Community Development Department
Comprehensive Planning Section
18400 Murdock Circle
Port Charlotte, FL, 33948

CHARLOTTE COUNTY
COMMUNITY DEVELOPMENT DEPARTMENT

LARGE SCALE PLAN AMENDMENT (TEXT)
Application Information

Application Submittal Requirements

- **Supply one unbound copy of the Application Materials (see checklist below).** Staff will have up to 5 working days following the application deadline day to review the application for completeness. If incomplete, the application will be returned with a description of the reasons why the application is incomplete. The applicant may resubmit the application any time prior to the next application deadline day.
- **Once deemed complete, the applicant will be notified that the application has been logged-in. The applicant is then required to supply one electronic copy, in PDF format, of all documents.** Additional copies of certain items will be required prior to the public hearing dates. ***Do not*** submit the additional copies to the Building and Growth Management Department until requested by a staff member of the department.
- **If deemed complete, the application will be logged in and assigned to a P&Z and BCC hearing cycle (see attached Application Schedule).** Staff will commence review.
    - The applicant is responsible for promptly providing any information that needs to be updated, modified, or newly submitted as part of the review; otherwise the petition may be continued to a later cycle or a recommendation of denial will be necessary.
- **No additional changes may be made to any information in an application subsequent to one week before the hearing packet is due to be compiled for the Planning and Zoning Board members or the NOVUS Agenda item deadline for the Board of County Commissioners.** The planner in charge of the petition will be able to inform the applicant of the drop-dead date.
- The filing fee is **$2,640.00**, with check made payable to the Charlotte County Board of County Commissioners or CCBCC

Additional Copies for Hearing Packet

10 copies each of the following when requested by department staff:

- any bound items
- any maps or other graphics sized larger than 11 X 17 (except surveys)
- any items in color.

CHARLOTTE COUNTY
COMMUNITY DEVELOPMENT DEPARTMENT

APPLICATION for LARGE SCALE PLAN AMENDMENT (TEXT)

Date Received:	Time Received:
Date of Log-in:	Petition #: Accela #:
Receipt #:	Amount Paid:

1. PARTIES TO THE APPLICATION

Name of Applicant: **Pulte Group**

Mailing Address: **24311 Walden Center Drive, Suite 300**

City: **Bonita Springs**	State: **FL**	Zip Code: **34134**
Phone Number:		Fax Number:

Email Address: **mike.hueniken@pultegroup.com**

Name of Agent: **Daniel DeLisi, AICP**

Mailing Address: **520 27th Street**

City: **West Palm Beach**	State: **FL**	Zip Code: **33407**
Phone Number: **239-913-7159**		Fax Number:

Email Address: **dan@delisi-inc.com**

2. APPLICANT'S ATTACHMENTS

a. Submit a strikethrough/underline version of the proposed changes.
b. Describe the purpose of/reason for the proposed change.

3. ADDITIONAL REQUIREMENTS

a. *Traffic Impact Study*: If the proposed change could influence traffic patterns, supply a study that identifies the impacts that could occur through adoption of the proposed change.
b. *Environmental Impact Assessment*: If the proposed change could have an impact on environmental resources, supply a narrative discussing what those impacts could be and how they will be mitigated.
c. *Public Infrastructure and Service Impact Assessment*: If the proposed change could have an impact on infrastructure or services, supply a narrative discussing what those impacts could be and how they will be mitigated or addressed.

Community Development Department
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Port Charlotte, FL 33948

APPLICANT AUTHORIZATION TO AGENT

I, the undersigned, being first duly sworn, depose and say that I am the applicant for this PLAN AMENDMENT.
I give authorization for Daniel DeLisi, AICP to be my agent for this application.

STATE OF Florida, COUNTY OF Lee

The foregoing instrument was acknowledged before me this 9th day of September, 2024, by

who is personally known to me ~~or has/have produced~~

~~as identification~~ and who did/~~did not~~ take an oath.

Notary Public Signature	Signature of Applicant
Patrick Butler	Michael Hueniken, VP of Land
Notary Printed Signature	Printed Signature of Applicant
	2431 Walden Ctr. Dr., Suite 300
Title	Address
HH277111	Bonita Springs, FL 34134
Commission Code	City, State, Zip
PATRICK BUTLER Notary Public-State of Florida Commission # HH 277111 My Commission Expires June 18, 2026	(239) 495-4800
	Telephone Number

Community Development Department
Comprehensive Planning Section
18400 Murdock Circle
Port Charlotte, FL, 33948

AFFIDAVIT

I, the undersigned, being first duly sworn, depose and say that all data and other supplementary matter attached to and made a part of the application and staff report are honest and true to the best of my knowledge and belief.

STATE OF Florida, COUNTY OF Palm Beach

The foregoing instrument was acknowledged before me this 11 day of September, 2024 by

who is personally known to me or has/have produced

as identification and who did/did not take an oath.

Notary Public Signature	Signature of Applicant or Agent
Kayde Peace	Daniel DeLisi
Notary Printed Signature	Printed Signature of Applicant or Agent
Notary Public	615 N Dixie Hwy
Title	Address
HH 046993	West Palm Beach FL 33401
Commission Code	City, State, Zip
	561-847-2700
	Telephone Number

KAYDE PEACE
Notary Public - State of Florida
Commission # HH 046993
My Comm. Expires Sep 28, 2024
Bonded through National Notary Assn.

LIST OF AUTHORIZED AGENTS
RURAL SETTLEMENT AREA OVERLAY DISTRICT
TEXT AMENDMENT

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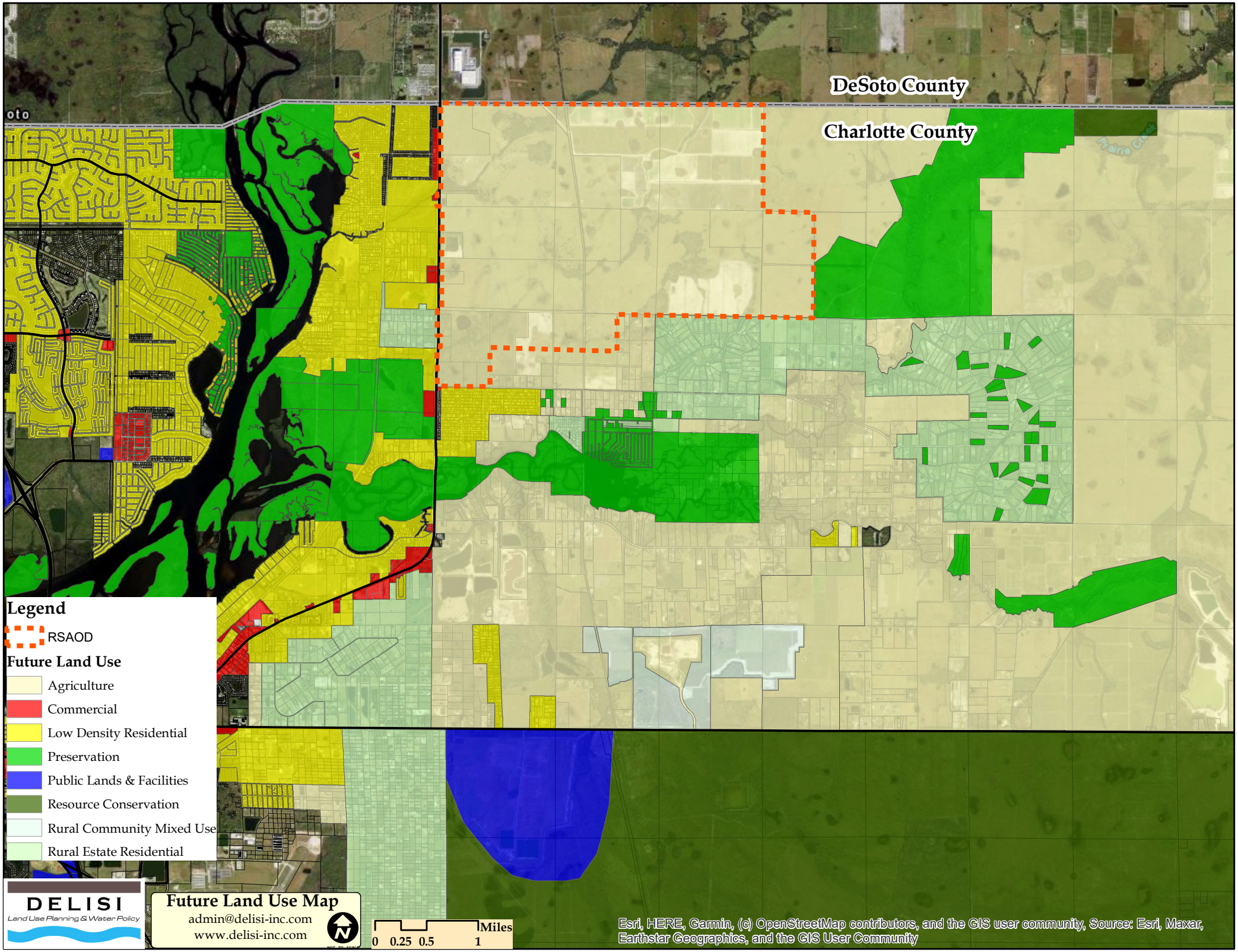
DeSoto County
Charlotte County
Legend
RSAOD
Future Land Use
Agriculture
Commercial
Low Density Residential
Preservation
Public Lands & Facilities
Resource Conservation
Rural Community Mixed Use
Rural Estate Residential
DELISI
Land Use Planning & Water Policy
Future Land Use Map
admin@delisi-inc.com
www.delisi-inc.com
0 0.25 0.5 1 Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

COMPREHENSIVE PLAN TEXT AMENDMENTS AND JUSTIFICATIONS

RURAL SETTLEMENT AREA OVERLAY DISTRICT (RSAOD)

In an effort to establish meaningful planning guidelines and standards for the future development of the area east of U.S. 17, north of Shell Creek and south of DeSoto County, the County establishes the 4,900 acre Rural Settlement Area Overlay District, depicted on FLUM Series Map #8. This district shall provide a comprehensive and functional transition between the suburban development pattern to the west of U.S. 17, the industrial uses within DeSoto County, and the rural and conservation uses to the east of the district.

General Range of Uses

Regional Economic Development uses, single-family residential dwelling units, multi-family residential units, commercial uses including office

Maximum Density/Intensity

Density: Maximum density is ~~6~~8,000 dwelling units; base density is one dwelling unit per ten acres or 490 dwelling units

Intensity: Commercial uses are limited to a maximum of 500,000 square feet Regional Economic Development uses are limited to a maximum of 1,5~~0~~00,000 square feet.

Developable area: Maximum developable area shall be limited to 2,450 acres consistent with Special Provision 5 below.

Amendment Justification:

The maximum density and intensity of development was established in 2010 with the adoption of the US 17 Area Plan and the Rural Settlement Overlay District. One important aspect of the plan was to create the necessary critical mass of development to be able to afford the extension of utilities along US 17 to the DeSoto County line and provide stub outs and the opportunity for the existing neighborhoods to connect. In nearly 15 years no development has occurred and no utilities have been extended to the area.

The development criteria for the RSAOD are numerous and costly. The cost of extending utilities along the corridor is significant. Increased open space, conservation, energy efficiency and other form of development criteria also add cost, over and above the typical costs of TDUs that are unique to Charlotte County. This has prevented development from providing larger public benefits, such as the extension of utilities and the provision of neighborhood commercial uses along that were envisioned in the US 17 Plan. In order to spread out the unique and significant infrastructure costs additional units are necessary to provide the necessary critical mass of development.

The increase in area for Regional Economic Development uses is consistent with Charlottee County's push for attracting jobs to the County and immediate area. While ECAP is able to provide for some of the uses that are needed to create a strong employment base in the County, where transportation corridors and hubs exist, land area should be maximized to make use of these limited opportunities. Other than I-75, US 17 is the only other transportation corridor within the County's urban area on the State

Strategic Intermodal System (SIS). State Road 31 is also on the SIS as an emerging corridor and may in the future provide for economic development opportunity, but other than Babcock, there are no urban areas in proximity. The US 17 Corridor is a major transportation route that extends from Punta Gorda north to Jacksonville in Florida and all the way to northern Virginia. The recent widening of US 17 has enhanced the unique economic development opportunity that the corridor may be able to provide for the County. Along the US 17 corridor in Charlotte County, however, there are few large parcels able to accommodate industrial parks and distribution centers, similar to ECAP and the distribution center located on US 17 just over the DeSoto County line. This unique opportunity for large scale industrial use was recognized in the US 17 Area Plan.

