Archive Highway Performance Monitoring System (HPMS) Data Item Descriptions 1993 – 1998

The following data item descriptions should be used with HPMS universe and sample archive data files for years 1993 through 1998. These data item descriptions include the coding instructions and definitions originally used to create the files; item descriptions follow the same sequence as the comma delimited ASCII universe and sample files. **Note: all included text and software references are not applicable.**

IDENTIFICATION DATA ITEMS

Item 1 -- State Control Field (Length = 100)

This portion of the record is for the use of the State. It may contain anything the State wishes for identification or for any other purpose. The Federal Highway Administration (FHWA) Headquarters does not use these data.

Item 2 -- Metric (or English) Reporting Units (Length = 1)

This item is to be coded for all section records. Beginning with 1995 submittal, all data submitted to FHWA must be in metric units. The HPMS software will automatically convert all data to metric during the FHWA submit process. Enter the code to indicate the units of measurement used to report applicable measurement type data items. **All applicable data items must use the same reporting unit for the entire data file**. **There can be no mixing of units within the file.**

Code	Description
1	This file of section data is coded using the English system of unit measurement (miles, feet, inches, etc.).
2	This file of section data is coded using the modernized metric system of unit measurement known as the SI (kilometers, meters, millimeters, etc.).

Universe data items 8, 25, 34, 35, and standard sample data items 45, 48, 51, 53, 55, 58, 61, 63 and 64 are to be coded with the units specified by this item. Item 7A may be converted if the identification includes kilometer point (mile point). Metric and English units are defined in Chapter II.

Soft conversions may be made using the following conversion factors taken from AASHTO's "Guide To Metric Conversion", 1993:

1 mile = 1.609344 kilometers	1 foot = 0.3048 meters = 304.8 millimeters
1 square mile = 2.59 square kilometers	1 inch = 0.0254 meters = 25.4 millimeters

Typical hard conversions normally used for design purposes also found in the AASHTO guide include:

11 foot lane = 3.3 meters	10 foot lane or shoulder = 3.0 meters
12 foot lane = 3.6 meters	55 mph = 90 km/h
8 foot shoulder = 2.4 meters	65 mph = 105 km/h

Items that are hard converted whenever possible are:

Item 51: Lane Width	**Item 63**: Speed Limit
Item 53: Right and Left Shoulder Width	**Item 64**: Weighted Design Speed

More information may be found in the AASHTO Guide referenced above and in Chapter XIII, "HPMS Metric/English Conversion Software." The conversion software will perform the appropriate conversions

on all of the applicable data items including Item 7A. The appropriate hard conversions are described in Chapter XIII and are performed by the software.

Item 35, Measured Roughness, is converted as noted in Appendix J of this Manual:

63.36 inches/mile = 1.0 meter/kilometer

Item 3 -- Year (Length = 2)

Enter the last two digits of the calendar year for which the data apply. For example, the 1997 data reported in 1998 would be coded "97". The data for the year 2000 would be coded "00". The HPMS software **is** "year 2000" compliant.

If adding a section while working in the HPMS software, the year will automatically be set based on the year in which the user is working. The year is displayed on the top of the screen. To change the year, select "Admin Tools/Change State/Year".

Item 4 -- State Code (Length = 2)

The FIPS codes, listed in Appendix A, are used.

If adding a section while working in the HPMS software, the State code will automatically be coded based on the State selected. The State name is displayed on the top of the screen. If the user selects the wrong State, it can be changed by selecting "Admin Tools/Change State/Year".

Item 5 -- Type of Section Identification (Length = 1)

Code	Description
1	Section Identifier: A countywide unique identifier for section records.
2	Grouped Length: A countywide unique identifier for grouped length (kilometers or miles) records only.

Enter the code that indicates the type of unique identification used in Item 7A.

Use code "1" for all section records, including standard and donut area sample section records and universe only section records that cannot or are not being grouped. Code "1" must be used for Linear Referencing System (LRS) section records (PAS, rural Minor Arterial, and NHS) [See Items 7B and 8].

Use the grouped length code "2" only for those records that truly include grouped length and do not reflect contiguous roadways. Only nonsample rural major collector, minor collector and local, and nonsample urban minor arterial, collector, and local system records may contain grouped length. Grouping may only be done for roadways where the data for Items 1-7, 9-14, 20-24 and 26-27, as applicable, are homogeneous across all sections being grouped.

See examples for codes 1 and 2 in Item 7A.

Item 6 -- County Code (Length = 3)

Use the three-digit FIPS county code (see FIPS Publication 6-4, "Counties and Equivalent Entities of the United States, its Possessions, and Associated Areas"). County equivalents are to be used in HPMS for the following:

Alaska	The highway districts
Louisiana	The parishes
Puerto Rico	The "Municipio" districts

In the HPMS software, the County Names table must be kept current. To add a county, modify a county name, or delete a county code, select "Admin Tools/County Names". When adding a section, the county code must be in the County Names table or the system will not allow the section to be added.

Item 7A -- Section Identification (ID) (Length = 12)

This field must be coded in accordance with the type of section coded in Item 5, and must contain a countywide unique record identifier. It provides for the flexibility needed

to identify sections in accordance with a State's needs independent of the unique identifier that must be maintained for sample sections (see Item 39, Sample Number). This item may be redefined to suit the needs of the State. If kilometer point (mile point) is part of this field, it may be converted to reflect the units as defined by metric (or English) Reporting Units (Item 2).

The appropriate type of ID is as follows:

- For all section records including rural arterials (Interstate, other principal arterial, minor arterial), urban principal arterials (Interstate, other freeways and expressways, other principal arterial), NHS sections, and all sample (standard and donut area) sections, supply a countywide unique section identifier (code "1" in Item 5). This may be a location specific identifier such as route kilometer point (mile point), anode-bnode, or just a unique number.
- For grouped length records, use a countywide, unique identifier (code "2" in Item 5). Only non sample urban minor arterial, collector and local, and non sample rural major and minor collector and local data records may be grouped.

Examples for each method follow:

1. Section Identifier (Item 5 = 1)

Any countywide unique identifier with no more than 12 digits is coded "right justified".

Example: Interstate Inventory Route 56, Kilometerpoint 4.321

Pos.	110	111	112	113	114	115	116	117	118	119	120	121
Code	0	0	0	I	5	6	0	0	4	3	2	1

2. Grouped Length (Item 5 = 2)

Any countywide unique identifier with no more than 12 digits is coded "right justified."

Grouped data is an aggregation of roadway kilometers (miles), where at least the following data items are homogeneous across all roadways being combined: Items 1-7A, 9-14, 20-24 and 26-27, as applicable. Use this choice ONLY when the length is truly grouped. Otherwise, use the "Section Identifier" identification.

Example: Grouped Length Record 98365

Pos.	110	111	112	113	114	115	116	117	118	119	120	121

Code	0	0	0	0	0	0	0	9	8	3	6	5

Item 7B -- LRS Identification (Length = 12)

This item is required for all PAS, NHS and rural minor arterial system section records, and must be coded in conjunction with LRS Kilometer points (Mile points) [Item 8] as part of the LRS location identifier. The Type of Section (Item 5) must be coded "1" for these systems. Items 7B and 8 are for the purpose of establishing an LRS for GIS applications. More information concerning the LRS may be found in Chapter V, Linear Referencing System Requirements.

Inventory Route and Subroute Numbers, for LRS use:

The inventory route and subroute numbers reported in this field must be consistent with the inventory route and subroute numbers identified on the Inventory Route and Node Maps and in the Inventory Route Link Data File that are fully discussed in Chapter V, Linear Referencing System Requirements.

The **inventory route number** is coded in positions 122-131 (first 10 positions), right justified, followed by the subroute number in the last 2 positions (132-133) of this field. The LRS inventory route number can be alphanumeric, but must not contain blanks. The inventory route number is not necessarily the same as that posted along the roadway, but is a number used to uniquely identify a route within at least a county and perhaps throughout the State.

The **subroute number** is a number that uniquely identifies the AHEAD and BACK portions of an inventory route section where duplicate KMPTs (MPTs) occur.

Example: Inventory Route 63951, Subroute Number 2

Pos.	122	123	124	125	126	127	128	129	130	131	132	133
Code	0	0	0	0	0	6	3	9	5	1	0	2

Item 8 -- LRS Beginning and Ending Kilometerpoints (Milepoints) (Length = 14)

This item is required for all PAS, NHS, and rural minor arterial system section records for the purpose of establishing an LRS. The Type of Section (Item 5) must be coded "1" for these systems. This field must be coded with the beginning and ending KMPTs (MPTs) for the section on the inventory route and for the subroute number coded in the LRS Identification (Item 7B), as specified under the above example. It must also reflect units as defined by Metric (or English) Reporting Units (Item 2).

The KMPTs (MPTs) for the section must be consistent with the LRS information found on the Inventory Route and Node Maps and in the Inventory Route Link Data File for a particular route and subroute. In order to be consistent, section breaks must adhere to the conditions listed in Chapter V, particularly under the section titled "The Effect of Duplicate/Non-Duplicate Kilometer points/Mile points and Subroutes on HPMS Sections." See Chapter V for a full discussion on coding of the Linear Referencing System.

Zero-fill this field for all records where LRS information is not provided. The beginning KMPT (MPT) is coded in positions 134-140 (7 positions), right justified (xxxx.xxx -- implied decimal point). The KMPT (MPT) represents the distance in kilometers (miles) from a set reference point to the beginning of this highway segment and is the lowest KMPT (MPT) of the section.

Similarly, the ending KMPT (MPT) is coded in positions 141-147 (7 positions), right justified (xxxx.xxx -- implied decimal point) and is the highest KMPT (MPT) of the section.

The KMPT (MPT) numbering format should be such that the combination of county, inventory route number, subroute number, and KMPT (MPT) information will define a unique location.

Example: Beginning kilometer point 98.25 and ending kilometer point 101.20 for the inventory route and subroute number coded in Item 7B:

Pos.	134	135	136	137	138	139	140	141	142	143	144	145	146	147
Code	0	0	9	8	2	5	0	0	1	0	1	2	0	0

Item 9 -- Rural/Urban Designation (Length = 1)

Adjusted urban area boundaries apply. See Chapter II for the definition of adjusted Census urban boundary.

Code	Description
1	Rural Area
2	Small Urban Area (Population 5,000 to 49,999)
3	Small Urbanized Area (Population 50,000 to 199,999)
4	Large Urbanized Area (Population 200,000 or More)

The complete adjusted urbanized area, including portions that cross State boundaries, is used to establish population criteria for coding this data item. The estimated population

between censuses should be used to determine the urbanized area size code ("3" or "4"). July 1 estimates are available by the end of each calendar year and are on the Internet at www.census.gov.

Item 10 -- Urbanized Area Sampling Technique and Urbanized Area Code (Length = 4)

This item must be coded when the Rural/Urban Designation (Item 9) is coded "3" or "4" for section records within an urbanized area boundary. Otherwise, zero-fill this field.

Item 10A -- Urbanized Area Sampling Technique (Length = 1)

All urbanized areas that contain a population of 200,000 persons or more, or smaller urbanized areas that are within an NAAQS nonattainment area boundary, or smaller urbanized areas that are NAAQS nonattainment areas on their own MUST be individually sampled. This includes any portion of a nonattainment urbanized area that crosses a State boundary, and individual State portions of an urbanized area that, in the aggregate (all States), contains more than 200,000 persons, even if a State's portion does not reach that population by itself. Otherwise, the State may sample urbanized areas individually or it may group two or more urbanized areas into one or more collective groups.

In order to identify how the State is sampling urbanized areas, this data item must be coded for all urbanized area universe only and standard sample records as follows:

0	If the urbanized area is being individually sampled or if the section record is not in an urbanized area.
Sequential (1-9)	If two or more areas are being grouped, one number from 1 to 9 should be used for each group, starting with "1". For example, if a State has consolidated all qualifying urbanized areas (<200,000 population and not an NAAQS nonattainment area) into one group, only "1" should be coded. If qualifying areas have been consolidated into two groups plus some individual areas, the first group of qualifying areas must be coded "1", the second group must be coded "2", and the individual areas must be coded "0".

Item 10B -- Urbanized Area Code (Length = 3)

Code the actual three-digit urbanized area code for the urbanized area in which the section falls (see Appendix B). The urbanized area code for the specific urbanized area is always coded for all section records in the urbanized area, universe only and standard sample, regardless of the sampling option selected. If the section is not in an urbanized area, zero-fill this field.

In the HPMS software, the Urbanized Area Names table must be kept current. To add an urbanized area, modify an urbanized area name, or delete an urbanized area code, select "Admin Tools/Urbanized Area Names".

Item 11 -- NAAQS Nonattainment Area Code (Length = 3)

Enter the three-digit urbanized area code for the **name** of the NAAQS nonattainment area, as declared by EPA. **This code is required for all rural, small urban, and urbanized area records, both universe only and sample (standard and donut area), that are within an NAAQS nonattainment area boundary**.

NOTE: If an NAAQS nonattainment area contains partial or split urbanized areas, HPMS cannot be used for travel tracking and "000" should be entered in the data records for this item. Because the HPMS sample can represent only whole urbanized areas, expanded results are not legitimate for partial urbanized areas. As a **result, other methods, external from HPMS, will have to be used for travel tracking or other purposes in these areas**.

Also, code "000" for section records that are not within a nonattainment area boundary.

The urbanized area codes may be found in Appendix B of this Manual. NAAQS nonattainment areas are discussed in Chapter II under definitions. The Houston nonattainment area coding example under this definition provides more explanation for coding this data item.

This data item is not to be confused with the Urbanized Area Code (Item 10B). Item 10B is reported only for section records that are within the urbanized area boundary.

SYSTEM DATA ITEMS

Item 12 -- Functional System Code (Length = 2)

Code	Description	Code	Description
RURAL		**URBAN**	
01	Principal Arterial-Interstate	11	Principal Arterial - Interstate
02	Principal Arterial - Other	12	Principal Arterial-Other Freeways & Expressways
06	Minor Arterial	14	Principal Arterial - Other

Code	Description	Code	Description
RURAL		**URBAN**	
07	Major Collector	16	Minor Arterial
08	Minor Collector	17	Collector
09	Local	19	Local

Prior to the 1997 data year, codes 13 and 15 were used to identify connecting link portions of the urban Other Freeways and Expressways and Other Principal Arterial functional systems. Code "13" **must** now be coded as "12" and code "15" **must** now be coded as "14".

Definitions of the highway functional systems can be found in "Highway Functional Classification, Concepts, Criteria and Procedures," FHWA, March 1989.

Item 13 -- Generated Functional System Code (Length = 1)

This field consists of a code that is generated by software based on the Functional System (Item 12), and is used as a software aid. It is encoded by the HPMS Software. If Item 12 is changed, standard calculations must be run to obtain the proper code in this field. The codes are as follows:

Code	Description	
RURAL		**URBAN**
1	Interstate	Interstate
2	Other Principal Arterial	Other Freeways and Expressways
3	Minor Arterial	Other Principal Arterial
4	Major Collector	Minor Arterial
5	Minor Collector	Collector
6	Local	Local

Item 14 -- National Highway System (NHS) (Length = 1)

This item is coded for all records to indicate whether this section is on the NHS. The coding must reflect the connectors that are already part of the approved NHS as well as those accepted by FHWA and submitted to Congress for approval. Also see the definition of NHS in Chapter II. Enter one of the following codes:

Code	Description	
0	This section **is not** on the NHS	
1	This section **is** on the NHS but **is not** an NHS intermodal connector	
2-9	This section **is** an NHS intermodal connector. Type of intermodal connector:	
	2	Major Airport
	3	Major Port Facility
	4	Major Amtrak Station
	5	Major Rail/Truck Terminal
	7	Major Public Transit Terminal or Multi-Modal Passenger Terminal
	8	Major Pipeline Terminal
	9	Major Ferry Terminal
	If more than one connector type is involved, use the predominant type.	

