MO SPS-9A
MST

Missouri (29)
SPS-9

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1.0 Introduction - SPS-9A Experiment

The SPS-9A experiment is the first of a multi-stage approach to validation of the SHRP SUPERPAVE Asphalt Binder Study. The objectives of the SPS-9A experiment are:

: Evaluate and improve the particular aspects of implementing the SUPERPAVE system through hands-on field trial by interested highway agencies.

: Comparison of the performance of the SUPERPAVE mixes against mixes designed with the current highway agencies' asphalt specifications, asphalt aggregate specifications and mix design procedure.

: To provide long term performance data for the evaluation and refinement of the SUPERPAVE specifications, design procedures and models.

: Test the sensitivity of the SUPERPAVE asphalt binder specification relative to low temperature cracking, fatigue, or permanent deformation distress factors.

: Provide highway agencies the opportunity to evaluate the performance of other experimental features by the construction of supplemental sections.

The study includes a detailed climatic factorial experiment in which a performance grade asphalt cement binder is selected according to it's ability to reduce cold temperature thermal cracking and warm temperature rutting. Accomplishing these objectives will provide improved tools for the design of flexible pavements and rehabilitation of rigid and flexible pavements using asphalt concrete overlay.

1.10 Scope.

This special provision includes the description of specific work to be performed between stations 277+00 (Beginning of Project) to 579+50 (End of Project) in the southbound lanes. Areas not otherwise described in the following are to be treated as described in other parts of this contract.

1.15 Unless otherwise stated, specifications section references are from the version, in effect at the time of this contract, of the Missouri Standard Specifications for Highway Construction and its supplements.

2.0 General.

2.10 All asphalt concrete pavement work between stations 277+00 to 579+50 in the southbound lane is to be completed between April 1, 1996 and October 1, 1996.

2.15 The penalty for noncompliance with section 2.10 will be $ 5,000 dollars per day for days worked before or after stated dates.

2.20 Contract specified tests and procedures will govern the contractor's operations and the acceptance of the completed work. Due to the research nature of this project, there will be other extensive testing of the materials and procedures prior to, during, and after construction. Additional testing by the department and/or other interested parties for research purposes will not be used for contract compliance.

2.25 The contractor shall keep the engineer advised of all work schedules and changes. A written schedule of work order is required seven days prior to work beginning and any changes, except those caused by weather or the engineer, shall be transmitted to the engineer in writing three days prior to the change in the work schedule occurring. This work schedule will be for the work in the area specified in section 1.10.

2.30 If the written work schedule and/or change in work schedule is not received in the required time period, the contractor shall cease work until the required testing or data collection can be completed by the department or other interested parties.

2.35 The department and other interested parties shall be allowed access to all operations and be given the full cooperation of the contractor or his approved subcontractors, whether work is accomplished on the project site or at an off-site location.

2.40 The contractor is advised that some testing or data collection between operations may affect work scheduling. These possible interruptions will be discussed as part of the pre-construction meeting and are to be included as part of the required written work schedule. Some possible instances are listed below, but are not limited to this list.

2.45 Prior to the construction of the asphaltic concrete overlay the Falling Weight Deflectometer will be employed to test all of the concrete joints load transfer efficiency, which are within the designated test section limits. This load transfer testing will be performed by the Material Research Engineer in accordance to section 3.90.

2.50 All joints within the designated test section limits, which joint efficiency has been determined by the Materials Research Engineer to be less than 70%, will then be removed and replaced with full depth pavement repair.

2.55 Prior to the construction of the asphaltic overlay the Falling Weight Deflectometer will perform deflection testing as described in section 7.25. Pavement distress survey and a pavement profile survey will also be performed prior to the asphalt concrete overlay as described in sections 7.15 and 7.20. The pavement profile survey will also be completed after the binder course and again after the surface course to determine the actual layer thickness of the asphalt mixes.

2.60 Sampling of the existing concrete, base, and subgrade, by means of coring and auger samples, prior to the construction of the asphaltic concrete overlay.

2.65 Extensive sampling of the asphalt concrete during the construction of the overlay, by means of loose mix samples. Sampling and testing of the mix at the plant to determine if the mix complies with the job mix tolerances.

2.70 Sampling of the asphalt concrete after the construction of the overlay, by means of coring. FWD testing and transverse 5 point cross section will also be performed after the construction of the asphaltic concrete overlay.

2.75 On the following pages are the nine test sections which are to be constructed on this project. The Strategic Highway Research Program (SHRP) ID number is the test section number which is specific to that site. The test section limits include the 250 foot lead in prior to the actual study limits, the 500 foot study limits, and the 250 foot lead out past the actual study limits. The general description depicts the specific study features of the test section.

SHRP ID & Test Section Number	Mix Placement Limits/ Test Section Limits/ Study Limits	General Description
290959	277+00 to 301+44/ 289+44 to 299+44/ 291+94 to 296+94	2 inches of Stone Mastic Asphalt (SMA) with fibers over 2 inches of MHTD I-B Mix
290960	301+44 to 327+90/ 315+90 to 325+90/ 318+40 to 323+40	2 inches of Stone Mastic Asphalt (SMA) with fibers and PG 64-28 asphalt cement binder over 2 inches of MHTD I-B Mix
290961	327+90 to 357+41/ 345+41 to 355+41 347+91 to 352+91	2 inches of a SUPERPAVE Mix Design but the use of AC-20 in lieu of the PG Binder over 2 inches of MHTD I-B Mix
290901	357+41 to 447+46/ 435+46 to 445+46/ 438+06 to 443+06	Highway Agency Standard Mix, 2 inches of I-C Mix over 2 inches of I-B Mix
290903	447+46 to 469+63 457+63 to 467+63/ 460+13 to 465+13	SUPERPAVE Mix Design, Alternate Binder Mix, of 2 inches of surface mix using a 12.5 mm nominal size aggregate and a PG 58-28 asphalt binder over 2 inches of binder course using a 19 mm nominal size aggregate and a PG 64-28 asphalt binder. (To examine rutting)
290902	469+63 to 494+26 482+26 to 492+26/ 484+76 to 489+76	SUPERPAVE Mix Design, Designed Standard Mix, of 2.5 inches of surface mix using a 12.5 mm nominal size aggregate and a PG 64-28 binder over 1.5 inches of a binder course using a 19 mm nominal size aggregate

and a PG 64-28 binder.

SHRP ID & Test Section Number	Mix Placement Limits Test Section Limits/ Study Limits	General Description
290964	494+26 to 533+96/ 521+96 to 531+96/ 524+46 to 529+46	SUPERPAVE Mix Design of 2 inches of a surface mix using a 12.5 mm nominal size aggregate and a PG 64-28 binder over 2 inches of a binder course using a 19 mm nominal size aggregate and a PG 64-28 binder.
290962	533+96 to 560+31/ 548+31 to 558+31 550+81 to 555+81	SUPERPAVE Mix Design of 2 inches of a surface mix using a 12.5 mm nominal size aggregate and a PG 70-28 binder over 2 inches of a binder course using a 19 mm nominal size aggregate and a PG 64-28 binder. (To examine rutting)
290963	560+31 to 579+50/ 565+50 to 575+50/ 568+00 to 573+00	SUPERPAVE Mix Design of 2 inches of a surface mix using a 12.5 mm nominal size aggregate and a PG 64-16 binder over 2 inches of a binder course using a 19 mm nominal size aggregate and a PG 64-28 binder. (To examine thermal cracking)

3.0 Special Construction Requirements.

3.10 The test sections will be physically located in the driving lane of the multi-lane highway. The adjacent passing lane will receive the same asphaltic mix and construction procedures as the driving lane. Through out the project limits the shoulders should be constructed of 2 inches of Type C Mix over 2 inches of Type B Mix.

3.15 In the plant production of the asphalt mixes, which were designed by the Gyratory Mix Design, a maximum plant production limit of 200 tons/hour shall be endorsed. This will allow for ample sampling and mix design testing of these mixes that require the Gyratory Compactor and Rice specific gravities. After the production of approximately 30 tons of these mixes, a mix sample will be retrieved from the plant drum discharge. This sample will be quartered and two Gyratory compacted specimens, one Rice specific gravity, and one percent of asphalt by the Nuclear Method will be performed. The results from these tests will be needed to determine if the asphalt mix complies with the job mix formula tolerance's. If the mix is found to be out of the specified job mix formula tolerance's, the contractor shall cease production and take the necessary corrective measures to produce a satisfactory mix. This procedure will continue until the plant produces a satisfactory mix which meets the job mix formula specifications. These tests are to verify the asphalt mixes and are not part of SPS9A testing requirements.

3.20 For construction of this project, bypasses will be constructed outside of the designated beginning and ending project limits. This will divert the south bound traffic onto the north bound lanes. The north bound lane, from bypass to bypass, will temporarily be divided to handle two way traffic. Therefore, there will be no traffic within the project limits except for the thru traffic at the existing crossovers. This was set up to expedite the construction of this project, but it also prevents any traffic from being prematurely released onto the newly placed asphalt layers before it would have had ample time to cool. This will eliminate any possibility of detrimental effects that traffic could have caused. Therefore, there will also be no construction traffic allowed on the newly placed asphalt

layers for a period of 12 hours for the same reasoning. Due to the experimental nature of this project, it is imperative that the shoulders not be degraded during the construction process. It is the contract's responsibiltiy to minimize traffic on the shoulder, especially loaded trucks. Any additional deterioration as evidenced by movement, pumping, disturbance, or other criteria shall be repaired by the contractor at no additional cost by removing all disturbed material, including base or subbase, to a stable platform and rebuild the shoulder back to the original stability, cross section, and grade as established by the engineer.

3.25 The passing lane will be constructed prior to the adjacent driving lane. This is to ensure that the contractor can satisfactorily concur with the specifications on the proper placement, compaction procedures, and design mix properties in a non-test section area.

3.30 To ensure the best possible asphaltic concrete mat construction and mix properties within the designated test sections, the mix which is specified within a test section will also be constructed prior to the test section limits, through the test section limits, and 200 foot past the end of the test section limits. Each individual surface mix shall be completed in its entirety within the same day of plant production.

3.35 Construction of each lift of the asphalt overlay will be as follows. The binder course for the construction of the passing lane will be constructed before construction of the binder course of the driving lane. Then the surface course will be constructed in the passing lane before construction of the surface course in the driving lane.

3.40 The longitudinal construction joint, which divides the passing and driving lanes, will be offset from the existing longitudinal construction joints as specified in section 403.19.2 of the Missouri Standard Specifications for Highway Construction.

3.45 There will be no transverse construction joints in the passing lane or the driving lane within the stations specified as the 1,000 foot test section limits.

3.50 The transverse construction joint in the driving lane, which is to be constructed at 200 foot past the end of the test section limits, will be directly across from the construction joint in the passing lane, which was previously constructed at the 200 foot past the test section limits. Transverse construction joints shall have a vertical face in accordance with section 403.19 of the standard specifications.

3.55 Example: The project limits begin at station 277+00 and the first test section limits begin at station 289+44 and ends at station 299+44, therefore from station 277+00 to station 301+44 will be constructed from the mix which is designated for that test section limit. At this point, 200 foot past the end of the test section limits, a transverse construction joint will be constructed to end this specified mix and the next mix which is designated for the next test section limits will be started.

3.60 The as-compacted average thickness of the asphalt concrete layer in each test section shall be constructed to within 5% of the average thickness of the test sections at the site.

3.65 The finished surface of the asphalt should achieve an average profile index of less than 10 inches per mile as measured by using a California type profilograph.

3.70 Profilographing and corrective actions to improve the average profile index will be in accordance with Missouri Standard Specifications For Highway Construction section 403.20 and its subsections with the exception of the minimum profile index specification which is mentioned in special provision section 3.65.

3.75 **Pavement Repair**

Full depth pavement repair will be performed on the concrete joints, within the designated 1,000 foot test section limits, which after being tested in accordance to special provision section 3.90 have been determined to not have 70% or greater load transfer. Full depth pavement repair will also be performed on the transverse cracks which have less than 70% load transfer and/or faulting in excess of 1/4 inch and/or crack width in excess of 1/4 inch.

3.80 Partial and full depth pavement repair, in all designated 1,000 foot test sections, shall be performed as specified in section 613 and as noted in Standard Drawing 613.00B.

3.85 Partial depth repairs will be performed within the designated 1,000 foot test section limits on the joints/cracks which have been determined to have 70% or greater load transfer but depict spalling of the concrete. These areas shall be cleaned to sound concrete, primed, filled with an approved hot mix asphalt bituminous mixture, and compacted. Removal of unsound concrete shall be completed by using a chipping hammer of weight no greater than 15 pounds. This is to ensure that sound concrete is not fractured during the removal process. All existing

bituminous material, that is presently in the partial depth repair areas, shall be removed.

3.90 Determination Of Load Transfer Joint Efficiency

The Falling Weight Deflectometer will be employed by the Materials Research Engineer to determine the load transfer joint efficiency of the concrete joints within the designated 1,00 foot test section limits. The procedure which will be used for this determination is in Chapter 5 of the 1993 ASSHTO Guide For Design of Pavement Structures section 5.6.5 page III-120.

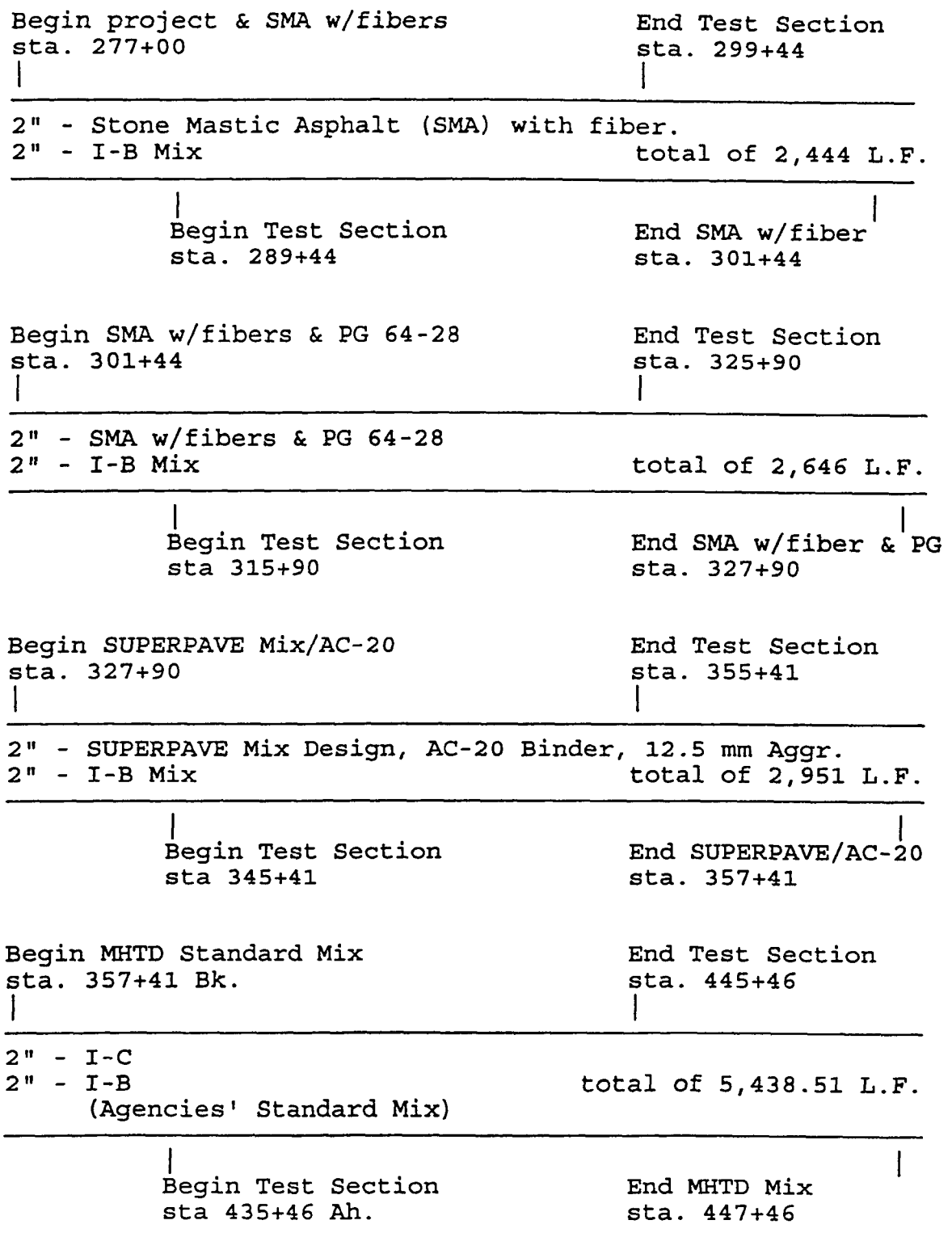
3.95 Maximum Joint Faulting

The longitudinal and transverse joints within the designated test section limits will be inspected by the Material Research Engineer for the amount of faulting between slabs.

The amount of faulting will be ascertained from the use of the Modified Digital Fault Meter, SHRP Product 5031. Any longitudinal joints with faulting greater than 1/2 inch and any transverse joints with faulting greater than 1/4 inch will be identified by the engineer. The joints which depict faulting values in excess of the quantified maximum will be subject to diamond grinding to eliminate the faulting or full depth pavement repair.

4.0 SPS-9A Site Layout - Asphalt Mix Limits

On the following pages is a general description of the site layout, transition lengths between test sections, and paving limits for each type of asphalt concrete mix which is incorporated in this overlay project.



Equation sta. 374+31.20 Bk. = 410+00.00 Ah. (-3,568.8 ft.)
Equation sta. 425+71.00 Bk. = 425+68.69 Ah. (+2.31 ft.)
Equation sta. 472+91.00 Bk. = 473+00.00 Ah. (-9.00 ft.)

Begin SUPERPAVE PG 58-28 sta. 447+46 | End Test Section sta. 467+63 |

2" - SUPERPAVE Mix Design, PG 58-28 Binder, 12.5 mm Aggr.
2" - SUPERPAVE Mix Design, PG 64-28 Binder, 19 mm Aggr.
(To examine rutting) total of 2,217 L.F.

Begin Test Section sta 457+63 | End PG 58-28 sta. 469+63 |

Begin SUPERPAVE PG 64-28 sta. 469+63 Bk. | End Test Section sta. 492+26 |

2.5" - SUPERPAVE Mix Design, PG 64-28 Binder, 12.5 mm Aggr.
1.5" - SUPERPAVE Mix Design, PG 64-28 Binder, 19 mm Aggr.
(Designed Standard Mix) total of 2,454 L.F.

Begin Test Section sta 482+26 | End PG 64-28 sta. 494+26 Ah. |

Begin SUPERPAVE PG 64-28 sta. 494+26 | End Test Section sta. 531+96 |

2" - SUPERPAVE Mix Design, PG 64-28 Binder, 12.5 mm Aggr.
2" - SUPERPAVE Mix Design, PG 64-28 Binder, 19 mm Aggr.
(Additional Standard Mix) total of 3,970 L.F.

Begin Test Section sta 521+96 | End PG 64-28 sta. 533+96 |

Begin SUPERPAVE PG 70-28 sta. 533+96 | End Test Section sta. 558+31 |

2" - SUPERPAVE Mix Design, PG 70-28 Binder, 12.5 mm Aggr.
2" - SUPERPAVE Mix Design, PG 64-28 Binder, 19 mm Aggr.
(To Examine Rutting) total of 2,635 L.F.

Begin Test Section sta 548+31 | End PG 70-28 sta. 560+31 |

Begin SUPERPAVE PG 64-16 sta. 560+31	End Test Section sta. 575+50

2" - SUPERPAVE Mix Design, PG 64-16 Binder, 12.5 mm Aggr.
2" - SUPERPAVE Mix Design, PG 64-28 Binder, 19 mm Aggr.
(To Examine Thermal Cracking) total of 1,919 L.F.

Begin Test Section sta 565+50	End PG 64-16 & Project sta. 579+50

5.0 Pre-Construction Laboratory Materials Characteristic, Mix Design & Performance Tests

All materials that will be used in the project for surface layers will have mix design tests performed in the laboratory prior to construction of the SPS9A project. Enough material will be mixed to complete the test for non-main study mix design test on the following tables. These tests will require nine gyratory compactions, three @ Nmax, and six @ 7% Va. The specimens from these samples will all be discarded after all data has been documented. For the main study section (Section 02) performance tests will also be performed. Thirty-four additional gyratory compactions will be made. Thirty-two of these will be @ 7% Va, and two will be @ 3% Va. Any compactions @Nmax will be 150mm in diameter and 115mm in height. All other specimens will be 150mm in diameter and 140mm in height. Some of the performance tests specimens require further testing. These specimens will be saved and shipped to the proper location according to the tracking tables attached to the back of this document. The following tables provide the material characteristics tests, which will be performed on the material prior to mixing, and the performance and volumetric tests that will be performed on the compacted samples.

PRE-CONSTRUCTION LABORATORY MATERIAL CHARACTERISTIC TESTING PROCEDURES FOR ALL ROADWAY MIX DESIGNS USED IN THE SPS-9A EXPERIMENT STUDY.

Material Property	Tested By	SHRP Protocol	SHRP Test	Report form	Procedure	No. of Tests	Remarks
AGGREGATE CHARACTERISTICS							
AGGREGATE GRADATIONS	PHYS	LTPP P14	AG04	T14		1	
SPEC GRAVITY OF COARSE AGGR	PHYS	LTPP P11	AG01	T11		1	
SPEC GRAVITY OF FINE AGGR	PHYS	LTPP P12	AG02	T12		1	
SPECIFIC GRAVITY OF -200 MATL	PHYS	AASHTO T100				1	
COARSE AGGR ANGULARITY	PHYS	PENN. DOT TM 621				1	
FINE AGGR ANGULARITY	PHYS	ASTM C1252				1	
TOUGHNESS	PHYS	AASHTO T96				1	
SOUNDNESS	PHYS	AASHTO T104				1	
DELETERIOUS MATERIAL	PHYS	AASHTO T112				1	
CLAY CONTENT	PHYS	AASHTO T176				1	
THIN, ELONGATED PARTICLES	PHYS	ASTM D 4791				1	
ASPH. CEM CHARACTERISTICS							
PENETRATION @ 5 DEGR C	CHEM.	AASHTO T49				3	
PENETRATION @ 25 & 46 DEGR C	CHEM.	LTPP P22	AE02	T22		3	
VISCOSITY @ 60 & 135 DEGR C	CHEM.	LTPP P25	AE05	T25		2	
SPECIFIC GRAVITY @ 16 DEGR C	CHEM.	LTPP P23	AE03	T23		2	
DYNAMIC SHEAR @ 3 TEMP	CHEM.	AASHTO TP5				2	
CREEP STIFFNESS	CHEM.	AASHTO TP1				2	
BROOKFIELD VISCOSITY @ 135 & 165 DEGR C	CHEM.	ASTM D4402				1	
ROLLING THIN FILM OVEN (RTFOT)	CHEM.	AASHTO T240				1	SUFFICIENT MATERIAL SHOUD BE CONDITIONED FOR THE REQUIRED TEST.
DYNAMIC SHEAR ON RTFOT RESIDUE @ 3 TEMPERATURES	CHEM.	AASHTO TP5				3	
PRESSURE AGING (PAV) OF RTFOT RESIDUE	CHEM.	AASHTO PP1				1	SUFFICIENT MATERIAL SHOUD BE CONDITIONED FOR THE REQUIRED TEST
CREEP STIFNESS OF RTFOT-PAV RESIDUE @ 2 TEMPERATURES	CHEM.	AASHTO TP1				2	
DYNAMIC SHEAR ON RTFOT-PAV RESIDUE @ 3 TEMPERATURES	CHEM.	AASHTO TP5				2	
DIRECT TENSION ON RTFOT-PAV RESIDUE @ 2 TEMPERATURES	CHEM.	AASHTO TP3				2	

PRE-CONSTRUCTION LABORATORY MIX DESIGN PERFORMANCE TESTING PROCEDURES FOR TEST SECTION 02 MAIN STUDY ONLY SURFACE MIX (PG64-28, 12.5mm SURFACE MIX)

Material Property	Tested By	SHRP Protocol	SHRP Test	Report form	Procedure	No. of Tests	Remarks
GYRO COMPACTION @ 7% AV	PHYS.	AASHTO M-002				32	Compaction diminsions are 150mm(diameter) X 140mm(height)
GYRO COMPACTION @ Nmax	PHYS.	AASHTO M-002				6	Compaction diminsions are 150mm(diameter) X 115mm(height)
GYRO. COMPACTION @ 3% Va	PHYS.	AASHTO M-002				2	Compaction diminsions are 150mm(diameter) X 140mm(height)
MOISTURE SUSCEPTIBILITY	PHYS.	AASHTO T283	AC05			6	
BULK SPECIFIC GRAVITY	PHYS.	LTPP P02	AC02	T02		9	
MAXIMUM SPECIFIC GRAVITY	PHYS.	LTPP P03	AC03	T03		1	
VOLUME % AIR VOIDS (Va%)	F O.	AASHTO PP19				6	
% VOIDS IN MINERAL AGGR (VMA%)	F O.	AASHTO PP19				6	
VOIDS FILLED WITH ASPHALT (VFA%)	F.O.	AASHTO PP19				6	

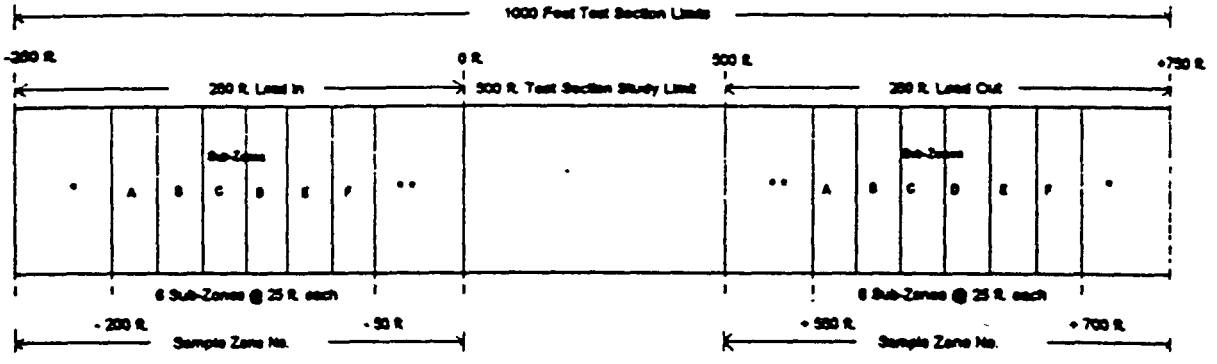
PRE-CONSTRUCTION LABORATORY MIX DESIGN PERFORMANCE TESTING PROCEDURES FOR ALL SUPERPAVE MIX DESIGNS (EXCEPT SECTION 02 MAIN STUDY) IN THE SPS-9A EXPERIMENTAL STUDY.

