Route 106
Arterial Management Plan

Adopted August 2016

VDOT Virginia Department of Transportation

New Kent County · Virginia

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Chapter 1.0 Executive Summary

The New Kent County *Route 106 Arterial Management Plan (AMP)* provides a comprehensive understanding of the operational and capacity improvements necessary along Route 106 over the next twenty-plus years to accommodate existing and anticipated future growth and economic vitality within the study area and the County. The study also identifies an implementation or phasing plan for this to realistically occur within the financial confines of the current transportation funding climate. The implementation of system-wide improvements will occur through local policies, programs, and funding as well as federal and state contributions and private investment. The study provides a blueprint for a coordinated approach to defining a transportation network capable of supporting the County's vision of a corridor that supports economic vitality, is attractive, and maintains or enhances quality of life attributes residents, business owners, and visitors of the corridor have come to expect.

The report will serve as a beneficial tool to both New Kent County and VDOT in their discussions with residents, land owners, and potentially developers as they convey future plans and projects for the Route 106 corridor. This study provides a strategic approach to phases of corridor improvements and lays the groundwork for the County and VDOT to initiate design elements, guide discussion with developers, identify potential right-of-way needs, pursue funding sources, as well as realize realistic stages of implementation. On a much broader scale, the study will ultimately be used as a planning tool by the County and VDOT to manage growth and assess the transportation network impacts created by sub-regional or County level traffic demand influences internally and/or externally to the study area. The *Route 106 AMP* examines existing and future conditions for the horizon year of 2040, with the intent of gaining a better understanding of the more immediate needs along the corridor while also establishing a vision for this important corridor that is consistent with the priorities and objectives of not only County leadership but that of the local community.

Growth within the study area corridor has been very dynamic in terms of residential development to the north of the I-64/Exit 211 interchange and a large truck stop to the south of the interchange, as well as increases in traffic volumes stemming from the corridor's role in the County's and sometimes the Region's transportation network. This study considered planned and approved growth within the study area (e.g., approved but undeveloped lots in the study area, the Farms of New Kent, Love's Travel Stop and Country Store, the proposed New Kent County City Center, etc.). The comprehensive approach to the development of future traffic volume projections was necessary due to anticipated changes in travel patterns, the expected increase in the mixture of truck and vehicular traffic, the need to document the operational benefits of the proposed improvements and their ability to support future growth, development, and economic vitality, as well as the need to establish a preferred typical section and/or vision for the Route 106 corridor.

As a result of the field reviews, traffic analyses, and discussions with the County, project stakeholders, public workshops, public information meetings, and VDOT, recommendations for improvements have been identified within the study area to include capacity enhancements and access management strategies. The recommendations were based on the desire to safely and efficiently address future internal and external traffic growth associated with the key study area components.

The primary recommendation of the study involves the widening of Route 106 between the I-64 westbound off/on-ramp intersection in the north to the Parrish Road intersection in the south over the next twenty-plus years. The proposed corridor improvement projects are grouped and/or categorized into short, mid, and long-term phases based on the magnitude of the project (i.e., cost), timing/schedule of when the particular project could be constructed, as well as the scale of the issue a particular project is intended to address. This approach allows communities to prioritize larger scale projects over time while also being able to implement short-term projects that mitigate more immediate needs.

Short-term recommendations are those that are intended to be implemented within six months to five years. These improvements typically cost much less than longer term improvements. The short-term improvements may consist of, but are not limited to the following:

- Installation of a traffic signal as a part of the proposed development, Love's Travel Stop and Country Store, at the intersection of Route 106 at Love's Country Store/Pilot Travel Center Site Driveways
- Construct geometric improvements as part of the Love's Travel Stop proposed development intersection improvement project
- Optimize traffic signal phasing and timing plans to accommodate peak/off-peak hour traffic along Route 106 corridor and side street demand
- Installation of new signage and/or pavement markings to enhance driver awareness and operational efficiency along the shared access driveway serving the Pilot Travel Center and Burger King

Mid-term recommendations are those that are intended to be implemented within five to fifteen years, which will range from relatively low cost to several million dollars. Mid-term improvements have been identified that include, but are not limited to the following:

- Widen existing bridge span to accommodate a 3-lane typical section. Widening will facilitate the ability to install traffic signals at the two I-64/Exit 211 Off/On-Ramp intersections as well as the implementation of exclusive left-turn lanes along Route 106 to enhance intersection operations. This improvement will also intermittently extend the operational life cycle of the Route 106 corridor and the I-64/Exit 211 interchange.
- Install a traffic signal when warrants are met to accommodate anticipated future development traffic volume demand and to maintain acceptable operational conditions at the I-64 interchange off/on-ramp intersections.
- Optimize traffic signal phasing and timing plans to accommodate peak/off-peak hour traffic along Route 106 but to also mitigate potential off-ramp queueing from impacting I-64 Westbound mainline operations.
- Following the installation of the Love's Country Store/Pilot Travel Center traffic signal, the existing northern site access driveway that serves the Pilot Travel Center, should be modified/converted to a Right-In/Right-Out (RI/RO) Only access driveway. This will encourage drivers wishing to travel south on Route 106 to use the new Love's/Pilot Travel Center signalized intersection and will mitigate adverse impacts to the Love's/Pilot Travel Center intersection operations and general operational safety.
- The modification of several site access driveways along Route 106 to meet minimum spacing standards for Commercial Entrances, Intersections, and Median Crossovers, per Appendix F - VDOT Access Management Design Standards for Entrances and Intersections.

Long-term recommendations are those that are intended to be implemented within fifteen to twenty-plus years. These long-term recommendations can range in cost and magnitude, but are typically higher in cost and larger in scale, involving major construction and right-of-way acquisition. The long-term improvements include, but are not limited to the following:

- As a result of the public involvement process, a preferred typical section was selected. The preferred typical section consists of improving existing Route 106 from a 2-lane facility to a 4-lane divided roadway.
- With the divided roadway, construct a 16 to 20-foot variable width median along the corridor between Parrish Road to the south and the I-64 Eastbound Off-Ramp to the north
    - The 16 to 20-foot median will allow for the construction of 12-foot full width left turn-lanes where applicable while maintaining a 4 to 8-foot median to provide physical separation between traffic located in the turn-lane and traffic in the opposing/oncoming travel lane.
- Transition of the roadway from a 4-lane facility back down to a 2-lane facility should occur over a distance of approximately 1,000 feet south of the Route 106/Parrish Road intersection.
- Construct the proposed 4-lane typical section north of the I-64 Eastbound Off/On-Ramp intersection to the roundabout intersection north of the I-64 Westbound Off/On-Ramp intersection
- Construct a second bridge span over I-64 to accommodate the additional two travel lanes along Route 106
- Tie proposed 4-lane typical section improvements into existing 4-lane typical section located in the immediate vicinity of the New Kent County Visitors Center and immediately south of the Roundabout.
- When/if future development of the parcel immediately north of and adjacent to the existing Pilot Travel Center occurs a cross access point between the two properties/businesses should be constructed so both properties/businesses can use a shared Right-In/Right-Out (RI/RO) Only access driveway.
- Maintain and/or implement desirable access management strategies to accommodate, prohibit, restrict, or best mitigate full-movement crossovers/intersections located along the Route 106 corridor.

Project specific recommendations focus on operational, capacity, and safety improvements within the study area. Planning-level cost estimates, expressed in year 2016 dollars, have been included for all recommendations. These planning-level cost estimates have been based on VDOT's statewide four-year cost averages for 2009, the VDOT Transportation & Mobility Planning Division's (TMPD) "Statewide Planning Level Cost Estimates" worksheet from 2006, as well as familiarity with similar project and improvement costs throughout Virginia. Due to fluctuations in the costs of labor, materials, and equipment, variability in the market and the outcome of competitive bidding, and the general planning-level nature of the recommendations, these estimated costs are neither exact nor guaranteed. Variation between actual and estimated costs will change as time passes, and the time value of money has not been taken into account. Cost estimates performed using the "Statewide Planning Level Cost Estimates" worksheet include right-of-way acquisition cost estimates developed with the sheet's methodology.

The stormwater collection and conveyance cost estimates included in this report assume the use of standard VDOT design specifications for roadway drainage including the use of concrete curb and gutter and concrete pipe for conveying stormwater to the treatment locations.

The costs for specific stormwater management features are not included in this corridor study because of the large variability in the type of stormwater treatment facilities contained in the Virginia Stormwater Management Clearinghouse and the uncertainty in the amount of additional right of way that the County may need to purchase to accommodate such features. Overall stormwater management costs will ultimately be dictated by the combination and number of total number of stormwater management measures determined necessary as a part of the roadway design. The cost breakdown per scenario includes engineering/design costs, roadway/intersection improvement costs (e.g., cost per mile for a particular roadway typical section, turn-lane improvements, roundabout, bridges/box culverts, milling, overlay, sidewalks, channelization, stormwater collection and conveyance, landscaping (e.g., trees, seeding, etc.), traffic signal equipment improvement costs (e.g., poles, mast arms, signal heads, pedestrian signal head equipment and construction), construction engineering and inspection (CEI) costs, right-of-way (ROW) acquisition, and utility relocation costs as well as miscellaneous costs which includes, mobilization, sediment and erosion control, traffic control (i.e., maintenance of traffic (MOT) during construction). Furthermore, a 15 percent contingency was applied to construction cost. Lastly, estimated dollars were rounded to the nearest $1,000.

Chapter 6.0 reflects the cost estimates for those projects that fall within a particular time frame (i.e., short-term, mid-term, long-term). The study outlines the long-term vision for the corridor and its associated transportation network needs. The intent is to now use the vision as projects emerge, whether small or large, public or private, to ensure that the ultimate overarching desires and needs of the corridor study area are achieved. Each project should be evaluated against the overall *Route 106 AMP* to determine specifically how it can best contribute towards realizing the vision.

The next key step in the planning process is to determine how the recommended improvements will be implemented. Both New Kent County and VDOT officials will need to determine implementation strategies as well as establish project priorities. Implementation strategies to consider include seeking and identifying funding streams, both public and private, to construct improvements. There are several potential public programs that may assist with funding projects. At the federal level there are earmarks, National Highway System funds, Congestion Mitigation Air Quality (CMAQ) funds, bridge funds, Surface Transportation Block Grant Program (STBG) funds, Highway Safety Improvement Program (HSIP) funds, and Transportation Alternatives Program (TAP) funds, to name a few. At the state level there is the VDOT six-year improvement program (SYIP), which can help define what alternative funding sources the project may best qualify for such as; the Recreational Access Program, the Economic Development Access Program, or the Revenue Sharing Program. At the local level, New Kent County is a member of the Richmond Regional Transportation Planning Organization (RRTPO) which can assist local planning efforts by providing services and guidance on funding strategies/coordination with VDOT. Private funds may be realized through rezoning action and proffer contributions, as well as dedication of right-of-way. All the referenced funding programs and strategies require some portion of commitment and/or match at the local level but serve as a means for communities to increase the effectiveness of their budgetary dollars toward priority projects. One source of local match funding could be the inclusion of specific transportation-match funds in the County's Capital Improvement Program (CIP), or another dedicated local fund. All of these programs should be considered for each recommended improvement as outlined in the report. It is recommended that proposed improvements be prioritized into projects with both County and VDOT input. Each project should be thoroughly evaluated then identified for priority order, time frame from implementation, and potential funding sources.

Chapter 2.0 INTRODUCTION

Section 2.1 Background

In 2009 the Commonwealth Transportation Board (CTB) proactively approved a process for developing Corridor Master Plans on the State's Corridors of Statewide Significance (CoSS). The CTB resolution stated that Corridor Master Plans are critical to preserving the capacity and safety and controlling congestion on the CoSS system. Additionally, these plans help ensure the ability of the CoSS to function today and into the future, as facilities for long distance travel, movement of goods and people, and economic development. In light of the CTB's responsibilities under § 33.1-12.8(f) and § 33.1-23.03, it was essential that similar plans be developed to preserve the capacity and safety on the regional network. Since most of the regional networks are functionally classified as arterials, the focus of Arterial Management Plans (AMP) is on the regional arterial network.

Recognizing that the arterial highways are an integral part of the Commonwealth's Transportation network, they are intended to provide service for long distance travel and goods movement. While through and local traffic must be accommodated by the arterial highways, balancing the transportation network to serve well managed access points for local businesses or commercial sites is equally important. The operational efficiency of the arterial network is a vital resource of the Commonwealth and as such must be preserved through implementation of access management strategies.

In 2013, VDOT initiated a pilot AMP study to develop a process/methodology for conducting these plans as well as identify best management practices and techniques, create a toolbox of alternatives matrix, to be used by planners statewide. The pilot study was completed in fall of 2015 with a finalized methodology and toolbox to be applied to arterials studies throughout the Commonwealth.

Section 2.2 Purpose of the Study

The Route 106 corridor is currently experiencing an increase in development with additional development anticipated as a result of approved rezoning applications and associated economic development opportunities. Therefore, the intent of this project was to develop a comprehensive AMP to manage existing but more importantly anticipated future corridor assets. This study provides guidance for VDOT, the locality, and the development community in maximizing capacity, minimizing congestion, as well as planning appropriate access to support and sustain future development.

Section 2.3 Study Area

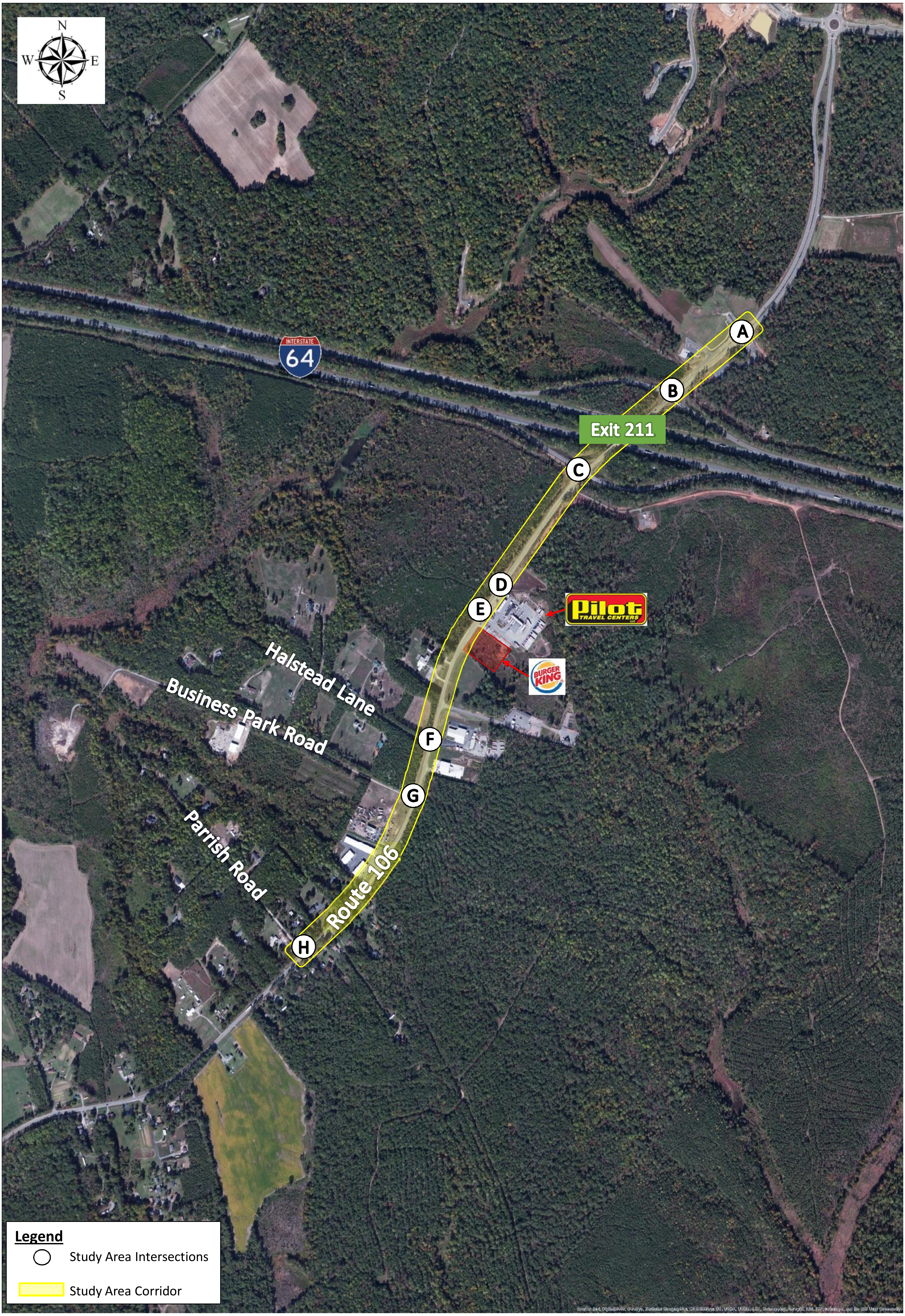
The corridor limits for the Route 106 AMP consist of an approximate 1.5 mile segment of Route 106 (Emmaus Church Road) in New Kent County, Virginia from the roundabout just north of Interstate 64 (I-64)/Exit 211 interchange to Parrish Road as illustrated in **Figure 1**. The study area is bound by residential developments to the north, a mixture of commercial, retail, light industrial/manufacturing, institutional uses, and several large undeveloped parcels along the east and west sides of the corridor, as well as a mixture of single family residences and agricultural properties to the south. A large portion of the study area contains undeveloped land expected to develop over the next ten to fifteen years.

The conventional diamond interchange of I-64 at Route 106 (Exit 211) is located within the study area. This interchange provides access to/from the Pilot Travel Center and a future Love's Travel Center and Country Store situated approximately 1,500 feet south of I-64 for regional vehicular and truck traffic as well as access to/from the County's Visitor and Commerce Center, the New Kent Winery, and several large scale residential communities currently under development.

Within the study area, the key intersections include the following:

A. Route 106 at Roundabout north of I-64 (Roundabout)
B. Route 106 at I-64 Westbound Off/On-Ramps (Unsignalized)
C. Route 106 at I-64 Eastbound Off/On-Ramps (Unsignalized)
D. Route 106 at Pilot Travel Center Northern Driveway (Unsignalized)
E. Route 106 at Pilot Travel Center Southern Driveway (Unsignalized)
F. Route 106 at Halstead Lane (Unsignalized)
G. Route 106 at Business Park Road (Unsignalized)
H. Route 106 at Parrish Road (Unsignalized)

Study area intersections and roadways were identified by VDOT and New Kent County personnel. The study area intersections are illustrated in **Figure 1**.



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Route 106 Arterial Management Plan
New Kent County, VA

Study Area

Figure
1

Section 2.4 Public Involvement Process

In order to develop recommendations and conceptual plans for improvements within the study area, several corridor characteristics required identification and review in conjunction with the stakeholder outreach program. Land use, corridor demographics, pedestrian and bicycle facilities, access, traffic, as well as environmental, historic, or cultural constraints were reviewed to understand the existing conditions and evaluate options for improvement within the study area. Public and elected officials, other stakeholders, and citizens within the study area were engaged throughout the entire project process in order to help document existing conditions and develop preferable recommendations.

2.4.1 Board of Supervisor and Planning Commission Presentations

Briefings on the study were presented to the New Kent County Board of Supervisors and Planning Commission at key milestones throughout the project process. The purpose of these briefings was to familiarize the members with the study and answer any project related questions. Presentation topics included project history, schedule, study area, existing conditions, public involvement, and recommendations.

2.4.2 Public Involvement

As previously mentioned, the planning process included a stakeholder and public outreach program in order to be rooted in a public involvement platform that gathered, processed, and applied a diversity of opinions and local knowledge from the corridor's residents, business owners, land owners, and civic groups. The intended outcome of the public involvement effort was for stakeholders to feel satisfied with their participation in the process and to have assisted with creating a vision for the corridor that is consistent with County's needs and the intent of the AMP program. It was important that the public feel positive about their contribution and ownership in the project that will last through subsequent phases. This was accomplished through a variety of techniques as described below:

Stakeholder Interviews

Early in the public outreach process, New Kent County and VDOT identified twelve (12) stakeholders to conduct interviews with in order to gather information relative to their relationship to the corridor, typical travel patterns along the corridor, general observations, and opinions of current and future corridor operations as well as areas of concern. These interviews were conducted with the following stakeholders from the study area:

A. Property Owners
B. Board of Supervisor Members
C. Planning Commission Members
D. Farms of New Kent
E. Economic Development Authority Chairman
F. Sheriff Personnel
G. Fire Marshall Personnel

The results of the stakeholder interviews are included in **Appendix A**.

Citizen Information Meeting #1 – November 2015

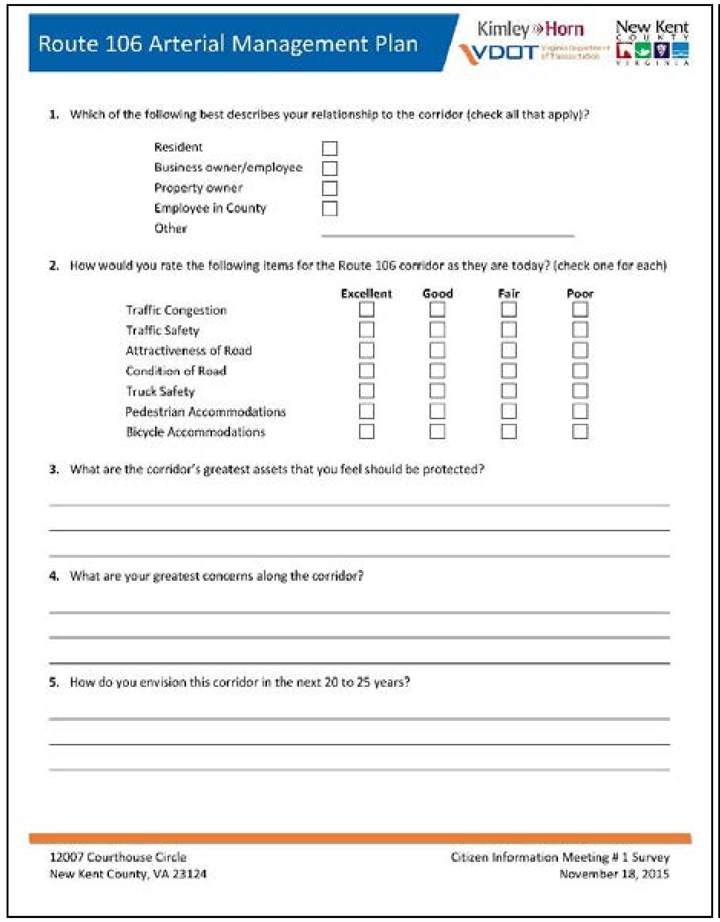
The first opportunity for public engagement occurred in the form of a Citizen Information Meeting held on November 18, 2015 from 6:00 PM to 8:00 PM at the New Kent County Administration Office Board Room located at 12007 Courthouse Circle. The purpose of this meeting was to focus on the goals and objectives of the study along with providing a summary of the existing conditions to gain public consensus. Citizens were given a 30-minute presentation about the study, informed of the intent of the meeting and the project, and participated in a questions and answers session as well as provided input on the prepared comment sheet. There were approximately 20 citizens who attended the meeting. A summary of the meeting feedback is provided in **Appendix A**.

Project Boards

Presentation

Presentation

Questions and Answers Session



Route 106 Arterial Management Plan

1. Which of the following best describes your relationship to the corridor (check all that apply)?

   - Resident ☐
   - Business owner/employee ☐
   - Property owner ☐
   - Employee in County ☐
   - Other ________

2. How would you rate the following items for the Route 106 corridor as they are today? (check one for each)

	Excellent	Good	Fair	Poor
Traffic Congestion	☐	☐	☐	☐
Traffic Safety	☐	☐	☐	☐
Attractiveness of Road	☐	☐	☐	☐
Condition of Road	☐	☐	☐	☐
Truck Safety	☐	☐	☐	☐
Pedestrian Accommodations	☐	☐	☐	☐
Bicycle Accommodations	☐	☐	☐	☐

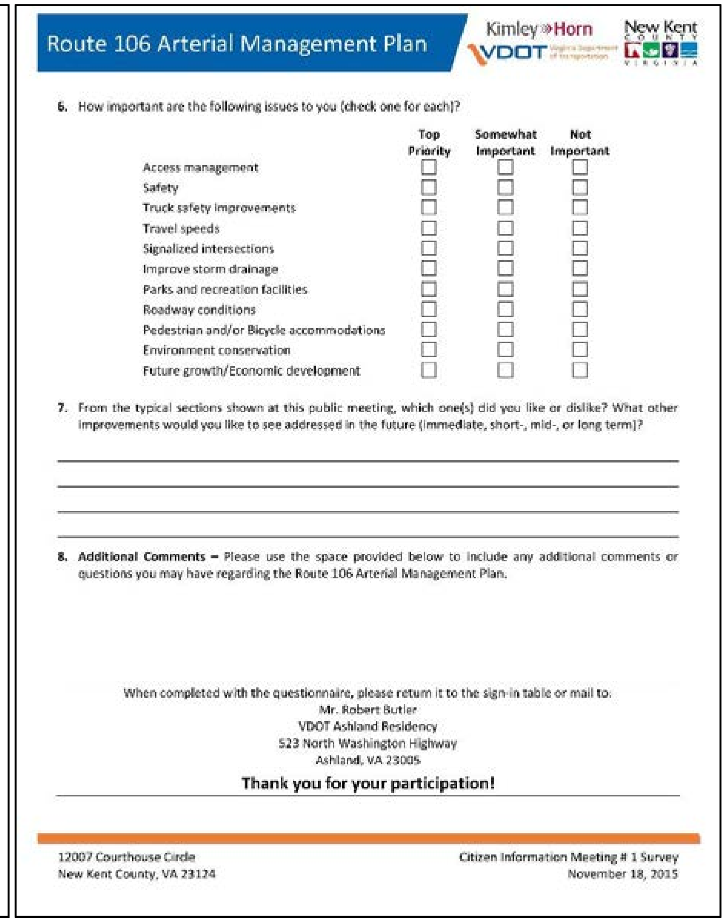
3. What are the corridor's greatest assets that you feel should be protected?

4. What are your greatest concerns along the corridor?

5. How do you envision this corridor in the next 20 to 25 years?

12007 Courthouse Circle
New Kent County, VA 23124

Citizen Information Meeting # 1 Survey
November 18, 2015



Route 106 Arterial Management Plan

6. How important are the following issues to you (check one for each)?

	Top Priority	Somewhat Important	Not Important
Access management	☐	☐	☐
Safety	☐	☐	☐
Truck safety improvements	☐	☐	☐
Travel speeds	☐	☐	☐
Signalized intersections	☐	☐	☐
Improve storm drainage	☐	☐	☐
Parks and recreation facilities	☐	☐	☐
Roadway conditions	☐	☐	☐
Pedestrian and/or Bicycle accommodations	☐	☐	☐
Environment conservation	☐	☐	☐
Future growth/Economic development	☐	☐	☐

7. From the typical sections shown at this public meeting, which one(s) did you like or dislike? What other improvements would you like to see addressed in the future (immediate, short-, mid-, or long term)?

8. **Additional Comments –** Please use the space provided below to include any additional comments or questions you may have regarding the Route 106 Arterial Management Plan.

When completed with the questionnaire, please return it to the sign-in table or mail to:
Mr. Robert Butler
VDOT Ashland Residency
523 North Washington Highway
Ashland, VA 23005

Thank you for your participation!

12007 Courthouse Circle
New Kent County, VA 23124

Citizen Information Meeting # 1 Survey
November 18, 2015

Public Comment Questionnaire (Sheets 1 and 2)

Citizen Information Meeting #2 – March 2016

The final public engagement occurred in the form of the second citizen information meeting held on March 10, 2016 from 6:00 PM to 8:00 PM at the New Kent County Visitors and Commerce Center located at 7324 Vineyards Parkway. There were 15 citizens at the meeting. This final meeting consisted of a 30-minute presentation to provide an overview of the project purpose, goals, and progress as well as preliminary improvements for the corridor.

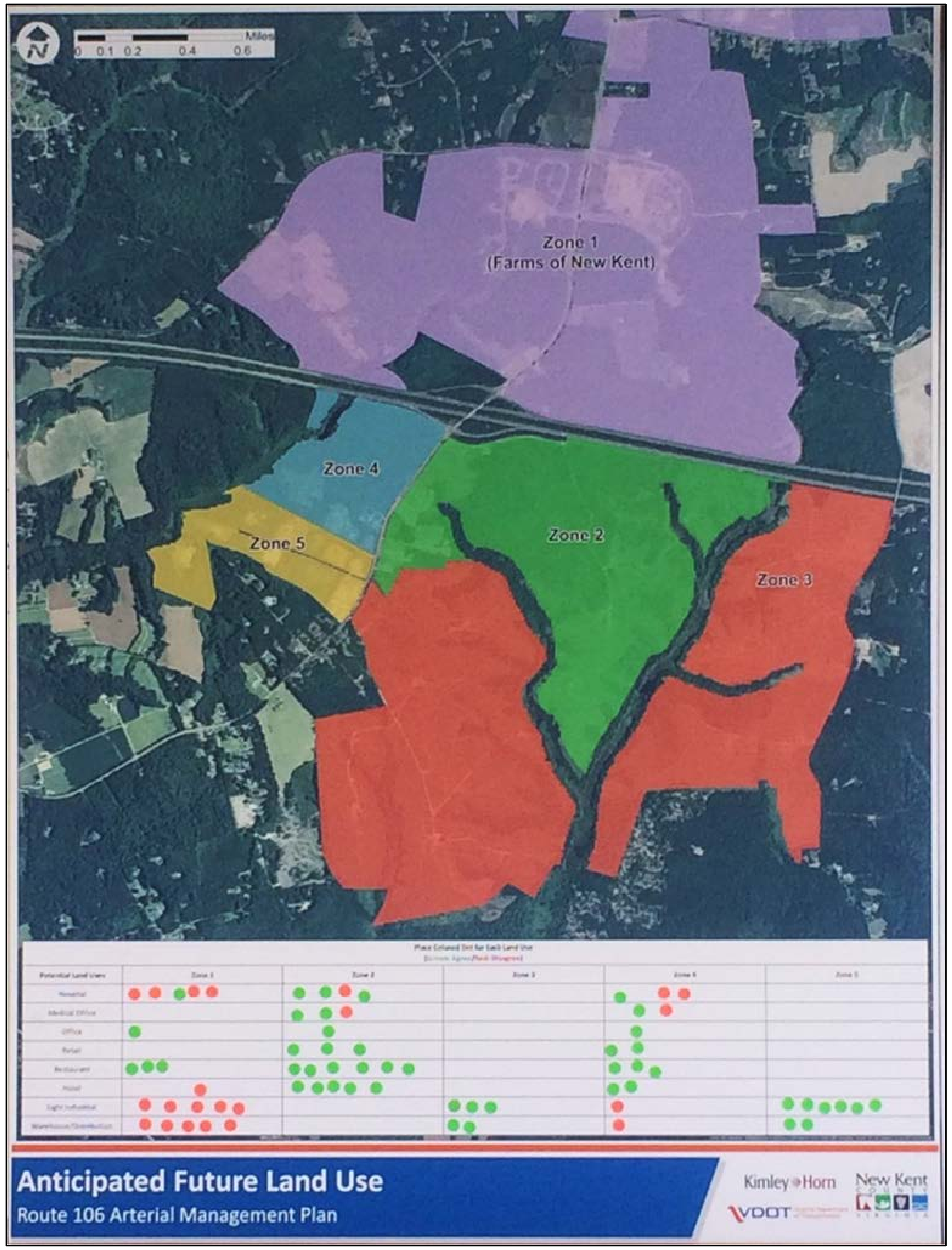
After the presentation, the public was asked to provide feedback on anticipated future land use for the study area and the preferred typical cross-sections. For the anticipated future land use, the citizens were given green (agree) and red (disagree) dots to illustrate their opinions of the suggested land uses within the study area. In addition, the citizens were asked to vote with green dots on one of the eight presented typical cross-section options in order to determine the public's preferred corridor typical cross-section. Lastly, a questionnaire was distributed to the attendees to provide any additional feedback, if necessary. Participant feedback and voting results from the meeting are provided in **Appendix A**.

