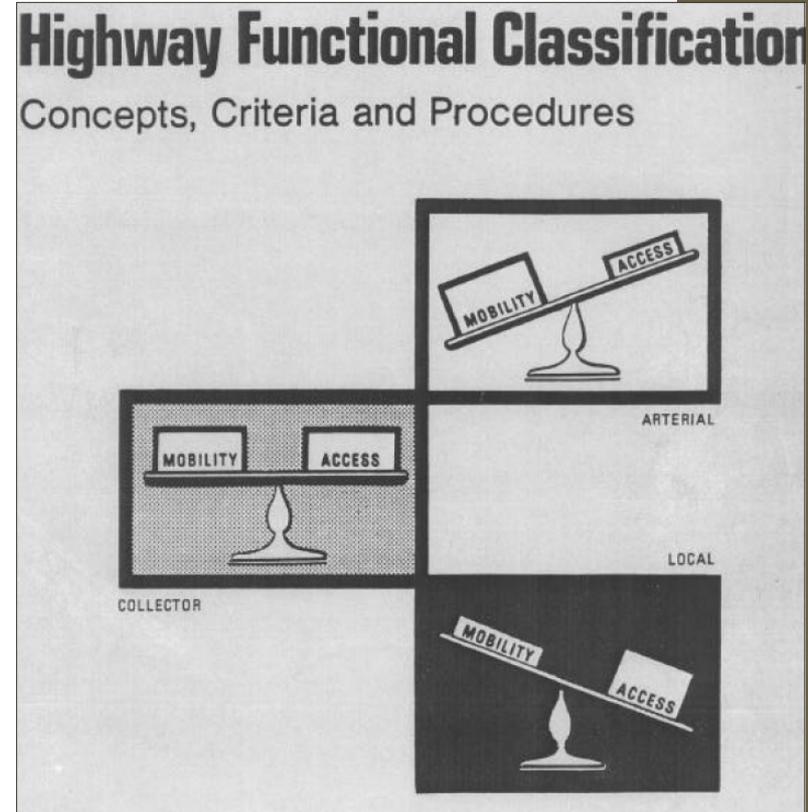


# FHWA's 2013 Functional Classification and Urban Area Boundary Guidance

Highway Information Seminar  
Thursday November 21, 2013  
Joseph Hausman, FHWA

# Overview

- 2012 Guidelines are a refresh, not a departure
- Acknowledges advances in mapping technologies and analysis capabilities
- Introduces relationship of design and functional classification
- Geared towards everyday practitioners and interested professionals



# Document Overview

- Builds on 1989 document and 2008 interim guidance
- Provides tangible “how to” – process and technical tasks
  - Clarifies what is mandatory and what is not
- Describes concepts and ideas behind functional classification
  - Describes influence of functional class and factors that have an influence on functional class

# Contents

- How and where functional classification used
- Definition of functional classifications
  - Retained original terms
  - Minimized urban and rural distinctions
  - Introduced OFE/minor and major collectors for all areas
- Description of mobility and access
- Updated mileage and VMT distribution ranges

	Rural	Urban
1	Principal Arterial – Interstate	Principal Arterial – Interstate
2	Principal Arterial – Other Freeways & Expressways	Principal Arterial – Other Freeways & Expressways
3	Principal Arterial – Other	Principal Arterial – Other
4	Minor Arterial	Minor Arterial
5	Major Collector	Major Collector
6	Minor Collector	Minor Collector
7	Local	Local

# What's Changed?

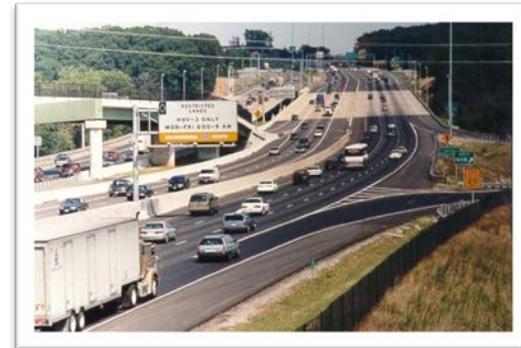
- Federal Aid system is mature
- For States, level of coordination for decision-making is high and increasing
- Geospatial technologies and data acquisition capabilities have grown considerably
- Roadway design options have increased, to accommodate non-auto modes

# Guidance Highlights

- Urban and rural demarcation defined by function not urban area boundary
- All functional classification exist in urban and rural categories
  - New Urban Minor Collector
- “Rule of Thumb” recommendations on VMT and mileage distributions
- Future roads – include only if in STIP
- Assign same FC to ramps as highest FC of connecting roadways