Material Property	Tested By	SHRP Protocol	SHRP Test	Report form	Procedure	No of Tests	Remarks
GYRO COMPACTION @ Nmax	PHYS.	AASHTO M-002				3	Compaction diminsions are 150mm(diameter) X 115mm(height)
GYRO. COMPACTION @ 7% Va	PHYS.	AASHTO M-002				6	Compaction diminsions are 150mm(diameter) X 140mm(height)
MOISTURE SUSCEPTIBILITY	PHYS.	AASHTO T283	AC05			6	
BULK SPECIFIC GRAVITY	PHYS.	LTPP P02	AC02	T02		3	
MAXIMUM SPECIFIC GRAVITY	PHYS.	LTPP P03	AC03	T03		1	
VOLUME % AIR VOIDS (Va%)	F O.	AASHTO PP19				3	
% VOIDS IN MINERAL AGGR. (VMA%)	F.O	AASHTO PP19				3	
VOIDS FILLED WITH ASPHALT (VFA%)	F O.	AASHTO PP19				3	

6.0 SPS-9A Testing & Sampling Zones

On the following pages, are the required sampling plan procedures and layouts for the pre-construction, during construction, and post construction sampling of the SPS-9A experiment. The sampling zones and the sub-zones of these areas are depicted on the next page. The pre-construction, during construction, and post construction sampling plans refer to these sampling zones and sub-zones.

TEST SECTION SAMPLING ZONES AND THEIR SUB-ZONES



Note: * = Not a designated materials sampling test area.

** = Pre-Construction materials sampling area for coring.

Sub-Zones A, B, C, D, E, & F are set up for Post Construction Materials sampling areas for coring.

7.0 Pre-Construction Testing

7.10 Test Site Layout

Research and/or construction personnel will establish the control points needed to layout the exact station locations for the 1,000 foot test section limits and 500 foot study limits. At these station locations 80 D nails will be driven at the edge of pavement and at 20 foot offsets from the edge of pavement. These points will be used to establish and re-establish the station locations before and after the overlay.

7.15 Distress Survey. A detailed pavement distress survey depicting the type, extent, and severity of distress will be performed on each of the nine 500 foot test section study limits. This distress survey shall be performed in accordance with the specifications in the "SHRP Distress Identification Manual For The Long Term Pavement Performance Project (SHRP-P-338)".

7.20 Five Point cross section

Transverse five point cross sections shall be performed and recorded on each of the nine 500 foot test section study limits. The cross sections shall start at the beginning of the test section study limit (0 feet) and continue at 50 foot intervals, the last transverse cross section being at the end of the test section study limit (500 feet).

The 5 points, at which the elevation of the pavement are to be recorded, are the edge of pavement (E/P), the outer wheel path (3' off of E/P), the mid-lane (6' off of E/P), the inner wheel path (9' off of E/P), and the center line (12' off of E/P). Research and/or Construction will establish the control point, bench marks, and survey diary needed to conduct and record the five point cross section.

The elevations on the exact same locations of the pavement will be recorded before construction, after the binder course has been constructed, and after the final surface course has been constructed. This will be used to determine the exact thickness of each layer of asphaltic concrete.

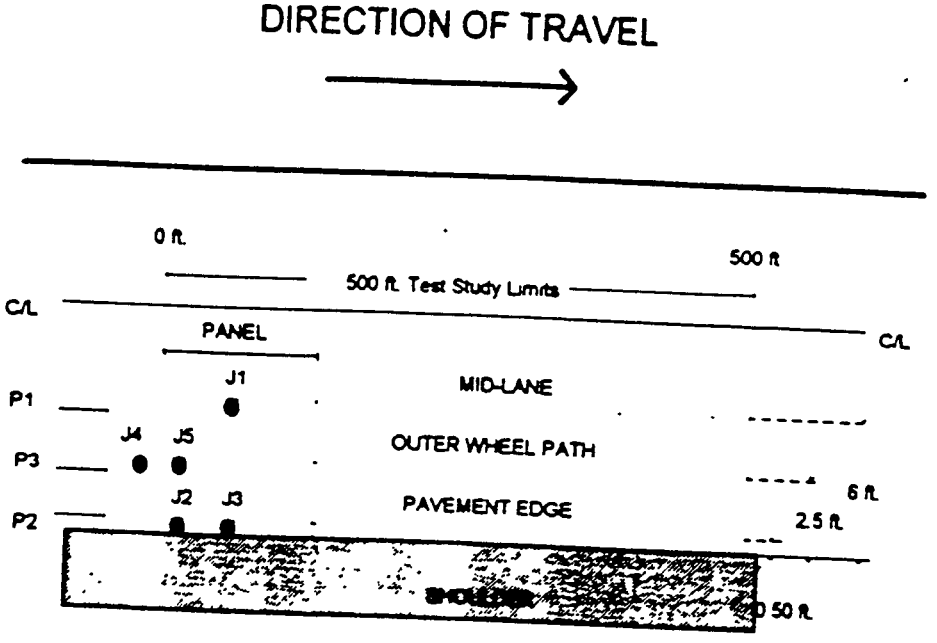
7.25 Falling Weight Deflectometer (FWD) Testing

FWD testing will be performed within each of the nine 500 foot test section study limits. This FWD testing will be performed in accordance with the specification in the "Manual for FWD Testing in the Long Term Pavement Performance Program (SHRP-P-661)". These FWD tests will be used to characterize the in-situ material strengths of the existing pavement, which in-turn will be used to depict the existing estimated structural capacity of the pavement. The FWD testing drop sequence and drop heights are depicted in the table below.

Number of Drops	Drop Height	Data Stored
3	3	No
4	2	Yes
4	3	Yes
4	4	Yes

The FWD Field Data Collection program shall be set up to acquire data from the field as per Figure 10 page 35 of SHRP-P-661 for Deflection Basin Tests, and Figure 11 page 36 for Load Transfer Tests.
For each pavement section tested the prompts of the FWD Field Data Collection Program shall be answered in accordance with the protocol on pages 44-53 of SHRP-P-661. The file name convention, data handling, data storage, and forwarding of the FWD data files to the SHRP Regional Information Management System (RIMS) shall be in accordance to pages 47-53 of SHRP-P-661.

Depicted below is an excerpt from the SHRP-P-661 manual depicting the location and type of tests to be performed by the FWD.



PRE-CONSTRUCTION FWD TESTING PLAN

P = Pass longitudinal location for FWD pass

J = FWD test point ID and test location

J1 = Mid-lane, in mid-panel of JRCP test location for FWD deflection basin test.

J2 = Edge of pavement, leave slab of joint corner test location for FWD deflection basin test.

J3 = Edge of pavement, in mid-panel of JRCP test location for FWD deflection basin test.

J4 = Outer wheel path approach slab of joint, test location for FWD load transfer test.

J5 = Outer wheel path leave slab of joint, test location for FWD load transfer test.

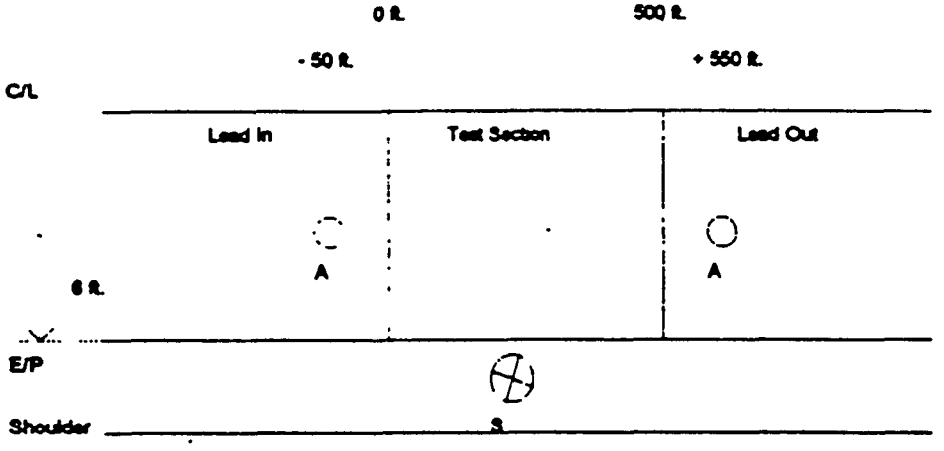
Deflection Basin Test Sensor Configuration
0 8 12, 18 24 36 & 60 inches from load plate

Load Transfer Test Sensor Configuration
-12, 0, 12, 18 24 36, & 60 inches from load plate

7.30 Pre-Construction Sampling of the Existing Pavement Structure Material

Depicted in the following figures and tables are the sampling plan layouts needed for the collection of the material properties inventory data of the existing pavement structure. The first figure shows the typical sampling plan layout for each test section. The next table depicts the sampling procedures that are required on each type of material.

TYPICAL PRE-CONSTRUCTION SAMPLING PLAN LAYOUT FOR SPS-9A



A — A-Type Core location. 6 inch OD core of bonded layer, auger to the top of the subgrade & retrieve base material, auger to 4 feet below the top of the subgrade & retrieve auger cuttings.

S — 6 inch OD Shoulder Auger probe to 20 feet below the surface to check for depth to rigid layer. The location of the auger probe is at the middle of the 500 ft. test section in the middle of the 10 foot shoulder.

TYPICAL PRE-CONSTRUCTION SAMPLING PROCEDURE

Material Property	Tested By	SHRP Protocol	SHRP Test	Field Sample Size	Sample Container	Sample Area	Report Form	Procedure	Remarks
PORTLAND CEMENT CONCRETE									
core examination/thickness	RES.	P66	PC06	2 cores	Box	A	T66		2-6 inch diameter cores for each test section, 1 in the lead in and 1 in the lead out
BASE									
Visual classification of unbound base in accordance to Appendix C of the SHRP-LTPP Glude for Field Materials, Sampling, Testing, and Handling									
SUBGRADE									
natural moisture content	SOILS	P49	SS09		sealed tared jar	A	T49	AASHTO T655-86	1-Sample from LI A-Type Location
sieve analysis	PHY.	P51	SS01	15 lbs.	Bags	A	T51	AASHTO T27-88I	1-Sample from LI A-Type Location
atterburg limits	PHY.	P43	SS03	15 lbs	Bags	A	T43	AASHTO T89-87I	1 - 15 lb sample will be sufficient for the sieve analysis, atterburg limits, and classification
classification	PHY.	P52	SS04	15 lbs.	Bags	A	T52	T90-87I ASTM	
depth to rigid layer	SOILS	Follow the procedure in Appendix C,"Guide for Materials, Sampling, Testing, and Handling"						D2488-84	Shoulder Auger Bore @ S Location

Note: PHY. = Physical Lab Section
RES = Research Section
SOILS = Soils & Geology Section
P = Protocol
SS = Subgrade Soil
PC = Portland Cement Concrete
LI = Lead In
LO = Lead Out

Laboratory Testing Sequence Of Unbound Granular Base
1) Natural Moisture Content
2) Sieve Analysis
3) Atterburg Limits
4) Classification

8.0 Beginning Of Plant Mix Production

Prior to the beginning of plant mix production for any/all of the SUPERPAVE Mix Designs, a sample of the asphalt cement will be obtained at the plant. This sample will be brought back to the Central Lab for verification of the asphalt cement characteristics. At the beginning of production on any/all of the SUPERPAVE Mix Designs, a loose mix sample will be obtained after approximately 30 ton of production to verify whether the mixture meets the job mix design tolerances. If it does not, the contractor shall cease production immediately until the reason for noncompliance has been determined and corrected. Production may then resume with the same testing and requirements applying. This verification will include the following testing procedures:

2 - Gyratory Specimens @ N_{design}

1 - Maximum Specific Gravity (Rice)

1 - Bulk Specific Gravity (Avg. of the 2 Gyro's)

Calculate Air Voids (Va), Voids in Mineral Aggregate (VMA), and percent asphalt cement.

9.0 During Construction Sampling

A total of eight samples of each Hot Mix Asphalt will be obtained from the roadway. Four from within the designated 250 foot Lead In and four from the 250 foot Lead Out sampling areas. These samples are for qaulity control tests. For all SUPERPAVE MIX DESIGNS these tests are part of the mix design verification procedure. These tests are also on all other HMA's are for comparison purposes and are in addition to the normal quality control test that would be performed. From these samples there will be six gyratory compacted specimens made. All quality control specimens will be 150mm in diameter and 115mm in height and compacted to N_{max}. Quality control tests will be performed on all surface and binder mixes

In addition quality control tests will be performed on the binder course from two sections, 290959 and 290903 (These are the only two unique binder mixes.).

Performance tests will be performed on samples from the main study area. The tests will require an additional 32 samples. Of these samples 26 will be compacted N@ 7% AV and two will compacted @ 3% AV. The remaining samples will be us for further testing in accordance to the tables on the following pages.

Each sample will consist of 25 lbs. of material. The samples should be obtained the pavement in a random manner to ensure representative samples. Samples should be obtained within the designated lead out and lead in sampling areas. Samples should be obtained in conformance with AASHTO T168 "Sampling Bituminous Paving Mixtures", stored in insulated containers, and compacted at specified compaction temperature by the gyratory compactor. If the sample temperature drops below the specified compaction temperature, the sample should be reheated to the compaction temperature. The tables on the next pages indicate the sampling procedure for during construction sampling and testing. **(See Appendix A for Flow Chart)**

NOTE: All gyratory compacted specimens that require further testing will be retained, labeled, and shipped to the LTPP contract laboratory for further analysis. Any samples not requiring further test will be discarded according to the attached tracking tables.

TYPICAL DURING CONSTRUCTION SAMPLING AND TESTING PROCEDURES FOR ALL MIXES IN THE NON-MAIN STUDY TEST SECTIONS.

Test Name	Tested By	Test Designation	SHRP Protocol	Report Form	Procedure	No. of Tests	Material Source/ Material Sample
HMA Specimen Compaction							
Gyratory Compaction @ Nmax	Phys.		AASHTO M-002			6	BA-Bulk Asphalt Concrete Speciman (Compact from loose mix samples) Compaction Diminsions are 150mm(diameter) X 115mm(height
Volumetric Tests							
Bulk Specific Gravity	Phys.	AC02	LTPP P02	T02	AASHTO T166	6	DA-Compacted Asphalt Concrete Speciman (This is 6 gyratory comacted samples made from the 6 loose mix samples)
Asphalt Content (extraction)	Chem.	AC04	LTPP P04	T04	AASHTO T164	2	BA- Bulk Asphalt Concrete Speciman These are 2 additional loose mix samples used for extraction and gradations.
Aggregate Gradation (Extracted Aggr)	Phys.	AG04	LTPP P14	T14	AASHTO T30	2	(This is the remaining aggregate from the extraction samples)
Maximum Specific Gravity	Phys.	AC03	LTPP P03	T03	AASHTO T209	2	BA- Bulk Asphalt Concrete Speciman (This is remaining material from 2 of the 6 loose mix samples after some has been used for the gyratory)
Volumetric Calculations							
Volume Percent of Air Voids	F O.		AASHTO PP19			6	DA-Compacted Asphalt Concrete Speciman (These clculations are made from tests on the 6 gyratory compacted samples)
Percent Voids in Mineral Aggregate	F O.		AASHTO PP19			6	
Voids Filled with Asphalt	F O.		AASHTO PP19			6	

NOTE: All BA loose mix samples from the roadway will weigh approximayely 10 kg. compacted from each BA sample. Test speciman DA01 is produced from BA01, etc..

TYPICAL DURING CONSTRUCTION SAMPLING AND TESTING PROCEDURES FOR THE MAIN STUDY TEST SECTION, THE SUPERPAVE DESIGN STANDARD MIX

Test Name	Tested By	Test Designation	SHRP Protocol	Report Form	Procedure	No of Tests	Material Source/ Material Sample
HMA Specimen Compaction							
Gyratory Compaction @ Nmax	Phys.		AASHTO M-002			6	BA-Bulk Asphalt Concrete Speciman (This is the 6 of the 40 loose mix samples retrieved from the roadway) Compaction Diminsions are 150mm(diameter) X 115mm(height
Gyratory Compaction @ 3% AV	Phys.		AASHTO M-002			2	BA-Bulk Asphalt Concrete Speciman (This is the 2 of the 40 loose mix samples retrieved from the roadway) Compaction Diminsions are 150mm(diameter) X 140mm(height
Gyratory Compaction @ 7% AV	Phys.		AASHTO M-002			26	BA-Bulk Asphalt Concrete Speciman (This is the 26 of the 40 loose mix samples retrieved from the roadway) Compaction Diminsions are 150mm(diameter) X 140mm(height
Volumetric Tests							
Bulk Specific Gravity	Phys.	AC02	LTPP P02	T02	AASHTO T166	9	DA-Compacted Asphalt Concrete Speciman (This is 6 gyratory comacted samples made @ Nmax and 3 @ 7% compacted from 40 loose mix samples)
Asphalt Content (extraction)	Chem.	AC04	LTPP P04	T04	AASHTO T164	6	BA- Bulk Asphalt Concrete Speciman These are the remaining 6 loose mix samples for extractions and gradations.
Aggregate Gradation (Extracted Aggr)	Phys.	AG04	LTPP P14	T14	AASHTO T30	2	(This is the remaining aggregate from the extraction samples)
Maximum Specific Gravity	Phys.	AC03	LTPP P03	T03	AASHTO T209	2	BA- Bulk Asphalt Concrete Speciman (This is remaining material from 2 of the 6 loose mix samples used for compaction @ 7% AV)
Volumetric Calculations							
Volume Percent of Air Voids	F O.		AASHTO PP19			34	DA-Compacted Asphalt Concrete Speciman (These ciculations are made on all 34 of the gyratory compacted samples)
Percent Voids In Mineral Aggregate	F O.		AASHTO PP19			34	
Voids Filled with Asphalt	F O.		AASHTO PP19			34	

NOTE: All BA loose mix samples from the roadway will weigh approximayely 10 kg.

9.10 SAMPLES OF MATERIALS FOR THE MATERIALS REFERENCE LIBRARY (MRL)

During pavement construction, bulk samples of the aggregate and asphalt binders used in all of the asphalt mixes used in the SPS-9A test sections should be collected, packaged, and shipped to the LTPP Materials Reference Library for storage and future testing.

The asphalt cement shall be sampled from the plant following AASHTO T40, "Sampling Bituminous Materials", after the asphalt has been heated for mixing. Only one sample of each unique asphalt binder used in the SPS-9A mixes is needed. If the same binder is used in more than one mix, then only one sample of that binder will be obtained.

One sample of the combined graded aggregates shall be obtained from the plant for each Asphalt Mix Design used in the SPS-9A test sections. This material shall be sampled in conformance with applicable portions of AASHTO T2, "Sampling Aggregates". For drum plants, the aggregates should be obtained from the charging (inclined) conveyor using the bypass chute, if possible. Otherwise, the sample should be taken from the belt on the charging conveyor. For batch plants, the aggregates can be sampled from the inclined conveyor at the dryer.

Containers for the storage and shipment of these samples will be provided to the participating state agency by the LTPP MRL at no cost to the state. Shipping of samples to the MRL will be performed by a common carrier and the cost borne by the MRL contractor. If necessary, cores and compacted specimens for the SPS-9A project can also be shipped and stored at the MRL if the SUPERPAVE Regional Test Center is not yet able to test or store the material designated for it to test.

A copy of LTPP Field Operations Information Form 1 should be completed and attached to all MRL shipments. Another copy of the form should be mailed separately to the MRL. Depicted below is a list of bulk material samples that are to be shipped to the LTPP MRL.

Material	Number
Asphalt cement collected from the plant in 10-liter pales.	1 for each type of binder
Combined fine and course aggregate obtained from the plant and stored in 10-liter pales.	10 for each aggregate combination.

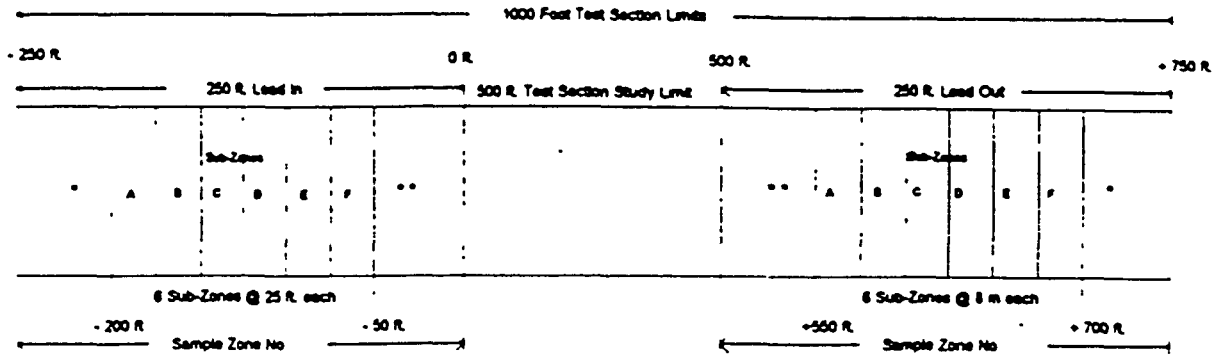
9.15 5 Point Cross Section

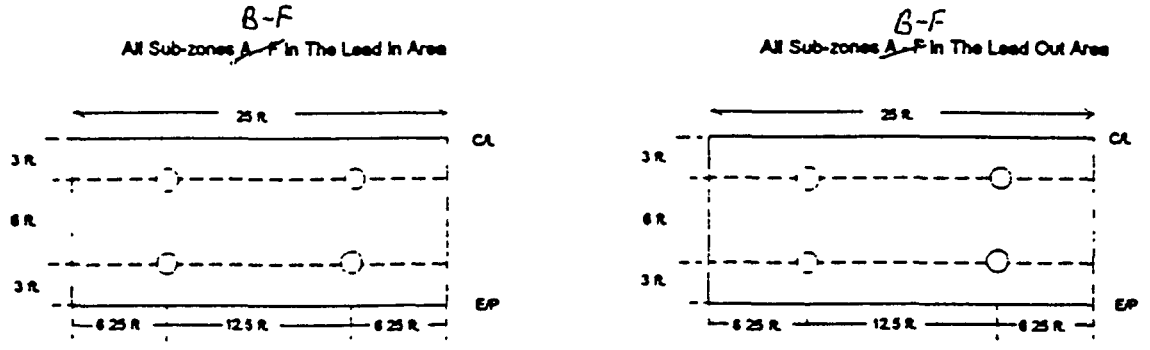
The elevations on the exact same locations of the pavement will be recorded before construction, after the binder course has been constructed, and after the final surface course has been constructed. This will be used to determine the exact thickness of each layer of asphaltic concrete.

10.0 Post Construction Sampling

The quantity and location of the required 6 inch diameter cores shall be obtained from the designated sampling zones and sub-zones at the appropriate time intervals after the construction of the test sections. Depicted on the following pages are the layout and sampling schemes for each test section.

TEST SECTION SAMPLING ZONES AND THEIR SUB-ZONES
FOR ALL THE TEST SECTIONS EXCEPT THE DESIGN STANDARD MIX TEST SECTION 290902





NOTE. ALL TYPE C CORE LOCATIONS

NOTE: SUB-ZONES A - F EACH CORRESPOND TO A SPECIFIC TEST TIME INTERVAL

A = TIME 0 IMMEDIATELY AFTER CONSTRUCTION
B = TIME AT 6 MONTHS AFTER CONSTRUCTION
C = TIME AT 12 MONTHS AFTER CONSTRUCTION
D = TIME AT 18 MONTHS AFTER CONSTRUCTION
E = TIME AT 24 MONTHS AFTER CONSTRUCTION
F = TIME AT 48 MONTHS AFTER CONSTRUCTION

In lieu of sub-zone (A) sampling, sampling immediately after construction @ time T=0, the required 4 cores each from the lead-in and lead-out will bw obtained by random location. This will be accomplished by using a random number table to pick the longitudinal and transverse location of the core. This will ensure that there is no bias in the sampling and will allow MHTD to statistically analyze the results.

TYPICAL POST CONSTRUCTION TESTING PROCEDURES FOR CORES EXTRACTED FROM NON– MAIN STUDY TEST SECTIONS.

