ENVISIONING A COMPLETE STREETS PRIORITIZATION SCHEME FOR GEORGIA'S SMALL AND MEDIUM-SIZED CITIES

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Abstract

This paper explores the policy implications of implementing a prioritization methodology exclusively for Complete Streets projects in Georgia urbanized areas (UZAs) with a population range of 50,000 to 200,000 people, or those UZAs that are not defined as transportation management areas (TMAs) by the United States Census Bureau. It is partly based on past work the author completed with the Valdosta-Lowndes Metropolitan Planning Organization and Southern Georgia Regional Commission from January to July 2017 in the development of a report titled *Valdosta and Lowndes County Complete Streets Suitability*. The effectiveness and criticisms of this report are examined in the paper. Potential improvements to the methodology are suggested should this either be implemented in Valdosta again or in another Georgia metropolitan planning organization (MPO). This paper is written with the Georgia Department of Transportation (GDOT) and the state's 16 MPOs as the intended audience. The ultimate goal is to illustrate why there is a need for a Complete Streets scoring methodology for road segments in small and medium-sized cities and UZAs in Georgia and discuss how MPOs can develop and implement such a methodology for their planning areas.

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List of Acronyms

ACS	American Community Survey
ADA	Americans with Disabilities Act of 1990
DOT	Department of Transportation
FAST	Fixing America's Surface Transportation Act
FC	Functional Classification
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GAMPO	Georgia Association of Metropolitan Planning Organizations
GDOT	Georgia Department of Transportation
GEARS	Georgia Electronic Accident Reporting System
GIS	Geographic Information System
GOHS	Governor's Office of Highway Safety
GPA	Georgia Planning Association
HAWK	High-Intensity Activated Crosswalk
HSIP	Highway Safety Improvement Program
LOS	Level of Service
LPI	Leading Pedestrian Intervals
LRTP	Long-Range Transportation Plan
LSV	Low-Speed Vehicle

LTS	Level of Traffic Stress
MAP-21	Moving Ahead for Progress in the 21st Century Act
MPA	Metropolitan Planning Area
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
NADO	National Association of Developmental Organizations
NCSC	National Complete Streets Coalition
ROW	Right-Of Way
SGRC	Southern Georgia Regional Commission
TAP	Transportation Assistance Program
TAZ	Travel Analysis Zone
TIP	Transportation Improvement Program
TMA	Transportation Management Areas
USBRS	United States Bicycle Route System
USDOT	United States Department of Transportation
UZA	Urbanized Area
VLMPO	Valdosta-Lowndes Metropolitan Planning Organization
VMT	Vehicle Miles Traveled

Introduction

Numerous public and private entities, including governments and consulting firms, make investment decisions regarding transportation networks and how they can be improved to accommodate higher capacity and reduce traffic injuries and fatalities. The metrics within these prioritization frameworks are often complex and mostly consider the needs of private automobile users. According to the Federal Highway Administration (FHWA), prioritization is a part of the Planning and Project Scoping phase, which occurs early in an infrastructure project (FHWA 2018d). A common criticism of transportation in the United States, particularly in the Southeast, is that transportation networks only comfortably cater to automobiles and prioritize mobility over accessibility (Godwin and Price 2016). It is often suggested that bicycling and walking are infrequent modes of transportation in the United States, especially in Sun Belt states, such as Georgia, due to the perceived lack of safe infrastructure, urban sprawl, and a generally humid climate (Sciara 2003; Godwin and Price 2016). Accessibility and safety should be prioritized and emphasized alongside, if not over, vehicular traffic flow.

The needs of the pedestrian, bicyclist, or transit user are often underestimated or entirely ignored in the transportation planning process. In fact, they are more dire than ever in Georgia as statewide pedestrian and bicycle injuries and fatalities have rapidly increased over the past several years. According to the Governor's Office of Highway Safety (GOHS), pedestrian fatalities increased from 194 in 2015 to over 246 through December 21, 2017, and 130 pedestrian fatalities were recorded in the first half of 2018 (GOHS 2017, 10; Wickert 2018). In the 2019 version of Smart Growth America's *Dangerous by Design* that examines route performance and data trends pertaining to multimodal transportation and Complete Streets, Georgia ranked as the sixth most dangerous state for pedestrians (up from tenth in 2016). Further, Augusta's metropolitan area was

the twentieth most dangerous Metropolitan Statistical Area (MSA) in the nation for pedestrians (NCSC 2019b, 15). As research accumulates linking transportation to the global phenomenon of climate change, a need to concentrate on improving multimodal accommodations also grows over time in urban and rural areas alike.

This report includes a brief discussion on Complete Streets and efforts to implement them through policy and engineering in Georgia. It specifically focuses on efforts to prioritize Complete Streets in Valdosta in south central Georgia. An overview of urbanized areas (UZAs) is provided and Georgia UZAs with a population between 50,000 and 200,000 people are identified. A literature review of Complete Streets prioritization efforts both within Georgia and around the nation is included. The components of a hypothetical, holistic Complete Streets prioritization methodology for small and medium-sized metropolitan planning organizations (MPOs) are discussed along with the policy implications, challenges, and recommendations necessary to address for this to be implemented in Georgia. The goal of this paper is to explore the potential of expounding upon the Georgia Department of Transportation's (GDOT) existing Complete Streets Policy to further assist Georgia's MPOs and their local governments in prioritizing multimodal transportation projects to benefit constituents and visitors. It will involve the integration of various facets of urban and regional planning, chiefly transportation and land use attributes, to help local governments and regional agencies make responsible and pragmatic decisions to make their built environments more accommodating to multimodal uses.

Complete Streets Overview

The Complete Streets movement is one that should have a holistic approach in accommodating street users. It tends to think of the street as more than just a road by considering all components of public right-of-way (ROW) including roadway shoulders, sidewalks, planting

strips or landscape buffers, signage, street furniture, and landscaping (NCSC 2019c). These amenities depend on the typology of the built environment (Zaccaro 2018). This section of the report defines Complete Streets by citing reputable sources, provides a historical overview of this modern movement to make public ROW more accommodating to any individual, and describes efforts to implement Complete Streets in Georgia.

Definition

Complete Streets are those corridors that not only meet the needs of automobiles and other motorized vehicles but also include amenities for pedestrians and people in non-motorized forms of transportation (McCann 2013). According to the National Complete Streets Coalition (NCSC), these streets "are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities" (NCSC 2019c). Attributes include wide pedestrian walkways, bicycle facilities, street lighting and furniture, and transit access (Sharpin, Welle, and Luke 2017). A Complete Street is a corridor that conveys a welcoming atmosphere through quality urban design and includes not only bicycle and pedestrian accommodations, but also utilities, aesthetics, ROW, transit, and freight .

The benefits of Complete Streets are documented in numerous publications and research studies, and these range from excellent physiological and psychological health to higher quality of life (Burden and Litman 2011; Hui et al. 2017; Quednau 2018). Positive economic benefits, safety, walkability, and equity are frequently cited as reasons to consider transforming a street into a corridor that incorporates multimodal transportation and Complete Streets attributes (Sharpin, Welle, and Luke 2017). Reduced automobile congestion is another significant contribution that these corridors can provide to a neighborhood and the greater community (Burden and Litman 2011). They tend to spur private investment in properties located along or near the corridor (AARP,

National Complete Streets Coalition, and Smart Growth America 2014). Access to businesses, residences, recreation, and centers of entertainment is significantly improved for those who either are unable or unwilling to operate a motor vehicle. Currently, transportation infrastructure in many places does not meet those particular needs, and the Complete Streets approach to project design along with the retrofitting of major thoroughfares aims to mitigate this challenge.

History

Lobbying for public spaces and streets that accommodate pedestrians and those utilizing non-motorized transportation have occurred for several decades. Florida and Oregon were two states that embraced these concepts as early as the 1970s and 1980s, especially for bicyclists (Sharpin, Welle, and Luke 2017). The "Complete Streets" movement is the 21st century rendition of this initiative that germinated in the mid-2000s. The term itself was created in 2003 by America Bikes (Zehngebot and Peiser 2014). The NCSC was founded by Barbara McCann in the early 2000s to advocate for streets designed for equity (McCann 2013, 2). As of February 2019, over 1,400 Complete Streets policies are in effect throughout the United States, and 33 of 50 states have drafted and approved a policy (NCSC 2019a).

Efforts in Georgia

In Georgia, Complete Streets efforts are not as bountiful as those in other states (Cohen 2017). The state is making some strides, however, especially in the past decade. GDOT implemented a Complete Streets Policy in September 2012 (Seskin 2012). GDOT will "routinely incorporate bicycle, pedestrian, and transit (user and transit vehicle) accommodations into transportation infrastructure projects as a means for improving mobility, access, and safety for the traveling public" (NCSC 2014). More language from this policy is included in Appendix A. This policy was further incorporated into GDOT's *Design Policy Manual*, and Chapter 9 of this

publication is devoted entirely to Complete Streets design (GDOT 2018a). The chapter includes information on bicycle, pedestrian, and transit design accommodations and includes cross-sections for roads with pedestrian and bicycle accommodations in both urban and rural environments.