Item 15 -- Planned Unbuilt Facility (Length = 1)

This item is coded for all PAS and NHS data records. Do not report unbuilt or not-open-to-traffic roadways that are not on the PAS/NHS. Enter the status of the roadway section being reported.

Code	Description
0	Section is not on the applicable PAS/NHS and **is open to public travel**.
1	PAS/NHS section is built and open to public travel.

Code	Description
2	PAS/NHS section is not yet built, but is **part of an approved or adopted plan** of a short range improvement program which has a good probability of being under construction in the near future (up to 6 years). This code should include those sections that are built but were not yet open to traffic for the reporting year.

For codes "0" and "1", code all applicable data items for the section record. If the section record is coded "2", report at least items 1-22, 24-25, 28 and 30 as applicable, using design estimates where needed.

Item 16 -- Official Interstate Route Number (Length = 5)

This data item is required for all Interstate System data records, and must contain the official Interstate route number, right justified. If two or more Interstate routes occupy the same roadway, code the lowest official route number. If the route is not an official Interstate route, zero-fill this item, regardless of signing.

Only code the officially approved AASHTO/FHWA Interstate numeric route number, right-justified. Do not enter extra alphanumeric characters--provide leading zeroes for the remaining digits. Identify short Interstate route spurs with their own approved route number and not that of the main route.

Alaska, Hawaii, and Puerto Rico may use alpha characters in the Interstate route number field as part of the official AASHTO/FHWA route number. Other exceptions to the Interstate numeric rule include a major route that has a parallel or diverging branch with fully paired directional roadways and has an official route number containing a letter for relative direction (i.e., E for east). For example, Interstate Route 35 in Minnesota splits with 35E going through St. Paul and 35W through Minneapolis.

Item 17 -- Route Signing (Length = 1)

This data item is required for all PAS, NHS and rural minor arterial system data records. The reporting of routes for other systems is optional. These codes specify the manner in which the highway segment actually is or will be signed with route markers. If the roadway is unsigned, code this field "0".

Code	Description	Code	Description
0	Not Signed or Not Applicable	5	County

Code	Description	Code	Description
1	Interstate	6	Township
2	U.S.	7	Municipal
3	State	8	Parkway Marker or Forest Route Marker
4	Off-Interstate Business Marker	9	None of the Above

When a route is signed with two or more identifiers (i.e., Interstate Route 83 and U.S. Route 32), the code for the highest class of route should be used (Interstate in this example). The hierarchy is in the order listed above.

Item 18 -- Route Signing Qualifier (Length = 1)

This data item is required for all PAS, NHS and rural minor arterial system data records. The reporting of routes for other systems is optional. These codes specify the manner in which the highway segment actually is or will be signed on the route marker described in Item 17. Where more than one code is applicable, use the lower code. If the roadway is unsigned, code this field "0".

Code	Description	Code	Description
0	No Qualifier or Not Signed or Not Applicable	5	Loop
1	Alternate	6	Proposed
2	Business Route	7	Temporary
3	Bypass	8	Truck Route
4	Spur	9	None of the Above

Item 19 -- Signed Route Number (Length = 8)

This data item is required for all PAS, NHS and rural minor arterial system data records, and must reflect the route signing hierarchy as coded in Item 17. The reporting of routes for other systems is optional. Enter the signed route number, right justified, for the marker described in Items 17 and 18. Any alphabetic character prefixes or suffixes that do not conform to the Route Signing or Route Signing Qualifier lists should be reported in this item, and abbreviated to fit the field length, as necessary. If two or more routes of the same

class in the hierarchy (see Item 17) are signed along a roadway section, the lowest route number is to be entered in this field. If Item 17 is coded "0", zero-fill this field.

JURISDICTIONAL DATA ITEMS

Item 20 -- Governmental Ownership (Length = 2)

This data item identifies the level of government that owns the facility. It does not matter if agency agreements exist for maintenance or other purposes, or if the roadway passes through a political or other boundary. The purpose of this item is to identify the owner of the facility. In the case of toll authorities, this code is not dependent upon a toll being charged. Where more than one code could be used for a section, the lowest numerical code should be reported (i.e., if county and town boundaries are the same, but only one ownership body exists, use code "02").

Code	Description	Code	Description
01	State Highway Agency	31	State Toll Authority
02	County Highway Agency	32	Local Toll Authority
03	Town or Township Highway Agency	60	Other Federal Agency Not Listed Below)
04	Municipal Highway Agency	62	Bureau of Indian Affairs
11	State Park, Forest, or Reservation Agency	64	U.S. Forest Service
12	Local Park, Forest, or Reservation Agency	66	National Park Service
21	Other State Agency	68	Bureau of Land Management
25	Other Local Agency	70	Military Reservation/Corps of Engineers
26	Private [1]		

Item 21 -- Special Systems (Length = 2)

This field identifies the special funding categories for applicable highway segments, both open-to-traffic and unbuilt, not-open-to-traffic PAS/NHS roadways (identified via Item 15).

These special systems are separate and distinct from those outlined in previously defined fields, and may overlap previously defined systems. For example, the National Forest Highway System may include roadways owned by a State or local government.

If Interstate System sections do not meet the criteria for special system codes "01" through "06", code "08", Strategic Highway Network (STRAHNET), is to be used. If a State or locally owned roadway is part of the National Forest Highway System, it should be coded as such in this field (i.e., "15"). Where conflicts exist, use the lower numbered code (i.e., use "02" where "02" and "08" are both applicable).

Code	Description
00	Not on a Special System
01	Addition to the Interstate System [23 U.S.C. 139(c)] [2]
02	Addition to the Interstate System [23 U.S.C. 139(a)] **approved prior to March 9, 1984** [3]
03	Addition to the Interstate System [23 U.S.C. 139(a)] **approved on or after March 9, 1984** [3]
04	Future addition to the Interstate System [23 U.S.C. 139(b)] [4]
05	Section 332 Interstate System that meets the Interstate System design standards [5]
06	Designated future Section 332 Interstate System [5]
08	Strategic Highway Network (STRAHNET) (includes all Interstate System) [6]
11	Appalachian Development Highway [7]
13	Indian Reservation Roads and Bridges [8]
15	National Forest Highway System [8]
16	National Forest Development Roads and Trails
18	National Park Service Parkway [8]
19	National Park Roads and Trails

OPERATION DATA ITEMS

Item 22 -- Type of Facility (Length = 1)

Code	Description
1	One-Way Roadway
2	Two-Way Roadway
3	One-Way Structure (Bridge, Tunnel, Causeway, etc.)
4	Two-Way Structure (Bridge, Tunnel, Causeway, etc.)

Use the "roadway" codes when a structure is on part of the section being reported. Use the "structure" codes when the section being reported is **entirely** on a structure. As noted at the beginning of this chapter under the heading, "Structure Treatment", sections entirely on a structure are to be avoided as standard samples.

When a section is entirely on a structure, only the following data items need to be reported: 1-30, 33, 34, 38. If a structure cannot be avoided as a standard sample, only the following additional items must be reported: 9-42, 51, 63, 65, 73, 74, 81 & 82 as applicable. All other data items should contain zeroes.

Definitions:

One-Way: A roadway or structure section with traffic moving in only one direction during nonpeak period hours. When part of a one-way couplet, each roadway/structure must be reported independently.

Two-Way: A roadway or structure with traffic moving in both directions during nonpeak period hours.

Item 23 -- Designated Truck Route/Parkway (Length = 1)

This item is required for all systems. Because of the link between the designated truck route system and the Federal-aid Primary System, which is still in effect for certain Federal-aid program purposes, careful consideration must be given to codes "1" and "2".

Code	Description
1	Designated truck route under **Federal authority** in 23 CFR 658. This code would include all Interstate and those sections/routes designated **only** under Federal authority or under **both** Federal and State authority. It would **not** include the routes in those States that had designated all, or almost all, of the non-Interstate Federal-Aid Primary System. If these roadways are on the current principal arterial system, use code "2" if there are no limitations/restrictions. [9]
2	Designated truck route **only** under **State authority** and **fully available** to both types of trucks described below. [9]
3	Parkway -- not on a designated truck route.
4	Not a Parkway -- not on a designated truck route.

Designated truck routes (codes "1" and "2") are those sections/routes that are available to truck tractor and 14.63-meter (48-foot) [or longer if "grandfathered"] semitrailer combinations, truck tractor and 8.53-meter (28-foot) twin trailer combinations, both subject to no overall length limits, and specialized combination vehicles such as automobile and boat transporters, maxicube vehicles, and saddle mount combinations, subject to Federal minimum overall length limits [generally 19.81 to 22.86 meters (65 to 75 feet)], all of which may be up to 2.59 meters (102 inches) wide.

The designated truck routes, as shown in Appendix A to 23 CFR 658, are open to vehicles subject to Federal minimum length limits specified in Section 411 of the Surface Transportation Assistance Act of 1982 (STAA) and the Federal width limit of 2.59 meters (102 inches) specified in Section 416 of STAA. Additional routes for such vehicles have been designated under State authority.

Do not include the following as designated truck routes for the purposes of this data item (use code "4"):

a. Routes (or portions thereof) that simply provide "access" for these large vehicles to terminals and for food, fuel, repair or rest services.

b. Those routes designated only under State authority that restrict some of the trucks described above because of length or width limitations or because of time of day restrictions.

For purposes of this data element, a parkway (code "3") is a highway that has full or partial access control, is usually located within a park or a ribbon of park-like developments, and

prohibits commercial vehicles. In this instance, buses are not considered commercial vehicles.

Item 24 -- Toll (Length = 1)

Code	Description
1	Non-Toll
2	Toll
3	Interstate toll section under Secretarial Agreement (Section 105 of 1978 Federal-Aid Highway Act, as amended).
4	Interstate toll section under Secretarial Agreement, now free of tolls.

In general, a section should be coded as toll if a fee is charged for its use or if it meets one of the conditions in code "3" or "4" above. Note: If portions of a continuous facility (i.e., road, bridge, tunnel, etc.) operated by a toll authority can be traversed without the payment of a toll, but a toll is charged on other portions, the entire continuous facility is considered to be toll. This applies even if some vehicles can enter and exit from the main through route without payment of a toll. If a toll is charged in only one direction, the "free" direction is also considered to be toll.

OTHER DATA ITEMS

Item 25 -- Section Length (xxx.xxx -- implied decimal) (Length = 6)

This field must reflect units as defined by Metric (or English) Reporting Units (Item 2). **It is required for all data records including those PAS/NHS routes that are being reported as unbuilt, or not open to traffic** (identified via Item 15).

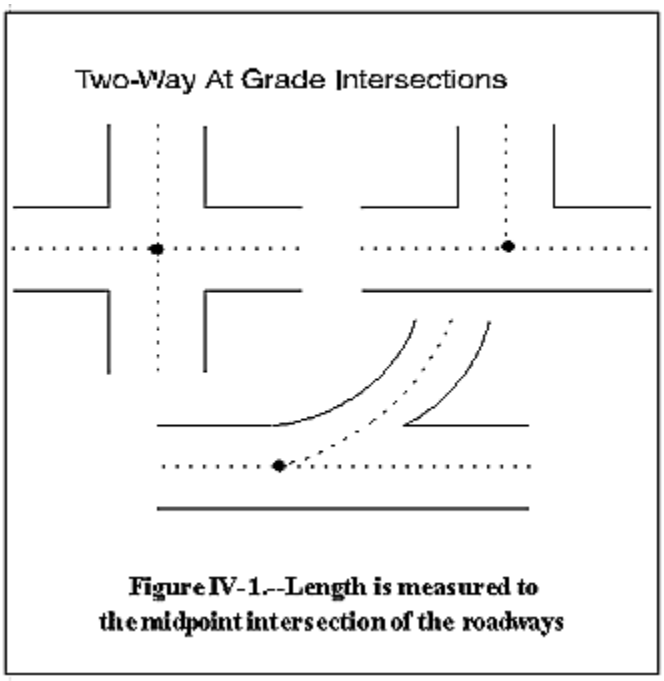

Figure IV-1.--Length is measured to the midpoint intersection of the roadways

Report length, in kilometers (miles), as measured along the centerline of the roadway. On independently aligned, divided highways, the reported length is normally the average of the lengths of the directional roadways, measured along their center lines. If the State has chosen an inventory direction for which all applicable data items are to be reported on divided facilities, the length is as measured along the centerline of the inventory direction (see Coding Nonuniform Roadways, page IV-2). The two roadways of a one-way couplet (see Item 22) are to be reported independently (not averaged).

Where a route length is reported from or to the intersection with another route, the point of measurement should be taken as the actual center of the intersection (see Figure IV-1). If two routes cross by a structure, the length measurement should be treated as if the two routes were unseparated highways meeting at grade (i.e., to the theoretical center of the intersection). When a route terminates at an interchange (a tee intersection), the length is measured as the average of the four directional, connecting roadway (ramp) lengths to the first point of intersection or cross over/under with the other mainline route (see Figure IV-2). Except in the case of the terminating route discussed above, ramps are considered part of the mainline routes and are not considered for HPMS length purposes.

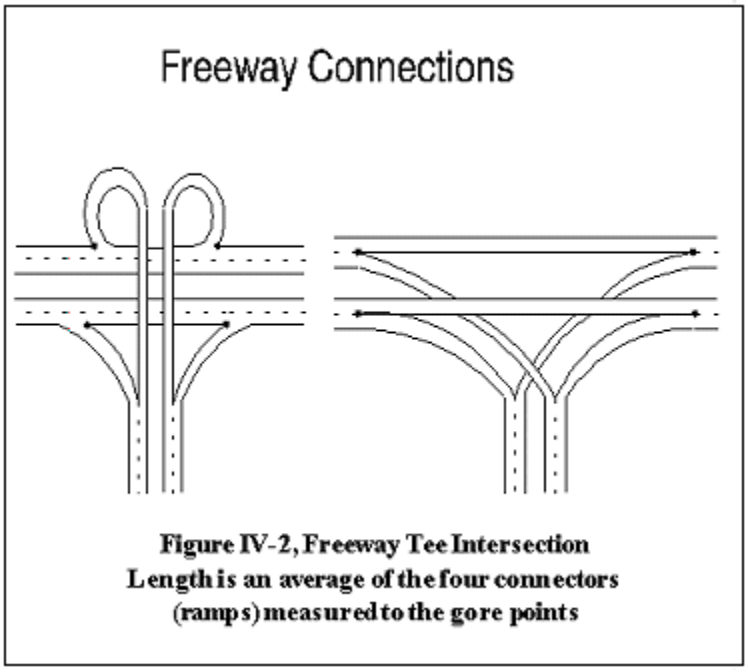

Figure IV-2, Freeway Tee Intersection
Length is an average of the four connectors (ramps) measured to the gore points

The length of certain non-PAS/NHS, nonrural minor arterial, nonsample roadways may be grouped if the roadways are homogeneous across several universe data items (see Items 5 and 7 for details). Under the grouping situation, the total combined length of these roadways is coded. Should it be necessary to code a number larger than 999.998 kilometers (or 621.370 miles), two or more records should be included so as to produce the required sum. Care should be taken to avoid splitting the length equally between records so that the possibility of mistaking these for duplicate records can be avoided--each record identification for grouped length must be unique.

While provision has been made for coding to a maximum precision of 0.001, records should reflect the precision normally utilized by the State, but at least to the nearest tenth (kilometer or mile). This not only provides maximum precision, but alleviates rounding and checking problems. The field should be coded with leading and trailing zeroes, depending on the precision obtained; e.g., 56.2 would be coded "056200".

