Operational Memorandum No.
SHRP-LTPP-OM-015

National Research Council

STRATEGIC HIGHWAY RESEARCH PROGRAM

SPECIFIC PAVEMENT STUDIES
DATA COLLECTION GUIDELINES
FOR EXPERIMENT SPS-5
REHABILITATION OF ASPHALT CONCRETE PAVEMENTS

STRATEGIC HIGHWAY RESEARCH PROGRAM
818 Connecticut Avenue NW
Washington, DC 20006

October 1990

TABLE OF CONTENTS

SPECIFIC PAVEMENT STUDIES
DATA COLLECTION GUIDELINES FOR EXPERIMENT 5,
REHABILITATION OF ASPHALT CONCRETE PAVEMENTS

INTRODUCTION

This report provides guidelines and instructions for collection of data for the Specific Pavement Studies SPS-5 experiment, Rehabilitation of Asphalt Concrete Pavements. Forms for recordering and reporting this data are also included. Data elements that will be collected for this experiment are classified into the following groups:

Inventory and Historical Maintenance
Test Section Location Reference Table
Construction
Field Materials Sampling and Testing
Laboratory Materials Testing
Deflection
Profile
Distress
Skid Resistance
Traffic
Climatic
Maintenance
Rehabilitation

The data collection and reporting process for SPS test sites requires the completion of specific data sheets from the Data Collection Guide for Long-Term Pavement Performance Studies which was developed for the General Pavement Studies (GPS) and data sheets developed specifically for the Specific Pavement Studies' experiments (SPS). The SPS project-specific data sheets address construction data and some aspects of the materials sampling and testing activities.

This report addresses the data to be collected during site construction. Monitoring measurements to be performed after construction will be reported on data forms similar to those used for the GPS test sections.

PROJECT VERSUS SECTION SPECIFIC DATA

In contrast to the General Pavement Studies test sections, each SPS site includes several test sections. Several data items including traffic, climate and some inventory data elements will be applicable to all test sections of an SPS site. Also some construction data items such as overlay mix design data will apply to more than one test section. However, a large portion of the data elements will be specific to each test section. Data items common to all test sections will be referred to as "project level data" while data items specific to each test section will be referred to as "section specific data."

SPS TEST SECTION NUMBERING SCHEME

The structure of the SPS test section numbering scheme will differ from that used for the GPS test sections to help identify project and test section specific data. Each GPS test section is identified with a six digit code consisting of a two digit STATE CODE and a four digit SHRP SECTION ID number. Also, each SPS test section will be identified with a six digit code that will consist of a two digit STATE CODE and a four digit SHRP SECTION ID number. However, this SHRP SECTION ID number will consist of a two digit SPS PROJECT CODE and a two digit TEST SECTION NUMBER.

The far left two digits are the STATE CODE designator. The same STATE CODE used for GPS test sections will be used for the SPS experiments. Table A.1 of the LTPP Data Collection Guide lists the STATE CODE for all states and provinces, District of Columbia, and Puerto Rico.

The midddle two digits are the SPS PROJECT CODE. The first digit of this code is the multiple site designator to distinguish between multiple sites of the same SPS experiment constructed in the same state or province. A zero "0" is assigned to the first site of a specific SPS experiment constructed in a state or province. An "A", "B", "C", etc. is assigned to the second, third, fourth,

etc. project of the same SPS experiment constructed in the same state or province. The second digit of this code designates the SPS experiment number, i.e., "5" for SPS-5 test sites.

The far right two digits are the TEST SECTION NUMBER. This is the two digit number for each test section on a test site. The test section numbers for the SPS test sections are specified in the report on experimental design and research plan for the experiment. Test sections numbers for the supplemental test sections on the SPS project should be specified by the SHRP regional office in coordination with the participating highway agency.

Thus, the combination of the STATE CODE and SPS PROJECT CODE uniquely identifies each SPS test site. For "section specific data", the assigned TEST SECTION NUMBER in combination with the state (or province) and SPS project code numbers will be used. However, for "project level data" "00" will be used as the TEST SECTION NUMBER to differentiate these data from the "section specific data", for which test section numbering starts with Section 01.

INVENTORY AND HISTORICAL MAINTENANCE DATA

It is mandatory that the inventory data sheets contained in Chapter 2, Inventory Data Collection for LTPP, of the LTPP Data Collection Guide for the test sections. Also, Sheet 1 of Chapter 6, Maintenance Data Collection, of the Guide should be completed as appropriate to report historical maintenance treatments on the project.

Table 1 lists the inventory and maintenance data sheets that should be completed for SPS-5 test sites.

Since the inventory data reported on these forms are primarily project level data, i.e., related to all test sections on the site, "00" should be used for the last two digits (furthest to the right) of the SHRP SECTION ID number of these forms. The two digits, furthest to the left, of the SHRP SECTION ID number on the GPS data forms should be the SPS PROJECT CODE. However, when test section-specific information is reported, the appropriate test section number should be entered on the data sheet.

The following inventory data sheets shall be completed following the guidelines as for GPS test sections except as noted below:

Sheet 1 PROJECT AND SECTION IDENTIFICATION. All location information should be referenced to the starting point (station 0+00) of the first test section encountered in the direction of travel on the project.

Sheet 2 GEOMETRIC, SHOULDER AND DRAINAGE INFORMATION

Sheet 3 LAYER DESCRIPTIONS. Complete a separate layer table for each test section. See note below on project level layering method.

Sheet 4 AGE AND MAJOR PAVEMENT IMPROVEMENTS

Sheet 12 PLANT MIXED ASPHALT BOUND LAYERS AGGREGATE PROPERTIES

Sheet 13 PLANT MIXED ASPHALT BOUND LAYERS AGGREGATE PROPERTIES (CONTINUED)

Sheet 14 PLANT MIXED ASPHALT BOUND LAYERS ASPHALT CEMENT PROPERTIES

Table 1. Guide to completion of Inventory and Maintenance data sheets for activities prior to start of overlay construction.

SECTION	INVENTORY DATA SHEETS															MAINT
	1	2	3	4	12	13	14	15	16	17	18	19	20	21	22	1
PROJECT	✓	✓		H	H	H	H	H	H	H	H	H	H	H	H	
1			✓													H
2			✓													H
3			✓													H
4			✓													H
5			✓													H
6			✓													H
7			✓													H
8			✓													H
9			✓													H

✓ Always complete indicated data sheet for this section.

H Complete from historical data as available.

Sheet 15 PLANT MIXED ASPHALT BOUND LAYERS ASPHALT CEMENT PROPERTIES (CONTINUED)

Sheet 16 PLANT MIXED ASPHALT BOUND LAYERS ORIGINAL MIXTURE PROPERTIES

Sheet 17 PLANT MIXED ASPHALT BOUND LAYERS ORGINAL MIXTURE PROPERTIES (CONTINUED)

Sheet 18 PLANT MIXED ASPHALT BOUND LAYERS CONSTRUCTION DATA

Sheet 19 UNBOUND OR STABILIZED BASE OR SUBBASE MATERIAL DESCRIPTION

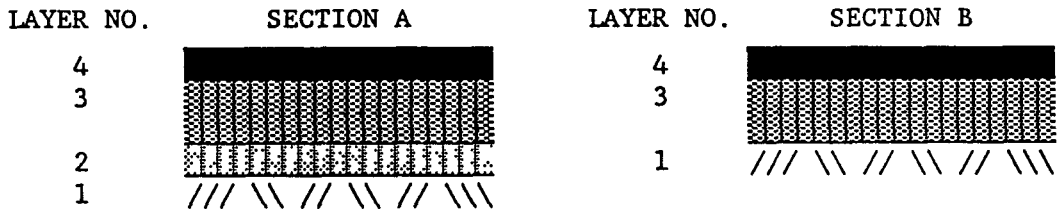
Sheet 20 UNBOUND OR STABILIZED BASE OR SUBBASE MATERIAL DESCRIPTION

Sheet 21 SUBGRADE DATA

Sheet 22 SUBGRADE DATA (CONTINUED). On sheets 21 and 22, enter the properties of the most predominate subgrade type, i.e. subgrade type upon which the majority of test section is located or encountered on the project. In cases where a variation in the subgrade along the project exists, these data sheets should be completed as "section specific data" for each test section.

A layer description table should be completed for each test section to note differences in the layer structure and thicknesses. A project level layering structure should be developed in which a unique layer number is assigned to every layer present on the project. The layer number for each material must be kept the same across all test sections. This is needed since the detailed inventory materials information is keyed to layer number. On test sections uniformly on cut or fill, the same layer structure should exist for all test sections, with differences between test sections due to embankment thicknesses or layer thicknesses. For test sites in which some sections are located in cut and others on fill (embankment), the project layer structure should include an embankment (fill) layer. The thickness of this layer would be coded as zero for the test sections which are located in cut.

The project layering concept is illustrated in Figure 1 for two hyopthetical test sections (Sections A and B) located on the same porject. Section A is located on a 4-foot deep fill (embankment) and Section B is located in a cut. To keep the layer number for each material the same across all test sections, the embankment layer is shwon in the layer structure for Section B with a zero thickness. In this manner, all materila data sheets (Sheets 12-22) can



EXAMPLE LAYER STRUCTURE CODING FOR SECTION A

LAYER NO.	LAYER DESCRIPTION	MATERIAL TYPE CLASS	THICKNESS
1	SUBGRADE (7)	52 - SANDY CLAY	N A
2	11 - EMBANKMENT	26 - SOIL-AGG MIX	48.0
3	05 - BASE LAYER	23 - CRUSHED STONE	8.0
4	03 - ORIG SURFACE	01 - HOT MIX DENSE AC	4.5

EXAMPLE LAYER STRUCTURE CODING FOR SECTION B

LAYER NO.	LAYER DESCRIPTION	MATERIAL TYPE CLASS	THICKNESS
1	SUBGRADE (7)	52 - SANDY CLAY	N A
2	11- EMBANKMENT	26 - SOIL - AGG MIX	0
3	05 - BASE LAYER	23 - CRUSHED STONE	8.0
4	03 - ORIG SURFACE	01 - HOT MIX DENSE AC	4.5

Figure 1. Example of project layering scheme for coding test section layer tables.

generally be completed only once using "00" as the last two digits of the test section number and the unique layer number corresponding to each material. In instances where pavement structure or materials of test sections are known to be different, it will be necessary to complete a set of inventory data sheets for each section on the test site.

Sheet 1, HISTORICAL MAINTENANCE INFORMATION, from Chapter 6, Maintenance Data Collection, of the LTPP Data Collection Guide should be completed to the extent possible by the participating highway agency, and if possible, a separate sheet should be completed for each test section on the project. The SPS PROJECT CODE and TEST SECTION NUMBER should be used as the SHRP SECTION ID number on this data sheet. If available historical maintenance information does not specifically address maintenance of each test section, then Sheet 1 should be completed to the extent possible using a "00" code for the last two digits of the SHRP SECTION ID number to indicate that the information represents project level data. As complete history of the maintenance activity on each test section is of importance, every effort should be made to obtain this information.

Detailed information on maintenance activities performed prior to the start of construction on the SPS test sections, if available, should be reported on other pertinent data sheets contained in Chapter 6 of the LTPP Data Collection Guide.

FIELD MATERIALS SAMPLING AND TESTING DATA

Field materials sampling and testing shall be performed following the guidelines outlined in Operational Memorandum No. SHRP-LTPP-OM-014, "Specific Pavement Studies: Materials Sampling and Testing Requirements for Experiment SPS-5, Rehabilitation of Asphalt Concrete Pavements," October 1990. This operational memorandum incorporates by reference the material included in Operational Guide No. SHRP-LTPP-OG-006, "Field Materials Sampling, Testing, and Handling" which was developed for the General Pavement Studies. This Guide will form the basis for the conduct of a substantial portion of the field materials sampling and testing activity for the SPS-5 experiment. The operational memoradnum for the SPS-5 experiment includes revised field data forms, data sheets for sampling of asphalt concrete materials during construction, and a test procedure for visual determination of asphalt concrete moisture related damage.

REVISED FIELD DATA FORMS

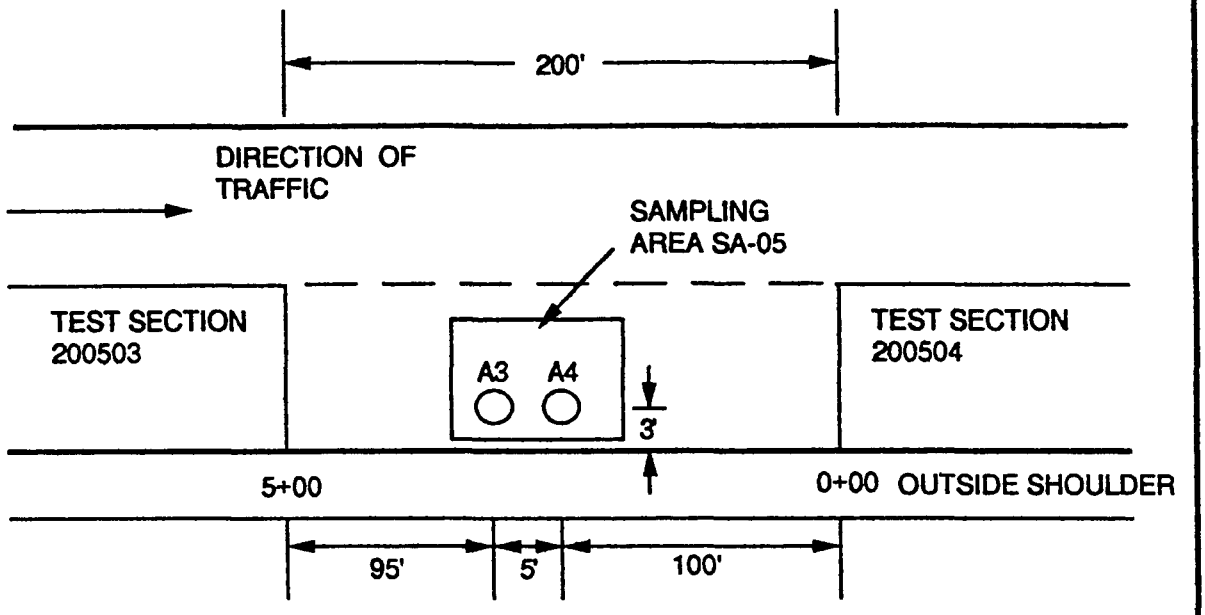
As the requirements for sampling SPS projects differ from those for GPS sections, the field materials sampling and testing data forms used in the GPS program were modified. The primary changes common to each form relate to test section number, sampling location referencing, and sampling area number.

Test Section Number. The six digit test section identification numbers on the data forms have been subdivided into three, two digit fields representing the state code, SPS project code, and test section number. The structure of this number is described in the section entitled, "SPS Test Section Numbering Scheme" of this report.

Sample Location Reference System. All material sampling and field testing data forms which reference the location of a sample or test use a station, offset and sampling area number. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. These sampling numbers are developed as part of the materials sampling plan for the test site and should run in sequential order in the direction of traffic.

The station to be specified on these data forms is referenced from either the beginning or end of the test sections adjacent to the sampling area. For expediency in the field, the station number designated on the form is relative to the test section number designated on the data form. Thus, if the sampling area occurs after the referenced test section, the station number should be greater than 5+00. If the sampling area occurs in front of the designated test section, the station number should be negative. This station number should not be the reference project station number, as outlined in the section entitled, "Construction Data" of this report. (The relative test section station number and the reference project station number will be the same only on the first test section of a project, since the beginning point of this test section is defined as the project station 0+00). The offset distance is measured from the interface of the outside edge of the test section lane and the outside shoulder to the core location (generally measured from the outside edge of the white pavement edge stripe).

Figure 2 illustrates the location referencing system to be used for SPS material samples. In this example, designated sampling area SA-05 is situated between sections 200503 and 200504. In sampling area SA-05, two 6-inch diameter A-Type cores, A3 and A4 are located 5 feet apart and three feet from the edge of the lane. The location of these two cores can be specified relative to either test section 200503 (alternative 1) or test section 200504 (alternative 2). In alternative 1, the station number of core A3 is 5+95 since it is 95 feet past the end of section 200504. Core A4 is located at station 6+00. In alternative 2, the station number of cores A3 and A4 are -1-05 and -1-00, respectively since they occur in advance of test section 200504. Thus when specifying the sampling locations on the field data form, the station number written on the form must correspond to the test section.



	Alternative 1 Location referenced to test section 200503	Alternative 2 Location referenced to test section 200504
CORE A3 LOCATION		
STATE CODE	20	20
SPS PROJECT CODE	05	05
TEST SECTION NO	03	04
STATION	5+95	-1-05
OFFSET	03	03
CORE A4 LOCATION		
STATE CODE	20	20
SPS PROJECT CODE	05	05
TEST SECTION NO	03	04
STATION	6+00	-1-00
OFFSET	03	03

Figure 2. Illustration of location referencing system for material samples from SPS projects using relative test section station numbers.

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING DATA SHEETS

Common Data Elements

Most of the LTPP-SPS Material Sampling and Field Testing data sheets use the same top block of information related to the test section and project.

SHEET NUMBER. Since several data sheets will be required to record the samples and test data from each sampling areas on the project, room is provided on all data forms to sequentially number the data sheets. The first field is the sequential number of the data sheet and the second field is the total number of data sheets submitted.

SHRP REGION. Indicate the SHRP region in which the state or province is located, i.e. North Atlantic, North Central, Southern, or Western.

STATE. Indicate the name of the state, District of Columbia, Puerto Rico, or the Canadian Province in which the project is located. Alternatively, use the two letter abbreviation shown in Table A.1.

STATE CODE. Enter the two-digit numeric code corresponding to the state or province as shown in Table A.1.

SPS PROJECT CODE. The two digit SPS project code. The first digit (from the left) of this code should either be a 0 (zero) for the first project constructed in a state, or a letter starting with A, B, etc. for the second, third, etc. project of the same SPS experiment constructed in the same state. The second digit corresponds to the SPS experiment number.

TEST SECTION NO. The two numeric digit number assigned to the test section. If a GPS section is co-located on the SPS project and these data sheets are used for the material sampling and field testing, the four digit SHRP SECTION ID should be divided into two-two digit fields and the first two digits (from the left) should be entered as the SPS PROJECT CODE and the last two digits

entered as the TEST SECTION NO. Enter the test section number marked on the project in the field.

SPS EXPERIMENT NO. The SPS experiment number for the project. This should be for projects in the SPS-5 experiment, "Rehabilitation of Asphalt Concrete Pavements".

ROUTE/HIGHWAY. Record the signed designation for the route or highway the project is located upon.

Lane. Record a "1" if sampling occurs on the outside lane and a "2" if sampling occurs on the inside lane. Drilling and sampling shall always occur on the outside lane for the SPS program.

Direction. Record the direction of travel at the project site. Use the following abbreviations:

E for eastbound traffic direction
W for westbound traffic direction
N for northbound traffic direction
S for southbound traffic direction

SAMPLE/TEST LOCATION. Check before Section if the sampling location is before the beginning of the test section indicated under TEST SECTION NUMBER on the form (station 0-). Check After Section if the sampling location is after the end of the test section indicated on the form (station 5+).

FIELD SET NO. The field set number is a sequentially assigned number to indicate the different time periods in which material samples and field testing were conducted on the project. These time periods usually refer to different stages in the pavement life, such as prior to overlay construction, after overlay construction, end of test, etc. A field set number can apply to more than one day since sampling of the test site usually requires more than one day. As a general rule, the same field set number should be applied to all material samples and field tests conducted in a continuous 30-day period, unless a construction event occurs between the two sampling sessions. Enter 1 for the first material

sampling and field testing activity conducted on the test site. Enter 2, 3, etc. for the second, third and subsequent sampling and field testing activities conducted on the site. For SPS-5 projects, the first sampling should occur prior to overlay construction.

SAMPLING DATA SHEET 1. LOG OF PAVEMENT CORE AT BOREHOLE LOCATIONS

This form is similar to Form S01 used for GPS test sections. This data sheet is used to log data for pavement cores taken at the borehole locations (either A-Type 6-inch diameter cores or BA-Type 12-inch diameter cores). Use the core sample coding system given in the sampling plan developed for the project to designate the core number requested on the data forms. Depth should be measured from the pavement surface to the bottom of the core of each layer and recorded to the nearest tenth of an inch.

OPERATOR. Record the coring equipment operators name.

EQUIPMENT USED. Indicate the generic type of the coring equipment used.

CORING DATE. Record the month, date, and year the core was taken.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project.

LOCATION: STATION. This is the station number of the core relative to the test section specified on the form under TEST SECTION NO. This number should be greater than 5+00 for sampling locations that occur after the test section and less than 0+00 for sampling locations which occur before the test section (see discussion in section entitled "Sample Location Reference System" of this report.)

LOCATION: OFFSET. This is the distance from the interface of the pavement lane and the outside shoulder to the core location (generally measured from the outside edge of the white pavement edge stripe). This distance should be indicated to the nearest 0.1 foot.

CORE HOLE NO. Enter the core hole sample code number following the sample coding system specified in the material sampling plan developed for the project. Core hole numbers designated with either an A- or a BA- should be used with this sheet.

CORE BARREL SIZE. Record the rated inside diameter of the core barrel to the nearest tenth of an inch.

COOLING MEDIUM. Record the material used for cooling during the coring operation.

DEPTH. Under the depth column, draw horizontal lines to designate the approximate depths of changes in the bound materials. Also write the depths in this column to the nearest 0.1 inch. All depths should be referenced from the pavement surface. The total depth cored should be indicated in this column even if a useable sample was not recovered.

CORE RECOVERED. Record the thickness of the recovered core. This should be the thickness of the testable (intact) portion of the core. This thickness may be less than the depth recorded in the depth column due to breakage of the material. On pavement sections with bound base layers the thicknesses of the base layers in the core should be indicated separate of the HMAC surface layers. The approximate average thickness of the core, or portion of the core should be recorded to the nearest 0.1 inch.

CORE SAMPLE NO. Record the core sample number for the recovered core. Separate sample numbers should be assigned to HMAC and bound base layers from the same core, even if the bound base layer adheres to the HMAC surface layer.

MATERIAL DESCRIPTION. Enter the appropriate material description based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide For Field Materials Sampling, Testing and Handling.

MATERIAL CODE. Enter the appropriate material code number from Table C.2 in the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling corresponding to described type of material.

SAMPLING DATA SHEET 2. PAVEMENT CORE LOG AT C-TYPE CORE LOCATIONS

This is similar to Form S01A used for GPS test sections. It is used to log data for 4-inch and 6-inch diameter pavement cores extracted from C-type core locations.

Each sheet can be used to record data for cores taken from six different core hole locations from one sampling area. Separate sheets should be used for cores from each sampling location. Space is provided in each column to record data for cores containing up to four layers from one core hole. The pavement surface layer core should be recorded first, followed by other layers in the column. The first column from the left should always be used for the lowest numbered core hole in the sampling area.

OPERATOR. Record the coring equipment operators name.

EQUIPMENT USED. Indicate the generic type of the coring equipment used.

CORING DATE. Record the month, date, and year the core was taken.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project.

CORE BARREL SIZE. Record the rated inside diameter of the core barrel to the nearest tenth of an inch.

COOLING MEDIUM. Record the material used for cooling during the coring operation.

CORE HOLE NO. Enter the core hole sample code number following the sample coding system as specified in the materials sampling plan developed for the project.

LOCATION: STATION. This is the station number of the core relative to the test section specified on the form under TEST SECTION NO. This number should be greater than 5+00 for sampling locations that occur after the test section and less than 0+00 for sampling locations which occur before the test section (see discussion in section entitled "Sample Location Reference System" of this report.)

LOCATION: OFFSET. This is the distance from the interface of the pavement lane and the outside shoulder to the core location (generally measured from the outside edge of the white pavement edge stripe). This distance should be indicated to the nearest 0.1 foot.

CORE RECOVERED. Circle the appropriate response to indicate if an intact and suitable core was recovered from the indicated core hole.

REPLACEMENT CORE HOLE NO. Record the sample number of the core that will replace a core which was deemed unacceptable during field sampling operations. This entry should only be used when a "No" was recorded in the "Core Recovered" data entry space of this form.

CORE SAMPLE NO. Record the core sample number for the recovered core. Separate sample numbers should be assigned to HMAC and bound base layers from the same core hole, even if the bound base adheres to the HMAC surface layer.

DEPTH. Depth should be measured from the pavement surface to the bottom of the material interface in the core and expressed to the nearest 0.1 inch.

MATERIAL DESCRIPTION. Enter the appropriate material description based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide for Field Material Sampling, Handling and Testing.

MATERIAL CODE. Enter the appropriate material code number from Table C.2 in the SHRP-LTPP Guide for Field Material Sampling, Handling and Testing corresponding to described type of material.

SAMPLING DATA SHEET 3. VISUAL DETERMINATION OF AC MOISTURE RELATED DAMAGE

The visual determination of moisture related damage in asphalt concrete is a test procedure that was not included in the GPS field work. This test should be conducted in accordance with SHRP testing protocol P08, "Visual Field Determination of Moisture Damage of Asphaltic Concrete Cores" for the SHRP-LTPP Specific Pavement Studies (SPS) Program.

TECHNICIAN. Record the name of the technician or engineer who conducts the visual examination.

AFFILIATION. Indicate the name of the agency or company which employs the person who performed the visual examination.

TEST DATE. Record the month, date, and year the examination was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project.

LOCATION: STATION. This is the station number of the core, relative to the test section specified on the form under TEST SECTION NO. This number should be greater than 5+00 for sampling locations that occur after the test section and less than 0+00 for sampling locations which occur before the test section (see discussion in section entitled "Sample Location Reference System" of this report.)

LOCATION: OFFSET. This is the distance from the interface of the pavement lane and the outside shoulder to the core location (generally measured from the outside edge of the white pavement edge stripe). This distance should be indicated to the nearest 0.1 foot.

BORE HOLE/CORE NO. Enter the bore hole or core hole code number following the sample coding system specified in the material sampling plan developed for the project.

CORE SAMPLE NUMBER. Enter the core sample code number following the scheme specified in the materials sampling plan developed for the project.

1. CORE THICKNESS. Record the thickness of the entire AC core to the nearest 0.1 inch.

2. CORE DIAMETER. Record the diameter of the core to the nearest 0.1 inch.

3. LAYER DEPTHS. Indicate the number and depth (thickness) of each distinct AC layer which can be identified in the core. A layer is defined as that part of the pavement produced with similar material and placed with similar equipment and techniques. Multiple lifts of the same material should be treated as one layer. Enter the approximate average depth, to the nearest 0.1 inch, from the pavement surface to the bottom of the interface between each AC layer in the core. The number of depths recorded indicate the number of AC layers in the core. Layer 1 should designate the top layer of the pavement surface.

4. VISIBLE MOISTURE IN THE CORE. Enter "yes" if moisture is visible inside the core after it has been broken or "no" if the inside of the core is dry. This will be evident if the surface of the aggregate changes color when exposed to air.

5. APPEARANCE OF ASPHALT. Describe the appearance of the asphalt cement on the open face of the core. Some common descriptors would be glossy (live), dull, brown (oxidized), etc..

6. HEIGHT OF STRIPPING PENETRATION. Record the height in the core that has experienced stripping. This should be measured from the bottom of the core to the nearest 0.1 inch.

7. PERCENT COARSE AGGREGATE STRIPPED. Record the estimated percentage of the coarse aggregate for the entire core that has experienced stripping.

8. PERCENT FINE AGGREGATE STRIPPED. Record the estimated percentage of the fine aggregate for the entire core that has experienced stripping.

9. VALUE OF P. Record the value of P from Worksheet "A" contained in SHRP Protocol P08.

10. VALUE OF C. Record the value of C from Worksheet "A" contained in SHRP Protocol P08.

11. VALUE OF F. Record the value of F from Worksheet "A" contained in SHRP Protocol P08.

12. STRIPPING RATING. Record the value of the stripping rating from Worksheet "A" in SHRP Protocol P08.

13. COMMENTS. Any other comments that are relevant should be recorded including any information concerning the condition of the pavement around the sampling area which is considered non-representative of the entire SPS site. This would include extensive cracking or patching in the sampling area or standing water in the general vicinity, etc. Conditions which would characterize the sampling location or sampling process as non-representative of the entire project should be indicated. An expansion of the description of the asphalt can be included on these lines as appropriate.

GENERAL REMARKS. Record any other general remarks.

SAMPLING DATA SHEET 4. A-TYPE BORE HOLE LOG

This form is similar to Form S02A used for GPS test sections. It is designed to record data for A-Type bore holes and any other similar type sampling areas. The following data is recorded on this form.

OPERATOR. Record the boring equipment operators name.

EQUIPMENT USED. Indicate the generic type of the drilling equipment used.

BORING DATE. Record the month, date, and year the operation was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project.

LOCATION; STATION. This is the station number of the bore relative to the test section specified on the form under TEST SECTION NO. This number should be greater than 5+00 for sampling locations that occur after the test section and less than 0+00 for sampling locations which occur before the test section (see discussion in section entitled "Sample Location Reference System" of this report.)

LOCATION; OFFSET. This is the distance from the interface of the pavement lane and the outside shoulder to the bore location (generally measured from the outside edge of the white pavement edge stripe). This distance should be indicated to the nearest 0.1 foot.

BORE HOLE NO. Enter the core hole sample code number following the sample coding system specified in the material sampling plan developed for the project.

BORE HOLE SIZE. Record the borehole size (diameter) in inches to the nearest 0.1 inch.

STRATA CHANGE. Record the depth of strata changes to the nearest 0.1 inch. The depth of strata changes should always be measured from the top of the pavement surface. Draw a horizontal line across the form which indicates the depth of each strata change.

Also, record the depth of sampling for each sample taken. For example, if a thin-walled tube sample was obtained at a depth from 18 inches to 36 inches, a line should be drawn at the 18 inch mark and the 36 inch mark along with the appropriate sample code number, material description, etc. For clarification,

see example data sheets in the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling.

SAMPLE NUMBER. Record the sample number for splitspoon or thin-walled tube samples obtained from the subgrade.

BLOWS. The next four columns (# Blows, Refusal?, DLR (Driving Length to refusal, IOP (Inches of Penetration)) shall be used only if a splitspoon sample recovery was attempted. Blow count for splitspoon samples should be recorded in three steps designed A, B, and C as follows:

A = number of blows for first 6 inches of penetration by the splitspoon sampler. This is considered a seating drive.

B = number of blows for second 6 inches of penetration by the splitspoon sampler.

C = number of blows for third 6 inches of penetration by the splitspoon sampler.

Record the blow count from the first 6 inches of seating penetration by the splitspoon sampler in the left side column under number of blows. ("A" from above example of blow count record). Record the blow count from the second 6 inches of penetration by the splitspoon sampler in the middle column under number of blows ("B" from above example of blow count record). Record the blow count from the third 6 inches of penetration by the splitspoon sampler in the right side column under number of blows. ("C" from above example of blow count record).

Refusal of the splitspoon sampler is defined as having advanced less than one inch with 100 blows (or no observed advance of the sampler during the application of 10 blows) or the test is aborted at the discretion of the SHRP Representative to avoid damage to the splitspoon sampler.

If refusal of the splitspoon sampler occurs in the first 6 inches, indicate the blow count to refusal in the left most column, place a "Y" in the "Refusal?" column, and indicate in the *DLR* (Driving Length to Refusal) column, the distance

from the top of the pavement surface to refusal to the nearest 0.1 inch. Also, record the penetration depth of the splitspoon sampler in the "IOP" column (distance penetrated in "A").

If the splitspoon is refused during the second 6 inches of penetration, indicate the blow count to refusal in the middle column, place a "Y" in the "Refusal?" column and indicate in the "DLR" column the distance from the top of the pavement surface to refusal to the nearest 0.1 inch. Also, record the penetration depth of the splitspoon sampler in the "IOP" column (distance penetrated in "A" + "B").