As of 2017, Georgia does not currently have a statewide bicycle plan updated in the past decade; however, there are regional bicycle plans for the state's planning regions, such as *Walk, Bike, Thrive!* in the Atlanta region (Cohen 2017; Atlanta Regional Commission 2016). GDOT released the *2018-2022 Statewide Pedestrian Action Plan* in 2018 which includes strategies for MPOs and local governments to work towards implementing Complete Streets policies. Additionally, GDOT makes available programs to its constituents that include multimodal and Complete Streets opportunities including the Transportation Alternatives Program (TAP) and Livable Centers Initiative (LCI) (GDOT 2018a).

As of February 2019, 25 local and state entities within Georgia have adopted Complete Streets policies, including three MPOs and GDOT (NCSC 2019a). A majority of these municipalities and MPOs are located in the northern half of the state and in close proximity to the Atlanta area. This is depicted through the map in Appendix B, and they are included in Table 1 on the following page.

Table 1: Entities within Georgia with Adopted Complete Streets Policies			
Jurisdiction	**Year Adopted**	**Type**	**Located in MPO?**
City of Americus	2016	Resolution	No
Athens-Clarke County	2012	Policy	Yes
City of Brunswick	2017	Ordinance	Yes
City of Carrollton	2015	Resolution	No
City of Clarkston	2011	Resolution	Yes
Coastal Region Metropolitan Planning Organization (Savannah area)	2009	Plan	---
Cobb County	2009	Intergovernmental	Yes
Columbus-Muscogee County	2014	Resolution	Yes
City of Decatur	2008	Plan	Yes
DeKalb County	2014	Policy	Yes
Douglas County	2009	Plan	Yes
City of Dunwoody	2011	Policy	Yes
Gainesville-Hall Metropolitan Planning Organization (Gainesville area)	2015	Policy	---
City of Gainesville	2015	Policy	Yes
Georgia Department of Transportation	2012	Intergovernmental	---
Gwinnett County	2018	Policy	Yes
Macon-Bibb County*	2012	Resolution	Yes
City of Milledgeville	2013	Ordinance	No
City of Norcross	2011	Resolution	Yes
Rockdale County	2015	Resolution	Yes
City of Roswell	2009	Policy	Yes
City of Savannah	2015	Policy	Yes
City of Suwanee	2009	Policy	Yes
Valdosta-Lowndes Metropolitan Planning Organization	2015	Plan	---
City of Woodstock	2015	Policy	Yes
*Macon and Bibb County consolidated in 2014; this was passed by the City of Macon			
Source: National Complete Streets Coalition, February 2019			

Valdosta-Lowndes Complete Streets Suitability Report

The effort that this paper attempts to build upon for possible implementation by other MPOs in Georgia and perhaps throughout the state is a Complete Streets Suitability analysis completed in June 2017 by the Valdosta-Lowndes MPO (VLMPO) housed within the Southern Georgia Regional Commission (SGRC). The *Valdosta and Lowndes County Complete Streets Suitability* consists of a 200-point scoring matrix of major arterial and collector streets within the Valdosta-Lowndes MPO's boundaries that appear on a major community project list or in a planning document and should be considered for Complete Streets design implementation. A higher score correlates to a higher need for a Complete Streets project along that corridor.

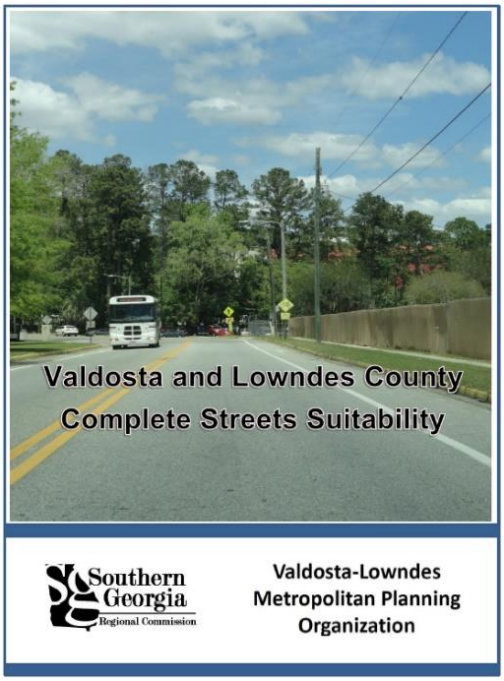

Figure 1: Cover photo for *Valdosta and Lowndes County Complete Streets Suitability* (2017)

Some of the prior project lists and plans reviewed include the City of Valdosta's 2016 Local Maintenance & Improvement Grant (LMIG) Program, the City of Valdosta's Street Evaluation Map, the City of Valdosta FY2017 Stormwater Project List, the City of Valdosta Stormwater Master Plan Capital Improvement Project List, Lowndes County's SPLOST Project List, the Lowndes County Thoroughfare Plan, and the Valdosta-Lowndes MPO FY2015-18 Transportation Improvement Program (TIP). The suitability report was in response to the 2040 Transportation Vision Plan, the local MPO's long-range transportation plan (LRTP), which called for "a list of streets for future projects that promote sustainable safety and accessible infrastructure"

along with the MPO's Complete Streets Strategy which stated that all projects listed in the LRTP that receive federal funding to incorporate Complete Streets elements (VLMPO 2017).

The scoring methodology consisted of ten categories including street classification, bicycle infrastructure, pedestrian infrastructure, mobility, destinations and networks, roadway characteristics, gaps and connectivity, signed/unsigned bicycle routes, crash and traffic data, and local and GDOT planning considerations. The scoring distribution was debated for several months by city and county planners and engineers and facilitated by VLMPO staff. The final scoring scheme and the percentage composition of the final total is shown in Table 2 below:

Table 2: VLMPO Complete Streets Suitability Scoring Methodology

Category	Max. Point Value	% of Total Value
Street Classification	10	5%
Bicycle Infrastructure	10	5%
Pedestrian Infrastructure	10	5%
Mobility	30	15%
Destination and Networks	30	15%
Roadway Characteristics	30	15%
Gaps and Connectivity	25	12.5%
Signed/Unsigned Bicycle Route	15	7.5%
Crash & Traffic Data	30	15%
Planning Considerations	10	5%
TOTAL	**200**	**100%**

Source: VLMPO/SGRC

The detailed scoring sheet that shows all the criterion in each category is included in Appendix C.

Overall, 59 segments were evaluated with 30 in the City of Valdosta and 29 in unincorporated Lowndes County and smaller communities like Hahira, Lake Park, and Dasher.

The scores ranged from 99 to 174 in the City of Valdosta and 75 to 154 in Lowndes County. Some street segments that were evaluated as a part of this initiative have seen some recommendations be implemented, including filling sidewalk gaps between Downtown Valdosta and a public housing complex almost one mile from each other along North Lee Street. This publication went on to receive a 2017 Innovation Award from the National Association of Developmental Organizations (NADO) and was named the 2017 Outstanding Initiative by the Georgia Planning Association (GPA). This paper takes the author's experience with this project, including achievements and lessons learned, and applies them in combination with academic research and state and federal guidelines to explore how this methodology can be improved and perhaps implemented in other Georgia communities and MPOs.

Why Emphasize Small and Medium-Sized Cities?

Investment in multimodal infrastructure is a significant need in the United States for a diverse array of built environments. According to the Governor's Highway Safety Association, there were approximately 37,000 traffic fatalities throughout the nation with a slight reduction in the past ten years; however, pedestrian fatalities have increased by approximately 35 percent since 2008 (Governor's Highway Safety Association 2018, 5). This alarming statistic illustrates the need to build safer multimodal infrastructure. In Georgia, bicycle and pedestrian injuries and fatalities increased significantly statewide between 2012 and 2016 with pedestrian fatalities rising from 167 in 2012 to 232 in 2016 and bicycle fatalities rising from 17 in 2012 to 29 in 2016 (GOHS 2019).

The overall transportation network is a concept that is emphasized; however, it is frequently labeled as fragmented, incomplete, or other words with similar connotations (Hui et al., 2017). The needs for small and medium-sized localities are not the same as major cities due to lower population density and more single-use zoning codes (McAndrews, Tabatabaie, and Litt

2018). This means smaller urban areas have unique challenges in accommodating non-automobile users.

The United States Census Bureau legally defines an urbanized area (UZA) as a place with 50,000 or more people (United States Census Bureau 2015). According to U.S. Census 2017 population estimates, approximately 83 percent of Americans live in an incorporated area of less than 250,000 people (Graham 2018). In addition to the nation's largest urban concentrations, these small and medium cities and accompanying metropolitan planning organizations (MPOs) should be subject to and, in turn, make significant investment in promoting a healthy quality of life.

Since 1962, MPOs have served as an educational median to local governments on state and federal transportation issues, debates, and regulations and are made possible through a combination of state and federal funding through state departments of transportation (DOT), and the Federal Transit Administration (FTA), and FHWA (Transportation for America 2014). They are also regarded as entities known for creating scoring systems and project selection criteria for initiatives within both their planning boundaries and urbanized areas which they administer (McCann 2013). A threshold of 200,000 people is utilized because it exists under current USDOT policy with transportation management areas (TMAs) where urbanized areas larger than this number are given this designation reserved for major cities and their surrounding regions (FTA and FHWA 2012). MPOs in Georgia are shown in the map in Appendix D.

