SEMINOLE COUNTY
PARKS & PRESERVATION ADVISORY COMMITTEE
January 22, 2020 MEETING MINUTES

ATTENDANCE:
Members Present: Mark Brandenburg, Nancy Dunn, Reid Hilliard, Jason Sutton, Ashlee Woodard, Grey Wilson, Pasha Baker, Emily Hanna and L. A. Key.

Members Absent: Robert Bowden, Tom Boyko, Jim Buck, Victoria Colangelo, Bryce Gibson, Ed Ghiglieri, Rocky Harrelson

Staff Present: Richard Durr, Leisure Services Director
Michael Wirsing, Parks & Recreation Manager
Sherry Williams, Special Projects Program Manager
Corey Warner, Administrative Assistant

LOCATION: Soldiers Creek Park
2400 State Road 419, Longwood, FL 32750

TIME: Chairman Mark Brandenburg called the meeting to order at 6:30 p.m. There is a quorum in attendance.

PLEDGE OF ALLEGIANCE

APPROVAL OF MINUTES: Motion to strike the Vetting Process out of the previous minutes was made. This motion passed unanimously.

ELECTION OF OFFICERS
- After discussion, a motion was made to reappoint Mark Brandenburg as Chairman and Emily Hanna as Vice Chair.

OLD BUSINESS:
- None

NEW BUSINESS:
- PJ Smith gave a detailed presentation about the LOTIS System developed by the East Central Florida Regional Planning Council. This presentation can be found attached.
- Rick Durr discussed the Countywide Review for Referendum
    - The Leisure Services Budget, and its effects on the referendum was discussed.
    - The overall system plan was the other topic. Of this, neighborhood parks and boat ramp parts were discussed.

- Rick Durr also discussed the recent TAC Meeting.

OTHER BUSINESS:

- Nothing

Public Comment:

- Kimberly Boukait was asking to find a copy of the Master Plan that was discussed.

Adjourn: Mr. Brandenburg adjourned the meeting at 8:00 p.m.

LOTIS Methodology

Version 2.0 | Published 1.15.2020

LOTIS 2.0

Land Overlayed on Transportation Information System

A singular lens for transportation and land use planning

January 2020

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Part 1. Overview

1.1 Overview of LOTIS

LOTIS (Land Overlayed on Transportation Information System) is a unified planning database that overlays transportation and land use data over Metropolitan Orlando (Orange, Osceola and Seminole counties).

The database is created in ArcGIS and features two principle files:

1) A polyline file that stores roadway characteristic information and cross-referenced proximity information; and
2) A polygon file derived from County Property Appraiser data that stores highly-specific land use information for points of interest.

The polyline transportation file is used to generate safety scores for roadway segments, provide a mapping interface for roadway characteristics, and is used as an input feature for a number of algorithms described later in this report. The polygon land use file is used to identify points of interest in map-form, generate proximity scores for roadway segments, and to identify vacant parcels for land use deficiency overlays described later in this report.

Goal: To provide a lens that unifies transportation and land use planning.

1.2 Original Funding Source and Version Updates

In 2018, MetroPlan Orlando and the East Central Florida Regional Planning Council applied for a "Multi-Modal Connectivity Pilot" grant from the Federal Highway Administration (FHWA) and were awarded $250,000 to complete the LOTIS database in addition to further analyses. At the time of the application, the LOTIS database was referred to as the "Route Condition Tool". However, the tool scope was expanded considerably during the term of the FHWA grant cycle and therefore a name change was made to reflect the adjustment in the comprehensiveness of the tool.

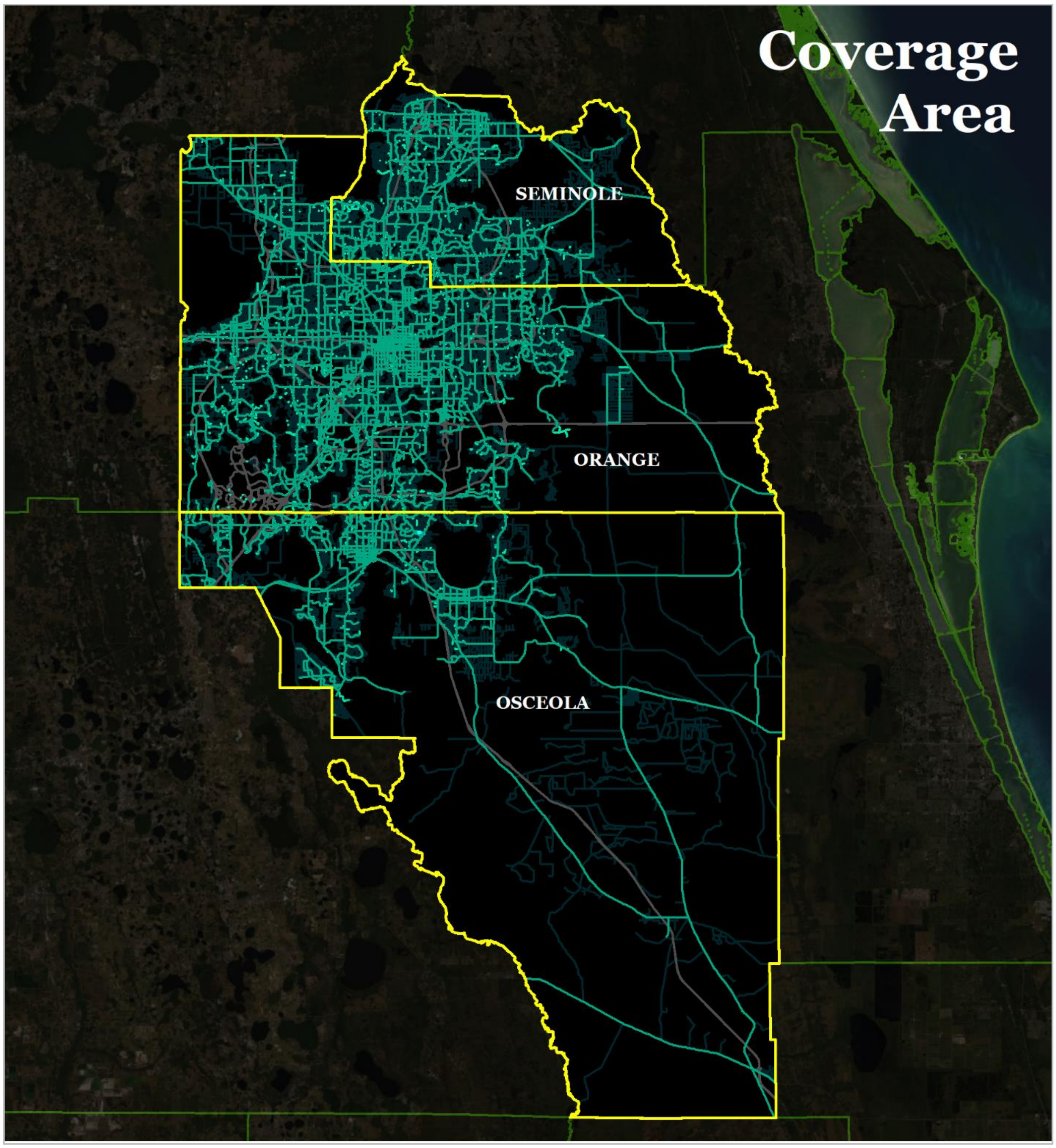
The project term spanned from November 1st, 2018 to September 30th, 2019, and final deliverables as part of LOTIS 1.0 were provided by the East Central Florida Regional Planning Council on October 1st, 2019.

Following the deliverable of LOTIS 1.0, further work was completed to complete the LOTIS 2.0 update. This update is comprehensive and all use of the tool after 1/15/2020 will use the LOTIS 2.0 baseline data and algorithms.

1.3 LOTIS Coverage Area

The LOTIS database covers the following counties in east central Florida:

- Orange
- Osceola
- Seminole



Part 2. Database Creation and Update Procedures

2.1 Transportation Polyline Data Creation

As described on the previous page, LOTIS consists of a transportation polyline file that stores roadway characteristic and proximity information. The steps outlined in this section of the report describe the data creation process for this file.

Step 1: Baseline File Creation

The first step in the data creation process is the creation of a final roadway system polyline file using existing data sources. This was done utilizing data from the Florida Department of Transportation, Orange County, Osceola County and Seminole County.

Step 1.1: Download Baseline Data

- Florida Department of Transportation data was downloaded from the following link:
  - https://www.fdot.gov/statistics/gis/
- Orange County data was downloaded from the following link:
  - ftp://ftp.onetgov.net/divisions/Infomap/pub/GIS_Downloads/FTP%20Shapefiles/
- Osceola County data was provided to the project team directly from the County Transportation Department.
- Seminole County data was downloaded from the following link:
  - http://cdn.seminolecountyfl.gov/departments-services/information-services/gis-geographic-information-systems/gis-data.stml

Step 1.2: Strip Attributes

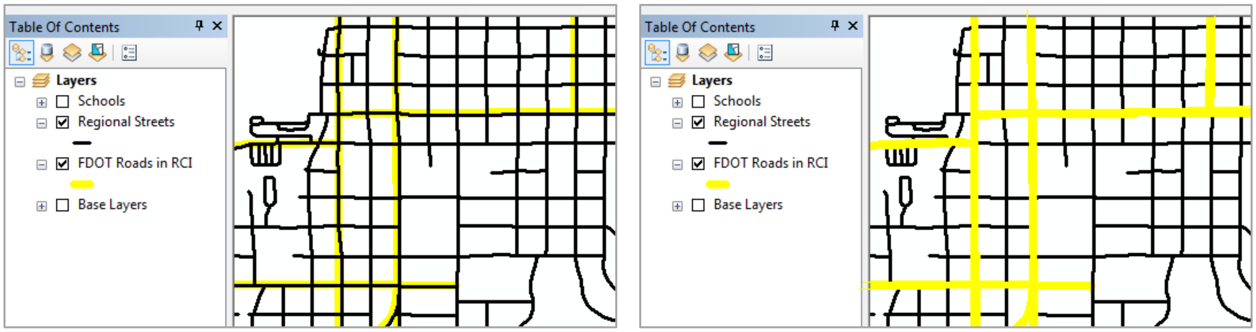
Following the download of the data, the baseline files were stripped of attributes that would not later be coded into the LOTIS database. The 'ROADWAY' and 'DESC' attributes within the FDOT file were kept for future cross-reference. The 'DESC' field is named 'ROADNAME' in the LOTIS database, while the 'ROADWAY' field remains unchanged.

Step 1.3: Clip to the 3-County Study Area

The base FDOT polyline file was clipped to the 3-County study area. The County study area polygon file was obtained from the Florida Geographic Data Library (FGDL) and the file name is cntbnd_sep15.shp. All counties other than Orange, Osceola and Seminole were deleted manually from this file before the clip function was performed.

Step 1.3: Delete Records from Countywide Street Layers

Florida Department of Transportation data was used as the primary dataset, but does not cover all local roadways. Therefore, overlap between the County and FDOT files along state roads led to County records being deleted. This was done in ArcGIS via a color-coding technique that allowed overlap to be viewed. The image below depicts this process in ArcGIS:



The image on the left shows the records before deletion, while the image on the right shows the FDOT (yellow) polylines unobstructed due to the deletion of the local roadway records. For records that did not have the same end-points from the County to the State level, roadway segments were "cut" in ArcGIS to prevent segment gaps.

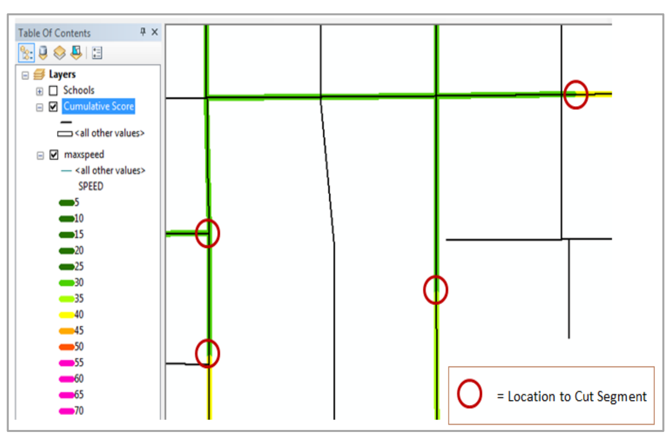
Step 1.4: Merge Files and Quality Assure for Gaps

The Orange County, Osceola County, Seminole County and FDOT polyline files were then merged into a final baseline file. Quality assurance was provided one more time to ensure that there were no gaps present in the roadway file.

Step 2: Attributes, Data Sources and Special Circumstances

This section of the report outlines the data creation process for all attributes within the transportation polyline database. Included with each attribute are the description, data sources used, methods of completion, special circumstances and quality assurance steps.

In order to code this information, ArcGIS MXD files were customized with advanced color-coding, transparency, and line thickness for each attribute in order to code data from existing FDOT, countywide and citywide shapefiles. It is important to note that every time an attribute symbol changes (ex: a speed limit change from 25 to 30 miles per hour), the line segment is "cut" in that location. The image to the right depicts this circumstance.



ROADWAY

Description: The FDOT roadway segment identification number.

Data Source(s) and Methods: FDOT RCI file; non-FDOT roadways are assigned the symbol "Non-FDOT"

Quality Assurance: None, accepted data "as is".

COUNTY

Description: The County that the roadway segment is located within.

Data Source(s) and Methods: Florida Geographic Data Library (FGDL) counties polygon file. Roadways were selected by location to generate their location.

Quality Assurance: Roadways were color-coded and overlayed with County boundaries to find errors.

ROADNAME

Description: The full name of the roadway as included in the original County and FDOT polyline files.

Data Source(s) and Methods: Sources included FDOT, Orange County, Osceola County and Seminole County. The most descriptive roadway name field from each base file was used to populate this field.

Quality Assurance: None, accepted data "as is".

ROADTYPE

Description: The road type classification as identified by the planning team. The following road types (and descriptions) were used as part of this attribute:

- Disney: These are roadways located on Disney World property that are limited access, are used as access to theme parks, and that generally have zero pedestrian and bicycle traffic. Roadways on Disney World property with sidewalks and pedestrian activity are not included in this classification. These roadways are not scored as part of this analysis.
- FDOT: These are roadways provided in the FDOT RCI file that do not fit into the description of the other five FDOT classifications (which are summarized below).
- FDOT – Airport Access: These are roadways that serve Orlando International Airport that have zero pedestrian and bicycle traffic. These roadways are not scored as part of this analysis.
- FDOT – Construction: These are FDOT roadways that were under construction at the time of coding in 2019. The satellite imagery used has an effective date of 2018. These roadways are not scored as part of this analysis, but will be in future updates.
- FDOT – Limited Access: These are highways (interstates, toll roads, etc.) that have exits and on-ramps. These roadways are not scored as part of this analysis.
- FDOT – New Highway: These are new highways (specifically, 429 near Apopka) that were not included in the most recent FDOT RCI file. These roadways are not scored as part of this analysis.
- Local Under Construction: These are county and city roadways that were under construction at the time of coding in 2019. The satellite imagery used has an effective date of 2018. These roadways are not scored as part of this analysis, but will be in future updates.

- Main Local: These are non-FDOT roadways that 1) have more than two lanes; 2) act as connectors between other major roadways; and 3) are principal roadways in large residential neighborhoods.
- Minor Local: These are non-FDOT neighborhood roads with 2 lanes, no outlier features (such as bike lanes and medians) and minimal traffic.
- Minor Local with Deviation: These are non-FDOT neighborhood roads that have a deviation, such as medians, bike lanes, a turn lane, or other anomaly.

Data Source(s) and Methods: Satellite imagery and an analysis of the connectivity of the roadway network was used to determine the classifications for each roadway. The project team included as many roadways as possible in the "main local" category in order to create a connected regional network.

Quality Assurance: Road types were color coded and quality assured via satellite imagery. This included the addition of numerous "main local" roadways that were shown to connect major networks. Roadways were also quality assured to ensure consistency in road type from critical start and end points (such as two major roadways that the roadway connects).

LENGTH

Description: The length of the roadway segment, in miles.

Data Source(s) and Methods: Auto-Generated with geometry calculation function in ArcGIS

Quality Assurance: The planning team ensured that no blank records were generated. Additionally, a "massive cut" was also performed on the roadway segments using this field in order to improve proximity scoring. The largest segments in the database were cut prior to final scoring.

SPEED

Description: The speed limit of the roadway.

Data Source(s) and Methods: FDOT provided speed limit data, which was coded into the LOTIS database using color coding and line thickness manipulation in ArcGIS. In some circumstances, two speed limits were present on one roadway, likely due to different speed limits for cars traveling in opposite directions. In this case, the higher of the two speed limits was used. In addition to FDOT, "main local" roadways were populated with speed limit information using the Google Maps ground level viewer. Minor local roadways and minor local with deviation roadways were provided a value of "30 or less" unless quality assured via satellite imagery.

Quality Assurance: Color coding deviations in ArcGIS allowed the project team to view mis-matches between the LOTIS file and the FDOT file after the data was initially populated.

THRU_LANES

Description: The number of through-lanes present on a roadway segment.

Data Source(s) and Methods: This data was coded using satellite imagery. While some roadways technically have zero through-lanes at t-intersections, a minimum value of "2" was utilized.

Quality Assurance: The project team poured over satellite imagery to improve the data after the initial data was coded. The initial data was approximately 99.5% accurate upon secondary review.

TURN_LANES

Description: The number of turn-lanes present on a roadway segment.

Data Source(s) and Methods: This data was coded using satellite imagery. The project team looked for turn lane markers (such as arrows and solid white lines) in order to identify turn lanes.

Quality Assurance: The project team poured over satellite imagery to improve the data after the initial data was coded. The initial data was approximately 99.5% accurate upon secondary review.

OFFRAMP_LN

Description: The number of on-and-offramp-lanes present that are parallel to the roadway segment.

Data Source(s) and Methods: This data was coded using satellite imagery.

Quality Assurance: A secondary review of all offramp lanes was performed following initial coding. The initial data was approximately 99.5% accurate upon secondary review.

BUS_LANE

Description: The number of bus-only lanes present on a roadway segment.

Data Source(s) and Methods: The data was coded using satellite imagery with the LYNX transit routes shapefile used as a back-drop. The project team looked for "Bus Only", "Bus Lane", or other text markings, while other bus lanes were spotted via a difference in color or the presence of protected bike lanes adjacent to the bus lane.

Quality Assurance: A secondary review of all bus lanes was performed following initial coding. The initial data was 100% accurate upon secondary review.

TOTL_LANES

Description: The total number of lanes, including through lanes, turn lanes, bus lanes and ramp lanes.

Data Source(s) and Methods: The data was auto-generated using the through lanes, turn lanes, bus lanes and ramp lanes fields.

Quality Assurance: This field was quality assured following the completion of the surface width field, with initial coding 99.5% accurate. A new attribute "average lane width" was generated and the project team color coded this data in GIS. Three circumstances led the quality assurance of a roadway segment:

1) Average lane width greater than 13, or
2) Average lane width less than 9.5, or
3) Abrupt changes in the color coding of average lane widths along a single roadway corridor.

SURF_WIDTH

Description: The marked surface width (in feet) of the roadway, not including bike slots and medians.

Data Source(s) and Methods: This data was coded using satellite imagery and the "measure" tool in ArcGIS. A scale of 1:400 was used in ArcGIS to ensure accuracy to a 1-foot margin of error. Additionally, due to the ever-changing dimensions of roadways (such as gradual increases from outside turn lanes), each roadway segment was analyzed based on a static roadway section. For example: The start of a turn

lane marked the beginning of the new roadway section and the roadway was measured once the lane was at full-length. Minor local roadways are provided a blanket value of less than 30.
Quality Assurance: The same quality assurance that was used on total number of lanes (TOTL_LANES) was used for the surface width field. No surface width errors were found during this quality assurance process; errors were limited to the number of total lanes.

MEDIAN_WTH
Description: The marked width of medians (in feet), including inside shoulders.
Data Source(s) and Methods: This data was coded using satellite imagery and the "measure" tool in ArcGIS. A scale of 1:400 was used in ArcGIS to ensure accuracy to a 1-foot margin of error.
Quality Assurance: Due to the accuracy of the surface width field upon review, no satellite review was made to the median width field. However, the project team ensured that all roadway segments with median widths greater than zero were also assigned a median type.