If the total blow count ("A" + "B") reaches 100 before penetrating deeper than 12 inches, the splitspoon sampling procedure should be stopped and the blow count for the second 6 inch increment should be recorded in the middle column and the total depth of penetration recorded under the "IOP" column (the depth of penetration shall be measured from the beginning of penetration of the splitspoon sampler.)

In the case of refusal during the third 6 inch increment, the same procedure outlined for the left and middle columns will be followed. The penetration depth of the splitspoon sampler will be recorded in the ***IOP*** column (distance penetrated in "B" + "C").

If the second and third 6 inch increment blow count ("B" + "C" only) reaches 100 before prior to penetrating 18 inches, the splitspoon sampling procedure should be stopped and the blow count for the third 6 inch increment recorded in under number of blows. The total depth of penetration ("B" + "C" only) should be recorded under the ***IOP*** column (measured from the beginning of penetration of the splitspoon sampler minus the 6 inch seating drive).

<u>(REF)USAL</u>. Record a "Y" if splitspoon sampler is refused (see explanation under "# Blows" above). Record a "N" if the full 18 inch sample is recovered and the splitspoon is not refused. This column is only used if a splitspoon sampler is utilized.

Refusal is defined as occurring when the splitspoon sampler advances less than one inch in 100 blows (or no observed advance of the sampler during the application of 10 blows) or when the test is aborted at the discretion of the SHRP Representative to avoid damage to the splitspoon sampler.

DLR. Driving Length to Refusal - Record the penetration of the splitspoon sampler to refusal to the nearest 0.1 inch. This value is measured from the top of the pavement surface. This column is only used if a splitspoon sampler is utilized and refused. In the case of refusal, an entry is made in the "DLR" and "IOP" columns.

IOP. Inches of Penetration - Record the distance of penetration of the splitspoon sampler after 100 blows is reached in the first 6 inches ("A"), the first and second 6 inches of penetration ("A" and "B") or the second and third 6 inches of penetration ("B" and "C") (see explanation under "# Blows" above). This column is only used if a splitspoon sampler is utilized.

MATERIAL DESCRIPTION. Enter the appropriate material description for each strata based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide for Field Material Sampling, Testing and Handling.

MATERIAL CODE. Enter the appropriate material code number for each strata from Table C.2 in the SHRP-LTPP Guide for Field Material Sampling, Testing and Handling corresponding to the described type of material.

SAMPLING DATA SHEET 5. BA-TYPE BORE HOLE LOG

This form is similar to Form S02B used for GPS test sections. It is designed to record data for BA-Type bore holes and any other similar type sampling areas. The following information is recorded on this form:

OPERATOR. Record the boring equipment operators name.

EQUIPMENT USED. Indicate the generic type of the drilling equipment used.

BORING DATE. Record the month, date, and year the operation was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project.

LOCATION; STATION. This is the station number of the bore relative to the test section specified on the form under TEST SECTION NO. This number should be greater than 5+00 for sampling locations that occur after the test section and less than 0+00 for sampling locations which occur before the test section (see discussion in section entitled, "Sample Location Reference System" of this report.)

LOCATION; OFFSET. This is the distance from the edge of the pavement lane and the outside shoulder to the bore location (generally measured from the outside edge of the white pavement edge stripe). This distance should be indicated to the nearest 0.1 foot.

BORE HOLE NO. Enter the bore hole sample code number following the sample coding system specified in the material sampling plan developed for the project.

BORE HOLE SIZE. Record the bore hole size (diameter) in inches to the nearest 0.1 inch.

STRATA CHANGE. Record the depth of strata changes to the nearest 0.1 inch. The depth of strata changes should always be measured from the top of the pavement surface. Draw a horizontal line across the form which indicates the depth of each strata change.

SAMPLE NUMBER. Record the sample number for the bulk samples obtained from unbound layers.

MOISTURE SAMPLE NUMBER. Record sample numbers for samples taken from unbound base, subbase and subgrade for moisture content testing.

MATERIAL DESCRIPTION. Enter the appropriate material description for each strata based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide for Field Material Sampling, Handling and Testing.

MATERIAL CODE. Enter the appropriate material code number for each strata from Table C.2 in the SHRP-LTPP Guide for Field Material Sampling, Handling and Testing corresponding to the described type of material.

SAMPLING DATA SHEET 6. TEST PIT LOG

This form is similar to Form S03 used for GPS test sections. It is designed to record data from the field sampling and field testing from test pits. The following data is recorded on this form:

TECHNICIAN. Record the name of the technician who obtains the samples and records the information on the data form.

EQUIPMENT USED. Indicate the generic type of the equipment used to cut and excavate the test pit.

EXPLORATION DATE. Record the month, date, and year the operation was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project.

LOCATION: STATION. This is the station number of the test pit, relative to the test section specified on the form under TEST SECTION NO. This number should be greater than 5+00 for sampling locations that occur after the test section and less than 0+00 for sampling locations which occur before the test section (see discussion in section entitled, "Sample Location Reference System" of this report.)

LOCATION: OFFSET. This is the distance from the edge of the pavement lane and the outside shoulder to the outside edge of the test pit (Generally measured from the outside edge of the white pavement edge stripe). This distance should be indicated to the nearest 0.1 foot.

TEST PIT NUMBER. Enter the test pit code number shown in the sample coding system specified in the material sampling plan developed for the project.

TEST PIT SIZE. Record the length and width of test pit to the nearest 0.5 foot.

STRATA CHANGE. Record the depth of strata changes to the nearest 0.1 inch. The depth of strata changes should always be measured from the top of the pavement surface. Draw a line across the form to indicate strata changes.

MOISTURE SAMPLE NUMBER. Record sample numbers for samples taken from unbound base, subbase and subgrade for moisture content testing.

BULK SAMPLE NUMBER. Record the sample number for bulk samples taken from the unbound pavement layers and the subgrade.

MATERIAL DESCRIPTION. Enter the appropriate material description for each strata based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide for Field Material Sampling, Handling and Testing.

MATERIAL CODE. Enter the appropriate material code number for each strata from Table C.2 in the SHRP-LTPP Guide for Field Material Sampling, Handling and Testing corresponding to the described type of material.

SAMPLING DATA SHEET 7. TEST PIT SKETCH

This data sheet is similar to Form S03A used for GPS test sections. It is designed to allow the field sampling personnel to record any sketches of the excavation of the test pit that may be appropriate. This sketch should at least include: (a) dimensions of the test pit; (b) depth of each layer in the test pit;

(c) material type of each layer and (d) the direction of traffic. All of the other information requested on this form is the same as that provided on Sampling Data Sheet 6. For clarification, refer to the completed example in the field data packet contained in Appendix E of the SHRP-LTPP Guide for Field Material Sampling, Handling and Testing.

SAMPLING DATA SHEET 8. IN SITU DENSITY AND MOISTURE TESTS

This sheet is similar to Form S04 used for GPS test sections. It is designed to record data from the in situ density and moisture tests performed on all unbound layers in the test pits with a nuclear moisture and density gauge. The following data is recorded on this form.

OPERATOR. Record nuclear density gauge operator's name.

NUCLEAR DENSITY GAUGE I.D. Record the identification number of the nuclear density gauge.

TEST DATE. Record the month, date, and year the test was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project.

LOCATION; STATION. This is the station number of the test pit relative to the test section specified on the form under TEST SECTION NO. This number should be greater than 5+00 for sampling locations that occur after the test section and less than 0+00 for sampling locations which occur before the test section (see discussion in section entitled, "Sample Location Reference System" of this report.)

LOCATION; OFFSET. This is the distance from the edge of the pavement lane and the outside shoulder to the location the test was performed (generally measured from the edge of the white pavement edge stripe). This distance should be indicated to the nearest 0.1 foot.

TEST PIT NUMBER. Enter the test pit code number shown in the sample coding system specified in the material sampling plan developed for the project.

DATE OF LAST MAJOR CALIBRATION. Record the date of the last major calibration of the nuclear density gauge. All dates should be recorded as mm-dd-yy. A major calibration is defined as that calibration\verification performed as directed in Section 4 of the SHRP-LTPP Guide for Field Material Sampling, Handling and Testing. Daily calibrations performed in the field do not constitute a major calibration.

DEPTH FROM SURFACE TO THE TOP OF THE LAYER. This information is obtained from Sampling Data Sheet 5 for each unbound granular layer. This depth should be recorded to the nearest 0.1 inch and measured from the top of the pavement surface for each test performed.

LAYER DESCRIPTION. Write in the generic description of the type of layer tested, such as BASE, SUBBASE, or SUBGRADE.

MATERIAL TYPE. Report a "G" if the material is unbound (granular); record "T" if the material is other than unbound (treated). In practice, all entries should be a "G" since nuclear density testing is not required on bound materials.

IN SITU DENSITY. For each unbound layer, record four nuclear density gauge results. These measurements should be taken at the top of each unbound layer using the direct transmission test method if possible. Record to one decimal place in pounds per cubic foot (pcf).

AVERAGE. Calculate and record the average in situ densities for each unbound layer. Record to one decimal place.

METHOD (A,B,or C). Record the test method used to perform the in situ density test as per AASHTO T238-86, "A" - Backscatter, "B" - Direct Transmission, or "C" - Air Gap. The direct transmission method ("B") should generally be used unless circumstances necessitates the use of method "A" or "C".

ROD DEPTH. Record the depth of the nuclear density gauge probe to the nearest 0.1 inch.

IN SITU MOISTURE CONTENT. For each unbound layer, record four in situ moisture content test results. These tests should be conducted at the top of each layer. Record as a percentage moisture content to one decimal place. The backscatter method should always be used for this measurement.

AVERAGE. Calculate and record the average of the four in situ moisture content test results for each unbound layer. Record to one decimal place.

SAMPLING DATA SHEET 9. SHOULDER PROBE LOG

This data sheet is similar to Form S05 used for the GPS test sections. It is used to record the results of the shoulder auger probe used to determine the depth to a rigid layer.

OPERATOR. Record the auger equipment operator's name.

EQUIPMENT USED. Indicate the generic type of the auguring equipment used.

AUGURING DATE. Record the month, date, and year the operation was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project.

LOCATION: STATION. This is the station number of the bore relative to the test section specified on the form under TEST SECTION NO. This number should be greater than 5+00 for sampling locations that occur after the test section and less than 0+00 for sampling locations which occur before the test section (see discussion in section entitled, "Sample Location Reference System" of this report.)

LOCATION: OFFSET. This is the distance from the edge of the pavement lane and the outside shoulder to the auger location (generally measured form the outside edge of the white pavement edge stripe. For shoulder probes, this distance will be measured toward the outside edge of the shoulder. This distance should be indicated to the nearest 0.1 foot.

AUGER PROBE NUMBER. Record the auger probe number; an S1 for the first auger and increasing numbers for subsequent auger probes.

TOP OF ROCK BASED ON. Enter "Auger Refusal" if auger is refused. If the top of rock is based on some other observation, indicate the type of observation.

DEPTH FROM SURFACE. Record the depths of strata changes to the nearest tenth of a foot.

MATERIAL DESCRIPTION. Enter the appropriate material description for each strata based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide for Field Materials Sampling, Handling and Testing.

MATERIAL CODE. Enter the appropriate material code number for each strata from Table C.2 in the SHRP-LTPP Guide for Field Material Sampling, Handling and Testing corresponding to described type of material.

REFUSAL WITHIN 20 FEET (Y/N). Record a "yes" or a "no" as appropriate to indicate if a rigid layer was encountered within 20 feet from the pavement surface.

DEPTH TO REFUSAL. Record the depth to refusal to the nearest 0.1 foot if the auger refused.

SAMPLING DATA SHEET 10. SAMPLING UNCOMPACTED BITUMINOUS PAVING MIXTURES

This data sheet is used to record information concerning sampling of uncompacted bituminous paving mixtures (asphalt concrete) for LTPP material

testing purposes. Sampling shall be performed according to AASHTO T-168, except that a 100-lb sample is required.

If the plant-sampled material is known to be of the same batch used on a specific test section, the number of this test section should be entered on the form. However, if specific test sections corresponding to the plant sampled material can not be identified, enter "00" on the test section number to indicate "project level data".

PERSON PERFORMING SAMPLING. Record the name, title and affiliation of the person performing the sampling.

PLANT NAME. Record the common name or operator of the mix plant facility which produced the sampled material.

PLANT LOCATION. Record the location of the mix plant, including street address, town, and state.

PLANT TYPE. Indicate the general type of mix plant used to produce the mix. If a plant other than a batch or drum plant was used, indicate other and provide a description of the plant on the next line.

DESCRIPTION OF MIX PLANT. Provide a brief description of the type of mix plant noting any special features of traditional types of batch or drum plants, or a description of other mix plant types.

MANUFACTURER OF MIX PLANT. Enter the name of the mix plant manufacturer.

MODEL NUMBER. Enter the model number or model designation of the mix plant.

BATCH SIZE. Record the size of the batch the sample from which the sample was obtained.

SAMPLING LOCATION. Enter the code number shown on the data form corresponding to the location from which the sample was taken. If the sample was

taken from the roadway prior to compaction, indicate the station and offset of the sample and the respective test section number.

MIX TYPE. Enter the code number corresponding to the generic type of material (all virgin material, or containing recycled material).

LAYER TYPE. Enter the code number, as shown on the form, which corresponds to the type of layer in which the material is used.

SAMPLE TYPE DESIGNATION. Enter the sample type designation for the sample. This is a 4 digit code which identifies the generic type of material (virgin or recycled) and a sequential number for each sample of each material type obtained. For all virgin materials, the sample type designation shall begin with the letters BV (Bulk Virgin). For recycled materials, the designation shall begin with BR (Bulk Recycled). These letter designations are followed with a two digit number sequentially assigned to each sample of each type of material.

SAMPLE NUMBER. This is a 4 digit code starting with the letters BA (Bulk Asphalt Concrete) and followed with a sequentially assigned two digit number, which uniquely designates each bulk asphalt concrete sample.

APPROXIMATE SAMPLE SIZE. Enter the approximate weight of the sample obtained to the nearest pound.

DATE SAMPLED. Enter the date the material sample was obtained.

LOCATION SAMPLE SHIPPED TO. Record the location the sample was shipped to from the field. In many cases this should be the laboratory assigned by the participating highway agency to perform the testing.

DATE SHIPPED. Enter the date the material was shipped to the location indicated on the form.

GENERAL REMARKS. Provide any general remarks or comments concerning the obtained sample, such as the quality or uniformity of the mix, and any other pertinent information.

FIELD OPERATION INFORMATION FORM 1. LABORATORY SHIPMENT SAMPLES INVENTORY

This form is not a data form, and therefore information from this form will not be included in the data base. The form titled, Field Operations Information Form provides information on where each sample was shipped for testing. This form is similar to Form S06 used for GPS test sections to provide a detailed inventory of material samples shipped to each materials testing laboratory. At least one form should be completed for each sampling area on the test site. The inventory should be made in the following sequence of sample location numbers, starting from the pavement surface layer in each case:

1. Samples from C-type locations, starting with cores of pavement surface layers.
2. Samples from A-type bore holes and any additional similar bore holes.
3. Samples from BA-type bore holes and any additional similar bore holes.
4. Samples from the test pit.

Sample location numbers and sample numbers should be obtained from the appropriate Sampling Data Sheets. "Sample size" should be used to record the number of bags of bulk samples or the number of jar samples bearing a single sample number in each case. The bulk sample from one layer can be placed in more than one bag, if necessary. However, the sample number should be the same on all of these bags with an indication of the number of bags on the labels and in the column of the "Sample size." For core samples, record only diameter of the core in the "Sample size" column in inches.

Enter core, bulk, moisture, tube or splitspoon in the "Sample type" column as appropriate. Enter AC, PCC, Base, Subbase or Subgrade in the "Sample material" column as appropriate. The "Sample condition" should indicate a brief description as to the overall quality of the sample (cores: good, poor, fractured; bulk samples: satisfactory, wet, insufficient quantity, contaminated).

Since more than one laboratory may be used to perform testing on samples obtained from each sampling area, room is provided on this form to indicate up to three laboratories. For each sample, enter a laboratory number and define it at the bottom of the form.

Generally, the following samples will be reported on this form:

- All AC cores from C-Type, A-Type, and BA-Type locations.
- All treated base/subbase cores (including ATB, CTB and econocrete) from C-Type locations.
- Block samples of AC layer and treated material.
- Bulk samples and jar samples of granular (untreated) layers and subgrade from BA-Type locations and test pits.
- Thin-walled tube samples and splitspoon samples from the subgrade.

FIELD OPERATION INFORMATION FORM 2. SUMMARY OF MATERIAL SAMPLES SENT TO EACH LABORATORY

This form provides a summary of the information included on Field Operations Information Form 1 concerning shipment of samples to testing laboratories. It is similar to Form S06A used for GPS test sections. A separate form should be completed for each set of samples sent to each laboratory.

This form requires that the layer from which the samples are obtained be identified with a layer number. The layer numbers are assigned in a sequential order starting with the subgrade and increasing upwards up to the pavement surface. Enter the layer number in the left hand column starting with "1" for the subgrade and increasing by one for each additional layer. The last layer number should be assigned to the pavement surface layer. A description of the pavement layer material and sampling type is provided in the next column on the right, followed by the total number of samples for each sample type.

OTHER GPS DATA FORMS

Other Field Materials Sampling and Testing data forms generally required for GPS test sections but not referenced in this report do not have to be completed for the SPS-5 related field work. These forms include S07, S08, S09, S10, S11, S12, S13, S14A, S14B, S15A, S15B, S16A, and S16B.

CONSTRUCTION DATA

Construction data for the SPS-5 experiment include primarily items related to surface preparation and placement of the overlay material. In addition, this data includes material properties measured as part of the mix design and construction control operations.

A number of data sheet sources must be used for construction data. A set of eleven SPS Construction Data Sheets were developed for SPS-5 projects. In addition, data forms from the GPS Rehabilitation and Maintenance chapters of the Data Collection Guide must also be completed as needed. Table 2 lists the construction-related data sheets that should be completed for the different test sections. Supplemental sections constructed at the SPS-5 site may require completion of more GPS maintenance and rehabilitation data sheets than those shown in Table 2, since a variety of treatments may be used. The GPS maintenance and rehabilitation data sheets listed in Table 2 are included in this report for convenience. Other data sheets needed to describe the supplemental test sections should be obtained from the LTPP Data Collection Guide.

LTPP-SPS CONSTRUCTION DATA SHEETS

The following LTPP-SPS construction data sheets were developed for the SPS-5 experiment.

CONSTRUCTION DATA SHEET 1. REFERENCE PROJECT STATION TABLE
CONSTRUCTION DATA SHEET 2. REVISED LAYER DESCRIPTIONS
CONSTRUCTION DATA SHEET 3. PRE-OVERLAY SURFACE PREPARATION SKETCH
CONSTRUCTION DATA SHEET 4. ASPHALT CONCRETE PATCHES
CONSTRUCTION DATA SHEET 5. RUT LEVEL-UP TREATMENT
CONSTRUCTION DATA SHEET 6. PREPARATION OF MILLED TEST SECTIONS
CONSTRUCTION DATA SHEET 7. OVERLAY PLACEMENT OPERATIONS
CONSTRUCTION DATA SHEET 8. OVERLAY COMPACTION DATA
CONSTRUCTION DATA SHEET 9. CONSTRUCTION QUALITY CONTROL MEASUREMENTS
CONSTRUCTION DATA SHEET 10. LAYER THICKNESS MEASUREMENTS
CONSTRUCTION DATA SHEET 11. MISCELLANEOUS CONSTRUCTION NOTES AND COMMENTS

Table 2. Guide to completion of data forms for construction of SPS-5 test sections.

SECTION	SPS CONSTRUCTION DATA											REHABILITATION DATA SHEETS													MAINT
	1	2	3	4	5	6	7	8	9	10	11	3	4	5	6	7	11	12	13	14	15	16	17	18	19	61	5
PROJECT	✓										N																
1			*	*					A		N															*	
2		✓	*	*	*	*	✓	✓	A	A	N						✓	✓	✓	✓	✓	✓	✓	A	A	*	
3		✓	*	*	*	*	✓	✓	A	A	N						✓	✓	✓	✓	✓	✓	✓	A	A	*	
4		✓	*	*	*	*	✓	✓	A	A	N	✓	✓	✓	A	A										*	
5		✓	*	*	*	*	✓	✓	A	A	N	✓	✓	✓	A	A										*	*
6		✓	*	*		✓	✓	✓	A	A	N	✓	✓	✓	A	A										*	*
7		✓	*	*		✓	✓	✓	A	A	N	✓	✓	✓	A	A										*	*
8		✓	*	*		✓	✓	✓	A	A	N						✓	✓	✓	✓	✓	✓	✓	A	A	*	*
9		✓	*	*		✓	✓	✓	A	A	N						✓	✓	✓	✓	✓	✓	✓	A	A	*	*

✓ Always complete indicated data sheet for this section.

* Complete data sheets if treatment was performed as appropriate.

A Complete data sheet if required data is available.

N Complete data sheet as needed.

CONSTRUCTION DATA SHEET 1. REFERENCE PROJECT STATION TABLE

A reference project station system must be established for each project. This station referencing system starts with station 0+00 assigned to the starting point of the first test section encountered on the project. The station number of the beginning and end of all test sections on the project will be referenced to this point to provide a relative distance measure of the beginning, end, and distance between test sections on the site. This continuous system is used to avoid compounding measurement error within test sections since test sections are not precisely marked to 500 feet when laid out. This information will be used to process profile data collected from continuous measurements over the test sites and to identify the locations of the materials sampling and testing operations on the test sections for the entire site. In addition, this information will indicate the ordering and distance between test sections.

Space is also provided on the data form to indicate those GPS sections which are similar to SPS test sections on the site.

Field measurements should be used to locate the start and end point of each test section with an accuracy of $\pm$ 1 foot. A manual rolling wheel distance measurement device or a calibrated vehicle mounted DMI of the required accuracy may be used for this purpose. Ideally, these measurements should be made prior to overlay construction, e.g. when the test section locations are initially marked on the pavement. This data can then be used as a check against the repositioning of the start and end of the test sections following overlay construction. Otherwise, these measurements should be performed on the as-marked sections following construction.

The relative SPS project station location information is recorded on Construction Data Sheet 1. The starting point of the first test section encountered on the project in the direction of traffic is assigned staton 0+00. Station numbers for the start and end of all test sections on each SPS test site should run continuous from this point with no equations and measured factor nearest one foot. This station numbering system is independent from the station numbering used on the construction plans to avoid complications due to mid-project station equations. A space is provided for the station number of the

end of the first test section since it may not always occur precisely at station 5+00.

The test section ID numbers and relative station numbers of the beginning and end of each section should be entered on Sheet 1, in the order in which the test sections are encountered in the direction of traffic.

1. TEST SECTION ID NUMBER. The six digit test section ID number, consisting of the STATE CODE, SPS PROJECT CODE, and TEST SECTION NUMBER, should be entered for each SPS test section. If a GPS test section is located on the project, then the six digit GPS test section identification number, consisting of the STATE CODE and SHRP SECTION NUMBER, should be entered in the test section ID column. If a GPS test section on the project is being used as both a SPS and GPS test section, such as use of a GPS section as the control section for an SPS project, then enter the GPS test section number in the table and indicate the corresponding SPS test section number under item 4 below.

2. START STATION NUMBER. The station number of the starting point of the test section relative to the starting point of the first test section on the project, to the nearest one foot.

3. END STATION NUMBER. The station number of the ending point of the test section relative to the starting point of the first test section on the project, to the nearest one foot.

4. Subgrade Structure Type. Enter the code number shown under note 1 on the form to indicate if the test section is located entirely on fill, cut, at-grade or is located on both cut and fill. If the test section is located on both cut and fill, the approximate location of the cut-fill transition within the test section should entered using a test section relative station number (0+00 to 5+00).

5. SPS - GPS TEST SECTION EQUALITIES. Spaces are provided to indicate the corresponding SPS test section number if a GPS test section(s) are being used as part of the SPS experiment. Typically this will be limited to use

of a GPS test section as the control section for the SPS experiment. Other GPS sections may be present on the project if the agency's standard rehabilitation treatment on the project corresponds to the criteria established for a GPS 6B test section.

6. INTERSECTIONS BETWEEN TEST SECTIONS ON THE PROJECT. If any intersections occur between any of the test sections on the project, indicate the number or name of the intersecting route, the reference project station number (referenced to the start of the first test section on the project), and check whether it is an entrance or exit ramp, or an intersection with a stop sign, traffic signal, or is unsignalized.

CONSTRUCTION DATA SHEET 2. REVISED LAYER DESCRIPTIONS

This data sheet should be completed for each test section to describe the previous and newly overlaid pavement structure layers. The layer numbers shown on this form provide a key reference to the other detailed information sheets concerning the properties of the layer. In order to provide future analysts with information on the test section pavement structure prior to overlay and to avoid confusion with layer numbers, the complete layer structure of the test section prior to overlay must be described. This pavement layer structure should be the same as that provided on the Laboratory Material Handling and Testing Form L05.

In order to describe the change in the pavement layer structure due to milling, the resulting thickness of existing layers which were milled should be shown on the revised layer description form. If a layer was completely removed, its thickness should be shown as zero. The material type class corresponding to the material that was milled should be shown, even if it was completely removed. If only a portion of the a layer was removed, the remaining approximate layer thickness should be shown. (Note that the total depth of milling is entered on Construction Data Sheet 6.)

Figure 3 illustrates the method for coding milled layers in the revised layer table for a hypothetical test section A consisting of 4 layers prior to the overlay. Layer 4 is a chip seal and layer 3 is the original asphalt concrete surface layer. The section is milled so that approximately 2-inch of layer 3

remains. A tack coat and 4-inch thick overlay of "virgin" asphalt concrete are placed on top of the milled surface. The layer structure after overly is described with 5 layers, i.e. the original 4 layers and the newly added tack coat and overlay. Since the chip seal was completely removed it is shown with a zero thickness. The thickness of the previous asphalt concrete layer, layer 3, is shown as 2 inches since the upper 2 inches of this layer was milled. The tack coat is coded as layer 5 and the asphalt concrete overlay is coded as layer 6.

1. Layer Number. The printed layer number on the form is used to reference the pavement layers on other data sheets. The first layer is assigned to subgrade and all other layers assigned increasing numbers. The new overlay surface will be the highest numbered layer.

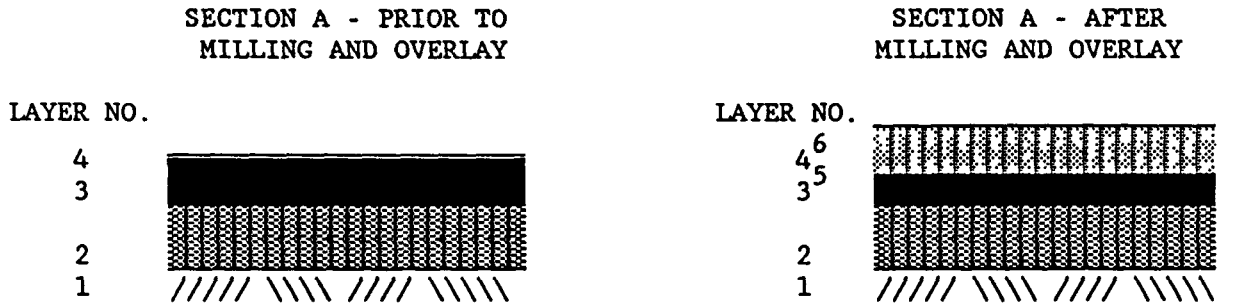
2. Layer Description. The layer description code, as shown in note 2 on the form, which describes the general type of layer should be entered corresponding to its order within the layer structure.

3. Material Type Classification. This code identifies the type of material in each layer. These codes are listed in Tables A.5, A.6, A.7, and A.9. for surfacing materials, base and subbase materials, subgrade soils, and thin seals and interlayers, respectively. If the layer is a milled layer, the material classification code corresponding to the type of material that was removed should be entered.

4. Layer Thickness. Enter the average thickness of each material layer. If sufficient measurement information is available enter the maximum, minimum, and standard deviation of the thickness measurements. If the layer was milled, enter zero if the layer was completely removed and the remaining thickness of any layer which was only partially removed.

CONSTRUCTION DATA SHEET 3. PRE-OVERLAY SURFACE PREPARATION SKETCH

This form is used to sketch the approximate locations of pre-overlay preparation treatments applied to the test section. It should also be used to describe any discontinuities existing or treatments placed after completion of milling. The approximate location of patches, sealed cracks, leveling course,



EXAMPLE LAYER STRUCTURE CODING PRIOR TO MILLING AND OVERLAY

LAYER NO.	LAYER DESCRIPTION	MATERIAL TYPE CLASS	THICKNESS, IN.
1	SUBGRADE (7)	52 - SANDY CLAY	N A
2	05 - BASE LAYER	23 - CRUSHED STONE	8.0
3	03 - ORIG SURFACE	01 - HOT MIX DENSE AC	4.0
4	10 - SURFACE TREAT	71 - CHIP SEAL COAT	0.2

EXAMPLE LAYER STRUCTURE CODING AFTER MILLING AND OVERLAY

LAYER NO.	LAYER DESCRIPTION	MATERIAL TYPE CLASS	THICKNESS, IN.
1	SUBGRADE (7)	52 - SANDY CLAY	N A
2	05 - BASE LAYER	23 - CRUSHED STONE	8.0
3	03 - ORIG SURFACE	01 - HOT MIX DENSE AC	2.0
4	10 - SURFACE TREAT	71 - CHIP SEAL COAT	0.0
5	02 - TACK COAT	86 - ASPHALT TACK COAT	0.1
6	01 - OVERLAY	01 - HOT MIX DENSE AC	4.0

In this example, the existing pavement section consists of an asphaltic concrete pavement with an existing chip seal. The chip seal and two inches of the asphalt concrete layer are milled. A tack coat and a 4 inch asphalt concrete overlay are placed. In the after overlay layer table, layer 4, the chip seal is still shown but with a zero thickness. The previous asphalt concrete layer is still shown as layer 3 but with a two inch thickness. The tack coat and overlay are assigned new layer numbers 5 and 6, respectively.

Figure 3. Method for coding milled layers in revised layer table.

and other features of the surface prior to placement of the overlay layers should be sketched. On milled sections, this form only needs to be completed if patches were placed, cracks were sealed, or delaminations were present in the surface after milling. This will help identify the location of pertinent features on the test section surface prior to overlay placement and those which may not have been recorded by the distress photography performed prior to the start of construction.

CONSTRUCTION DATA SHEET 4. ASPHALT CONCRETE PATCHES

The information on this data sheet applies to asphalt concrete patches placed for preparation of the test sections as part of the rehabilitation construction operations. One data sheets should be completed for each test section. The information on this form provides a summary of the patching operations on a test section. Information on the location of patches should be sketched on Construction Data Sheet 3.

1. Date Patching Operation Began. This is the date at which patching operation on the test section began.

2. Date Patching Operations Completed. This is the date at which placement of all patches on the test section was completed.

3. Primary Distress Occurrence Patched. Indicate the code number from Table A.22 for the primary, i.e. most prevalent, distress occurrence patched. If the code descriptions provided in Table A.22 do not adequately describe the primary distress, describe the distress or occurrence being patched in the space provided. The distress terminology and definitions contained in the SHRP Distress Identification Manual should be used as a guide to distresses interpretations.

