ + + T528 T529 T530	
C26	⊕		⊕	o			o	C35		⊕			⊕	C45	
C27	⊕		⊕	o	C31 C33	o	o	C36	o	⊕	C41 C43	⊕	⊕	C46	⊕
C28	⊕		⊕	o	C32 C34	o	o	C37 C39	o	⊕	C42 C44	⊕	⊕	C47 C49	⊕
								C38 C40	o	⊕			⊕	C48 C50	⊕

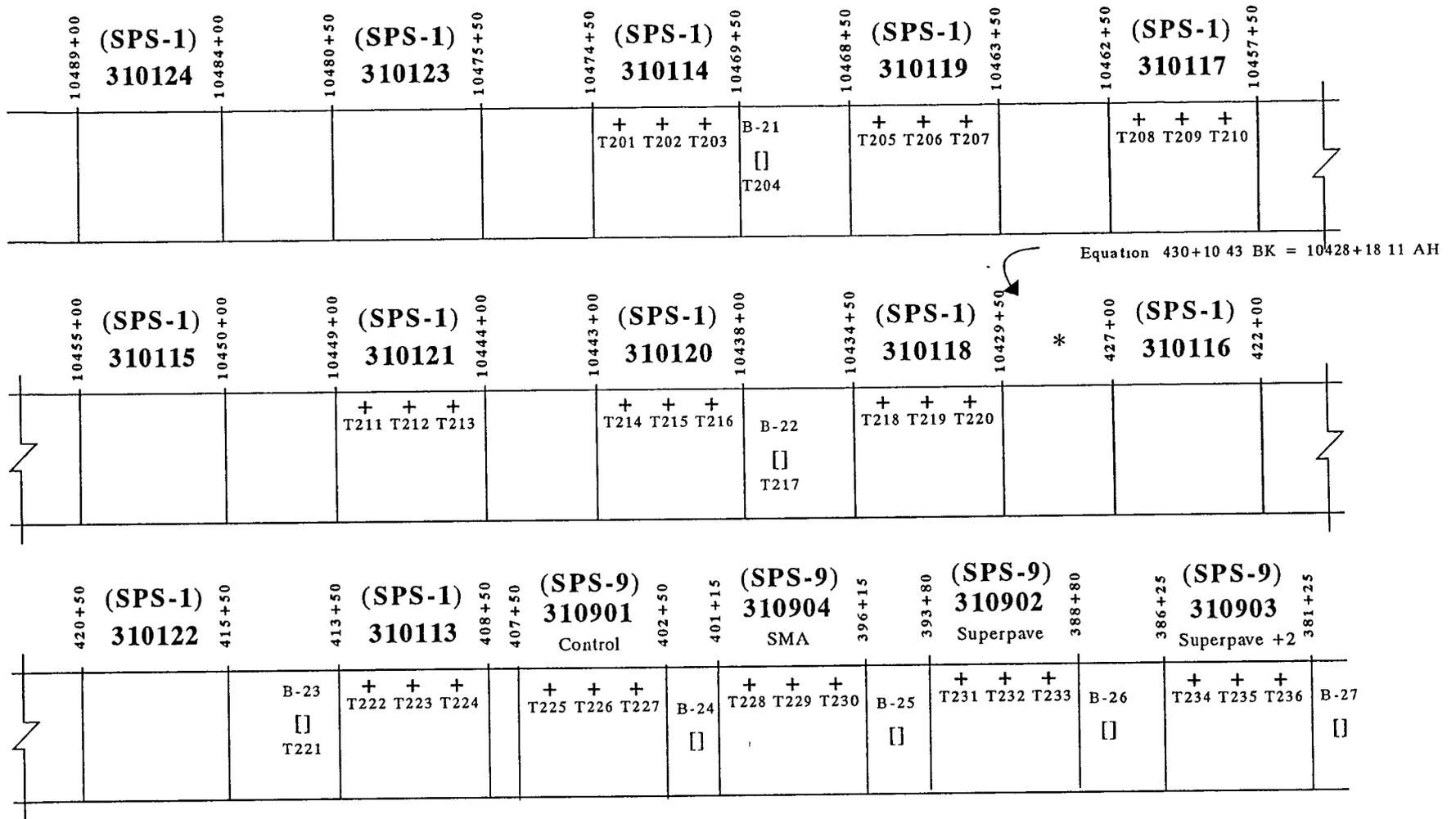
	420+50	(SPS-1) 310122	415+50	413+50	(SPS-1) 310113	408+50	407+50	(SPS-9) 310901	402+50	401+15	(SPS-9) 310904	396+15	393+80	(SPS-9) 310902	388+80	386+25	(SPS-9) 310903	381+25
		+ + + T531 T532 T533	B-54 □	o	+ + + T534 T535 T536			+ + + T537 T538 T539	B-55 □		+ + + T540 T541 T542	B-56 □		+ + + T543 T544 T545	B-57 □		+ + + T546 T547 T548	B-58 □
	⊕	C51 C53	⊕	o	C55 C59	o			⊕			⊕						
	⊕	C52 C54	⊕	o	C56 C60	o												