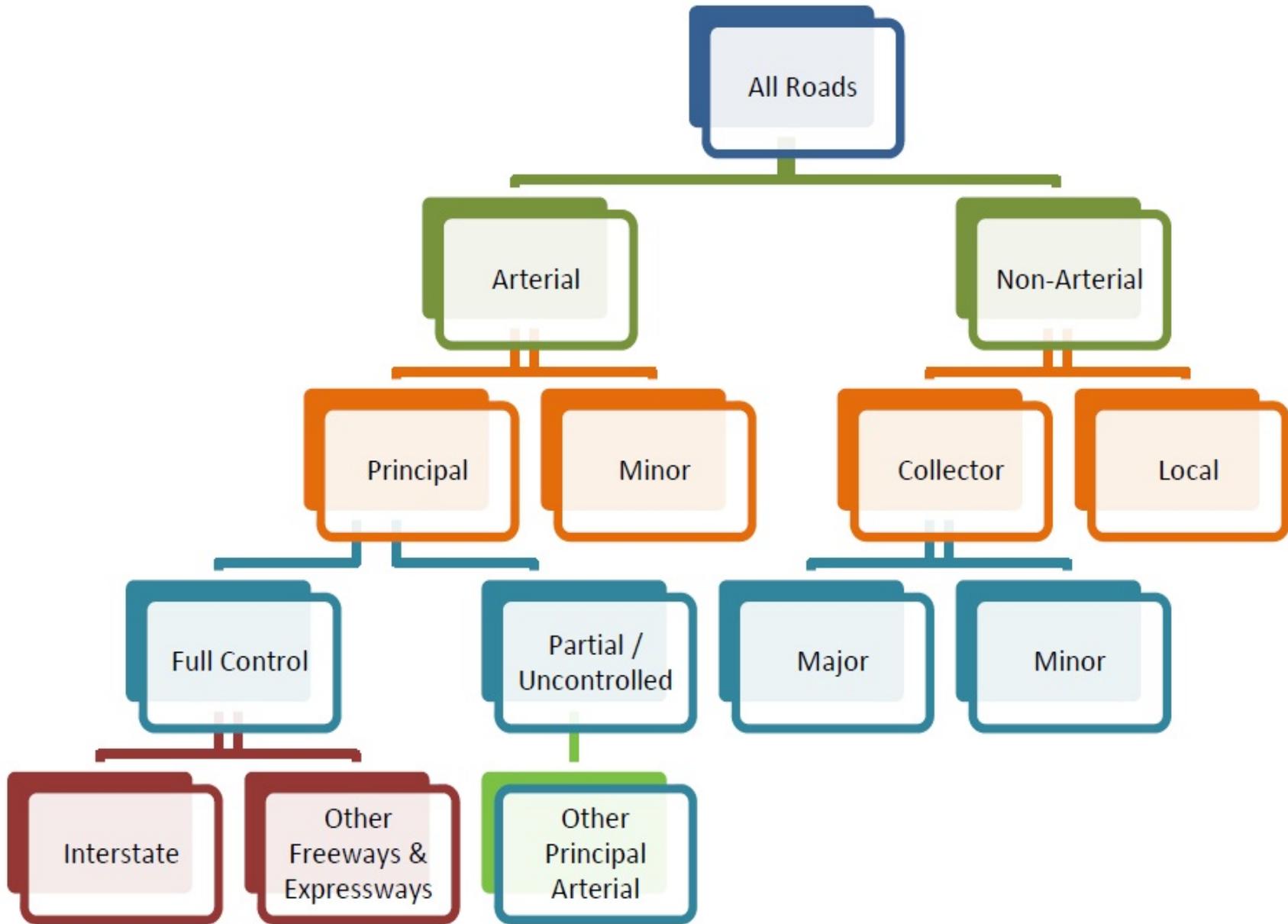


*Other Principal Arterial in California*

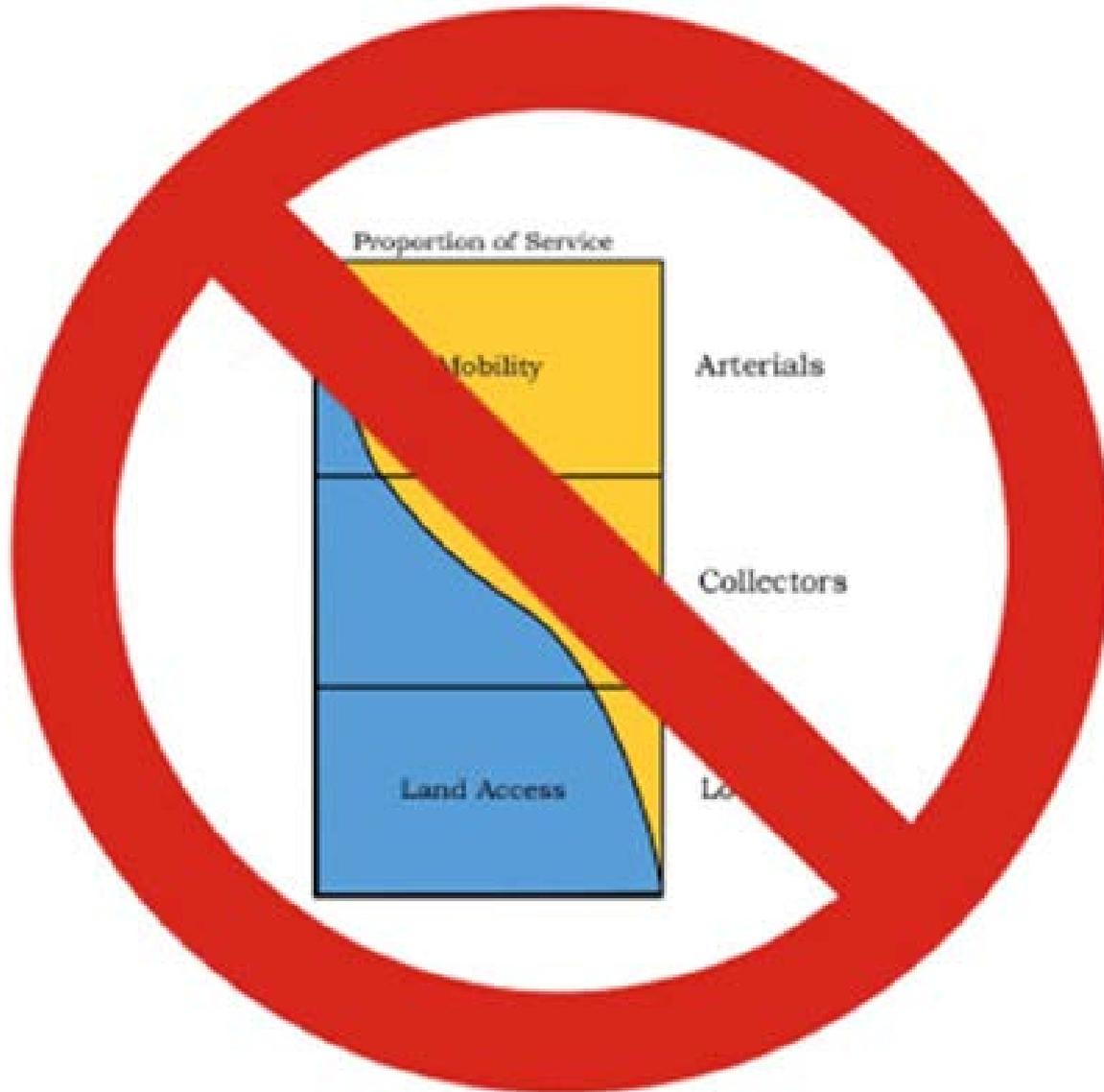


*HOV lane on Interstate 95 in Woodbridge, VA*

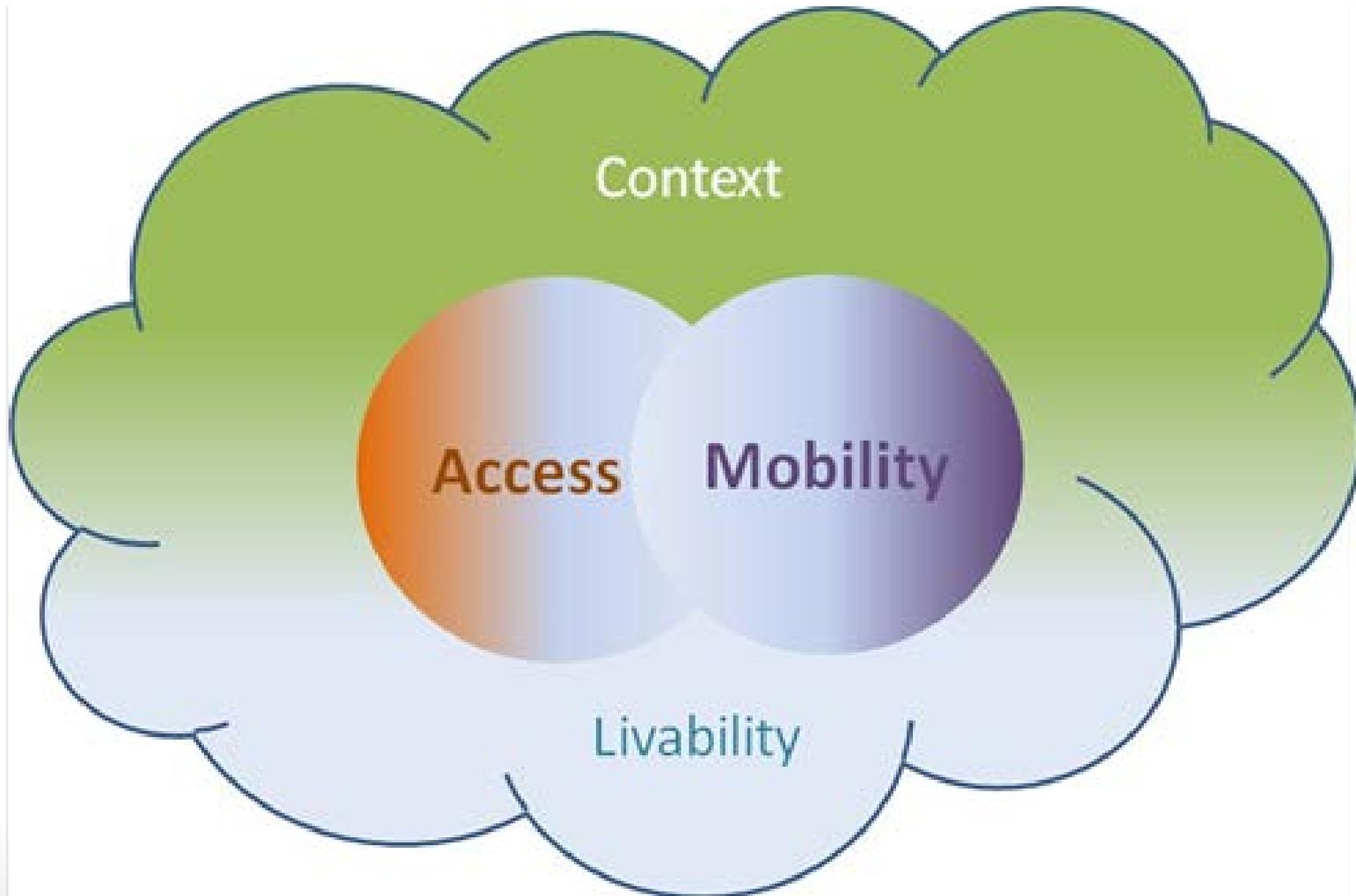
*Figure 3-4: Federal Functional Classification Decision Tree*



# Not strictly Land Access and Mobility

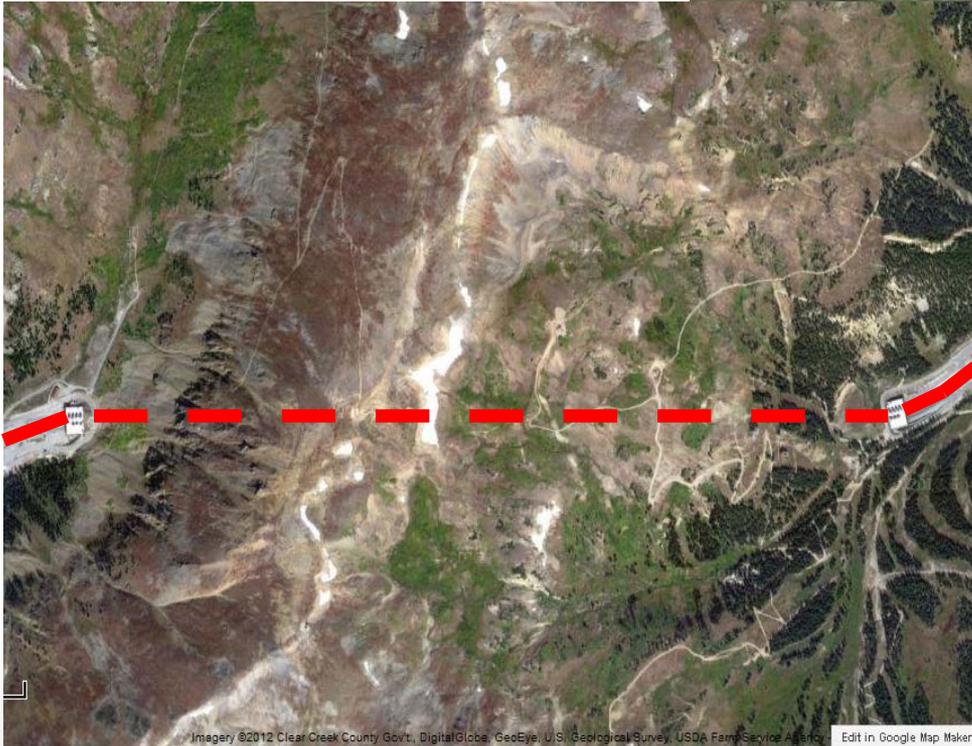


# Mobility, Accessibility and Other Factors



# FC Concepts - Mobility

Eisenhower (and Johnson) Tunnels  
along I-70, west of Denver, CO



Inside the Eisenhower Tunnel

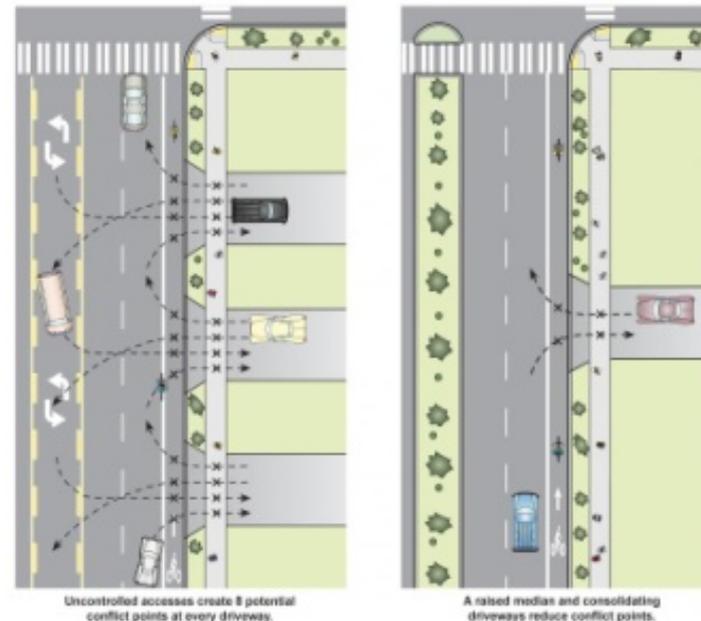
# FC Concepts - Access

- Mobility: Few opportunities for entry and exit and low travel friction