MEDIAN_TP2
Description: The type of median(s) present on a roadway.
Data Source(s) and Methods: This data was coded using satellite imagery. Three types of median types were found, including grass, paved and brick. Roundabout medians are not included in the database. In circumstances where multiple medians were present on a roadway segment, the types of medians present were coded in the following order:

- North to South
- West to East
- Northwest to Southeast
- Southwest to Northeast

Quality Assurance: Median types were color coded and made transparent in ArcGIS and the project team reviewed satellite imagery to review for accuracy. The initial data created was approximately 99.9% accurate upon review.

TOT_WIDTH
Description: The total width of the roadway, including travel lanes, medians and interior bike slots.
Data Source(s) and Methods: This field was auto-generated using the surface width, median width and interior bike lanes fields. If one interior bike lane was present, 4 feet was added to the total width. If two interior bike lanes were present, then 8 feet was added to the total width. Bike lanes located on the outside shoulder are not included in this field. Additionally, due to the ever-changing dimensions of roadways (such as gradual increases from outside turn lanes), each roadway segment was analyzed based on a static roadway section. For example: The start of a turn lane marked the beginning of the new roadway section and the roadway was measured once the lane was at full-length. Minor local roadways are assigned a blanket value of less than 30.
Quality Assurance: No additional quality assurance was performed on this field due to the previous quality assurance done to the fields that led to its auto-generation.

AVG_LN_WID

Description: The average lane width, calculated as surface width divided by total number of lanes.

Data Source(s) and Methods: This is an aggregate field that utilizes SURF_WIDTH and TOTL_LANES. The field is derived from the following equation: AVG_LN_WID = (SURF_WIDTH / TOTL_LANES)

Quality Assurance: No additional quality assurance was performed on this field due to the previous quality assurance done to the fields that led to its auto-generation.

SIDEWALK

Description: The number of sidewalks present along the roadway (0, 1 or 2).

Data Source(s) and Methods: This data was coded using satellite imagery with City and County sidewalk files used as a reference. There were some special circumstances encountered with this variable. First, roundabouts with sidewalk coverage along the entire outside boundary were provided with a value of '2' despite a lack of sidewalk in the center median. Secondly, in situations where cycle tracks are present but there are no sidewalks present, the cycle track is counted as a sidewalk.

Quality Assurance: A secondary review of the data was performed using satellite imagery. This review found approximately 90% accuracy of the initial data; therefore, a full second quality assurance step was taken to improve the data.

SW_FLUSH

Description: The number of sidewalks present that are not buffered to the roadway (0, 1 or 2).

Data Source(s) and Methods: This data was coded using satellite imagery. One special circumstance was encountered: In highly urbanized areas with sporadic planters and buffers, if the planter or buffer coverage was less than 50%, then the sidewalk was marked as flush. *At the time of the publishing of this report, Osceola County flush sidewalks have not been added to the database.*

Quality Assurance: A secondary review of the data was performed using satellite imagery. This review found approximately 90% accuracy of the initial data; therefore, a full second quality assurance step was taken to improve the data.

BIKELN_TYP

Description: The types of bike lanes present along the roadway.

Data Source(s) and Methods: Bike lane types include protected bike lanes, marked bike lanes, unmarked bike lanes, bike slots, median bike lanes, sharrows and cycle tracks and were coded in using satellite imagery. If the shoulder of a roadway was unmarked and less than 4 feet in width, then this was classified as no bike lane present. However, marked bike lanes that were measured less than 4 feet in width are included in this field. In circumstances where multiple bike lanes are present, the following order was used within the field:

- North to South
- West to East
- Northwest to Southeast
- Southwest to Northeast

Quality Assurance: A gap analysis was performed on bike lane types along all corridors to ensure accuracy. Additionally, City and County bike lane maps were reviewed to ensure that no bike lanes were being missed during the aerial coding process.

PAVED_SHLD

Description: The number of marked or unmarked bike lanes or bike slots present (0, 1 or 2).

Data Source(s) and Methods: This data was auto-generated using the BIKELN_TYP field. However, in circumstances where cycle tracks were present, these facilities were not treated as paved shoulders if they were located off of the roadway network. Additionally, median bike lanes and sharrows were not counted as paved shoulders.

Quality Assurance: Quality assurance for this field was directly tied to the quality assurance of the BIKELN_TYP field. Any alterations to both fields were made simultaneously upon quality review.

INT_BIKELN

Description: The number of interior bike lanes (bike slots) present (0, 1 or 2).

Data Source(s) and Methods: This data was auto-generated using the BIKELN_TYP field. The project team performed a "select by attributes" on the BIKELN_TYP field and populated the INT_BIKELN field.

Quality Assurance: Quality assurance for this field was directly tied to the quality assurance of the BIKELN_TYP field. Any alterations to both fields were made simultaneously upon quality review.

AADT ("DOUBLE" FIELD: AADT2)

Description: Annual Average Daily Traffic counts.

Data Source(s) and Methods: FDOT provided annual average daily traffic data, which was coded into the LOTIS database using color coding and line thickness manipulation in ArcGIS. Main local and minor local roadways were provided "blanket" values for this attribute until specific counts come in. This includes "less than 10,000" for main local roadways and "less than 5,000" for minor local roadways. Following initial coding, County AADT figures will be added to the database upon receipt from Orange, Osceola and Seminole Counties. The City of Lake Mary provided AADT data, which has been incorporated into the LOTIS database.

Quality Assurance: Color coding deviations in ArcGIS allowed the project team to view mis-matches between the LOTIS file and the FDOT file after the data was initially populated.

TRK_AADT ("DOUBLE" FIELD: TRK_AADT2)

Description: Annual Average Daily Truck Traffic counts.

Data Source(s) and Methods: FDOT provided annual average daily truck traffic data, which was coded into the LOTIS database using color coding and line thickness manipulation in ArcGIS. Main local and minor local roadways were provided "blanket" values for this attribute until specific counts come in. This includes "less than 1,000" for main local roadways and "less than 500" for minor local roadways.

Quality Assurance: Color coding deviations in ArcGIS allowed the project team to view mis-matches between the LOTIS file and the FDOT file after the data was initially populated.

AADTPRLANE ("DOUBLE" FIELD: AADTPRLN2)

Description: The Annual Average Daily Traffic per lane.

Data Source(s) and Methods: This is an aggregate field that utilizes AADT and TOTL_LANES. The field is derived from the following equation: AADTPRLANE = (AADT / TOTL_LANES)

Quality Assurance: No additional quality assurance was performed on this field due to the previous quality assurance done to the fields that led to its auto-generation.

CONSTRUCTN

Description: Describes (yes or no) whether a roadway is currently under construction.

Data Source(s) and Methods: This data was coded using satellite imagery. The project team will focus on updating these records when the tool is updated.

Quality Assurance: An aerial review found that 100% of the records were coded correctly using the satellite imagery available.

TRAFF_SIG

Description: The distance to the nearest traffic signal (ex: 1/8 mile translates to "within 1/8 mile)

Data Source(s) and Methods: A traffic signal file was created using the FDOT traffic signal as a baseline. The project team used satellite imagery to add traffic signal points on local roadways that were not included in the FDOT data. This accumulated into a voluminous amount of data additions, including the addition of traffic signals along FDOT roadways which were not captured by the dataset. Following this step, proximity (of segments) to traffic signal points were executed at 1/8 mile using the "Select by Location" function in ArcGIS for FDOT, Main Local and Minor Local with Deviation roadways only. This distance was used to account for expansive turn lane sections.

Quality Assurance: Traffic signals were quality assured via satellite imagery for a second time following the initial data input. FDOT point locations were also moved to be within each intersection.

LIGHTING

Description: Describes (yes or no) whether a roadway has street lighting or not.

Data Source(s) and Methods: This data was not available as of 9/17/2019.

Quality Assurance: None.

FUNC_CLASS

Description: The functional classification of the roadway (FDOT only).

Data Source(s) and Methods: FDOT provided functional classification data, which was coded into the LOTIS database using color coding and line thickness manipulation in ArcGIS. Main local and minor local roadways currently are not classified.

Quality Assurance: Color coding deviations in ArcGIS allowed the project team to view mis-matches between the LOTIS file and the FDOT file after the data was initially populated.

SURFC_TYPE

Description: Roadway surface type (FDOT only).

Data Source(s) and Methods: FDOT provided surface type data, which was coded into the LOTIS database using color coding and line thickness manipulation in ArcGIS. Main local and minor local roadways currently are not classified. Osceola County data has also been included "as is".

Quality Assurance: Color coding deviations in ArcGIS allowed the project team to view mis-matches between the LOTIS file and the FDOT file after the data was initially populated.

PAVE_COND

Description: Roadway pavement conditions (FDOT only).

Data Source(s) and Methods: FDOT provided pavement condition data, which was coded into the LOTIS database using color coding and line thickness manipulation in ArcGIS. Main local and minor local roadways currently are not classified.

Quality Assurance: Color coding deviations in ArcGIS allowed the project team to view mis-matches between the LOTIS file and the FDOT file after the data was initially populated.

MAINT_AGCY

Description: Maintaining agency of the roadway (FDOT only).

Data Source(s) and Methods: FDOT provided maintaining agency data, which was coded into the LOTIS database using color coding and line thickness manipulation in ArcGIS. Main local and minor local roadways currently are not classified.

Quality Assurance: Color coding deviations in ArcGIS allowed the project team to view mis-matches between the LOTIS file and the FDOT file after the data was initially populated.

BPCRASH

Description: Number of bike/ped crashes on the roadway segment from 2014-2018

Data Source(s) and Methods: Data was collected from Signal 4 Analytics and queried to include only bike/ped crashes in the 3-county area from 1/1/2014 to 12/31/2019. Crash points and segments were simultaneously selected, the crashes were counted via the ArcGIS attribute table, and the LOTIS database was coded one record at a time.

Quality Assurance: A visual quality assurance process was put in place. Segments with crashes were color coded to match the color of the crash points. Deviations in color signified a fallout (error) record.

EVAC_ROUTE

Description: Describes (yes or no) whether a roadway is a hurricane evacuation route or not.

Data Source(s) and Methods: Data was collected from Orange County Emergency Management, Osceola County Emergency Management and Seminole County Emergency Management and coded into the LOTIS database one corridor at a time.

Quality Assurance: Evacuation routes were reviewed for gaps using satellite imagery on a corridor-by-corridor basis. No gaps in coverage were identified.

UNMARK_PK

Description: Describes (yes or no) whether there is unmarked parking present along wide roadways

Data Source(s) and Methods: This attribute was provided only for roadway types FDOT, Major Local and Minor Local with Deviation via satellite imagery. Roadways were tagged "yes" when cars were observed parked on the roadway on the satellite imagery. Widths for these roadway segments include the unmarked parking area but these areas are flagged and not included in the retrofittability algorithm.

Quality Assurance: The unmarked parking file was quality assured in the affirmative for records tagged with the designations. No gaps in coverage were identified.

FLOODZONE

Description: Describes (yes or no) whether a roadway is within the FEMA 100-year floodplain.

Data Source(s) and Methods: FEMA floodplain data was collected for the state of Florida and clipped to the 3-county study area. This data was then processed via a "select by location" function (within 0.000001 feet) and roadway segments that were selected were provided the symbol "Yes".

Quality Assurance: The floodplain was viewed visually in the context of the LOTIS roadway segments. It was found that the select by location function was performed successfully.

TIP

Description: Identifies (yes or no) segments included in the MetroPlan TIP

Data Source(s) and Methods: Data was provided by MetroPlan Orlando detailing the start and end points of TIP projects. These projects were added via the attribute table on a 1 by 1 basis.

Quality Assurance: TIP projects were reviewed for gaps using satellite imagery on a corridor-by-corridor basis. No gaps in coverage were identified.

LOPP

Description: Identifies (yes or no) segments included in the MetroPlan LOPP

Data Source(s) and Methods: Data was provided by MetroPlan Orlando detailing the start and end points of LOPP projects. These projects were added via the attribute table on a 1 by 1 basis.

Quality Assurance: LOPP projects were reviewed for gaps using satellite imagery on a corridor-by-corridor basis. No gaps in coverage were identified.

PX_TRANSIT

Description: Proximity to Transit

Data Source(s) and Methods: Transit points were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to transit points in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons.

PX_SCHOOLS

Description: Proximity to Public Schools and Colleges

Data Source(s) and Methods: School points were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to school points in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons.

PX_GROCERY

Description: Proximity to Grocery Stores

Data Source(s) and Methods: Grocery store polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to grocery store polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_RESTRT

Description: Proximity to Restaurants

Data Source(s) and Methods: Restaurant polygons (not including fast food establishments) were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to restaurant polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_MARKET

Description: Proximity to Markets and Convenience Stores with Food/Retail

Data Source(s) and Methods: Market polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_HOTELS

Description: Proximity to Hotels

Data Source(s) and Methods: Hotel polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to hotel polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_THEMEPK

Description: Proximity to Theme Parks

Data Source(s) and Methods: Theme park polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to theme park polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. Multi-parcel parks were also generalized for total acres.

PX_PARKS1

Description: Proximity to Parks (0.01 – 0.99 acres)

Data Source(s) and Methods: Park polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). Parks between 0.01 and 0.49 acres in size were included in this portion of the park analysis. The select by location tool was then used to tag proximities of roadway segments to park polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. Multi-parcel parks were also generalized for total acres.

PX_PARKS2

Description: Proximity to Parks (1.00 – 1.99 acres)

Data Source(s) and Methods: Park polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). Parks between 0.50 and 0.99 acres in size were included in this portion of the park analysis. The select by location tool was then used to tag proximities of roadway segments to park polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. Multi-parcel parks were also generalized for total acres.

PX_PARKS3

Description: Proximity to Parks (2.00 – 9.99 acres)

Data Source(s) and Methods: Park polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). Parks between 2.00 and 9.99 acres in size were included in this portion of the park analysis. The select by location tool was then used to tag proximities of roadway segments to park polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. Multi-parcel parks were also generalized for total acres.

PX_PARKS4

Description: Proximity to Parks (10 or more acres)

Data Source(s) and Methods: Park polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). Parks greater than 10 acres in size were included in this portion of the park analysis. The select by location tool was then used to tag proximities of roadway segments to park polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. Multi-parcel parks were also generalized for total acres.

PX_GOLFCRS

Description: Proximity to Golf Courses

Data Source(s) and Methods: Golf course polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to golf course polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons.

PX_CAMPING

Description: Proximity to Campgrounds

Data Source(s) and Methods: Campground polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to campground polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons.

PX_RESDENS

Description: Transportation Analysis Zone Residential Density (population per square mile)

Data Source(s) and Methods: Transportation Analysis Zone (TAZ) data was collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to TAZ's in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: A visual quality assurance procedure was executed to ensure that roadways adjacent to two TAZ zones were tagged with the higher population density of the TAZ's involved.

PX_TRAFSIG

Description: Roadways (not including Minor Locals) with a traffic signal within 1/8 mile.

Data Source(s) and Methods: Began with FDOT data downloaded from the FDOT GIS data download page. The project team manually added signals to intersections along road types FDOT, Major Local and Minor Local with Deviation. A "select by location" function was run on the segments; 1/8 mile buffer.

Quality Assurance: None due to time constraints associated with building the data.

PX_SUNRAIL

Description: Roadways (not including Minor Locals) with a traffic signal within 1/8 mile.

Data Source(s) and Methods: SunRail points added to aerial imagery by the project team.

Quality Assurance: None.

PX_FSTFOOD

Description: Proximity to Fast Food Establishments

Data Source(s) and Methods: Fast food polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_ENTVENU

Description: Proximity to Entertainment Venues

Data Source(s) and Methods: Entertainment venue polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table. Entertainment venues includes all stadiums, museums, performing arts centers and non-theme park tourist attractions.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_MALL

Description: Proximity to Malls

Data Source(s) and Methods: Mall polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_SMLMKT

Description: Proximity to Small Markets & Bodegas

Data Source(s) and Methods: Small market and bodega polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table. Discretion was given to the project team when determining whether an establishment fit within the market or small market categories. Generally, small markets are less than 2,500 square feet in size.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_MONEYLN

Description: Proximity to Money Loan Stores

Data Source(s) and Methods: Money loan store polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table. This layer includes money loan centers such as Amscot, but not banks.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_DEPTSTR

Description: Proximity to Department Stores

Data Source(s) and Methods: Department store polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_BAR

Description: Proximity to Bars

Data Source(s) and Methods: Bar polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table. This layer includes bars, lounges that serve alcohol, and restaurants such as ale houses with a stand-alone bar area.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_LIQTOB

Description: Proximity to Liquor and Tobacco Stores

Data Source(s) and Methods: Liquor and tobacco store polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table. This layer does not include liquor stores within grocery stores.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_STORE

Description: Proximity to General Stores and Leisure Services

Data Source(s) and Methods: General store polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table. This layer includes all general stores, salons, barber shops, and other personal services not related to the legal and insurance industries.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_AUTOSTR

Description: Proximity to Automotive Stores & Dealerships

Data Source(s) and Methods: Automotive store polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). This layer includes all dealerships and car repair businesses. The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_LIBRARY

Description: Proximity to Libraries

Data Source(s) and Methods: Library polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_GYM

Description: Proximity to Gyms

Data Source(s) and Methods: Gym polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). This layer includes all non-HOA clubhouse gyms, including pay-for-use gyms. Training facilities and YMCA's are also included within the gym's category. Classes, such as karate class parcels, are not included. The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_COFFEE

Description: Proximity to Coffee Shops

Data Source(s) and Methods: Coffee shop polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table. Establishments including Einstein's Bagels, Panera Bread and Starbucks are classified within this category in addition to the fast food category. Wawa convenience stores are included in this category, fast food and markets.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_HOSPITL

Description: Proximity to Hospitals

Data Source(s) and Methods: Hospital polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments. VA hospitals are included.

PX_PHARMCY

Description: Proximity to Pharmacies

Data Source(s) and Methods: Pharmacy polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The pharmacy land use dataset includes all Walgreens, CVS and other pharmacis that also function as convenience stores. The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_CLINIC

Description: Proximity to Medical Clinic / Doctor's Offices

Data Source(s) and Methods: Medical clinic polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). This layer includes all medical clinics and doctors' offices, as well as Department of Health buildings. The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.

Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_CTYHALL

Description: Proximity to City Halls

Data Source(s) and Methods: City hall polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to

tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.
Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_POSTOFC

Description: Proximity to Post Offices
Data Source(s) and Methods: Post office polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.
Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_COURTHS

Description: Proximity to Courthouses
Data Source(s) and Methods: Courthouse polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). This layer includes all County, City and Town Courthouses. The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.
Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_COMMCTR

Description: Proximity to Community Centers
Data Source(s) and Methods: Community Center polygons were collected in ArcGIS utilizing the methodology outlined in Section 2.2 (Land Use Polygon Data Creation). This layer includes Community Centers, Neighborhood Centers, Civic Centers, Recreation Centers (with at least one meeting area) and Senior Centers. The select by location tool was then used to tag proximities of roadway segments to market polygons in ArcGIS, beginning with the largest proximities and ending with the smallest proximities. These values were added to the attribute table.
Quality Assurance: Proximity scores were edited in selected areas (see Section 2.2) to manually downgrade scores in areas with lakes, wetlands, and other obstructions and without roadways

connecting them to critical points and polygons. A secondary quality assurance process was completed with the use of Google Maps to confirm the location of these establishments.

