# GUIDANCE FOR REVIEWING FUNCTIONAL CLASSIFICATION

**TEXAS DEPARTMENT OF TRANSPORTATION**
**Transportation Planning and Programming Division**
**Systems Planning Section**

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## ACKNOWLEDGEMENTS

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## 1. INTRODUCTION

After each decennial census, the U.S. Census Bureau updates urban area[1] boundaries (UABs) to reflect changes in population densities. The Census designated UABs are very jagged as they are primarily based on population density of Census block groups and blocks. While the criteria for designating UABs serves the Census Bureau's purpose of identifying where people live, the criteria, when applied to transportation planning, do not adequately recognize all elements of urban areas (UAs).

Unpopulated traffic generators located on the fringe of UABs are often designated as rural as they do not meet population density requirements to be considered urban. Another issue with the Census Designated UABs when applied to transportation planning is that many roadways enter and leave the UABs several times in a relatively short distance. Functional classification is based on the urban or rural designation of an area. Therefore, the functional classification of a roadway changes each time it enters or leaves an urban area.

While the U.S. Census Bureau will not recognize smoothed UABs, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) will recognize smoothed boundaries for transportation planning purposes.

Following the decennial census, MPOs examine and smooth their Urbanized Area[2] (UZA) boundaries, and TxDOT Districts examine and smooth small urban area[3] boundaries. Once boundaries are smoothed, functional classification is updated to reflect changes in urban and rural designations as well as changes in roadway function. This guidebook provides background information and guidelines to consider while updating roadway functional classification.

The Texas Transportation Institute (TTI), through an interagency contract with the Texas Department of Transportation, Transportation Planning and Programming Division (TxDOT – TPP) has created this and other guidebooks, training sessions, electronic packages, maps, and Excel inventories to assist with the urban boundary smoothing and functional classification update. Additional information and assistance has been provided by FHWA, TxDOT districts and Metropolitan Planning Organizations (MPOs).

[1] Urban areas have populations greater than 5,000. They include both small urban and urbanized areas.
[2] Urbanized areas have populations greater than 50,000.
[3] Small urban areas have populations of 5,000 – 49,999 and are delineated by urban place boundaries.

## 2. OVERVIEW

This section provides a brief overview of material contained in this guide. For more detailed information on each of the subjects addressed, refer to following sections.

Federal functional classification represents the hierarchy of purposes roadways serve. Every road serves a specific purpose, whether it is strictly the movement of vehicles through an area (freeways) or serving the access needs of a residential neighborhood (locals).

Accurate Federal functional classification is essential for informed transportation-related decision making and appropriate roadway funding. Data aggregated by functional classification are used extensively in the analysis of highway system condition, performance, and investment needs that make up the biennial Condition and Performance Reports to Congress. These data are also used by other Federal, State, and local officials to make data-driven decisions.

There are four basic functional classification categories; principal arterial, minor arterial, collector and local. Some of these categories are further broken down depending on the area type. Functional classification by area type are shown in Table 2 on page 15.

Several factors may be considered when determining the appropriate functional classification for a given roadway, such as length, traffic volumes, cross-section, and land uses served. However, no single factor should be considered when assigning functional classifications to roadways.

Roadway functional classification is relative and cannot be tied to any one factor, such as traffic volumes. Two roads carrying the same traffic volumes may be serving different purposes, and therefore, have different functional classifications. Conversely, two roadways in different areas of the state may have the same functional classification, but serve very different volumes of traffic. This is particularly applicable among urban areas with very different populations or between urban and rural areas.

In the past, FHWA issued guidance for each functional classification category that included mileage percentages (of the total roadway network). While there are no mandatory mileage percentage limits, they should be used as a rule of thumb, according to the FHWA Texas Division. Percentage guidelines are included in Tables 5 and 6 on page 29. **Although percent VMT is listed in these tables, reporting the percent of VMT by functional classification is not a requirement in Texas.**

Although roadway funding is no longer directly tied to the mileage percentage of each functional classification, funding for the Federal-aid highway system is still linked to functional classification. Roadways of all functional classifications are eligible for some type of federal funding. It is important that roadways be properly classified in order to qualify for the proper funding. In addition, HPMS data, aggregated by functional classification, are used in some federal allocation formulas.

The complete current 1989 “Highway Functional Classification, Concepts, Criteria, and Procedures” manual is located at http://www.tpd.az.gov/gis/fclass/fc_fhwa_gdeln.html.

# 3. THE IMPORTANCE OF FUNCTIONAL CLASSIFICATION

## FEDERAL AID ELIGIBILITY

Roadways classified as local or rural minor collector are not eligible for federal funding with only a few exceptions. All public roads are eligible for the STP set-aside for safety improvements and highway bridge replacement and rehabilitation program funds. In addition, a small set-aside of STP funds is available for rural minor collectors[3].

Proposed roadways must be assigned a functional classification to be eligible for Federal funding. Any roadway that is anticipated to be built within the next six years and included in State's transportation plan, should be functionally classified. A roadway is no longer proposed once it is open to traffic. At this point, TxDOT should be notified of the status change to maintain accuracy of HPMS reporting.