- Accessibility function: Provides many opportunities for entry and exit; higher travel friction



# FC influencers

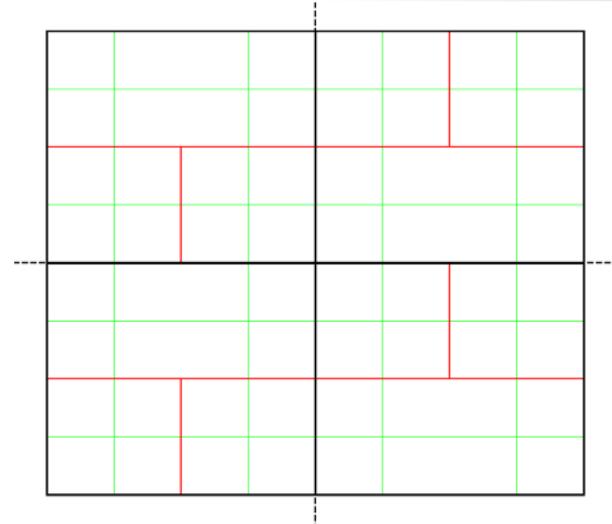
- Trip length: Longer trips – More Principal Arterial use. Shorter trips – more Local/Collector use.
- Access points: In theory, Surface Arterials provide the least access for-grade roads – Access Management tries to preserve function.
- Speed limit
- Route spacing
- Usage / traffic volume
- Number of lanes
- Connections to activity centers



Intro Fig. Access Management - Caption: *Benefit of Access Management*

# FC Concepts: Continuity

- A roadway of a higher classification should not terminate at a single roadway of a lower classification.
- Of course there are exceptions...