Presentation

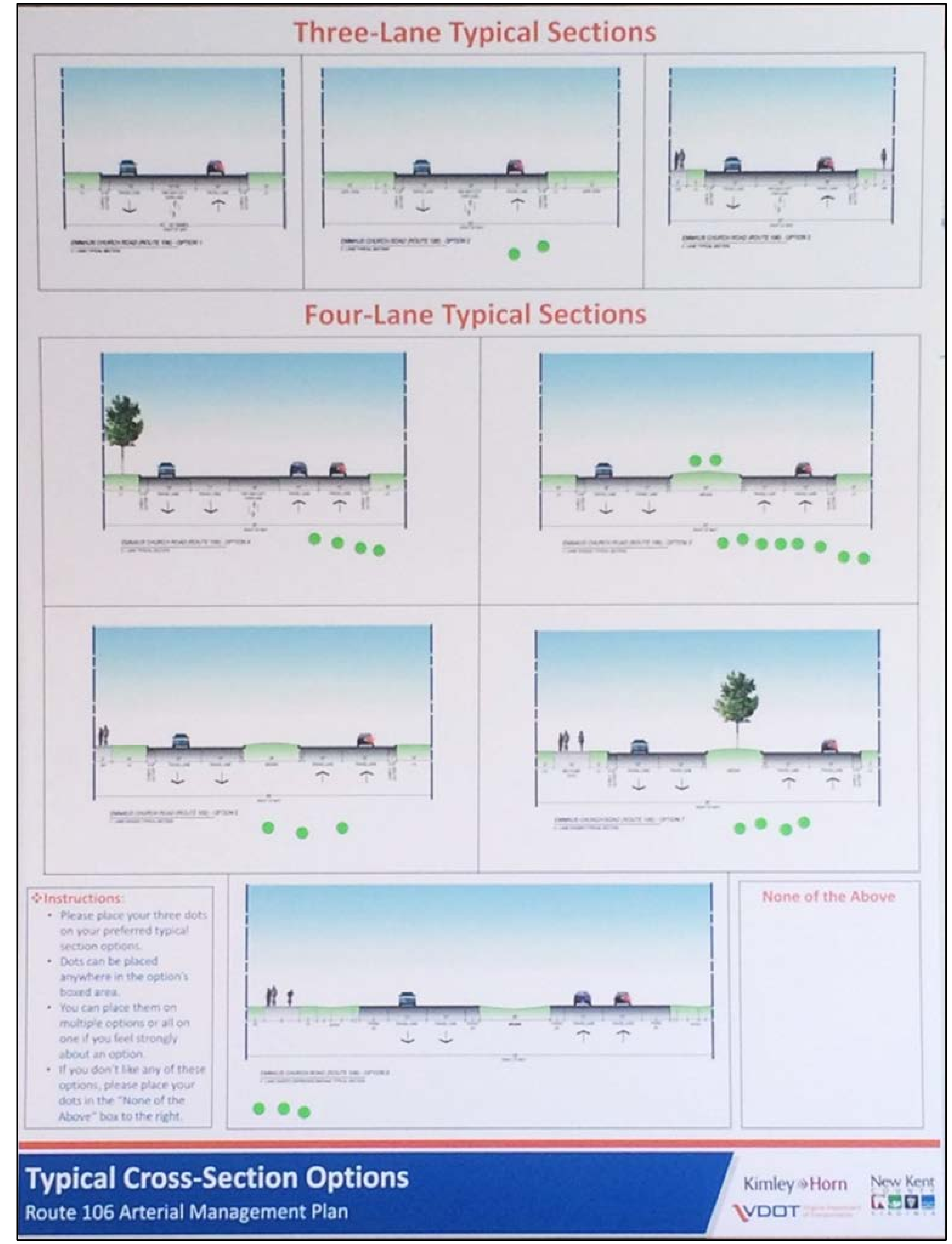
Presentation

Citizen's Voting Exercises

Questions and Answers Session



Voting Exercise #1: Anticipated Future Land Use



Voting Exercise #2: Preferred Typical Cross-Section Option

Chapter 3.0 EXISTING CONDITIONS

Section 3.1 Existing Zoning

Zoning is regulated through New Kent County ordinances and the Comprehensive Plan. Existing zoning within the corridor is shown in **Figure 2**. Per the zoning map, the Route 106 corridor primarily consists of Economic Opportunity (EO), Planned Unit Development (PUD), and Industrial (IND) zoning. In addition, the study area contains several commercial businesses (e.g., Burger King, Pilot Travel Center) interspersed with the Emmaus Baptist Church, and numerous residential properties. With the close proximity of Interstate 64 (Exit 211), most commercial developments are geared towards travelers. As previously mentioned, much of the study area is currently undeveloped. However, just north of the study area, two residential developments are under construction near the New Kent County winery. With the construction of additional residential developments, commercial and industrial developers are seeking land within the study area for future development.

Section 3.2 Existing Study Area Roadway Characteristics

Route 106 is predominantly a two-lane undivided facility classified as an urban minor arterial with a general north-south alignment. Within the study area limits along Route 106 is an interchange with two unsignalized ramp intersections as well as a roundabout to the north of Exit 211. The roundabout is featured at the northern termination point of the Route 106 study area. South of I-64 and in front of the Pilot Travel Center is a transitional segment where the roadway goes from 2-lanes to 3-lanes with an exclusive southbound left-turn and an exclusive northbound right-turn lane, allowing for access into and out of the Pilot Travel Center and Burger King sites. The speed limit along Route 106 is posted at 45 mph (miles per hour). However, at the southern portion leaving the study area heading southbound, the posted speed limit increases to 55 mph. The existing geometry and lane assignment of the study intersections along the corridor is shown in **Figure 3**.

The majority of the corridor is open/undeveloped land with utilities (i.e., power, telephone, cable) located above ground beginning immediately south of the eastbound off/on-ramp of the I-64 interchange, and located along the east side of the roadway. From field observations it appears some extent of water and sewer utility services are located along the west side of the roadway. The corridor presents some small horizontal curvature challenges to the truck driver and there is an overpass present crossing over I-64 near the northern end of the study area.

Currently, stormwater runoff from Route 106 is collected in ditches adjacent to the roadway. These ditches direct the runoff away from roadways and address stormwater treatment. It is noted that there are no designated or VDOT maintained BMPs or drainage basins along the corridor intended to collect and/or treat stormwater runoff from the roadway today.

Section 3.3 Existing Traffic Volumes

Existing traffic volumes along the corridor are determined by stationing people or automated counting equipment at selected points on Route 106 and counting the number of vehicles that pass through that point during a given timeframe. Both automated and human counters can collect data on vehicle classification to distinguish passenger cars, small trucks, and SUV's from heavy vehicles while counting volumes as well as travel speed data.

Weekday turning movement counts (TMCs) were conducted on April 21, 2015 from 5:00 AM – 9:00 AM and 3:00 PM – 7:00 PM peak periods at the following locations:

A. Route 106 at Roundabout north of I-64
B. Route 106 at I-64 Westbound Off/On-Ramps
C. Route 106 at I-64 Eastbound Off/On-Ramps
D. Route 106 at Pilot Travel Center Northern Driveway
E. Route 106 at Pilot Travel Center Southern Driveway
F. Route 106 at Halstead Lane
G. Route 106 at Business Park Road
H. Route 106 at Parrish Road

The traffic peak hours were reviewed to determine the common AM and PM peak hours of the study corridor. As shown in **Table 1**, Column A indicates the observed peak hours for study intersections, while Column B shows the corresponding volume for that hour. It was determined that 6 of the 7 intersections shared a common AM peak hour from 7:00 AM to 8:00 AM. The remaining location with a differing peak hour had at least 97% of the peak volume occurring between 7:00 AM and 8:00 AM. While 5 of the 7 intersections share a common PM peak from 4:30 PM to 5:30 PM. The remaining location with a differing peak hour had at least 99% of the peak volume occurring within the 4:30 PM to 5:30 PM time period. Peak hour factors (PHFs) were calculated by movement at the study intersections during the overall study area AM and PM peak hours; if 15-minute counts were not captured a PHF of 0.92 was assumed.

Table 1: Peak Hour Determination Table

Study Intersection	AM Peak Hour				PM Peak Hour			
	Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H
	Observed Peak Hour	Volume Observed in Column A	Volume from 7:00 – 8:00 AM	% of Column C to Column B	Observed Peak Hour	Volume Observed in Column E	Volume from 4:30 – 5:30 PM	% of Column G to Column F
Route 106 at I-64 WB Ramps	7:00-8:00	406	406	100.0%	4:45-5:45	435	433	99.5%
Route 106 at I-64 EB Ramps	7:00-8:00	544	544	100.0%	4:30-5:30	564	564	100.0%
Route 106 at Pilot Station North	7:00-8:00	467	467	100.0%	4:45-5:45	523	522	99.8%
Route 106 at Pilot Station South	7:00-8:00	376	376	100.0%	4:30-5:30	457	457	100.0%
Route 106 at Halstead Lane	7:00-8:00	289	289	100.0%	4:30-5:30	350	350	100.0%
Route 106 at Business Park Road	7:00-8:00	287	287	100.0%	4:30-5:30	341	341	100.0%
Route 106 at Parrish Road	7:15-8:15	249	242	97.2%	4:30-5:30	309	309	100.0%

Peak hour turning movement volumes reflect an equivalent directional distribution for northbound and southbound traffic along the corridor during the AM and PM peak time periods. During both AM and PM peak hours, traffic is predominately traversing to/from I-64.

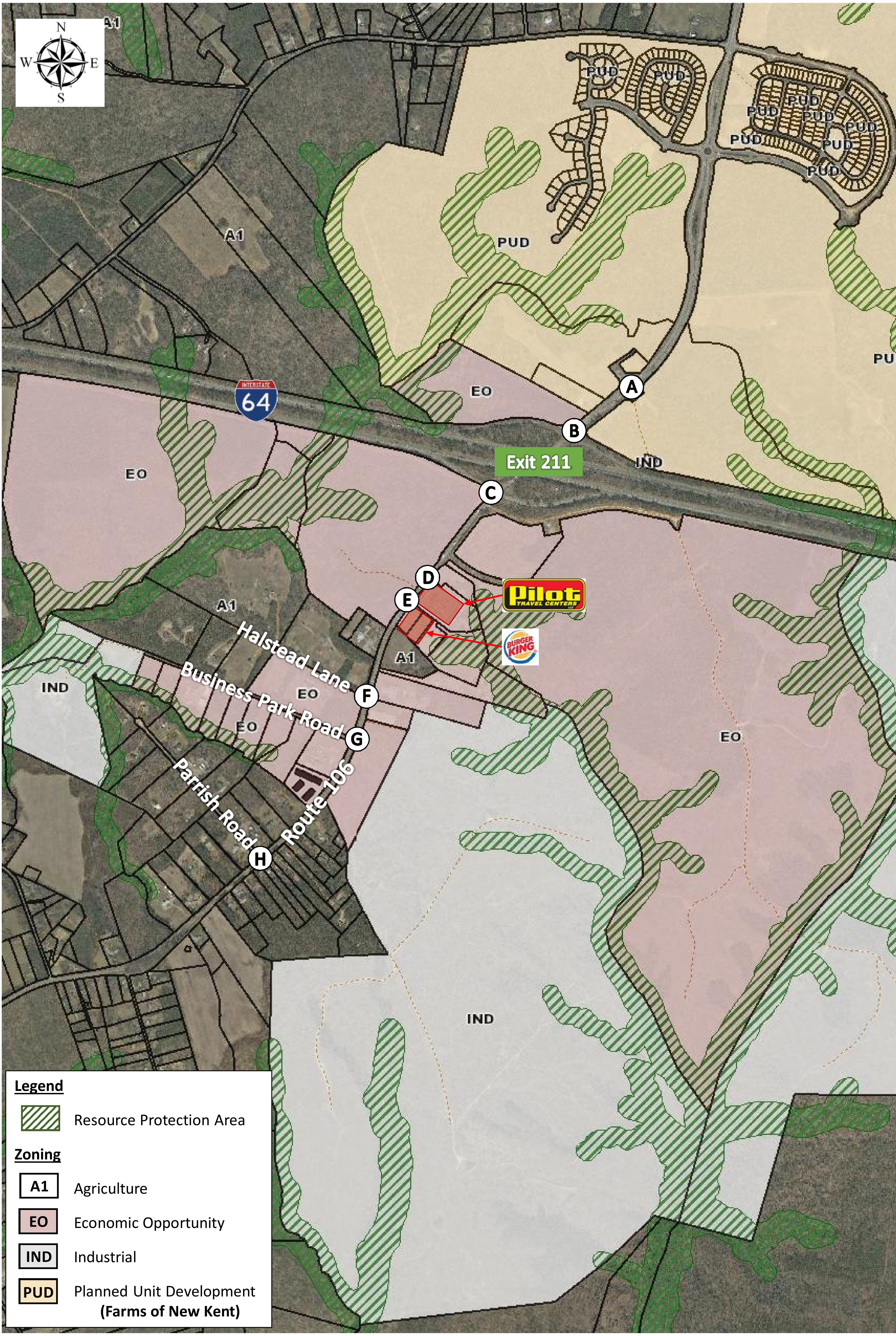
In addition to the TMCs, Average Weekday Daily Traffic (AWDT) counts were conducted for 72 continuous hours from Tuesday, April 21 through Thursday, April 23 to capture average daily traffic conditions. Speed and classification data were included as part of the AWDT data collection effort. The AWDT fluctuates from 2,800 vehicles per day (vpd) north of I-64 to approximately 6,500 vpd south of I-64, decreasing to 3,400 vpd south of the Parrish Road intersection.

Therefore, the majority of the traffic traveling along this Route 106 segment originates from I-64 with the remaining traffic defined as local or through traffic. Similar to the peak hour turning movement volumes, the directional distribution of the AWDT is equivalent for the northbound and southbound traffic. For example, just south of the I-64 interchange the direction distribution is 50.4% and 49.6% for the northbound and southbound approaches, respectively.

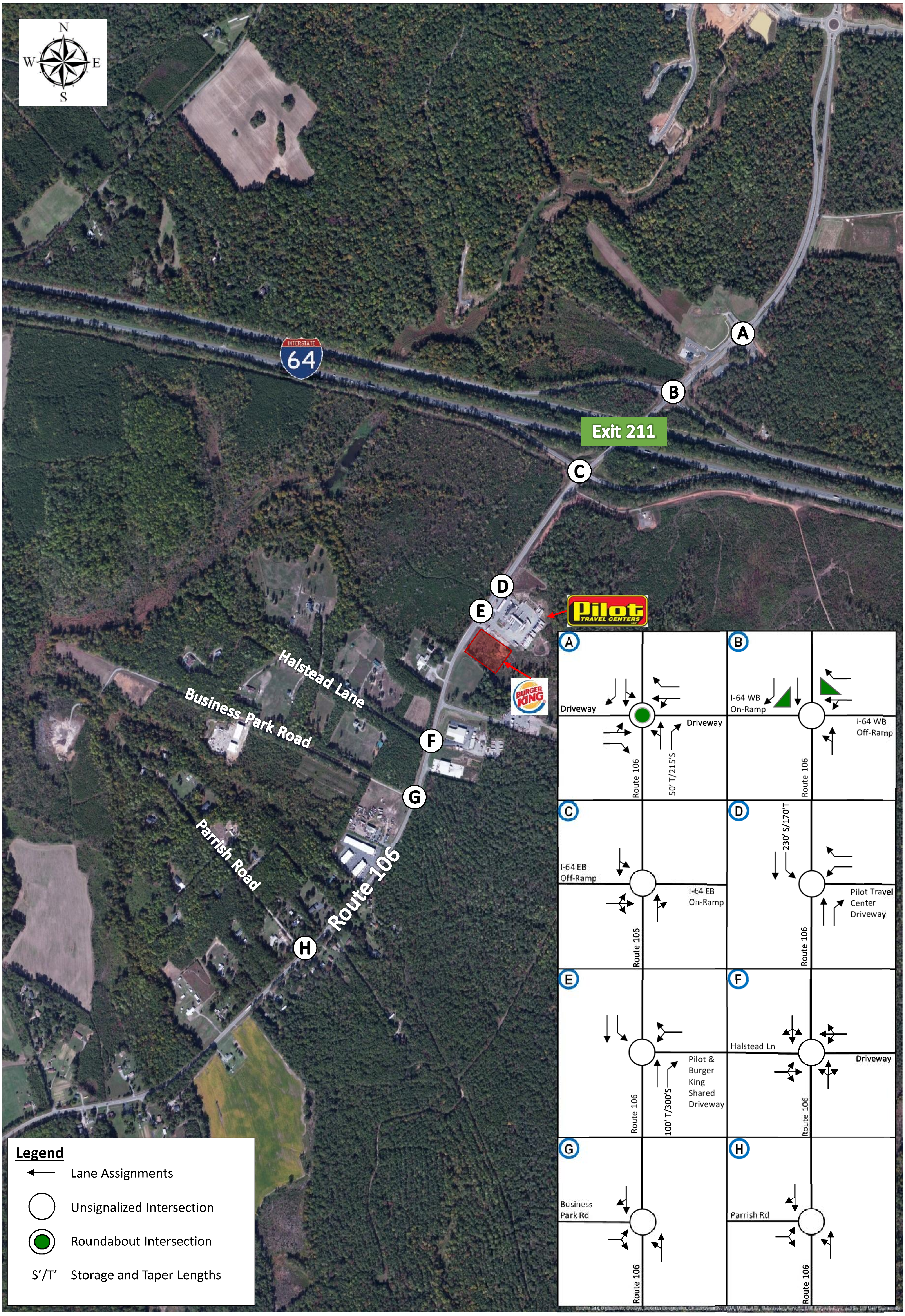
As part of the data collection, the 85th percentile travel speed was determined from the collected speed data which identifies the speed at which 85% of drivers are traveling. The majority of drivers are traveling at speeds within approximately +/- 5 mph of the posted speed limit for Route 106 from I-64 to Business Park Road. However, drivers are traveling approximately 8 mph higher than the posted speed on Route 106 south of the Business Park Road intersection where the posted speed limit transitions to 55 mph.

The last part of the data collection effort consisted of identifying the percentage of heavy vehicles from the classification data. The heavy vehicle percentage was determined by the summation of trucks for Federal Highway Administration's (FHWA's) Class 4 and above. As expected, the majority of the trucks traverse between the I-64 interchange and the Pilot Travel Center.

Figure 4 through **Figure 7** display the AM and PM peak hour turning movement counts, average weekday daily traffic (AWDT) volumes along the corridor, 85th percentile of speed, and the peak hour truck percentages, respectively. Detailed data collection information is provided in **Appendix B**.



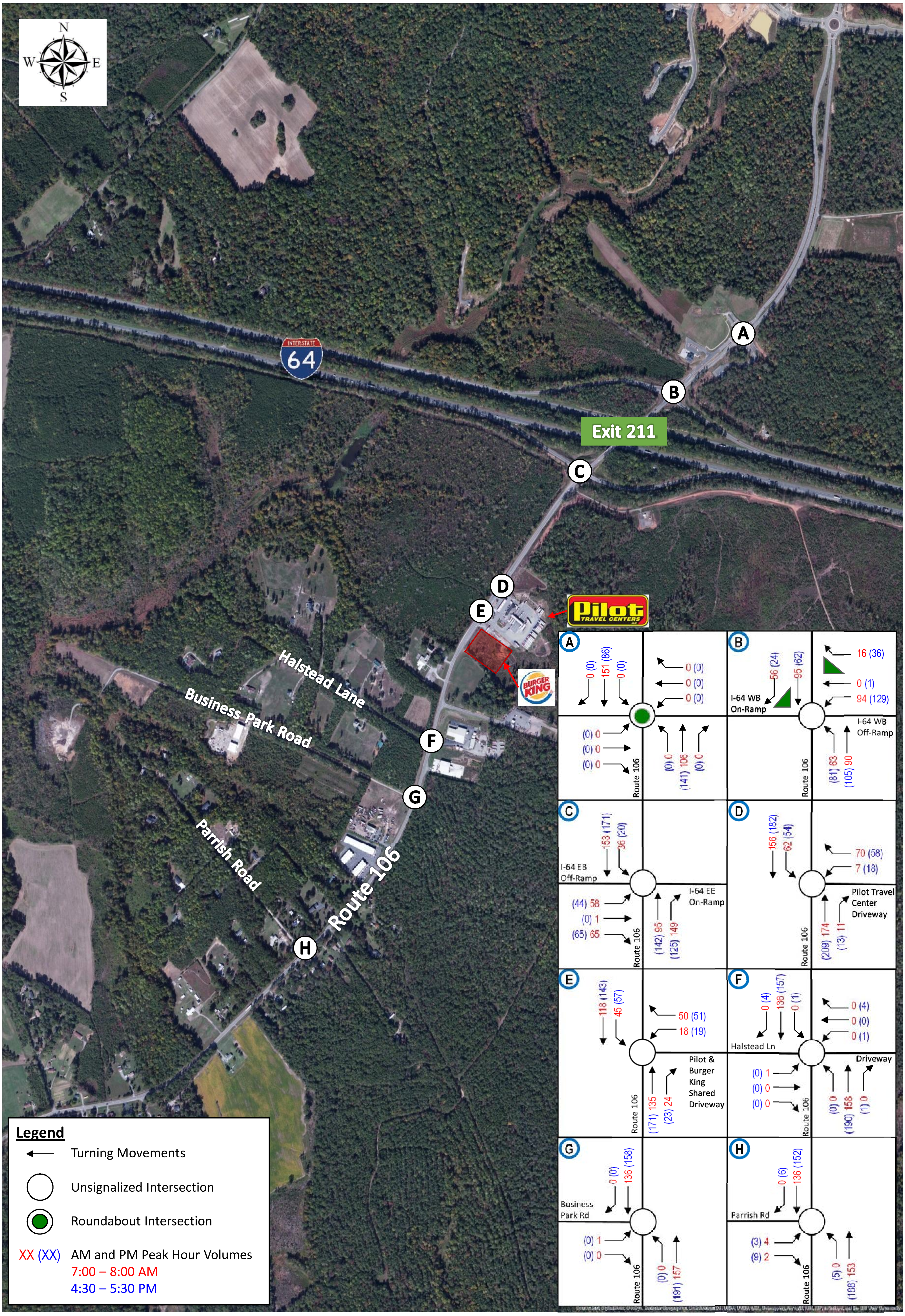
Kimley»Horn	Route 106 Arterial Management Plan New Kent County, VA	2015 Existing Zoning	Figure 2



Route 106 Arterial Management Plan
New Kent County, VA

2015 Existing Geometry and Lane Assignment

Figure 3



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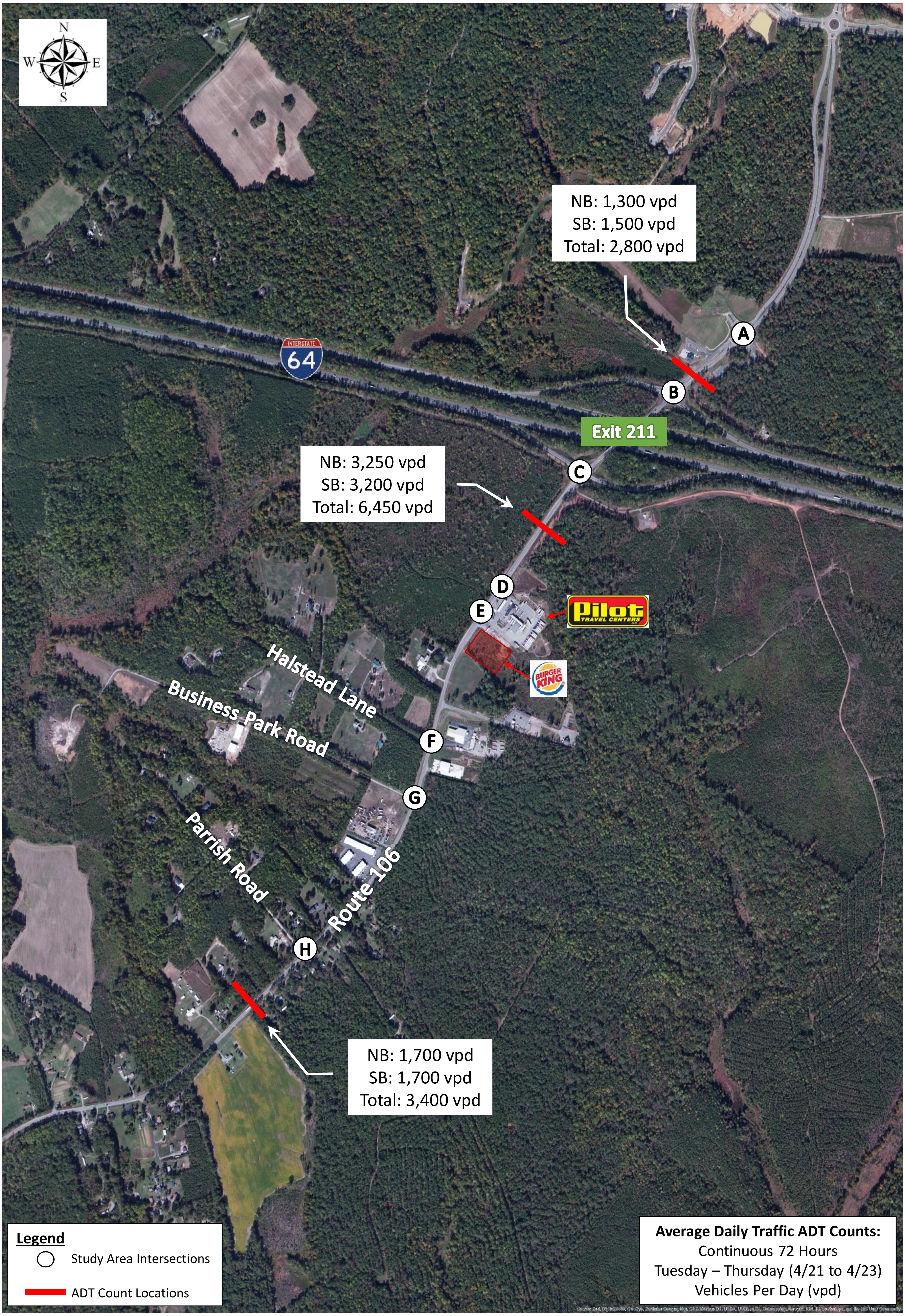
Route 106 Arterial Management Plan
New Kent County, VA

2015 Existing AM and PM Peak Hour Volumes

Figure 4



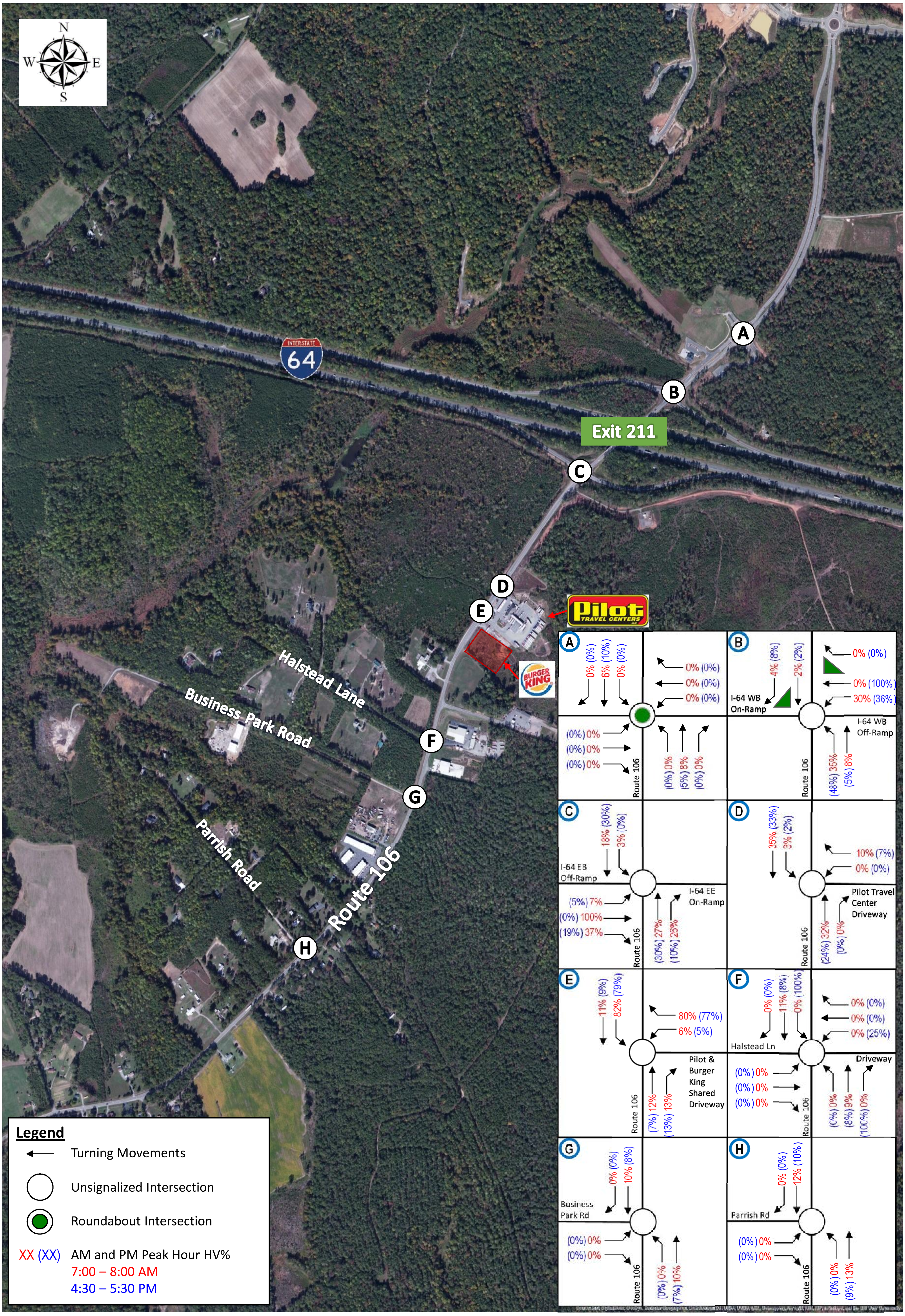
Kimley»Horn	Route 106 Arterial Management Plan New Kent County, VA	2015 Existing Average Weekday Daily Traffic (AWDT) Volumes	Figure 5

Kimley»Horn

Route 106 Arterial Management Plan
New Kent County, VA

2015 Existing
85th Percentile Speed

Figure
6



Kimley»Horn

Route 106 Arterial Management Plan
New Kent County, VA

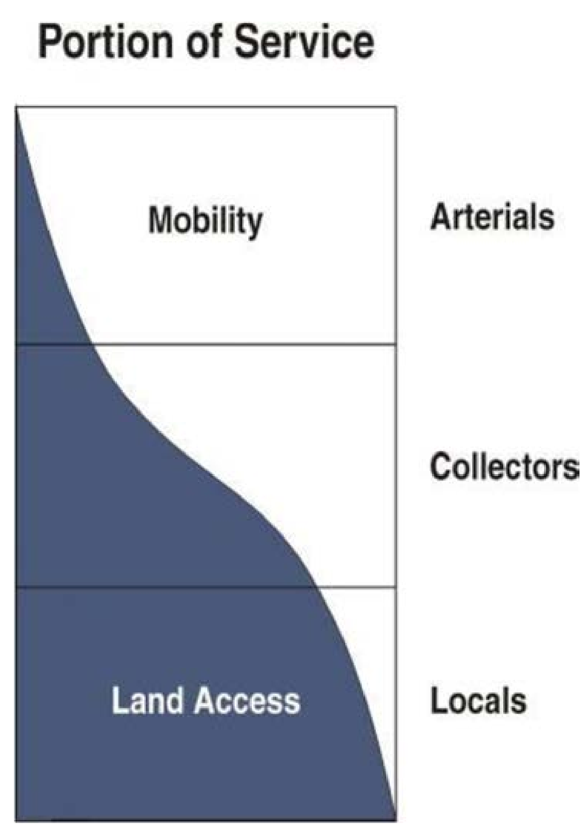
2015 Existing AM and PM Truck Percentages

Figure 7

Section 3.4 Functional Classification

The classification of streets into several "functional" categories aids in communication among policy makers, planners, engineers, and citizens for expanding the transportation system. The functional classification system groups streets according to the land use served (or to be served) and provides a general designation of the type and volume of traffic each street is intended to accommodate. The street functional classification system primarily defines the street in terms of roadway design and character, as well as operational features for the movement of vehicles.