## HIGHWAY PERFORMANCE MONITORING SYSTEM (HPMS)

HPMS data reflects the "extent, condition, performance, use, and operational characteristics of the Nation's highways[11]." HPMS collects and reports data aggregated by federal functional classification and is used by Federal, State, and Local officials to make informed transportation-related decisions. HPMS data are used in the Condition and Performance Reports submitted to Congress and make up the majority of the information in the FHWA publication, "Highway Statistics".

"Maintaining a valid HPMS database is an item of national significance; … This extends beyond the simple reporting of data each year and includes taking actions to assure that all data are complete, current, and accurate." (FHWA's HPMS Field Manual).

Reporting of false data is in violation of 18 U.S.C., Section 1020, making it a federal crime. Reporting the most accurate information possible to TxDOT is imperative. This includes, not only ensuring appropriate functional classification is assigned to all roadways, but also making sure proposed roadways are clearly marked as proposed. Once a proposed roadway has traffic traveling on it, the proposed designation needs to be removed. Any updates to functional classification should also be reported to TxDOT as soon as they are known. Once TxDOT reviews updates, they must be approved by FHWA before being used in HPMS reporting.

In addition to National reporting, HPMS data are used in many research projects, and ad hoc report. The State and local areas also use HPMS data for reports and data driven decision making.

## FUNDING

HPMS data are used to determine highway system performance and for the apportionment of Federal-aid Highway Funds.

"The major purpose of the HPMS is to support a data driven decision process within FHWA, TxDOT, and the Congress. The HPMS data are used extensively in the analysis of highway system condition, performance, and investment needs that make up the

biennial Condition and Performance Reports to Congress. These Reports are used by Congress in establishing both authorization and appropriation legislation, activities that ultimately determine the scope and size of the Federal-aid Highway Program, and determine the level of Federal highway taxation." (FHWA website www.fhwa.dot.gov/policy/ohpi/hpms/abouthpms.htm. )

Eligibility for funding of some Federal-aid program categories is dependant upon data associated with one or more functional classifications. For example, the amount of NHS funding apportioned to the state is dependant upon principal arterial data. Interstate maintenance funds can, obviously, only be spent on roadways classified as interstates. And, roadways classified as rural minor collectors are eligible for up to 15% of a state's rural Surface Transportation Program (STP) funds.

It is important that roadways be properly classified in order to qualify for the proper funding.

## ALLOCATION FORMULAS

HPMS data aggregated by functional classification are used in some Federal allocation formulas. For example, the National Highway System (NHS) fund uses the variables shown in table 1 as part of its allocation formula.

| *Fund* | *Factors* | *Weight* |
|---|---|---|
| *National Highway System (NHS)* | *Lane Miles of Principal Arterial Highways (excluding Interstate System)* | *25%* |
| | *Vehicle Miles Traveled on Principal Arterial Highways (excluding Interstate System)* | *35%* |
| | *Total Lane Miles of Principal Arterial Highways divided by the State's Population* | *10%* |

*(FHWA – Highway Performance Monitoring System – Field Manual)*
**Table 1. NHS Allocation Formula Variables**

## DATA SAMPLING

Data is sampled and reported based on roadway functional classification. Samples are subsets of the universe of all roadways within a particular functional classification.

All arterials and collectors, except rural minor collectors, are sampled for HPMS data. The data collected on each functional classification varies. In order for the appropriate data to be collected and accurate, the functional classification must be accurate.

In addition, states report aggregate estimates of local roadway VMT for air quality determination. For this reason, it is important to ensure roadways classified as local are truly functioning as local.

## FORECASTING

Linear forecasting uses HPMS data that is aggregated by Federal Functional classification. Accurate forecasts can only be made if data from similar roadways is used. For example, data from an Interstate cannot be used to forecast vehicle classification on a collector.

Forecasting should not be confused with travel demand modeling. Texas uses a modeling functional classification system in their travel demand model. The differences between modeling functional classification and federal functional classification are discussed in the next section.

## 4. FEDERAL FUNCTIONAL CLASSIFICATION VERSES MODELING FUNCTIONAL CLASSIFICATION

Modeling and Federal functional classification systems have many similarities, but their uses are very different. It is important to understand the similarities and differences between the two systems so they can be maintained properly.

**Similarities:**
Both Federal functional classification and modeling functional classification are based on operational functions of roadways. They both use VMT, roadway spacing, signalization, roadway access verses mobility, posted speed limit, etc to determine the proper functional classification.

In addition, the name and requirements for each functional classification are, with few exceptions, identical.

**Differences:**
Modeling functional classification does not differentiate between urban and rural area types, and has a total of eight functional classification categories. Federal functional classification, however, has six rural and six urban functional classification categories.

Modeling functional classification is used in travel demand modeling. Travel demand models are complex traffic forecasting systems that "evaluate the effects of known and projected changes in population, employment, development patterns, and other socioeconomic conditions may have on the demand for travel on the urban area's major roadway and transit systems." Model outputs are used in developing long-range transportation plans. (TxDOT's Traffic Data and Analysis Manual)

Federal functional classification, as discussed in previous sections, is used to aggregate data collected and stored in the HPMS. HPMS data are used in the Condition and Performance Reports submitted to Congress and comprise the majority of information in the FHWA publication, "Highway Statistics". These reports are used to make data-driven decisions for funding allocation.