Material Property	Tested By	SHRP Protocol	SHRP Test	Field Sample Size	Sample Container	Sample Area	Report Form	Procedure	Remarks
Core Examination/Thickness	Res.	LTPP P01	AC01	8–cores	box	C	T01		8–cores sampled from designated test zones
VOLUMETRIC ANALYSIS									
Bulk Specific Gravity	Phy.	LTPP P02	AC02	8–cores		C	T02		All 8 cores that were extracted from the designated test zones in the Lead In and Lead Out areas.
Asphalt Content (Extraction)	Chem.	LTPP P04	AC04	8–cores		C	T04		
Aggregate Gradation (Extract Aggr.)	Phy.	LTPP P14	AG04	1–extract		C	T14		
VOLUMETRIC CALCULATIONS									
Volume Percent of Air Voids	Phy./FO	AASHTO PP19		8–cores		C			All 8 cores that were extracted from the designated test zones in the Lead In and Lead Out areas.
Percent Voids In Mineral Aggregate	Phy./FO	AASHTO PP19		8–cores		C			
Voids Filled with Asphalt	Phy./FO	AASHTO PP19		8–cores		C			
RECOVERED ASPHALT CEMENT									
Abson Recovery	Chem.	LTPP P21	AE01	8–cores		C	T21		All 8 cores that were extracted from the designated test zones in the Lead In and Lead Out areas.
Penatration @ 5 degrees C	Chem	AASHTO T49		3–extracts		C			
Penetration @ 25 & 46 degrees C	Chem	LTPP P22	AE02	3–extracts		C	T22		
Viscosity @ 60 & 135 degrees C	Chem	LTPP P25	AE05	2–extracts		C	T25		
Specific Gravity @ 16 degrees C **	Chem	LTPP P23	AE03	2–extracts		C	T23		
Dynamic Shear @ 3 temperatures **	Chem	AASHTO TP5		2–extracts		C			
Creep Stiffness @ 2 temperatures **	Chem	AASHTO TP1		2–extracts		C			
Direct Tension @ 2 temperatures	Chem	AASHTO TP03		2–extracts		C			

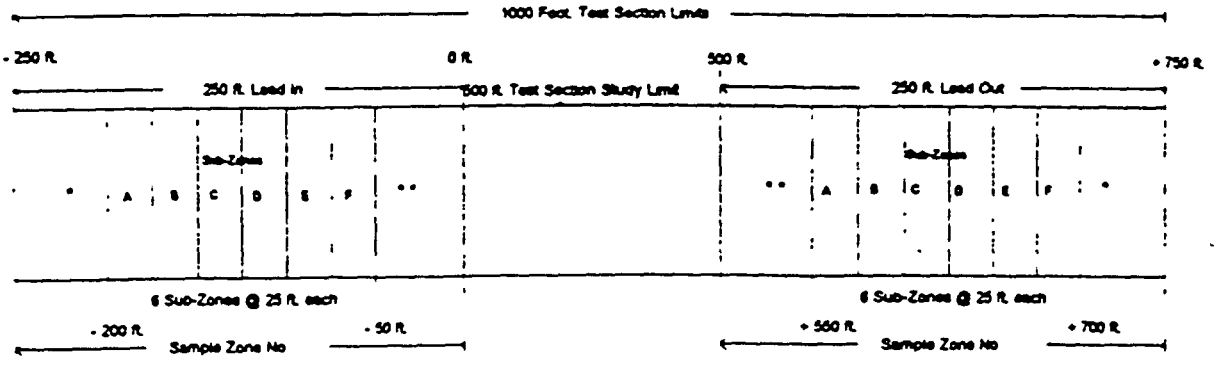
NOTES· USE THE MAXIMUM THEORETICAL SPECIFIC GRAVITY DETERMINED ON TESTS ON BULK UNCOMPACTED SAMPLES OBTAINED DURING CONSTRUCTION.
USE SPECIFIC GRAVITY OF AGGREGATE COMPONENTS FROM TESTS ON UNMIXED AGGREGATES.

** THE TEST TEMPERATURES SHOULD BE THE SAME AS THOSE USED FOR THE TESTS ON THE RTFOT–PAV CONDITIONED SAMPLES PERFORMED DURING THE INITIAL BINDER GRADING

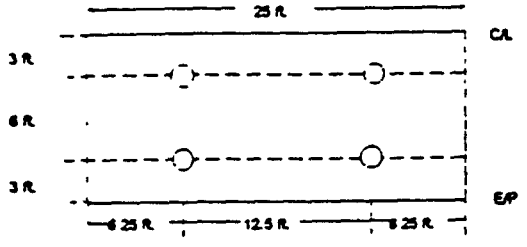
THE TOP OF ALL CORES SHALL BE MARKED WITH AN ARROW TO INDICATE THE DIRECTION OF TRAFFIC.

Note: PHY. = Physical Lab Section
Res = Research Section
FO = Field Office

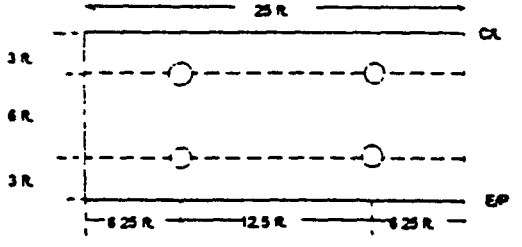
TEST SECTION SAMPLING ZONES AND THEIR SUB-ZONES
FOR THE DESIGN STANDARD MIX TEST SECTION 290902.



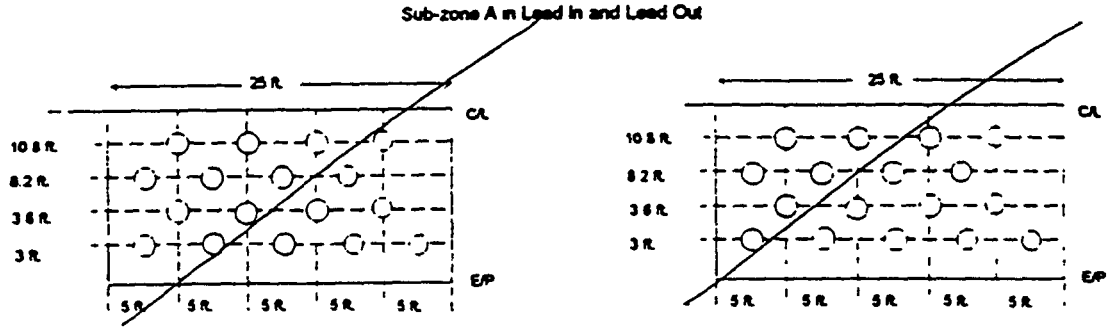
All Sub-zones B - F In The Lead In Area



All Sub-zones B - F In The Lead Out Area



Sub-zone A in Lead In and Lead Out



For Sub-Zone A theses core will be drilled in random location in the same manner as non-main study sections. (See note at bottom of page 29.)

TYPICAL POST CONSTRUCTION TESTING PROCEDURES FOR CORES EXTRACTED FROM THE MAIN STUDY TEST SECTION

Material Property	Tested By	SHRP Protocol	SHRP Test	Field Sample Size	Sample Container	Sample Area	Report Form	Procedure	Remarks
Core Examination/Thickness	Res.	LTPP P01	AC01	34/8–cores	box	C	T01		34–cores sampled from sub–zone A @ t=0 8–cores sampled @ suzones B–F @ the appropriate times.
VOLUMETRIC ANALYSIS									
Bulk Specific Gravity ***	Phy	LTPP P02	AC02	34/8–cores	box	C	T02		34–cores sampled from sub–zone A @ t=0 8–cores sampled @ suzones B–F @ the appropriate times.
Asphalt Content (Extraction) ***	Chem.	LTPP P04	AC04	8–cores		C	T04		
Aggregate Gradation (Extract Aggr)	Phy.	LTPP P14	AG04	2–extract		C	T14		
VOLUMETRIC CALCULATIONS									
Volume Percent of Air Voids	Phy./FO	AASHTO PP19		34/8–cores		C			34–cores sampled from sub–zone A @ t=0 8–cores sampled @ suzones B–F @ the appropriate times
Percent Voids in Mineral Aggregate	Phy./FO	AASHTO PP19		34/8–cores		C			
Voids Filled with Asphalt	Phy./FO	AASHTO PP19		34/8–cores		C			
RECOVERED ASPHALT CEMENT									
Abson Recovery	Chem.	LTPP P21	AE01	34/8–cores		C	T21		34–cores sampled from sub–zone A @ t=0 8–cores sampled @ suzones B–F @ the appropriate times.
Penatration @ 5 degrees C	Chem	AASHTO T49		3–extracts		C			
Penetration @ 25 & 46 degrees C	Chem	LTPP P22	AE02	3–extracts		C	T22		
Viscosity @ 60 & 135 degrees C	Chem	LTPP P25	AE05	2–extracts		C	T25		
Specific Gravity @ 16 degrees C **	Chem	LTPP P23	AE03	2–extracts		C	T23		
Dynamic Shear @ 3 temperatures **	Chem	AASHTO TP5		2–extracts		C			
Creep Stiffness @ 2 temperatures **	Chem	AASHTO TP1		2–extracts		C			
Direct Tension @ 2 temperatures	Chem	AASHTO TP03		2–extracts		C			

NOTES: USE THE MAXIMUM THEORETICAL SPECIFIC GRAVITY DETERMINED ON TESTS ON BULK UNCOMPACTED SAMPLES OBTAINED DURING CONSTRUCTION.
USE SPECIFIC GRAVITY OF AGGREGATE COMPONENTS FROM TESTS ON UNMIXED AGGREGATES

** THE TEST TEMPERATURES SHOULD BE THE SAME AS THOSE USED FOR THE TESTS ON THE RTFOT–PAV CONDITIONED SAMPLES PERFORMED DURING THE INITIAL BINDER GRADING

*** **THESE TESTS ARE TO BE RUN ON CORES AFTER THE COMPLETION OF THE LTPP PERFORMANCE TESTS PERFORMED BY THE LTPP CONTRACT LABORATORY. ALL RECOVERED ASPHALT CEMENT TESTS CAN NOT BE COMPLETED UNTIL AFTER THE LTPP CONTRACT LABORATORY HAS FINISHED THEIR REQUIRED PERFORMANCE TESTS ON CORES. ALL 34 CORES EXTRACTED BY RANDOM LOCATION @ TIME T=0 WILL BE RETAINED, LABELED, AND SHIPPED TO THE LTPP CONTRACT LABORATORY.**

THE TOP OF ALL CORES WILL BE MARKED WITH AN ARROW TO INDICATE THE DIRECTION OF TRAFFIC.

Note PHY = Physical Lab Section
Res = Research Section
FO = Field Office

10.10 Summary Of Field Cores For SPS-9A Testing

Project	Test Section	Time After Construction (Months) 0** -A-	6 -B-	12 -C-	18 -D-	24 -E-	48 -F-
Main Study	Agency Mix (I-C Mix)	8 (V)	8 (V)	8 (V)	8 (V)	8 (V)	8 (V)
	SUPERPAVE Binder	34 (S*)	8 (V)	8 (V)	8 (V)	8 (V)	8 (V)
	Alternate SUPERPAVE Binder	8 (V)	8 (V)	8 (V)	8 (V)	8 (V)	8 (V)

Note: Number in the table represents the number of 6 inch diameter cores. Top of cores will be marked with an arrow to depict the direction of traffic.

V = Volumetric and binder stiffness test on cores

S = Performance testing including all tests carried under "V"

S* = Performance testing at t=0 months will be performed on three sets of specimens; the 34 gyratory compacted specimens from the design mixture in the laboratory, the 34 gyratory compacted specimens from the plant mixture at the asphalt plant, and the 34 cores extracted from the roadway.

** = Inventory testing is only carried out at time t=0

10.15 CORING PROCEDURE

Cores from each surface layer mixture used on the SPS-9A project will be needed for volumetric testing, extracted binder testing, and mixture performance testing. The cores will be obtained at the specified time intervals so that aging characteristics can be assessed. The full depth asphalt concrete cores shall be extracted at the locations and time intervals as indicated in section 10.00 and 10.10. The cores shall be cut to the top elevation of the existing PCCP riding surface. The surface and the binder course will be separated in the lab. The coring operation shall be carried out in accordance with AASHTO T24-B6, "Obtaining and Testing Drilled Cores and Sawed Beams of Concrete." It is essential for laboratory materials testing that the direction of traffic be indicated on the test cores. Therefore, all cores of the pavement surface shall be marked with a waterproof marking material prior to extraction from the pavement.

The cores shall be labelled and recorded on SHRP LTPP Field Operations Information Form 1. The color of the label will be sky blue as to agree with the color code assigned to asphalt cores. The label will depict the following information:

SHRP SECTION I.D.	(unique six digit SHRP section I.D.)
SAMPLING ZONE	(sample zone of core)
SUB-ZONE	(sub-zone of the sample area)
CORE/SAMPLE LOCATION	(as marked on the sample layout plan)
SAMPLE CODE	(four digit alphanumeric code)
DATE	(sampling date)
FIELD SET	(one digit for sampling period)

After the cores are retrieved, the core holes will be immediately backfilled with hot mix which is being produced for the project at that time.

The asphalt concrete shall be hand compacted in lifts no thicker than 2 inches.

10.20 Post Construction FWD Testing

FWD testing will be performed in each of the nine 500 foot test section study limits after the construction of the asphaltic concrete overlay. After and long term deflection testing will follow the specifications in the "Manual for FWD Testing in the Long Term Pavement Performance Program (SHRP-P-661)".
The FWD testing drop sequence and drop heights are depicted in the table below.

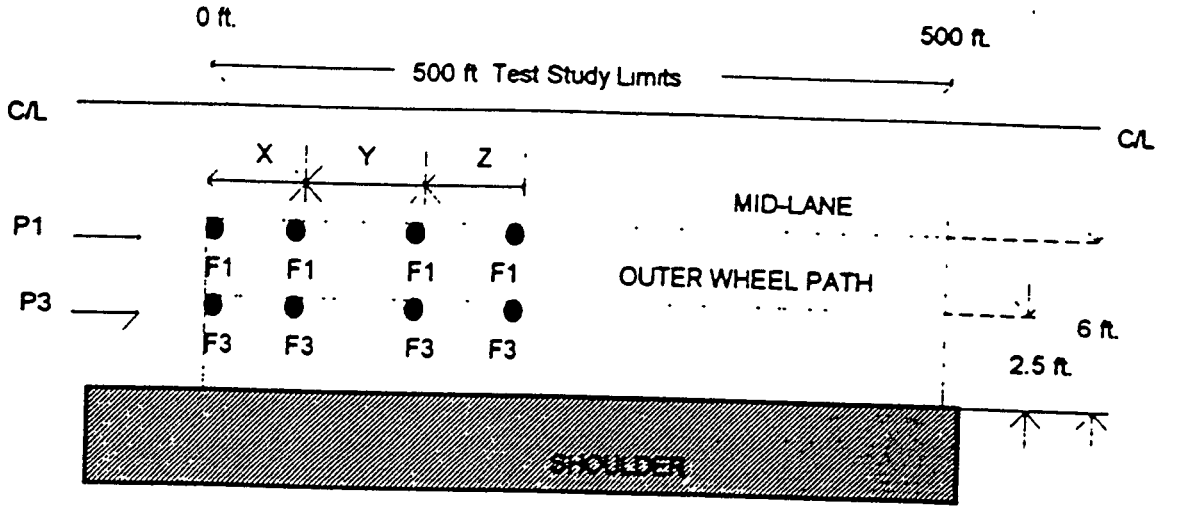
FLEX TESTING PLAN

Number of Drops	Drop Height	Data Stored
3	3	No
4	1	Yes
4	2	Yes
4	3	Yes
4	4	Yes

The FWD field data collection program will be set up to acquire data from the field as per Figure 9 page 34 of SHRP-P-661 for deflection basin tests. Load transfer test and Edge of Pavement test will **NOT** be required in the post construction FWD testing. Deflection Basin test will be conducted in the Mid-Lane and Outer For each pavement section tested the prompts of the FWD Field Data Collection Program shall be answered in accordance with the protocol on pages 44-53 of SHRP-P-661. The file name convention, data handling, data storage, and forwarding of the FWD data files to the SHRP Regional Information Management System (RIMS) shall be in accordance to pages 47-53 of SHRP-P-661.
On the following page there is an excerpt from the SHRP-P-661 manual depicting the location and type of tests to be performed by the FWD.

POST CONSTRUCTION FWD TESTING

DIRECTION OF TRAVEL



POST CONSTRUCTION FWD TESTING PLAN

P = Pass, longitudinal location for FWD pass.

F = FWD test point ID and test location

F1 = Mid-lane deflection basin test, the location is to match pre-construction deflection basin test.

F3 = Outer wheel path deflection basin test, longitudinal location in the test section is to match the F1 location.

Deflection Basin Test Sensor Configuration
0, 8, 12, 18, 24, 36, & 60 inches from the load plate

10.25 Post Construction 5 Point Cross Section

Post construction 5 point cross sections will be obtained at the same locations as the pre construction 5 point cross sections. The procedure will be the same as the pre-construction testing as described in section 7.20.

11.0 Traffic Data Collection Station

Purchasing and installation of the traffic data collection station will be by the Missouri Highway and Transportation Department. Installation shall be performed after the asphaltic concrete overlay is complete. The location of the traffic data collection system will be determined by the Planning Division. MHTD's Planning Division will specify the Weigh In Motion (WIM) equipment and installation (phone # 751-2842).

12.0 Pavement Temperature Data Collection Station

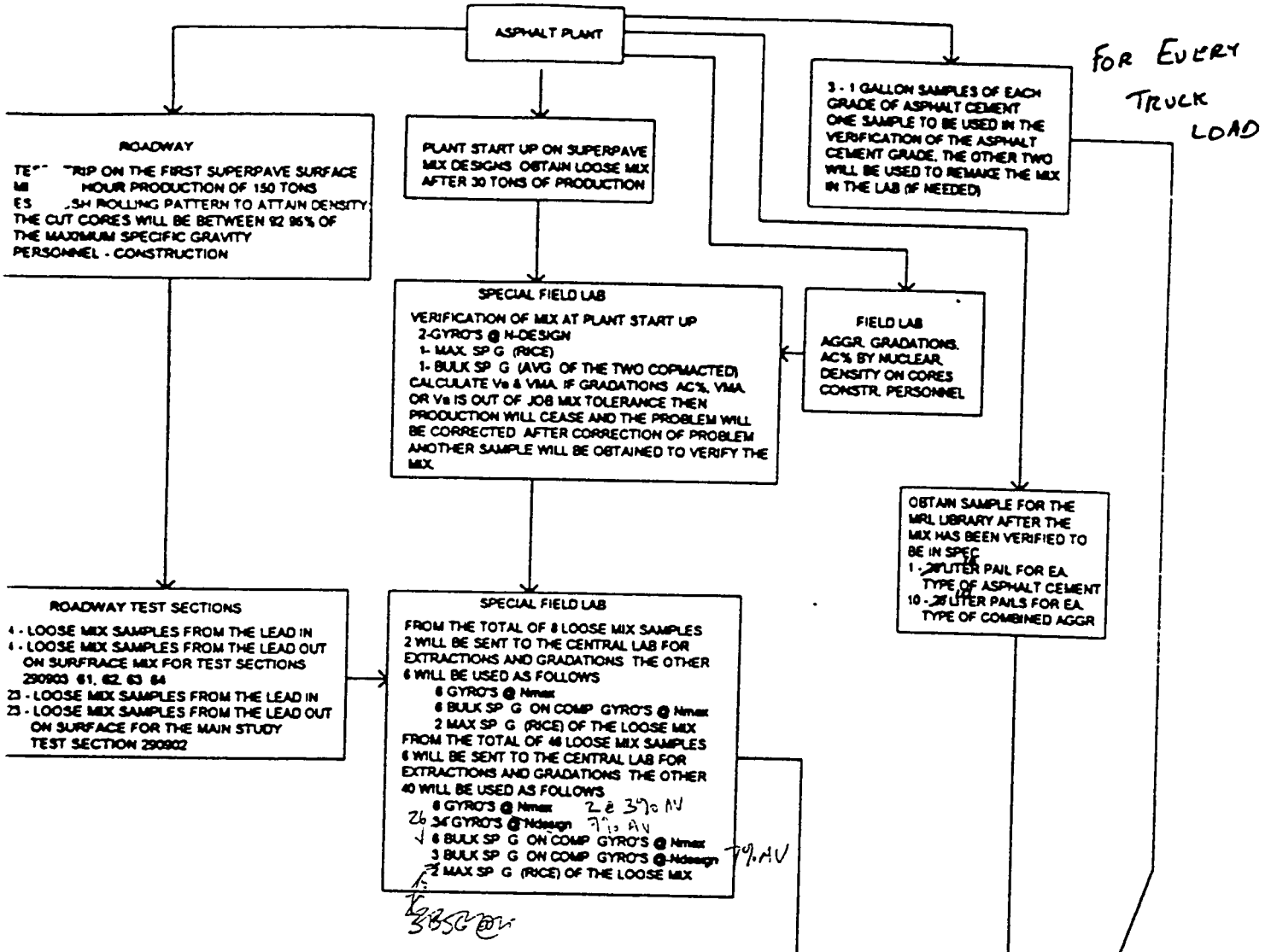
The Research Section will specify what type of pavement temperature data collection system will be used, at what station location it is to be installed, and perform the installation and/or delegate the installation of the system. The system will be purchased by the commission.

13.0 Post Construction Signing, Marking, and Layout

From the control points that were established during the pre-construction test site layout, the test site signing and marking locations can be established by research/construction personnel. All signs, posts, hardware, and paint shall be furnished by the commission. All site signing and marking shall be performed by research and maintenance personnel. **(See Appendix B for Details)**

APPENDIX A

Flow chart for during construction sampling and testing plan.



PERSONNEL

SEARCH

RDWY TO PULL LOOSE MIX SAMPLES

TO SHUTTLE SAMPLES FROM RDWY TO THE SPECIAL FIELD LAB AND FROM THE SPECIAL FIELD LAB TO THE MAIN LAB AT JEFF CITY

) THE SPECIAL FIELD LAB TO ASSIST N TESTING

) THE SPECIAL FIELD LAB TO ENSURE THAT ALL SAMPLES ARE LABELED CORRECTLY TO FILL OUT ALL OF THE REQUIRED SHRP TEST RESULT AND IDENTIFICATION FORMS AND TO MAINTAIN FILE AND PAPER TRAIL

) THE MAIN LAB TO STORE AND SHIP SAMPLES

D OFFICE

) SPECIAL FIELD LAB TO CALCULATE AND INTERPERATE RESULTS AND TO ORCHASTRATE ENTIRE PROJECT

PHYSICAL LAB

1 - IN THE SPECIAL FIELD LAB TO CONDUCT THE TESTING

1 - (PART TIME) IN THE MAIN LAB FOR GRADATIONS

CHEMICAL LAB

1 - (PART TIME) IN THE MAIN LAB FOR EXTRACTIONS

2 - (PART TIME) IN THE MAIN LAB FOR SHRP PG VERIFICATION

APPENDIX B

The following pages are excerpts from the SHRP-LTPP-Operational Memorandum for the layout, signing, and marking of GPS & SPS test site location.

STRATEGIC HIGHWAY RESEARCH PROGRAM

LONG-TERM PAVEMENT PERFORMANCE

GUIDELINES FOR SIGNING AND MARKING OF GENERAL PAVEMENT STUDIES' (GPS) TEST STUDIES

1. General

To assist SHRP data collection contractors and state highway agency maintenance crews in locating and identifying the General Pavement Studies (GPS) test sections, signing and marking of the test sites is required. These guidelines describe the signing and marking details.

2. Sign Locations and Details

2.1 A 24 x 36 in. reflectorized sign, designated Sign A, should be installed facing the traffic, 500 ft in advance of the test section, as shown in Figure 1. This sign will help alert distress photographic and profile measurement crews to the proximity of the test section.

2.2 A 12 x 15 in. sign, designated Sign B, should be installed parallel to traffic direction at the edge of right-of-way exactly at the beginning of the test section as shown in Figure 1. This sign will serve as a long-lasting marker of the test section.

2.3 Details of Signs A and B are shown in Figure 2. Sign A will include a SHRP logo, "Road Test," and a six digit SHRP Section ID numbr. Sign B will include "SHRP," and SHRP Section ID number. The SHRP logo portion of Sign A will be furnished by a SHRP contractor. The applicable ID number will be designated by the SHRP Regional Coordination Office. Addresses and phone numbers of SHRP Regional Coordination Offices are listed in Appendix A.

3. Marking Locations and Details

3.1 Test section should be marked by two while paint stripes, not less than 6 in. wide, across the test lane. The stripes should be located exactly at the beginning and end of the test section, as shown in Figure 1.

3.2 Maintenance control zone should be marked by two white paint stripes, not less than 6 in. wide, across the test lane. The stripes should be located 500 ft in advance of the test section and 250 ft beyond the test section, as shown in Figure 1.

3.3 Test section will be identified by a six digit SHRP Section ID number. The ID number should be painted at the beginning of the test section near the outside shoulder, as shown in Figure 3. The ID number will be designated by the SHRP Regional Coordination Office.

3.4 Test section will be divided into five, 100-ft long subsections. Therefore, "crosses" should be painted at the beginning of the test section and every 100 ft, and marked consecutively with the numbers 0, 1, 2, 3, 4, and 5, as shown in Figure 3. The numbers "0" and "5" should be painted at the beginning and end of test section, respectively. Approximately 6-in. high letters should be used.

3.5 Monuments, in the form of nails, spikes, or rebars, should be installed in the shoulder, exactly at the beginning and end of test section, as shown in Figure 1. These monuments will serve as a section marker in case of sign loss or paint wear.

3.6 Delineators with 3 and 2 blue reflectors should be installed at the beginning and end of test section, respectively, as shown in Figure 1.

