Context Based Classification Technical Memorandum

March 2021

Hillsborough County Florida

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Hillsborough County Florida

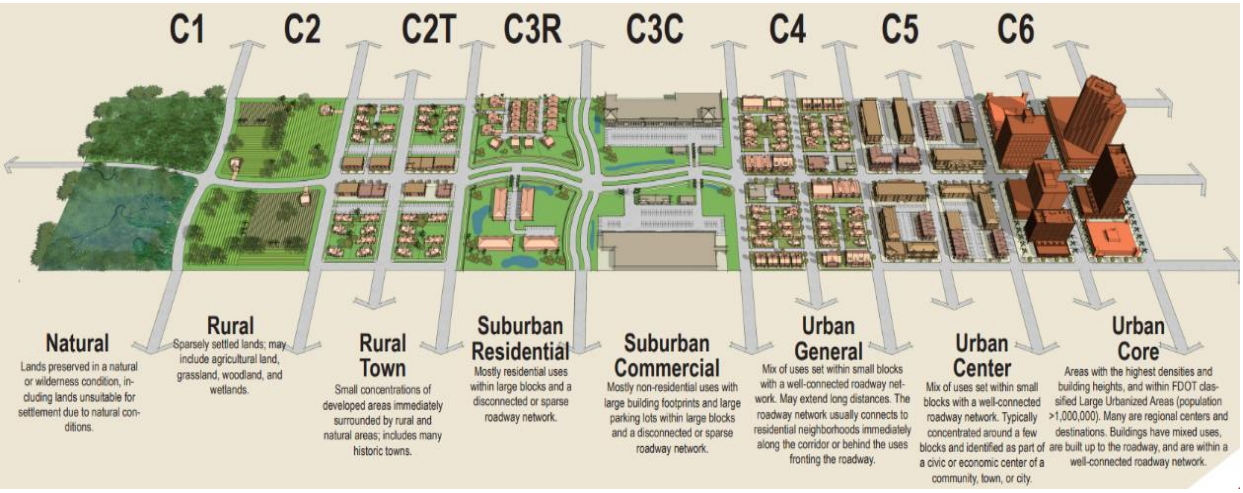
1 INTRODUCTION

Hillsborough County developed a database of Context Based Classifications (CBC) for all County arterial and collector roadways. The County Context Based Classification system describes a way of classifying roadways that prioritizes the type of users utilizing a roadway, CBC general characteristics of Future Land Uses, existing and planned development patterns, and communities it traverses. The purpose of this Technical Memorandum is to document the methodology employed to assign context designations to all County maintained arterials and collectors within Unincorporated Hillsborough County. County owned roadways within the City of Tampa were not assigned a classification. The City of Tampa is currently in the process of a visioning exercise to calibrate their land uses. The methodology details a step by step process utilizing the ArcGIS Online mapping tool and layers created specifically for this analysis. The combination of GIS mapping and professional review of specific community context and roadway characteristics, speed management, and consideration of corridor safety, such as Vison Zero, were applied to further define the future context of County arterials and collectors.

2 CONTEXT BASED CLASSIFICATION SYSTEM

The Florida Department of Transportation (FDOT) established the state context classification system based on the existing built environment in Florida (FDOT Context Classification). This includes natural wilderness preserves such as the Everglades or Urban Core such as downtown Tampa. The FDOT Context Classification is shown in Figure 1.

Figure 1 FDOT Context Classification



The County Context Based Classification system has been developed by focusing on localized land uses and Future Land Uses, which identify the planned development patterns in the County. Given the difference in roadway characterizations and localized land uses, some variations were made to the assignment of Context Based Classification. Based on discussions, it was determined that FDOT's C1 (Natural) and C2 (Rural) categories would be combined due to the prevalence of rural areas within the unincorporated County and fewer all-natural parcels. The FDOT rural town category would be redefined to Suburban Town (C3T) because most of the small towns and census designated places within greater Hillsborough County primarily serve as suburban communities, some with small well-defined town centers. Additionally, the FDOT categories of Suburban Residential (C3R) and Suburban Commercial (C3C) would remain as they were determined to be appropriate for Hillsborough County. Lastly, the urban

general category would be used for small pockets of urban development on the fringes of the Tampa urban area. The urban categories C5 (Urban Center) and C6 (Urban Core) were more appropriate for central business district type of development pattern such as Downtown Tampa, which are not included in the County Context Based Classification system. As a result, all County arterials and collectors are categorized into 5 Context Based Classifications: Rural (C1&C2), Suburban Town (C3T), Suburban Residential (C3R), Suburban Commercial (C3C) and Urban General (C4) as illustrated in the figure below:

Figure 2 Hillsborough County Context Based Classification

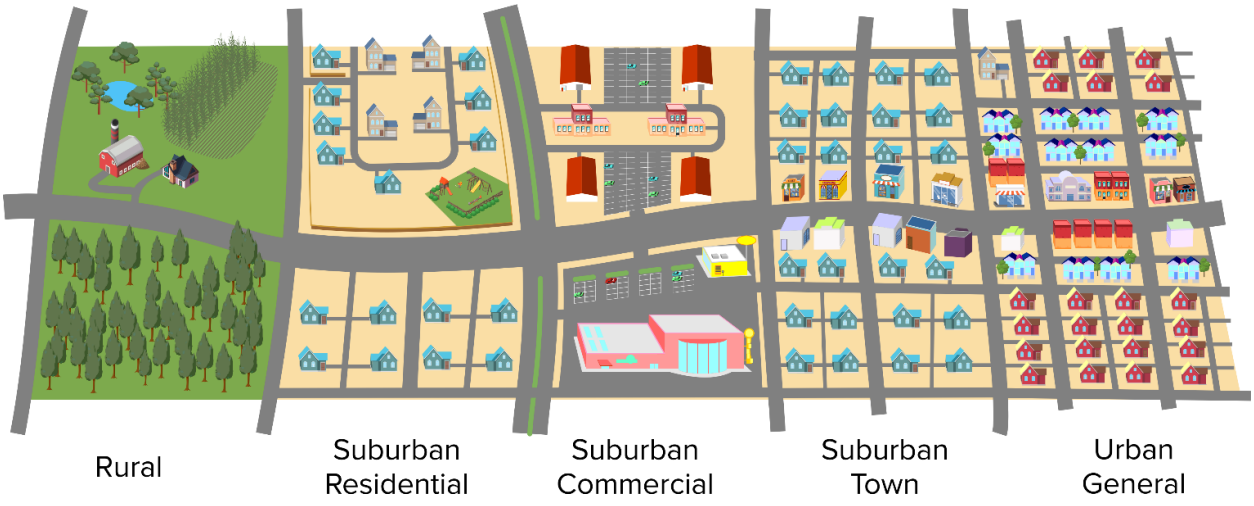


Table 1 Context Based Classification Matrix presents the definition and characteristics for each Context Based Classification along the County arterial and collector roadways. The Context Based Classification in roadway considerations such as lane widths, bike, and pedestrian facilities, etc. are appropriate to the land uses surrounding them. In a separate effort, the County is completing a Complete Streets Guidebook, that will inform the development of typical cross sections to be included in the Hillsborough County Design Manual (HCDM).

Table 1 Context Based Classification Matrix

Context-Based Classification		Characteristics	Future Land Use Typically Surrounding the Corridor	Note
Rural (C1&C2)		Preserved land in a natural or wilderness condition, sparsely settled lands, may include agricultural land, grassland and wetlands	Natural preservation, agriculture, mining, planned low density residential	Includes all areas outside the Urban Service Area. Excludes areas that can be designated Suburban Town.
Suburban	**Residential** (C3R)	Most residential uses within a disconnected or sparse roadway network	Residential	Includes land uses that constitute the Suburban Development Area and Non-Residential Development Area, as well as land uses within the Urban Development Area that are expected to grow to suburban population or employment densities.
	Commercial (C3C)	Mostly non-residential uses with large building footprints and large parking lots within a disconnected or sparse roadway network	Suburban mixed-use, neighborhood mixed-use, research/corporate park, light industrial, heavy industrial, energy industrial park	
Suburban Town (C3T)		Small concentrations of mixed-use areas or town centers, or developed areas which are immediately surrounded by low to medium density residential areas	Suburban mixed-use, neighborhood mixed-use, low to medium density residential	Areas with planned development forms where lower speed is required, including: 1) Areas described in the Livable Communities Element as walkable centers, walkable Overlay Districts identified in the Land Development Code and developed town centers in Mixed-Use Developments of Regional Impact (DRI); 2) The top 20 Severe Crash Corridors involving people walking or biking identified in the Vision Zero Plan that are not otherwise designated C4.
Urban General (C4)		Mixed-use set within a well-connected roadway network, highest densities within Urbanized Areas	Community mixed-use, urban mixed-use, office commercial, regional mixed-used, innovation corridor mixed-use, higher density of residential	Includes the land uses that constitute the Urban Development Area and are expected to reach urban population and employment densities or are described in the Livable Communities Element as walkable centers

3 DATA SOURCES

The methodology to assign Context Based Classifications included the use of ESRI ArcMap 10.7 for data creation, manipulation, and processing. ESRI's ArcGIS Online was used to create the map visualization function for the context assignment and the preliminary context assignment results. The detailed data and map layer information is summarized as below:

Table 2 Data Sources

GIS Map Layer Name	Content	Source	Obtained Date
Hillsborough County Future Land Use	Future Land Use (HC_FLU.shp) – Updated 3/3/2020	http://www.planhillsborough.org/gis-maps-data-files/	Mar. 2020
Hillsborough County Existing Land Use	Existing Land Use (HC_existing_land_use.shp) – Updated 12/01/2019	http://www.planhillsborough.org/gis-maps-data-files/	Dec. 2019
SDEINT_DBO_Roads	Roadway network within the County and roadway segmentation	Hillsborough County (obtained direct from GIS Department)	Dec. 2019
Hillsborough County Corridor Preservation Plan (Comprehensive Plan Map 25)	Hillsborough County planned future new roadways and roadway improvements	http://www.planhillsborough.org/wp-content/uploads/2015/07/Map-25-HC-Corridor-Preservation-Plan.pdf	May 2020
Town Centers	Town Centers were identified from:		
	Community Plan (Livable Communities Element)	http://www.planhillsborough.org/livable-communities-element/	Dec. 2019
	DRI Mixed Use	http://www.tbrpc.org/dri-maps/	Feb. 2020
	Land Development Code: Overlay Districts	https://library.municode.com/fl/hillsborough_county/codes/land_development_code?nodeId=ARTIIISPDI_PT3.15.00HIAVOVDI https://library.municode.com/fl/hillsborough_county/codes/land_development_code?nodeId=ARTIIISPDI_PT3.15.00HIAVOVDI	Feb. 2020
Hillsborough County 2045 Long Range Transportation Plan (2045 LRTP) Needs Plan	Hillsborough County planned future new roadways	Hillsborough County	May 2020
2045 Population Density and Employment Density	2045 LRTP projected densities for population and employment	Hillsborough County Planning Commission	Mar. 2020
FDOT D7 Preliminary Context Classification	D7 State Roadways Preliminary Context Classification based on existing land use	https://www.arcgis.com/apps/webappviewer/index.html?id=b5ecc163fe04491dafeb44194851ba93	Feb. 2020
Hillsborough County Urban Service Area (USA)	Urban Service Area Boundary (URBANSRVAREA_POLY.shp) – Updated 8/2019	http://www.planhillsborough.org/gis-maps-data-files/	Dec. 2019
City Boundary	Outline of city boundaries for Tampa, Temple Terrace and Plant City	http://gis2017-01-10t133755357z-hillsborough.opendata.arcgis.com	Dec. 2019

4 CONTEXT ASSIGNMENT

This section describes the following steps involved in assigning context to County roadways:

Geographic (GIS) Data Preparation

The source data utilized for the Context Based Classification assignment was obtained from public sources. The data was not manipulated but was filtered, as necessary.

- Existing Roadways

  The SDEINT_DBO_Roads ("Roads") layer was obtained in an ArcGIS geodatabase from the County and served as the base road network layer for the assessment and assignment of Context Based Classification. This layer was obtained in December 2019 and was considered by the County as the best available road network data for use in the project.

  The Roads layer contains all the existing road segments within Hillsborough County, so the data was filtered using definition queries to isolate the roads that met the following parameters:
  - Ownership: Hillsborough County Board of County Commissioners
  - Functional Class: arterial, collector, or principal arterial

- Future Planned Roadways

  Future new roadways planned to address County growth were obtained from:
  - Corridor Preservation Plan (adopted Map 25 in Comprehensive Plan, June 2015)
  - 2045 LRTP (obtained from MPO in May 2020)

  Both layers contain planned new roadways and planned improvements of existing road segments, therefore, the data was filtered to obtain the planned new roadways only. Since the Corridor Preservation Plan has not been updated to reflect the 2045 LRTP, inconsistencies of roadway segmentation and alignment were identified. An updated roadway map layer (New Roadway Layer) was developed based on the Corridor Preservation Plan (June 2015), 2045 LRTP and the most current Waterset Trail Plan (Aug 2019) including the new roads within the unincorporated areas should be included in the analysis.

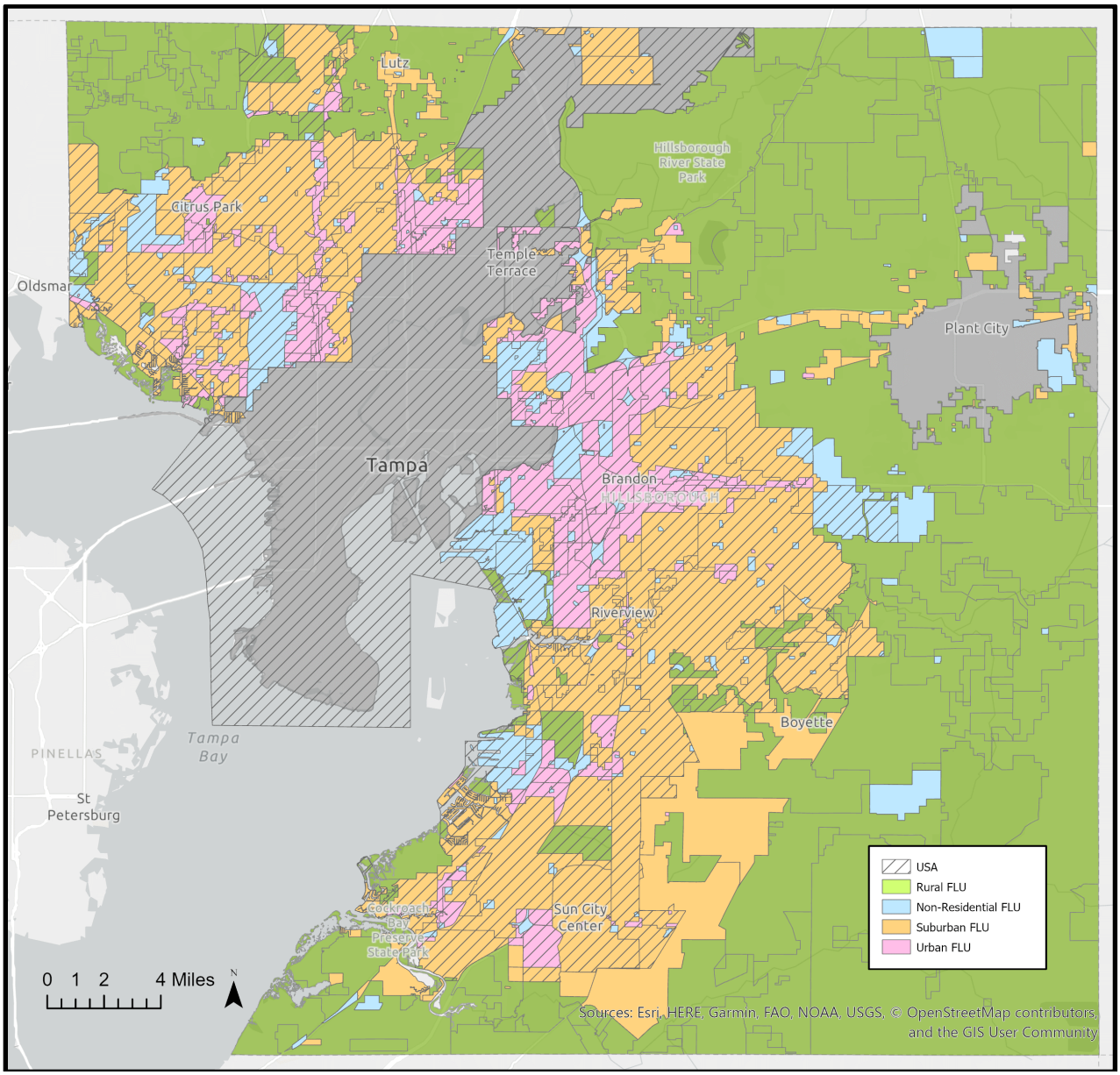
4.1 Future Land Use Data Collection

Since the County's Context Based Classification system primarily focuses on Future Land Use, the Comprehensive Plan for Unincorporated Hillsborough County Future Land Use Map, and the Urban Service Area (USA), were used to determine potential context areas. The potential context categories were assigned and summarized in Table 3 and shown in Figure 3.