Traffic Direction

- Location of bulk sampling of asphaltic concrete mix (45kg, 100lb)
- 102 mm (4") OD core of asphalt concrete surface (see attached)
- 102 mm (4") OD core of asphalt concrete surface and treated base (see attached)
- + Location of field nuclear density testing within section

**Sampling and Testing Locations for AC Surface and Treated Base.  
SPS-1&9, US-81 Southbound Lane**

Updated 06/12/95



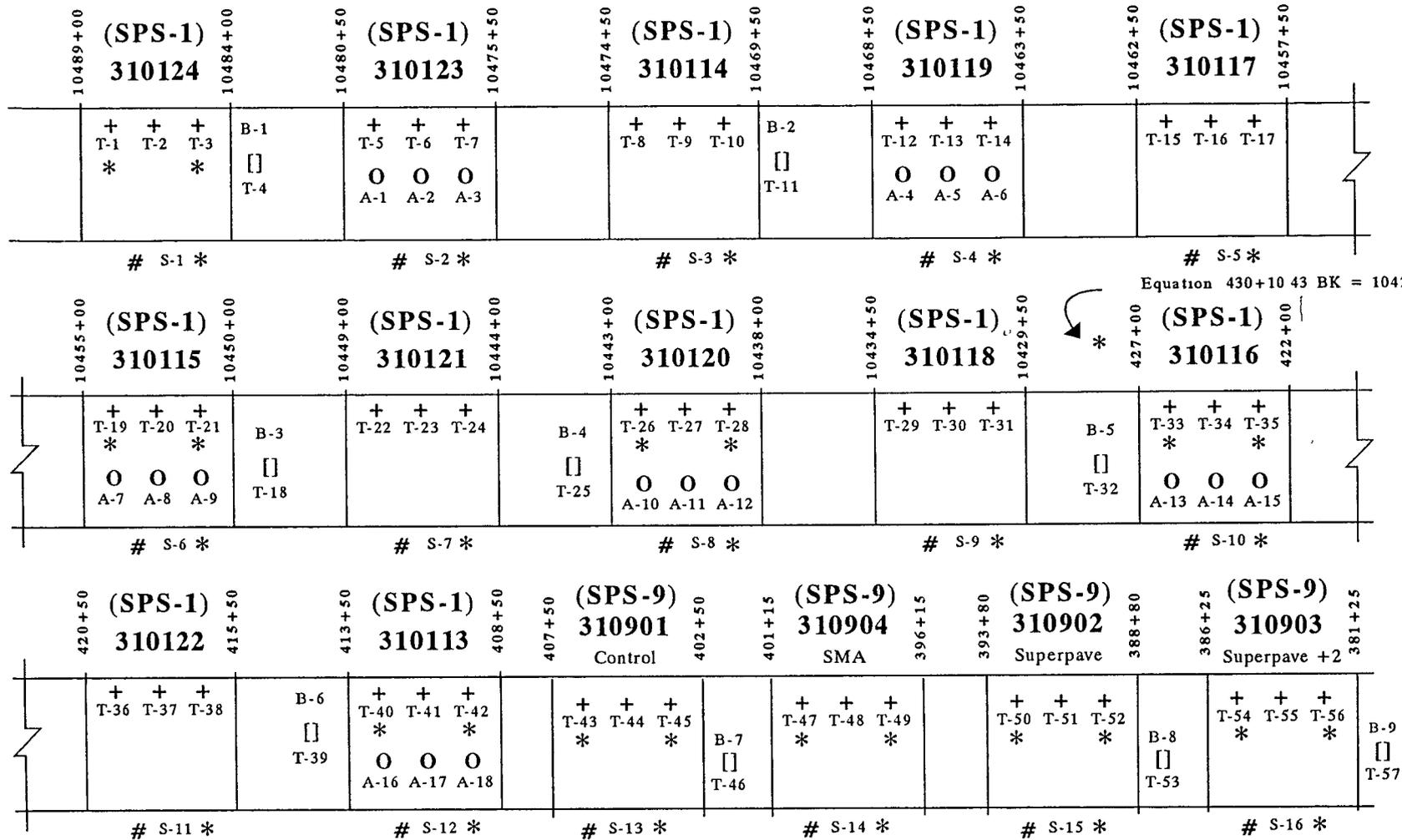