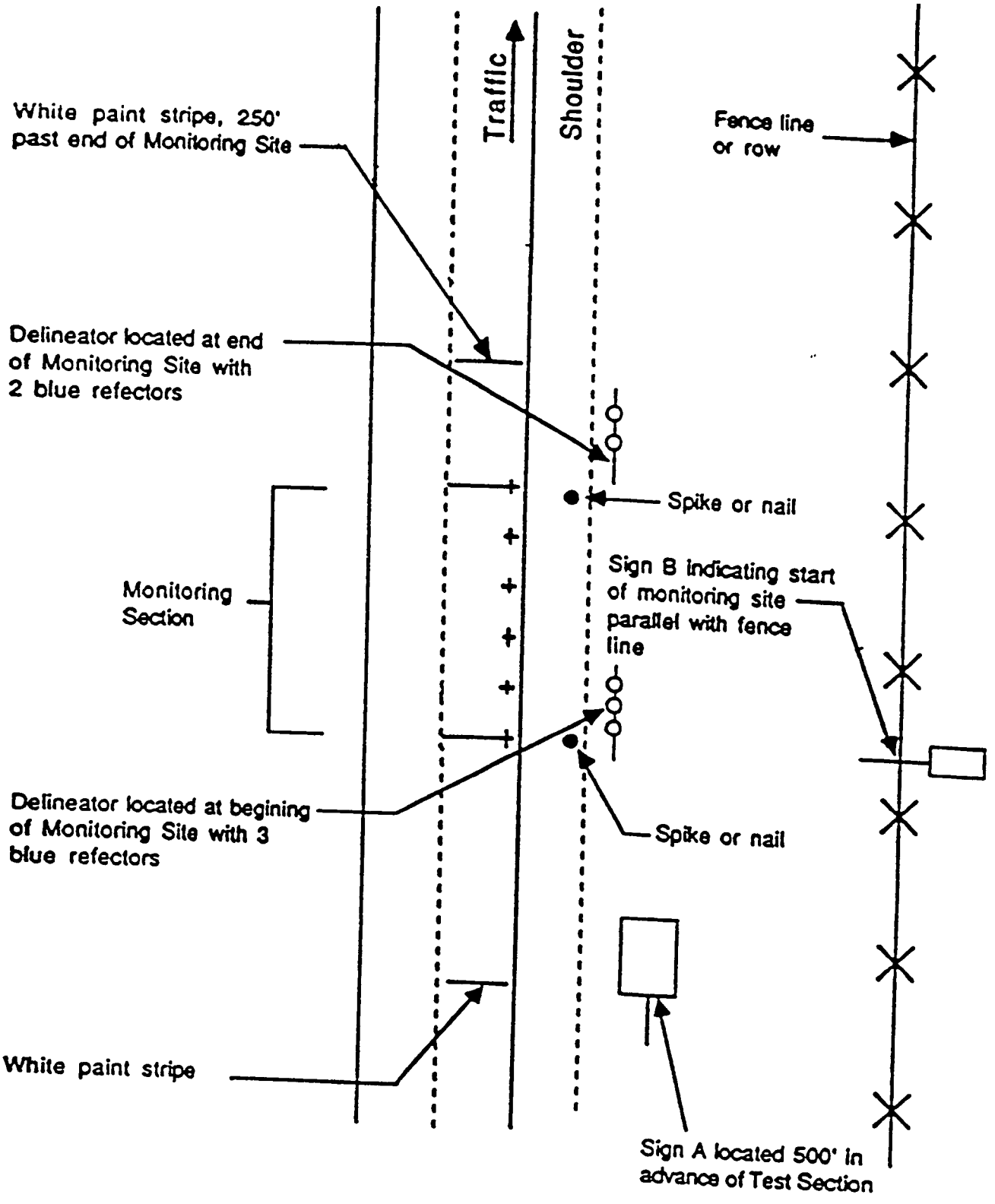
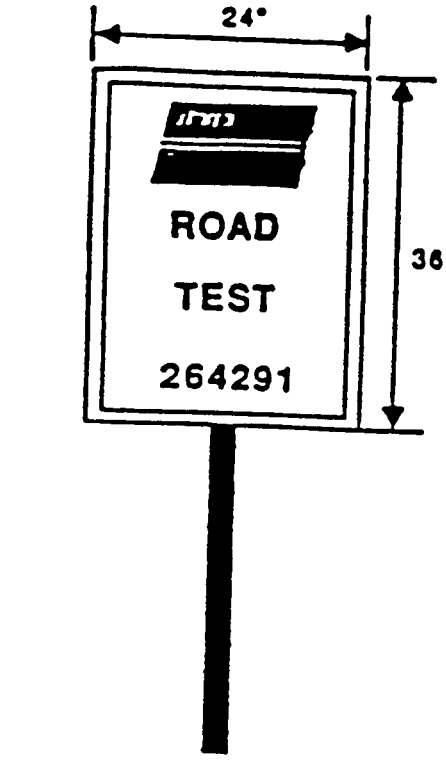


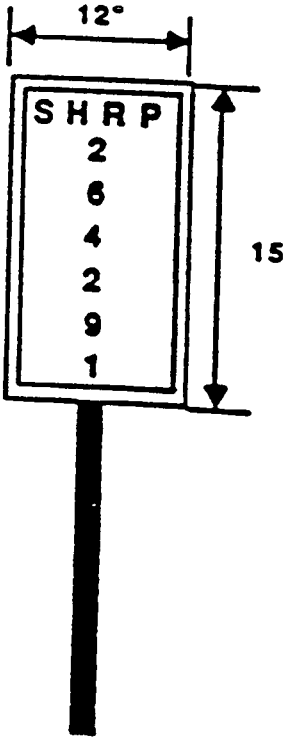
Figure 1. General Layout of test section showing sign locations



Notes:

- Blue Background
- White letters
- White Border, 1" wide
  1/2" offset from edge
- Letters and numbers
  4" high
- SHRP logo 6" by 9"

Sign A Detail



Notes:

- Blue Background
- White Letters
- White Border 1/2" wide
  1/2" offset from edge
- Letters and numbers
  1 1/2" high

Sign B Detail

Figure 2. Sign details

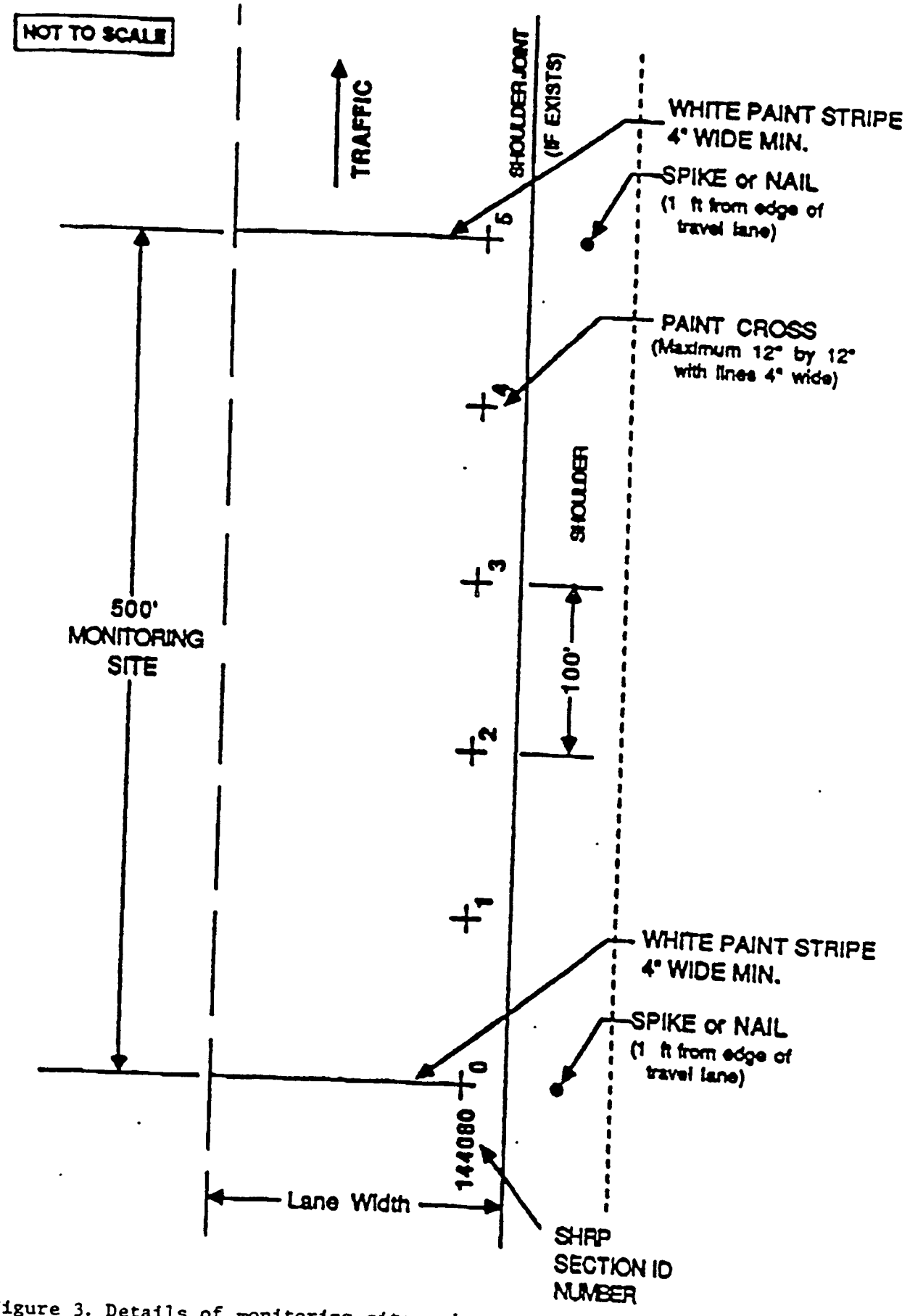


Figure 3. Details of monitoring site paint configuration

APPENDIX C

The following pages are excerpts from the "Specific Pavement Studies Materials Sampling & Testing Requirements Experiment SPS-9A SUPERPAVE Asphalt Binder Study". They depict the sampling, marking, labeling, packaging, and shipping of specimens for the SPS-9A experimental study.

3. Field Materials Sampling

3.1 General

This section describes procedures and guidelines for field material sampling, field testing and handling of cores and other material samples in the field and during transfer to the laboratory for testing. These procedures should be followed as closely as possible to minimize the variability of material properties attributable to differences in sampling and handling techniques.

3.2 Personnel Requirements

The scope, intensity and time constraints imposed on the field drilling and sampling for this SPS experiment are such that it is recommended that additional field personnel, above and beyond those needed for routine construction/acceptance testing, be present on the site. These personnel should have sole responsibility for obtaining the necessary material samples, completing the necessary data sheets and forms, and performing the necessary testing. It is recommended that the field crew include a qualified and experienced on-site project supervisor who is experienced with LTPP sampling procedures and data collection and reporting requirements. This supervisor should be a senior technician, geologist, or engineer with experience in subsurface explorations and pavement field sampling and testing. This person must be familiar with all aspects of the LTPP drilling and sampling program, field drilling and sampling techniques and the timing of all field activities.

3.3 Field Operations

Field operations at each SPS-9A project site will include the following activities:

1. Prior to construction, the LTPP RCOC should establish a joint field team with the participating highway agency to coordinate the conduct of the activities involved in the drilling and sampling operations. An LTPP representative should be assigned to assist the participating highway agency and contractors to assure that field operations are performed in accordance with the proper procedures and the field sampling and testing plan.

2. The LTPP field team shall lay out the project site, mark initial sample locations and perform the sampling and testing operations. It is important to follow the sequence of boring as specified in the sampling plan to reduce the risk of mixing of samples at the site. Core or auger locations that are considered unacceptable should be replaced with alternate locations and marked on an as-sampled layout plan after obtaining a written approval from FHWA-LTPP staff.

3. The LTPP field representative shall record, report, and resolve problems encountered during the field operations. Correspondence with the requisite FHWA-LTPP staff

should be performed as necessary to maintain uniformity across all experiment projects.

4. Test samples shall be prepared for shipping together with complete logs and other records.

3.4 Collection of Samples, Marking, Packaging, and Shipping

Because of the research nature of this project and because samples will be shipped over long distances, it is extremely important that the sample be packaged carefully. The samples shall be packaged and preserved in accordance with ASTM D4220 (Group B), "Preparing and Transporting Soil Samples". Extreme care must be taken in packaging and shipping of test samples to eliminate damage to the samples or influence their properties.

General requirements for marking and packaging individual samples are as follows:

- Sample numbering systems (as provided later in this section).
- Indelible ink pens of black or other suitable color shall be used for marking labels.
- Labels and tags shall be of high quality moisture resistant material.
- Bags for small portions of auger and bulk samples of materials to be used for laboratory moisture content determination shall be plastic lined cloth or heavy plastic and sealable against moisture loss or gain by wire-ties. Liter-size jars adequately sealed against moisture loss or gain may also be used for this purpose.
- Bags for large bulk samples shall be heavy cloth, plastic lined with wire-tie for closing.
- Cores shall be placed in"zip-lock" storage bags or other suitable material (e.g. heavy-duty plastic or "bubble-wrap" wrap) to ensure that they are sealed from moisture, then wrapped for their entire length with tape (e.g., plastic transparent mailing tape 50 mm wide).

3.4.1 Sampling Location Designations

Sampling locations are designated on the LTPP forms and material sampling plans with the following six digit code format:

L ## t X X

where

L = Location type:

- B - bulk sample location
- A - 150 mm diameter core and/or auger locations
- S - Shoulder auger probe 6 m below the pavement surface
- C - 150 mm diameter core locations
- T - nuclear density/moisture gage
- F - field bulk HMA sample
- H - Samples obtained from the Hot Mix Plant.

= Location number. Up to a two digit location number is assigned sequentially to each location type on each test section. For the SUPERPAVE™ mixtures, when obtaining bulk samples of plant mix materials use sample location numbers of 01-09 for the topmost layer (wearing course) and 11-19 for the binder course. (This explicitly limits sampling and testing to a maximum of two SUPERPAVE™ materials, layers, in a test section)

t = Sampling time interval. This time interval is used for samples taken at specified time intervals referenced to the construction date. The single letter designating the time from paving is as follows:

- A - prior, during or immediately after construction
- B - 6 months
- C - 12 months
- D - 18 months
- E - 24 months
- F - 48 months

X X = Section. Use the 2 digit test section number, e.g., 01, 02, 03. This makes the sample location unique to that test section.

Examples of valid sample location numbers include:

B01A01 Bulk sample 01 from test section 01.

A02A03 Auger location 02 from test section 03.

C04B03 Core location 4 at sampling time interval B (six months after paving) from test section 03.

The samples from each sample location are assigned a sample number as described in the next section.

3.4.2 Sample Code Number

Each sample (core, bulk, moisture, compacted) shall be assigned a seven digit designation that must be recorded on the appropriate data forms. The sample number will consist of the following format:

	S	M	##	t	XX
Digit	1	2	34	5	6 7

where

S = Sample type:
C - core sample
D - compacted specimen from plant mixed material
B - bulk sample
M - moisture sample
L - compacted specimen from laboratory mixed material
N - uncompacted laboratory mixed material sample

M = Material Type:
A - asphalt concrete
C - asphalt cement
P - portland cement concrete
T - treated, bound, or stabilized base/subbase
U - combined aggregate used in asphalt concrete mixes
G - untreated, unbound granular base/subbase
S - subgrade soil or fill material

= Sample number. Up to a two digit sample number assigned sequentially to each sample with the same sample type and material type designation. For specimens made in the SUPERPAVE™ Gyratory Compactor from bulk samples (DA***** and LA***** codes), use sample numbers from 01-49 for the topmost SUPERPAVE™ layer and 50-99 for a binder course material/layer (if it is a SUPERPAVE™ mixture). Similarly for cores (CA***** codes), the top layer is marked with a sample number of 01-49 while the bottom of the core

(binder layer) is incremented by 49 to be in the range of 50-99.

t = Sampling time interval. This time interval is used for samples taken at specified time intervals referenced to the construction date. The single letter designating the time from paving is as follows:

A	-	prior, during or immediately after construction
B	-	6 months
C	-	12 months
D	-	18 months
E	-	24 months
F	-	48 months

XX = Section number. Use the 2 digit test section number, e.g., 01, 02, 03. This makes the sample location unique to that test section.

The following are examples of valid samples code numbers:

CA24A02 Asphalt concrete cores obtained at time interval A, immediately following paving, from section 02.

CA01D01 An example of HMA core sample numbering taken from section 01 during interval "D" (18 months after construction).

CT02A03 Treated base core 2 from test section 03.

BG01A01 Bulk sample 1 of granular base from test section 1. Assign numbers consecutively as samples are obtained from each test section, BG01A01, BG02A01, etc.

BA01A02 Bulk sample 1 of uncompacted HMA from test section 2. Assign numbers consecutively as samples are obtained from each test section, BA01A02, BA02A02, etc.

DA01A01 Compacted specimen number 01 of plant mixed HMA from section 01 interval A (during construction).

NA01A02 Uncompacted sample of laboratory mixed HMA made from constituent materials obtained from the plant used in section 02.

LA01A01 Compacted specimen 1 of laboratory mixed HMA made from constituent materials obtained from the plant destined for mixture placed in section 01.

BS01A02 Bulk subgrade sample of material from test section 02 obtain prior to construction. Assign sample numbers consecutively for multiple samples from the same test section.

MS01A02 Subgrade moisture content sample 1 obtained from bulk sampling location on test section 02.

3.4.3 Labels and Tags

Each sample shall be labeled before packing in boxes and cartons. As a minimum, the following information shall be included on tags and labels:

STATE CODE
SPS PROJECT CODE
TEST SECTION NO.
LOCATION DESIGNATION (as marked on sample layout plans)
SAMPLE NUMBER
DATE (mm-dd-yy, sampling date)
FIELD SET (one digit number which will be 1 for the first round of sampling)

3.4.4 Packaging

Suggestions for labelling and combining the samples for shipment are as follows:

1. All samples of like material (e.g., asphaltic concrete surface and binder) shall be placed in separate boxes or separate compartments of one box.

2. Each sample shall have a label or tag attached that clearly identifies the material.

3. Each core shall be surrounded with "bubble-wrap" or other acceptable cushioning material on all sides within the shipping box.

4. All bulk samples shall be marked with 2 labels or tags. One shall be placed inside the bag and one attached to the outside. A small bag or jar sample for moisture testing of each bulk sample shall be placed inside the bulk sample bag.

5. All shipping boxes should be wood of suitable grade and construction to withstand shipping and subsequent moving without breakage of the box or damaging of samples.

6. All boxes should be adequately secured by nails or screws prior to shipping.

Field Operations Information Sheets 1 and 2-1 shall be sent with each shipment of materials samples.

3.4.5 Shipping

All samples should be shipped within 5 days to the laboratory designated by the participating highway agency. Each box shall be labeled to include the State Code, SPS Project Code, type(s) of samples, box number (for each series of boxes for the specific project to each delivery point). The boxes should be labeled "Handle with Care" or similar wording. Samples shall be protected against freezing and overheating.

It is recommended that each shipment be insured for an amount to cover at least twice the cost of the field work performed at the site to obtain the samples.

A copy of the bill of lading clearly showing the boxes being shipped and a receipt signed by the shipping organization shall be sent to the appropriate FHWA LTPP Regional Coordination Office.

All of the above guidelines are designed to protect the integrity of the material samples to the highest degree possible within economic limits. These materials are very important to the success of the LTPP program and should be treated with as much care as possible. Cooperation from all participants is needed to ensure that these specimens are shipped to the laboratory with a minimum of damage.

3.4.6 Patching and Clean-up

Following the completion of the sampling and testing of each layer, the sampling personnel shall be especially careful to remove all debris created by the operations. Field sampling and testing personnel shall also repair and restore all bulk sampling, auger probe, or coring locations, etc. by replacing all material and compacting the layer as per the participating agency practice. The method of repair of each type of sampling area shall be outlined in the materials sampling plan.

3.5 Logs and Reports

Accurate and detailed record keeping is essential for the materials sampling and testing program. During the field sampling operations, two types of forms must be completed. These are the Field Operations Information Forms and the Sampling Data Sheets. Field Operations Information Forms are used to record general information concerning the pavement test sections and the materials samples. Sampling Data Sheets are used to record the actual information for each sampling area or sampling location. A person should be designated to record data at each site on the appropriate data sheets, insure the accuracy and integrity of the collected data and forward the data sheets to the appropriate personnel. This person must have a thorough understanding of the content of the data sheets and the procedures for completing the sheets. If these forms are completed by a person other than the LTPP representative, the data sheets must be reviewed by the LTPP representative prior to forwarding the sheets to the appropriate personnel.

3.5.1 Field Set Number

The field set number is a sequentially assigned number used to indicate the different time periods in which material sampling and field testing were conducted on the project. A field set number can apply to more than one day since sampling of SPS-9A test sections may require more than one day.

As a general rule for new construction, all sampling that occurs up to the opening of the pavement test section to traffic shall be assigned field set number 1. For cores, this is the same as sampling time interval A. All subsequent sampling shall be assigned a field set number incrementally. For example, the next sampling conducted would be given a field set number of 2, etc.

For overlay projects, all sampling that occurs prior to construction of the overlay should be designated field set number 1. All sampling performed during construction should be designated field set number 2, etc.

3.5.2 Cores

A separate log shall be completed for each core hole. The depth of penetration of each coring operation and the average length of the recovered core shall be recorded to the nearest 2 mm. Data sheets for these logs are included in Appendix B of this document. Sampling Data Sheet 2 shall be used to record pavement cores from C-type sampling areas. These logs shall show the general type of material in accordance with terminology described in Appendix B of the SHRP-LTPP Guide for Field Materials Sampling, Handling and Testing. The general code 700 shall be used to identify HMA. Code 321 shall be used in the field to classify other asphalt treated mixes such as base and subbase materials. Remarks shall include the type of cooling medium, difficulties encountered in coring, defects observed in the core (such as cracks, voids and disintegration), and other pertinent observations.

3.5.3 A-type Sampling

Data for each A-type sampling hole shall be recorded on Sampling Data Sheet 4-1. This includes auguring used to obtain subgrade bulk samples and to perform material classification and layer thickness measurements on base and subbase layers. This data should include descriptions of the subgrade layers, samples depths, and other related data. Data to be recorded on this form should include the following:

1. Material type and description for each layer of untreated materials and soils in accordance with Table C.2. of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling.

2. Thickness of each layer encountered in the hole to the nearest 2 mm.

3. Presence and levels of any water encountered.

4. Sample numbers.

3.5.4 Shoulder Auger Probes

Data for shoulder auger probes shall be reported using Sampling Data Sheet 9. A description and material code must be recorded as a function of depth. If bedrock or other very stiff layer of material occurs at less than 6 m, auguring operations must be terminated and reported. Refusal caused by the presence of cobbles, boulders, etc. should not be reported as bedrock or a stiff layer. For all the sampling operations the data recorded should follow the following guidelines.

1. Material type and description for each layer of untreated materials and soils in accordance with Table C.2. of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling.

2. Thickness of each layer, as measured in the hole, to the nearest 2-mm.

3. Presence and levels of any water encountered.

4. Sample numbers.

3.5.5 Bulk Sampling of Subgrade

Observations and measurements performed during subgrade sampling shall be logged as the excavation progresses and reported on Sampling Data Sheet 12. The record shall include description of the exposed subgrade and thickness of any layers to the nearest 2 mm, sample numbers and number of bags per sample, test numbers, any water seepage, sloughing, voids and other pertinent items.

3.6 Assembly of Data Sheets and Transmittal

The following is a description of the format that should be used for the assembly of the data sheets from each SPS-9A test site. The forms will appear in the final assembled data packet in the order provided in Appendix A. The title page will always be the first (top) sheet of the data packet and it will include the following information:

1 - SHRP Region
2 - State
3 - State Code
4 - SPS Project Code
5 - Experiment Name
6 - Highway Number
7 - Date(s) of Field Material Sampling and Field Testing
8 - Submitting Contractor/Agency
9 - Total Sheets, including the Title Page.

To determine the number of sheets (item 9 above) all of the pages in the packet should be counted. The pages should then be numbered starting with the title page. For example, if there are 100 pages in the packet, the title page would be "page 1 of 100" followed by "page 2 of 100" and so forth until the last page would read: "page 100 of 100". This will insure that any lost sheets can be quickly identified and found.

After the packet has been assembled and numbered, an appropriate number of duplicates should be made. The original and one copy should be forwarded to the FHWA LTPP RCOC. Also, copies should forwarded to the participating highway agency and those laboratories designated by the agency to perform the laboratory tests on the samples.

4. Laboratory Materials Testing

4.1 General

This chapter contains general guidelines to be used by laboratories participating in the SPS-9A laboratory materials testing program. Most of the protocols, test data reporting sheets, definitions, etc. referenced in this document can be found in the document SHRP-LTPP Interim Guide for Laboratory Material Handling and Testing Revised and Amended July, 1993. The purpose of the protocols and the materials testing guide is to minimize the variability of materials test data attributable to laboratory material testing and handling techniques by standardizing these techniques as much as possible. They also provide a common format for reporting test results so they can be stored in the LTPP Information Management System for dissemination. The general instructions included in this SPS-9A materials sampling and testing document are to be used as general guidelines by the laboratories. However, the laboratory chief/manager must exercise judgement when using these guidelines. If problems or discrepancies are found, the LTPP Regional Coordination Office (RCO) should be contacted.

It should be noted that all laboratories wishing to participate in the laboratory material testing program for the SPS projects must maintain either a current AASHTO certification or satisfactory current participation in AMRL/CCRL certification programs combined with the direct supervision of the laboratory by a registered professional engineer.

This laboratory materials testing plan assumes that multiple laboratories will be involved with testing the materials from each SPS-9A test section. Because more than one laboratory is involved with the testing of these materials, close coordination is essential between the LTPP Regional Coordination Office, the state/provincial field sampling forces, the state/provincial laboratory and the FHWA-LTPP Laboratory Materials Testing Contractor. The LTPP RCO is responsible for this coordination which includes:

- Detailing the material test assignments for each laboratory.
- Verifying that layer numbers, sample codes and specimen codes assigned to the various samples are correct and consistent.
- Tracking materials shipments, sample test status and disposal of all samples.
- Compiling and quality review of all laboratory test results.