Table 3 Future Land Use Category Summary

Land Use Category	Maximum Residential Density Allowed	Potential Context
Rural-Agriculture Development Area		Rural (C1/C2)
Agricultural/Mining-1/20	Agricultural/Mining-1/20	
Agricultural-1/10	Agricultural-1/10	
Agricultural/ Rural-1/5	Agricultural/ Rural-1/5	
Rural-Residential Development Area		
Residential -1	1 du/ga	
Agricultural Estate-1/2.5	Agricultural Estate-1/2.5	
Planned Environmental Community - ½	Planned Environmental Community - ½	
Residential Planned -2	Residential Planned -2	
Wimauma Village Residential - 2	2 du/ga	
Suburban Development Area		Suburban (C3)
Residential -2	2 du/ga	
Residential -4	4 du/ga	
Neighborhood Mixed Use-1{3)	4 du/ga	
Residential -6	6 du/ga	
Suburban Mixed Use-6	6 du/ga	
Urban Development Area		Urban General (C4)
Residential - 9	9 du/ga	
Residential - 12	12 du/ga	
Residential - 16	16 du/ga	
Community Mixed Use-12	12 du/ga	
Residential-20	20 du/ga	
Residential -35	35 du/ga	
Office Commercial-20		
Urban Mixed Use-20	20 du/ga	
Regional Mixed Used-35	35 du/ga	
Innovation Corridor Mixed Use-35	35 du/ga	
Citrus Park Village	35 du/ga	
Non-Residential Development Areas		Depends on surrounding context
Research/Corporate Park	No Residential Uses Allowed	
Light Industrial		
Light Industrial-Planned		
Heavy Industrial		
Energy Industrial Park		
Electrical Power Generating Facility	1 du/5 gross acres	
Natural Preservation	No Residential Uses Allowed	
Major Public/Quasi-Public		

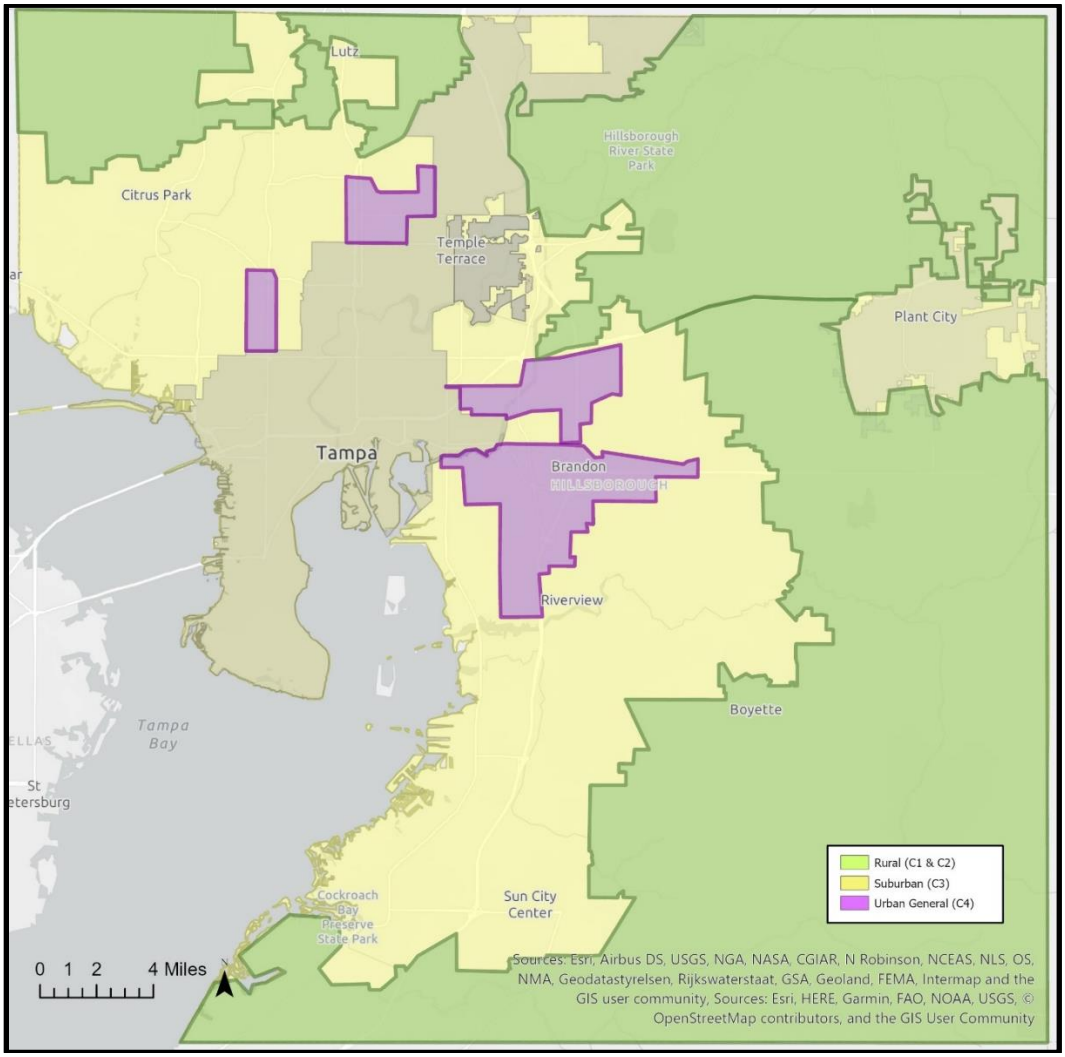
Figure 3 Potential Context Area (Future Land Use) Identification Results



4.2 Draft Context Boundary

Based on data collection from the previous step, small Future Land Use parcels (as shown in Figure 3) were merged into surrounding context categories to avoid context changes across a short roadway segment. The potential context boundary is drafted based on Future Land Use and characteristics of the surrounding community. Then draft context boundaries were developed from ongoing collaborative discussions with Hillsborough County and Hillsborough County City-County Planning Commission staff, which is illustrated in Figure 4.

Figure 4 Draft Context Boundary



4.3 Preliminary Context Assignment

Individual community plans from the Hillsborough County Comprehensive Plan were reviewed to consider community visions and conceptual plans for roadways that serve their community. These plans specify desired context and functionality of the major roads and how they will help in creating more sustainable, people-friendly communities.

4.3.1 Assignment of Rural Context

The roadways outside the Urban Service Area (USA) boundary (as shown in Figure 4) were assigned the Rural (C1&C2) context and the results are shown in Figure 6. Hillsborough County's Growth Management Strategy includes a rural area is that planned to remain in long term agriculture, mining or large lot residential development. Within the rural area, some "rural communities" exist. These areas were generally developed prior to the establishment of the USA in Hillsborough County. These are considered rural in the Comprehensive Plan but have suburban growth patterns. So, consistent with the Comprehensive Plan, these areas must be provided special consideration through design guidelines when assigning target speed and user priority to the roadways traversing them.

4.3.2 Assignment of Suburban Town Context

The next step was to identify the special areas for future development (potential Suburban Town). Those potential C3T areas were defined as Town Centers, and identified from reviewing the following three sources:

- Community Plan (Livable Communities Element):

  Many of the community plans reimagine and redefine the roadways by incorporating multimodal systems, reducing speeds and reclaiming public spaces to serve the heart of the communities, town centers. Some communities specify the form of commercial development, such as a Main Street, town center, strip or shopping center. Some community plans identify multi-modal facility needs for some specific roadways. For example, Orient Road needs improvement with bike lanes (Community Plan of East Lake-Orient Park).
- Mixed Use Developments of Regional Impact (DRIs):

  The approved Developments of Regional Impact (DRIs), the conceptual site plans were reviewed to identify future potential suburban town centers where the C3T Context Based Classification and associated typical sections may be appropriate.
- Overlay Districts:

  Special community overlay districts in the Hillsborough County Land Development Code (LDC) were reviewed to ensure land development and roadway context features identified in these districts were captured for context designations.

The impacts of each town center, which is identified from the sources above, C3T determinations were evaluated. If any of the following criteria are met, the roadway is assigned as C3T:

- The community has specified the form of development, such as a Main Street, town center, strip or shopping center. For example, as specified in the Gibsonton Community Plan, Gibsonton Drive is identified as Signature Corridor by planning a large retail center and small professional, businesses and specialty neighborhood retail along Gibsonton Drive. Then it was assigned as C3T.
- Increasing needs for multimodal facilities where the C3T context classifications and associated typical sections may be appropriate. Compared to the Typical Cross Sections for the other suburban context classifications (C3R or C3C) with Shared Use Path, C3T's typical section provides an on-street buffered bicycle lane and an option for street parking. For example, there are small businesses along Montague Street, and it links residential areas to commercial areas where on-street bicycle lanes and street parking are preferred.

The details of each town center's impact on C3T determinations are summarized in Appendix A.

The final step for C3T identification was to determine whether there were any corridors with high bicycle and pedestrian activity that are not already included in community plans or already classified as C-4. There is no readily available information for bicycle and pedestrian activity, so the Vision Zero Action Plan was used to help locate these areas. Vison Zero Corridors were reviewed for indicators of pedestrian bicycle activity. The Top 20 Severe Crash Corridors Involving People Walking or Biking were used as a proxy of heavy pedestrian activity to supplement community plans and future land use information to determine a Context Based Classification of C3T. Aerial imagery of these areas was reviewed to further refine where pedestrian activity was likely. The following roadway segments were reclassified as C3T:

- Sheldon Rd from Hillsborough Ave to Waters Ave.
- Fletcher Ave from Armenia Ave to 50th St.
- CR 579 / Mango Rd from MLK Blvd to US 92.
- Waters Ave from Sheldon Rd to Anderson Rd and from the CSX Rail right-of-way to Armenia (segment from Anderson Rd to the CSX Rail was left with a designation of C3C).

Assignment of Urban General Context

To refine and confirm future Urban General (C4) context locations, an additional exercise was performed to identify anticipated dense aggregations of residential populations and employment centers for the year 2045. The Hillsborough County Planning Commission's socioeconomic forecasting model utilizes population and employment estimates projected for 2045 and allocates these totals across the County based on high growth areas and future land use designations. These high growth, dense employment and residential areas were overlaid on the town center maps and manual reviews of these areas were conducted to ensure that all potential urban growth areas were accounted for and the appropriate context for facilities within these areas was identified. Roadways within those dense areas were assigned the C4 context as shown in Figure 5.

4.3.3 Assignment of Suburban Context

After context assignments for C3T and C4, the remaining roadways within the Urban Service Area were preliminary assigned a Context Based Classification of Suburban (C3) as shown in Figure 5.

4.4 Manual Review

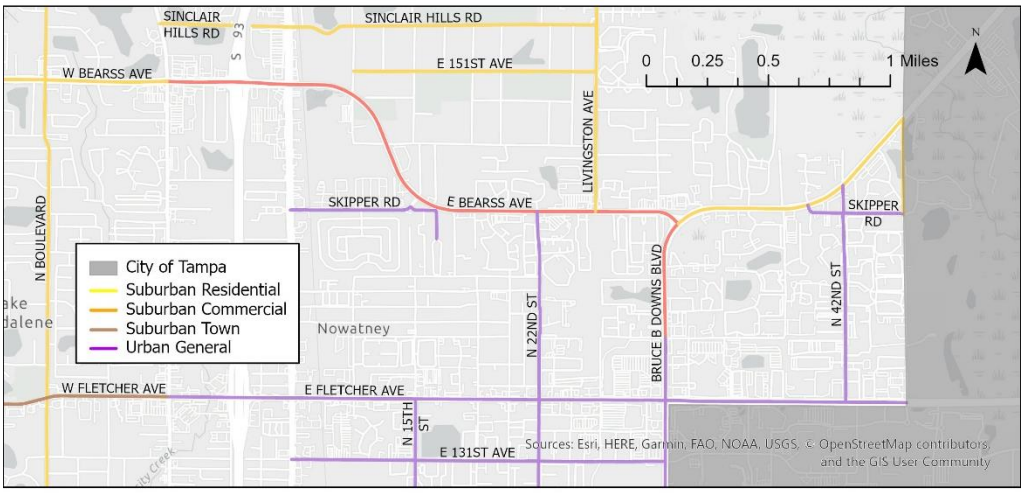
After preliminary assignment of Context Based Classification, a manual review was conducted. The criteria considered in the manual review includes:

- Functionality of major thoroughfares as regional transportation facilities.

  The following corridors (also shown in Figure 5) were identified by the County as multi-lane corridors and their major function is maintaining regional mobility. The context was changed from C4 to C3:

  - Bearss Ave from Nebraska Ave to Bruce B Downs Blvd
  - Bruce B Downs Blvd from City Limit to Bearss Ave

Figure 5 Manual Review of Corridors

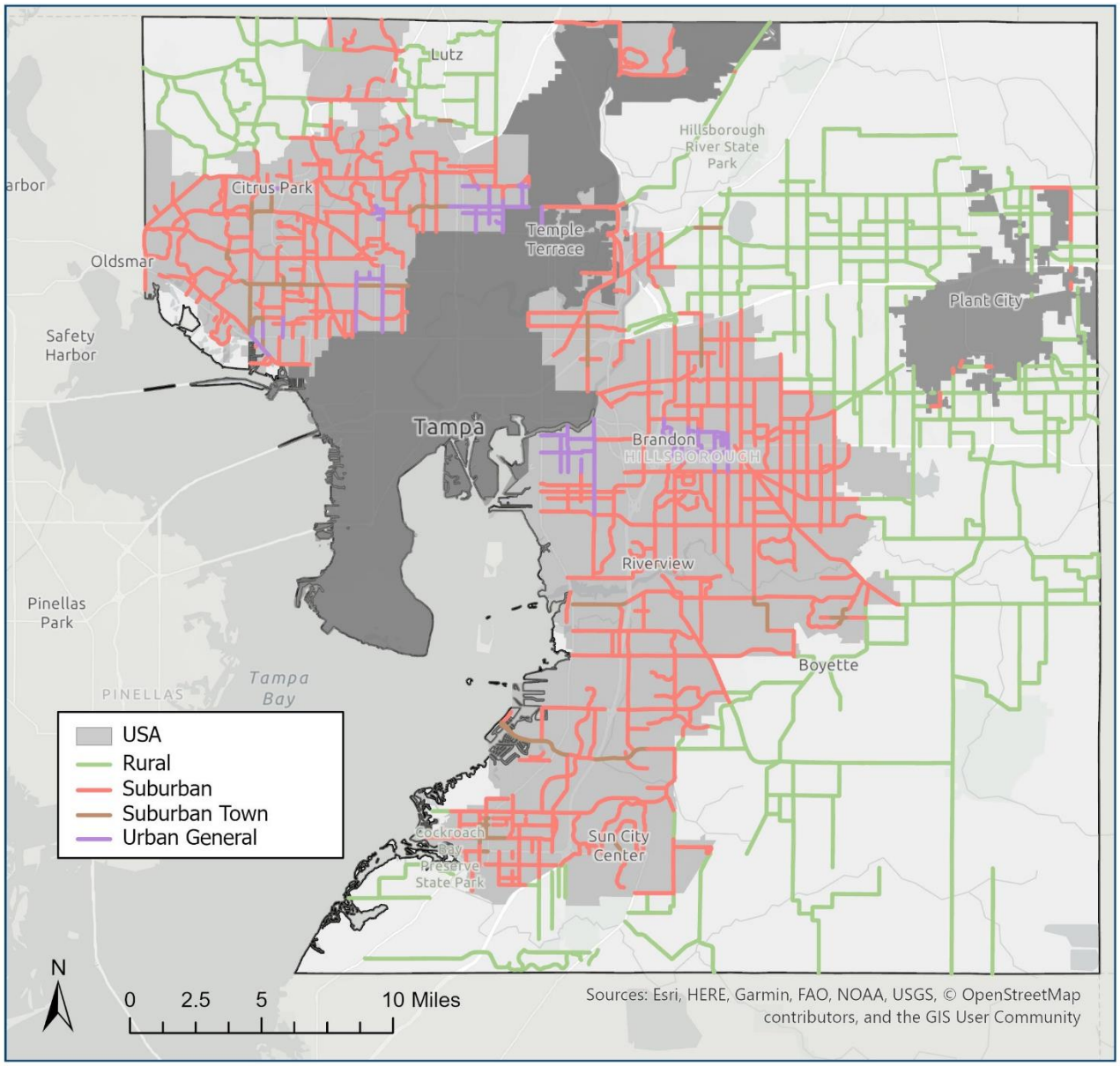


- Presence of high volumes of freight movements which may conflict with vulnerable road users

  Truck Routes identified by the map layer, SDEINT_DBO_Roads, affect the context assignment. For example, Harney Road (from Sligh Ave to Temple Terrace Highway) was identified as a truck route, and the context was changed from C3T to C3.