Based on the 2010 Census and the Georgia Association of MPOs (GAMPO), Georgia contains 16 urbanized areas that are home to 65 percent of the state's population, and 11 of these have at least 50,000 people but no more than 200,000 people. Urbanized areas located partly or entirely within Georgia which have more than 200,000 people are Atlanta, Augusta, Chattanooga,

Columbus, and Savannah. The urbanized areas which will be the subject of this paper are listed in Table 3 and are shown in the map in Appendix E.

Table 3: Georgia Urbanized Areas with Populations Between 50,000 and 200,000

2010 Urbanized Area (UZA)	UZA Population	MPO	Year Designated as MPO
Albany	95,779	Dougherty Area Regional Transportation Study	1965
Athens	128,754	Madison-Athens-Clarke-Oconee Transportation Study	1969
Brunswick	51,024	Brunswick Area Transportation Study	1991
Cartersville	52,477	Cartersville-Bartow MPO	2013
Dalton	85,239	Greater Dalton MPO	2003
Gainesville	130,846	Gainesville-Hall MPO	2003
Hinesville	51,456	Hinesville Area MPO	2003
Macon	137,570	Macon Area Transportation Study	1964
Rome	60,851	Floyd-Rome Urban Transportation Study	1983
Valdosta	77,085	Valdosta-Lowndes MPO	2003
Warner Robins	133,109	Warner Robins Area Transportation Study	1982

Source: GAMPO

Literature Review

A literature review conducted for this paper outlines sources for design guidelines at the state and federal level. It also explores the existing policy framework in Georgia as it pertains to Complete Streets and prioritization examples undertaken by local governments and MPOs.

Design Guidelines

Guidelines for bicycle and pedestrian facility design are published by the National Association of City Transportation Officials (NACTO), the American Association of State

Highway and Transportation Officials (AASHTO), and FHWA, among other national organizations. Two of NACTO's prominent publications on multimodal facility design are the *Urban Street Design Guide* and the *Urban Bikeway Design Guide* which include information on signage, safety specifications, and curb radii, lane, sidewalk, and cycle track dimensions, among other characteristics. AASHTO's 4th edition of the *Guide for the Development of Bicycle Facilities* was released in 2012 and includes information pertaining to on-street bicycle facility design, shared use paths, bicycle parking, and facility maintenance and operations. FHWA has released numerous publications over the past decade detailing how multimodal infrastructure can and should be built in both urban and rural settings. These include *Incorporating On-Road Bicycle Networks into Resurfacing Projects* (2016), *Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts* (2016), *Small Town and Rural Multimodal Networks* (2016), the *Guidebook for Developing Pedestrian and Bicycle Measures* (2016), the *Guidebook on Identification of High Pedestrian Crash Locations* (2018), and the *Bikeway Selection Guide* newly released in February 2019. These resources and guidelines are essential to any work done in Complete Streets design, construction, and maintenance.

Policy

From a policy standpoint, the NCSC identifies ten ideal components to a Complete Streets policy, and the ninth on this list – project selection criteria – is directly related to the goal of this paper. It is as follows:

> "A Complete Streets policy should modify the jurisdiction's project selection criteria for funding to encourage Complete Streets implementation. Criteria for determining the ranking of projects should include assigning weight for active transportation infrastructure; targeting underserved communities; alleviating disparities in health, safety, economic

> benefit, access destinations; and creating better multimodal network connectivity for all users. Jurisdictions should include equity criteria in their project selection process and give the criteria meaningful weight" (NCSC 2017).

In the NCSC's policy weighting criteria, it is preferred that a policy include language on how to weight and prioritize road projects exclusively for Complete Streets elements. This prioritization should consider equity and underserved communities as part of the process. In transportation planning literature and guidelines, traditionally underserved communities are comprised of environmental justice, low-income, minority, and senior populations along with people with disabilities (Sandt, Combs, and Cohn 2016).

Prioritization Examples

Complete Streets project prioritization schemes are extremely developed in large metropolitan areas through extensive technological and staff resources. Recent examples of sophisticated prioritizations of streets in large cities are in Indianapolis and San Diego (Nelson Nygaard Associates 2016; Circulate San Diego 2015). Quebec City in Canada conducted two distinct analyses to create a prioritization tool that examined 41 overall criteria in identifying which streets were most suitable for change (NCSC 2018). These criteria included were mixed-use zoning, heat island effects, grocery store and restaurant access, school and greenspace proximity, bicycle networks, pedestrian circulation, and street connectivity, among others (NCSC 2018). Vermont has explored multi-criteria analysis in project prioritizations for transportation planning to prevent funding inequality among jurisdictions (Novak et al. 2015).

Small and medium-sized cities have also developed their own prioritization systems for Complete Streets purposes, but they are not as robust as those enacted by planning agencies and consulting groups working on behalf of large cities. This is partly due to limited staff and financial

resources and capabilities. Lincoln, Nebraska conducted a gap analysis to determine where to devote future multimodal investments within the city, especially for sidewalks, bicycle lanes, and shared-use paths (Lincoln/Lancaster County Planning Department 2015). The Georgia Institute of Technology's Sidewalk Lab has undertaken sidewalk prioritizations for the City of Atlanta and Cobb County, among other jurisdictions (Georgia Tech 2019). MetroPlan Orlando's Prioritization Screening Tool synergizes land use and transportation with the intent of developing the best routes that will reduce vehicle miles traveled (VMT) (Whitton 2018).

Multiple towns and cities in Massachusetts have utilized grant resources from the Massachusetts Department of Transportation (MassDOT) to further their Complete Streets goals and policies, and an example of this is in Greenfield, Massachusetts north of Springfield (Alta Planning + Design and Watson Active 2017). Approximately 100 project ideas for this plan were compiled through the examination of project lists in existing plans such as the downtown Greenfield master plan, open spaces and recreation plan, and long-range transportation plan, among others. The prioritization criteria included safety, connectivity, transit linkage, impact to vehicular and freight operations, proximity to schools, and community support. The July 2016 *Complete Streets Master Plan* for Reno and Washoe County, Nevada included a sophisticated scoring scheme that comprised of bikeability, public transit ridership and routes, and employment access. The plan in Reno, Nevada was partly the basis for the *Valdosta and Lowndes County Complete Streets Suitability* report.

Potential Components of Methodology for Georgia MPOs

The methodology components outlined below consider numerous characteristics of Complete Streets from a top-down approach. They were identified through a combination of application practice, research, and feedback. The Essential Elements of a Bicycle Friendly

Community, affectionately known as the 5 E's, were the foundation for these characteristics and they include Engineering, Education, Encouragement, Enforcement, and Evaluation and Planning (League of American Bicyclists 2019). The methodology is structured to encourage communities to be proactive and treat risk before crashes can occur. The framework also combines a Complete Streets approach with other methods of incorporating safety as a project criterion based on FHWA's *MPO Guidebook for Using Safety as a Prioritization Factor*. Judgment and decisions should be based on data and not on subjective observations alone. Sensitivity to context and scenarios should be considered, as well.

General Road Characteristics

The functional classification that is assigned to a particular roadway is prioritized not just for Complete Streets retrofitting but for any general construction or roadway improvement project. Functional Classification (FC) is defined as "the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide" (GDOT 2014). This classification system regards streets as a network and not as an individual corridor; instead, streets are related to one another in that an event on one street will have effects on adjacent and intersecting streets. Aside from freeways that are ineligible for Complete Streets in all municipalities in Georgia, surface streets are typically classified as either arterial, collector, or local/residential. Within these three classifications, arterials are further divided into principal and minor arterials while collectors are either major or minor collectors. Arterials are typically designed to move higher volumes of traffic, collectors tend to link arterials, and local streets provide direct or indirect access to homes and community amenities (Zaccaro 2018).

In Georgia, GDOT maintains a mapping application that shows the functional classification of all public roads in the state (GDOT 2019). This resource, along with internal MPO resources,

will be useful in examining a street's functional classification and understanding its role in a MPO's traffic network. Functional classification should not be relied upon exclusively. Instead, an integrated approach that examines land uses along streets, the underlying demographics of people who drive, walk, and bike on a corridor, and traffic and crash patterns should be utilized.

Design Considerations

Lane Width

Lane widths should not be so narrow that a bicyclist feels uncomfortable, and the standard bike lane width is approximately four feet (Watkins 2018; Isebrands, Newsome, and Sullivan 2015, 37). Bicycles are only one type of low-speed vehicle (LSV) as others may include electric vehicles and scooters that travel less than 25 miles per hour (Jannat and Hunter-Zaworski 2012). Roads with narrow lanes are less suitable for a Complete Streets project since there is little existing asphalt to work with. AASHTO recommends that vehicular travel lanes should not be narrower than 10 feet along non-truck routes and 11 feet on truck routes (AASHTO 2012). Lanes that are wider than 12 feet, but less than 14 feet may be adequate for additional bike or pedestrian infrastructure, but this depends on the type of traffic that exists along the road and the speed limit at which it is traveling (Isebrands, Newsome, and Sullivan 2015, 39). Lanes that are 14 feet or greater are in the best position to be retrofitted for a bike lane as long as traffic counts are not exorbitantly high along that route.