4. Secondary Distress Occurrence Patched. Indicate the code number from Table A.22 corresponding to the second most prevalent distress occurrence patched. If the code descriptions provided in Table A.22 do not adequately describe the primary distress, describe the distress or occurrence being patched in the space provided. The distress terminology and definitions

contained in the SHRP Distress Identification Manual should be used as a guide to distresses interpretations.

5. Summary of Patching. Summarize the number of patches placed and the area of patching by type of patch. This should include only those patches placed in the test sections.

6. Method Used to Determine Location and Sizes of Patches. Enter the code number corresponding to the primary method used to determine the location and extent of patches. Enter code 2 if a visual determination was the only method employed.

7. Method Used to Form Patch Boundary. Enter the code number corresponding to the type of equipment used to form the boundary of the patch. For example, if saw cuts were made and an air hammer used to remove the material from within the patch area, then saw cuts should be indicated since they were used to form the patch boundary.

8. Compaction Equipment. Enter the code numbers for the type of equipment used to compact the patches. Space is provided for two responses if more than one type of compaction equipment was used.

9. Patch Material. Enter the code corresponding to the general classification of material used in the surface of the patches.

10. Minimum Time from Material Placement to Opening to Traffic. Indicate the minimum time, to the nearest hour, from completion of placement of the patch to opening to traffic.

11. Maximum Material Temperature for Traffic Opening. If opening of a patched area to traffic is specified in terms of the maximum allowable temperature of the patch material, indicate the highest allowable temperature. Leave blank if temperature was not used as a criteria for opening the patched section to traffic.

12. Air Temperature During Placement Operations. Enter the highest and lowest air temperature, in degrees fahrenheit, during the patching operations.

13. Predominate Road Surface Moisture Condition During Placement Operations. Indicate the predominate moisture condition of the pavement surface during patching operations. Moist is considered as some moisture visible on the pavement surface, but the entire surface of the pavement is not wet and no standing water is present.

CONSTRUCTION DATA SHEET 5. RUT LEVEL-UP TREATMENT

This sheet is used to record information on rut level-up treatments placed in the wheel paths in the test section. If this treatment was not applied, or if the surface layer was milled, do not complete this data sheet. Note that level-up layers to compensate for transverse distortion due to rutting are limited to placement on material in the ruts only. For the test sections, a full lane width level-up layer should not be placed.

1. Date Level-up Layer Applied. Enter the date the level-up layer in the ruts was applied to the test section.

2. Placement Location of Level-up Layer. Indicate if the level-up was applied in either inside rut, outside rut (relative to outside edge of study lane), or both of the ruts (channels).

3. Length of Test Section Covered. Indicate the length of the test section on which the rut level-up layer was placed. If the level-up was placed over less than the full length of the test section, enter the start and end station number (test section station number) of the level-up.

4. Average Rut Dimensions. Enter the approximate width and depth of the inside and outside wheel path ruts in which the level up material is placed. The depth should be referenced to a 6 foot straight edge. The width should be the width over which the level-up material is placed. These should be measured at 25 foot intervals and the average of the measurements entered to the nearest tenth of an inch.

5. Rut Preparation Prior to Application of Level-up. Enter the code number shown on the form which corresponds to the preparation treatment prior to application of the level-up material. If wheel path milling is used (inlay), then specify the depth and width of the milled trench. If other treatments, or combination of treatments, were used, provide a written description under other.

6. Compaction Equipment. Enter the code numbers for the type of equipment used to compact the level-up material. Space is provided for two responses if more than one type of compaction equipment was used.

7. Type of Level-up Material. Enter the code corresponding to the type of level-up material used in the ruts. If a material not described on the form was used, provide a written description in the space provided under other.

8. Maximum Top Size Aggregate. Enter the nominal maximum top size aggregate used in the level-up mixture.

9. Minimum Time from Material Placement to Opening to Traffic. Indicate the minimum time, to the nearest hour, from completion of level-up placement to the opening of traffic or placement of the overlay.

10. Maximum Material Temperature for Traffic Opening. If opening of a section to traffic, or placement of the overlay, is specified in terms of the maximum allowable temperature of the level-up material, indicate the highest allowable temperature. Leave blank if temperature was not used as a criteria for opening to traffic or further construction operations.

11. Air Temperature During Placement Operations. Enter the highest and lowest air temperature, in degrees fahrenheit, during the placement operations.

12. Predominate Road Surface Moisture Condition During Placement Operations. Indicate the predominate moisture condition of the pavement surface during placement operations. Moist is considered as some moisture visible on the pavement surface, but the entire surface of the pavement is not wet.

CONSTRUCTION DATA SHEET 6. PREPARATION OF MILLED TEST SECTIONS

The information on this form applies to the test sections that are milled for the entire lane width prior to overlay placement.

1. Date of Milling Operation. Enter the date the milling operation on the test section was completed.

2. Manufacturer of Milling Machine. Indicate the manufacturer of the milling machine.

3. Milling Machine Model Designation. Indicate the model number and designation of the milling machine.

4. Width of Cutting Head. Enter the width of the cutting head employed on the milling machine, to the nearest 0.1 inch.

5. Milled Depth. Enter the measured average final milled depth to the nearest 0.1 inch. The milled depth should be measured at the outside (adjacent to the shoulder) and the inside edge (along center line or adjacent lane) of the milled area every 25 feet. Measurements should be made from the surface of the pavement adjacent to the milled surface. For surfaces with significant macro texture, the measurement should be made to the nominal bottom milled surface (bottom of valleys between peaks in the macrotexture). Enter the number of measurements, maximum, minimum and standard deviation of the measurements in the spaces provided.

Milled Surface Characteristics

Items 6, 7, 8, and 9 relate to milled surface characteristics.

6. Macro-Texture. Indicate the general roughness of the surface as defined by the macro texture. Fine macro-texture designates a surface with an average or typical peak height (distance between valleys and peaks in the texture) of 1/4 inch or less. Coarse macro-texture designates a surface with an average peak height of more than 1/4 inch.

7. Estimate of Extent of Test Section Delaminated. This data item refers to delaminations in the milled surface due to chipping of two square inch or greater size chunks from the surface. This may occur when material separates from an interface between pavement layers and becomes dislodged. Estimate the extent of delamination due to milling as a percentage of the delaminated surface area in the study lane. If the extent of delaminations is large (>30%) or is localized, provide a sketch of the milled surface using Construction Data Sheet 3.

8. Height of Ridge Between Parallel Passes. If the width of the cutting head is less than the full lane width, indicate the height of any longitudinal ridge remaining between parallel passes of the milling machine in the study lane, to the nearest 0.1 inch. If a distinguishable ridge does not exist, enter 0.

9. Comments. Describe any other events or features of the milling operation which may have potential impact on the performance of the overlay in the comment space provided under item 10.

10. Were Patches Placed After Milling?. If patches were placed in the test section after the completion of milling, enter yes. Show the approximate location and size the patches placed on Construction Data Sheet 3.

11. Length of Time Milled Surface Was Opened to Traffic. If the milled pavement surface was opened to traffic prior to placement of the replacement material layer, enter the length of time, in hours, it was opened to general traffic. If the milled surface was not opened to traffic, enter a 0.

12. Was Mill Replacement Layer Thicker Than Mill Depth? Enter "yes" if the mill replacement layer was thicker than the mill depth. If not, enter "no".

13. Layer Number of Mill Replacement. Enter the layer number for the mill replacement.

14. Nominal Thickness of Mill Replacement Material. Enter the nominal thickness of the mill replacement layer, to the nearest 0.1 inch. On SPS-5 test sections, this should be equivalent to the average milled depth.

15. Type of Mill Replacement Layer Material. Enter the generic type of asphaltic material (virgin or recycled) used in the mill replacement layer.

16. Was Adjacent Travel Lane Milled to Same Depth as Test Lane? Indicate if the adjacent travel lane was eventually milled to the same depth as the test section lane. If the lane next to the test section was not milled or not milled to the same depth as the travel lane, then indicate no and record the total width of pavement that was milled to the same depth as the travel lane, to the nearest 0.1 foot.

17. General Comments. Provide any general comments pertaining to the milling operation, which may be useful in interpreting the subsequent performance of the overlay, such as unusual events, equipment problems, and climatic events.

CONSTRUCTION DATA SHEET 7. OVERLAY PLACEMENT OPERATIONS

This data sheet should be completed for all tests sections, except the control section.

1. Date Surface Preparation Began. Enter the date on which surface preparation on the test section began.

2. Date Surface Preparation Completed. Enter the date on which surface preparation as the test section was completed.

3. Surface Preparation Prior to Placement of Overlay. Indicate the type of preparation treatment applied to the pavement surface prior to overlay placement.

4. Tack Coat Material. Enter the layer number from Construction Data Sheet 2 which corresponds to the tack coat layers. If two tack coat layers are placed at different interfaces within the overlay structure, enter both layer numbers in the spaces provided. Enter the code number on the form corresponding to the type of asphaltic tack coat material used.

5. Dilution Percentage of Asphalt Emulsion Tack Coat. Enter either the dilution percentage or the mixing rate of water in emulsified asphalt cement tack coat materials. Use the following formula to compute percent dilution:

$$\text{Dilution Percentage} = [V_{asphalt} / (V_{water} + V_{asphalt})] * 100$$

where:

V_{water} = volume of water or diluent added to unit volume of asphalt.
$V_{asphalt}$ = unit volume of asphalt used as basis of mixing.

Alternatively, the mixing rate, i.e. parts diluent (water) to parts asphalt can be entered in the space provided.

6. Tack Coat Application Rate. Enter the application rate for the combined tack coat mixture in gallons per square yard.

7. Asphalt Concrete Haul. Enter the type of asphalt concrete mix plant, a reference mix plant name, the haul distance and approximate haul time from the plant to the construction project, and the layer numbers of the material. Space is provided for up to three different mix plants in the instance that more than one mix plant was used to produce the asphalt concrete used in the different paving courses.

8. Manufacturer of Asphalt Concrete Paver. Enter the name of the manufacturer of the asphalt concrete paver.

9. Model Designation of Asphalt Concrete Paver. Enter the model number designation of the asphalt concrete paver used on the test section.

10. Single Pass Laydown Width. Enter the single pass laydown width of the paver used on the test section to the nearest 0.1 foot.

11. AC Binder Course Lift. Enter the layer number of the AC binder course specified in Construction Data Sheets 2. Enter the nominal placement thickness of each lift of the binder course. This is the placement thickness prior to compaction and should be based on field observations and measurements. Provide only one entry if only one lift is placed. Leave these entries blank if an AC binder course was not placed.

12. AC Surface Course Lift. Enter the layer number of the AC surface course lift specified in Construction Data Sheet 2. Enter the nominal placement thickness of each lift of the dense graded surface course. This is the placement thickness prior to compaction and should be based on field observations and measurements. Provide only one entry if only one lift is placed.

13. Surface Friction Course. If a separate surface friction course is applied to the pavement, indicate the layer number from Construction Data Sheet 2 and the nominal placement thickness. Note that surface friction courses are not desired on SPS test sections, but may be used if required by the agency.

14. Test Section Station of Transverse Joints. Enter the location of transverse paving joints which occur within the limits of the test section in any of the AC layers. Use the test section relative station number (between 0+00 and 5+00). As transverse paving joints are not allowed within the test sections, this entry would generally be left blank.

15. Location of Longitudinal Surface Joint. Indicate if the longitudinal joint in the surface of the pavement is either located within the width of the test section lane or between lanes. In either case, enter the

offset distance from the outside shoulder longitudinal surface joint (or approximate location of the edge stripe). If joints occurs both within the test lane and between lanes, indicate the location of the joint within the test lane.

16. Significant Events During Construction. Describe any significant events which occurred during construction and may influence on the performance of the test section, e.g. disruptions to the paving operations due to rain, equipment break downs or unusual periods of sustained high or low temperatures. Use Construction Data Sheet 11 if more room is required for comments.

CONSTRUCTION DATA SHEET 8, OVERLAY COMPACTION DATA

1. Date Paving Operations Began. Enter the date on which paving operations on the test section began.

2. Date Paving Operations Completed. Enter the date on which paving operations on the test section was completed.

3. Layer Number. Enter the layer number from Construction Data Sheet 2 which corresponds to the compaction information provided on this form. A separate sheet must be completed for each layer compacted.

4. Mixing Temperature. Enter the temperature of the mixture during mixing at the plant in °F.

5. Laydown Temperatures. Enter the mean, minimum, maximum, standard deviation, and number of measurements of the asphalt concrete laydown temperatures. These measurements should be performed in the field as close to the rear of the paver as practical. Measurements every 100 feet per paver pass are desired.

6-22. Roller Data. Codes appear on the data sheet for steel-wheeled tandem, pneumatic-tired, single-drum vibratory, and double-drum vibratory types of rollers. For each type of roller, spaces are provided to describe

significant characteristics for up to four different rollers of the same type. Enter the requested characteristics for each roller used to compact the referenced layer. These roller code numbers are used in the compaction data portion of the form to indicate the number of coverages of each roller.

23-28. Coverages. For the breakdown, intermediate and final compaction of each lift, indicate the numbers of coverages of each roller used. Enter the roller code number specified under roller data and the corresponding number of coverages for each lift of the material. A coverage is defined as one trip of the roller across the pavement.

29. Air Temperature. Enter the air temperature during compaction to the nearest degree fahrenheit. Space is provided to record data for each of up to four lifts.

30. Compacted Thickness. Enter the compacted thickness to the nearest 0.1 inch. Space is provided to record data for each of up to four asphalt concrete lifts.

31. Curing Period. Enter the length of the curing period, to the nearest tenth of a day, before a new lift is placed or the layer is opened to traffic. Space is provided to record data for each of up to four asphalt concrete lifts.

CONSTRUCTION DATA SHEET 9, CONSTRUCTION QUALITY CONTROL MEASUREMENTS

The purpose of this form is to record the results of nuclear density tests or surface profile measurements if used for construction control or acceptance by the participating agency. For nuclear density tests, it is desired that the test section be treated as the sampling unit if a random sampling technique is used. Reported Profilograph readings should be based on measurements on the test section and prorated to units of inches per mile. Measurements over 528 feet (0.1 of a mile) centered around the test section may also be used.

1. Nuclear Density Measurements. Space is provided for entry of the results of nuclear density tests on asphalt concrete rut level-up, mill replacement, binder course, surface course, and surface fiction course pavement layers. Enter information only for the layers on the test section that were tested. For each layer tested, enter the measurement method (backscatter, direct transmission, air gap), rod depth (for direct transmission measurements), number of measurements, average, maximum, minimum and standard deviation of the density measurements (pounds per cubic foot), and corresponding the layer number from Construction Data Sheet 2.

2. Manufacturer of Nuclear Density Gauge. Indicate the name of the manufacturer of the nuclear density gauge used for the reported measurements.

3. Nuclear Density Gauge Model Number. Enter the manufacturer's model designation of the gauge used.

4. Nuclear Density Gauge Identification Number. Enter the identification number of the nuclear density gauge used.

5. Nuclear Gauge Count Rate for Standardization. Enter the gauge count rate used for standardization.

6. Profilograph Measurements. Report the results of any Profilograph measurements performed on the overlay surface layer. For each measurement performed, report the type of Profilograph (Rainhart or California), Profile index, interpretation method (manual, mechanical, or computer), height of blanking band, and cutoff height. Note that mechanical interpretation method refers to readings from mechanical counters located on some devices. Enter mechanical counter reading only if the profilograms are not interpreted either by manual or computer methods.

7. Surface Profile Used as Basis of Incentive Payment? Indicate if the surface profile is or is not used as a contractual basis for incentive payments to the construction contractor.

CONSTRUCTION DATA SHEET 10, LAYER THICKNESS MEASUREMENTS

This form is used to record the results of the layer thickness measurements within the test section from before and after elevation measurements. Results of these measurements should be provided for 5 offset points at every station along the project which was measured. The station number should be entered as the test section relative station number. Offset distance should be entered in inches and measured from the outside shoulder lane edge joint or edge stripe. Space is provided to enter elevation for up to five types of layers within the test section. If individual layer thicknesses are not measured, enter the layer thicknesses in the column corresponding to the layer whose after placement surface elevation was measured. For example, if surface elevation was only measured for the surface course, then the layer thickness should be entered on Construction Data Sheet 10 under the surface course column. Enter the layer number of any layer for which layer thickness is shown. Use more than one sheet as required.

CONSTRUCTION DATA SHEET 11, MISCELLANEOUS CONSTRUCTION NOTES AND COMMENTS

This data sheet is provided for reporting miscellaneous notes and comments, further descriptions of entries on other forms, or construction related data that are not covered on other data forms. Comments on this form should address features or occurrences which may influence the performance of the test section. For example, comments from the site asphalt concrete inspector concerning marginal or questionable batches which were either rejected or used on the test sections may be included.

Also, this sheet may be used to provide additional comments on items included in other data sheets. In these cases, the items and sheets numbers pertaining to these comments should be indicated on this form.

In addition, this form can be used to report other types of quality control measurements performed on the test sections which are not covered in the construction data sheets. For example, if profile or ride quality acceptance procedures are not based on Profilograph measurements, this information could be provided on this form. In this case, specify the type, manufacture, model number of measurement equipment used, and a reference to the standard test procedure employed (such as ASTM, AASHTO, or Agency's test method). If similar types of data or information are reported for several SPS test sites on this sheet, then consideration will be given to the development of standard forms for reporting this information to simplify its entry in the data base.

GPS REHABILITATION DATA SHEETS

Several data collection sheets from the GPS Rehabilitation Data Chapter of the Data Collection Guide should be completed for the SPS-5 test sites, as indicated in Table 2. These include Sheets 3 through 7, 11 through 19, and 61.

Rehabilitation Data Sheets 3 through 7 and 11 through 19 are to be filled out from project records and construction observations for each new asphalt concrete layer identified on Construction Data Sheet. Sheets 3 through 7 should be used for "virgin" type of asphalt concrete mixes which do not contain any recycled asphalt concrete materials. Sheets 11 through 19 should be used for mixes which contain recycled asphalt concrete materials.

Rehabilitation Data Sheet 61 should be used to provide information on shoulder treatments.

REHABILITATION DATA SHEET 3, ASPHALT CONCRETE OVERLAY, AGGREGATE PROPERTIES

Highway agencies differentiate between fine and coarse aggregates on the basis of different sieve sizes. However, for SHRP studies all aggregate retained on the No. 8 sieve is classified coarse aggregate and all aggregate passing the No. 8 sieve is classified as fine aggregate. "Mineral Filler" is defined (ASTM D242) as that portion passing the No. 30 sieve (at least 95 percent must pass the No. 50 sieve and at least 70 percent must also pass the No. 200 sieve).

1. Layer Number. The asphalt concrete layer number from Construction Data Sheet 2.

2-4. Composition of Coarse Aggregate. When more than one coarse aggregate is used, the type and percentage by total weight of each coarse aggregate should be indicated. If only one type of coarse aggregate is used, enter its type code and 100 percent in the top set of data spaces, leaving the others blank.

5. Geologic Classification of Coarse Aggregate. Enter the appropriate code for the geologic classification of the natural material used as coarse aggregate in the mix. These codes appear in Table A.9 and provide identification as to which of the three major classes of rock the coarse aggregate belongs to and the type of rock within those classes. If a "blend" was used, enter the code for the geologic classification for the material representing the majority of the coarse aggregate. If a "crushed slag", "manufactured lightweight", or "recycled concrete" was used, enter "N".

6-8. Composition of Fine Aggregate. When more than one fine aggregate is used, the type and percentage by total weight of fine aggregate should be indicated for each fine aggregate. Fine aggregate is defined as that passing the No. 8 sieve and retained on the No. 200 sieve. If only one type of fine aggregate is used, enter its type code and 100 percent in the top set of the data spaces, leaving the others blank.

9. Type of Mineral Filler. The type of mineral filler used. The codes appear on the data sheet, including space for entering some other type for which a code has not been provided.

10-13 Aggregate Durability Test Results. The type of durability tests used and the results in thousandths recorded in units specified for the test. Three of these sets are for coarse (Items 10, 11, and 12) and one (Item 13) is for the combination of coarse and fine aggregates. The durability test type codes appear in Table A.13. Items 10, 11, and 12 are to correlate with Items 2, 3, and 4 above, respectively.

14. Polish Value of Coarse Aggregates. The accelerated polish value of the coarse aggregates used in the surface layer, as determined by AASHTO T279 (ASTM D3319).

REHABILITATION DATA SHEET 4, ASPHALT CONCRETE OVERLAY, AGGREGATE PROPERTIES (CONTINUED)

1. Layer Number. The asphalt concrete layer for which a description is being provided (from Construction Data Sheet 2).

2. Gradation of Combined Aggregates. The percent passing (of coarse and fine aggregates) on various standard sieve sizes to the nearest one percent. It is not expected that values will be available for all eighteen sieve sizes; the objective is to provide sufficient sieve sizes to accommodate testing and specification practice for most highway agencies.

3-6. Bulk Specific Gravities. The bulk specific gravities (to the nearest thousandth) for coarse aggregate, fine aggregate, mineral filler, and the aggregate combination. The bulk specific gravities for the aggregate fractions are measured using the laboratory procedures indicated on the data sheet. The bulk specific gravity for the aggregate combination (usually called "bulk specific gravity of aggregate") is calculated as follows:

$$G_{sb} = \frac{P_1 + P_2 + P_3}{P_1/G_1 + P_2/G_2 + P_3/G_3} \qquad (7.1)$$

where:

G_{sb} = Bulk specific gravity for the total aggregate

P_1, P_2, P_3 = Percentages by weight of coarse aggregate, fine aggregate, and mineral filler, respectively

G_1, G_2, G_3 = Specific gravities of coarse aggregate, fine aggregate, and mineral filler, respectively

7. Effective Specific Gravity of Aggregate Combination. The calculated effective specific gravity to the nearest thousandth. This calculation requires the maximum specific gravity (no air voids) of the paving mixture, which is obtained by Test Method AASHTO T209 or ASTM D2041. The effective specific gravity of the aggregate is calculated as follows:

$$G_{se} = \frac{100 - P_b}{100/G_{mm} - P_b/G_b} \qquad (7.2)$$

where:

G_{se} = Effective specific gravity of aggregate

P_b = Asphalt cement, percent by total weight of mixture

G_{mm} = Maximum specific gravity of paving mixtures (no air voids)

G_b = Specific gravity of asphalt

REHABILITATION DATA SHEET 5, ASPHALT CONCRETE OVERLAY, ASPHALT CEMENT PROPERTIES

1. Layer Number. The asphalt concrete layer to be described on this sheet (from Construction Data Sheet 2).

2. Asphalt Grade. The grade of asphalt cement used (see Table A.16). Space is provided on the data sheet for identifying another grade of asphalt cement not appearing in Table A.16.

3. Source. The source for the asphalt cement. A list of asphalt refiners and processors is provided in Table A.14, Appendix A. Space is provided to specify other sources which may not be included in the table provided.

4. Specific Gravity of Asphalt Cement. The specific gravity of the asphalt cement (to the nearest thousandth) when it is available. If unavailable, a typical specific gravity for asphalt cements produced at the source refinery may be entered. If source is unknown, enter 1.010 as a reasonable estimate. This specific gravity is measured as specified by AASHTO T228 (or ASTM D70).

5. Viscosity of Asphalt at 140°F. The results in poises from kinematic viscosity testing using Test Method AASHTO T202 (or ASTM D2171) on samples of the original asphalt cement prior to its use in construction of the pavement section.

6. Viscosity of Asphalt at 275°F. The results in centistokes (to the nearest hundredth) from absolute viscosity testing using Test Method AASHTO T201 (or ASTM D2170) on samples of the original asphalt cement.

7. Penetration at 77°F. The penetration (in tenths of a millimeter) from testing the original asphalt cement in the mixture at 77°F, using a 100 gram load and a five-second load duration with Test Method AASHTO T49 (or ASTM D5) on samples of the original asphalt cement material.

8-9. Asphalt Modifiers. Space is provided to list the type and quantity of up to two modifiers added to the asphalt cement for whatever purpose. A list of possible asphalt cement modifiers and codes for data entry are provided on Table A.15, Appendix A. If a material other than those listed in Table A.15 is used, space is provided to record the pertinent information. The quantities of modifier should be provided in percent of asphalt cement weight. Some modifiers (such as lime) may be specified in terms of "percent of aggregate weight", but they must be converted to percent of asphalt cement weight for uniformity. Space is provided for up to two types of modifiers.

10. Ductility at 77°F. The ductility in centimeters as measured by Test Method AASHTO T51 at 77°F (or ASTM D113).

11. Ductility at 39.2°F. The ductility in centimeters at 39.2°F, using the procedures of Test Method AASHTO T51 (or ASTM D113).

12. Test Rate for Ductility Measurement at 39.2°F. The test speed in centimeters per minute for the ductility measurement taken at 39.2°F.

13. Penetration at 39.2°F. The penetration value using a 200 gram weight and 60 second loading duration, tested in accordance with Test Method AASHTO T49 (or ASTM D5) on samples of the original asphalt cement, prior to its use as a construction material.

14. Ring and Ball Softening Point. The softening point of the asphalt cement in °F as measured with the ring-and-ball apparatus used in Test Method AASHTO T53, on samples of the original asphalt cement prior to its use as a construction material.

REHABILITATION DATA SHEET 6, ASPHALT CONCRETE OVERLAY, LABORATORY AGED ASPHALT CEMENT PROPERTIES

The following data items should be provided for laboratory aged asphalt cement samples, using virgin asphalt cement samples aged in accordance with the provisions of Test Method AASHTO T179 (or ASTM D1754) or Test Method AASHTO T240 (or ASTM D2872).

1. Layer Number. The asphalt concrete layer for which a description is being provided (from Construction Data Sheet 2).

2. Test Procedure Used to Measure Aging Effects. The test procedure used to "age" the asphalt cement in the laboratory and to measure the effects of the aging. Codes are provided on the data sheet.

3. Viscosity of Asphalt at 140°F. The results in poises from viscosity testing on laboratory aged asphalt cement samples using Test Method AASHTO T202 (or ASTM D2171).

4. Viscosity of Asphalt at 275°F. The results in centistokes (to the nearest hundredth) from viscosity testing using Test Method AASHTO T201 (or ASTM D2170) on laboratory aged asphalt cement samples.

5. Ductility at 77°F. The ductility in centimeters as measured by Test Method AASHTO T51 (or ASTM D113) on laboratory aged samples of the asphalt cement.

6. Ductility at 39.2°F. The ductility in centimeters of laboratory aged asphalt specimens at 39.2°F, using the procedures of Test Method AASHTO T51 (or ASTM D113).

7. Test Rate for Ductility Measurement at 39.2°F. The test rate to the nearest tenth of a centimeter per minute for ductility determination at 39.2°F.

8. Penetration at 77°F. The penetration (in tenths of millimeters) from testing the asphalt cement used in the mixture at 77°F, using a 100 gram load and a 5 second load duration, in accordance with Test Method AASHTO T49 (or ASTM D5).

9. Penetration at 39.2°F. The penetration (in tenths of millimeters) from testing the asphalt cement used in the mixture at 39.2°F, using a 200 gram load and 60 second load duration, in accordance with Test Method AASHTO T49 (or ASTM D5).

10. Ring and Ball Softening Point. The results in °F from the ring and ball softening point test for bitumens (AASHTO T53).

11. Weight Loss. The weight loss resulting from the laboratory aging process to the nearest one-tenth of one percent.

REHABILITATION DATA SHEET 7, ASPHALT CONCRETE OVERLAY, LABORATORY MIXTURE DESIGN

The following data items are to be derived from tests conducted on the mixture during mix design.

1. Layer Number. The asphalt concrete layer to be described on this sheet (from Construction Data Sheet 2).

2. Maximum Specific Gravity. The maximum specific gravity (to the nearest thousandth) of the mixture, calculated using Equations 7.2 and 7.3.

3. Bulk Specific Gravity. The bulk specific gravity (to the nearest thousandth) of the mixture, compacted in the laboratory at the optimum asphalt content selected and by appropriate procedures for Marshall or Hveem stability. Test Method ASTM D1188 is to be used for establishing the bulk specific gravity.

4. Optimum Asphalt Content. The optimum amount of asphalt cement added to the asphalt concrete mixture to the nearest one-tenth of a percent. This optimum asphalt content is obtained from the Marshall or Hveem Stability Testing.

5. Percent Air Voids. The calculated air voids (to the nearest tenth of a percent) in the mixture, compacted in the laboratory to the optimum asphalt content and by appropriate procedures for Marshall or Hveem stability. Equation 7.4 may be used for calculating the percent air voids.

6. Marshall Stability. The Marshall Stability (Test Method AASHTO T245 or ASTM D1559) of the mixture at optimum asphalt content in pounds.

7. Number of Blows. The number of blows of the compaction hammer that were applied to each end of the specimen to compact it for Marshall Stability and flow testing.

8. Marshall Flow. The Marshall Flow (Test Method AASHTO T245 or ASTM D1559) of the mixture at optimum asphalt content. This item is to be entered as

the whole number of the measured hundredth of an inch (i.e. if 0.15 is measured, enter "15.").

9. Hveem Stability. The Hveem Stability or "stabilometer value" of the mixture at optimum asphalt content as measured with the Hveem apparatus using Test Method AASHTO T246 (or ASTM D1561).

10. Hveem Cohesiometer Value. The cohesiometer value of the mixture at optimum asphalt content, in grams per 25 mm width (or diameter) of specimen, obtained by Test Method AASHTO T246 (or ASTM D1561).

REHABILITATION DATA SHEET 11, HOT MIX RECYCLED ASPHALT PAVEMENT, GENERAL INFORMATION AND RECLAIMED AGGREGATE PROPERTIES

The properties of the original asphalt concrete mixture (to be reclaimed) and its components will already be available as inventory data. However, some of the key properties, such as aggregate gradation, will be duplicated here to assist in the evaluation of the recycled mix design. Also included for the hot mix recycled asphalt will be procedures on the removal and processing of the existing structure, as well as properties for the new asphalt cement, recycling agents, and/or any aggregate used in the recycled mixture.

1. Layer Number. The recycled layer for which a description is being provided (from Construction Data Sheet 2).

2. Procedure Used to Break Up and/or Remove the Asphalt Pavement. A code to indicate the procedure used for removal of the asphalt pavement to be recycled. Codes are provided on the data sheet.

3. Pavement Processing. A code to indicate how the pavement material was processed after removal. Codes are provided on the data sheet.

4. Gradation of Reclaimed Aggregates. The percent passing (after crushing) on various standard sieve sizes to the nearest one percent. It is not expected that values will be available for all eighteen sieve sizes; the objective is to provide sufficient sieve sizes to accommodate testing and

specification practices for most agencies.

5-8. Bulk Specific Gravities. The bulk specific gravities (to the nearest thousandth) for coarse aggregate, fine aggregate, mineral filler, and the aggregate combination. The bulk specific gravities for the aggregate fractions are measured using the laboratory procedures indicated on the data sheet. The bulk specific gravity for the aggregate combination (usually called "bulk specific gravity of aggregate") is calculated as shown in Equation 7.1.

9. Effective Specific Gravity of Aggregate Combination. The calculated effective specific gravity to the nearest thousandth. This calculation requires the maximum specific gravity (no air voids) of the paving mixture, which is obtained by Test Method AASHTO T209 or ASTM D2041. The effective specific gravity of the aggregate is calculated as shown in Equation 7.2.

REHABILITATION DATA SHEETS 12, HOT MIX RECYCLED ASPHALT PAVEMENT, UNTREATED AGGREGATE PROPERTIES

This data sheet is to be filled out when untreated aggregate (new or reclaimed from base layer) is added to a recycled AC mixture. If no untreated aggregate was added, this sheet will not be applicable and should be so noted.