Wings Neck Road, Bourne, MA



Urban	Rural
<ul style="list-style-type: none"> <li>• Serve major activity centers, highest traffic volume corridors and longest trip demands</li> <li>• Carry high proportion of total urban travel on minimum of mileage</li> <li>• Interconnect and provide continuity for major rural corridors to accommodate trips entering and leaving urban area and movements through the urban area</li> <li>• Serve demand for intra-area travel between the central business district and outlying residential areas</li> </ul>	<ul style="list-style-type: none"> <li>• Serve corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel</li> <li>• Connect all or nearly all Urbanized Areas and a large majority of Urban Clusters with 25,000 and over population</li> <li>• Provide an integrated network of continuous routes without stub connections (dead ends)</li> </ul>

# Principal Arterials- Characteristics

Urban	Rural
<ul style="list-style-type: none"> <li>• Interconnect and augment the higher-level Arterials</li> <li>• Serve trips of moderate length at a somewhat lower level of travel mobility than Principal Arterials</li> <li>• Distribute traffic to smaller geographic areas than those served by higher-level Arterials</li> <li>• Provide more land access than Principal Arterials without penetrating identifiable neighborhoods</li> <li>• Provide urban connections for Rural Collectors</li> </ul>	<ul style="list-style-type: none"> <li>• Link cities and larger towns (and other major destinations such as resorts capable of attracting travel over long distances) and form an integrated network providing interstate and inter-county service</li> <li>• Be spaced at intervals, consistent with population density, so that all developed areas within the State are within a reasonable distance of an Arterial roadway</li> <li>• Provide service to corridors with trip lengths and travel density greater than those served by Rural Collectors and Local Roads and with relatively high travel speeds and minimum interference to through movement</li> </ul>

# Minor Arterials- Characteristics

Urban	Rural
<ul style="list-style-type: none"> <li>• Serve both land access and traffic circulation in <u>higher</u> density residential, and commercial/industrial areas</li> <li>• Penetrate residential neighborhoods, often for <u>significant</u> distances</li> <li>• Distribute and channel trips between Local Roads and Arterials, usually over a distance of <u>greater than</u> three-quarters of a mile</li> <li>• Operating characteristics include higher speeds and more signalized intersections</li> </ul>	<ul style="list-style-type: none"> <li>• Provide service to any county seat not on an Arterial route, to the larger towns not directly served by the higher systems and to other traffic generators of equivalent intra-county importance such as consolidated schools, shipping points, county parks and important mining and agricultural areas</li> <li>• Link these places with nearby larger towns and cities or with Arterial routes</li> <li>• Serve the most important intra-county travel corridors</li> </ul>

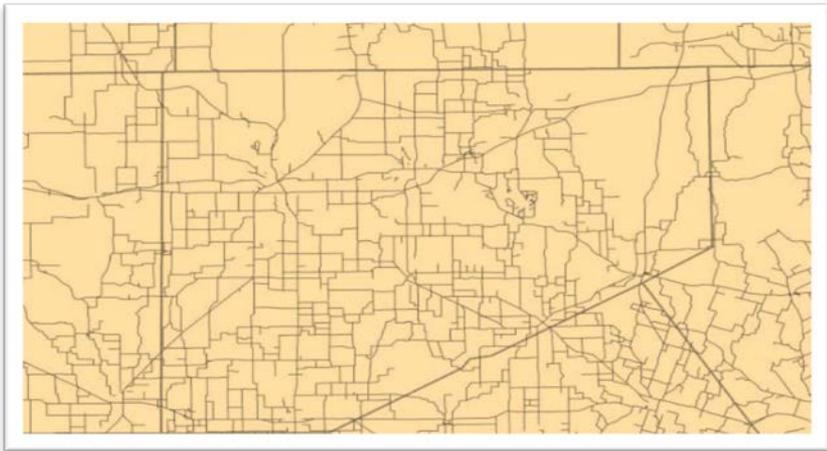
# Major Collectors- Characteristics

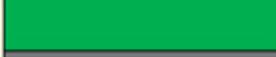
Urban	Rural
<ul style="list-style-type: none"> <li>• Provide direct access to adjacent land</li> <li>• Provide access to higher systems</li> <li>• Carry no through traffic movement</li> <li>• Constitute the mileage not classified as part of the Arterial and Collector systems</li> </ul>	<ul style="list-style-type: none"> <li>• Primarily, provide access to adjacent land</li> <li>• Provide service to travel over short distances as compared to higher classification categories</li> <li>• Constitute the mileage not classified as part of the Arterial and Collector systems</li> </ul>