The Metro Forecast study forecasts a need for an additional 1.3 million square feet of industrial floor area needed in Charlotte County by 2030 just to maintain the current housing to industrial ratio. But the study also points out that"

> *"...industrial is influenced by policy, or how much land is designated for industrial uses. Some industrial uses are necessary to support local needs, particularly for construction uses and employment opportunities. Other industrial uses do not need to be near residents but* ***should still be planned near adequate transportation corridors, which can support freight traffic****."*

There are few such corridors in Charlotte County that can accommodate freight traffic. Where those limited opportunities exist, land should be maximized to provide for the County's goals for economic development and diversification. The increase in intensity will allow the County to fully capture the unique employment center opportunity along the corridor.

The maximum development area was established based on the open space criteria in Special Provision 5d, which requires 50% open space to be placed into conservation easement. The revisions to the open space criteria allow for less area in conservation in exchange for a greater overall open space total and to allow for more active open space areas, including golf courses, but otherwise create a form of development that has less impervious surface and more area for wildlife movement. In addition, any golf course development will require an easement over the golf course to provide greater protection preventing future conversion of the golf course to some other use. The open space criteria and the development area will be implemented on a project-by-project basis with the backbone conservation areas within the greenways and blueway identified on the overall Master Plan. It is therefore important to recognize that this criterion specifically relates to and is implemented by Special Provision 5.

Special Provisions

1. *Development Timing/Phasing:* To achieve the type of development contemplated for the Rural Settlement Area Overlay, the following criteria must be met:
    a. The completion of a Master Development Plan for the entire Rural Settlement Area, described further in #2.
    b. The provision of the necessary infrastructure to serve the entire Rural Settlement Area.
        h. All development approvals shall be timed to ensure that the improvements necessary to serve each phase of development are programmed within the Charlotte County CIE prior to the approval of any development activity within that phase.

ii. The County shall coordinate with Sun River Utilities or its successor to ensure that adequate potable water supplies and sanitary sewer collection are available for development. The County shall not approve any final site plans for development within the Rural Settlement Area prior to the availability of central water and sanitary sewer services.

iii. No building permits shall be issued after the first 200,000 square feet of non-residential development or the 1,000th residential unit until potable water and sanitary sewer wastewater lines are extended to those portions of Peace River Shores, Peace River and Peace River Highway subdivisions that are located inside the Urban Service Area. The collective owners and/or developers of the Rural Settlement Area and the Sun River Utility shall fund the extension. Funding mechanisms may include Community Development District bonds, MSBU revenues, grant monies and rebatable agreements.

2. *Master Development Plan:* The County shall require the submittal of a single Master Development Plan covering the entire Rural Settlement Area to be approved by the Board of County Commissioners prior to any development. The Master Development Plan must that include the following:
    a. A Master Concept Plan that delineates the future use areas of the property and distinguishes areas as either Regional Economic Development centers or Villages.
    b. A Rural Settlement Area Pattern Book and Development Guide that includes specific design guidelines for the development, to ensure that the development adheres to the principles of sustainability and low impact design as defined within this Comprehensive Plan.
    c. An Infrastructure Financing Strategy and Procedure for Implementing the Financing Strategy throughout the Area.
    d. Method to demonstrate that the proposed development helps to reduce greenhouse gas emission within Charlotte County.
    e. A management strategy for all open space and identification of a funding source to support management and maintenance.
3. ~~*Phasing of*~~*Commercial Development: To ensure that there is enough land reserved to accommodate non-residential uses,* ~~The~~ the chart below sets forth the minimum area of commercial or Regional Economic Development ~~square footage required for the number of dwelling units, and vise versa~~that must be accommodated in the RSAOD through the PD process. ~~This phasing is linked to the issuance of a Certificate of Occupancy. The following phasing schedule shall be followed~~:

FLU Table A-9: Rural Settlement Area Overlay District ~~Phasing~~ Requirements	
Dwelling Units	**Square Feet (Cumulative)**
500	10,000
1,000	35,000
2,000	100,000
For every extra 1,000 dwelling units	Add an extra 50,000 square feet

Amendment Justification: *When the US 17 Corridor Study was originally drafted in 2009 the nature and function of both retail and office uses were very different. Over the last 15 years consumer habits and office environments have changed significantly with an effect on land use patterns. While retail uses were evolving pre-Covid through an increase in on-line sales, lockdowns brought forth a rapid intensification of delivery services such as Amazon and Kruger. It is no longer necessary to leave home for many needs. This has further diminished the viability of commercial uses and the reliance on the immediate adjacency to residential for basic commercial needs. Including requirements for commercial phased with residential units no longer promotes the same public interest that it did 15 years ago when the RSAOD was first conceived.*

Post-Covid, telecommuting has also become far more prevalent and the utilization of platforms such as Teams and Zoom have become far more widespread. This has enabled more people to work from home, decreasing the reliance on office space for many types of employment. With the changing office environment, the need to commute daily to work has also diminished.

In an ever-changing commercial environment, it is increasingly difficult to predict timing and counterproductive to tie commercial uses to residential development when that timing is uncertain and with less necessity. Projecting a reasonable point in time when commercial use will become viable is nearly impossible. While metrics do exist that show the amount of commercial need generated per unit or per capita, many of these commercial needs along US 17 will continue to be accommodated closer to Punta Gorda or north in Arcadia. Many of the employment opportunities will continue to be met through targeted employment hubs such as the Enterprise Charlotte Airport Park (ECAP). Again, that is not to say that there is no need for commercial development, just that the amount of commercial at any given point in time or phase of development will be difficult to predict.

This does not eliminate the need to locate commercial uses in new residential development areas, but it does make the amount of commercial needed less certain and the early timing unnecessary. It is important to continue to designate commercial area(s) within the RSAOD, but the timing of that commercial should market driven. It is impossible to force a commercial use to operate when the market conditions are not adequate and the market conditions for commercial use continue to evolve. On the other hand, when the market conditions are present it will be necessary to have reserved the appropriate land area to accommodate commercial development and promote internal capture of trips.

> 4. *Density Transfers:* Transfers of density shall be required in order to attain any density above 490 dwelling units. Density may be transferred from the Rural Service Area. ~~Density shall be transferred from the platted land identified on SPAM Series Map #12: Areas Removed from the (1997-2010) Urban Service Area. The sending zone lots shall be placed under a conservation easement.~~

Amendment Justification: *Limiting the sending areas from which future development can receive density is counterproductive for implementing Charlotte County's planning objectives. There are areas of environmental sensitive platted lands, outside of the urban service area that may available for purchase and comply with the County's TDU ordinance and provide the same planning benefit as those areas that were removed from the Urban Service Area. Further, the 2010 Plan amendment that adopted the US 17 Area Plan and the RSAOD removed unplatted*

areas in order to balance "population accommodation" on the future land use map. This removal was proposed to accommodate a planning rule that is no longer required by the State and not necessary or to the benefit of achieving Charlotte County's growth management goals.

5. *Open Spaces/Greenbelt:* A minimum of 50 percent of the Rural Settlement Area shall be set aside as open space exclusive of development areas. The intent of open space areas is for preservation and restoration of indigenous upland and wetland vegetation as well as the creation of passive recreational opportunities. ~~All open space shall be placed under a conservation easement granted to the County at time of approval of the Master Development Plan.~~

Amendment Justification: *The requirement for a conservation easement granted to the County for open space is overly burdensome for the open space that the overlay is seeking to encourage. Further, this requirement goes well beyond even the requirements of the Rural Community Mixed Use and any other similar area in Charlotte County. This was not part of the original U.S. 17 Area Plan but was added later without justification within the Plan.*

a. A greenbelt is required around the southern and eastern perimeters of the Rural Settlement Area, forming a large open space that will create a clear physical delimiter between the urban uses within the Rural Settlement Area and the rural uses bordering the Rural Settlement Area. The greenbelt shall be a minimum of 250 feet in width.
b. Open space will be made accessible to the public, but a portion of the open space may be reserved for and designated for use by the residents of the Rural Settlement Area only. Open space may contain hiking and bridle trails. Reserved open space areas must be clearly designated through the development review process.
c. The County shall explore granting impact fee credits toward the cost of restoration and perpetual maintenance of non-reserved open space as indigenous vegetation, or toward the creation, restoration, and maintenance of identified wildlife corridors and linkages. In order to be considered for impact fee credits, the area to be created or restored or maintained shall be a minimum of 500 feet in average width and evidence shall be provided of the arrangements established to have the area maintained in perpetuity.
~~c.~~d. An alternative to the above open space and conservation requirement may be granted through the planned development process where an applicant designates 60% of the development area to Rural Open Space with a minimum 35% conservation/restoration. For the purpose of this policy only, Rural Open Space shall include golf courses. Golf course areas must be placed under an easement in favor of Charlotte County preventing future conversion of use, must incorporate environmental best management practices and be certified under the Audubon golf course Cooperative Sanctuary Program.

Amendment Justification: *The proposed alternative achieves greater public benefit by maintaining the requirement for restoration of greenways and flowways, maintaining a significant conservation/restoration requirement, greater than any other land use category or planning area*

in the comprehensive plan, while providing for an increase in overall open space. The inclusion of golf courses introduces an important recreational element to Charlotte County. For an aging population, golf allows for the maintenance of an active lifestyle, as a social recreational activity that can be enjoyed at virtually any age. Further, golf courses maintain open space areas that act as wildlife corridors allowing for the movement of birds and mammals across the landscape. Several studies have documented the value of golf courses on the landscape for wildlife movement (Colding and Folke). The above policy amendment allows for an overall increase in area for wildlife movement while maintaining a specific focus on restoration of historic greenways and flowways that cross the site. Incorporating best management practices through Audubon International's golf course BMP certification ensures that the golf course development will minimize nutrient run off and be managed in a way that protects the County's environmental resources. The proposed amendment furthers the goals of the U.S. 17 Area Plan.

6. *Regional Economic Development and Commercial Development Standards:* All sites of industrial and commercial development within the Rural Settlement Area shall be designed to accommodate energy efficient materials where possible and electric vehicle charging spaces in order to meet the energy conservation goals of Charlotte County. ~~in accordance with sustainable best management practices and all non-residential buildings shall be constructed in compliance with the United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) Green Building Certification, the Florida Green Building Coalition Commercial Building Designation or the Green Building Initiative's Green Globes system; all new industries locating in the area shall be ISO 14001 compliant or shall be otherwise in accordance with Natural Step or other similar green business operating practices~~.
7. ~~*Rural Village Standards:* The Rural Settlement Area will be developed with no more than six Villages; each Village shall be no more than 390 acres. Areas developed as Villages are required to contain a village center wherein higher density and intensity shall be placed, with a reduction in density and intensity as one moves farther out from the center. There shall be clear separation between Villages by use of a greenbelt around each village. All village centers shall be mixed use or multi-use in nature, either through vertical mixing of residential and commercial uses or by providing for strong pedestrian connectivity between uses. Village centers shall be well integrated with surrounding development and shall provide for pedestrian character through the following techniques:~~

    a. ~~Vehicular, pedestrian and/or bicycle connections to adjacent residential, commercial, civic or industrial development will be provided.~~
    b. ~~Buffering of different abutting uses shall be required only where compatibility concerns exist. Buffering from adjacent developments, when deemed absolutely necessary, will not preclude future interconnectivity.~~
    c. ~~On-street parking with landscaping and design features such as corner and mid-street bump outs, which afford traffic calming and produce a comfortable and safe pedestrian environment, will be promoted.~~
    d. ~~Screening for parking lots along streets, sidewalks, and open spaces. Parking lots and structured parking garages without ground floor commercial uses shall~~

~~be shielded from the view of the sidewalk, preferably located behind or to the sides of buildings, to enhance the pedestrian environment of the street.~~

~~e. Shared parking arrangements which encourage walking between multiple destinations shall be encouraged to promote a "park once" environment.. Deviations from the County's parking requirements will be considered to minimize parking areas, based on projected pedestrian activity, joint use of parking lots, and parking spaces for uses with different peak hours.~~

~~The minimum density within a village center will be seven units per acre. The maximum lot size at the outer edge of a Village is one acre. For each 200 dwelling units that receive a Certificate of Occupancy, there must be at least 8,000 square feet of non-residential use under construction.~~

8. ~~*Residential Development Standards:* Residential development in the Rural Settlement Area shall provide for compact land use forms~~.

Amendment Justification: *The Rural Village standards were created as a planning idea without precedent as a development model. While the idea may have seemed to promote a walkable urban form, there are other ways to achieve both walkability and the high quality of life that the Rural Village idea was attempting to implement. As written, the Rural Village concept is unworkable. Other "Rural Village" areas that have been implemented throughout the State have been significantly larger in scale and without the rigid timing of commercial development to residential units, based on the evolving nature of commercial markets.*

As noted above, there are limited attractive areas for industrial development in Charlotte County, and those areas along major roadway corridors that can attract large employers are further constrained by sites that are not large enough to accommodate larger distribution centers, industrial parks and similar uses. US 17 and the RSAOD provides a unique opportunity that should be maximized to the greatest extend possible. Adding overly restrictive construction and maintenance criteria, such as those contained in the LEED certification process will simply push these economic development opportunities north into DeSoto County. Future development will be required to filter nutrients in accordance with the newly adopted State storm water rule, incorporate low impact development techniques to accomplish this, have large areas of preserve, and include energy efficiency measures into building design. To required LEED certification in addition to all of this will soften or potentially eliminate the market for either industrial or commercial uses, both of which were specifically desired uses in the US 17 Area Plan.