4.2 Laboratory Testing of Subgrade Materials

The participating highway agency laboratory, or their designee, is responsible for performing the sieve analysis, atterberg limits, material classification, and natural moisture content tests on the subgrade materials obtained from the SPS-9A test sections. The LTPP

protocols containing the test procedure, reporting requirements and data forms for these tests are:

Natural Moisture Content	Protocol P49
Sieve Analysis	Protocol P51
Atterberg Limits	Protocol P43
Classification	Protocol P52

The following general procedures shall be used to perform the testing on the subgrade soils:

- Perform moisture content testing (Protocol P49) on all jar samples provided with the bulk samples.
- Combine the bulk samples with the same sample number if contained in more than one bag or container. Do not combine bulk samples of materials obtained from different locations in the SPS-9A project.
- Thoroughly mix the combined bulk sample and then dry the sample in accordance with the procedure described in Section 4.1 of AASHTO T87-86, "Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test."
- The mixed and dried sample is to be reduced to the appropriate test size using the procedures described in AASHTO T248. The test samples shall be representative of the total bulk sample.
- Perform all other tests in accordance with the appropriate protocols. The table below contains approximate test sample sizes for each test procedure.

Protocol Name	Protocol No.	Approximate Sample Size (kg)		
		Maximum Aggregate Size		
		25 mm	51 mm	76 mm
Particle Size Analysis	P51	5	18	60
Atterberg Limits	P43	2	4	5
Classification	P47	Based on P51 and P43 Results		
TOTAL		7	22	65

It is likely that a substantial amount of material may be left over after testing of the subgrade soil. This extra material ensures that an adequate amount of sample is available to

run all of the required characterization tests. This extra material shall not be disposed of until all testing has been completed and reviewed by the supervising engineer.

4.3 Laboratory Testing of Embankment Materials

Materials from embankment layers greater than or equal to 1.2-m thick shall be treated as subgrade materials and tested in accordance with section 4.2, Laboratory Testing of Subgrade Soils. Materials from embankment layers less than 1.2 m thick shall be considered as a subbase but tested as a subgrade material.

4.4 Laboratory Testing of Unbound Granular Base/Subbase Material

The participating highway agency laboratory, or their designee, is responsible for conducting all laboratory testing on unbound base and subbase materials.

These tests shall be conducted in the following order:

1.	Particle Size Analysis	Protocol P41
2.	Sieve Analysis (washed)	Protocol P41
3.	Atterberg Limits	Protocol P43
4.	Classification	Protocol P47

The following general procedures shall be used to perform the testing on the unbound granular base/subbase.

- Combine the bulk samples with the same sample number if contained in more than one bag or container. Do not combine bulk samples of materials obtained from different locations in the SPS-9A project.

- Thoroughly mix the combined bulk sample and then dry the sample in accordance with the procedure described in Section 4.1 of AASHTO T87-86, "Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test."

- The mixed and dried sample is to be reduced to the appropriate test size using the procedures described in AASHTO T248. The test samples shall be representative of the total bulk sample.

- Perform all other tests in accordance with the appropriate protocols.

Extra material shall not be disposed of until all testing has been completed and reviewed by the supervising engineer.

4.5 Laboratory Testing of HMA Materials

The following sections are to be used as a guide for the completion of the laboratory material testing program for Hot Mixed Asphalt (HMA) materials, including asphalt cement, aggregates, gyratory compacted HMA mix, and HMA cores.

4.5.1 Bulk Samples of HMA Mix and Constituent Materials

Tests on bulk samples of HMA mix constituent materials include tests on samples of aggregate and asphalt cement binder.

4.5.1.1 Testing of Bulk HMA Aggregate Samples

The following tests, as presented in Table 4, should be performed on the aggregates sent to the Participating Agency designated laboratory:

Aggregate Gradation
Specific Gravity of Coarse Aggregate
Specific Gravity of Fine Aggregate
Specific Gravity of -200 Material
Coarse Aggregate Angularity
Fine Aggregate Angularity
Toughness
Soundness
Deleterious materials
Clay Content
Thin, Elongated particles

4.5.1.2 Testing of Bulk Asphalt Cement Samples

The following tests, as presented in Table 4, should be performed on each asphalt cement used in the SPS-9A experiment HMA mixtures:

Penetration @ 5°, 25° and 46° C
Viscosity @ 60° and 135° C
Specific Gravity @ 16° C
Dynamic Shear @ 3 temperatures
Brookfield Viscosity @ 135° & 165° C
Rolling Thin Film Oven conditioning (RTFO)
Dynamic Shear on RTFO residue @ 3 temperatures
Pressure Aging Vessel (PAV) conditioning on RTFO residue
Dynamic Shear on RTFO-PAV residue @ 3 temperatures
Creep Stiffness of RTFO-PAV residue @ 2 temperatures
Creep Stiffness of RTFO-PAV residue @ 2 temperatures (24 hours conditioning)
Direct Tension on RTFO-PAV residue @ 2 temperatures

Determining Test Temperatures for Binder Testing - Original (Tank) Material. High temperature Dynamic Shear Rheometer (DSR) testing is used to characterize the original properties of asphalt cement. This test is performed to determine the ratio between the complex shear modulus G^* and the sine of the phase angle δ at a minimum of three temperatures. The selection of the three temperatures is dependent upon the PG grade of the asphalt cement. The first temperature at which the asphalt must be tested is the high temperature value of the performance grade. (see Table 1 in AASHTO Designation MP1). The selection of the other two temperatures is done with the intent to bracket the specification threshold value ($G^*/\text{Sin}\ \delta = 1.0$ kPa) for high temperature DSR testing over a temperature range of 12°C. In order to achieve this objective, the second test temperature depends on the value of $G^*/\text{Sin}\ \delta$ obtained for the first temperature. If the value of $G^*/\text{Sin}\ \delta$ is less than 1.0 kPa at the first test temperature, the next temperature should be 6°C less than the first temperature (Figure 7(a)). However, if the value of $G^*/\text{Sin}\ \delta$ is greater than 1.0 kPa at the first test temperature, a temperature 6°C greater than the first temperature should be used. The third temperature is selected based upon the value of $G^*/\text{Sin}\ \delta$ at the first and second test temperatures, with the objective to bracket the threshold value of 1.0 kPa to the maximum possible extent. The selection approach for the third temperature is shown schematically in Figure 7. In this figure, "X" and "Y" define the difference between $G^*/\text{Sin}\ \delta$ at the first and second temperatures and threshold value, respectively. In Figure 7(a), "X" is less than "Y", which results in a third test temperature of 64°C (closer to the first temperature). In the situation illustrated in Figure 7(b), "X" is greater than "Y", thus a third test temperature of 52°C is used (closer to the second temperature). If the test results at the first two temperatures are both greater than 1, then the third temperature should be higher than the second temperature. If the test results at the first two temperatures are less than 1, then the third temperature should be lower than the second temperature. **In summary, the three temperatures are selected based upon the balancing temperature range around the value of $G^*/\text{Sin}\ \delta = 1$ kPa to the maximum possible extent.**

Asphalt Binder Test Temperature after RTFO and at Times t = 0 and t = 6 Months. The test temperatures at these sampling times will be the same as those established for the case of original asphalt binder in the previous section. Tests at these temperatures will provide a comparison between the original properties of asphalt cements, after RTFO conditioning, and after aging effects at t=0 and t=6 months.

Asphalt Binder Test Temperatures After PAV Conditioning. Three type of tests are needed to characterize asphalt after PAV conditioning. These include: low temperature DSR, bending beam (BB) and direct tension (DT). In developing the test temperatures for these tests, a similar approach as in the case of original asphalt cement is used. That is, the objective is to establish test temperatures that will closely bracket the threshold value of the test results.

In case of low temperature DSR testing, measurement of the loss shear modulus, $G'' = G^*\text{Sin}\ \delta$, at three test temperatures is required. The first temperature is defined as the low test temperature specified in AASHTO MP1 for the PG grade. For example, if the asphalt cement PG grade is PG 58-28, the first testing temperature for the asphalt is 19°C,

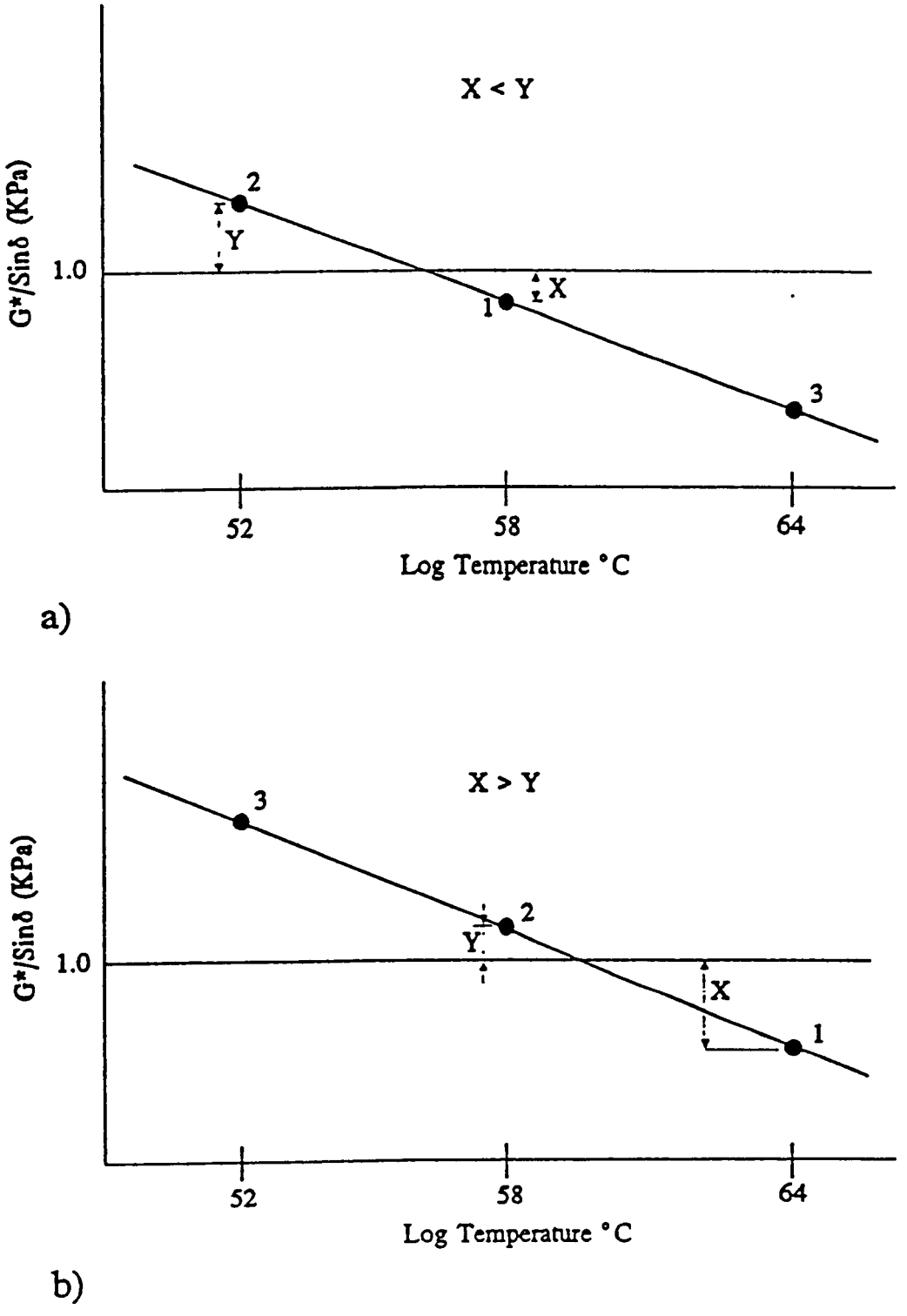


Figure 7. Test temperature determination for original asphalt cement for DSR testing

which corresponds to the low temperature for this PG grade from Table 1 of AASHTO MP1. The intent of the other two temperatures is to bracket the specification threshold value of G*Sin δ = 5000 kPa over a temperature range of 6°C. The second test temperature depends upon the value of G*Sin δ obtained at the first temperature. If the value of G*Sin δ at the first temperature is less than 5000 kPa, the second test temperature should be 3°C less than the first temperature (Figure 8(a)), i.e. 16°C. However, if G*Sin δ is greater than 5000 kPa at the first test temperature, the second test temperature should be 3°C greater than the first temperature, i.e. 22°C. The third temperature is selected to bracket the threshold value of G*Sin δ of 5000 kPa to the maximum possible extent. The selection approach for the third temperature is shown schematically in Figure 8. In Figure 8(a), with "X" is less than "Y", a third test temperature of 22°C is selected. In Figure 8(b), since "X" is greater than "Y", a third test temperature of 16°C is selected. If the test results at the first two temperatures are both greater than 5,000, then the third temperature should be higher than the second temperature. If the test results at the first two temperatures are less than 1, then the third temperature should be lower than the second temperature. In summary, the selection of three temperatures is based upon balancing the three temperatures across a value of G*Sin δ = 5000 kPa to the maximum possible extent.

Two test temperatures are required for creep stiffness and direct tension measurements. For both of these tests, the first test temperature is the temperature specified in MP1 as a function of the asphalt PG grade. For example, if the asphalt grade is PG 58-28, the asphalt should be tested at -18°C for both the tests. The second temperature will be selected based upon how the test results compare with the criteria established in AASHTO MP1. If the creep stiffness is less than 300 MPa, a temperature 6°C lower is selected for the second test and vice versa. Similarly, if the value of strain in direct tension is greater than 1%, a 6°C lower temperature is selected for the second temperature and vise versa.

Asphalt Binder Test Temperatures for Times, t > 6 Months. The test temperatures at these sampling times will be the same as those for the tests on the PAV conditioned material for all test types (DSR, BB and DT) as described in the previous section. These temperatures are used for developing relationships of age hardening behavior as a function of time. In addition, the relationships developed from this testing can be used for validating the results from PAV conditioning.

4.5.1.3 Testing of Gyratory Compacted HMA Mix Samples

Characterization, quality control tests and performance related tests are performed on HMA specimens prepared with the gyratory compactor.

Plant Obtained Material Characterization. Bulk samples of aggregate and binder obtained from the plant will be mixed in accordance with the Job Mix Formula for each test section. These samples will be evaluated for volumetric and moisture susceptability properties as indicated in Table 5 for all test sections. To maintain a consistent basis for comparison, three specimens for each of the sections shall be compacted to N_{Max} established

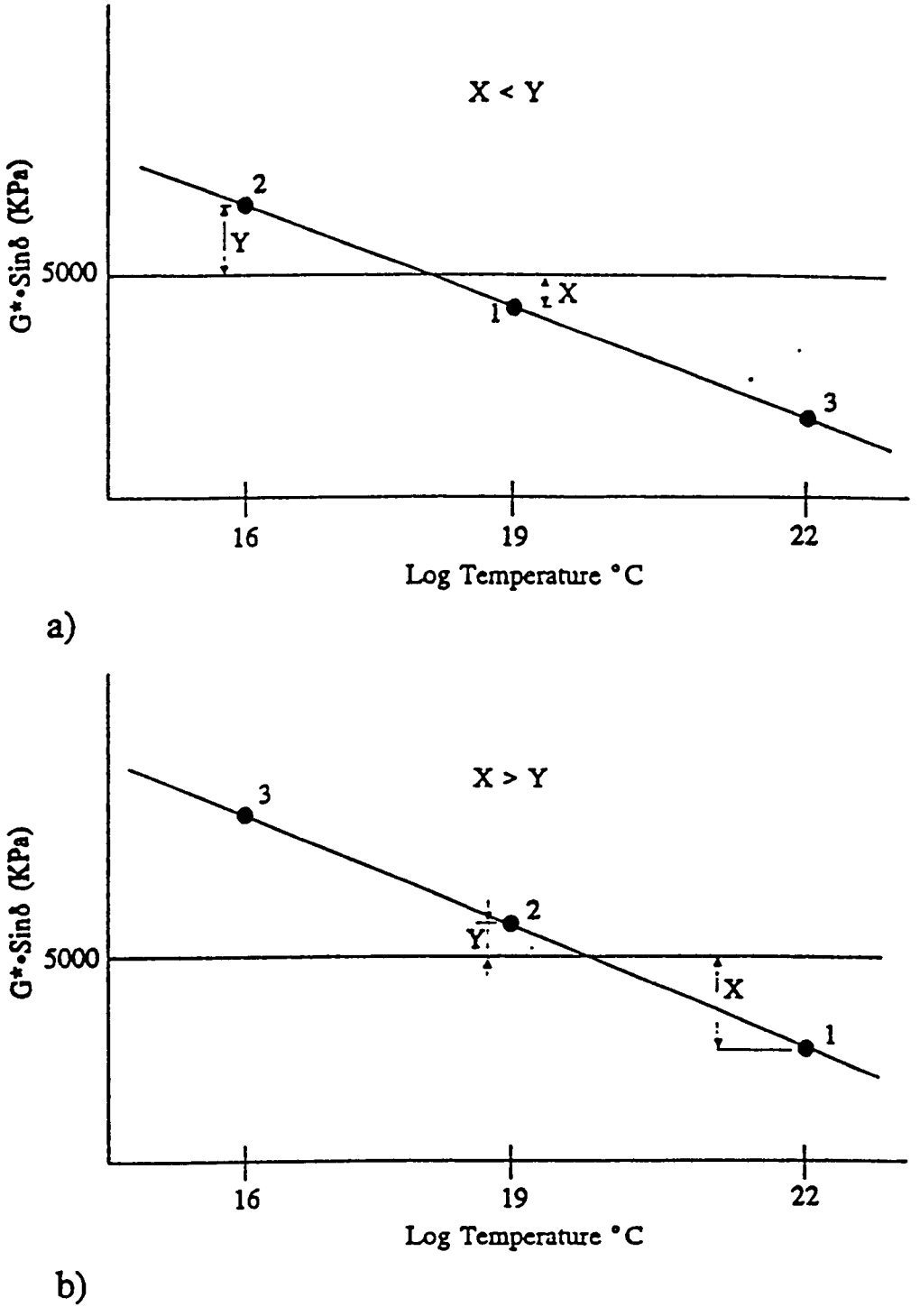


Figure 8. Test temperature determination for PAV conditioned asphalt cement for DSR testing

by the traffic and environmental loadings. Upon obtaining the corrected gyratory compaction curves, the bulk specific gravity at N_{Design} and the number of gyrations to obtain 7 % air voids may be determined. The moisture susceptability specimens shall be compacted to the number of gyrations required to achieve 7 % air voids and six samples are to be prepared at this compaction level for determining the moisture susceptability. The bulk specific gravity, estimated from the gyratory compaction curves at N_{Design} along with maximum specific gravity; the aggregate properties previously determined under 4.5.1.1; and the binder specific gravity determined under 4.5.1.2 shall be used to calculate the volumetric properties in accordance with AASHTO PP-19.

The above procedure may be accomplished from the following steps:

1. Prepare and mix 3 samples in accordance with the Job Mix Formula being careful to use the proper mixing temperature and the guidelines set forth in the Asphalt Institute Manual MS-2.

2. Compact these specimens at the appropriate compaction temperature in the Gyratory Compactor to N_{Max} as required for the specific temperature and traffic loadings. While compacting the specimens, produce the Gryatory Compaction versus gyrations curves.

LAB MIX PROCEDURES

3. Determine the bulk specific gravity of the compacted specimens and determine the correction factor for the compaction curves.

4. Estimate the bulk density (G_{mb} AASHTO T166) at N_{Design} of each of the specimens by reading the associated corrected density corresponding to N_{Design} (also based upon temperature and traffic loadings).

5. Prepare and mix another sample in accordance with the Job Mix Formula, and determine the maximum theoretical density (G_{mm}, AASHTO T209) of the sample.

6. Look up the specific gravities of the coarse, fine and -#200 aggregates from the testing performed as stated in Table 4, and compute the combined bulk specific gravity (G_{sb}). Also obtain the binder specific gravity (G_b) from the same source.

7. Calculate Voids in Mineral Aggregate (VMA), Air Voids (AV) and Voids Filled with Asphalt (VFA) from the above components following the instructions in AASHTO PP-19.

For test section 02, the preconstruction testing is further expanded as presented in Table 6. The number of sample compacted at N_{Max} for this section increases to 6. These six compaction curves serve as a basis to prepare the additional 32 samples at 7 % air voids and 2 at 3 % air voids. The basis for compaction levels (3 or 7% air voids) was based upon the entry levels for the SUPERPAVE™ Level III mix design procedures. Calculate the

Volumetric properties for the compacted specimens as presented above for the other test sections.

Quality Control Related Tests. Samples of plant produced HMA will be compacted using a gyratory compactor to N_{Max} to assess either conformance with the mixture design or document possible changes in the plant produced mixture for non SUPERPAVE™ test sections. The results of these tests will be recorded for reference purposes. The use of these measurements for control quality control purposes will depend on the total production quantity for a given mixture. Quality control related tests on the aggregate, binder and the asphalt mixture are to be performed by the participating highway agency or their designee.

Similar to the Plant Material Characterization, at time of production, a comparison data is collected on the volumetric properties of the mixtures compacted to N_{Design}. This procedure is slightly different from above due to possible plant variations in gradations and asphalt content. Thus, the following procedure is presented:

1. Group the samples into two subsets of three samples; one from the beginning of production and one from end of production.

2. Sample and Compact three specimens at the appropriate compaction temperature in the Gyratory Compactor to N_{Max} as required for the specific temperature and traffic loadings. While compacting the specimens, produce the Gryatory Compaction versus gyrations curves.

3. Determine the bulk specific gravity of the compacted specimens and determine the correction factor for the compaction curves.

4. Estimate the bulk density (G_{mb} AASHTO T166) at N_{Design} of each of the specimens by reading the associated corrected density corresponding to N_{Design} (also based upon temperature and traffic loadings).

5. Sample and test another sample to determine the maximum theoretical density (G_{mm}, AASHTO T209) of the sample.

6. Extract asphalt (LTPP P04/AC04) from a sufficient quantity of mix to run the aggregate gradation and measure asphalt content. Compare extracted asphalt content to the job mix formula (JMF) tolerance range.

7. Run an aggregate gradation on the extracted aggregate (P14) and compare against JMF design composite gradation.

8. Look up the specific gravities of the coarse, fine and -#200 aggregates from the testing performed as stated in Table 4, and compute the combined bulk specific gravity (G_{sb}) based upon the weight fractions determined by the aggregate gradation. Also obtain the binder specific gravity (G_b) from the same source.

9. Calculate Voids in Mineral Aggregate (VMA), Air Voids (AV) and Voids Filled with Asphalt (VFA) from the above components following the instructions in AASHTO PP-19.

Similar to the Plant Material Characterization and Quality Control samples above, the number of samples for test section 02 is also 6. These samples are similarly grouped into two subsets; one at the start of the test section and another at the end of the section. Each subset is to be tested as noted above to provide information concerning possible material variation occurring during production. These two subsets are to be completed prior to initiation of preparation of the Performance Testing samples.

Performance Testing. Samples of plant production for SUPERPAVE™ mixtures intended for the SUPERPAVE™ performance test methods are compacted at two levels of compaction. The majority of the test samples are to be compacted to 7 % air voids, with limited samples compacted to 3 % air voids for the Repeated Shear at Constant Stress Ratio. These results will be used in the evaluation of the SUPERPAVE™ performance prediction models. The following samples of 150 mm diameter and 140 mm height shall be prepared in the Gryatory Compactor for the following tests.

Test Method	Protocal	Air Voids
Samples for the LTPP Contract Laboratory		
Creep Compliance (LTPP method)	P 06	7 %
Resilient Modulus (LTPP method)	P 07	7 %
Indirect tensile strength (LTPP method)	P 07	7 %
Samples for the SUPERPAVE™ Regional Test Center		
Frequency Sweep at Constant Height	SST-1	7 %
Simple Shear at Constant Height	SST-1	7 %
Volumetric Test	SST-2	7 %
Uniaxial Strain	SST-2	7 %
Repeated Shear at Constant Stress	SST-3	3 %
Indirect Tensile Creep Compliance (SUPERPAVE™ method)	SP-IT	7 %
Indirect Tensile Strength (SUPERPAVE™ method)	SP-IT	7 %

It is assumed that the performance samples will be split immediately upon receipt and processing in the laboratory to the appropriate sample size for compaction. Once split, these samples should be set aside until the Quality Control (N_{Max}) samples are completed. Once the required machine settings, as described below, are determined, compaction of these samples may begin. These samples were also grouped into two subsets; one associated with

the beginning and end of production. The Gyratory Compaction curves for the beginning set shall be associated with the beginning samples and likewise for the end portion. To determine the compaction level (Number of gyrations required to produce the desired air voids), overlay the three corrected Compaction - Gyration curves and determine the average number of gyration necessary to obtain this compaction level. Once the required number of gyrations is determined, compact each set of samples to this number of gyrations.

4.5.2 Laboratory Procedures for HMA Core Preparation and Testing

4.5.2.1 HMA Core Preparation, Orientation, Handling and Thickness Measurement

The AC Core Examination and Thickness Test (LTPP Test Designation AC01) will be the first test performed on all AC cores prior to sawing. LTPP Protocol P01 will be used for the performance of this test. Protocol P01 covers the visual examination of the entire asphaltic concrete core and the measurement of the length of the entire asphalt concrete core. It also covers the identification and determination of thickness of the individual layers within the core. On cores which contain one or more bonded layers the laboratory is required to identify the different layers, assign layer numbers and measure the thickness of each layer prior to sawing. The procedure described in Section 3.3 of Attachment "B" to Protocol P01, contained in Appendix E.2 of the SHRP-LTPP Interim Guide for Laboratory Material Handling and Testing, shall be used to measure the thickness of the bonded layers. It should be noted and emphasized that multiple lifts within an asphalt concrete layer shall not be separated by sawing. All of the lifts will be treated as a single homogeneous layer and tested as such. Also, in no case shall two or more layers within an HMA core sample be combined for any test.