PX_JOBS
Description: Proximity to Job Density
Data Source(s) and Methods: See Section 2.2 (Land Use Polygon Creation)
Quality Assurance: None; Data accepted "as is"

SAFETY_SCR
Description: Roadway Safety Score
Data Source(s) and Methods: See Section 3.1 (Safety Score)

SAFETY_DSP
Description: Roadway Safety-Proximity Disparity Score
Data Source(s) and Methods: See Section 3.3 (Proximity-Safety Disparity Score)

SAFCM_NS1
Description: Safety Countermeasures: Consider Adding One New Sidewalk
Data Source(s) and Methods: See Section 3.8 (Roadway Safety Countermeasures)

SAFCM_NS2
Description: Safety Countermeasures: Consider Adding 2 New Sidewalks
Data Source(s) and Methods: See Section 3.8 (Roadway Safety Countermeasures)

SAFCM_PST
Description: Safety Countermeasures: Assess Pedestrian Signal Timing
Data Source(s) and Methods: See Section 3.8 (Roadway Safety Countermeasures)

SAFCM_RLW
Description: Safety Countermeasures: Consider Reducing Lane Widths to 11 Feet
Data Source(s) and Methods: See Section 3.8 (Roadway Safety Countermeasures)

SAFCM_RSP
Description: Safety Countermeasures: Consider Reducing Speed (Bike Lane Present)
Data Source(s) and Methods: See Section 3.8 (Roadway Safety Countermeasures)

SAFCM_SWGT
Description: Consider Filling Sidewalk Gaps Within 1/8 Mile of Transit Stops
Data Source(s) and Methods: See Section 3.8 (Roadway Safety Countermeasures)

PXSC_ALL
Description: Cumulative Proximity Score (Livability Index), from 0 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.2 (Proximity Scores)

PXSC_TRANS
Description: Transit Proximity Score, from 0 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.2 (Proximity Scores)

PXSC_RESDN
Description: Residential Density Proximity Score, from 0 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.2 (Proximity Scores)

PXSC_FOOD
Description: Food Proximity Score, from 0 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.2 (Proximity Scores)

PXSC_RTENT
Description: Retail & Entertainment Proximity Score, from 0 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.2 (Proximity Scores)

PXSC_PARKS
Description: Parks & Recreation Proximity Score, from 0 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.2 (Proximity Scores)

PXS_HEALTH
Description: Healthcare Access Proximity Score, from 0 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.2 (Proximity Scores)

PXSC_GOVMT
Description: Government Services Proximity Score, from 0 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.2 (Proximity Scores)

PXSC_JOBS
Description: Job Density Proximity Score, from 0 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.2 (Proximity Scores)

DISP_TRANS
Description: Transit Disparity Score, from 0 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.4 (Isolated Proximity Disparity Scores)

DISP_RESDN
Description: Residential Density Disparity Score, from 0 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.4 (Isolated Proximity Disparity Scores)

DISP_FOOD
Description: Food Disparity Score, from 0 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.4 (Isolated Proximity Disparity Scores)

DISP_RTENT
Description: Retail & Entertainment Disparity Score, from 0 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.4 (Isolated Proximity Disparity Scores)

DISP_PARKS
Description: Parks & Recreation Disparity Score, from 1 (lowest) to 10 (highest)
Data Source(s) and Methods: See Section 3.4 (Isolated Proximity Disparity Scores)

RETRO
Description: The lateral retrofittable space, in feet, for thinning down roadway surfaces.
Data Source(s) and Methods: See Section 3.5 (Retrofittability Score)

RETRO_CM
Description: Potential countermeasures identified for roadway segments using the retrofittability score.
Data Source(s) and Methods: See Section 3.5 (Retrofittability Score)

HAZCON
Description: Roadways with the potential to be Hazardous Walking Conditions (pre-screen)
Data Source(s) and Methods: See Section 3.6 (Hazardous Conditions)

TMapID
Description: Unique Roadway ID provided by Osceola County for Public Works cross-reference
Data Source(s) and Methods: Accepted "as is"; coded into attribute table one record at a time.

JURIS
Description: Used for the retrofittability analysis, this shows local roadways within jurisdictions that use the 10-foot retrofittability standard.
Data Source(s) and Methods: Overlayed the City boundary (Source: Seminole County GIS) and selected all non-FDOT roadways within the City or non-FDOT roadways that serve a City parcel.

Step 3: Completion and Final Quality Assurance

Step 3.1: Mass-Cut of Records

Following the creation of the aforementioned attributes (with the exception of the proximity scoring, which was completed after steps 3.1 and 3.2), roadway segments longer than 0.5 miles were cut at mid-points and critical intersections to ensure that proximity scores were within a small margin of error.

Step 3.2: Roadway Segment Alignment

The FDOT roadway segments were then aligned with the local (county) roadway segments to increase clarity from and end-user perspective. This included ensuring that t-intersections and four-point intersections were aligned at the center point. This work will continue as the data is continually updated.

2.2 Land Use Polygon Data Creation

The land use polygons comprise of one half of the LOTIS database. This parcel data was retrieved from County Property Appraiser's Offices (which contains Department of Revenue "DOR Codes") and the data was quality assured to fit into the LOTIS land use categories as described in this section of the report.

The following land use polygon files were created as part of this analysis. The table below depicts the land use files created as well as the original source, alongside special quality assurance files or programs that were used to ensure accuracy.

Land Use Polygon File	Original Data Source	Quality Assurance
Food	Property Appraisers / Dept. Revenue (Parcel)	Google Maps
Hotels	Property Appraisers / Dept. Revenue (Parcel)	Google Maps, ECFRPC
Parks & Recreation	Property Appraisers / Dept. Revenue (Parcel)	Google Maps, City Data
Healthcare	Property Appraisers / Dept. Revenue (Parcel)	Google Maps
Government Services	Property Appraisers / Dept. Revenue (Parcel)	Google Maps
Retail & Entertainment	Property Appraisers / Dept. Revenue (Parcel)	Google Maps
Vacant Parcels	Property Appraisers / Dept. Revenue (Parcel)	Google Maps
Population Density	MetroPlan Orlando (TAZ)	Visual QA, See Apx. 3
Job Density	MetroPlan Orlando (TAZ)	Accepted "As Is"
Public Schools & Colleges	ECFRPC via School Districts	Accepted "As Is"
Transit	LYNX; ECFRPC via SunRail	Accepted "As Is"

This section of the report reviews the methodology for the creation of the 8 files listed above.

Step 1: Data Collection

Data was collected from four main sources.

- Property Appraiser Data: Property Appraiser parcel data was collected by the project team from the Property Appraiser's offices of Orange, Osceola and Seminole County, effective 2018. This data included address, owner, DOR land use code, valuation and build year attributes that remain in the final land use files. This data was used for multiple categories within the land use classification analysis as shown in the table above.
- School Data: As part of its Safe Routes program, the East Central Florida has been continually collecting and updating school point data from the eight school districts in its region. This data was quality assured before its inclusion in this project.

- TAZ Data: TAZ's, or "Transportation Analysis Zones", were collected from MetroPlan Orlando with an effective date of 2015.
- Transit Data: Transit data was collected from LYNX, effective 2019, and SunRail points were added to the data by the project team via satellite imagery in ArcGIS.
- Job Density Data: TAZ's, or "Transportation Analysis Zones", were collected from MetroPlan Orlando with an effective date of 2015.

*School, transit and TAZ data were received and used by the project team "as is"

Step 2: Parcel Data Quality Assurance: DOR Code Cross Reference

Department of revenue "DOR Codes" were used as a first screen to appropriate parcels into respective land use classes. This was done by classifying the DOR codes into preliminary LOTIS land use codes. These LOTIS land use codes included the following categories:

- RESMF (Multi-Family Residential)
- RESSF (Single-Family Residential)
- HM (Hotels)
- FOOD (Food)
- MU (Mixed Use)
- RETENT (Retail)
- RETFOOD (Retail and Food)
- PARK (Parks)
- VAC (Vacant) | Multiple Classes

^Healthcare, Job Density and Healthcare Access were completed separate of the analysis shown above

It is important to note that these classifications were highly preliminary, and the Google Maps satellite quality assurance process (Step 3) identified high variability in actual, on-the-ground land uses relative to the classifications provided by the Department of Revenue.

While some DOR codes were not provided a preliminary LOTIS land use, these parcels were added to the LOTIS database from the original parcel(s) database during Step 3 if the Google Maps quality assurance process revealed that the parcel fit into one of the categories listed above.

Please view Appendix 1 of this report to view the cross-reference table used to classify parcels by their Department of Revenue (DOR) Code.

Step 3: Parcel Data Quality Assurance: Tertiary Source Overlay (by file)

The next phase of parcel quality assurance used Google Maps and associated GIS data heavily in ground-truthing the land uses of parcels.

This section of the report reviews the steps made, by land use file, as well as the tertiary sources that were used in the final development of each layer. Special circumstances, notes taken, and other information is available under each section.

Primary Land Use Categories and Final LOTIS Land Use Classifications

Primary land use categories covered in this section include the following (in maroon). Final LOTIS Land Use Classifications are also shown, per primary land use category.

- Food
  - Grocery Stores, Markets, Markets w/ Pharmacy, Small Markets, Restaurants, Fast Food
- Hotels
  - Including store, restaurants and bars on site
- Parks & Recreation
  - Delineated by size and type
- Retail & Entertainment
  - Entertainment Venues, Bars, Coffee Shops, Gyms, Malls, Libraries, Liquor and Tobacco Stores, Department Stores, General Stores, Money Loan Centers, Automotive Stores, Theme Parks
- Government Services
  - City Halls, Courthouses, Post Offices, Community Centers, Libraries
- Healthcare Access
  - Hospitals, Medical Clinics, Pharmacies
- Vacant Parcels
  - Classified by Department of Revenue (DOR) Land Use Code

Food

The project team first color-coded parcels into the categories outlined in Step 2 (above) in ArcGIS. The values listed in Step 2 were then converted to the following final LOTIS Land Use values:

- Grocery Store (also included in the "Retail" category)
- Market/ Convenience Store (also included in the "Retail" category)
- Market with Pharmacy (also included in the "Retail" category)
- Small Markets (also included in the "Retail" category)
- Restaurant
- Fast Food

*Final tabular values can include multiple food typologies as well as the inclusion of hotels, retail and residential if multiple uses are present on one parcel.

The quality assurance process for food parcels comprised of a deep look at Google Maps data in comparison with the color-coded LOTIS file in ArcGIS. The entire 3-County area was reviewed for food types, and the respective food classifications were imbedded into the LOTIS Land Use attribute column. Parcels that were "missed" by the initial DOR Code cross-reference process were added to the food file on a parcel-by-parcel basis. As part of the food analysis, the term "food" was queried into Google Maps in order to show all restaurants, markets, convenience stores and grocery stores.

A degree of discretion was provided in the classification of parcels. For example: The "Market" classification included convenience stores with food, as well as gas stations and pharmacies (such as CVS and Walgreens) with food, but did not include liquor stores without food. The "Restaurant" classification includes all restaurants and fast-food locations, while the "Grocery" classification includes all grocery stores.

Establishments including Einstein's Bagels, Panera Bread and Starbucks are classified within both the food (fast food) and retail and entertainment (coffee shop) categories. Similarly, Wawa convenience stores are included in the food (fast food), market and retail categories.

Small markets are typically less than 2,500 square feet and serve local neighborhoods. Discretion was provided to the project team when determining whether a market classified as a "market" or "small market".

The final step in the quality assurance of the food land use file was the performing of the "erase" function to the lakes in the 3-County area in ArcGIS, utilizing the "nhd24waterbody.shp" file mentioned previously in this report as the erase feature. This will ensure the visual clarity of final applications. Establishments have also begun to be "cut" to the building footprint.

Hotels

The project team first color-coded parcels into the categories outlined in Step 2 (page 23) in ArcGIS. The values listed in Step 2 were then converted to the following final LOTIS Land Use values:

- Hotel
- Hotel with Restaurant
- Hotel with Bar
- Hotel with Store
- Hotel with [combination of 2 or more: restaurant, bar, store]

*Final tabular values included additional typologies, specifically: Hotel and Restaurant; Hotel and Retail; Hotel, Restaurant and Retail.

The quality assurance process for hotel parcels comprised of a deep look at Google Maps data in comparison with the color-coded LOTIS file in ArcGIS. The entire 3-County area was reviewed hotels, and the respective hotel classifications were imbedded into the LOTIS Land Use attribute column. Parcels that were “missed” by the initial DOR Code cross-reference process were added to the hotel file on a parcel-by-parcel basis. As part of the hotel analysis, the term “hotel” was queried into Google Maps in order to show all hotels listed by Google.

In addition to the Google Maps quality assurance process, hotel points were quality assured against existing GIS data maintained by the East Central Florida Regional Planning Council Emergency Preparedness Department. This file, named “Central_Florida_Lodging_Points.shp”, was overlayed on hotel parcels following the initial Google Maps review. A total of 8 additional hotels were added.

The final step in the quality assurance of the hotel land use file was the performing of the “erase” function to the lakes in the 3-County area in ArcGIS, utilizing the “nhd24waterbody.shp” file mentioned previously in this report as the erase feature. This will ensure the visual clarity of final applications. Establishments have also begun to be “cut” to the building footprint.

Parks & Recreation

The project team first color-coded parcels into the categories outlined in Step 2 (page 23) in ArcGIS. The values listed in Step 2 were then converted to the following final LOTIS Land Use values:

- Camping
- General Park (< 1 AC)
- General Park (1.00 – 1.99 AC)
- General Park (2.00 – 9.99 AC)
- General Park (> 10 AC)
- Golf Course
- Natural Park & Forest (size delineations and scoring match General Parks)
- HOA Parks (size delineations and scoring match General Parks)
- Theme Park

*No mixed attributes are present within the Parks and Recreation file. However, theme parks are also included in the retail and food files.

The quality assurance process for parks and recreation parcels comprised of a deep look at Google Maps data in comparison with the color-coded LOTIS file in ArcGIS. The entire 3-County area was reviewed parks and recreation, and the respective park classifications were imbedded into the LOTIS Land Use attribute column. Parcels that were "missed" by the initial DOR Code cross-reference process were added to the parks file on a parcel-by-parcel basis. As part of the parks analysis, the term "parks" was queried into Google Maps in order to show all parks as classified by Google.

Discretion was given to the project team for types of parks included, and it was decided not to include cemeteries in the park analysis. HOA playgrounds and athletic facilities are included.

The park typologies present in the GIS data are fairly general. "Camping" includes all campgrounds but does not include RV parks. "General Park" includes all playgrounds, public athletic fields, public athletic courts, landscaped parks, and parks with walkways around natural features in urban areas. "General Park" also includes Homeowner's Association-owned facilities that include open space, athletic fields and athletic courts; however, standalone tennis courts were not included. All of these parcels were initially missed by the DOR Code analysis and the Google Maps analysis, as they are not listed. "Golf Course" includes all golf courses, and "Theme Park" includes the region's 12 theme parks. The final classification, natural park and forest, includes natural park settings typically rural in nature.

As a final quality assurance, the project team reviewed city parks files as well as the Generalized Future Land Use files maintained by the East Central Florida Regional Planning Council to find missing records. A full quality assurance step was also taken to comb through satellite imagery for HOA-owned parks. Once all HOA parks were identified using satellite imagery, the project team cross-referenced all DOR Codes and populated parks with residential DOR codes as "HOA Parks".

The final step in the quality assurance of the parks and recreation land use file was the performing of the “erase” function to the lakes in the 3-County area in ArcGIS, utilizing the “nhd24waterbody.shp” file mentioned previously in this report as the erase feature. This will ensure the visual clarity of final applications.

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As part of the LOTIS 2.0 update, parks have been quality assured for size. This included the merger of park polygons if multiple parcels made up one stand-alone park. If, through the merge and recalculation of acreage process, a park was determined to be within a different size category (as determined in the table on the previous page) then the park was moved to the new park ArcGIS shapefile and removed from its original file.

In addition to quality assurance for size, park names have been added into the ArcGIS shapefile attribute tables. HOA parks, which were identified by Department of Revenue (DOR) Codes, were provided either a) a proper name if labeled in Google Maps; b) a general name that includes the name of the community the park is within; or c) a name that describes the types of activities on site. In the above case, “a” was the first criteria, followed by “b” and then “c”.

Retail & Entertainment

The project team first color-coded parcels into the categories outlined in Step 2 (page 23) in ArcGIS. The values listed in Step 2 were then converted to the following final LOTIS Land Use values:

- Entertainment Venues
- Bars
- Coffee Shops
- Gyms
- Malls
- Libraries
- Liquor/Tobacco Stores
- Department Stores
- General Stores
- Money Loan Stores
- Automotive Stores
- Theme Park
- Grocery Store (also included in "Food" category)
- Market (also included in "Food" category)
- Market with Pharmacy (also included in "Food" category)
- Small Markets (also included in "Food" category)
- Restaurant with Bars (also included in "Food" category)

*Final tabular values included multiple mixtures of retail and food, retail and hotels, retail and residential, and other mixed classifications. Any parcels with multiple land uses are included in their (multiple) related proximity files. As of the LOTIS 2.0 update, multiple retail categories have been included for single records. For example: "BAR, COFFEE & DEPARTMENT STORE".

The quality assurance process for retail and entertainment parcels comprised of a deep look at Google Maps data in comparison with the color-coded LOTIS file in ArcGIS. The entire 3-County area was reviewed retail and entertainment, and the respective retail and entertainment classifications were imbedded into the LOTIS Land Use attribute column. Parcels that were "missed" by the initial DOR Code cross-reference process were added to the retail and entertainment file on a parcel-by-parcel basis. The retail analysis was completed at the same time as the food analysis in order to maximize efficiency.

The project team used discretion in terms of the types of businesses included in this category. Banks, mortuaries, insurance offices, religious institutions as well as lawyer's offices were not included in the retail and entertainment category despite their DOR classification describing them as such.

In addition, like the food analysis, markets with retail were included in the retail file, as were pharmacies and convenience stores with retail. Individual businesses were analyzed as part of this QA step.

Fast Food & Coffee Category

Establishments including Einstein's Bagels, Panera Bread and Starbucks are classified within both the food (fast food) and retail and entertainment (coffee shop) categories. Similarly, Wawa convenience stores are included in the food (fast food), market and retail categories.

YMCA Gym Classification

YMCA gyms were included within the "gym" category of retail and entertainment and museums were classified generally as entertainment venues.

Final Quality Assurance

The final step in the quality assurance of the retail and entertainment land use file was the performing of the "erase" function to the lakes in the 3-County area in ArcGIS, utilizing the "nhd24waterbody.shp" file mentioned previously in this report as the erase feature. This will ensure the visual clarity of final applications. Establishments have also begun to be "cut" to the building footprint.

The attribute table descriptions contain more information on the types of establishments permissible per retail and entertainment category.

Vacant Parcels

The values listed in Step 2 were used as the final LOTIS Land Use values for vacant parcels. They include:

- VACAGFOOD | Vacant Agriculture, Food Related
- VACAGRI | Vacant Agriculture, Non-Food
- VACANT | Vacant, Unclassified
- VACCOM | Vacant Commercial
- VACFOOD | Vacant Food
- VACHM | Vacant Hotels
- VACINST | Vacant Institutional
- VACPARK | Vacant Parks
- VACRES | Vacant Residential
- VACRET | Vacant Retail and Entertainment

Quality Assurance

The vacant parcel analysis was quality assured in ArcGIS using satellite imagery. The project team first removed records from the vacant parcel file that had been added to the food, parks, retail, and hotels file. This was done by marking land use changes in the vacant file with a "Y" in a QA field that documented non-vacant parcels to be added to other parcel files.

A second quality assurance process included a review of vacant parcels over satellite imagery with 50% transparency. Records were deleted that showed existing buildings on parcels, as well as homeowner's association parcels showing common areas with units on top of them.

As a future step, the project team will add the Future Land Use and Zoning Classification to all vacant parcels in order to complete a more thorough analysis of land use amendment options.

The final step in the quality assurance of the vacant land use file was the performing of the "erase" function to the lakes in the 3-County area in ArcGIS, utilizing the "nhd24waterbody.shp" file mentioned previously in this report as the erase feature. This will ensure the visual clarity of final applications.