Then, the roadway segments were aggregated based on functional classification, context, and the County roadway segmentation (street ID provided by map layer SDEINT_DBO_Roads). The results are presented in Figure 6.

Figure 6 Preliminary Context Based Classification Assignment



4.5 Assignment Suburban Commercial (C3C) and Suburban Residential (C3R)

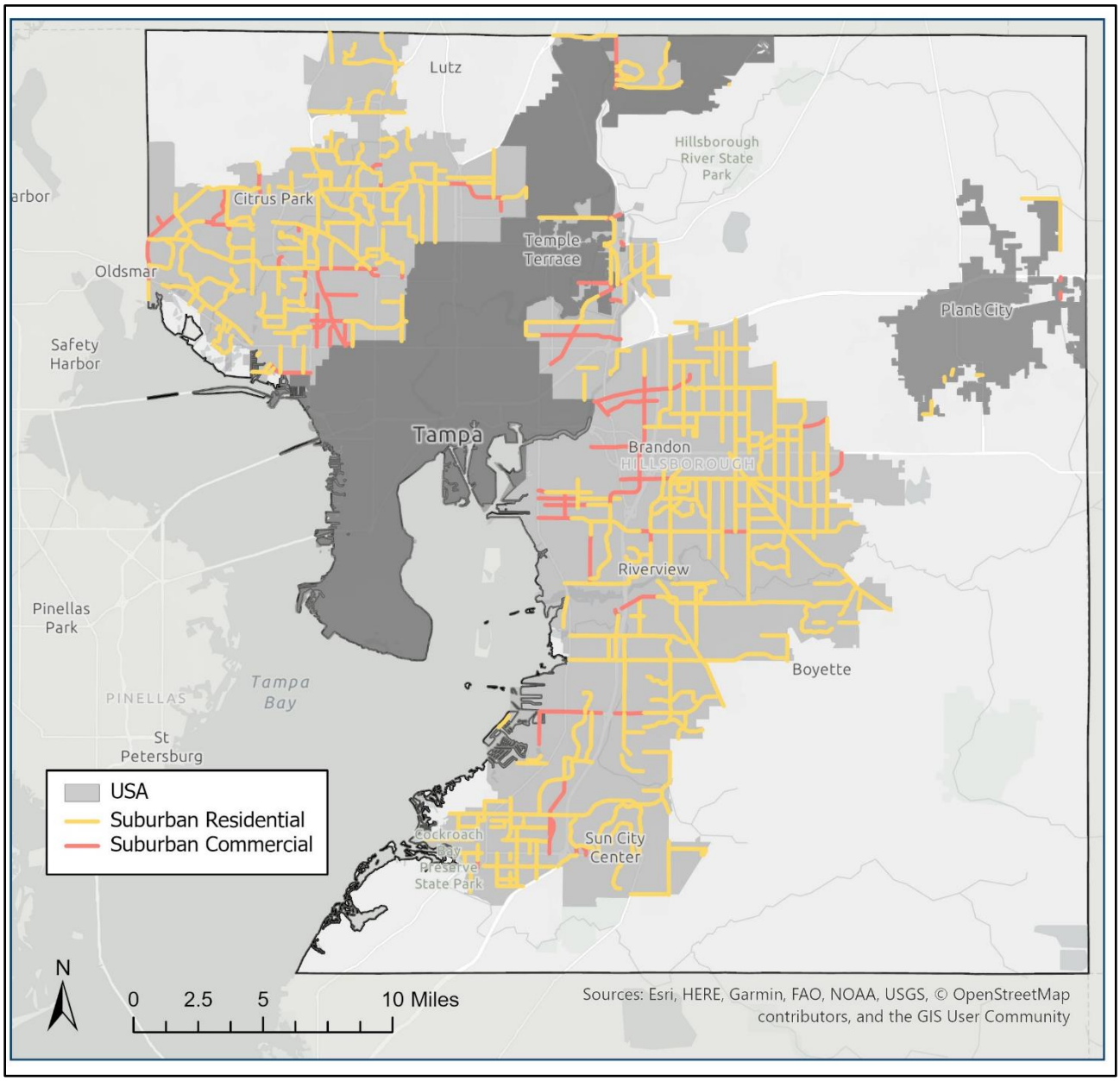
The next step in the Context Based Classification assignment was separating the suburban area facilities into C3C and C3R classifications. The FDOT D7 Preliminary Context Classification Memo (D7 Memo) was reviewed and the data processing methods was applied in this study, which is included in Appendix B. The methodology for identifying these two facilities, involved the analysis of adjacent existing and future land uses, which was conducted as follows:

- To obtain the land use type for the parcel frontage along each roadway segment, a buffer was extracted on both sides of the roadway. As discussed in D7 memo, on a districtwide scale, 500 ft is an approximate block size, which is suitable to identify adjacent land uses. The proportion of each land use type per segment buffer area for existing and future land use was calculated, respectively.
- Reclassify land use categories by grouping similar land use types using D7 Memo methodology of land use categories (details are included in D7 Memo Appendix A) and the land use percentage for each re-classified category on existing and future land use, respectively.
- The thresholds of C3R and C3C from the D7 Memo are:
    - *C3R:*
        - *At least 20% of the adjacent land use is residential*
        - *The adjacent land use contains a higher proportion of residential than commercial*
    - *C3C:*
        - *At least 20% of the adjacent land use is commercial OR at least 20% is industrial*
        - *The adjacent land use contains a higher proportion of commercial, industrial than residential*

  The suitability of D7 Memo thresholds in the County arterials and collectors was tested and it was concluded that they are applicable to the County conditions.
- The context of C3R and C3C were assigned to County roads based on existing and future land use, respectively.
- Inconsistencies between existing and future context assignment were identified and manually revised based on the principles below:
    - Use existing context except:
        - If the existing land use is primarily rural or vacant, then use future context
        - If the future land use is primarily industrial, then use future context
        - If the future land use is regional mixed use and majority of the existing land use was not residential, then the context was determined on a case by case basis.

The results of the final suburban context (C3R and C3C) assignment are presented in Figure 7.

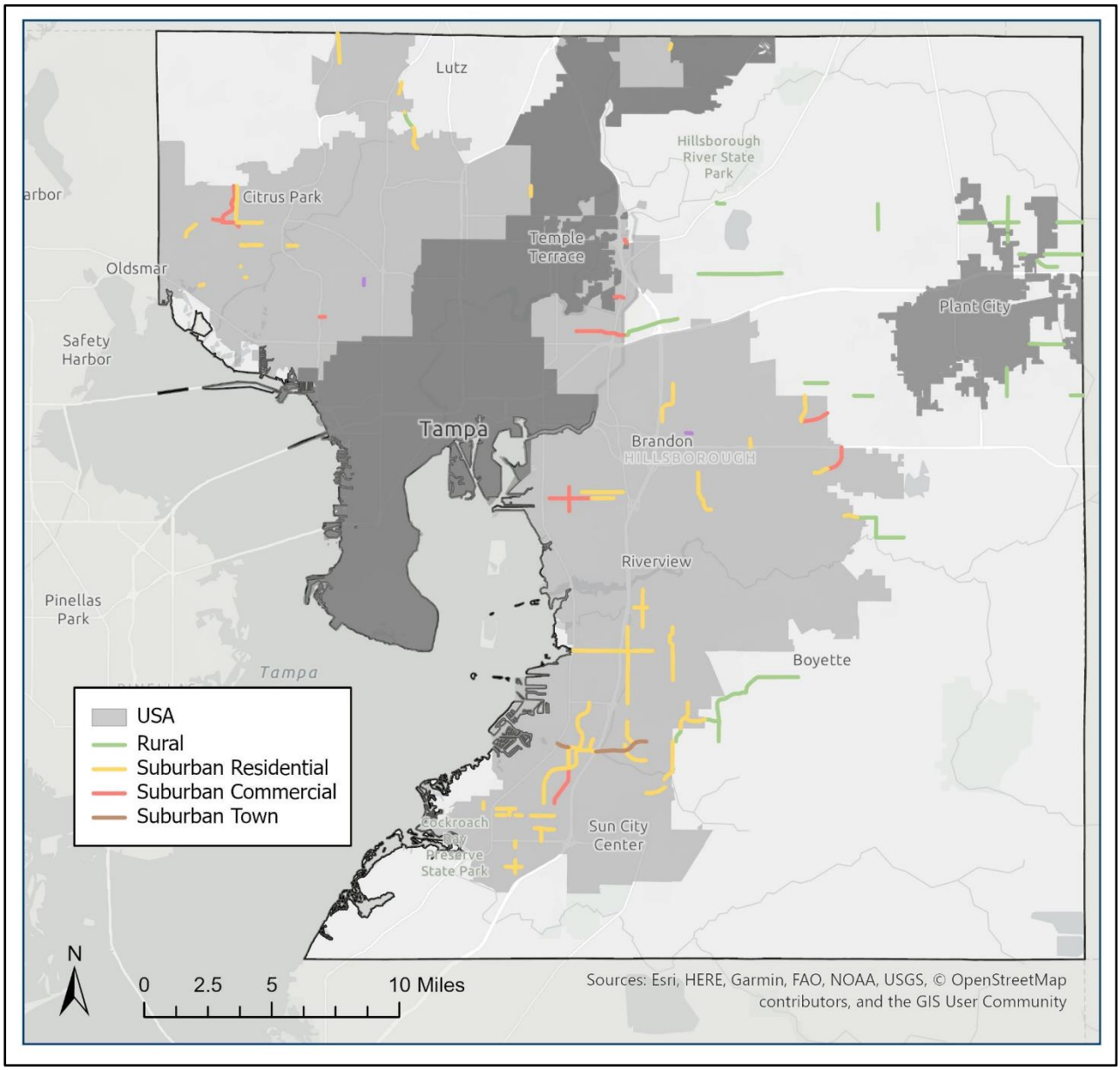
Figure 7 Preliminary C3R and C3C Assignment Results



5 FUTURE PLANNED ROADWAYS

All roadways in the New Roadway Layer were reviewed using the same methodology in Section 4. The preliminary Context Based Classification is presented in Figure 8.

Figure 8 Future New Roadways Context Based Classification

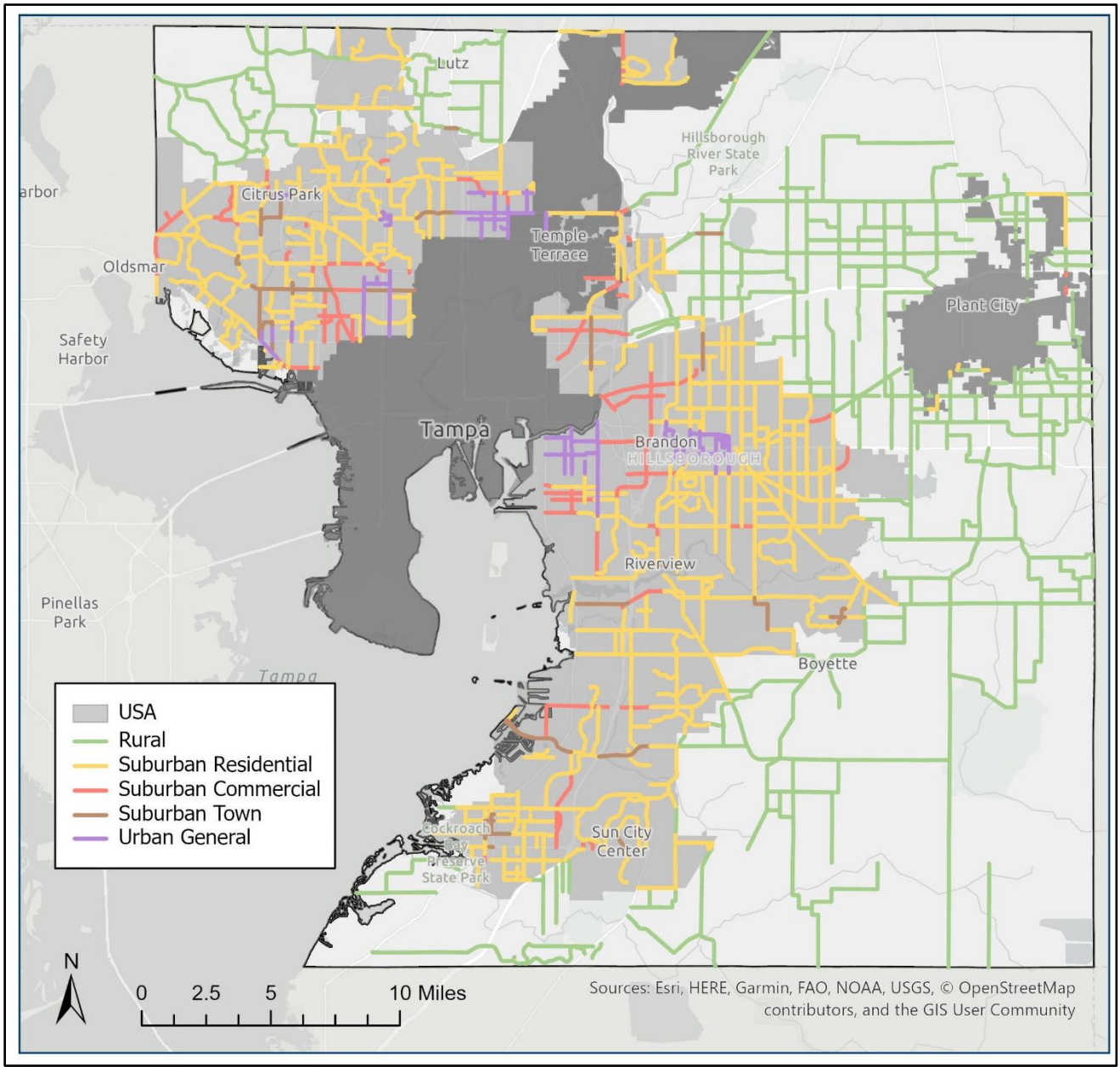


6 FINAL RESULTS

The final Context Based Classification are shown in the Figure 9. The final result of this analysis is a GIS layer identifying the Context Based Classification for each County arterial and collector, including the information:

- Roadway Name
- Street ID
- Functional Classification
- Context Based Classification