1. Layer Number. The asphalt concrete layer for which a description is being provided (from Construction Data Sheet 2).

2-4. Composition of Coarse Aggregate. When more than one coarse aggregate is used, the type and percentage by total weight of coarse aggregate should be indicated for each coarse aggregate. If only one type of coarse aggregate is used, enter its type code and 100 percent in the top set of the data spaces, leaving the others blank.

5. Geologic Classification of Coarse Aggregate. The geologic classification of the untreated aggregate. The codes appear in Table A.9 and provide identification as to which of the three major classes of rock the coarse aggregate belongs to and the type of rock within those classes. If a

"blend" was used, enter the code for the geologic classification for the material representing the majority of the untreated coarse aggregate. If a "crushed slag", "manufactured light-weight", or "recycled concrete" was used as coarse aggregate, enter "N".

6-8. Composition of Fine Aggregate. When more than one fine aggregate is used, the type and percentage by total weight of fine aggregate should be indicated for each fine aggregate. Fine aggregate is defined as that passing the No. 8 sieve and retained on the No. 200 sieve. If only one type of fine aggregate is used, enter its type code and 100 percent in the top set of the data spaces, leaving the others blank.

9-10. Source. Two one-digit codes to reflect whether the coarse and fine aggregates, respectively, were reclaimed from existing base material on the roadway or obtained for original use from a conventional source (pit). Codes are provided on the data sheet.

11. Type of Mineral Filler. The type of mineral filler used. The codes appear on the data sheet, including space for entering some other type for which a codes has not been provided.

12-15 Aggregate Durability Test Results. The type of aggregate durability test used in the results in thousandths recorded in units specified for the test. Three of these sets are for coarse (Items 12, 13, and 14) and one (Item 15) for the combination of coarse and fine aggregate. Items 12, 13, and 14 are to correlate with Items 2, 3, and 4 above, respectively. The durability test type codes appear in Table A.13.

16. Polish Value of Coarse Aggregates. The accelerated polish value of the coarse aggregates used in the surface layer, as determined by AASHTO T279 (ASTM D3319).

REHABILITATION DATA SHEET 13, HOT MIX RECYCLED ASPHALT PAVEMENT, UNTREATED AGGREGATE PROPERTIES (CONTINUED)

1. Layer Number. The hot mix asphalt recycled concrete layer for which a

description is being provided (from Construction Data Sheet 2).

2. Gradation of Untreated Aggregates. The percent passing of untreated coarse and fine aggregates on various standard sieve sizes to the nearest one percent. It is not expected that values will be available for all eighteen sieve sizes; the objective is to provide sufficient sieve sizes to accommodate testing and specification practice for most agencies.

3-6. Bulk Specific Gravities. The bulk specific gravities (to the nearest thousandth) for coarse aggregate, fine aggregate, mineral filler, and the aggregate combination. The bulk specific gravities for the aggregate fractions are measured using the laboratory procedures indicated on the data sheet. The bulk specific gravity for the aggregate combination (usually called "bulk specific gravity of aggregate") is calculated as shown in Equation 7.1.

7. Effective Specific Gravity of Aggregate Combination. The calculated effective specific gravity to the nearest thousandth. This calculation requires the maximum specific gravity (no air voids) of the paving mixture, which is obtained by Test Method AASHTO T209 or ASTM D2041. The effective specific gravity of the aggregate is calculated as shown in Equation 7.2.

REHABILITATION DATA SHEET 14, HOT MIX RECYCLED ASPHALT PAVEMENT, COMBINED AGGREGATE PROPERTIES

This data sheet is provided to note the combined (the reclaimed and the untreated) aggregate properties.

1. Layer Number. The hot mix asphalt recycled layer for which a description is being provided (from Construction Data Sheet 2).

2. Amount of New Untreated Aggregate Added. The amount of untreated aggregate added, to the nearest 0.1 percent of the combined weight of the aggregates in the recycled mixture.

3. Gradation of Combined Aggregates. The percent passing on various standard sieve sizes to the nearest one percent. It is not expected that values will be available for all eighteen sieve sizes; the objective is to provide sufficient sieve sizes to accommodate testing and specification practices for most agencies.

4-7. Bulk Specific Gravities. The bulk specific gravities (to the nearest thousandth) for coarse aggregate, fine aggregate, mineral filler, and the aggregate combination. The bulk specific gravities for the aggregate fractions are measured using the laboratory procedures indicated on the data sheet. The bulk specific gravity for the aggregate combination (usually called "bulk specific gravity of aggregate") is calculated as shown in Equation 7.1.

8. Effective Specific Gravity of Aggregate Combination. The calculated effective specific gravity to the nearest thousandth. This calculation requires the maximum specific gravity (no air voids) of the paving mixture, which is obtained by Test Method AASHTO T209 or ASTM D2041. The effective specific gravity of the aggregate is calculated as shown in Equation 7.2.

REHABILITATION DATA SHEET 15, HOT MIX RECYCLED ASPHALT PAVEMENT, RECLAIMED ASPHALT CEMENT PROPERTIES

The following data items should reflect the results of laboratory testing of asphalt cement extracted from representative samples of the existing asphalt concrete mixture to be reclaimed and used in the recycled mixture.

1. Layer Number. The hot mix recycled asphalt concrete layer to be described on this sheet (from Construction Data Sheet 2).

2. Specific Gravity of Asphalt Cement. The specific gravity of the asphalt cement (to the nearest thousandth) when it is available. If unavailable, a typical specific gravity for asphalt cements produced at the source refinery may be entered. If source is unknown, enter 1.010 as a reasonable estimate. This specific gravity is measured as specified by AASHTO T228 (or ASTM D70).

3. Viscosity of Asphalt at 140°F. The results in poises from kinematic viscosity testing using Test Method AASHTO T202 (or ASTM D2171) on samples of the extracted asphalt cement.

4. Viscosity of Asphalt at 275°F. The results in centistokes (to the nearest hundredth) from absolute viscosity testing using Test Method AASHTO T201 (or ASTM D2170) on samples of the extracted asphalt cement.

5. Penetration at 77°F. The penetration (in tenths of a millimeter) from testing the original asphalt cement in the mixture at 77°F, using a 100 gram load and a five-second load duration with Test Method AASHTO T49 (or ASTM D5) on samples of the extracted asphalt cement material.

6. Ductility at 77°F. The ductility in centimeters as measured by Test Method AASHTO T51 at 77°F (or ASTM D113).

7. Ductility at 39.2°F. The ductility in centimeters at 39.2°F, using the procedures of Test Method AASHTO T51 (or ASTM D113).

8. Test Rate for Ductility Measurement at 39.2°F. The test speed in centimeters per minute for the ductility measurement taken at 39.2°F.

9. Penetration at 39.2°F. The penetration value using a 200 gram weight and 60 second loading duration, tested in accordance with Test Method AASHTO T49 (or ASTM D5) on samples of the extracted asphalt cement.

10. Ring and Ball Softening Point. The softening point of the asphalt cement in °F as measured with the ring-and-ball apparatus used in Test Method AASHTO T53, on samples of the extracted asphalt cement.

REHABILITATION DATA SHEET 16, HOT MIX RECYCLED ASPHALT PAVEMENT, NEW ASPHALT CEMENT PROPERTIES

This sheet is provided to incorporate data on any new asphalt cement which is added to the recycled mix.

1. Layer Number. The asphalt concrete layer to be described on this sheet (from Construction Data Sheet 2).

2. Asphalt Grade. The grade of the asphalt cement used (see Table A.16). Space is provided on the data sheet for identifying another grade of asphalt cement not appearing in Table A.16.

3. Source. The source for the new asphalt cement. A list of asphalt refiners and processors is provided in Table A.14, Appendix A. Space is provided to specify other sources which may not be included on the table provided.

4. Specific Gravity of Asphalt Cement. The specific gravity of the asphalt cement (to the nearest thousandth) when it is available. If unavailable, a typical specific gravity for asphalt cements produced at the source refinery may be entered. If source is unknown, enter 1.010 as a reasonable estimate. This specific gravity is measured as specified by AASHTO T228 (ASTM D70).

5. Viscosity of Asphalt at 140°F. The results in poises from kinematic viscosity testing using test method AASHTO T202 (ASTM D2171) on samples of the new asphalt cement prior to its addition to the recycled mix.

6. Viscosity of Asphalt at 275°F. The results in centistokes (to the nearest hundredth) from absolute viscosity testing using test method AASHTO T201 (ASTM D2170) on samples of the new asphalt cement.

7. Penetration at 77°F. The penetration (in tenths of a millimeter) from testing the original asphalt cement in the mixture at 77°F, using a 100 gram load and a five-second load duration with test method AASHTO T49 (ASTM D5) on samples of the new asphalt cement material.

8. Ductility at 77°F. The ductility in centimeters as measured by test method AASHTO T51 (ASTM D113) at 77°F.

9. Ductility at 39.2°F. The ductility in centimeters at 39.2°F, using the procedures of test method AASHTO T51 (ASTM D113).

10. Test Rate for Ductility Measurement at 39.2°F. The test speed in centimeters per minute for the ductility measurement taken at 39.2°F.

11. Penetration at 39.2°F. The penetration value using a 200 gram weight and 60 second loading duration, tested in accordance with test method AASHTO T49 (ASTM D5) on samples of the new asphalt cement, prior to its addition to the recycled mix.

12. Ring and Ball Softening Point. The softening point of the asphalt cement in °F as measured with the ring and ball apparatus used in test method AASHTO T53, on samples of the new asphalt cement prior to its addition to the recycled mix.

REHABILITATION DATA SHEET 17, HOT MIX RECYCLED ASPHALT PAVEMENT, COMBINED ASPHALT CEMENT PROPERTIES

The following data should be provided, when available, for the combined asphalt cement, tested prior to its use in the construction.

1. Layer Number. The hot mix recycled asphalt concrete layer to be described on this sheet (from Construction Data Sheet 2).

2. Recycling Agent. Codes to identify the Type and Quantity of recycling agent used. The codes for type appear in Table A.20. The amount of recycling agent should be provided by weight added to the reclaimed (aged) asphalt, to the nearest one-tenth of a percent of the reclaimed asphalt cement weight. As an example, if the weight of the recycling agent to be added to the aged asphalt cement was 41.5 percent of the weight of the aged asphalt in the reclaimed mixture, "41.5" would be entered on the data sheet.

3. Amount of New Asphalt Cement Added. The quantity of new asphalt cement to the nearest tenth of a percent of total recycled mixture weight

(includes reclaimed asphalt concrete and untreated aggregate and asphalt cement/recycling agent added).

4. Specific Gravity of Asphalt Cement. The specific gravity of the asphalt cement (to the nearest thousandth) when it is available. If unavailable, a typical specific gravity for asphalt cements produced at the source refinery may be entered. If source is unknown, enter 1.010 as a reasonable estimate. This specific gravity is measured as specified by AASHTO T228 (or ASTM D70).

5. Viscosity of Asphalt at 140°F. The results in poises from kinematic viscosity testing using test method AASHTO T202 (ASTM D2171) on samples of the combined asphalt cement prior to its use in construction of the recycled pavement section.

6. Viscosity of Asphalt at 275°F. The results in centistokes (to the nearest hundredth) from absolute viscosity testing using test method AASHTO T201 (ASTM D2170) on samples of the combined asphalt cement.

7. Penetration at 77°F. The penetration (in tenths of a millimeter) from testing the combined asphalt cement in the mixture at 77°F, using a 100 gram load in the five-second load duration with test method AASHTO T49 (ASTM D5) on samples of the combined asphalt cement material.

8-9. Asphalt Modifiers. Space is provided to list the type and quantity of up to two modifiers added to the asphalt cement for whatever purpose (other than the recycling agent which is recorded under Item 2. above). A list of possible asphalt cement modifiers and codes for data entry are provided on Table A.15, Appendix A. If a material other than those listed in Table A.15 is used, space is provided to record the pertinent information. The quantities of modifier should be provided in percent of asphalt cement weight. Some modifiers (such as lime) may be specified in terms of "percent of aggregate weight", but they must be converted to percent of asphalt cement weight for uniformity. Space is provided for up to two types of modifiers.

10. Ductility at 77°F. The ductility in centimeters measured by test method AASHTO T51 (ASTM D113) at 77°F.

11. Ductility at 39.2°F. The ductility in centimeters at 39.2°F, using the procedures of test method AASHTO T51 (ASTM D113).

12. Test Rate for Ductility Measurement at 39.2°F. The test speed in centimeters per minute for the ductility measurement taken at 39.2°F.

13. Penetration at 39.2°F. The penetration value using a 200 gram weight and 60-second loading duration, tested in accordance with test method AASHTO T49 (ASTM D5) on samples of the combined asphalt cement, prior to its use as a construction material.

14. Ring and Ball Softening Point. The softening point of the asphalt cement in °F as measured with the ring and ball apparatus used in test method AASHTO T53, on samples with the combined asphalt cement prior to its use as a construction material.

REHABILITATION DATA SHEET 18, HOT MIX RECYCLED ASPHALT PAVEMENT, LABORATORY AGED COMBINED ASPHALT CEMENT PROPERTIES

The data items on this sheet should be provided for laboratory aged asphalt cement samples using samples of the combined asphalt cement aged in accordance with the provisions of test method AASHTO T179 (ASTM D1754) or test method AASHTO T240 (ASTM D2872).

1. Layer Number. The hot mix asphalt recycled concrete layer for which a description is being provided (from Construction Data Sheet 2).

2. Test Procedure Used to Measure Aging Effects. The test procedure used to "age" the asphalt cement in the laboratory, and to measure the effects of the aging. Space is provided on the data sheet to indicate the aging process used if other than those stated above.

3. Viscosity of Asphalt at 140°F. The results in poises from viscosity testing on laboratory aged asphalt cement samples using Test Method AASHTO T202 (or ASTM D2171).

4. Viscosity of Asphalt at 275°F. The results in centistokes (to the nearest hundredth) from viscosity testing using Test Method AASHTO T201 (or ASTM D2170) on laboratory aged asphalt cement samples.

5. Ductility at 77°F. The ductility in centimeters as measured by Test Method AASHTO T51 (or ASTM D113) on laboratory aged samples of the asphalt cement.

6. Ductility at 39.2°F. The ductility in centimeters at 39.2°F, using the procedures of Test Method AASHTO T51 (or ASTM D113).

7. Test Rate for Ductility Measurement at 39.2°F. The test rate to the nearest tenth of a centimeter per minute for ductility determination at 39.2°F.

8. Penetration at 77°F. The penetration (in tenths of millimeters) from testing the asphalt cement used in the mixture at 77°F, using a 100 gram load and a 5 second load duration, in accordance with Test Method AASHTO T49 (or ASTM D5).

9. Penetration at 39.2°F. The penetration (in tenths of millimeters) from testing the asphalt cement used in the mixture at 39.2°F, using a 200 gram load and 60 second load duration, in accordance with Test Method AASHTO T49 (or ASTM D5).

10. Ring and Ball Softening Point. The results in °F from the ring and ball softening point test for bitumens (AASHTO T53).

11. Weight Loss. The weight loss resulting from the laboratory aging process to the nearest one-tenth of one percent.

REHABILITATION DATA SHEET 19, HOT MIX RECYCLED ASPHALT PAVEMENT, LABORATORY MIXTURE DESIGN

The following data items are to be derived from tests conducted on the mixture during mix design.

1. Layer Number. The recycled asphalt concrete layer to be described on this sheet (from Construction Data Sheet 2).

2. Maximum Specific Gravity. The maximum specific gravity (to the nearest thousandth) of the recycled mixture, calculated using Equations 7.2 and 7.3.

3. Bulk Specific Gravity. The bulk specific gravity (to the nearest thousandth) of the recycled mixture, compacted in the laboratory at the optimum asphalt content selected and by appropriate procedures for Marshall or Hveem stability. Test Method ASTM D1188 is to be used for establishing the bulk specific gravity.

4. Optimum Asphalt Content. The optimum amount of asphalt cement added to the recycled asphalt concrete mixture to the nearest one-tenth of a percent. This optimum asphalt content is obtained from the Marshall or Hveem Stability Testing.

5. Percent Air Voids. The calculated air voids (to the nearest tenth of a percent) in the recycled mixture, compacted in the laboratory to the optimum asphalt content and by appropriate procedures for Marshall or Hveem stability. Equation 7.4 may be used for calculating the percent air voids.

6. Marshall Stability. The Marshall Stability (Test Method AASHTO T245 or ASTM D1559) of the mixture at optimum asphalt content in pounds.

7. Number of Blows. The number of blows of the compaction hammer that were applied to each end of the specimen to compact it for Marshall Stability and flow testing.

8. Marshall Flow. The Marshall Flow (Test Method AASHTO T245 or ASTM D1559) of the mixture at optimum asphalt content. This item is to be entered as the whole number of the measured hundredth of an inch (i.e. if 0.15 is measured, enter "15.").

9. Hveem Stability. The Hveem Stability or "stabilometer value" of the mixture at optimum asphalt content as measured with the Hveem apparatus using Test Method AASHTO T246 (or ASTM D1561).

10. Hveem Cohesiometer Value. The cohesiometer value of the mixture at optimum asphalt content, in grams per 25 mm width (or diameter) of specimen, obtained by Test Method AASHTO T246 (or ASTM D1561).

REHABILITATION DATA SHEET 61, RESTORATION OF AC SHOULDERS

This data sheet is for describing work to restore existing shoulders. All data items pertain to the characteristics of the restored AC shoulder.

1. Shoulder Restored. A code to indicate whether the outside, inside, or both shoulders were restored. Codes are provided on the data sheet. Note that Data Items 2. through 7. pertain to restored inside and/or outside shoulders. Data Items 8. through 14. pertain to restored outside shoulders only.

2. Surface Type. The type of restored shoulder surface (See Table A.5, Appendix A for codes).

3. Total Width. The total (paved and unpaved) width of the restored shoulder to the nearest whole number of feet.

4. Paved Width. The total paved width of the restored shoulder to the nearest whole number of feet.

5. Shoulder Base Type. The type of base material used in the restored shoulder (See Table A.6, Appendix A for codes).

6. Surface Thickness. The average thickness of the restored shoulder surface at the outside lane-shoulder edge to the nearest 0.1 inch.

7. Base Thickness. The average thickness of the restored shoulder base at the outside lane-shoulder edge to the nearest 0.1 inch.

8. Type of Shoulder Restoration. A code to identify the procedure used to restore the shoulder. Codes are provided on the data sheet.

9. Type of AC Materials. The type of asphalt concrete materials used in the shoulder restoration. Codes are provided on the data sheet.

10. Thickness of AC Material Removed by Cold Milling. If cold milling was used, the thickness of the AC removal, to the nearest tenth of an inch.

11. AC Overlay Thickness. If an AC overlay was placed on the shoulder, the thickness of the overlay to the nearest tenth of an inch.

12. Lane/Shoulder Joint Sealant. The method used to seal the joint separating the shoulder and traffic lane. Codes are provided on the data sheet.

13. Lane/Shoulder Joint Sealant Reservoir. The average Width and Depth of the as-built joint sealant reservoir between the restored shoulder and traffic lane. If butt or keyed joints were used without a sealant reservoir, enter "0.0" in both of the spaces provided.

14. Type of Joint Sealant. A code to indicate whether the sealant was poured (molded in place) or preformed (compression-type). Codes are provided on the data sheet.

GPS MAINTENANCE DATA SHEETS

Sheet 5 is the only data sheet from Chapter 6, Maintenance Data Collection, of the Data Collection Guide that should be completed as part of the construction data for SPS-5 projects. This sheet pertains to crack sealing and should only

be completed if crack sealing is performed on the test sections as a part of the overlay construction operations. Other maintenance data sheets may need to be completed as part of the historical data (prior to overlay construction) and monitoring data (after construction). As outlined in the SPS-5 construction guidelines, crack sealing prior to overlay should only be performed on the intensive surface preparation test sections after milling has been performed. Sealing of cracks in the milled surface is optional.

MAINTENANCE DATA SHEET 5, CRACK SEALING DATA

This data sheet is required for reporting the details of sealing cracks.

1. Dates. The month, day, and year the crack sealing activity began and the month, day and year it was completed.

2. Average Crack Severity Level. The average severity of the cracks in the test section. Codes are provided on the data forms. Reference to the Distress Identification Manual should be used to establish severity level.

3. Primary Type of Cracks. A code entered to describe the primary type of cracks sealed in the test section lane. Codes are provided in Table A.22 of Appendix A. A complete description of each type of crack is available in the Distress Identification Manual.

4. Type of Material Used to Seal Cracks. Enter the appropriate code shown on the data form which best describes the type of crack sealant material used. If a proprietary crack/joint sealant or some other type not coded is used, spaces are provided to record information to identify the material.

5. Ambient Conditions at Time of Crack Sealing. Enter the low and high air temperatures observed during crack sealing activities in degrees Fahrenheit, and a code to indicate whether the surface was dry or wet at the time the cracks were sealed.

6. Approximate Total Length of Cracks Sealed. The approximate total linear feet of individual cracks sealed within the test section should be entered to the nearest foot. For SHRP LTPP studies, only the total linear feet of cracks sealed in the test section lane are to be recorded.

7. Method Used to Clean Crack Prior to Sealing. Enter the code provided on the data sheet which describes the procedure used to clean the debris from cracks prior to sealing.

LABORATORY MATERIAL TESTING DATA

Laboratory material tests required for the SPS experiments which are also required for the GPS test sections, should be performed in accordance with the SHRP standard protocols contained in Operational Guide No. SHRP-LTPP-OG-004, "SHRP-LTPP Interim Guide for Laboratory Materials Handling and Testing", November 1989. Data forms are provided for reporting test information and results. Procedures and forms for those test methods that are not included in the GPS materials testing program but required for the SPS-5 experiment will be developed.

TRAFFIC DATA

Traffic data should be collected and reported using the same forms and procedures as used for GPS test sections. Also, historical traffic data forms must be completed for the project as required for GPS test sections. Monitoring information must be reported using the same formats and procedures as required for GPS test sections.

In general, traffic data should be project level data and coded with a "00" as the test section number. In instances where an intervening intersection occurs between test section on a project which causes unequal traffic on all test sections, measurements of the traffic level on the separate groups of sections on each side of the intersection will need to be referenced to the lead test section of the group. The locations of any intersections or ramps should be recorded on Construction Data Sheet 1.

CLIMATE DATA

The procedures used for collection and storage of climate and environmental data for GPS test sections should be used for SPS-5 projects. Since this data will apply to all test sections on the project, it should be entered as project level data and coded with a "00" as the test section number.

DISTRESS, DEFLECTION, PROFILE AND SKID DATA

Table 3 provides guidelines regarding the timing for deflection, profile, distress, and friction measurements before and after overlay construction. In general, the same procedures and reporting formats used for GPS should be used for these measurements on SPS test sections. All data should be recorded for each test section on the project.

Profile, distress, and friction measurements should be performed in the same manner used for the GPS test sections.

Guidelines for delfection testing procedures for the SPS-5 experiment are different from those used for the GPS test sections. These guidelines are included in the report, FWD Test Plan for Specific Pavement Studies Experiment SPS-5, "Rehabilitation of Asphalt Concrete Pavements."

MAINTENANCE AND REHABILITATION DATA

All maintenance and rehabilitation activities performed on the SPS test sections after completion of construction should be recorded on a test section basis using the data sheets contained in the LTPP Data Collection Guide.

Table 3. Guidelines for performance monitoring measurements of SPS-5 test sections.

MEASUREMENT	BEFORE CONSTRUCTION	AFTER CONSTRUCTION
DEFLECTION MEASUREMENTS	< 3 Months	1 - 3 Months
PROFILE MEASUREMENTS	< 3 Months	< 2 Months
DISTRESS SURVEY	< 6 Months	< 6 Months
FRICTION MEASUREMENTS	< 12 Months	3 - 12 Months

APPENDIX A

DATA COLLECTION SHEETS

(Exclusively for SPS Experiments)

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
PAVEMENT CORE LOG AT BOREHOLE LOCATIONS
SAMPLING DATA SHEET 1

SHEET NUMBER _____ OF_____

LTPP REGION _____ STATE _____ *STATE CODE* __ __
EXPERIMENT NO _____ *SPS PROJECT CODE* __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ *TEST SECTION NO.* __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section *FIELD SET NO.* __

OPERATOR_____ EQUIPMENT USED_____ *CORING DATE*___-___-___
SAMPLING AREA NO. SA-_____ *LOCATION: STATION*_____ *OFFSET*_____*feet from °/s*
CORE HOLE NUMBER _____ *CORE BARREL SIZE*_____(in. Inside Diam.) Cooling Medium_____

Scale (Inches)	*Depth (Inches)*	Core Recov. (Inches)	*Core Sample No.*	*Material Description*	*Material Code*
0					
5					
10					
15					
20					
25					

Note: "Depth" should be measured from the top of the pavement surface to the bottom of the cores of each layer and recorded to the nearest tenth of an inch.

GENERAL REMARKS:_____

CERTIFIED VERIFIED AND APPROVED DATE

_____ _____ __ __-__ __-19__ __
Field Crew Chief SHRP Representative Month- Day - Year
Affiliation:_____ Affiliation:_____

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
PAVEMENT CORE LOG AT C-TYPE CORE LOCATIONS
SAMPLING DATA SHEET 2

SHEET NUMBER _____ OF _____

RP REGION _____ STATE _____ *STATE CODE* __ __
_S EXPERIMENT NO _____ *SPS PROJECT CODE* __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ *TEST SECTION NO.* __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section *FIELD SET NO.* __

OPERATOR_____ EQUIPMENT USED_____ *CORING DATE* ___-___-___

SAMPLING AREA NO SA-_____ CORE BARREL: Tip Type_____ Cooling Medium_____

Note: Record information for all cores extracted from each core hole in one column in the table below. Use a separate sheet for each sampling area. "Depth" should be measured from the pavement surface to the bottom of the core and recorded to the nearest tenth of an inch.

CORE HOLE NUMBER						
LOCATION: (a) STATION						
(b) OFFSET (Feet, O/S)						
Core Recovered?	*YES/NO*	*YES/NO*	*YES/NO*	*YES/NO*	*YES/NO*	*YES/NO*
Replacement Core Hole No.						
Core Size (inch Diam.)	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam)	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam.)	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam.)	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Remarks						

GENERAL REMARKS: _____

CERTIFIED VERIFIED AND APPROVED DATE

_____ _____ ____-____-19___
ld Crew Chief SHRP Representative Month- Day- Year
iliation:_____ Affiliation:_____

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
VISUAL DETERMINATION OF AC MOISTURE RELATED DAMAGE
SAMPLING DATA SHEET 3

SHEET NUMBER _____ OF _____

SHRP REGION _____ STATE _____ *STATE CODE* __ __
SPS EXPERIMENT NO _____ *SPS PROJECT CODE* __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ *TEST SECTION NO.* __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section *FIELD SET NO.* __

TECHNICIAN_____ AFFILIATION_____ *TEST DATE* __-__-__
SAMPLING AREA NO: SA-__ __ *LOCATION: STATION*__ __ __ __ + __ __ *OFFSET*__ __*feet from °/s*
BORE HOLE/CORE NUMBER __ __ __ *SHRP SAMPLE NUMBER* __ __ __ __

1. *CORE THICKNESS (INCHES)* __ __.__
2. *CORE DIAMETER (INCHES)* __ __.__
3. *LAYER DEPTHS (measured from TOP of core, INCHES)*
   A. __ __.__
   B. __ __.__
   C. __ __.__
   D. __ __.__
4. *VISIBLE MOISTURE IN THE CORE? (YES/NO)* __

   APPEARANCE OF ASPHALT _____

6. *HEIGHT OF STRIPPING PENETRATION (measured from BOTTOM of core, INCHES)* __ __.__
6. *PERCENT COARSE AGGREGATE STRIPPED* __ __ __.
7. *PERCENT FINE AGGREGATE STRIPPED* __ __ __.
8. *STRIPPING PENETRATION RATING VALUE (P)* __
9. *COARSE AGGREGATE STRIPPING RATING VALUE (C)* __
10. *FINE AGGREGATE STRIPPING RATING VALUE (F)* __
11. *STRIPPING RATING (P+C+F)* __ __
12. *COMMENTS:* _____

_____

_____

GENERAL REMARKS: _____

_____

_____FIED VERIFIED AND APPROVED DATE

_____ _____ _____-_____-19___

Field Crew Chief SHRP Representative Month- Day- Year

Affiliation:_____ Affiliation:_____

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
A-TYPE BORE HOLE LOG
SAMPLING DATA SHEET 4

SHEET NUMBER _____ OF _____

P REGION _____ STATE _____ *STATE CODE* __ __
SPS EXPERIMENT NO _____ *SPS PROJECT CODE* __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ *TEST SECTION NO.* __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section *FIELD SET NO.* __

OPERATOR_____ EQUIPMENT USED_____ *BORING DATE*___-___-___
SAMPLING AREA NO: SA-_____ *LOCATION: STATION*_____ *OFFSET*_____ *feet from °/s*
*BORE HOLE NUMBER:*_____ *BORE HOLE SIZE:* _____ (inch Diam.)

Scale (Inches)	*Strata Change (Inches)*	*Sample Number* (1)	*#Blows*(2) 6"	6"	6"	*Ref? Y/N* (3)	*DLR (Inches)* (4)	*IOP* (5)	*Material Description*	*Material Code*
_____										
_10.0__										
_____										
_20.0__										
_____										
_30.0__										
_____										
_40.0__										
_____										
_50.0__										
_____										
60.0__										
_____										
_).0__										
_____										
_80.0__										
_____										
_90.0__										
_____										
_100.0_										

1. Record sample numbers for splitspoon/thin-walled tube samples taken from the subgrade.
2. For splitspoon samples, record the number of blows for the first, second and third 6 inches of penetration.
3. *Refused* - If the splitspoon is refused, place a Y in the *REFUSAL* column and complete *Driving Length To Refusal* column. Refusal is defined as less than 1 inch of penetration with 100 blows.
4. *Driving Length To Refusal* - Record penetration to refusal of splitspoon from the top of the pavement surface.
5. *Inches Of Penetration* - Record from start of splitspoon sampling procedure if 100 blows is reached before one foot of penetration. If penetration exceeds 12 inches before 100 blows is reached, enter middle 6 inches plus depth of penetration into the last 6 inches when 100 blows was reached (not including seating drive); record to nearest tenth of an inch.

GENERAL REMARKS:_____

CERTIFIED VERIFIED AND APPROVED DATE

_____ _____ _____-____-19___

F Crew Chief SHRP Representative Month- Day- Year

A: ation:_____ Affiliation:_____

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
BA-TYPE BORE HOLE LOG
SAMPLING DATA SHEET 5

SHEET NUMBER _____ OF _____

P REGION _____ STATE _____ *STATE CODE* __ __
EXPERIMENT NO _____ *SPS PROJECT CODE* __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ *TEST SECTION NO.* __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section *FIELD SET NO.* __

OPERATOR_____ EQUIPMENT USED_____ *BORING DATE*___-___-___
SAMPLING AREA NO: SA-_____ *LOCATION: STATION*_____ *OFFSET*_____ *feet from °/s*
*BORE HOLE NUMBER:*_____ *BORE HOLE SIZE:* _____ (inch Diam.)

Scale (Inches)	*Strata Change (Inches)*	*Sample Number* (1)	*Moisture Sample Number* (2)	*Material Description*	*Material Code*
_____					
_10.0__					
_____					
_20.0__					
_____					
_30.0__					
_____					
_40.0__					
_____					
_50.0__					
_____					
_60.0__					
_____					
_70.0__					
_____					
_80.0__					
_____					
_90.0__					
_____					
_100.0_					

1. Record sample numbers for bulk samples taken from unbound layers and the subgrade.
2. Record sample numbers for samples taken from unbound base, subbase and subgrade for moisture content testing.