Shoulders

A paved, bike-able shoulder is a shoulder that is wide enough to safely accommodate a cyclist and vehicular traffic. GDOT recommends that a bikeable shoulder in a rural area be approximately 6.5 feet wide (GDOT 2018a, 9-28). There should be at least striping and signage notifying a driver that a bicycle lane or facility exists along a roadway. A buffer such as rumble

strips, a landscaped median, or delineator posts are a bonus in most cases (FHWA 2016e). In Georgia, these rumble strips are 16 inches wide (GDOT 2018a, 9-28). Shoulders with the necessary width could also include a pedestrian lane where a sidewalk with curb and gutter is not feasible (FHWA 2016e).

Available Right-Of-Way (ROW)

A plethora of available ROW space is another desirable feature for a road that needs bike and pedestrian accommodations. In the Valdosta suitability report, wider ROW on either side of the street translated to a higher score in this category. For this section, county property and tax parcel data or geographic information systems (GIS) can be utilized to delineate where ROW ends and where private property begins. Anything over ten feet on each side is probably adequate for Complete Streets, at the very least (VLMPO 2017, 7). What is contained in this available or existing ROW can either be beneficial or problematic for a project, especially from a cost standpoint. If there are no open ditches for stormwater along a corridor, this is exceptional because of higher costs for capping the ditches and installing pipes and other water and sewer infrastructure. Utility poles within public ROW, especially those abutting a street curb, are also a significant cost burden for any project proposal – not just specific to Complete Streets (FHWA 2019). The intent is to maximize the use of existing ROW before acquiring additional ROW due to scarcity of space and resources.

Existing Infrastructure

Existing infrastructure on a corridor can be simplified into three distinct, yet related categories – bicycle, pedestrian, and utilities infrastructure. These will affect a corridor's priority for improvements, especially if certain characteristics, such as road striping and signage, exist on a road that have significant cost implications. Even if one of these currently exist, perhaps

improvements are necessary to make them more efficient. FHWA considers network connectivity as a part of analyzing existing infrastructure, and this is ideally through a multimodal framework which consists of network completeness, network density, route directness, access to destinations, and network quality in its guidebook titled *Measuring Multimodal Network Connectivity* (FHWA 2018b). This should be explored when weighing the intrinsic value of a corridor for multimodal uses. The presence of traffic calming measures like roundabouts or mid-block crossings should also be included in this category of a prioritization scheme (NACTO 2014). Bicycle and pedestrian infrastructure should be independent from one another in this stage of a Complete Streets prioritization (Watkins 2018).

Bicycle infrastructure such as lane allocation, striping, and parking structures are just a few of the urban bicycle amenities that are desirable to recreational bicyclists and commuters (FHWA 2019). Bicycle lanes with higher visibility, such as those with lanes painted green, should especially be noted (NACTO 2014). One of the general questions that should be asked about a corridor that is considered for a Complete Streets project is whether or not the road is part of a local, state, or United States bicycle route. Roads that are part of any of these networks should be prioritized above those that are not or those which do not experience high bicycle ridership. GDOT oversees the state bicycle route system that consists of several cross-state and intra-state routes (GDOT 2018a). The United States Bicycle Routes System (USBRS) has increased its route offerings in Georgia in the past few years, with routes such as U.S. Bicycle Routes 15 and 21 in southern and northwest Georgia, respectively (Adventure Cycling Association 2019).

Pedestrian infrastructure that should be examined include sidewalks, crosswalks, location of crosswalks either at intersections or mid-block crossings, and compliance with the Americans with Disabilities Act of 1990 (ADA) (FHWA 2016e; GDOT 2018a). Crosswalks that exhibit more

friendliness to pedestrians are those with leading pedestrian intervals (LPIs) or where a pedestrian is allowed time to cross before a motor vehicle traffic signal parallel to the crossing pedestrian turns green (NACTO 2013b). Pedestrian scrambles that allow for diagonal crossings are also desirable, especially in areas with high pedestrian traffic such as a downtown area or college campus (NACTO 2013b). The signalization of these crosswalks is especially important as all should have signals for both motorists and pedestrians to follow closely. Signal types are unique to crossing types, such as rectangular rapid flashing beacons (RRFBs) or high-intensity activated crosswalks (HAWKs) at mid-block crossings that are not adjacent to a traditional signalized intersection (FHWA 2016e). The width of sidewalks should be considered. In most Georgia cities, sidewalks should be at least five feet wide based on GDOT standards (GDOT 2018a, 9-21). Sidewalks that are ten feet or wider are often labeled shared-use or multi-use paths because they accommodate not just pedestrians but also bicyclists, wheelchairs, and other forms of non-motor vehicle traffic along a corridor (GDOT 2018a, 9-30). ADA compliance is essential not only to pedestrians bound to wheelchairs, but also to those impaired of hearing and vision (NCSC 2017). An example of this could be a signaled crosswalk where verbal cues to cross or wait are provided.

Utilities infrastructure consists of power lines and poles, telephone lines, cable lines, and Internet fiber optic cable, among other items. This ties into a road project in several ways including whether or not utility lines are buried, the location of utility poles in relation to the road itself, and the presence or absence of open ditches. All of these factors can adversely affect the cost of a road project and should be considered thoroughly when exploring feasibility and suitability of any road upgrade and not just a multimodal or Complete Streets addition (Bushell et al. 2013).

Destination, Zoning, and Adjacent Land Uses

Destinations and infrastructure both influence bicycle accessibility, especially in places accessible by a 20-minute bicycle ride (McNeil 2011). Connectivity to existing bicycle and pedestrian infrastructure was considered to be of high importance in the creation of this criterion since projects should build upon the current network and not be isolated and difficult to access. This includes, but is not limited to, on-road bicycle lanes, sidewalks, and mixed-use paths. Those projects that connected to existing bicycle and pedestrian paths received higher prioritization.

Land uses and zoning boundaries are essential in determining the degree of freight planning and access necessary for each corridor of interest. These are also good indicators for predicting multimodal traffic patterns (FHWA 2018b). Local signage dictating whether or not freight vehicles could utilize a road should be a general consideration with higher emphasis on the frequency of freight deliveries. A multitude of centers and community amenities can be considered under the auspice of a destination for the purpose of driving transportation investments. These can include, but are not limited to, primary and secondary schools, colleges and universities, healthcare facilities, industrial and office parks, recreation areas, and military installations (FHWA 2018b). Destination-based planning tools may be appropriate to fulfill this potential criteria set.

Demographics and Mobility

The feasibility to capture corridor demand through community engagement typically occurs on a project-by-project basis, but the focus should initially center around data. In this effort, demographics and mobility should factor into decision-making with respect to project prioritization. This component of a prioritization should consider the most recent available datasets from the United States Census Bureau through the annual American Community Survey (ACS) estimates. In Valdosta, this approach was handled by only considering census block groups that

were either bordered by or contained a street on which there was a programmed project (VLMPO 2017). The block group demographics were then averaged to calculate the exact number of points assigned to each street. Datasets considered for this exercise were the percent of people with vehicle access, the percent of people who walk to work, and the percent of people who bike to work – with higher percentages of each of these metrics leading to a higher assigned score. An example of a street with a high prioritization is North Lee Street and is summarized through the fact sheet in Figure 2.

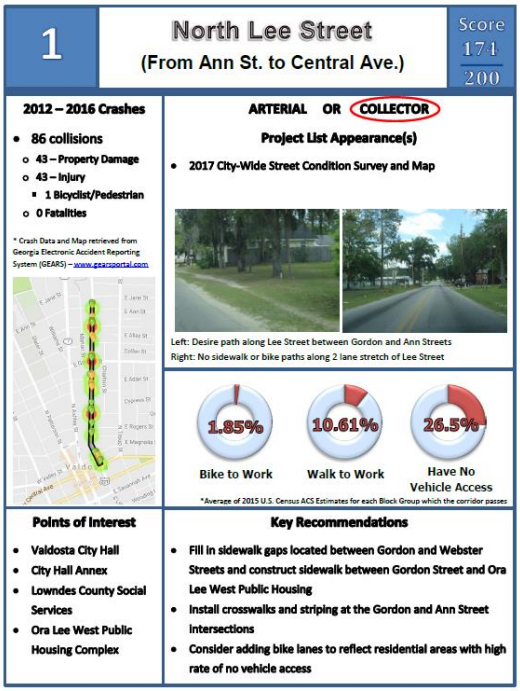

Figure 2: Example fact sheet from *Valdosta and Lowndes County Complete Streets Suitability* that displays most impactful criteria that can drive local multimodal decision-making.

