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SPS 9A MS&T so far...

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LAY OUT SHOWS ALL 6" (152mm) HC CORES. FOR RM P07 WE NEED

NEED FOR BM 2C

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Table 1. Testing of Layers Below Final Surface

Test Type	LTPP Designation	LTPP Protocol	Minimum No. of Tests	Sample Designation
New Construction				
Subgrade Soils:				
Sieve Analysis	SS01	P51	3	B1 to B3
Atterberg Limits	SS03	P43	3	B1 to B3
Classification	SS04	P52	3	B1 to B3
Natural Moisture Content	SS08	P56	3	B1 to B3
Depth to Rigid Layer	SS09	P49	3	S1 to S3
Base Course:				
Classification	UG08	P47	3	B4 to B6
Core Examination/Thickness (bound base)	AC01	P01	6	C1 to C6
Existing Pavement (Pre-Overlay Construction)				
Surface Bound Layers:				
Core Examination/Thickness	AC01	P01	3	A1 to A6
Subgrade:				
Sieve Analysis	SS01	P51	3	A1,A3,A5
Atterberg Limits	SS03	P43	3	A1,A3,A5
Classification	SS04	P52	3	A1,A3,A5
Natural Moisture Content	SS08	P56	3	A1,A3,A5
Depth to Rigid Layer	SS09	P49	3	S1 to S3
Base:				
Classification (field only)	UG08	P47	3	A2,A4,A6

The thickness of the final surface layer will be determined from cores taken in the first sampling after construction.

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Table 2. Bulk Material Sampling During Construction for Each Section on a Project

Material and Sample Description	Sample Size	Sample Location
Material to be Tested		
Asphalt Cement	8 liter	Asphalt Tanker
Aggregate (10 - 20 liter pails)	250 kg	Stock Pile
Compacted Mixtures:		
SUPERPAVE	40	Plant
Agency	6	
SUPERPAVE Alternate Binder	6	
Materials to be Shipped to the SHRP Asphalt Reference Library		
Asphalt Cement	20 liter	Asphalt Tanker
Aggregate (10 - 20 liter pails)	250 kg	Stock Pile

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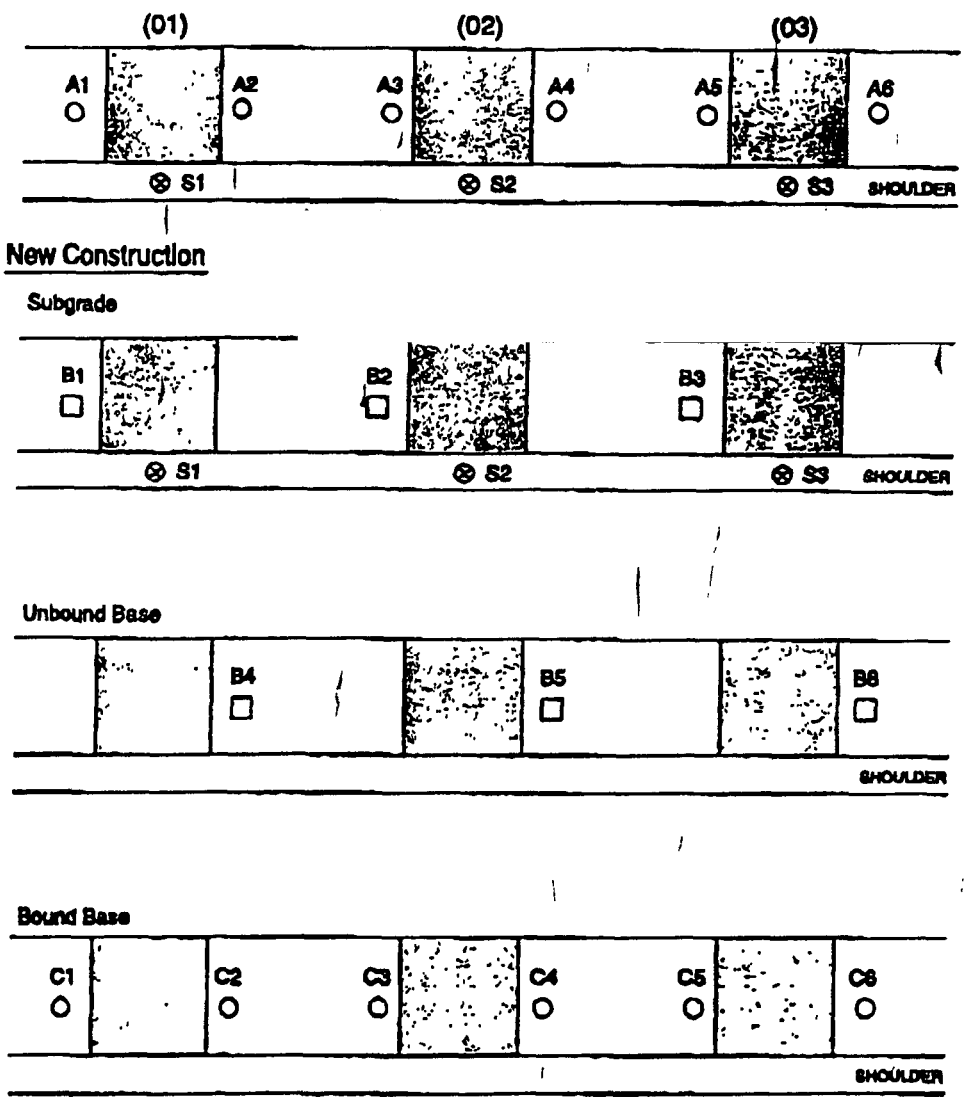