Federal functional classification must be reviewed and approved by FHWA prior to use in HPMS reporting.

## 5. ELEMENTS OF FUNCTIONAL CLASSIFICATION

There are three elements of a roadway's functional classification code:

- on- or off- the state highway system (on- or off- system)
- area type (rural or urban)
- functional classification (Discussed in section 8)

### ON- / OFF- THE STATE HIGHWAY SYSTEM

A roadway that is on the state highway system is often referred to as "on-system". Conversely, roadways that are off the state highway system are often referred to as being "off-system". This is not an opportunity to transfer roads from local jurisdiction to the state system! The state highway system designation can only change if the City Council or County Commissioners Court passes a resolution requesting an existing roadway be added to the on-system network. The roadway must then meet design, right-of-way, and traffic operations standards before a minute order can be sent to the Texas Transportation Commission (TTC).

### AREA TYPES

Functional classification is directly related to urban boundaries. All roads are designated as either urban or rural. These two groups have been established because of the differences in travel patterns and needs that can often be observed between rural and urban areas. Therefore, each functional classification officially begins with "rural' or "urban."

For the purposes of this exercise, typically, all roadways inside 2000 adjusted urban area boundaries are considered urban. All roadways outside of these boundaries are considered rural.

The urban or rural roadway designation is established through the urban area smoothing process. The urban or rural designation will typically change at the adjusted urban area boundary. However, there may be instances when the adjusted urban area boundary may not be the most appropriate place for functional classification to change from urban to rural. It may be necessary for an urban functional classification to extend into a rural area until it reaches a traffic generator that provides the best point for change. The same may also be true for a rural road entering an urbanized area.

#### Urban

Any roadway that runs through an urban area with a population greater than 5,000 is considered urban for functional classification purposes. For purposes of this guidebook, urban areas refer to census places with populations of 5,000 – 49,999 and UZAs with populations of at least 50,000.

In Texas, Small urban areas (population 5,000 – 49,999) are delineated using Census place boundaries and are assigned their corresponding populations.

Census Places

Census places include Census designated Places (CDP), consolidated cities, and incorporated places. Census places do not have population or population density thresholds.

- CDP – CDPs are "delineated to provide Census data for concentrations of population, housing, and commercial structures that are identifiable by name but are not within an incorporated place. CDP boundaries usually are defined in cooperation with state, local, and tribal officials."
- Consolidated Cities – "A consolidated government is a unit of local government for which the functions of an incorporated place and its country or minor civil division have merged… The primary incorporated place is referred to as a consolidated city."
- Incorporated Places – "Incorporated places recognized in decennial Census data products are those reported to the U.S. Census Bureau as legally in existence on January 1, 2000, under the laws of their respective states as cities."

Urbanized Area

The Census designated urbanized areas contain contiguous and nearby census blocks that meet certain population density requirements and have populations greater than or equal to 50,000. The 2000 adjusted urbanized areas contain the Census designated urbanized area and may contain unpopulated land with urban land uses. All roads in urbanized areas are categorized with urban functional classifications.

**Rural**

Rural areas include any Census place with a population less than 5,000 and all area outside of Census place and urbanized area boundaries. Rural areas may or may not be incorporated.

## 6. FUNCTIONAL CLASSIFICATION CATEGORIES

Both rural and urban areas have four basic functional classification categories:

- Principal Arterial
- Minor Arterial
- Collector
- Local

Table 2 shows the break-down of functional classification categories. In urban areas, principal arterials have three sub-categories, 1) Interstate, 2) Other Freeways and Expressways, and 3) Other Principal Arterials.

In rural areas, principal arterials have two sub-categories, 1) interstate and 2) other principal arterials and collectors have two sub-categories 1) major collectors and 2) minor collectors.

| Urban Functional Classifications | Rural Functional Classifications |
|---|---|
| **Principal Arterial** | **Principal Arterial** |
| • Interstate | • Interstate |
| • Other Freeways and Expressways | • Other Principal Arterial |
| • Other Principal Arterial | **Minor Arterial** |
| **Minor Arterial** | **Collector** |
| **Collector** | • Major Collector |
| **Local** | • Minor Collector |
| | **Local** |

**Table 2. Functional Classification Categories.**

Since functional classification refers to the relative function the roadway serves, a roadway with a particular functional classification in a rural area may be much different than a roadway with that same functional classification in a large urban area. Even among urban areas, roadways with the same functional classification may be very different. For example, a minor arterial roadway in Victoria (population approximately 62,000) would serve different traffic volumes than a minor arterial roadway in Houston (population approximately 4 million).

When functionally classifying roadways within an urban area, do not compare the roadway in question with roadways in other urban areas. The relative function of the roadway in question should be compared to the functions of other roadways within the same area.

There are no quantitative methods to determine the functional classification of a roadway. However, there are many characteristics that each functional classification should have relative to other functional classifications. The primary factors to consider are the level of mobility a roadway allows verses the amount of access provided to adjacent land and intersecting roadways. As access to adjacent land increases, the level of mobility decreases and vice versa. Figure 1 depicts this phenomenon.