AC cores that are received by the laboratory from the field should be marked with an arrow to show the direction of traffic. It is important that this orientation mark be transferred to all layers to be tested within an AC core when these layers are separated by sawing. After sawing, the laboratory technician must paint an arrow in the same orientation on the sawed surface of the lower asphalt layer(s). This arrow shall be placed along the same axis to designate the direction of traffic on the pavement surface. The face to be marked shall be the one closest to the pavement surface. The marking of the direction of traffic is required for all cores.

Different layers within an AC core shall be separated by carefully sawing the sample. Special care shall be taken for sawing AC cores so as to provide minimum disturbance. The sawing operation on the interface of the layer to be separated shall be performed so that the asphaltic concrete will not be weakened by shock or by heating. The sawed surfaces of cores shall be smooth, plane, parallel and free from steps, ridges, and grooves. Care should be taken to avoid chipping or cracking. Always saw and separate the bottom layer first, followed by the next layer in ascending order until reaching the top layer. After sawing, proper identification, etc. shall be attached to the core to facilitate identification.

4.5.2.2 Volumetric and Binder Tests on Cores from Main Study Test Sections

Cores from all test sections will be tested for volumetric and both conventional and SUPERPAVE™ binder stiffness properties. Tests and computations include:

Volume percent air voids
Percent voids filled with asphalt
Bulk Specific Gravity

Asphalt extraction, Abson recovery
Penetration @ 5° C
Penetration @ 25° and 46° C
Viscosity @ 60° and 135° C
Specific Gravity @ 16° C
Dynamic Shear @ 3 temperatures
Creep Stiffness @ 2 temp
Direct Tension @ 2 temp

Properties of field (aged) asphalt binder will be determined from asphalt extracted from the cores. The top 50-mm of each core sample should be used to obtain these recovered asphalt samples. It is estimated that a total of approximately 650-g of asphalt is required to run a complete set of binder tests, although these tests can be performed on as little as 475 grams. It is estimated that a total of 8 cores are required to produce the desired 650-g of material assuming a 3% recovery of asphalt (total mass) from the top 50 mm of the core. All asphalt reclaimed from the 8 cores must be blended together prior to testing. The tests and the amount of binder required for each test is summarized as follows:

Test Name	Number of Tests	Amount of Mat'l Per Test (gms)	Total Amount (gms)
Penetration @ 5°C	3 Points	75	75
Penetration @ 25°C	3 Points	75	75
Penetration @ 46°C	3 Points	150	150
Viscosity @ 60°C	2	30	60
Viscosity @ 135°C	2	30	60
Specific Gravity @ 16° C	2	30	60
Dynamic Shear at three temperatures	2(3 temp)	3	18
Creep Stiffness at two Temperatures	2(2 temp)	15	60
Direct Tension at two Temperatures	2(2 temp)	10	80
Total Amount of Asphalt Required			638

The above table shows a requirement of approximately 638 grams of asphalt to run the all tests on separate samples. If at least 475-g of material are available, all of the

above tests results can be obtained by performing more than one test on the samples using the following procedure:

Penetrations	Prepare one 6 oz container for penetration testing that contains 150 grams of asphalt. Run the test at 5°C and take three penetration readings. Use the same asphalt in the same container to run penetration at 25°C for three points. Finally, bring the same container to 46°C and perform the penetration test at three points. Thus, using this approach only 150 grams of asphalt is needed to run all of the penetration tests.
Viscosity @ 60°C	A total of 60 grams of asphalt is sufficient to run the viscosity test at 60°C.
Viscosity @ 135°C	A total of 60 grams of asphalt is sufficient to run the viscosity test at 135°C.
Dynamic Shear Rheometer	Use a total of 18 grams of asphalt to run the test at three temperatures. Use the same specimen at each of the three temperatures. However, a new sample must be used for the replicate test.
Creep Stiffness	Run this test at two temperatures for two replicates. This requires a total of 60 grams of asphalt.
Direct Tension	Run this test at two temperatures for two replicates. This requires a total of 80 grams of asphalt.
Specific Gravity	A total of 60 grams of asphalt is required for the two replicate samples. If sufficient asphalt is not available, use asphalt from the penetration tests to run the specific gravities.

Using this methodology, the anticipated least amount of extracted binder can be used to perform all the required binder tests.

The following procedure should be used to determine the volumetric parameters from the cores obtained at various time intervals.

1. A total of eight (8) cores should be available for testing from each time period.

2. Perform Core Examination and Thickness AC01 on all eight (8) cores prior to any other testing.

3. Measure the Bulk Specific Gravity G_{mb} (AC02) on all cores.

4. Perform an asphalt extraction on these cores to determine the asphalt content, P_b, and to perform a gradation analysis on the extracted aggregate on all cores. The extracted AC should be reclaimed by using Abson Recovery (AE01) technique and used for binder tests.

5. Determine Aggregate Gradation (AG04) and record the values of percent weight of dry aggregate passing each sieve to the appropriate number of significant figures and decimal places on laboratory data sheet T14.

6. Estimate the maximum theoretical specific gravity G_{mm} based upon the extracted asphalt percentage and effective aggregate specific gravity determined during the mix design process.

7. Calculate the VMA, Air voids and VFA using the results listed above, the specific gravity of aggregate portions and the asphalt cement specific gravity previously determined,

4.5.2.3 Volumetric, Binder, and Performance tests on Cores from Level III Study Test Sections

Cores from test sections having mixtures designed using SUPERPAVE™ will be tested for both volumetric and conventional and SUPERPAVE™ binder properties, as detailed in 4.5.2.2, as well as the SUPERPAVE™ performance measurements. The results from these tests are intended to be used in the SUPERPAVE™ models to predict performance of the as-placed mixture. The tests and computation to be performed on these cores include:

Volume percent air voids
Percent voids filled with asphalt
Bulk specific gravity
Theoretical maximum specific gravity

Asphalt extraction, Abson recovery
Penetration @ 5° C
Penetration @ 25° and 46° C
Viscosity @ 60° and 135° C
Specific gravity @ 16° C
Dynamic Shear @ 3 temperatures
Creep Stiffness @ 2 temp
Direct Tension @ 2 temp

Creep Compliance (LTPP method)
Resilient Modulus (LTPP method)
Indirect Tensile Strength (LTPP method)

Frequency Sweep at Constant Height
Simple Shear at Constant Height
Uniaxial Strain
Volumetric Test
Repeated Shear at Constant Stress

Indirect Tensile Creep Compliance (SUPERPAVE™ method)
Indirect Tensile Strength (SUPERPAVE™ method)

4.6 Sample Identification and Marking

It is imperative to maintain strict adherence to the sample identification and marking procedures used initially in the field. The sample numbers, core/sample location numbers, etc. shall follow each sample throughout the laboratory materials testing process and it is extremely important to keep sample tags and labels on samples during storage.

4.7 Sample Record Keeping

The laboratories conducting the testing for the SPS-9A projects are required to keep in close coordination with the FHWA-LTPP Regional Coordination Office from the time of receiving the samples from the field to the disposal of the material samples. Timely transmission of information between the laboratory and the RCO should be maintained using the standard guidelines and forms discussed in this section. The forms discussed herein may be found in Appendix C.2 of the SHRP-LTPP Interim Guide for Laboratory Material Handling and Testing.

4.7.1 Sample Receipt Procedures

The field material samples will be shipped to the participating laboratory by the drilling and sampling crew. The drilling and sampling crew or others, as designated by the state/provincial agency, will also mail a complete packet of field data sheets for the corresponding SPS project. Field Operations Information Form 1 provides an inventory of material samples shipped to the laboratory. Field Operations Information Form 2-1 also provides pavement layer numbers assigned in the field.

Upon receipt of the samples, the samples shall be inspected by the laboratory manager (or their designee) for completeness of the shipment (as compared to the data shown on Field Operation Forms 1 and 2-1), damage, contamination, sufficient quantity, proper identification and properly completed field forms. Regardless of the condition and size of the samples, they must be logged in by using the information from Field Operation Forms 1 and 2-1 as well as individual sample tags and markings.

The laboratory shall then use Forms L01, L02, and L03 to prepare the sample receipt report for each project. It is imperative that the sample identification and any unique laboratory control number (assigned by the participating laboratory) remain attached to the sample/sample container at all times. In the event that it becomes necessary to remove the

identification label or tag during sample processing or testing, steps shall be taken to ensure that the relationship between the sample and its identification is not lost but the identification is restored to the sample at the end of each step of processing or testing.

After completing the sample receipt process, these forms should be transmitted to the appropriate personnel. As a minimum, this should include the state/provincial agency contact person and the FHWA-LTPP RCOC.

After preparing the sample receipt report, the laboratory manager shall make laboratory test assignments using Form L04 (Appendix C.2 of the Laboratory Testing Guide). On this form, the first three columns from the left provide the following information about the pavement layers:

a. **Column 1 - Layer Number.** Layer number is assigned on Column 1 of Form L04 starting with layer number 1. Layer number 1 is always assigned for the subgrade and the last layer number is always assigned to the pavement surface layer. An example of layer numbers for a five-layer pavement structure is:

Subgrade	1
Subbase	2
Base	3
AC Binder Course	4
AC Surface Course	5

b. **Column 2 - Layer Description.** Layer description is provided on Column 2 of this form, using the following codes:

Overlay	01	Subgrade	07
Seal Coat	02	Interlayer	08
Surface Layer	03	Friction Course	09
AC Layer below Surface .	04	Surface Treatment . .	10
Base Layer	05	Embankment (Fill) . .	11
Subbase Layer	06		

c. **Column 3 - Layer Type.** Layer type code is assigned in Column 3 from the left on Form L04 using:

AC - for asphaltic concrete (bituminous concrete) layer,
TB - for bound (treated) base,
TS - for bound (treated) subbase,
GB - for unbound (granular) base,
GS - for unbound (granular) subbase,
SS - for subgrade (untreated), and
ST - for subgrade (treated).

Multiple sheets can be used for the laboratory designated test assignments on the samples from a SPS project. Appendix C.2 of the Laboratory Materials Testing Guide contains further instructions on the use of Forms L01-L04. The FHWA-LTPP RCOC, shall approve all test data reporting forms.

4.7.2 Test Data Reporting

The participating laboratory is required to use the LTPP standard data reporting forms for recording test results. These data reporting forms are contained in Appendix C.2 of the SHRP-LTPP Interim Guide for Laboratory Material Handling and Testing. All of these forms provide space to record sample identification information and test data as well as comments and notes relevant to each test. These forms are also contained at the end of each LTPP Protocol contained in Appendix E.2 of the Laboratory Material Testing Guide. All data entry sheets should be forwarded to the FHWA-LTPP RCOC for processing and approval.

4.7.3 Sample Disposition Reporting

At the completion of all testing for a SPS project, Form L06 (Appendix C.2 of the Laboratory Materials Testing Guide) is used by the participating laboratory to provide the LTPP RCO with a record status of all material samples. This form includes entries for recording whether a particular sample/specimen was stored, disposed of, etc. After completion of this form, it should be transmitted to the appropriate personnel. As a minimum, this should include the state/province agency contact personnel and the RCOC.

4.8 Sample Storage

Due to the volume of work and the likelihood of delays in testing, proper storage conditions must be maintained for all specimens obtained from the Long Term Pavement Performance (LTPP) program Specific Pavement Studies experiments. This includes samples and specimens that will be tested by the state highway agency laboratories or their agents and the materials which will subsequently tested by the FHWA contracted laboratories. The storage requirements presented herein are critical to ensuring the integrity of the sample/specimen for future testing and materials characterization. Specifically, requirements for adequate storage and temperature conditions have been detailed for the specimens to ensure that the samples are not compromised while intending not to make the storage requirements burdensome on the participating laboratory. Identification assigned to the materials shall be retained on tested samples, untested samples and extra samples at all times.

The term "Environmentally Protected Storage" as used in this document means that the storage area shall be fully enclosed and not subjected to the natural elements. This type of area shall provide protection against contact with water (rain or wet floor) and exposure to direct sunlight. Also, the storage area shall be capable of maintaining each sample in the required temperature range as specified below. Samples shall be marked to indicate their status; such as "hold material - do not use."

The following guidelines shall be followed for storage of materials from the LTPP experiments:

4.8.1 Asphaltic Concrete Cores

Asphaltic concrete cores should be stored flat side down, fully supported and between 5°C (40°F) and 21°C (70°F) in an environmentally protected storeroom.

4.8.2 Asphalt Treated Materials

Asphalt Treated Base/Subbase and Treated Subgrade cores and materials should be stored flat side down, fully supported and at a temperature between 5°C (40°F) and 21°C (70°F) in an environmentally protected storeroom.

4.8.3 Other Than Asphalt Treated Materials

Other than asphalt treated base/subbase and subbase cores and materials should be stored in a fully supported condition and at a temperature between 5°C (40°F) and 38°C (100°F) in an environmentally protected storeroom.

4.8.4 Bulk/Moisture Samples

Bulk and moisture samples of base, subbase and subgrade material should be kept in an environmentally protected storage area at temperatures between 5°C (40°F) and 38°C (100°F).

4.9 Sample Handling and Shipping

All samples sent to <u>other</u> laboratories for testing shall, as a minimum, be prepared and shipped using the following guidelines.

4.9.1 Packaging

1. Each sample shall have a label or tag attached that clearly identifies the material, the project number/test section from which it was recovered, and the sample number.

2. Each core shall be surrounded by "bubble-wrap" or other acceptable cushioning material on all sides within the shipping box.

3. Bulk samples shall be marked with the two samples or tags. One shall be placed inside the bag and one attached to the outside. Pieces from treated layers not suitable for testing as cores shall be packaged and shipped as bulk samples.

4. Thin-walled tube samples and jar samples shall be packaged in boxes with cushioning such as "bubble-wrap" or other similar material.

5. Shipping boxes shall be made of wood of suitable grade and construction to withstand shipping and subsequent moving without breakage of the box or damaging of the samples.

6. All boxes shall be adequately secured by nails or screws prior to shipping.

7. All necessary documentation related to the samples being shipped shall also be included in the shipment. A duplicate set of all necessary documentation shall be sent in a separate package to the laboratory to confirm the box inventory.

4.9.2 Shipping

Each box shall be labeled to include the project identification number, type(s) of samples, box number (for each series of boxes). The boxes shall be labeled "Handle with Care" or similar wording as specified by the transporting organization to reasonably insure careful handling and protection from freezing and overheating.

It is recommended that each shipment be insured for an amount to cover at least twice the cost of the field work performed at the site to obtain the samples.

A copy of the bill of lading clearly showing the boxes being shipped and a receipt signed by the shipping organization shall be sent to the appropriate FHWA LTPP Regional Coordination Office.

4.9.3 Summary

The sample preparation and shipping guidelines provided herein are designed to protect the integrity of the materials samples to the highest degree possible within economic limits. These materials are very important to the success of the LTPP program and should be treated with as much care as possible. Cooperation from all participants is needed to insure that these specimens are shipped between laboratories with a minimum of damage.

4.10 Laboratory Tracking of Samples

This section contains Laboratory Sample Tracking Tables which contain instructions for sample handling and tracking throughout the laboratory testing process. Tables 12 to 24 detail the sample handling and testing for the material samples through the progression of testing. Tables 12 to 16 present the pre-HMA placement samples for test sections exclusive of 02. Tables 17a & 17b detail the state/ provincial agency laboratory (or their designee), sampling and testing activities immediately before and during construction. Tables 18a, 18b and 19 detail the SUPERPAVE™ Regional Test Center and LTTP Contract Laboratory activities at the start of the project. Finally Tables 20 to 24 details core sample handling and testing done by the various agencies with Table 23 presenting SUPERPAVE™ Regional Test Center and Table 24 detailing the sample handling and testing for the FHWA-LTPP Laboratory Materials Testing Contractor.

These tables provide the laboratories with the following information and directions:

- tracking of samples as they are taken from the field and tested in the laboratory
- laboratory test sequences for each pavement material type
- dedicated sample(s) for each test
- designation of extra samples for future use
- instructions for sample storage
- special instructions and other remarks

As mentioned previously, these tables are based on the idealized sampling plan presented in Section 3 of this document. Using these tracking tables, each laboratory shall be able to plan and track each sample through the laboratory materials testing program for the SPS-9A experiment in a step-by-step manner.

The following is a description of the column headings used for the tracking table:

Sample Location Number - as described previously in Section 3 and as shown on sample tags and labels.

Sample Number - as described previously in Section 3 and as shown on sample tags and labels.

Lab Test Number - shall be assigned as per the following:

a. Beginning of the Section (Station 0-): samples of each layer that are retrieved from areas in the approach end of the test section (stations preceding 0+) shall be assigned Laboratory Test Number '1'.
b. End of the Section (Stations 150+): samples of each layer that are retrieved from areas in the leave end of the test section (stations after 150+) shall be assigned Laboratory Test Number '2'.
c. Middle of the Section (Stations 0+ to 150+): samples of each layer that are retrieved from areas in the middle of the test section (from the paver) shall be assigned Laboratory Test Number '3'.

Required Laboratory Tests Per Layer - order in which testing shall proceed.
Extra Sample - is the sample to be saved as a backup for other tests? A "yes" in this column implies that this is a dedicated extra sample saved for future use. A "no" indicates that a sample can be discarded after use.

Sample Storage - the following codes are used to specify the sample storage conditions for samples.

a. environmentally protected and controlled storeroom at 5-21°C (40-70°F).
b. environmentally protected and controlled storeroom at 5-38°C (40-100°F).

Sample Disposal? - indicates whether or not a sample can be disposed of after testing. Generally all samples, or portions of samples that are not tested are saved until further notice.

Table 12. Tracking table of subgrade/embankment testing in the state/province laboratory (or their designee)

a) For New/Reconstruction Only

Sample Location Number	Sample Number	Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence						
			Required Laboratory Tests Per Layer				Extra Sample	Sample Storage	Sample Disposed
			First	Second	Third	Fourth			
B01A01	BS01A01	1	SS01/P51	SS03/P43	SS04/P52	SS09/P49	No	(b)	Yes
B01A02	BS01A02	1	SS01/P51	SS03/P43	SS04/P52	SS09/P49	No	(b)	Yes
B01A03	BS01A03	1	SS01/P51	SS03/P43	SS04/P52	SS09/P49	No	(b)	Yes

Note: above table represents three sections on a project

b) For Existing Pavement - Overlay Construction

Sample Location Number	Sample Number	Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence						
			Required Laboratory Tests Per Layer				Extra Sample	Sample Storage	Sample Disposed
			First	Second	Third	Fourth			
A01A01	BS01A01	1	SS01/P51	SS03/P43	SS04/P52	SS09/P49	No	(b)	Yes
A01A02	BS01A02	1	SS01/P51	SS03/P43	SS04/P52	SS09/P49	No	(b)	Yes
A01A03	BS01A03	1	SS01/P51	SS03/P43	SS04/P52	SS09/P49	No	(b)	Yes

Note: above table represents three sections on a project

APPENDIX D
TRACKING TABLES

Test Designation	Protocol	Definition
	ASPHALT CEMENT TESTS (Cont.)	
	AASHTO TP5	Dymanic Shear on RTFOT-PAV residue @ 3 temperatures
	AASHTO TP3	Direct Tension on RTFOT-PAV residue @ 2 temperatures
	SUPERPAVE™ LOOSE MIX TEST	
AC02	LTPP P02	Bulk Specific Gravity
AC03	LTPP P03	Maximum Specific Gravity (Rice)
AC04	LTPP P04	Asphalt Content (Extraction)
AG04	LTPP P14	Aggregate Gradation (Extracted Aggr.)
AC05	LTPP P05	Moisture Suspectibility
	AASHT0 M-002	Gyratory Compaction
	AASHTO PP19	VMA, AC Volume, Voids filled with asphalt
AC07	LTPP P07	Indirect Tensile Strength
AC06	LTPP P06	Creep Compliance
SST-1	AASHTO M-003, P-005	Frequency Sweep at Constant Height & Simple Shear at Constant Height
SST-2	AASHTO M-003, P-005	Volumetric Test & Uniaxial Strain
SST-3	AASHTO M-003, P-005	Repeated Shear at Constant Stress Ratio
SP-IT	AASHTO M-005	Indirect Tensile Creep Compliance & Indirect Tensile Strength

Definitions of Superpave Tests

Test Designation	Protocol	Definition
		SUBGRADE TESTS
SS01	P 51	Sieve Analysis
SS03	P 43	Atterberg Limits
SS04	P 52	Classification
SS09	P 49	Natural Moisture Content
		AGGREGATE TESTS
AG04	P14	Aggregate Gradation
AG01	P11	Specific Gravity of Coarse Aggregate
AG02	P12	Specific Gravity of Fine Aggregate
	AASHTO T100	Specific Gravity of - 200 material
	Penn DOT TM 621	Coarse Aggregate Angularity
	ASTM C1252	Fine Aggregate Angularity
	AASHTO T96	Toughness
	AASHTO T104	Soundness
	AASHTO 112	Deleterious Materials
	AASHTO T176	Clay Content
	ASTM D4791	Thin, Elongated Particles
		ASPHALT CEMENT TESTS
	AASHTO T49	Penetration @ 5° C
AE02	LTPP P22	Penetration @ 25° C & 46° C
AE05	LTPP P25	Viscosity @ 60° & 135° C
AE03	LTPP P23	Specific Gravity @ 16° C
	AASHTO TP5	Dymanic Shear @ 3 Temperatures
	ASTM D4402	Brookfield Viscosity @ 135° & 165° C
	AASHTO T240	Rolling Thin Film Oven (RTFOT)
	AASHTO TP5	Dymanic Shear on RTFOT residue @ 3 temperatures
	AASHTO PP1	Pressure Aging (PAV) of RTFOT residue
	AASHTO TP1	Creep stifness of RTFOT residue @ 2 temperatures 24 hour conditioning
	AASHTO TP1	Creep stifness of RTFOT residue @ 2 temperatures

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Pre-Construction

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	LC	AC-20	3/4"	2"
Binder	LB	AC 20	1"	2"

	Location Number	Initial Sample Number	Final Sample Number	Date Sampled
Distress Survey				
FWD				
Cores				

	Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer: First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed
Existing Surface Layer (A01A01, A02A01 / CP01A01, CP02A01)	1	PC08/P86					No	(a)	Yes
	2	PC08/P86					No	(a)	Yes
Base Layer (A01A01, A02A01 / BG01A01, BG02A01)		Visually Classify in Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
		Visually Classify in Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
Subgrade Layer (A01A01, A02A01 / BS01A01, BS02A01)	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes
	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes
Shoulder Auger Probe (S01A01 / NA)	3	6 meters or until refusal							
Site Layout 5-POINT									

			Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer: First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed
Laboratory Test SURFACE LAYER											
Aggregate Test (I-C)	B01A01	BU10A01	3	AG04/P14	AG01/P11 AG02/P12 AASHTO T100	Penn DOT TM 011 ASTM C1252	AASHTO T96,T104	AASHTO T112,T176 ASTM D4791	YES	(b)	NO
Asphaltic Cement (AC-20)	B01A01	BC01A01	3	AASHTO T49 AE02/P22 AE05/P25 AE03/P23	ASTM D4402 AASHTO TP5	ASTM T240 AASHTO TP5	AASHTO PP1,TP5 TP1	AASHTO TP3	YES	(b)	NO

Asphalt Mixtures									Gyratory Compactio	Compactor Height
	H01A01	NA01A01	LA01A01	3	AC03/P03				NO (a) YES	
	H01A01	NA01A01	LA01A01	3		M-002	AC02/P02	PP19	NO (a) YES	Nmax 115mm
	H01A01	NA02A01	LA02A01	3		M-002	AC02/P02	PP19	NO (a) YES	Nmax 115mm
	H01A01	NA03A01	LA03A01	3		M 002	AC02/P02	PP19	NO (a) YES	Nmax 115mm
	H01A01	NA04A01	LA04A01	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm
	H01A01	NA05A01	LA05A01	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm
	H01A01	NA06A01	LA06A01	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm
	H01A01	NA07A01	LA07A01	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm
	H01A01	NA08A01	LA08A01	3		M 002	AC05/P05		NO (a) YES	@7%AV 140mm
	H01A01	NA09A01	LA09A01	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm

BINDER LAYER
Aggregate Test (I-B)
Asphaltic Cement (AC-20)

These results will be obtained from the binder layer aggregate tests of Section 290080
These results will be obtained from the surface asphalt cement tests of Section 290901

Asphalt Mixtures									Gyratory Compactio	Compactor Height
	H50A01	NA50A01	LA50A01	3	AC03/P03				NO (a) YES	
	H50A01	NA50A01	LA50A01	3		M-002	AC02/P02	PP19	NO (a) YES	Nmax 115mm
	H50A01	NA51A01	LA51A01	3		M-002	AC02/P02	PP19	NO (a) YES	Nmax 115mm
	H50A01	NA52A01	LA52A01	3		M-002	AC02/P02	PP19	NO (a) YES	Nmax 115mm
	H50A01	NA53A01	LA53A01	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm
	H50A01	NA54A01	LA54A01	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm
	H50A01	NA55A01	LA55A01	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm
	H50A01	NA56A01	LA56A01	3		M 002	AC05/P05		NO (a) YES	@7%AV 140mm
	H50A01	NA57A01	LA57A01	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm
	H50A01	NA58A01	LA58A01	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	I-C	AC-20	3/4"	2"
Binder	I-B	AC-20	1"	2"