Traffic Direction

- Bulk sampling location
- + Location of field nuclear testing

**Sampling and Testing Locations for DGAB  
SPS-1&9, US-81 Southbound Lane**

Updated 06/12/95





\* Optional Testing

Traffic Direction

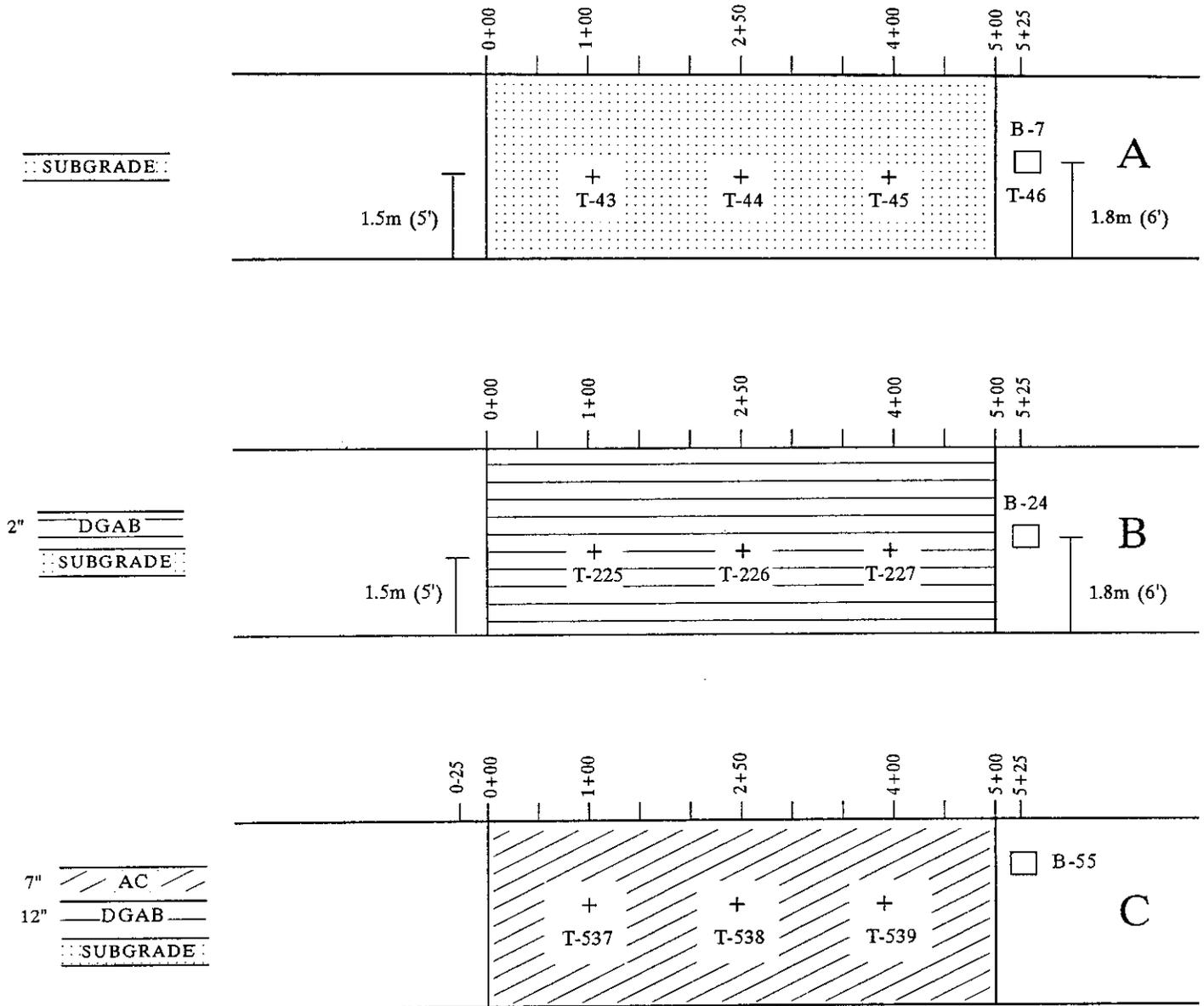
- Bulk sampling location to 12" below top of subgrade
- O Thinwall tube/splitspoon sampling to 1.2m (4') below top of subgrade
- # Shoulder Probe
- + Location of field nuclear testing