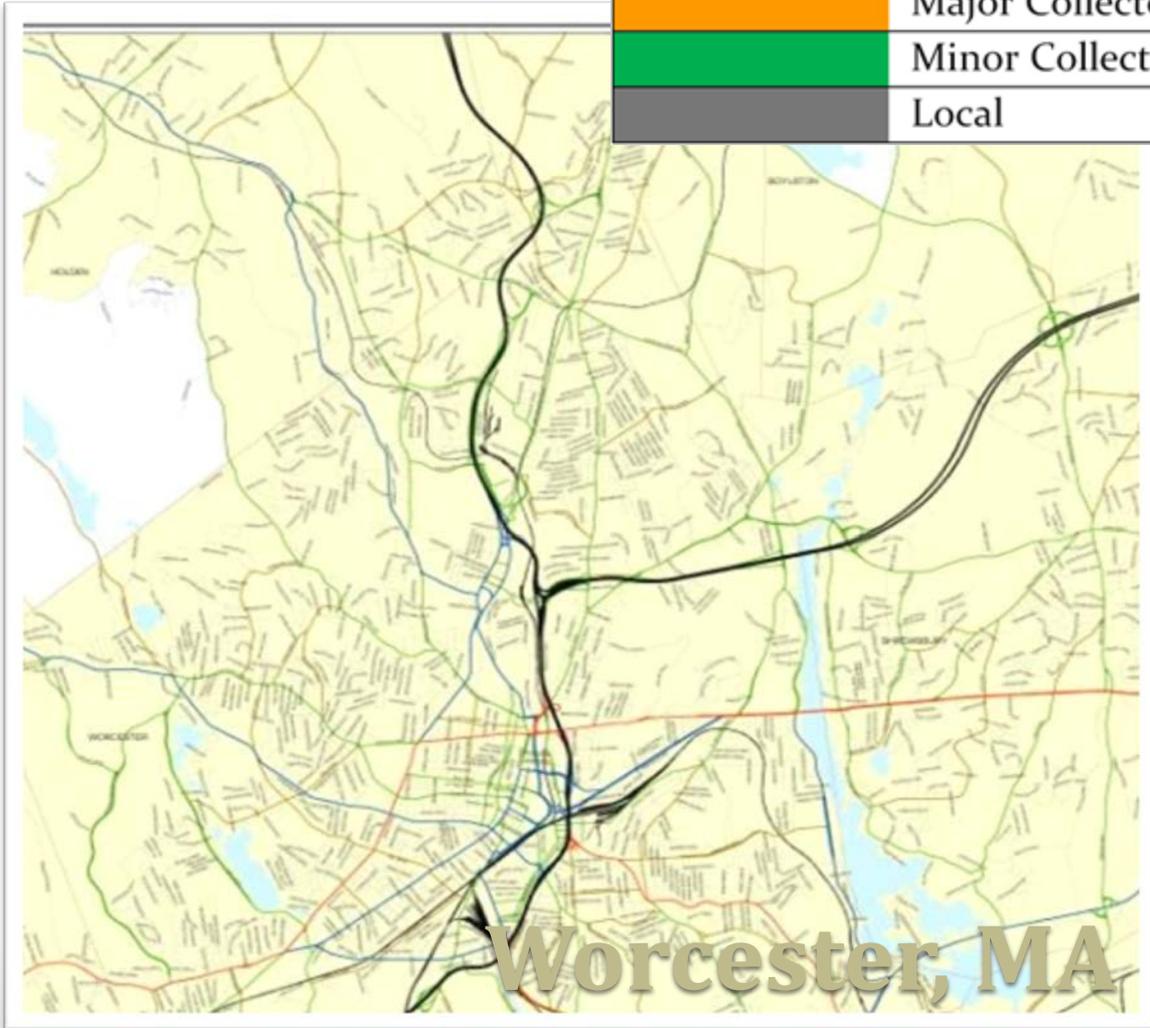
# Minor Collectors- Characteristics

# FC – Typical Rural and Urban Distinctions

- Urban area networks more diverse
  - Greater variety in density, land use
  - Generally, stronger land use controls
- Rural area networks less diverse
  - Less variety in density, land use, less zoning control



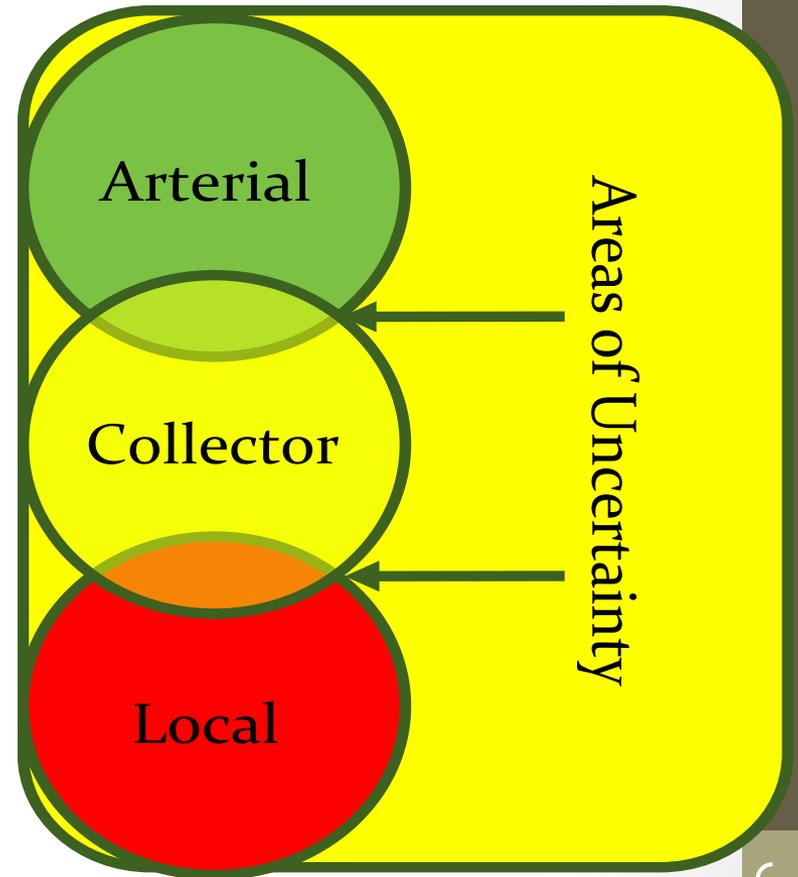
	Interstate	1
	Other Freeways and Expressways	2
	Other Principal Arterial	3
	Minor Arterial	4
	Major Collector	5
	Minor Collector	6
	Local	7



# FHWA Cartographic Colors for Functional Classification

# FC – Flexibility and Overlap

- Common sense should be guide
- Look at over all distribution and spacing when in doubt
- Be consistent with community standards



# FC – Typical Characteristics

Typical Characteristics	Interstate	Other Freeways and Expressways	Other Principal Arterials	Minor Arterials
Lane Width	12 feet	11 - 12 feet	11 - 12 feet	10 feet - 12 feet
Inside Shoulder Width	4 feet - 12 feet	0 feet - 6 feet	0 feet	0 feet
Outside Shoulder Width	10 feet - 12 feet	8 feet - 12 feet	8 feet - 12 feet	4 feet - 8 feet
AADT (Rural)	12,000 - 34,000	4,000 - 18,500	2,000 - 8,500	1,500 - 6,000
AADT (Urban)	35,000 - 129,000	13,000 - 55,000	7,000 - 27,000	3,000 - 14,000
Divided/Undivided	Divided	Undivided/ Divided	Undivided/ Divided	Undivided
Access	Fully Controlled	Partially/Fully Controlled	Uncontrolled	Uncontrolled

*For this table, Rural States are defined as those with a maximum of 75 percent of their population in urban centers.*

# FC – Mileage/VMT Guidelines

Typical Characteristics	Interstate	Other Freeways and Expressways	Other Principal Arterials	Minor Arterials
Mileage Extent for Rural States	<b>1% - 3%</b>	<b>0% - 2%</b>	<b>2% - 6%</b>	<b>2% - 6%</b>
Mileage Extent for Urban States	<b>1% - 2%</b>	<b>0% - 2%</b>	<b>2% - 5%</b>	<b>3% - 7%</b>
Mileage Extent for All States	<b>1% - 2%</b>	<b>0% - 2%</b>	<b>2% - 6%</b>	<b>3% - 7%</b>
VMT Extent for Rural States	<b>18% - 38%</b>	<b>0% - 7%</b>	<b>15% - 31%</b>	<b>9% - 20%</b>
VMT Extent for Urban States	<b>18% - 34%</b>	<b>0% - 8%</b>	<b>12% - 29%</b>	<b>12% - 19%</b>
VMT Extent for All States	<b>20% - 38%</b>	<b>0% - 8%</b>	<b>14% - 30%</b>	<b>11% - 20%</b>