GENERAL REMARKS:_____

_____

CERTIFIED _____ VERIFIED AND APPROVED _____ DATE _____-_____-19___

Field Crew Chief SHRP Representative Month- Day- Year
A iation:_____ Affiliation:_____

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
TEST PIT LOG
SAMPLING DATA SHEET 6

SHEET NUMBER _____ OF _____

RP REGION _____ STATE _____ *STATE CODE* __ __
__S EXPERIMENT NO _____ *SPS PROJECT CODE* __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ *TEST SECTION NO.* __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section *FIELD SET NO.* __

TECHNICIAN_____ EQUIPMENT _____ *EXPLORATION DATE*___-___-___
SAMPLING AREA NO: SA-_____ *LOCATION: STATION*_____ *OFFSET*_____*feet from °/s*
*TEST PIT NUMBER*_____ *PIT SIZE:* (a) *Length*_____feet (b) *Width*_____feet

Scale (Inches)	*Strata Change (Inches)*	*Moisture Sample No.*	*Bulk Sample No.*	*Material Description*	*Material Code*
4					
8					
12					
16					
24					
28					
32					
36					
40					
44					
48					

GENERAL REMARKS:_____

CERTIFIED _____
ld Crew Chief
iliation:_____

VERIFIED AND APPROVED _____
SHRP Representative
Affiliation:_____

DATE
_____-____-19___
Month- Day- Year

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
TEST PIT SKETCH
SAMPLING DATA SHEET 7

SHEET NUMBER _____ OF _____

RP REGION _____ STATE _____ *STATE CODE* __ __
_S EXPERIMENT NO _____ *SPS PROJECT CODE* __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ *TEST SECTION NO.* __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section *FIELD SET NO.* __

TECHNICIAN_____ EQUIPMENT _____ *EXPLORATION DATE*___-___-___
SAMPLING AREA NO: SA-_____ *LOCATION: STATION*_____ *OFFSET*_____*feet from °/s*
*TEST PIT NUMBER*_____ *PIT SIZE:* (a) *Length*_____feet (b) *Width*_____feet

This form is to be used to sketch the test pit as it was sampled. Show the dimensions of the test pit, the depth of each layer and the material type for each layer. Sketch the direction of traffic on the test pit illustration with an arrow in the direction of traffic.

GENERALREMARKS:_____

CERTIFIED

_____
eld Crew Chief
filiation:_____

VERIFIED AND APPROVED

_____
SHRP Representative
Affiliation:_____

DATE
_____-____-19___
Month- Day- Year

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
IN SITU DENSITY AND MOISTURE TESTS
SAMPLING DATA SHEET 8

SHEET NUMBER _____ OF _____

RP REGION _____ STATE _____ *STATE CODE* __ __
--S EXPERIMENT NO _____ *SPS PROJECT CODE* __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ *TEST SECTION NO.* __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section *FIELD SET NO.* __

OPERATOR_____ *NUCLEAR DENSITY GAUGE I.D.*_____ *TEST DATE*___-___-____
SAMPLING AREA NO: SA-_____ *LOCATION: STATION*_____ *OFFSET*_____*feet from °/s*
*TEST PIT NO:*_____ DATE OF LAST MAJOR CALIBRATION___-___-___
Note: Use additional sheets if necessary

DEPTH FROM SURFACE TO THE TOP OF THE LAYER, INCHES (See Sheet 5)						
LAYER DESCRIPTION						
MATERIAL TYPE: (Unbound=G Other=T)						
IN SITU DENSITY, pcf 1						
2						
3						
(AASHTO T238-86) 4						
AVERAGE						
Method (A,B,or C)						
Rod Depth, inches						
IN SITU MOISTURE CONTENT, % 1						
2						
3						
(AASHTO T239-86) 4						
AVERAGE						

GENERAL REMARKS:_____

CERTIFIED
_____
Field Crew Chief
iliation:_____

VERIFIED AND APPROVED
_____
SHRP Representative
Affiliation:_____

DATE
_____-_____-19___
Month- Day- Year

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
SHOULDER PROBE LOG
SAMPLING DATA SHEET 9

SHEET NUMBER _____ OF _____

SHRP REGION _____ STATE _____ *STATE CODE* __ __
EXPERIMENT NO _____ *SPS PROJECT CODE* __ __
TE/HIGHWAY_____ Lane_____ Direction_____ *TEST SECTION NO.* __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section *FIELD SET NO.* __

OPERATOR_____ EQUIPMENT USED_____ *AUGERING DATE*___-____-____
*AUGER PROBE NUMBER*_____ *LOCATION STATION*:_____ *OFFSET*:_____*feet from °/s*
TOP OF ROCK BASED ON:_____

Scale (feet)	*Depth from Surface (Feet)*	*Material Description*	*Material Code*
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

REFUSAL WITHIN 20 FEET (Y/N):_____ *DEPTH TO REFUSAL*:_____*(FEET)*

GENERAL REMARKS:_____

CERTIFIED _____
Field Crew Chief
Affiliation:_____

VERIFIED AND APPROVED _____
SHRP Representative
Affiliation:_____

DATE
_____-_____-19___
Month- Day- Year

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
SAMPLING UNCOMPACTED BITUMINOUS PAVING MIXTURES
SAMPLING DATA SHEET 10

SHEET NUMBER _____ OF _____

RP REGION _____ STATE _____ *STATE CODE* __ __
S EXPERIMENT NUMBER _____ *SPS PROJECT CODE* __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ *TEST SECTION NO.* __ __
FIELD SET NO. __

PERSON PERFORMING SAMPLING

NAME _____ EMPLOYER _____

TITLE _____

MIX PLANT

PLANT NAME _____

PLANT LOCATION _____

PLANT TYPE Batch..... 1 Drum..... 2 Other (Specify)..... 3 [__]

DESCRIPTION OF MIX PLANT _____

MANUFACTURER OF ASPHALT PLANT _____

MODEL NUMBER _____

BATCH SIZE _____

SAMPLING LOCATION [___]

Conveyor Belt..... 1 Stockpile..... 2 Haul Truck..... 3 Funnel Device..... 4
Roadway Prior to Compaction ..... 5 Station __ + __ __ Offset ____ (feet from O/S)
Other..... 6 (specify) _____

MIX TYPE "Virgin" Asphalt Concrete ..... 1 Recycled Asphalt Concrete..... 2 [___]

LAYER TYPE [___]

Rut Level-Up..... 1 Mill Replacement..... 2 Binder Course..... 3
Surface Course..... 4 Surface Friction Layer..... 5

SAMPLE TYPE DESIGNATION [___ ___ ___ ___]

SAMPLE NUMBER [___ ___ ___ ___]

APPROXIMATE SAMPLE SIZE (lbs) ___ ___ ___

DATE SAMPLED (Month - Day - Year) [__ __ - __ __ - __ __]

LOCATION SAMPLE SHIPPED TO _____

DATE SHIPPED (Month-Day-Year) [__ __ - __ __ - __ __]

GENERAL REMARKS: _____

_____

_____

IDENTIFIED

_____
Field Crew Chief
Affiliation:_____

VERIFIED AND APPROVED

_____
SHRP Representative
Affiliation:_____

DATE
_____-_____-19___
Month- Day- Year

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
LABORATORY SHIPMENT SAMPLES INVENTORY
FIELD OPERATIONS INFORMATION FORM 1

SHEET NUMBER _____ OF _____

:P REGION _____ STATE _____ *STATE CODE* __ __
:PS EXPERIMENT NO _____ *SPS PROJECT CODE* __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ *TEST SECTION NO.* __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section *FIELD SET NO.* __

SAMPLING AREA No: SA- _____ FIELD WORK COMPLETED ON ____-____-____

Note: Use a separate form for each sampling area. Use additional sheets if necessary. Include summary information (Field Operations Information Form 2) and "as actual" sampling location plan sheets with this material samples inventory.

SAMPLE LOCATION	SAMPLE NUMBER	SAMPLE SIZE	SAMPLE TYPE	SAMPLE MATERIAL	SAMPLE CONDITION	LAB*

* Enter number of laboratory, as specified below, each sample was sent to:

Lab No.(1) _____
Lab No.(2) _____
Lab No.(3) _____

GENERAL REMARKS: _____

CERTIFIED _____
:ld Crew Chief
:iliation:_____

VERIFIED AND APPROVED _____
SHRP Representative
Affiliation:_____

DATE
____-____-19___
Month- Day- Year

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING SHEET NUMBER _____ OF _____
SUMMARY OF MATERIAL SAMPLES SENT TO EACH LABORATORY
FIELD OPERATIONS INFORMATION FORM 2

LTPP REGION _____ STATE _____ *STATE CODE* __ __
SPS EXPERIMENT NO _____ *SPS PROJECT CODE* __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ *TEST SECTION NO.* __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section *FIELD SET NO.* __

LABORATORY _____ WORK COMPLETED ON ____-____-____

NOTE: This is a summary of material samples sent to each laboratory based on the information from Field Operations Information Form 1. Complete one form for each laboratory that material samples were sent.

LAYER NO. (From Subgrade)	MATERIAL/SAMPLE TYPE		TOTAL NUMBER OF SAMPLES
_____	AC CORES:	4" Diameter_____ 6" Diameter_____ 12" Diameter_____	
		AC Cores with Bound Base/Subbase	_____
		AC Cores with PCC	_____
		AC Cores with PCC and Bound Base/Subbase	_____
		PCC Cores with Bound Base/Subbase	_____
_____	AC MIX BULK SAMPLES:	Fifty Pound Samples - Virgin	_____
		Recycled	_____
_____	PCC CORES:	4" Diameter_____ 6" Diameter_____	
___	PCC BEAMS:		_____
___	BOUND BASE CORES:	4" Diameter_____	
_____	UNBOUND BASE SAMPLES:	(a) BAGS (BULK)_____ (b) JARS (MOISTURE)_____	
_____	BOUND SUBBASE CORES:	4" Diameter_____	
_____	UNBOUND SUBBASE SAMPLES:	(a) BAGS (BULK)_____ (b) JARS (MOISTURE)_____	
1	SUBGRADE SAMPLES:	(a) BAGS (BULK)_____ (b) JARS (MOISTURE)_____	
		(c) THIN-WALLED TUBES_____ (d) SPLITSPOON _____ JARS	

GENERAL REMARKS: _____

_____

_____

_____

CERTIFIED VERIFIED AND APPROVED DATE

_____ _____ _____-_____-19___

Field Crew Chief SHRP Representative Month- Day- Year

Affiliation:_____ Affiliation:_____

SPS-5 CONSTRUCTION DATA SHEET 1 REFERENCE PROJECT STATION TABLE	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO [0 0]

ORDER	TEST SECTION ID NO (1)	REFERENCE PROJECT STATION NUMBER		(4) CUT-FILL[1]	
		(2) START	(3) END	TYPE	STATION
1	__ __ __ __ __ __	0 + 0 0	__ __ __ __ + __ __	___	__ + __ __
2	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
3	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
4	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
5	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
6	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
7	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
8	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
9	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
10	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
11	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
12	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
13	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
14	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
15	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
16	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
17	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
18	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
19	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __
20	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	___	__ + __ __

5. SPS - GPS TEST SECTION EQUALITIES
   GPS section __ __ __ __ __ __ is the same as SPS section __ __ __ __ __ __
   GPS section __ __ __ __ __ __ is the same as SPS section __ __ __ __ __ __

6. INTERSECTIONS BETWEEN TEST SECTION ON THE PROJECT

ROUTE	PROJECT STATION NO.	RAMPS EXIT	RAMPS ENT	INTERSECTION STOP	INTERSECTION SIGNAL	INTERSECTION UNSIG
_____	__ __ __ __ + __ __	____	____	____	____	_____
_____	__ __ __ __ + __ __	____	____	____	____	_____
_____	__ __ __ __ + __ __	____	____	____	____	_____

Note 1. Indicate the type of subgrade section the test section is located on:
Cut ..... 1 Fill ..... 2 At-Grade ..... 3 Cut and Fill 4
If cut-fill transition is located in a test section, enter test section station of the cut-fill transition location.

PREPARER_____ EMPLOYER _____ DATE _____

SPS-5 CONSTRUCTION DATA SHEET 2 REVISED LAYER DESCRIPTIONS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1.LAYER NUMBER	2. LAYER DESCRIPTION	3. MATERIAL TYPE CLASS	4. LAYER THICKNESSES (Inches)			
			AVERAGE	MINIMUM	MAXIMUM	STD. DEV.
1	SUBGRADE(7)	[__ __]				
2	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
3	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
4	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
5	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
6	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
7	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
8	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
9	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
10	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
11	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
12	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
13	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
14	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
15	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._

NOTES:

1. Layer 1 is subgrade soil, the highest numbered layer is the pavement surface.
2. Layer description codes:

Overlay.....01	Base Layer.....05	Porous Friction Course..09
Seal/Tack Coat.....02	Subbase Layer.....06	Surface Treatment.....10
Original Surface.....03	Subgrade.....07	Embankment (Fill).....11
HMAC Layer (Subsurface).04	Interlayer.....08	

   If milling was performed, the layers which were milled shall be assigned their previous layer number and material type. If the layer was completely removed by milling, it shall still be shown as a layer with a zero thickness.
3. Enter the material type classification codes from Tables A.5, A.6, A.7 and A.8 which best describes the material in each layer. If the layer was milled, enter the material classification code corresponding to the type material which was removed.
4. Enter the average thickness of each layer and the maximum, minimum, and standard deviation of the thickness measurements, if known. If a layer was partially milled, the remaining thickness of the layer shall be indicated.

PREPARER EMPLOYER DATE

SPS-5 CONSTRUCTION DATA SHEET 3 PRE-OVERLAY SURFACE PREPARATION SKETCH	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO [__ __]

SPS-5 CONSTRUCTION DATA SHEET 4 ASPHALT CONCRETE PATCHES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO [__ __]

1. DATE PATCHING OPERATIONS BEGAN (Month - Day - Year) [__ __ - __ __ - __ __]

2. DATE PATCHING OPERATIONS COMPLETED [__ __ - __ __ - __ __]

3. PRIMARY DISTRESS OCCURRENCE PATCHED (code from Table A.22) [__ __]
   Other (Specify) _____
   _____

4. SECONDARY DISTRESS OCCURRENCE PATCHED (code from Table A.22) [__ __]
   Other (Specify)_____
   _____

5. SUMMARY Of PATCHING

	NUMBER	TOTAL AREA (SQ. FT.)
Surface Only	[__ __]	[__ __ __ __]
Surface and partial base replacement	[__ __]	[__ __ __ __]
Full depth	[__ __]	[__ __ __ __]

6. METHOD USED TO DETERMINE LOCATION AND SIZES Of PATCHES [___]
   Deflection ..... 1 Coring ..... 2 Visual 3
   Other ..... 4 (specify) _____
   _____

7. METHOD USED TO FORM PATCH BOUNDARIES [___]
   None ..... 1 Saw Cut ..... 2 Air Hammer ..... 3 Cold Milling 4
   Other ..... 5 (Specify) _____
   _____

8. COMPACTION EQUIPMENT [___]
   None ..... 1 Pneumatic roller ..... 2 Vibratory Plate Compactor ..... 3 [___]
   Vibratory Roller ..... 4 Steel Wheel Roller ..... 5 Truck Tire 6
   Hand Tools ..... 7 Other ..... 8 (Specify) _____
   _____

9. PATCH MATERIAL [___]
   Hot Mix Asphalt Concrete ..... 1 Plant Mix with Cutback Asphalt, Cold Laid 2
   Plant Mix with Emulsified Asphalt, Cold Laid ..... 3 Road Mix with Cutback Asphalt 4
   Road Mix with Emulsified Asphalt ..... 5 Portland Cement Concrete 6
   Other ..... 7 (Specify) _____
   _____

10. MINIMUM TIME FROM MATERIAL PLACEMENT TO OPENING TO TRAFFIC (Hrs) [__ __]

11. MAXIMUM MATERIAL TEMPERATURE FOR TRAFFIC OPENING (if used) (°F) [__ __ __]

12. AIR TEMPERATURE DURING PLACEMENT OPERATIONS
    High Temperature (°F) [__ __]
    Low Temperature (°F) [__ __]

13. PREDOMINATE ROAD SURFACE MOISTURE CONDITION DURING PLACEMENT OPERATIONS [__]
    Dry ..... 1 Moist ..... 2 Wet 3

PREPARER_____ EMPLOYER _____ DATE _____

SPS-5 CONSTRUCTION DATA SHEET 5 RUT LEVEL-UP TREATMENT	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO [__ __]

1. DATE LEVEL-UP LAYER APPLIED [__ __ - __ __ - __ __]

2. PLACEMENT LOCATION OF LEVEL-UP LAYER [__]
   Outside Rut ..... 1 Inside Rut ..... 2 Both Ruts ..... 3 Full Lane Width 4

3. LENGTH Of TEST SECTION COVERED [__]
   Full Length of Test Section 1
   Partial Length of Test Section ..... 2 (enter start and end station numbers)
   Outside Wheel Path Rut: Start Station __ + __ __ End Station __ + __ __
   Inside Wheel Path Rut: Start Station __ + __ __ End Station __ + __ __

4. AVERAGE RUT DIMENSIONS (Inches) DEPTH WIDTH
   Outside Wheel Path Rut [__ . __] [__ __ . __]
   Inside Wheel Path Rut [__ . __] [__ __ . __]

5. RUT PREPARATION PRIOR TO APPLICATION OF LEVEL-UP [__]
   None ..... 1 Broomed ..... 2 Broomed + Asphaltic Tack Coat 3
   Asphaltic Tack Coat (only) 4
   Wheel Path Milling ..... 5 (specify, inches) DEPTH __ . __ WIDTH __ . __
   Other ..... 6 (Specify) _____
   _____

6. COMPACTION EQUIPMENT [__]
   None ..... 1 Pneumatic roller ..... 2 Vibratory Plate Compactor ..... 3 [__]
   Vibratory Roller ..... 4 Steel Wheel Roller ..... 5 Truck Tire 6
   Hand Tools ..... 7 Other ..... 8 (Specify) _____
   _____

7. TYPE OF LEVEL- UP MATERIAL [__]
   Hot Mix Asphalt Concrete ..... 1 Plant Mix with Cutback Asphalt, Cold Laid 2
   Plant Mix with Emulsified Asphalt, Cold Laid ..... 3 Road Mix with Cutback Asphalt 4
   Road Mix with Emulsified Asphalt 5
   Other ..... 6 (Specify) _____
   _____

8. MAXIMUM TOP SIZE AGGREGATE (Inches) [__ . __ __]

9. MINIMUM TIME FROM MATERIAL PLACEMENT TO OPENING TO TRAFFIC (Hrs) [__ __]

10. MAXIMUM MATERIAL TEMPERATURE FOR TRAFFIC OPENING (if used) (°F) [__ __ __]

11. AIR TEMPERATURE DURING PLACEMENT OPERATIONS
    High Temperature (°F) [__ __]
    Low Temperature (°F) [__ __]

12. PREDOMINATE ROAD SURFACE MOISTURE CONDITION DURING PLACEMENT OPERATIONS [__]
    Dry ..... 1 Moist ..... 2 Wet 3

PREPARER_____ EMPLOYER _____ DATE _____

SPS-5 CONSTRUCTION DATA SHEET 6 PREPARATION OF MILLED TEST SECTIONS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO [__ __]

1. DATE OF MILLING OPERATION [__ __ - __ __ - __ __]

2. MANUFACTURER OF MILLING MACHINE (Specify) _____

3. MILLING MACHINE MODEL DESIGNATION (Specify) _____

4. WIDTH OF CUTTING HEAD (Inches) [__ __ __]

5. TOTAL MILLED DEPTH (Inches)

Location	No. Measrmnts	Maximum	Minimum	Std. Dev.	Average
Inside lane edge	__ __ .	__ __ . __	__ __ . __	__ __ . __	[__ . __]
Outside lane edge	__ __ .	__ __ . __	__ __ . __	__ __ . __	[__ . __]

MILLED SURFACE CHARACTERISTICS

6. Macro Texture [__]
   Fine Macro Texture (#1/4 inch) ..... 1 Coarse Macro Texture(>1/4 inch) 2

7. Estimate of extent of test section surface area delaminated (Percent) [__ __]

8. Height of Ridge Between Parallel Passes? (Inches) [__ . __]

9. Other Comments? (Yes, No) [___]
   Comments _____
   _____

10. WHERE PATCHES PLACED AFTER MILLING? (Yes, No) [_____]
    (If yes complete Construction Data Sheet 3)

11. LENGTH OF TIME MILLED SURFACE WAS OPENED TO TRAFFIC? (Hrs.) [__ __ __]
12. WAS MILL REPLACEMENT LAYER THICKER THAN MILL DEPTH (YES, NO) [_____]
13. LAYER NUMBER OF MILL REPLACEMENT [__]
14. NOMINAL THICKNESS OF MILL REPLACEMENT MATERIAL (Inches) [__ __ . __]

15. TYPE OF MILL REPLACEMENT LAYER MATERIAL [__]
    "Virgin" Asphalt Concrete ..... 1 Recycled Asphalt Concrete 2
    Other ..... 3 (Specify) _____

16. WAS ADJACENT TRAVEL LANE MILLED TO SAME DEPTH AS TEST LANE? (Yes, No) [_____]
    IF NO, WIDTH MILLED SAME DEPTH AS TEST LANE (Feet) [__ __ . __]

17. COMMENTS _____

PREPARER_____ EMPLOYER _____ DATE _____

January 1993

SPS-5 CONSTRUCTION DATA SHEET 7 OVERLAY PLACEMENT OPERATIONS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. DATE SURFACE PREPARATION BEGAN (Month-Day-Year) [__ __-__ __- __ __]
2. DATE SURFACE PREPARATION COMPLETED [__ __-__ __- __ __]

3. SURFACE PREPARATION PRIOR TO PLACEMENT OF OVERLAY [__]
   None ..... 1 Broomed ..... 2 Broomed + Asphaltic Tack Coat 3
   Asphaltic Tack Coat (only) 4

4. TACK COAT MATERIAL
   Material Type None ..... 1 SS-1 ..... 2 SS-1H ..... 3 CRS-1 ..... 4 [__ __]
   CRS-2 ..... 5 CMS-2 ..... 6 CMS-2H ..... 7 CSS-1 ..... 8 CSS-1H 9
   Other ....10 (Specify)

5. TACK COAT DILUTION (Percent) [__ __]
   or Mixing Rate Parts Diluent _____ TO Parts Asphalt _____

6. TACK COAT APPLICATION RATE (Ga1/Sq. Yd.) [__ . __ __]

7. ASPHALT CONCRETE PLANT AND HAUL

	Type	Name	Haul Distance (Mi)	Time (Min)	Layer Numbers
Plant 1	[___]	_____	[__ __ __]	[___ ___]	[__] [__] [__]
Plant 2	[___]	_____	[__ __ __]	[___ ___]	[__] [__] [__]
Plant 3	[___]	_____	[__ __ __]	[___ ___]	[__] [__] [__]

   Plant Type: Batch ..... 1 Drum Mix ..... 2 Other ..... 3 Specify _____

8. MANUFACTURER OF ASPHALT CONCRETE PAVER _____

9. MODEL DESIGNATION OF ASPHALT CONCRETE PAVER _____

10. SINGLE PASS LAYDOWN WIDTH (Feet) [__ __ . __]

11. Layer No.	12. Material Type Classification Code	13. Nominal Lift Placement Thickness				14. Tack Coat Between Lifts? (Y/N)	15. Transverse Joint Station
		1st Lift	2nd Lift	3rd Lift	4th Lift		
[__ __]	[__ __]	[__.__]	[__.__]	[__.__]	[__.__]	[__]	[__+__ __]
[__ __]	[__ __]	[__.__]	[__.__]	[__.__]	[__.__]	[__]	[__+__ __]
[__ __]	[__ __]	[__.__]	[__.__]	[__.__]	[__.__]	[__]	[__+__ __]

16. LOCATION OF LONGITUDINAL SURFACE JOINT [__]
    Between lanes ..... 1 Within lane ..... 2 (specify offset from pavement lane edge in feet) [__ __.__]

17. SIGNIFICANT EVENTS DURING CONSTRUCTION (disruptions, rain, equip. problems, etc.)
    _____
    _____

.

PREPARER _____ EMPLOYER _____ DATE _____

SPS-5 CONSTRUCTION DATA SHEET 8 OVERLAY COMPACTION DATA	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. DATE PAVING OPERATIONS BEGAN (Month-Day-Year) [__ __-__ __-__ __]
2. DATE PAVING OPERATIONS COMPLETED [__ __-__ __-__ __]

3. LAYER NUMBER [__]

4. MIXING TEMPERATURE (°F) [__ __ __.]

5. LAYDOWN TEMPERATURES (°F)
   - Mean..... __ __ __.
   - Minimum..... __ __ __.
   - Standard Deviation... __ __.__
   - Number of Tests ..... __ __.
   - Maximum..... __ __ __.

ROLLER DATA

	Roller Code #	Roller Description	Gross Wt (Tons)	Tire Press. (psi)	Frequency (Vibr./Min)	Amplitude (Inches)	Speed (mph)
6	A	Steel-Whl Tandem	__ __.__				
7	B	Steel-Whl Tandem	__ __.__				
8	C	Steel-Whl Tandem	__ __.__				
9	D	Steel-Whl Tandem	__ __.__				
10	E	Pneumatic-Tired	__ __.__	__ __ __ __.			
11	F	Pneumatic-Tired	__ __.__	__ __ __ __.			
12	G	Pneumatic-Tired	__ __.__	__ __ __ __.			
13	H	Pneumatic-Tired	__ __.__				
14	I	Single-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
15	J	Single-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
16	K	Single-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
17	L	Single-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
18	M	Double-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
19	N	Double-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
20	O	Double-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
21	P	Double-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
22	Q	Other					

	COMPACTION DATA	First Lift	Second Lift	Third Lift	Fourth Lift
	BREAKDOWN				
23	Roller Code (A-Q)	__	__	__	__
24	Coverages	__ __.	__ __.	__ __.	__ __.
	INTERMEDIATE				
25	Roller Code (A-Q)	__	__	__	__
26	Coverages	__ __.	__ __.	__ __.	__ __.
	FINAL				
27	Roller Code (A-Q)	__	__	__	__
28	Coverages	__ __.	__ __.	__ __.	__ __.
29	Air Temperature (°F)	__ __ __.	__ __ __.	__ __ __.	__ __ __.
30	Compacted Thickness (In)	__.__	__.__	__.__	__.__
31	Curing Period (Days)	__ __.__	__ __.__	__ __.__	__ __.__

PREPARER EMPLOYER DATE

SPS-5 CONSTRUCTION DATA SHEET 9 CONSTRUCTION QUALITY CONTROL MEASUREMENTS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO [__ __]

1. NUCLEAR DENSITY MEASUREMENTS

LAYER TYPE	Rut Level-Up	Mill Replacement	Binder Course	Surface Course	Surface Friction Layer
Measurement Method (A, B, C) [1]	___	___	___	___	___
Rod Depth (Inches)	___ ___	___ ___	___ ___	___ ___	___ ___
Number of Measurements	___ ___	___ ___	___ ___	___ ___	___ ___
Average (pcf)	__ __ __ . __	__ __ __ . __	__ __ __ . __	__ __ __ . __	__ __ __ . __
Maximum (pcf)	__ __ __ . __	__ __ __ . __	__ __ __ . __	__ __ __ . __	__ __ __ . __
Minimum (pcf)	__ __ __ . __	__ __ __ . __	__ __ __ . __	__ __ __ . __	__ __ __ . __
Standard Deviation (pcf)	__ __ __ . __	__ __ __ . __	__ __ __ . __	__ __ __ . __	__ __ __ . __
Layer Number	__ __	__ __	__ __	__ __	__ __

[1] Measurement Method Backscatter ..... A Direct Transmission ..... B Air Gap C

2. MANUFACURER OF NUCLEAR DENSITY GAUGE _____

3. NUCLEAR DENS ITY GAUGE MODEL NUMBER _____

4. NUCLEAR DENSITY GAUGE IDENTIFICATION NUMBER _____

5. NUCLEAR GAUGE COUNT RATE FOR STANDARDIZATION __ __ __ __ __

6. PROFILOGRAPH MEASUREMENTS

Profilograph Type California ..... 1 Rainhart ..... 2 ___
Profile Index (Inches/Mile) ___ ___
Interpretation Method Manual ..... 1 Mechanical ..... 2 Computer ..... 3 ___
Height of Blanking Band (Inches) ___ . ___ ___
Cutoff Height (Inches) ___ . ___ ___

7. SURFACE PROFILE USED AS BASIS OF INCENTIVE PAYMENT? (YES, NO) ___

PREPARER_____ EMPLOYER _____ DATE _____

SPS-5 CONSTRUCTION DATA SHEET 10 LAYER THICKNESS MEASUREMENTS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO [__ __]

LAYER THICKNESS MEASUREMENTS (Inches) SHEET ___ OF ___

STATION NUMBER	OFFSET (Inches)	RUT LEVEL-UP	MILL REPLACEMENT	BINDER COURSE	SURFACE COURSE	SURFACE FRICTION LAYER
__ + __ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
__ + __ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
__ + __ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
__ + __ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
__ + __ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
__ + __ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
__ + __ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
LAYER NUMBER		___ ___	___ ___	___ ___	___ ___	___ ___

PREPARER____________________ EMPLOYER ___________________ DATE ________________

SPS-5 CONSTRUCTION DATA SHEET 11 MISCELLANEOUS CONSTRUCTION NOTES AND COMMENTS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO [__ __]

Provide any miscellaneous comments and notes concerning construction operations which may have an influence on the ultimate performance of the test sections or which may cause undesired performance differences to occur between test sections. Also include any quality control measurements or data for which space is not provided on other forms. Provide an indication of the basis for such measurements, such as an ASTM, AASHTO, or Agency standard test designation.

PREPARER_____ EMPLOYER _____ DATE _____

APPENDIX B

DATA COLLECTION SHEETS

(Reproduced from Data Collection Guide)

Revised June 13, 1988

*STATE ASSIGNED ID [__ __ __ __]

SHEET 1 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

PROJECT AND SECTION IDENTIFICATION

* 1.DATE OF DATA COLLECTION OR UPDATE (MO/YR) [__ __/__ __]

* 2.STATE HIGHWAY AGENCY (SHA) DISTRICT NUMBER [__ __.]

* 3.COUNTY OR PARISH [__ __ __.]

* 4.FUNCTIONAL CLASS (SEE TABLE A.2, APPENDIX A) [__ __.]

* 5.ROUTE SIGNING (NUMERIC CODE) [__.]
Interstate.....1 State.....3
U. S. .....2 Other.....4

* 6.ROUTE NUMBER [__ __ __ __ __.]

* 7.LTPP EXPERIMENT CODE (SEE TABLE A.3, APPENDIX A) [__ __.]

* 8.TYPE OF PAVEMENT (SEE CODES, TABLE A.4) [__ __.]

* 9.NUMBER OF THROUGH LANES (ONE DIRECTION) [__.]

*10.DIRECTION OF TRAVEL [__.]
East Bound.....1 North Bound.....3
West Bound.....2 South Bound.....4

SECTION LOCATION STARTING POINT

*11.MILEPOINT ..... [__ __ __.__ __]
*12.ELEVATION ..... [__ __ __ __ __]
*13.LATITUDE ..... [__ __° __ __' __ __.__ __"]
*14.LONGITUDE ..... [__ __ __° __ __' __ __.__ __"]

*15.ADDITIONAL LOCATION INFORMATION (SIGNIFICANT LANDMARKS):[_____

_____

_____]

16.HPMS SAMPLE NUMBER (HPMS ITEM 28)

__ __ __ __ __ __ __ __ __ __ __ __

17.HPMS SECTION SUBDIVISION (HPMS ITEM 29) __.