During Construction

Plant

Asphalt Cement(MHTD))
Asphalt CementT(MRL)
Combined Aggregate(MRL)

Roadway

Bulk Samples
Surface Course

Binder Course

Location Number	Initial Sample Number	Final Sample Number	Date Sampled	Lab Test Number	First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed	Gyratory Compaction	
													Compactio	Height
F01A01	BA01A01	DA01A01		1				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F02A01	BA02A01	DA02A01		1		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F02A01	BA02A01	DA02A01		1	AC03/P03					No	(a)	Yes		
F03A01	BA03A01	DA03A01		1				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F04A01	BA04A01	DA04A01		2		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F04A01	BA04A01	DA04A01		2	AC03/P03					No	(a)	Yes		
F05A01	BA05A01	DA05A01		2				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F06A01	BA06A01	DA06A01		2				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F50A01	BA50A01	DA50A01		3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F51A01	BA51A01	DA51A01		3		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F52A01	BA52A01	DA52A01		3	AC03/P03					No	(a)	Yes		
F53A01	BA53A01	DA53A01		3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F54A01	BA54A01	DA54A01		3		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F55A01	BA55A01	DA55A01		3	AC03/P03					No	(a)	Yes		
F56A01	BA56A01	DA56A01		3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F57A01	BA57A01	DA57A01		3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm

Cores

Location Number	Initial Sample Number	Final Sample Number	Date Sampled	Lab Test Number	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Extra Sample	Sample Storage	Sample Disposed
C01A01	CA01A01			1	P01	P02	P04	P21	P14	PP19		T49			
C02A01	CA02A01			1	P01	P02	P04	P21			Blended	P22			
C03A01	CA03A01			1	P01	P02	P04	P21			Recovered	P25			
C04A01	CA04A01			1	P01	P02	P04	P21			Asphalt	TP5	No		Yes
C05A01	CA05A01			2	P01	P02	P04	P21			For	TP1			
C06A01	CA06A01			2	P01	P02	P04	P21			Binder	TP3			
C07A01	CA07A01			2	P01	P02	P04	P21			Testing	P23			
C08A01	CA08A01			2	P01	P02	P04	P21	P14	PP19					

Site-Layout
5-POINT

After Binder
After Surface

Post Construction

FWD
5 POINT
Distress Survey
Cores

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thicness
Surface	SP	PG 64-28	PG 64-28	2.5"
Binder	SP	PG 64-28	PG 64-28	1.5"

Pre-Construction

	Location Number	Initial Sample Number	Final Sample Number	Date Sampled
Distress Survey				
FWD				
Cores				

	Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed
Existing Surface Layer A01A02 CP01A02	1	PC06/P66					No	(a)	Yes
Existing Surface Layer A02A02 CP02A02	2	PC06/P66					No	(a)	Yes
Base Layer A01A02 BG01A02		Visually Classify In Accordance to App.C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
Base Layer A02A02 BG02A02		Visually Classify In Accordance to App.C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
Subgrade Layer A01A02 BS01A02	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes
Subgrade Layer A02A02 BS02A02	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes

Shoulder Auger Probe S01A01 NA

Site-Layout
5-POINT

Laboratory Test
SURFACE LAYER

			Lab Test Number	First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed
Aggregate Test (SP 125)	B01A02	BU10A02	3	AG04/P14	AG01/P11 AG02/P12 AASHTO T100	Penn DOT TM 011 ASTM C1252	AASHTO T96,T104	AASHTO T112,T176 ASTM D4791	YES	(b)	NO
Asphaltic Cement (PG 64-28)	B02A02	BC11A02	3	AASHTO T49 AE02/P22 AE05/P25 AE03/P23	ASTM D4402 AASHTO TP5	ASTM T240 AASHTO TP5	AASHTO PP1,TP5 TP1	AASHTO TP3	YES	(b)	NO

BINDER LAYER

			Lab Test Number	First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed
Aggregate Test (SP 190)	B01A02	BU10A02	3	AG04/P14	AG01/P11 AG02/P12 AASHTO T100	Penn DOT TM 011 ASTM C1252	AASHTO T96,T104	AASHTO T112,T176 ASTM D4791	YES	(b)	NO
Asphalt Cement (PG 64-28)	These results will be obtained from the surface asphalt cement tests of Section 290902										

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thcness
Surface	SP	PG 64-28	PG 64-28	2.5"
Binder	SP	PG 64-28	PG 64-28	15"

Asphalt Mixtures
SURFACE LAYER

			Compact Bulk Sample to Conditions and label compacted Specimens(Lab)									
			Gyratory compactions as per AASHTO M-002						Extra	Sample	Sample	Ship To
			Air(%)	Ht(mm)	First	Second	Third	Fourth	Sample	Storage	Disposed	
H01A02	NA01A02	LA01A02	Nmax	115	AC02/P02	PP19			No	(a)	Yes	
H01A02	NA02A02	LA02A02	Nmax	115	AC02/P02	PP19			No	(a)	Yes	
H01A02	NA03A02	LA03A02	Nmax	115	AC02/P02	PP19			No	(a)	Yes	
H01A02	NA04A02	LA04A02	Nmax	115	AC02/P02	PP19			No	(a)	Yes	
H01A02	NA05A02	LA05A02	Nmax	115	AC02/P02	PP19			No	(a)	Yes	
H01A02	NA06A02	LA06A02	Nmax	115	AC02/P02	PP19			No	(a)	Yes	
H01A02	NA07A02	LA07A02	3	140	AC02/P02				No	(a)	No	SRTC
H01A02	NA08A02	LA08A02	3	140					No	(a)	No	SRTC
H01A02	NA09A02	LA09A02	7	140	AC05/P05				No	(a)	Yes	
H01A02	NA10A02	LA10A02	7	140	AC05/P05				No	(a)	Yes	
H01A02	NA11A02	LA11A02	7	140	AC05/P05				No	(a)	Yes	
H01A02	NA12A02	LA12A02	7	140	AC05/P05				No	(a)	Yes	
H01A02	NA13A02	LA13A02	7	140	AC05/P05				No	(a)	Yes	
H01A02	NA14A02	LA14A02	7	140	AC05/P05				No	(a)	Yes	
H01A02	NA15A02	LA15A02	7	140	AC02/P02				No	(a)	No	LCL
H01A02	NA15A02				AC03/P03				No	(a)	Yes	
H01A02	NA16A02	LA16A02	7	140					No	(a)	No	LCL
H01A02	NA17A02	LA17A02	7	140					No	(a)	No	LCL
H01A02	NA18A02	LA18A02	7	140					No	(a)	No	LCL
H01A02	NA19A02	LA19A02	7	140					No	(a)	No	LCL
H01A02	NA20A02	LA20A02	7	140					No	(a)	No	LCL
H01A02	NA21A02	LA21A02	7	140					No	(a)	No	LCL
H01A02	NA22A02	LA22A02	7	140					No	(a)	No	LCL
H01A02	NA23A02	LA23A02	7	140					No	(a)	No	SRTC
H01A02	NA24A02	LA24A02	7	140					No	(a)	No	SRTC
H01A02	NA25A02	LA25A02	7	140					No	(a)	No	SRTC
H01A02	NA26A02	LA26A02	7	140					No	(a)	No	SRTC
H01A02	NA27A02	LA27A02	7	140					No	(a)	No	SRTC
H01A02	NA28A02	LA28A02	7	140					No	(a)	No	SRTC
H01A02	NA29A02	LA29A02	7	140					No	(a)	No	SRTC
H01A02	NA30A02	LA30A02	7	140					No	(a)	No	SRTC
H01A02	NA31A02	LA31A02	7	140					No	(a)	No	SRTC
H01A02	NA32A02	LA32A02	7	140					No	(a)	No	SRTC
H01A02	NA32A02	LA32A02	7	140					No	(a)	No	SRTC
H01A02	NA33A02	LA33A02	7	140					No	(a)	No	SRTC
H01A02	NA34A02	LA34A02	7	140					No	(a)	No	SRTC
H01A02	NA35A02	LA35A02	7	140					No	(a)	No	SRTC
H01A02	NA36A02	LA36A02	7	140					No	(a)	No	SRTC
H01A02	NA37A02	LA37A02	7	140					No	(a)	No	SRTC
H01A02	NA38A02	LA38A02	7	140	AC02/P02				No	(a)	No	SRTC
H01A02	NA39A02	LA39A02	7	140					No	(a)	No	SRTC
H01A02	NA40A02	LA40A02	7	140					No	(a)	No	SRTC
H50A01	NA50A01	LA50A01	3	AC03/P03					NO	(a)	YES	
H50A01	NA50A01	LA50A01	3		M-002	AC02/P02	PP19		NO	(a)	YES	Nmax 115mm
H50A01	NA51A01	LA51A01	3		M-002	AC02/P02	PP19		NO	(a)	YES	Nmax 115mm
H50A01	NA52A01	LA52A01	3		M-002	AC02/P02	PP19		NO	(a)	YES	Nmax 115mm
H50A01	NA53A01	LA53A01	3		M-002	AC05/P05			NO	(a)	YES	@7%AV 140mm
H50A01	NA54A01	LA54A01	3		M-002	AC05/P05			NO	(a)	YES	@7%AV 140mm
H50A01	NA55A01	LA55A01	3		M-002	AC05/P05			NO	(a)	YES	@7%AV 140mm
H50A01	NA56A01	LA56A01	3		M-002	AC05/P05			NO	(a)	YES	@7%AV 140mm
H50A01	NA57A01	LA57A01	3		M-002	AC05/P05			NO	(a)	YES	@7%AV 140mm
H50A01	NA58A01	LA58A01	3		M-002	AC05/P05			NO	(a)	YES	@7%AV 140mm

Asphalt Mixtures
BINDER LAYER

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SP	PG 64-28	PG 64-28	2.5"
Binder	SP	PG 64-28	PG 64-28	1.5"

<u>During Construction</u>

Plant

Asphalt Cement(MHTD))
Asphalt CementT(MRL)
Combined Aggregate(MRL)

Roadway

				Compact Bulk Sample to Conditions and label compacted Specimens											
				Gyratory compactions as per AASHTO M-002						Extra	Sample	Sample	Ship To		
				Air(%)	Ht(mm)	First	Second	Third	Fourth	Sample	Storage	Disposed			
Bulk Samples															
Surface Course	F01A02	BA01A02	DA01A02		3	140				No	(a)	No	SRTC		
	F01A02	BA01A02	DA01A02				AC04/P04			No	(a)	Yes			
	F02A02	BA02A02	DA02A02		Nmax	115	AC02/P02			No	(a)	Yes			
	F03A02	BA03A02	DA03A02		Nmax	115	AC02/P02			No	(a)	Yes			
	F04A02	BA04A02	DA04A02		Nmax	115	AC02/P02			No	(a)	Yes			
	F05A02	BA05A02	DA05A02			140				No	(a)	No	LCL		
	F06A02	BA06A02	DA06A02		7	140	AC02/P02			No	(a)	No	SRTC		
	F06A02	BA06A02	DA06A02				AC03/P03	AC04/P04	AC04/P14	No	(b)	Yes			
	F07A02	BA07A02	DA07A02		7	140				No	(a)	No	SRTC		
	F08A02	BA08A02	DA08A02		7	140				No	(a)	No	SRTC		
	F09A02	BA09A02	DA09A02		7	140				No	(a)	No	LCL		
	F10A02	BA10A02	DA10A02		7	140				No	(a)	No	SRTC		
	F11A02	BA11A02	DA11A02		7	140				No	(a)	No	SRTC		
	F11A02	BA11A02	DA11A02				AC04/P04			No	(b)	Yes			
	F12A02	BA12A02	DA12A02		7	140				No	(a)	No	SRTC		
	F13A02	BA13A02	DA13A02		7	140				No	(a)	No	SRTC		
	F14A02	BA14A02	DA14A02		7	140				No	(a)	No	SRTC		
	F15A02	BA15A02	DA15A02		7	140				No	(a)	No	LCL		
	F16A02	BA16A02	DA16A02		7	140	AC02/P02			No	(a)	No	LCL		
	F16A02	BA16A02	DA16A02				AC04/P04			No	(b)	Yes			
	F17A02	BA17A02	DA17A02		Nmax	115	AC02/P02			No	(a)	Yes			
	F18A02	BA18A02	DA18A02		Nmax	115	AC02/P02			No	(a)	Yes			
	F19A02	BA19A02	DA19A02		Nmax	115	AC02/P02			No	(a)	No			
	F20A02	BA20A02	DA20A02		7	140				No	(a)	No	SRTC		
	F21A02	BA21A02	DA21A02		7	140				No	(a)	No	SRTC		
	F22A02	BA22A02	DA22A02		7	140				No	(a)	No	SRTC		
	F22A02	BA22A02	DA22A02				AC03/P03	AC02/P02	AC04/P04	AC04/P14	No	(a)	Yes		
	F23A02	BA23A02	DA23A02		7	140				No	(a)	No	SRTC		
	F24A02	BA24A02	DA24A02		7	140				No	(a)	No	SRTC		
	F25A02	BA25A02	DA25A02		7	140				No	(a)	No	SRTC		
	F26A02	BA26A02	DA26A02		7	140				No	(a)	No	SRTC		
	F27A02	BA27A02	DA27A02		7	140				No	(a)	No	SRTC		
	F28A02	BA28A02	DA28A02		7	140				No	(a)	No	SRTC		
	F29A02	BA29A02	DA29A02		7	140				No	(a)	No	LCL		
	F30A02	BA30A02	DA30A02		7	140				No	(a)	No	LCL		
	F31A02	BA31A02	DA31A02		7	140				No	(a)	No	LCL		
	F32A02	BA32A02	DA32A02		7	140				No	(a)	No	LCL		
	F33A02	BA33A02	DA33A02		7	140				No	(a)	No	SRTC		
	F34A02	BA34A02	DA34A02		3	140				No	(a)	No	SRTC		
	F34A02	BA34A02	DA34A02				AC04/P04			No	(b)	Yes			
Binder Course	F50A02	BA50A02	DA50A02		3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
	F51A02	BA51A02	DA51A02		3		AC04/P04	AC04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
	F52A02	BA52A02	DA52A02		3	AC03/P03					No	(a)	Yes		
	F53A02	BA53A02	DA53A02		3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
	F54A02	BA54A02	DA54A02		3		AC04/P04	AC04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
	F55A02	BA55A02	DA55A02		3	AC03/P03					No	(a)	Yes		
	F56A02	BA56A02	DA56A02		3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
	F57A02	BA57A02	DA57A02		3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Cores

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SP	PG 64-28	PG 64-28	2.5"
Binder	SP	PG 64-28	PG 64-28	1.5"

		Ship To	Extra Sample	Sample Storage	Sample Disposed	Steps Involved in Laboratory Handling and Testing Sequence Required State Laboratory Test per Layer First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Extra Sample	Sample Storage	Sample Disposed
C01A02	CA01A02	SRTC	No	(a)	No									No	(a)	Yes
C02A02	CA02A02	SL	No	(a)	No	P01	P02	P04	P21					No	(a)	Yes
C03A02	CA03A02	LTPP	No	(a)	No									No	(a)	Yes
C04A02	CA04A02	SRTC	No	(a)	No									No	(a)	Yes
C05A02	CA05A02	SL	No	(a)	No									Yes	(a)	No
C06A02	CA06A02	SL	No	(a)	No	P01	P02	P04	P21					No	(a)	No
C07A02	CA07A02	LTPP	No	(a)	No						Blend			No	(a)	No
C08A02	CA08A02	SRTC	No	(a)	No									No	(a)	No
C09A02	CA09A02	SRTC	No	(a)	No									No	(a)	No
C10A02	CA10A02	SRTC	No	(a)	No									No	(a)	No
C11A02	CA11A02	SL	No	(a)	No	P01	P02	P03	P04	P21	Recovered		P14	No	(a)	No
C12A02	CA12A02	SRTC	No	(a)	No									No	(a)	No
C13A02	CA13A02	SRTC	No	(a)	No									No	(a)	No
C14A02	CA14A02	LTPP	No	(a)	No							Run		No	(a)	No
C15A02	CA15A02	SL	No	(a)	No	P01	P02	P04	P21		Asphalt	Thase		No	(a)	No
C16A02	CA16A02	LTPP	No	(a)	No							test		No	(a)	No
C17A02	CA17A02	SRTC	No	(a)	No							on blended		No	(a)	No
C18A02	CA18A02	SRTC	No	(a)	No							asphalt		No	(a)	No
C19A02	CA19A02	SL	No	(a)	No	P01	P02	P04	P21		from			No	(a)	No
C20A02	CA20A02	SRTC	No	(a)	No									No	(a)	No
C21A02	CA21A02	SRTC	No	(a)	No									No	(a)	No
C22A02	CA22A02	SRTC	No	(a)	No									No	(a)	No
C23A02	CA23A02	LTPP	No	(a)	No						Cores			No	(a)	No
C24A02	CA24A02	SL	No	(a)	No	P01	P02	P03	P04	P21			P14	No	(a)	No
C25A02	CA25A02	SL	No	(a)	No									Yes	(a)	No
C26A02	CA26A02	SRTC	No	(a)	No									No	(a)	No
C27A02	CA27A02	SRTC	No	(a)	No									No	(a)	No
C28A02	CA28A02	SL	No	(a)	No	P01	P02	P04	P21					No	(a)	No
C29A02	CA29A02	SRTC	No	(a)	No									No	(a)	No
C30A02	CA30A02	SRTC	No	(a)	No									No	(a)	No
C31A02	CA31A02	LTPP	No	(a)	No									No	(a)	Yes
C32A02	CA32A02	LTPP	No	(a)	No									No	(a)	Yes
C33A02	CA33A02	SL	No	(a)	No	P01	P02	P04	P21					No	(a)	No
C34A02	CA34A02	SRTC	No	(a)	No									No	(a)	No

Site-Layout
5-POINT

After Binder
After Surface

Post Construction

FWD
5-POINT
Distress Survey
Cores

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SP	PG58-28	3/4"	2"
Binder	BP	PG64-28	1"	2"

Pre-Construction

	Location Number	Initial Sample Number	Final Sample Number	Date Sampled
Distress Survey				
FWD				
Cores				

	Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed
Existing Surface Layer A01A03 CP01A03	1	PC05/P68					No	(a)	Yes
Existing Surface Layer A02A03 CP02A03	2	PC05/P65					No	(a)	Yes
Base Layer A01A03 BG01A03		Visually Classify in Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
Base Layer A02A03 BG01A03		Visually Classify in Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
Subgrade Layer A01A03 BG01A03	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes
Subgrade Layer A02A03 BG01A03	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes
Shoulder Auger Probe S01A03 NA	3	6 meters or refusal							
Site-Layout 5-POINT									

Laboratory Test
SURFACE LAYER

Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed
Aggregate Tests(SP 125)	These results will be obtained from the surface layer aggregate tests of Section 290902							
Asphaltic Cement (PG 58-28) B01A03 BC01A03	3	AASHTO T49 AE02/P22 AE05/P25 AE03/P23	ASTM D4402 AASHTO TP5	ASTM T240 AASHTO TP6	AASHTO PP1,TP5 TP1	AASHTO TP3	YES	(b)	NO

Asphalt Mixtures

														Gyratory Compactio	Compactio Height
H01A03	NA01A03	LA01A03	3	AC03/PO3	M-002	AC02/P02	PP19				NO	(a)	YES	Nmax	115mm
H01A03	NA02A03	LA02A03	3		M-002	AC02/P02	PP19				NO	(a)	YES	Nmax	115mm
H01A03	NA03A03	LA03A03	3		M-002	AC02/P02	PP19				NO	(a)	YES	Nmax	115mm
H01A03	NA04A03	LA04A03	3		M-002	AC05/P06					NO	(a)	YES	@7%AV	115mm
H01A03	NA05A03	LA05A03	3		M-002	AC05/P05					NO	(a)	YES	@7%AV	115mm
H01A03	NA06A03	LA06A03	3		M-002	AC05/P05					NO	(a)	YES	@7%AV	115mm
H01A03	NA07A03	LA07A03	3		M-002	AC05/P05					NO	(a)	YES	@7%AV	115mm
H01A03	NA08A03	LA08A03	3		M-002	AC05/P05					NO	(a)	YES	@7%AV	115mm
H01A03	NA09A03	LA09A03	3		M-002	AC05/P05					NO	(a)	YES	@7%AV	115mm

BINDER LAYER
Aggregate Tests (SP 190) These results will be obtained from the binder layer aggregate tests of Section 290902
Asphalt Cement Tests (PG 64-28) These results will be obtained from the surface layer asphalt cement tests of Section 290902

Asphalt Mixtures

														Gyratory Compactio	Compactio Height
H50A03	NA50A03	LA50A03	3	AC03/PO3	M-002	AC02/P02	PP19				NO	(a)	YES	Nmax	115mm
H50A03	NA50A03	LA50A03	3		M-002	AC02/P02	PP19				NO	(a)	YES	Nmax	115mm
H50A03	NA51A03	LA51A03	3		M-002	AC02/P02	PP19				NO	(a)	YES	Nmax	115mm
H50A03	NA52A03	LA52A03	3		M-002	AC05/P05					NO	(a)	YES	@7%AV	115mm
H50A03	NA53A03	LA53A03	3		M-002	AC05/P05					NO	(a)	YES	@7%AV	115mm
H50A03	NA54A03	LA54A03	3		M-002	AC05/P05					NO	(a)	YES	@7%AV	115mm
H50A03	NA55A03	LA55A03	3		M-002	AC05/P05					NO	(a)	YES	@7%AV	115mm
H50A03	NA56A03	LA56A03	3		M-002	AC05/P05					NO	(a)	YES	@7%AV	115mm
H50A03	NA57A03	LA57A03	3		M-002	AC05/P05					NO	(a)	YES	@7%AV	115mm
H50A03	NA58A03	LA58A03	3		M-002	AC05/P05					NO	(a)	YES	@7%AV	115mm

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SP	PG58-28	3/4"	2"
Binder	SP	PG64-28	1"	2"

During Construction

Plant

Asphalt Cement(MHTD))
Asphalt CemenT(MRL)
Combined Aggregate(MRL)

Roadway

Bulk Samples
Surface Course

Binder Course

Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer — First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed	Gyratory Compactio	Compaction Height
F01A03 BA01A03 DA01A03	3			M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F02A03 BA02A03 DA02A03	3		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F02A03 BA02A03 DA02A03	3	AC03/P03					No	(a)	Yes		
F03A03 BA03A03 DA03A03	3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F04A03 BA04A03 DA04A03	3		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F04A03 BA04A03 DA04A03	3	AC03/P03					No	(a)	Yes		
F05A03 BA05A03 DA05A03	3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F06A03 BA06A03 DA06A03	3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F50A03 BA50A03 DA50A03	3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F51A03 BA51A03 DA51A03	3		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F52A03 BA52A03 DA52A03	3	AC03/P03					No	(a)	Yes		
F53A03 BA53A03 DA53A03	3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F54A03 BA54A03 DA54A03	3		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F55A03 BA55A03 DA55A03	3	AC03/P03					No	(a)	Yes		
F56A03 BA56A03 DA56A03	3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F57A03 BA57A03 DA57A03	3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm

Cores

Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer — First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Extra Sample	Sample Storage	Sample Disposed
C01A03 CA01A03	1	P01	P02	P04	P21	P14	PP19		T49			
C02A03 CA02A03	1	P01	P02	P04	P21			Blended Recovered Asphalt For Binder Testing	P22			
C03A03 CA03A03	1	P01	P02	P04	P21				P25			
C04A03 CA04A03	1	P01	P02	P04	P21				TP5	No		Yes
C05A03 CA05A03	2	P01	P02	P04	P21				TP1			
C06A03 CA06A03	2	P01	P02	P04	P21				TP3			
C07A03 CA07A03	2	P01	P02	P04	P21				P23			
C08A03 CA08A03	2	P01	P02	P04	P21	P14	PP19					

Site-Layout
5 POINT

After Binder
After Surface

Post Construction

FWD
5-POINT
Distress Survey
Cores

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SMA/FBRS	AC-20	3/4"	2"
Binder	1-B	AC-20	1"	2"

Pre-Construction

	Location Number	Initial Sample Number	Final Sample Number	Date Sampled
Distress Survey				
FWD				
Cores				
Existing Surface Layer	A01A59	CP01A59		
	A02A59	CP02A59		
Base Layer	A01A59	BG01A59		
	A02A59	BG01A59		
Subgrade Layer	A01A59	BG01A59		
	A02A59	BG01A59		
Shoulder Auger Probe	S01A59	NA		
Site-Layout				
5 POINT				

Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer					Extra Sample	Sample Storage	Sample Disposed
	First	Second	Third	Fourth	Fifth			
	1	PC06/P66				No	(a)	Yes
	2	PC08/P66				No	(a)	Yes
	Visually Classify In Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
	Visually Classify In Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49	No	(b)	Yes
	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49	No	(b)	Yes
	3	6 meters or refusal						

Laboratory Test
SURFACE LAYER

Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer					Extra Sample	Sample Storage	Sample Disposed
	First	Second	Third	Fourth	Fifth			
3	AG04/P14	AG01/P11 AC02/P12 AASHTO T100	Penn DOT TM 621 ASTM C1252	AASHTO T96,T104	AASHTO T112,T176 ASTM D4791	YES	(b)	NO

Aggregate Test (SMA/FIBERS) B01A59 BU10A59

Asphalt Cement (AC-20) These results will be obtained from the surface layer asphalt cement tests of Section 290901