*For this table, Rural States are defined as those with a maximum of 75 percent of their population in urban centers.*

# FC – Mileage/VMT Guidelines

Typical Characteristics	Interstate	Other Freeways and Expressways	Other Principal Arterials	Minor Arterials
Mileage Extent for Rural States	<b>1% - 3%</b>	<b>0% - 2%</b>	<b>4% - 9%</b>	<b>7% - 14%</b>
Mileage Extent for Urban States	<b>1% - 2%</b>	<b>0% - 2%</b>	<b>4% - 5%</b>	<b>7% - 12%</b>
Mileage Extent for All States	<b>1% - 3%</b>	<b>0% - 2%</b>	<b>4% - 5%</b>	<b>7% - 14%</b>
VMT Extent for Rural States	<b>17% - 31%</b>	<b>0% - 12%</b>	<b>16% - 33%</b>	<b>14% - 27%</b>
VMT Extent for Urban States	<b>17% - 30%</b>	<b>3% - 18%</b>	<b>17% - 29%</b>	<b>15% - 22%</b>
VMT Extent for All States	<b>17% - 31%</b>	<b>0% - 17%</b>	<b>16% - 31%</b>	<b>15% - 25%</b>

*For this table, Rural States are defined as those with a maximum of 75 percent of their population in urban centers.*

# FC – Mileage/VMT Guidelines

Typical Characteristics	Major Collector	Minor Collector	Local
Lane Width	10 feet - 12 feet	10 - 11 feet	8 - 10 feet
Inside Shoulder Width	0 feet	0 feet	0 feet
Outside Shoulder Width	1 feet - 6 feet	1 feet - 4 feet	0 feet - 2 feet
AADT (Rural)	300 - 2,600	150 - 1,110	15 - 400
AADT (Urban)	1,100 - 6,300 <sup>2</sup>		80 - 700
Divided/Undivided	Undivided	Undivided	Undivided
Access	Uncontrolled	Uncontrolled	Uncontrolled

*For this table, Rural States are defined as those with a maximum of 75 percent of their population in urban centers.*

# FC – Mileage/VMT Guidelines

Mileage/VMT Extent (Percentage Ranges)	Major Collector	Minor Collector	Local
<b>Rural System</b>			
Mileage Extent for Rural States	<b>8% - 19%</b>	<b>3% - 15%</b>	<b>62% - 74%</b>
Mileage Extent for Urban States	<b>10% - 17%</b>	<b>5% - 13%</b>	<b>66% - 74%</b>
Mileage Extent for All States	<b>9% - 19%</b>	<b>4% - 15%</b>	<b>64% - 75%</b>
VMT Extent for Rural States	<b>10% - 23%</b>	<b>1% - 8%</b>	<b>8% - 23%</b>
VMT Extent for Urban States	<b>12% - 24%</b>	<b>3% - 10%</b>	<b>7% - 20%</b>
VMT Extent for All States	<b>12% - 23%</b>	<b>2% - 9%</b>	<b>8% - 23%</b>
<b>Urban System</b>			
Mileage Extent for Rural States	<b>3% - 16%</b>	<b>3% - 16%</b>	<b>62% - 74%</b>
Mileage Extent for Urban States	<b>7% - 13%</b>	<b>7% - 13%</b>	<b>67% - 76%</b>
Mileage Extent for All States	<b>7% - 15%</b>	<b>7% - 15%</b>	<b>63% - 75%</b>
VMT Extent for Rural States	<b>2% - 13%</b>	<b>2% - 12%</b>	<b>9% - 25%</b>
VMT Extent for Urban States	<b>7% - 13%</b>	<b>7% - 13%</b>	<b>6% - 24%</b>
VMT Extent for All States	<b>5% - 13%</b>	<b>5% - 13%</b>	<b>6% - 25%</b>

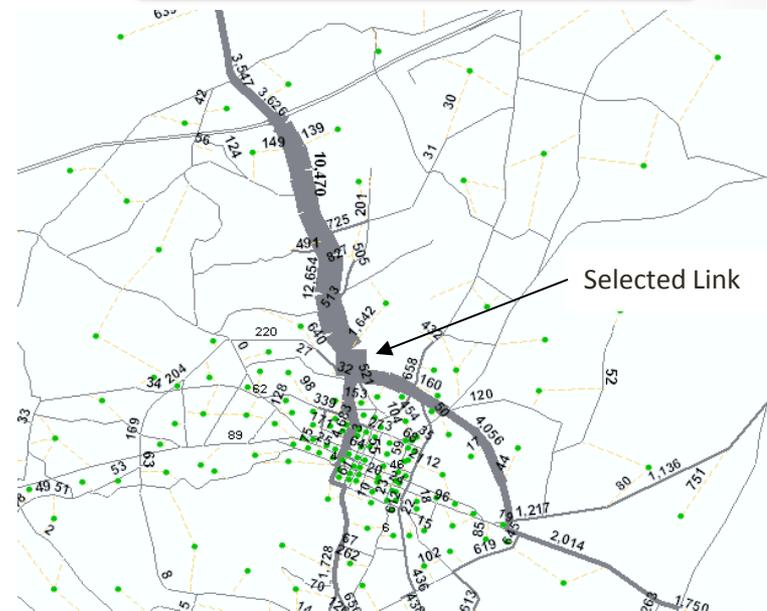
*For this table, Rural States are defined as those with a maximum of 75 percent of their population in urban centers.*

# FC Update Triggers

- New significant roadways that may warrant Arterial or Collector status
- Any Principal Arterial roadway reconstructed as a divided facility
- Construction of major development that has caused traffic patterns to change
- Significant growth that causes new access or mobility needs
- Arterial or Collector roadways been extended or to attract more through trip movements?
- Significant growth in daily traffic volumes?