Government Services

The project team used Google Maps and county/city website information to add government service points of interest to the LOTIS database. Categories include:

- City Halls
  - County Administration Buildings and Commission Chambers used for counties
- Courthouses
  - Includes Courthouses, Teen Courthouses and Clerk of Courts Offices
- Post Offices
- Community Centers
  - Includes Community Centers, Neighborhood Centers, Civic Centers, Recreation Centers (with Meeting Areas) and Senior Centers
- Libraries (also included in "Retail & Entertainment" category)

Healthcare Access

Google Maps and County Property Appraiser DOR code data are used to input health service points of interest to the LOTIS database. Hospitals did not require a DOR code overlay, while pharmacies were found via an extensive review of satellite imagery in addition to the use of "Market with Pharmacy" parcels quality assured within the Retail & Entertainment data creation process. Categories include:

- Hospitals
- Pharmacies
- Medical Clinics and Services

DOR codes used to identify medical clinics include, by County:

County	DOR Code	DOR Code Description	LOTIS Land Use
Orange	0420*	Condo-Medical Building	CLINIC/SERVICES
Orange	1706*	Condo-Off Medical I	CLINIC/SERVICES
Orange	1707*	Condo-Off Medical II	CLINIC/SERVICES
Orange	1708*	Condo-Off Medical III	CLINIC/SERVICES
Osceola	1911*	Professional Service Bldg.-MedicalDental	CLINIC/SERVICES
Seminole	7502	Rehab Living Facility	CLINIC/SERVICES
Seminole	19^	Professional Services Building	CLINIC/SERVICES
Seminole	1900^	Professional Services Building-multi story	CLINIC/SERVICES

*Medical services DOR codes for Orange and Osceola Counties were accepted "as is" without further ground-truthing due to their specificity.

^Seminole County codes 19 and 1900 (247 establishments) were quality assured one at a time via Google Maps to confirm the presence or absence of medical services. Additional parcels were found via a search query in Google Maps.

2.3 Update Procedures

The following update procedures are to be followed for future updates to the database. Updates are currently scheduled to occur on an annual basis.

Transportation Polyline File

Updates to the transportation polyline file will include three major steps, which will be reviewed one-by-one in this section:

- FDOT Data Color Code QA
- Construction Records Update
- Outreach to Public Works and MetroPlan Orlando for major transportation projects

FDOT Color Code QA: All data collected from FDOT will undergo the same color-code quality assurance process listed in Section 2.1, Step 2. This includes the project team looking for deviations in color coding using transparency levels and varying line thickness. New FDOT data will be placed behind the LOTIS database with higher thickness and identical color coding; differences in color indicate a change in baseline data. This is to be completed for the following fields: AADT, Truck AADT, Maintaining Agency, Functional Classification, Speed Limits and Pavement Quality.

Construction Records Update: Construction records will be updated using the visual measuring and attribute addition steps outlined in Section 2.1. All attributes that require a satellite quality assurance process must be included in this step of the update procedure. This includes sidewalk coverage, flush sidewalks, roadway width, median width, median type, bike lane types/coverage, through lanes, turn lanes, ramp lanes, bus lanes and unmarked parking.

Outreach to Public Works Departments and MetroPlan Orlando: The project team will reach out to all cities and counties, as well as MetroPlan Orlando, to identify transportation projects completed or initiated over the last two years. The attributes listed in the construction records update are to be completed for these roadways, as identified.

Land Use Polygon File

The land use polygon file includes "EYB" and "AYB" fields depicting the build year and modification year to each parcel. As part of the annual update process (starting in 2020), the project team will query parcels built or modified within the last 2 years. For example: During the 2020 update, the project team will query all parcels built in 2018, 2019 and 2020.

Each new parcel built will be reviewed in ArcGIS and in Google maps on a 1-by-1 basis. This methodology can be completed quickly in comparison to the data creation process.

Part 3. Algorithms

Overview

Six algorithms were developed to apply the transportation and land use data agglomerated as part of the LOTIS methodology to this point. This section of the report details the algorithmic processes and quality assurance steps taken for the following algorithms:

- Section 3.1: Roadway Safety Score
- Section 3.2: Proximity Scores (6)
- Section 3.3: Safety-Proximity Disparity Score
- Section 3.4: Isolated Proximity Disparity Scores (5)
- Section 3.5: Retrofittability Score
- Section 3.6: Hazardous Walking Condition Candidates
- Section 3.7: Neighborhood and Corridor Scoring
- Section 3.8: Roadway Safety Countermeasures
- Section 3.9: Infill Countermeasures

3.1 Roadway Safety Score

The roadway safety score algorithm uses the roadway characteristic data developed as part of the roadway polyline file development (Section 2.1 of this report) and calculates a 0 (low safety) to 10 (high safety) safety score for each roadway segment. These scores are based on bicycle and pedestrian statistics (including fatality rates associated with speed limits) as well as observed statistics in the Metro Orlando region. Many of the variables are codependent within the algorithm.

The safety score consists of four deduction categories and two premium categories that alter the score. Each roadway segment begins the analysis with a score of 10 out of 10, and points are deducted or added from this total to calculate the final safety score. At this time, the sixth safety score category, lighting, has not been coded into the LOTIS database. The scoring categories include:

- Speed Limit | Deduction
- Sidewalk Coverage | Deduction
- Turn Lanes & Traffic Signals | Deduction
- Total Number of Lanes and Median Coverage | Deduction
- Bike Lanes | Premium

This section of the report outlines the scoring methodology for each of the five categories covered in this version of the LOTIS tool.

Category 1: Speed Limits *(Fatality Rates by Speed Limit)* | **Deduction** (2.5 Points Total)

The speed limit deduction uses the pedestrian fatality rate associated with certain speed limits in miles per hour to deduct from a baseline of 2.5. Fatality statistics were studied and collected from the study *Relationship between Speed and Risk of Fatal Injury: Pedestrians and Car Occupants* by D.C. Richards (UK Department of Transport, September 2010). Since this study provides fatality statistics in intervals of 10, speed limits ending with a '5' have been rounded up 5 miles per hour to fit into the higher speed limit category (ex: 35 is assigned to the 40 mile per hour fatality rate). This methodology decision was made to account for observed speeds along numerous corridors that exceed the posted speed limit. All neighborhood roads (Road type: Minor Local) have been classified in the 0.01 fatality rate classification unless a specific speed limit is provided for the segment. Speed limit deductions are calculated as follows:

Variable Definitions

A_X = Category 1 Deduction for Roadway Segment "x"
S_X = Speed of Roadway Segment "x"
$F_{S(x)}$ = Fatality Rate of Posted Speed Limit where:

$F_{(15,20)} = 0.01$
$F_{(25-30)} = 0.06$
$F_{(35-40)} = 0.30$
$F_{(45-50)} = 0.78$
$F_{(55+)} = 0.98$

Where:

$$A_X = (2.5)F_{S(x)}$$

Scored for all Roadway Segments "x"

Category 2: Sidewalk Coverage | **Deduction** (2.5 Points Total)

Sidewalk coverage deductions (B_X) are codependent with the speed limit of the roadway, as sidewalk gaps in high-speed areas can greatly increase the risk of injury or death to pedestrians. Moreover, no deduction is given to roadways with full sidewalk coverage, regardless of speed limit. The following matrix outlines the deductions made per sidewalk coverage and speed combination.

Road Type	No Sidewalks	One Sidewalk	Two Sidewalks
Minor Local, Minor Local w/ Dev.	1.00 (a_x)	0.50 (e_x)	0.00 (h_x)
FDOT/Main, Speed < 35	1.75 (b_x)	0.87 (f_x)	0.00 (i_x)
FDOT/Main; Speed $\geq$ 35	2.50 (d_x)	1.25 (g_x)	0.00 (j_x)

Where:

$$B_X = a_x \text{ OR } b_x \text{ OR } d_x \text{ OR } e_x \text{ OR } f_x \text{ OR } g_x \text{ OR } h_x \text{ OR } i_x \text{ OR } j_x$$

Scored for all Roadway Segments "x"

Category 3: Turn Lanes & Traffic Signals | Deduction (2.5 Points Total)

Deductions from the turn lanes and traffic signals category originate from data collected by the development team in the Orlando Metro Area describing bicycle and pedestrian crash rates associated with number of turn lanes present (see Appendix 4). This data was analyzed to calculate the score for this sub-category.

LOTIS Analytics | 5-Year Crash Rates (2014 - 2018) | Roadway Design (Turn Lanes)					
Road Design Type	Effective Radius in ArcGIS	Total # Crashes	Total Miles of Roadway	Annual Crashes Per Mile	One Annual Crash Every X Miles
Turn Lane Present	10'	1801	N/A	N/A	N/A
Turn Lane Present	20'	576	N/A	N/A	N/A
Turn Lane Present	30'	671	N/A	N/A	N/A
Turn Lane Present	40'	417	N/A	N/A	N/A
Turn Lane Present	50'	257	N/A	N/A	N/A
Turn Lane Present	80'	234	N/A	N/A	N/A
Turn Lane Present	**Total**	**3956**	**944.32**	**0.84**	**1.19**
No Turn Lanes	10'	1746	N/A	N/A	N/A
No Turn Lanes	20'	335	N/A	N/A	N/A
No Turn Lanes	30'	150	N/A	N/A	N/A
No Turn Lanes	40'	71	N/A	N/A	N/A
No Turn Lanes	50'	34	N/A	N/A	N/A
No Turn Lanes	80'	40	N/A	N/A	N/A
No Turn Lanes	**Total**	**2376**	**9146.76**	**0.05**	**19.25**

Source(s): Signal Four Analytics (Crashes); LOTIS 2.0 (Roadway Features)

Due to the excessive difference in annual per mile crash rates with and without turn lanes, the project team decided to treat turn lanes as a binary variable with two possible deductions (0.00 and 2.50).

The presence of traffic signals also has an effect on the safety of an intersection, but granular data to assess the effectiveness of traffic signals in preventing pedestrian deaths has not been conclusive. Therefore, the project team also treated traffic signals as a binary variable; a roadway with turn lanes will have its deduction slit in half (from 2.50 to 1.25) if a traffic signal is present within 1/8 of a mile.

The final calculation of turn lane and traffic signal deductions (C_X) are calculated as follows:

Turn Lanes Present	Signalized	Not Signalized
Yes	1.25 (a_x)	2.50 (d_x)
No	0.00 (b_x)	0.00 (e_x)

Where:

$$C_X = a_x \text{ OR } b_x \text{ OR } d_x \text{ OR } e_x$$

Scored for all Roadway Segments "x"

Category 4: Number of Lanes and Median Coverage | Deduction (2.5 Points Total)

This category measures *pedestrian exposure* while crossing a roadway network. Deductions from the number of lanes and median coverage category originate from data collected by the development team in the Orlando Metro Area describing bicycle and pedestrian crash rates associated with number of lanes and median coverage (see Appendix 4). As part of this analysis, the following statistics were developed.

LOTIS Analytics | 5-Year Crash Rates (2014 - 2018) | Roadway Design (Lanes/Medians)					
Road Design Type	Effective Radius in ArcGIS	Total # Crashes	Total Miles of Roadway	Annual Crashes Per Mile	One Annual Crash Every X Miles
1-3 Lanes (All)	10'	2131	N/A	N/A	N/A
1-3 Lanes (All)	20'	364	N/A	N/A	N/A
1-3 Lanes (All)	30'	117	N/A	N/A	N/A
1-3 Lanes (All)	40'	48	N/A	N/A	N/A
1-3 Lanes (All)	50'	10	N/A	N/A	N/A
1-3 Lanes (All)	80'	23	N/A	N/A	N/A
1-3 Lanes (All)	**Total**	**2693**	**9068.97**	**0.06**	**16.84**
Grass & 4+ Lanes	10'	187	N/A	N/A	N/A
Grass & 4+ Lanes	20'	193	N/A	N/A	N/A
Grass & 4+ Lanes	30'	263	N/A	N/A	N/A
Grass & 4+ Lanes	40'	197	N/A	N/A	N/A
Grass & 4+ Lanes	50'	138	N/A	N/A	N/A
Grass & 4+ Lanes	80'	100	N/A	N/A	N/A
Grass & 4+ Lanes	**Total**	**1078**	**638.28**	**0.34**	**2.96**
Paved/None & 4+ Lanes	10'	1204	N/A	N/A	N/A
Paved/None & 4+ Lanes	20'	348	N/A	N/A	N/A
Paved/None & 4+ Lanes	30'	437	N/A	N/A	N/A
Paved/None & 4+ Lanes	40'	237	N/A	N/A	N/A
Paved/None & 4+ Lanes	50'	140	N/A	N/A	N/A
Paved/None & 4+ Lanes	80'	147	N/A	N/A	N/A
Paved/None & 4+ Lanes	**Total**	**2513**	**383.84**	**1.31**	**0.76**

Source(s): Signal Four Analytics (Crashes); LOTIS 2.0 (Roadway Features)

Using this data, the project team decided to provide one-to-three-lane roadways with no deduction in score under this category due to the overall low crash rate. Moreover, 3-lane roadways typically have turn lanes and many are unsignalized (see Category 3), and deductions of this magnitude would disproportionately affect 3-lane roads across the four deduction categories relative to other road types. The deduction that each roadway is given under the number of lanes and median coverage category (D_X) is equal to the "annual crashes per X miles" rate, multiplied by 1.4845*, then divided by 10 and subtracted from 2.50. This arithmetic provides one-to-three lane roadways with a deduction approximately equal to 2.50 minus 2.50, or *zero*. ^ The following matrix outlines final values.

Number of Lanes	Grass Median	None, Brick, Multiple (Non-Grass) or Paved
1, 2 or 3	0.00 (a_x)	0.00 (c_x)
4 or More	2.06 (b_x)	2.39 (e_x)

Where:

$D_X = a_x$ OR b_x OR c_x OR e_x

Scored for all Roadway Segments "x"

*1.4845 is used to normalize 16.84 (the 1-3-lane crash rate) to 25 before dividing by 10 to arrive at 0 deduction^

Category 5: Bike Lane Coverage | Premium (Up to 2.0 Points Total)

The final category, bike lane coverage (E_X) provides premiums to roadways with protected bike lanes and bike lanes with speed limits not exceeding 35 miles per hour. This score provides incentive for planners to protect bike lanes and to potentially reduce speed limits where bicycle lanes are present.

The table below summarizes the inputs to this premium:

Feature	2 Present	1 Present
Protected Bike Lane	2.00 (a_x)	1.00 (b_x)
Bike Lane and Speed $\leq$ 35	1.00 (c_x)	0.50 (d_x)
Cycle Track	--	1.50 (e_x)
Median Trail and Speed $\leq$ 35	--	1.50 (f_x)
Protected Bike Lane (1) & Bike Lane (1)	1.50 (g_x)	--

Where:

$E_X = a_x$ OR b_x OR c_x OR d_x OR e_x OR f_x OR g_x OR h_x OR i_x OR j_x

Scored for all Roadway Segments "x"

Roadway Safety Score (S_X)

The roadway safety score agglomerates the four deductions and one premium detailed within this section of the report to give each roadway a 1 (low) to 10 (high) safety score. This includes the following categories:

- Speed Limit | Deduction (A_X)
- Sidewalk Coverage | Deduction (B_X)
- Turn Lanes & Traffic Signals | Deduction (C_X)
- Number of Lanes & Median Coverage | Deduction (D_X)
- Bike Lane Coverage | Premium (E_X)
- Street Light Coverage | Future Premium

The final roadway safety score is calculated as follows:

$$S_X = 10 - (A_X + B_X + C_X + D_X - E_X)$$

Scored for all Roadway Segments “x”

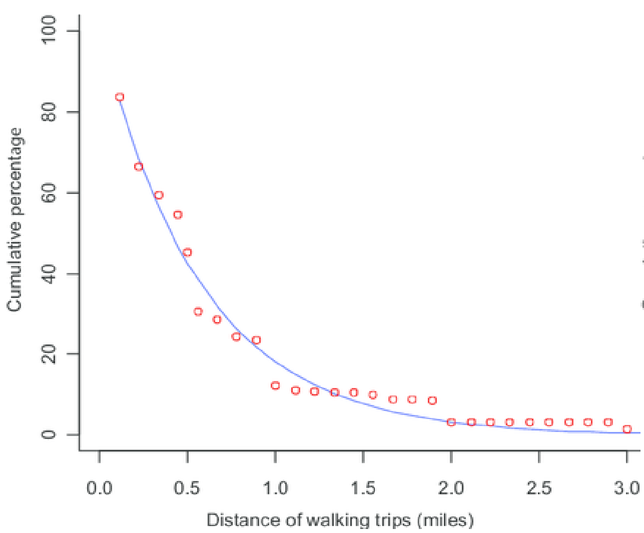
3.2 Proximity Scores

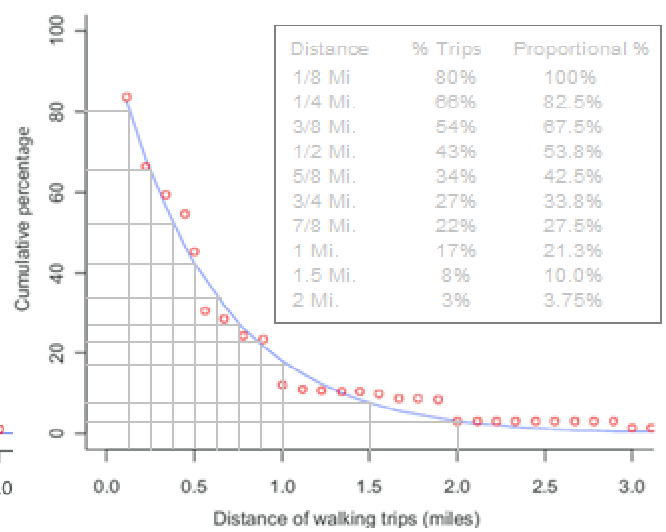
The proximity score algorithm uses the proximity data developed as part of the land use polygon file development (Section 2.2 of this report) and calculates a 0 (low proximity) to 10 (high proximity) proximity score for each roadway segment and vacant parcel. The following proximity scores have been developed as part of this process:

- Cumulative Proximity Score (Livability Index)
- Food Proximity Score
- Parks and Recreation Proximity Score
- Residential Density Proximity Score
- Retail and Entertainment Proximity Score
- Transit Proximity Score
- Government Services Proximity Score
- Healthcare Access Proximity Score
- Job Density Proximity Score

Decay Curve Calculations for Proximity Scores (by Distance)

The LOTIS Proximity Scores use a walking distance decay curve to award points to roadway segments within specified distances of community features. The graphs below, developed as part of the publication "Walking Distance by Trip Purpose and Population Subgroups" by Yong Yang at the University of Memphis, show the cumulative percentage of walking trips that are made at certain distances. The LOTIS database uses the *approximate* percent of trips shown below, per distance parameter, and scores roadway segments based on the proportional percentage of trips that occur at any distance relative to the 1/8-mile trip. For example, 1/4-mile trips account for 66% of total trips, or a proportional 82.5% as many trips as the 1/8-mile parameter of 80%. Thus, points are weighted at 82.5% of the 1/8-mile value for the 1/4-mile distance for all points of interest in the LOTIS database with the exception of hospitals.





Food Proximity Score (P_F)

The food proximity score uses proximity to grocery stores, markets, small markets, fast food establishments and restaurants to calculate a 0 (low proximity) to 10 (high proximity) score for all roadway segments and vacant parcels. The food proximity score is based on the availability of multiple food options within a one-half mile radius, also known as the 10-minute walking radius. Therefore, the project team concluded that a maximum score of approximately "10" would be achieved if a roadway segment or parcel has a grocery store, market/convenience store, and one or more restaurants or fast food establishment within a one-half mile radius.

The radii on the left correspond to the scores (in grey) under each food category. The final 1/8-mile score totals were completed following a full analysis of the output proximity scores and gaps (as described in Section 3.4). Decay curves set the scoring beyond the 1/8-mile parameter.

The following matrix is used to score vacant parcels and roadway segments.

Radius (within)	Grocery (a)	Market (b)	Small Market (c)	Restaurant (d)	Fast Food (e)^
1/8 Mile	7.50	5.00	2.50	2.00	1.00
1/4 Mile	6.19	4.13	2.06	1.65	0.83
1/2 Mile	4.04	2.69	1.35	1.08	0.54
3/4 Mile	2.54	1.69	0.85	0.68	0.34
1 Mile	1.60	1.07	0.53	0.43	0.21
1.5 Miles	0.75	0.50	0.25	0.20	0.10
2 Miles	0.28	0.19	0.09	0.08	0.04

Where:

$$P_{F(x)} = a_x + b_x + c_x + d_x + e_x$$

Maximum: 10 (High Proximity); Scores > 10 normalized to 10
Minimum: 0 (Low Proximity)
Scored for Vacant Parcels and Roadway Segments "x"
^Outputs for MetroPlan Orlando do not include points for fast food establishments (e)

At this time, theme parks have not been added to the food proximity score, however they will remain in the food database due to the presence of food on site.