9. *Transportation System:* The transportation system within the Settlement Area shall be designed ~~as~~ with an interconnected network aimed at promoting connectivity between communities and streets as well as walkability between uses. Individual projects must be designed as part of an overall transportation network within the Rural Settlement Area as defined on the transportation interconnectivity plan in the pattern book, not as separated, stand alone developments.
    a. All new development shall provide the appropriate connections of road segments, and shall preserve and protect existing and future rights-of-way to provide for an efficient multi-modal transportation system. The transportation system shall be designed so that multiple streets, bicycle paths and sidewalks continue between adjacent neighborhoods and developments to facilitate convenient movement

and disperse traffic throughout the local network in accordance with the transportation interconnectivity plan. ~~Dead-end streets are prohibited, except when necessary at the edge of development to provide stub outs for future connections to adjacent, undeveloped properties, or when environmental features necessitate the construction of a dead-end street.~~

b. ~~Communities shall construct an interconnected network of public streets in a predictable block pattern that encourages walking, reduces the number and length of automobile trips and provides multiple circulation routes. Block sizes will be established with the intent of providing for walkable distances between intersecting streets~~.

Amendment Justification: *While there is a clear public interest in interconnectivity, block patterns are a specific design form. There are many ways to implement connectivity and walkability without creating small grid patterns.*

c. Interconnections between complementary uses shall be required, including access to and circulation among parking lots and to pedestrian paths. Shared driveways, frontage streets, and parking with cross access easements shall be required to reduce conflicts with the main flow of traffic.
d. Specify the design of street types that are functional, visually appealing, and promote walking and cycling. Street cross-sections will be acceptable road types for both public construction projects and for privately built roads and will be consistent with the principles of context sensitive design and walkability. Reduced right of way widths and travel lanes will be encouraged to the extent that they meet AASHTO standards.
e. To ensure that adequate funding sources are available for the provision of infrastructure, and that each property owner is fairly compensated for their contribution to the infrastructure system, improvements may be funded through a variety of mechanisms that include, but are not limited to, Community Development Districts (CDDs), Municipal Services Taxing Units (MSTUs), Municipal Service Benefit Units (MSBUs), grants, and impact fees/impact fee credits.

10. *Wildlife Undercrossings*: The collective owners and developers of the Rural Settlement Area shall provide wildlife undercrossings, along with appropriate signage and roadside treatments, within the Rural Settlement Area to provide protections for wildlife movement between open space areas. The owners and developers shall also work with the County and with various State and Federal agencies to design and ~~construct~~ locate a wildlife crossing underneath U.S 17 prior to 2030.

Amendment Justification: *The widening of US 17 has already occurred and a box culvert crossing has been provided similar to the crossing that the County implemented with he widening of Burnt Store Road.*

11. Development in the RSAOD shall utilize Low Impact Design techniques to supplement and enhance traditional stormwater retention/detention development.

FLU Policy 3.1.4: Standards for Rural Settlement Area Overlay District

The County shall allow the establishment of a "Rural Settlement Area" within the Rural Service Area through the Rural Settlement Area Overlay District, described in FLU Appendix I, in order to establish a more functional transition between the urban area and rural area along U.S. 17 (Duncan Road). The development shall exhibit the highest level of sustainable design. Prior to approval of any development within the Rural Settlement Area, the County shall ~~draft land development regulations for the area consistent with an approved~~adopt a pattern book and development guide with~~, the~~ Rural Settlement Overlay District standards, and the following concepts to be specifically implemented through the Planned Development process:

1. A balanced mixture of uses will be provided to reduce overall trip lengths, to support pedestrian, bicycle and transit opportunities and create pedestrian-friendly streetscapes.
2. Requirements for the provision of civic spaces, such as green spaces, community centers or central plaza features.
3. Provision for outdoor livability, including interconnected pedestrian and bike facilities, walkways, public plazas, ample seating, and walkable block length.

Amendment Justification: *The county has not yet undertaken a process to draft land development regulations and is not likely to do so. The public interest that the land development regulations seek to address can be implemented through the planned development process. The applicant has submitted a Pattern Book for review that will act as the overall development guide.*

DELISI
Land Use Planning & Water Policy

US 17 Area Plan Update
Planning Justification & Consistency with the Comprehensive Plan
September 7, 2024

This purpose of this text amendment to the Charlotte County Comprehensive Plan is to update the Rural Settlement Area Overlay District (RSAOD) section of the Future Land Use Element, consistent with changes to Statute, changes to land use patterns in the area and evolving planning practice. The proposed amendments are to FLUE Appendix I and maintain consistency with the overall intent of the US 17 Area Plan and the RSAOD as outlined in the Future Land Use Element of the Comprehensive Plan.

Background and History

The RSAOD was established through the adoption of the U.S. 17 Area Plan in 2010. The U.S. 17 Area Plan was a comprehensive study of the development patterns along U/S. 17 from the Punta Gorda line, east and north to the DeSoto County line. When the U.S. 17 Area Plan was being drafted in 2009, several factors influencing development were present. On the north side of the study area, development of large-scale industrial development was being introduced through the construction of the Wal-Mart distribution center. This was a clear indication that urban development would continue along the corridor and move east of U.S. 17 into what was then outside of the Urban Service Area.

Within Charlotte County, there were several developed neighborhoods that extended along the west side of U.S. 17, between the roadway corridor and the river. The neighborhoods at the north side of the corridor had limited utility availability and a proliferation of septic systems. Strengthening the potable water and sanitary sewer utility was in the public interest and would provide a direct benefit, not only to the neighborhoods on the west side of U.S. 17, but to the health of the Peace River and Charlotte Harbor.

Finally, allowing for the opportunity for new development along the corridor would lead to investment in the area. Business development was a major desire of residents through the U.S. 17 Area Plan. Development and redevelopment along the corridor was and remains stagnant. The desire for new and increased commercial opportunities and recreational activities was clearly expressed by residents living in the area. Promoting new development could lead to an enhancement of the quality of life for the existing communities.

One aspect of the U.S. 17 Area Plan that was prevalent and was a specific goal of the County Planning staff at the time of the study was incorporation of Low Impact Development (LID) techniques into future development. Over the last 15 years the development and planning community has learned a lot about the benefits and limitations of incorporating LID into our stormwater management systems. On the one hand, there are several elements of LID that were promoted in the study, such as green roofs, that have been found to be counterproductive in Florida. With seasonal rainfall, often roofs need to be irrigated to keep plant material alive, consuming more water, rather than attenuating more water.

LID was particularly useful in addressing the removal of Total Nitrogen (TN) from the water column, a nutrient of concern for many estuaries and one that traditional stormwater lakes inadequately removed. However, in early 2024 the State Legislature ratified a new stormwater rule that requires stricter nutrient reductions for both Total Nitrogen and Total Phosphorus. To do this the new Rule allows for a variety of best management practices, including LID techniques for the filtration of TN and TP. Requiring LID may be overly prescriptive when other, more modern techniques can be used to more efficiently filter TN from the water column.

At the time of adoption of the U.S. 17 Area Plan, all local government comprehensive plans were evaluated based on a strict balancing of potential development units allowed on a future land use map. Further, the then Department of Community Affairs requested that Charlotte County "balance" the area of land within the Urban Services Area such that the new area coming in would be replaced with area removed. This is a unique situation and not something required in other counties throughout the State. This was required despite Charlott County's strict Transfer of Development Units (TDU) ordinance, which specifies that any increase in density may only be achieved through transferring those development rights from designated areas of the County.

At the time of adoption, Charlotte County was requiring other large scale development proposals to include a generalized master plan and pattern book to create some level of certainty for development patterns in the area. Because the RSAOD consisted of multiple property owners, only some of which were engaged in the planning process at the time, the master plan and pattern book was not practical. As an alternative, very strenuous, often impractical design criteria were adopted into Appendix I of the Future Land Use Element.

Over the last 15 years, since the designation of the RSAOD and partially due to the very onerous development criteria within the RSAOD, nothing has been proposed or has occurred. Investment in the corridor remains static and improvement of utility service has not occurred. The proposed text amendment to Appendix I of the Future Land Use Element seeks to implement practical changes that continue to implement the planning intent of the RSAOD while updating the overlay criteria based on changing conditions

and development patterns. The removal of the Rural Village criteria is being replaced with a Pattern Book and a general master plan for the area, consistent with other planning areas such as Rural Community Mioxed Use projects.

The proposed amendments to the Comprehensive Plan are being submitted with a proposed Master Development Plan and a Pattern Book that aim to be the guideline for development in the RSAOD and address specific policies in the comprehensive plan. Each individual land use proposal will need to implement the overall vision of the development area through the planned development process.

Public Services Analysis

The proposed Master Development Plan does not specifically locate areas for public services within the RSAOD. However, it is the intent of the applicant that land will be available for public services, including schools and fire/EMS, to the extent that they are desired by the service providers.

For the first time in the 15 years since the U.S. 17 Area Plan was adopted there has been a concerted effort of plan for and extend water and sewer services along the corridor. Attached with this application is a letter of service availability from the utility provider – CSWR Florida. As detailed in the letter from Gray Robinson, the applicant is working with the utility and DeSoto County to obtain bulk water from the Peace River Manasota Regional Water Authority. Sanitary Sewer will be provided by CSWR Florida, in cooperation with Charlotte County Utilities. These improvements will have a significant benefit to the corridor.

Consistency with the Comprehensive Plan

> ***FLU Policy 3.1.4: Standards for Rural Settlement Area Overlay District***
> *The County shall allow the establishment of a "Rural Settlement Area" within the Rural Service Area through the Rural Settlement Area Overlay District, described in FLU Appendix I, in order to establish a more functional transition between the urban area and rural area along U.S. 17 (Duncan Road). The development shall exhibit the highest level of sustainable design. Prior to approval of any development within the Rural Settlement Area, the County shall draft land development regulations for the area consistent with an approved pattern book and development guide, the Rural Settlement Overlay District standards, and the following concepts:*
>
> 1. *A balanced mixture of uses will be provided to reduce overall trip lengths, to support pedestrian, bicycle and transit opportunities and create pedestrian-friendly streetscapes.*
> 2. *Requirements for the provision of civic spaces, such as green spaces, community centers or central plaza features.*
> 3. *Provision for outdoor livability, including interconnected pedestrian and bike facilities, walkways, public plazas, ample seating, and walkable block length.*

The proposed Master Development Plan and Pattern Book demonstrate that there will be an adequate mix of uses, including a mix of housing types, commercial, industrial and public facilities. Green space will be included through both recreational areas and the restoration of greenways and flowways across the area.

> ***FLU Policy 6.3.4: Multi-use Public Spaces***
> *The County shall require developers to coordinate with all interested government entities, including Charlotte County school officials, to identify future locations for multi-use public spaces that can combine school, recreational, and conservation uses.*

The applicant has been in contact with the School Board to discuss locations for a future school site(s) within the RSAOD. If needed or desired by the School Board, this site can act as the multi-use public space that this policy envisions.

> **FLU Policy 6.3.11: Established Flowways**
> *The County shall encourage the protection of historic flowways (SPAM Series Map #6) by designating them as environmentally sensitive and allowing density to be severed from these areas. Passive recreational uses may be incorporated into upland areas adjacent to restored flowways. Development along a flowway shall be encouraged to provide for public use by providing pedestrian paths and connections to adjacent properties. Public uses shall not include any activities that are detrimental to drainage, flood control, water conservation, erosion control or fish and wildlife habitat conservation and preservation. Proposed crossings of flowways shall include appropriately sized culverts or bridges to maintain surface water flows and wildlife underpasses where appropriate.*

The proposed Master Development Plan preserves and reestablishes the flowway located within the RSAOD. In addition, as shown in the connectivity plan, a pedestrian path is provided along the flowway for passive recreation and pedestrian connectivity.

> **FLU Policy 6.3.12: Greenways Plan**
> *The County shall implement a Greenways Plan (SPAM Series Map #6) for the U.S. 17 Corridor area that will connect flowways and wildlife corridors. The flowways and wildlife corridors may be a minimum of 300 feet wide for 20 percent of their length but shall be a minimum of 500 feet wide for the remaining 80 percent of their length. A smaller flowway and wildlife corridor may be utilized if a flowway and wildlife corridor study is conducted and an alternative corridor is provided to provide the same or enhanced level of protection. The County shall also work with the property owners and various State and Federal agencies to explore funding source in order to construct wildlife crossings underneath U.S. 17 and C.R. 74 (Bermont Road).*

As shown in the Pattern Book, the greenways will be implemented consistent with FLU Policy 6.3.12.