Two major considerations for classifying arterials from neighborhood streets are land access and mobility. They are inversely proportional to one another when considering the functionality of roadway types.



The primary function of local or neighborhood streets is to provide access. These streets are intended to serve localized areas or neighborhoods, including local commercial land uses and mixed-use areas (i.e., low speeds, low volumes, and short distances). Local streets are not intended for use by through traffic.

The primary function of arterials is mobility. Limiting access points (intersections and driveways) on arterials enhances mobility. Too much mobility at high speeds limits access by pedestrians and bicyclists. The arterial is designed with the intent to carry more traffic than is generated within its corridor (i.e. higher speeds, higher volumes, through traffic, and over longer distances).

Classifying the street system in the vicinity of the study area required close examination of roles that each street performs in the overall transportation system. Existing plans, as well as quantitative and qualitative classification criteria, also helped in the development of the hierarchy of streets within the study area transportation system. The existing public street network in the study area is divided into several functional classifications, including arterials, collectors, and locals.

3.4.1 Interstates, Expressways, and Freeways

Interstates, expressways, and freeways provide the most mobility and least access (since access is only available at interchanges). Interstate and expressway/freeway facilities typically serve longer distance travel and support regional mobility.

3.4.2 Arterials

Arterials provide enhanced mobility, offer higher operating speeds (45 mph and above), provide significantly more roadway capacity, have a great degree of access control, and serve longer distance travel. Arterials can be subdivided into categories that include facilities with full access control such as freeways and expressways, as well as major and minor arterials. Arterials usually connect to one another or to collector streets. Very few arterials connect to local streets.

3.4.3 Principal Arterials

Principal arterials typically have very deliberate and controlled access points with few, if any, individual site driveways. These facilities serve medium to longer distance travel and typically connect minor arterials and collector streets to freeways and other higher classification roadway facilities.

3.4.4 Minor Arterials

Minor arterials primarily serve a mobility function but often have more closely spaced intersections, some individual site driveways, and generally lower design and posted speeds compared to other arterials. The minor arterial network primarily serves local traffic and connects to other minor arterials, principal arterials, and collector streets. Minor arterials provide a higher level of access to adjacent land uses than principal arterials and typically have lower traffic volumes.

In general, minor arterials in the study area have two-lane undivided cross sections with little or no paved shoulders and an occasional left-turn lane at intersections and major driveways. Posted speed limits range from 35 mph to 45 mph. Within this study area, Route 106 is a minor arterial.

3.4.5 Collectors

Collectors typically provide less overall mobility, operate at lower speeds (less than 35 mph), have more frequent and greater land use access flexibility, and serve shorter distance travel than arterials. Collectors provide critical connections in the roadway network by bridging the gap between arterials and locals. Thus, the majority of collector streets connect with one another, with local streets, and with non-expressway/freeway arterials.

The primary purpose of the collector street system is to collect traffic from neighborhoods and distribute it to the system of major and minor arterials throughout an area. In general, collector streets have two lanes and often have exclusive left-turn lanes at intersections with major and minor arterials and less frequently at intersections with other collector streets.

3.4.6 Locals

Local facilities provide greater access and the least amount of mobility. These facilities typically connect to one another or to collector streets and provide a high level of access to adjacent land uses/development (i.e., frequent driveways). Locals serve short distance travel and have low posted speed limits (25 mph to 35 mph).

Many of the local roads within the study area are unpaved side streets serving residential lots or undeveloped properties. Parrish Road, Business Park Road, and Halstead Lane are all classified as local roads within this study area.

Section 3.5 Field Review

A site field review was conducted on May 14, 2015 along the Route 106 corridor and at study intersections to identify and assess the following existing conditions:

- Roadway, intersection, median and access configurations, deficiencies, and issues/concerns
- Roadway and intersection geometrics and deficiencies
- Unique roadway features
- Safety-related issues/concerns
- Sight distance issues/concerns

- Pedestrian and bicycle accommodations
- Traffic operations (vehicles, trucks, pedestrians, and bicycles)
- Traffic control devices
- Rumble strips, clear zones, and shoulders
- Posted speed limits
- Observations of corridor elements:
    - Floodplain
    - Landscape enhancements within right-of-way (ROW)
    - Topography
    - Historical/Cultural sites

The subsequent sections provide a summarized description of the roadway, intersection, and safety issues/concerns observed along the corridor during the field review. Detailed field review notes are provided in **Appendix B**.

3.5.1 Intersection Inventory/Observations

Route 106 at Roundabout

- The roundabout is designed to accommodate two circulating lanes but is currently being utilized with one circulating lane *(Picture 1)*
- Truck traffic frequently utilizes this intersection due to the construction occurring north of the study area
- Multiple New Kent County designated bicycle routes travel through the roundabout

Picture 1: Route 106 at Roundabout Looking South

Route 106 at I-64 Westbound Off/On-Ramps

- Heavy truck traffic on the westbound and northbound left-turn movements
- Inadequate turn radius for the westbound left-turning trucks *(Picture 2)*
- Sight distance issues for westbound right-turning vehicles when trucks are in the shared through/left-turn lane

Picture 2: Route 106 at I-64 Westbound Off/On-Ramps Looking South

Route 106 at I-64 Eastbound Off/On-Ramps

- Poor pavement conditions on the northbound approach southbound receiving lane
- Heavy truck traffic on the northbound right-turn and eastbound right-turn movements
- Wide shoulders are located on the southwest and southeast intersection corners where vehicles are frequently parked *(Picture 3)*

Picture 3: Route 106 at I-64 Eastbound Off/On-Ramps Southwest Corner

Route 106 at Pilot Station Center North and South Driveways

- Truck entrance and exit is located at the southern driveway *(Picture 4)*
- Truck driveway is shared with Burger King traffic *(Picture 5)*
- Inadequate turn radius for westbound right-turn and southbound left-turn movements

Picture 4: Route 106 at Pilot Travel Center Southern Driveway

Picture 5: Route 106 at Pilot Travel Center Southern Driveway

Route 106 at Halstead Lane

- Halstead Lane is a gravel road

Route 106 at Business Park Road

- Business Park Road is a narrow gravel road. This road will become a public road and built to VDOT standards in the near future.

Route 106 at Parrish Road

- Parrish Road is a gravel road
- Vehicles traveling at high speeds along Route 106 as speed limit changes from 45 mph to 55 mph
- Route 106 horizontal curvature restricts sight distance of vehicles turning from Parrish Road *(Picture 6)*
- Gas line parallel to Route 106 on the east side

Picture 6: Route 106 at Parrish Road Southbound Approach

3.5.2 Bicycle and Pedestrian Observations

As previously mentioned, New Kent County bicycle routes are designated along Route 106 from Old River Road (Route 608) to Route 60 (Pocahontas Trail). However, formal or physical bicycle and pedestrian accommodations are not provided along Route 106 within the study area.

Section 3.6 Safety Analysis

In addition to the field review, a preliminary evaluation of corridor safety was conducted based on an analysis of crash summary information and field reconnaissance. Crash data analysis for Route 106 was conducted using the most currently available crash data over approximately the past three years (January 1, 2012 through April 30, 2015). These crash data were obtained from VDOT's Roadway Network System (RNS). Only partial crash data was provided for 2015 due to the continued effort by VDOT to verify the remaining crash data for 2015 (May through December). Crash data was collected and compiled for the study area along Route 106 between the roundabout to the north and Parrish Road to the south as well as along I-64 in the interchange influence area (0.75 miles east and west of interchange ramps). During this period, a total of 57 crashes occurred within the study area. **Figures 8** and **9** illustrate the approximate crash locations as well as the collision type and crash severity, respectively.

A summary of crashes by corridor and year is provided in **Table 2**. A majority of the crashes occurred on the I-64 mainline adjacent to Route 106. The highest number of crashes throughout the analysis period were experienced in 2012, with a total of 24.

Table 2: Crash Summary of Study Corridors

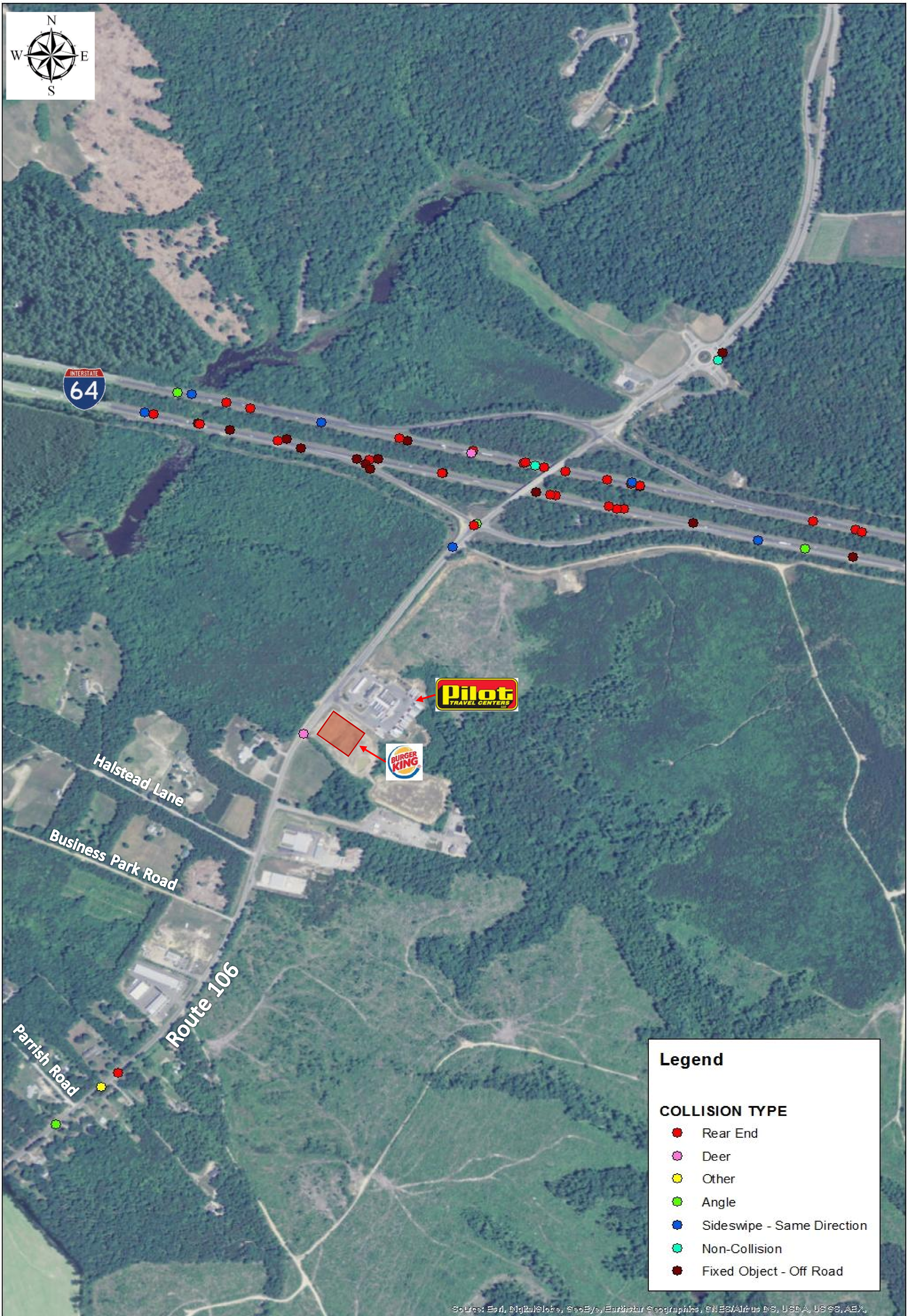
Study Corridor	Number of Crashes				
	2012	2013	2014	2015	Total
Route 106	5	2	1	0	8
Interstate 64	19	12	13	5	49
Total	**24**	**14**	**14**	**5**	**57**

Table 3 summarizes a breakdown of crash severity (i.e., proportion of crashes involving a fatality, injury, or property damage only [PDO]). The majority of crashes on both Route 106 and I-64 resulted in property damage only. Approximately a quarter of the total study area crashes resulted in at least one injury. In addition, nine of the total crashes (16%) involved heavy vehicles. There was one fatal crash on I-64 within the study area during this period.

Table 3: Crash Severity of Study Corridors

Study Corridor	Number of Crashes (Percentage)			
	PDO	Injury	Fatality	Total
Route 106	5 (9%)	3 (5%)	0 (0%)	8
Interstate 64	37 (65%)	11 (19%)	1 (2%)	49
Total	**42 (74%)**	**14 (24%)**	**1 (2%)**	**57**

A summary of the crash types on Route 106 and I-64 are illustrated in **Figure 10** and **Figure 11,** respectively. The majority of the crashes on Route 106 were angle (25%) crashes. The majority of crashes on I-64 were rear-end (55%) and fixed object – off road (25%).



Kimley»Horn

Route 106 Arterial Management Plan
New Kent County, VA

2012 – 2015
Crash Type

Figure
8

Kimley»Horn	Route 106 Arterial Management Plan New Kent County, VA	2012 – 2015 Crash Severity	Figure 9

Figure 10: Route 106 Crash Type

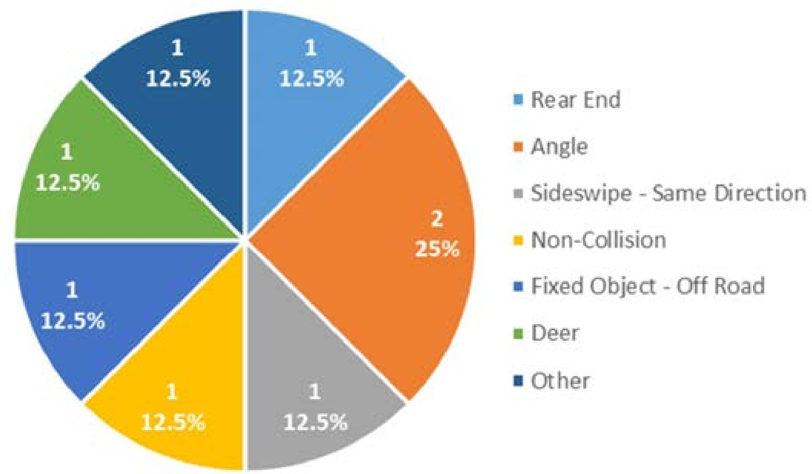


Figure 11: Interstate 64 Crash Type

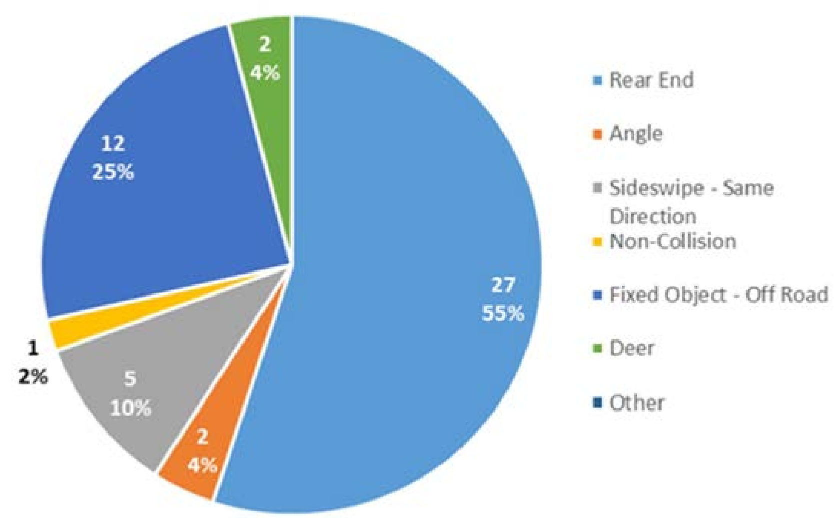


Table 4: Corridor Crash Rates

Crash Severity	Number of Crashes	Crash Rate^ Study Corridor (2012 - 2015)		Crash Rate^ Statewide Average (2013)
Route 106				
Injury	3	25.49	<	67.20
Total	8	67.96	<	123.21
I-64				
Fatality	1	0.87	>	0.57
Injury	11	9.57	<	19.68
Total	49	42.62	<	46.23

^Crash Rates = Crashes per 100 Million Vehicle-Miles Traveled

Crash rates were computed for the study corridors for the three-year study period as shown in **Table 4.** Crash rates are based on the number of crashes on the specified section, the average annual daily traffic (AADT) on the roadway, the time period of analysis, and the length of the section. **Table 4** provides a comparison of the overall crash rate, injury crash rate, and fatal crash rate for each study corridor (i.e., Route 106 and I-64) to the latest available (2013) average statewide crash rates for two-lane undivided roadways (Route 106) and rural interstate facilities (I-64) as provided by VDOT. All crash rates are expressed in terms of crashes per 100 million vehicle-miles traveled (MVMT). All crash rates for both corridors are lower than the 2013 statewide average with the exception of the fatality crashes located on I-64 during the analysis period.

Section 3.7 Review of Existing Access Management

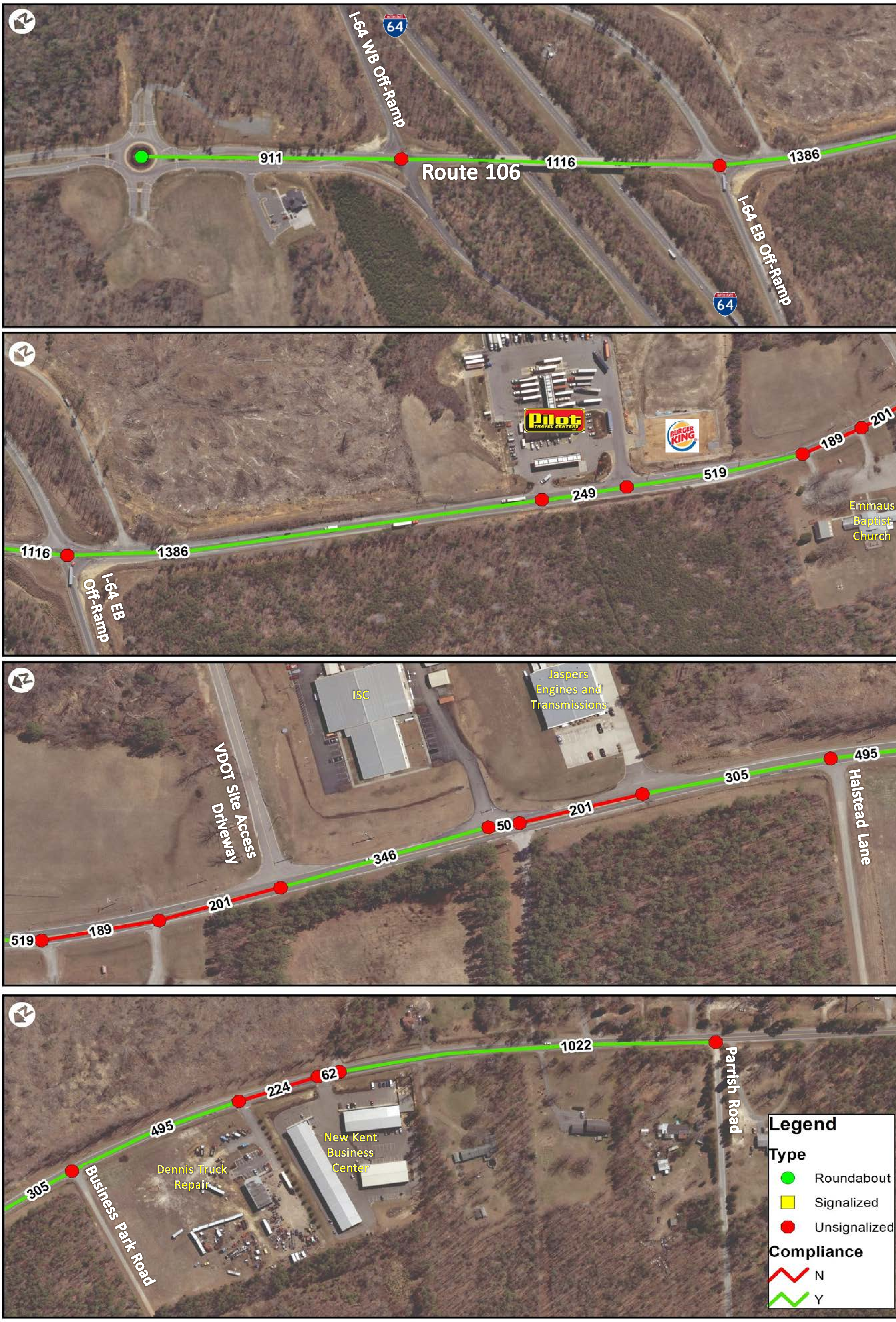
An evaluation of the existing driveway and access points along Route 106 within the study area was completed to assess compliance with VDOT minimum standards for commercial entrances, intersections, and median crossovers. According to VDOT, Route 106 is classified as a Minor Arterial. From the *VDOT Roadway Design Manual, Appendix F*, **Table 5** provides a summary of the minimum spacing requirements for a posted speed limit of 45 mph along various classifications of roadways.

Figure 12 provides an illustrative overview of the existing spacing between driveways, entrances, median crossovers, and intersections. A measurement was considered not applicable when measuring the spacing relative to a private residential driveway. Spacing standards are largely satisfied based on the Route 106 existing roadway classification as a minor arterial. Overall, six of the 15 locations were identified as not meeting the required spacing between driveways, entrances, median crossovers, and intersections.

Table 5: VDOT Access Management Spacing

Highway Functional Classification	Centerline to Centerline Spacing (Feet) to Centerline Spacing (Feet)			
	Spacing between Signalized Intersections	Spacing between Unsignalized Intersections and Full/Directional Median Crossovers and Other Intersections or Median Crossovers	Spacing between Full Access Entrances and Other Full Access Entrances, Intersections, or Median Crossovers	Spacing between Partial Access Entrances (One or Two-Way) and Other Entrances, Intersections, or Median Crossovers
Principal Arterial	1,320	1,050	565	305
Minor Arterial	**1,050**	**660**	**470**	**250**
Collector	660	440	335	250

Source: VDOT Roadway Design Manual, Appendix F (Table 2-2)



Kimley»Horn	Route 106 Arterial Management Plan New Kent County, VA	2015 Existing Access Management Spacing	Figure 12

Section 3.8 Congested Corridors Level of Service

Congested corridors result from several factors. One primary cause is bottlenecks at intersections along the corridor. Aside from individual bottleneck locations, congestion frequently results from too many people trying to use a route that is already nearing, at, or over-capacity. In these situations, it is also assumed that motorists do not have the option of an alternative route or corridor.

Level of Service (LOS) places roadways into six letter grade levels of the quality of service to a typical traveler on a facility. An "A" describes the highest level (least congestion) and level "F" describes the lowest level (most congestion). The Levels of Service (and volume to capacity (V/C) ratios) are grouped into one of the following categories.

- **LOS A or B** — Well Below Capacity (V/C = less than 0.75) — Roadways operating with a V/C ratios less than 0.75 operate at optimal efficiency with no congestion during peak travel periods.
- **LOS C** — Approaching Capacity (V/C = 0.75 to 1.0) — Roadways with a V/C less than 0.8 typically operate with efficiency. As the V/C nears 1.0, the roadway becomes more congested. A roadway approaching capacity may operate effectively during non-peak hours, but may be congested during morning and evening peak travel periods.
- **LOS D** — At Capacity (V/C = 1.0 to 1.1) — Roadways operating at capacity are somewhat congested during non-peak periods, with congestion building during peak periods. A change in capacity due to incidents impacts the travel flow on corridors operating within this V/C range.
- **LOS E** — Slightly Over Capacity (V/C = 1.1 to 1.3) — Roadways operating with V/C ratios between 1.1 and 1.3 experience heavy congestion during peak periods and moderate congestion during non-peak periods. Changes in capacity can have major impacts on corridors and may create gridlock conditions.
- **LOS F** — Well Over Capacity (V/C = greater than 1.3) — Roadways in this category represent the most congested corridors in the study area. These roadways are congested during non-peak hours and most likely operate in stop-and-go gridlock conditions during the morning and evening peak travel periods.

Section 3.9 Level of Service (LOS)

Through methodology outlined by the Transportation Research Board's Highway Capacity Manual (HCM), turning movement and ADT counts were used in conjunction with *Synchro Professional 9.0* to determine existing levels of service at all signalized intersections and most unsignalized intersections. Level of service (LOS) describes the quality of the driving experience using six levels designated A through F. Each LOS is defined by a range of quantitative measurements appropriate to the described facility, such as the density and speed of traffic for a highway LOS or the number of vehicles stopped and average stop duration for a traffic signal LOS.

3.9.1 Intersection LOS Analysis

Capacity analyses for signalized and unsignalized intersections in the weekday AM and PM peak hours were performed using Synchro Professional 9.0. This software uses methodologies contained in the *2000 Highway Capacity Manual (HCM)*. The ranges of delay for each intersection LOS are shown in **Table 6**.

Table 6: Unsignalized and Signalized Intersection HCM LOS Criteria

Level of Service (LOS)	Intersection Delay per Vehicle (s)	
	Unsignalized	Signalized
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

Source: Highway Capacity Manual 2000

According to the VDOT Traffic Operations and Safety Manual *(TOSAM)*, *SIDRA Intersection 6.0* is required for analysis of roundabout operations using the SIDRA Standard model. Similar to Synchro, the SIDRA Intersection software uses methodologies contained within the HCM as well as the ranges in delay as outlined in **Table 6**. Lastly, SIDRA LOS output results are the same as the signalized intersection methodology per the TOSAM.

Intersection turning movement counts (TMC) were used in conjunction with existing geometric data to determine existing levels of service. For intersections, LOS is based on the average delay experienced by all traffic using the intersection during the busiest 15-minute peak period. LOS A through D is considered acceptable. Existing intersection LOS results are reported in **Table 7** through **Table 14** for the unsignalized intersections within the study area. **Figure 13** graphically illustrates the 2015 existing LOS analysis results. Detailed LOS analysis reports are provided in **Appendix C**.

Table 7: Route 106 at Roundabout Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)			
		Eastbound	Westbound	Northbound	Southbound
		LT/TH/RT	LT/TH/RT	LT/TH/RT	LT/TH/RT
AM Peak Hour					
2015 Existing	A (4.2)	A (6.6)	A (6.4)	A (4.2)	A (4.1)
PM Peak Hour					
2015 Existing	A (4.2)	A (6.4)	A (6.6)	A (4.1)	A (4.2)
Source: Kimley-Horn and Associates, Inc.					

Table 8: Route 106 at I-64 WB Off/On-Ramps Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)		
		Westbound	Northbound	Southbound
		LT/TH/RT	LT/TH	TH/RT
AM Peak Hour				
2015 Existing	A (5.1)	B (14.2)	A (3.6)	A (0.0)
PM Peak Hour				
2015 Existing	A (6.7)	C (15.1)	A (3.8)	A (0.0)
Source: Kimley-Horn and Associates, Inc.				
Note: Worst Control Delay is provided under each approach				

Table 9: Route 106 at I-64 EB Off/On-Ramps Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)		
		Eastbound	Northbound	Southbound
		LT/TH/RT	TH/RT	LT/TH
AM Peak Hour				
2015 Existing	A (3.5)	B (12.2)	A (0.0)	A (1.7)
PM Peak Hour				
2015 Existing	A (2.9)	B (12.4)	A (0.0)	A (1.0)
Source: Kimley-Horn and Associates, Inc.				
Note: Worst Control Delay is provided under each approach				

Table 10: Route 106 at Pilot Travel Center (North) Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)		
		Westbound	Northbound	Southbound
		LT/RT	TH/RT	LT/TH
AM Peak Hour				
2015 Existing	A (2.8)	B (12.3)	A (0.0)	A (7.8)
PM Peak Hour				
2015 Existing	A (3.1)	B (14.0)	A (0.0)	A (8.0)
Source: Kimley-Horn and Associates, Inc.				
Note: Worst Control Delay is provided under each approach				

Table 11: Route 106 at Pilot Travel Center (South) Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)		
		Westbound	Northbound	Southbound
		LT/RT	TH/RT	LT/TH
AM Peak Hour				
2015 Existing	A (2.9)	B (11.1)	A (0.0)	A (8.8)
PM Peak Hour				
2015 Existing	A (2.9)	B (12.0)	A (0.0)	A (9.0)
Source: Kimley-Horn and Associates, Inc.				
Note: Worst Control Delay is provided under each approach				

Table 12: Route 106 at Halstead Lane Unsignalized Intersection LOS

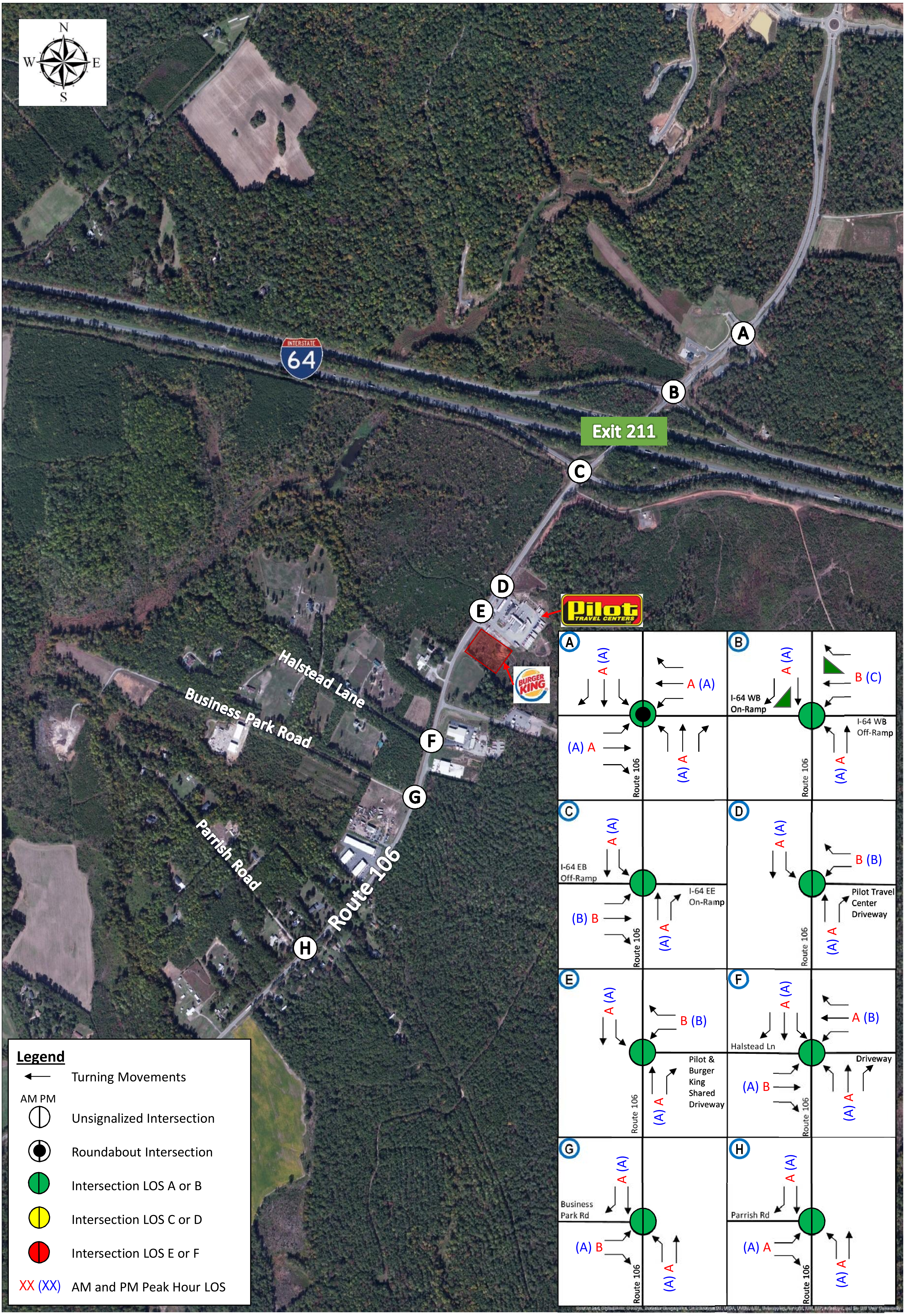
Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)			
		Eastbound	Westbound	Northbound	Southbound
		LT/TH/RT	LT/TH/RT	LT/TH/RT	LT/TH/RT
AM Peak Hour					
2015 Existing	A (0.1)	B (11.0)	A (0.0)	A (0.0)	A (0.0)
PM Peak Hour					
2015 Existing	A (0.2)	A (0.0)	B (10.5)	A (0.0)	A (0.1)
Source: Kimley-Horn and Associates, Inc.					
Note: Worst Control Delay is provided under each approach					

Table 13: Route 106 at Business Park Road Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)		
		Eastbound	Northbound	Southbound
		LT/RT	LT/TH	TH/RT
AM Peak Hour				
2015 Existing	A (0.1)	B (10.6)	A (0.0)	A (0.0)
PM Peak Hour				
2015 Existing	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Source: Kimley-Horn and Associates, Inc.				
Note: Worst Control Delay is provided under each approach				

Table 14: Route 106 at Parrish Road Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)		
		Eastbound	Northbound	Southbound
		LT/RT	LT/TH	TH/RT
AM Peak Hour				
2015 Existing	A (0.4)	A (10.0)	A (0.0)	A (0.0)
PM Peak Hour				
2015 Existing	A (0.7)	A (10.0)	A (0.2)	A (0.0)
Source: Kimley-Horn and Associates, Inc.				
Note: Worst Control Delay is provided under each approach				



Kimley»Horn

Route 106 Arterial Management Plan
New Kent County, VA

2015 Existing AM and PM LOS Analysis

Figure 13

Chapter 4.0 FUTURE (2040) TRAFFIC VOLUME PROJECTIONS

In order to understand future traffic conditions along the study area corridors, traffic volumes were forecasted for the future (2040) year analysis. The following sections describe the methodology for developing growth rates and projected future traffic volumes.