Figure 9 Context Based Classification Map



7 APPENDIX

APPENDIX A
TOWN CENTER IMPACTS ON C3T DETERMINATION TABLE

Appendix A: Town Centers Impacts on C3T Determinations

Town Center Name	Source	Community	C3T Determination	C3T Considerations
Fish Hawk Ranch TND	DRI Mixed Use	DRI #:191	C3T: Dorman Rd, Fishhawk Crossing Blvd, Boyette Rd	Town Center
Big Basin Commerce Park	DRI Mixed Use	DRI #:189	No impacts	Future Land Use: Research Corporate Park
Lake Brandon	DRI Mixed Use	DRI #:93	No impacts	Included in Urban General Boundary
Fish Hawk Ranch	DRI Mixed Use	DRI #:191	No impacts	Shared Use Path (SUP) is prefered where C3T typical section does not apply
South Shore Corporate Park DRI	DRI Mixed Use	DRI #:249	No impacts	Industrial Land Use
Bloomingdale	DRI Mixed Use	DRI #:41	No impacts	Small road segment in suburban areas
Carrollwood Village	DRI Mixed Use	DRI #:162	No impacts	Residential land use, larger block length, C3
Cross Creek	DRI Mixed Use	DRI #:162	No Impacts	Residential land use, larger block length, C3
Crosstown Center	DRI Mixed Use	DRI #:151	No impacts	Semon Expressway
DG Farms	DRI Mixed Use	DRI #:194	No impacts	State Roads
Harbor Bay DRI Town Center	DRI Mixed Use	DRI #:241	No impacts	State Roads
Highland Park	DRI Mixed Use	DRI #:98	No Impacts	Build out as Suburban
Lake Hutto DRI Town Center	DRI Mixed Use	DRI #:259	C3T: Boyette Rd	Link Residential and Commercial (P31)
Oak Creek	DRI Mixed Use	DRI #:146	No Impacts	Industrial Land Use
Regency Park North	DRI Mixed Use	DRI #:131	No Impacts	Included in Urban General Boundary
South Shore Corporate Park DRI	DRI Mixed Use	DRI #:249	No Impacts	Larger block length, C3
Southbend DRI	DRI Mixed Use	DRI #:145	No Impacts	Residential land use only with large block prefer SUP
Summerfield Crossings	DRI Mixed Use	DRI #:73	No Impacts	Majority land use are residential only with large block prefer SUP
Tampa Triangle	DRI Mixed Use	DRI #:140	No impacts	Included in Urban General Boundary
The Pavilion	DRI Mixed Use	DRI #:148	No impacts	Included in Urban General Boundary
Tri-County Business Park	DRI Mixed Use	DRI #:181	No Impacts	Remian C3 typicals for Race Track Rd
Waterset DRI	DRI Mixed Use	DRI #:207	No Impacts	Planned C3 Pattern, larger block length
Westchase	DRI Mixed Use	DRI #:84	C3T: Montague St	Link Residential to Commercial
Bloomingdale TND	Land Development Code	LDC	No Impacts	Small road segement in suburban areas
Brandon Main Street	Livable Communities	Brandon Main Street	No impacts	Included in Urban General Boundary
Citrus Park Village	Livable Communities	Citrus Park Village	C3T: Ehrlich Rd, C3T & C4 Gunn Hwy	CPV Suburban Town
Greater Carrollwood Northdale Communities Plan	Livable Communities	Greater Carrollwood Northdale	C4: Moran Rd, Stall Rd, Orange Grove Dr, South Village Dr	Urban Community Center
Greater Palm River Community Node	Livable Communities	Greater Palm River	No impacts	Included in Urban General Boundary
Little Manatee	Livable Communities	Little Manatee	No impacts	Small road segement in rural areas
Ruskin Town Center	Livable Communities	Ruskin	C3T Shell Point Rd, W College Ave, 1st & 4th Sts NW, 11th & 15th Ave NW	Link residential areas to heavy commercials with increasing multi-modal faciltity needs
University Community Area	Livable Communities	University Area	No impacts	Included in Urban General Boundary
Wimauma	Livable Communities	Wimauma	No impacts	State Roads, larger block length, C3
East Lake Orient Park Activity Center	Livable Communities	East Lake Orient Park	C3T: Orient Rd	(P147)Orient Rd from Sligh Ave to Columbus Dr as a 4L with bike lanes (P50) activity center
Gibsonton Main Street	Livable Communities	Gibsonton	C3T: Gibsonton Dr	P112 Signature Corridor
Little Manatee	Livable Communities	Little Manatee	No Impacts	Rural areas
Riverview Downtown and Riverwalk	Livable Communities	Riverview	C3T: Riverview Dr	P99 Downtown
Sun City Town Center	Livable Communities	Sun City	C3T: Pebble Beach Blvd N	Town Center
Town N Country Town Center	Livable Communities	Town N Country	C3T: Town'n Country Blvd	High intersection density
Apollo Beach Town Center	Livable Communities	Apollo Beach	C3T: Apollo Beach Blvd	High intersection density
Lutz	Livable Communities	Lutz	C3T: Crenshaw Lake Rd, Whitaker Rd	Town Center, refinement of rural boundary due to Whitaker Rd, Debuel Rd
Seffner Mango Commercial Corridor	Livable Communities	Seffner Mango	No Impacts	State Roads
SR 60	Livable Communities	SR 60	No impacts	Included in Urban General Boundary
SR 580 - Hillsborough Ave	Livable Communities	SR 580 - Hillsborough Ave	C3T: Town'n Country Blvd	High intersection density
SR 60	Livable Communities	SR 60	No impacts	Included in Urban General Boundary
Balm	Livable Communities	Balm	No Impacts	State Roads
Keystone Community Activity Center	Livable Communities	Keystone (P19)	No Impacts	Gunn highway (truck route) & N Mobley Rd new improvements, rural areas
Thonotosassa Main Street	Livable Communities	Thonotosassa	No Impacts	Residential land use
SR 580 - Hillsborough Ave	Overlay Districts	LDC	C3T: Sheldon Rd, Jackson Springs Rd	Link residential areas to heavy commercials with increasing multi-modal faciltity needs
North Dale Mabry Boulevard	Overlay Districts	LDC	C3T: Crystal Lake Rd, new county road	Not in functional classification map
SR 580 - Hillsborough Ave	Overlay Districts	LDC	C3T: Webb Rd	Link residential areas to heavy commercials with increasing multi-modal faciltity needs
North Dale Mabry Boulevard	Overlay Districts	LDC	No Impacts	Refinement of rural boundary due to Geraci Rd, lutz Lake Fern Rd

APPENDIX B
FDOT D7 PRELIMINARY CONTEXT CLASSIFICATION MEMO

Memorandum

Date:	May 7, 2018
To:	Stephen Benson
From:	Jennifer Musselman
Project:	Districtwide Preliminary Context Classification
Subject:	Methods for Classification Automation

The Florida Department of Transportation (FDOT) has adopted a Complete Streets context classification system, which has been incorporated into the Florida Design Manual (FDM), to determine key design criteria for all non-limited access State roadways. To implement this system, FDOT is developing a database of the preliminary context classification for all state roadways. The context classification evaluations will use available data and information on existing conditions and surrounding land uses. As FDOT projects are conducted, these initial evaluations must be reviewed and confirmed or updated based on current data and, if applicable, future conditions.

Kittelson & Associates, Inc. (Kittelson) is working with FDOT District 7 to develop a GIS-based method for districtwide preliminary evaluation of the context classification for state roadways using a subset of the primary and secondary measures in the 2017 FDOT Context Classification Matrix. The selected measures rely on available GIS data, including roadway network structure, adjacent land use, and employment and population density. The memo outlines the steps used in the GIS-based evaluation of preliminary context classification for District 7.

STEP 1: NETWORK DEVELOPMENT

The local roadway system has a significant impact on the classification of each highway segment, and the way the highway itself is segmented will impact the ultimate classification. The method used in this study to segment the highway network had three phases:

1. Network structure was used to establish the initial segmentation;
2. Adjacency to conservation areas was used to refine the segmentation; and
3. Population and employment density were used as the final step in segmentation refinement.

The base state route network is FDOT's 2018 linear referencing system (basemap_route_road.shp). This file contains more than just state routes, so the FDOT state route centerline file (state_roads.shp) and the FDOT interstate centerline file (interstates.shp) were used to select the state routes and remove the interstates, respectively, from the basemap file to create what will be referred to as the "state route input file" in this memorandum. The Selmon Expressway, Suncoast Parkway and Veterans Expressway were manually removed from the state route input file.

The local street network was assembled from each county's local road network GIS file. To allow for recalculation of mileposts after segmentation, the geometry of the state route input file was carefully preserved. All other inputs in the process were projected to the same projection as the state route input file (NAD 1983 UTM Zone 17 in Meters).

The state roadway system was segmented using a set of breakpoints generated in three phases, as described next.

1: Breakpoints using Network Structure

Segmentation using the network structure had three components:

1. FDOT roadway ID;
2. Intersections with other FDOT state roads; and
3. Block length (also used as a context classification measure).

The procedure for preparing each component was as follows:

FDOT Roadway ID

A breakpoint was created wherever the FDOT roadway ID changes by dissolving the state route input file on the ROADWAY field (Dissolve on roadway ID, ET Geowizards – Polyline to Points).

Intersections with Other FDOT State Roads

The FDOT state roads file does not split a state route line feature at all state road intersections. Splits were created as follows:

1. Dissolve the state roads input file into a single feature
2. Separate it at intersection nodes (ET Geowizards – Clean Polyline Layer)
3. Extract endpoints (ET Geowizards – Polyline to Points), set aside for later use

Block Length

To calculate block length along state roads, a version of the state route input file split at all local street intersections was prepared. The state route input file has a single centerline, whereas the combined local roadways file from each of the counties in District 7 has parallel lines for segments with a median, resulting in two nodes for a single local intersection. To work around this issue, the following process was used:

1. Filter the local street network by removing the following: state routes, interstates, interchanges, unnamed roads, driveways, and parking lot entrances. The filtering process also included selecting out terraces, circles, trails, and courts less than 800 feet in length to remove disconnected residential streets.
2. Use Extend Line tool to ensure that the local network intersections connect correctly to the state route network, especially where medians exist (tolerance within 25 meters).

3. Merge the state route input file with the filtered local network

4. Use Extend Line tool a second time to connect side street intersections in the merged layer from Step 3 (tolerance within 25 meters).

5. Split the merged file at every local intersection (ET Geowizards – Clean Polyline Layer)

6. Extract local intersection nodes (ET Geowizards – Export Nodes) and select the ones within 100 feet of the state roads layer (a few extra are selected)

7. Extract state road nodes from state roads input file (ET Geowizards – Export Nodes)

8. Snap local nodes within 15 meters of state road nodes to the state road nodes (Snap Points) (to prevent tiny segments from being created around a single intersection)

9. Filter out local nodes where they are within 150 feet of another local node:

    a. Buffer 150 feet around local nodes

    b. Intersect buffers with themselves

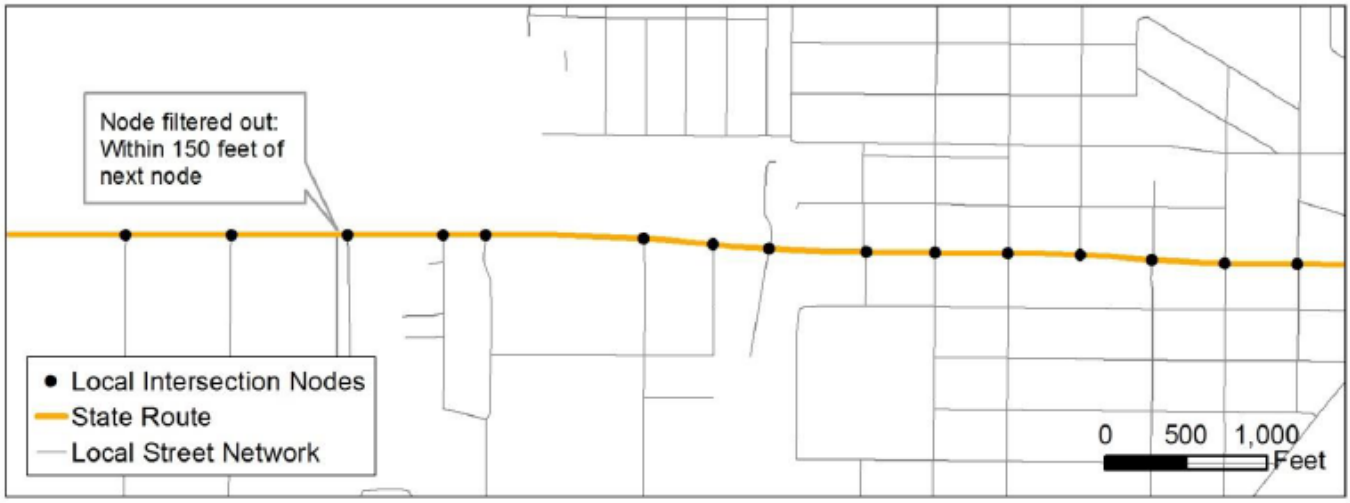
    c. Isolate clusters of local nodes within 50 feet of the same intersected buffer

    d. Replace clusters of local nodes with one point (ET Geowizards – Thin/Generalize Points)

    e. Merge reduced set of nodes with nodes not within 150 feet of each other

10. Split the state roads input file with the filtered local nodes (ET Geowizards – Split Polylines with Feature) (see **Figure 1**).

Figure 1. Split the state road network at local intersections

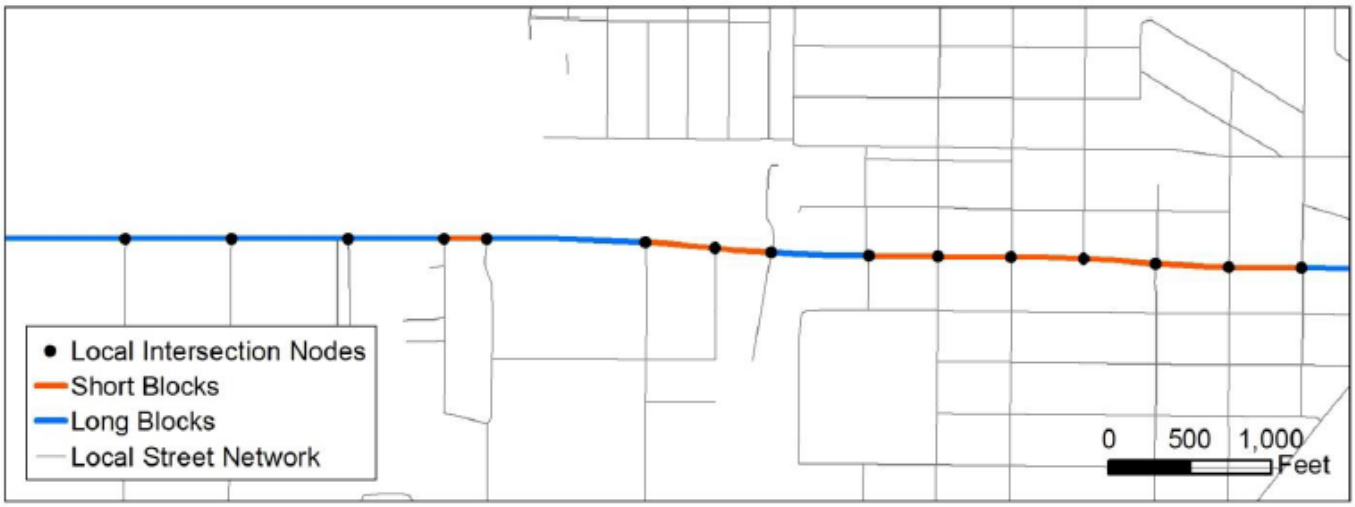


The output file is split at FDOT state road intersections as well as at all local cross streets so that it is ready for calculating block length. Similar block lengths were grouped into two categories: long blocks and short blocks, as follows:

1. Calculate the length of each state roadway block

2. Separate roadway into short blocks (less than 500 feet long) and long blocks (greater than or equal to 500 feet long) and output these into separate files (Select by Attribute) (see **Figure 2**)

Figure 2. Identify short and long blocks along state road network



3. Identify isolated short blocks (not contiguous with other short blocks), and merge them into the long block file (see **Figure 3**):

    a. Buffer around short segments

    b. Intersect buffers with themselves – where segments are contiguous, an intersected polygon exists

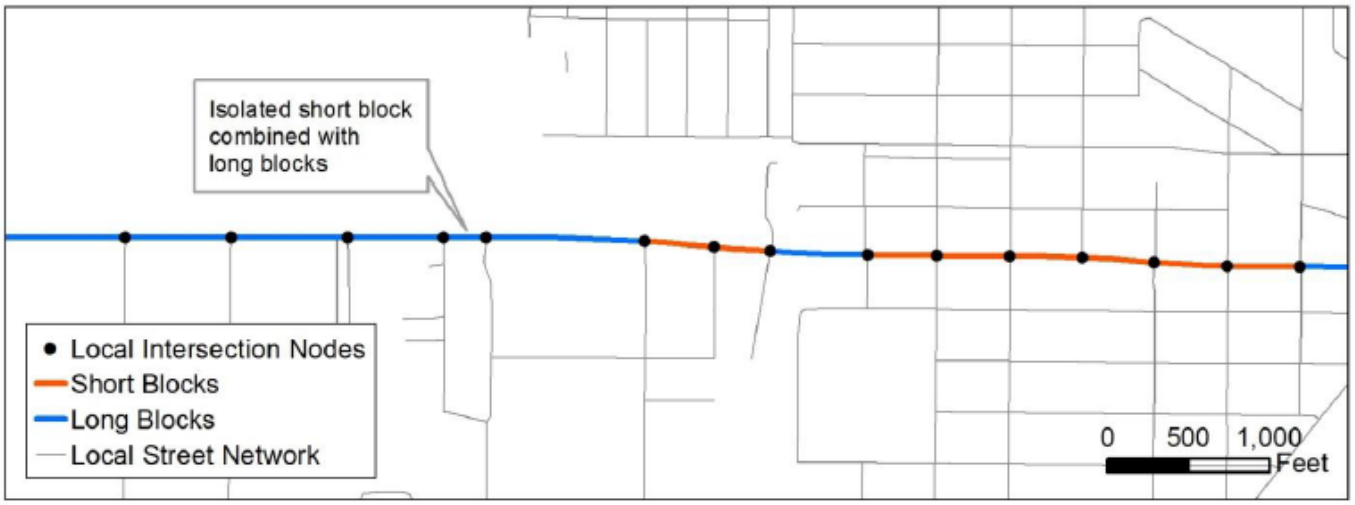
    c. Select the segment buffers that intersect with the intersected buffers

    d. Select short segments that fall within the previous selection

    e. Invert the selection – this yields short segments that do not touch any other short segments

    f. Combine isolated short blocks with long blocks file (Append)