Item 26 -- Donut Area Sample AADT Volume Group Identifier (Length = 1)

Enter a number from 1 to 5 that represents the donut area sample AADT volume group for this record. **The volume group must be coded for all data records (universe only, standard sample, and donut area sample section) that are within the donut area portion of a nonattainment area for the rural minor arterial and major collector, and the small urban minor arterial and collector systems**. Code "0" for all nonapplicable section records. The AADT ranges for each volume group number are presented in Appendix S and in Appendix F, Table F-5.

Use count-based AADT data to ascertain the volume group where available. When AADT is not precisely known for all applicable universe only sections, use traffic flow maps, count data obtained from local governments, and other available data to make reasonable volume group assignments. The volume group can be determined by the HPMS Software provided the AADT is reported and the FHWA volume group ranges are used.

A discussion of NAAQS nonattainment and donut areas may be found in Chapter II. A description of the donut area sampling scheme is contained in Appendix S.

Item 27 -- Standard Sample AADT Volume Group Identifier (Length = 2)

Enter a number from 01 to 13 that represents the standard sample AADT volume group for the record. **The volume group must be coded for all open-to-traffic data records (universe only, standard sample, and donut area sample section) for all systems except for the rural minor collector and the rural and urban local functional systems**. Code "00" for all nonapplicable section records. The AADT ranges for each volume group number are presented in Appendix F, Tables F-1 to F-4.

Use count-based AADT data to ascertain the volume group where available. When AADT is not precisely known for all applicable universe only sections, use traffic flow maps, count data obtained from local governments, and other available data to make reasonable volume group assignments. The volume group can be determined by the HPMS Software provided the AADT is reported and the FHWA volume group ranges are used.

A description of the standard sampling scheme is contained in Appendix E.

Item 28 -- AADT (Length = 6)

This item is required for all PAS and NHS data records (including not-yet-open-to-traffic facilities coded via Item 15), and for all standard and donut area sample sections; it is optional for the remaining data records. The field is zero-filled when not used.

Enter the section's AADT for the given year. For two-way facilities, provide the AADT for both directions; provide the directional AADT if part of a one-way couplet or for one-way streets. Since many applications, including travel estimates, will be based on these section AADTs, States should concentrate efforts on the PAS/NHS and sample (standard and donut area) sections of the highway system, and provide AADT values that are count-based (actual counts adjusted to represent AADT) rather than estimated. Code the expected (estimated) AADT for PAS/NHS facilities that are not yet open to traffic.

The reported AADT values are to be updated annually. The AADT values derived from pneumatic tube counts must include the application of an axle correction factor. All counts

must reflect application of current day of week and seasonal factors; growth factors must be applied if the AADT was not derived from current year counts. Specific guidance for the frequency and size of traffic data collection programs, factor development, age of data, and other applications is contained in Appendix K with further references to the "Traffic Monitoring Guide."

Caution: Metropolitan planning organizations and other local governmental agencies traditionally develop an average weekday traffic volume for local purposes. However, the HPMS requires reported AADT to be an average daily value that represents all days of the reporting year.

Leading zeroes must be coded. For example, an AADT of 25,300 is coded "025300".

Item 29 -- AADT Derivation (Length = 1)

Code this item for all urban and rural arterial section records where AADT (Item 28) is a required data item. This includes the complete PAS and NHS data records on the applicable functional systems and all standard and donut area minor arterial sample section records. Enter one of the following codes that best describes the method used to develop the AADT on the applicable sections.

Code	Description
0	Not applicable. AADT is not required to be coded for this section, or it is not on the PAS/NHS and is not a standard sample or donut area minor arterial sample.
1	The AADT for this section is developed from traffic counts collected on or adjacent to the section during the current year and appropriately factored as required by the procedures in Appendix K.
2	The AADT for this section is factored from a previous year count-based AADT (using Appendix K procedures) that is less than or equal to 2 years old.
3	The AADT for this section is based on count data that exceeds the 3-year cycle, as addressed by the procedures in Appendix K and in the code "2" description.
4	The AADT for this section is estimated using a means not corroborated in Appendix K or the TMG, such as from traffic flow maps, based on "engineering judgement", regionwide trends, etc., or does not fit into the above coding scheme.

Item 30 -- Number of Through Lanes (Length = 2)

This item is required for all PAS and NHS data records, and all standard sample section records. It is optional for all other data records. Enter "00" when not supplied.

Enter the prevailing number of through lanes in both directions (excluding collector-distributor lanes, weaving lanes, frontage road lanes, parking and turning lanes, etc.) carrying through traffic in the off-peak period. Exclude truck climbing lanes unless the length and importance are sufficient to warrant inclusion. Other additional short-length lanes needed for toll collection, police and emergency vehicle turnaround, acceleration/deceleration lanes, etc., are to be excluded. Code the expected (estimated) number of through lanes for the PAS/NHS facilities that are not yet open to traffic.

Additional information concerning coding of this and other related data items is contained in this Chapter under Sample Geometrics/Configuration, General Guidelines (following Item 50).

Item 31 -- Urban Location [Urban Data Item] (Length = 1)

This item is required for urbanized areas that contain 200,000 or more persons for the following systems:

- **all urbanized PAS data records.**
- **all urbanized minor arterial standard sample section records**.

The complete adjusted urbanized area, including portions that cross State boundaries, is used to establish the population criteria for coding this data item.

The purpose of this data item is to identify the general character of the land surrounding each section of roadway. The process of doing so, however, must fully recognize that "pure" delineations may be the exception rather than the rule because of the variety and mixes of existing land uses. A reasonable approach to accomplishing this task may be by delineating sizeable portions of the urbanized areas according to the individual code descriptions noted below. Include sport complexes, zoos, air and rail terminals, etc., in the delineations based on both trip end and density characteristics. Note that this data item is in effect a surrogate for vehicular trip end density or the vehicular trip generation characteristics of the land area.

Enter the code that represents the predominant characteristics of the land area based on the delineation procedures noted above for the roadway section. If a road section is contained in two different delineated areas or if the areas differ on either side of the road section, code the higher of the delineated densities (lower code) for the section.

Code	Description
0	Not applicable for this section record; not on the PAS, not a minor arterial standard sample, and not an urban section in an urbanized area with 200,000 or more population.
1	Central Business District (CBD): The traditional commercial and retail trade center in the central city of an urbanized area. An area having very high land value because of intense concentration of retail trade, office space, and cultural and service activities.
2	High Density Business/Commercial Center (excluding the CBD): One or more centers of business and/or commercial activities within the urbanized area (**or a cluster of two or more adjacent smaller centers**). [Note: These smaller centers may have different names and may have been built at different times.] The inclusion of adjacent high density housing should also be considered in the delineation of these areas. Typical density and size characteristics are as follows: (1) Number of Employees >10,000 **OR** All Development >450,000 m2 (5,000,000 ft2) (2) WITH A Retail Portion>55,000 m2 (600,000 ft2)(3) **AND** Land Area <30 km2 (<7,500 acres) The limit to the land area eliminates sprawling areas such as highway corridors with strip commercial or business development, while ensuring a substantial density of activities. In all cases the high density commercial/business center should be a set of contiguous census blocks having an identifiable relationship. There should be more employees than residents, and there should be a mixture of uses, including jobs, shopping, and entertainment.
3	Low Density Commercial: That portion of an urbanized area that is not the CBD or a High Density Business/Commercial Center and contains a lower density of business, industrial, warehousing, service and strip development or a wide mixture/variety of such uses.
4	High Density Residential: That portion of an urbanized area in which the major land use is residential and has a density of 2,000 or more persons per square kilometer (5,000 or more persons per square mile).
5	Low Density Residential: That portion of an urbanized area in which the major land use is residential and has a density less than 2,000 persons per square kilometer

Code	Description
	(5,000 persons per square mile). The development density is greater than or equal to 250 dwellings per square kilometer (one dwelling unit per acre).
6	Other, including undeveloped land and residential areas having a density of less than 250 dwellings per square kilometer (one dwelling unit per acre).

Item 32 -- Access Control (Length = 1)

Enter the code for the type of access control **for all PAS and NHS data records and all standard sample section records**.

Code	Description
0	Not applicable; not on the PAS/NHS and not a standard sample section.
1	Full Access Control: Preference has been given to through traffic movements by providing interchanges with selected public roads and by prohibiting crossing at grade and direct driveway connections.
2	Partial Access Control: Preference has been given to through traffic movement. In addition to interchanges, there may be some crossings at-grade with public roads, but direct private driveway connections have been minimized through the use of frontage roads or other local access restrictions. Merely controlling curb cuts does not constitute partial control of access.
3	No Access Control. For HPMS purposes, this code includes all section records that do not meet the criteria for the above codes.

Item 33 -- Median Type (Length = 1)

Enter one of the following codes **for all PAS and NHS data records, and for all standard sample section records**:

Code	Description
0	Not applicable; not on the PAS/NHS and not a standard sample section.
1	Curbed

Code	Description
2	Positive Barrier
3	Unprotected
4	None

A positive barrier would normally consist of guardrail or concrete (Jersey type barrier), but could consist of thick, impenetrable vegetation on most of the section. Turning lanes or bays are not considered medians unless a median exists on the major portion of the roadway, and the turning lanes/bays are cut into the median at intersections, entrances to commercial enterprises, etc.

A continuous turning lane is not to be considered a median. Continuous crosshatching that is at least 1.2 meters (4 feet) wide may be considered a median; however, if a crosshatched portion of a roadway is used as a turning lane by law, it is to be considered a turning lane, not a median.

Item 34 -- Median Width (Length = 3)

This item is required for all PAS and NHS data records, and for all standard sample section records. The units of measurement must be reported in accordance with the option chosen for Metric (or English) Reporting Units (Item 2).

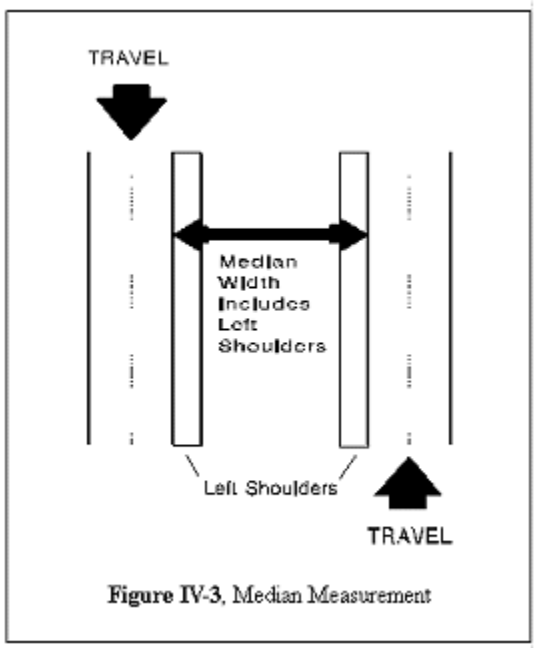

Figure IV-3, Median Measurement

Enter the predominant median width (including left shoulders, if any; see Figure IV-3), measured between the inside edges of the through roadways, to a tenth of a meter (xx.x -- implied decimal) or the nearest foot. Enter "000" for undivided or nonapplicable roadways. Enter "999" where the median width is 100.0 meters or 1,000 feet or greater. Provide leading zeroes if applicable. Ignore turning bays cut into the median.

Item 35 -- Measured Pavement Roughness [International Roughness Index (IRI)] (Length = 3)

This item is required for all paved PAS and NHS universe and sample (standard and donut area) data records, and all paved standard sample section records on the rural minor arterial system. It is also recommended to be reported for all other paved standard sample sections (see Table IV-1). Code "999" for unpaved facilities on the required systems. Zero-fill for all other sections when not supplied.

Enter the actual measured IRI value to the nearest unit per length measurement [hundredths of meters/kilometer (x.xx -- implied decimal) for the Metric system (9.97 maximum) or whole inches/mile (632 maximum) for the English system]. The entry must be in accordance with the reporting units chosen for Metric (or English) Reporting Units (Item 2). Provide leading zeroes where necessary.

State Pavement Management Systems (PMS) are expected to provide roughness data that meet HPMS standards. These data should be incorporated into HPMS for applicable sections.

Appendix J contains requirements, good practice guidelines and references pertaining to equipment, calibration/correlation and data collection procedures. Note that calibration and data collection activities are to be conducted during stable pavement and weather conditions (no frost heave, freeze/thaw, wet conditions, etc.)

When a pavement improvement is made on an applicable section and available IRI data were collected prior to the improvement, provide a temporary value for the improved section that reflects a reasonable average value for new pavement. Specify in the submittal correspondence the value used, the number of improved sections involved and when a measured value can be expected to be reported.

If IRI is reported for a section where IRI is required (see Table IV-1), and has been measured, collected, and reported in full conformity with the data item instructions and the Appendix J procedures and good practice guidelines, then PSR for that section is not required to be reported. Conformity to the calibration procedures in Appendix J and to those of the equipment manufacturer must also have been followed.

PSR is required for those systems where IRI is not required (urban minor arterial and collector, and rural major collector sample sections) or not reported.

A sample section must have either PSR or IRI reported.

Table IV-1 - Roughness Reporting Requirements

Functional System	Record Type	Roughness
RURAL		
Interstate	All Records	Required
Other Principal Arterial	All Records	Required
Minor Arterial	Standard Sample	Required
Major Collector	Standard Sample	Recommended
URBAN		
Interstate	All Records	Required
Other Freeways & Expressways	All Records	Required
Other Principal Arterial	All Records	Required
Minor Arterial	Standard Sample	Recommended
Collector	Standard Sample	Recommended

Reporting of IRI for all NHS data records, regardless of functional system, is required.

When the IRI data are unknown or do not meet the 2-year update cycle, zeros are to be reported for the sections. Default values or values obtained by other means (i.e., conversions) that are not directly obtained from the measured road profiles are **not** to be reported. The only exception is if a section has been newly improved after the IRI has been measured, then a reasonable value for new pavements may be entered.

Item 36 -- Present Serviceability Rating (PSR) (x.x -- implied decimal) (Length = 2)

Enter the PSR or equivalent, to the nearest tenth, **for all paved PAS and NHS data records, and all paved standard sample section records** where Item 35, Measured Roughness, is not reported. Code "99" for unpaved facilities on the required systems. Zero-fill all other

sections when not supplied. Use PSR or the Present Serviceability Index (PSI) where available. If current sufficiency ratings of pavement condition (but excluding geometrics) are available, a correlation between the sufficiency rating scale and the PSR scale or other rating factors may be developed so that such existing ratings may be used.

If there are no current PSR, PSI, or sufficiency ratings that can be adapted, the section must be rated from the following table (Table IV-2). In view of the growing national concern regarding pavement deterioration, careful attention to realistic pavement condition ratings is strongly suggested. Estimates to the nearest tenth within the applicable range should be made, e.g. 2.3. This is most important for comparisons to prior years. Where different lanes have different pavement condition ratings, code the worst condition.

If IRI is reported for a section and has been collected and reported in full conformity with the data item instructions and the Appendix J procedures and good practice guidelines, then PSR for that section is not required to be reported. Conformity to the calibration procedures in Appendix J and to those of the equipment manufacturer must also have been followed.

PSR is required for those systems where IRI is not required (urban minor arterial and collector, and rural major collector sample sections) or not reported.

A sample section must have either PSR or IRI reported.