Section 4.1 Development of Growth Rates

To establish future (2040) traffic volume projections within the study area, annualized background growth rates were established for Route 106 using the following resources:

- Historical VDOT Annual Average Daily Traffic (AADT) volume estimates
- Data obtained from the 2008 Base Year and 2035 Horizon Year Richmond/Tri-Cities Regional Travel Demand Model
- New Kent County Traffic Analysis Zone (TAZ) socioeconomic data

4.1.1 Historical VDOT Annual Average Traffic Volume Estimates

Based on historical data from VDOT's daily traffic volume estimates, annual growth rates were calculated for Route 106. AADT volumes were compiled from 2005 through 2014 for Route 106 between U.S. Route 60 (Pocahontas Trail) to New Kent Highway (State Route 249) to identify historical traffic volume trends within the study area. **Table 15** displays the calculated annual growth rates for Route 106 based on the VDOT historical traffic data.

Table 15: Vehicle Historical Annual Average Growth Rate

Roadway	Segment	Annual Growth Rate			
		2005 to 2008	2008 to 2011	2011 to 2014	2005 to 2014
Route 106	U.S. Route 60 (Pocahontas Trail) to I-64	1.3%	1.2%	2.4%	1.7%
	I-64 to SR 249 (New Kent Hwy)	1.9%	3.5%	3.2%	3.1%

4.1.2 Richmond/Tri-Cities Regional Travel Demand Model

Projected daily volumes from the 2008 base year and 2035 horizon year of the Richmond/Tri-Cities Regional Travel Demand Model were reviewed. The future volumes were taken from multiple model links that comprise the roadways within the study area. Due to the level of the variations in the 2008 base year model assignment compared to the 2008 VDOT traffic count data, the model assignment data was post-processed using a common factor to determine an adjusted future ADT based on the count data. **Table 16** shows the compared model links, the average percentage change, and the adjusted average percent change along select corridor segments.

Table 16: Travel Demand Model Traffic Projections

Roadway	From	To	Average Percent Change	Adjusted Percent Change
Route 106	Parrish Road	I-64	10%	2%
	I-64	Roundabout	6%	2%

4.1.3 Socioeconomic Data

In addition to the historical volume data and future projection model volumes, socioeconomic data (population, households, and employment) for the study area transportation analysis zones was obtained from the Richmond/Tri-Cities Travel Demand Model. Data was provided for the 2008 base year and the 2035 horizon year. The study area is currently located within the boundaries of the following New Kent County TAZ's: 1805, 1806, 1810, and 1811 as shown in **Figure 14**. From these TAZ's, the raw change and annual growth rates between 2008 and 2035 were calculated for each type of socioeconomic data (population, households, employment) to determine the projected future traffic volumes as shown in **Table 17**.

Table 17: New Kent County Traffic Analysis Zone Socioeconomic Data

TAZ	Area	Population		Residential Households		Total Employment	
		Raw Change	Annual Growth Rate	Raw Change	Annual Growth Rate	Raw Change	Annual Growth Rate
1805	North of I-64;West of 106	2,011	4.5%	857	4.5%	46	0.9%
1806	North of I-64; East of 106	1,171	10.0%	487	9.3%	282	12.7%
1810	South of I-64; West of 106	36	0.1%	17	0.1%	74	3.9%
1811	South of I-64; East of 106	541	2.6%	223	2.4%	90	3.8%
Total		3,759	**3.3%**	1,584	**3.2%**	492	**4.3%**

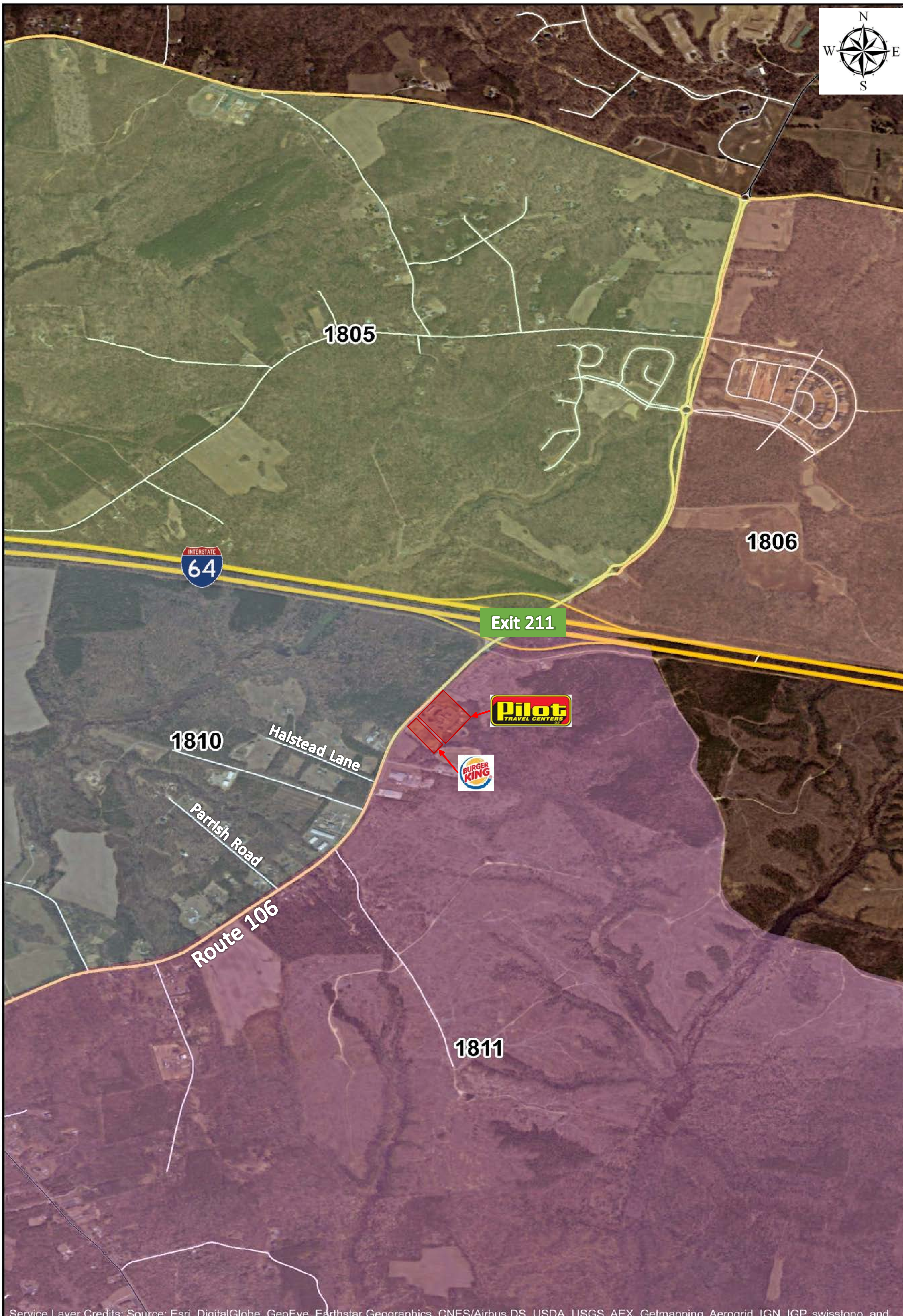
4.1.4 Annualized Background Growth Rates

In review of the historical traffic volumes, projected growth estimated from the regional TDM, and projected changes in socioeconomic data, the growth rates in **Figure 15** were recommended for use in developing future traffic volume projections for the study corridor: 2% north of I-64 and 1% south of I-64. Background (2040) traffic volumes were developed by applying the growth rates to existing volumes, projected in a linear manner, from the existing base year of 2015 to the future year of 2040. This approach is based on the assumption that the rates developed as part of the study take into account not only the growth captured and reflected in the TDM but also the daily trips associated with the identified approved development. This same methodology also was used to obtain 2040 peak hour traffic volumes.

Section 4.2 Projected Future (2040) Build Traffic Volumes

In addition to the annualized background growth rates applied to Route 106, future (2040) build traffic volumes were developed. These volumes consist of the background traffic growth plus the build-out future development within the study area. The following resources were used in development of the future build traffic projections:

- Approved Development
- Future Land Use and Development



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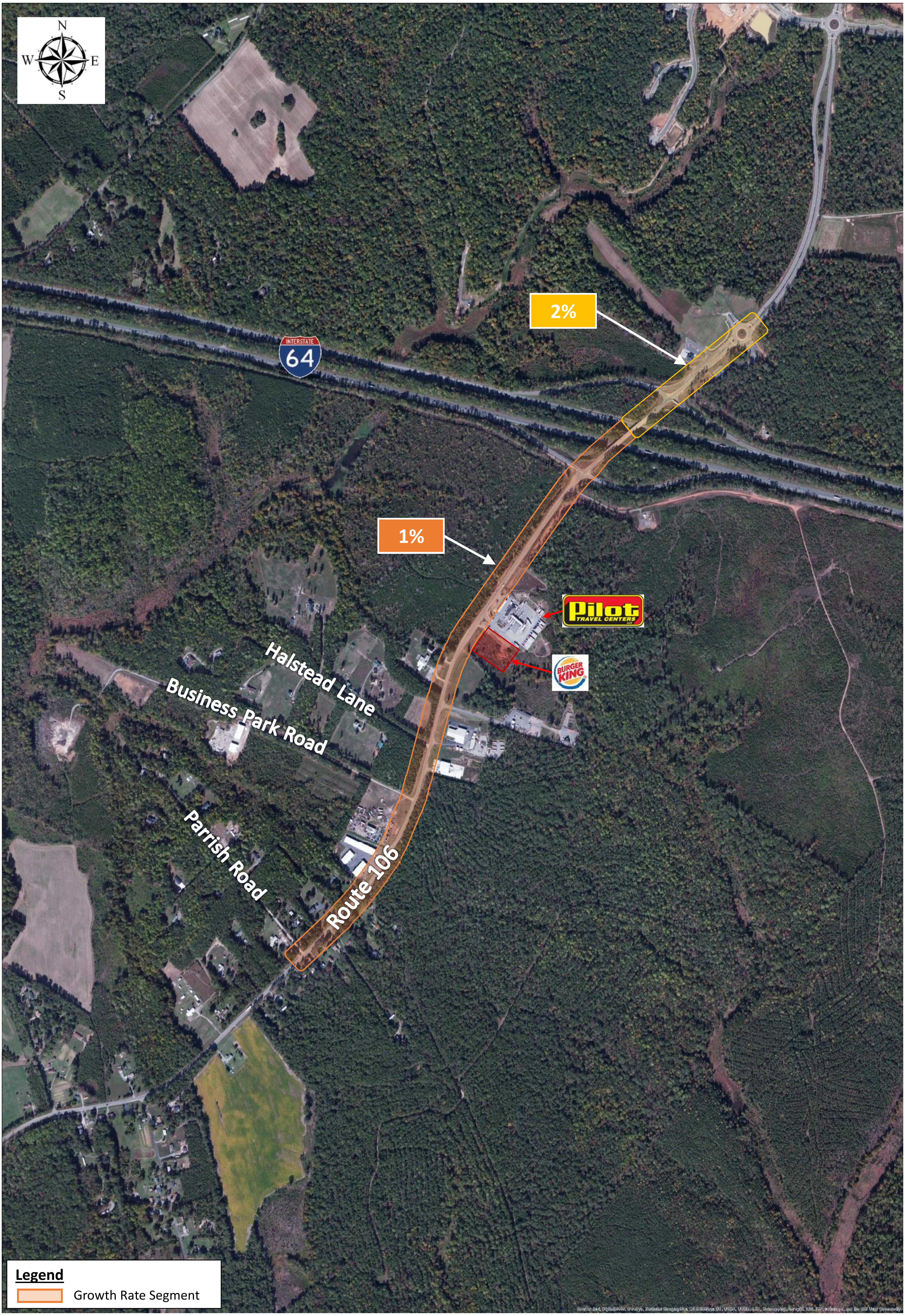
Route 106 Arterial Management Plan
New Kent County, VA

Richmond/Tri-Cities Regional Travel Demand Model Traffic Analysis Zones

Figure 14



Kimley»Horn	Route 106 Arterial Management Plan New Kent County, VA	Study Area Annualized Growth Rates	Figure 15

4.2.1 Approved Development

Table 18 summarizes the only approved development, identified during discussions with the New Kent County and VDOT staff, within the general study area. This development, Love's Travel Stop and Country Store, will be located within the study area along the west side of Route 106, approximately 1,500 feet south of the I-64 Exit 211 interchange and across from the existing Pilot Travel Center. The annual growth rate from the traffic impact analysis conducted in support of this development was 2% and was referenced as part of this analysis for consistency. Build-out of this development is anticipated by 2021 and is projected to generate new daily trips of approximately 4,400 vehicles per day on Route 106. **Figure 16** displays the latest site plan for the Love's Travel Stop and Country Store. Access to this development will be provided by the study area intersection of Route 106 and Pilot Travel Center Southern Site Access Driveway.

Table 18: Approved Development

Development	Annual Growth Rate from TIA	Proposed Land Use and Units	Projected New Daily Trips (vehicles/day)
Love's Travel Stop and Country Store	2%	▪ Convenience Market – 7,268 Square Feet ▪ Truck Fueling Stations – 8 Stations ▪ Automobile Fueling Stations – 14 Stations ▪ Fast Food Restaurant – 2,527 Square Feet	4,400

4.2.2 Future Land Use and Development

A future land use and development plan was developed and vetted with New Kent County and VDOT for input on the type, density, and location of future development anticipated by the horizon year of 2040. The study area was segmented into five (5) development zones, as shown in **Figure 17**, based on land use and assumptions regarding the following factors that were determined in coordination with New Kent County:

- **Land use** – referenced future land use plan and input gained from the stakeholder interviews to make assumptions as to type of land use per zone
- **Mixed-Use** – for zones assumed to develop as mixed-use the percent of residential, commercial, and retail components were assumed
- **Percent of developable land** – percent of land that could be developed, discounting the anticipated area of open space and unusable land due to topographic features or for environmental reasons
- **Floor-to-area ratio (FAR)** – defined as the ratio of a building's total floor area (gross floor area) to the size of the piece of land upon which it is built
- **Percent of internal capture** – defined as trips made within mixed-use developments , these trips are on internal roadways only and do not use adjacent main roadways, results in trip reductions for mixed-use developments
- **Percent of pass-by trips** – defined as an intermediate stop, upon exit, trips will continue to travel in the same direction they were traveling before stopping, not a new trip on the roadway network

Table 19 through **Table 24** provides a detailed summary of the land use and development assumptions for each zone. For all of the zones, developable area was determined to be 60% of the total acreage with the exception of Zone 1 – Farms of New Kent. The Farms of New Kent development information was provided by New Kent County staff, refer to **Appendix D** for the provided list of developments with the study area. Trip generation potential for build-out of the study area was determined using the traffic generation data published in the Institute of Transportation Engineers Trip Generation, 9th Edition. The build-out of the development is anticipated to add 46,700 additional vehicles per day onto Route 106 within the study area by 2040.

Table 19: Zone 1 – Farms of New Kent Trip Generation

Land Use	Description	ITE Code	Density	Unit	Daily	AM Peak Hour			PM Peak Hour		
						Total	Enter	Exit	Total	Enter	Exit
Residential	Single-Family Detached	210	300	DU	2,886	220	55	165	282	178	104
Residential	Mixed Housing Units	220	650	DU	4,063	322	64	258	375	244	131
Residential	Age Restricted Housing Units	251	1,450	DU	5,108	276	97	179	333	203	130
Residential	Resort Cottages	310	100	DU	522	53	31	22	60	31	29
Recreation	18-Hole Golf Course	430	175	AC	882	39	29	10	54	18	36
Mixed Use	Fast Food with Drive Through	934	5,500	SF	2,729	250	128	122	180	94	86
	Fast Food with Drive Through	934	5,500	SF	2,729	250	128	122	180	94	86
	High Turnover Sit-Down Restaurant	932	6,500	SF	826	70	39	31	64	38	26
	Shopping Center	820	75,000	SF	5,633	131	81	50	494	237	257
	Specialty Retail	826	84,700	SF	3,660	0	0	0	225	99	126
					Subtotal ***29,038***	***1,611***	***652***	***959***	***2,247***	***1,236***	***1,011***
				Internal Capture (15%)	4,356	242	98	144	337	185	152
				Pass-By Reduction (30%)	1,098	39	24	15	68	30	38
				Total (Rounded)	**23,600**	**1,330**	**530**	**800**	**1,840**	**1,020**	**820**

Table 20: Zone 2 – Trip Generation

Land Use	Description	ITE Code	FAR	Density	Unit	Daily	AM Peak Hour			PM Peak Hour		
							Total	Enter	Exit	Total	Enter	Exit
Office	Office	710	-	150,000	SF	2,886	220	55	165	282	178	104
Office	Medical Office	720	0.2	100,000	SF	4,063	322	64	258	375	244	131
Commercial	Shopping Center	820	0.2	250,000	SF	5,108	276	97	179	333	203	130
					Subtotal	***17,981***	***777***	***591***	***186***	***1,710***	***673***	***1,037***
					Internal Capture (15%)	2,697	117	89	28	257	101	156
					Pass-By Reduction (30%)	3,696	82	51	31	332	159	173
					Total (Rounded)	**11,590**	**580**	**450**	**130**	**1,120**	**410**	**710**

Table 21: Zone 3 – Trip Generation

Land Use	Description	ITE Code	Density	Unit	Daily	AM Peak Hour			PM Peak Hour		
						Total	Enter	Exit	Total	Enter	Exit
Industrial	General Light Industrial	110	500,000	SF	3,633	501	441	60	558	67	491
Industrial	High-Cube Warehouse/ Distribution Center	152	1,500,000	SF	2,520	184	127	57	191	59	132
					Subtotal	***6,153***	***685***	***568***	***117***	***749***	***126***	***623***
					Total (Rounded)	**6,150**	**690**	**570**	**120**	**750**	**130**	**620**

Table 22: Zone 4 – Trip Generation

Land Use	Description	ITE Code	Density	Unit	Daily	AM Peak Hour			PM Peak Hour		
						Total	Enter	Exit	Total	Enter	Exit
Commercial	Fast Food Restaurant with Drive Through	934	5,500	SF	2,729	250	128	122	180	94	86
Commercial	Hotel	310	200	Rooms	1,417	106	63	43	120	61	59
				Subtotal	***4,146***	***356***	***191***	***165***	***300***	***155***	***145***
				Internal Capture (15%)	622	53	29	25	45	23	22
				Total (Rounded)	**3,520**	**300**	**160**	**140**	**250**	**130**	**120**

Table 23: Zone 5 – Trip Generation

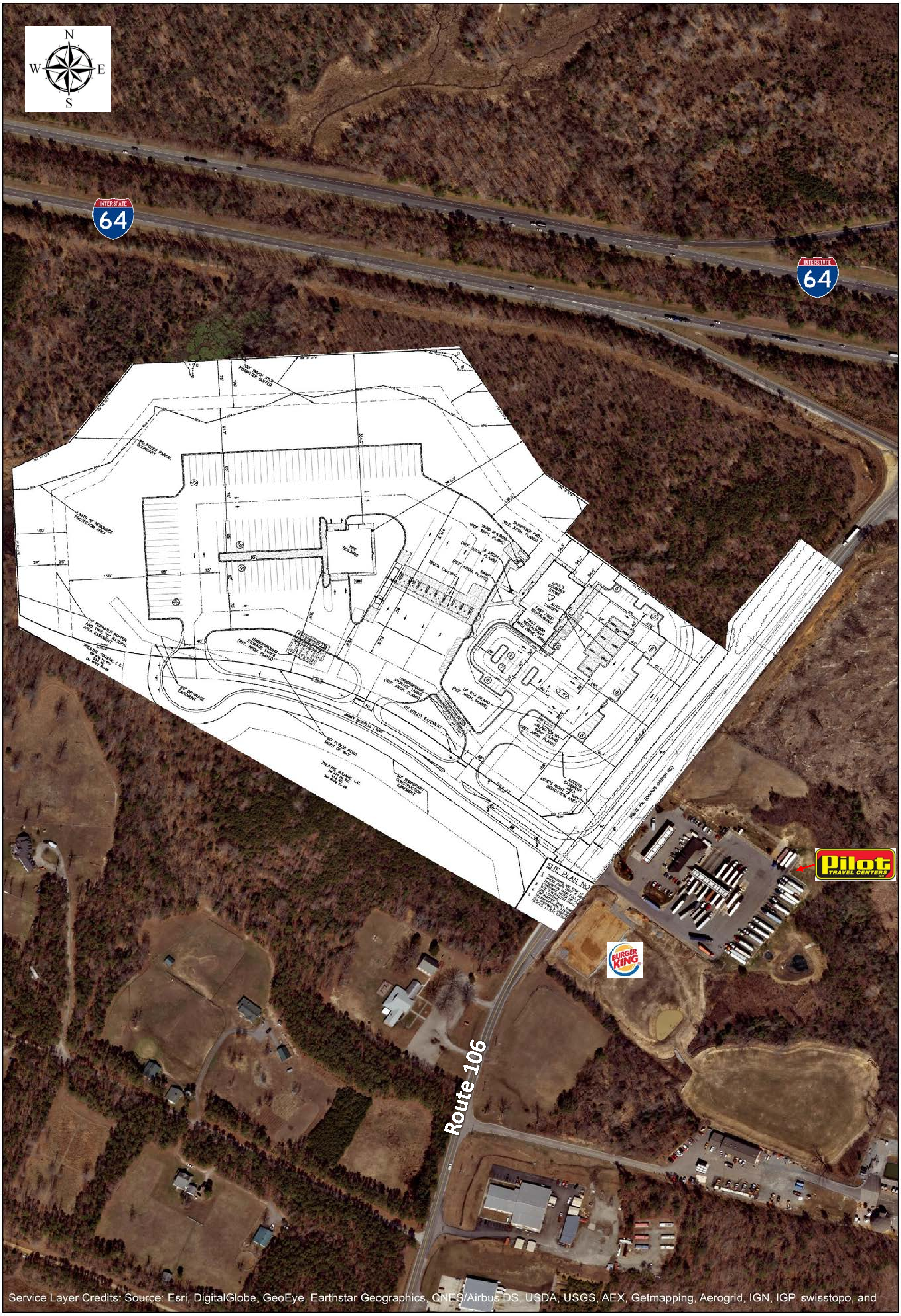
Land Use	Description	ITE Code	FAR	Density	Unit	Daily	AM Peak Hour			PM Peak Hour		
							Total	Enter	Exit	Total	Enter	Exit
Industrial	General Light Industrial	110	0.2	259,300	SF	1,835	217	191	26	213	26	187
					Subtotal	***1,835***	***217***	***191***	***26***	***213***	***26***	***187***
					Total (Rounded)	**1,840**	**220**	**190**	**30**	**220**	**30**	**190**

Table 24: Total Trip Generation – Zones 1 through 5

Daily	AM Peak Hour			PM Peak Hour		
	Total	Enter	Exit	Total	Enter	Exit
46,700	3,120	1,900	1,220	4,180	1,720	2,460

4.2.3 Trip Distribution

The directional distribution of trips generated by the land use and development zones is based on a review of the existing traffic volumes and an understanding of travel patterns within the study area. Due to the unique travel characteristics and patterns of the future land use and developments, trip distribution was developed for each of the five development zones. The following traffic distributions were derived and approved by New Kent County and VDOT to be applied to the analysis of the study area. **Figure 18** through **Figure 22** illustrate the future trip distribution percentages for each zone in the study area. **Figure 18** displays that 20% of the Farms of New Kent development will be entering and exiting via roadways outside the study area which include: New Kent Highway (Route 249) and Old Church Road (Route 606)



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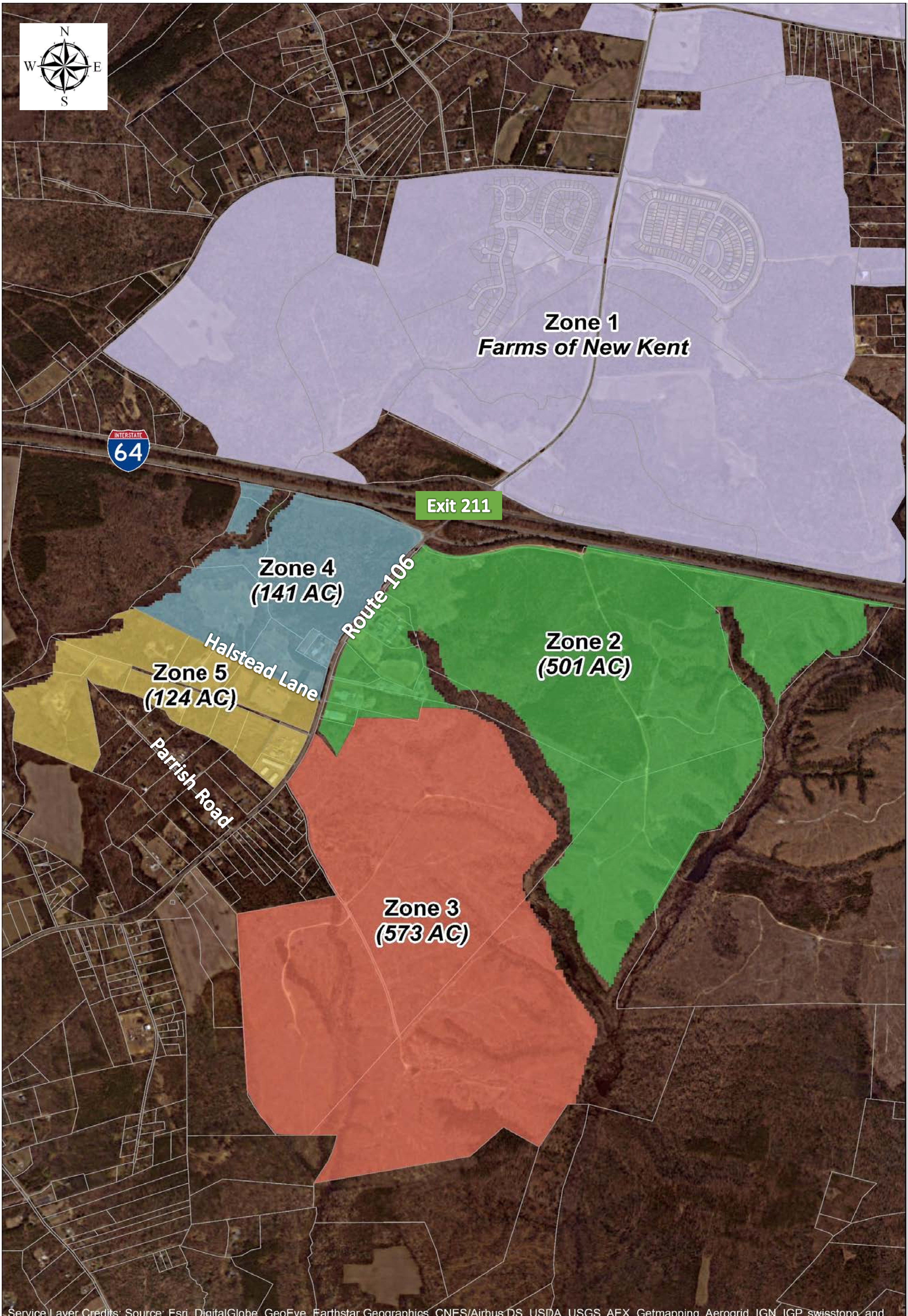
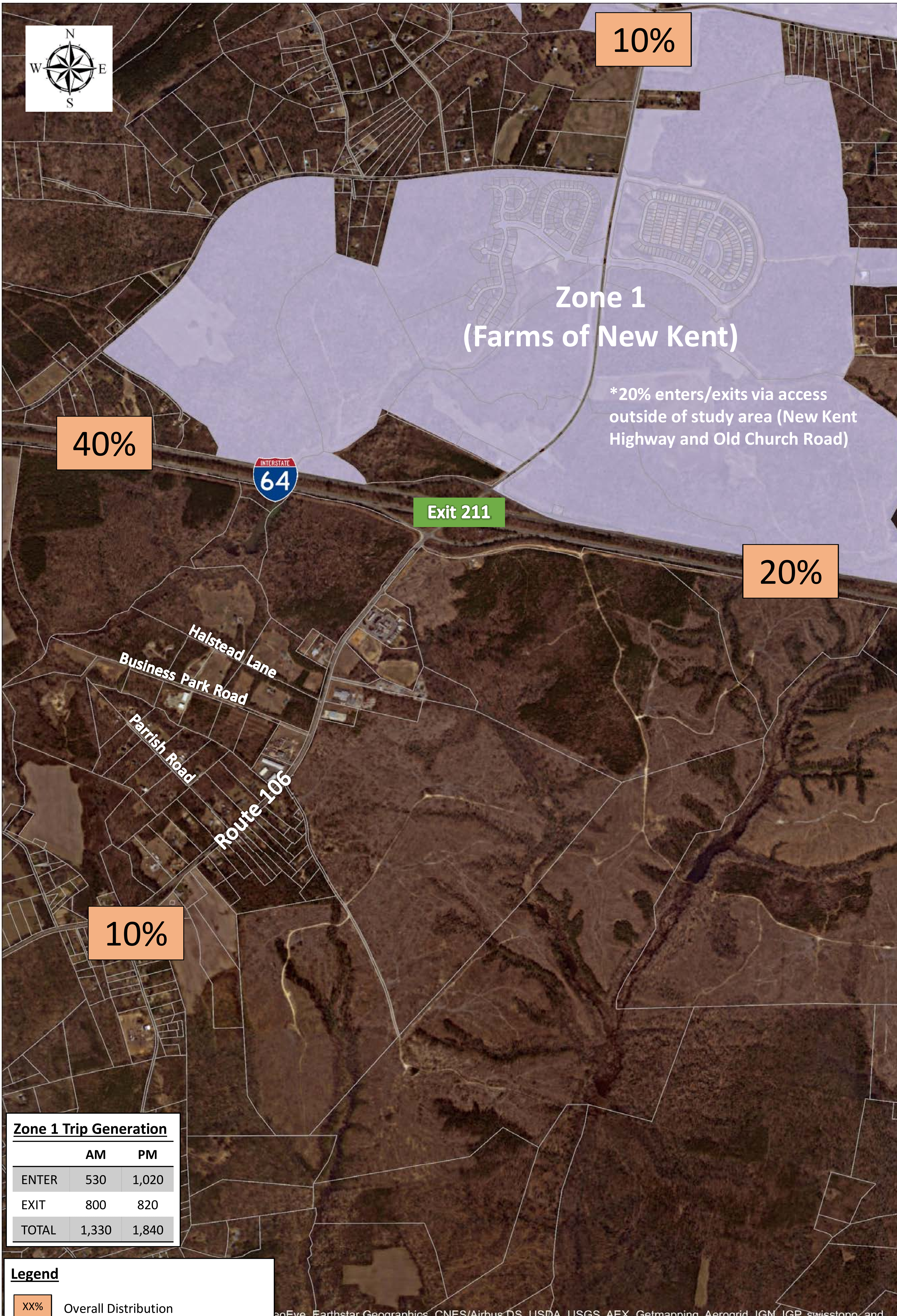
Route 106 Arterial Management Plan
New Kent County, VA