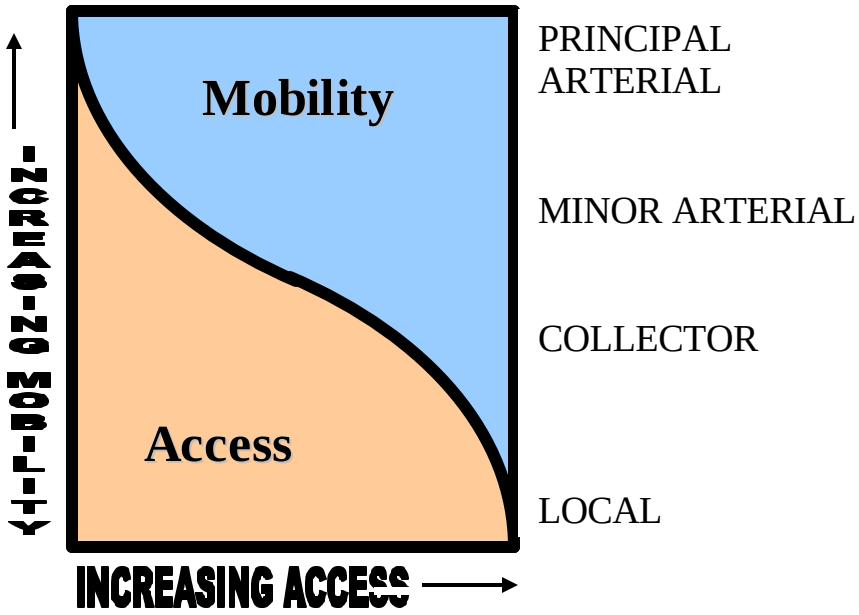


**Figure 1. Relationship of Traffic Mobility and Land Access with the Functional Classification**

Table 3 shows additional factors to consider when functionally classifying roadways, and the relative importance to each factor to each functional classification.

| Functional Classification | Distance Served | VMT | Speeds | Significance | Access Points | Distance Between Routes |
|---|---|---|---|---|---|---|
| Principal Arterial | Longest | Highest | Highest | Statewide | None | Longest |
| Minor Arterial | 9 | 9 | 9 | 9 | 9 | 9 |
| Collector | | | | | | |
| Local | Shortest | Lowest | Lowest | Local | Many | Shortest |

Table 3. Factors of Functional Classification.

No single factor should be considered alone. For example, a principal arterial serving statewide traffic may have many access points and reduced speed limits within a rural town, but the classification would remain principal arterial because the roadway is still serving intrastate travel.

More detailed information about each functional classification is included in the following section.

## 7. PROCESS FOR UPDATING FUNCTIONAL CLASSIFICATION

Assigning functional classifications to roadways is similar to the UZA adjustment process in that basic logic should be used.

Most changes to functional classification will occur where urban boundaries have changed. While not required, it is recommended to take this opportunity to review and update your entire functionally classified network. Generally Arterial systems are relatively stable, requiring few changes. However, changes among collector and local roadways are more frequent.

Whether functional classification is examined within rural, small urban or urbanized areas, the same basic procedures are followed. **The below listed steps would be used to assign functional classifications in an area with roadways yet to be classified.** While areas in Texas will not have to go to this extreme, understanding the basic steps to functionally classifying the network will help ensure updates are made properly. The following steps are based on information in the FHWA publication *Highway Functional Classification: Concepts, Criteria and Procedures", "HPMS Field Manual",* and the FHWA publication *"Functional Classification, Flexibility in Highway Design"*.

1. **Identify Traffic Generators**. In rural areas, traffic generators may be population centers (cities and towns); recreational areas such as lakes, national, state and county parks; military facilities; consolidated schools; shipping points; etc. In small urban and urbanized areas, traffic generators may be business districts, air, rail, bus, and truck freight terminals, regional and local shopping centers, colleges, hospital complexes, military bases, industrial and commercial centers, stadiums, fairgrounds, parks, etc. Regional traffic generators adjacent to the study area should also be identified as they produce or attract trips that travel into, from, or through the study area.

2. **Rank Traffic Generators**. Traffic generators should be categorized based on their relative ability to generate trips. Traffic generators thought to be significant enough to be served by a major collector or higher should be categorized into several groups (5 to 8 are recommended). More groups are better than fewer groups. Traffic generators with similar significance should be placed in the same groups. These groups will be used to identify the functional classification of connections. Population, sales tax receipts, retail trade, visitation, and employment are some examples of factors to consider when ranking significance of traffic generators.

   In rural areas, traffic generators will primarily be towns and cities. However, it is important to recognize unpopulated traffic generators as well. The annual number of visitors can be equated to the population of a city or town to determine the significance of unpopulated traffic generators using the table on page III-5 of the FHWA publication *Functional Classification: Concepts, Criteria, and Procedures*. Unpopulated traffic generators should be provided similar service as population centers with populations similar to the annual visitation. Visitation data for recreation areas administered by the State and

Federal Governments should be available from the Bureau of Outdoor Recreation Texas liaison officer.

3. **Determine the Appropriate Functional Classification to Connect Traffic Generators.** To determine functional classification, work from the top down. In other words, identify principal arterials first, then minor arterials, collectors, and finally locals. Begin with a large regional perspective. Moving from arterials to collectors and from collectors to locals, the perspective will become smaller and more localized.