○ A-type core locations - 152mm OD core of bound layers, auger to top of subgrade, Shelby tube or split spoon sampling to 1.2m below top of subgrade

○ C type core locations - 152mm OD core of bound layers

⊗ Shoulder augerprobe to 6m below surface

□ Bulk sample locations - 0.6m x 0.6m x 0.3m below surface

Figure 2. Sampling of layers below the final surface layer

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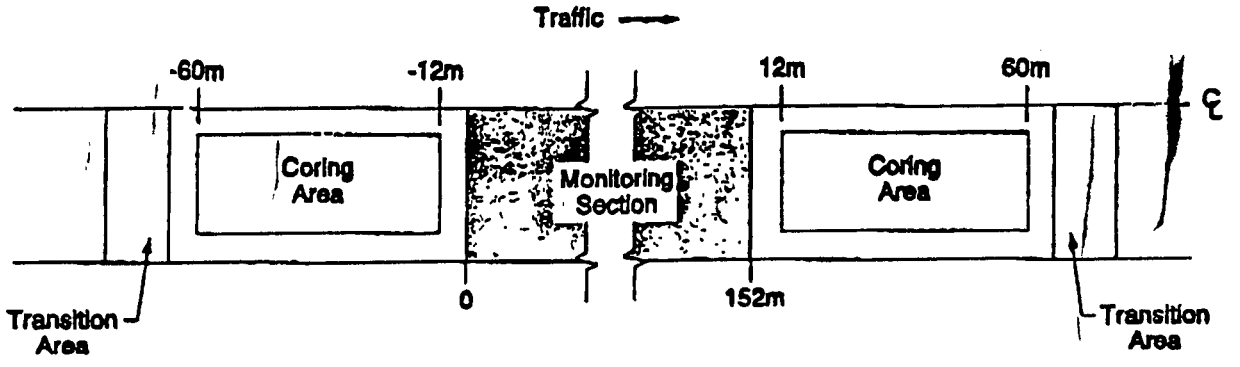

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Figure 3. Coring areas for SPS-9A test sections

Table 3: Summary of SPS-9A Testing

Project Type	Test Section	Time After Construction, months					
		0**	6	12	18	24	48
Main Study	Agency	V	V	V	V	V	V
	SHRP Binder	S*	V	V	V	V	V
	Alternate SHRP Binder	V	V	V	V	V	V
SUPERPAVE Level III Sites	Agency	S		S		S	S
	SHRP Binder	S*		S		S	S
	Alternate SHRP Binder	S		S		S	S

Testing Types:

V = Volumetric and binder stiffness tests

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

S* = Performance testing at t=0 months will be performed on 3 sets of specimens; design mixtures in the laboratory, plant mixture compacted at the plant, and cores.