Selected parcels had their scores manually altered due to the presence of large lakes, wetlands, and other obstructions separating them from the points of interest analyzed.

Parks and Recreation Proximity Score (P_N)

The parks and recreation proximity score uses proximity to parks, nature reserves, golf courses and campgrounds to calculate a 0 (low proximity) to 10 (high proximity) score for all roadway segments and vacant parcels.

The park proximity score is based on proximity by park type and park size, with larger parks having larger effective radii and vice versa for smaller parks. The effective radii used for each park are based on reviews of city, town and county Comprehensive Plans and are closely related to the *APA Standards for Outdoor Recreational Areas* relative to the size and effective radius of each park scored.

The following matrix is used as part of this algorithm to score vacant parcels and roadway segments. The radii on the left correspond to the scores (in grey) under each park category. The 1/8-mile parameter values were altered following multiple iterations of scoring (grey values only) in order to match a qualitative review on the ground accessibility. Decay curves set point scores for other distance parameters beyond the 1/8-mile parameter. However, as part of the parks score, decay curves are not utilized outside of the effective radius of each park and are these records are provided scores of 0. Final algorithm outputs underwent a qualitative map analysis prior to completion (see Appendix 2).

Radius (within)	Park (<1 ac) (a)	Park (1-2 ac) (b)	Park (2-10 ac) (c)	Park (>10 ac) (d)	Golf/Camps (e)
1/8 Mile	3.50	5.00	6.75	8.50	2.00
1/4 Mile	2.89	4.13	5.57	7.01	1.65
1/2 Mile	1.88	2.69	3.63	4.57	0
3/4 Mile	1.18	1.69	2.28	2.87	0
1 Mile	0	0	1.44	1.81	0
1.5 Miles	0	0	0	0.85	0

Where:

$$P_{N(x)} = a_x + b_x + c_x + d_x + e_x$$

Maximum: 10 (High Proximity); Scores > 10 normalized to 10
Minimum: 0 (Low Proximity)
Scored for Vacant Parcels and Roadway Segments "x"

At this time, theme parks have not been added to the parks and recreation proximity score, however they will remain in the parks and recreation database.

Selected parcels had their scores manually altered due to the presence of large lakes, wetlands, and other obstructions separating them from the points of interest analyzed.

Residential Density Proximity Score (P_R)

The residential density proximity score uses traffic analysis zone (TAZ) data to calculate a 0 (low proximity) to 10 (high proximity) score for all roadway segments and vacant parcels. TAZ data was collected from MetroPlan Orlando. An "ACRES" field was added to the data, as well as a "POP_ACRE" field. The project team then performed an erase function on the TAZ's to remove lakes and calculated the acreage of each TAZ using the calculate geometry function. Finally, the project team divided the total population "TOT_POP" by the "ACRES" field to populate the "POP_ACRE" field. This field normalizes by population per acre, which feeds into the scoring thresholds below.

The project team decided to "bunch" low population TAZ's near the bottom ranges of the scoring metric (0 to 4). As population metrics increased, relatively higher ranges were used. The range of each score category increases to 2.5 persons per acre (ex: 6.01 to 8.50) for scores 8, 9, and 10.

The project team also created "generalized TAZ zones" when TAZ's were either small or adjacent TAZ's misrepresented the population of the total area. The I-Drive and Universal Resort areas were normalized for visitor (tourist) population. Appendix 3 provides information on these zones.

Using the lowest population density ranges first, the project team then tagged (using select by location) the location of each roadway segment and vacant parcel to assign them a TAZ zone. A buffer of 50 feet was used on the select by location function to normalize for uncentered roadway centerlines.

The following matrix is used as part of this algorithm to score vacant parcels and roadway segments. The radii on the left correspond to the scores (in grey) under each residential density range. Roadways and vacant parcels can achieve a maximum score of 10.

Residential Density (persons per acre)	Score	General Urban Environment/Transect
> 11.00 (a)	10.0	High Density Suburban/ Urban (T4-T6)
8.51 – 11.00 (b)	9.0	Higher Density Suburban (T3-T4)
6.01 – 8.50 (c)	8.0	Suburban (T3)
4.51 – 6.00 (d)	7.0	Suburban (T3)
3.01 – 4.50 (e)	6.0	Lower Density Suburban (T3)
2.01 – 3.00 (f)	5.0	Lower Density Suburban (T3)
1.51 – 2.00 (g)	4.0	Rural/Suburban (T2-T3)
1.00 – 1.50 (h)	3.0	Rural (T2)
0.51 – 1.00 (i)	2.0	Rural (T2)
0.01 – 0.50 (j)	1.0	Rural (T2)
0.00 (k)	0.0	Conservation/Agriculture

Where:

$$P_{R(x)} = a_x \text{ OR } b_x \text{ OR } c_x \text{ OR } d_x \text{ OR } e_x \text{ OR } f_x \text{ OR } g_x \text{ OR } h_x \text{ OR } i_x \text{ OR } j_x \text{ OR } k_x$$

Maximum: 10 (High Proximity)
Minimum: 0 (Low Proximity)
Scored for Vacant Parcels and Roadway Segments "x"

Retail and Entertainment Proximity Score (P_E)

The retail and entertainment proximity score uses proximity to retail and entertainment establishments (including stores, services, theme parks and entertainment venues) to calculate a 1 (low proximity) to 10 (high proximity) score for all roadway segments and vacant parcels.

A tiered approach was taken to scoring retail proximity due to the breadth of establishments present.

The following tiers are utilized:

Tier 1.1 Entertainment: Entertainment Venues, Malls
Tier 1.2 Retail: Bars, Coffee Shops, Gyms
Tier 2 (Retail & Entertainment): Libraries, Liquor/Tobacco Stores, Department Stores, Grocery Stores
Tier 3 (Retail & Entertainment): General Stores, Money Loan Centers, Markets
*Automotive stores are not included. Grocery and markets are included due to the presence of retail.

The 1/8-mile parameter points for each of the categories below were quality assures following a qualitative analysis of the map outputs. Decay curves set the point totals for the other distance parameters beyond 1/8 mile. The radii on the left correspond to the scores (in grey) under each retail and entertainment category. The following matrix is used as part of this algorithm to score vacant parcels and roadway segments. Roadways and vacant parcels can achieve a maximum score of 10.

Radius (within)	Tier 1.1 (a)	Tier 1.2 (b)	Tier 2 (c)	Tier 3 (d)
1/8 Mile	6.00	6.00	3.75	1.25
1/4 Mile	4.95	4.95	3.09	1.03
1/2 Mile	3.23	3.23	2.02	0.67
3/4 Mile	2.03	2.03	1.27	0.42
1 Mile	1.28	1.28	0.80	0.27
1.5 Miles	0.60	0.60	0.38	0.12
2 Miles	0.23	0.23	0.14	0.04

Where:

$$P_{E(x)} = a_x + b_x + c_x + d_x$$

Maximum: 10 (High Proximity)
Minimum: 0 (Low Proximity)
Scored for Vacant Parcels and Roadway Segments “x”

Selected parcels had their scores manually altered due to the presence of large lakes, wetlands, and other obstructions separating them from the points of interest analyzed.

Transit Proximity Score (P_T)

The transit proximity score uses proximity to SunRail stations and LYNX bus stops to calculate a 1 (low proximity) to 10 (high proximity) score for all roadway segments and vacant parcels.

The transit score is calculated based on nominal proximities tailored to walking distances (1/4 and ½ mile) as well as biking distances (maximum of 2 miles). Future updates to the methodology will weight the transit stops by stop frequency times, although this development has not been done at this time.

The following matrix is used as part of this algorithm to score vacant parcels and roadway segments. Decay curves are not used as part of this analysis at this time; instead, a linear deduction is provided through to the 1-mile range at intervals of 1/8 of a mile. The radii on the left correspond to the scores (in grey).

Radius (within)	Score
1/8 Mile (a)	10
1/4 Mile (b)	9
3/8 Mile (c)	8
1/2 Mile (d)	7
5/8 Mile (e)	6
3/4 Mile (f)	5
7/8 Mile (g)	4
1 Mile (h)	3
1.5 Miles (i)	2
2 Miles (j)	1
Outside 2 Miles (k)	0

Where:

$$P_{T(x)} = a_x \text{ OR } b_x \text{ OR } c_x \text{ OR } d_x \text{ OR } e_x \text{ OR } f_x \text{ OR } g_x \text{ OR } h_x \text{ OR } i_x \text{ OR } j_x \text{ OR } k_x$$

Maximum: 10 (High Proximity)
Minimum: 0 (Low Proximity)
Scored for Vacant Parcels and Roadway Segments "x"

Selected parcels had their scores manually altered due to the presence of large lakes, wetlands, and other obstructions separating them from the points of interest analyzed.

Future updates to the transit score will weight head times and the directness of each specific transit stop to destinations.

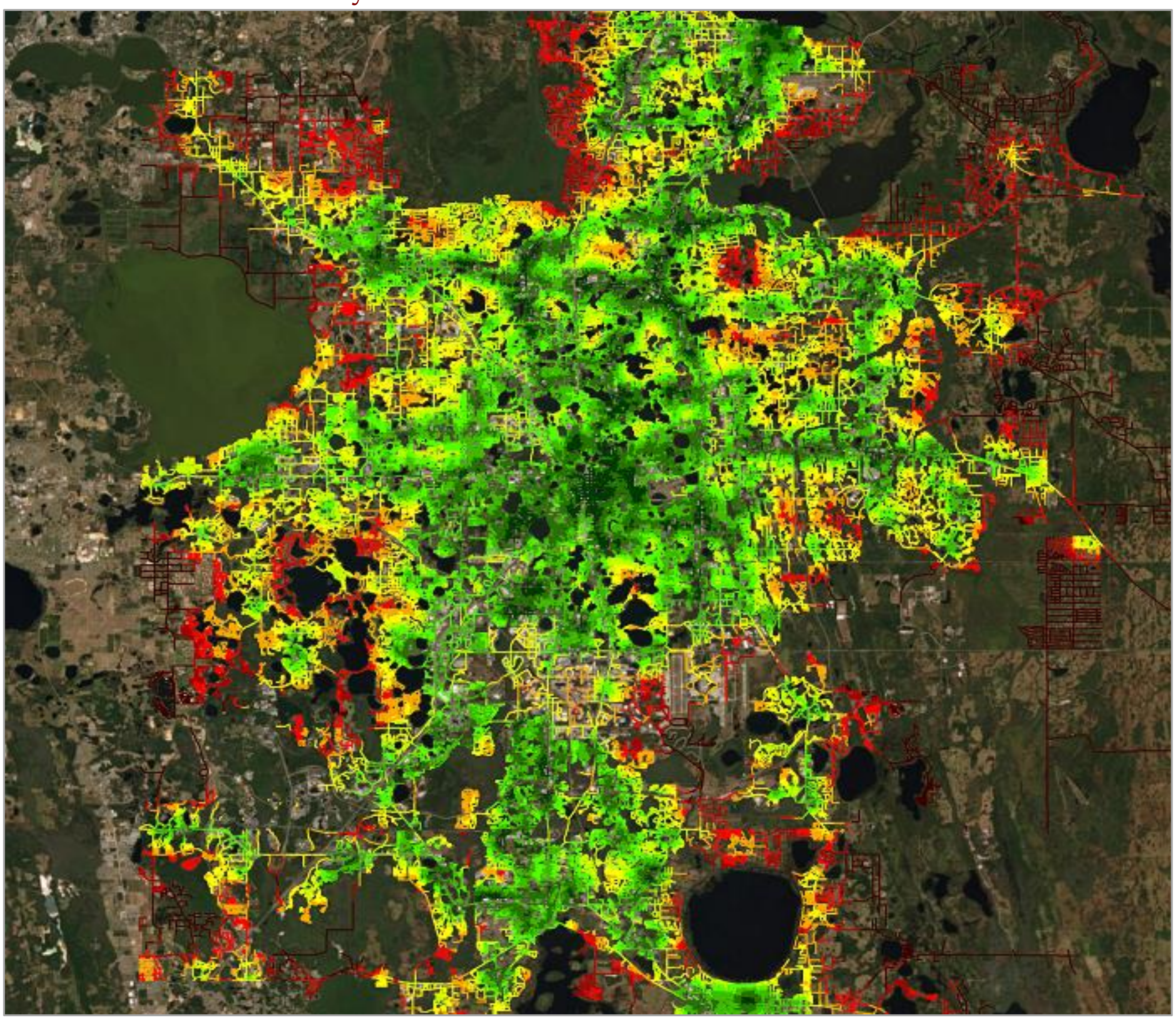
Cumulative Proximity Score (Livability Index) (P_C)

The cumulative proximity score is calculated as the average of the food, parks and recreation, residential density, retail and entertainment, and transit proximity scores. This score, also referred to as the livability index, is a measure of how balanced an area is from a multi-need, synergetic perspective. It is calculated as shown below:

$$P_{C(x)} = ((P_{F(x)} + P_{N(x)} + P_{R(x)} + P_{E(x)} + P_{T(x)}) /5)$$

Maximum: 10 (High Proximity)
Minimum: 0 (Low Proximity)
Scored for Vacant Parcels and Roadway Segments "x" (not annotated

Pictured: Cumulative Proximity Scores



Healthcare Access Proximity Score (P_H)

The healthcare access proximity score uses proximity to hospitals, pharmacies and medical clinics to calculate a 1 (low proximity) to 10 (high proximity) score for all roadway segments and vacant parcels. The health access proximity score is not included within the cumulative proximity score.

The following matrix is used as part of this algorithm to score vacant parcels and roadway segments. Decay curve values are relative the 1/4-mile parameter values, as opposed to the 1/8-mile values, but are not applied to hospitals, which receive a linear reduction due to the fact that walking and biking to the hospital is not common (nor feasible). The radii on the left correspond to the scores (in grey).

Radius (within)	Hospitals (a)	Pharmacies (b)	Medical Clinics (c)
1/4 Mile	10.00	5.00	5.00
1/2 Mile	8.50	3.26	3.26
3/4 Mile	7.00	2.05	2.05
1 Mile	5.50	1.29	1.29
1.5 Miles	4.00	0.61	0.61
2 Miles	2.50	0.23	0.23
3 Miles	1.00	0.00	0.00

Where:

$$P_{H(x)} = a_x + b_x + c_x$$

Maximum: 10 (High Proximity)
Minimum: 0 (Low Proximity)
Scored for Vacant Parcels and Roadway Segments "x"

Selected parcels had their scores manually altered due to the presence of large lakes, wetlands, and other obstructions separating them from the points of interest analyzed.

Government Services Proximity Score (P_G)

The government services proximity score uses proximity to city halls, courthouses and post offices to calculate a 1 (low proximity) to 10 (high proximity) score for all roadway segments and vacant parcels. The government services proximity score is not included within the cumulative proximity score.

The following matrix is used as part of this algorithm to score vacant parcels and roadway segments. The baseline 1/8-mile values were generated in order to provide a score of approximately "10" to any roadway segment or parcel within 1/2-mile of each of the five government services provided below. The radii on the left correspond to the scores (in grey).

Radius (within)	City Hall (a)	Comm. Center (b)	Library (c)	Courthouse (d)	Post Office (e)
1/8 Mile	8.00	5.50	3.50	2.00	2.00
1/4 Mile	6.60	4.54	2.89	1.65	1.65
1/2 Mile	4.30	2.96	1.88	1.08	1.08
3/4 Mile	2.70	1.86	1.18	0.68	0.68
1 Mile	1.70	1.17	0.75	0.43	0.43
1.5 Miles	0.80	0.55	0.35	0.20	0.20

Where:

$$P_{G(x)} = a_x + b_x + c_x + d_x + e_x$$

Maximum: 10 (High Proximity)
Minimum: 0 (Low Proximity)
Scored for Vacant Parcels and Roadway Segments "x"

Selected parcels had their scores manually altered due to the presence of large lakes, wetlands, and other obstructions separating them from the points of interest analyzed.

Job Density Proximity Score

The job density proximity score uses traffic analysis zone (TAZ) data to calculate a 0 (low proximity) to 10 (high proximity) score for all roadway segments and vacant parcels. TAZ data was collected from MetroPlan Orlando. An "ACRES" field was added to the data, as well as a "EMPACRE" field. Finally, the project team divided the total population "TOT_EMP" by the "ACRES" field to populate the "EMPACRE" field. This field normalizes by population per acre, which feeds into the scoring thresholds below.

The project team decided to "bunch" low job density TAZ's near the bottom ranges of the scoring metric with scores of 0 and 1 (0 to 0.5 jobs per acre). This represents about one half of the TAZ's within the metro area. As job density metrics increased, relatively higher ranges were used. Job density ranges (in persons per acre) increase as the job proximity score increases in order to increase score parity in the 7, 8, 9 and 10-point range. The ranges can be found below and may be altered in the future depending on the type of analysis being performed.

Using the lowest job density ranges first, the project team then tagged (using select by location) the location of each roadway segment and vacant parcel to assign them a TAZ zone. A buffer of 150 feet was used on the select by location function to normalize for uncentered roadway centerlines.

The following matrix is used as part of this algorithm to score vacant parcels and roadway segments. The radii on the left correspond to the scores (in grey) under each residential density range. Roadways and vacant parcels can achieve a maximum score of 10.

Jobs Per Acre	Score (# TAZ) Records)	General Urban Environment/Transect
> 60.00 (a)	10.0 (32)	Highest Density (T4-T6)
45.01 – 60.00 (b)	9.0 (11)	Higher Density (T3-T4)
22.51 – 45.00 (c)	8.0 (62)	Suburban (T3)
15.01 – 22.50 (d)	7.0 (85)	Suburban (T3)
7.51 – 15.00 (e)	6.0 (220)	Lower Density (T3)
5.01 – 7.50 (f)	5.0 (166)	Lower Density (T3)
2.51 – 5.00 (g)	4.0 (284)	Rural/Suburban (T2-T3)
1.01 – 2.50 (h)	3.0 (408)	Rural (T2)
0.51 – 1.00 (i)	2.0 (262)	Rural (T2)
0.01 – 0.50 (j)	1.0 (865)	Rural (T2)
0.00 (k)	0.0 (308)	Conservation/Agriculture

Where:

$$P_{R(x)} = a_x \text{ OR } b_x \text{ OR } c_x \text{ OR } d_x \text{ OR } e_x \text{ OR } f_x \text{ OR } g_x \text{ OR } h_x \text{ OR } i_x \text{ OR } j_x \text{ OR } k_x$$

Maximum: 10 (High Proximity)
Minimum: 0 (Low Proximity)
Scored for Vacant Parcels and Roadway Segments "x"

3.3 Safety-Proximity Disparity Score

The safety-proximity score algorithm combines the roadway safety score and cumulative proximity score to determine the least-safe roadways in the most-important areas for bicyclists and pedestrians within the Orlando Metro region. Calculations associated with this algorithm are detailed in this section of the report.

The safety-proximity disparity score is calculated on a -10 (low disparity) to 10 (high disparity) scale and is equal to the difference between the safety score (as calculated in section 3.1) and cumulative proximity score (as calculated in section 3.2).

Variable Definitions

S_X = Safety Score of Roadway Segment "x" *
$P_{C(x)}$ = Cumulative Proximity Score of Roadway Segment "x" *
G_X = Safety-Proximity Disparity Score of Roadway Segment "x"

* As derived in Section 3.1
* As derived in section 3.2

Safety-Proximity Disparity Score

$$G_X = P_{C(x)} - S_X$$

Maximum: 10 (High Disparity)
Minimum: -10 (Low Disparity)
Scored for Roadway Segments "x"

As a next step (future updates), the project team will calculate safety-proximity scores for specific categories, including *schools*, food, parks and recreation, residential density, retail and entertainment, and transit.

The equation for transit (as an example) is depicted below. In addition to the other proximity variables covered in this section, school safety deficiencies will also be a priority moving forward.