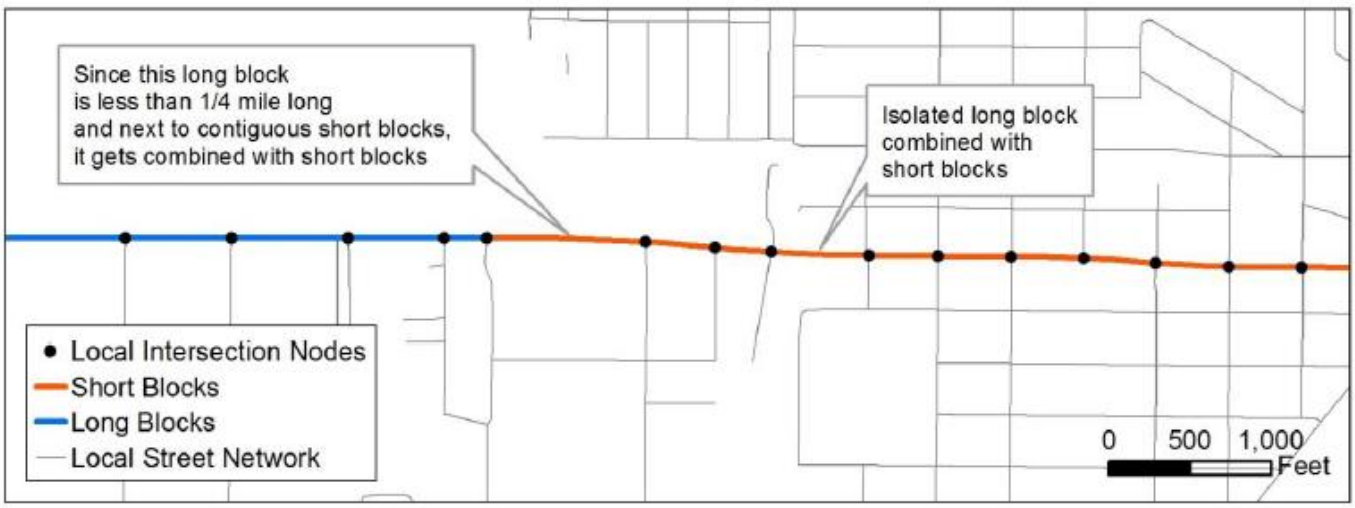
Figure 3. Combine isolated short blocks with long blocks



4. Identify isolated long blocks (not contiguous with other long blocks) that are also less than a quarter mile long, and merge them into the short block file (see **Figure 4**)

    a. Same process as above, but for long blocks. This process was run using the original short and long blocks from Step 2 above.

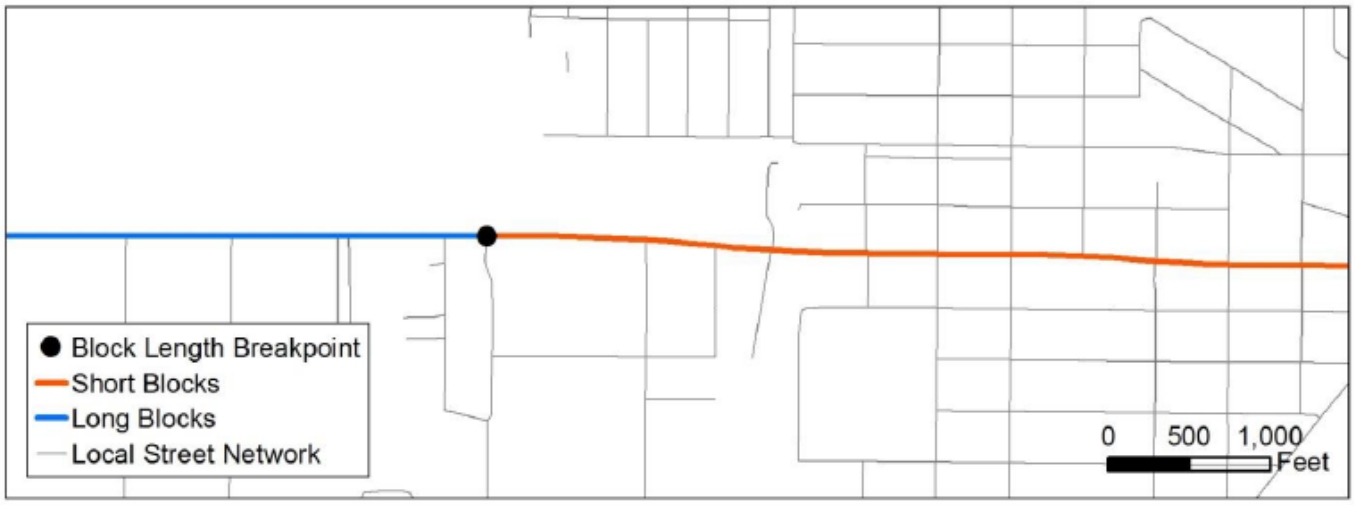
Figure 4. Combine isolated long blocks with short blocks



5. Create final set of contiguous short blocks and contiguous long blocks, dissolve contiguous long blocks, and extract endpoints (ET Geowizards – Polyline to Points) (see **Figure 5**)

    a. Note: this could have been done using the merged short blocks for the same result.

Figure 5. Create breakpoint based on block length



6. In some cases, resulting breakpoints were still too close to each other to create reasonable segments. Breakpoints within a quarter mile of other each other were filtered as follows:

    a. Buffer ¼ mile around breakpoints

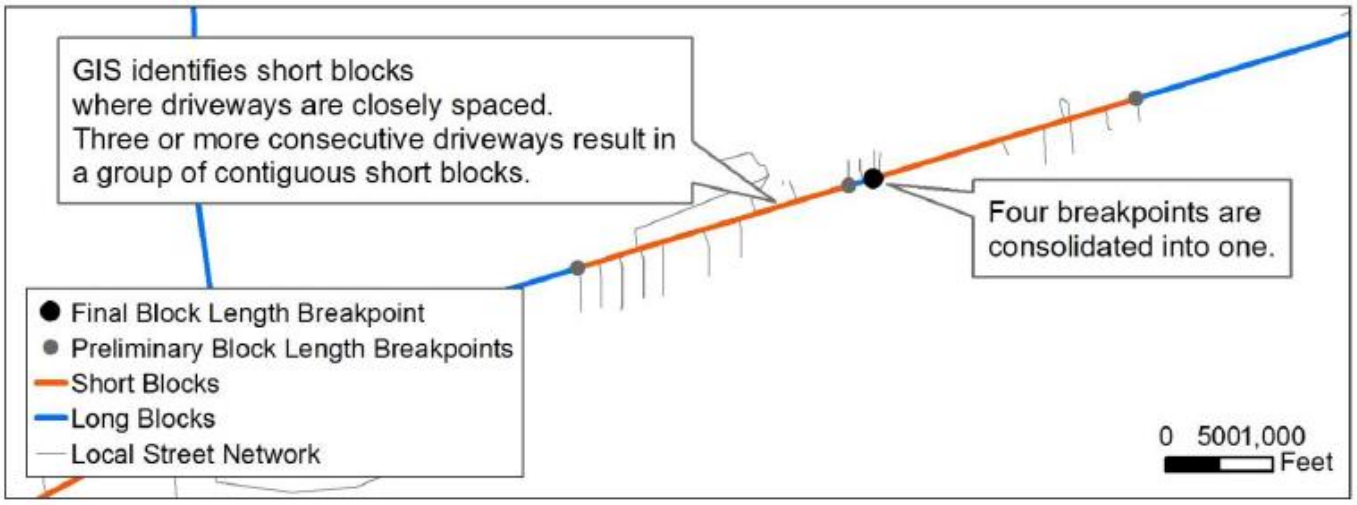
    b. Intersect buffers with themselves

    c. Isolate clusters of breakpoints within 100 feet of the same intersected buffer

    d. Replace clusters of breakpoints with one point (ET Geowizards – Thin/Generalize Points) (Figure 6)

    e. Merge reduced set of points with breakpoints not within ¼ mile of each other

Figure 6. Consolidate breakpoints where several are near each other



7. Remove any breakpoints within a quarter mile of existing breakpoints (FDOT roadway ID or state road intersections)

8. Set aside remaining (final) breakpoints for the final segmentation step.

Block Perimeter

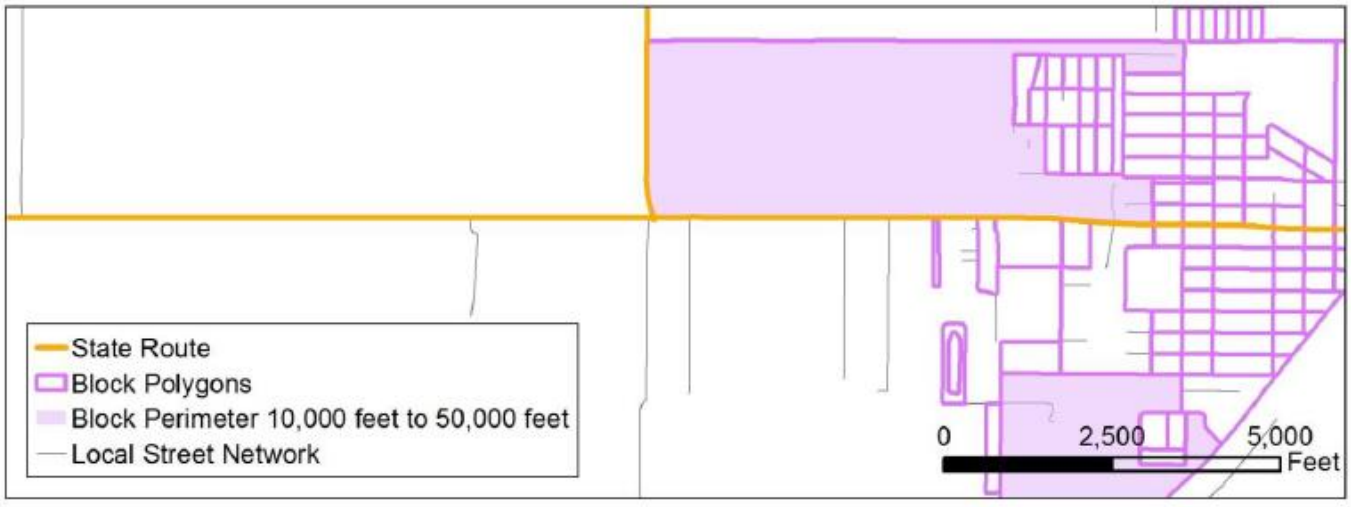
In some areas, the block length may be small, but a block structure may not exist due to narrowly spaced side streets and driveways that do not connect away from the state road. Therefore, a block perimeter step was introduced into the segmentation process to identify segments where the block structure begins to break down as state roads exit urbanized areas. Block perimeter was calculated and used as follows:

1. Create block polygons from the source network by using the Construct Polygons tool in Advanced Editing Mode. This method traces along the street centerlines until it finds enclosure, or a complete polygon. Results yield accurate blocks in urban places, but large polygons are created in areas where no defined block structure exists.

2. Calculate the perimeter of each block polygon that is adjacent to a state road.

3. For segmentation, select the block polygons with a perimeter of greater than 10,000 feet and less than 50,000 feet and combine adjacent polygons into single shapes (see **Figure 7**).

Figure 7. Isolate large blocks to use in segmentation process



4. Extract the endpoints of long blocks that pass through these “large perimeter” polygons to use as breakpoints (ET Geowizards – Polyline to Points).

5. Remove breakpoints within a quarter mile of other each other:

    a. Buffer ¼ mile around breakpoints

    b. Intersect buffers with themselves

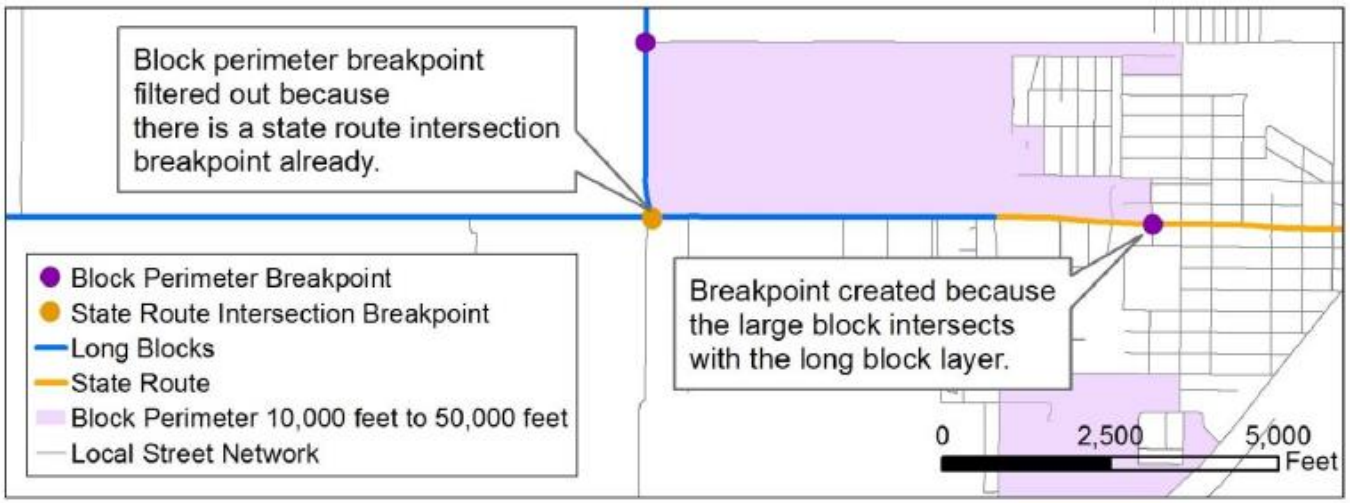
c. Isolate clusters of breakpoints within 100 feet of the same intersected buffer

d. Replace clusters of breakpoints with one point (ET Geowizards – Thin/Generalize Points)

e. Merge reduced set of points with breakpoints not within ¼ mile of each other

6. Remove any perimeter breakpoints within a quarter mile of block length breakpoints and within a quarter mile of FDOT roadway ID or state road intersection nodes. (Select by Location with Invert Selection) (see **Figure 8**).

Figure 8. Create and filter breakpoints based on large block size



7. Set aside remaining (final) breakpoints for the final segmentation step

2: Breakpoints using Conservation Land Use

Since the network structure by itself does not necessarily distinguish between natural, rural, and suburban segments, conservation land use, identified in Florida Natural Areas Inventory, was introduced to refine the network segmentation process. The conservation layer contained many small, fragmented parcels. A smoother version of the layer was prepared using the Aggregate Polygons and Fill Polygon Holes tools in ET Geowizards. The boundaries of the conservation areas were used to extract breakpoints as follows:

1. Intersect state road file split at local intersections with the prepared conservation layer

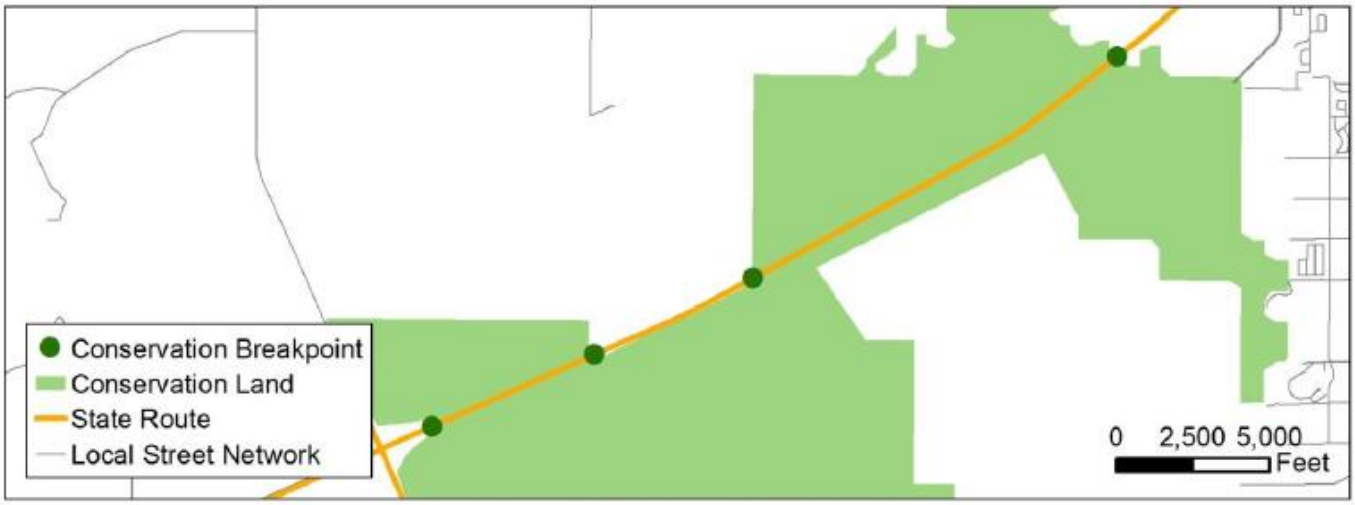
2. Dissolve intersected features and run Clean Polylines in ET Geowizards to re-split at ends

3. Calculate the length of each intersected segment

4. Select intersected segments longer than ¼ mile

5. Extract endpoints (ET Geowizards – Convert Polyline to Points), set aside for the final segmentation step (see **Figure 9**).