   A. First, identify all roadways to be functionally classified as arterials (both principal and minor).

   B. Classify the preliminary set of arterial roadways as either principal or minor arterials.

   C. Classify the principal arterials as appropriate

   D. Identify collector roadways.

   E. If classifying rural roadways, sub-classify the collectors as major or minor.

   F. Classify remaining roadways as local.

   Most roadways are easily functionally classified. However, since functional classification is not an exact science, some areas of uncertainty exist between functional classifications as shown in figure 2.

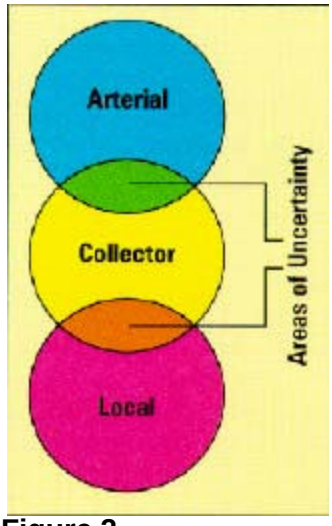


**Figure 2**.

The functional classification definitions listed in Section 5 will help identify which roadways belong to which functional classification.

## MAINTAINING CONTINUITY OF FUNCTIONAL CLASSIFICATION

To keep continuity of functional classification, roadways should maintain a similar functional classification at urban boundaries. For example, a rural minor arterial should connect to an urban minor arterial or one step above or below that functional classification.

Continuity of functional classification should also be maintained at district boundaries. A significant amount of communication and coordination among entities is needed to provide statewide continuity of functional classification.

## SPECIAL CIRCUMSTANCES

### One-Way Streets

One-way streets should be classified individually, not in pairs[1].

### Frontage Roads

Frontage roads should be classified independently of the controlled-access facility which they abut. The classification of frontage roads should be either in the collector or local categories. If a classification other than collector or local is appropriate, justification of that classification should be provided to TxDOT and FHWA.

## 8. FUNCTIONAL CLASSIFICATION CATEGORIES[1]

### URBAN FUNCTIONAL CLASSIFICATION CATEGORIES

Due to differences in population density, functional classification in urban areas may be very different than functional classification in rural areas, even though their classification may carry the same name.

### Urban Principal Arterial

Urban principal arterials can be identified as "unusually significant to the area in which it lies in terms of the nature and composition of travel it serves." In small urban areas, principal arterials most likely will serve predominately through traffic. In larger urban areas, however, they will serve intraurban traffic as well as through traffic.

Principal arterial streets will have the following characteristics:

- Serve major activity centers
- Have the highest traffic volume
- Serve the longest trip desires
- Carry a high proportion of the total urban area travel on a minimum of mileage.
- Integrated, both internally and between major rural connections.
- Carry the major portion of trips entering and leaving the urban area, as well as the majority of through movements desiring to by-pass the central city.
- May carry major intraurban as well as intercity bus routes.
- The system should provide connections to and between:
    - Central business districts and outlying residential areas.
    - Major inner city communities
    - Major suburban centers
    - All rural arterials which intercept the urban boundary

Principal arterial streets in urbanized areas most commonly have four or more through-lanes and may or may not be divided. The primary purpose of Principal Arterial Streets is mobility. This does not mean that all Principal Arterials will have controlled access, but most controlled access roadways will be classified as Principal Arterial. The urban principal arterial system is divided into three sub-categories to differentiate various levels of access.

*Interstate (Controlled access Interstates)*

As with rural Interstates, urban interstates are very easily identified because they are part of the Interstate Highway system. These roadways are the highest level of urban functional classification with their primary purpose being to provide mobility to the traveling public.

*Other Freeways and Expressways (Controlled access non-Interstates)*

Other Freeways and Expressways are completely access-controlled, but not part of the Interstate Highway system. For the purposes of functional classification, "access-controlled" means that access to main lanes of traffic is permitted at entrance and exit ramps only and intersections are grade-separated.

*Other Principal Arterials (No control of access)*

Other Principal Arterials are not controlled access facilities, and they are the only Principal Arterial functional classification that provides any direct access to adjacent property. Even though access is not controlled, mobility is the primary function of Other Principal Arterial streets. Access to adjacent land should be purely incidental.

Areas of Uncertainty

Interstates and Other Freeways and Expressways are very easily identifiable by the criteria listed above. Uncertainty may arise, however, when distinguishing between Other Principal Arterials and Minor Arterials.

Keep in mind that the "urban principal arterial system should be integrated, both internally and between major rural connections." If adding a roadway in question to the Principal Arterial system would create a stub connection or connects to a lower functional classification, it should NOT be classified as a Principal Arterial. Likewise, if a roadway in question provides greater integration of the principal arterial system, it may be classified as Principal Arterial.

In urban areas, only very large activity centers that should be served by Principal Arterials. "A principal arterial is considered to be offering service to a center when direct access is not further than about one-half to one mile from the facility." Additional arterial spacing guidelines can be found in table 4 on page 23. These activity centers can be identified by number of employees, number of visitors, and/or ability to attract trips from outside of the region. Not all traffic generators can be quantified in these terms, but should still be considered for the appropriate functional classification connection.