Transit Safety-Proximity Disparity Score (example)

$$G_{T(x)} = P_{T(x)} - S_X$$

Maximum: 10 (High Disparity)
Minimum: -10 (Low Disparity)
Scored for Roadway Segments "x"
$P_{F(x)}$ = Transit Proximity Score
$G_{F(x)}$ = Transit Safety-Proximity Disparity Score

3.4 Isolated Proximity Disparity Scores (Gaps)

The proximity-disparity score algorithm looks *within* the proximity scores and identifies gaps in coverage for all land use categories covered, calculating a -10 (lowest disparity) to 10 (highest disparity) score over all *roadway segments and vacant parcels*. Proximity disparity scores include the following:

- Food Disparity Score
- Parks & Recreation Disparity Score
- Residential Density Disparity Score
- Retail & Entertainment Disparity Score
- Transit Disparity Score

The baseline equation used for each of the land use variables is equal to the following:

Control Variable Proximity Disparity = Average Score of All Other Proximity Variables
(minus) Score of Control Variable

In short, this equation measures the relative difference in score when the land use analyzed is isolated against the average score of the other proximity variables analyzed. The equations for each of the disparity scores are as follows:

Variable Definitions

P_F = Food Proximity Score*
P_N = Parks & Rec. Proximity Score*
P_R = Residential Density Proximity Score*
P_E = Retail & Entertainment Proximity Score*
P_T = Transit Proximity Score*

D_F = Food Disparity Score
D_N = Parks & Rec. Disparity Score
D_R = Residential Density Disparity Score
D_E = Retail & Entertainment Disparity Score
D_T = Transit Disparity Score

*As derived in Section 3.3 (Proximity Scores); for Road Segment or Vacant Parcel "X" (not annotated)

Food Disparity Score

$$D_F = ((P_N + P_R + P_E + P_T) / 4) - P_F$$

Maximum: 10 (High Disparity)
Minimum: -10 (Low Disparity)
Scored for Vacant Parcels and Roadway Segments "x" (not annotated)

Parks and Recreation Disparity Score

$$D_N = ((P_F + P_R + P_E + P_T) / 4) - P_N$$

Maximum: 10 (High Disparity)
Minimum: -10 (Low Disparity)
Scored for Vacant Parcels and Roadway Segments "x" (not annotated)

Residential Density Disparity Score

$$D_R = ((P_N + P_F + P_E + P_T) / 4) - P_R$$

Maximum: 10 (High Disparity)
Minimum: -10 (Low Disparity)
Scored for Vacant Parcels and Roadway Segments "x" (not annotated)

Retail and Entertainment Disparity Score

$$D_E = ((P_N + P_R + P_F + P_T) / 4) - P_E$$

Maximum: 10 (High Disparity)
Minimum: -10 (Low Disparity)
Scored for Vacant Parcels and Roadway Segments "x" (not annotated)

Transit Disparity Score

$$D_T = ((P_N + P_R + P_E + P_F) / 4) - P_T$$

Maximum: 10 (High Disparity)
Minimum: -10 (Low Disparity)
Scored for Vacant Parcels and Roadway Segments "x" (not annotated)

Implications of the Land Use Disparity Scores

The land use disparity scores provide information pertaining to the potential "highest and best use" of vacant parcels from a livability perspective. These scores can be used to inform criteria for land use amendments, comprehensive plan amendments, and other policy-level decisions that lead to a more balanced and synergetic urban environment.

New "overlay districts" could be formed, by jurisdiction, within areas identified as outliers within this analysis to incentivize targeted development goals in certain areas with a high volume of vacant parcels or high cumulative proximity scores. Incentives could include tax breaks or a waiver of development fees for "early adopting" prospective developers who provide land use disparity relief, by land use, in the short term. This incentivizes livability improvements in the free market.

Flexible land uses assigned to vacant parcels identified as outliers within this analysis could provide short-and-long-term term land use disparity relief for each of the land use categories covered in this section of the report.

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Gaps for government services, healthcare and jobs have not been completed as part of LOTIS 2.0. Algorithmic calculations for these gaps would likely heavily weight population density. These additions will be provided as part of LOTIS 3.0.

3.5 Retrofittability Screening Score

The retrofittability score calculates the number of lateral feet that can be reduced from the current width of a roadway using updated FDOT 2017 PPM Manual design guidelines (Table 2.1.1 Lane Widths, Page 12). These guidelines allow for 11-foot-wide lanes along state roads. In certain jurisdictions, 10-foot-wide lanes are allowed, and thus a 10-foot-standard can also be used to calculate retrofittability.

The following jurisdictions have informed the LOTIS development team to utilize a 10-foot land-width standard as of December 18th, 2019:

- The City of Casselberry – 10.0' standard. Populated within the "JURIS" field on 12/23/2019

Using the retrofittability score, measured in feet, redesign options and countermeasures can be identified including the addition of bicycle lanes, the protection of existing bicycle lanes with 1.5-foot-plus buffers, speed limit reductions where existing bike lanes are present, and others as described in this section. *All outputs are subject to engineer review.* The algorithmic process to calculate this score is summarized below:

Variable Definitions

L_X = Total Number of Lanes present along Roadway Segment "x"
W_X = Current Roadway Surface Width of Roadway Segment "x"
R_X = Retrofittable Space of Roadway Segment "x"
n = Custom minimum lane width criteria (completed on a jurisdiction-by-jurisdiction basis)

Retrofittability Score Calculation: State (FDOT) Roads with 11-Foot Minimum Width Standard

$$R_X = W_X - (11)L_X$$

LOTIS Data Query: Where "JURIS" = ""
Scored for Roadway Segments "x"

Retrofittability Score Calculation: Local Roads with a Custom Jurisdictional Minimum Width Standard

$$R_X = W_X - (n)L_X$$

LOTIS Data Query: Where "JURIS" = [Applicable Jurisdiction]
Scored for Roadway Segments "x"

Using the output of the two algorithms above, the project team developed specific "retrofittability countermeasures" by cross-referencing the retrofittability value (in feet) with the roadway characteristics present on a segment-by-segment basis. For example, roadways with more than 10 feet of retrofittable space *and zero bike lanes present* were given a countermeasure of "Paint 2 New 4.5-foot-plus Bike Lanes". Additionally, roadways with unmarked parking have been removed from the retrofittability output. The following countermeasures are included in the RETRO_CM field within the roadway polyline file given the parameters specified below.

Countermeasure #1: Protect 2 Bike Lanes with 1.5-foot Buffers *

- Constraint(s):
    - Where $R_x \geq 3$; and PAVED_SHLD = 2; and INT_BIKELN = 0; and UNMARKPK = No
- Roadway Polyline Data Symbol within RETRO_CM field: PBL2

Countermeasure #2: Protect 1 Bike Lane with 1.5-foot Buffer *

- Constraint(s):
    - Where RETRO_CM <> PBL2; and UNMARKPK = No
        - And, Option 1: $R_x > 1$; and PAVED_SHLD = 1; and INT_BIKELN = 0
        - Or, Option 2: $R_x > 1$; and PAVED_SHLD = 2; and INT_BIKELN <> 2
- Roadway Polyline Data Symbol within RETRO_CM field: PBL1 or PBL1of2

Countermeasure #3: Paint 2 New 4.5-foot-plus Bike Lanes

- Constraint(s):
    - Where SPEED $\leq$ 35; and UNMARKPK = No
        - And, Where $R_x \geq 9$; and PAVED_SHLD = 0; and INT_BIKELN = 0
- Roadway Polyline Data Symbol within RETRO_CM field: NBL2

Countermeasure #4: Paint 1 New 5-foot-plus Bike Lane

- Constraint(s):
    - Where RETRO_CM <> NBL2; and SPEED $\leq$ 35; and UNMARKPK = No
        - And, Option 1: $R_x \geq 5$; and PAVED_SHLD = 1; and INT_BIKELN = 0
        - Or, Option 2: $R_x \geq 5$; and PAVED_SHLD = 0; and INT_BIKELN = 0
- Roadway Polyline Data Symbol within RETRO_CM field: NBL1

Countermeasure #5: Consider Speed Limit Reduction Where Bike Lanes are Present*

- Constraint(s):
    - Where PAVED_SHLD <> 0; and INT_BIKELN <> 0; and SPEED $\geq$ 40 and UNMARKPK = No
- Roadway Polyline Data Symbol within RETRO_CM field: SPD

*Future countermeasure not utilized in the 2019 LOTIS release

*Analytics associated with the implementation of the protection of bicycle lanes, and corresponding modeled reductions in overall bicycle fatality rates within the Orlando Metro Area, will be analyzed by the project team at a later date.

Funding Implications of the Retrofittability Score

The retrofittability score will be best-implemented if streamlined with “business as usual” repave-and-restripe projects. This will establish a framework for absorbing bicycle and pedestrian safety enhancements into the existing project funding framework.

Green Infrastructure Countermeasures: Green infrastructure, or “green streets”, that incorporate features such as bioswales and green bike-lane-buffers, can also be a potential countermeasure using the retrofittability score. The implementation of these features could utilize the equations *as presented*, provided that the green infrastructure countermeasures can be implemented within a width radius of 1.5 to 5 feet of lateral roadway space. Countermeasures include:

- 1.5-foot wide-planters that serve as bicycle lane buffers
- 4.5-to-5-foot-wide swales and other green features that treat and mitigate water and flooding

Reduction in Fatalities and Injuries: If provided with average bicycle ridership figures for metro area roadways, the project team could approximate injury and fatality reductions. As described in *Why Cities with High Bicycling Rates Are Safer for All Road Users* (2019) by Wesley E. Marshall and Nicholas N. Ferenchak, protected bike lane facilities lead to a 44% reduction in fatalities and a 50% reduction in serious injuries. When these statistics are applied to the “protectible” bike lane metrics developed as part of LOTIS, *annual fatalities or injuries prevented* can be calculated at a future time using the following variables:

Output:

I = Injuries Prevented Annually

Input Variables

P = Protected Bike Lane Injury Rate

S = Roadway Segment with Protected Bike Lane (Annotated as: S_1, S_2, ... S_x)

N = Number of Annual Riders Along Each Segment (N_{S1}, N_{S2}, ... N_{Sx})

P = Protected Bike Lane Injury Rate

F = Normalizing Factor (for single trips going across multiple segments)

3.6 Hazardous Walking Condition Candidates

This algorithm identifies roadways that may qualify as a Hazardous Walking Condition, per Florida State Statute, Chapter 1006, Section 23. A preliminary screening process, this score is represented as "HAZCON" in the transportation polyline GIS attribute table. The following GIS functions are performed to screen roadway segments for this attribute:

Hazardous Walking Conditions (Criteria 1 of 3: Parallel Hazardous Conditions, 35-45 mph)

- Constraint(s):
  - HAZCON = "Preliminary Candidate 1" if;
    - PX_SCHOOLS <> Outside 2 Miles; and
    - SPEED ≥ 35; and SPEED ≤ 45; and
    - AADT > 3000; and SIDEWALK <> 2

Hazardous Walking Conditions (Criteria 2 of 3: Parallel Hazardous Conditions, > 45 mph)

- Constraint(s):
  - HAZCON = "Preliminary Candidate 2" if;
    - PX_SCHOOLS <> Outside 2 Miles; and
    - SPEED ≥ 50; and
    - AADT > 3000; and
    - SIDEWALK <> 2

Hazardous Walking Conditions (Criteria 3 of 3: Perpendicular Hazardous Conditions, > 45 mph)

- Constraint(s):
  - HAZCON = "Preliminary Candidate 3" if;
    - PX_SCHOOLS <> Outside 2 Miles; and
    - SPEED ≥ 50; and TOTL_LANES ≥ 6

Recommendation: It is recommended that the Orange, Osceola and Seminole County school districts provide 2-mile walk zone polygons to the ECFRPC for further application development.

3.7 Corridor and Neighborhood Scoring

The LOTIS database can also "score" entire roadway corridors consisting of multiple roadway segments. This is done by "averaging" the score within the corridor based on the score of each individual segment and the proportion of the entire corridor that a particular segment occupies. This analysis will be completed on an as-needed basis in future update cycles.

Variable Definitions

S = Score of Segment	A = Segment 1 of 4
X = Length of Segment	B = Segment 2 of 4
Z = Total Length of Corridor	C = Segment 3 of 4
V = Corridor Score	D = Segment 4 of 4
N = Neighborhood Score	
R = Total Length of Neighborhood Roadway Network	

*This example is limited to 4 variables as a stand-alone example

Corridor Score

$$V = [S_A (X_A / Z)] + [S_B (X_B / Z)] + [S_C (X_C / Z)] + [S_D (X_D / Z)]$$

Scored for Roadway Segments "A", "B", "C" and "D" which constitute an entire corridor
Calculated for Safety or Proximity Scores

This equation will calculate either the Corridor Safety Score and the Corridor Proximity Score. Once this has been completed, the Corridor Disparity Score can be calculated by subtracting the Corridor Safety Score from the Corridor Proximity Score. TIP projects can be overlayed with this score, as needed.

Neighborhood Score

$$N = [S_A (X_A / R)] + [S_B (X_B / R)] + [S_C (X_C / R)] + [S_D (X_D / R)]$$

Scored for Roadway Segments "A", "B", "C" and "D" which constitute an entire neighborhood
Calculated for Safety or Proximity Scores

This equation will calculate either the Neighborhood Roadway Safety Score, Neighborhood Roadway Safety-Proximity Disparity Score, the Neighborhood Proximity Score for all proximity scores (food, retail, parks, etc.), and the Neighborhood Proximity Gap Score for all proximity scores.

3.8 Roadway Safety Countermeasures

The LOTIS roadways safety countermeasures are intended to specify roadways that could benefit from roadway safety enhancements due to their roadway characteristics and proximity to different community features.

The equations (queries) used to identify roadway segments that would potentially benefit from safety countermeasures generally use a combination of low roadway safety scores, higher than average cumulative proximity scores, close proximity to features such as markets and schools, and specific queries utilizing roadway characteristics such as sidewalk gaps. Countermeasures are intended to decrease bike/ped crash rates by specifying the "most needed" safety enhancements within the Metro Area.

Countermeasure #1: Consider Building Two New Sidewalks

- Constraint(s):
    - Option 1, where: "SIDEWALK" = 0 and "SAFETY_SCR" < 7 and "PXSC_ALL" ≥ 7.5
    - or, Option 2, where: "SIDEWALK" = 0 and "SAFETY_SCR" < 7 and "PX_SCHOOLS" = 'Within 1/4 Mile'
    - or, Option 3, where: "SIDEWALK" = 0 and "SAFETY_SCR" < 7 and "PX_SCHOOLS" = 'Within 1/8 Mile'
    - or, Option 4, where: "SIDEWALK" = 0 and "SAFETY_SCR" < 7 and "PX_MARKET" = 'Within 1/8 Mile'
    - or, Option 5, where: "SIDEWALK" = 0 and "SAFETY_SCR" < 7 and "PX_GROCERY" = 'Within 1/8 Mile'
- Roadway Polyline Data Symbol within SAFCM_NS2 field: 'Consider Building 2 New Sidewalks'

Countermeasure #2: Consider Building One New Sidewalk

- Constraint(s):
    - Option 1, where: ”SIDEWALK" = 1 and "SAFETY_SCR" < 7 and "PXSC_ALL" ≥ 7.5
    - or, Option 2, where: "SIDEWALK" = 1 and "SAFETY_SCR" < 7 and "PX_SCHOOLS" = 'Within 1/4 Mile'
    - or, Option 3, where: "SIDEWALK" = 1 and "SAFETY_SCR" < 7 and "PX_SCHOOLS" = 'Within 1/8 Mile'
    - or, Option 4, where: "SIDEWALK" = 1 and "SAFETY_SCR" < 7 and "PX_MARKET" = 'Within 1/8 Mile'
    - or, Option 5, where: "SIDEWALK" = 1 and "SAFETY_SCR" < 7 and "PX_GROCERY" = 'Within 1/8 Mile'
- Roadway Polyline Data Symbol within SAFCM_NS1 field: 'Consider Building 1 New Sidewalk'

Countermeasure #3: Assess Pedestrian Signal Timing (Intervals Between Crossing Signal)

- Constraint(s):
    - Option 1, where: "SAFETY_SCR" < 7 and "PX_MARKET" = 'Within 1/8 Mile' and "PXSC_ALL" > 8 and "TRAFF_SIG" Within 1/8 Mile'
    - or, Option 2, where: "SAFETY_SCR" < 7 and "PX_ GROCERY" = 'Within 1/8 Mile' and "PXSC_ALL" > 8 and "TRAFF_SIG" Within 1/8 Mile'
    - or, Option 3, where: "SAFETY_SCR" < 7 and "PX_ SCHOOLS" = 'Within 1/8 Mile' and "PXSC_ALL" > 8 and "TRAFF_SIG" Within 1/8 Mile'
- Roadway Polyline Data Symbol within SAFCM_PST field: 'Assess Pedestrian Signal Timing'

Countermeasure #4: Consider Adding Flashing Beacon of Other Traffic Calming Device

- Constraint(s):
    - Option 1, where: "SAFETY_SCR" < 7 and "PX_MARKET" = 'Within 1/8 Mile' and "PXSC_ALL" > 8 and "TRAFF_SIG" Within 1/8 Mile'
    - or, Option 2, where: "SAFETY_SCR" < 7 and "PX_ SCHOOLS" = 'Within 1/8 Mile' and "PXSC_ALL" > 8 and "TRAFF_SIG" Within 1/8 Mile'
- Roadway Polyline Data Symbol within SAFCM_FLB field: 'Consider Adding Flashing Beacon'

Countermeasure #5: Consider Reducing Lane Widths to 11-Feet

- Constraint(s):
    - Where: "RETRO" > 2 and "PXSC_ALL" > 7.5
- Roadway Polyline Data Symbol within SAFCM_RLW field: 'Consider Narrowing Lane Widths'

Countermeasure #6: Consider Reducing Speed Limits where Marked Bike Lane(s) Present

- Constraint(s):
    - Where: "PAVED_SHLD" <> 0 and "BIKELN_TYPE" <> 'Unmarked (2)' and "BIKELN_TYP" <> "Unmarked (1) and "SPEED" > 35
- Roadway Polyline Data Symbol within SAFCM_RSP field: 'Reduce Speed (Bike Lane Present)'

Countermeasure #7: Consider Filling Sidewalk Gaps within 1/8 Mile of Transit Stops

- Constraint(s):
    - Where: "SIDEWALK" <> 2 and "PX_TRANSIT" = 'Within 1/8 Mile' and "SAFETY_SCR" < 7
- Roadway Polyline Data Symbol within SAFCM_SWGT field: 'Consider Filling SW Gap within 1/8 Mile of Transit'

3.9 Infill Countermeasures

Infill countermeasures will be added during the first quarter of 2020.

Part 4. Application Descriptions

Overview

Applications were developed using the land use database, transportation database, and integrated algorithms developed as described in Part 2 and Part 3 of this report. This section of the report provides an overview of the mapping applications developed. All coding associated with the development of these applications can be viewed on the ArcGIS MXD files.

Mapping applications include:

4.1 Roadway Safety/Condition Tool

Description: The Roadway Safety Tool displays roadway safety metrics and customized queries depicting sidewalk and bike lane conditions. Bike/ped crash heat maps, points of interest and all primary roadway features are included in the map viewer.

4.2 Transit Proximity Application

Description: This application looks at current proximity to transit as well as relative gaps in coverage. Existing transit points and vacant parcels are included in order to view opportunity areas.

4.3 Food Proximity Application

Description: This application looks at current proximity to food as well as relative gaps in coverage. Existing food parcels and vacant parcels are included in order to view opportunity areas.

4.4 Retail & Entertainment Proximity Application

Description: This application looks at current proximity to retail as well as relative gaps in coverage. Existing retail parcels and vacant parcels are included in order to view opportunity areas.

4.5 Park Proximity Application

Description: This application looks at current proximity to parks as well as relative gaps in coverage. Existing park parcels and vacant parcels are included in order to view opportunity areas.

4.6 School Zone Analysis Tool

Description: The school zone analysis depicts roadways within 3/4 mile of public schools and colleges and depicts numerous safety metrics, such as sidewalk gaps color coded by speed limit. A 1-mile radius was used in order to focus the analysis within close proximity to schools.