A core component of transportation planning in the United States is consideration for equity and environmental justice populations (Sandt, Combs, and Cohn 2016; Thrun, Perks, and Chriqui 2016). Poorer regions of cities often lack sidewalks, bike lanes, and other types of multimodal infrastructure needed for a person to safely commute to work or conduct a trip for education, shopping, or leisure when that individual does not have vehicle access (Angus 2016). Discrimination is not only limited to wealth and household income, but also race, age, and disabilities, among other variables (NCSC 2019b). A study at the University of Illinois at Chicago found that Complete Streets foster equity not just within neighborhoods but across multiple

neighborhoods by allowing access through various forms of transportation (Thrun, Perks, and Chriqui 2016).

Gap Analysis in Sidewalks and Bike Lanes

It is essential that a road have continuous sidewalks for pedestrians, especially in areas where residents may not have ready access to a vehicle for shopping or commuting. This builds upon the vehicular access considerations outlined in the Demographics and Mobility section and instead asks about sidewalk gaps and approximately where those gaps are located. Desire paths, or sides of roads that do not have a sidewalk but have lawns worn down to dirt because of heavy foot traffic, are a strong indicator of a missing feature that is in heavy demand (FHWA 2016e). Sidewalk gaps can be categorized based on if they occurred on both sides of the street, one side, or neither side of the street. Further, gaps can be calculated at a percentage rate through numerous GIS tools. Land development regulations and zoning ordinances strongly vary throughout Georgia in terms of sidewalk installation requirements (GDOT 2018a). A combination of field visits and GIS analysis should be conducted to explore this aspect of Complete Streets prioritization.

Traffic and Crash Data

Data collection for safety should consist of crash-, vehicle-, and person-level datasets with a predetermined analysis period, which is typically five years for many transportation planning endeavors (FHWA 2018a). Crash data are typically stored and downloaded from the Georgia Electronic Accident Reporting System (GEARS). Crash data often do not paint the entire picture of the degree to which bicyclists and pedestrians are at risk of injury while conducting trips (Marshall and Garrick 2011). A challenge towards identifying and remedying design flaws is that some crash databases do not include "bicycle" or "pedestrian" as part of the system (Sciara 2003). Literature frequently discusses the separate needs of bicyclists and pedestrians as the two have

vastly different habits. In terms of bicycling, Level of Service (LOS) classifications are generally regarded as something that is geared towards vehicular traffic only and there is too much emphasis on this metric in policy generation (Zaccaro 2018). Research has led to the creation of a new metric called Level of Traffic Stress (LTS) that can be applied for bicycling (Carter et al. 2013; Furth, Mekuria, and Nixon 2016). Peter Furth of Northeastern University established four progressive levels of LTS as follows (Mineta Transportation Institute 2012):

> LTS 1 - Demands little attention to traffic from cyclists and attractive for a relaxing bike ride; Suitable for almost all cyclists, including children trained to safely cross intersections.
>
> LTS 2 - Presents little traffic stress but demands more attention than might be expected from children.
>
> LTS 3 - Offers cyclists an exclusive cycling zone (e.g., bike lane) requiring little negotiation with motor traffic, but in close proximity to moderately-high speed traffic or mixed traffic requiring regular negotiation with traffic with a low speed differential
>
> LTS 4 - Requires riding near high-speed traffic, regularly negotiating with moderate-speed traffic, or making dangerous crossings

Planning agencies should strive towards developing corridors with a lower LTS, especially when they pass by or near a major destination such as a grocery store or school (Lowry, Furth, and Hadden-Loh 2016). Corridors with higher traffic volumes may need separated bicycle amenities like a multi-use path or buffered bicycle lane (FHWA 2019).

Traffic count stations are both maintained locally and by GDOT and counts should be the most recent to account for changes in the network's traffic patterns. Roads with higher annual average daily traffic (AADT) counts are typically given higher priority in most transportation

investment debates to account for safety of drivers, bikers, and pedestrians, alike. It is often observed that principal and minor arterials experience higher fatalities annually (Zaccaro 2018).

Pedestrian modeling and the walking environment are emphasized in numerous research articles, and techniques to model pedestrian behaviors are improving with advanced technology and data. Traditional methods like safety and intersection audits are now supported through the pedestrian counting stations and the identification of crash clusters with GIS analysis, among others (Tolford, Renne, and Fields 2014). A pedestrian's sense of safety can be impacted by the presence or absence of a sidewalk, sidewalk width, buffer between a sidewalk and street, motor vehicle traffic volume and speed, the percentage of trucks traversing a corridor, and driveway frequency (FHWA 2016d). Together, these could comprise of a pedestrian LOS (Landis et al. 2001). Measures for addressing pedestrian concerns should be "systemic" in nature to enable agencies to identify, prioritize, and select countermeasures for those locations where safety concerns do exist (Transportation Research Board 2018).

NADO chronicled trends among small and medium-sized metropolitan areas to incorporate safety performance measures into their planning practices (NADO Research Foundation 2014). These are set by DOTs and MPOs and are federally required as part of the Moving Ahead for Progress in the 21st Century Act (MAP-21) to improve the reliability of the nation's transportation system (FHWA 2018c). MPOs can either set their own targets or support those established by their state DOT. Title 23, Part 490 in the Code of Federal Regulations makes this stipulation and through data-driven performance of the Highway Safety Improvement Program (HSIP), and the five safety performance measures which carry this out include five-year rolling average targets for the number of fatalities, rate of fatalities per 100 million VMT, number of injuries, rate of injuries per 100 million VMT, and number of non-motorized injuries and fatalities (FHWA 2018c). These

performance safety measures could be part of a prioritization scheme, especially the non-motorized crash measure.

Presence in Other Community Planning Documents

Since Complete Streets and multimodal considerations are only a singular aspect of road corridors, their identification and programming should be in conjunction with other community plans and initiatives (Watkins 2018). The consultation of prior plans and studies is an essential component to corridor and feasibility studies executed by local governments or consultants, and the findings of this step in a project can help build new recommendations or refine previously published recommendations. Corridor beautification and revitalization projects should be among those types of project lists and planning documents because of the green infrastructure implications that could be embedded within them.

Cost Estimates

Cost estimations of investments in multimodal infrastructure are another element that should be considered in the development of a prioritization criteria. The University of North Carolina (UNC) Highway Safety Research Center published a report in 2013 that details cost estimates based on state DOT averages for various infrastructures such as bicycle lanes and tracks, bicycle parking facilities, traffic calming measures, medians, landscaping, furniture, and sidewalks, among other design attributes (Bushell et al. 2013). Financial resources and budgets are often strapped and thin with little room for error or creativity. The objective with any other planning exercise is to consider how to accomplish numerous tasks with finite financial resources available. Funding resources should be considered for evaluated projects for a Complete Streets prioritization, including through state and federal programs. Multimodal projects can either stand

by themselves or be integrated into a larger infrastructure project, such as a resurfacing or road diet (FHWA 2016c; FHWA 2018d).

Other Factors to Potentially Consider

Below are several factors that were not considered in the Valdosta-Lowndes MPO Complete Streets Suitability study that should be examined in other similar efforts throughout Georgia. They include topography, weather conditions, existing local policy, green infrastructure, and access to fixed-route transit. Additional factors that are not listed below can be found in FHWA's *Guidebook for Developing Pedestrian & Bicycle Performance Measures*.

Planning Area Boundaries and Urbanized Area Boundaries

A challenge with the suitability report in Valdosta was how to give more weight to those corridors with higher population numbers and that are predominantly in the urbanized area. A distinction between an MPO's boundary, or metropolitan planning area (MPA), and an urbanized area (UZA) could be a potential direction and component in analyzing a corridor for potential Complete Streets investments. UZAs and MPAs for Georgia MPOs are shown in Appendix F. An MPO administers planning programs and oversees transportation initiatives within an urbanized area, but it plans for an area that is larger than the urbanized core and it often correlates with county boundaries. There are many instances, however, as seen through Appendix D, where MPO boundaries may encapsulate a primary county but also have small slivers in adjacent counties.

An example of applying this tactic is through weighting a corridor that exists in an urbanized area rather than just the planning area. More weight could be granted in a corridor that exists in both. Distinguishing between an urbanized core and the MPO planning area provides an administrative, top-down approach in determining suitability, but it does not factor in specific land

uses or demographics by travel analysis zones (TAZs) or Census block groups, among other finite boundary types.

Infrastructure Appropriate to Specific Land Uses

Another approach to remedying the urban versus rural challenge is to examine by specific land uses and apply prescribed recommendations from GDOT and FHWA resources. Routes with heavy traffic and near industrial uses are probably not suited for Complete Streets attributes. These routes are more suited for automobiles and freight. On the other hand, routes near schools and community amenities should be studied for multimodal and Complete Streets additions as these are areas with heavy bicycle and pedestrian traffic.

Parallel Routes and Connectivity

Many street networks are planned and laid out in such a manner that large arterial streets and collector roads are complemented with smaller city and residential streets that have dead ends and do not connect with one another (NCSC n.d.). This phenomenon dating to the 1950s and onwards led to indirect trips and isolated neighborhoods with respect to community centers and downtown business districts. An objective of transportation planning, particularly in urbanized areas, is to incorporate multimodal network connectivity, and this is often achieved through the utilization of routes parallel to one another (FHWA 2018b; FHWA 2019). This measure is taken in areas with urban typologies and where roads are organized in a grid framework. Bicyclists and pedestrians tend to prefer routes with lower traffic counts and also value the shortest distance in conducting trips (Mineta Transportation Institute 2012). By emphasizing connected streets, this could lead to lower automobile traffic on major thoroughfares, disperse traffic to other nearby routes, incentivize multimodal trip methods, or a combination of these results (NCSC n.d.).