Table IV-2 - **Pavement Condition Rating**
(Use full range of values)

PSR	Description
4.0 - 5.0	Only new (or nearly new) superior pavements are likely to be smooth enough and distress free (sufficiently free of cracks and patches) to qualify for this category. Most pavements constructed or resurfaced during the data year would normally be rated in this category.
3.0 - 4.0	Pavements in this category, although not quite as smooth as those described above, give a first class ride and exhibit few, if any, visible signs of surface deterioration. Flexible pavements may be beginning to show evidence of rutting and fine random cracks. Rigid pavements may be beginning to show evidence of slight surface deterioration, such as minor cracks and spalling.
2.0 - 3.0	The riding qualities of pavements in this category are noticeably inferior to those of new pavements, and may be barely tolerable for high speed traffic. Surface defects

PSR	Description
	of flexible pavements may include rutting, map cracking, and extensive patching. Rigid pavements in this group may have a few joint failures, faulting and/or cracking, and some pumping.
1.0 - 2.0	Pavements in this category have deteriorated to such an extent that they affect the speed of free-flow traffic. Flexible pavement may have large potholes and deep cracks. Distress includes raveling, cracking, rutting and occurs over 50 percent of the surface. Rigid pavement distress includes joint spalling, patching, cracking, scaling, and may include pumping and faulting.
0.0 - 1.0	Pavements in this category are in an extremely deteriorated condition. The facility is passable only at reduced speeds, and with considerable ride discomfort. Large potholes and deep cracks exist. Distress occurs over 75 percent or more of the surface.

Item 37 -- Reserved for Federal Use (Length = 14)

This field is reserved for future use, and is to be zero-filled. The HPMS Software will zero-fill this field when used to build the data set.

Item 38 -- Record Type Code (Length = 4)

This field must be present in all records. It indicates the type of section record that is being reported, consists of four elements, and is normally encoded by software. The coding possibilities are:

A universe only section or a grouped length record	"0000"
A universe only section with only HOV Operations	"0010"
A universe only section with only Surveillance Systems	"0001"
A universe only section with **both** HOV Operations and Surveillance Systems	"0011"
A sample section record for the standard sample	"1000"
A standard sample section with only HOV Operations	"1010"
A standard sample section with only Surveillance Systems	"1001"

A standard sample section with **both** HOV Operations & Surveillance Systems	"1011"
A supplementary sample section record for a donut area [10]	"0100"

A sample section record that is both a standard sample and a donut area sample will carry the record type code of a standard sample ("1000"). The NAAQS Nonattainment Area Code (Item 11), the Functional System Code (Item 12) and the Donut Area Sample AADT Volume Group (Item 26) will be used by software to determine if the section is also a donut area sample.

NOTE: This is the end of the record for all nonsample sections that do not contain HOV Operations (Item 81) and/or Highway Surveillance Systems (Item 82). If this roadway section is a universe only section on the PAS, check data Items 81 and 82 to see if they should be reported (added to the universe only section record). If applicable, Items 81 and/or 82 will immediately follow Item 38 on a universe only data record.

SAMPLE DATA CODING INSTRUCTIONS

Samples (donut area and standard) are obtained only from open-to-traffic public roads. All system and ownership categories must be fully represented among the required functional systems in order to ensure that the sample is representative of all of the streets and highways within the State.

Sections that are fully contained on a structure are not to be chosen as standard samples. Choose sections that contain nonstructure roadway and code the standard sample data items for the roadway portion(s) of the section. Donut area sample sections (that are not also standard sample sections) are not affected by this rule.

SAMPLE IDENTIFICATION

Item 39 -- Sample Number (Length = 12)

For existing sections, carry over the sample section identifier previously used for this section. For a new sample section, assign a new unique number. Once coded, the sample number is considered to be a countywide unique number that **cannot change in the future**, even if locational information changes. It will be assigned to all subdivided portions of a sample section, as necessary.

This data item is used to track sample sections (standard and donut area) over time. Therefore, the Sample Number **must never change** for any reason. The State may change the Section Identification (Item 7A) for any good cause, or the State Control Field (Item 1) may be used for additional identifiers.

Item 40 -- Sample Subdivision (Length = 1)

This field will be used if it becomes necessary to subdivide a section due to operational or capital improvements on part of the section's length. Initially, this field is coded "0". If the section is subdivided over time, the code is changed to 1, 2, 3, etc., depending upon the number of subdivisions (records) created from the original section. The order or value of the subdivision numbers are not significant except as an aid to determine the relative positions of the segments for field reviews and data updates. Item 39, Sample Number, always remains the same for all subdivided sections.

Sample sections should be subdivided only when significant changes have occurred. Routine maintenance, short lengths of resurfacing or sealing, or repair of several joints would not normally constitute a significant change. A change in almost any one of the data items in the universe would be cause for subdividing (such as county or other political boundary changes, functional system, ownership, volume group, number of lanes, median type, etc.). A change in many of the data items in the standard sample would also be cause for subdividing (such as surface type, improvement to a midpoint, shoulder type, any width if the change is substantial, etc.). If the changes are back and forth between the same values (or codes) along the length of the section for short distances, the predominant type should be reported, rather than subdividing numerous times. Some additional information is contained on page IV-2, Coding Nonuniform Roadways.

If more than nine subdivisions are proposed, the section should be reviewed for combining contiguous subdivisions with similar characteristics. Combining of contiguous subdivisions that have become homogeneous should be done annually. Reset this data item to "0" if subdivisions no longer exist at any point in time.

SAMPLE COMPUTATIONAL ELEMENTS

Item 41 -- Donut Area Sample Expansion Factor (xxx.xxx -- implied decimal) (Length = 6)

This data item is calculated and placed in the donut area sample section record by the HPMS Software using the volume group information placed in Item 26.

By definition, the expansion factor is the ratio of the total length in a volume group to the total sampled volume group length:

Expansion Factor = Total length in the Volume Group / Sampled length in the Volume Group

If the expansion factor for a given group exceeds 100.000, additional sections in the volume group must be selected for sampling until the expansion factor is reduced to a maximum of 100.000. Additional sample sections must also be selected if there are fewer than three samples in a volume group and additional sections are available for sampling.

Chapter II contains a discussion of NAAQS nonattainment area travel estimate requirements for the donut area portion of NAAQS nonattainment areas. Appendix S describes the donut area sample selection and maintenance scheme.

NOTE: This is the end of the record for all donut area sample sections that are not also standard sample sections.

Item 42 -- Standard Sample Expansion Factor (Length = 6; xxx.xxx -- implied decimal)

This data item is calculated and placed in the standard sample section record by the HPMS Software using the volume group information placed in Item 27.

By definition, the expansion factor is the ratio of the total length in a volume group to the total sampled volume group length:

Expansion Factor = Total length in the Volume Group / Sampled length in the Volume Group

If the expansion factor for a given group exceeds 100.000, additional sections in the volume group must be selected for sampling until the expansion factor is reduced to a maximum of 100.000. Additional sample sections must also be selected if there are fewer than three samples in a volume group and additional sections are available for sampling.

Appendix E contains a description of the standard sample selection and maintenance scheme.

SAMPLE PAVEMENT ATTRIBUTES

Item 43 -- Surface/Pavement Type (Length = 2)

Enter the code that represents the type of surface on the section.

Code	Description
20	Unimproved Road: A road using the natural surface and maintained as barely passable for motor vehicles, but not conforming to the requirements for a graded and drained road. The road may have been bladed and minor improvements may have been made locally. (Unpaved)
30	Graded and Drained: A road of natural earth aligned and graded to permit reasonably convenient use by motor vehicles and with drainage systems (natural and artificial) sufficient to prevent serious impairment of the road by normal surface water. It is with or without dust palliative treatment or a continuous course

Code	Description
	of special borrow material to protect the new roadbed temporarily and to facilitate immediate traffic service. (Unpaved)
40	Soil, Gravel or Stone: A road, the surface of which consists of mixed soil, stabilized soil, gravel or stone. Gravel or stone surfaces may also be stabilized. (Unpaved)
51	Bituminous Surface-Treated: An earth road, a soil-surfaced road, or a gravel or stone road to which has been added by any process a bituminous surface course with or without a seal coat, the total compacted thickness of which is less than 25 millimeters (1 inch). Seal coats include those known as chip seals, drag seals, plant-mix seals, and rock asphalt seals. (Low Type)
52	Mixed Bituminous: A road, the surface course of which is 25 millimeters (1 inch) or greater and less than 178 millimeters (7 inches) in compacted thickness composed of gravel, stone, sand or similar material, and mixed with bituminous material under partial control as to grading and proportions. (Intermediate Type)
53	Bituminous Penetration: A road, the surface course of which is 25 millimeters (1 inch) or greater and less than 178 millimeters (7 inches) in compacted thickness composed of gravel, stone, sand or similar material, bound with bituminous penetration material. (Intermediate Type)
61	High Flexible: Mixed bituminous or bituminous penetration road on a flexible base with a combined (surface and base) thickness of 178 millimeters (7 inches) or more. Includes any bituminous concrete, sheet asphalt or rock asphalt having a high load-bearing capacity. (High Type Flexible)
62	Composite; Flexible over Rigid: Mixed bituminous or bituminous penetration road on a rigid pavement with a combined (surface and base) thickness of 178 millimeters (7 inches) or more. Includes any bituminous concrete, sheet asphalt or rock asphalt overlay that is greater than 25 millimeters (1 inch) of compacted bituminous material. Otherwise, use rigid pavement codes. (High Type Flexible)
NOTE: If applicable, codes 74, 75, and 76 have priority over other rigid surface type codes.	

Code	Description
71	High Rigid; Plain Jointed: Portland cement concrete pavement that is jointed but is without reinforcing. (High Type Rigid)
72	High Rigid; Reinforced Jointed: Reinforced (with mesh or equivalent) Portland cement concrete pavement that has been jointed. (High Type Rigid)
73	High Rigid; Continuously Reinforced: Continuously reinforced Portland cement concrete pavement. (High Type Rigid)
74	Rigid over Rigid; Bonded or Partially Bonded: Portland cement concrete pavement over a Portland cement concrete pavement where the two separate layers have been bonded. (High Type Rigid)
75	Rigid over Rigid; Unbonded (i.e., Bond Breaker Used): Portland cement concrete pavement over a Portland cement concrete pavement where the two separate layers are unbonded. (High Type Rigid)
76	Rigid over Flexible: Portland cement concrete pavements that have been placed over a bituminous (mixed or penetration) pavement. (High Type Rigid)
80	Brick, Block or Other Combination: A road consisting of paving brick; stone, asphalt, wood and other block; steel or wood with or without a bituminous wearing surface less than 25 millimeters (1 inch) in compacted thickness. Includes roads with a combination of wearing surfaces. (High Type Flexible)

Item 44 -- Pavement Section (Length = 1)

Enter the appropriate code to indicate that the structural number (SN) for flexible pavements or the slab thickness (D) for rigid pavements is known, or enter the code for the type of pavement section (heavy, medium, light) where SN or D are not reported. **The SN or D, as appropriate, is required for all Principal Arterial System sections**. Where available, code SN or D for all functional systems. A roadway with at least 25 millimeters (1 inch) of compacted flexible overlay (disregarding short patches) is considered a flexible pavement for purposes of this item.

The SN or D value should reflect the last improvement on the section. That is, when an improvement takes place, all new or redesigned base and pavement materials are to be taken into consideration when recalculating the SN value.

To assist in determining the type of pavement section (heavy, medium or light) for those sections where SN or D, as appropriate, are not required or are not available, Table IV-3 has been prepared showing typical pavement sections. This guide includes typical thicknesses of surface, base and subbase. Unpaved facilities are those designated as unimproved, graded and drained earth, gravel or stone (codes 20/30/40 in Item 43).

Code	Description	Code	Description
0	Unpaved	3	Heavy
1	"SN" Known	4	Medium
2	"D" Known	5	Light

Table IV-3

Examples of Pavement Section Coding Using Metric (English) Units

		Flexible Pavement				Rigid Pavement
Code	**Type of Pavement Section**	**"SN" Range**	**Surface Type & Minimum Thickness**	**Base Type & Minimum Thickness**	**Subbase Type & Minimum Thickness**	**Range in Pavement Thickness "D"**
3	Heavy	4.6-6.0	152 mm (6") Asphaltic Concrete	305 mm (12") Aggregate	330 mm (13") Aggregate	>228.6 mm (9.0") [203.2 mm (8.0") if continuously reinforced]
			OR			
			102 mm (4") Asphaltic Concrete	203 mm (8") Asphaltic Concrete	203 mm (8") Aggregate	
4	Medium	3.1-4.5	102 mm (4") Asphaltic Concrete	203 mm (8") Aggregate	203 mm (8") Aggregate	180.3 mm-228.6 mm (7.1"-9.0") [152.4 mm (6.0") if
			OR			

		Flexible Pavement				Rigid Pavement
Code	Type of Pavement Section	"SN" Range	Surface Type & Minimum Thickness	Base Type & Minimum Thickness	Subbase Type & Minimum Thickness	Range in Pavement Thickness "D"
			76 mm (3") Asphaltic Concrete	152 mm (6") Asphaltic Concrete		continuously reinforced]
5	Light	1.0-3.0	Surface Treatment	102 mm (4") Aggregate	102 mm (4") Aggregate	152.4 mm-177.8 mm (6.0"-7.0")
			OR			
			51 mm (2") Asphaltic Concrete	152 mm (6") Aggregate		

Item 45 -- SN or D (Length = 3)

This item is required for all Principal Arterial System sections. Where available, code SN or D for all functional systems. Enter the SN value to the nearest tenth (xx.x --implied decimal) for those sections coded "1" in Item 44. Enter D to the nearest whole millimeter (inch) for those sections coded "2" in Item 44. Provide leading zeroes where necessary. Otherwise code "000."

The SN or D value should reflect the last improvement on the section. That is, when an improvement takes place, all new or redesigned base and pavement materials are to be taken into consideration when recalculating the SN value.

Both of these data items are to be entered according to the reporting units chosen for Metric (or English) Reporting Units (Item 2). When calculating and reporting SN (a unitless number), ensure that the layer coefficients [value per millimeter (inch)] and the layer thicknesses [millimeters (inches)] are both in the same unit system before reporting the resulting SN value.

Item 46 -- Type of Base (Length = 1)

This item is required for all Principal Arterial System sections. Enter the code that describes the type of base. Use the highest numerical code where a mixture of materials has been used.

Code	Description
0	Not Applicable due to Functional System Requirements
1	Roadbed Soil
2	Granular Material
3	Stabilized Earth or Granular Material with Admixture (Cement, Lime, Fly Ash, Asphalt, etc.)
8	Hot Mix Asphalt
9	Lean Concrete

Item 47 -- Type of Subgrade (Length = 1)

Enter the code that describes the type of material used or in place for the subgrade on the section. **This item is required for all Principal Arterial System sections**.

Code	Description
0	Not Applicable due to Functional System Requirements
1	Coarse Graded Material (Gravel, Sand, etc.)
2	Fine Graded Material (Original Earth, Clay, etc)

SAMPLE IMPROVEMENT DATA

Item 48 -- Overlay or Pavement Structure Thickness (Length = 3)

Enter the total overlay pavement thickness (for overlaid pavements) or the total pavement structure thickness (**for new pavements**) to the nearest whole millimeter [nearest tenth of an inch (xx.x -- implied decimal)] when an improvement has been completed on the section. The reporting units must reflect those chosen for Metric (or English) Reporting Units (Item 2). This item should be coded when 25 millimeters (1 inch) or more of compacted resurfacing is accomplished as part of any improvement or when the pavement is completely reconstructed. It should remain fixed (retained in the HPMS data record) until

another resurfacing/ reconstruction improvement is completed on the section. Code "000" if the section has not been improved since the initial reporting year (1988).

All Type of Improvement codes (Item 50), with the possible exception of "40", "50" and "60" (Major or Minor Widening and Restoration and Rehabilitation), will cause a change to this item. **The surface on the roadway must be improved in order for this data item to be coded**. If original paving material is left in place (in major widening, for example, where the pavement on the original lane is left intact), this field is not to be changed from its previous value. If this field is changed, ensure that Year of Surface Improvement (Item 49) is also changed.

The thickness reported here should include all newly laid pavement, including replacement pavement material where milling or grinding has occurred.