4.7 Retrofittability Screening Application | Slide Screen

Description: The retrofittability analysis identifies potential opportunity areas for new bicycle infrastructure, subject to engineering review. This includes new bike lanes and protectible bike lanes shown in the context of the existing bike-ped network.

4.8 SunRail Connectivity & Land Use Application

Description: This tool provides an analysis of connectivity, safety and infill opportunity areas near SunRail stations, highlighting roadway segments within a ½ mile radius. Connectivity is viewed in the context of sidewalk gaps and safety scores, while infill opportunity areas can be viewed and analyzed further using the vacant parcels and generalized Future Land Use map.

4.9 Best Foot Forward Application

Description: This application shows the intersection enforcement analytics as part of the Bike-Walk Central Florida Best Foot Forward Program.

4.10 Roadway Safety Countermeasures Application

Description: This application shows the roadway safety countermeasures as outlined in Section 3.8 alongside multiple roadway characteristics and a bicycle and pedestrian crash heatmap.

4.11 Government Services Proximity Application

Description: This application looks at current proximity to government services as well as relative gaps in coverage. Existing government parcels are shown in the map view.

4.12 Health Services Proximity Application

Description: This application looks at current proximity to health services as well as relative gaps in coverage. Existing health parcels are shown in the map view.

4.13 Jobs Proximity Application

Description: This application looks at current proximity to jobs as well as other layers, such as transit, population density and community features.

4.14 Vacant Parcel Infill Countermeasure Application

Description: This application identifies vacant parcels within high-proximity and/or proximity-disparity (gap) areas and provides countermeasures for potential development.

Appendix 1: DOR Code Cross Reference Table

ORANGE COUNTY		
DOR Code	Land Use Category	Prelim LOTIS LU
0000	Vacant Residential	VACRES
0001	Vacant Residential	VACRES
0004	Vacant Condo	VACRES
0019	Vacant Home Owners Association	VACRES
0020	Manufactured Home with Sticker	RESSF
0030	Vacant Water	VACRES
0031	Vacant Canal Frontage	VACRES
0035	Vacant Lake View	VACRES
0040	Vacant Golf Front	VACRES
0049	Vacant Condo Assoc	VACRES
0100	Single Family	RESSF
0101	Single Family	RESSF
0102	Single Family Class II	RESSF
0103	Single Family Class III	RESSF
0104	Single Family Class IV	RESSF
0105	Single Family Class V	RESSF
0106	Single Family Class VI	RESSF
0119	Improved Home Owner Association	RESSF
0120	Townhouse	RESSF
0121	Townhouse Class II	RESSF
0122	Townhouse Class III	RESSF
0130	Single Family Residential - Lake Front	RESSF
0131	Single Family Residential - Canal Front	RESSF
0135	Single Family Residential - Lake View	RESSF
0140	Single Family Residential - Golf	RESSF
0150	Single Family Residential - Town Home	RESSF
0175	Rooming House	RESMF
0181	1 Unit of Duplex	RESSF
0182	1 Unit of Class 2 Duplex	RESSF
0194	Single Family	RESSF
0195	Single Family Class 3	RESSF
0196	Single Family Class 4	RESSF
0197	Single Family Class 5	RESSF
0200	Manufactured Home	RESSF
0201	Manufactured Home	RESSF
0202	Manufactured Home	RESSF
0299	Manufactured Home Community	RESSF

ORANGE COUNTY		
DOR Code	Land Use Category	Prelim LOTIS LU
0300	Multi Family Class I	RESMF
0301	Multi Family Class II	RESMF
0310	Multi Family Class III	RESMF
0311	Student Housing	RESMF
0314	Mid-Rise Apartment	RESMF
0315	High-Rise Apartment	RESMF
0349	Multi-Family 10-49	RESMF
0400	Condominium Residential	RESMF
0401	Condominium - Single Family Residential	RESSF
0411	Comdominium Office Building Retail	RETENT
0421	Condominium – Restaurant	FOOD
0425	Condominium - Flexible Space	HM
0430	Condominium - Time Share	HM
0439	Condominium - Hotel/Motel	HM
0450	Condominium - Manufactured Home	VACRES
0471	Residential Condo Class 1	RESMF
0472	Residential Condo Class 2	RESMF
0473	Residential Condo Class 3	RESMF
0474	Residential Condo Class 4	RESMF
0499	Residential Condominium Association	RESMF
0550	Cooperatives Manufactured Home	RESMF
0600	Retirement Homes / Assisted Living (Sm)	RESMF
0610	Assisted Living	RESMF
0800	Multi-Family	RESMF
0805	Multi-Family 5-9 Units	RESMF
0812	Duplex	RESMF
0813	Triplex	RESMF
0814	Quadraplex	RESMF
0822	Class II Duplex	RESMF
0823	Class II Triplex	RESMF
0824	Class II Quadraplex	RESMF
1000	Vacant Commercial	VACRETENT
1003	Vacant Multi-Family (10 Units or More)	VACRES
1004	Vacant Condo Site	VACRETENT
1010	Pad Site Vacant Land	VACRETENT
1019	Vacant Commercial Association	VACRETENT
1100	Stores One Story	RETENT

ORANGE COUNTY		
DOR Code	Land Use Category	Prelim LOTIS LU
1101	Condo-Retail I	RETENT
1102	Condo-Retail II	RETENT
1103	Condo-Retail III	RETENT
1105	Retail Multi Tennant	RETENT
1110	Retail Convenience Store	RETFOOD
1115	Retail Free Standing	RETENT
1119	Improved Commercial Association	RETENT
1120	Retail Drug Store	RETENT
1125	Retail Big Box Small	RETENT
1130	Retail Big Box Medium	RETENT
1135	Retail Big Box Large	RETENT
1200	Store/Office/Converted Residential	RETENT
1210	Store/Office/Res Class 2	RETFOOD
1220	Store/Office/Res Class 3	RETFOOD
1300	Retail Department Store	RETENT
1400	Retail Supermarket	FOOD
1500	Retail Regional Mall Class I	RETENT
1505	Retail Regional Mall Class II	RETENT
1510	Retail Lifestyle Center	RETENT
1600	Retail Community Shopping	RETENT
1610	Retail Neighborhood Center	RETENT
2100	Retail Restaurant Class I	FOOD
2101	Condo – Restaurant	FOOD
2110	Retail Restaurant Class II	FOOD
2200	Retail Restaurant Fast Food	FOOD
2700	Vehicle Sale Showroom	RETENT
2710	Vehicle Service Building	RETENT
2720	Tire Dealer	RETENT
2730	Lube Facility	RETENT
2740	Vehicle Repair	RETENT
2750	Car Wash Self Service	RETENT
2751	Car Wash Drive Thru	RETENT
2752	Car Wash Automatic	RETENT
2801	Mobile Home Park Family	RESSF
2805	Mobile Home Park Senior	RESSF
3200	Theater / Auditorium Enclosed	RETENT
3300	Nightclub/Bars	RETENT

ORANGE COUNTY		
DOR Code	Land Use Category	Prelim LOTIS LU
3400	Recreational/Meeting	RETENT
3500	Tourist Attraction	RETENT
3503	T.A. Theater Class I	RETENT
3504	T.A. Ridehousing Class I	RETENT
3505	T.A. Restaurant Class I	FOOD
3507	T.A. Retail Class I	RETENT
3509	T.A. Cubic	RETENT
3514	T.A. Ridehousing Class II	RETENT
3600	Camps	PARK
3700	Race Tracks	RETENT
3800	Golf Course	PARK
3900	Motel	HM
3902	Hotel Condo II	HM
3903	Hotel Condo III	HM
3904	Hotel Weekly / Monthly Class I	HM
3905	Hotel Extended Stay	HM
3906	Timeshare Holding	HM
3907	Hotel Interim / Transition Use	HM
3908	Hotel Bed & Breakfast	HM
3909	Hotel Weekly / Monthly Class II	HM
3910	Hotel Limited Service	HM
3915	Hotel Select Service	HM
3920	Hotel Full Service	HM
3925	Hotel Luxury	HM
3926	Hotel Resort / Conv Class I	HM
3927	Hotel Resort / Conv Class II	HM
3928	Hotel Resort / Conv Class III	HM
3935	Hotel Ultra Luxury	HM
7000	Vacant Institutional	VACINST
8200	Forest, Parks, Recreational Areas (Public)	PARK
8289	Municipial Owned	PARK
8630	Conservation / Wetland	VACPARK
8670	Recreation Tracts: Access, Pedstrian, Bike Trails	PARK
8730	Conservation / Wetland	VACPARK
8770	Recreation Tracts: Access, Pedstrian, Bike Trails	PARK
8930	Conservation / Wetlands	VACPARK
8970	Recreation Tracts: Access, Pedstrian, Bike Trails	PARK

ORANGE COUNTY		
DOR Code	Land Use Category	Prelim LOTIS LU
9011	Lease Retail	RETENT
9600	Waste Land	VACPARK
9700	Recreational Park	PARK
9770	Recreation Tracts: Access, Pedstrian, Bike Trails	PARK
9912	Boat House / Lake Access	PARK
9930	Conservation Assessment	VACPARK
9931	Conservation / Wetland	VACPARK

OSCEOLA COUNTY		
DOR Code	Land Use Category	Prelim. LOTIS LU
0001	Vacant	VACRES
0011	Vacant - Improved	VACRES
0101	Single Family - Vacant	VACRES
0111	Single Family - Improved	RESSF
0211	Mobile Home - Improved	RESSF
0311	Multi-Family - 10-50 Units	RESMF
0312	Multi-Family - 51 Units or More	RESMF
0313	Multi-Family - LIHTC	RESMF
0411	Condominium - Improved	RESMF
0490	Timeshare / Condo Vacant	VACRES
0491	Timeshare / Condo Improved	RESMF
0493	Timeshare / Condo Common Elements - VAC	VACRES
0611	Retirement Homes - Single Fam Conversion	RESSF
0811	Multi-Family - Improved less than 10 units	RESMF
0901	Residential Common Elemenents/Area - Vac	VACRES
0911	Residential Common Elements/Area - Imp	RESMF
1001	Vacant Commercial	VACCOM
1003	Multi-Family - VAC 10 units or more	VACRES
1004	Vacant Community Condo Site	VACRES
1006	Retirement Homes - Vacant	VACRES
1011	Retail Vacant	VACRET
1016	Community Shop - Vac	VACRET
1021	Restaurant/Café - Vac	VACFOOD
1022	Drive-In Restaurant - Vac	VACFOOD
1031	Drive-In/Open St - Vac	VACFOOD
1035	TOURIST ATTRACT-VAC	VACRET
1036	CAMPS-VAC	VACPARK
1038	GOLF COURSES-VAC	VACPARK
1039	HOTELS & MOTELS-VAC	VACHM
1111	Retail Free Standing 1 Story	FOOD
1111	RETAIL FREE STANDING 1 STORY	RETENT
1112	RETAIL STRIP CENTER - MULTI TENANT	RETENT
1113	RETAIL CONVENIENCE STORE (7-11, WAWA)	FOOD
1121	RETAIL PHARMACY	RETENT
1241	STOR/OFC/RES/CONDO-I	RETFOOD
1311	Department Stores - IMP	FOOD
1311	DEPT. STORES-IMP	RETENT
1411	Supermarket - IMP	FOOD

OSCEOLA COUNTY		
DOR Code	Land Use Category	Prelim. LOTIS LU
1511	REGIONAL SHOPPING CENTERS	RETENT
1611	Community Shopping Centers	FOOD
1611	COMMUNITY SHOPPING CENTERS	RETENT
2111	Restaurant/Café - IMP	FOOD
2211	Drive-In Restaurant - IMP	FOOD
2611	SERVICE STATION - FULL OR SELF SERVICE	RETFOOD
2711	Auto Dealership Sales & Service	FOOD
2711	AUTO DEALERSHIP-SALES & SERVICE (RV & MOTORCYCLE)	RETENT
2712	USED AUTO DEALER	RETENT
2713	TIRE/AUTO SERIVCE FACILITIES	RETENT
2714	GENERAL AUTO REPAIR	RETENT
2716	CAR WASH	RETENT
2811	MOBILE HOME PARKS	RESSF
2911	Wholesale Outlet - IMP	FOOD
2911	WHOLESALE OUTLET-IMP	RETENT
3011	FLORIST/GREENHS-IMP	RETENT
3211	THEATER/ENCLOSED AUDITORIUM	RETENT
3311	NIGHTCLUB/BARS	RETENT
3411	BOWLING/SKATING/ENCLOSED ARENAS	RETENT
3511	TOURIST ATTRACTION/ENTERTAINMENT FACILITIES(DINNER	RETENT
3611	RV PARKS & CAMPGROUNDS	PARK
3811	GOLF COURSES	PARK
3911	HOTELS & MOTELS-IMP	HM
3941	HOTEL/MOTL CONDO-IMP	HM
3942	HOTEL/MOTL CONDO COMMON ELEMENTS - IMP	HM
3943	HOTEL/MOTL CONDO COMMON ELEMENTS VAC	VACHM
5101	CROPLAND CLASS 1-VAC	VACAGFOOD
5201	CROPLAND CLASS 2-VAC	VACAGFOOD
6001	PASTURELAND 1-VAC	VACAGFOOD
6601	ORCHARDS,GROVES-VAC	VACAGFOOD
6701	PLTRY,BEES,FISH-VAC	VACAGFOOD
7001	Vacant Institutional	VACINST
7071	Churches - Vacant	VACINST
7072	Private Schools - Vacant	VACINST
7073	Private Hospital - Vacant	VACINST
7075	Non-Profit Service - Vacant	VACINST
7076	Mortuary/Cemetery - Vacant	VACINST

OSCEOLA COUNTY		
DOR Code	Land Use Category	Prelim. LOTIS LU
7077	Club/Lodge/Hall - Vacant	VACINST
7099	Vacant Institutional with XFOB	VACINST
8201	Forest/Park/Rec - VAC	VACPARK
8211	FOREST/PARK/REC-IMP	PARK
9701	REC/PARK LAND-VAC	VACPARK
9711	REC/PARK LAND-IMP	PARK
9801	Rec/Park Land - VAC	VACPARK

SEMINOLE COUNTY		
DOR Code	Land Use Category	Prelim LOTIS LU
0000	VACANT RESIDENTIAL	VACRES
0001	SINGLE FAMILY	RESSF
0002	MOBILE/MANUFACTURED HOME	RESSF
0003	MULTI FAMILY 10 OR MORE	RESMF
0003	VACANT TOWNHOME	VACRES
0004	CONDOMINIUM	RESMF
0004	VACANT CONDO	VACRES
0005	COOPERATIVES	RESMF
0007	MISCELLANEOUS RESIDENTIAL	RESMF
0009	RESIDENTIAL COMMON ELEMENTS/AREAS	RESMF
0010	VAC GENERAL-COMMERCIAL	VACCOM
0011	STORES GENERAL-ONE STORY	RETENT
0012	COMM AND RES MIXED	RESSF
0013	DEPARTMENT STORE	RETENT
0014	SUPERMARKET	FOOD
0016	RETAIL CENTER-ANCHORED	RETENT
0021	RESTAURANT	FOOD
0022	FAST FOOD RESTAURANT	FOOD
0025	REPAIR SHOP(EXCLUDING AUTO)	RETENT
0026	SERVICE STATION	RETFOOD
0027	CAR REPAIR	RETENT
0028	MOBILE HOME PARK	RESSF
0029	WHOLESALE OUTLETS	RETENT
0030	FLORIST/GREENHOUSE	RETENT
0030	VACANT WATERFRONT	VACRES
0032	ENCLOSED THEATER & STADIUM	RETENT
0033	NIGHT CLUB	RETENT
0034	RECREATIONAL FACILITY	PARK
0035	TOURIST ATTR & ENTERT FAC	RETENT
0036	CAMP	PARK
0037	RACE TRACK-HORSE DOG AUTO	RETENT
0038	GOLF COURSE	PARK
0039	HOTEL MOTL	HM
0040	VACANT RES CROSS COUNTY LINE	VACRES
0070	VACANT INSTITUTIONAL	VACINST
0082	FOREST/PARKS/REC AREAS	PARK
0096	WASTE LANDS/SWAMPS ETC	VACPARK

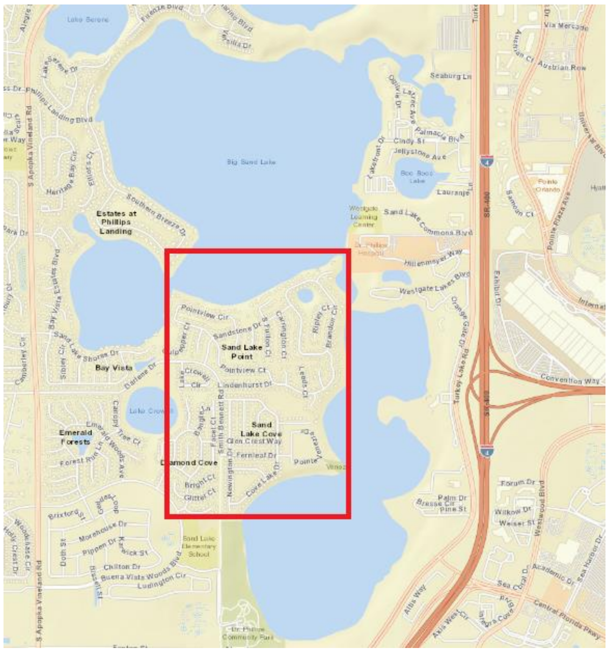
SEMINOLE COUNTY		
DOR Code	Land Use Category	Prelim LOTIS LU
0102	SINGLE FAMILY - SANFORD HISTORICAL DISTRICT	RESSF
0103	TOWNHOME	RESSF
0107	SINGLE FAMILY - HISTORY OF SINKHOLE ACTIVITY	RESSF
0108	SFR - 1 UNIT OF DUPLEX STRUCTURE	RESSF
0112	RESD STRUCTURE W/COMM LAND	RESSF
0130	SINGLE FAMILY WATERFRONT	RESSF
0135	SINGLE FAMILY WATERVIEW	RESSF
0140	SINGLE FAMILY CROSS COUNTY LINE	RESSF
0150	SINGLE FAMILY AG HOMESTEAD	RESSF
0160	SINGLE FAMILY GOLF-FRONT	RESSF
0161	SINGLE FAMILY FORMER GOLF-FRONT	RESSF
0230	MOBILE HOME WATERFRONT	RESSF
0250	MOBILE HOME AG HOMESTEAD	RESSF
0403	CONDO (APT CONVERSION)	RESMF
0701	MISCELLANEOUS RESIDENTIAL HX ELIGIBLE	RESSF
0730	MISCELLANEOUS RESIDENTIAL WATERFRONT	RESSF
0740	MISCELLANEOUS RESIDENTIAL CROSS COUNTY LINE	RESSF
0802	MULTI FAMILY 2 UNIT (DUPLEX)	RESMF
0803	MULTI FAMILY 3 UNIT (TRIPLEX)	RESMF
0804	MULTI FAMILY 4 UNIT (QUADRAPLEX)	RESMF
0805	MULTI FAMILY 5 UNITS	RESMF
0806	MULTI FAMILY 6 UNITS	RESMF
0807	MULTI FAMILY 7 UNITS	RESMF
0808	MULTI FAMILY 8 UNITS	RESMF
0809	MULTI FAMILY 9 UNITS	RESMF
1010	VAC MULTI-FAMILY	VACRES
1020	VAC COMM RETENTION/CONSERVATION/ROADS/COMMON AREAS	VACPARK
1100	RETAIL STORE	RETENT
1101	RETAIL/CONV. RESIDENTIAL	RETENT
1103	CONVENIENCE STORE NO GAS	RETFOOD
1104	CONVENIENCE STORE WITH GAS	RETFOOD
1105	RETAIL CONDO	RETENT
1301	DEPARTMENT STORE @ REGIONAL MALL	RETENT
1302	DISCOUNT WAREHOUSE	RETENT
1501	SUPER REG SHOPPING CENTER	RETENT
1601	RETAIL CENTER-UNANCHORED	RETENT
1602	RETAIL-POWER CENTER	RETENT

SEMINOLE COUNTY		
DOR Code	Land Use Category	Prelim LOTIS LU
1603	RETAIL-TOWN CENTER	RETENT
1612	RETAIL-MIXED USE	RETENT
2101	RESTAURANT/CONV. RESIDENTIAL	FOOD
2502	DRY CLEANER/LAUNDROMAT	RETENT
2601	GAS ONLY/CONVENIENCE STORE W/GAS	FOOD
2602	QUICK LUBE/TIRE CENTER	RETENT
2603	CARWASH	RETENT
2605	CARWASH/QUICKLUBE	RETENT
2701	USED CARS SALES	RETENT
2702	CAR DEALERSHIPS	RETENT
2703	MARINE SALES & SERVICES	RETENT
2704	MISC MOTOR SALES	RETENT
2705	VEHICLE/MOTOR RENTAL	RETENT
3005	RETAIL NURSERY	RETENT
3301	BARS/CONV. RESIDENTIAL	RETENT
3401	HEALTH/FITNESS CLUB	RETENT
3801	DRIVING RANGE	RETENT
3901	MOTEL	HM
3902	HOTEL	HM
3903	HOTEL LUXURY	HM
3905	HOTELS-EXTENDED STAY	HM
3910	HOTELS-BED & BREAKFAST	HM
4020	VACANT INDUSTRIAL RETENTION/CONSERVATION	VACPARK
4102	COMMERCE CENTER	RETENT
8201	RAILS TO TRAILS	PARK

Appendix 2: Euclidean Distance Normalization

The roadway segments in the following area had their proximity fields edited within the LOTIS database due to obstructions such as linear water bodies. This included changes to proximity to post offices, transit, clinics, hospitals and stores. Additional areas will be added to this appendix as they are identified.

