Mobility on Demand Study

Space Coast Area Transit

Identification of Mobility on Demand Areas

August 2024

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Table of Contents

List of Figures

Introduction

This report documents the process used to identify, prioritize, and evaluate potential areas and alternatives for a new Mobility on Demand (MOD) service within Brevard County. The MOD service goals were created to align with the broader agency vision and goals and are the following:

- Equity Emphasis
    - Expand service in transportation disadvantaged areas. These areas will include the Justice40 Climate and Economic Justice Screening Tool (CEJEST), Equitable Transportation Community (ETC) census tracts, as well as the Space Coast TPO's Transportation Disadvantaged tracts as defined by their Vision Zero Action Plan.
- Land Use Emphasis
    - Provide flexibility to efficiently serve the areas of growth within Brevard County
- Multi-Modal Emphasis
    - Provide better first-mile/last-mile service to connect to fixed routes
- Resiliency Emphasis
    - Cost effectively increase the ridership in areas with low ridership on existing fixed-route service

These goals were used to guide the evaluation of service areas. The following sections provide more detail on the methodology and results of each step.

Step 1: Identify

- Identify opportunity areas that support MOD service through an existing conditions analysis of land use, population density, and transit service.
- Evaluate demographic characteristics of identified areas to create potential MOD areas.

Step 2: Prioritize

- Evaluate alternatives analysis for service areas and evaluate resources needed.
- Prioritize potential MOD areas.

Step 3: Define

- Define a preferred service area for MOD pilot and develop service characteristics.

As part of the development of service characteristics and procurement of potential turnkey services, implementation plans, costs, and funding sources will be gathered from peer agencies and identified.

Identification of Potential MOD Service Areas

Step 1: Identify

Based on the goals of Space Coast Area Transit, literature review findings, and peer agency recommendations, opportunities for successful microtransit service should include the following characteristics:

- Low to Moderate concentration of population and employment density;
- High concentration of population and employment density in areas not conducive to large transit vehicle maneuverability; and
- No existing transit service or low transit ridership on existing fixed-route service

Microtransit services tend to perform better in low- to medium-density areas where smaller vehicles can accommodate the lower demand. Microtransit can provide effective service to areas that have moderate levels of population density but lack the overall high density to support robust fixed-route transit. Areas more suitable for microtransit will include moderate population densities and lower fixed-route ridership.