Love's Travel Stop and Country Store

Figure 16

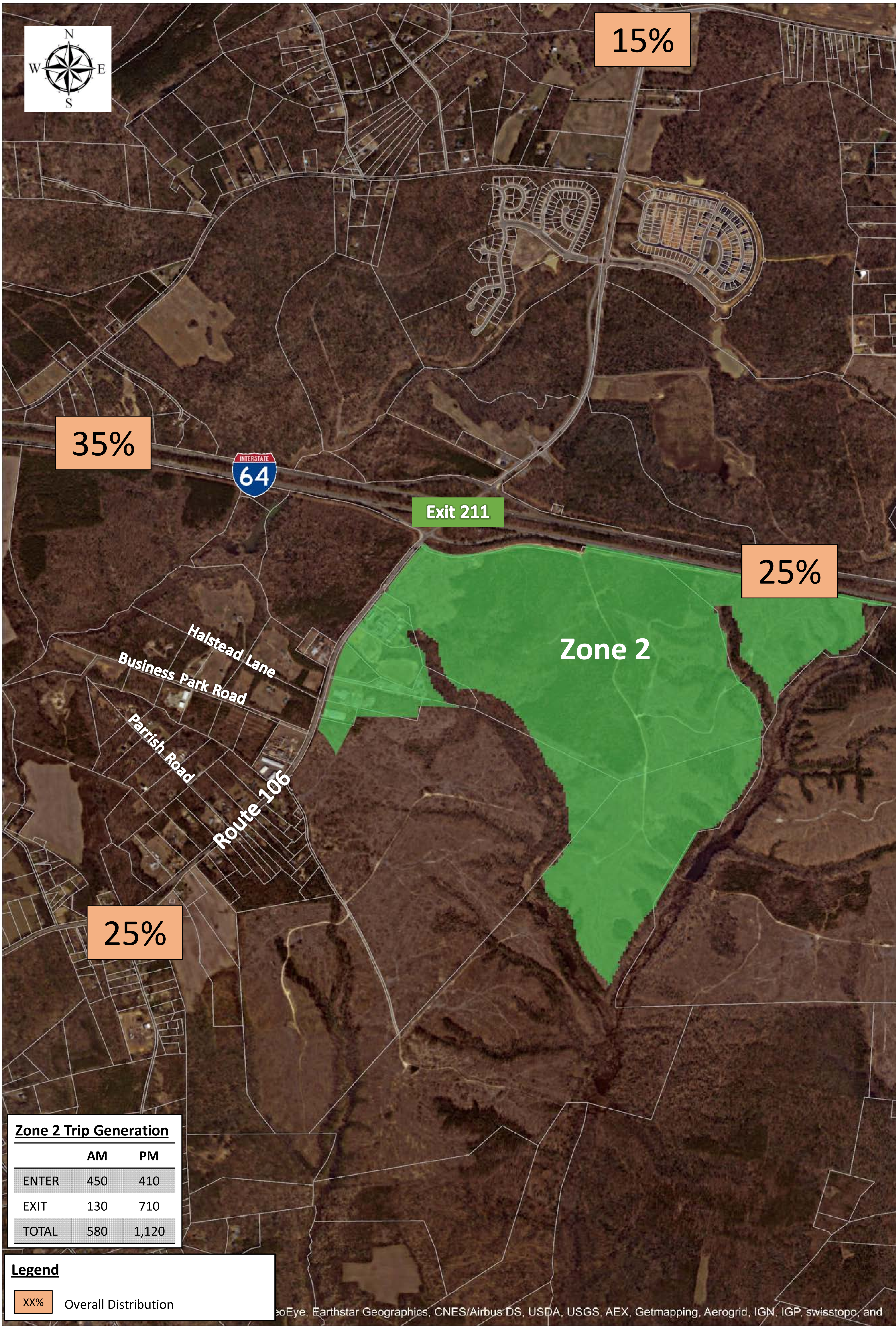


Kimley»Horn	Route 106 Arterial Management Plan New Kent County, VA	Future Land Use and Development Zones	Figure 17



Zone 1 Trip Generation

	AM	PM
ENTER	530	1,020
EXIT	800	820
TOTAL	1,330	1,840



Zone 2 Trip Generation

	AM	PM
ENTER	450	410
EXIT	130	710
TOTAL	580	1,120

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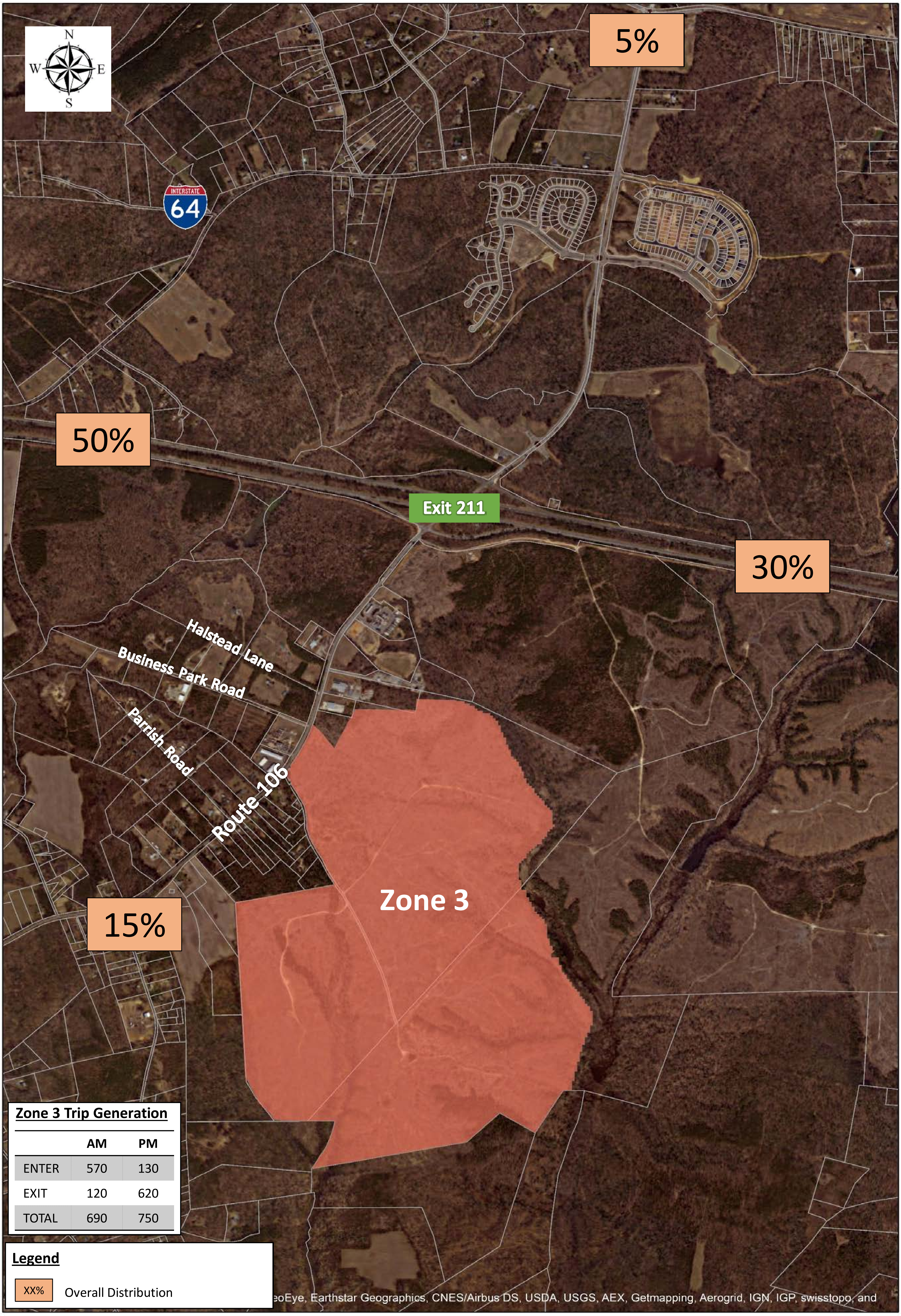
Route 106 Arterial Management Plan
New Kent County, VA

2040 Future Build
Zone 2 Trip Distribution

Figure 19



Zone 3 Trip Generation

	AM	PM
ENTER	570	130
EXIT	120	620
TOTAL	690	750

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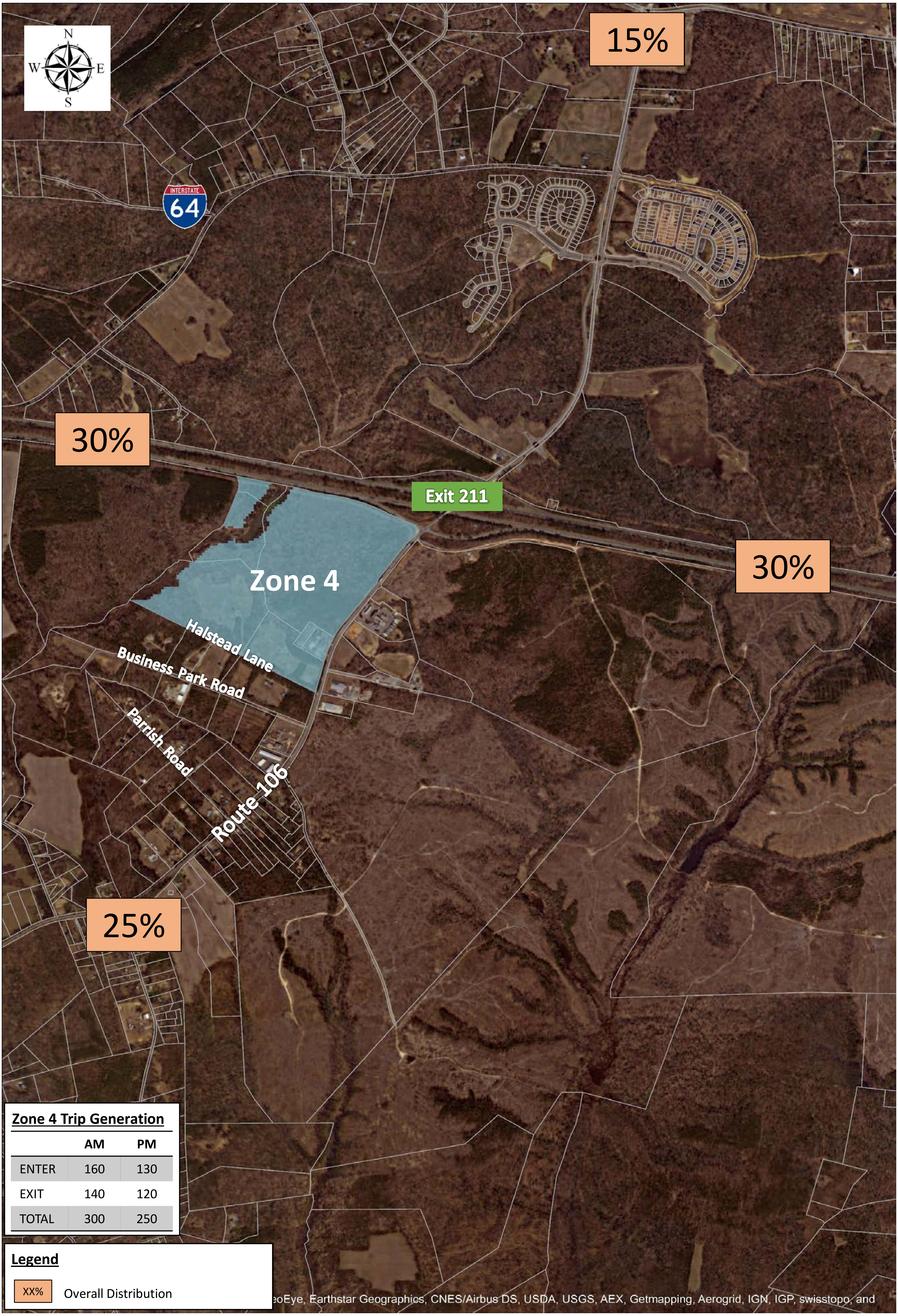
Route 106 Arterial Management Plan
New Kent County, VA

2040 Future Build
Zone 3 Trip Distribution

Figure
20



Zone 4 Trip Generation

	AM	PM
ENTER	160	130
EXIT	140	120
TOTAL	300	250

Legend

XX% Overall Distribution

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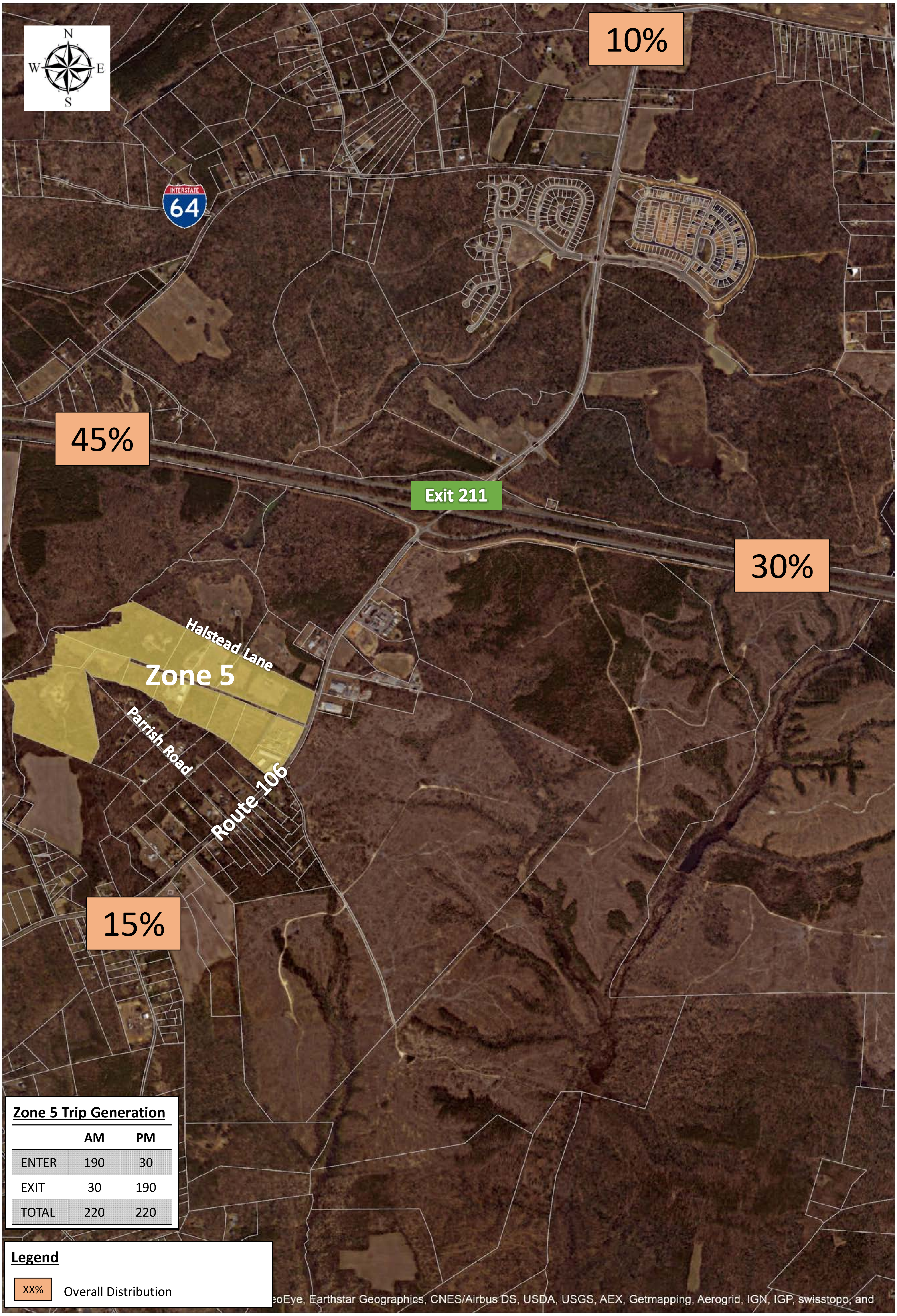
Route 106 Arterial Management Plan
New Kent County, VA

2040 Future Build
Zone 4 Trip Distribution

Figure
21



Zone 5 Trip Generation

	AM	PM
ENTER	190	30
EXIT	30	190
TOTAL	220	220

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Route 106 Arterial Management Plan
New Kent County, VA

2040 Future Build
Zone 5 Trip Distribution

Figure
22

4.2.4 Future (2040) Build Traffic Volumes

Based on the trip generation and the directional distribution, the build-out development traffic was assigned to the adjacent street network for the Unimproved and Improved Roadway Networks. Projected 2040 build traffic volumes were determined by adding the anticipated development traffic volumes to the projected 2040 background volumes.

Unimproved Roadway Network

The existing driveway locations, geometry, and lane assignments were used for the Unimproved Roadway Network. Trips were assigned to each of the existing study area intersections and their corresponding driveways. As previously discussed in **Section 4.2.2**, trip generation from each of the land use and development zones were assigned to driveways adjacent to the geographic location of the zones. **Figure 23** illustrates the future (2040) build AM and PM peak hour traffic volumes on the Unimproved Roadway Network.

Improved Roadway Network

The VDOT Access Management Guidelines (VDOT Road Design Manual: Appendix F – Access Management Design Standards for Entrances and Intersections) were utilized to determine the maximum amount of accessibility that could be accommodated under those guidelines as well as identifying the most likely access locations and types based on existing crossovers and corridor constraints. For the Improved Roadway Network, the VDOT minor arterial functional classification was used to determine the maximum amount of access locations along Route 106 which is consistent with the existing functional classification. **Table 25** displays the minimum centerline to centerline intersection spacing outlined in the VDOT Access Management Guidelines. Two Access Management scenarios were developed using the VDOT Access Management Guidelines: Three-Lane Typical Access Management and Four-Lane Typical Access Management. **Figure 24** through **Figure 27** illustrate the two proposed access management scenarios and their associated spacing characteristics for the Route 106 Improved Roadway Network.

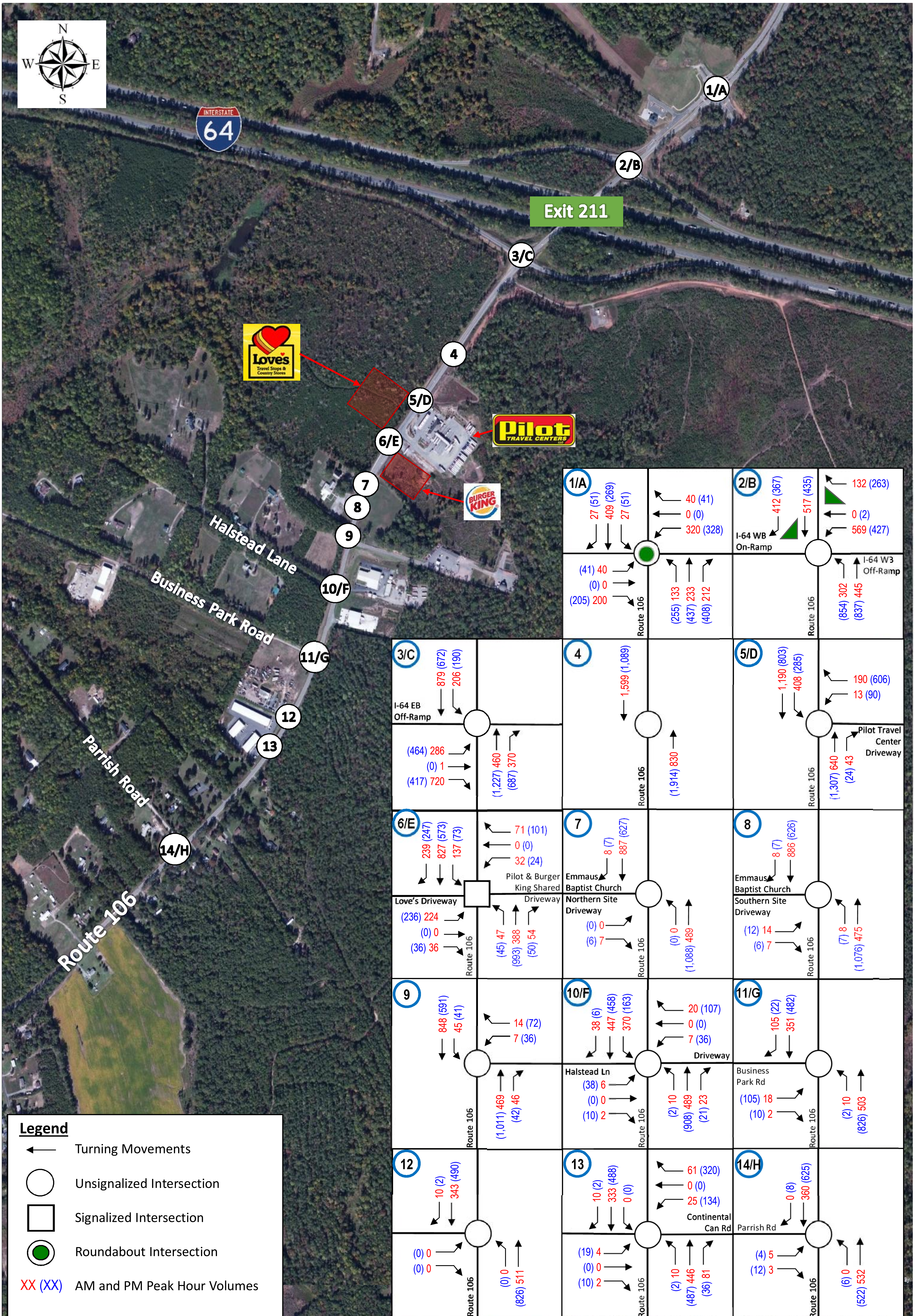
For the Three-Lane and Four-Lane Typical Access Management Spacing scenarios, spacing standards are largely satisfied based on the Route 106 existing roadway classification as a minor arterial. Three of the 14 locations are identified as not meeting the required spacing between driveways, entrances, median crossovers, and intersections for the Three-Lane scenario. The Four-Lane Access Management Spacing scenario satisfies spacing requirements for all but three of the 14 locations. Both of these spacing scenarios eliminate unnecessary access points, combine driveway locations, and increase the access management standard compliance compared to the existing conditions.

Table 25: VDOT Access Management Spacing

Highway Functional Classification	Centerline to Centerline Spacing (Feet) to Centerline Spacing (Feet)			
	Spacing between Signalized Intersections	Spacing between Unsignalized Intersections and Full/Directional Median Crossovers and Other Intersections or Median Crossovers	Spacing between Full Access Entrances and Other Full Access Entrances, Intersections, or Median Crossovers	Spacing between Partial Access Entrances (One or Two-Way) and Other Entrances, Intersections, or Median Crossovers
Principal Arterial	1,320	1,050	565	305
Minor Arterial	**1,050**	**660**	**470**	**250**
Collector	660	440	335	250

Source: VDOT Roadway Design Manual, Appendix F (Table 2-2)

The Four-Lane Typical Access Management Scenario was the preferred scenario based on input from New Kent County staff and citizens as well as the future roadway capacity that would be needed to accommodate projected traffic volumes and an expected improvement in safety conditions as a result of reducing the number of corridor and intersection crossover conflict points. Once the preferred access management strategy was determined, trips were assigned to the Improved Roadway Network to/from each land use and development zone based on the trip distribution percentages, previously shown in **Figure 18** through **Figure 22**. Figures showing detailed trip assignment to/from each land use and development zone are provided in **Appendix D**. **Figure 28** and **Figure 29** display the future (2040) build AM and PM peak hour traffic volumes on the Improved Roadway Network, respectively.



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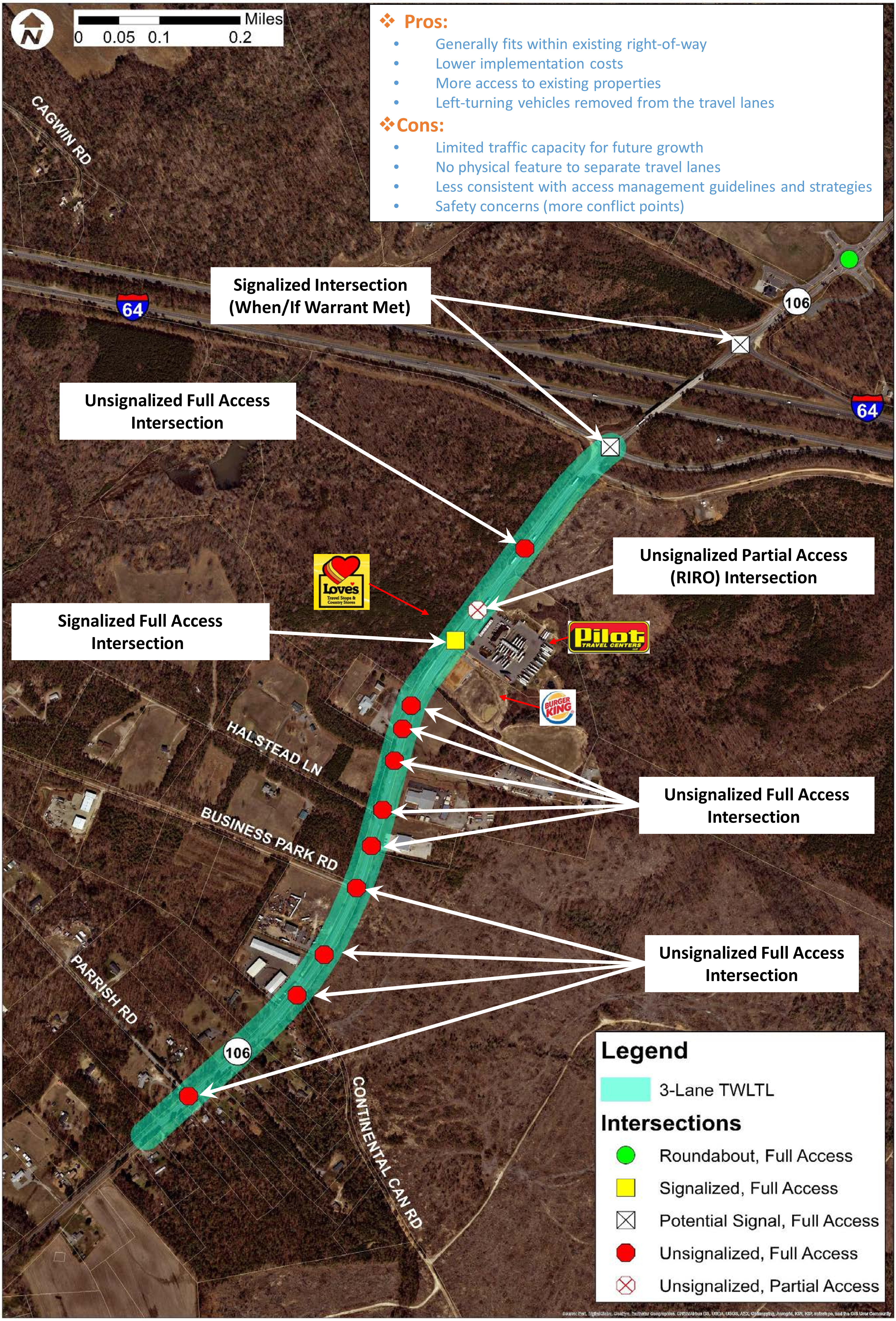
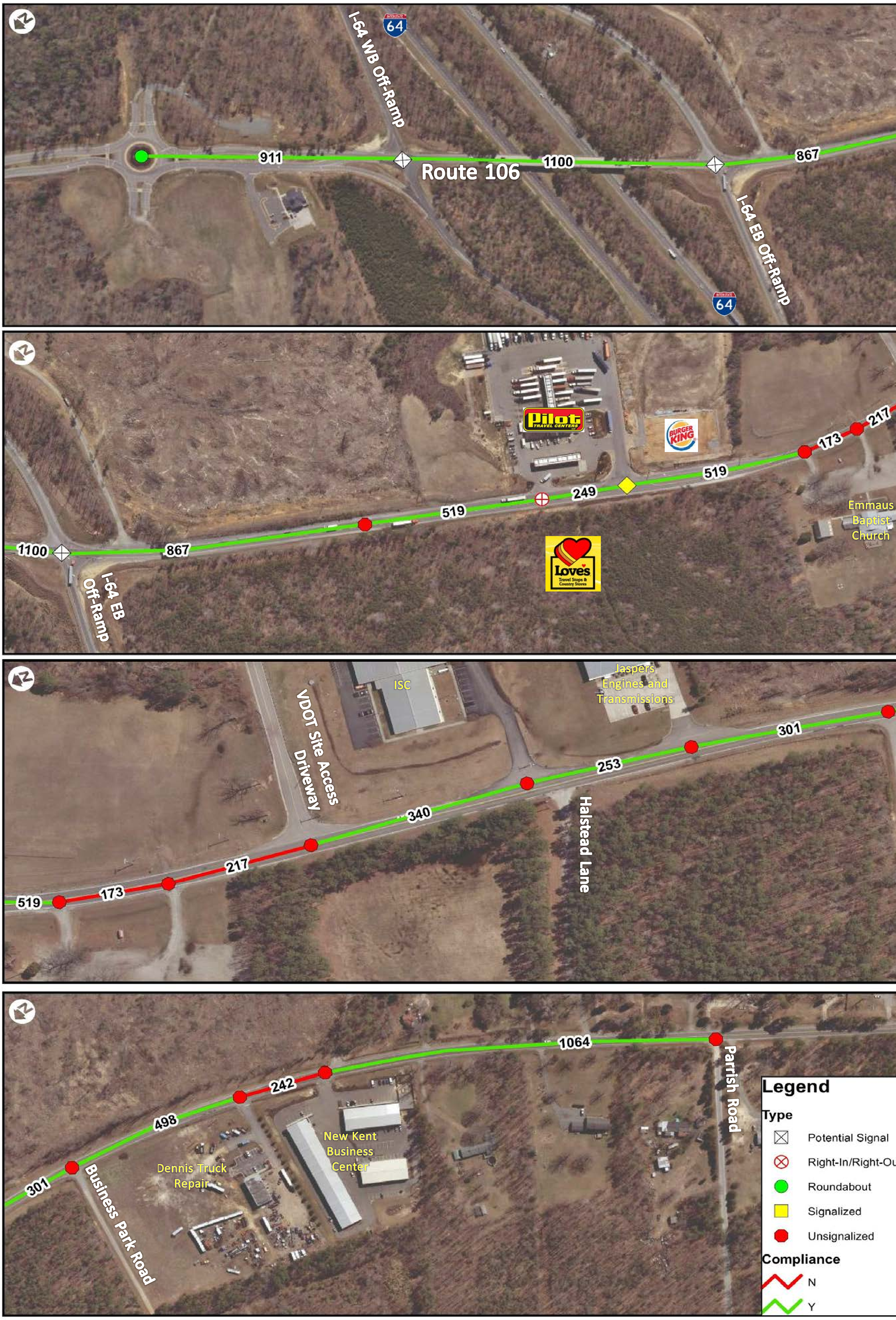
Route 106 Arterial Management Plan
New Kent County, VA