FLU Policy 1.2.5 Transfer of Density Units (TDU) Programs Intent
The County shall employ a transfer of density units (TDU) program whereby the development rights of property may be severed in perpetuity and transferred to designated locations that are more appropriate for development. The TDU program identifies sending and receiving zones. The intent is to create a TDU process that will:

1. *Assist and encourage the removal of old, outdated platted lots and subdivisions throughout the County;*
2. *Assist and encourage the replacement of an unsustainable and inefficient form of development with compact, higher density, mixed use development that is more sustainable and efficiently utilizes resources;*
3. *Incentivize the retention of long-term agricultural activities and the clustering of rural development densities as an alternative to rural large lot sprawl;*
4. *Incentivize the voluntary preservation of environmentally sensitive lands.*

Any development on the subject property will need to transfer density in excess of the currently vested units within the RSAOD. All units above the vested units on site will need to be transferred from areas less appropriate for development, such as the antiquated plats, agricultural areas and environmentally sensitive lands.

FLU Policy 1.2.8 TDU Receiving Zones
Receiving Zones within the Rural Service Area shall include lands within:

1. *Rural Community Mixed Use areas;*
2. *Conservation Subdivisions;*
3. *The Rural Settlement Area Overlay District.*

The proposed text amendment is within a receiving area. The proposed amendment to increase density within the RSAOD will increase the number of units that would need to be acquired from sending areas.

Conclusion

The proposed serves as an update to the policies that were adopted following the completion of the U.A. 17 Area Plan. The text amendment furthers the intent of the Area Plan and helps to move forward with key goals, including the provision of utility service and investment in the corridor. The proposed text amendments are consistent with the Comprehensive Plan and further the growth management objectives of Charlotte County.

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ECOSYSTEMS

The Role of Golf Courses in Biodiversity Conservation and Ecosystem Management

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Abstract

We assessed the ecological value of golf courses based on a quantitative synthesis of studies in the scientific literature that have measured and compared biota on golf courses to that of biota in green-area habitats related to other land uses. We found that golf courses had higher ecological value in 64% of comparative cases. This pattern was consistent also for comparisons based on measures of species richness, as well as for comparisons of overall measures of birds and insects—the fauna groups most widely examined in the studies. Many golf courses also contribute to the preservation of fauna of conservation concern. More broadly, we found that the ecological value of golf courses significantly decreases with land types having low levels of anthropogenic impact, like natural and nature-protected areas. Conversely, the value of golf courses significantly increases with land that has high levels of anthropogenic impact, like agricultural and urban lands. From an ecosystem management perspective, golf courses represent a promising measure for restoring and enhancing biodiversity in ecologically simplified landscapes. Furthermore, the review suggests that golf courses hold a real potential to be designed and managed to promote critical ecosystem services, like pollination and natural pest control, providing an opportunity for joint collaboration among conservation, restoration and recreational interests.

Key words: golf; golf courses; biodiversity conservation; restoration; urban; land-use comparison; ecosystem services.

Introduction

Golf courses are subject to much debate in environmental terms because their construction often involves modification of natural habitats (Warnken and others 2001), and their management may involve excessive use of chemicals and irrigation (Pearce 1993). Although chemical contamination of water bodies from golf-course establishments still evokes concern (Joyce 1998; Neo 2001), a large-scale review in the United States concluded that there are generally no significant human toxicological impacts from golf courses to groundwater and surface water (Cohen and others 1999). During the last decade, scholars have proposed that golf courses play a role in the support of biodiversity, with an increasing number of case studies having assessed their values in ecological terms. However, no synthesis of those studies has been compiled, making it difficult to more comprehensively understand what role golf courses hold in

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J.C. have designed the study, performed research, the analysis of data and writing the paper, and C.F. has especially contributed to the latter two.

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biodiversity conservation and ecosystem management. In this article, our goal is to elucidate this relationship.

A more comprehensive understanding of the recreational land use of golf is motivated for several reasons. First, the number of courses is rapidly increasing in many parts of the world, with a strong correlation between golf-course development and economic growth (Dair and Schofield 1990). Given the recreational demands from rising urban populations, the number of golf courses will likely increase in the years to come, with a current estimate of over 31,500 courses worldwide (Tanner and Gange 2005). As of 2004, there were 16,057 golf courses in the United States alone (National Golf Foundation 2005), with some 300 new ones annually built over the past 30 years (Nicholls and Crompton 2007). Europe, holding about 5,800 courses, witnessed a yearly increase of 5% from 1990 to 2000, with one new golf course opened per week in the United Kingdom (European Institute of Golf Course Architects 2007; Hodgkison and others 2007a). The number of golf courses is also rising in suburban Australia (Hodgkison and others 2007a), Japan (Yasuda and Koike 2006), Southeast Asia (Neo 2001), and is presently booming in China where local governments believe that new courses will attract investors.

Second, golf courses in urban settings constitute large green-area habitats, even surpassing many nature reserves in size (Colding and others 2006a). Although they can cover landscape units up to 250 ha (Jones and others 2005), a typical 18-hole golf course averages about 54 ha of land. Between 40 and 70% of this land is non-playable, often with diverse native habitats (Tanner and Gange 2005). Potentially, urban golf courses could become more purposefully designed and managed for biodiversity and the promotion of critical ecosystem services.

Third, given the immense task of managing ecosystems and their services in more sustainable ways, the golfing sector could become an important partner in sustaining biota and processes in ecosystems. Both the Millennium Ecosystem Assessment and the Ecological Society of America have encouraged the development of land-management approaches that draw on cooperation among a greater set of scientists, land-use practitioners, the public and different sectors in society (MA, Millennium Ecosystem Assessment 2005; Palmer and others 2005). For this reason, a review of this kind may be particularly useful because it may foster a broadened understanding of what constraints and potentials the land use of golf holds in ecosystem management.

In this study, we assessed the ecological value of golf courses based on a quantitative synthesis of studies in the scientific literature that have measured and compared biota on golf courses to that of biota in green-area habitats related to other land uses. We refer to such studies as 'case–control studies'. We back up results from the quantitative analyses of case–control studies with other ecological findings on golf courses, as derived from the peer-reviewed ecological literature. We thoroughly discuss the obtained results in relation to biodiversity conservation and ecosystem management.

Materials and Methods

Case–Control Study Characteristics

Databases primarily used to acquire case–control studies and other relevant, ecological findings on golf courses, included Google Scholars, the ISI Web of Knowledge, and the LIBRIS Web Search. Search terms encompassed ''golf'' and ''golf courses'' in combination with terms such as ''biodiversity'', ''biology'', ''birds'', ''conservation'', ''ecology'', ''ecosystems'', ''fauna'', ''flora'', ''mammals'', ''insects'', ''plants'', ''species'' and ''threatened species''.

A total of 17 case–control studies were found in the literature that described and compared biota on golf courses with other land types. These studies were published between 1996 and 2007 and encompassed 190 golf courses, with ten studies from the United States, and the rest from Europe, Australia, Canada, Japan and Trinidad (WI) (Table 1). Our sample derived mainly from the humid temperate climatic zones, with only two studies covering the dry and humid tropical domains, respectively (studies #5 and #16 in Table 1). We do not claim that we have found all the case–control studies related to biodiversity on golf courses, but a majority of those available in peer-reviewed scientific journals and books.

Taxa sampled in case–control studies included single species to whole assemblages of species. Eleven studies addressed birds (#1–9, #14, #17 in Table 1) with nine solely targeting this class. Six case–control studies targeted insects (#10–13, #16–17), and two each targeted amphibians (#12 and #14), reptiles (#15 and #17), macroinvetebrates (#12 and #13) and plants (#15 and #17).

Methods used for surveillance of taxa in case–control studies included installation of artificial nesting devices for birds (#1, #2, #3 in Table 1);

Table 1. Case–Control Studies Analyzed for Review, Including Surveyed Taxa, Origin and Type of Study

#	Taxa and location	Study type
1	Burrowing owl, *Athene cunicularia.* South-central Washington, USA	Use of natural and artificial burrows. Eight Gc vs. Cs in moderately disturbed industrial areas with little human presence
2	Eastern blue-bird, *S. sialis.* North Carolina, USA	Survey of reproductive parameters. Seven Gc vs. Cs in hayfields, old fields, and pastures
3	Eastern blue-bird, *S. sialis,* York County, Virginia, USA	Breeding performance. Nine G.c vs. ten structurally similar non-golf sites (parks, campuses, pastures, and recreational areas)
4	Birds of conservation concern. Virginia, USA	Survey determining whether golf courses provide habitat for birds of conservation concern. Eighty-seven Gc vs. Cs of landscapes that golf courses hade replaced (forested, agricultural and residential)
5	Bird assemblages. Albuquerque, New Mexico, USA	Comparative study of indigenous birds. Five Gc vs. five paired, control sites that reflect landscape conditions priror to construction of golf courses
6	Summer resident birds. Palo Alto, California, USA	Survey of summer resident birds across an urban gradient at six different control sites (golf course, biological preserve, recreational area, residential area, office park, business district)
7	Breeding birds. Agricultural and urban areas in Italy	Survey of birds with conservation status. Twenty-three Gc vs. Cs in agricultural and urban areas. Comparison also of bird community parameters at three golf courses with surrounding main land-cover types to evaluate golf courses contribution to bird enrichment at the local landscape-level
8	Breeding birds. Oxford, Ohio, USA	Survey of summer resident birds across an urban gradient at six different control sites (golf course, biological preserve, open space area, residential area, apartment area, business district)
9	Birds. Prairie Dunes, Kansas, USA	Comparison of birds on a golf course and a nearby State park of the same sand dune-grassland habitat
10	Butterflies (Papilionoidae and Hesperiidae). Oxford, Ohio, USA	Survey of butterfly species across an urban gradient at six different sites (golf course, biological preserve, open space area, residential area, apartment area, business district)
11	Butterflies (Papilionoidae and Hesperiidae). Palo Alto, California, USA	Survey of the distribution and abundance of butterfly species across an urban gradient at six different sites (golf course, biological preserve, recreational area, residential area, office park, business district)
12	Amphibians and macro-invertebrates. Stockholm, Sweden	Fauna survey of ponds at six golf courses compared with fauna in 12 off-course ponds located in nature-protected sites and parklands
13	Macroinvertebrates. Muskoka, ON, Canada	Fauna in six streams associated with five golf courses compared with fauna in seven streams in forested habitats
14	Multi-species (birds, mammals, reptiles and frogs). Southeast Queensland, Australia	Survey on what extent regionally threatened species utilized habitats on ten suburban eucalypt-based golf courses relative ten nearby eucalypt fragments and ten suburban residential habitats
15	Multi-species (plants, arthropods and vertebrates. Kanagawa and Chiba, Tokyo, Japan	Comparative survey on occurrence of biota on 12 golf courses and adjacent control sites (paddy fields, parks, roadsides and forests)
16	Multi-species (bumble bee, ground beetle and birds). Wales (UK); Oxford (UK); Lower Saxony, Germany; Moka Estate, Trinidad, WI	Comparative fauna survey of golf courses and adjacent habitats that the courses replaced in their construction. Four courses were analyzed for fauna: Bumble bees at one course in South Wales (UK); ground beetle (Carabidae) at one course in Oxford (UK); and birds in one course in Lower Saxony (Germany) and one in the Moka Estate, Trinidad (WI)
17	Multi-species (vegetation, birds, ground beetles and bumble bees). Surrey, UK	Comparison of trees and herbaceous species and three indicator taxa (birds, ground beetles and bumble bees) between nine golf courses and nine adjacent pasture grasslands for cattle and sheep grazing

Associated references of study numbers: 1, Smith and others (2005); 2, Stanback and Seifert (2005); 3, LeClerc and others (2005); 4, LeClerc and Cristol (2005); 5, Merola-Zwartjes and De Long (2005); 6, Blair (1996); 7, Sorace and Visentin (2007); 8, Blair (2001a); 9, Terman (1997); 10, Blair (2001b); 11, Blair and Launer (1997); 12, Colding and others (2006b); 13, Winter and others (2002); 14, Hodgkison and others (2007a); 15, Yasuda and Koike (2006); 16, Gange and Lindsay (2002); 17, Tanner and Gange (2005).
Gc = golf courses; Cs = control sites of other non-golf land type.

pitfall traps (#16 and #17) and sweep-net technique for collection of arthropods (#15); point count surveys for birds (#4, #5, #6, #8); straight transect lines, strip transects and walking lines for birds and insects (#7, #9, #10, #11, #14, #15, #16, #17); visual encounter surveys for amphibians (#12, #14); time-based active search surveys for mammals and reptiles (#14); Elliot trapping of mammals (#14); and sample collection of macro-invertebrates (#12 and #13). Furthermore, quadrates and aerial photographs were used for sampling of vegetation (#15 and #17).