- Use of GIS

- Identify traffic generators/activity centers
- Rank / estimate traffic generated
- Connect with roadway system/validate FC
- Travel demand models (select link feature) can estimate the origin and destination of trips on a facility
- Results of GIS-based mapping and editing should synch up with enterprise data systems



# FC – Validation/Review

- Create a multi-agency review team-stay in touch
- Build/share understanding of game plan
- Generate maps and share electronically – use GIS if at all possible
- Encourage/work towards timely delivery of FC revisions

# FC Good Practice Steps/Schedule

Event	Month Following FHWA Adjusted Urban Area Boundary Approval
State DOT launches the formal Functional Classification update process after FHWA approves the State's adjusted urban area boundaries	Month 1
State DOT works with planning partners to review and propose changes to the functional classification of its roadways	Months 2-17
State DOT gathers and processes all proposed function classification changes and submit draft final data and/or maps to FHWA division office for review	Months 18-20
DOT incorporates updates into planning process and related databases, to ensure submittal of updated functional classification in upcoming June 15 <sup>th</sup> HPMS submittal	Months 22-24

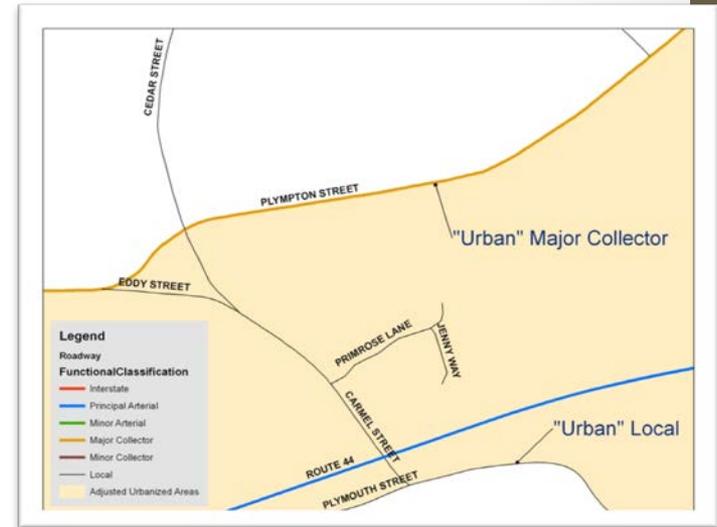
# Urban Area Boundaries

## Urban/Rural Definition



# Urban Area Boundary

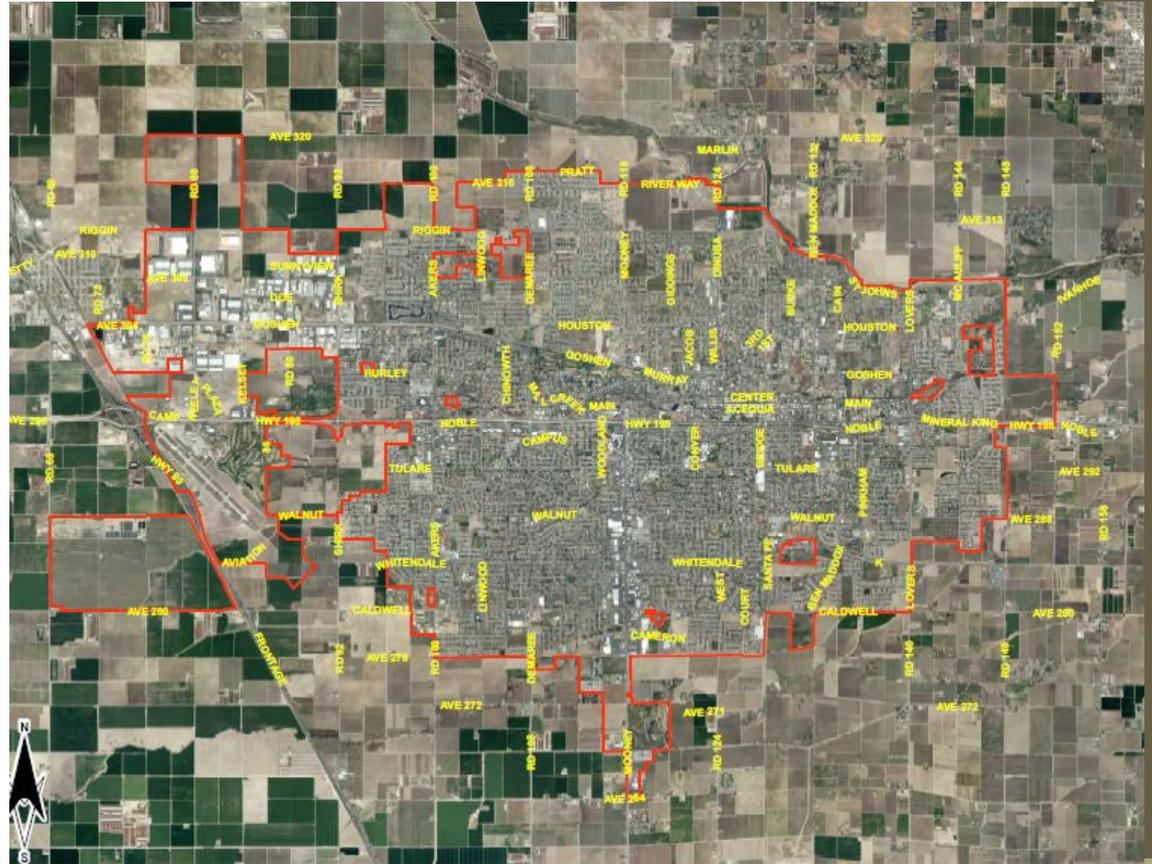
- Urban and rural demarcation defined by function not urban area boundary
- Roads that define a boundary should be consistently urban or rural
- Area must encompass Census Bureau urban area, at a minimum
- Should be one contiguous area



Example of Roadway Coinciding with Adjusted Urban Area

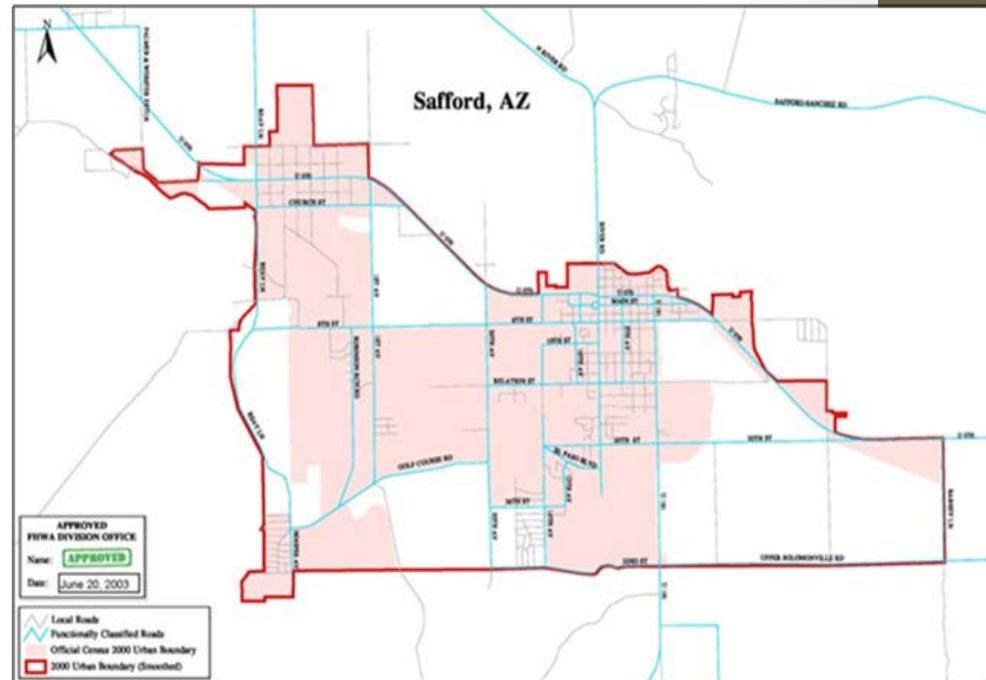
# Urban Area Boundaries – Reasons to Expand