Figure 9. Create breakpoints where state road passes through conservation land



3: Breakpoints using Population and Employment Density

After breaking segments based on block length and conservation land use, there are still some long segments passing through transitioning areas. Averaging measures over a long distance may result in misclassification for particular stretches of the roadway. Therefore, the final step of the segmentation process created approximate breakpoints between rural and suburban areas based on population and employment density. These breakpoints were created as follows:

1. Census blocks containing population counts (Census 2010) and job counts (LEHD 2015) were converted to block centroids

2. Block centroids were used to create district-wide population and job density raster layers (Kernel Density with 200-foot cell size and density units per acre – Requires Spatial Analyst extension)

3. Each raster layer's values were reclassified to separate out less than one (1) and at least one (1) per acre (Reclassify)

4. Population and job density rasters were combined into a single raster (Plus tool)

5. Combined raster was reclassified again to separate out less than one (1) and at least one (1) per acre (Reclassify)

6. Raster was converted to a polygon (Raster to Polygon)

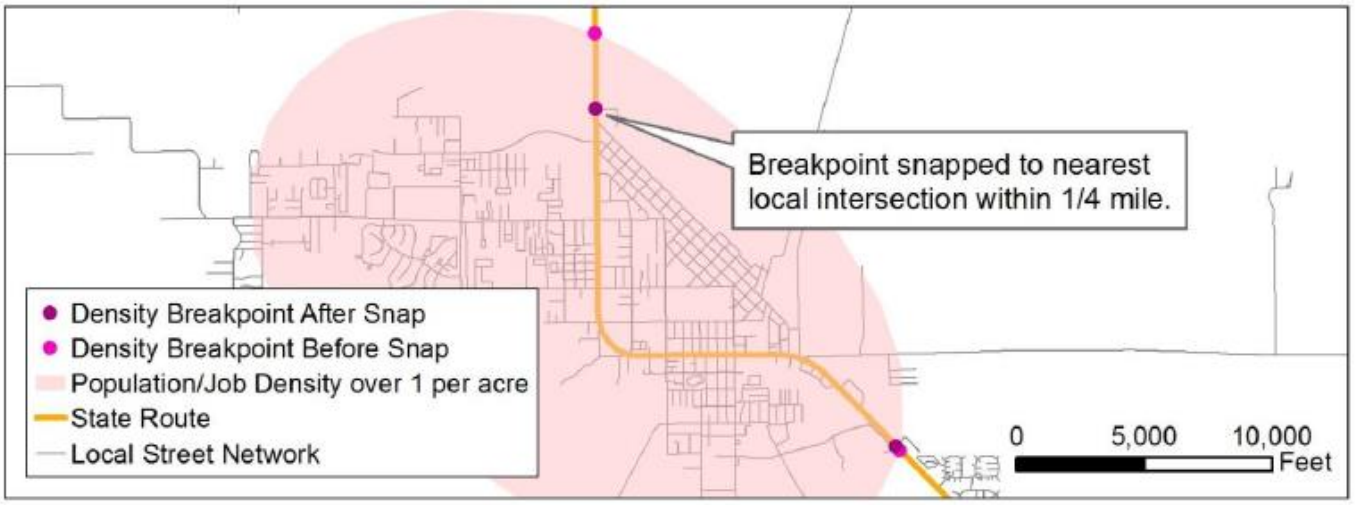
7. Polygon features containing at least one (1) resident or job per acre were used to obtain the state road segments passing through these areas (Intersect) (see **Figure 10**)

8. Endpoints of intersected segments were extracted (ET Geowizards – Export Nodes)

9. Only endpoints at the boundary of each polygon (previous step results in all internal nodes as well) were extracted to use as the density breakpoints (Select Layer by Location)

10. Snap breakpoints to the nearest intersection within a quarter mile.

Figure 10. Create breakpoints where population/job density falls to one per acre



11. Remove any density breakpoints within a quarter mile of other breakpoints (see **Figure 11**).

Figure 11. Filter density breakpoints

12. Set aside remaining block length breakpoints for the final segmentation step.

Other density combinations were tested (e.g. using the thresholds in the context classification methodology), but these thresholds tended to pull potential breakpoints too close to urban areas instead of falling in areas transitioning from suburban to rural. The density value of one (1) was selected based on testing where density values fell relative to the urban street network. Note that the districtwide population and job density rasters were only used for segmentation. The population and job density measures for each segment were calculated using the census block polygons instead of a raster layer (see Step 3 for details).

4: Final Segmentation

Before merging all breakpoints into a single set, a final filtering process ensured that no breakpoints were within a quarter mile of each other, except for breakpoints generated using the state route roadway ID and state route intersections, since these come from the roadway network's inherent structure. The final set of breakpoints was used to split the state route input file using ET Geowizards – Split Polylines with Feature.

STEP 2: ROADWAY CONNECTIVITY MEASURES

The Context Classification Matrix identifies three local roadway connectivity measures that influence whether a segment is urban or suburban/rural. The following parameters were used to determine if a segment has urban characteristics:

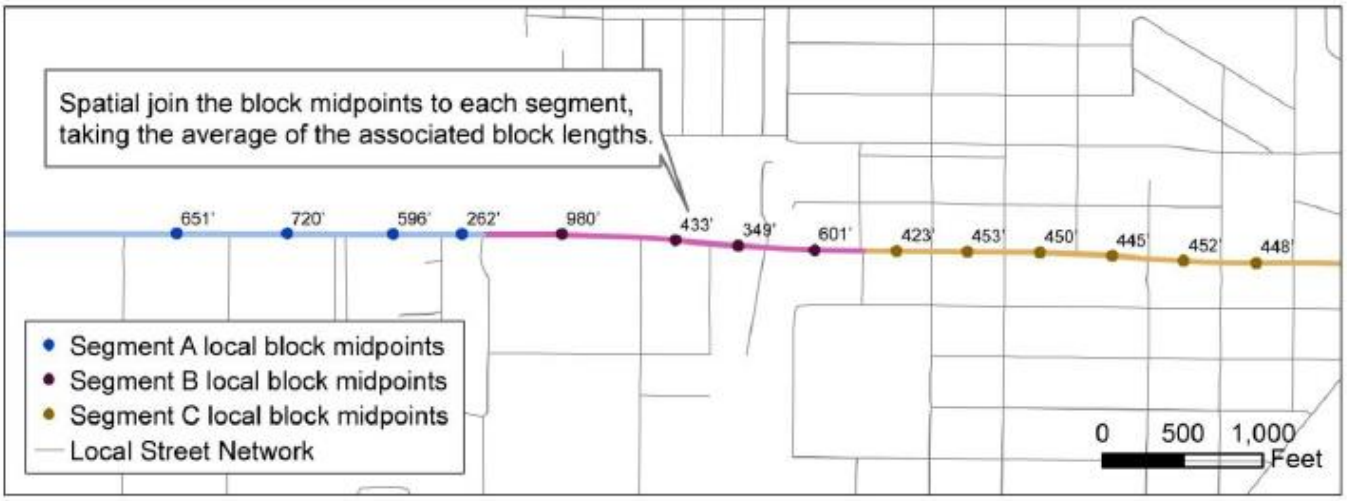
- Block length – Average block length less than 500 feet for C4 and C5 and less than 660 feet for C6
- Block perimeter – Average blocks fronting the roadway with a perimeter of 2,500 feet or less for C5 and C6 and 3,000 feet or less for C4
- Intersection density – More than 100 intersections per square mile in the area immediately around the segment.

These three roadway connectivity measures were calculated for each segment, and the measures were converted into a score that was used in the context classification procedure.

Block Length

1. Start with the block lengths for individual blocks from the segmentation process, and filter out blocks measuring less than 150 feet, as they tend to be small segments between closely spaced offset side-streets or irregularities created by the Extend Line tool used in segmentation. Note that since the block length measure is based on an average, removing these blocks gives us a result close to what would visually be identified as the average block length for a segment.
2. Convert block segments into a midpoint so that block lengths for adjacent segments are not picked up during the calculation of the average.
3. Calculate the average block length for each segment (Spatial Join the local block midpoints to the segmented state route input file, using "average" as merge rule for length field and "intersect" as the match option) (see **Figure 12**)
    a. Note: In a limited number of cases, no block midpoints were joined to the state route segment. This occurred if it was a very small segment extending beyond an intersection or if the state route segment fell between two block midpoints (this happened in a few cases in rural or suburban areas with no block structure). These segments were manually recoded as -9999 for average block length.

Figure 12. Calculate average block length for each segment



4. Calculate each segment's Block Length Score as two (2) if average block length is less than 500 feet, one (1) if block length is greater than or equal to 500 feet but less than 660 feet, and zero (0) for all else (Field Calculator)

Block Perimeter

Using the individual block perimeters from the segmentation process, calculate the median block perimeter for each segment and assign this value to the segment.

1. Create block polygons from the local road network using the Construct Polygons tool in Advanced Editing Mode. This method traces along the street centerlines until it finds enclosure, or a complete polygon. Results yield accurate blocks in urban places, but large polygons are created in areas where no defined block structure exists.

2. Buffer 2,000 feet around the state roadway network (a dissolved version – a single feature) and use this buffer to cut the block polygons in areas with no block structure. In urban areas, blocks adjacent to the roadway are not affected, while in suburban and rural areas, this step limits the size of the blocks in terms of lateral distance from the state roadways.

3. Intersect Block Polygons with 2,000-foot buffer.

4. Calculate new block perimeter based on 2,000-foot cut-off. This lateral distance cut-off is used to imitate the way an analyst would manually measure block perimeter, going only as far as 2,000 feet based on the FDOT Context Classification method.

5. Calculate the median block perimeter for each segment (Spatial Join with "median" as merge rule for block perimeter and "share a line segment with" as match option). The spatial join picks up any block that slightly overlaps with the segment, as shown in Figure 13, Figure 14, and Figure 15. For this reason, it is important to use median instead of mean to calculate the block perimeter measures to reduce the effect of both numerical outliers and spatial outliers.

a. Note: In a limited number of cases, no block polygons were joined to the to the state route segment. These segments were manually recoded as -9999 for median block perimeter.

Figure 13. Calculate median block perimeter for each segment: Example 1

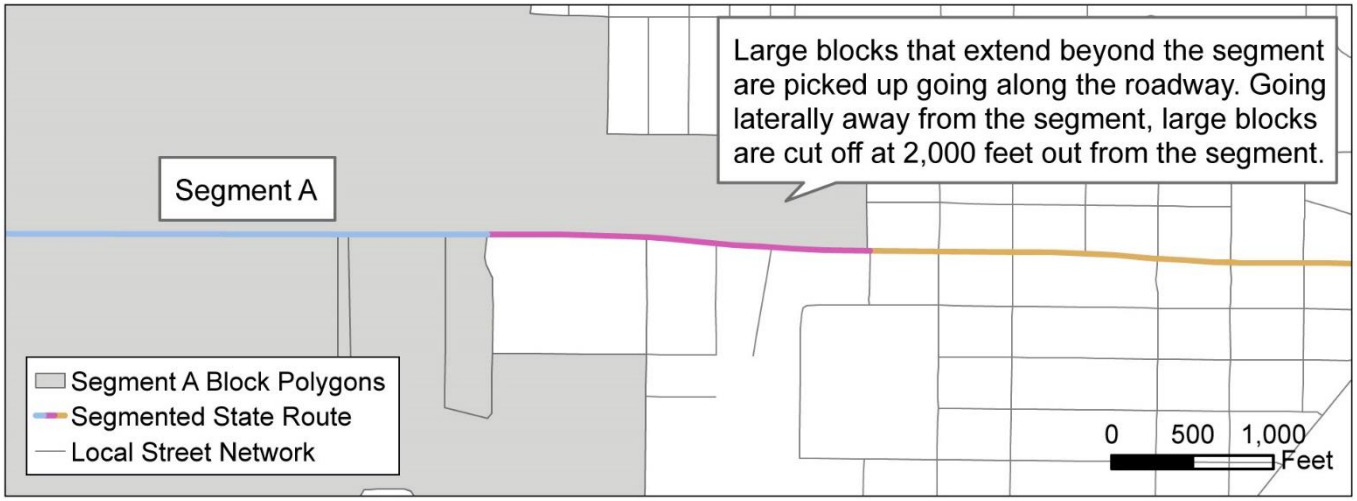


Figure 14. Calculate median block perimeter for each segment: Example 2

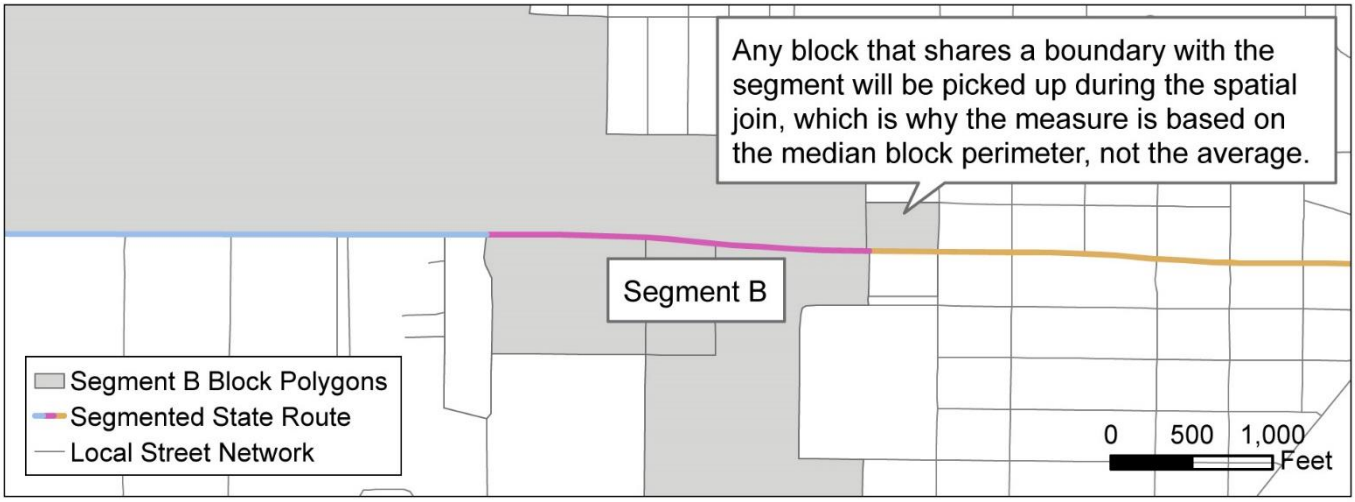
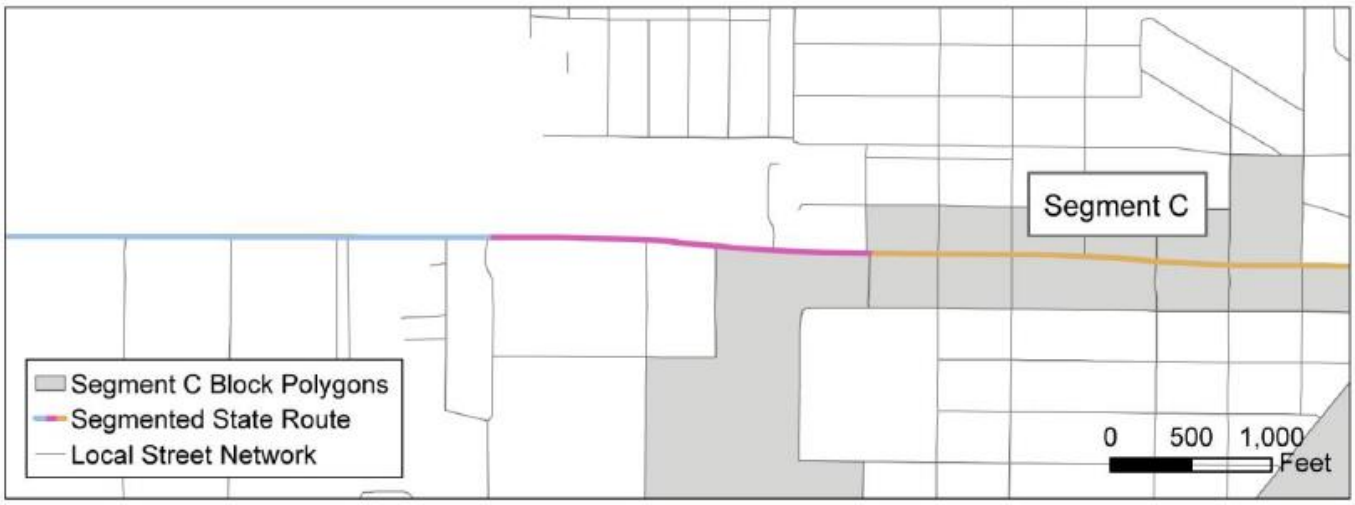