Depending on case–study objectives, compared green-area habitats were located adjacent to or nearby studied golf course(s) (studies #2, #7, #9, #13, #15, #16, #17 in Table 1), within a larger area in a particular geographic setting (#1, #3, #4, #5, #12, #14), or along a gradient of landscape alteration (see #6, #8, #10 and #11 in Table 1). Golf courses and other land types in case–control studies were chosen by the researchers based on maps, aerial photographs and/or Geographic Information Systems, and were predominantly deliberately selected with only one case study with comparable land types randomly selected (#14).

Four case–control studies were found that specifically targeted species of conservation concern (#1, #4, #7, #14 in Table 1). This category includes fauna indicated by sources as threatened, or regionally declining, based on international and/or national species conservation prioritization indices (for example, National red lists, the EC Directive, BirdLife International, Partners in Flight [PIF]). Moreover, three case–control studies compared and measured the reproductive/recruitment success of biota on golf courses with that of other land types (#1, #2, #3).

Quantitative Assessments

We determined the ecological value of golf courses based on quantitative treatment of a portfolio of analytical measures on biota as derived from the case–control studies. These measures included estimates on species diversity, richness and abundance, as well as measures on species occurrence, community structure and species reproductive/breeding success. In all cases, the authors of the case–control studies statistically treated these estimates. Obtained results on measures were grouped into three discrete classes, depending on whether a golf course, or a number of golf courses, were found to have *higher*, *similar* or *lower* value for biota relative other types of land use. When golf courses were compared with more than one land type in a case–control study, we treated each comparison as a separate one, referred to as a 'comparative case' in the following. Likewise, if several estimates in the portfolio of analytical measures were assessed in a case–control study, and/or if different taxa (class, family or species) were targeted in a case–control study, we treated each comparison as a separate comparative case.

To distinguish results in a more systematic way, we grouped the different non-golf land types assessed in case–control studies into seven land-use categories, including Natural, Agricultural, Parklands, Nature-protected, Residential, Highly mpacted Urban and Miscellaneous Land. This categorization was based on available information in case–control studies. The grouping enabled us to aggregate comparative cases and to quantitatively determine how golf courses ranked in relation to the different land-use categories. In this way, the 'ecological value' of golf courses is a relative measure determined by how well golf courses perform for biodiversity in relation to other land-use types.

The ecological value of golf courses was determined for three levels of analysis: (1) comparisons based on overall estimates of the portfolio of measures examined in case–control studies; (2) comparisons adjusted for measures only on species richness and (3) comparisons based on overall estimates on portfolio measures for the two most studied fauna groups in case–control studies. In addition, we estimated the role of golf courses for biota of conservation.

Statistical Analysis

We constructed a contingency table with cross-tabulations of frequency counts to draw inference on the dependencies between where in a landscape a golf course is constructed and its resulting ecological value. Due to the lack of comparative cases, we divided the six land-use categories into two basic categories: Low Human-Impacted Areas (natural and nature-protected land) and High Human-Impact Areas (Parklands, Agriculture, Residential, Urban land). The categorical dependencies were evaluated using Pearson's Goodness-of-Fit statistic, which is based on large sample theory. Following usual recommendations, it is required that at least 80% of the expected cell count should be 5 or more and that no expected cell count be less than 1. This is only fulfilled in the two-category case (see Appendix 1 in supplementary material). For further information regarding categorical data analysis, see Agresti (1990).

We checked whether the observed values in the table were significantly different from their expected values using Pearson's Goodness-of-Fit test, which follows a Chi-squared distribution with $(r-1)(c-1)$ degrees of freedom. The null hypothesis that the categorical variables are statistically independent was formulated as follows: H_0: The ecological values of a specific landscape are unaffected when building a golf course in that landscape regardless of whether it was previously a landscape subject to high or low human impact.

Results

Comparisons of Ecological Value

Comparisons between golf courses and other land types are presented in Table 2. As determined by all portfolio measures in comparative cases ($n = 101$), 61 cases showed that golf courses had higher ecological value relative to other green-area habitats (land types), with 18 and 22 cases, respectively, showing that golf courses had an ecological value similar to or lower than non-golf land types (Table 3). Thus, in 64% of comparative cases golf courses had higher ecological value than the compared set of land types.

Comparisons of species richness showed that golf courses had higher ecological value in 59% of comparative cases ($n = 56$), with 21.4 and 19.6% of cases, respectively, showing that species richness was similar to or lower than that of other land types (Table 3). The pattern of golf courses having higher ecological value was consistent also for birds and insects. For birds, we found 16 comparative cases ($n = 32$) showing that golf courses had higher ecological value, as compared with 8 cases each where this value was similar to or lower (Table 2). Thus, in 50% of cases golf courses held higher ecological value for birds. For insects, 11 comparative cases ($n = 18$) were found that golf courses had higher ecological value, with seven cases showing that their ecological value was lower.

When golf courses were analyzed in relation to the different land-use categories, their ecological value increased with the degree of anthropogenic impact (Table 3). In comparison with natural areas, assumed here to be the land-use category with the lowest levels of anthropogenic impact, golf courses held lower or similar ecological value in 81.25% of comparative cases. The ecological value of golf courses, however, increased with the degree of anthropogenic impacts, being progressively higher as one moved from Parkland (44%) to Agricultural (69%), Residential (84%) to Highly urban land uses (94%). This overall relationship was repeated also for species richness (Table 3).

The null hypothesis was strongly rejected on the 1% level ($P = 0.000121$; χ^2 sum: 18.05), so there seems to be evidence that the area in which a golf course is built has an effect on the resulting ecological values of that area. The complete tables containing the adjusted residuals are presented in Appendix 1 in supplementary material.

Regarding fauna of conservation concern, ten comparative cases ($n = 27$) were found showing that golf courses were inferior relative to non-golf land types, with eight and seven cases, respectively, showing that they were superior or comparable to non-golf land types. When golf courses were compared with natural habitats and nature-protected areas, only three comparative cases ($n = 18$) showed that golf courses were superior, with five and ten cases, respectively, showing they were similar, or inferior.

Discussion

Results from the analyses made in this study suggest that golf courses overall hold high ecological value. In comparison with a larger set of land types, ranging from natural habitat types to urbanized sites, golf courses were shown to have higher ecological value in 64% of comparative cases. This pattern was consistent also for species richness of fauna, and when birds and insects separately were analyzed.

Although we could not statistically determine how golf courses ranked relative to individual categories of land use due to limitation of data (see ''Materials and Methods''), a high proportion of golf courses (63%) were found to have ecological values similar to or higher than nature-protected sites.

As also shown in the quantitative analyses, golf courses contribute in the support of species of conservation concern. Again, a rather high proportion of golf courses (44%) scored similar or higher value for this group of biota in comparison with natural land and nature-protected sites.

The null hypothesis of this study was strongly rejected. Interpretation of the analysis of Pearson's adjusted residuals provided us with strong evidence that if we were to build a golf course in a natural habitat, we are not likely to experience higher overall ecological values as a result of this change to the landscape. On the other hand, if we build a golf course in an urban area we will most likely be experiencing increasing ecological values.

Table 2. Comparisons of Golf Courses with Other Land Types (n = 101)

#	Compared land-use types	No. of land-use types	Measure	Score
1	Industrial sites[1]	1	Annual fecundity of owls	–
2	Hayfields, old fields, pastures[2] (clustered as agricultural)	1	Reproduction of Eastern bluebird	–
4	Agricultural areas	1	Relative abundance of conservation-status' birds of disturbance-dependent habitats	–
4	Forest areas	1	Species richness and relative abundance of birds with conservation status	–
7	Agricultural areas and urban residential areas (clustered as miscellaneous in meta-analysis)	1	Species richness of open-habitat birds with conservation status	–
7	Agricultural areas and urban residential areas (clustered as miscellaneous in meta-analysis)	1	Species richness of Mediterranean birds with conservation status	–
7	Agricultural areas and urban residential areas (clustered as miscellaneous in meta-analysis)	1	Species richness of raptor birds with conservation status	–
10	Biological preserve, open-space recreational area	2	Species richness of butterflies (Papilionoidae and Hesperioidae)	–
11	Biological preserve	1	Species richness of ''original'' oak woodland butterfly species (Papilionoidae and Hesperioidae) in a preserve	–
11	Biological preserve	1	Abundance of butterflies (Papilionoidae and Hesperioidae)	–
11	Biological preserve	1	Relative abundance of ''original'' oak woodland butterfly species (Papilionoidae and Hesperioidae) in a preserve	–
11	Open-space recreational area	1	Species richness of butterflies (Papilionoidae and Hesperioidae)	–
11	Open-space recreational area, biological preserve, residential area	3	Abundance of butterflies (Papilionoidae and Hesperioidae)	–
11	Open-space recreational area	1	Shannon diversity of butterflies (Papilionoidae and Hesperioidae)	–
13	Forest areas	1	Community structure of macroinvertebrates	–
14	Eucalyptus forests	1	Species richness of reptiles	–
14	Eucalyptus forests	1	Species richness of amphibians	–
14	Eucalyptus forests	1	Relative abundance of amphibians	–
14	Eucalyptus forests	1	Species richness of terrestrial birds	–
4	Agricultural areas, residential areas	2	Relative abundance of birds with conservation status	0
7	Agricultural areas and urban residential areas (clustered as miscellaneous in meta-analysis)	1	Species richness of field-edge/anthropophilous birds with conservation status	0
7	Agricultural areas and urban residential areas (clustered as miscellaneous in meta-analysis)	1	Species richness of forest birds with conservation status	0
9	State park	1	Species richness of birds	0
12	Protected areas and public parklands (clustered as miscellaneous in meta-analysis)	1	Occurrence of amphibians	0
12	Protected areas and public parklands (clustered as miscellaneous in meta-analysis)	1	Shannon diversity of macroinvertebrates	0

Table 2. continued

#	Compared land-use types	No. of land-use types	Measure	Score
14	Eucalyptus forests	1	Relative abundance of reptiles	0
14	Eucalyptus forests	1	Species richness of mammals	0
14	Eucalyptus forests	1	Relative abundance of mammals	0
14	Eucalyptus forests	1	Species richness of birds	0
14	Eucalyptus forests, residential areas	2	Relative abundance of terrestrial birds	0
15	Urban forests	1	Occurrence of flora and fauna	0
16[3]	Pasture[4]	1	Species richness of bumble bees (Apidae)	0
16	Former cropland designated as set-aside[5]	1	Species richness of birds	0
16	Natural grassland, cocoa plantation[6]	2	Species richness of birds	0
1	Industrial sites[1]	1	Annual site fidelity of owls	+
3[3]	Parks, campuses, livestock pastures, and recreational land (clustered as miscellaneous in meta-analysis)	1	Breeding performance of Eastern bluebird	+
5[3]	Paired control sites of various landscape types (clustered as miscellaneous in meta-analysis)	1	Species richness of native riparian birds	+
6	Biological preserve, open-space area, residential area, office park, business district	5	Species richness of summer resident birds	+
6	Biological preserve, open-space area, residential area, office park, business district	5	Abundance of summer resident birds	+
8	Biological preserve, open space area, residential area, apartments, business district	5	Species richness of summer resident birds	+
8	Biological preserve, open space area, residential area, apartments, business district	5	Abundance of summer resident birds	+
10	Residential area, apartments, business district	3	Species richness of butterflies (Papilionoidae and Hesperioidae)	+
10	Residential area, apartments, business district, open-space, biological preserve	5	Species richness of birds	+
11	Biological preserve, residential area, office park, business district	4	Species richness of butterflies (Papilionoidae and Hesperioidae)	+
11	Office park, business district	2	Abundance of butterflies (Papilionoidae and Hesperioidae)	+
11	Biological preserve, residential area, office park, business district	4	Shannon diversity of butterflies (Papilionoidae and Hesperioidae)	+
12	Nature-protected areas and public parklands (clustered as miscellaneous in meta-analysis)	1	Species richness of disturbance-sensitive macroinvertebrates	+
14	Residential areas	1	Species richness of birds	+
14	Residential areas, eucalyptus forests	2	Relative abundance of birds	+
14	Residential areas, eucalyptus forests	2	Species richness of wetland birds	+
14	Residential areas, eucalyptus forests	2	Relative abundance of wetland birds	+
15	Paddy fields, roadside, and parks (clustered as urban in meta-analysis)	1	Occurrence of flora and fauna	+
16	Pasture[4]	1	Abundance of bumble bees (Apidae)	+

Table 2. continued

#	Compared land-use types	No. of land-use types	Measure	Score
16	Pasture[5]	1	Species richness of birds	+
16	Cocoa plantation[6]	1	Abundance of birds	+
16	Arable farm[7]	1	Species richness of ground beetles (Carabidae)	+
16	Arable farm[7]	1	Abundance of ground beetles (Carabidae)	+
17[3]	Pasture grassland	1	Species richness of birds	+
17[3]	Pasture grassland	1	Abundance of birds	+
17[3]	Pasture grassland	1	Species richness of ground beetles (Carabidae)	+
17[3]	Pasture grassland	1	Abundance of ground beetles (Carabidae)	+
17[3]	Pasture grassland	1	Species richness of bumble bees (Apidae)	+
17[3]	Pasture grassland	1	Abundance of bumble bees (Apidae)	+

Score refers to whether golf courses hold lower (−), similar (0), or higher (+) ecological value (based on analyzed measure) compared with other land types as stated by sources. For references of studies (#), see Table 1.
[1]Moderately disturbed with low levels of human presence and chemical application.
[2]Low levels of human presence and no chemical use.
[3]Reflecting conditions prior to golf-course construction.
[4]South Wales, UK.
[5]Lower Saxony, Germany.
[6]Moka Estate, Trinidad.
[7]Oxford, UK.