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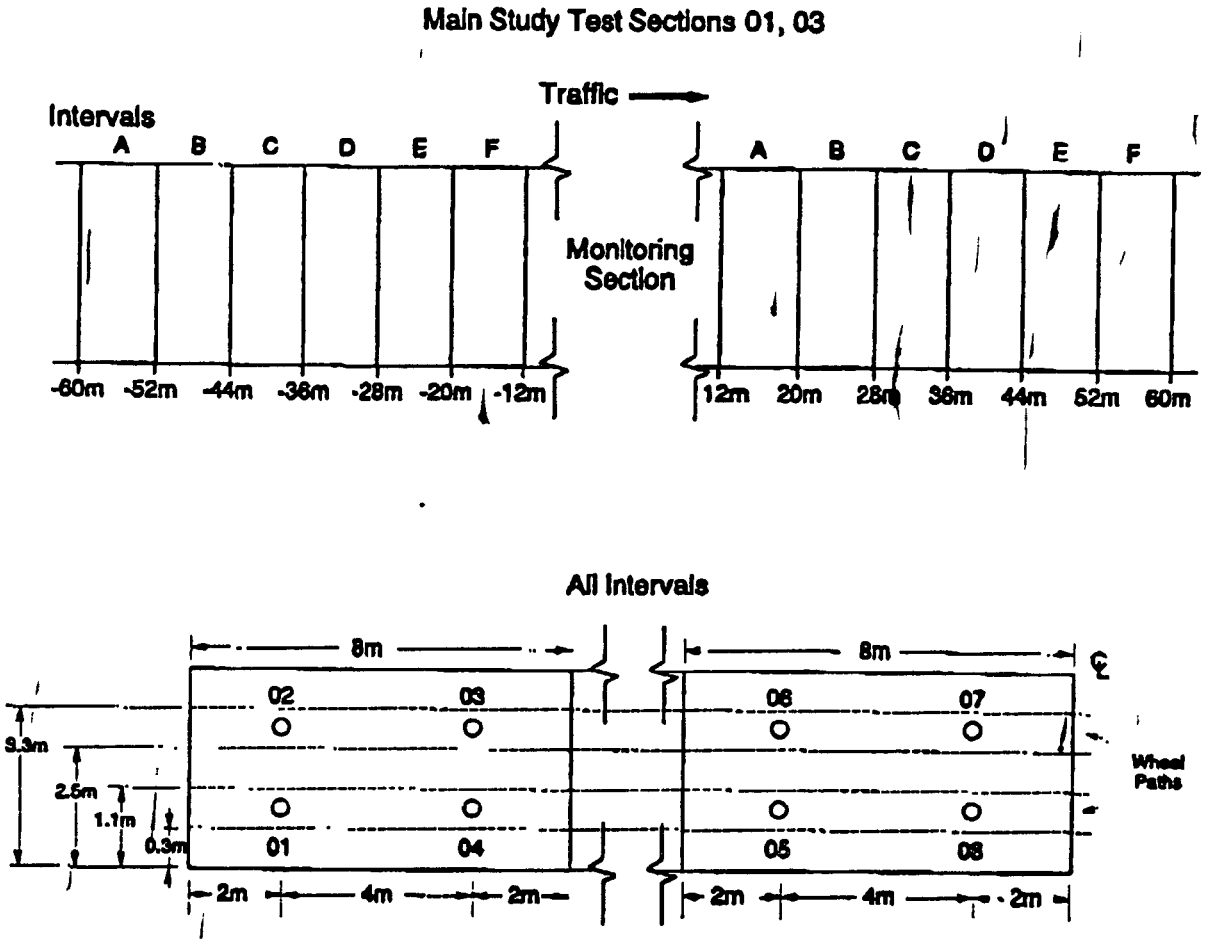