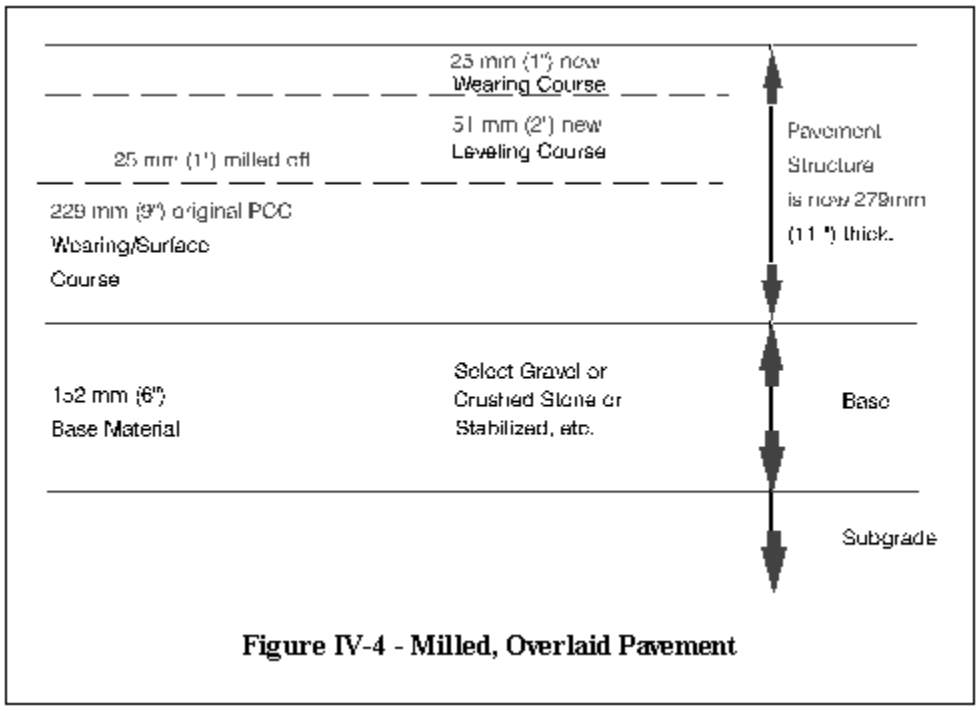

Figure IV-4 - Milled, Overlaid Pavement

See "NOTES" under Item 49 for additional information about coding this data item.

The example in Figure IV-4 contains a roadway where milling and replacement have occurred. The reported overlay thickness would be "076" (millimeters) ["030" (3 inches)].

If the improvement was reconstruction, the whole pavement structure (all pavement material) should be entered. For example, since the improvement is reconstruction for the roadway portrayed in Figure IV-5, the reported pavement structure thickness value would be "229" (millimeters) ["090" (9 inches)].

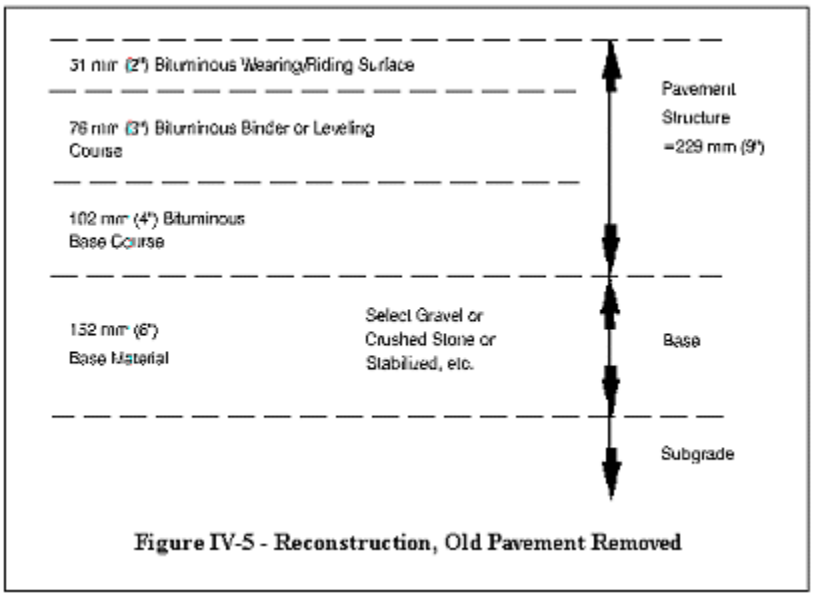

Figure IV-5 - Reconstruction, Old Pavement Removed

Item 49 -- Year of Surface Improvement (Length = 4)

Enter the year when a surface improvement (e.g., resurfacing or reconstruction, including new samples selected on newly constructed or improved roadway facilities) has been completed on the section; e.g., 1996 would be coded "1996". Do not remove this entry in subsequent data years; it should be retained in the HPMS data record until another improvement affecting the surface is completed on the section. Code "0000" if the section has not been improved since the initial reporting year (1988).

All Type of Improvement codes (Item 50), with the possible exception of "40", "50" and "60" (Major or Minor Widening and Restoration and Rehabilitation), will cause a change to this item. **The surface on the roadway must be improved in order for this data item to be coded**. If original paving material is left in place (in minor widening, for example, where the original lane pavement has been left intact), then this field is not to be changed from its previous value. If this field is changed, ensure that Overlay or Pavement Structure Thickness (Item 48) is also changed.

NOTES:

- When the improvement items (Items 48, 49, 50) indicate that a surface improvement has been completed, all affected data items, including IRI and PSR (Items 35 and 36), must be updated for the same data submittal to reflect the improved roadway.
- If the PSR/IRI update cycle is not in sync with the improvement completion year, report a "reasonable new pavement" value for PSR/IRI; inform FHWA of this action

via the submittal letter; and indicate when the actual PSR/IRI will be reported for any sections that are affected.

- 25 millimeters (one inch) or more of compacted pavement material must be put in place to be considered an improvement for HPMS purposes.
- The reporting of improvements is limited to those completed after 1987. However, should a completed improvement be overlooked for any given year after 1987, code the proper improvement data (Items 48, 49 and 50, as applicable) when the improvement is identified. Include post 1987 improvements on newly selected sample sections.

Item 50 -- Type of Improvement (Length = 2)

This item is coded as defined below for all improvements completed during the reporting year. If completed improvements overlap, use the improvement type code with the highest priority (lowest numerical code). If no improvements were completed during the reporting year, the section should retain the last improvement type coded. Do not include routine maintenance.

See "NOTES" under Item 49 for additional information about coding this data item.

If only a portion of the section, lengthwise, was improved and completed during the reporting year, the section should be split into two or more subdivisions at the point(s) of change. If only one side of a divided highway is improved, report the improvement only if it occurs on the inventory side of the highway (see Coding Nonuniform Roadways, page IV-2). Use one of the following codes:

Code	Description
00	NONE -- No improvement has been completed on the section.
10	NEW ROUTE: The only time this code could possibly be used is when a new sample has been randomly chosen on a newly constructed roadway that was completed and opened to traffic in the data year being reported.
20	RELOCATION: Construction of a facility on new location that replaces an existing route to the extent that the old route is abandoned. If the existing facility remains in use as a rural major collector, urban collector, or higher functional system, do not code the improvement and retain the old facility as the sample with no improvement (unless the old facility was also improved). If the existing facility is abandoned, the sample should be moved to the new facility and coded with this

Code	Description
	improvement type; if the existing facility remains open and becomes a local or rural minor collector functional system facility, delete the sample.
RECONSTRUCTION: Construction on approximate alignment of an existing route where the pavement structure is substantially removed and replaced. Such reconstruction may include widening to provide additional through lanes, adding grade separations, and replacing other highway elements. Adjustment to existing horizontal and vertical alignment can be made. Code one of the following types of reconstruction (Codes 31 to 35).	
31	RECONSTRUCTION TO FREEWAY: Complete reconstruction to freeway design standards on substantially existing alignment. This improvement type always includes the addition of full control of access. It may include the addition of through lanes, dualism, addition of interchanges or grade separations, or widening of through lanes, depending on what was required to bring the facility to freeway standards.
32	RECONSTRUCTION WITH MORE LANES: Complete reconstruction on substantially the same alignment with the addition of through lanes to the existing section. Alignment, shoulder, and drainage deficiencies are corrected.
33	RECONSTRUCTION TO WIDER LANES: Complete reconstruction on substantially the same alignment with through lanes at least 0.3 meters (1 foot) wider than the existing section. Alignment, shoulder, and drainage deficiencies are corrected.
34	PAVEMENT RECONSTRUCTION WITH ALIGNMENT IMPROVEMENTS: Reconstruction of the highway section to correct a pavement deficiency. Specific horizontal or vertical alignment deficiencies are also corrected.
35	PAVEMENT RECONSTRUCTION: Complete reconstruction on substantially the same alignment without widening the pavement structure. Drainage deficiencies and minor alignment deficiencies are corrected.
40	MAJOR WIDENING: The addition of through lanes or dualism of an existing facility where the existing pavement is salvaged. Also included, where necessary, is the resurfacing of existing pavement and other incidental improvements such as drainage and shoulder improvements.

Code	Description
50	MINOR WIDENING: The addition of more width per through lane to the roadway of an existing facility without adding through lanes. The existing pavement is salvaged. In many cases, the improvement will include resurfacing the existing pavement, where necessary, and other incidental improvements, such as shoulder and drainage improvements.
60	RESTORATION AND REHABILITATION: Work required to return an existing pavement (including shoulders) to a condition of adequate structural support or to a condition adequate for an additional stage of construction. There may be some upgrading of unsafe features or other incidental work in conjunction with restoration and rehabilitation. Typical improvements would include replacing spalled or malfunctioning joints; substantial pavement stabilization prior to resurfacing; grinding/grooving of rigid pavements; replacing deteriorated materials; reworking or strengthening bases or subbases, adding underdrains, subsealing, diamond grinding, milling, inlays, etc. If this type of improvement is done in preparation for resurfacing, it should be reported separately only if the resurfacing is not completed in the year for which the data is reported.
71	RESURFACING WITH SHOULDER IMPROVEMENTS AND PORTLAND CEMENT CONCRETE PAVEMENT RESTORATION: Shoulders are widened or reconstructed to provide additional strength. Placement of additional Portland cement concrete material over the existing roadway to improve serviceability or to provide additional strength. There may be some upgrading of unsafe features and other incidental work. This code should also be used when concrete restoration includes techniques such as subsealing, joint repair, diamond grinding, etc. Where surfacing is constructed by a separate project as a final stage of construction, the type of improvement should be the same as that of the preceding stage--relocation, reconstruction, minor widening, etc.
72	RESURFACING WITH SHOULDER IMPROVEMENTS AND BITUMINOUS PAVEMENT RESTORATION: Shoulders are widened or reconstructed to provide additional strength. Placement of at least 25 millimeters (1 inch) of compacted bituminous material over the existing roadway to improve serviceability or to provide additional strength. There may be some upgrading of unsafe features and other incidental work. Where surfacing is constructed by a separate project as a final stage of

Code	Description
	construction, the type of improvement should be the same as that of the preceding stage-- relocation, reconstruction, minor widening, etc.
77	RESURFACING WITH PORTLAND CEMENT CONCRETE PAVEMENT RESTORATION: Placement of additional Portland cement concrete material over the existing roadway to improve serviceability or to provide additional strength. There may be some upgrading of unsafe features and other incidental work in conjunction with resurfacing. This code should also be used when concrete restoration includes techniques such as subsealing, joint repair, diamond grinding, etc. Where surfacing is constructed by a separate project as a final stage of construction, the type of improvement should be the same as that of the preceding stage -- relocation, reconstruction, minor widening, etc.
78	RESURFACING WITH BITUMINOUS PAVEMENT RESTORATION: Placement of at least 25 millimeters (1 inch) of compacted bituminous material over the existing roadway to improve serviceability or to provide additional strength. There may be some upgrading of unsafe features and other incidental work in conjunction with resurfacing. Where surfacing is constructed by a separate project as a final stage of construction, the type of improvement should be the same as that of the preceding stage--relocation, reconstruction, minor widening, etc.

SAMPLE GEOMETRICS/CONFIGURATION

GENERAL GUIDELINES for coding Number of Through Lanes (Item 30), Lane Width (Item 51), Shoulder Type (Item 52), Shoulder Width (Item 53) and Peak Parking (Item 54):

All of the above data items need to be considered together in order to properly code them for HPMS. The standard descriptions and coding requirements are given under the respective data item. This section simply provides some additional guidelines where the coding of one item depends on one or more of the other items.

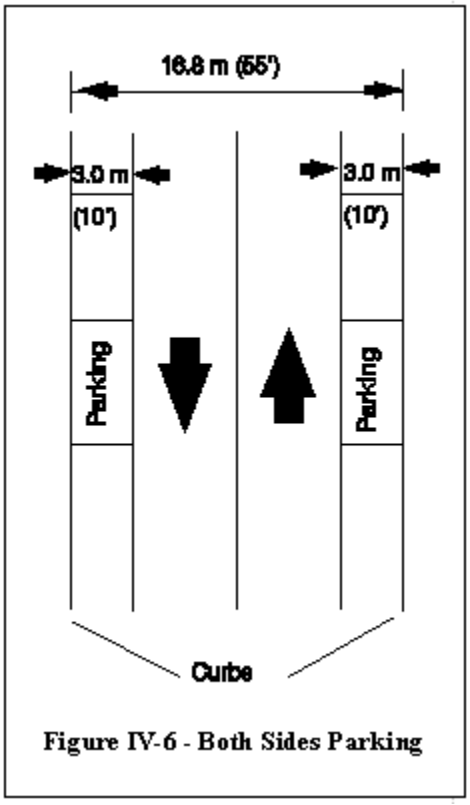

Figure IV-6 - Both Sides Parking

The number of through lanes and the lane width should be coded according to the striping, if present, on multilane facilities, or according to the traffic use if no striping or only centerline striping is present. For example, the number of through lanes in Figure IV-6 would probably be 2 and the lane width might be 3.9 meters (13 feet), even though 5.3 meters (17.5 feet) are available, since traffic would normally only use the middle portion of the roadway.

The roadway beyond the ends of the sample section being inventoried should be considered when the number of lanes and the lane width, in particular, are being coded. For example, if the sample section is short and atypically wider than the rest of the contiguous roadway, code the typical roadway conditions according to the conditions before and after the ends of the short section.

Shoulder width (or lane width) cannot include parking lanes, bicycle lanes, or bikeways. There is no shoulder (or shoulder width) coded under these circumstances (i.e., parking and bicycle lanes take precedence over shoulders for HPMS purposes). If a curb exists, code the curbing under shoulder type. If there is parking on one side of a roadway and a shoulder or a curb on the other side, code both parking and shoulder type (and shoulder width), accordingly.

A shoulder cannot exist between a traffic lane and a parking lane that is completely within the roadway boundaries. Code no shoulder and zero (00) shoulder width under this circumstance.

As with all HPMS data items, code the lesser or worse condition where the two sides of the roadway differ; code the predominant condition where frequent changes take place along the roadway, lengthwise.

The total roadway width may not be fully represented under a few of the coding schemes that would develop under these guidelines. Under these situations, the "lost" roadway area is considered to be for uses other than capacity, parking and emergency storage for disabled vehicles (i.e., other uses for which there are no data items in the HPMS).

Item 51 -- Lane Width (Length = 2)

Enter the prevailing traffic lane width (for through lanes) to the nearest tenth of a meter (x.x -- implied

decimal) [whole foot]. Provide the leading zero where applicable. This data item is to be entered according to the reporting units chosen for Metric (or English) Reporting Units (Item 2).

There are situations where the traffic lane and the shoulder have the same surface type/appearance with no delineation to distinguish the lane from the shoulder. In such cases, use a reasonable width for each based on the actual width used by traffic. For example, a 9.8 meter (32-foot) total paved surface width with centerline striping only and no additional shoulder (i.e., unpaved) width could be coded as 3.6 meter (12-foot) lanes with 1.3 meter (4-foot) shoulders.