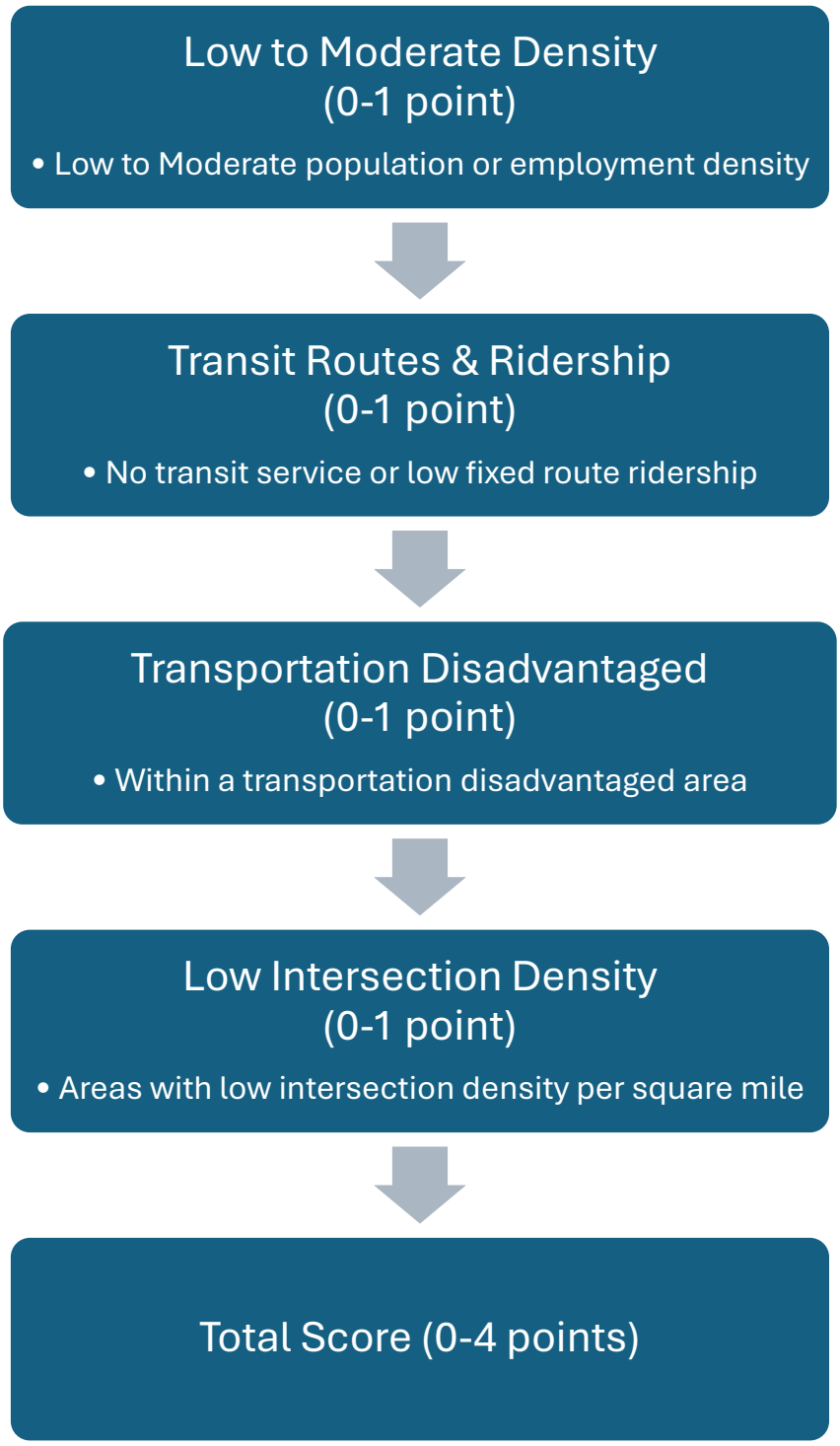
Socioeconomic characteristics that indicate a higher tendency to use transit, including microtransit services, were considered. Transportation disadvantaged areas and activity-oriented jobs can lead to more trips throughout the day, rather than a concentration of trips during typical peak periods. This MOD analysis considered three definitions of transportation disadvantaged populations—the Space Coast TPO's Vision Zero Action Plan Update, the Justice40 Initiative's Climate and Economic Justice Screening Tool (CEJST), and the U.S. Department of Transportation's Equitable Transportation Community (ETC) Explorer.

Therefore, potential MOD service areas were analyzed in uniformly sized areas and scored based on the following four criteria:

- Low to moderate density
- Low transit route ridership
- Transportation disadvantaged
- Low intersection density

Each of the four categories is assumed to receive a maximum of 1 point. The highest total score an area can receive is 4 points and is illustrated in **Figure 1**. To account for existing and future conditions (such as developments approved but not yet constructed), the same analysis was performed for both 2020 and 2045. Results of both 2020 and 2045 are discussed in the **Potential MOD Areas** section.

Figure 1: Scoring Methodology



Population & Employment Density

Population and employment density data was derived from the Central Florida Regional Planning Model (CFRPM) for the interim year 2020. Based on the literature review and peer agency interviews, successful MOD service areas have low to moderate concentrations of population and employment density. The following thresholds are the average population and employment densities in the three peer agency MOD service areas.

The low to moderate population and employment densities were defined as the following:

- Less than 4 people per acre; or
- Less than 2 jobs per acre.

The high population and employment densities were defined as the following:

- 4 people per acre or more; or
- 2 jobs per acre or more.

Areas with low to moderate population and employment density were scored with 1 point. Areas with high concentrations of population and employment density were given no points. Areas with population density less than 0.001 persons per acre were excluded from analysis. **Appendix A** and **Appendix B** show the population density and employment density maps, respectively.

Transit Ridership

Existing fixed-route ridership was analyzed to determine areas with low ridership or no existing ridership. Ridership by stop was provided by Space Coast Area Transit for the year 2023. Ridership was then summarized by total onboardings per route and by daily ridership, as shown in **Table 1**. A quarter (0.25) mile buffer around existing routes was used as a 0.25 mile buffer covers the typical five-minute walkshed to access transit routes and stops.

Ridership thresholds were identified using guidance from the Transit Cooperative Research Program (TCRP) Microtransit or General Public Demand-Response Transit Services: State of the Practice report.[1] Space Coast Area Transit's thresholds were modified to match peer agency thresholds for the replacement of fixed route service with MOD.