Sampling and Testing Locations for Subgrade (embankment layer >1.2m (4'))

SPS-1&9, US81 Southbound Lane

Updated 06/09/95





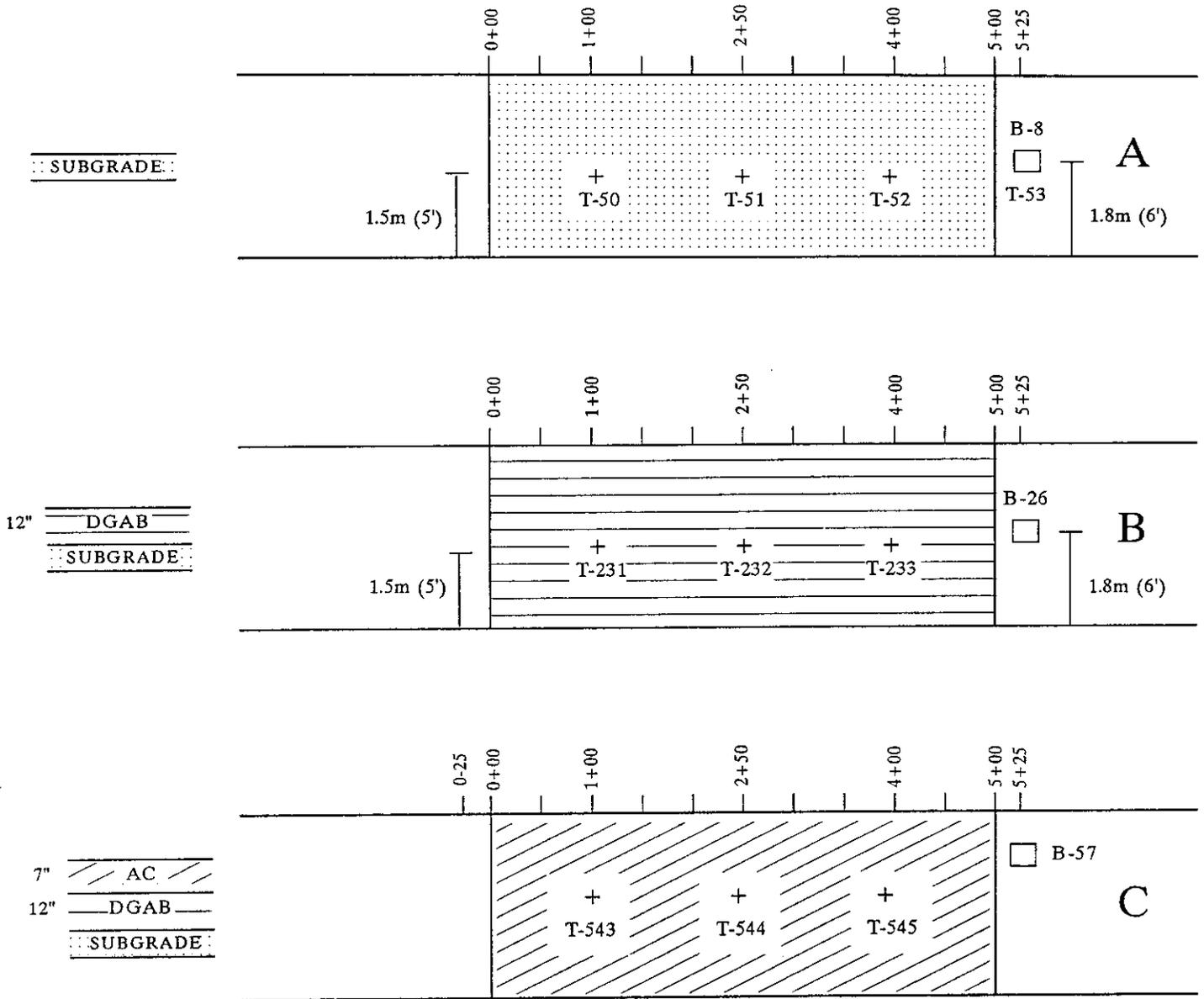
- A. Nuclear Density Testing on Subgrade (T-43 to T-46)  
Bulk Sampling Location to 12" Below Top of Subgrade (B-7)
  - B. Nuclear Density Testing on DGAB (T-225 to T-227)  
Bulk Sampling of DGAB (B-24)
  - C. Nuclear Density Testing on AC Surface (T-537 to T-539)  
Bulk Sampling of AC (45kg, 100lb), (B-55)
- SEE ATTACHED FOR ASPHALT CONCRETE SURFACE CORES (C-100 to C-107)

Sampling and Testing Locations for Section 310901 (All Layers)  
SPS-1, US-81 Southbound Lane