**Urban Minor Arterial**

Minor Arterial streets should provide a lower level of mobility, more direct access to adjacent land and serve shorter distances than streets classified as Principal Arterial. These streets will serve geographic areas that are smaller than those served by principal arterials.

Minor arterials are considered to be providing service to a center when direct access is located between one-quarter to one-half mile from the minor arterial. Additional arterial spacing guidelines can be found in table 4. Urban minor arterials have the following characteristics:

- May carry local bus routes.
- Provide intra-community continuity but not connect communities together.
- Spacing of 1/8 to ½ mile in central business district.
- Spacing not more than 1 mile in fully developed areas.
- Spacing of 2 to 3 miles in the suburban fringe.

| **Area type** | **Arterial spacing** |
|---|---|
| Central business district | 1/8-1/2 mile |
| Urban (central city except CBD) | ½-1 mile |
| Suburban | 1-2 miles |
| Lowest density development | 2-3 miles |

Table 4. Arterial spacing guidelines (published in FHWA Functional Classification Guidelines)

**Urban Collector**

Urban collector streets serve the combined purposes of vehicular movement and access to adjacent property. They carry lesser volumes of traffic for shorter distances and typically have cross-sections of two or four lanes. Intersections (with private driveways and public roads) are considerably more frequent than on arterial roads. They provide circulation to residential neighborhoods, and commercial and industrial areas.

Urban collectors may penetrate neighborhoods as their primary function is to connect arterials to a final destination.

**Urban Local**

All urban streets that do not receive one of the above urban functional classification designations are considered to be local streets. Local streets provide the most frequent access to adjacent land and higher-order roadway, as access is their primary purpose. Through traffic is usually deliberately discouraged and they generally do to carry bus routes.

## RURAL FUNCTIONAL CLASSIFICATION CATEGORIES

### Rural Principal Arterials

The rural principal arterial system is a connected rural network having the following characteristics:

- Likely to include all rural freeways.
- Trip length and travel density characteristics indicative of statewide or interstate travel.
- Serves all urban areas of 50,000+ population.
- Serves most small urban areas with populations of 25,000 -49,999.
- Creates an integrated network without stub connections (unless unusual geographic conditions exist).

The rural principal arterial system is divided into two sub-categories, Interstate and Other Principal Arterials.

*Rural Interstate*

This functional classification is the simplest to identify because a road must be part of the Interstate Highway system. The Interstate Highway system is the highest type of principal arterial, meaning that its purpose is primarily to move traffic. Access to adjacent land is very limited.

*Rural Other Principal Arterial*

Non-Interstate freeways and arterial streets that primarily serve large volumes of through-traffic in rural areas typically receive this classification. As with other transportation issues, the concept of "large volumes" is relative – the most important non-freeway arterial roadway in one rural area may carry somewhat less traffic than the most important non-freeway arterial roadway in another rural area.

Areas of Uncertainty

When uncertainty arises as to whether a road is a principal arterial or a minor arterial, reexamine the size of traffic generators being connected, predominant travel distance served, size of the "travel shed" and frequency of access.

**Rural Minor Arterials**

Rural minor arterials, when combined with the rural principal arterial system, should create a network with the following characteristics:

- "Link cities and larger towns (and other traffic generators, such as major resort areas, that are capable of attracting travel over similarly long distances)"
- "Form an integrated network providing interstate and intercounty service."
- Spacing of routes should be "consistent with population density, so that all developed areas of the State are within a reasonable distance of an arterial highway."
- Designed for "relatively high overall travel speeds"
- "Designed for minimum interference to through movement."
- "Provide service to corridors with trip lengths and travel density greater than those predominantly served by rural collector or local systems."

Areas of Uncertainty

In addition, a complete network of minor arterial roads will usually be found to intersect roads in all other classifications. Arterials provide circulation at the regional and statewide levels, while collectors provide circulation at the county and local levels.

Minor Arterials experience a rate of diminishing returns. In other words, each additional roadway that is added to the Minor Arterial network, generally serves less traffic than the roadway previously added. A lower population limit of traffic generators served by minor arterials should be set. If the recommended percentage of mileage for Minor Arterial Roadways is close to being reached, ask the following questions: (1) "Would adding routes to serve a next group of smaller generators result in adding a considerable mileage of routes carrying, as a group, substantially less traffic than routes already added?" (2) "Is the radius of traffic attraction of this next group of smaller generators, as implied by their size, their distance from larger generators, or by traffic flow data, substantially less than that of places already served?" If the answer to either of these questions is "yes", roadways in question should perhaps be classified as Major Collector.

Roadways that do not serve similar size traffic generators may be added to the Minor Arterial system if they serve similar trip lengths and traffic volumes.

More than one route between traffic generators may be designated Minor Arterial if:

- A geographic barrier is located between the generators
- One facility prohibits commercial vehicles
- One facility is a toll road

**Rural Collector**

It is important to keep in mind that rural collectors provide circulation at the county and local levels. Review the map with a local perspective as opposed to a statewide perspective to identify traffic generators of only local significance, such as small urban areas with low population, consolidated schools, and county parks. Collectors will be shorter in distance than Principal and Minor Arterials and have more moderate speeds.