Revised June 13, 1988

*STATE ASSIGNED ID [__ __ __ __]

SHEET 2 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM _____

GEOMETRIC, SHOULDER AND DRAINAGE INFORMATION

* 1. LANE WIDTH (FEET) [__ __.]

* 2. MONITORING SITE LANE NUMBER[1] [__.]
(LANE 1 IS OUTSIDE LANE, NEXT TO SHOULDER
LANE 2 IS NEXT TO LANE 1, ETC)

* 3. SUBSURFACE DRAINAGE LOCATION [__.]
Continuous Along Test Section...1
Intermittent.....2

* 4. SUBSURFACE DRAINAGE TYPE [__.]

No Subsurface Drainage..1	Well System.....5
Longitudinal Drains.....2	Drainage Blanket with Longitudinal Drains...6
Transverse Drains.....3	
Drainage Blanket.....4	
Other (Specify)_____7	

SHOULDER DATA	INSIDE SHOULDER	OUTSIDE SHOULDER
* 5. SURFACE TYPE	__	[__]
Turf..... 1 Concrete..... 4		
Granular..... 2 Surface Treatment. 5		
Asphalt Concrete.. 3		
Other (Specify)_____ 6		
6. TOTAL WIDTH (FEET)	__ __.	__ __.
7. PAVED WIDTH (FEET)	__ __.	__ __.
8. SHOULDER BASE TYPE (CODES-TABLES A.6)	__ __	__ __
9. SURFACE THICKNESS (INCHES)	__ __.__	__ __.__
10. BASE THICKNESS (INCHES)	__ __.__	__ __.__
ADDITIONAL DATA FOR PCC SHOULDERS:		
11. AVERAGE JOINT SPACING (FEET)	__ __ __.	__ __ __.
12. SKEWNESS OF JOINTS (FEET)	__.__	__.__
13. JOINTS MATCH PAVEMENT JOINTS? (YES - 1, NO - 2)	__	__
14. REINFORCED? (YES - 1, NO - 2)	__	__

15. DIAMETER OF LONGITUDINAL DRAINPIPES (INCHES) __.__

16. SPACING OF LATERALS (FEET) __ __ __.

'ES:

1. For the LTPP studies, only the outside lane will be studied, so the number "1" should always be entered.

Revised June 13, 1988

*STATE ASSIGNED ID [__ __ __ __]

SHEET 3

*STATE CODE [__ __]

INVENTORY DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

LAYER DESCRIPTIONS

LAYER[1] NUMBER	*LAYER[2] DESCRIPTION	*MATERIAL[3] TYPE CLASSIFICATION	<------ LAYER THICKNESS (IN) ------> *MEAN	MIN.	MAX.	STD. DEV.	*LAYER[4] TYPE
1	SUBGRADE(7)	[__ __]					[__]
2	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
3	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
4	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
5	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
6	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
7	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
8	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
9	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]

*DEPTH BELOW SURFACE TO "RIGID" LAYER (FEET) [__ __._]
(ROCK, STONE, DENSE SHALE)

NOTES:

1. Layer 1 is subgrade soil, last layer is existing surface.

2. Layer description codes:

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

3. The material type classification codes for surface, base or subbase, subgrade, and seal coat or interlayer materials appear in Tables A.5, A.6, A.7 and A.8, respectively.

4. Layer Types:
   - A - HMAC Layer (Requires sheets 12-18 to be filled out)
   - P - PCC Layer (Requires sheets 5-11 to be filled out)
   - B - Base/Subbase Layers (Requires sheets 19 and 20 to be filled out)
   - G - Subgrade (Requires sheets 21 and 22 to be filled out)

*STATE ASSIGNED ID [__ __ __ __]

SHEET 4 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

AGE AND MAJOR PAVEMENT IMPROVEMENTS

* 1. DATE OF LATEST (RE)CONSTRUCTION (MONTH/YEAR) [__ __/__ __]

* 2. DATE SUBSEQUENTLY OPENED TO TRAFFIC (MONTH/YEAR) [__ __/__ __]

3. LATEST (RE)CONSTRUCTION COST PER LANE MILE (IN THOUSANDS OF DOLLARS)[1] __ __ __ __ __.

MAJOR IMPROVEMENTS SINCE LATEST (RE)CONSTRUCTION

* 4. YEAR	* 5. WORK TYPE CODE (TABLE A.17)	* 6. WORK QUANTITY (TABLE A.17 for units)	7. THICKNESS (INCHES)	8. TOTAL COST[1] (THOUSANDS OF DOLLARS PER LANE-MILE)
__ __]	[__ __]	[__ __ __ __ __.]	__ __.__	__ __ __.
[__ __]	[__ __]	[__ __ __ __ __.]	__ __.__	__ __ __.
[__ __]	[__ __]	[__ __ __ __ __.]	__ __.__	__ __ __.
[__ __]	[__ __]	[__ __ __ __ __.]	__ __.__	__ __ __.
[__ __]	[__ __]	[__ __ __ __ __.]	__ __.__	__ __ __.
[__ __]	[__ __]	[__ __ __ __ __.]	__ __.__	__ __ __.

* 9. YEAR WHEN ROADWAY WIDENED [__ __]

*10. ORIGINAL NUMBER OF LANES (ONE DIRECTION) [__]

*11. FINAL NUMBER OF LANES (ONE DIRECTION) [__]

*12. LANE NUMBER OF LANE ADDED[2] [__]

NOTES 1. Cost is to represent pavement structure cost. Non-pavement costs such as cut and fill work, work on bridges, culverts, lighting, and guard rails are to be excluded.

2. A lane created by roadway widening should not be used for SHRP LTPP unless the pavement structure under the entire lane was constructed at the same time and is uniform.

Revised June 13, 1988

*STATE ASSIGNED ID [__ __ __ __]

SHEET 12

*STATE CODE [__ __]

INVENTORY DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

PLANT MIXED ASPHALT BOUND LAYERS
AGGREGATE PROPERTIES

* 1. LAYER NUMBER (FROM SHEET 3) [__]

COMPOSITION OF COARSE AGGREGATE			TYPE	PERCENT
* 2. Crushed Stone.....1	Crushed Slag.....4		[__]	[__ __ __.]
* 3. Gravel.....2	Manufactured		[__]	[__ __ __.]
* 4. Crushed Gravel.....3	Lightweight.....5		[__]	[__ __ __.]
Other (Specify)_____6				

* 5. GEOLOGIC CLASSIFICATION OF COARSE AGGREGATE [__ __.]
(SEE GEOLOGIC CLASSIFICATION CODES, TABLE A.9)

COMPOSITION OF FINE AGGREGATE	TYPE	PERCENT
* 6. Natural Sand.....1	[__]	[__ __ __.]
* 7. Crushed or Manufactured Sand (From	[__]	[__ __ __.]
* 8. Crushed Gravel or Stone).....2	[__]	[__ __ __.]
Recycled Concrete.....3		
Other (Specify)_____4		

* 9. TYPE OF MINERAL FILLER [__]

Stone Dust.....1	Portland Cement....3
Hydrated Lime.....2	Fly Ash.....4
Other (Specify)_____5	

AGGREGATE DURABILITY TEST RESULTS
(SEE DURABILITY TEST TYPE CODES,TABLE A.13)

TYPE OF AGGREGATE	TYPE OF TEST	RESULTS
10. Coarse	__ __	__ __ __.__ __ __
11. Coarse	__ __	__ __ __.__ __ __
12. Coarse	__ __	__ __ __.__ __ __
13. Coarse	__ __	__ __ __.__ __ __

14. POLISH VALUE OF COARSE AGGREGATES __ __.
SURFACE LAYER ONLY (AASHTO T279, ASTM D3319)

Revised June 13, 1988

*STATE ASSIGNED ID [__ __ __ __]

SHEET 13

*STATE CODE [__ __]

INVENTORY DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

PLANT MIXED ASPHALT BOUND LAYERS

AGGREGATE PROPERTIES (CONTINUED)

* 1.LAYER NUMBER (FROM SHEET 3) [__]

* 2. GRADATION OF COMBINED AGGREGATES

Sieve Size or No.	% Passing	Sieve Size or No.	% Passing
2"....	[__ __ __]	No. 4.....	[__ __]
1 1/2".....	[__ __ __]	No. 8.....	[__ __]
1".....	[__ __ __]	No. 10.....	[__ __]
7/8".....	[__ __ __]	No. 16.....	[__ __]
3/4 ".....	[__ __ __]	No. 30.....	[__ __]
5/8".....	[__ __ __]	No. 40.....	[__ __]
1/2".....	[__ __ __]	No. 50.....	[__ __]
3/8".....	[__ __]	No. 80.....	[__ __]
		No. 100.....	[__ __]
		No. 200.....	[__ __]

BULK SPECIFIC GRAVITIES:

* 3. Coarse Aggregate (AASHTO T85 or ASTM C127) [__.__ __ __]

* 4. Fine Aggregate (AASHTO T84 or ASTM C128) [__.__ __ __]

* 5. Mineral Filler (AASHTO T100 or ASTM D854) [__.__ __ __]

* 6. Aggregate Combination (Calculated) [__.__ __ __]

7.EFFECTIVE SPECIFIC GRAVITY OF AGGREGATE COMBINATION (Calculated) __.__ __ __

Revised June 13, 1988

*STATE ASSIGNED ID [__ __ __ __]

SHEET 14

*STATE CODE [__ __]

INVENTORY DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

PLANT MIXED ASPHALT BOUND LAYERS
ASPHALT CEMENT PROPERTIES

* 1. LAYER NUMBER (FROM SHEET 3) [__]

* 2. ASPHALT GRADE (SEE ASPHALT CODE SHEET, TABLE A.16) [__ __]
(IF OTHER, SPECIFY_____)

* 3. SOURCE (SEE SUPPLY CODE SHEET, TABLE A.14) [__ __]
(IF OTHER, SPECIFY _____)

* 4. SPECIFIC GRAVITY OF ASPHALT CEMENT
(AASHTO T228) [__.__ __ __]

ORIGINAL ASPHALT CEMENT PROPERTIES

5. VISCOSITY OF ASPHALT AT 140°F (POISES)
(AASHTO T202) [__ __ __ __ __ __.]

* 6. VISCOSITY OF ASPHALT AT 275°F (CENTISTOKES)
(AASHTO T201) [__ __ __ __.__ __]

* 7. PENETRATION AT 77°F (AASHTO T49) (TENTHS OF A MM)
(100 g., 5 sec.) [__ __ __.]

ASPHALT MODIFIERS (SEE TYPE CODE, TABLE A.15)

	TYPE	QUANTITY(%)
* 8. MODIFIER #1	[__ __].	[__ __].
* 9. MODIFIER #2	[__ __].	[__ __].

(IF OTHER, SPECIFY TYPE _____)

10. DUCTILITY AT 77°F (CM)
(AASHTO T51) __ __ __.

11. DUCTILITY AT 39.2°(CM)
(AASHTO T51) __ __ __.

12. TEST RATE FOR DUCTILITY MEASUREMENT
AT 39.2°F (CM/MIN) __ __ __.

13. PENETRATION AT 39.2°F (AASHTO T49) (TENTHS OF A MM)
(200 g., 60 sec.) __ __ __.

14. RING AND BALL SOFTENING POINT (AASHTO T53) (°F) __ __ __.

NOTE: If emulsified or cutback asphalt was used, enter "N" in the spaces for "Original Asphalt Cement Properties".

Revised June 13, 1988

*STATE ASSIGNED ID [__ __ __ __]

SHEET 15 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

PLANT MIXED ASPHALT BOUND LAYERS

ASPHALT CEMENT PROPERTIES (CONTINUED)

* 1. LAYER NUMBER (FROM SHEET 3) [__]

LABORATORY AGED ASPHALT CEMENT PROPERTIES

2. TEST PROCEDURE USED TO MEASURE AGING EFFECTS __

ASTM D1754 - THIN FILM OVEN TEST.....1
ASTM D2872 - ROLLING THIN FILM OVEN TEST...2
OTHER (SPECIFY)_____3

3. VISCOSITY OF ASPHALT AT 140°F (POISE) (AASHTO T202) __ __ __ __ __ __.

4. VISCOSITY OF ASPHALT AT 275°F (CENTISTOKES) (AASHTO T201) __ __ __ __.__ __

5. DUCTILITY AT 77°F (CM) (AASHTO T51) __ __ __.

6. DUCTILITY AT 39.2°F (CM) (AASHTO T51) __ __ __.

7. TEST RATE FOR DUCTILITY MEASUREMENT AT 39.2°F (CM/MIN) __ __.__

8. PENETRATION AT 77°F, 100 g., 5 Sec. (TENTHS OF A MM) (AASHTO T49) __ __ __.

9. PENETRATION AT 39.2°F, 200 g., 60 Sec. (TENTHS OF A MM) (AASHTO T49) __ __.

10. RING AND BALL SOFTENING POINT (°F) (AASHTO T53) __ __ __.

11. WEIGHT LOSS (PERCENT) __.__

NOTE: If emulsified or cutback asphalt was used, enter "N" in the spaces for "Laboratory Aged Asphalt Cement Properties".

Revised June 13, 1988

*STATE ASSIGNED ID [__ __ __ __]

SHEET 16 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

PLANT MIXED ASPHALT BOUND LAYERS

ORIGINAL MIXTURE PROPERTIES

* 1. LAYER NUMBER (FROM SHEET 3) [__]

* 2. TYPE OF SAMPLES [__]
SAMPLES COMPACTED IN LABORATORY.....1
SAMPLES TAKEN FROM TEST SECTION.....2

* 3. MAXIMUM SPECIFIC GRAVITY (NO AIR VOIDS)
(AASHTO T209 OR ASTM D2041) [__.__ __ __]

BULK SPECIFIC GRAVITY (ASTM D1188)

* 4. MEAN .....[__.__ __ __] NUMBER OF TESTS ..... __ __.
5. MINIMUM ..... __.__ __ __ MAXIMUM ..... __.__ __ __
6. STD. DEV..... __.__ __ __

ASPHALT CONTENT (PERCENT WEIGHT OF TOTAL MIX)
(AASHTO T164 OR ASTM D2172)

* 7. MEAN .....[__ __.__] NUMBER OF SAMPLES .... __ __.
8. MINIMUM ..... __ __.__ MAXIMUM ..... __ __.__
9. STD. DEV. ..... __ __.__

PERCENT AIR VOIDS

*10. MEAN .....[__ __.__] NUMBER OF SAMPLES .... __ __.
11. MINIMUM ..... __ __.__ MAXIMUM ..... __ __.__
12. STD. DEV. ..... __ __.__

13. VOIDS IN MINERAL AGGREGATE (PERCENT) __ __.__

14. EFFECTIVE ASPHALT CONTENT (PERCENT) __ __.__

15. MARSHALL STABILITY (LBS) (AASHTO T245 OR ASTM D1559) __ __ __ __.

16. NUMBER OF BLOWS __ __

17. MARSHALL FLOW (HUNDREDTHS OF AN INCH) __ __ __ __.
(AASHTO T245 OR ASTM D1559)

18. HVEEM STABILITY (AASHTO T246 OR ASTM D1561) __ __ __.

19. HVEEM COHESIOMETER VALUE (GRAMS/25 MM OF WIDTH)
(AASHTO T246 OR ASTM D1561) __ __ __ __.

Revised June 13, 1988

*STATE ASSIGNED ID [__ __ __ __]

SHEET 17

*STATE CODE [__ __]

INVENTORY DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

PLANT MIXED ASPHALT BOUND LAYERS

ORIGINAL MIXTURE PROPERTIES

CONTINUED

* 1.LAYER NUMBER (FROM SHEET 3) [__]

* 2.TYPE ASPHALT PLANT [__]

BATCH PLANT.....1 DRUM MIX PLANT.....2

OTHER (SPECIFY)_____3

* 3.TYPE OF ANTISTRIPPING AGENT USED
(SEE TYPE CODES, TABLE A.21) [__ __]
(Other, Specify_____)

* 4.AMOUNT OF ANTISTRIPPING AGENT USED LIQUID OR SOLID CODE [__]

* 5. (If liquid, enter code 1, and amount as percent of asphalt cement weight. If solid, enter code 2 and amount as percent of aggregate weight.) [__ __.__]

6.MOISTURE SUSCEPTIBILITY TEST TYPE __

1 - AASHTO T165 (ASTM D1075)
2 - TEXAS FREEZE-THAW PEDESTAL TEST (REF. 21)
3 - TEXAS BOILING TEST (REF. 22)
4 - REVISED LOTTMAN PROCEDURE (AASHTO T283)
5 - OTHER (SPECIFY) _____

MOISTURE SUSCEPTIBILITY TEST RESULTS:

7. HVEEM STABILITY NO. __ __

8. PERCENT STRIPPED __ __

9. TENSILE STRENGTH RATIO (AASHTO T283) __.__ __

10. INDEX OF RETAINED STRENGTH (AASHTO T165) __ __ __.

*STATE ASSIGNED ID [__ __ __ __]

SHEET 18

*STATE CODE [__ __]

INVENTORY DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

PLANT-MIXED ASPHALT BOUND LAYERS CONSTRUCTION DATA

* 1. LAYER NUMBER (SEE SHEET 3) [__]

2. MEAN MIXING TEMPERATURE (°F) __ __ __.

LAYDOWN TEMPERATURES (°F)

3. MEAN ..... __ __ __ NUMBER OF TESTS ..... __ __
4. MINIMUM ..... __ __ __ MAXIMUM ..... __ __ __
5. STD. DEV. ..... __ __ __

	ROLLER CODE	#	ROLLER DESCRIPTION	GROSS WGT (TONS)	TIRE PRES. (PSI)	FREQ. (VIBR/MIN)	AMPLITUDE (IN)	SPEED (MPH)
6.	A		STEEL-WHL TANDEM	__ __.__				
7.	B		STEEL-WHL TANDEM	__ __.__				
8.	C		STEEL-WHL TANDEM	__ __.__				
9.	D		STEEL-WHL TANDEM	__ __.__				
10.	E		PNEUMATIC-TIRED	__ __.__	__ __ __.			
11.	F		PNEUMATIC-TIRED	__ __.__	__ __ __.			
12.	G		PNEUMATIC-TIRED	__ __.__	__ __ __.			
13.	H		PNEUMATIC-TIRED	__ __.__	__ __ __.			
14.	I		SINGLE-DRUM VIBR.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
15.	J		SINGLE-DRUM VIBR.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
16.	K		SINGLE-DRUM VIBR.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
17.	L		SINGLE-DRUM VIBR.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
18.	M		DOUBLE-DRUM VIBR.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
19.	N		DOUBLE-DRUM VIBR.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
20.	O		DOUBLE-DRUM VIBR.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
21.	P		DOUBLE-DRUM VIBR.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
22.	Q		OTHER _____					

COMPACTION DATA

	First Lift	Second Lift	Third Lift	Fourth Lift
Breakdown				
23. Roller Code # (A-Q)	__	__	__	__
24. Coverages	__ __.	__ __.	__ __.	__ __.
Intermediate				
25. Roller Code # (A-Q)	__	__	__	__
26. Coverages	__ __.	__ __.	__ __.	__ __.
Final				
27. Roller Code # (A-Q)	__	__	__	__
8. Coverages	__ __.	__ __.	__ __.	__ __.
9. Mean Air Temp (°F)	__ __ __.	__ __ __.	__ __ __.	__ __ __.
30. Compacted Thick. (in)	__.__	__.__	__.__	__.__
31. Curing Period (days)	__ __.	__ __.	__ __.	__ __.

Revised June 13, 1988

SHEET 19

INVENTORY DATA

LTPP PROGRAM

*STATE ASSIGNED ID [__ __ __ __]

*STATE CODE [__ __]

*SHRP SECTION ID [__ __ __ __]

UNBOUND OR STABILIZED BASE OR SUBBASE MATERIAL DESCRIPTION

* 1. LAYER NUMBER (FROM SHEET 3) [__]

* 2. AASHTO SOIL CLASSIFICATION (SEE CODES, TABLE A.10) [__ __]

* 3. ATTERBERG LIMITS (ASTM D4318)
PI ..... [__ __.] LL ..... [__ __.] PL ..... [__ __.]

4. MAXIMUM LAB DRY DENSITY (PCF) __ __ __.

5. OPTIMUM LAB MOISTURE CONTENT (PERCENT) __ __.__

6. TEST USED TO MEASURE MAXIMUM DRY DENSITY __
Standard AASHTO T99.....1 ASTM D558.....4
Modified AASHTO T180.....2 ASTM D4223.....5
AASHTO T134 (SOIL-CEMENT)..3
Other (SPECIFY)_____6

7. COMPACTIVE ENERGY FOR 'OTHER' METHOD (FT.-LBS./CU.IN.) __ __.__

IN SITU DRY DENSITY (PCF)

8. MEAN ..... __ __ __ NUMBER OF SAMPLES .... __ __
9. MINIMUM ..... __ __ __ MAXIMUM ..... __ __ __
10. STD. DEV. ..... __ __ __

IN SITU MOISTURE CONTENT (PERCENT OF DRY WEIGHT)

11. MEAN ..... __ __ __ NUMBER OF SAMPLES .... __ __
12. MINIMUM ..... __ __ __ MAXIMUM ..... __ __ __
13. STD. DEV. ..... __ __ __

14. COARSE GRADATION OF BASE/SUBBASE MATL.
15. FINE GRADATION OF BASE/SUBBASE MAT

Sieve Size or No.	% Passing	Sieve Size or No.	% Passing
1 1/2".....	__ __ __	No. 4.....	__ __
1".....	__ __ __	No. 8.....	__ __
7/8".....	__ __ __	No. 10.....	__ __
3/4 ".....	__ __ __	No. 16.....	__ __
5/8".....	__ __ __	No. 30.....	__ __
1/2".....	__ __ __	No. 40.....	__ __
3/8".....	__ __	No. 50.....	__ __
		No. 80.....	__ __
		No. 100.....	__ __
		No. 200.....	__ __

*STATE ASSIGNED ID [__ __ __ __]

SHEET 20 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

UNBOUND OR STABILIZED BASE OR SUBBASE MATERIAL DESCRIPTION (CONTINUED)

* 1. LAYER NUMBER (FROM SHEET 3) [__]

TYPE AND PERCENT STABILIZING AGENT (FOR STABILIZED LAYERS ONLY)

* 2. STABILIZING AGENT 1 TYPE CODE [__] PERCENT [__ __.__]
* 3. STABILIZING AGENT 2 TYPE CODE [__] PERCENT [__ __.__]

STABILIZING AGENT TYPE CODES

Asphalt Cement	1	Lime	5
Emulsified Asphalt	2	Fly Ash, Class C	6
Cutback Asphalt	3	Fly Ash, Class N	7
Portland Cement	4		
Other (Specify) _____	8		

* 4. ADMIXTURES: TYPE [__] PERCENT [__ __.]

Calcium Chloride	1	Magnesium Chloride	3
Sodium Chloride	2		
Other (Specify) _____	4		

COMPRESSIVE STRENGTH (PSI)

* 5. MEAN [__ __ __] NUMBER OF TESTS __ __
6. MINIMUM __ __ __ MAXIMUM __ __ __
7. STD. DEV. __ __ __

* 8. TYPE OF COMPRESSION TEST [__]

AASHTO T167 (ASTM D1074)	1	AASHTO T220	2
AASHTO T24 (ASTM D1633)	2	AASHTO T234 (ASTM D2850)	4
Other (Specify) _____	5		

* 9. CONFINING PRESSURE (PSI)[1] [__ __.__]

10. CALCIUM CARBONATE CONTENT (PERCENT) (ASTM D4373) __ __ __.

11. CALIFORNIA BEARING RATIO (CBR) (AASHTO T193 OR ASTM D3668) __ __ __.

12. RESISTANCE (R-VALUE) (ASTM D2844) __ __ __.

13. MODULUS OF SUBGRADE REACTION (K-VALUE) (PSI/SQ.IN.) __ __ __.

14. TYPE OF TEST __

AASHTO T221 OR ASTM D1195	1	AASHTO T222	2

NOTE 1: If the test is unconfined, enter "0.0".

Revised June 13, 1988

*STATE ASSIGNED ID [__ __ __ __]

SHEET 21

*STATE CODE [__ __]

INVENTORY DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

SUBGRADE DATA

* 1. AASHTO SOIL CLASSIFICATION (SEE CODES, TABLE A.10) [__ __]

2. CALIFORNIA BEARING RATIO (CBR) (AASHTO T193 OR ASTM D3668) __ __ __.

3. RESISTANCE (R-VALUE) (AASHTO T190 OR ASTM D2844) __ __ __.

4. MODULUS OF SUBGRADE REACTION (K-VALUE) (PSI/IN.) __ __ __.

5. TYPE OF TEST __
   AASHTO T221 OR ASTM D1195... 1 AASHTO T222..... 2

6. PERCENT PASSING NO. 40 SIEVE __ __.__

7. PERCENT PASSING NO. 200 SIEVE __ __.__

8. PLASTICITY INDEX (AASHTO T90 OR ASTM D4318) __ __.

9. LIQUID LIMIT (AASHTO T89 OR ASTM D4318) __ __.

10. MAXIMUM LAB DRY DENSITY (PCF) __ __ __.

11. OPTIMUM LAB MOISTURE CONTENT (PERCENT) __ __.__

12. TEST USED TO MEASURE MAXIMUM DRY DENSITY __
    STANDARD AASHTO (T-99)..... 1 MODIFIED AASHTO (T-180).. 2
    Other (Specify)_____3

13. COMPACTIVE ENERGY FOR "OTHER" METHOD (FT.-LBS./CU.IN.) __ __.__

IN SITU DRY DENSITY (PERCENT OF OPTIMUM)

14. MEAN ..... __ __ __ NUMBER OF TESTS ..... __ __
15. MINIMUM ..... __ __ __ MAXIMUM ..... __ __ __
16. STD. DEV. ..... __ __ __

IN SITU MOISTURE CONTENT (PERCENT OF OPTIMUM)

17. MEAN ..... __ __ __.__ NUMBER OF TESTS ..... __ __
18. MINIMUM ..... __ __ __.__ MAXIMUM ..... __ __ __.__
19. STD. DEV. ..... __ __ __.__

IN SITU DRY DENSITY (PCF)

20. MEAN ..... __ __ __ NUMBER OF TESTS ..... __ __
21. MINIMUM ..... __ __ __ MAXIMUM ..... __ __ __
22. STD. DEV. ..... __ __ __

IN SITU MOISTURE CONTENT (PERCENT OF DRY WEIGHT)

23. MEAN ..... __ __ __ NUMBER OF TESTS ..... __ __
24. MINIMUM ..... __ __ __ MAXIMUM ..... __ __ __
25. STD. DEV. ..... __ __ __

Revised June 13, 1988

*STATE ASSIGNED ID [__ __ __ __]

SHEET 22 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

SUBGRADE DATA (CONTINUED)

RELATIVE DENSITY OF COHESIONLESS FREE-DRAINING SOILS
(ASTM D2049)

MEASURED DENSITIES FROM LABORATORY TESTS (PCF):

1. MINIMUM ..... __ __ __.__ MAXIMUM ..... __ __ __.__

RELATIVE DENSITIES (PERCENT):

2. MEAN ..... __ __.__ NUMBER OF TESTS ..... __ __
3. MINIMUM ..... __ __.__ MAXIMUM ..... __ __.__
4. STD. DEV. ..... __ __.__

5. SOIL SUCTION (TSF) (AASHTO T273) __ __ __.__

6. EXPANSION INDEX __ __ __.
(NEW TEST UNDER COMMITTEE BALLOT BY ASTM IN DEC. 1987)

SWELL PRESSURE (PSI)
7. TEST VALUE __ __ __.
8. TEST CODE __
AASHTO T190 OR ASTM D2844.1 AASHTO T258, Method 1..2
Other _____3

9. PERCENT BY WEIGHT FINER THAN 0.02MM[1] __ __.__

10. AVERAGE RATE OF HEAVE DURING STANDARD LABORATORY FREEZING TEST (MILLIMETERS/DAY)[1] __ __.__

11. FROST SUSCEPTIBILITY CLASSIFICATION CODE[1] __

Negligible.....1	Medium.....4
Very Low.....2	High.....5
Low.....3	Very High.....6

NOTE 1: This data is only required in "Freeze Zones" where frost may be expected to penetrate into the subgrade.

Revised August 30, 1989

SHEET 1

MAINTENANCE DATA

LTPP PROGRAM

*STATE ASSIGNED ID __ __ __ __

*STATE CODE __ __

*SHRP SECTION ID __ __ __ __

HISTORICAL MAINTENANCE INFORMATION[1]

1 *YEAR	2 *MAINT. CASE NO. (CASE)	3 *WORK TYPE CODE (TABLE A.17)	4 *MAINTENANCE LOCATION CODE (TABLE A.18)	5 *MAINT. MATERIAL CODE (TABLE A.19)	6 *WORK QUANTITY	7 *THICKNESS (INCHES)	8 *TOTAL COST[2] (THOUSANDS OF DOLLAR PER LANE-MILE)
__ __	__ __ __	__ __	__ __	__ __	__ __ __ __ __.	__ __.__	__ __ __.
__ __	__ __ __	__ __	__ __	__ __	__ __ __ __ __.	__ __.__	__ __ __.
__ __	__ __ __	__ __	__ __	__ __	__ __ __ __ __.	__ __.__	__ __ __.
__ __	__ __ __	__ __	__ __	__ __	__ __ __ __ __.	__ __.__	__ __ __.
__ __	__ __ __	__ __	__ __	__ __	__ __ __ __ __.	__ __.__	__ __ __.
__ __	__ __ __	__ __	__ __	__ __	__ __ __ __ __.	__ __.__	__ __ __.

Note 1. This data will frequently be very difficult to convert from existing records for pre-SHRP monitoring work, but it is sufficiently important that every effort should be made to obtain it.

Note 2. Maintenance costs should be converted to thousands of dollars per lane-mile for uniformity with other cost data.

Revised August 30, 1989

***STATE ASSIGNED ID** [__ __ __ __]

SHEET 5 ***STATE CODE** [__ __]

MAINTENANCE DATA ***SHRP SECTION ID** [__ __ __ __]

LTPP PROGRAM

CRACK SEALING DATA FOR PAVEMENT WITH ASPHALT CONCRETE SURFACES

1. ***DATE WORK BEGAN** (MONTH/DAY/YEAR) [__ __ /__ __ /__ __]
   ***DATE WORK WAS COMPLETED** (MONTH/DAY/YEAR) [__ __ /__ __ /__ __]

2. ***AVERAGE CRACK SEVERITY LEVEL** (SEE DISTRESS IDENTIFICATION MANUAL)
   (LOW = 1, MODERATE = 2, HIGH = 3) [__]

3. ***PRIMARY TYPE OF CRACKS** (SEE TABLE A.22 FOR TYPE CODES) [__ __]
   (SEE DISTRESS IDENTIFICATION MANUAL FOR DESCRIPTION)

4. ***TYPE OF MATERIAL USED TO SEAL CRACKS** [__]

ASPHALT CEMENT.....1	EMULSIFIED ASPHALT CEMENT WITH SAND.....5
EMULSIFIED ASPHALT CEMENT..2	PROPRIETARY CRACK/JOINT SEALANT.....6
CUTBACK ASPHALT CEMENT.....3	MODIFIED ASPHALT.....7
EMULSIFIED ASPHALT CEMENT SLURRY SEAL.....4	

   OTHER (SPECIFY)_____8
   DATA SOURCE - ACTUAL = 1 PLANS/SPECS = 2 JUDGEMENT = 3 [__]
   IF 6 OR 7 ABOVE, COMPLETE FOLLOWING:
   MANUFACTURER NAME [_____]
   MANUFACTURER SEALANT NAME [_____]

5. ***AMBIENT CONDITIONS AT TIME OF CRACK SEALING**
   AIR TEMPERATURES (^{0}F) LOW __ __ __.
   HIGH __ __ __.
   ***SURFACE MOISTURE** - DRY = 1, WET = 2 [__]
   DATA SOURCE - ACTUAL = 1 PLANS/SPECS = 2 JUDGEMENT = 3 __

6. APPROXIMATE TOTAL LENGTH OF CRACKS SEALED, FEET __ __ __ __.

7. METHOD USED TO CLEAN CRACK PRIOR TO SEALING __

NONE.....1	STEEL WIRE BRUSH.....4
COMPRESSED AIR.....2	BROOMING.....5
ROUTING.....3	HOT AIR LANCE.....6

   OTHER (SPECIFY)_____7
   DATA SOURCE - ACTUAL = 1 PLANS/SPECS = 2 JUDGEMENT = 3 __

*STATE ASSIGNED ID [__ __ __ __]

SHEET 3

*STATE CODE [__ __]

REHABILITATION DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

ASPHALT CONCRETE OVERLAY AGGREGATE PROPERTIES

* 1. LAYER NUMBER (FROM SHEET 2) [__]

COMPOSITION OF COARSE AGGREGATE (Items 2., 3., and 4.)