Table 3. Aggregated Scores for Ecological Value of Golf Courses in Relation to Different Land-Use Categories

	Natural (forest areas, natural grassland, urban forest)	Nature-protected (state parks, biological preserves, nature reserves)	Parkland (public parks, open-space recreational)	Agricultural (hayfields, old fields, pastures, croplands, paddy fields, cocoa plantation)	Residential (residential areas, campuses, apartment areas)	Highly urban (industrial, business district, office park, roadside field)	Miscellaneous	Σ
Lower overall (−)	6	5	4	2	1	1	3	22
Similar overall (0)	7	2	–	3	2	–	4	18
Higher overall (+)	3 (18.8%)	7 (50%)	5 (55.6%)	11 (68.8%)	16 (84.2%)	16 (94,1%)	3	61
Σ cases/category	16	14	9	16	19	17	10	101
Lower *S* (−)	4	2	2	–	–	–	3	11
Similar *S* (0)	3	2	–	2	1	–	4	12
Higher *S* (+)	1 (12.5%)	3 (42.8%)	3 (60%)	5 (71.4%)	11 (91.7%)	7 (100%)	3	33
Σ cases/category	8	7	5	7	12	7	10	56

Values (lower, similar or higher) are presented for both overall comparative measures (n = 101) and for species richness [S] (n = 56) in cases analyzed. Percentage numbers are given to illustrate how the ecological value increases with the degree of anthropogenic impact (from left to right).

Although golf courses dealt with in the case–control studies amount to about 0.6% of the world's golf courses, it is important to emphasize that results obtained here predominantly derive from temperate, climatic zones of the developed world. Thus, we simply do not know what impacts golf courses have on biodiversity in other climatic zones and settings. In the following, we more critically discuss the results of this study.

The Role of Golf Courses in Biodiversity Conservation

Results of this study support the notion that biodiversity conservation should not entirely be centered on protected-area management, which is common in many settings (Colding and others 2006a). That many golf courses support species of conservation concern may, however, not come as a surprise considering that the great majority of threatened and endangered species occur on private lands, such as more than 90% in the United States (Scott and others 2001). Moreover, the results obtained in our study should not be interpreted as if golf courses more generally can be constructed to support threatened flora and fauna. It is important to recognize that measurements on biota in case–control studies are taken after the fact that a golf course has been built in a landscape and do not necessarily reflect preconditions of biota. For example, Blair and Launer (1997, #11), comparing the butterfly fauna along a gradient of landscape alteration in Oxford, Ohio, found that a golf course maintains neither the original species composition nor the abundance of a predevelopment community of butterflies. In fact, the predevelopment butterfly fauna progressively disappeared as sites became more urban. Moreover, Winter and others (2002, #13) showed that golf courses adversely impacted macroinvertebrate communities in natural streams in a region of Canada where agricultural and urban development was minimal and land modifications few. In all cases, golf-course streams were higher in nutrients, dissolved ions, and more alkaline than in forested reference streams. The construction of courses in these settings resulted in a considerable change in the variability of the macroinvertebrate fauna in forest streams.

As studies in ecology show, biodiversity often peaks in moderately disturbed habitats due to an increase in species that are anthropophilous (Blair 1996, 2001a; McKinney 2002). These species are able to exploit many resources and can adapt to forest edges and adjacent open lands. Hence, in landscapes dominated by native natural habitats the construction of a moderately disturbed habitat, like a golf course, may increase biodiversity at the local patch level. However, this may occur at the expense of overall biodiversity in a landscape, for example, eliminating conditions for habitat specialists and species that depend on undisturbed interior habitats. This relationship has been observed in Australia, where golf-course construction

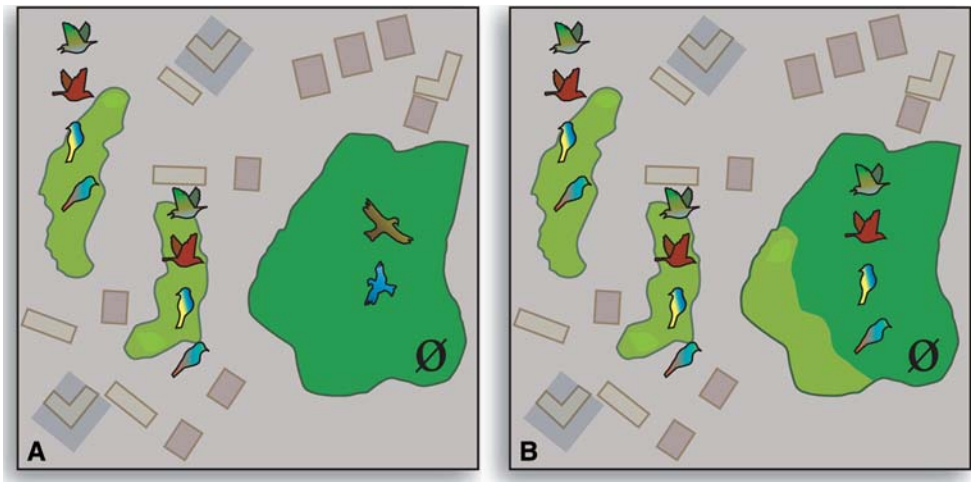

Figure 1. When a golf course is built within a larger native habitat fragment, local biodiversity can increase at the patch-level (ø) at the expense of overall regional biodiversity. In (**A**), the total number of birds is six, whereas in (**B**) the total number has been reduced to four. We refer to this event as the 'biodiversity illusionary phenomenon', or the 'BIP-effect' of habitat-replacement. The phenomenon can be explained in that birds that benefit from human presence ('urban adapters') increase at the expense of anthropogenic disturbance-sensitive birds ('urban avoiders'), such as interior-dependent avifauna.

has contributed to the loss of regionally rare and threatened species (Hodgkison and others 2007a). We refer to this phenomenon as the 'Biodiversity Illusionary Phenomenon', or BIP-effect, further elaborated on in Figure 1.

Nevertheless, a great deal of currently existing golf courses contribute to sustaining threatened flora and fauna at regional levels. For example, in the United Kingdom older golf courses often contain vegetative communities that have been undisturbed for considerable time (Gange and others 2003), containing both coastal dune grassland and inland heathland, with as much as 20% of the dune grassland contained on golf courses on the Sefton Coast (Sorace and Visentin 2007). Over the past 150 years, southern England has experienced a 70% loss of heathland, which is designated as internationally rare and endangered, with golf courses containing over 100 such sites (Gange and Lindsay 2002).

Moreover, golf courses in New Mexico contribute to preserve native riparian vegetative systems and their associated birds (Merola-Zwartjes and De Long 2005, #5). With some 95% of the U.S. western riparian vegetative communities lost or degraded over the past century, these courses play a critical role in conserving riparian birds at regional levels. Golf courses in the United States also contain declining oak savanna and orchards (Rodewald and others 2005), and courses in the suburbs of the southeastern Coastal Plain hold remnant patches of longleaf-pine ecosystems, representing pyrogenic communities, with flora and fauna that depend on periodic low-intensity fires (Heuberger and Putz 2003) (for more examples, see Tables 4 and 5).

The degree to which golf courses support species of conservation concern is contingent upon several factors. For example, the lack of adequate amounts of forested areas render many golf courses incapable of sustaining interior-dependent forest birds and birds of conservation concern (LeClerc and Cristol 2005, #4; Sorace and Visentin 2007, #7). In a study comparing golf courses along a gradient of landscape alteration in South Carolina, Jones and others (2005) found 33% more bird species in less landscape-altered golf courses with nearly 60% of the avifauna having PIF scores. Moreover, habitat characteristics on golf courses in northern and central Ohio, USA, determined their value as habitat for the widely declining red-headed woodpecker (*Melanerpes erythrocephalus*). Courses sustaining this species contained trees that were 12% larger in diameter and had twice as many hard-mast trees (for example, oak, hickory, beech), standing dead trees (snags) and dead limbs as golf

Table 4. Vegetation Communities and Associated Fauna with Conservation Status as Found on Golf Courses

Vegetation communities and associated fauna	Golf course	Source
Magnesian limestone grassland with St. John's wort (*Hypericum montanum*), autumn lady's tresses (*Spiranthes spiralis*), the glow worm beetle (*Lampyris noctiluca*)	Lindrick GC in south Yorkshire, UK	Gange and others (2003)
Chalk grassland with green-winged orchid (*Orchis morio*) and several nationally rare species of fungi	Temple GC in Berkshire, UK	Gange and others (2003)
Dune grassland with sand lizard (*Lacerta agilis*), natterjack toad (*Bufo calamita*), the green tiger beetle (*Cicindela campestris*)	Golf courses on the Sefton coast, Merseyside, UK	Gange and others (2003)
Dune grassland with lizard orchid (*Himantoglossum hircinum*), bedstraw broomrape (*Orobranche caryophyllace*)	Royal St George, Kent, UK	Carey and Brown (1994) and Brennan (1992)
Heathland (*Calluna vulgaris, Erica tetralix, Erica cinerea*)	Therfield Heath GC, Hertfordshire UK; Ashford GC and Wrotham Heath GC, Kent, UK	Green and Marshall (1987) and Gange and others (2003)
Longleaf pine ecosystems (*Pinus palustris*)	Pine Needles GC, North Carolina, USA; Haile Plantation GC, Gainesville, Florida, USA	Terman (1997) and Heuberger and Putz (2003)
Broad-leaved paperbark communities (such as *Melaleuca quinquinervia*); Ephemeral wetlands (*Juncus* spp., *Typha* spp., *Cyperus* spp.)	Golf courses on the Gold Coast, Australia	Warnken and others (2001)

Table 5. Birds with Conservation Status Found on Golf Courses

Taxa (species, and vegetation communities)	Golf course/location	Source
Red-headed woodpecker (*M. erythrocephalus*), yellow-billed cuckoo (*Coccyzus americanus*), northern flicker (*Colaptes aurratus*), eastern kingbird (*Tyrannus tyrannus*), Baltimore oriole (*Icterus galbula*)	Golf courses in northern and central Ohio, USA	Rodewald and others (2005)
Burrowing owl (*A. cunicularia*)	Golf courses in south-central Washington (WA), USA	Smith and others (2005)
Henslow's sparrow (*Ammodramus henslowii*), Bell's vireo (*Vireo bellii*), dickcissel (*Spiza Americana*), grasshopper sparrow (*Ammodramus savannarum*), yellow-billed cuckoo (*C. americanus*), Mississippi kite (*Ictinia mississippiensis*)	Prairie Dunes Country Club in Kansas, USA	Terman (1997)
Brown-headed nuthatch (*Siita pusilla*), Swainson's warbler (*Limnothlypis swainsonii*), wood trush (*Catharus mustelinus*), northern parula (*Parula americana*), prothonatary warbler (*Protonotaria citrea*), worm-eating warbler (*Helmitheros vermivorus*), Painted bunting (*Passerina ciris*), and others	Golf courses in Georgetown and Horry counties, South Carolina, USA	Jones and others (2005)
Purple heron (*Ardea purpurea*)	Tanah Merah CC, Singapore	Neo (2001)
Barn swallow (*Hirundo rustica*), house martin (*Delichon urbica*), spotted flycatcher (*Muscicapa striata*), turtle dove (*Streptopelia turtur*), hoopoe (*Upupa epops*), common quail (*Coturnix coturnix*), European bee-eater (*Merops apiaster),* barbary partridge (*Alectoris Barbara*), woodchat shrike (*Lanius senator*), common kestrel (*Falco tinnunculus*), and others	Golf courses in the lowlands and hilly territories of Italy	Sorace and Visentin (2007)
The comb-crested jacana (*Jacana gallinacea*), black swan (*Cygnus atratus*), wandering whistling duck (*Dendrocygna arcuata*), buff-banded rail (*Rallus philippensis*)	Golf courses in Southeast Queensland, Australia	Hodgkison and others (2007a)

Conservation status includes threatened and regionally declining taxa based on international and/or national species conservation prioritization indices, as referred to by sources.

courses where this species was not detected (Rodewald and others 2005).