Collector roads in rural areas are classified as either "major" or "minor". This is due to the fact that collector roads typically comprise a significantly larger percentage of the roadway system in rural areas than in urban areas.

*Rural Major Collectors*

Rural major collectors should have the following characteristics:

- "Provide service to any county seat not on an arterial route."
- Provide service to larger towns not directly served by the higher systems."
- Provide service to other traffic generators of equivalent intracounty importance, such as consolidated schools, shipping points, county parks, important mining and agricultural areas, etc."
- Link unpopulated traffic generators with nearby larger towns or cities, or with routes of higher classification.
- "Serve the more important intracounty travel corridors."

*Rural Minor Collectors*

These roads are typically spaced at more frequent intervals than rural major collectors. However, in more sparsely developed areas of the state, spacing frequency of various types of roads cannot be used as a factor in assigning functional classification.

Rural minor collectors should have the following characteristics:

- Located "at intervals, consistent with population density."
- "Collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road."
- "Provide service to the remaining smaller communities."
- "Link the locally important traffic generators with their rural hinterland."

Areas of Uncertainty

When uncertainty exists as to whether a roadway should be classified as Collector or Local, keep in mind the hierarchy of the functional classification system in terms of land uses served, travel distances of the route and the connection to the functionally classified network. Generally, local roads serve very short travel distances and primarily provide access to adjacent land, generally having residential use.

**Rural Local**

All roads that do not qualify for one of the above listed functional classifications should be classified as Local. The primary purpose of rural local roads is to provide access to adjacent property. They provide service over relatively short distances as compared to higher systems.

## 8. CATEGORY PERCENTAGE OF TOTAL ROADWAY MILEAGE

In the past, FHWA issued guidance for each functional classification category that included mileage percentages (of the total roadway network). While maintaining these percentages is not mandatory, they should be used as a rule of thumb, according to the FHWA Texas Division.

In cases where an area varies significantly from the mileage percentage rule of thumb (presented in Tables 1 and 2 from the current March 1989 FHWA "Highway Functional Classification, Concepts, Criteria, and Procedures,") additional analysis of the designations should be undertaken to ensure appropriate designations have been made. Any deviation from these mileage percentage ranges, should be justified by the MPO and/or State DOT.

Tables 5 and 6 also contain percent of vehicle miles traveled (VMT) thresholds. While VMT may be used as an indicator of functional classification, recording percent of VMT is not required.

| CATEGORY | % of VMT | % of MILEAGE |
|---|---|---|
| Principal Arterial | 40-65 | 5-10 |
| Minor Arterial | 15-25 | 5-20 |
| Collector | 5-10 | 5-10 |
| Local | 10-30 | 65-80 |

**Table 5. Urban Area Functional Classification Rules of Thumb**

| CATEGORY | % of VMT | % of MILEAGE |
|---|---|---|
| Principal Arterial | 30-55 | 2-4 |
| Minor Arterial | 15-20 | 2-10 |
| Collector | 20-35 | 20-25 |
| Local | 5-20 | 65-75 |

**Table 6. Rural Area Functional Classification Rules of Thumb**

## 9. HELPFUL LINKS

"Highway Functional Classification, Concepts, Criteria, and Procedures" (March 1989, Publication No.FHWA-ED-90-006) -

http://www.tpd.az.gov/gis/fclass/fc_fhwa_gdeln.html

“A Guide to Federal-Aid Programs and Projects” (May 1999)

http://www.fhwa.dot.gov/programadmin/part1.htm

Additional legislation and regulation information

http://www.fhwa.dot.gov/legsregs/legislat.html

Frequently Asked Questions: Applying 2000 Census Data to Urbanized and Urban Areas

http://www.fhwa.dot.gov/planning/census/faqa2cdt.htm#61

## GLOSSARY OF TERMS

**Access Controlled** – Access to main lanes of traffic is permitted at entrance and exit ramps only and intersections are grade-separated.

**Adjusted Small Urban Area Boundary (a.k.a. Smoothed Small Urban Area Boundary) -** An area with population of 5,000 – 49,999. The boundaries shall encompass the entire Census designated small urban area AND adjacent geographic areas as agreed upon by state and local officials and approved by FHWA.

**Adjusted Urbanized Area Boundary (a.k.a. Smoothed Urbanized Area Boundary) –** An area with population of 50,000 or greater. The boundaries shall encompass the entire Census designated urbanized area AND adjacent geographic area as agreed upon by state and local officials and approved by FHWA and FTA.

**Area Type –** The large urban (urbanized), small urban, or rural designation given to an area. Area type changes at the urban area boundary.

**Centerline Miles –** Roadway mileage as measured down the center of a facility.

**Census Designated Place (CDP) –** CDPs are delineated to provide Census data for concentrations of population, housing, and commercial structures that are identifiable by name but are not within an incorporated place. CDP boundaries usually are defined in cooperation with state, local, and tribal officials[6].

**Census Designated Urbanized Area –** An urbanized area consists of a densely settled territory that contains 50,000 or more people[6].

**Consolidated Cities –** A consolidated government is a unit of local government for which the functions of an incorporated place and its country or minor civil division have merged… The primary incorporated place is referred to as a consolidated city[6].