			TYPE	PERCENT
Crushed Stone... 1	Crushed Slag..... 4	* 2.	[__]	[__ __ __.]
Gravel..... 2	Manufactured	* 3.	[__]	[__ __ __.]
Crushed Gravel.. 3	Lightweight.... 5	* 4.	[__]	[__ __ __.]
Other (Specify)_____ 6				

* 5. GEOLOGIC CLASSIFICATION OF COARSE AGGREGATE [__ __.]
(SEE GEOLOGIC CLASSIFICATION CODES, TABLE A.9)

COMPOSITION OF FINE AGGREGATE (Items 6., 7., and 8.)

		TYPE	PERCENT
Natural Sand..... 1	* 6.	[__]	[__ __ __.]
Manufactured Sand (From	* 7.	[__]	[__ __ __.]
Crushed Gravel or Stone)..... 2	* 8.	[__]	[__ __ __.]
Recycled Concrete..... 3			
Other (Specify)_____ 4			

* 9. TYPE OF MINERAL FILLER [__]

Stone Dust..... 1	Portland Cement... 3
Hydrated Lime..... 2	Fly Ash..... 4
Other (Specify)_____ 5	

AGGREGATE DURABILITY TEST RESULTS (Items 10. to 13.)
(SEE DURABILITY TEST TYPE CODES, TABLE A.13)

	TYPE OF AGGREGATE	TYPE OF TEST	RESULTS
10.	COARSE	__ __	__ __ __.__ __ __
11.	COARSE	__ __	__ __ __.__ __ __
12.	COARSE	__ __	__ __ __.__ __ __
13.	COMBINED COARSE AND FINE	__ __	__ __ __.__ __ __

14. POLISH VALUE OF COARSE AGGREGATES __ __
(SURFACE LAYER ONLY) (AASHTO T279, ASTM D3319)

SHEET 4

REHABILITATION DATA

LTPP PROGRAM

*STATE ASSIGNED ID [__ __ __ __]

*STATE CODE [__ __]

*SHRP SECTION ID [__ __ __ __]

ASPHALT CONCRETE OVERLAY
AGGREGATE PROPERTIES (CONTINUED)

* 1.LAYER NUMBER (FROM SHEET 2) [__]

* 2.GRADATION OF COMBINED AGGREGATES

Sieve Size or No.	% Passing	Sieve Size or No.	% Passing
2".....	[__ __ __]	No. 4.....	[__ __]
1 1/2".....	[__ __ __]	No. 8.....	[__ __]
1".....	[__ __ __]	No. 10.....	[__ __]
7/8".....	[__ __ __]	No. 16.....	[__ __]
3/4 ".....	[__ __ __]	No. 30.....	[__ __]
5/8".....	[__ __ __]	No. 40.....	[__ __]
1/2".....	[__ __ __]	No. 50.....	[__ __]
3/8".....	[__ __]	No. 80.....	[__ __]
		No. 100.....	[__ __]
		No. 200.....	[__ __]

BULK SPECIFIC GRAVITIES (Items 3. to 6.)

* 3. COARSE AGGREGATE (AASHTO T85 OR ASTM C127) [__.__ __ __]

* 4. FINE AGGREGATE (AASHTO T84 OR ASTM C128) [__.__ __ __]

* 5. MINERAL FILLER (AASHTO T100 OR ASTM D854) [__.__ __ __]

* 6. AGGREGATE COMBINATION (CALCULATED - EQ. 7.1) [__.__ __ __]

7.EFFECTIVE SPECIFIC GRAVITY OF AGGREGATE COMBINATION (CALCULATED - EQ. 7.2) __.__ __ __

*STATE ASSIGNED ID [__ __ __ __]

SHEET 5

*STATE CODE [__ __]

REHABILITATION DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

ASPHALT CONCRETE OVERLAY
ASPHALT CEMENT PROPERTIES

* 1. LAYER NUMBER (FROM SHEET 2) [__]

* 2. ASPHALT GRADE (SEE ASPHALT CODE SHEET, TABLE A.16) [__ __]
(IF OTHER, SPECIFY_____)

* 3. SOURCE (SEE SUPPLY CODE SHEET, TABLE A.14) [__ __]
(IF OTHER, SPECIFY _____)

* 4. SPECIFIC GRAVITY OF ASPHALT CEMENT
(AASHTO T228 OR ASTM D70) [__.__ __ __]

* 5. VISCOSITY OF ASPHALT AT 140°F (POISES)
(AASHTO T202 OR ASTM D2171) [__ __ __ __ __ __.]

* 6. VISCOSITY OF ASPHALT AT 275°F (CENTISTOKES)
(AASHTO T201 OR ASTM D2170) [__ __ __ __.__ __]

* 7. PENETRATION AT 77°F (AASHTO T49 OR ASTM D5)
(TENTHS OF A MM) (100 G., 5 SEC.) [__ __ __.]

ASPHALT MODIFIERS (SEE TYPE CODE, TABLE A.15) (Items 8. and 9.)

		TYPE	QUANTITY(%)
* 8.	MODIFIER #1	[__ __.]	[__ __.]
* 9.	MODIFIER #2	[__ __.]	[__ __.]

(IF OTHER, SPECIFY TYPE _____)

10. DUCTILITY AT 77°F (CM)
(AASHTO T51 OR ASTM D113) __ __ __.

11. DUCTILITY AT 39.2°(CM)
(AASHTO T51 OR ASTM D113) __ __ __.

12. TEST RATE FOR DUCTILITY MEASUREMENT AT 39.2°F (CM/MIN) __ __ __.

13. PENETRATION AT 39.2°F (AASHTO T49 OR ASTM D5)
(TENTHS OF A MM) (200 G., 60 SEC.) __ __ __.

14. RING AND BALL SOFTENING POINT (AASHTO T53) (°F) __ __ __.

*STATE ASSIGNED ID [__ __ __ __]

SHEET 6

REHABILITATION DATA

LTPP PROGRAM

*STATE CODE [__ __]

*SHRP SECTION ID [__ __ __ __]

ASPHALT CONCRETE OVERLAY
LABORATORY AGED ASPHALT CEMENT PROPERTIES

* 1. LAYER NUMBER (FROM SHEET 2) [__]

2. TEST PROCEDURE USED TO MEASURE AGING EFFECTS __
   ASTM D1754 - Thin Film Oven Test..... 1
   ASTM D2872 - Rolling Thin Film Oven Test..... 2
   Other (Specify)_____ 3

3. VISCOSITY OF ASPHALT AT 140°F (POISES) __ __ __ __ __ __.
   (AASHTO T202 OR ASTM D2171)

4. VISCOSITY OF ASPHALT AT 275°F (CENTISTOKES) __ __ __ __.__ __
   (AASHTO T201 OR ASTM D2170)

5. DUCTILITY AT 77°F (CM) (AASHTO T51 OR ASTM D113) __ __ __.

6. DUCTILITY AT 39.2°F (CM) (AASHTO T51 OR ASTM D113) __ __ __.

7. TEST RATE FOR DUCTILITY MEASUREMENT AT 39.2°F (CM/MIN) __ __.__

8. PENETRATION AT 77°F, 100 G., 5 SEC.
   (TENTHS OF A MM) (AASHTO T49 OR ASTM D5) __ __ __.

9. PENETRATION AT 39.2°F, 200 G, 60 SEC.
   (TENTHS OF A MM) (AASHTO T49 OR ASTM D5) __ __.

10. RING AND BALL SOFTENING POINT (°F) (AASHTO T53) __ __ __.

11. WEIGHT LOSS (PERCENT) __.__

*STATE ASSIGNED ID [__ __ __ __]

SHEET 7

*STATE CODE [__ __]

REHABILITATION DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

ASPHALT CONCRETE OVERLAY LABORATORY MIXTURE DESIGN

* 1. LAYER NUMBER (FROM SHEET 2)	[__]
2. MAXIMUM SPECIFIC GRAVITY (NO AIR VOIDS) (EQ. 7.3)	__.__ __ __
3. BULK SPECIFIC GRAVITY (ASTM D1188)	__.__ __ __
4. OPTIMUM ASPHALT CONTENT (PERCENT WEIGHT OF TOTAL MIX) (AASHTO T164 OR ASTM D2172)	__ __.__
5. PERCENT AIR VOIDS (EQ. 7.4)	__ __.__
6. MARSHALL STABILITY (LBS) (AASHTO T245 OR ASTM D1559)	__ __ __ __.
7. NUMBER OF BLOWS	__ __.
8. MARSHALL FLOW (HUNDREDTHS OF AN INCH) (AASHTO T245 OR ASTM D1559)	__ __ __ __.
9. HVEEM STABILITY (AASHTO T246 OR ASTM D1561)	__ __ __.
10. HVEEM COHESIOMETER VALUE (GRAMS/25 MM OF WIDTH) (AASHTO T246 OR ASTM D1561)	__ __ __ __.

Revised September 18, 1989

*STATE ASSIGNED ID [__ __ __ __]

SHEET 11

*STATE CODE [__ __]

REHABILITATION DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

HOT MIX RECYCLED ASPHALT PAVEMENT
GENERAL INFORMATION AND RECLAIMED AGGREGATE PROPERTIES

* 1. LAYER NUMBER (FROM SHEET 2) [__]

GENERAL INFORMATION

* 2. PROCEDURE USED TO BREAK UP AND/OR REMOVE THE ASPHALT PAVEMENT [__]

Scarifying	1	Ripping	3
Grid Rolling	2	Cold Milling	4
Other (Specify)_____			5

* 3. PAVEMENT PROCESSING [__]

None	1
Crushed and Screened	2
Pulverized by Hammermill	3
Pulverized by Grid or V-Cleated Roller	4
Other (Specify)_____	5

RECLAIMED AGGREGATE PROPERTIES

* 4. GRADATION OF RECLAIMED AGGREGATES

Sieve Size or No.	% Passing	Sieve Size or No.	% Passing
2"	[__ __ __]	No. 4	[__ __]
1 1/2"	[__ __ __]	No. 8	[__ __]
1"	[__ __ __]	No. 10	[__ __]
7/8"	[__ __ __]	No. 16	[__ __]
3/4 "	[__ __ __]	No. 30	[__ __]
5/8"	[__ __ __]	No. 40	[__ __]
1/2"	[__ __ __]	No. 50	[__ __]
3/8"	[__ __]	No. 80	[__ __]
		No. 100	[__ __]
		No. 200	[__ __]

BULK SPECIFIC GRAVITIES (Items 5. to 8.)

* 5. COARSE AGGREGATE (AASHTO T85 OR ASTM C127) [__.__ __ __]
* 6. FINE AGGREGATE (AASHTO T84 OR ASTM C128) [__.__ __ __]
* 7. MINERAL FILLER (AASHTO T100 OR ASTM D854) [__.__ __ __]
* 8. AGGREGATE COMBINATION (CALCULATED - EQ. 7.1) [__.__ __ __]

9. EFFECTIVE SPECIFIC GRAVITY OF AGGREGATE COMBINATION (CALCULATED - EQ. 7.2) __.__ __ __

SHEET 12

REHABILITATION DATA

LTPP PROGRAM

*STATE ASSIGNED ID [__ __ __ __]

*STATE CODE [__ __]

*SHRP SECTION ID [__ __ __ __]

HOT MIX RECYCLED ASPHALT PAVEMENT
UNTREATED AGGREGATE PROPERTIES

* 1. LAYER NUMBER (FROM SHEET 2) [__]

COMPOSITION OF COARSE AGGREGATE (Items 2., 3., and 4.)

			TYPE	PERCENT
Crushed Stone.....1	Crushed Slag.....4	* 2.	[__]	[__ __ __.]
Gravel.....2	Manufactured	* 3.	[__]	[__ __ __.]
Crushed Gravel....3	Lightweight.....5	* 4.	[__]	[__ __ __.]
Other (Specify)_____6				

* 5. GEOLOGIC CLASSIFICATION OF COARSE AGGREGATE [__ __.]
(SEE GEOLOGIC CLASSIFICATION CODES, TABLE A.9)

COMPOSITION OF FINE AGGREGATE (Items 6., 7., and 8.)

		TYPE	PERCENT
Natural Sand..... 1	* 6.	[__]	[__ __ __.]
Manufactured Sand (From	* 7.	[__]	[__ __ __.]
Crushed Gravel or Stone)..... 2	* 8.	[__]	[__ __ __.]
Recycled Concrete..... 3			
Other (Specify)_____ 4			

SOURCE (Items 9. and 10.)

Reclaimed Base Material..... 1 * 9. COARSE [__]

Pit (Original Use)..... 2 *10. FINE [__]

*11. TYPE OF MINERAL FILLER [__]

Stone Dust..... 1 Portland Cement... 3

Hydrated Lime..... 2 Fly Ash..... 4

Other (Specify)_____ 5

AGGREGATE DURABILITY TEST RESULTS (Items 12. to 15.)
(SEE DURABILITY TEST TYPE CODES, TABLE A.13)

TYPE OF AGGREGATE	TYPE OF TEST	RESULTS
12. COARSE	__ __	__ __ __.__ __ __
13. COARSE	__ __	__ __ __.__ __ __
14. COARSE	__ __	__ __ __.__ __ __
15. COMBINED COARSE AND FINE	__ __	__ __ __.__ __ __

16. POLISH VALUE OF COARSE AGGREGATES __ __.
(SURFACE LAYER ONLY) (AASHTO T279, ASTM D3319)

*STATE ASSIGNED ID [__ __ __ __]

SHEET 13

*STATE CODE [__ __]

REHABILITATION DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

HOT MIX RECYCLED ASPHALT PAVEMENT
UNTREATED AGGREGATE PROPERTIES (CONTINUED)

* 1. LAYER NUMBER (FROM SHEET 2) [__]

* 2. GRADATION OF UNTREATED AGGREGATES

Sieve Size or No.	% Passing	Sieve Size or No.	% Passing
2".....	[__ __ __]	No. 4.....	[__ __]
1 1/2".....	[__ __ __]	No. 8.....	[__ __]
1".....	[__ __ __]	No. 10.....	[__ __]
7/8".....	[__ __ __]	No. 16.....	[__ __]
3/4 ".....	[__ __ __]	No. 30.....	[__ __]
5/8".....	[__ __ __]	No. 40.....	[__ __]
1/2".....	[__ __ __]	No. 50.....	[__ __]
3/8".....	[__ __]	No. 80.....	[__ __]
		No. 100.....	[__ __]
		No. 200.....	[__ __]

BULK SPECIFIC GRAVITIES (Items 3. to 6.)

* 3. COARSE AGGREGATE (AASHTO T85 OR ASTM C127) [__.__ __ __]

* 4. FINE AGGREGATE (AASHTO T84 OR ASTM C128) [__.__ __ __]

* 5. MINERAL FILLER (AASHTO T100 OR ASTM D854) [__.__ __ __]

* 6. AGGREGATE COMBINATION (CALCULATED - EQ. 7.1) [__.__ __ __]

7. EFFECTIVE SPECIFIC GRAVITY OF AGGREGATE COMBINATION (CALCULATED - EQ. 7.2) __.__ __ __

SHEET 14

REHABILITATION DATA

LTPP PROGRAM

*STATE ASSIGNED ID [__ __ __ __]

*STATE CODE [__ __]

*SHRP SECTION ID [__ __ __ __]

HOT MIX RECYCLED ASPHALT PAVEMENT
COMBINED AGGREGATE PROPERTIES

* 1. LAYER NUMBER (FROM SHEET 2) [__]

* 2. AMOUNT OF UNTREATED AGGREGATE ADDED [__ __.__]
(PERCENT BY WEIGHT OF COMBINED AGGREGATE IN RECYCLED MIX)

* 3. GRADATION OF COMBINED AGGREGATES

Sieve Size or No.	% Passing	Sieve Size or No.	% Passing
2".....	[__ __ __]	No. 4.....	[__ __]
1 1/2".....	[__ __ __]	No. 8.....	[__ __]
1".....	[__ __ __]	No. 10.....	[__ __]
7/8".....	[__ __ __]	No. 16.....	[__ __]
3/4 ".....	[__ __ __]	No. 30.....	[__ __]
5/8".....	[__ __ __]	No. 40.....	[__ __]
1/2".....	[__ __ __]	No. 50.....	[__ __]
3/8".....	[__ __]	No. 80.....	[__ __]
		No. 100.....	[__ __]
		No. 200.....	[__ __]

BULK SPECIFIC GRAVITIES (Items 4. to 7.)

* 4. COARSE AGGREGATE (AASHTO T85 OR ASTM C127) [__.__ __ __]

* 5. FINE AGGREGATE (AASHTO T84 OR ASTM C128) [__.__ __ __]

* 6. MINERAL FILLER (AASHTO T100 OR ASTM D854) [__.__ __ __]

* 7. AGGREGATE COMBINATION (CALCULATED - EQ. 7.1) [__.__ __ __]

8. EFFECTIVE SPECIFIC GRAVITY OF AGGREGATE COMBINATION (CALCULATED - EQ. 7.2) __.__ __ __

SHEET 15

REHABILITATION DATA

LTPP PROGRAM

***STATE ASSIGNED ID** [__ __ __ __]

***STATE CODE** [__ __]

***SHRP SECTION ID** [__ __ __ __]

HOT MIX RECYCLED ASPHALT PAVEMENT
RECLAIMED ASPHALT CEMENT PROPERTIES

*** 1.LAYER NUMBER (FROM SHEET 2)** [__]

*** 2.SPECIFIC GRAVITY OF ASPHALT CEMENT (AASHTO T220 OR ASTM D70)** [__.__ __ __]

*** 3.VISCOSITY OF ASPHALT AT 140°F (POISES) (AASHTO T202 OR ASTM D2171)** [__ __ __ __ __ __.]

*** 4.VISCOSITY OF ASPHALT AT 275°F (CENTISTOKES) (AASHTO T201 OR ASTM D2170)** [__ __ __ __.__ __]

*** 5.PENETRATION AT 77°F (AASHTO T49 OR ASTM D5) (TENTHS OF A MM) (100 G., 5 SEC.)** [__ __ __.]

6.DUCTILITY AT 77°F (CM) (AASHTO T51) __ __ __.

7.DUCTILITY AT 39.2°(CM) (AASHTO T51) __ __ __.

8.TEST RATE FOR DUCTILITY MEASUREMENT AT 39.2°F (CM/MIN) __ __ __.

9.PENETRATION AT 39.2°F (AASHTO T49) (TENTHS OF A MM) (200 G., 60 SEC.) __ __ __.

10.RING AND BALL SOFTENING POINT (AASHTO T53) (°F) __ __ __.

SHEET 16

REHABILITATION DATA

LTPP PROGRAM

***STATE ASSIGNED ID** [__ __ __ __]

***STATE CODE** [__ __]

***SHRP SECTION ID** [__ __ __ __]

HOT MIX RECYCLED ASPHALT PAVEMENT
NEW ASPHALT CEMENT PROPERTIES

*** 1.LAYER NUMBER (FROM SHEET 2)** [__]

*** 2.ASPHALT GRADE (SEE ASPHALT CODE SHEET, TABLE A.16)** [__ __]
(IF OTHER, SPECIFY_____)

*** 3.SOURCE (SEE SUPPLY CODE SHEET, TABLE A.14)** [__ __]
(IF OTHER, SPECIFY _____)

*** 4.SPECIFIC GRAVITY OF ASPHALT CEMENT**
(AASHTO T228 OR ASTM D70) [__.__ __ __]

*** 5.VISCOSITY OF ASPHALT AT 140°F (POISES)**
(AASHTO T202 OR ASTM D2171) [__ __ __ __ __ __.]

*** 6.VISCOSITY OF ASPHALT AT 275°F (CENTISTOKES)**
(AASHTO T201 OR ASTM D2170) [__ __ __ __.__ __]

*** 7.PENETRATION AT 77°F (AASHTO T49 OR ASTM D5)**
(TENTHS OF A MM) (100 G., 5 SEC.) [__ __ __.]

8.DUCTILITY AT 77°F (CM)
(AASHTO T51 OR ASTM D113) __ __ __.

9.DUCTILITY AT 39.2°(CM)
(AASHTO T51 OR ASTM D113) __ __ __.

10.TEST RATE FOR DUCTILITY MEASUREMENT AT 39.2°F (CM/MIN) __ __ __.

11.PENETRATION AT 39.2°F (AASHTO T49 OR ASTM D5)
(TENTHS OF A MM) (200 G., 60 SEC.) __ __ __.

12.RING AND BALL SOFTENING POINT (AASHTO T53) (°F) __ __ __.

*STATE ASSIGNED ID [__ __ __ __]

SHEET 17

*STATE CODE [__ __]

REHABILITATION DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

HOT MIX RECYCLED ASPHALT PAVEMENT
COMBINED ASPHALT CEMENT PROPERTIES

* 1.LAYER NUMBER (FROM SHEET 2) [__]

	TYPE	QUANTITY(%)
* 2.RECYCLING AGENT (SEE TYPE CODE, TABLE A.20)	[__ __]	[__ __.]
(IF OTHER, SPECIFY TYPE _____)		

* 3.AMOUNT OF NEW ASPHALT CEMENT ADDED
(PERCENT BY WEIGHT OF RECYCLED MIXTURE WEIGHT) [__ __.__]

*4.SPECIFIC GRAVITY OF ASPHALT CEMENT
(AASHTO T228 OR ASTM D70) [__.__ __ __]

* 5.VISCOSITY OF ASPHALT AT 140°F (POISES)
(AASHTO T202 OR ASTM D2171) [__ __ __ __ __ __.]

* 6.VISCOSITY OF ASPHALT AT 275°F (CENTISTOKES)
(AASHTO T201 OR ASTM D2170) [__ __ __ __.__ __]

* 7.PENETRATION AT 77°F (AASHTO T49 OR ASTM D5)
(TENTHS OF A MM) (100 G., 5 SEC.) [__ __ __.]

ASPHALT MODIFIERS (SEE TYPE CODE, TABLE A.15) (Items 8. and 9.)
(OTHER THAN RECYCLING AGENT)

	TYPE	QUANTIFY(%)
8.MODIFIER #1	[__ __.]	[__ __.]
9.MODIFIER #2	[__ __.]	[__ __.]
(IF OTHER, SPECIFY TYPE _____)		

10.DUCTILITY AT 77°F (CM)
(AASHTO T51 OR ASTM D113) __ __ __.

11.DUCTILITY AT 39.2°(CM)
(AASHTO T51) __ __ __.

12.TEST RATE FOR DUCTILITY MEASUREMENT AT 39.2°F (CM/MIN) __ __ __.

13.PENETRATION AT 39.2°F (AASHTO T49 OR ASTM D5)
(TENTHS OF A MM) (200 G., 60 SEC.) __ __ __.

14.RING AND BALL SOFTENING POINT (AASHTO T53) (°F) __ __ __.

*STATE ASSIGNED ID [__ __ __ __]

SHEET 18

*STATE CODE [__ __]

REHABILITATION DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

HOT MIX RECYCLED ASPHALT PAVEMENT
LABORATORY AGED COMBINED ASPHALT CEMENT PROPERTIES

* 1. **LAYER NUMBER (FROM SHEET 2)** [__]

2. TEST PROCEDURE USED TO MEASURE AGING EFFECTS __
   - ASTM D1754 - Thin Film Oven Test..... 1
   - ASTM D2872 - Rolling Thin Film Oven Test..... 2
   - Other (Specify)_____ 3

3. VISCOSITY OF ASPHALT AT 140°F (POISES) (AASHTO T202 OR ASTM D2171) __ __ __ __ __ __.

4. VISCOSITY OF ASPHALT AT 275°F (CENTISTOKES) (AASHTO T201 OR ASTM D2170) __ __ __ __.__ __

5. DUCTILITY AT 77°F (CM) (AASHTO T51 OR ASTM D113) __ __ __.

6. DUCTILITY AT 39.2°F (CM) (AASHTO T51 OR ASTM D113) __ __ __.

7. TEST RATE FOR DUCTILITY MEASUREMENT AT 39.2°F (CM/MIN) __ __.__

8. PENETRATION AT 77°F, 100 G., 5 SEC. (TENTHS OF A MM) (AASHTO T49 OR ASTM D5) __ __ __.

9. PENETRATION AT 39.2°F, 200 G., 60 SEC. (TENTHS OF A MM) (AASHTO T49 OR ASTM D5) __ __.

10. RING AND BALL SOFTENING POINT (°F) (AASHTO T53) __ __ __.

11. WEIGHT LOSS (PERCENT) __.__

Revised September 18, 1989

SHEET 19

REHABILITATION DATA

LTPP PROGRAM

***STATE ASSIGNED ID** [__ __ __ __]

***STATE CODE** [__ __]

***SHRP SECTION ID** [__ __ __ __]

HOT MIX RECYCLED ASPHALT PAVEMENT LABORATORY MIXTURE DESIGN

* 1. **LAYER NUMBER (FROM SHEET 2)** [__]

2. MAXIMUM SPECIFIC GRAVITY (NO AIR VOIDS) (EQ. 7.3) __.__ __ __

3. BULK SPECIFIC GRAVITY (ASTM D1188) __.__ __ __

4. OPTIMUM ASPHALT CONTENT (PERCENT WEIGHT OF TOTAL MIX) (AASHTO T164 OR ASTM D2172) __ __.__

5. PERCENT AIR VOIDS (EQ. 7.4) __ __.__

6. MARSHALL STABILITY (LBS) (AASHTO T245 OR ASTM D1559) __ __ __ __.

7. NUMBER OF BLOWS __ __.

8. MARSHALL FLOW (HUNDREDTHS OF AN INCH) (AASHTO T245 OR ASTM D1559) __ __ __ __.

9. HVEEM STABILITY (AASHTO T246 OR ASTM D1561) __ __ __.

10. HVEEM COHESIOMETER VALUE (GRAMS/25 MM OF WIDTH) (AASHTO T246 OR ASTM D1561) __ __ __ __.

*STATE ASSIGNED ID [__ __ __ __]

SHEET 61

*STATE CODE [__ __]

REHABILITATION DATA

*SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

RESTORATION OF AC SHOULDERS

		INSIDE SHOULDER	OUTSIDE SHOULDER
* 1.	**SHOULDER RESTORED** (Outside ....1, Inside ....2, Both ....3)		[__]
* 2.	**SURFACE TYPE (CODES-TABLE A.5)**	__	[__]
* 3.	**TOTAL WIDTH (FEET)**	__ __.	[__ __.]
* 4.	**PAVED WIDTH (FEET)**	__ __.	[__ __.]
* 5.	**SHOULDER BASE TYPE (CODES-TABLE A.6)**	__ __	[__ __]
* 6.	**SURFACE THICKNESS (INCHES)**	__ __.__	[__ __.__]
* 7.	**BASE THICKNESS (INCHES)**	__ __.__	[__ __.__]

* 8. **TYPE OF SHOULDER RESTORATION** [__]
- AC Overlay Without Removal of Existing AC..... 1
- Cold Milling and AC Overlay..... 2
- Complete Shoulder Removal and Replacement..... 3
- In-place Recycling and Overlay..... 4
- Other (Specify)_____ 5

* 9. **TYPE OF AC MATERIALS** [__]
- New Materials..... 1
- Hot Recycled Materials..... 2
- Cold Recycled Materials..... 3
- Other (Specify)_____ 4

*10. **THICKNESS OF AC MATERIAL REMOVED BY COLD MILLING (IN)** [__.__]

*11. **AC OVERLAY THICKNESS (IN)** [__.__]

12. LANE/SHOULDER JOINT SEALANT [__]
- None..... 1
- Sealed Without Providing Reservoir..... 2
- Saw Reservoir and Seal..... 3
- Other (Specify)_____ 4

13. LANE/SHOULDER JOINT SEALANT RESERVOIR
- WIDTH (INCHES) __.__
- DEPTH (INCHES) __.__

14. TYPE OF JOINT SEALANT __
- Poured..... 1
- Preformed..... 2

NOTE: DATA ITEMS 8. TO 14. PERTAIN ONLY TO THE RESTORED OUTSIDE SHOULDER.

Revised August 30, 1989

APPENDIX A. STANDARD CODES

This appendix provides standard codes to simplify entry of data during collection and the subsequent storage and processing of this data. These codes are tabulated as follows:

Table A.1 Table of Standard Codes for States, District of Columbia, Puerto Rico, American Protectorates and Canadian Provinces

State	Code	State	Code
Alabama	01	New York	36
Alaska	02	North Carolina	37
Arizona	04	North Dakota	38
Arkansas	05	Ohio	39
California	06	Oklahoma	40
Colorado	08	Oregon	41
Connecticut	09	Pennsylvania	42
Delaware	10	Rhode Island	44
District of Columbia	11	South Carolina	45
Florida	12	South Dakota	46
Georgia	13	Tennessee	47
Hawaii	15	Texas	48
Idaho	16	Utah	49
Illinois	17	Vermont	50
Indiana	18	Virginia	51
Iowa	19	Washington	53
Kansas	20	West Virginia	54
Kentucky	21	Wisconsin	55
Louisiana	22	Wyoming	56
Maine	23	American Samoa	60
Maryland	24	Guam	66
Massachusetts	25	Puerto Rico	72
Michigan	26	Virgin Islands	78
Minnesota	27	Alberta	81
Mississippi	28	British Columbia	82
Missouri	29	Manitoba	83
Montana	30	New Brunswick	84
Nebraska	31	Newfoundland	85
Nevada	32	Nova Scotia	86
New Hampshire	33	Ontario	87
New Jersey	34	Prince Edward Island	88
New Mexico	35	Quebec	89
		Saskatchewan	90

Note: The U.S. codes are consistent with the Federal Information Processing Standards (FIPS) and HPMS

Table A.2. Functional class codes.

Functional Class	Code
Rural:	
Principal Arterial - Interstate	01
Principal Arterial - Other	02
Minor Arterial	06
Major Collector	07
Minor Collector	08
Local Collector	09
Urban:	
Principal Arterial - Interstate	11
Principal Arterial - Other Freeways or Expressways	12
Other Principal Arterial	14
Minor Arterial	16
Collector	17
Local	19

Note: These codes are consistent with the HPMS system.

Table A.3 Experiment Type Definitions for the General Pavement Studies

Note: The numbers in parentheses in the following paragraphs refer to the material codes found in Tables A.5, A.6, A.7, and A.8 unless indicated otherwise.