In some situations, striping is placed inside the edge of the pavement in order to keep traffic (particularly trucks) from breaking the pavement edge. Ignore the striping (particularly on the outside lanes of multilane facilities) and code the actual lane width under this situation. For example, a two-lane roadway that contains a solid stripe 0.3 meters (1 foot) inside the edge of the roadway surface (to the left of the right shoulder), having a width from centerline to edge-striping of 3.3 meters (11 feet), should be coded as 3.6 meters (12 feet).

Additional information concerning coding of this and other related data items is contained in this Chapter under Sample Geometrics/Configuration, General Guidelines (following Item 50).

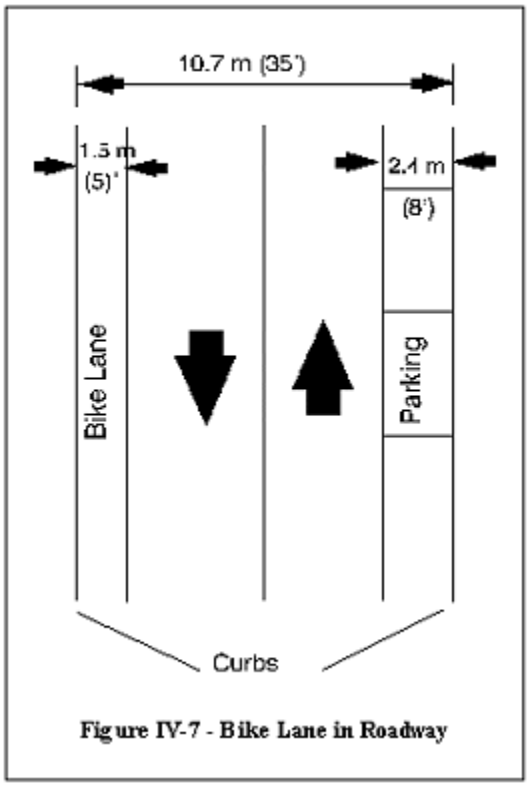

Figure IV-7 - Bike Lane in Roadway

Item 52 -- Shoulder Type (Length = 1)

Enter the code for the type of shoulder on the section. If the shoulder type changes back and forth between types along the length of the section for short distances, code the predominant type. (However, there may be cause for subdividing instead. See "Coding Nonuniform Roadways" on page IV-3.) If left and right shoulder types differ on a divided facility, the right shoulder type should be considered the predominant type. If the section has both shoulders and curbs (i.e., a shoulder bounded by a curb or a mountable curb and then a shoulder), code the shoulder.

If the section has parking or bike lanes (or one of each) on both sides of the roadway, there cannot be a shoulder and only codes "1" (none) and "8" (curbed) are legitimate. There is no shoulder or shoulder width on the roadway section contained in Figure IV-7; the shoulder type code would be "8" (curbed).

Additional information concerning coding of this and other related data items is contained in this Chapter under Sample Geometrics/Configuration, General Guidelines (following Item 50).

Code	Description
1	None: No Shoulders or Curbs Exist.
2	Surfaced with Bituminous Material: A Bituminous Course over a Granular or Stabilized Base.
3	Surfaced with Portland Cement Concrete (not Tied): A Portland Cement Concrete Course over a Granular or Stabilized Base.
4	Surfaced with Tied Portland Cement Concrete: A Portland Cement Concrete Course over a Granular or Stabilized Base that is Part of the Mainline Pavement.
5	Stabilized: A Gravel or Other Granular Material, with or Without Admixture, Capable of Supporting Most Loads Even Under Wet Conditions.
6	Combination: A Part of the Shoulder Width is Surfaced and/or a Part is Stabilized, and/or a Part is Turf, Etc.--Some Combination of Codes 2-5, 7.
7	Earth: Natural Earth With or Without Turf.
8	Curbed: No Shoulders Exist; Section is Curbed.

Item 53 -- Shoulder Width (Length = 4)

This field must reflect units as defined by Metric (or English) Reporting Units (Item 2).

Item 53a Right Shoulder: Enter the width to the nearest tenth of a meter (x.x -- implied decimal) [whole foot]. Enter "00" if no right shoulder exists. (Length = 2)

Item 53b Left Shoulder: On divided highways, enter the width of the left (median) shoulder to the nearest tenth of a meter (x.x -- implied decimal) [whole foot]. Enter "00" where no left shoulder exists (i.e., two-way, undivided streets). (Length = 2)

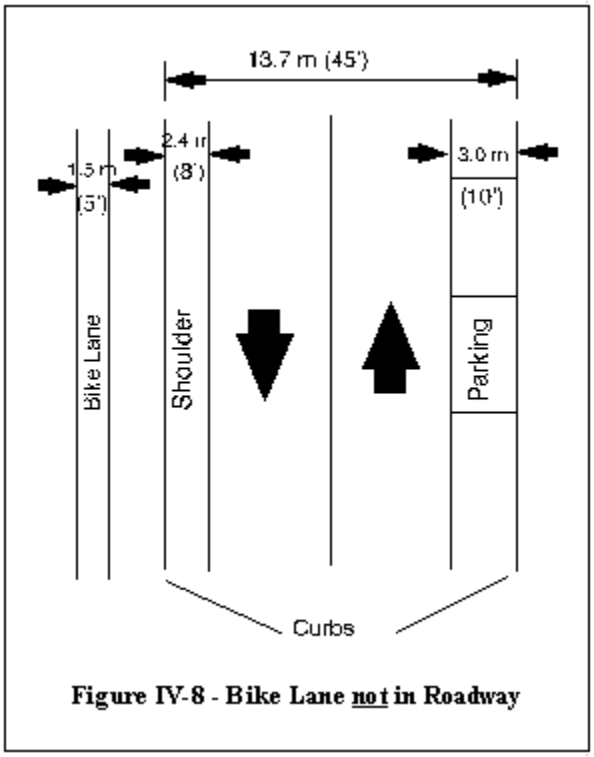

Figure IV-8 - Bike Lane not in Roadway

Rumble strips built along the outer edges of the pavement are to be included in the width measurements.

Do not include parking or bicycle lanes as (part of) the shoulder width measurement when parking and/or bicycle lanes exist on both sides of the roadway. There is no shoulder width under these circumstances. Figure IV-8 contains an example where the bike lane is outside of the roadway; the shoulder width of 2.4 meters (8 feet) is reported under this circumstance. Use the predominant width where it is not constant (changes back and forth along a roadway, lengthwise, in short lengths). Particular attention should be paid to combination shoulders to ensure that the total width is being reported.

Additional information concerning coding of this and other related data items is contained in this Chapter under Sample Geometrics/Configuration, General Guidelines (following Item 50).

Item 54 -- Peak Parking (Urban Data Item) (Length = 1)

Enter the appropriate code reflecting the type of peak-hour parking, if any, that exists on the section. If parking prohibitions are routinely ignored, use the "permitted" code(s) to reflect the actual situation rather than the regulations. The facility does not have to be formally signed or striped for parking to use the "permitted" code(s) (i.e., parking is simply

available). If parking is actually beyond the shoulder (or beyond the pavement edge where no shoulder exists), use code "3" for no parking.

Additional information concerning coding of this and other related data items is contained in this Chapter under Sample Geometrics/Configuration General Guidelines (following Item 50).

Code	Description
0	Not Applicable; This is a Rural Section
1	Parking Permitted One Side
2	Parking Permitted Both Sides
3	No Parking Allowed or None Available

Item 55 -- Right-of-Way Width (Length = 3)

Enter the prevailing right-of-way width to the nearest meter (whole foot) for the section. Where data are unavailable, estimates are sufficient. Code "999" where the right-of-way is 1,000 meters (1,000 feet) or greater. Provide leading zeroes where necessary.

This data item is to be entered according to the reporting units chosen for Metric (or English) Reporting Units (Item 2).

Item 56 -- Is Widening Feasible? (Length = 1)

Enter the appropriate code to indicate the extent to which it is feasible to widen the existing road. Consider mainly the physical features along the roadway section, such as large single family residences or office buildings, shopping centers and other large enterprises, severe terrain, cemeteries and park land, as well as where widening would be otherwise cost or environmentally prohibitive. Do not consider restrictions because of current right-of-way width, State practices concerning widening, politics or projected traffic.

The code is to represent the lanes that could be added in both directions; e.g., if a lane could be added for each direction of the roadway, then use code "4"; if only some widening could occur use code "2".

Restriping to narrower lanes, resulting in an additional lane on a multilane facility, does not constitute widening feasibility. When coding this item, also consider medians and other areas already within the right- of-way to be available for widening.

Code	Description
1	No Widening is Feasible
2	Yes, Partial Lane
3	Yes, One Lane
4	Yes, Two Lanes
5	Yes, Three Lanes or More

Table IV-4 - Coding Guide for Horizontal and Vertical Alignment
(Items 57-58, 60-61)

	Item 57	Item 58	Item 60	Item 61
Highway Category	**Horizontal Alignment Adequacy**	**Curves by Class**	**Vertical Alignment Adequacy**	**Grades by Class**
PAVED - RURAL				
Principal Arterial	Code "0"	Required	Code "0"	Required
Minor Arterial	Code "0"	Required	Code "0"	Required
Major Collector	Required	Not Required	Required	Not Required
PAVED - URBAN				
Principal Arterial	Code "0"	Required	Code "0"	Required
Minor Arterial	Not Required	Not Required	Not Required	Not Required
Collector	Not Required	Not Required	Not Required	Not Required

Item 57 -- Horizontal Alignment Adequacy (Rural Data Item) (Length = 1)

This item is required for paved rural major collectors unless Curves by Class (Item 58) is reported for the section. (See Table IV-4.) If Item 58 is not reported for the required systems (paved rural arterials and paved urban principal arterials), this item must be appropriately coded since calculation from Item 58 is not possible. Use the following codes:

Code	Description
0	Item 58 (Curves) is reported (the HPMS calculation software will insert the appropriate code based on the curve data), or this item is not required for the section.
1	All curves meet appropriate design standards for the type of roadway. Reduction of curvature would be unnecessary even if reconstruction were required to meet other deficiencies (i.e., capacity, vertical alignment, etc.).
2	Although some curves are below appropriate design standards for new construction, all curves can be safely and comfortably negotiated at the prevailing speed limit on the section. The speed limit was not established by the design speed of curves.
3	Infrequent curves with design speeds less than the prevailing speed limit on the section. Infrequent curves may have reduced speed limits for safety purposes.
4	Several curves uncomfortable or unsafe when traveled at the prevailing speed limit on the section, or the speed limit on the section is severely restricted due to the design speed of curves.

Item 58 -- Curves by Class (Length = 91)

This item is required for paved rural arterials (Interstate, other principal arterial, and minor arterial) and urban principal arterials (Interstate, other freeways and expressways, and other principal arterial), but may be reported for other functional systems if the data are available (see Table IV-4). Zero- fill this item when the data are not reported. When this item is not reported for the required rural systems, Horizontal Alignment Adequacy (Item 57) must be provided since calculation of Item 57 is not possible. Each individual curve segment, including each individual tangent, is to be counted as a separate curve. The segments are summed to obtain the total length in a curve class.

This field must reflect units as defined by the Metric (or English) Reporting Units (Item 2).

Report the following data; when reporting in Metric units, curve classes are identified by the radius length in meters. They are approximately equivalent to the English unit degree of curvature classes (based on a 100-foot arc) and are provided below:

	Curve Classes					
	Radius Length (Metric)	Degree of Curvature (English)	Number of Curves (Right-Justified)	Record Positions	Length of Curves in Class (Implied Decimal-xx.xxx)	Record Positions
a	3906+	0.0-0.4	--	285-286	-----	287-291
b	1206-3905	0.5-1.4	--	292-293	-----	294-298
c	716-1205	1.5-2.4	--	299-300	-----	301-305
d	506-715	2.5-3.4	--	306-307	-----	308-312
e	391-505	3.5-4.4	--	313-314	-----	315-319
f	321-390	4.5-5.4	--	320-321	-----	322-326
g	251-320	5.5-6.9	--	327-328	-----	329-333
h	206-250	7.0-8.4	--	334-335	-----	336-340
i	161-205	8.5-10.9	--	341-342	-----	343-347
j	126-160	11.0-13.9	--	348-349	-----	350-354
k	91-125	14.0-19.4	--	355-356	-----	357-361
l	61-90	19.5-27.9	--	362-363	-----	364-368
m	<61	28+	--	369-370	-----	371-375

The format is a 91-position field with 13 classes of curves reported (13 x 7). For each of the 13 curve classes, the numbers of curves (2 positions) and the sum of the class lengths [5 positions, with implied decimal (xx.xxx kilometers or miles)] are reported. The sum of all curve lengths must equal the section length.

Item 59 -- Type of Terrain (Rural Data Item) (Length = 1)

Enter the code for the predominant terrain type through which the section passes.

Code	Terrain Type
0	Not Applicable; This is an Urban Section
1	Flat Terrain: That condition where highway sight distances, as governed by both horizontal and vertical restrictions, are generally long or could be made to be so without construction difficulty or major expenses.
2	Rolling Terrain: That condition where the natural slopes consistently rise above and fall below the highway grade line and where occasional steep slopes offer some restriction to normal highway horizontal and vertical alignment.
3	Mountainous Terrain: That condition where the longitudinal and transverse changes in the elevation of the ground with respect to the highway are abrupt and where the roadbed requires frequent benching or side hill excavation.

Item 60 -- Vertical Alignment Adequacy (Rural Data Item) (Length = 1)

This item is required for paved rural major collectors unless Grades by Class (Item 61) is reported for the section. (See Table IV-4.) If Item 61 is not reported for the required systems (paved rural arterials and paved urban principal arterials), this item must be appropriately coded since calculation from Item 61 is not possible. Use the following codes for this item:

Code	Description
0	Item 61 (Grades) is reported (the HPMS calculation software will insert an appropriate code based on the grade data), or this item is not required for the section.
1	All grades (rate and length) and vertical curves meet minimum design standards appropriate for the terrain. Reduction in rate or length of grade would be unnecessary even if reconstruction were required to meet other deficiencies (i.e., capacity, horizontal alignment, etc.).
2	Although some grades (rate and/or length) and vertical curves are below appropriate design standards for new construction, all grades and vertical curves

Code	Description
	provide sufficient sight distance for safe travel and do not substantially affect the speed of trucks.
3	Infrequent grades and vertical curves that impair sight distance or affect the speed of trucks (when truck climbing lanes are not provided).
4	Frequent grades and vertical curves that impair sight distance or severely affect the speed of trucks; truck climbing lanes are not provided.

Item 61 -- Grades by Class (Length = 42)

This item is required for paved rural arterials (Interstate, other principal arterial, and minor arterial) and urban principal arterials (Interstate, other freeways and expressways, and other principal arterial), but may be reported for other functional systems if the data are available (see Table IV-4). Zero- fill this item when it is not reported. When this item is not reported for the required rural systems, Vertical Alignment Adequacy (Item 60) must be provided since calculation of Item 60 is not possible. Each individual grade segment, including each individual zero (flat) gradient, is to be counted as a separate grade. The segments are summed to obtain the total length in each grade class.

This data item is to be entered according to the reporting units chosen for Metric (or English) Reporting Units (Item 2).

Report the following data:

	Grade Classes by Gradient (Percent)	Number of Grades (Right-Justified)	Record Positions	Length of Grades in Class (Implied Decimal--xx.xxx)	Record Positions
a	0.0-0.4	--	378-379	-----	380-384
b	0.5-2.4	--	385-386	-----	387-391
c	2.5-4.4	--	392-393	-----	394-398
d	4.5-6.4	--	399-400	-----	401-405
e	6.5-8.4	--	406-407	-----	408-412

	Grade Classes by Gradient (Percent)	Number of Grades (Right-Justified)	Record Positions	Length of Grades in Class (Implied Decimal--xx.xxx)	Record Positions
f	8.5+	--	413-414	-----	415-419

The format is a 42-position field with six classes of grades reported (6 x 7). For each of the six grade classes, the numbers of grades (2 positions) and the sum of the grade lengths [5 positions, with implied decimal (xx.xxx kilometers or miles)] are reported. The sum of all grade lengths must equal the section length.