Updated 06/12/95



S:\tpp\hg\lps\310114pl.ch3



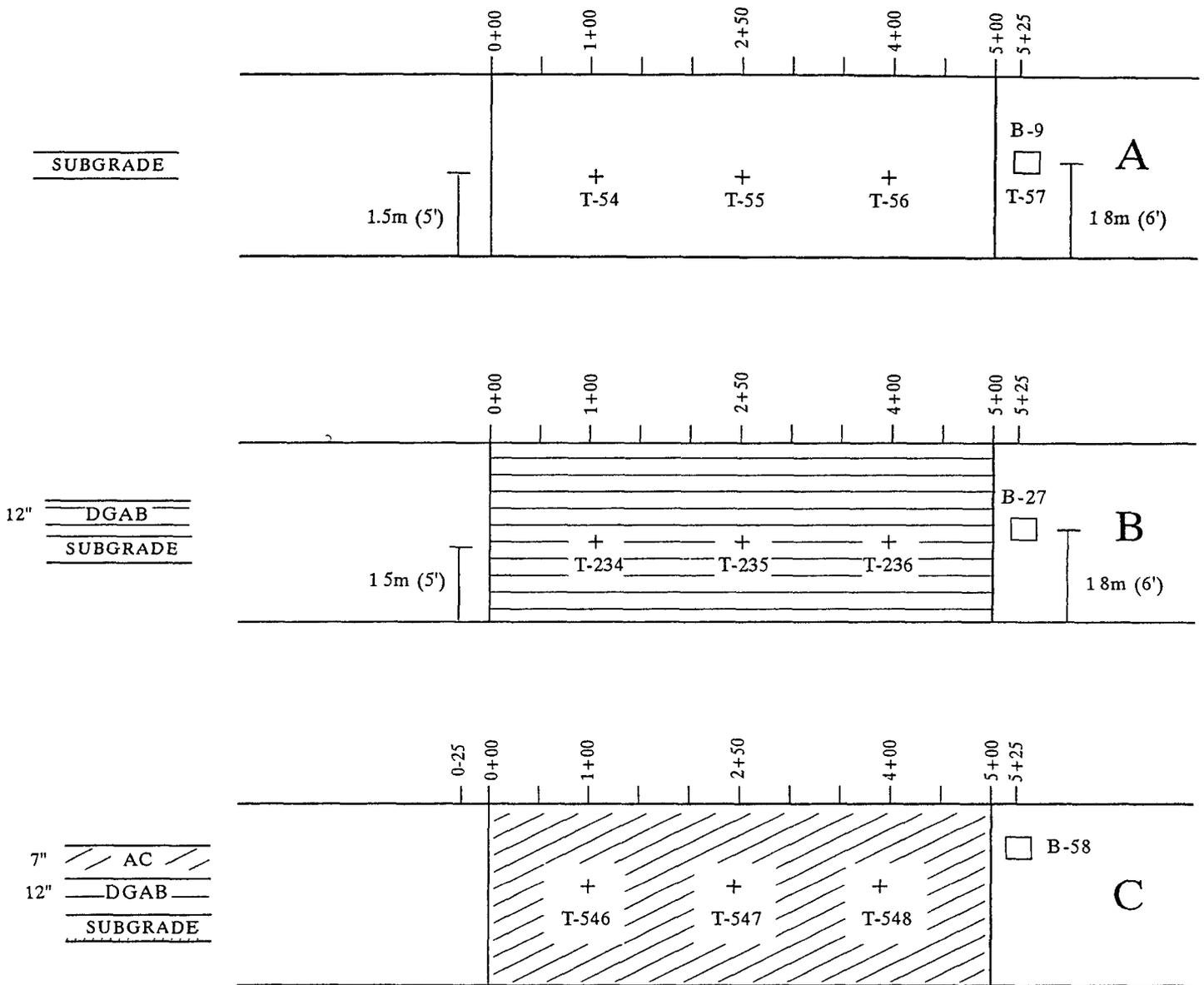
- A. Nuclear Density Testing on Subgrade (T-50 to T-53)  
Bulk Sampling Location to 12" Below Top of Subgrade (B-8)
  - B. Nuclear Density Testing on DGAB (T-231 to T-233)  
Bulk Sampling of DGAB (B-26)
  - C. Nuclear Density Testing on AC Surface (T-543 to T-545)  
Bulk Sampling of AC (45kg, 100lb), (B-57)
- SEE ATTACHED FOR ASPHALT CONCRETE SURFACE CORES (C-114 to C-147)

Sampling and Testing Locations for Section 310902 (All Layers)  
SPS-1, US-81 Southbound Lane