Areas with no existing service were defined as:

- Not within 0.25 miles of an existing route

[1] Transit Cooperative Research Program, 2019. "Microtransit or General Public Demand-Response Transit Services: State of the Practice." Retrieved from https://nap.nationalacademies.org/read/25414/chapter/5#36

Low ridership was defined as:

- Within 0.25 mile of route with less than 50 daily riders (less than 1% of Space Coast Area Transit's total system ridership). These include Route 11 Port St. John, Route 21 Downtown Melbourne (Sunday Service), and Route 33 Eau Gallie Arts District.

High fixed-route ridership was defined as the following:

- Within 0.25 mile of route with more than 200 daily riders (at least 5% of the system ridership). These include Route 9 Cape Canaveral/Cocoa Beach, Route 4 520 Connector, Route 6 Cocoa/Rockledge, Route 1 Titusville/Viera, Route 25 Melbourne/Palm Bay, Route 21 Downtown Melbourne, Route 27 East Palm Bay, Route 29 Melbourne/Viera, and Route 28 North Melbourne.

Areas with no existing or low ridership are scored with 1 point. Areas with high fixed-route ridership are scored with 0.5 points. Although the high fixed-route ridership areas are considered high-performing and suited well for existing fixed-route ridership rather than an MOD service area, those area still receive points to accommodate the goal of improving connections to existing routes and accommodating first-mile/last-mile connectivity.

Table 1: Space Coast Area Transit Daily Ridership by Route

Route	Total Boardings	Daily Ridership	Percent of Total System Ridership
9 Cape Canaveral/Cocoa Beach	229,397	628	12.62%
4 520 Connector	212,061	581	11.67%
6 Cocoa/Rockledge	180,284	494	9.92%
1 Titusville/Viera	140,537	385	7.73%
25 Melbourne/Palm Bay	130,486	357	7.18%
21 Downtown Melbourne	120,568	385	6.63%
27 East Palm Bay	101,433	278	5.58%
29 Melbourne/Viera	101,367	278	5.58%
28 North Melbourne	92,822	254	5.11%
23 West Palm Bay	72,397	198	3.98%
2 Titusville	70,801	194	3.90%
22 South Palm Bay	57,088	156	3.14%
30 South Beach Connector	45,179	124	2.49%
24 Melbourne/Eau Gallie	43,484	119	2.39%
3 Merritt Island	37,375	102	2.06%
20 Heritage-West Melbourne	36,441	100	2.00%
5 Titusville/Mims	32,594	89	1.79%
8 West Cocoa	28,683	79	1.58%
7 Rockledge/Viera	23,762	65	1.31%
26 South Beach	23,601	65	1.30%
10 Central Titusville Circulator	21,117	58	1.16%
11 Port St. John	14,708	40	0.81%
21 Downtown Melbourne (Sunday)	958	18	0.05%
33 Eau Gallie Arts District	437	1	0.02%

Appendix C shows the existing transit route buffers used for the scoring.

Transportation Disadvantaged

Based on the service goals, providing service to transportation disadvantaged users is a priority for MOD service. This MOD analysis considered three definitions of transportation disadvantaged populations—the Space Coast TPO's Vision Zero Action Plan Update, the Justice40 Initiative's Climate and Economic Justice Screening Tool (CEJST), and the U.S. Department of Transportation's Equitable Transportation Community (ETC) Explorer. Areas classified as disadvantaged by any of these three sources were assumed to be transportation disadvantaged for this analysis and received 1 point. **Appendix D** shows the three transportation disadvantaged populations.

Intersection Density

Areas with high intersection density can allow for more efficient fixed routes. Areas with moderate intersection density can be better supported by microtransit service compared to fixed route service. Microtransit can deploy more direct routing for requested trips by skipping areas where passengers aren't actively waiting to be picked up, shortening travel times for transit riders and improving service efficiency. Microtransit can also support areas with low intersection density, although trip lengths may be longer than average MOD trip lengths. According to the literature review and peer agency interviews, providing on demand connections to existing fixed route service may be better for these areas. Definitions and scoring of the intersection density measure is outlined below.

High intersection density is defined as:

- Areas with intersection densities greater than or equal to 100 intersections per square mile (threshold for roadways classified C4-Urban General or higher)

Moderate intersection density is defined as:

- Areas with intersection densities between 20 and 100 intersections per square mile (threshold for roadways classified as C3C-Suburban Commercial or C3R-Suburban Residential)

Low Intersection density is defined as:

- Areas with intersection densities less than 20 intersections per square mile (threshold for roadways classified as C2-Rural)

Areas with high intersection densities are scored with no points. Areas with moderate intersection densities are scored with 1 point as they are most suitable for a MOD service area.