Asphalt Mixtures

									Compactio	Height
H01A59	NA01A59	LA01A59	3	AC03/P03	M-002	AC02/P02	PP19	NO (a) YES	Nmax	115mm
H01A59	NA02A59	LA02A59	3		M-002	AC02/P02	PP19	NO (a) YES	Nmax	115mm
H01A59	NA03A59	LA03A59	3		M-002	AC02/P02	PP19	NO (a) YES	Nmax	115mm
H01A59	NA04A59	LA04A59	3		M-002	AC05/P05		NO (a) YES	@7%AV	115mm
H01A59	NA05A59	LA05A59	3		M-002	AC05/P05		NO (a) YES	@7%AV	115mm
H01A59	NA06A59	LA06A59	3		M-002	AC05/P05		NO (a) YES	@7%AV	115mm
H01A59	NA07A59	LA07A59	3		M-002	AC05/P05		NO (a) YES	@7%AV	115mm
H01A59	NA08A59	LA08A59	3		M-002	AC05/P05		NO (a) YES	@7%AV	115mm
H01A59	NA09A59	LA09A59	3		M-002	AC05/P05		NO (a) YES	@7%AV	115mm

BINDER LAYER

Aggregate Test (I-B) These results will be obtained from the binder layer aggregate tests of Section 290960
Asphalt Cement (AC-20) These results will be obtained from the surface layer asphalt cement tests of Section 290901
Asphalt Mixtures These results will be obtained from the binder layer asphalt mixture tests of Section 290901

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SMA/FBRS	AC-20	3/4"	2"
Binder	I-B	AC-20	1"	2"

During Construction

Plant

Asphalt Cement(MHTD))
Asphalt CemenT(MRL)
Combined Aggregate(MRL)

Roadway

Bulk Samples
Surface Layer

Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer — First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed	Gyratory Compactio	Compaction Height
F01A59 BA01A59 DA01A59	3				M-002 AC02/P02	No	(a)	Yes	Nmax	115mm
F02A59 BA02A59 DA02A59	3		AC04/P04	AG04/P14	V-002 AC02/P02	No	(a)	Yes	Nmax	115mm
F02A59 BA02A59 DA02A59	3	AC03/P03				No	(a)	Yes		
F03A59 BA03A59 DA03A59	3				M-002 AC02/P02	No	(a)	Yes	Nmax	115mm
F04A59 BA04A59 DA04A59	3		AC04/P04	AG04/P14	M-002 AC02/P02	No	(a)	Yes	Nmax	115mm
F04A59 BA04A59 DA04A59	3	AC03/P03				No	(a)	Yes		
F05A59 BA05A59 DA05A59	3				M-002 AC02/P02	No	(a)	Yes	Nmax	115mm
F06A59 BA06A59 DA06A59	3				M-002 AC02/P02	No	(a)	Yes	Nmax	115mm

Binder Layer

Since this section has the same binder layer as 290901, QC Test will not be performed

Cores

Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer — First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Extra Sample	Sample Storage	Sample Disposed
C01A59 CA01A59	1	P01	P02	P04	P21	P14	PP19					
C02A59 CA02A59	1	P01	P02	P04	P21			Blended Recovered Asphalt For Binder Testing	T49 P22 P25 TP5 TP1 TP3 P23	No		Yes
C03A59 CA03A59	1	P01	P02	P04	P21							
C04A59 CA04A59	1	P01	P02	P04	P21							
C05A59 CA05A59	2	P01	P02	P04	P21							
C06A59 CA06A59	2	P01	P02	P04	P21							
C07A59 CA07A59	2	P01	P02	P04	P21							
C08A59 CA08A59	2	P01	P02	P04	P21	P14	PP19					

Site-Layout
5-POINT

After Binder
After Surface

Post Construction

FWD
5 POINT
Distress Survey
Cores

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SMA/FIBERS	PG64-28	3/4"	2"
Binder	I-B	AC-20	1"	2"

Pre-Construction

	Location Number	Initial Sample Number	Final Sample Number	Date Sampled
Distress Survey				
FWD				
Cores				
Existing Surface Layer	A01A60 A02A60	CP01A60 CP02A60		
Base Layer	A01A60 A02A60	BG01A60 BG01A60		
Subgrade Layer	A01A60 A02A60	BG01A60 BG01A60		
Shoulder Auger Probe	S01A60	NA		
Site Layout				
5-POINT				

Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer — First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed
1	PC06/P66					No	(a)	Yes
2	PC06/P66					No	(a)	Yes
	Visually Classify in Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
	Visually Classify in Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes
2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes
3	6 meters or refusal							

Laboratory Test
SURFACE LAYER

Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer — First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed

Aggregate Tests (SMA/FIBERS) — These results will be obtained from the surface layer aggregate tests of Section 290959
Asphalt cement (AC-20) — These results will be obtained from the surface asphalt cement tests of Section 290901

Asphalt Mixtures

										Compactio	Height
H01A60	NA01A60	LA01A60	3	AC03/PC03	M-002	AC02/P02	PP19	NO	(a)	YES	Nmax	115mm
H01A60	NA02A60	LA02A60	3		M-002	AC02/P02	PP19	NO	(a)	YES	Nmax	115mm
H01A60	NA03A60	LA03A60	3		M-002	AC02/P02	PP19	NO	(a)	YES	Nmax	115mm
H01A60	NA04A60	LA04A60	3		M-002	AC05/P05		NO	(a)	YES	@7%AV	115mm
H01A60	NA05A60	LA05A60	3		M-002	AC05/P05		NO	(a)	YES	@7%AV	115mm
H01A60	NA06A60	LA06A60	3		M-002	AC05/P05		NO	(a)	YES	@7%AV	115mm
H01A60	NA07A60	LA07A60	3		M-002	AC05/P05		NO	(a)	YES	@7%AV	115mm
H01A60	NA08A60	LA08A60	3		M-002	AC06/P05		NO	(a)	YES	@7%AV	115mm
H01A60	NA09A60	LA09A60	3		M-002	AC05/P05		NO	(a)	YES	@7%AV	115mm

BINDER LAYER

Aggregate Test (I B) — These results will be obtained from the binder layer aggregate tests of Section 290960
Asphalt Cement (AC-20) — These results will be obtained from the surface layer asphalt cement tests of Section 290901
Asphalt Mixtures — These results will be obtained from the binder layer asphalt mixture tests of Section 290901

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SMA/FIBRS	PG64-28	3/4"	2"
Binder	I-B	AC-20	1"	2"

<u>During Construction</u>

Plant

Asphalt Cement(MHTD))
Asphalt CemenT(MRL)
Combined Aggregate(MRL)

Roadway

Bulk Samples
Surface Layer

Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer: First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed	Gyratory Compactio	Compactor Height
F01A60 BA01A60 DA01A60	3			M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F02A60 BA02A60 DA02A60	3		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F02A60 BA02A60 DA02A60	3	AC03/P03					No	(a)	Yes		
F03A60 BA03A60 DA03A60	3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F04A60 BA04A60 DA04A60	3		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F04A60 BA04A60 DA04A60	3	AC03/P03					No	(a)	Yes		
F05A60 BA05A60 DA05A60	3				M-002	AC02/P02	No	(a)	Yes	Nmax	116mm
F06A60 BA06A60 DA06A60	3				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm

Binder Layer

Since this section has the same binder layer as 290901, QC test will not be performed

Cores

Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer: First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Extra Sample	Sample Storage	Sample Disposed
C01A60 CA01A60	1	P01	P02	P04	P21	P14	PP19					
C02A60 CA02A60	1	P01	P02	P04	P21			Blended Recovered Asphalt For Binder Testing	T49 P22 P25 TP5 TP1 TP3 P23	No		Yes
C03A60 CA03A60	1	P01	P02	P04	P21							
C04A60 CA04A60	1	P01	P02	P04	P21							
C05A60 CA05A60	2	P01	P02	P04	P21							
C06A60 CA06A60	2	P01	P02	P04	P21							
C07A60 CA07A60	2	P01	P02	P04	P21							
C08A60 CA08A60	2	P01	P02	P04	P21	P14	PP19					

Site-Layout
5-POINT

After Binder
After Surface

<u>Post Construction</u>

FWD
5-POINT
Distress Survey
Cores

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SP	AC-20	3/4"	2"
Binder	I-B	AC-20	1"	2"

Pre-Construction

	Location Number	Initial Sample Number	Final Sample Number	Date Sampled
Distress Survey				
FWD				
Cores				
Existing Surface Layer	A01A61	CP01A61		
	A02A61	CP02A61		
Base Layer	A01A61	BG01A61		
	A02A61	BG02A61		
Subgrade Layer	A01A61	BS01A61		
	A02A61	BS02A61		
Shoulder Auger Probe	S01A61	NA		
Site Layout				
5 POINT				

Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer					Extra Sample	Sample Storage	Sample Disposed
	First	Second	Third	Fourth	Fifth			
1	PC06/P66					No	(a)	Yes
2	PC06/P66					No	(a)	Yes
	Visually Classify in Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
	Visually Classify in Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes
2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes
3	6 meters or until refusal							

Laboratory Test
SURFACE LAYER

Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer					Extra Sample	Sample Storage	Sample Disposed
	First	Second	Third	Fourth	Fifth			

Aggregate Tests (SP 125)
Asphalt Cement Tests (AC-20)

These results will be obtained from the surface layer aggregate tests of Section 290902
These results will be obtained from the surface layer asphalt tests of Section 290901

Asphalt Mixtures

								Gyratory Compactio	Compaction Height
H01A61	NA01A61	LA01A61	3	AC03/PC3	M-002	AC02/P02	PP19	NO (a) YES	Nmax 115mm
H01A61	NA02A61	LA02A61	3		M-002	AC02/P02	PP19	NO (a) YES	Nmax 115mm
H01A61	NA03A61	LA03A61	3		M-002	AC02/P02	PP19	NO (a) YES	Nmax 115mm
H01A61	NA04A61	LA04A61	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm
H01A61	NA05A61	LA05A61	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm
H01A61	NA06A61	LA06A61	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm
H01A61	NA07A61	LA07A61	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm
H01A61	NA08A61	LA08A61	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm
H01A61	NA09A61	LA09A61	3		M-002	AC05/P05		NO (a) YES	@7%AV 140mm

BINDER LAYER
Aggregate Test (I-B)
Asphalt Cement (AC-20)
Asphalt Mixtures

These results will be obtained from the binder layer aggregate tests of Section 290960
These results will be obtained from the surface layer asphalt cement tests of Section 290901
These results will be obtained from the binder layer asphalt mixture tests of Section 290901

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SP	AC-20	3/4"	2"
Binder	I-B	AC-20	1"	2"

During Construction

Location Number	Initial Sample Number	Final Sample Number	Date Sampled
Plant			
Asphalt Cement(MHTD))			
Asphalt CemenT(MRL)			
Combined Aggregate(MRL)			
Roadway			

Bulk Samples
Surface Course

Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer: First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed	Gyratory Compactio	Compaction Height
F01A61 BA01A61 DA01A61	1				M-002	AC02/P02	No	(a)	Yes	Nmax 115mm
F02A61 BA02A01 DA02A61	1		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax 115mm
F02A61 BA02A61 DA02A61	1	AC03/P03					No	(a)	Yes	
F03A61 BA03A61 DA03A61	1				M-002	AC02/P02	No	(a)	Yes	Nmax 115mm
F04A61 BA04A61 DA04A61	2		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax 115mm
F04A61 BA04A61 DA04A61	2	AC03/P03					No	(a)	Yes	
F05A61 BA05A61 DA05A61	2				M-002	AC02/P02	No	(a)	Yes	Nmax 115mm
F06A61 BA06A61 DA06A61	2				M-002	AC02/P02	No	(a)	Yes	Nmax 115mm

Binder Layer

Since this section has the same binder layer as 290901, QC Test will not be performed

Cores

Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer: First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Extra Sample	Sample Storage	Sample Disposed
C01A61 CA01A61	1	P01	P02	P04	P21	P14	PP19	Blended Recovered Asphalt Tar Binder Testing	T49 P22 P25 TP5 TP1 TP3 P23	No		Yes
C02A61 CA02A61	1	P01	P02	P04	P21							
C03A61 CA03A61	1	P01	P02	P04	P21							
C04A61 CA04A61	1	P01	P02	P04	P21							
C05A61 CA05A61	2	P01	P02	P04	P21							
C06A61 CA06A61	2	P01	P02	P04	P21							
C07A61 CA07A61	2	P01	P02	P04	P21							
C08A61 CA08A61	2	P01	P02	P04	P21	P14	PP19					

Site-Layout
5 POINT

After Binder
After Surface

Post Construction

FWD
5 POINT
Distress Survey
Cores

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SP	PG 70-28	3/4"	2"
Binder	SP	PG 64-28	1"	2"

Pre-Construction

	Location Number	Initial Sample Number	Final Sample Number	Date Sampled
Distress Survey				
FWD				
Cores				
Existing Surface Layer	A01A62	CP01A62		
	A02A62	CP02A62		
Base Layer	A01A62	BG01A62		
	A02A62	BG02A62		
Subgrade Layer	A01A62	BS01A62		
	A02A62	BS02A62		
Shoulder Auger Probe	S01A62	NA		
Site-Layout				
5 POINT				

	Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed
Distress Survey									
FWD									
Cores									
Existing Surface Layer	1	PC06/P66					No	(a)	Yes
	2	PC06/P66					No	(a)	Yes
Base Layer		Visually Classify In Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
		Visually Classify In Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
Subgrade Layer	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes
	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes
Shoulder Auger Probe	3	6 meters or until refusal							
Site-Layout									
5 POINT									

Laboratory Test
SURFACE LAYER

These results will be obtained from the surface layer aggregate tests of Section 290902

	Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed
Aggregate Tests(SP 125)	3	AASHTO T49	ASTM D4402	ASTM T240	AASHTO PP1,TP5	AASHTO TP3	YES	(b)	NO
Asphaltic Cement(PG 70 28)		AE02/P22	AASHTO	AASHTO	TP1				
B01A62 BC01A62		AE05/P25	TP5	TP5					
		AE03/P23							

								Gyratory Compactio	Compaction Height
Asphalt Mixtures	H01A62	NA01A62	LA01A62	3	AC03/PC03	M-002	AC02/P02	PP19	NO (a) YES	Nmax	115mm
	H01A62	NA02A62	LA02A62	3		M-002	AC02/P02	PP19	NO (a) YES	Nmax	115mm
	H01A62	NA03A62	LA03A62	3		M-002	AC02/P02	PP19	NO (a) YES	Nmax	115mm
	H01A62	NA04A62	LA04A62	3		M-002	AC05/P05		NO (a) YES	@7%AV	140mm
	H01A62	NA05A62	LA05A62	3		M-002	AC05/P05		NO (a) YES	@7%AV	140mm
	H01A62	NA06A62	LA06A62	3		M-002	AC05/P05		NO (a) YES	@7%AV	140mm
	H01A62	NA07A62	LA07A62	3		M-002	AC05/P05		NO (a) YES	@7%AV	140mm
	H01A62	NA08A62	LA08A62	3		M-002	AC05/P05		NO (a) YES	@7%AV	140mm
	H01A62	NA09A62	LA09A62	3		M-002	AC05/P05		NO (a) YES	@7%AV	140mm

BINDER LAYER

Aggregate Test (SP 190)
Asphalt Cement (PG 64-28)
Asphalt Mixtures

These results will be obtained from the binder layer aggregate tests of Section 290902
These results will be obtained from the surface layer asphalt cement tests of Section 290902
These results will be obtained from the binder layer asphalt mixture tests of Section 290902

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SP	PG 70-28	3/4"	2"
Binder	SP	PG 64-28	1"	2"

During Construction

Location Number	Initial Sample Number	Final Sample Number	Date Sampled

Plant

Asphalt Cement(MHTD))
Asphalt CementT(MRL)
Combined Aggregate(MRL)

Roadway

Bulk Samples
Surface Course

Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer — First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed	Gyratory Compactio	Compaction Height
F01A62 BA01A62 DA01A62	1				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F02A62 BA02A01 DA02A62	1		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F02A62 BA02A62 DA02A62	1	AC03/P03					No	(a)	Yes		
F03A62 BA03A62 DA03A62	1				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F04A62 BA04A62 DA04A62	2		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F04A62 BA04A62 DA04A62	2	AC03/P03					No	(a)	Yes		
F05A62 BA05A62 DA05A62	2				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F06A62 BA06A62 DA06A62	2				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm

Binder Layer

Since this section has the same binder layer as 290902, QC Test will not be performed

M&R FIELD OFFICE

Cores

Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer — First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Extra Sample	Sample Storage	Sample Disposed
C01A62 CA01A62	1	P01	P02	P04	P21	P14	PP19		T49			
C02A62 CA02A62	1	P01	P02	P04	P21			Blended	P22			
C03A62 CA03A62	1	P01	P02	P04	P21			Recovered	P25			
C04A62 CA04A62	1	P01	P02	P04	P21			Asphalt	TP5	No		Yes
C05A62 CA05A62	2	P01	P02	P04	P21			For	TP1			
C06A62 CA06A62	2	P01	P02	P04	P21			Binder	TP3			
C07A62 CA07A62	2	P01	P02	P04	P21			Testing	P23			
C08A62 CA08A62	2	P01	P02	P04	P21	P14	PP19					

Site-Layout
5-POINT

After Binder
After Surface

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Post Construction

FWD
5 POINT
Distress Survey
Cores

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SP	PG 64-16	3/4"	2"
Binder	SP	PG 64-28	1"	2"

Pre-Construction

	Location Number	Initial Sample Number	Final Sample Number	Date Sampled
Distress Survey				
FWD				
Cores				

	Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer — First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed
Existing Surface Layer	1	PC06/P66					No	(a)	Yes
A01A63 CP01A63	2	PC06/P66					No	(a)	Yes
A02A63 CP02A63									
Base Layer		Visually Classify in Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
A01A63 BG01A63		Visually Classify in Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
A02A63 BG02A63									
Subgrade Layer	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes
A01A63 BS01A63	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49		No	(b)	Yes
A02A63 BS02A63									
Shoulder Auger Probe	3	6 meters or until refusal							
S01A63 NA									

Site Layout
5-POINT

Laboratory Test
SURFACE LAYER

These results will be obtained from the surface layer aggregate tests of Section 290902

Aggregate Tests(SP 125)
Asphaltic Cement(PG 64-16)
B01A62 BC01A62

Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer — First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed
3	AASHTO T49 AE02/P22 AC05/P25 AE03/P23	ASTM D4402 AASHTO TP5	ASTM T240 AASHTO TP5	AASHTO PP1,TP5 TP1	AASHTO TP3	YES	(b)	NO

Asphalt Mixtures

									Gyratory Compactio	Compaction Height
H01A63	NA01A63	LA01A63	3	AC03/P03	M-002	AC02/P02	PP19	NO	(a)	YES	Nmax	115mm
H01A63	NA02A63	LA02A63	3		M-002	AC02/P02	PP19	NO	(a)	YES	Nmax	115mm
H01A63	NA03A63	LA03A63	3		M-002	AC02/P02	PP19	NO	(a)	YES	Nmax	115mm
H01A63	NA04A63	LA04A63	3		M-002	AC05/P05		NO	(a)	YES	@7%AV	140mm
H01A63	NA05A63	LA05A63	3		M-002	AC05/P05		NO	(a)	YES	@7%AV	140mm
H01A63	NA06A63	LA06A63	3		M-002	AC05/P05		NO	(a)	YES	@7%AV	140mm
H01A63	NA07A63	LA07A63	3		M-002	AC05/P05		NO	(a)	YES	@7%AV	140mm
H01A63	NA08A63	LA08A63	3		M-002	AC05/P05		NO	(a)	YES	@7%AV	140mm
H01A63	NA09A63	LA09A63	3		M-002	AC05/P05		NO	(a)	YES	@7%AV	140mm

BINDER LAYER

Aggregate Test (SP 190)
Asphalt Cement (PG 64-28)
Asphalt Mixtures

These results will be obtained from the binder layer aggregate tests of Section 290902
These results will be obtained from the surface layer asphalt cement tests of Section 290902
These results will be obtained from the binder layer asphalt mixture tests of Section 290902

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SP	PG 64-16	3/4"	2"
Binder	SP	PG 64-28	1"	2"

During Construction

Plant

Asphalt Cement(MHTD))
Asphalt CemenT(MRL)
Combined Aggregate(MRL)

Roadway

Bulk Samples
Surface Course

Location Number	Initial Sample Number	Final Sample Number	Date Sampled	Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer — First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed	Gyratory Compactio	Compaction Height
F01A63	BA01A63	DA01A63		1				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F02A63	BA02A01	DA02A63		1		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F02A63	BA02A63	DA02A63		1	AC03/P03					No	(a)	Yes		
F03A63	BA03A63	DA03A63		1				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F04A63	BA04A63	DA04A63		2		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F04A63	BA04A63	DA04A63		2	AC03/P03					No	(a)	Yes		
F05A63	BA05A63	DA05A63		2				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F08A63	BA08A63	DA08A63		2				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm

Binder Layer

Since this section has the same binder layer as 290902, QC Test will not be performed

Cores

Location Number	Initial Sample Number	Final Sample Number	Date Sampled	Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer — First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Extra Sample	Sample Storage	Sample Disposed
C01A63	CA01A63			1	P01	P02	P04	P21	P14	PP19	Blended Recovered Asphalt For Binder Testing	T49 P22 P25 TP5 TP1 TP3 P23	No		Yes
C02A63	CA02A63			1	P01	P02	P04	P21							
C03A63	CA03A63			1	P01	P02	P04	P21							
C04A63	CA04A63			2	P01	P02	P04	P21							
C05A63	CA05A63			2	P01	P02	P04	P21							
C06A63	CA06A63			2	P01	P02	P04	P21							
C07A63	CA07A63			2	P01	P02	P04	P21	P14	PP19					
C08A63	CA08A63														

Site-Layout
5-POINT

After Binder
After Surface

Post Construction

FWD
5-POINT
Distress Survey
Cores

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SP	PG 64-28	3/4"	2'
Binder	SP	PG 64-28	1"	2'

Pre-Construction

	Location Number	Initial Sample Number	Final Sample Number	Date Sampled
Distress Survey				
FWD				
Cores				

Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer					Extra Sample	Sample Storage	Sample Disposed
	First	Second	Third	Fourth	Fifth			
Existing Surface Layer A01A64 / CP01A64	1	PC06/P66				No	(a)	Yes
Existing Surface Layer A02A64 / CP02A04	2	PC06/P66				No	(a)	Yes
Base Layer A01A64 / BG01A64	Visually Classify In Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
Base Layer A02A64 / BG02A64	Visually Classify In Accordance to App C of SHRP-LTPP Guide for Material Sampling Testing and Handling							
Subgrade Layer A01A64 / BS01A64	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49	No	(b)	Yes
Subgrade Layer A02A64 / BS02A64	2	SS01/P51	SS03/P43	SS04/P52	SS09/P49	No	(b)	Yes
Shoulder Auger Probe S01A64 / NA	3	6 meters or until refusal						

Site-Layout
5-POINT

Laboratory Test
SURFACE LAYER

Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer					Extra Sample	Sample Storage	Sample Disposed
	First	Second	Third	Fourth	Fifth			

Agreggate Test(SP 125) — These results will be obtained from the surface layer aggregate tests of Section 290902
Asphalt Cement Tests (PG 64-28) — These results will be obtained from the surface layer asphalt cement tests of Section 290902
Asphalt Mixture Test — Since this material is identical to Section 290902 these test will not be repeated

BINDER LAYER

Agreggate Test(SP 190) — These results will be obtained from the surface layer aggregate tests of Section 290902
Asphalt Cement Tests (PG 64-28) — These results will be obtained from the surface layer asphalt cement tests of Section 290902
Asphalt Mixture Test — Since this material is identical to Section 290902 these test will not be repeated

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SPS9A
SAMPLING AND SURVEY
SCHEDULE

Mix Design

	Mix	Binder	Max Agg	Thickness
Surface	SP	PG 64-28	3/4"	2"
Binder	SP	PG 64-28	1"	2"

During Construction

Plant

Asphalt Cement(MHTD))
Asphalt CementT(MRL)
Combined Aggregate(MRL)

Roadway

Bulk Samples
Surface Course

Location Number	Initial Sample Number	Final Sample Number	Date Sampled	Lab Test Number	Steps involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer: First	Second	Third	Fourth	Fifth	Extra Sample	Sample Storage	Sample Disposed	Gyratory Compactio	Compaction Height
F01A64	BA01A64	DA01A64		1				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F02A64	BA02A01	DA02A64		1		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F02A64	BA02A64	DA02A64		1	AC03/P03					No	(a)	Yes		
F03A64	BA03A64	DA03A64		1				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F04A64	BA04A64	DA04A64		2		AC04/P04	AG04/P14	M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F04A64	BA04A64	DA04A64		2	AC03/P03					No	(a)	Yes		
F05A64	BA05A64	DA05A64		2				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm
F06A64	BA06A64	DA06A64		2				M-002	AC02/P02	No	(a)	Yes	Nmax	115mm

Binder Layer

Since this section has the same binder layer as 290902, QC Test will not be performed

Cores

		Lab Test Number	Steps Involved in Laboratory Handling and Testing Sequence: Required Laboratory Test per Layer: First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Extra Sample	Sample Storage	Sample Disposed
C01A64	CA01A64	1	P01	P02	P04	P21	P14	PP19		T49			
C02A64	CA02A64	1	P01	P02	P04	P21			Blended	P22			
C03A64	CA03A64	1	P01	P02	P04	P21			Recovered	P25			
C04A64	CA04A64	1	P01	P02	P04	P21			Asphalt	TP5	No		Yes
C05A64	CA05A64	2	P01	P02	P04	P21			For	TP1			
C06A64	CA06A64	2	P01	P02	P04	P21			Binder	TP3			
C07A64	CA07A64	2	P01	P02	P04	P21			Testing	P23			
C08A64	CA08A64	2	P01	P02	P04	P21	P14	PP19					

Site-Layout
5-POINT

After Binder
After Surface

Post Construction

FWD
5 POINT
Distress Survey
Cores

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TOTAL P.21