Updated 06/12/95



S:\tpp\hg\sp\310114pl.ch3



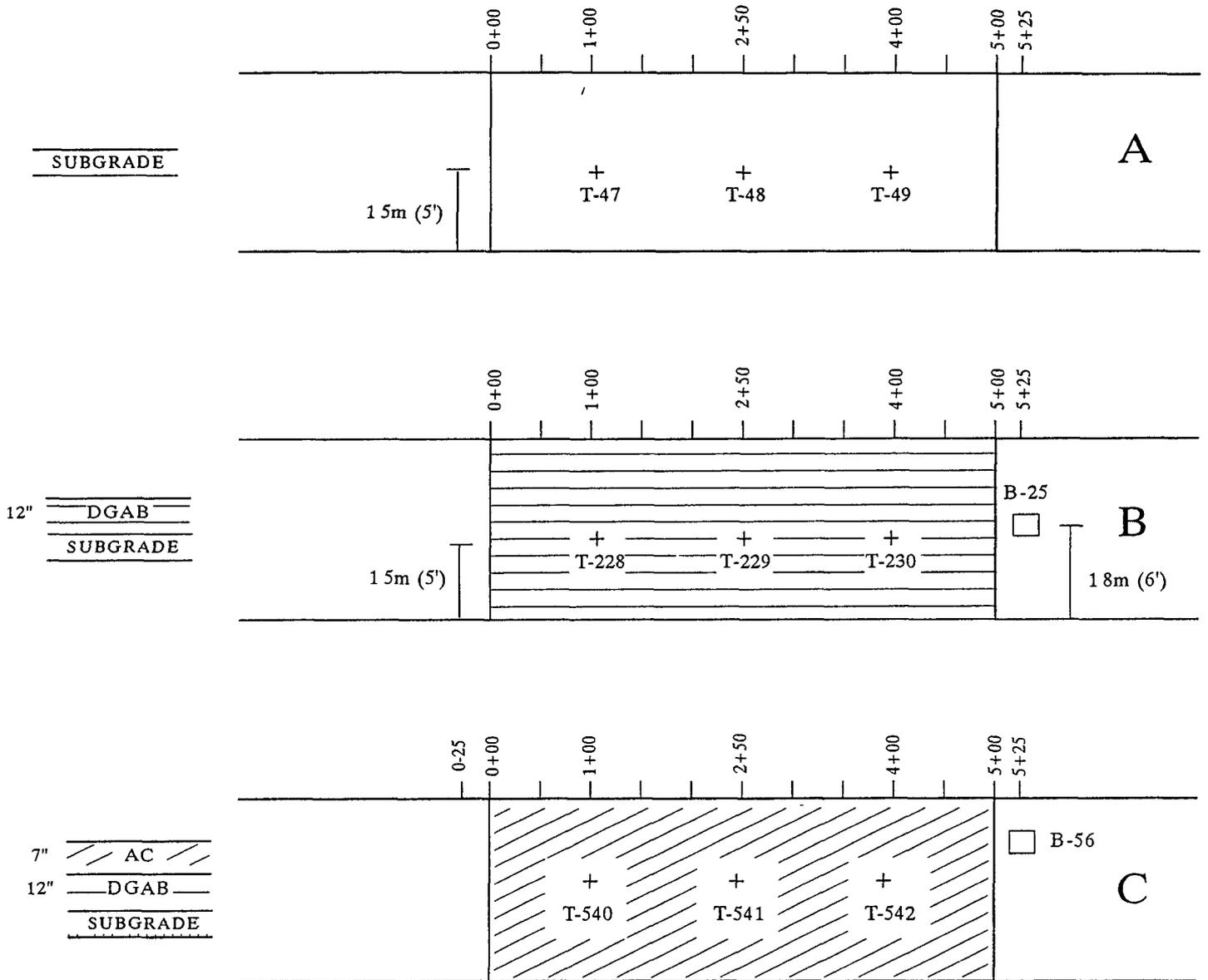
- A. Nuclear Density Testing on Subgrade (T-54 to T-57)  
Bulk Sampling Location to 12" Below Top of Subgrade (B-9)
  - B. Nuclear Density Testing on DGAB (T-234 to T-236)  
Bulk Sampling of DGAB (B-27)
  - C. Nuclear Density Testing on AC Surface (T-546 to T-548)  
Bulk Sampling of AC (45kg, 100lb), (B-58)
- SEE ATTACHED FOR ASPHALT CONCRETE SURFACE CORES (C-148 to C-155)

Sampling and Testing Locations for Section 310903 (All Layers)  
SPS-1, US-81 Southbound Lane