Figure 4. Coring plan for Main Study Test Sections 01 and 03

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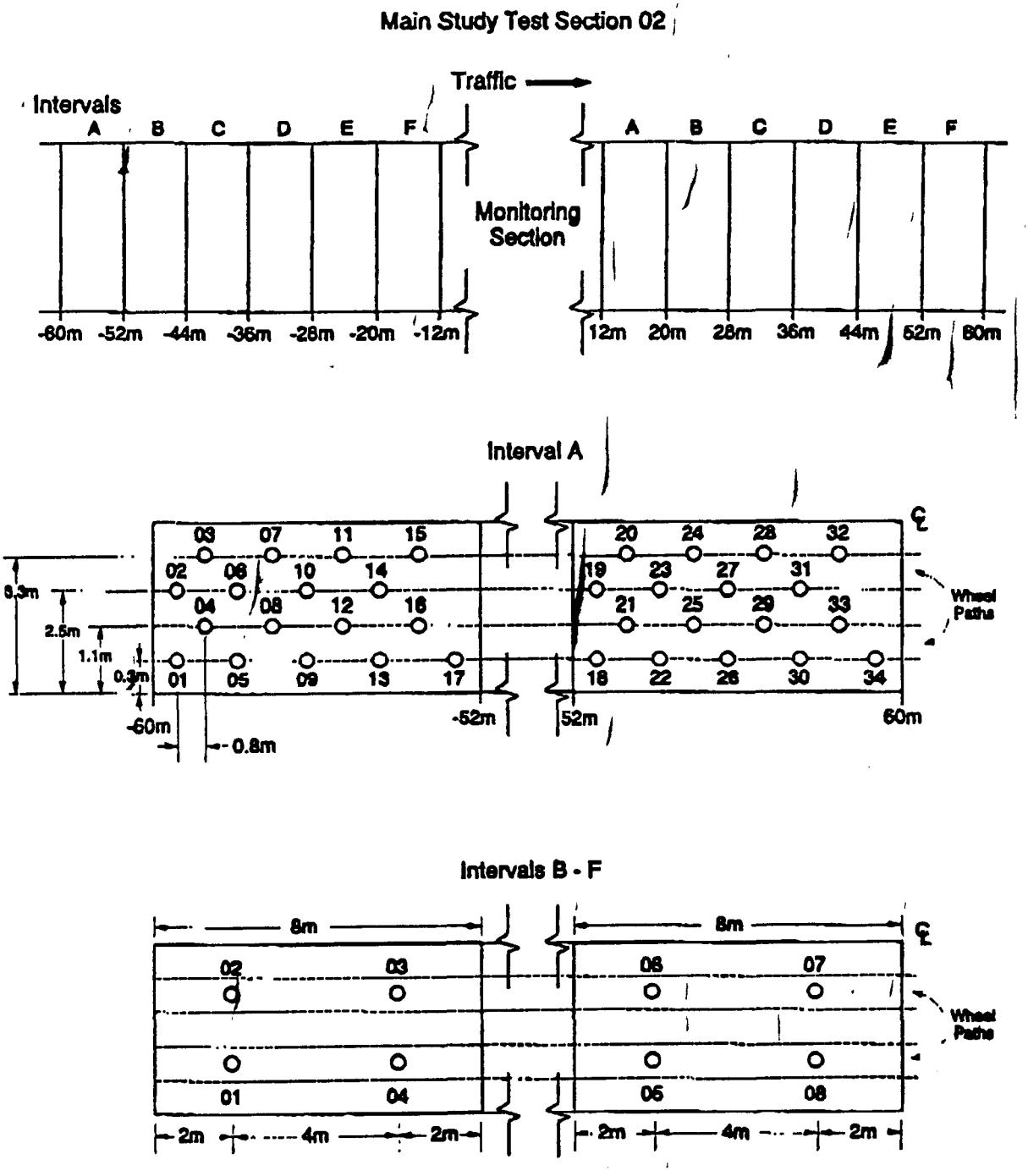

Figure 5. Coring plan for Main Study Test Section 02 (SUPERPAVE Mixture)