Areas with low intersection densities are scored with 0.5 points to accommodate potential rural service areas. **Appendix E** shows the intersection densities used for scoring.

Potential MOD Areas

The existing conditions (year 2020) scores are shown in **Figure 2**. These areas represent higher potential for MOD service. Potential MOD areas will be created by grouping areas with high microtransit suitability into larger areas of 10 to 15 square miles, a typical microtransit area size, and defining potential MOD service types. Eleven potential service areas were identified from the preliminary MOD service area identification include:

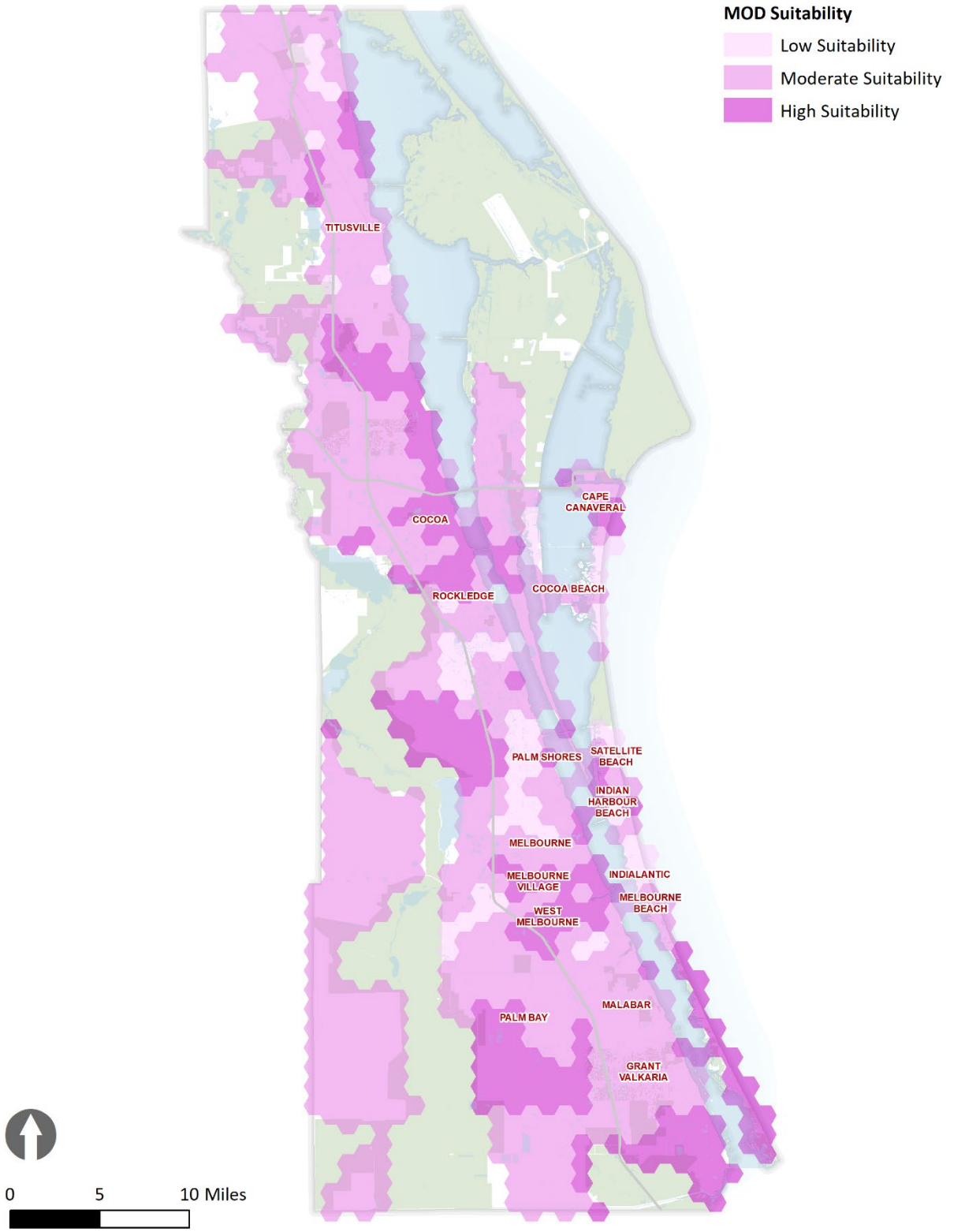
- Mims;
- Port St. John;
- Titusville-Cocoa Airport Authority (TICO) Area;
- Sharpes/Airport/Camp Road;
- Cocoa West;
- Viera;
- West Melbourne;
- Northeast Palm Bay;
- Southwest Palm Bay;
- North Merritt Island; and
- Cape Canaveral.