A hypothetical approach would be if an arterial street is accompanied by a parallel route with minimal traffic, then this less traveled route could be recommended for transformation into a bicycle boulevard. This criterion could be factored into a Complete Streets prioritization by giving more weight to roads that do not end in a cul-de-sac. Also, streets that are being evaluated should consider the existence of parallel routes that may be more bicycle-friendly than the street under review, particularly if that street is a popular arterial route.

Urban versus Rural Corridors

Within a UZA, urban and rural typologies are included, especially in smaller cities that have MPOs. A challenge in the Valdosta project was how to include a diversity of road segments within the Valdosta city limits, unincorporated Lowndes County, and smaller Lowndes County communities like Hahira, Lake Park, and Dasher. A potential approach in how to not have a prioritization skew towards predominantly urban and suburban corridors is to examine street typology. Street typologies reflect adjacent land use and therefore are more holistic in determining high level classification of streets and surrounding public right-of-way (FHWA 2016e). Striving for a certain typology is subject to land use code, demographics, and engineering judgment and decisions (Zaccaro 2018). A vision for a corridor could be consistent with those of mixed-use boulevards, main streets, commercial connectors, neighborhood connectors, and others or combinations of them (NACTO 2013b).

Speed Limit

Speed limit and corridor safety have an inverse relationship in that higher speed limits tend to correlate with less safe corridors, particularly for bicyclists and pedestrians (GOHS 2017). This metric was absent in the Valdosta suitability report, and this metric could be used if this were to be updated for a second version. This is an especially significant factor on larger arterial streets

designed explicitly for heavy automobile traffic and commercial vehicles (Zaccaro 2018). For pedestrians, the likelihood of crashes resulting in fatalities increases along a corridor where the speed limit is higher than 30 miles per hour (NCSC 2019b). Speed management signage and software are appropriate features for roads with higher speed limits, especially county roads in rural environments (FHWA 2016e).

Intersections

Street segments, especially in denser urban areas, host numerous intersections that are for residential, collector, and arterial streets. Intersections are a location for crosswalks and maneuvers, but they are a notorious location for crashes (FHWA 2016b). Crashes at these locations can occasionally be attributed to the engineering and design of the intersection itself. Bicyclists and pedestrians are particularly vulnerable at intersections due to a variety of factors including the presence of crossing infrastructure, visibility, vehicle movement and yielding requirements, and lack of other essential infrastructure to mitigate injury (FHWA 2016b). This impacts the safety of the corridor being prioritized, and metrics relating to intersections and crossings should be taken into consideration. The time it takes to cross a street not only for an average person, but for someone in a wheelchair should be examined to meet ADA requirements. The presence of turn signals and "No Right Turn on Red" restrictions should be recorded as these may need to be altered to transform a corridor into a Complete Street. Turning radii for larger vehicles such as tractor trailers and buses is exceptionally paramount for wide principal arterial streets.

Topography

Not only should infrastructure promote a sense of safety, but also comfort in terms of ability to maneuver a route (Krenn, Oja, and Titze 2015). An example of this can be seen through topography, slopes, and grades (Hiroyuki and Tingstrom 2013). This is a factor that is especially

pertinent in areas with hilly or mountainous terrain like in the Georgia Piedmont or foothills of the Appalachian Mountains.

Existing Local Policy

According to Smart Growth America, approximately 25 local governments and state entities in Georgia have adopted a Complete Streets policy (NCSC 2019a). Each policy, however, places emphasis on different characteristics of mobility, demographics, safety, and quality of life. If a prioritization framework were to be introduced, it would need to, at the minimum, address the presence of a local government Complete Streets policy such as those outlined in Table 1.

Green Infrastructure

Renewable infrastructure such as landscape buffers, drainage, permeable pavement materials, and stormwater mitigation are increasingly being considered as Complete Streets amenities through efforts of organizations like NACTO and other public and private entities (NACTO 2013a). The inclusion of green infrastructure leads to numerous benefits to public works and the people that it serves such as stormwater management, runoff and pollution mitigation, and aesthetics. Landscape buffers between roads and sidewalks are the most ideal settings for the implementation of green infrastructure. These buffers are recommended to be six feet wide by GDOT but no less than two feet (GDOT 2018a, 9-21). This can include shade trees to make a walking environment more ambient in areas with warmer climates, especially during the summer months. Permeable pavements on sidewalks or bike lanes can reduce pooling of water after heavy rain events and make these environments more accommodating to non-motorized forms of transportation (NACTO 2013a). As this is considered a Complete Streets attribute by the NCSC, it should be explored or included as a potential criterion in evaluating public streets and corridors for Complete Streets (Zaccaro 2018). This can be a criterion in and of itself by analyzing canopy

coverage either qualitatively through field observations, quantitatively through GIS analysis, or a combination of the two.

Transit Access

Transit agencies that operate fixed-routes are not present in all of Georgia's 16 MPOs with Valdosta and Dalton as notable urbanized areas only containing on-demand systems contractually operated by third-party organizations (Stephen 2017). This parity will need to be considered in the development of this criterion for prioritizing Complete Streets investments; however, many arterial and collector streets are home to at least one bus route in small and medium-sized cities in Georgia. Vanpool services and campus transit should be considered with respect to transit access and the programming and construction of Complete Streets projects. Paratransit services should be factored into the prioritization and planning process, as well (GDOT 2018a).

Recommendations and Conclusion

This paper recommends that MPOs in Georgia which administer small and medium UZAs explore the possibility of applying either all of these factors or a combination of factors relevant to their planning area in determining how to prioritize investment in Complete Streets projects. This could integrate with existing data availability and perhaps lead to future data collection initiatives for each MPO. The exercise completed in Valdosta can serve as a model for MPOs to construct this type of prioritization scheme; however, the structure should be locally unique to the needs and opportunities of an MPO's planning area. This holistic methodology may also be beneficial in mitigating legal liability and other implications to avoid litigation over decaying infrastructure.

This prioritization should examine previous plans and studies to determine relevant corridors to evaluate, identify and choose alternatives, and implement the alternatives for those corridors which score the highest or show the most pertinent need for multimodal infrastructure. Implementation should be incremental to determine if the chosen alternative is indeed the right approach to transforming a transportation corridor into something that is accommodating to various modes of travel. A prioritization should produce project fact sheets or profiles for ease of communicating information similar to that of a policy brief or an information handout.

Additionally, non-motorized transportation monitoring in Georgia is not currently in widespread existence, and GDOT and MPOs should consider working together in implementing this. An example of this type of program can be found in some localities in Virginia where count stations were placed in both urban and rural environments. (Ohlms 2018). This can serve as a form of data collection both for this initiative and others that are vital to the administrative and required functions of DOTs and MPOs in the United States. It is also another form of asset management, especially for multimodal infrastructure (GDOT 2018c).

Incentivizing local governments and MPOs to further investigate the status of multimodal networks and non-motorized forms of transportation is another recommendation. Currently, only three MPOs in Georgia have officially passed a Complete Streets policy, and there is room for improvement through this lens. A grant program exclusively for Complete Streets or multimodal projects could be applied to corridors where needs are identified and substantiated with data, testimony, and existing conditions. An example of this is in the Commonwealth of Massachusetts where a Complete Streets Funding Program was established for the use of towns and cities and to incentivize Complete Streets projects throughout the state (Massachusetts Department of Transportation 2019). This program is essentially allowing local governments to plan for

accessibility and mobility considerations in tandem rather than exclusively for mobility. Updating and rewriting policies on the state and federal level will enable better design and lead to safer built environments (Zaccaro 2018). A key opportunity at the federal stage will be the transportation funding re-authorization bill that must be passed by Congress in 2020, with the most recent being the Fixing America's Surface Transportation (FAST) Act signed into law in 2015 by President Barack Obama (NCSC 2019b).

GDOT is heading in the right direction with the position that new construction and reconstruction of state routes "shall be considered in all planning studies and shall be included in all reconstruction, new construction, and capacity-adding projects…" for bicycle and pedestrian infrastructure (GDOT 2018a). However, according to Appendix A, the GDOT Complete Streets Policy states that there will be routine investment in multimodal infrastructure, and this is somewhat vague and indirect for a concept that is vital to the well-being of the state's urbanized areas regardless of size. The policy should be bolstered by incorporating more incentives and diverse funding opportunities into the language.

Accessibility is an essential component of transportation, and Complete Streets is a concept that seeks to address this in combination with mobility. For the state of Georgia to improve its standing in providing world-class transportation infrastructure to all users of public right-of-way – both motorized and non-motorized, the next step is to determine how each attribute should be weighted in determining the proper placement and balance of modes. This should be done through dialogue and debate between policymakers, MPOs, GDOT representatives, and municipalities who strive to improve the ability of urban environments to serve as a healthy setting for constituents to thrive, prosper, and contribute to the economic growth and productivity of Georgia and the United States. Cities can also benefit from making Complete Streets a priority by

potentially becoming Walk Friendly Communities or Bicycle Friendly Communities (GDOT 2018b).