(01) ASPHALT CONCRETE PAVEMENT WITH GRANULAR BASE

Acceptable pavements for this study include a dense-graded hot mix asphalt concrete (HMAC) surface layer (1), with or without other HMAC layers (28), placed over an untreated granular base (22 or 23). One or more subbase layers (22, 23, 24, 25, 26, 42, or 43) may also be present but are not required. Two or more consecutive lifts of the same mixture design are to be treated as one layer. "Full depth" asphalt concrete pavements are also included in this study. They include an HMAC surface layer (1) and usually one or more HMAC layers (28) beneath the surface with a minimum total HMAC thickness of 8 inches placed directly upon treated or untreated subgrade. For "full depth" asphalt concrete pavements, a base layer (Layer Description 5) of zero thickness and material code of 21 should be indicated. If a treated subgrade (42 or 43) is present, it should be shown as a subbase (Layer Description 6). Seal coats or porous friction courses are allowed on the surface, but not in combination, i.e., a porous friction course placed over a seal coat is not acceptable. Seal coats are also permissible on top of granular base layers. At least one layer of dense-graded HMAC is required, regardless of the existence of seal coats or porous friction courses.

(02) ASPHALT CONCRETE PAVEMENT WITH BOUND BASE

Acceptable pavements for this study include a dense-graded HMAC surface layer (1) with or without other HMAC layers (28), placed over a bound base layer (27-39, 42-44, 46). To properly account for a variety of bound base types in the sampling design, two classifications of binder types, bituminous and non-bituminous, are defined as the factor levels. Bituminous binders include asphalt cements, cutbacks, emulsions, and road tars. Non-bituminous binders include all hydraulic cements (those which harden by a chemical reaction with water and are capable of hardening under water), lime, fly ashes and natural pozzolans, or combinations thereof. Stabilized bases with lower quality materials such as sand asphalt or soil cement are also allowed. Stabilization practices of primary concern for this study are those in which the structural characteristics of the material are improved due to the cementing action of the stabilizing agent. Thus, the description of the study actually refers to treatments improving the structural properties of the base

Table A.3 Characteristics of acceptable pavement types for the General Pavement Studies (Continued)

materials. Two or more consecutive lifts of the same mixture design are to be treated as one layer. One or more subbase layers (22, 23, 24, 25, 26, 42, or 43) may be present but are not required. Seal coats or porous friction courses are permitted on the surface but not in combination, i.e., a porous friction course placed over a seal coat is not acceptable. Project selection is open to those constructed on both fine and coarse subgrades (51-65).

(03) JOINTED PLAIN CONCRETE PAVEMENT - JPCP

Acceptable projects include a jointed, unreinforced portland cement concrete slab (4) placed over untreated granular base (22 or 23), HMAC (28, 31) or stabilized base (29, 30, 37, or 38). One or more subbase layers (22, 23, 24, 25, 26, 42, or 43) may also be present but are not required. The joints may have either no load transfer devices or smooth dowel bars. A seal coat is also permissible above a granular base layer. Jointed slabs with load transfer devices other than dowel bars and pavements placed directly upon a treated or untreated subgrade are not acceptable.

(04) JOINTED REINFORCED CONCRETE PAVEMENT - JRCP

Acceptable projects include jointed reinforced portland cement concrete pavements (5) with doweled joints spaced between 20 and 65 feet. The slab may rest directly upon a layer of any material listed in Table A.6 (except 25 and 45) or upon unstabilized coarse-grained subgrade (57-65). A base layer and one or more subbase layers may exist but are not required. These layers may consist of any of the material types indicated in Table A.6. A seal coat is also permissible above a granular base layer. JRCP placed directly upon a fine-grained soil/aggregate layer (25) or a fine-grained subgrade (51-56) will not be considered for this study. JRCP's without load transfer devices or using devices other than smooth dowel bars at the joints are not acceptable.

(05) CONTINUOUSLY REINFORCED CONCRETE PAVEMENT - CRCP

Acceptable projects include continuously reinforced portland cement concrete pavements (6) placed directly on a layer of any material listed in Table A.6 (except 25 or 45) or upon unstabilized coarse-grained subgrade (57-65). CRCP's placed directly upon a fine-grained soil/aggregate layer (25) or a fine-grained subgrade (51-56) are not acceptable for this study.

Table A.3 Characteristics of acceptable pavement types for the General Pavement Studies (Continued)

(06) AC OVERLAY OF AC PAVEMENT

Acceptable pavements for this study include a dense-graded HMAC surface layer (1) with or without other HMAC layers (28) placed over a previously existing asphalt concrete pavement meeting the requirements of GPS-1 or GPS-2. Seal coats or porous friction courses are allowed but not in combination. Fabric interlayers (75 and 76) and Stress Absorbing Membrane Interlayers (SAMIs) (77) are permitted between the original surface and the overlay. The total thickness of HMAC used in the overlay must be at least 1.0 inches. Pavements which have been overlaid more than once since they were originally constructed are not acceptable. Pavements in both bad and good condition as measured by levels of specific distress types present prior to the overlay are needed.

(07) AC OVERLAY OF CONCRETE PAVEMENT

Acceptable pavements for this study include a dense-graded HMAC surface layer (1) with or without other HMAC layers (28) placed on either a JPCP (4), JRCP (5), or CRCP (6). The slab may rest upon any combination of the base and/or subbase layers indicated in Table A.6 (except 45). The previously existing concrete slab may also have been placed directly on lime or cement treated fine or coarse-grained subgrade (27, 42, and 43) or on untreated coarse-grained subgrade (57-65). Slabs placed directly on untreated fine-grained subgrade (51-56) are not acceptable. Seal coats or porous friction courses are permissible but not in combination. Fabric interlayers (75 or 76) and SAMI's (77) are acceptable when placed between the original surface (concrete) and the overlay. Overlaid pavements with aggregate interlayers (79) and open-graded asphalt concrete (80) will not be considered for this study. The total thickness of HMAC used in the overlay must be at least 1.5 inches. Pavements which have been overlaid more than once since they were originally constructed are not acceptable. Pavements in both bad and good condition as measured by levels of specific distress types present prior to the overlay are needed.

(09) UNBONDED PCC OVERLAYS OF CONCRETE PAVEMENT

Acceptable projects for this study include unbonded JPCP (4), JRCP (5), or CRCP (6) overlays with a thickness of 5 inches or more placed over an existing JPCP (4), JRCP (5), or CRCP (5) pavement. The overlaid concrete pavement may rest on any of the base and subbase types listed in Table A.6 or directly upon the subgrade.

Table A.4 Pavement Type Codes

Type of Pavement	Code
Asphalt Concrete (AC) Surfaced Pavements:	
AC With Granular Base	01
AC With Bituminous Treated Base	02
AC with Non-Bituminous Treated Base	07
AC Overlay on AC Pavement	03
AC Overlay on JPCP Pavement	28
AC Overlay on JRCP Pavement	29
AC Overlay on CRCP Pavement	30
Other	10
Portland Cement Concrete Surfaced Pavements:	
JPCP - Placed Directly On Untreated Subgrade	11
JRCP - Placed Directly On Untreated Subgrade	12
CRCP - Placed Directly On Untreated Subgrade	13
JPCP - Placed Directly On Treated Subgrade	14
JRCP - Placed Directly On Treated Subgrade	15
CRCP - Placed Directly On Treated Subgrade	16
JPCP - Over Unbound Base	17
JRCP - Over Unbound Base	18
CRCP - Over Unbound Base	19
JPCP Over Bituminous Treated Base	20
JRCP Over Bituminous Treated Base	21
CRCP Over Bituminous Treated Base	22
JPCP Over Non-Bituminous Treated Base	23
JRCP Over Non-Bituminous Treated Base	24
CRCP Over Non-Bituminous Treated Base	25
JPCP Overlay on JPCP Pavement	31
JPCP Overlay on JRCP Pavement	33
JPCP Overlay on CRCP Pavement	35
JRCP Overlay on JPCP Pavement	32
JRCP Overlay on JRCP Pavement	34
JRCP Overlay on CRCP Pavement	36
CRCP Overlay on JPCP Pavement	38
CRCP Overlay on JRCP Pavement	39
CRCP Overlay on CRCP Pavement	37
JPCP Overlay on AC Pavement	04
JRCP Overlay on AC Pavement	05
CRCP Overlay on AC Pavement	06
Prestressed Concrete Pavement	40
Other	49

Table A.4 Pavement Type Codes
(Continued)

*Composite Pavements (Wearing Surface Included in Initial Construction):

JPCP With Asphalt Concrete Wearing Surface 51
JRCP With Asphalt Concrete Wearing Surface 52
CRCP With Asphalt Concrete Wearing Surface 53
Other 59

Definitions:

JPCP - Jointed Plain Concrete Pavement

JRCP - Jointed Reinforced Concrete Pavement

CRCP - Continuously Reinforced Concrete Pavement

* "Composite Pavements" are pavements originally constructed with an asphalt concrete wearing surface over a portland cement concrete slab (1986 "AASHTO Guide for Design of Pavement Structures").

Table A.5 Pavement Surface Material Type Classification Codes

Material Type	Code
Hot Mixed, Hot Laid Asphalt Concrete, Dense Graded	01
Hot Mixed, Hot Laid Asphalt Concrete, Open Graded (Porous Friction Course)	02
Sand Asphalt	03
Portland Cement Concrete (JPCP)	04
Portland Cement Concrete (JRCP)	05
Portland Cement Concrete (CRCP)	06
Portland Cement Concrete (Prestressed)	07
Portland Cement Concrete (Fiber Reinforced)	08
Plant Mix (Emulsified Asphalt) Material, Cold Laid	09
Plant Mix (Cutback Asphalt) Material, Cold Laid	10
Single Surface Treatment	11
Double Surface Treatment	12
Recycled Asphalt Concrete	
Hot, Central Plant Mix	13
Cold Laid Central Plant Mix	14
Cold Laid Mixed-In-Place	15
Heater Scarification/Recompaction	16
Recycled Portland Cement Concrete	
JPCP	17
JRCP	18
CRCP	19
Other	20

Table A.6 Base and Subbase Material Type Classification Codes

	Code
No Base (Pavement Placed Directly on Subgrade)	21
Gravel (Uncrushed)	22
Crushed Stone, Gravel or Slag	23
Sand	24
Soil-Aggregate Mixture (Predominantly Fine-Grained Soil)	25
Soil-Aggregate Mixture (Predominantly Coarse-Grained Soil)	26
Soil Cement	27
Bituminous Bound Base or Subbase Materials	
Dense Graded, Hot Laid, Central Plant Mix	28
Dense Graded, Cold Laid, Central Plant Mix	29
Dense Graded, Cold Laid, Mixed In-Place	30
Open Graded, Hot Laid, Central Plant Mix	31
Open Graded, Cold Laid, Central Plant Mix	32
Open Graded, Cold Laid, Mixed In-Place	33
Recycled Asphalt Concrete, Plant Mix, Hot Laid	34
Recycled Asphalt Concrete, Plant Mix, Cold Laid	35
Recycled Asphalt Concrete, Mixed In-Place	36
Sand Asphalt	46
Cement-Aggregate Mixture	37
Lean Concrete (<3 sacks cement/cy)	38
Recycled Portland Cement Concrete	39
Sand-Shell Mixture	40
Limerock, Caliche (Soft Carbonate Rock)	41
Lime-Treated Subgrade Soil	42
Cement-Treated Subgrade Soil	43
Pozzolanic-Aggregate Mixture	44
Cracked and Seated PCC Layer	45
Other	49

Table A.7 Subgrade Soil Description Codes

Soil Description	Code
Fine-Grained Subgrade Soils:	
Clay (Liquid Limit >50)	51
Sandy Clay	52
Silty Clay	53
Silt	54
Sandy Silt	55
Clayey Silt	56
Coarse-Grained Subgrade Soils:	
Sand	57
Poorly Graded Sand	58
Silty Sand	59
Clayey Sand	60
Gravel	61
Poorly Graded Gravel	62
Clayey Gravel	63
Shale	64
Rock	65

Table A.8 Material Type Codes for Thin Seals and Interlayers

	Code
Chip Seal Coat	71
Slurry Seal Coat	72
Fog Seal Coat	73
Woven Geotextile	74
Nonwoven Geotextile	75
Stress Absorbing Membrane Interlayer	77
Dense Graded Asphalt Concrete Interlayer	78
Aggregate Interlayer	79
Open Graded Asphalt Concrete Interlayer	80
Chip Seal With Modified Binder (Does Not Include Crumb Rubber)	81
Sand Seal	82
Asphalt-Rubber Seal Coat (Stress Absorbing Membrane)	83
Sand Asphalt	84
Other	85

Table A.9 Geologic Classification Codes

Igneous:	Code
Granite	01
Syenite	02
Diorite	03
Gabbro	04
Peridotite	05
Felsite	06
Basalt	07
Diabase	08
Sedimentary:	
Limestone	09
Dolomite	10
Shale	11
Sandstone	12
Chert	13
Conglomerate	14
Breccia	15
Metamorphic:	
Gneiss	16
Schist	17
Amphibolite	18
Slate	19
Quartzite	20
Marble	21
Serpentine	22

Table A.10 Soil and Soil-Aggregate Mixture Type Codes, AASHTO Classification

	Code
A-1-a	01
A-1-b	02
A-3	03
A-2-4	04
A-2-5	05
A-2-6	06
A-2-7	07
A-4	08
A-5	09
A-6	10
A-7-5	11
A-7-6	12

Table A.11 Portland Cement Type Codes

	Code
Type I	41
Type II	42
Type III	43
Type IV	44
Type V	45
Type IS	46
Type ISA	47
Type IA	48
Type IIA	49
Type IIIA	50
Type IP	51
Type IPA	52
Type N	53
Type NA	54
Other	55

Table A.12 Portland Cement Concrete Admixture Codes

	Code
Water-Reducing (AASHTO M194, Type A)	01
Retarding (AASHTO M194, Type B)	02
Accelerating (AASHTO M194, Type C)	03
Water-Reducing and Retarding (AASHTO M194, Type D)	04
Water-Reducing and Accelerating (AASHTO M194, Type E)	05
Water-Reducing, High Range (AASHTO M194, Type F)	06
Water-Reducing, High Range and Retarding (AASHTO M194, Type G)	07
Air-Entraining Admixture (AASHTO M154)	08
Natural Pozzolans (AASHTO M295, Class N)	09
Fly Ash, Class F (AASHTO M295)	10
Fly Ash, Class C (AASHTO M295)	11
Other (Chemical)	12
Other (Mineral)	13

Table A.13 Aggregate Durability Test Type Codes

Description	AASHTO	ASTM	Code
Resistance to Abrasion of Small Size Coarse Aggregate by Use of Los Angeles Machine (Percent Weight Loss)	T96	C131	01
Soundness of Aggregate by Freezing and Thawing (Percent Weight Loss)	T103	--	02
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate (Percent Weight Loss)	T104	C88	03
Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine (Percent Weight Loss)	--	C535	04
Potential Volume Change of Cement-Aggregate Combinations (Percent Expansion)	--	C342	05
Evaluation of Frost Resistance of Coarse Aggregates in Air-Entrained Concrete by Critical Dilution Procedures (Number of Weeks of Frost Immunity)		C682	06
Potential Alkali Reactivity of Cement Aggregate Combinations (Average Percent Expansion)	--	C227	07
Potential Reactivity of Aggregates (Reduction in Alkalinity-mmol/L)	--	C289	08
Test for Clay Lumps and Friable Particles in Aggregates (Percent by Weight)	T112	C142	09
Test for Potential Alkali Reactivity of Carbonate Rocks for Concrete Aggregates (Percent Change in Speciment Length)	--	C586	11

Table A.14. Codes for Asphalt Refiners and Processors in the United States.*

	Code
Belcher Refining Co.--Mobile Bay, Alabama	78
Hunt Refining Company--Tuscaloosa, Alabama	01
Chevron USA, Inc.--Kenai, Alaska	02
Mapco Alaska Petroleum--North Pole, Alaska	03
Intermountain Refining Cl.--Fredonia, Arizona	04
Berry Petroleum Company--Stevens, Arkansas	05
Cross Oil and Refining Company--Smackover, Arkansas	06
Lion Oil Company--El Dorado, Arkansas	07
McMillan Ring, Free Oil Cl.--Norphlet, Arkansas	08
Chevron USA, Inc.--Richmond, California	09
Conoco, Inc.--Santa Maria, California	10
Edgington Oil Co., Inc.--Long Beach, California	11
Golden Bear Division, Witco Chemical Corp.--Oildale, California	12
Golden West Refining, Co.--Santa Fe Springs, California	13
Huntway Refining Co.--Benicia, California	14
Huntway Refining Co.--Wilmington, California	15
Lunday-Thagard Co.--South Gate, California	79
Newhall Refining Co., Inc.--Newhall, California	16
Oxnard Refining--Oxnard, California	17
Paramount Petroleum Corp.--Paramount, California	80
Powerline Oil Co.--Santa Fe Springs, California	81
San Joaquin Refining Cl.--Bakersfield, California	18
Shell Oil Co.--Martinez, California	19
Superior Processing Co.--Santa Fe Springs, California	20
Colorado Refining Co.--Commerce City, Colorado	82
Conoco, Inc.--Commerce City, Colorado	21
Amoco Oil Co.--Savannah, Georgia	22
Young Refining Corp.--Douglasville, Georgia	23
Chevron USA--Barber's Point, Hawaii	24
Clark Oil and Refining Corp.--Blue Island, Illinois	25
Shell Oil Co.--Wood River, Illinois	26
Unacol Corp.--Lemont, Illinois	27
Amoco Oil Co.-- Whiting, Indiana	28
Laketon Refining Corp.--Laketon, Indiana	83
Young Refining Corp.--Laketon, Indiana	29
Derby Refining Co.-- El Dorado, Kansas	84
Farmland Industries, Inc.--Phillipsburg, Kansas	30
Total Petroleum, Inc.--Arkansas City, Kansas	31
Ashland Petroleum Co.--Catlettsburg, Kentucky	32
Atlas Processing Co.--Shreveport, Louisiana	33
Calumet Refining Co.--Princeton, Louisiana	34
Exxon Co.--Baton Rouge, Louisiana	35
Marathon Petroleum Co.--Garyville, Louisiana	36
Marathon Petroleum Co.--Detroit, Michigan	37
Ashland Petroleum Co.--St. Paul, Minnesota	38
Koch Refining Co.--Rosemount, Minnesota	39
Chevron USA, Inc.--Pascagoula, Mississippi	40
Ergon Refining Inc.--Vicksburg, Mississippi	41
Southland Oil Co.--Lumberton, Mississippi	42
Southland Oil Co.--Sanderson, Mississippi	43

Table A.14. Codes for Asphalt Refiners and Processors in the United States (Continued).*

	Code
Cenex--Laurel, Montana	44
Conoco, Inc.--Billings, Montana	45
Exxon Co.--Billings, Montana	46
Chevron USA, Inc.--Perth Amboy, New Jersey	47
Exxon Co., Linden, New Jersey	48
Giant Industries, Inc.--Gallup, New Mexico	85
Navahoe Refining Co.--Artesia, New Mexico	49
Cibro Petroleum Products Co.--Albany, New York	86
Ashland Petroleum Co.--Canton, Ohio	50
Standard Oil Co.--Toledo, Ohio	51
Sohio Oil Co (BP America)--Toledo, Ohio	87
Kerr-McGee Refining Co.--Wynnewood, Oklahoma	52
Sinclair Oil Corp.--Tulsa, Oklahoma	53
Sun Co. Inc.--Tulsa, Oklahoma	54
Total Petroleum Inc.--Ardmore, Oklahoma	55
Chevron USA, Inc.--Portland, Oregon	56
Atlantic Refining & Marketing Corp.--Philadelphia, PA	57
United Refining Co.--Warren, Pennsylvania	58
Mapco Petroleum Inc.--Memphis, Tennessee	59
Charter International Oil Co.--Houston, Texas	60
Chevron USA, Inc.--El Paso, Texas	61
Coastal Refining & Marketing, Inc.--Corpus Christi, Texas	88
Coastal States Petroleum Co.--Corpus Christi, Texas	62
Diamond Shamrock Corp.--Sunray, Texas	63
Exxon Co. USA--Baytown, Texas	64
Fina Oil and Chemical Co.--Big Spring, Texas	65
Fina Oil and Chemical Co.--Port Arthur, Texas	89
Hill Petroleum Co.--Houston, Texas	90
Shell Oil Co.--Deer Park, Texas	66
Star Enterprise--Port Arthur & Port Neches, Texas	91
Texaco Refining & Marketing Inc.--Port Arthur & Port Neches, Texas	67
Trifinery--Corpus Christi, Texas	92
Unocal Corp.--Nederland, Texas	68
Valero Refining Co.--Corpus Christi, Texas	69
Phillips 66 Co.--Woods Cross, Utah	70
Chevron USA Inc.--Seattle, Washington	71
Sound Refining, Inc.--Tacoma, Washington	72
US Oil and Refining Co.--Tacoma, Washington	73
Murphy Oil USA, Inc.--Superior, Wisconsin	74
Big West Oil Co.--Cheyenne, Wyoming	75
Little America Refining Co.--Casper, Wyoming	93
Sinclair Oil Corp.--Sinclair, Wyoming	76
Other	77

* Taken from Oil and Gas Journal, March 20, 1989, pp. 72-89.

Table A.15 Asphalt Cement Modifier Codes

	Code
Stone Dust	01
Lime	02
Portland Cement	03
Carbon Black	04
Sulfur	05
Lignin	06
Natural Latex	07
Synthetic Latex	08
Block Copolymer	09
Reclaimed Rubber	10
Polyethylene	11
Polypropylene	12
Ethylene-Vinyl Acetate	13
Polyvinyl Chloride	14
Asbestos	15
Rock Wool	16
Polyester	17
Manganese	18
Other Mineral Salts	19
Lead Compounds	20
Carbon	21
Calcium Salts	22
Recycling Agents	23
Rejuvenating Oils	24
Amines	25
Fly Ash	26
Other	27

Table A.16 Grades of Asphalt, Emulsified Asphalt, and Cutback Asphalt Codes

	Code
Asphalt Cements	
AC-2.5	01
AC-5	02
AC-10	03
AC-20	04
AC-30	05
AC-40	06
AR-1000 (AR-10 by AASHTO Designation)	07
AR-2000 (AR-20 by AASHTO Designation)	08
AR-4000 (AR-40 by AASHTO Designation)	09
AR-8000 (AR-80 by AASHTO Designation)	10
AR-16000 (AR-160 by AASHTO Designation)	11
200-300 pen	12
120-150 pen	13
85-100 pen	14
60-70 pen	15
40-50 pen	16
Other Asphalt Cement Grade	17
Emulsified Asphalts	
RS-1	18
RS-2	19
MS-1	20
MS-2	21
MS-2h	22
HFMS-1	23
HFMS-2	24
HFMS-2h	25
HFMS-2s	26
SS-1	27
SS-1h	28
CRS-1	29
CRS-2	30
CMS-2	31
CMS-2h	32
CSS-1	33
CSS-1h	34
Other Emulsified Asphalt Grade	35
Cutback Asphalts (RC, MC, SC)	
30 (MC only)	36
70	37
250	38
800	39
3000	40
Other Cutback Asphalt Grade	99

Taken from MS-5, "A Brief Introduction to Asphalt," and Specification Series No. 2 (SS-2), "Specifications for Paving and Industrial Asphalts," both publications by the Asphalt Institute.

Table A.17 Maintenance and Rehabilitation Work Type Codes

	Code
Crack Sealing (linear ft.)	01
Transverse Joint Sealing (linear ft.)	02
Lane-Shoulder, Longitudinal Joint Sealing (linear ft.)	03
Full Depth Joint Repair Patching of PCC (sq. yards)	04
Full Depth Patching of PCC Pavement Other than at Joint (sq. yards)	05
Partial Depth Patching of PCC Pavement Other than at Joint (sq. yards)	06
PCC Slab Replacement (sq. yards)	07
PCC Shoulder Restoration (sq. yards)	08
PCC Shoulder Replacement (sq. yards)	09
AC Shoulder Restoration (sq. yards)	10
AC Shoulder Replacement (sq. yards)	11
Grinding/Milling Surface (sq. yards)	12
Grooving Surface (sq. yards)	13
Pressure Grout Subsealing (no. of holes)	14
Slab Jacking Depressions (no. of depressions)	15
Asphalt Subsealing (no. of holes)	16
Spreading of Sand or Aggregate (sq. yards)	17
Reconstruction (Removal and Replacement) (sq. yards)	18
Asphalt Concrete Overlay (sq. yards)	19
Portland Cement Concrete Overlay (sq. yards)	20
Mechanical Premix Patch (using motor grader and roller) (sq. yards)	21
Manual Premix Spot Patch (hand spreading and compacting with roller) (sq. yards)	22
Machine Premix Patch (placing premix with paver, compacting with roller) (sq. yards)	23
Full Depth Patch of AC Pavement (removing damaged material, repairing supporting material, and repairing) (sq. yards)	24
Patch Pot Holes - Hand Spread, Compacted with Truck (no. of holes)	25
Skin Patching (hand tools/hot pot to apply liquid asphalt and aggregate) (sq. yards)	26
Strip Patching (using spreader and distributor to apply hot liquid asphalt and aggregate) (sq. yards)	27
Surface Treatment, single layer (sq. yards)	28
Surface Treatment, double layer (sq. yards)	29
Surface Treatment, three or more layers (sq. yards)	30
Aggregate Seal Coat (sq. yards)	31
Sand Seal Coat (sq. yards)	32
Slurry Seal Coat (sq. yards)	33
Fog Seal Coat (sq. yards)	34
Prime Coat (sq. yards)	35
Tack Coat (sq. yards)	36
Dust Layering (sq. yards)	37
Longitudinal Subdrains (linear feet)	38
Transverse Subdrainage (linear feet)	39

Table A.17 Maintenance and Rehabilitation Work Type Codes (continued)

	Code
Drainage Blankets (sq. yards)	40
Well System	41
Drainage Blankets with Longitudinal Drains	42
Hot-Mix Recycled Asphalt Concrete (sq. yards)	43
Cold-Mix Recycled Asphalt Concrete (sq. yards)	44
Heater Scarification, Surface Recycled Asphalt Concrete (sq. yards)	45
Crack and Seat PCC Pavement as Base for New AC Surface (sq. yards)	46
Crack and Seat PCC Pavement as Base for New PCC Surface (sq. yards)	47
Recycled Portland Cement Concrete (sq. yards)	48
Pressure Relief Joints in PCC Pavements (linear feet)	49
Joint Load Transfer Restoration in PCC Pavements (linear feet)	50
Mill Off Existing Pavement and Overlay with AC (sq. yards)	51
Mill Off Existing Pavement and Overlay with PCC (sq. yards)	52
Other	53
Partial Depth Patching of PCC Pavement at Joints (sq. yards)	54

Table A.18. Maintenance location codes.

	Code
Outside Lane (Number 1)	01
Inside Lane (Number 2)	02
Inside Lane (Number 3)	03
All Lanes	09
Shoulder	04
All Lanes Plus Shoulder	10
Curb and Gutter	05
Side Ditch	06
Culvert	07
Other	08

Note: SHRP LTPP only studies outside lanes.

Table A.19 Maintenance Materials Type Codes

	Code
Preformed Joint Fillers	01
Hot-Poured Joint and Crack Sealer	02
Cold-Poured Joint and Crack Sealer	03
Open Graded Asphalt Concrete	04
Hot Mix Asphalt Concrete Laid Hot	05
Hot Mix Asphalt Concrete Laid Cold	06
Sand Asphalt	07
Portland Cement Concrete (overlay or replacement)	
Jointed Plain (JPCP)	08
Jointed Reinforced (JRCP)	09
Continuously Reinforced (CRCP)	10
Portland Cement Concrete (Patches)	11
Hot Liquid Asphalt and Aggregate (Seal Coat)	12
Hot Liquid Asphalt and Mineral Aggregate	13
Hot Liquid Asphalt and Sand	14
Emulsified Asphalt and Aggregate (Seal Coat)	15
Emulsified Asphalt and Mineral Aggregate	16
Emulsified Asphalt and Sand	17
Hot Liquid Asphalt	18
Emulsified Asphalt	19
Sand Cement (Using Portland Cement)	20
Lime Treated or Stabilized Materials	21
Cement Treated or Stabilized Materials	22
Cement Grout	23
Aggregate (Gravel, Crushed Stone or Slag)	24
Sand	25
Mineral Dust	26
Mineral Filler	27
Other	28

Table A.20. Recycling Agent Type Codes

	Code
RA 1	42
RA 5	43
RA 25	44
RA 75	45
RA 250	46
RA 500	47
Other	48

Note: The recycling agent groups shown in this table are defined in ASTM D4552.

Table A.21. Anti-Stripping Agent Type Codes

	Code
Permatac	01
Permatac Plus	02
Betascan Roads	03
Pavebond	04
Pavebond Special	05
Pavebond Plus	06
BA 2000	07
BA 2001	08
Unichem "A"	09
Unichem "B"	10
Unichem "C"	11
AquaShield AS4115	12
AquaShield AS4112	13
AquaShield AS4113	14
Portland Cement	15
Hydrated Lime:	
Mixed Dry With Asphalt Cement	16
Mixed Dry with Dry Aggregate	17
Mixed Dry with Wet Aggregate	18
Slurried Lime Mixed with Aggregate	19
Hot Lime Slurry (Quick Lime Slaked and Slurried at Job Site)	20
Nostrip Chemicals A-500	21
No Strip Chemical Works ACRA RP-A	22
No Strip Chemical Works ACRA Super Conc.	23
No Strip Chemical Works ACRA 200	24
No Strip Chemical Works ACRA 300	25
No Strip Chemical Works ACRA 400	26
No Strip Chemical Works ACRA 500	27
No Strip Chemical Works ACRA 512	28
No Strip Chemical Works ACRA 600	29
Darakote	30
De Hydro H86C	31
Emery 17065	32
Emery 17319	33
Emery 17319 - 6880	34
Emery 17320	35
Emery 17321	36
Emery 17322	37
Emery 17339	38
Emery 1765-6860	39
Emery 6886B	40
Husky Anti-Strip	41
Indulin AS-Special	42
Indulin AS-1	43

Table A.21. Anti-Stripping Agent Type Codes
(Continued)

	Code
Jetco AD-8	44
Kling	45
Kling Beta ZP-251	46
Kling Beta L-75	47
Kling Beta LV	48
Kling Beta 1000	49
Kling Beta 200	50
Nacco Anti Strip	51
No Strip	52
No Strip Concentrate	53
Redi-Coat 80-S	54
Redi-Coat 82-S	55
Silicone	56
Super AD-50	57
Tap Co 206	58
Techni H1B7175	59
Techni H1B7173	60
Techni H1B7176	61
Techni H1B7177	62
Tretolite DH-8	63
Tretolite H-86	64
Tretolite H-86C	65
Tyfo A-45	66
Tyfo A-65	67
Tyfo A-40	68
Edoco 7003	69
Other	70

Table A.22 Distress Types

	Code
Asphalt Concrete Pavement	
Alligator Cracking	01
Block Cracking	02
Edge Cracking	03
Longitudinal Cracking	04
Reflection Cracking	05
Transverse Cracking	06
Patch Deterioration	07
Potholes	08
Rutting	09
Shoving	10
Bleeding	11
Polished Aggregate	12
Raveling and Weathering	13
Lane Shoulder Dropoff	14
Water Bleeding	15
Pumping	16
Other	17
Portland Cement Concrete Pavement	
Corner Breaks	20
Durability Cracking	21
Longitudinal Cracking	22
Transverse Cracking	23
Joint Seal Damage	24
Spalling	25
Map Cracking/Scaling	26
Polished Aggregate	27
Popouts	28
Punchouts	29
Blowouts	30
Faulting	31
Lane/Shoulder Dropoff	32
Lane/Shoulder Separation	33
Patch Deterioration	34
Water Bleeding/Pumping	35
Slab Settlement	36
Slab Upheavel	37
Other	38