- Include entire municipality
- Include areas with urban characteristics
- Include large/significant generators, e.g., airports, industrial areas
- Should be one contiguous area



# Urban Area Boundaries – Considerations

- Boundaries can consider transportation terminals, transit routes
- Boundary should follow municipal limits or physical features
- Boundary should be easy to discern
- Boundaries should be simple, without irregularities
- Boundaries should not split roadways or ramps



Example Boundary Adjusted to Align with Major East-West Roadway to the South

# Urban Area Boundaries

## Urban/Rural Definition

Census Bureau Area Definition	Population Range
Urban Area	2,500+
Urban clusters	2,500-49,999
Urbanized Area	50,000+



FHWA Area Definition	Population Range	Allowed Urban Area Boundary Adjustments
Urban Area	5,000+	Yes
Small Urban Area (From Clusters)	5,000-49,999	Yes
Urbanized Area	50,000+	Yes



# Urban Area Boundary Adjustment Good Practice Steps/Schedule

- Recommended 12 month schedule following Census data release
- At a minimum – confirm Census boundaries are adequate, also...
  - Build/share understanding of game plan
  - Generate maps and share electronically – use GIS if at all possible
  - Encourage/work towards timely delivery of UAB revisions

Event	Months Following Decennial Census Data Release (CDR)
Census releases urban area boundaries and FHWA issues transmittal letter	Month 24
Begin adjusted urban area boundary update process	Month 24
DOT works with planning partners to define adjusted urban area boundaries	Month 27-Month 33
Provide draft final data and/or maps to FHWA Division Office for review	Month 34
DOT incorporates updates	Month 35
DOT submits adjusted urban area boundaries via annual HPMS submittal	Month 36

## Office of Highway Policy Information Highway Performance Monitoring System (HPMS)



[OHPI Home](#) > [Highway Performance Monitoring System \(HPMS\)](#)

The HPMS is a national level highway information system that includes data on the extent, condition, performance, use and operating characteristics of the nation's highways. The HPMS contains administrative and extent of system information on all public roads, while information on other characteristics is represented in HPMS as a mix of universe and sample data for arterial and collector functional systems. Limited information on travel and paved miles is included in summary form for the lowest functional systems.



HPMS was developed in 1978 as a continuing database, replacing the special biennial condition studies that had been conducted since 1965. The HPMS has been modified several times since its inception. Changes have been made to reflect changes in the highway systems, legislation, and national priorities, to reflect new technology, and to consolidate or streamline reporting requirements.

### More on HPMS

- [ARNOLD FAQ](#)
- [Frequently Asked Questions](#)
- [HPMS Community Practice](#)
- [HPMS Reassessment](#)
- [Purpose of HPMS](#)
- [State HPMS Websites](#)



### HPMS and Related Publications

[Quick Find Mileage Data](#) (tables on Road miles from Highway Statistics)

[HPMS Field Manual](#)

[HPMS Primer](#) (Overview of the HPMS for FHWA)

[FHWA Review Guidelines](#)

#### HPMS Archive Item Descriptions (Data item descriptions)

- [1982-1987 Archive](#)
- [1988-1992 Archive](#)
- [1993-1998 Archive](#)
- [Urbanized Area Codes 1991-2001](#)

#### Use of Census Boundaries for HPMS Data Reporting

[FAQs: Applying 2000 Census Data to Urbanized and Urban Areas Urban Area Boundaries](#)

#### Highway Functional Classification Guidelines

[Highway Functional Classification: Concepts, Criteria and Procedures](#)

#### HPMS Travel Data Reporting

[State Practices Used to Report Local Area Travel](#)

[Traffic Data for High Volume Routes: Best Practices and Guidelines](#)

#### Improving HPMS Data Quality

[A Continuous Process Improvement Model for the HPMS](#)

[Seven Deadly Misconceptions About Information Quality](#)

#### Data Quality

#### HPMS Sample Management

#### Other Publications

[Non-Federal Applications of HPMS](#)

[State geospatial networks in the National Transportation Atlas Database \(NTAD\)](#)

[Summary of the extent, usage, and condition of the U.S. Interstate System: By State and Interstate Route Number](#)

[HPMS Public Release of Geospatial Data in Shapefile Format](#)



## Office of Highway Policy Information Highway Performance Monitoring System (HPMS)



OHPI Home > [Highway Performance Monitoring System \(HPMS\)](#) > Highway Functional Classification: Concepts, Criteria and Procedures

### Highway Functional Classification: Concepts, Criteria and Procedures

Our nation's roadway system is a vast network that connects places and people within and across national borders. Planners and engineers have developed elements of this network with particular travel objectives in mind. These objectives range from serving long-distance passenger and freight needs to serving neighborhood travel from residential developments to nearby shopping centers. The functional classification of roadways defines the role each element of the roadway network plays in serving these travel needs. Ultimately, the coordinated and systematic maintenance of an accurate roadway functional classification system ensures that Federal Aid funds are allocated where they are most needed, to enable people and goods move fluidly through our modern transportation system.

[The Highway Functional Classification: Concepts, Criteria and Procedures, 2013 Edition](#), describes the procedures and processes for assigning functional classifications to roadways and adjusting urban area boundaries. This document builds upon and updates previous guidance documents.



#### Why develop new guidance?

- **The Federal Aid system is mature.** Modern functional classification processes typically involve reclassification of existing roads rather than the development of new networks in need of classification.
- **Classification of roadways is more comprehensive than before.** Where vehicular mobility was the driver of historical classification needs, today's classification process involves context, multimodal accommodation, and cross disciplinary consensus building between engineers, planners and communities.
- **Technology has changed.** New methods for cataloging and tracking roadways such as Geographic Information Systems (GIS) enable precise spatial location of roadways as well as detailed mapping of highway systems.
- **Functional classification coding at the Federal level has been simplified.** All functional classification categories will now exist in both urban and rural areas.
- **Urban Boundary delineation correlates with changes to urban area designation by the US Census Bureau.** Guidance to coincide with the latest Census and FHWA requirements for urban areas was needed.

#### What is included in the updated guidance document?

- Definitions and criteria for each highway classification category
- Guidance, best practices and procedural tasks for functional classification maintenance
- Discussion of the applications for Functional Classification including performance and design
- Description of emerging and future classification trends
- Definitions of urban area designations
- Delineation of the technical tasks and considerations of adjusting urban area boundaries
- Data transmittal requirements for urban area boundary adjustments



# Planning Processes

## Statewide Transportation Planning



Statewide Land Use Rural Tribal Metropolitan Tools

FHWA → Planning → Processes → Statewide Transportation Planning → Related

## Highway Functional Classification Concepts, Criteria and Procedures 2013 Edition



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PDF files can be opened with the [Acrobat® Reader®](#)

Financing Planning

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Planning Practices

Related Topics

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Updated: 10/07/2013

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- Comments/Questions