Item 62 -- Percent of Length with Sight Distance of at least 460 Meters (1,500 Feet) (Rural Data Item) (Length = 3)

For all rural, paved two-lane facilities, excluding dense rural sections, enter the percent of the section length (estimated to the nearest 10 percent) which has an available passing sight distance (as measured from the driver's eye to the road surface) of at least 460 meters (1,500 feet). Striping should be used for this measurement where it delineates unsafe passing zones. Contiguous roadway on both ends of the section are to be considered in estimating this item, particularly where the section is very short. Where there is a discernable directional difference, enter the more restrictive sight distance percentage. See Appendix C for optional estimating procedures. Code "000" for nonapplicable sections including dense rural (Item 77 = 2).

Note that "000" is also a legitimate entry for roadways that are very curved or very hilly [i.e., the sight distance is not 460 meters (1,500 feet) for any portion of the section, including the sight distance at the end points of the section, for both directions of a two-way facility].

SAMPLE TRAFFIC/CAPACITY DATA

Item 63 -- Speed Limit (Length = 3)

Enter the daytime speed limit for automobiles posted or legally mandated on the greater part of the section. This data item is to be entered according to the reporting units chosen for Metric (or English) Reporting Units (Item 2) (in kilometers per hour or miles per hour). Provide leading zeroes as necessary.

If there is no legally mandated maximum daytime speed limit for automobiles, enter "999" (for metric or English reporting units).

Item 64 -- Weighted Design Speed (Rural Data Item; Calculated for Urban) (Length = 3)

This item is required for all paved rural major collectors with rural type of development (Item 77 = 1) when curve data (Item 58) are not present. Code "000" for all sections for which the weighted design speed is not supplied. Enter the weighted design speed, to the nearest 10 kilometers per hour (5 miles per hour), as determined by weighting the design speed of the individual horizontal curves and tangents in the section by the length of each.

This item is calculated by the HPMS Software when Curves by Class (Item 58) are present. When Curves by Class are not provided for the required systems (rural arterials and urban principal arterials), this item must be appropriately coded since calculation cannot take place. A recommended procedure for calculating weighted design speed is contained in Appendix D.

This data item is to be entered according to the reporting units chosen for Metric (or English) Reporting Units (Item 2) (in kilometers per hour or miles per hour). Supply leading zeroes as necessary.

Item 65A -- Percent Single Unit Trucks (Peak and Average Daily) (Length = 4)

Enter the percentage of single unit trucks to the nearest whole percent. Single unit trucks include classes 4 through 7 (buses through four-or-more axle, single-unit trucks) as identified in Chapter III of this Manual and in Section 4, Appendix A, of the TMG.

Certain routes may exhibit significant differences in truck percentages between peak period and average daily operation (i.e., recreational routes), and such differences can have a significant bearing on the calculation of capacity. In those cases where the State determines that such peak period operations have a significant bearing on capacity calculations, separate peak usage values are to be reported even if they must be estimated. In those situations where such differences are known not to exist, the same percentage should be reported for both peak and average daily.

The vehicle classification data reported for each sample section should be representative of the truck activity over all days of the week and seasons of the year. "Peak" and "Average Daily" refer to the total traffic peak and AADT, not just for truck traffic.

65A1 -- Percent Peak Single Unit Trucks (Length = 2)
65A2 -- Percent Average Daily Single Unit Trucks (Length = 2)

Item 65B -- Percent Combination Trucks (Peak and Average Daily) (Length = 4)

Enter the percentage of combination trucks to the nearest whole percent. Combination trucks include classes 8 through 13 (four-or-less axle, single-trailer trucks through seven-or-more axle, multi-trailer trucks) as identified in Chapter III of this Manual and in Section 4, Appendix A, of the TMG.

Certain routes may exhibit significant differences in truck percentages between peak period and average daily operation (i.e., recreational routes), and such differences can have a significant bearing on the calculation of capacity. In those cases where the State determines that such peak operations have a significant bearing on capacity calculations, separate peak usage values are to be reported even if they must be estimated. In those situations where such differences are known not to exist, the same percentage should be reported for both peak and average daily.

The vehicle classification data reported for each sample section should be representative of the truck activity over all days of the week and seasons of the year. "Peak" and "Average Daily" refer to the total traffic peak and AADT, not just for truck traffic.

65B1 -- Percent Peak Combination Trucks (Length = 2)
65B2 -- Percent Average Daily Combination Trucks (Length = 2)

Item 66 -- K-Factor (Length = 2)

Enter the K-factor--the design hour volume (30th highest hour) as a percentage of the annual average daily traffic, to the nearest percent. Provide a leading zero, where necessary. These factors should be derived for the specific facility or a similar facility in the area and not simply assigned by area type or functional system. Except under extreme conditions, this factor ranges from 06 to 18.

Item 67 -- Directional Factor (Length = 3)

Enter the percentage of the design hour volume (30th highest hour) flowing in the peak direction, to the nearest 5 percent. Code "100" for one-way facilities. Provide a leading zero, where necessary. These factors should be derived for the specific facility or a similar facility in the area and not simply assigned by area type or functional system. Except under extreme conditions (and for one-way facilities), this factor normally ranges from 050 to 075.

Item 68 -- Peak Capacity (Length = 5)

The rural and urban peak capacity values are calculated by procedures in the HPMS software provided to the States. The procedures used in the software for determining highway capacity conform to the Highway Capacity Manual (HCM), Third Edition, updated 1994. The capacity calculations are based on service flow rates for level of service E. The procedures are outlined in Appendix I.

All urban capacity is for the peak direction. Rural capacity for freeways by design and multi-lane facilities is for the peak direction. The capacity for rural facilities with 2 or 3 lanes is for both directions. If a facility has 2 or 3 lanes with one-way operation, it is considered to be a multi-lane facility for determining capacity.

The State may override the calculated capacity if upon review the State determines that the capacity is too low or too high. This may be done if there are particular conditions that are not reflected in the HPMS data items which influence the determination of the HPMS calculated capacity for the section.

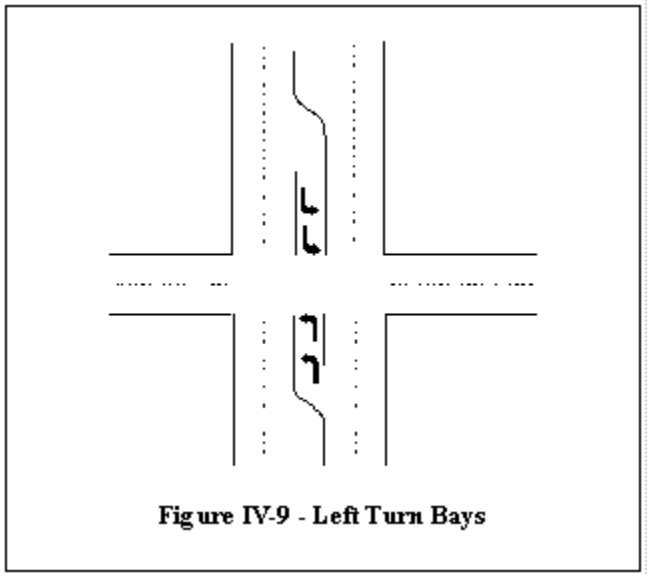

Figure IV-9 - Left Turn Bays

Item 69 -- Volume/Service Flow Ratio (V/SF) (Length = 3 -- x.xx -- implied decimal)

This field is generated by the HPMS Software from data within the HPMS record. Appendix L contains the formulas.

Item 70 -- Turning Lanes

(Urban Data Item) (Length = 2)

Enter the code (one each for left and right) that best describes the peak-period turning lane situation on the section (see Figures IV-9 and IV-10). Where peak capacity would be governed by a particular intersection, code the turning lane situation at that location; otherwise code for a typical intersection. Code turning lanes and the percent green time (where signals exist) at the same intersection.

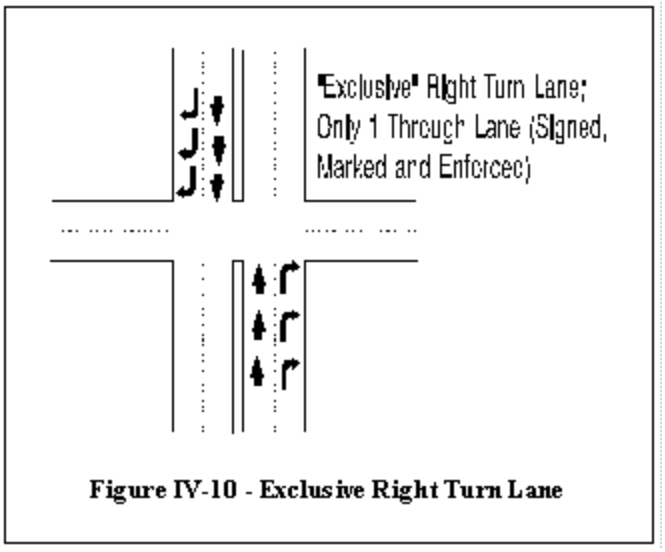

Figure IV-10 - Exclusive Right Turn Lane

Include turning lanes/bays that are located at commercial entrances (shopping centers, industrial centers, etc.). A continuous turning lane that contains painted bays for directing traffic turns is still considered to be a continuous turning lane. A through lane that contains painted arrows to indicate an exclusive turning sane at intersections is to be coded as a turning lane (see Figure IV-10). If through movements (crossing an intersection) may be made from a lane (where, for example, arrows painted on the pavement indicate both left and through movements), it is not to be considered a turning lane for the purposes of this data item.

Ignore short turning bays that cannot handle the turning traffic to the extent that the turning traffic continually blocks the adjacent through lane.

Examples:

Figure IV-9 contains a section that has a single left turn bay, and nothing for the right turns -- code "3" (a single left turning lane/bay exists) and "4" (no right turning lanes/bays exist). There are four through lanes.

Figure IV-10 contains what appears to be four through lanes, but one in each direction becomes an exclusive right turn lane as the intersection is approached. The correct code would be "4" (no left turning lanes/bays exist) and "3" (a single right turning lane/bay exists). Note that the number of through lanes is two for the section, since the exclusive turn lanes eliminate the other two lanes for through movement.

Item 70A -- LEFT Turning Lanes/Bays (Length = 1)

Code	Description
0	Not applicable; this is a rural section or **no intersections exist on the section**.
1	Multiple left turning lanes/bays exist (includes a continuous left turning lane that becomes multiple left turn bays just prior to the intersection). Through movements are prohibited in these lanes. Multiple turning lanes/bays allow for simultaneous turns from all turning lanes.
2	A continuous left turning lane exists from intersection to intersection. Through movements are prohibited in this lane.
3	A single left turning lane/bay exists.
4	No left turning lanes/bays exist (**intersections exist with left turns permitted**).
5	No left turns are permitted during the peak period.

Item 70B -- RIGHT Turning Lanes/Bays (Length = 1)

Code	Description
0	Not applicable; this is a rural section or **no intersections exist on the section**.
1	Multiple right turning lanes/bays exist (includes a continuous right turning lane that becomes multiple right turn bays just prior to the intersection). Through movements are prohibited in these lanes. Multiple turning lanes/bays allow for simultaneous turns from all turning lanes.
2	A continuous right turning lane exists from intersection to intersection. Through movements are prohibited in this lane.
3	A single right turning lane/bay exists.
4	No right turning lanes/bays exist (**intersections exist with right turns permitted**).
5	No right turns are permitted during the peak period.

Item 71 -- Prevailing Type of Signalization (Urban Data Item) (Length = 1)

Enter the appropriate code that best describes the predominant signal system facing the traffic on the section being inventoried (not for the intersecting routes).

Although this item is marked as an urban data item, signal information may be coded for rural sections to aid in capacity calculations.

Code	Description
0	Not applicable; this is a rural section.
1	Uncoordinated Fixed Time (may include pre-programmed changes for peak or other time periods).
2	Traffic Actuated.
3	Progressive (coordinated signals through several intersections).
4	No signal systems exist.

Item 72 -- Typical Peak Percent Green Time (Urban Data Item) (Length = 2)

Enter the percent green time in effect during peak hours at the signalized intersections facing the traffic for the section being inventoried (not for the intersecting routes). Where peak capacity would be governed by a particular signalized intersection, code the percent green time at that location; otherwise code for the typical signalized intersection. Code the percent green time and turning lanes (where turning lanes exist) at the same intersection. Enter "00" if no signalized intersections exist or if this is a rural section. Where signals are traffic actuated, code an estimated average green time during peak hours. Ignore green-arrow time for turning movements; this item is intended to obtain through movement green time.

Although this item is marked as an urban data item, percent green time information may be coded for rural sections to aid in capacity calculations.

Item 73 -- Future AADT (Length = 6)

Enter the forecasted AADT for both directions for the appropriate year entered in Year of Future AADT (Item 74). This cannot be for less than 17 years nor for more than 22 years. The intent is to obtain a 20-year forecast, but it may be for some other period of time that is within the noted time span. For example, the future AADT may be for any of the years 2014 to 2019 for the 1997 data year to be reported in 1998. This item may be updated anytime, but must be updated when the forecast falls below the 17-year limit.

The use of a repeatable procedure or data from MPOs and other such sources are recommended for obtaining the future AADT. HPMS forecasts for urbanized areas are to be

consistent with those developed by the MPO. The intent is to obtain reliable estimates on a locally derived basis, rather than statewide estimates for whole functional systems. The value entered here should reflect any planned, unbuilt facilities in the traffic corridor (i.e., that will affect the sample section future AADT) that have a good probability of being built in the near future (up to 6 years).

Item 74 -- Year of Future AADT (Length = 2)

Enter the last two digits of the year for which Future AADT (Item 73) has been forecasted. This cannot be for less than 17 years nor more than 22 years from the data year. For example, a 21-year forecast reported for the 1997 data year would be coded "18" (for the year 2018).

SAMPLE ENVIRONMENT DATA

Item 75 -- General Climate Zone (Length = 2)

This code is entered by the HPMS Software from county/climate zone equivalency tables. It should be checked by the State and may be changed if found not to be representative of the area in question. Once corrected, there should be no further need for change except under extraordinary situations. Note that if the county code is changed the climate zone should be updated using the HPMS calculation software. The definitions for the nine possible climate zones are contained in Appendix R.

Item 76 -- Drainage Adequacy (Length = 1)

Enter the code for the drainage adequacy of the section. Adequacy is based on the height of the grade line, the design of the cross section, and the capability of the cross drains, both in condition and capacity, to maintain a well-drained surface on a stable subgrade.

Code	Description
1	Good: A fully adequate drainage and cross section design exists. There is no evidence of flooding, erosion, ponding, or other water damage.
2	Fair: The height of grade line, cross section, or culvert capacity is somewhat below the standard for the type of roadway that would comply with standards if rebuilt. Drainage structures are structurally sound. Some added maintenance effort is required due to drainage and sedimentation problems.

Code	Description
3	Poor: Evidence of severe flooding, ponding, erosion, or other drainage problems exists. Drainage structures may be in poor condition. Considerable excess maintenance effort is required due to drainage and sedimentation problems.

Item 77 -- Type of Development (Rural Data Item) (Length = 1)

Enter the code for the predominant type of development.

Code	Description
0	Not applicable; this is an urban section.
1	Rural: Includes all areas outside of the adjusted urban boundaries (places of 5,000 or more population), excluding those described as "dense".
2	Dense: Includes those areas that have urban characteristics but are outside of the adjusted urban boundaries (i.e., small towns), or those areas in which major recreational facilities, such as parks, ski resorts, scenic overlooks, rest areas, etc., have significant impact on traffic operation of the adjacent facility.