Although forest cover often determines a golf course's value for fauna of conservation concern (Sorace and Visentin 2007), it can negatively affect certain fauna groups such as native grassland birds (LeClerc and Cristol 2005, #4), birds adjusted to open habitats and semiarid pastures (Sorace and Visentin 2007, #7), as well as desert specialists in arid regions (Merola-Zwartjes and De Long 2005, #5). More generally, designs that increase the structural complexity of vegetation on golf courses can enhance their value for urban-avoiding groups like mammals, reptiles and amphibians (Hodgkison and others 2007b, #14). For these fauna groups, it is important to account for variables like tree density, native vegetation cover, number of hollows in golf-course habitats, waterbody heterogeneity (permanent and ephemeral wetlands) and aquatic vegetation complexity (Hodgkison and others 2007b).

Golf Courses as Breeding Habitats

Our analysis suggests that golf courses hold mixed values for fauna reproduction, although very few studies have examined this relationship. For example, Smith and others (2005, #1) and Stanback and Seifert (2005, #2) found that golf courses generally are inferior in providing effective breeding habitats for fauna in comparison with moderately disturbed habitats due to greater anthropogenic disturbance like frequent mowing, watering and golfer traffic. Indirect effects from chemical applications related to turf management might also limit their value as breeding habitats for fauna (Stanback and Seifert 2005).

On the other hand, LeClerc and others (2005 #3) found that nestboxes on golf courses in West Virginia produced a significantly greater number of broods and fledged offspring of higher phenotypic quality (more symmetric) of the Eastern bluebird (*Sialia sialis*) than boxes in structurally similar control sites that shared high levels of human disturbance and development but not the extensive use of pesticides typical of golf courses. They linked this result to greater food availability on these courses and to less competition of bluebirds with other cavity-nesting birds.

Because golf courses often contain ample wetland habitats, studies have shown that they can provide adequate breeding habitats for pond-dependent species, like amphibians (Scott and others 2002; Paton and Egan 2002; Colding and others 2006b; Semlitsch and others 2007). Moreover, a study from Australia showed that suburban golf courses harbor regionally uncommon wetland birds, of which some nested in wetlands on golf courses (Hodgkison and others 2007a). In contrast, White and Main (2005) showed that although water birds used wetlands for foraging and as stationary/resting sites on golf courses in southwest Florida, only a tiny fraction (0.3%) actually nested on these courses.

Although it makes intuitive sense that golf courses due to their sheer size could offer effective breeding locales for less mobile organism groups like reptiles and amphibians, this is not always the case. For example, Hodgkison and others (2007a) found that golf courses in Queensland, Australia, generally served as better refuge for mobile fauna (birds and mammals) than less mobile fauna (reptiles and amphibians) likely due to isolation of many golf courses by built-up suburban land, exposure to herbicides, or greater disruption of ground-level habitats.

Suffice it to say, our literature review suggests that a golf course's value in terms of providing efficient breeding habitats for fauna depends on several factors, including the degree of direct and indirect human disturbance regimes on golf courses, the extent of vegetation cover and the amount of suitable interior habitats, as well as factors such as forage availability, and the degree of isolation of golf courses from other green-area habitats in a landscape.

Golf-Course Construction and Biodiversity

As suggested by the results of this study, the ecological value of a golf course progressively increases with the degree of humanly impacted land. In contrast, when golf courses are constructed in landscapes dominated by natural habitats, we are not likely to experience higher overall ecological values as a result of this change to the landscape. This overall relationship lends support from other findings in ecology. For example, Blair and Launer (1997) and Blair (2001b) showed that the pre-development fauna community gradually dropped as sites that became more urban, resulting in the homogenization of fauna.

Conversely, several sources of case–control studies suggested that golf-course construction increased biodiversity levels in humanly modified urban and agricultural landscapes because a golf course adds structural diversity in those settings, thereby increasing landscape diversity (Gange and Lindsay 2002; Merola-Zwartjes and De Long 2005; Hodgkison and others 2007b; Tanner and Gange

2005; Sorace and Visentin 2007). For example, suburban golf courses in Queensland, Australia, were found to have high conservation value for wetland birds because they provided additional wetland habitats that were largely missing in the overall suburban landscape (Hodgkison and others 2007a, #14). Colding and others (2006b, #12) found that wetlands on golf courses comprised over a quarter of all available freshwater ponds in the suburban/urban landscapes of Stockholm, Sweden, supporting a number of threatened and red-listed amphibians and aquatic invertebrates.

In regions dominated by agriculture, golf-course development can also positively contribute to biodiversity. For example, Gange and Lindsay (2002, #16) found a higher diversity of taxa on golf courses than the farmland and pastures these courses had replaced. Similarly, Tanner and Gange (2005, #17) found a significantly higher richness and abundance of birds, ground beetles and bumble bees on golf courses than on adjacent farmlands in the UK, constituting the same habitats from which the courses had been constructed. Although introduced tree species were more abundant on older golf courses, they found that courses of any age enhanced local biodiversity in intensively managed agricultural areas by providing a greater variety of habitats.

The increase in landscape diversity likely also promotes essential ecosystem processes (Colding 2007), like those resulting from landscape complementation/supplementation in which species utilize different habitat types to fulfill their lifecycle requirements and use different land types for supplemental foraging (Dunning and others 1992).

Studied Biota and Their Functions in Ecosystems

In a comparative land-use assessment of this kind, it is essential to clarify to what degree targeted taxa in case–control studies actually reflect overall biodiversity patterns of land use, as it is known that species vary considerably in relation to what general ecological inference can be drawn from them (Lawton and others 1998; Simberloff 1998). It is also important to clarify what functions targeted species in case–control studies perform in ecosystems because this is related to what ecological values a particular land type might hold.

Birds, targeted in nearly 65% of the case–control studies, commonly serve as bellwether taxa for assessing environmental impacts in ecosystems such as habitat fragmentation (Wilcove 1985; Blair 2001b), with predator avifauna being effective indicators of organochlorine pesticides in ecosystems (Blair 1999; Stanback and Seifert 2005). Bird diversity also correlates well with the amount of trees, shrubs and grasses contained in ecosystems (Blair 1999). Considering that birds also perform a number of critical ecosystem services like pest control, seed dispersal, spreading of organic materials and functioning as 'mobile links' that connect habitats in space and time (Lundberg and Moberg 2003), bird-based study data can reveal relevant ecological information on land use.

Insects, which were targeted in 35% of the case–control studies, generally provide useful information about habitat availability and quality in ecosystems (compare Blair and Launer 1997), with butterflies often acting as a surrogate for plant diversity in studies because they directly depend on and are highly coevolved with plants (Ehrlich and Raven 1964). Hence, ecosystems that support large numbers of butterflies likely contain rich amounts of plants. Bumblebees (Apidae), having short foraging ranges of a few kilometers (Cane 2001; Kremen and others 2004), reflect habitat characteristics at more local scales in ecosystems. Essential pollinators, such as butterflies and wild bees, have also declined massively in recent years (Kremen and others 2004; Biesmeijer and others 2006) and may therefore be particularly useful to assess in land-use comparative studies.

Ground beetles (Carabidae) have also been used as indicator species in many studies (Tanner and Gange 2005), representing vital omnivorous predators in arable fields, and providing farmers with a natural pest control. Land types that provide adequate habitat for ground beetles can therefore be of high ecological value.

Because macroinvertebrates and amphibians (assessed in nearly 12% of the case–control studies, respectively) have seriously declined in many parts of the world (Alford and Richards 1999; Wood and others 2001), land types that promote these groups have high ecological value, and are worthy of studying in land-use comparative studies.

Although it may be argued that measures on the abundance of species in ecosystems poorly reflect to what degree a land-use holds ecological value, abundant species may carry out important functions in ecosystems. Hence, from an ecosystem management perspective, land types containing abundant species like pollinators, seed dispersers, or pest-regulating species may contribute to the resilience building of landscapes, although we could not determine to what extent this was the situation in the case–control studies examined here.

Golf Courses and Ecosystem Management

Although this review shows that many golf courses play an important role in biodiversity conservation, golf-course development often occurs in an ad hoc manner in many countries (Hodgkison and others 2007b), often with a dodgy expansion in environmentally sensitive areas (Warnken and others 2001). Many golf-course locations also occur without careful consideration of how more fine-scaled climatic conditions in a landscape affect management inputs, as golf courses only a few kilometers apart can greatly vary in terms of moisture levels, temperature and soil composition, and therefore differ regarding their requirement for chemical inputs and irrigation (Joyce 1998). In contrast, the trend of constructing golf courses on closed landfills (Mackey 1996; Amick 1998) represents a particularly instructive example of how golf courses can substantially contribute to important habitat restoration and associated biodiversity enhancement.

The way a golf course is designed and managed also influence what potential it holds in ecosystem management, with several useful recommendations offered in the scientific literature (see Terman 1997; Gange 1998). We propose that golf courses become more widely designed and managed also to promote critical ecosystem services in regions where these are threatened or being disrupted. As shown in this review, golf courses hold a real potential to support functional groups like pollinators, pest-control regulating species and seed dispersers. We also propose that golf courses be more widely considered in urban designs to promote biodiversity conservation, such as in urban designs that promote 'ecological land-use complementation' (Colding 2007)—a land-development strategy that configures land uses more optimally to promote ecosystem processes in urban areas (Figure 2).

As suggested by Marzluff and Ewing (2001), restoration ecologists, land managers and urban planners can help maintain fauna in fragmented landscapes by a combination of short- and long-term actions, such as integrating semi-natural land types into native habitat systems, and seeking creative ways to increase native habitat fragments and manage it collectively in urbanizing regions. We propose that golf courses increasingly become integrated in ecological networks that provide an operational model for conserving biodiversity on ecological principles and at the same time allow a degree of human use of the landscape (Bennett 2004). Such networks should be managed along principles of adaptive co-management (Olsson and others 2004) that integrate different stakeholders and land managers in cooperative management.

Conclusions

Overall, our literature review shows that golf courses play an essential role in biodiversity conservation and ecosystem management. Many golf courses hold high levels of biodiversity, even surpassing lands designated for nature conservation in many cases. Golf courses also provide habitats for threatened and regionally declining flora and

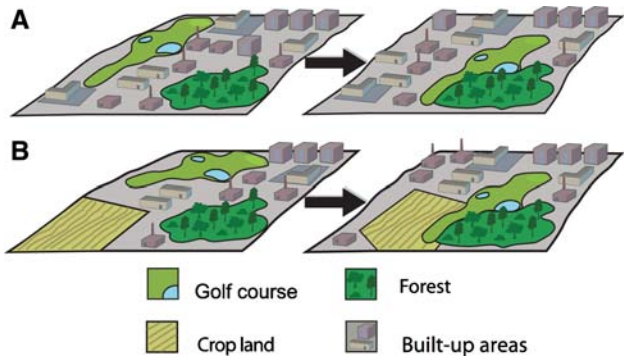

Figure 2. By adopting 'ecological land-use complementation' in urban spatial design, planners could promote ecosystem processes. In situation (**A**) a golf course with freshwater ponds that is located adjacent to a forested area has greater potential to promote amphibians, relative to if it is located in isolation surrounded by urban built-up land. In this sense, the golf course and forested area complement each other, providing necessary habitats for amphibians to breed, forage and over-winter. Similarly, in (**B**) a golf course clustered together with forested patches and crop fields, holds greater chance of supporting pollinators relative to a course located in isolation. If managed adequately, pollinators could use the golf course for foraging while using the forested area for nesting, and perform pollination in the adjacent crop field. *Source*: Colding (2007).

fauna, and can support functional groups that perform critical ecosystem services. However, and as shown here, the ecological value of golf courses is foremost determined by what habitats they replace when they are built. Golf-course construction involving replacement of native habitats generally leads to a regional decline of biodiversity. Conversely, well-planned and adequately designed and managed golf courses may enhance biodiversity in ecologically impoverished landscapes through an increase in landscape diversity. Land-use planners and managers that aspire to increase biodiversity in structurally homogenized landscapes and highly human-impacted regions, like in agricultural and urban settings, should consider golf courses as a means for realizing this. Such considerations need, however, to be accompanied by a careful analysis of *how* and *where* golf courses best can support biodiversity in a region to avoid ecologically adverse effects from golf-course construction. We propose that golf courses, their staff and their various members become more closely integrated in current conservation and management approaches to further enhance golf courses' ecological values. Both the golfing sector and ecologists have much to gain by combining research efforts to adaptively test and seek out ways for how existing and future golf courses could become more environmentally adapted. This could take place within the framework of adaptive co-management that provides a new window of opportunity for joint collaboration among conservation, restoration and recreational interests.