Updated 06/12/95



S:\tpp\hg\sp\310114pl.ch3



- A. Nuclear Density Testing on Subgrade (T-47 to T-49)
  - B. Nuclear Density Testing on DGAB (T-228 to T-230)  
Bulk Sampling of DGAB (B-25)
  - C. Nuclear Density Testing on AC Surface (T-540 to T-542)  
Bulk Sampling of AC (45kg, 100lb), (B-56)
- SEE ATTACHED FOR ASPHALT CONCRETE SURFACE CORES (C-108 to C-113)

Sampling and Testing Locations for Section 310904 (All Layers)  
SPS-1, US-81 Southbound Lane

Updated 06/12/95



S:\tpp\hg\sps\310114pl eh3

**Attachment F**  
**Samples Taken for materials Reference Library (MRL)**



**Braun Intertec Corporation**  
6875 Washington Avenue South  
P.O. Box 39108  
Minneapolis, Minnesota 55439-0108  
612-941-5600 Fax: 942-4844

*Engineers and Scientists Serving  
the Built and Natural Environments®*

November 8, 1995

Mr. Bill Cuda  
Nebraska Department of Roads  
R.R. 4, Box 86  
York, NE 68467

Dear Mr. Cuda:

I have reviewed our project files in reference to the samples that are stored at the Hebron Maintenance Yard. These samples were taken during the construction of the SPS-1 and SPS-9 projects on US highway 81, south of Hebron. The five gallon metal and plastic pails are to be sent to the materials reference library (MRL). This is a special facility for long term storage of materials used on the SPS projects. Nichols Consulting Engineers of Reno, Nevada are the ones managing the MRL storage facility. The shipping of the samples to the MRL storage facility will be by common carrier, and the cost will be burden by the MRL contractor (Nichols Consulting Engineers). The participating agency should contact the MRL office for exact coordination in sample shipping details. You should contact Mr. Jim Nichols at Nichols Consulting at (702) 329-4955.

A copy of the field operations information sheet form No. 1 and 2 (attached), should be completed for each of the SPS-1 and SPS-9 projects, a copy should be sent with the samples. These forms are laboratory shipment samples inventory sheets needed for tracking the materials for shipment and inventory at the MRL storage facility.

Also, mail a copy to me at:

Braun Intertec Corporation  
6875 Washington Avenue South  
P.O. Box 39108  
Minneapolis, MN 55439-0108

I have reviewed our project files, and this should be a summary of the samples that are at the Hebron Maintenance Yard.

**SPS-1**

<b>SPS Project Number</b>	<b>Material Type</b>	<b>Size of Samples</b>
SPS-1	Asphaltic Cement Type 4 Mix	3 Five Gallon Pails
SPS-1	Finished Mix (type 4)	3 Five Gallon Pails
SPS-1	Finished Mix Asphaltic Treated Base (ATB)	2 Five Gallon Pails
SPS-1	Combined Aggregate (type 4 mix)	12 Five Gallon Pails
SPS-1	Combined Aggregate Asphalt Treated Base (ATB)	12 Five Gallon Pails

**SPS-9**

<b>SPS-Project Number</b>	<b>Material Type</b>	<b>Size of Samples</b>
SPS-9 Superpave (Section 310902)	Asphaltic Cement	3 five gallon pails
SPS-9 Superpave Plus 2 PG Grades (Section 310903)	Asphaltic Cement	1 five gallon pail
SPS-9 Superpave and Superpave plus 2 PG grades	Combined Aggregate	12 five gallon pails
SPS-9 SMA (Section 310904)	Combined Aggregate	12 five gallon pails

There is also several one gallon cans that were taken of the asphaltic cement that was used in each of the mixes. There should be eight to ten of these containers. These samples are of the asphaltic cement that may have to be tested at a later date. These samples should be shipped to the Nebraska Department of Roads testing laboratory in Lincoln.

Should you require any additional information, please contact us at your convenience.

Very truly yours,  
  
 Ronald R. Urbach, CET

Attachments  
 Field Operations Form 1 and 2

cc: George Woolstrum  
 Don Mazour  
 Ben Worel  
 Gene Skok