Analysis conducted for the year 2045 showed similar trends in scores in theses same potential service areas. However, the suitability areas expanded the potential service areas. Based on these results, service areas were created to be larger than the recommended 10 to 15 square miles to accommodate for growth and flexibility of the service areas.

Based on Space Coast Area Transit and Space Coast TPO's ongoing coordination with local stakeholders, potential fixed route modifications, and general feedback, the following were identified for further analysis of MOD suitability including trip patterns and opportunities to replace fixed routes (in no specific order):

- Port St. John/Sharpes/Cocoa West;
- Viera;
- Greater Palm Bay Area (including Northeast Palm Bay, Northwest Palm Bay, and Southwest Palm Bay); and
- Cape Canaveral.

Figure 2: Microtransit Suitability with Potential MOD Areas



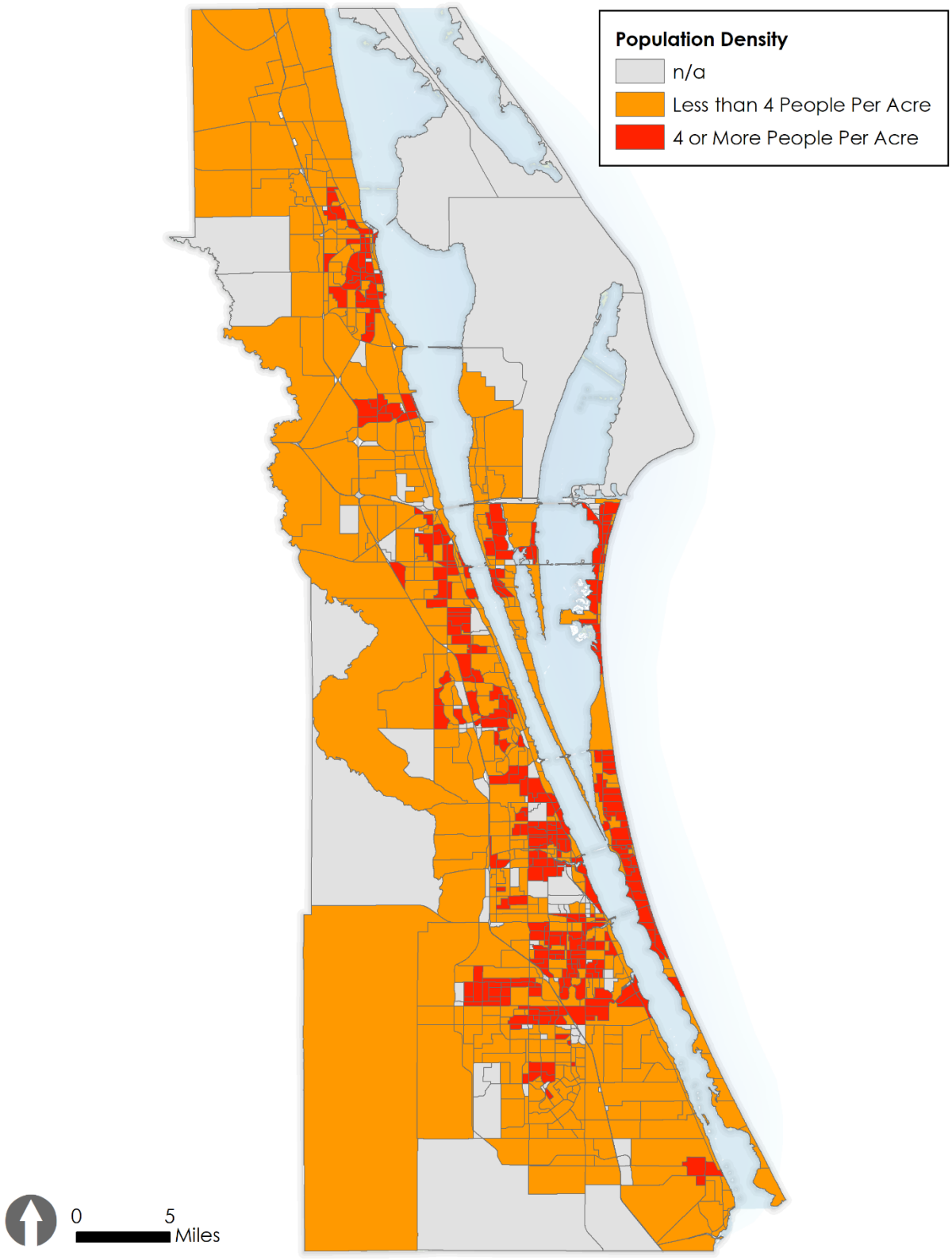
Steps 2 and 3: MOD Alternatives Analysis