Figure 15. Calculate median block perimeter for each segment: Example 3



6. Calculate each segment's Block Perimeter Score as two (2) if the median block perimeter is less than 2,500 feet, one (1) if less than 3,000 feet but greater than 2,500 feet, and zero (0) if greater than or equal to 3,000 feet (Field Calculator)

Intersection Density

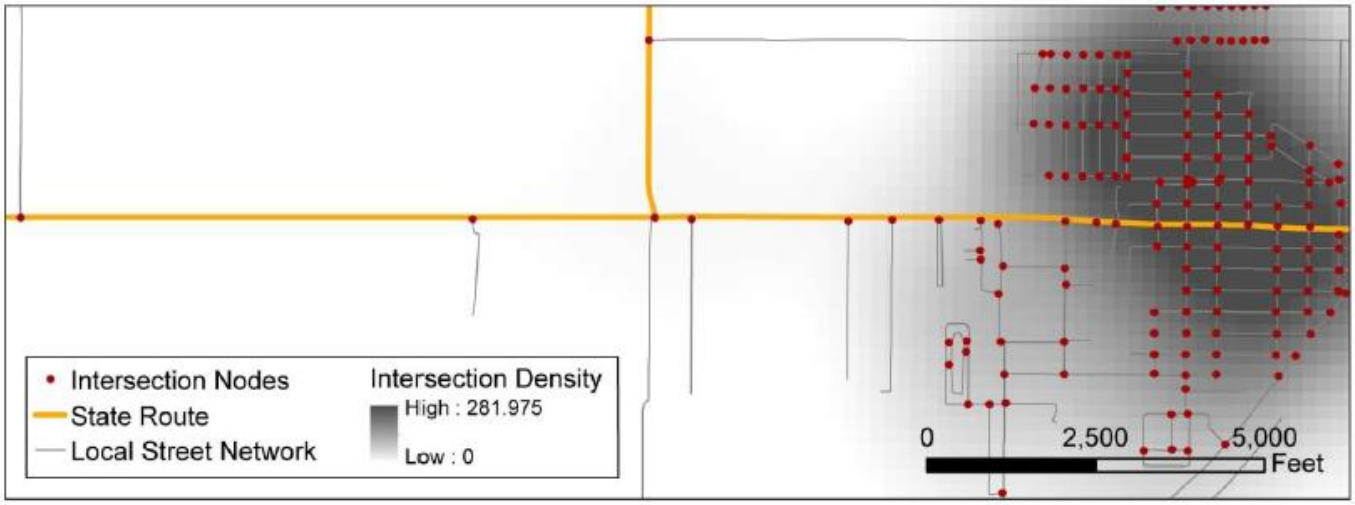
1. Extract intersection points from the combined local and FDOT roadways (ET Geowizards – Export Nodes)

    a. Note: The raw local street file cannot be used for this purpose as it uses double line segments to denote boulevards, doubling the number of intersections.

    b. Intersection nodes created by local streets with the type coded as a Terrace, Court, or Circle and length of less than 800 feet are filtered out to reduce intersection density in suburban residential areas that do not have a true block structure.

2. Create a raster surface of intersection density based on ½ mile (805 meter) search radius using 200 feet or less (61 meters or less) focal resolution (Kernel Density – requires Spatial Analyst extension) (see **Figure 16**)

Figure 16. Make intersection density raster

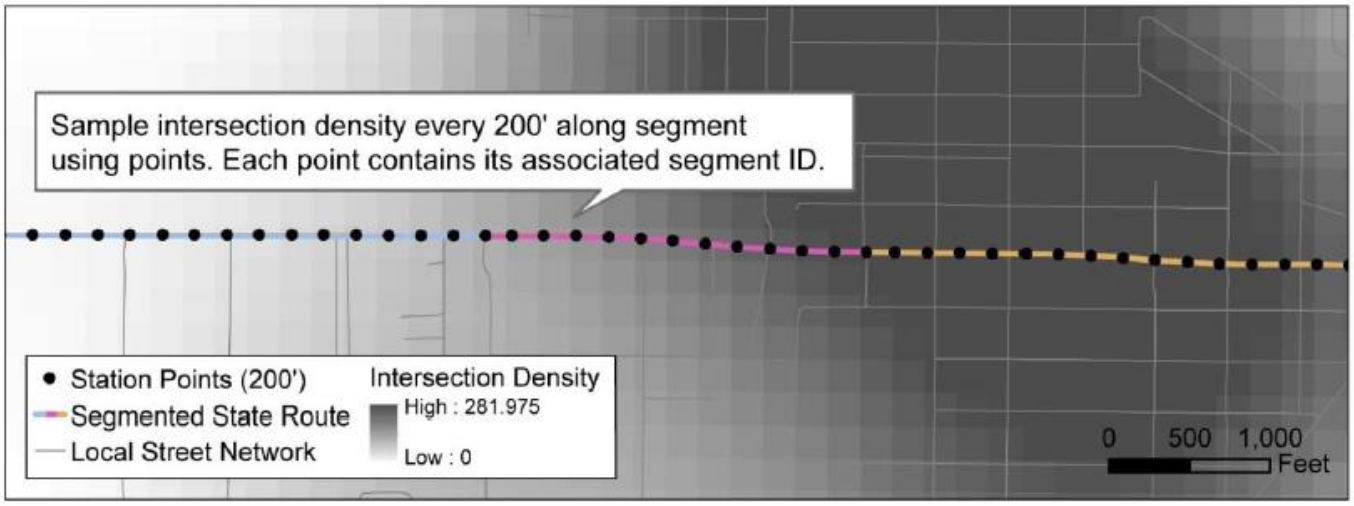


3. Create a set of sampling points located every 200 feet along each segment with the Segment ID associated with each set of points (ET Geowizards – Station Points)

    a. Note: Multiple points were used along each segment instead of the midpoint to sample more values in case of variation along the segment

4. Sample the intersection density at points along each segment (Extract Values from Raster– requires Spatial Analyst extension) (see **Figure 17**)

Figure 17. Sample intersection density along segment



5. Calculate the average intersection density along segment points (Summary Statistics)

6. Calculate each segment's Intersection Density Score as one (1) if average intersection density is greater than or equal to 100 and zero (0) if less than 100 (Field Calculator)

The three connectivity scores were summed into a single roadway connectivity measure ranging in value from zero (0) to five (5) (two points possible each for block perimeter and block length and one possible point for intersection density). Segments scoring at least three (3) out of five (5) points were preliminarily classified as urban segments: C2T – Rural Town, C4 – Urban General, C5 – Urban Center, or C6 – Urban Core. Segments that do not meet these criteria are preliminarily designated as non-urban: C1 – Natural, C2 – Rural, C3C – Suburban Commercial, or C3R – Suburban Residential.

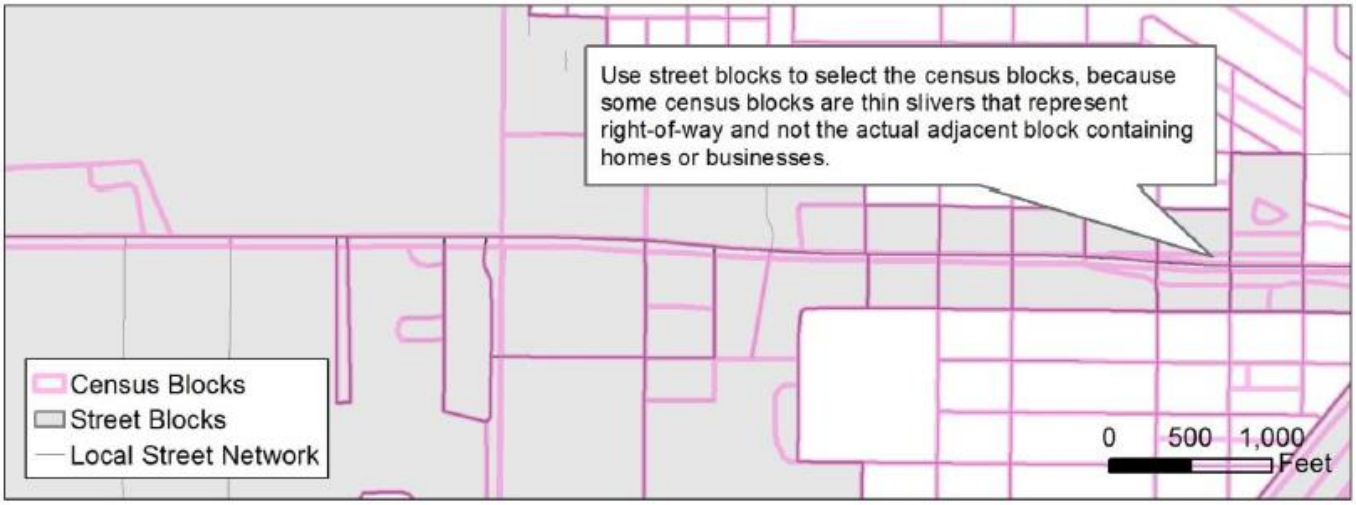
STEP 3: POPULATION AND EMPLOYMENT DENSITY MEASURES

Population and job density are measures used to distinguish between suburban and urban segments and between suburban and rural segments. Population data came from the 2010 population counts in the decennial US Census (latest with that resolution) and job counts came from the Longitudinal Employment and Housing Dynamic (LEHD) workplace 2015 dataset. Population and job density were calculated as follows:

1. Select census blocks adjacent to the state roadway network (Select by Location within 75 feet)

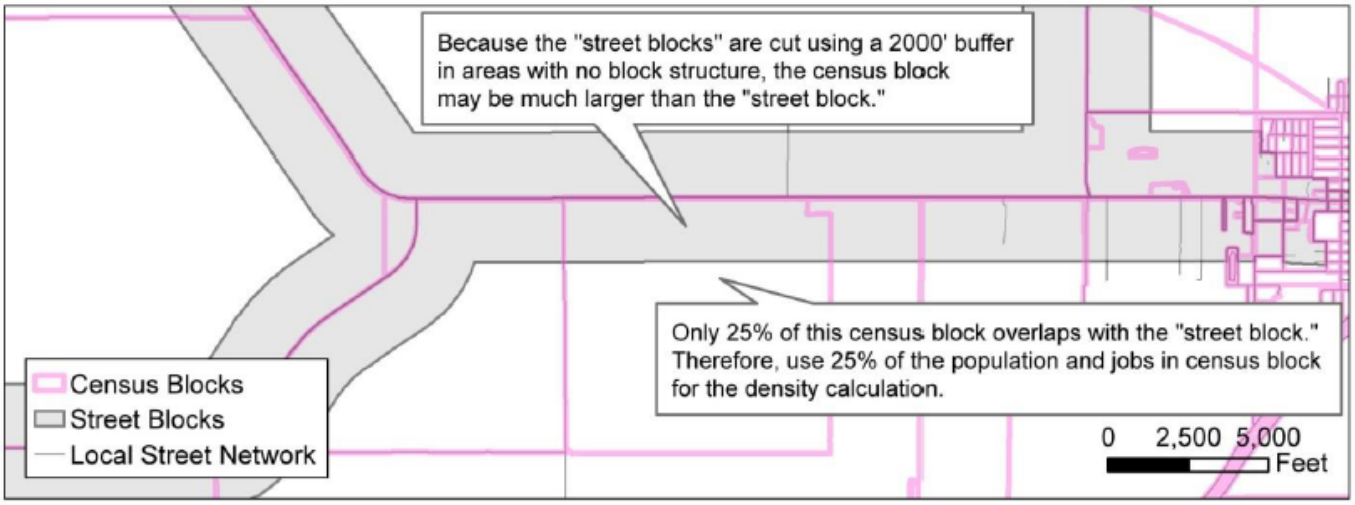
2. Since the census blocks and road network blocks have different sizes, intersect them to get the portion of the census block within the adjacent road block (Intersect) (see **Figure 18**)

Figure 18. Select adjacent census blocks using street blocks



3. Weight the census counts by the percentage of census block area within the adjacent road blocks (Field Calculator) (see **Figure 19**)

Figure 19. Weight census counts by area within street block

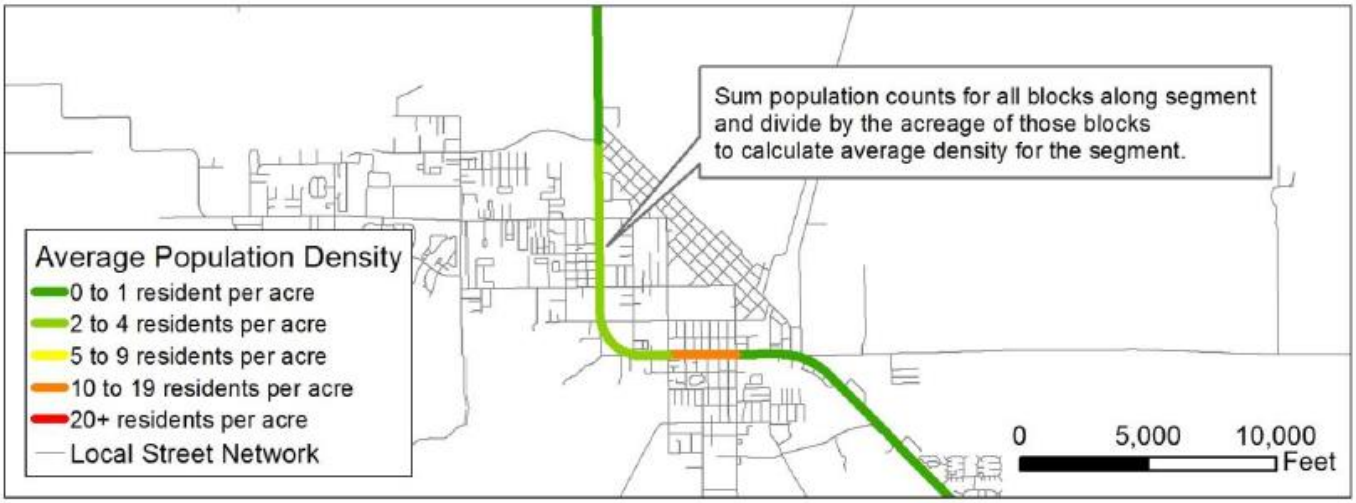


4. Attribute the segment ID to each group of intersected census blocks along the segment and sum the weighted number of jobs and residents in each adjacent census block for each segment (Spatial Join with sum as merge rule for job and population counts) (see **Figure 20**)

5. Divide the sum of job and population counts by the sum of census block acreage along the segment to obtain the population and job density measures (Field Calculator) (see **Figure 21**)

Figure 20. Calculate densities of adjacent blocks

Figure 21. Calculate average densities for segment



STEP 4: LAND USE MEASURES

The percentages of adjacent agricultural and residential land were calculated for each segment using the statewide parcel database maintained by the Florida Department of Revenue (FDoR). The proportion of land use by type for each segment was calculated as follows:

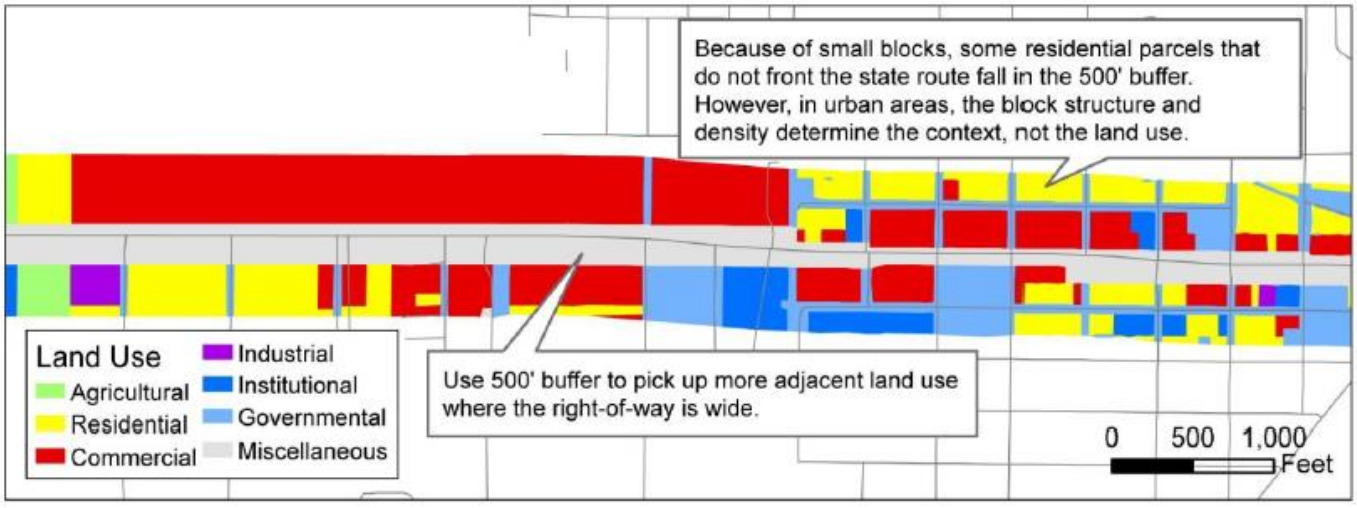
1. Simplify the land uses listed in the parcel database (Agricultural, Rural, Residential, Commercial, Governmental, Industrial, Institutional, Miscellaneous, Conservation, Other).

    a. Some detailed land uses were reclassified into a different general category or into a new category (ex. Rural). See Appendix A for the land use simplification scheme.