Area 1: Sand Lake Chain (West)

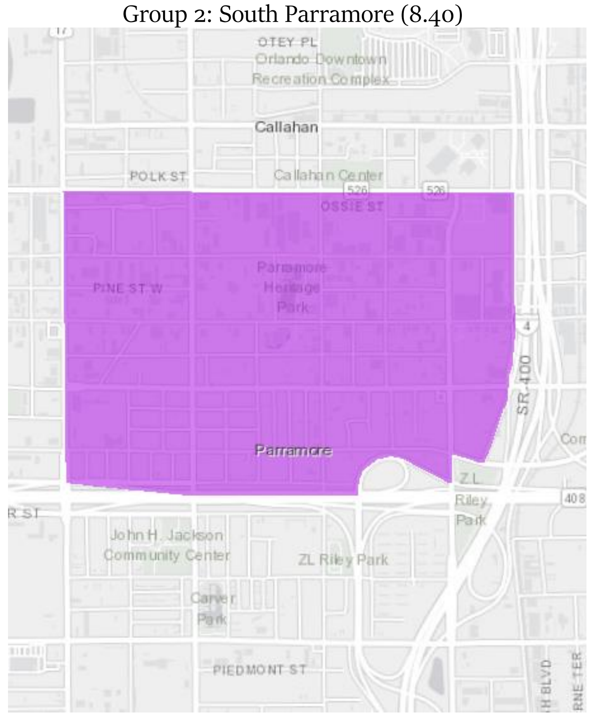


Appendix 3. TAZ Generalization

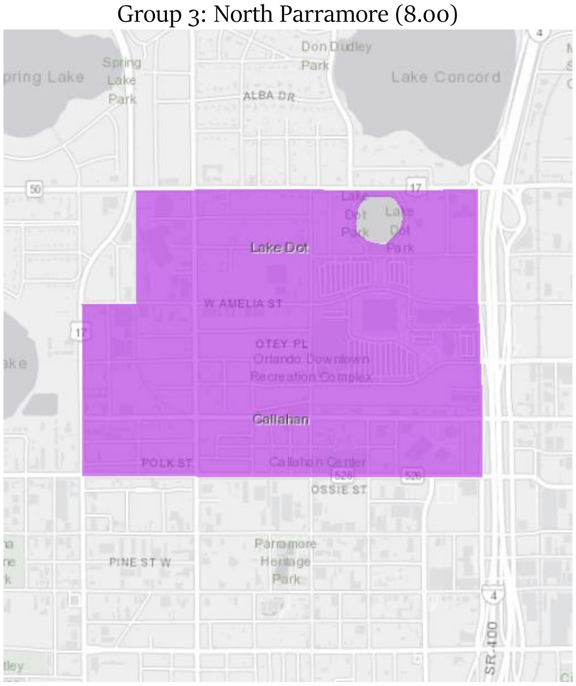
This section of the report identifies the “generalized” TAZ’s that were combined in order to perform a more accurate population density analysis. The persons per acre calculated for each TAZ group is provided in parenthesis. GIS data can be provided showing these groupings upon request.

Group 1: Downtown Orlando (11.15)

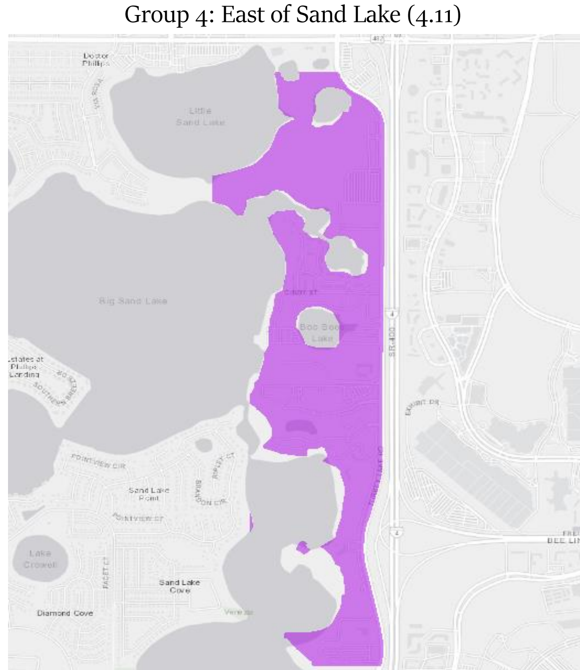
Group 2: South Parramore (8.40)



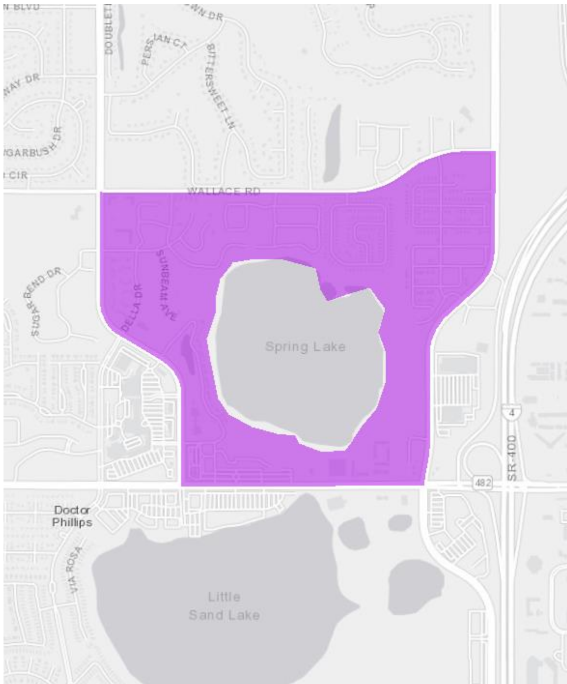
Group 3: North Parramore (8.00)



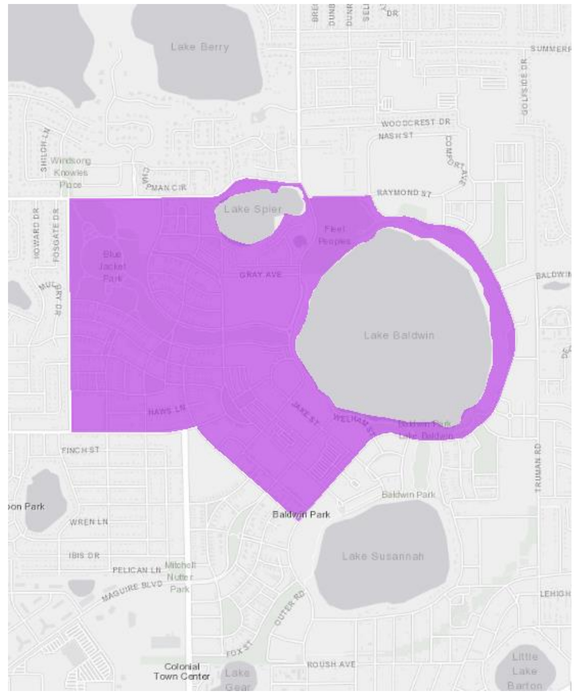
Group 4: East of Sand Lake (4.11)



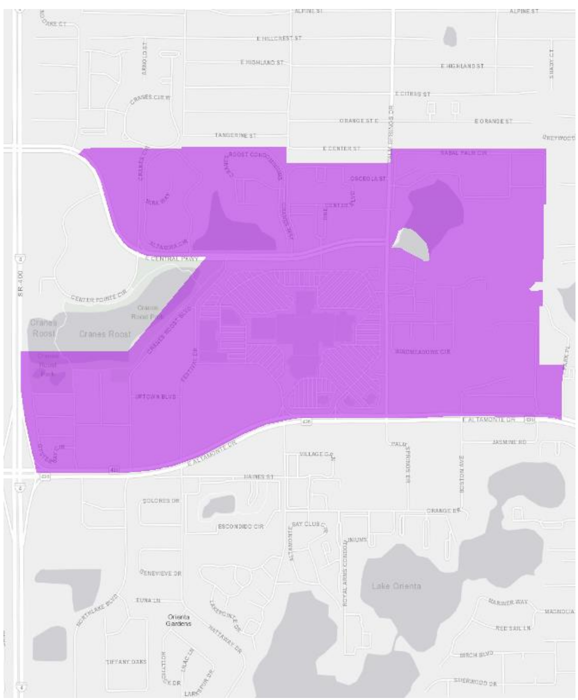
Group 5: Spring Lake (7.69)



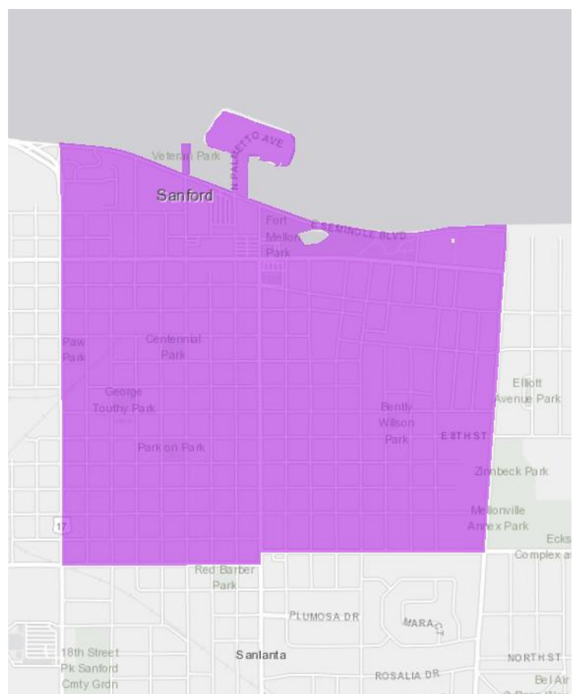
Group 6: Baldwin Park Northwest (6.58)



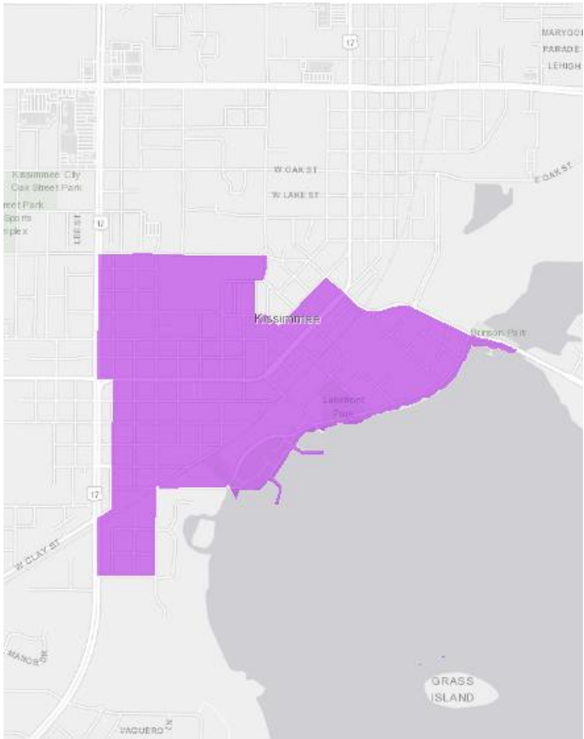
Group 7: Cranes Roost Park (9.49)



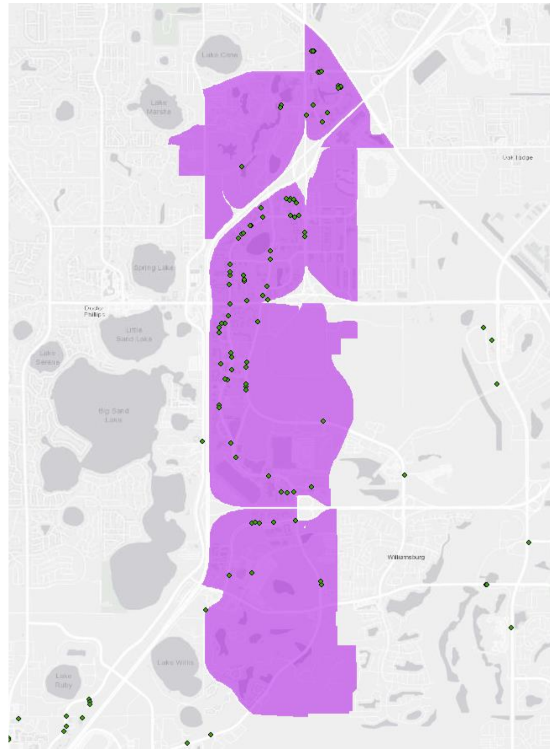
Group 8: Downtown Sanford (5.01)



Group 9: Downtown Kissimmee South (2.76)

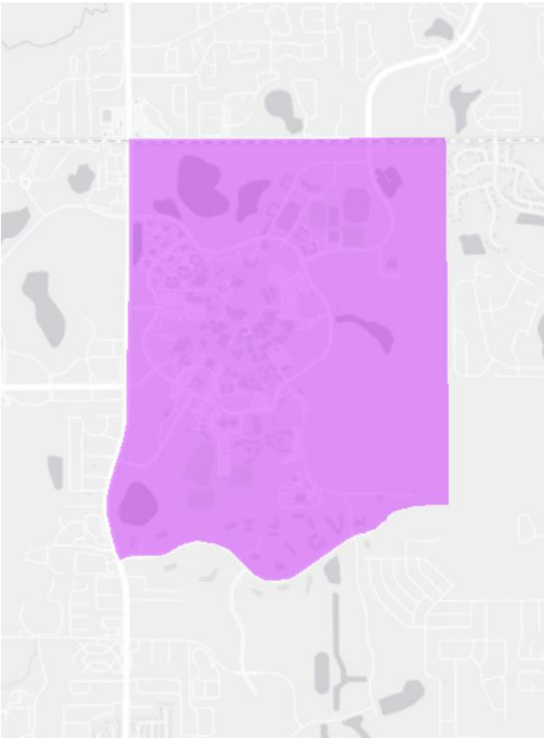


Group 10: International Drive & Universal (8.66)



The ECFRPC hotels file was analyzed within these TAZ's. Approximately 28,461 hotel rooms are available in this area. Normalizing for vacancy rates for the month of June (73.5%) provided by STR and persons per hotel room (2.2) metrics provided by Visit Florida, a measure of 8.66 persons per acre was calculated for these TAZ's. Hotels are shown on the map in point form alongside the purple group area.

Group 11: University of Central Florida (8.75)



This TAZ originally had a population of zero. This was adjusted using the following methodology: The 2019 US News Report on US collected data from the University showing 68,571 total students, 17% of which live on campus. This results in approximately 11,657 students living on campus. The generalized TAX's (pictured above) as part of the UCF QA total to 1,332 acres. This results in a density metric of 8.75 persons per acre.

Appendix 4. Bike/Ped Crash Analytics

The development team cross-referenced bicycle and pedestrian crashes along roadway segments and assessed roadway design metrics and proximity information where bicycle and pedestrian crashes are located.

Crash analytics for points of interest were completed using the ArcGIS "Select by Location" function. The LOTIS tables were then used to calculate total crashes, total miles (per attribute or point of interest), and a normalized crash rate that compares the proximity-isolated variables to the 3-county network as a whole. The following table was developed using this methodology. The color coding of the numbers in the table was done for display purposes only.

LOTIS Analytics | 5-Year Crash Rates (2014 - 2018) | "Points of Interest" Cross-Reference					
Establishment Type	% with Bike/Ped Crash Occurring within 1/8 Mile	Average # Bike/Ped Crashes per Establishment (within 1/8 mile)	% of All Bike/Ped Crashes that Occurred within 1/8 Mile of Est.	Average # Bike/Ped Crashes per Est. 10PM - 330 AM (within 1/8 mile)	Normalized Crash Rate Per Mile (within 1/8 mile)
Grocery Stores	88.5%	4.42	16.1%	0.36	4.70
Markets	87.5%	2.71	43.0%	0.31	4.70
Small Markets	85.7%	3.48	6.5%	0.35	3.66
Restaurants	86.3%	1.57	50.0%	0.18	3.81
Fast Food	90.6%	2.87	27.3%	0.31	5.55
Bars	92.0%	2.54	12.5%	0.47	4.48
Coffee Shops	85.9%	3.23	15.4%	0.35	4.29
Entertainment Venues	74.7%	2.16	4.6%	0.49	3.50
Gyms	75.4%	2.93	5.5%	0.31	3.16
Libraries	60.5%	2.08	1.1%	0.24	2.24
Liquor/Tobacco Stores	89.1%	4.63	6.5%	0.44	4.82
LYNX Bus Stops	70.1%	0.94	62.5%	0.11	3.33
Malls	45.5%	1.18	0.2%	0.09	1.66
Schools (Public)	28.0%	0.42	1.8%	0.02	N/A
Stores (Services/Retail)	86.1%	1.27	49.7%	0.14	3.55
Stores (Automotive)	82.9%	1.62	31.4%	0.17	3.80
Stores (Department)	69.9%	2.26	4.9%	0.10	3.87
Stores (Money Loan)	98.0%	8.96	6.3%	0.90	10.31

Source(s): Signal Four Analytics, University of Florida (Crashes, 2014-2018); LOTIS (Points of Interest, January 2020)

*Excludes crashes not within 120 feet of the LOTIS roadway centerline

The development team also cross-referenced roadway design characteristics with crash locations. To do this, the "Select by Location" function was utilized in ArcGIS.

In order to minimize error, crashes were "tagged" by their proximity to the LOTIS database in increments of 10-feet, 20-feet, 30-feet, 40-feet, 50-feet, and 80-feet. The crash files were then separated into individual layers for the "Select by Location Function" to be performed.

Before the "Select by Location" function was performed the development team also split the LOTIS file into individual attribute files. One file contained only roadway segments with turn lanes, the second contained only roadway segments with no turn lanes, the third file contained only roadway segments with 1, 2, or 3 total lanes, the fourth file contained only roadway segments with 4 or more lanes and a grass median present, and the firth file contained only roadway segments with 4 or more lanes and a median other than a grass median present.

The "Select by Location" function was then run on all crashes (for each specific radius file) with a radius equal to the radius in the file name. This was done to reduce margin of error. In order to not "double count" crashes, fields were populated as follows:

Field	Field Description	Possible Values
TL	Turn Lane Presence	Yes, No
LN	Lanes/Medians	1-3 Lane, 4-Grass, 4-Other

As part of the TL field, the "Select by Location" tool was first run on the "no turn lanes" LOTIS file, and then the "Select by Location" tool was run on the "turn lanes present" LOTIS file.

As part of the LN field, the "Select by Location" tool was first run on 1-3 lane roads, then 4+ lane grass median roads, then finally on 4 + lane non-grass median roads.

The total number of crashes and total mileage were then assessed to finalize the tables located in Section 3.1 (Categories 3 and 4).

Appendix 5. Contact Information

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(407) 496-5463

[redacted]