Next, MOD area boundaries will be refined after examining the feasibility and service type. Microtransit services can be tailored to match the specific needs of each area, as well as agency and jurisdiction goals. Areas will be further examined after discussion with local stakeholders and assigned use cases based on area characteristics like existing transit service, the presence of transit facilities, and the presence of trip generators.

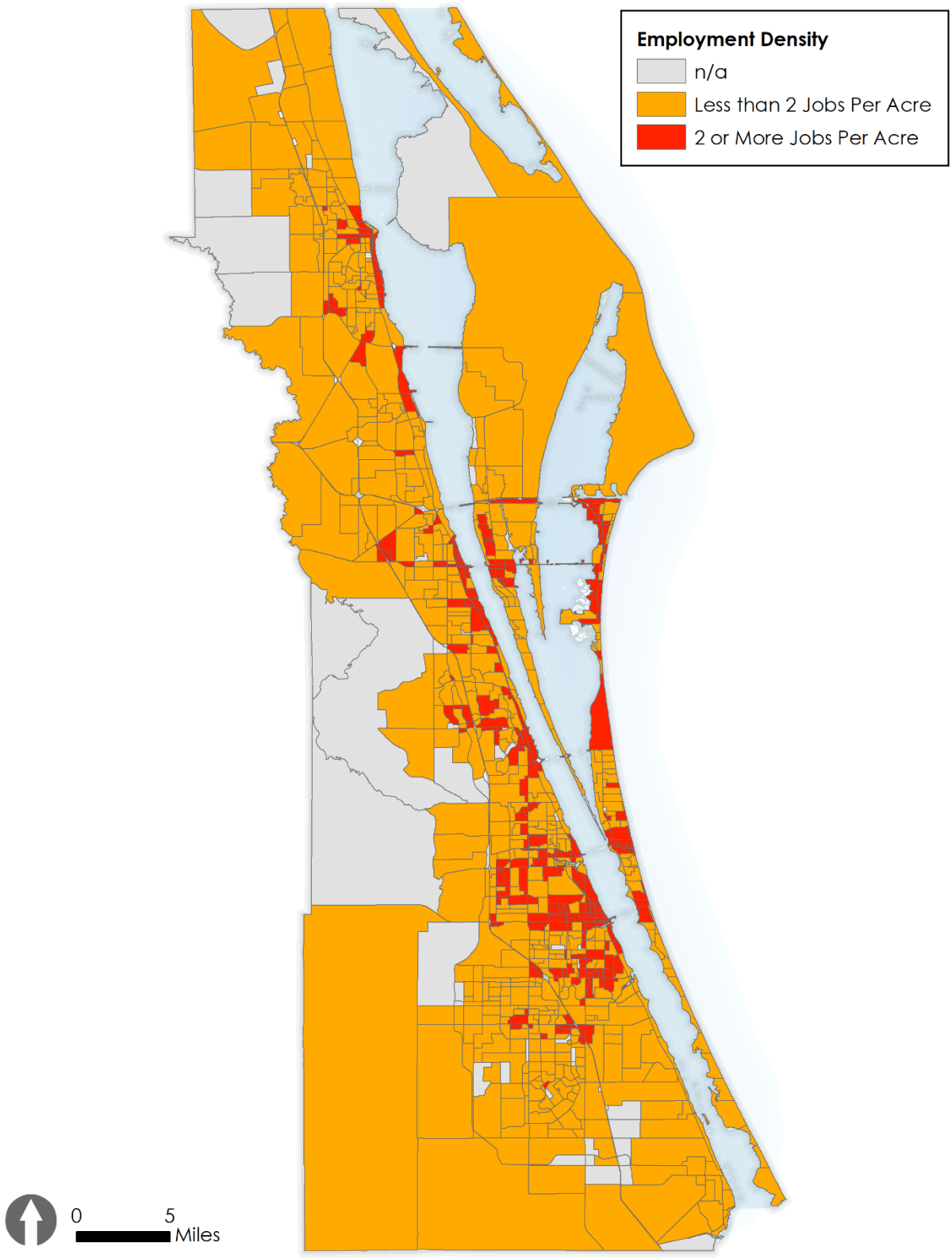
Through refining the results of this analysis and discussions with stakeholders and local municipalities, the following next steps will also be addressed:

- Perform MOD alternatives analysis including recommendations for modifications of existing fixed routes;
- Stakeholder meetings;
- Prioritization of MOD service areas;
- Selection of MOD recommended alternatives;
- Request for implementation plans and costs from peer agencies; and
- Identify potential funding sources.

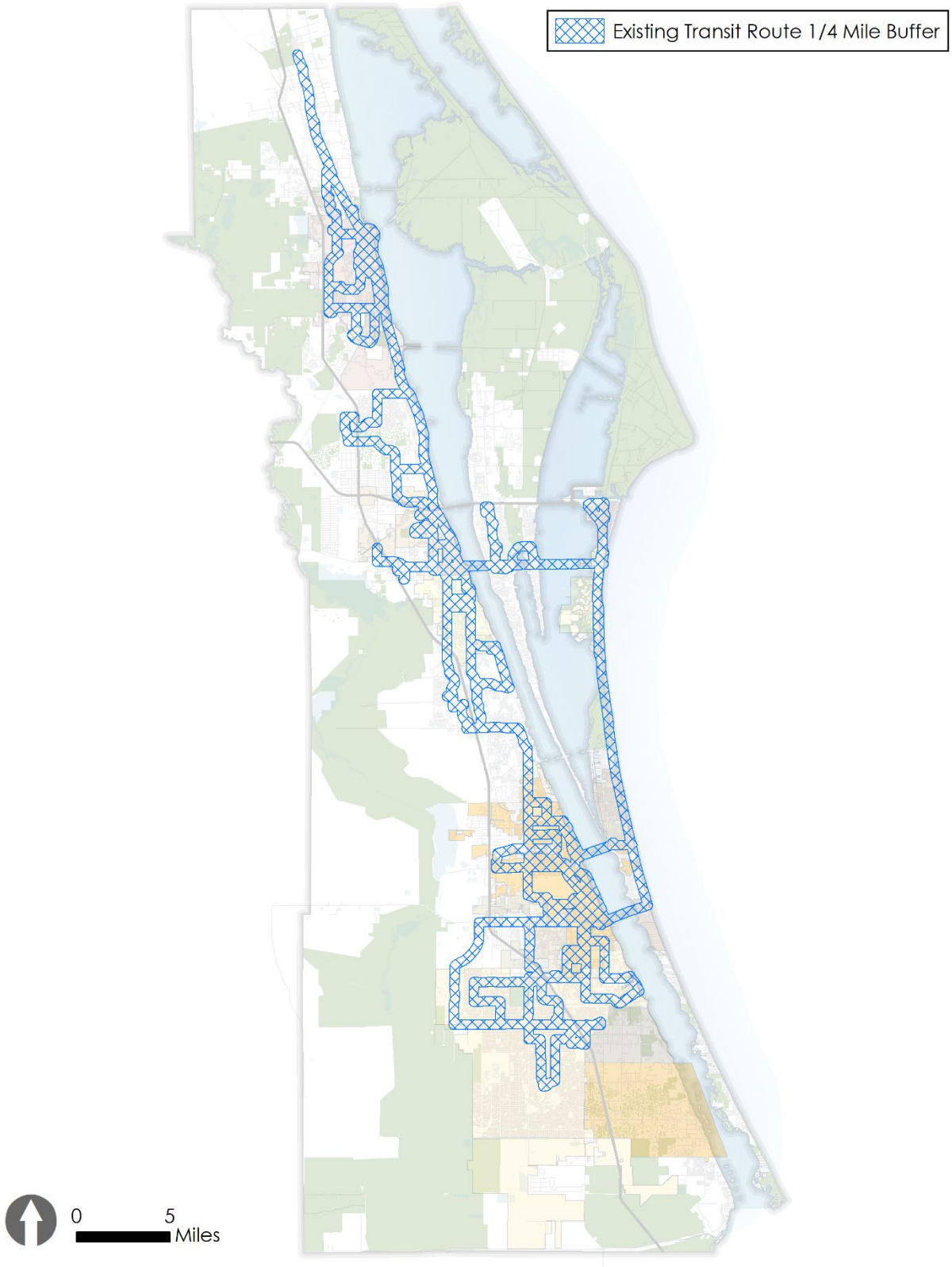
Appendix B.1 – Population Density



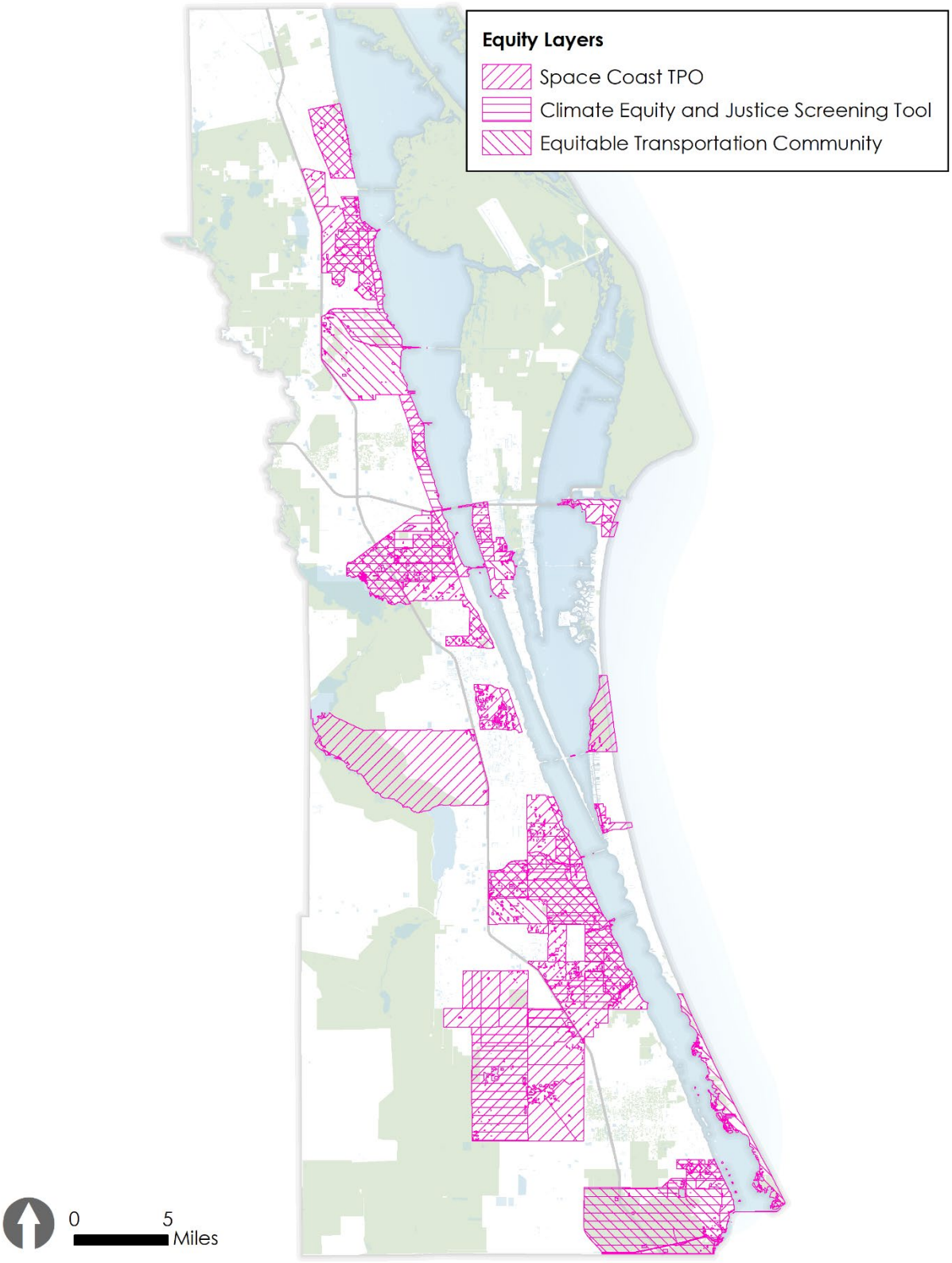
Appendix B.2 – Employment Density



Appendix B.3 – Existing Transit Route Buffers



Appendix B.4 – Transportation Disadvantaged Areas



Appendix B.5 – Intersection Density