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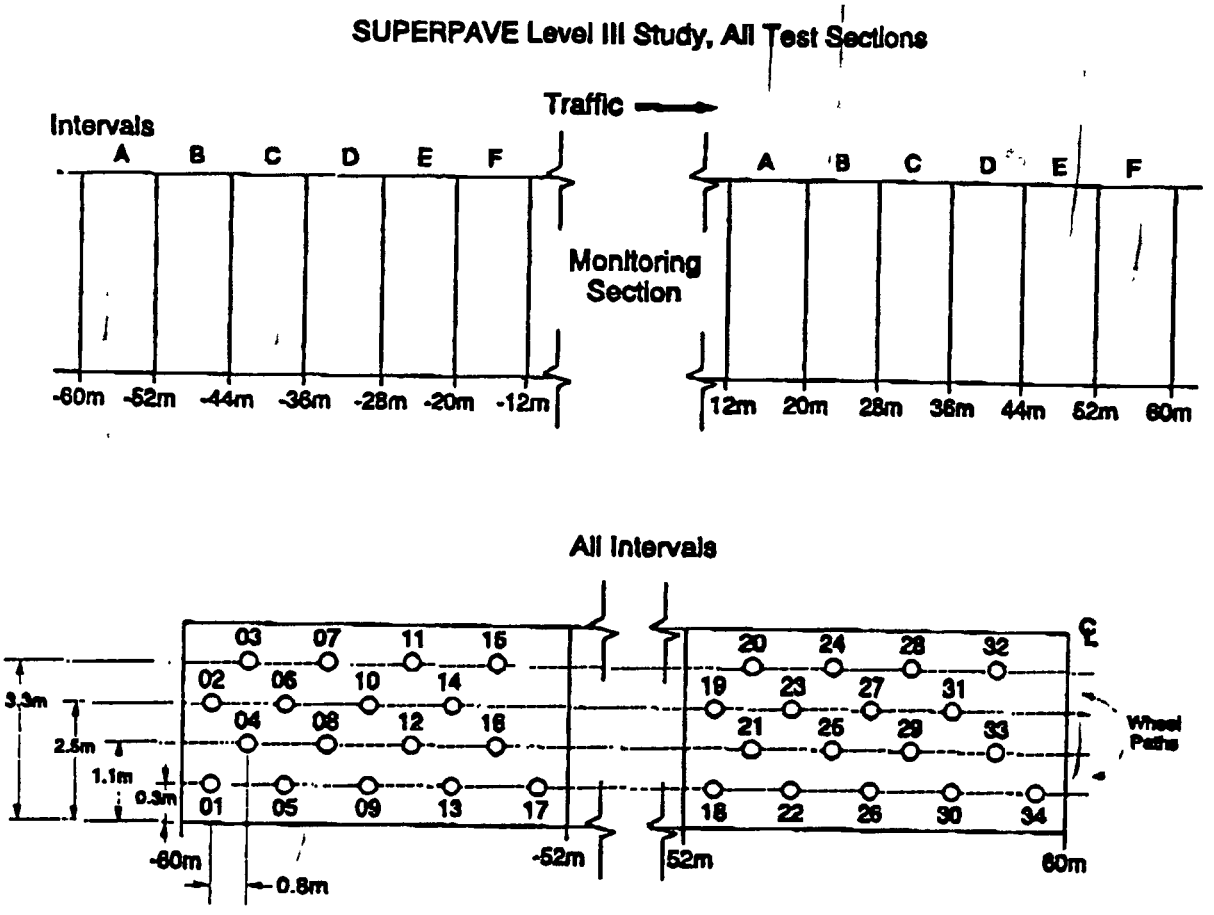

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Figure 6. Coring plan for SUPERPAVE Level III Study, All Sections

Table 4 - Laboratory Materials Testing Plan: SPS-9A Experiment

Test Type	LTPP Designation	LTPP Protocol	Minimum No. of Tests	Type/Amount of Sample Needed
Thickness of Surface Layer - New Construction Only	AC01	P01	2	2 cores (full depth)
Volumetric Analysis (Original Materials, From Cores)		PP19*	2	2
Gradation of Aggregate (Original only)	AG04	P14	—	—
Asphalt Recovery	AE01	P21	—	8 cores
Original Asphalt				
Penetration @ 5°C		T49*	3	70 grams
Penetration @ 25°C and 46°C	AE02	P22	3	70 grams
Viscosity @ 60°C and 135°C	AE05	P25	2	100 grams
Specific Gravity @ 16°C	AE03	P23	2	50 grams
Thin Film Oven (TFO)		T179*	2	100 grams
Rolling Thin Film Oven (RTFO)		T240*	8	300 grams
Pressure Aging Vessel (PAV)		PP1*	4	200 grams
Brookfield Viscosity @ 135°C & 165°C		ASTM D4402	1	30 grams
Dynamic Shear Rheometer (DSR)		TP5*	2 (3 temp.)	20 grams
After RTFO				
Dynamic Shear Rheometer (DSR)		TP5*	2 (3 temp.)	20 grams
After PAV				
Dynamic Shear Rheometer (DSR)		TP5*	2 (3 temp.)	20 grams
Bending Beam Rheometer		TP1*	2 (3 temp.)	72 grams
Direct Tension Tester		TP3*	4 (3 temp.)	36 grams

* AASHTO Designation

Notes: Penetrations, Viscosities & Specific Gravity can be repeated on a 100 grams sample of asphalt. TFO, RTFO, PAV, DSR, BBR, DT and Brookfiled requires 700 grams sample of asphalt. Total original asphalt required for testing is 800 grams.

Three temperature for DSR, BBR and DT represents, specification PG and Specification PG ± one PG temperature.