2. Extract a 500-foot buffer of land use from the database on either side of the highway (Buffer, Intersect) (see **Figure 22**)

    a. On a districtwide scale, 500 feet aligns approximately with the block size on either side of the road, with more rear parcels selected in urban areas and more roadway right-of-way and less fronting parcels selected in rural and suburban areas.

Figure 22. Select land use parcels along state route



3. Calculate the total area of each generalized land use (Summary Statistics to sum intersected area by segment and by land use type) as shown in Table 1.

4. Calculate the proportion of each land use type per segment buffer area as shown in **Table 1**.

5. Convert table format from long to wide format in R software using dplyr and reshape2 R packages) as shown in **Table 2**.

    a. The Summary Statistics output table was organized with repeating Segment IDs by land use type; the output from the data transformation step re-organizes the table so that each row contains a unique Segment ID with the percentages of each land use in separate columns.

6. Join the proportion of each land use type in adjacent parcels back to each segment using the unique Segment ID.

Table 1. Land Use Percentages by Land Use and by Segment ID (Example)

Segment ID	Land Use	Square Feet	Total Square Feet	Percentage
1	Commercial	938,932	1,595,652	59%
1	Governmental	16,690	1,595,652	1%
1	Institutional	92,296	1,595,652	6%
1	Miscellaneous	86,780	1,595,652	5%
1	Residential	460,954	1,595,652	29%
2	Commercial	1,120,827	1,927,780	58%
2	Governmental	23,883	1,927,780	1%
2	Miscellaneous	72,796	1,927,780	4%
2	Residential	710,274	1,927,780	37%

Table 2. Land Use Percentages by Segment ID after Table Format Conversion (Example)

Segment ID	% Commercial	% Governmental	% Institutional	% Miscellaneous	% Residential
1	59%	1%	6%	5%	29%
2	58%	1%	0%	4%	37%

STEP 5: NATURAL AND RURAL CLASSIFICATIONS

Segments with a roadway connectivity score less than three (3) that run through conservation areas as defined by Florida Natural Areas Inventory were classified as **C1 – Natural**. The definition requires that both sides of the highway designated as conservation.

Where the adjacent land uses were 50% or more agricultural and the roadway connectivity score was less than three (3) out of five (5) points, the segment was classified as **C2 – Rural**.

STEP 6: CONNECTED NETWORK CLASSIFICATIONS

Segments that received a roadway connectivity score of at least three (3) out of five (5) points were identified as C2T – Rural Town, C4 – Urban General, C5 – Urban Center, or C6 – Urban Core.

Rural town centers were identified as follows (see **Figure 23**):

1. Create a three-mile buffer around each segment that received a roadway connectivity score of at least three (3) (Buffer)

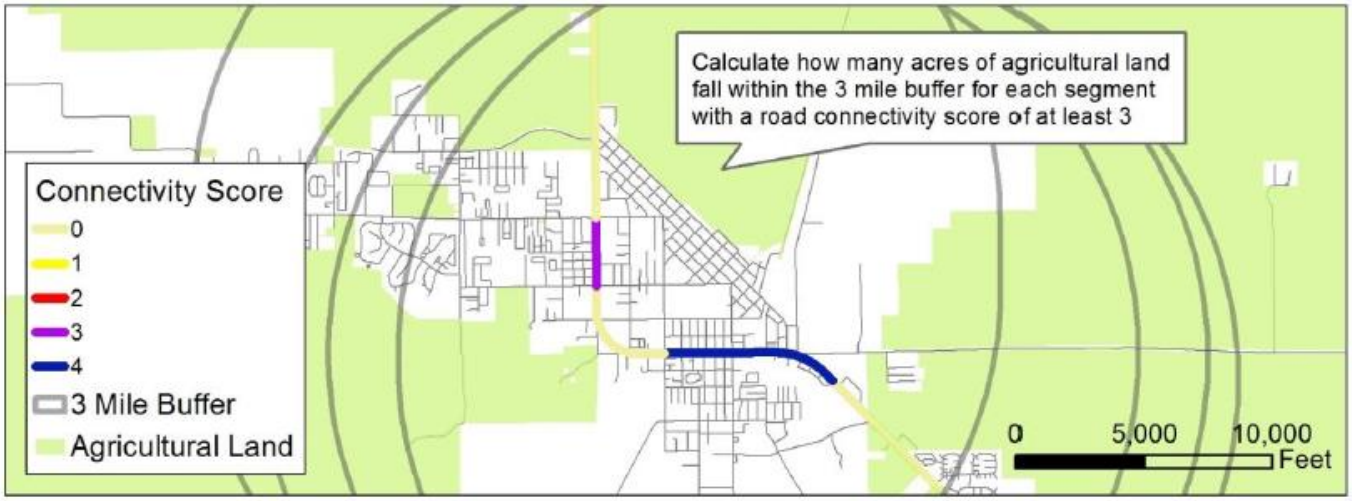
2. Extract parcels or portions of parcels within the buffer zone for each (Intersect)

3. Sum the total agricultural land use area in each buffer zone (Calculate Geometry as acres for intersected area, Summary Statistics, Join Field)

4. Select segments with 4,740 acres or more of agricultural land within the buffer (Select by Attributes). In general, areas with 5,000 or more agricultural acres tend to be rural towns; for District 7, the threshold was set as 4,740 to exclude Lutz from being classified as C2T. Lutz has 4,735 acres of agricultural land around its connected network segments.

The selected segments were classified as **C2T – Rural Town**.

Figure 23. Determine which segments go through rural towns



Urban segments were identified as follows:

- **C4 – Urban General**
    - Intersection density of at least 100 AND either: Average block length less than 500 feet OR Median block perimeter less than 3,000 feet
    - Either population density of four (4) or more residents per acre or job density of four (4) or more jobs per acre
- **C5 – Urban Center**
    - Intersection density of at least 100 AND either: Average block length less than 500 feet OR Median block perimeter less than 2,500 feet
    - Additional requirement of median block perimeter being less than 2,500 feet
    - Either job density of 20 or more jobs per acre or population density of 10 or more residents per acre.
- **C6 – Urban Core**
    - Intersection density of at least 100 AND either: Average block length less than 660 feet OR Median block perimeter less than 2,500 feet
    - Either job density of 45 or more jobs per acre or population density of 20 or more residents per acre.

All classifications were assigned using a combination of Select by Attribute and Field Calculator.

STEP 7: DISCONNECTED NETWORK CLASSIFICATIONS

Any segments not already classified as natural, rural, or urban were suburban segments: scoring fewer than three (3) points for roadway connectivity and not surrounded by conservation or agricultural land uses.

Suburban segments were identified as follows:

- **C3R – Suburban Residential**
    - At least 20% of the adjacent land use is residential
    - The adjacent land use contains a higher proportion of residential than commercial
- **C3C – Suburban Commercial**
    - At least 20% of the adjacent land use is commercial OR at least 20% is industrial OR at least 30% is governmental
    - The adjacent land use contains a higher proportion of commercial, industrial, or governmental than residential

Some resulting suburban segments were interspersed with longer C2 segments in less developed areas of the district. Therefore, C3C and C3R segments and any remaining unclassified segments with all the following characteristics were assigned as **C2 – Rural:**

- Fewer than 20 intersections per square mile OR median block perimeter is greater than 3,000 feet (or -9999) OR average block length is longer than 660 feet (or -9999)
- Less than 20% of the adjacent land use is commercial OR less than 20% of the adjacent land use is residential OR less than 50% of the land use is miscellaneous
- At least 10% of the adjacent land use is agricultural
- Population density less than 1 resident per acre
- Job density less than 1 job per acre

STEP 8: BRIDGES

In most cases, the above classification system defaults long bridge segments to a suburban or rural context. The classification guidelines suggest that bridges be classified to match the higher classification of its two ends. Using the FDOT bridge inventory database, segments that coincided with a bridge link were manually edited to match the context of the higher neighbor segment.

STEP 9: MANUALLY CLASSIFIED SEGMENTS

After Steps 1 through 8, eleven (11) unclassified segments remained. These segments did not meet urban or rural town roadway connectivity thresholds, but also did not have high enough land use percentages to be classified as rural, suburban commercial, or suburban residential. Since they tended to be adjacent to C3 and C2 segments, these segments were manually assigned the same context (C3C, C3R, or C2) as their neighboring segments.

SUMMARY

Table 3 summarizes the results of the preliminary context classification evaluation, using the methodology outlined in this memorandum. The table provides the centerline lane miles for each context classification by FDOT functional classification.

Table 3. Summary of Preliminary Context Classification

	Centerline Miles							
Context Classification	Total	Rural Principal Arterial (04)	Rural Minor Arterial (06)	Rural Major Collector (07)	Urban Principal Arterial (14)	Urban Minor Arterial (16)	Urban Major Collector (17)	Urban Minor Collector (17)
C1	19	16	--	--	3	--	--	--
C2	189	61	15	2	108	2	<1	<1
C2T	16	--	--	--	15	<1	--	--
C3C	322	4	--	--	288	29	--	<1
C3R	191	9	--	<1	141	35	3	<1
C4	87	--	--	--	37	48	<1	--
C5	17	--	--	--	9	8	--	--
C6	7	--	--	--	5	2	--	--
Total	847	89	15	2	606	124	5	1

APPENDIX A: LAND USE CATEGORIES

Table 1. Simplified land use categories used in GIS tool process

Land Use Category	Detailed Land Use Description
Agricultural	Improved agricultural
	Cropland soil capability Class I
	Cropland soil capability Class II
	Cropland soil capability Class III
	Timberland - site index 90 and above
	Timberland - site index 80 to 89
	Timberland - site index 70 to 79
	Timberland - site index 60 to 69
	Timberland - site index 50 to 59
	Timberland not classified by site index to Pines
	Grazing land soil capability Class I
	Grazing land soil capability Class II
	Grazing land soil capability Class III
	Grazing land soil capability Class IV
	Grazing land soil capability Class V
	Grazing land soil capability Class VI
	Orchard Groves, citrus, etc.
	Poultry, bees, tropical fish, rabbits, etc.
	Dairies, feed lots
	Ornamentals, miscellaneous agricultural
Commercial	Vacant Commercial
	Stores, one story
	Mixed use - store and office or store and residential combination
	Department Stores
	Supermarkets
	Regional Shopping Centers
	Community Shopping Centers
	Office buildings, non-professional service buildings, one story
	Office buildings, non-professional service buildings, multi-story
	Professional service buildings
	Airports (private or commercial), bus terminals, marine terminals, piers, marinas
	Restaurants, cafeterias
	Drive-in Restaurants
	Financial institutions (banks, saving and loan companies, mortgage companies, credit services)
	Insurance company offices
	Repair service shops (excluding automotive), radio and T.V. repair, refrigeration service, electric repair, laundries, Laundromats
	Service stations
	Auto sales, auto repair and storage, auto service shops, body and fender shops, commercial garages, farm and machinery sales and services, auto rental, marine equipment, trailers and related equipment, mobile home sales, motorcycles, construction vehicle sales
	Parking lots (commercial or patron), mobile home parks
	Wholesale outlets, produce houses, manufacturing outlets
	Florists, greenhouses
	Drive-in theaters, open stadiums

	Enclosed theaters, enclosed auditoriums
	Nightclubs, cocktail lounges, bars
	Bowling alleys, skating rinks, pool halls, enclosed arenas
	Tourist attractions, permanent exhibits, other entertainment facilities, fairgrounds (privately owned)
	Camps
	Race tracks (horse, auto, or dog)
	Hotels, motels
Governmental	Vacant Governmental
	Military
	State, other than military, forests, parks, recreational areas, colleges, hospitals
	Federal, other than military, forests, parks, recreational areas, hospitals, colleges
	Municipal, other than parks, recreational areas, colleges, hospitals
	Hospitals (non-private)
	Counties (other than public schools, colleges, hospitals) including non-municipal government
Industrial	Vacant Industrial
	Light manufacturing, small equipment manufacturing plants, small machine shops, instrument manufacturing, printing plants
	Heavy industrial, heavy equipment manufacturing, large machine shops, foundries, steel fabricating plants, auto or aircraft plants
	Lumber yards, sawmills, planing mills
	Packing plants, fruit and vegetable packing plants, meat packing plants
	Canneries, fruit and vegetable, bottlers and brewers, distilleries, wineries
	Other food processing, candy factories, bakeries, potato chip factories
	Mineral processing, phosphate processing, cement plants, refineries, clay plants, rock and gravel plants
	Warehousing, distribution terminals, trucking terminals, van and storage warehousing
	Open storage, new and used building supplies, junk yards, auto wrecking, fuel storage, equipment and material storage
Institutional	Vacant Institutional, with or without extra features
	Churches
	Private schools and colleges
	Privately owned hospitals
	Colleges (non-private) ("Governmental" in FDoR classification)
	Orphanages, other non-profit or charitable services
	Mortuaries, cemeteries, crematoriums
	Clubs, lodges, union halls
	Sanitariums, convalescent and rest homes
	Cultural organizations, facilities
	Public county schools - including all property of Board of Public Instruction ("Governmental" in FDoR classification)
Miscellaneous	Leasehold interests (government-owned property leased by a non-governmental lessee)
	Utility, gas and electricity, telephone and telegraph, locally assessed railroads, water and sewer service, pipelines, canals, radio/television communication
	Centrally assessed
	Subsurface rights
	Right-of-way, streets, roads, irrigation channel, ditch, etc.
	Acreage not zoned agricultural with or without extra features
Residential	Vacant Residential
	Single Family
	Mobile Homes

	Golf courses, driving ranges
	Multi-family - 10 units or more
	Condominiums
	Cooperatives
	Retirement Homes not eligible for exemption
	Miscellaneous Residential (migrant camps, boarding homes, etc.)
	Multi-family - fewer than 10 units
	Residential Common Elements/Areas
	Homes for the aged ("Institutional" in FDoR classification)
Rural	Mining lands, petroleum lands, or gas lands ("Miscellanous" in FDoR classification)
	Sewage disposal, solid waste, borrow pits, drainage reservoirs, waste land, marsh, sand dunes, swamps ("Miscellanous" in FDoR classification)
Conservation	Forest, parks, recreational areas ("Governmental" in DoR classification)
	Outdoor recreational or parkland, or high-water recharge subject to classified use assessment ("Miscellanous" in FDoR classification)
	Rivers and lakes, submerged lands ("Miscellanous" in FDoR classification)