2040 Build AM and PM Peak Hour Volumes - Unimproved Roadway Network

Figure 23


Miles
0 0.05 0.1 0.2
Pros:
Generally fits within existing right-of-way
Lower implementation costs
More access to existing properties
Left-turning vehicles removed from the travel lanes
Cons:
Limited traffic capacity for future growth
No physical feature to separate travel lanes
Less consistent with access management guidelines and strategies
Safety concerns (more conflict points)
CAGWIN RD
64
Signalized Intersection (When/If Warrant Met)
106
Unsignalized Full Access Intersection
64
Unsignalized Partial Access (RIRO) Intersection
Signalized Full Access Intersection
HALSTEAD LN
BUSINESS PARK RD
Unsignalized Full Access Intersection
PARRISH RD
Unsignalized Full Access Intersection
106
CONTINENTAL CAN RD
Legend
3-Lane TWLTL
Intersections
Roundabout, Full Access
Signalized, Full Access
Potential Signal, Full Access
Unsignalized, Full Access
Unsignalized, Partial Access



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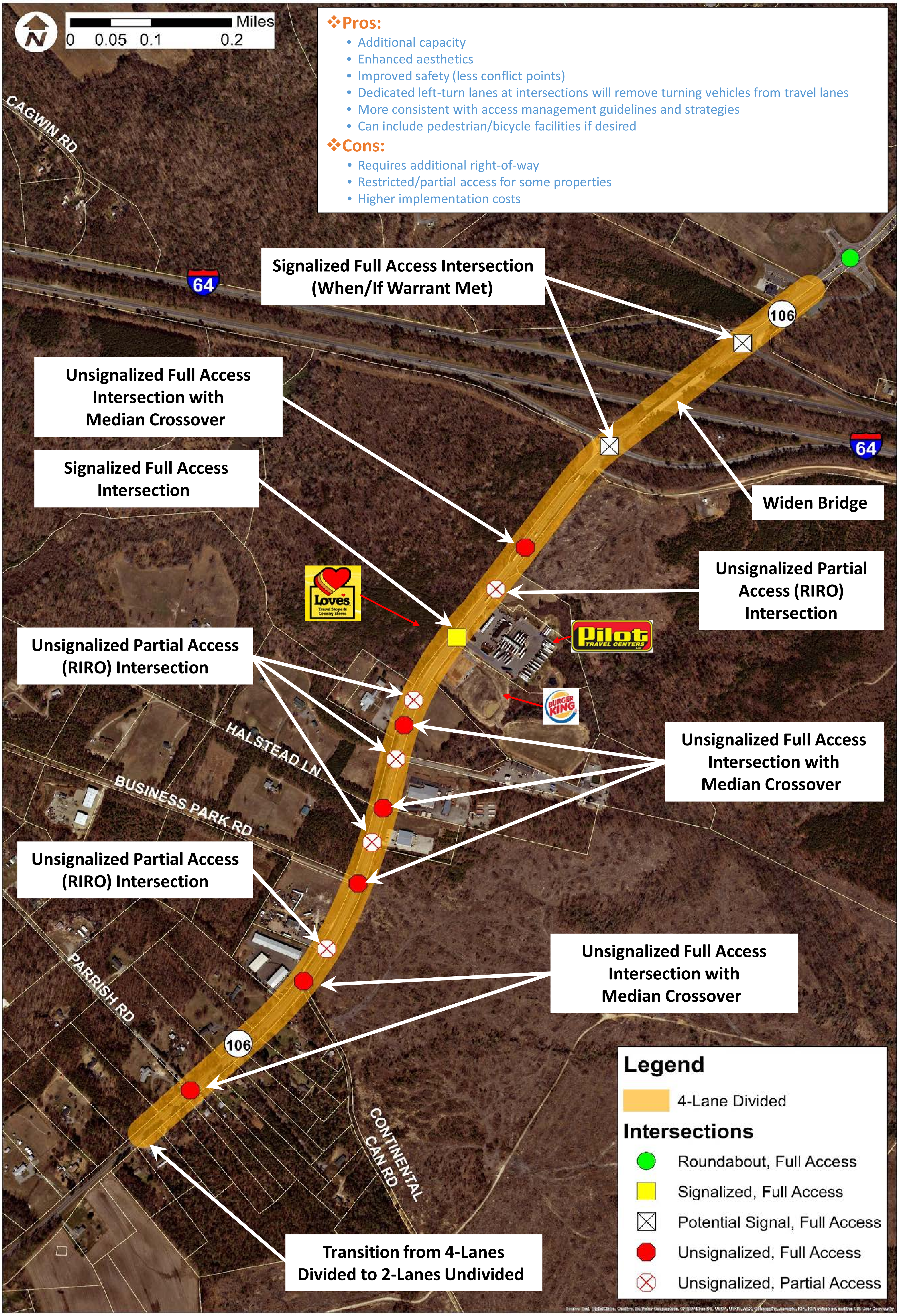
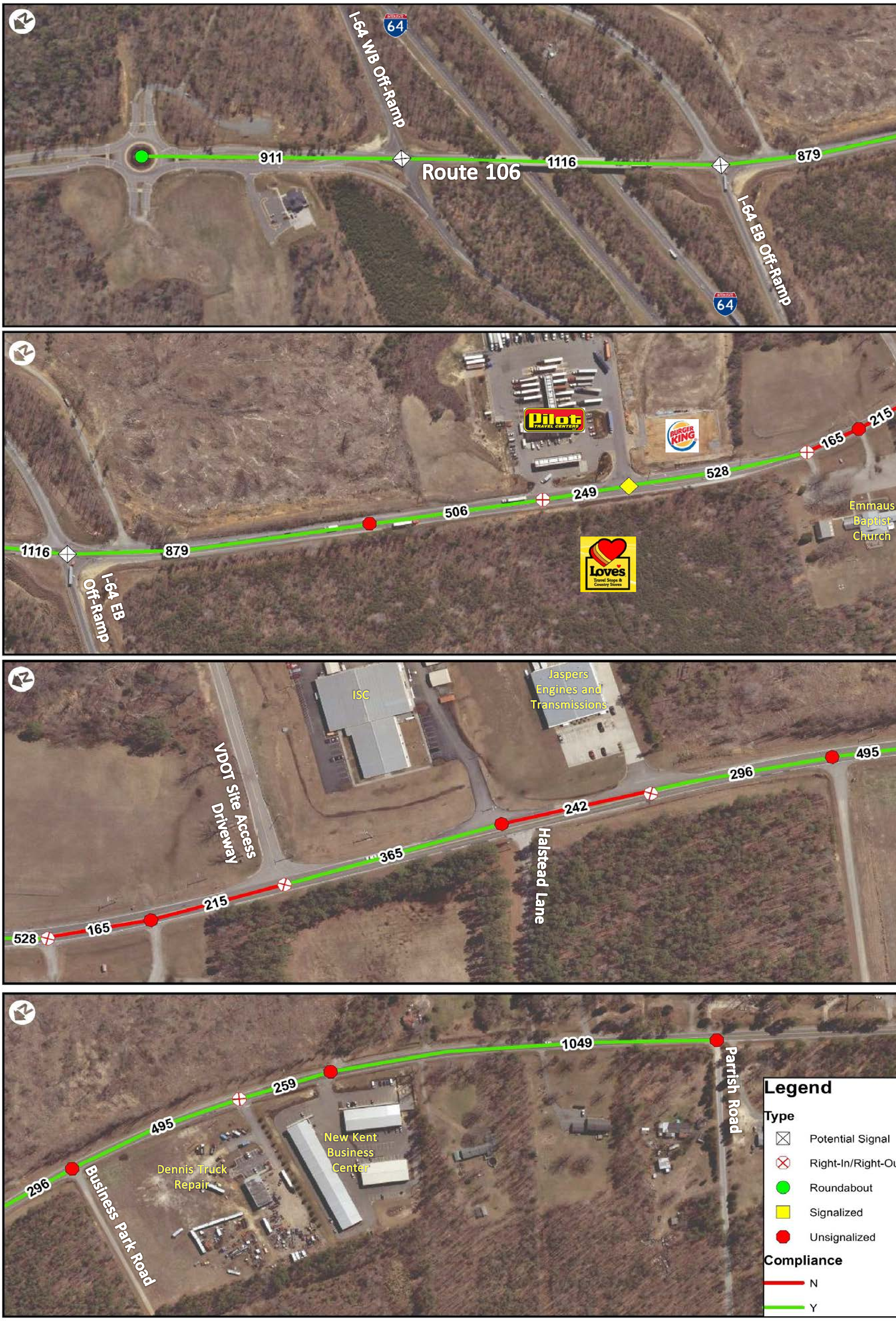
Route 106 Arterial Management Plan
New Kent County, VA

Three-Lane Typical Access Management Spacing

Figure 25



Kimley»Horn	Route 106 Arterial Management Plan New Kent County, VA	Four-Lane Typical Access Management Scenario	Figure 25



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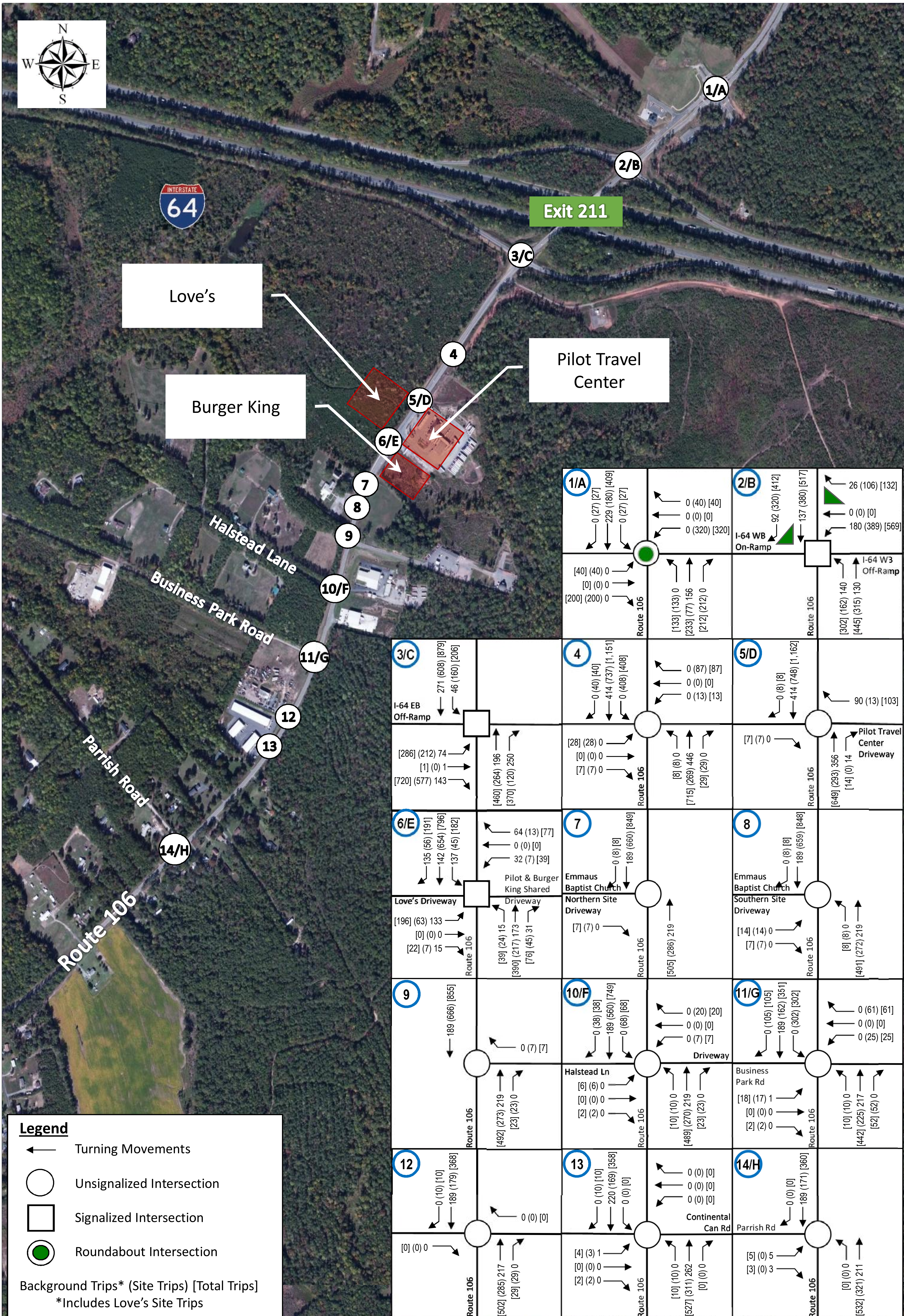
Route 106 Arterial Management Plan
New Kent County, VA

Four-Lane Typical Access Management Spacing

Figure 27



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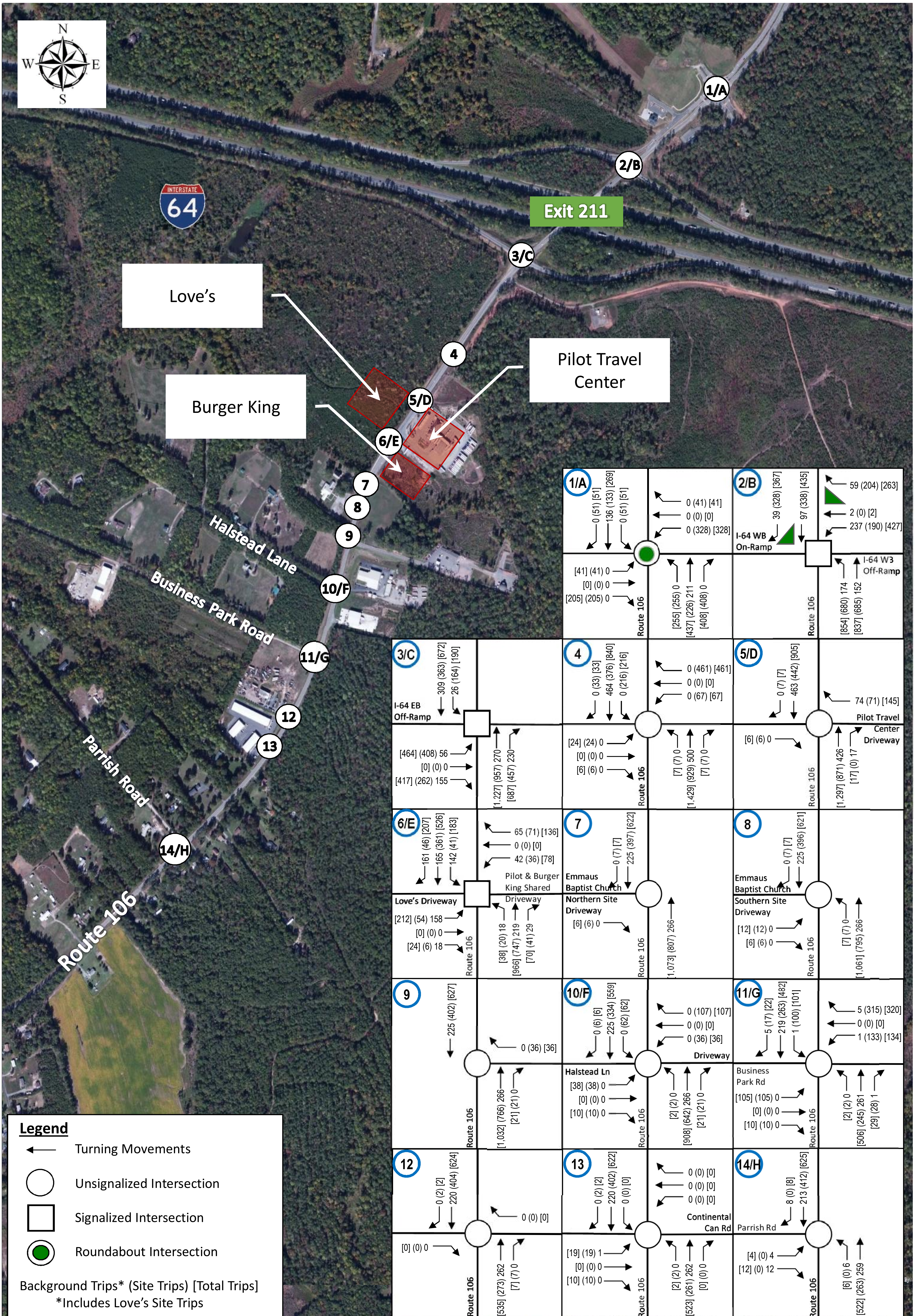
Route 106 Arterial Management Plan
New Kent County, VA

2040 Build AM Peak Hour Volumes - Improved Roadway Network

Figure 28



Route 106 Arterial Management Plan
New Kent County, VA

2040 Build PM Peak Hour Volumes - Improved Roadway Network

Figure 29

Chapter 5.0 FUTURE (2040) TRAFFIC CONDITIONS

Section 5.1 Unimproved Roadway Network Analysis

Future Unimproved Roadway Network (2040) traffic operational analyses were conducted to evaluate the results of future traffic demand, build-out of the study area, on the existing roadway network. Existing roadway geometry plus the planned improvements at the Route 106 and Love's/Pilot Travel Center Site Access Driveway intersection were used in this analysis with optimized signal timings and projected 2040 peak hour volumes. Unimproved lane assignments were assumed to equal the existing lane assignments summarized previously in **Figure 3**. The intent of the unimproved conditions analysis was to provide a general understanding of the baseline future traffic conditions to be used in evaluating/comparing the effectiveness of future proposed roadway improvement recommendations (Improved Roadway Network).

Section 5.2 Improved Roadway Network Analysis

Future Improved Roadway Network (2040) traffic operational analyses were conducted to evaluate the results of future traffic demand as a result of build-out of the study area, on the improved roadway network. Refer to **Chapter 6** for a detailed description of the Improved Roadway Network. These detailed recommendations were used in this analysis with optimized signal timings and projected 2040 peak hour volumes. The intent of the improved conditions analysis was to evaluate the effectiveness of future proposed roadway improvement recommendations (Improved Roadway Network).

Section 5.3 Intersection LOS Analysis

Capacity analyses for signalized and unsignalized intersections in the weekday AM and PM peak hours were performed using *Synchro Professional 9.0* for all of the study area intersections. This software uses methodologies contained in the *2000 Highway Capacity Manual (HCM).* The ranges of delay for each intersection LOS are shown in **Table 26**.

Table 26: Unsignalized and Signalized Intersection HCM LOS Criteria

Level of Service (LOS)	Intersection Delay per Vehicle (s)	
	Unsignalized	Signalized
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

Source: Highway Capacity Manual 2000

According to the VDOT Traffic Operations and Safety Manual *(TOSAM)*, *SIDRA Intersection 6.0* is required for analysis of roundabout operations using the SIDRA Standard model. Similar to Synchro, the SIDRA Intersection software uses methodologies contained within the HCM as well as the ranges in delay as outlined in **Table 26**. Lastly, SIDRA LOS output results are the same as the signalized intersection methodology per the TOSAM.

Table 27 summarizes the overall intersection results of the levels of service and delays for both AM and PM peak hours under the 2040 Unimproved and Improved scenarios. The results indicate the majority of the corridor intersections are anticipated to operate at LOS D or better under the improved conditions with the exception of two intersections during the PM peak hour. The intersections that experience LOS F, were the result of significant delays on the minor/side streets due to the high volume of traffic traversing the intersections along Route 106.

Table 28 through **Table 41** summarize the delay and HCM LOS results for each of the study area intersections under the 2040 Unimproved and Improved conditions. **Figure 30** and **Figure 31** show a graphical representation of the intersection and approach LOS results for the study intersections for the 2040 Unimproved and Improved conditions, respectively. Detailed LOS analysis reports are provided in **Appendix C**.

Table 27: Overall Intersection Levels of Service and Delay

Intersection	2040 Unimproved		2040 Improved	
	AM LOS (Delay)	PM LOS (Delay)	AM LOS (Delay)	PM LOS (Delay)
Route 106 at Roundabout	A (8.3)	A (8.7)	A (8.3)	A (8.7)
Route 106 at I-64 WB Off/On-Ramps	F (>300)	F (>300)	C (32.5)	D (38.2)
Route 106 at I-64 EB Off/On-Ramps	F (>300)	F (>300)	C (29.8)	C (27.4)
Route 106 at New Kent City Center Site Access Driveway	-	-	C (20.4)	F (>300)
Route 106 at Pilot Travel Center (North)	F (69.3)	F (>300)	A (0.7)	A (0.9)
Route 106 at Loves/Pilot Travel Center (South)	C (32.9)	F (93.5)	C (29.7)	D (40.2)
Route 106 at Emmaus Baptist Church Northern Site Access Driveway	A (0.1)	A (0.0)	A (0.0)	A (0.0)
Route 106 at Emmaus Baptist Church Southern Site Access Driveway	A (1.0)	A (0.9)	A (0.3)	A (0.3)
Route 106 at VDOT Site Access Driveway	A (1.4)	B (12.1)	A (0.1)	A (0.3)
Route 106 at Halstead Lane/ISC Site Access Driveway	B (13.2)	F (94.9)	A (1.0)	A (5.8)
Route 106 at Business Park Road	A (0.5)	A (6.7)	B (11.1)	F (>300)
Route 106 at Dennis Truck Repair Site Access Driveway	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Route 106 at New Kent Business Center Site Access Driveway/Continental Can Road	A (1.7)	F (75.0)	A (0.2)	A (0.5)
Route 106 at Parrish Road	A (0.1)	A (0.3)	A (0.1)	A (0.2)

Table 28: Route 106 at Roundabout Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)			
		Eastbound	Westbound	Northbound	Southbound
		LT/TH/RT	LT/TH/RT	LT/TH/RT	LT/TH/RT
AM Peak Hour					
2040 Unimproved	A (8.3)	B (10.6)	B (11.6)	A (5.8)	A (7.5)
2040 Improved	A (8.3)	B (10.6)	B (11.6)	A (5.8)	A (7.5)
PM Peak Hour					
2040 Unimproved	A (8.7)	A (9.4)	B (15.2)	A (6.1)	A (9.1)
2040 Improved	A (8.7)	A (9.4)	B (15.2)	A (6.1)	A (9.1)

Source: Kimley-Horn and Associates, Inc.

Table 29: Route 106 at I-64 WB Off/On-Ramps Unsignalized and Signalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)						
		Westbound			Northbound		Southbound	
		LT	LT/TH	RT	LT	TH	TH	RT
AM Peak Hour								
2040 Unimproved	F (>300)	F (>300)			B (10.2)		A (0.0)	
2040 Improved*	C (32.5)	D (48.3)	D (48.3)	C (27.7)	D (43.3)	B (11.1)	C (30.5)	C (28.8)
		D (44.4)			C (24.1)		C (29.8)	
PM Peak Hour								
2040 Unimproved	F (>300)	F (>300)			F (102.7)		A (0.0)	
2040 Improved*	D (38.2)	E (55.8)	E (56.4)	D (41.5)	D (45.6)	A (9.6)	D (51.7)	D (48.3)
		D (50.6)			C (27.8)		D (50.1)	

Note: Worst Control Delay is provided under each approach for unsignalized
*Analyzed as signalized intersection in Improved scenario
Source: Kimley-Horn and Associates, Inc.

Table 30: Route 106 at I-64 EB Off/On-Ramps Unsignalized and Signalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)						
		Eastbound			Northbound		Southbound	
		LT	LT/TH	RT	TH	RT	LT	TH
AM Peak Hour								
2040 Unimproved	F (>300)	F (>300)			A (0.0)		A (7.4)	
2040 Improved*	C (29.8)	C (23.2)	C (23.2)	D (41.8)	C (30.0)	D (54.9)	B (12.7)	B (13.7)
		D (36.5)			D (41.1)		B (13.5)	
PM Peak Hour								
2040 Unimproved	F (>300)	F (>300)			A (0.0)		E (41.8)	
2040 Improved*	C (27.4)	D (51.7)	D (51.7)	D (41.0)	B (19.0)	D (37.9)	D (35.2)	A (0.3)
		D (46.6)			C (25.8)		A (8.0)	

Note: Worst Control Delay is provided under each approach for unsignalized
*Analyzed as signalized intersection in Improved scenario
Source: Kimley-Horn and Associates, Inc.

Table 31: Route 106 at New Kent City Center Site Access Driveway Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)			
		Eastbound	Westbound	Northbound	Southbound
		LT/TH/RT	LT/TH/RT	LT/TH/RT	LT/TH/RT
AM Peak Hour					
2040 Improved	C (20.4)	F (>300)	F (49.7)	B (11.4)	B (13.4)
PM Peak Hour					
2040 Improved	F (>300)	F (>300)	F (>300)	A (9.9)	C (19.7)

Source: Kimley-Horn and Associates, Inc.
Note: Worst Control Delay is provided under each approach

Table 32: Route 106 at Pilot Travel Center (North) Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)			
		Eastbound	Westbound	Northbound	Southbound
		RT	RT	TH/RT	TH/RT
AM Peak Hour					
2040 Unimproved	F (69.3)	-	F (>300)	A (0.0)	C (16.2)
2040 Improved	A (0.7)	B (13.6)	B (10.7)	A (0.0)	A (0.0)
PM Peak Hour					
2040 Unimproved	F (>300)	-	F (>300)	A (0.0)	F (255.3)
2040 Improved	A (0.9)	B (12.0)	B (11.6)	A (0.0)	A (0.0)

Source: Kimley-Horn and Associates, Inc.
Note: Worst Control Delay is provided under each approach

Table 33: Route 106 at Love/Pilot Travel Center (South) Signalized Intersection LOS

Scenario	Overall LOS	Level of Service by Movement and Approach (Delay in sec/veh)											
		Eastbound		Westbound		Northbound			Southbound				
		LT/TH	RT	LT/TH	RT	LT	TH	RT	LT	TH	RT		
AM Peak Hour													
2040 Unimproved	C (32.9)	E (65.7)	C (25.4)	D (46.8)	C (33.7)	D (41.6)	C (26.6)	B (19.4)	C (22.0)	D (37.6)	A (3.0)		
		E (60.2)		D (37.6)		C (27.2)			C (29.0)				
2040 Improved	C (29.7)	E (60.3)	D (42.7)	D (54.9)	D (53.1)	E (57.0)	C (27.8)	C (24.5)	E (57.3)	B (16.5)	B (11.8)		
		E (58.5)		E (53.7)		C (29.5)			C (21.9)				
PM Peak Hour													
2040 Unimproved	F (93.5)	F (112.8)	C (31.9)	D (54.8)	D (43.5)	B (18.6)	F (175.3)	B (17.3)	D (36.1)	B (17.7)	A (2.7)		
		F (102.2)		D (45.5)		F (161.5)			B (15.0)				
2040 Improved	D (40.2)	E (76.6)	D (46.9)	E (60.4)	E (55.9)	E (64.1)	C (34.9)	C (23.0)	E (82.4)	B (16.7)	C (33.5)		
		E (73.5)		E (57.4)		D (35.2)			C (33.3)				

Source: Kimley-Horn and Associates, Inc.