**Highway Performance Monitoring System (HPMS) –** The HPMS is a federally mandated program used by the FHWA to provide data to Congress on the nation's streets and highways[9]. Data reported through HPMS is aggregated by Federal functional classification.

**Federal Aid Highway –** A highway eligible for Federal aid finding under 23 USC, Chapter 1 other than a highway classified as rural minor collector or local [8].

**Federal Functional Classification –** The process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide [1].

**Lane Miles –** A measure of the total length of traveled pavement surface. Lane-miles is the centerline length (in miles) multiplied by the number of lanes [9].

**Minute Order -** A formal expression of opinion, direction, or intent voted by the Texas Transportation Commission to approve various actions by TxDOT [9].

**Modeling Functional Classification –** Functional classification system used in Travel Demand Modeling.

**MPO Planning Area Boundary (MAB) –** An MAB is defined in the Code of Federal Regulations, (23 CFR 450.104) as the geographic area in which the metropolitan transportation planning process must be carried out. This term is further described in 23 CFR 450.308.

The MPA boundary shall, as a minimum, cover the urbanized area boundary and the contiguous geographic area(s) likely to become urbanized within the twenty year forecast period covered by the transportation plan. The boundary may encompass the entire metropolitan statistical area or consolidated metropolitan statistical area, as defined by the Census Bureau.

**National Highway System (NHS) –** A system designated by Congress that includes all Interstate routes, a large percentage of urban and rural principal arterials, the Strategic Highway Corridor Network (STRAHNET) and Strategic Highway Corridor Network Connectors and connectors to approved Intermodal Facilities [7].

**Proposed Roadway –** For the purpose of functional classification, proposed roadways are those that will be constructed within six years or are in the TIP. A roadway has "Proposed" status until it has traffic traveling on it.

**Public Road-** Any road or street under the jurisdiction of and maintained by a public authority and open to public travel [8].

**Rural Areas –** All areas of a State not included in urban areas [8].

**Small Urban Area –** A census place with population of 5,000 – 49,999.

**Smoothed Small Urban Area Boundary (a.k.a. Adjusted Urban Area Boundary) -** An area with population of 5,000 – 49,999. The boundaries shall encompass the entire Census designated small urban area AND adjacent geographic areas as agreed upon by state and local officials and approved by FHWA.

**Smoothed Urbanized Area Boundary (a.k.a. Adjusted Urban Area Boundary) -** An area with population of 50,000 or greater. The boundaries shall encompass the entire Census designated urbanized area AND adjacent geographic area as agreed upon by state and local officials and approved by FHWA and FTA.

**Surface Transportation Program (STP) –** The block grant type program established by 23 USC to supplement the National Highway System. The STP may be used by states and localities for any roads, including NHS, that are not functionally classified as local or rural minor collectors. These roads are now collectively referred to as federal-aid roads [9].

**Texas Transportation Commission (TTC) -** The Texas Transportation Commission is the five-member board that governs the Texas Department of Transportation, which is headed by an executive director selected by the commission. The governor, with the advice and consent of the Texas Senate, appoints commission members, who serve overlapping six-year terms.

**Travel Demand Modeling –** Predicts travel behavior and resulting demand for a specific future time frame, based on assumptions dealing with land use, the number and character of trip makers, and the nature of the transportation system[10].

**Urban Area (UA)** – Urban areas have populations of at least 5,000 within their Census designated boundaries. This term refers to both small urban and urbanized areas.

**Urbanized Area –** The term "urbanized area" means an area with a population of 50,000 or more designated by the Bureau of the Census, within boundaries to be fixed by responsible State and local officials in cooperation with each other, subject to approval by the Secretary. Such boundaries shall encompass, at a minimum, the entire urbanized area within a State as designated by the Bureau of the Census [8].

**Vehicle Miles Traveled (VMT) -** A unit to measure vehicle travel made by a private vehicle, such as an automobile, van, pickup truck, or motorcycle. Each mile traveled is counted as one vehicle mile regardless of the number of persons in the vehicle. Vehicle mile of travel is a measure of travel developed by multiplying a roadway section length (in miles) by the AADT [9].

## REFERENCES


1. U.S. Department of Transportation - Federal Highway Administration. *Highway Functional Classification: Concepts, Criteria and Procedures*, Revised March 1989.

2. U.S. Department of Transportation – Federal Highway Administration. *Highway Performance Monitoring System – Field Manual*, December 2000.

3. U.S. Department of Transportation – Federal Highway Administration. *A Guide to Federal-Aid Programs and Projects*, Last modified October 2, 2003.

4. U.S. Department of Transportation – Federal Highway Administration. "Functional Classification." Flexibility in Highway Design.

5. http://www.fhwa.dot.gov/policy/ohpi/hpms/abouthpms.htm

6. "Census 2000 Geographic Terms and Concepts"

7. Transportation Statistics Office, Florida Department of Transportation, Tallahassee, Florida. *FHWA Urban Boundary and Federal Functional Classification Handbook*, April 4, 2003.

8. Title 23, Chapter 1, Subchapter I, Sec. 101. *Definitions and Declaration of Policy.*

9. Texas Department of Transportation. *On-line Manual System.*

10. National Highway Institute. *Introduction to Urban Travel Demand Forecasting*, Course materials dated August 22-25, 2000.