This paper does not seek to generate a one-size-fits-all approach for fair and prudent prioritization of Complete Streets projects in small and medium-sized cities. It only serves as potential guidance by outlining general recommendations for implementation within the State of Georgia. Rather, it builds the case that Georgia MPOs should proactively explore a data-driven prioritization process that considers design elements and which exclusively examines corridors of various types for Complete Streets amenities to accommodate people's travel behaviors. The exact structure of a prioritization scheme comprising these components of a public street corridor should be dependent on each individual MPO's needs and priorities, but the factors discussed in this paper should be considered when determining investment for multimodal infrastructure within an urbanized area.

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Appendices

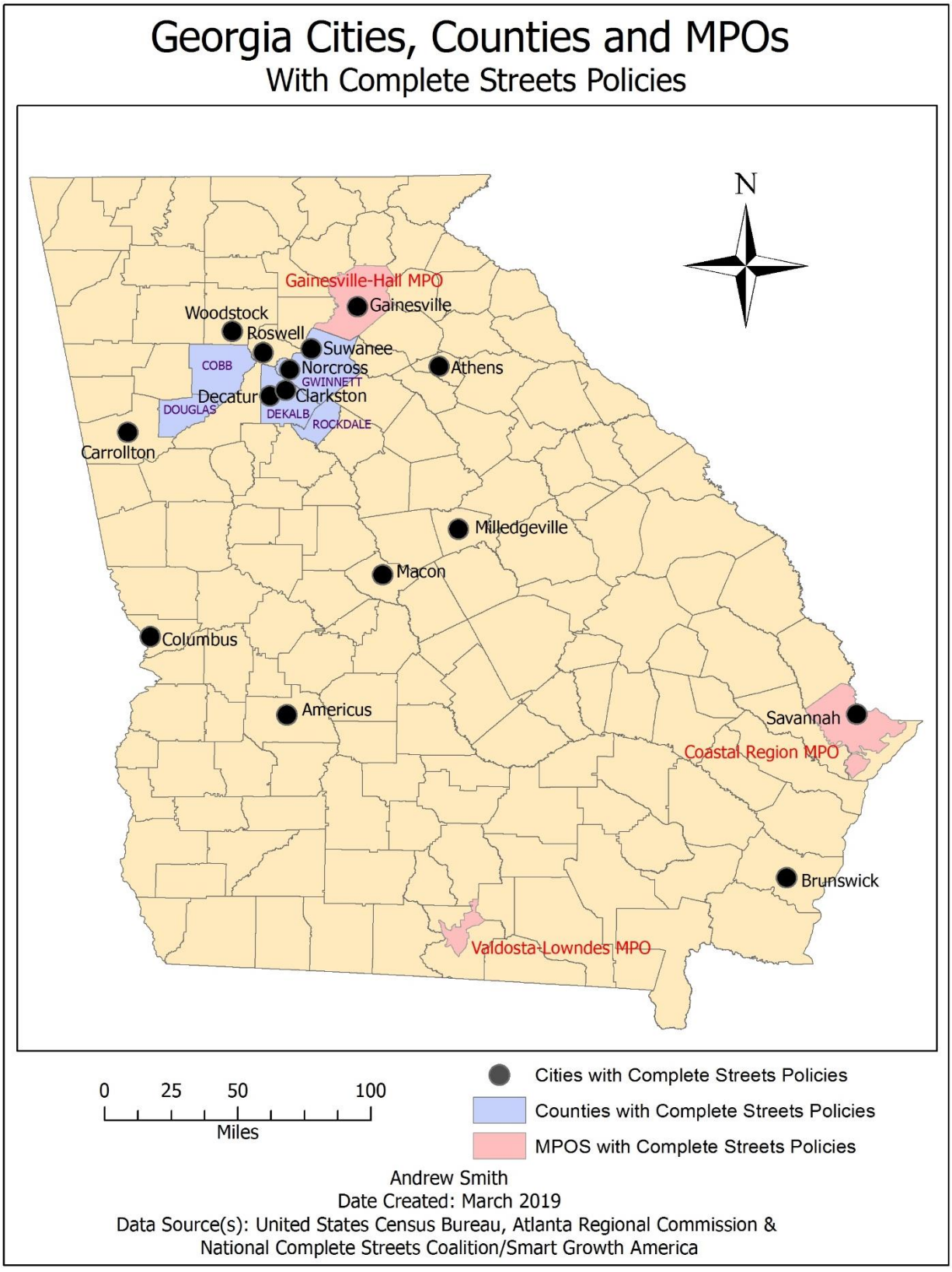
Appendix A: GDOT Complete Streets Policy (2012)

"It is the policy of the Georgia Department of Transportation (GDOT) to routinely incorporate bicycle, pedestrian, and transit accommodations into transportation infrastructure projects as a means for improving mobility, access, and safety for the traveling public. Accordingly, GDOT coordinates with local governments and planning organizations to ensure that bicycle, pedestrian, and transit needs are addressed, beginning with system planning and continuing through design, construction, maintenance and operations. This is the "Complete Streets" approach for promoting pedestrian, bicycle, and transit travel in the State of Georgia.

The concept of Complete Streets emphasizes safety, mobility, and accessibility for all modes of travel and for individuals of all ages and abilities. The design of transportation projects for multiple travel modes requires balancing the needs of each mode. This "balance" must be accomplished in a context sensitive manner appropriate to the type of roadway and the conditions within the project and surrounding area."

Source: GDOT, *Design Policy Manual* Version 5.8 (December 2018)

Appendix B: Georgia Cities, Counties & MPOs with Complete Streets Policies (as of Feb. 2019)



Appendix C: Valdosta-Lowndes Complete Streets Suitability Scoring Sheets (3 pages)

Page 1

Street Name				Max Score	SCORE
Beginning Point					
End Point				200	200
Project List Appearance					
SCORING CRITERIA					POINTS
Street Classification (Arterials and Collectors Only)					
Is the road classified as an arterial or collector street by GDOT?					
Arterial - 10 points					
Collector - 5 points					10
Bicycle Infrastructure -Does the road exhibit bicycle-friendly qualities?			Comments		
Yes, no needed improvements (i.e. bike lanes, side path, etc.)	0 points				
Yes, but improvements recommended	5 points				
No, this road is not bicycle-friendly	10 points				10
Pedestrian Infrastructure - Does the road exhibit pedestrian-friendly qualities?			Comments		
Yes, no needed improvements (i.e. sidewalks, shared paths, etc.)	0 points				
Yes, but improvements recommended	5 points				
No, this road is not pedestrian-friendly	10 points				10
Mobility - Is the road in an area with high levels of multimodal transportation?					
High percentage of people who bike to work (based on 2015 U.S. Census ACS Estimates)			RAW VALUES		
Block Groups					
0 - 4%	1 point		Beg. Point	10	
4 - 8%	5 points		End Point	10	
8 - 12%	10 points		Average	10	10
High percentage of people walking to work (based on 2015 U.S. Census ACS Estimates)			RAW VALUES		
Block Groups					
0 - 4%	1 point		Beg. Point	10	
4 - 8%	5 points		End Point	10	
8 - 12%	10 points		Average	10	10
Percent of people who do not own a vehicle (based on 2015 U.S. Census ACS Estimates)			RAW VALUES		
Block Groups					
0 - 10%	1 point		Beg. Point	10	
10 - 25%	5 points		End Point	10	
>25%	10 points		Average	10	10

Page 2

Destinations and Networks				
Does the corridor connect to existing bike/pedestrian networks?				
Yes (both) - 10 points	Yes, but not both - 5 points	No - 0 points		10
Does adjacent land use require access for freight deliveries?				
Yes - 5 points	No - 0 points			5
Does the road pass by or near (within 1/2 mile) a destination center, such as a school, college/university, industrial complex, retail/business, military installation, etc.?				
Yes - 15 points	No - 0 points			15
Roadway Characteristics				
Does the road in question contain bikeable shoulders?				
0 - 30 % of segment		5 points		
30 - 60% of segment		3 points		
60 - 90 % of segment		1 point		5
How much extra available right-of-way (ROW) width is there on each side of the road?				
0 - 10 feet		2 points		
10 - 20 feet		5 points		
20 feet or greater		10 points		10
Does the road right-of-way contain open ditches for stormwater?				
Yes -0 points	Yes, but in portions - 2 points	No - 5 points		5
Is there utility infrastructure (i.e. poles) that hinder the development of bike/ped infrastructure within existing ROW?				
Yes -0 points	Yes, but in portions - 2 points	No - 5 points		5
How wide are the existing lanes along this road?				
10 feet or less		1 point		
10 - 12 feet		2 points		
12 - 14 feet		3 points		
14 feet or greater		5 points		5
Gaps & Connectivity				
Does aerial imagery show signs of a need for sidewalks (desire paths)?				
Yes - 15 points	No - 0 points			15
Do sidewalk gaps exist on one-side, both, or neither side of the road?				
Neither		0 points		
One Side		3 points		
Both Sides		5 points		5