Table 34: Route 106 at Emmaus Baptist Church Northern Site Access Driveway Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)			
		Eastbound RT	Westbound RT	Northbound TH/RT	Southbound TH/RT
AM Peak Hour					
2040 Unimproved	A (0.1)	C (17.0)	-	A (0.0)	A (0.0)
2040 Improved	A (0.0)	A (9.1)	-	A (0.0)	A (0.0)
PM Peak Hour					
2040 Unimproved	A (0.0)	B (12.7)	-	A (0.0)	A (0.0)
2040 Improved	A (0.0)	A (9.3)	-	A (0.0)	A (0.0)
Source: Kimley-Horn and Associates, Inc.					
Note: Worst Control Delay is provided under each approach					

Table 35: Route 106 at Emmaus Baptist Church Southern Site Access Driveway Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)			
		Eastbound LT/TH/RT	Westbound LT/TH/RT	Northbound LT/TH/RT	Southbound LT/TH/RT
AM Peak Hour					
2040 Unimproved	A (1.0)	F (56.5)	-	A (0.5)	A (0.0)
2040 Improved	A (0.3)	C (21.4)	-	A (9.1)	A (0.0)
PM Peak Hour					
2040 Unimproved	A (0.9)	F (69.2)	-	A (0.3)	A (0.0)
2040 Improved	A (0.3)	C (20.4)	-	A (8.7)	A (0.0)
Source: Kimley-Horn and Associates, Inc.					
Note: Worst Control Delay is provided under each approach					

Table 36: Route 106 at VDOT Site Access Driveway Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)		
		Westbound RT	Northbound TH/RT	Southbound TH
AM Peak Hour				
2040 Unimproved	A (1.4)	E (36.7)	A (0.0)	A (1.3)
2040 Improved	A (0.1)	B (10.1)	A (0.0)	A (0.0)
PM Peak Hour				
2040 Unimproved	B (12.1)	F (189.9)	A (0.0)	A (2.0)
2040 Improved	A (0.3)	B (13.5)	A (0.0)	A (0.0)
Source: Kimley-Horn and Associates, Inc.				
Note: Worst Control Delay is provided under each approach				

Table 37: Route 106 at Halstead Lane/ISC Site Access Driveway Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)			
		Eastbound LT/TH/RT	Westbound LT/TH/RT	Northbound LT/TH/RT	Southbound LT/TH/RT
AM Peak Hour					
2040 Unimproved	B (13.2)	F (>300)	F (235.9)	A (0.4)	A (8.3)
2040 Improved	A (1.0)	C (19.1)	B (13.8)	A (9.1)	A (8.9)
PM Peak Hour					
2040 Unimproved	F (94.9)	F (>300)	F (>300)	A (0.1)	A (6.4)
2040 Improved	A (5.8)	E (46.3)	E (43.6)	A (8.5)	B (10.9)
Source: Kimley-Horn and Associates, Inc.					
Note: Worst Control Delay is provided under each approach					

Table 38: Route 106 at Business Park Road Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)			
		Eastbound LT/TH/RT	Westbound LT/TH/RT	Northbound LT/TH/RT	Southbound LT/TH/RT
AM Peak Hour					
2040 Unimproved	A (0.5)	C (19.0)	-	A (0.3)	A (0.0)
2040 Improved	B (11.1)	F (150.6)	D (27.5)	A (8.4)	B (10.1)
PM Peak Hour					
2040 Unimproved	A (6.7)	F (84.4)	-	A (0.1)	A (0.0)
2040 Improved	F (>300)	F (>300)	E (38.1)	A (8.5)	A (9.1)
Source: Kimley-Horn and Associates, Inc.					
Note: Worst Control Delay is provided under each approach					

Table 39: Route 106 at Dennis Truck Repair Site Access Driveway Unsignalized Intersection LOS

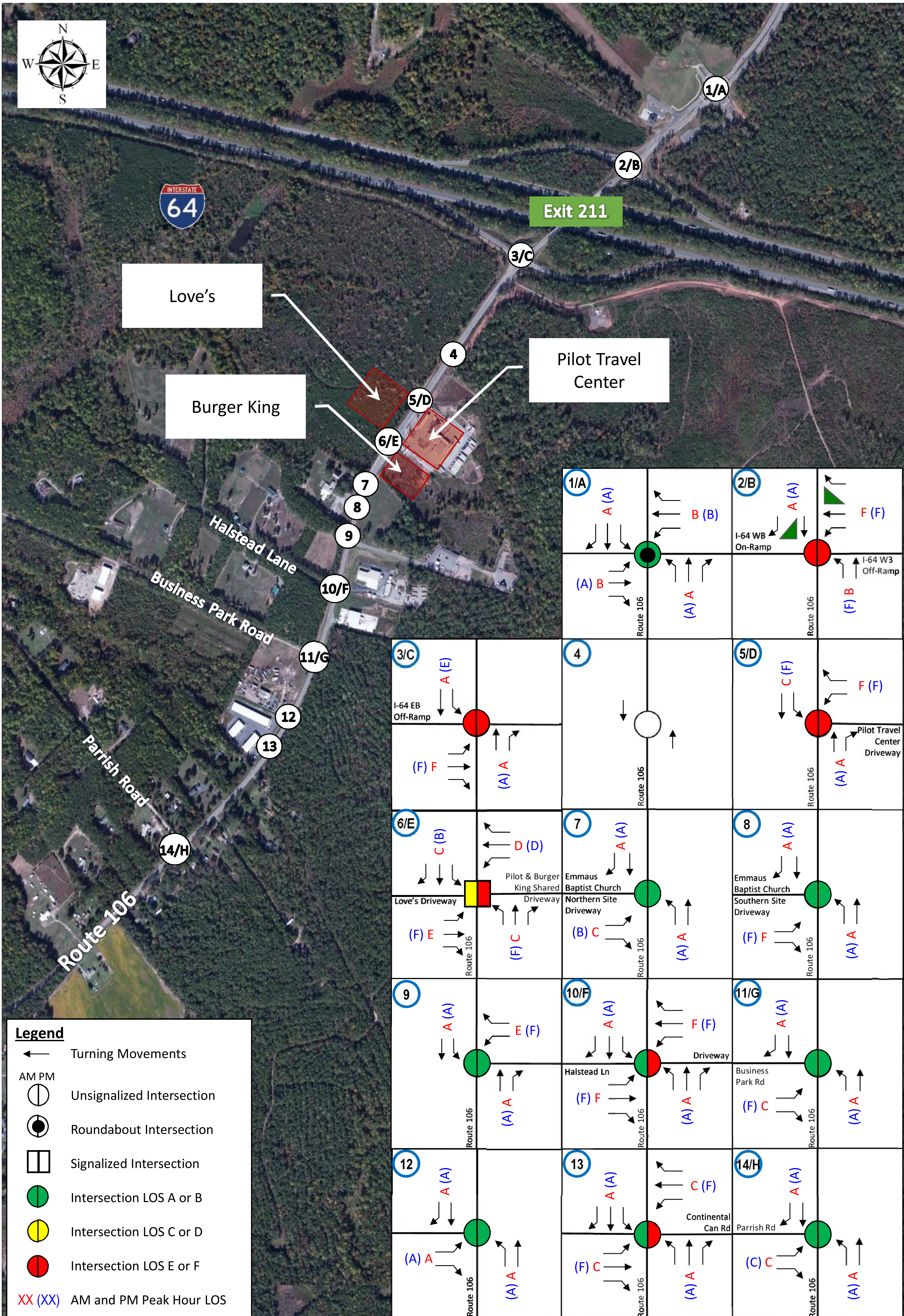
Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)			
		Eastbound RT	Westbound RT	Northbound TH/RT	Southbound TH/RT
AM Peak Hour					
2040 Unimproved	A (0.0)	A (0.0)	-	A (0.0)	A (0.0)
2040 Improved	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
PM Peak Hour					
2040 Unimproved	A (0.0)	A (0.0)	-	A (0.0)	A (0.0)
2040 Improved	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Source: Kimley-Horn and Associates, Inc.					
Note: Worst Control Delay is provided under each approach					

Table 40: Route 106 at New Kent Business Center Site Access Driveway/Continental Can Road Unsignalized Intersection LOS

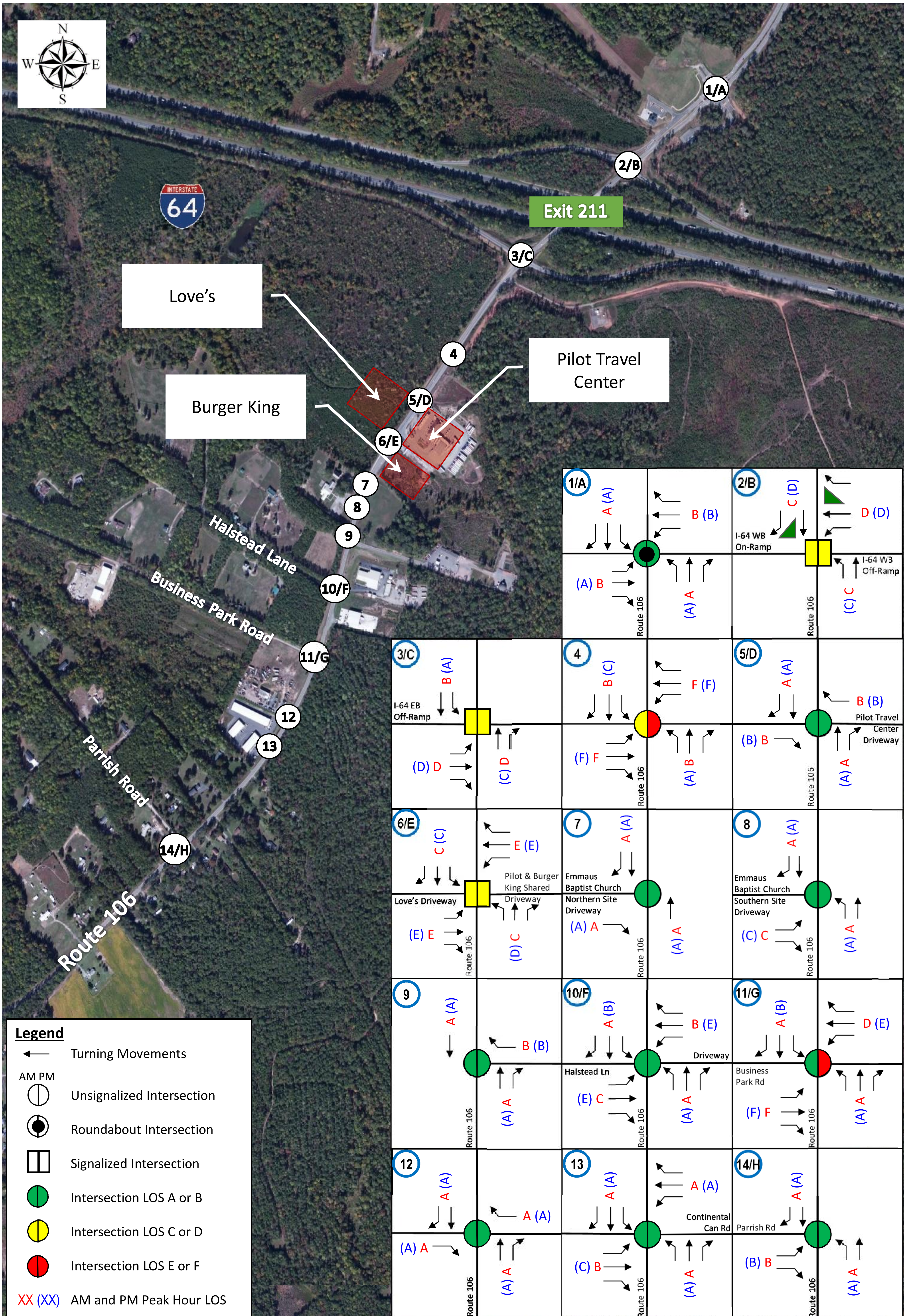
Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)			
		Eastbound LT/TH/RT	Westbound LT/TH/RT	Northbound LT/TH/RT	Southbound LT/TH/RT
AM Peak Hour					
2040 Unimproved	A (1.7)	C (19.2)	C (16.5)	A (0.3)	A (0.0)
2040 Improved	A (0.2)	B (14.0)	A (0.0)	A (8.1)	A (0.0)
PM Peak Hour					
2040 Unimproved	F (75.0)	F (127.6)	F (238.7)	A (0.1)	A (0.0)
2040 Improved	A (0.5)	C (19.4)	A (0.0)	A (9.0)	A (0.0)
Source: Kimley-Horn and Associates, Inc.					
Note: Worst Control Delay is provided under each approach					

Table 41: Route 106 at Parrish Road Unsignalized Intersection LOS

Scenario	Overall LOS	Level of Service by Approach (Delay in sec/veh)		
		Eastbound LT/RT	Northbound LT/TH	Southbound TH/RT
AM Peak Hour				
2040 Unimproved	A (0.1)	C (15.3)	A (0.0)	A (0.0)
2040 Improved	A (0.1)	B (12.6)	A (0.0)	A (0.0)
PM Peak Hour				
2040 Unimproved	A (0.3)	C (16.3)	A (0.2)	A (0.0)
2040 Improved	A (0.2)	B (12.9)	A (9.0)	A (0.0)
Source: Kimley-Horn and Associates, Inc.				
Note: Worst Control Delay is provided under each approach				



Kimley»Horn	Route 106 Arterial Management Plan New Kent County, VA	2040 AM and PM LOS Analysis – Unimproved Roadway Network	Figure 30



Kimley»Horn

Route 106 Arterial Management Plan
New Kent County, VA

2040 AM and PM LOS Analysis - Improved Roadway Network

Figure 31

Chapter 6.0 ROUTE 106 AMP RECOMMENDATIONS

Recommendations for specific improvements to the Route 106 corridor have been split into short-term (zero to five years), mid-term (five to fifteen years), and long-term (fifteen to twenty-five plus years) categories based primarily on their scale as well as the time frame in which they are expected to be needed. This approach allows communities to prioritize larger scale projects over time while also being able to implement shorter term projects that mitigate immediate needs at relatively lower costs. Planning-level cost estimates, expressed in year 2016 dollars, have also been included for all recommendations. These planning-level cost estimates have been based on VDOT's statewide two-year cost averages for 2014, the VDOT Transportation & Mobility Planning Division's "Statewide Planning Level Cost Estimates" worksheet from 2009, and familiarity with similar projects and improvements throughout Virginia. Due to fluctuations in the costs of labor, materials, and equipment, fluctuations in the market, and the outcome of competitive bidding as well as the general planning-level nature of the recommendations, these estimated costs are neither exact nor guaranteed.

Variation between actual and estimated costs will change as time passes, and the time value of money has not been taken into account. Cost estimations performed using the "Statewide Planning Level Cost Estimates" worksheet include right-of-way (ROW) acquisition cost estimates developed with the sheet's methodology. The stormwater collection and conveyance cost estimates included in this report assume the use of standard VDOT design specifications for roadway drainage including the use of concrete curb and gutter and concrete pipe for conveying stormwater to the treatment locations. The costs for specific stormwater management features are not included in this corridor study because of the large variability in the type of stormwater treatment facilities contained in the Virginia Stormwater Management Clearinghouse and the uncertainty in the amount of additional ROW that the County may need to purchase to accommodate such features. Overall stormwater management costs will ultimately be dictated by the combination and number of total number of stormwater management measures determined necessary as a part of the roadway design.

The cost breakdown per scenario includes engineering/design costs, roadway/intersection improvement costs (e.g., cost per mile for a particular roadway typical section, turn-lane improvements, roundabout, bridges/box culverts, milling, overlay, sidewalks, turn-lane channelization, stormwater collection and conveyance, landscaping (e.g., trees, seeding), etc.), traffic signal equipment improvement costs (e.g., poles, mast arms, signal heads, pedestrian signal head equipment and construction), construction engineering and inspection (CEI) costs, right-of-way (ROW) acquisition, and utility relocation costs as well as miscellaneous costs which includes, mobilization, sediment and erosion control, traffic control (i.e., maintenance of traffic (MOT) during construction). Furthermore, a 10% contingency was applied for general roadway construction cost, while a 15% contingency was applied for bridge construction costs.

Section 6.1 Short-Term Recommendations (0 to 5 years)

The short-term recommendations identified for the corridor address existing and anticipated operational issues that were brought up by the public and represent some of the critical issues for the area. Some of the feedback that was provided by the public was directed at the existing unsignalized intersection at the Pilot Travel Center/Burger King entrance as well as the future signalized Love's Country Store/Pilot Travel Center intersection.

Local residents, land owners, and business owners reported that the intersection is often congested with truck traffic and it is expected to only become worse with additional truck centered services and future development reliant on trucks to transport materials and goods.

Short-term recommendations for the Route 106 Arterial Management Plan study area consist of plan adoption, signage and pavement marking improvements, ongoing maintenance and upkeep, roadway safety enhancements (e.g., drainage and shoulder widening), the future signalization of Love's Country Store/Pilot Travel Center intersection, as well as select intersection improvements needed in the near future.

Route 106 Arterial Management Plan Adoption

To memorialize the plan and the associated improvements envisioned for the corridor study area, New Kent County must formally adopt the Route 106 Arterial Management Plan. The findings and recommendations from the study must then be incorporated in the County's Comprehensive Plan and the Richmond Regional Transportation Planning Organization's (RRTPO) Long Range Transportation Plan. It will be important for New Kent County to work closely with the Richmond Regional TPO so key projects can be planned and then programmed into the VDOT Six Year Improvement Program (SYIP), and that funding sources are identified to ensure implementation. The implementation window for the following recommendations is between zero and five years.

Route 106 at Love's Country Store/Pilot Travel Center Site Access Driveways

- Install a traffic signal as a part of the proposed development and intersection improvement project.
- Optimize traffic signal phasing and timing plans to accommodate peak/off-peak hour traffic along Route 106 corridor and side street demand.

<u>Northbound Route 106</u>

- Construct one exclusive left-turn lane
- Maintain one through lane
- Maintain one exclusive right-turn lane

<u>Southbound Route 106</u>

- Maintain one exclusive left-turn lane
- Maintain one through lane
- Construct one exclusive right-turn lane

<u>Eastbound Love's Site Access Driveway</u>

- Construct one shared through/left-turn lane – trap lane for approaching eastbound travel lane
- Construct one exclusive right-turn lane

Westbound Pilot Travel Center/Burger King Site Access Driveway

- East leg of intersection from Route 106 back to first internal site driveway intersections (i.e., Pilot Travel Center to the north/Burger King to the south, a distance of approximately 80') should be restriped to reflect the following laneage:
- One inbound leg
- Two outbound lanes consisting of the following:
  - One shared through/left-turn lane
  - One exclusive right-turn lane
- Install/stripe out "DO NOT BLOCK INTERSECTION" pavement markings to reflect protected operational area of the intersection
- Install supplemental "DO NOT BLOCK INTERSECTION" signage to further emphasize the need to not impede inbound left-turning vehicles from accessing the Pilot Travel Center site
- Maintain the existing Right-In/Right-Out (RI/RO) Burger King Driveway located immediately south of this intersection

6.1.1 Short-Term – Opinion of Probable Costs

The planning level cost estimates for the short-term alternatives are shown in **Table 42**. Individual estimates for the alternatives are broken out by the phase (i.e., preliminary engineering, right of way, and construction costs).

Table 42: Short-Term Alternatives Opinion of Probable Costs

Improvement	2016 Dollars			
	PE	RW	CN	Total
Route 106 Love's/Pilot Travel Center Intersection Improvements	$194,000	$125,000	$1,447,000	$1,766,500
Total	**$194,000**	**$125,000**	**$1,447,000**	**$1,766,500**

Notes: PE = Preliminary Engineering, RW = Right of Way and Utility Relocation, CN = Construction

Section 6.2 Mid-Term Recommendations (5 to 15 years)

The specific mid-term recommendations identified in this section address anticipated operational and future site access issues for the corridor. Due to some uncertainty regarding the timing and scale of expected growth and development along the corridor as well as market demand, definitive implementation for the proposed improvements place them outside the time period for short-term improvements. These challenges consist of the additional coordination needed between existing property owners for shared access points, cross access agreements, and the consolidation of commercial access driveways, and funding considerations. Additionally, these recommendations begin to reflect the requirements and strategies at the core of an arterial management plan as well as reflect the interim and ultimate vision for the corridor.

Mid-term recommendations for the Route 106 corridor study area consist of installing traffic signals at the I-64/Exit 211 eastbound and westbound off/on-ramp intersections, spot intersection turn-lane improvements, and site driveway access management strategies, with the intent of extending the operational life cycle of the two-lane corridor as it exists today. The implementation window for the following recommendations is between five to fifteen years.

Route 106 at I-64/Exit 211 Bridge Overpass

- Widen existing bridge span to accommodate a 3-lane typical section. Widening will facilitate the ability to install traffic signals at the two I-64/Exit 211 Off/On-Ramp intersections as well as the implementation of exclusive left-turn lanes along Route 106 to enhance intersection operations. This improvement will also intermittently extend the operational life cycle of the Route 106 corridor and the I-64/Exit 211 interchange.

Route 106 at I-64/Exit 211 Westbound Off/On-Ramp

- Install a traffic signal when warrants are met to accommodate anticipated future development traffic volume demand and to maintain acceptable interchange off/on-ramp intersection operational conditions.
- Optimize traffic signal phasing and timing plans to accommodate peak/off-peak hour traffic along Route 106 but to also mitigate potential off-ramp queueing from impacting I-64 Westbound mainline operations.

Northbound Route 106

- Construct one exclusive left-turn lane
- Maintain one through lane

Southbound Route 106

- Maintain one through lane
- Maintain one exclusive right-turn lane

Westbound I-64 Off-Ramp

- Maintain one shared through/left-turn lane
- Construct one exclusive right-turn lane
- Extend the I-64 Westbound Off-Ramp deceleration lane approximately 250 feet to provide a longer transitional area for passenger vehicles and trucks as they reduce their speed preparing to exit and access Route 106.

Westbound I-64 On-Ramp

- Re-stripe and clearly define the I-64 Westbound On-Ramp acceleration lane over a distance of approximately 600 feet (similar to the I-64 Eastbound On-Ramp) to designate a longer transitional area for passenger vehicles and trucks as they increase their speed preparing to access/merge into the I-64 mainline.

Route 106 at I-64 Eastbound Off/On-Ramp

- Install a traffic signal when warrants are met to accommodate anticipated future development traffic volume demand and to maintain acceptable interchange off/on-ramp intersection operational conditions.
- Optimize traffic signal phasing and timing plans to accommodate peak/off-peak hour traffic along Route 106 but to also mitigate potential off-ramp queueing from impacting I-64 Eastbound mainline operations.

Northbound Route 106

- Maintain one exclusive through lane
- Construct one exclusive right-turn lane

Southbound Route 106

- Construct one exclusive left-turn lane
- Maintain one through lane

Eastbound I-64 Off-Ramp

- Maintain/construct one shared through/left-turn lane
- Construct one exclusive right-turn lane
- Extend the I-64 Eastbound Off-Ramp deceleration lane approximately 250 feet to provide a longer transitional area for passenger vehicles and trucks as they reduce their speed preparing to exit and access Route 106.

Route 106 at Pilot Travel Center "North" Site Access Driveway

- Following the installation of the Love's Country Store/Pilot Travel Center traffic signal, the existing northern site access driveway that serves the Pilot Travel Center, should be modified/converted to a Right-In/Right-Out (RI/RO) Only access driveway. This will encourage drivers wishing to travel south on Route 106 to use the new Love's/Pilot Travel Center signalized intersection and will mitigate adverse impacts to the Love's/Pilot Travel Center intersection operations and general operational safety.
- The modification of the existing full-movement site access driveway to a partial access driveway will meet minimum spacing standards for Commercial Entrances, Intersections, and Median Crossovers, per Appendix F - VDOT Access Management Design Standards for Entrances and Intersections.

Route 106 at Business Park Road/Proposed Future Development Site Access Driveway

- Construct/implement intersection improvements associated with Future Development Site Access Driveway and associated Route 106 exclusive turn-lane improvements.

Northbound Route 106

- Construct one exclusive left-turn lane
- Construct one shared through/right-turn lane
  - Monitor right-turning movement traffic volumes associated with anticipated future development and construct exclusive right-turn lane when warrants are met.

Southbound Route 106

- Construct one exclusive left-turn lane
- Construct one shared through/right-turn lane
  - Monitor right-turning movement traffic volumes associated with anticipated future development and construct exclusive right-turn lane when warrants are met.

Eastbound Business Park Road

- Construct one shared through/left-turn lane
- Construct one exclusive right-turn lane

Westbound Future Development Site Access Driveway

- Construct one shared through/left-turn lane
- Construct one exclusive right-turn lane

Route 106 at New Kent Business Center/Continental Can Road

- Construct/implement intersection improvements to accommodate Route 106 exclusive turn-lane improvements
- Relocate/realign Continental Can Road to the north to align with the New Kent Business Center Site Access Driveway
  - This will eliminate the slight offset between the two roadway approaches to the intersection resulting in a conventional four-legged intersection.

Northbound Route 106

- Construct one exclusive left-turn lane
- Construct one shared through/right-turn lane
  - Monitor right-turning movement traffic volumes associated with anticipated future development and construct exclusive right-turn lane when warrants are met.

Southbound Route 106

- Construct one exclusive left-turn lane
- Construct one shared through/right-turn lane
  - Monitor right-turning movement traffic volumes associated with anticipated future development and construct exclusive right-turn lane when warrants are met.

Eastbound New Kent Business Center

- Construct one shared through/left-turn lane
- Construct one exclusive right-turn lane

Westbound Realigned Continental Can Road

- Construct one shared left/through/right-turn lane

6.2.1 Mid-Term – Opinion of Probable Costs

The planning level cost estimates for the mid-term alternatives are shown in **Table 43**. Individual estimates for the alternatives are broken out by the phase (i.e., preliminary engineering, right of way, and construction costs).

Table 43: Mid-Term Alternatives Opinion of Probable Costs

Improvement	2016 Dollars			
	PE	RW	CN	Total
Route 106 at I-64/Exit 211 Bridge Overpass and Interchange Off/On-Ramp Improvements	$944,000	$667,000	$7,424,000	$9,035,000
Route 106 at Business Park Road/Future Business Site Access Driveway	$293,000	$325,000	$2,578,000	$3,196,000
Route 106 at New Kent Business Center/Realigned Continental Can Road	$281,000	$310,000	$2,488,000	$3,079,000
Total	**$1,518,000**	**$1,302,000**	**$12,490,000**	**$15,310,000**

Notes: PE = Preliminary Engineering, RW = Right of Way and Utility Relocation, CN = Construction

Section 6.3 Long-Term Recommendations (15 to 25 years)

The specific long-term recommendations identified in this section address anticipated future development traffic demands and the improvements necessary to support/sustain acceptable traffic operations, safety, and accessibility along the corridor. These recommendations have some additional challenges expected for implementation that would place them outside the time period for the short-term or mid-term improvements. These challenges consist of the additional coordination between existing property owners, funding considerations, and the scale and schedule of future developments. Economic factors such as market demand will play the largest factor in triggering the need to improve the corridor beyond its current condition to a four-lane divided roadway with the likely need for associated I-64/Exit 211 interchange ramp and intersection improvements.

Long-term recommendations for the Route 106 corridor study area consist of widening the roadway from a 2-lane to a 4-lane facility, constructing a second I-64 overpass bridge span, I-64/Exit 211 eastbound and westbound off/on-ramp intersection improvements, corridor study area/system wide intersection turn-lane improvements, standardized full-movement and partial access intersection spacing consistent with the minimum spacing standards for Commercial Entrances, Intersections, and Median Crossovers, per Appendix F - VDOT Access Management Design Standards for Entrances and Intersections. The implementation window for the following recommendations is between fifteen to twenty-five plus years. **Figure 33** through **Figure 37** graphically display the conceptual long-term recommendations.

Route 106 Corridor

- As a result of the public involvement process, a preferred typical section was selected. The preferred typical section consists of improving existing Route 106 from a 2-lane facility to a 4-lane divided roadway.
- With the divided roadway, construct a 16 to 20-foot variable width median along the corridor between Parrish Road to the south and the I-64 Eastbound Off-Ramp to the north
  - The 16 to 20-foot median will allow for the construction of 12-foot full width left-turn lanes where applicable while maintaining a 4 to 8-foot median to provide physical separation between traffic located in the turn-lane and traffic in the opposing/oncoming travel lane.
- Transition of the roadway from a 4-lane facility back down to a 2-lane facility should occur over a distance of approximately 1,000 feet south of the Route 106/Parrish Road intersection.
  - This will allow for an adequate transition between the two typical sections and mitigate the potential for congestion as vehicles merge down from 2 to 1-lane traveling southbound toward U.S. Route 60.
- Construct the proposed 4-lane typical section north of the I-64 Eastbound Off/On-Ramp intersection to the roundabout intersection north of the I-64 Westbound Off/On-Ramp intersection
- Construct a second bridge span over I-64 to accommodate the additional two travel lanes along Route 106
- Tie proposed 4-lane typical section improvements into existing 4-lane typical section located in the immediate vicinity of the New Kent County Visitors Center and immediately south of the Roundabout.
- Conduct a speed study to identify the need to reduce the existing speed limit of 55 mph to 45 mph extending to Parrish Road.

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- Maintain and/or implement desirable access management strategies to accommodate, prohibit, restrict, or best mitigate full-movement crossovers/intersections located along the Route 106 corridor. Maintain or locate full-movement intersections at the following locations:
  - I-64/Exit 211 Westbound Off/On-Ramp
  - I-64/Exit 211 Eastbound Off/On-Ramp
  - Proposed/planned New Kent City Center Site Access Driveway
  - Love's Country Store/Pilot Travel Center
  - Emmaus Baptist Church South Site Access Driveway
  - Halstead Lane/ISC Site Access Driveway
  - Business Park Road/Proposed Future Development Site Access Driveway
  - New Kent Business Center/Continental Can Road
  - Parrish Road
  - Location and spacing of other subsequent full-movement intersections will be based on the immediately adjacent full-movement intersection or partial access intersection, VDOT Access Management Guidelines, and intersections serving high traffic demand side streets locations.
- Construct exclusive left-turn lanes along Route 106 at designated full-movement intersections.
- Construct partial access intersections along Route 106 consisting of right-in/right-out/left-over laneage, right-in/right-out only laneage, and/or channelized U-Turns.

Route 106 at I-64/Exit 211 Westbound Off/On-Ramp

- Install a traffic signal to accommodate proposed roadway widening and interchange off/on-ramp intersection capacity/operational changes
- Optimize traffic signal phasing and timing plans to accommodate peak/off-peak hour traffic along Route 106 but to also mitigate potential off-ramp queueing from impacting I-64 Westbound mainline operations.

<u>Northbound Route 106</u>

- Construct two exclusive left-turn lanes
- Construct two through lanes

<u>Southbound Route 106</u>

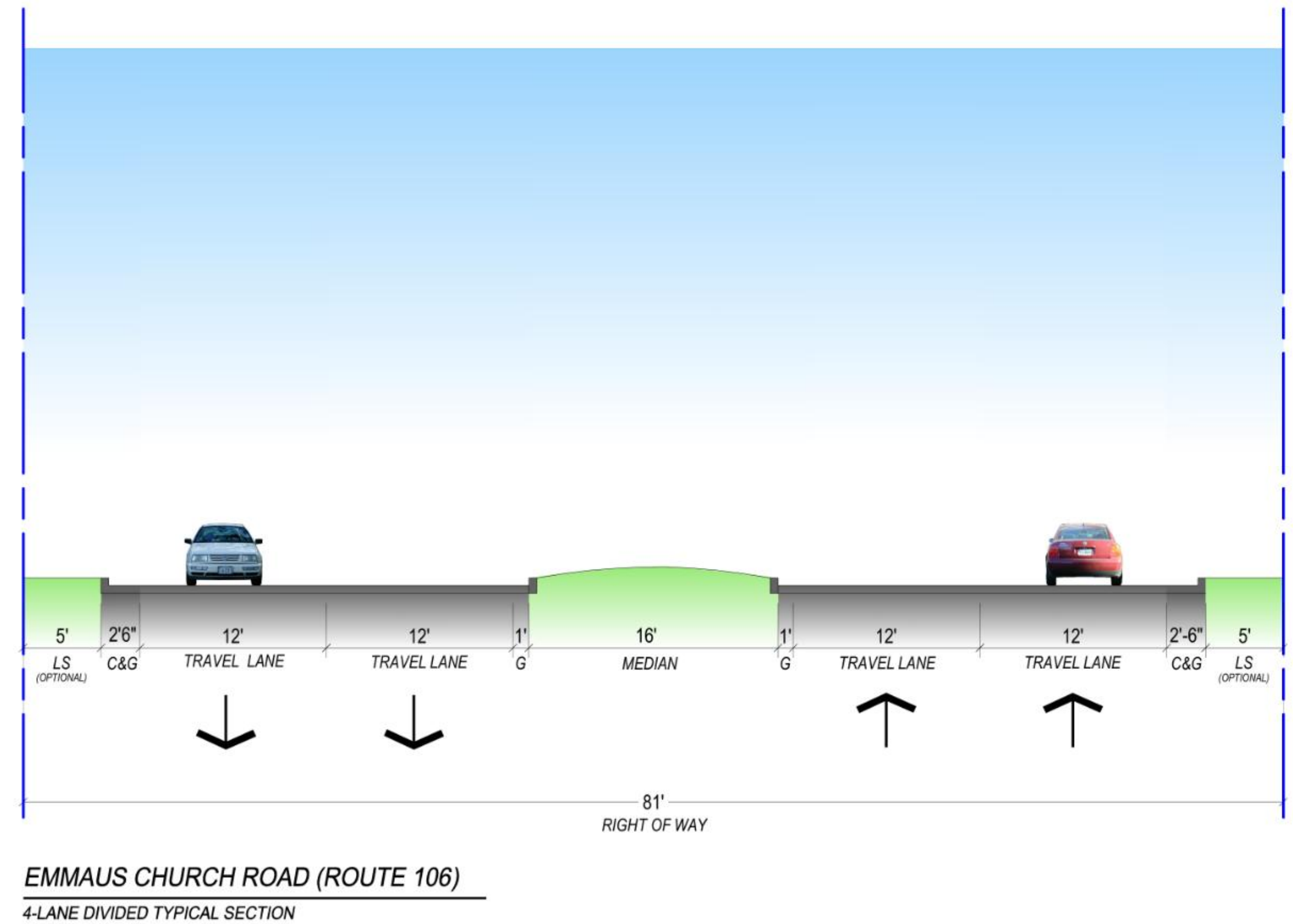
- Construct two exclusive through lanes
- Maintain/construct one exclusive right-turn lane

<u>Westbound I-64 Off-Ramp</u>

- Construct one exclusive left-turn lane
- Construct one shared through/left-turn lane
- Construct one exclusive right-turn lane

- Construct, delineate, and/or improve the I-64 Westbound deceleration/acceleration lane lengths so they are consistent with current VDOT Road Design Manual standards for Interstate facilities.

Figure 32: Four-Lane Divided Typical Section



Route 106 at I-64 Exit 211 Eastbound Off/On-Ramp

- Install a traffic signal to accommodate proposed roadway widening and interchange off/on-ramp intersection capacity/operational changes
- Optimize traffic signal phasing and timing plans to accommodate peak/off-peak hour traffic along Route 106 but to also mitigate potential off-ramp queueing from impacting I-64 Eastbound mainline operations.