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Table 4 - Laboratory Materials Testing Plan: SPS-9A Experiment (Cont'd)

Test Type	LTPP Designation	LTPP Protocol	Minimum No. of Tests	Type/Amount of Sample Needed
Recovered Asphalt				
Penetration @ 5°C		T49*	3	70 grams
Penetration @ 25°C and 46°C	AE02	P22	3	70 grams
Viscosity @ 60°C and 135°C	AE05	P25	2	100 grams
Specific Gravity @ 16°C	AE03	P23	2	50 grams
Dynamic Shear Rheometer (DSR)		TP5*	2(3 temp.)	20 grams
Bending Beam Rheometer		TP1*	2 (3 temp.)	72 grams
Direct Tension Tester		TP3*	4 (3 temp.)	36 grams
Asphalt Mix Testing (Lab and Field Cores)				
Creep Compliance	AC06	P06	2 (4 Temp.)	8 cores
Indirect Tensile Strength	AC07	P07	2 (1 Temp.)	2 cores
Resilient Modulus	AC07	P07	2 (3 Temp.)	2 cores
SUPERPAVE Testing				
Volumetric Test			2 (3 Temp.)	2 cores
Uniaxial Strain Test			2 (3 Temp.)	2 cores
Repeated Shear Test at Constant Stress Ratio			2 (1 Temp.)	2 cores
Simple Shear Test at Constant Height			2 (3 Temp.)	2 cores
Frequency Sweep Test at Constant Height			2 (3 Temp.)	2 cores
IDT Creep Compliance			2 (3 Temp.)	6 cores
IDT Strength			2 (3 Temp.)	6 cores

* AASHTO Designation

Notes: Penetrations, Viscosities & Specific Gravity can be repeated on a 100 grams sample of asphalt. DSR, BBR and DT requires 150 grams sample of asphalt. Total recovered asphalt required for testing is 250 grams. Eight cores of 152 mm diameter and 50 mm thick are required to extract a minimum of 250 grams of asphalt. Three temperature for DSR, BBR and DT represents, specification PG and Specification PG ± one PG temperature.

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Table 5: Summary Test Specimens for SPS-9A Testing

Project Type	Test Section	Time After Construction, months - Interval Identifier -					
		0 - A -	6 - B -	12 - C -	18 - D -	24 - E -	48 - F -
Main Study	Agency	8 (V)	8 (V)	8 (V)	8 (V)	8 (V)	8 (V)
	SHRP Binder	34 (S*)	8 (V)	8 (V)	8 (V)	8 (V)	8 (V)
	Alternate SHRP Binder	8 (V)	8 (V)	8 (V)	8 (V)	8 (V)	8 (V)
SUPERPAVE Level III Sites	Agency	34 (S)		34 (S)		34 (S)	34 (S)
	SHRP Binder	34 (S*)		34 (S)		34 (S)	34 (S)
	Alternate SHRP Binder	34 (S)		34 (S)		34 (S)	34 (S)

Note : The numbers in the cells represent the number of 152 mm diameter cores needed to perform the tests listed in Table 4. Of the 34 cores used for performance testing, the first 8 will be used for volumetric analysis (asphalt extraction) after they have been used in performance testing.

V = Volumetric and binder stiffness tests
S = Performance testing and volumetric and binder stiffness tests
S* = Performance testing at t=0 months will be performed on 3 sets of specimens;

- design mixtures produced in the laboratory
- plant mixtures compacted at the plant, and
- cores.

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Table 6 : Assignment of Cores for Performance Testing

Test Type	Number of Cores (Example)
1. Inventory	C1 & C8
Thickness of Layers	
Material Type (PCC, AC, or Granular)	
2. Volumetric	C2 & C7
Bulk Specific Gravity (Gmb)	
Theoretical Maximum Specific Gravity (Gmm)	
Percent Air Voids (Va)	
Voids in Mineral Aggregate (VMA)	
Voids Filled with Asphalt (VFA)	
3. Conventional Mix Tests (Lab/Field)	
Creep Compliance	C1, C2,C3,C4,C5,C6,C7 & C8
Indirect Tensile Strength	C9 & C10
Resilient Modulus	C11 & C12
4. SUPERPAVE™ Shear Tester (Lab/Field)	
Volumetric Test	
Uniaxial Strain Test	C13 & C14
Repeated Shear Test at Constant Stress Ratio	C15 & C16
Simple Shear Test at Constant Height	C17 & C18
Frequency Sweep Test at Constant Height	C19 & C20
	C21 & C22
5. SUPERPAVE™ Indirect Tensile Test. (Lab/Field)	
IDT Creep Compliance	C23,C24,C25,C26,C27 & C28
IDT Strength	C29,C30,C31,C32,C33 & C34

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