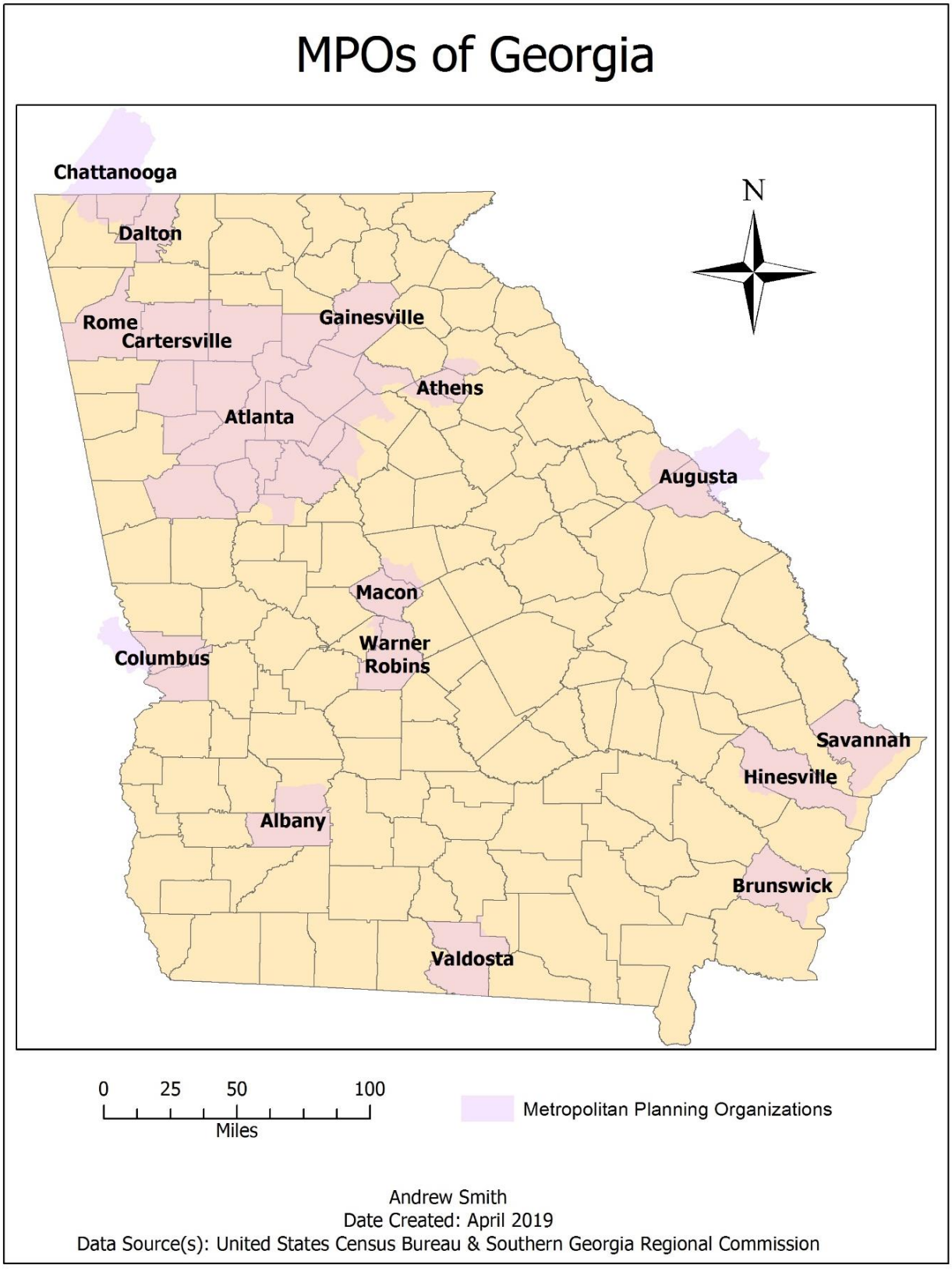
Page 3

What is the estimated gap length according to GIS analysis?				
0 - 25%		1 point		
25 - 75 %		3 points		
75 - 100%		5 points		5
Signed/Unsigned Bicycle Route				
Is the road part of a signed and/or unsigned bicycle route?				
Yes - 0 points	Yes, but in portions - 10 points	No - 15 points		15
Motor Vehicle Crash & Traffic Data				
How many crashes were there along this road in the past five (5) years?				
Less than 50 crashes - 5 points				
More than 50 crashes - 10 points				10
What is the approximate AADT for this road segment (2015 GDOT AADT data)?				
Less than 10,000		1 point		
10,000 - 15,000		3 points		
Greater than 15,000		5 points		5
Did any of these crashes involve bicyclists or pedestrians?				
Yes - 15 points	No - 0 points			15
Planning Considerations				
Does the roadway include Design Standards in GDOT Design Policy Manual, SGRC Complete Streets Best Practices report or identified in the Bike/Pedestrian Master Plan?				
Yes - 5 points	No - 10 points			10

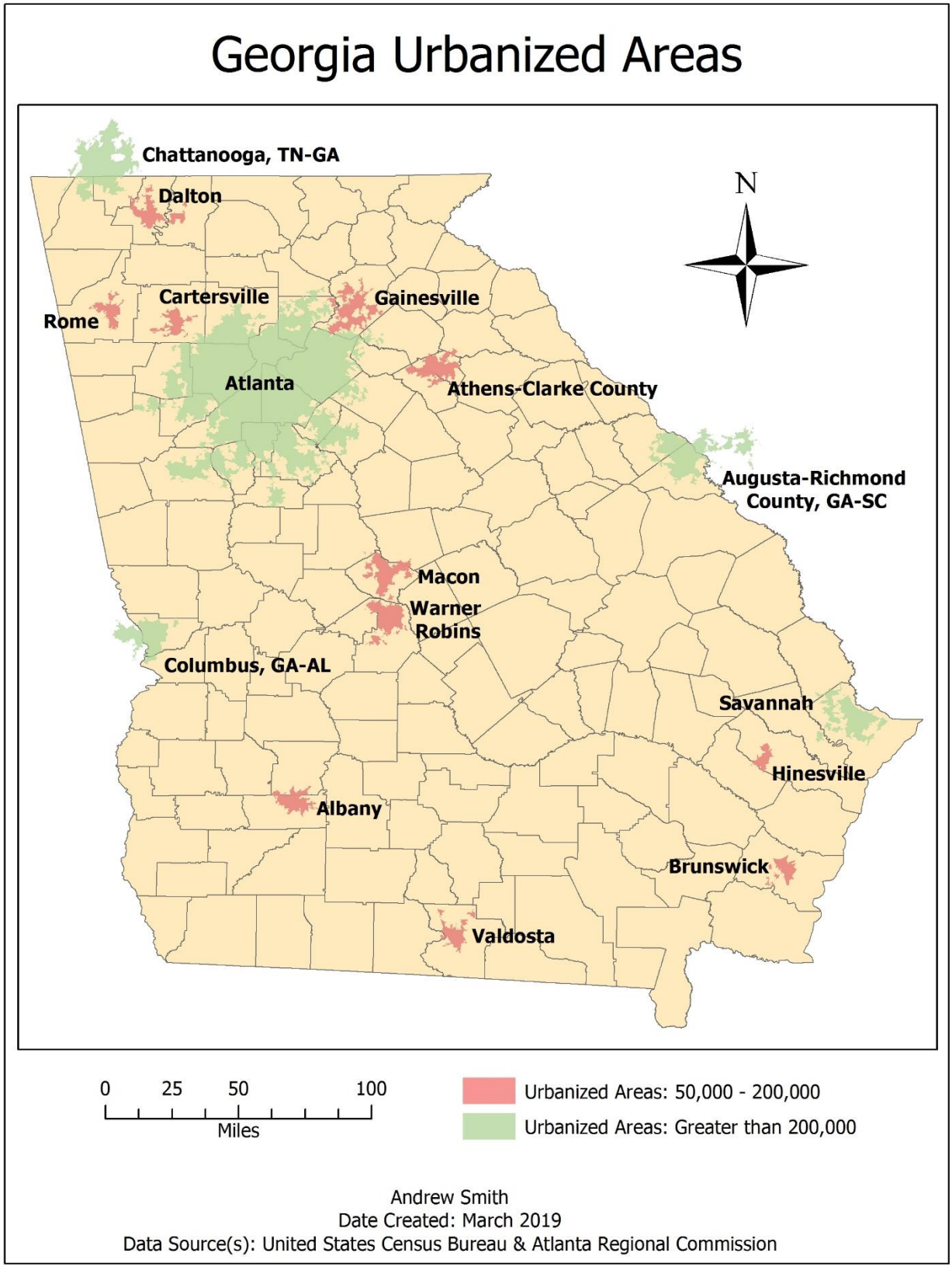
ADDITIONAL NOTES:

Source: Valdosta-Lowndes MPO / Southern Georgia Regional Commission

Appendix D: Map of Georgia MPOs (Based on 2010 United States Census)



Appendix E: Map of Georgia Urbanized Areas (Based on 2010 United States Census)



Appendix F: Urbanized Areas Imposed on MPO Boundaries