<u>Northbound Route 106</u>

- Construct two exclusive through lanes
- Maintain/construct one exclusive right-turn lane

Southbound Route 106

- Construct one exclusive left-turn lane
- Construct two through lanes

Eastbound I-64 Off-Ramp

- Construct one exclusive left-turn lane
- Construct one shared through/left-turn lane
- Construct two exclusive right-turn lanes
- Construct, delineate, and/or improve the I-64 Eastbound deceleration/acceleration lane lengths so they are consistent with current VDOT Road Design Manual standards for Interstate facilities

Route 106 at Proposed/Planned New Kent City Center Site Access Driveway

- Construct as new full movement unsignalized intersection

Northbound Route 106

- Construct one exclusive left-turn lane
- Construct two through lanes
- Construct one exclusive right-turn lane

Southbound Route 106

- Construct one exclusive left-turn lane
- Construct two through lanes
- Construct one exclusive right-turn lane

Eastbound New Kent City Center Site Access Driveway

- Construct one shared through/left-turn lane
- Construct one exclusive right-turn lane

Westbound New Kent City Center Site Access Driveway

- Construct one shared through/left-turn lane
- Construct one exclusive right-turn lane

Route 106 at Pilot Travel Center/Future Development Shared Site Access Driveway (Right-In/Right-Out Only)

- When/if future development of the parcel immediately north of and adjacent to the existing Pilot Travel Center occurs a cross access point between the two properties/businesses should be constructed so both properties/businesses can use a shared Right-In/Right-Out (RI/RO) Only access driveway.
- The existing northern site access driveway along Route 106 that serves the Pilot Travel Center should be closed to further encourage use of the shared access point and to meet minimum spacing standards for Commercial Entrances, Intersections, and Median Crossovers, per Appendix F - VDOT Access Management Design Standards for Entrances and Intersections.

Route 106 at Love's/Pilot Travel Center Site Access Driveways

- Modify/upgrade traffic signal as a part of the proposed widening of Route 106.
- Optimize traffic signal phasing and timing plans to accommodate peak/off-peak hour traffic along Route 106 corridor and side street demand.

Northbound Route 106

- Modify/construct one exclusive left-turn lane
- Construct two through lanes
- Maintain/construct one exclusive right-turn lane

Southbound Route 106

- Maintain/construct one exclusive left-turn lane
- Construct two through lanes
- Maintain/construct one exclusive right-turn lane

Eastbound Love's Site Access Driveway

- Maintain/construct one shared through/left-turn lane – trap lane for approaching eastbound travel lane
- Maintain/construct one exclusive right-turn lane

Westbound Pilot Travel Center/Burger King Site Access Driveway

- East leg of intersection from Route 106 back to first internal site driveway intersections (i.e., Pilot Travel Center to the north/Burger King to the south, a distance of approximately 80') should be restriped to reflect the following laneage:
    - One inbound leg
    - Two outbound lanes consisting of the following:
        - One shared through/left-turn lane
        - One exclusive right-turn lane
- Install/stripe out "DO NOT BLOCK INTERSECTION" pavement markings to reflect protected operational area of the intersection
- Install supplemental "DO NOT BLOCK INTERSECTION" signage to further emphasize the need to not impede inbound left-turning vehicles from accessing the Pilot Travel Center site
- Maintain the existing Right-In/Right-Out (RI/RO) Burger King Driveway located immediately south of this intersection

Route 106 at Emmaus Baptist Church Northern Site Access Driveway (Right-In/Right-Out Only)

- The existing northern site access driveway along Route 106 that serves the Emmaus Baptist Church should be modified/reconstructed as a Right-In/Right-Out (RI/RO) only site access driveway.
    - Construct a new RI/RO westbound approach across from Emmaus Baptist Church Northern Site Access Driveway
    - The proposed RI/RO site access driveway shall be located in the immediate vicinity of the existing northern site access driveway to meet minimum spacing standards for Commercial Entrances, Intersections, and Median Crossovers, per Appendix F - VDOT Access Management Design Standards for Entrances and Intersections.

Route 106 at Emmaus Baptist Church Southern Site Access Driveway

- Construct as new full movement unsignalized intersection

<u>Northbound Route 106</u>

- Construct one exclusive left-turn lane
- Construct one exclusive through lane

<u>Southbound Route 106</u>

- Construct one exclusive left-turn lane (to accommodate U-Turns)
- Construct two through lanes
- Construct one exclusive right-turn lane

<u>Eastbound Emmaus Baptist Church Site Access Driveway</u>

- Construct one exclusive left-turn lane
- Construct one exclusive right-turn lane

Route 106 at VDOT Site Access Driveway

- The existing site access driveway along Route 106 that serves the VDOT site should be modified/reconstructed as a Right-In/Right-Out (RI/RO) only site access driveway.
- The proposed RI/RO site access driveway shall be located in the immediate vicinity of the existing site access driveway to meet minimum spacing standards for Commercial Entrances, Intersections, and Median Crossovers, per Appendix F - VDOT Access Management Design Standards for Entrances and Intersections.

Route 106 at Halstead Lane/ISC Site Access Driveway

- Construct as new full movement unsignalized intersection
- Relocate Halstead Lane to the north approximately 50 feet to align with the ISC Site Access Driveway
    - This will eliminate the two offset approaches to the intersection resulting in a conventional four-legged intersection that can be served by a single median crossover.

<u>Northbound Route 106</u>

- Construct one exclusive left-turn lane
- Construct two through lanes
- Construct one exclusive right-turn lane

<u>Southbound Route 106</u>

- Construct one exclusive left-turn lane
- Construct two through lanes
- Construct one exclusive right-turn lane

<u>Eastbound Halstead Lane</u>

- Construct one shared through/left-turn lane
- Construct one exclusive right-turn lane

<u>Westbound ISC Site Access Driveway</u>

- Construct one shared left/through/right-turn lane

Route 106 at Jasper Engines and Transmissions Site Access Driveway

- Construct a cross access point/drive aisle between the Jasper Engines and Transmission and ISC properties.
- Provide access for Jasper Engines and Transmissions to/from the proposed Route 106 at Halstead Lane/ISC full movement intersection.
- Maintain the existing Jasper Engines and Transmissions site access driveway along Route 106 as a Right-in/Right-out only driveway. With the relocation of Halstead Lane to the north approximately 50 feet and the speed limit along this segment at 45 mph, the driveway location should meet minimum spacing standards for Commercial Entrances, Intersections, and Median Crossovers, per Appendix F - VDOT Access Management Design Standards for Entrances and Intersections.

Route 106 at Business Park Road/Proposed Future Development Site Access Driveway

- Construct as new full movement unsignalized intersection
- Install a traffic signal when warrants are met to accommodate anticipated future development traffic volume demand. For the purpose of this study, this intersection was analyzed as a full movement unsignalized due to the uncertainty of the signal warrant adherence.

<u>Northbound Route 106</u>

- Construct one exclusive left-turn lane
- Construct two through lanes
- Construct one exclusive right-turn lane

Southbound Route 106

- Construct one exclusive left-turn lane
- Construct two through lanes
- Construct one exclusive right-turn lane

Eastbound Business Park Road

- Construct one shared through/left-turn lane
- Construct one exclusive right-turn lane

Westbound Proposed Future Development Site Access Driveway

- Construct one shared through/left-turn lane
- Construct one exclusive right-turn lane

Route 106 at Dennis Truck Repair Site Access Driveway (Right-In/Right-Out Only)

- Construct/configure the existing Dennis Truck Repair site access driveway along Route 106 as a Right-In/Right-Out (RI/RO) only site access driveway.
- Construct a new RI/RO westbound approach across from Dennis Truck Repair Site Access Driveway
  - The proposed RI/RO site access driveway should remain located in the immediate vicinity of the existing site access driveway to meet minimum spacing standards for Commercial Entrances, Intersections, and Median Crossovers, per Appendix F - VDOT Access Management Design Standards for Entrances and Intersections.
  - Construct a new roadway connection and site access driveway along Business Park Road to serve Dennis Truck Repair
    - This will provide access for Dennis Truck Repair to/from the proposed Route 106 at Business Park Road/Proposed Future Development Site Access Driveway intersection

Route 106 at New Kent Business Center Site Access Driveway/Continental Can Road

- Construct as new full movement unsignalized intersection

Northbound Route 106

- Construct one exclusive left-turn lane
- Construct two through lanes
- Construct one exclusive right-turn lane

Southbound Route 106

- Construct one exclusive left-turn lane
- Construct two through lanes
- Construct one exclusive right-turn lane

Eastbound New Kent Business Center Site Access Driveway

- Construct shared through/left-turn lane
- Construct one exclusive right-turn lane

Westbound Continental Can Road

- Construct one shared through/left-turn lane
- Construct one exclusive right-turn lane

Route 106 at Parrish Road

- Construct as new full movement unsignalized intersection
- Close the residential driveway immediately south of the eastbound approach and provide a connection to Parrish Road further west of Route 106

Northbound Route 106

- Construct one exclusive left-turn lane
- Construct two through lanes

Southbound Route 106

- Construct one exclusive left-turn lane (to accommodate U-Turns)
- Construct two through lanes
- Construct one exclusive right-turn lane

Eastbound Parrish Road

- Construct one shared left/right-turn lane

6.3.1 Long-Term – Opinion of Probable Costs

The planning level cost estimates for the long-term alternatives are shown in **Table 44**. Individual estimates for the alternatives are broken out by the phase (i.e., preliminary engineering, right of way, and construction costs).

Table 44: Long-Term Alternatives Opinion of Probable Costs

Improvement	2016 Dollars			
	PE	RW	CN	Total
Route 106 at I-64/Exit 211 New Bridge Overpass and Interchange Off/On-Ramp Improvements	$3,092,000	$558,000	$20,264,000	$23,914,000
Route 106 Widening to 4-Lane Roadway	$2,366,000	$2,845,000	$17,356,000	$22,567,000
Route 106 at New Kent City Center Access Driveways Intersection	$87,000	$47,000	$440,000	$574,000
Route 106 at Love's/Pilot Travel Center Signalized Intersection	$177,000	$120,000	$1,099,000	$1,396,000
Route 106 at Emmaus Church Site Access Driveways and VDOT Site Access Driveway	$53,000	$32,000	$302,000	$387,000
Route 106 at Relocated Halstead Lane and ISC Site Access Driveway/Jasper Engines Access	$231,000	$154,000	$1,582,000	$1,967,000
Route 106 at Business Park Road and Future Development Access Driveway	$128,000	$77,000	$707,000	$912,000
Route 106 at New Kent Business Center and Continental Can Road	$138,000	$85,000	$828,000	$1,051,000
Route 106 at Parrish Road	$112,000	$76,000	$776,000	$964,000
Total	**$6,384,000**	**$3,994,000**	**$43,354,000**	**$53,732,000**

Notes: PE = Preliminary Engineering, RW = Right of Way and Utility Relocation, CN = Construction

Section 6.4 Other Alternatives

6.4.1 Bike and Pedestrian

Pedestrian and bicycle accommodations were considered (e.g., sidewalks, multi-use paths, etc.) in conjunction with the proposed arterial improvements, where feasible. However, bicycle and pedestrian accommodations were not included in the preferred typical section due to the lack of existing or expected future users as well as valid safety concerns associated with the perceived encouragement of mixing heavy vehicular/truck traffic with bicycle traffic and pedestrian activity. For these same reasons, bike lanes are not recommended along the Route 106 study area corridor. In addition, since Route 106 is currently designated as a bicycle route within New Kent County, it is recommended that this designation be removed for the segment of Route 106, beginning immediately south of the New Kent County Visitor's and Commerce Center, in the vicinity of the I-64 westbound Off/On-ramps intersection, to the U.S. Route 60 (Pocahontas Trail) intersection. The removal of this designation should be addressed during the next update to the County's Comprehensive Plan.

6.4.2 Park & Ride Facilities

As the study area continues to develop New Kent County should plan for Park & Ride facilities in conjunction with other transportation improvement projects such as interchange modifications, road widening, and multimodal facilities. Park & Ride facilities are suggested to be considered when parcels of land are available in close proximity to limited-access facilities. Park & Ride facilities located near limited-access facilities are attractive for ridesharing and/or express bus service to employment centers. Future opportunities to provide a Park & Ride lot in the vicinity of the I-64 and Route 106 interchange should be explored. It is anticipated that the need for Park & Ride facilities could increase in the future as congestion levels intensify, fuel costs increase, and/or more and more people seek ridesharing opportunities to commute to employment centers.

6.4.3 Transit and Ride Share

Potential transit (local transit service, express bus service, bus rapid transit, etc.) and/or rideshare (vanpool, carpool, etc.) recommendations within the study area is dependent on the type and density of future development within study area and surrounding region. Transit and ride share services could be in demand as development along the study corridor gains momentum and congestion increases along I-64, Route 106, and other major travel routes in New Kent County. The County should look for opportunities to incorporate transit services as needed. Possible services could include ride sharing and express bus destinations. Transit services in conjunction with other components of the plan help to manage and preserve capacity and safety on the study corridors.

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Route 106 Arterial Management Plan
New Kent County, VA

Conceptual Long-Term Recommendations
Sheet 1 of 5

Figure 33

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Route 106 Arterial Management Plan
New Kent County, VA

Conceptual Long-Term Recommendations
Sheet 2 of 5

Figure 34

Kimley»Horn	Route 106 Arterial Management Plan New Kent County, VA	Conceptual Long-Term Recommendations Sheet 3 of 5	Figure 35

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Route 106 Arterial Management Plan
New Kent County, VA

Conceptual Long-Term Recommendations
Sheet 5 of 5

Figure 37

Chapter 7.0 IMPLEMENTATION PLAN

The next key step in the planning process is to determine how the recommended improvements will be implemented. Both New Kent County and VDOT officials will need to determine implementation strategies as well as establish project priorities. Implementation strategies to consider include seeking and identifying funding streams, both public and private, to construct improvements. There are several potential public programs that may assist with funding projects. At the federal level there are earmarks, National Highway System funds, Congestion Mitigation Air Quality (CMAQ) funds, bridge funds, Surface Transportation Block Grant Program (STBG), Highway Safety Improvement Program (HSIP) funds, and Transportation Alternatives Program (TAP) funds, to name a few. At the state level there is the VDOT Six-Year Improvement Program (SYIP) that can help define what alternative funding sources the project may qualify for such as; the Recreational Access Program, the Economic Development Access Program, or the Revenue Sharing Program.

It is recommended that proposed improvements be prioritized into projects with both County and VDOT input. Each project should be thoroughly evaluated then identified for priority order, time frame from implementation, and potential funding sources.

Section 7.1 Federal Funding Source Alternatives

To assist New Kent County, a review of available federal funding sources is provided with a summary of federal roadway/transportation alternative improvement funding programs.

7.1.1 Congestion Mitigation and Air Quality (CMAQ)

The CMAQ program, as continued under the "Fixing America's Surface Transportation Act" (FAST Act), provides a flexible funding source to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. FAST Act, signed into law in December 2015. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter (nonattainment areas) and for former nonattainment areas that are now in compliance (maintenance areas).

The CMAQ program supports two important goals of the Department of Transportation: improving air quality and relieving congestion. The typical split for CMAQ projects between federal funding and the project sponsor is 80% federal and 20% state and/or local match. By policy the CTB has delegated the authority to allocate CMAQ funds to the Metropolitan Planning Organization's (MPO) in nonattainment and maintenance areas. The Richmond area was designated by the Environmental Protection Agency (EPA) in 2007 as a maintenance area. New Kent County is on the border of this maintenance area and therefore, not eligible for CMAQ funding. (http://www.fhwa.dot.gov/fastact/factsheets/cmaqfs.cfm)

7.1.2 Highway Safety Improvement Program (HSIP)

Safety throughout all transportation programs remains VDOT's number one priority. The Federal FAST Act continues the successful HSIP, with average annual funding of $2.4 billion, including $220 million per year for the Rail-Highway Crossings program. The next round of HSIP funding will become available for use in FY17.

The HSIP emphasizes a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance. The foundation for this approach is a safety data system, which each state is required to have to identify key safety problems, establish their relative severity, and then adopt strategic and performance-based goals to maximize safety. Every state is required to develop a Strategic Highway Safety Plan (SHSP) that lays out strategies to address these key safety problems. Every State now has an SHSP in place, and FAST Act ensures ongoing progress toward achieving safety targets by requiring regular plan updates and defining a clear linkage between behavioral (NHTSA funded) State safety programs and the SHSP. Virginia's 2012-2016 SHSP identified seven emphasis areas for the updated plan including speeding, young drivers, occupant protection, impaired driving, roadway departures, intersections and data collection / management / analysis. The updated SHSP also initiates a comprehensive evaluation plan to track progress and effectiveness towards the plan's goal of reducing deaths and severe injuries by half by 2030.

The current VDOT Six Year Improvement Plan (SYIP) does not provide HSIP funding on the non-interstate system beyond FY 2014. The federal share for HSIP projects is 90%, with the remaining 10% typically being covered by VDOT. Where VDOT funding is limited, however, the locality could be required to cover this 10%. FY 2017 - 2021 HSIP applications are accepted for approval through November 1st. (http://www.fhwa.dot.gov/fastact/factsheets/hsipfs.cfm)

http://www.virginiadot.org/business/ted_app_pro.asp

7.1.3 Surface Transportation Block Grant Program (STBG)

The Surface Transportation Block Grant Program (STBG) provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway (e.g., I-64, Route 288), bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals. Federal-aid highways are defined as those highways on the Federal-aid highway systems and all other public roads not classified as local roads or rural minor collectors. The Federal-aid highway systems consist of the National Highway System and the Dwight D. Eisenhower National System of Interstate and Defense Highways (the "Interstate System").

Construction and operational improvements for a minor collector in the same corridor and in proximity to a National Highway System (NHS) route if the improvement is more cost-effective (as determined by a benefit-cost analysis) than an NHS improvement and will enhance NHS level of service and regional traffic flow. This link provides NHS routes near the project locations. The typical split for STP projects between federal funding and the project sponsor is 80% federal and 20% state and/or local match. Additional STP facts: http://www.fhwa.dot.gov/fastact/factsheet/stbgfs.cfm

http://www.fhwa.dot.gov/planning/national_highway_system/nhs_maps/virginia/richmond_va.pdf

7.1.4 Transportation Alternatives Program (TAP)

The Transportation Alternatives Program redefines the former Transportation Enhancement (TE) Program and consolidates these eligibilities with the Safe Routes to School and Recreational Trails program eligibilities. The program is intended to help local sponsors fund community based projects that expand travel choices and enhance the transportation experience by improving the cultural, historical, and environmental aspects of the transportation infrastructure.

The program does not fund traditional roadway projects or provide maintenance for these facilities. Instead it focuses on providing for pedestrian and bicycle facilities, community improvements and mitigating the negative impacts of the highway system. The application cycle for FY 2016 TAP funding begins in early July, followed by applicant workshops in late July/August. The typical split for TAP projects between federal funding and the project sponsor is 80% federal and 20% state and/or local match. http://www.virginiadot.org/business/resources/transportation_enhancement/Transportation_Alternatives_Program_Guide.pdf

Section 7.2 State Funding Source Alternatives

To assist New Kent County, a review of available funding sources is provided with a summary of state roadway/transportation alternative improvement funding programs.

7.2.1 SMART Scale[1]

Governor Terry McAuliffe signed SMART Scale (i.e., **S**ystem for the **M**anagement and **A**llocation of **R**esources for **T**ransportation) into law in 2014, which directs the Commonwealth Transportation Board (CTB) to develop and use a scoring process for project selection by July 2016. The intent of SMART Scale is to invest limited tax dollars in the right projects that meet the most critical transportation needs in Virginia. The intent of the new law is to score projects based on an objective, quantitative, transparent process that also includes public engagement and public input. Once projects are scored, the CTB will have the information necessary to select the right projects for funding.

There are two main pathways to funding within the SMART Scale process—the Construction District Grant Program (CDGP) and the High-Priority Projects Program (HPPP). These two grant programs were established this year under House Bill 1887. The CDGP is open only to localities and replaces the old “40-30-30” construction fund allocation model. A project applying for funds from the CDGP is prioritized with projects from the same construction district. A project applying for funds from the HPPP is prioritized with projects statewide. The Commonwealth Transportation Board (CTB) then makes a final decision on which projects to fund. Projects are considered eligible and qualify to be scored if they comply with the following project types:

Project Type	Regional Entity (MPOs, PDCs)	Locality* (Counties, Cities, and Towns)	Public Transit Agencies
Corridor of Statewide Significance	Yes	Yes, with a resolution of support from relevant regional entity	Yes, with resolution of support from relevant regional entity
Regional Network	Yes	Yes	Yes, with resolution of support from relevant entity
Urban Development Area	No	Yes	No

A technical evaluation team will ensure that the project meets the capacity and operations needs of VTrans2040. VTrans 2040 divides the Commonwealth’s needs into three types; each receives their own set of principles:

1. Corridors of Statewide Significance (CoSS) – Interregional travel market
2. Regional Networks – Intraregional travel market
3. Urban Development Areas (UDA) – Local activity center market
4. Safety Need

In general, submitted projects must meet a need for network on which the project is proposed. Projects will be scored based on specific scoring factors for safety, congestion mitigation, accessibility, environmental quality, economic development, and land use.

The most critical information that will be needed for each application is a well-defined scope and project description and a reasonable cost estimate. A well-defined scope is needed to calculate many of the measure that will be used to evaluate the project benefit. A detailed scope is critical to having a reasonable cost estimate. If a project is selected for funding and the cost increases significantly ($5,000,000 or less >20 percent increase, $5,000,000 or more >10 percent increase), the project will have to be rescored through the process.

Though the State will be using many different data sources to compile the data and calculate the measures needed to score the projects, there will be some measure-related data that must be provided by the applicant. A link to the SMART Scale website is referenced below where an overview of what measures will be the responsibility of the state versus the applicant.

All projects must be submitted by September 30th. Prior to submittal, all entities are encouraged to coordinate with their local Virginia Department of Transportation and Virginia Department of Rail and Public Transportation representatives. Projects may be submitted via the online web application any time from August 1st – September 30th. Once all projects have been submitted, evaluation teams will work through December to screen and score all projects and provide project rankings to the CTB in January 2016. http://vasmartscale.org

[1] http://vasmartscale.org

7.2.2 Revenue Sharing

The "Revenue Sharing Program" provides additional funding for use by a county, city, or town to construct, reconstruct, or improve the highway systems within such county, city, or town. Locality funds are matched on a dollar-for-dollar basis with state funds, with statutory limitations on the amount of state funds authorized per locality. A locality may apply for up to a maximum of $10 million in matching allocations per fiscal year, with up to $5 million of these requested funds being utilized for maintenance projects. There is no limit to the amount of additional funds the locality may contribute. Priority will be given first to allocations that accelerate construction projects in the Commonwealth Six-Year Improvement Program or the locality's capital plan. Locality requests up to a total of $1 million will be evaluated first and funded first.

The Revenue Sharing Program is administered by the Virginia Department of Transportation, in cooperation with the participating localities, under the authority of Section 33.1-23.05 of the Code of Virginia and the Commonwealth Transportation Board's (CTB) Revenue Sharing Program Policy. Application for program funding must be made by resolution of the governing body of the jurisdiction requesting the funds. Applications for program funding are typically due by November for funding under the next fiscal year. Localities are typically notified by June prior to the effective fiscal year of application approvals.

The Revenue Sharing Program may be used to finance eligible work on highway systems within a locality. The Revenue Sharing Program is intended to provide funding for immediately needed improvements or to supplement funding for existing projects. Larger new projects may also be considered, provided the locality identifies any additional funding needed to implement the project. Revenue Sharing Program funds are generally expected to be used to finance project costs in the same fiscal year and projects should be in active development that is leading to their completion within the near term.

The total funds available each fiscal year will be determined by the Commonwealth Transportation Board. The maximum allocation the CTB may make to the Revenue Sharing Program is $200 million annually. The minimum allocation the CTB may make to the Revenue Sharing Program is $15 million annually.

7.2.3 Recreational Access Program

The Recreational Access Program is a state-funded program intended to assist in providing adequate access to or within public recreational areas and historic sites operated by the Commonwealth of Virginia, or by a local government or authority. Federal sites are not eligible. Recreational Access funds, with the appropriate designation and concurrence of the Director of Conservation and Recreation or the Director of Historic Resources, are allocated by the Commonwealth Transportation Board (CTB) in accordance with its policy revised February 20, 2008. While projects may qualify under either recreational or historic categories, the area may have both recreational and historic qualities.

It is recommended that localities consult with both DCR and DHR to ensure the access project design takes all values into account when requesting funding under this program. These funds may be used for financing the construction or improvement of secondary or local system roads within all counties and cities and certain towns that are part of the Urban System, hereinafter referred to as eligible localities. The Recreational Access Program is funding through an annual appropriation, with up to $3 million available for the program. Applications are considered on a first come, first served basis. Limitations to this funding specify that not more than $400,000 may be allocated for an access road or $75,000 for a bikeway project for any facility operated by a state agency. Additionally, not more than $250,000 may be allocated for an access road or $60,000 for a bikeway project to any facility operated by a locality, with an additional $100,000 available for the access road or $15,000 for the bikeway if matched dollar-for-dollar by the locality. (http://www.virginiadot.org/business/resources/local_assistance/Recreational_Access_Program_Guide_2009.pdf)

7.2.4 Economic Development Access Program

The Economic Development Access Program is a state-funded incentive designed to assist Virginia localities in attracting sustainable businesses that create jobs and generate tax revenues within the locality. The program makes funds available to localities for road improvements needed to provide adequate access for new or substantially expanding qualifying establishments.

These qualifying investments represent the cost of land, building, and any manufacturing/processing equipment by an incoming establishment, including manufacturing, processing, research and development, distribution centers, regional service centers and corporate headquarters. Economic Development Access funds are allocated by the Commonwealth Transportation Board (CTB) in accordance with its policy revised on June 20, 2012. These funds may be used for financing the construction or improvement of secondary or local system roads within all counties and cities, and certain towns that are part of the Urban System, hereinafter referred to as eligible localities. Ancillary improvements, such as turn lanes or intersection modifications may also be warranted as part of the access project, but are not to be considered as the primary objective of the project. The program is administered by the Virginia Department of Transportation (VDOT), Local Assistance Division. Subject to available funding, the maximum unmatched allocation to a locality within any one fiscal year is $500,000, which may be used for one or more projects. The maximum allocation to any one project is limited to the lesser of either the access road construction cost or 20% of the qualifying investment made. This guide describes the requirements, limitations, and procedures of obtaining and utilizing Economic Development Access funds. http://www.virginiadot.org/business/resources/local_assistance/EDA_Guide_July_2012.pdf

7.2.5 Local Funding Source Alternatives

At the local level, New Kent County is a member of the Richmond Regional Transportation Planning Organization (RRTPO) which can assist local planning efforts by providing services and guidance on funding strategies/coordination with VDOT. Private funds may be realized through rezoning action and proffer contributions, as well as dedication of right-of-way. All the referenced funding programs and strategies require some portion of commitment and/or match at the local level but serve as a means for communities to increase the effectiveness of their budgetary dollars toward priority projects. One source of local match funding could be the inclusion of specific transportation-match funds in the County's Capital Improvement Program (CIP), or another dedicated local fund.

Local fund matches or the use of additional local funds for some components may be necessary if it is determined their inclusion in the roadway project is cost prohibitive, a significant addition to anticipated costs, or inconsistent with the intent of the project. The vision for the corridor is to provide an efficient transportation system that is safe for all intended users, aesthetically acceptable to the community, and supports anticipated economic growth and vitality in this area of New Kent County.

Section 7.3 Funding Summary

Each of the funding alternatives and funding sources described above present their own unique sets of challenges when it comes to their availability, application process and any “strings” that may be attached. Generally speaking, the federal funding resources are much larger and require a smaller state/local match (10-20% match typical) when compared to the alternative state funding sources (often 50% or more).

The challenge with utilizing federal funding is the required compliance with the National Environmental Policy Act (NEPA) through the completion of an Environmental Impact Statement (EIS) and the required use of Davis-Bacon Act wage rates for construction.

These can lead to impacts to project schedules and construction budgets. State funded projects over $500,000 are only required to complete the State Environmental Review Process (SERP), which typically has a much shorter and less exhaustive schedule, and does not require the use of Davis-Bacon wage rates. Both federal and state alternative funding sources typically have expiration dates based on when funds are first allocated, which is typically three years. Projects not being delivered in a timely manner risk losing funding and negatively impacting the state’s ability to receive additional federal discretionary funds. All federal-aid or federal-aid eligible projects are required to be in the State Transportation Improvement Program (STIP). New Kent County should work with the Richmond Regional TPO to ensure that all projects under consideration are included in the STIP and SYIP. Regardless of the challenges, New Kent County should diligently pursue and consider all of these programs when strategizing on ways to fund each of the recommended improvement outlined in the AMP.

Section 7.4 Key Steps

The following key steps are required to success deliver the recommendations in the AMP:

1. **Adopt the AMP:** Official adoption of the AMP by New Kent County will be the first step of implementing the plan. This can be accomplished by formal resolution of the entire report. Adoption of the plan will demonstrate support of the strategies and goals outlined in the report. With local agency adoption of the AMP, New Kent County can better partner with local and federal agencies (VDOT, Richmond Regional Planning District Commission, and the Federal Highway Administration) to ensure future developments are consistent with this plan. Early collaboration regarding future developments will ensure that all provisions in the plan are being met.

2. **Incorporate AMP into Decision Making Process:** Following adoption of the plan, New Kent County staff should be familiar with the AMP and planning and engineering strategies required to achieve the plan. Additionally, New Kent County’s Planning Commission and Board of Supervisors members should be aware of the benefits associated with implementing the plan and their role in its implementation. The County will need to ensure land use and development approvals do not allow access to Route 106 that are inconsistent with the AMP. The plan should be referenced and used to guide their decision making on a range of land use issues pertaining to access location and design.

3. **Coordinate between Agencies:** Without the coordination and cooperation of all involved agencies, the AMP cannot be implemented successfully. Development decisions along Route 106 are under the control of several agencies. New Kent County has jurisdiction over land use planning, zoning, site plan and subdivision review outside VDOT right-of-way. VDOT has control over improvements within state right-of-way. Successful implementation of the recommendations in the AMP requires a partnership between New Kent County and VDOT. Prior to the issuance of any VDOT action on applications or permits, VDOT should confer with New Kent County. This joint effort by VDOT and New Kent County should preclude developers from applying to VDOT for access permits in advance of or inconsistent with local approvals.

   Additional agencies that will require close coordination to deliver the plan include the Richmond Regional Transportation Planning Organization, through which access to funding is coordinated, and Federal Highway Administration, who govern access to the interstate system.

4. **Phasing from Current Conditions to Build-Out:** Several steps are needed for the study corridor to grow from its current cross-sections into an improved roadway with additional traffic signals, turn lanes, supporting parallel street systems, and high volume intersection improvements. Development growth will drive an increasing need for improvements to the corridors. To mitigate growth impacts on road capacity and safety, New Kent County, through their land zoning and development authority, will need to require private development to mitigate their impacts by improving local streets. The AMP serves as a tool to provide guidance to make those improvements most effective at achieving the long term goals of the plan. Smaller developments may only have the opportunity to make initial improvements while larger developments may achieve more towards the longer-term, ultimate build-out phase.

5. **Regular Review and Update of the Plan:** To continue the implementation of the AMP, New Kent County should continue to meet on a regular basis to review and revise the plan as necessary. Once adopted, the AMP should be incorporated into the County’s Comprehensive Plan, and reviewed periodically for consistency with any land use updates or changes that could impact the corridor. Additional opportunities to revisit the plan include: through coordination of major development proposals, traffic impact studies, access issues, right-of-way preservation and roadway cross-section designs, rezoning proposals, ordinance text amendments, local master plan updates, roadway improvements, non-motorized transportation, streetscape enhancement and other common issues along the corridor.

Chapter 8.0 TECHNICAL APPENDIX (ELECTRONIC)

Appendix A: Public Engagement Summary

Appendix B: Data Collection and Field Review

Appendix C: Operational Analysis Results

Appendix D: Trip Generation and Assignment

VDOT Virginia Department of Transportation

New Kent County Virginia

Kimley»Horn