GENERAL GUIDELINES for reporting the data items that contain counts:

- Number of Grade-Separated Interchanges (Item 78)
- Number of At-Grade Intersections with Public Roads (Item 79)
- Number of At-Grade Railroad Crossings (Item 80)

Care needs to be taken to prevent over counting. Special treatment is required when a sample section begins and/or ends with a counted data item. This is accomplished by doing the following:

- Choose a statewide direction for inventory (South to North, West to East, etc.)
- Choose a statewide rule to always count the beginning only or the ending only, but **never both**
- Count and report accordingly

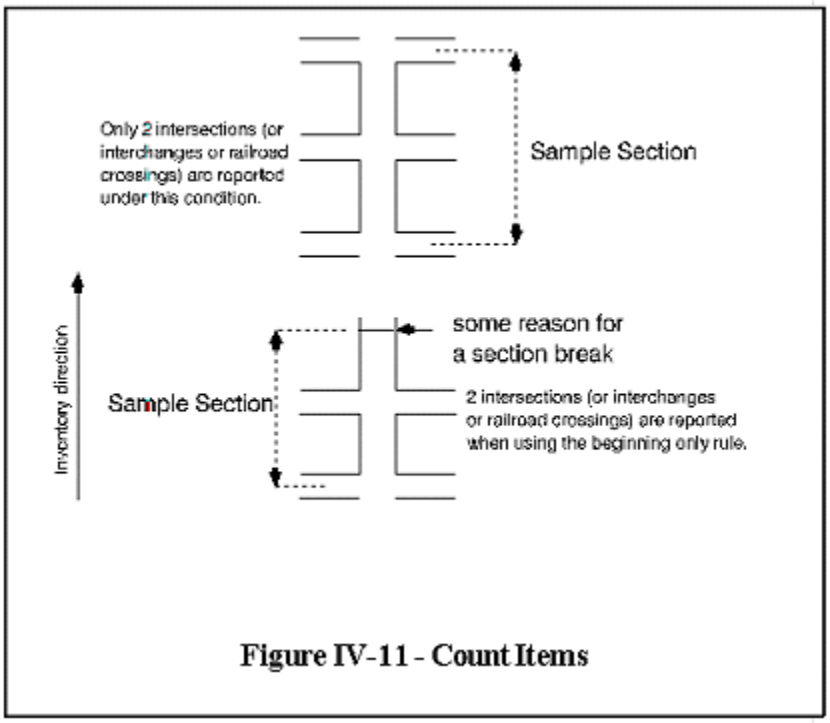

Figure IV-11 - Count Items

In the upper portion of Figure IV-11, the intersection count would always be two regardless of the inventory direction or the beginning/ending only rule. There may be differences in other data items, however, since items such as green time, turning lanes, etc., would depend on what rule the State is using. For example, if the State always counts the beginning only, the ending intersection would be ignored for all data items affected by intersections.

The lower portion of Figure IV-11 bases the count of two on the assumptions that the inventory direction is bottom to top and that the beginning only rule is being followed. If the inventory direction remains as bottom to top, but the State rule is to count ending only, the count for this example would only be one.

If neither end of a sample section contains a counted data item, there is no special treatment. Simply count and report all that exist within the section endpoints.

Item 78 -- Number of Grade-Separated Interchanges (Length = 2)

For all freeway and expressway facilities by design, enter the number of grade-separated interchanges. See the GENERAL GUIDELINES noted above for the inventory direction and begin/end rules required to properly report this data item. Enter "00" if none exist or if the facility being inventoried is not a freeway or an expressway.

An expressway is defined as a divided highway for through traffic with full or partial access control and including grade separations at all or most major intersections. A freeway is defined as an expressway with full control of access.

Item 79 -- Number of At-Grade Intersections with Public Roads (Length = 6)

This data item pertains to the type of traffic controls **on the route being inventoried and not those of the intersecting route**. It consists of three elements. Only those controls facing (controlling) the route being inventoried are counted. See the GENERAL GUIDELINES noted above for the inventory direction and begin/end rules required to properly report this data item. Controls at shopping centers, industrial parks, and other large traffic generating enterprises are to be included.

79A	**Signals**: Enter the number of intersections with a signal controlling the route being inventoried. A signal that cycles through red, yellow, and green for all or a portion of the day should be counted as a signalized intersection. If none, enter "00". (Length = 2)
79B	**Stop Signs**: Enter the number of intersections with a stop sign controlling the route being inventoried. A continuously-operating, flashing red signal should be counted as a stop sign control. If none, enter "00". (Length = 2)
79C	**Other or No Controls**: Enter the number of intersections where the route being inventoried is not controlled by either a signal or a stop sign; or is controlled by other types of signing or has no controls. A continuously-operating, flashing yellow signal should be considered as "other or no control". If none, enter "00". (Length = 2)

Item 80 -- Number of At-Grade Railroad Crossings (Length = 2)

Enter the number of at-grade railroad crossings on the section. Supply a leading zero where necessary. Multiple tracks should be reported as a single crossing. Exclude crossings on abandoned railroads.

See the GENERAL GUIDELINES noted above for the inventory direction and begin/end rules required to properly report this data item. Code "00" if no at-grade railroad crossings exist.

SUPPLEMENTAL DATA

NOTE: The following data items are to be reported for all applicable PAS data records, both universe only and standard sample. The data are to be reported only if HOV facilities and/or Surveillance Systems exist on the applicable system sections.

If this is an applicable standard sample section, these data will immediately follow the Number of At-Grade Railroad Crossings (Item 80). If this is an applicable universe only section, these data will immediately follow the Record Type Code (Item 38).

Item 81 -- HOV Operations (Length = 58; 26 separate fields of varying lengths)

This data item consists of 26 separate subitems that are **required to be coded if one or more of the described HOV facilities exist on a PAS universe only or PAS standard sample section**. Report this data item only if HOV operations exist on the roadway.

Provide the appropriate code or value as denoted for each subitem to describe the HOV facility. Facilities that allow use of the highway right-of-way (ROW) for at or above ground rail transit should be reported whether or not the facility contains roadway HOV facilities. Subitems 81E, 81S and 81W pertain to rail transit operation within the highway ROW. These data should include all rapid, light and commuter rail facilities; exclude major intercity rail, such as AMTRAK, unless it obviously serves commuters.

The peak periods generally span a 3-hour period during both the AM and the PM. Please provide information in the correspondence regarding the peak period used for coding this data item if it does not reflect a 3-hour period.

Sub-Item	Description		
Allowable use by Type of Vehicle (Length = 5; five fields, each with a length of 1)			
	NO	YES	
81A	0	1	Cars, Pickup Trucks, and Vans
81B	0	1	Large Trucks (Over 2 Axles)
81C	0	1	Buses
81D	0	1	Motorcycles
81E	0	1	Rail Transit with (on or above) the Highway ROW

Sub-Item	Description	
81F	**Minimum Vehicle Occupancy Requirements** (Total Persons; Except Motorcycles) (Length = 1)	
	Code	**Description**
	0	Nonapplicable
	1	2 Persons or More
	2	3 Persons or More
	3	4 Persons or More
	4	Buses Only
81G	**Highway Facilities Used by HOV Vehicles** (Length =1)	
	Code	**Description**
	0	Nonapplicable
	1	Exclusive HOV Lane(s) or Roadway (Not Reversible)
	2	Exclusive HOV Lane(s) or Roadway (Reversible)
	3	Normal through lane that is signed for exclusive HOV use in specified time periods (concurrent flow, same direction as other traffic)
	4	Normal through lane that is signed for exclusive HOV use in specified time periods (contra flow, opposite direction to other traffic)
	5	Shoulder used during specified period by HOV
	6	Shoulder used during specified period by general traffic
	7	All through lanes used by HOV vehicles during specified periods
	8	Other; Describe in submittal correspondence

Sub-Item	Description	
81H	**Delineation/Separation of HOV Lane(s)** (Length = 1)	
	Code	**Description**
	0	Nonapplicable
	1	Permanent, Fixed, Positive Barrier, or Separate Roadway
	2	Movable Positive Barrier
	3	Marked Diamond Lane(s), with or without drop traffic cones, pylons, painted buffer, or other "soft," temporary separation
Number of Lanes used in HOV Operations (Length = 4; four fields, each with a length of 1)		
81I	Code the number of lanes (including shoulders if applicable) used by HOV vehicles in the **AM** peak period. Code zero for nonapplicable section records.	
81J	Code the number of lanes (including shoulders if applicable) used by the general traffic in the **AM** peak period. Code zero for nonapplicable section records. Code "9" if the number of lanes is greater than 9, but provide a caution in the correspondence.	
81K	Code the number of lanes (including shoulders if applicable) used by HOV vehicles in the **PM** peak period. Code zero for nonapplicable section records.	
81L	Code the number of lanes (including shoulders if applicable) used by the general traffic in the **PM** peak period. Code zero for nonapplicable section records. Code "9" if the number of lanes is greater than 9, but provide a caution in the correspondence.	
Hours of HOV Operation(Length = 6; three fields, each with a length of 2)		
81M	Code the number of hours that the HOV facilities are in operation during the **AM** peak period. Supply leading zeroes, as necessary. Code zero for nonapplicable section records.	

Sub-Item	Description
81N	Code the number of hours that the HOV facilities are in operation during the **PM** peak period. Supply leading zeroes, as necessary. Code zero for nonapplicable section records.
81O	Code the total number of hours that the HOV facilities are in operation during the day for both directions. Supply leading zeroes, as necessary. Code zero for nonapplicable section records.
TRAFFIC VOLUMES for AM Peak Period Operations (Length = 16; two fields of 5 followed by two fields of 3)	
81P	Code volume of **cars, pickup trucks, vans and motorcycles** using HOV lanes/shoulders during the **AM** peak period. Supply leading zeroes, as necessary. Code zero for nonapplicable facilities. (Length = 5)
81Q	Code the volume of traffic using the general purpose lanes/shoulders during the **AM** peak period (as coded in 81M). Supply leading zeroes, as necessary. Code zero for nonapplicable facilities. (Length = 5)
81R	Code the volume of **buses** using the HOV lanes/shoulders during the **AM** peak period (as coded in 81M). Supply leading zeroes, as necessary. Code zero for nonapplicable facilities. (Length = 3)
81S	Code the number of **commuter rail transit cars** that use the highway facility right of way during the **AM** peak period (as coded in 81M). Supply leading zeroes, as necessary. Code zero for nonapplicable facilities. (Length = 3)
TRAFFIC VOLUMES for PM Peak Period Operations (Length = 16; two fields of 5 followed by two fields of 3)	
81T	Code the volume of **cars, pickup trucks, vans and motorcycles** using the HOV lanes/shoulders during the **PM** peak period (as coded in 81N). Supply leading zeroes, as necessary. Code zero for nonapplicable facilities. (Length = 5)

Sub-Item	Description
81U	Code the volume of traffic using the general purpose lanes/shoulders during the **PM** peak period (as coded in 81N). Supply leading zeroes, as necessary. Code zero for nonapplicable facilities. (Length = 5)
81V	Code the volume of **buses** using the HOV lanes/shoulders during the **PM** peak period (as coded in 81N). Supply leading zeroes, as necessary. Code zero for nonapplicable facilities. (Length = 3)
81W	Code the number of **commuter rail transit cars** that use the highway facility right of way during the **PM** peak period (as coded in 81N). Supply leading zeroes, as necessary. Code zero for nonapplicable facilities. (Length = 3)
81X	**TOTAL TRAFFIC VOLUME for a typical, non-holiday weekday** (Length = 6) Enter the total traffic volume for all traffic and all lanes for a typical, non-holiday, 24-hour period of a weekday. This value is to include HOV volumes in addition to the traffic using the general purpose lanes/shoulders. Provide leading zeroes as necessary. Code zero for nonapplicable facilities. No rail traffic is to be included.

Sub-Item	Description		
HOV ENFORCEMENT AREAS (Length = 2; two fields, each with a length of 1)			
	NO	YES	
81Y	0	1	Continuous shoulders are available for enforcement pull off.
81Z	0	1	Special pull off areas are available for enforcement in addition to or instead of shoulders.

Item 82 -- Highway Surveillance Systems (Length = 7; seven separate fields, each with a length of 1)

This data item consists of seven separate subitems that are **required to be coded only if one or more of the described surveillance systems exist on a PAS universe only or PAS standard sample section**. Report this data item only if Surveillance Systems exist on the roadway. If the surveillance system affects the operation of the roadway, code this data

item even if the surveillance system does not actually exist on the section (i.e., variable message signs may be mounted every few miles, but the whole roadway is affected from the first such sign to the last; all sections in between should contain the "yes" code).

Provide the appropriate code for "yes" or "no" to describe the surveillance system(s) being used on the applicable facility.

Sub-item	NO	YES	Description
82A	0	1	Manned Central Control Center that collects/receives data and information via cameras, detectors (lane counts and speed), etc. in real-time and relays the information to motorists using the facilities and/or police, emergency and other such vehicles.
82B	0	1	Ramp Metering.
82C	0	1	Ramp Metering with bypass lane(s) for certain (permissible) vehicles.
82D	0	1	Variable message signs to advise motorists of hazards, incidents and/or congestion ahead, route diversion, etc.
82E	0	1	Restricted visibility (fog, dust, etc.) and/or ice/snow detection system.
82F	0	1	Exclusive fixed frequency radio traffic condition reports (AM or FM) to alert motorists of roadway conditions, incidents, possible route diversions, etc.
82G	0	1	Other systems Intelligent Transportation Systems [ITS] operations, etc.). Describe in submittal correspondence.

---

[1]A "private" roadway is one that is privately owned, but is commonly used by, and open to, public traffic. In many of these cases, the roadway may be closed for a short time period (such as 1 day) each year by the owner to maintain its private status. Only a minor amount of this category actually exists--the code will have very limited use.

[2] Highways designated as part of the Interstate System that are only applicable to Alaska and Puerto Rico.

[3] Highways designated as part of the Interstate System under the provisions of 23 U.S.C. 139(a) should be coded "02" or "03" for this data item, depending on the date of approval. They must be functionally classified as Interstate (Item 12 = "01" or "11"). Additions must have been built to Interstate standards.

[4] Highways designated as a future part of the Interstate System under the provisions of 23 U.S.C. 139(b) should be coded "04" for this data item. These highways should not be functionally classified as Interstate until the highway has been officially designated as part of the Interstate System.

[5] Highways designated as part of the Interstate System under provisions of Section 1105(e) of the Intermodal Surface Transportation Efficiency Act of 1991 (105 Statute 2033) as amended under Section 332 of the National Highway System Designation Act of 1995 (109 Statute 597 and 598). The highways in this category that are open to traffic (code "05") must be functionally classified as Interstate. Those coded as "06" are to retain the original non-Interstate classification on the current open-to-traffic roadway until they have been officially designated as complete and open-to- traffic Interstate. Alternatively, "06" sections may be reported separately as unbuilt (Item 15 = "2") and contain the Interstate functional system code in Item 12.

[6] This definition is intended to be consistent with 23 U.S.C. 103(b)(2)(C). Includes Connectors.

[7] This definition is intended to be consistent with 23 U.S.C. 143(f)(2) and 23 U.S.C. 101(a).

[8] These definitions are intended to be consistent with 23 U.S.C. 101(a), Definitions and Declaration of Policy.

[9] Those States that had designated all, or almost all, of the non-Interstate Federal-aid Primary System were: AR, CO, IN, KS, LA, MS, MT, NE, NV, OH, OK, SD, TN, TX, UT, WA and WY. Code "2" should be used for these States if the roadways are currently on the principal arterial system and are fully available to the trucks described for this data item.

[10] HOV Operations or Surveillance Systems are not to be reported for donut area sample sections since the donut area samples cannot exist on the PAS and the data items will not be recognized by the software.