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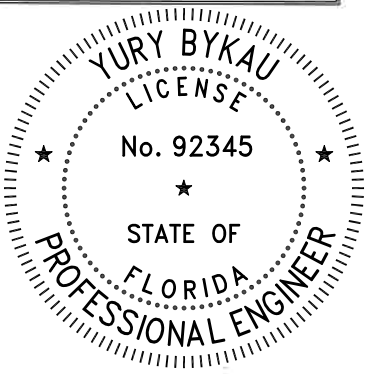
TRAFFIC ENGINEERING
TRANSPORTATION PLANNING
SIGNAL SYSTEMS/DESIGN

MEMORANDUM



TO: Mr. Dan DeLisi
DeLisi, Inc.

FROM: Yury Bykau, P.E.
Senior Project Manager

DATE: November 5, 2024

RE: US 17 CPA – 4,900 Acres
Comprehensive Plan Amendment
Charlotte County, Florida

TR Transportation Consultants, Inc. has completed a traffic impact analysis for the proposed Comprehensive Plan Amendment for approximately 4,900 acres of property located on the east side of US 17 just south of DeSoto County line in Charlotte County, Florida. The subject area illustrating the entire 4,900 acres of property is outlined on the attached map as part of the methodology meeting notes.

Based on the discussion with DeLisi, Inc., the site currently has a Future Land Use of Agriculture (AG) and is located within a Rural Settlement Area that allows up to 6,000 residential dwelling units, 500,000 square feet of commercial uses and 1 million square feet of industrial uses. The applicant is proposing an amendment that will increase the number of allowable residential units from 6,000 dwelling units to 8,000 dwelling units, or a total increase of 2,000 dwelling units. The proposed amendment will also increase the permitted industrial floor area from 1 million square feet to 1.5 million square feet, or a total increase of 500,000 square feet of industrial floor area. No changes to the allowable 500,000 square feet of commercial floor area are being proposed with this application. Access to the site will be determined during the rezoning/final site plan approval process.

The transportation related impacts of the proposed Comprehensive Plan Amendment were evaluated based on the long-range impact (20-year horizon or year 2045) the proposed amendment would have on the existing and future roadway infrastructure.

Under the existing Future Land Use of Agriculture (AG) and Rural Settlement Area, the site is permitted with up to 6,000 residential dwelling units, 500,000 square feet of commercial uses and 1 million square feet of industrial uses. As previously mentioned, the applicant is proposing an amendment that will increase the allowable residential units from 6,000 dwelling units to 8,000 dwelling units as well as increase the industrial floor area from 1 million square feet to 1.5 million square feet. **Table 1** summarizes the permitted and proposed residential intensity.

Table 1
Land Uses
US 17 CPA – 4,900 Acres

Land Use	Permitted	Proposed
Residential	6,000 Dwelling Units	8,000 Dwelling Units
Industrial	1,000,000 Sq. Ft.	1,500,000 Sq. Ft.
Commercial	500,000 Sq. Ft.	500,000 Sq. Ft

Trip Generation

The trip generation for the with and without amendment scenarios was determined by referencing the Institute of Transportation Engineer's (ITE) report, titled ***Trip Generation Manual***, 11th Edition. Land Use Code 210 (Single-Family Detached Housing), Land Use Code 130 (Industrial Park) and Land Use Code 820 (Shopping Center) were utilized for the trip generation purposes of the permitted/proposed residential, industrial and commercial uses. The trip generation equations utilized are attached to this Memorandum for reference.

Table 2 reflects the total weekday PM peak hour trip generation of the development as currently permitted on the subject property. **Table 3** reflects the total weekday AM and PM peak hour trip generation of the proposed development as a result of the Amendment request. Both tables include the reduction in trips due to internal capture as well as pass-by traffic associated with the commercial uses. Note, internal capture and pass-by calculations were completed consistently with the methodologies in the NCHRP Report and published in the ***ITE Trip Generation Handbook***, 3rd Edition.

Table 2
Trip Generation - Permitted
US 17 CPA – 4,900 Acres

Land Use	Weekday P.M. Peak Hour			Daily (2-way)
	In	Out	Total	
Single-Family Detached Housing LUC 210 (6,000 Dwelling Units)	2,938	1,726	4,664	43,632
Industrial LUC 130 (1 million Sq. Ft.)	75	265	340	3,109
Commercial LUC 820 (500,000 Sq. Ft.)	863	935	1,798	18,919
Total Trips	**3,876**	**2,926**	**6,802**	**65,660**
Less Internal Capture (10%)	-329	-329	-658	-6,566
Less Pass-By (19%)	-140	-140	-280	-3,235
Net New External Trips	**3,407**	**2,457**	**5,864**	**55,859**

*Internal capture trips were obtained from the attached internal capture matrices.

Table 3
Trip Generation - Proposed
US 17 CPA – 4,900 Acres

Land Use	Weekday P.M. Peak Hour			Daily (2-way)
	In	Out	Total	
Single-Family Detached Housing LUC 210 (8,000 Dwelling Units)	3,850	2,262	6,112	56,853
Industrial LUC 130 (1.5 million Sq. Ft.)	112	398	510	3,839
Commercial LUC 820 (500,000 Sq. Ft.)	863	935	1,798	18,919
Total Trips	**4,825**	**3,595**	**8,420**	**79,611**
Less Internal Capture (8%)	-329	-329	-658	-6,369
Less Pass-By (19%)	-140	-140	-280	-3,235
Net New External Trips	**4,356**	**3,126**	**7,482**	**70,007**

*Internal capture trips were obtained from the attached internal capture matrices.

Table 4 illustrates the trip generation change when comparing the trip generation of the permitted development to the trip generation of the proposed development (Table 2 vs Table 3).

Table 4
Trip Generation Comparison – Permitted vs Proposed
US 17 CPA – 4,900 Acres

Land Use	Weekday P.M. Peak Hour			Daily (2-way)
	In	Out	Total	
Proposed Residential	4,356	3,126	7,482	70,007
Permitted Residential	-3,407	-2,457	-5,864	-55,859
Trip Change	**949**	**669**	**1,618**	**14,148**

2045 Link Level of Service Analysis (20-year horizon)

The Charlotte County-Punta Gorda Metropolitan Planning Organization's (MPO) 2045 Long Range Transportation Plan was reviewed to determine if any future roadway improvements were planned in the vicinity of the subject site. Based on the review, the only roadway improvements within the vicinity of the subject site shown on the 2045 Financially Cost Feasible Plan were the widening of US 17 to a six-lane facility from Copeley Avenue to Bermont Road (CR 74), interchange improvement at I-75 and US 17 interchange and widening of Taylor Road to a four-lane facility from US 41 to Jones Loop Road. The 2045 Roadway Cost Feasible Plan Map and Table are attached to this Memorandum for reference.

The Charlotte County-Punta Gorda Metropolitan Planning Organization's (MPO) long range transportation travel model was also reviewed to determine what the future traffic volumes and Level of Service will be in 2045 (date of most recent model update) on the roadways in the vicinity of the site. The trips from the proposed project as identified in Table 3 were distributed to the surrounding roadway network based on a trip distribution as shown on the attached 2045 District One FSUTMS model run.

Table 1A attached to this memorandum identifies the Level of Service Thresholds and the impact area for the project. The Level of Service threshold volumes for County maintained roadways were derived based on the attached ***Charlotte County Roadway Level of Service Data Table***. The Level of Service threshold volumes for State maintained roadways were derived based on the attached FDOT's ***Generalized Service Volume Tables*** consistent with the attached FDOT's ***District One Level of Service Report***. The determination if the proposed land use change would have a significant impact (Project Trips > 5% of Adopted Level of Service Volume) on a roadway segment was determined by dividing the number of project trips anticipated to travel on that segment (two-way peak hour) by the adopted Level Service Threshold Volume.

Table 2A attached to this memorandum indicates the projected peak hour two-way traffic volumes and corresponding Levels of Service on the roadways in the vicinity of the site based on the volumes taken from the FDOT's District One Travel Model file (FSUTMS). The traffic volumes as reported in the travel model were utilized to determine the 2045 AADT volume for each roadway segment. The AADT was then multiplied by the K-100 factor as provided by Charlotte County in the ***Charlotte County Roadway Level of Service Tada Table*** to determine the peak hour two-way traffic volume for each roadway segment. The projected Level of Service was then determined by referencing the volume to the Level of Service Thresholds as contained in Table 1A. The peak hour two-way project trips were then added to the projected 2045 peak hour two-way volumes to determine the projected 2045 peak hour two-way volume and Level of Service with the proposed Comprehensive Plan Amendment request.

The results of the analysis indicate that the addition of the project trips to the network will not cause any roadway links, except for US 17 (state-maintained roadway) between the site and Bermont Road (CR 74), to fall below the adopted Level of Service standard for each analyzed roadway link within the study area. Additionally, US 41 (Peace River Bridge) was shown to operate below the adopted Level of Service both with and without the proposed amendment request. A more detailed link Level of Service analysis will be prepared at the time each property seeks rezoning and final site plan approvals, which is when more specific end-users and intensities will be known. At this time the analysis was prepared based on the worst-case development scenario.

Attachments

METHODOLOGY MEETING NOTES

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TRAFFIC ENGINEERING
TRANSPORTATION PLANNING
SIGNAL SYSTEMS/DESIGN

MEMORANDUM

TO: Mr. Ravi Kamarajugadda
Charlotte County Transportation Engineer

FROM: Yury Bykau, P.E.
Transportation Consultant

DATE: July 16, 2024

RE: US 17 CPA – 4,900 Acres
Comprehensive Plan Amendment Traffic Impact Statement Methodology

This memorandum summarizes the methodology that will be utilized for the traffic impact analysis to be prepared by TR Transportation Consultants, Inc. for the Comprehensive Plan Amendment approval for the 4,900 acres of property located on the east side of US 17 just south of DeSoto County line in Charlotte County, Florida. See attached map illustrating the entire 4,900 acres subject area.

The site currently has a Future Land Use of Agriculture (AG) and is located within a Rural Settlement Area that allows up to 6,000 residential dwelling units as well as various commercial/industrial uses. The applicant is proposing an amendment that will increase the allowable residential units from 6,000 dwelling units to 8,000 dwelling units, or a total increase of 2,000 dwelling units. No changes to the allowable commercial/industrial floor area are being proposed with this application. Therefore, the traffic analysis will focus only on the change in the number of residential dwelling units.

Access to the site will be determined during the rezoning/final site plan approval process.

TRIP GENERATION

The trip generation will be completed utilizing the Institute of Transportation Engineer's (ITE) report, ***Trip Generation Manual,*** 11th Edition. Land Use Code 210 (Single Family Detached Housing) will be utilized for the permitted/proposed residential dwelling units. **Table 1** summarizes the land uses that will be utilized for the purposes of the traffic analysis.

Table 1
Land Uses
US 17 – 4,900 Acres CPA

Land Use	Permitted	Proposed
Residential	6,000 Dwelling Units	8,000 Dwelling Units

Table 2 reflects the total weekday AM and PM peak hour trip generation of the residential development as currently permitted on the subject property. **Table 3** reflects the total weekday AM and PM peak hour trip generation of the proposed residential development.

Table 2
Trip Generation - Permitted
US 17 – 4,900 Acres CPA

Land Use	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour			Daily (2-way)
	In	Out	Total	In	Out	Total	
Single-Family Detached Housing LUC 210 (6,000 Dwelling Units)	773	2,319	3,092	2,938	1,726	4,664	43,632

Table 3
Trip Generation - Proposed
US 17 – 4,900 Acres CPA

Land Use	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour			Daily (2-way)
	In	Out	Total	In	Out	Total	
Single-Family Detached Housing LUC 210 (8,000 Dwelling Units)	1,004	3,013	4,017	3,850	2,262	6,112	56,853

Table 4 illustrates the trip generation change when comparing the trip generation of the permitted residential development to the trip generation of the proposed residential development (Table 2 vs Table 3).

Table 4
Trip Generation Comparison – Permitted Residential vs Proposed Residential
US 17 – 4,900 Acres CPA

Land Use	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour			Daily (2-way)
	In	Out	Total	In	Out	Total	
Proposed Residential	1,004	3,013	4,017	3,850	2,262	6,112	56,853
Permitted Residential	-773	-2,319	-3,092	-2,938	-1,726	-4,664	-43,632
Trip Change	**231**	**694**	**925**	**912**	**536**	**1,448**	**13,221**

TRIP DISTRIBUTION
The trip distribution for the project trips will be based on the latest D1RPM Travel Model (FSUTMS).

STUDY AREA
The roadway link level of service analysis will be evaluated on those roadways that are shown to be significantly impacted (>5% of adopted LOS standard) based on the trip change shown in Table 4.

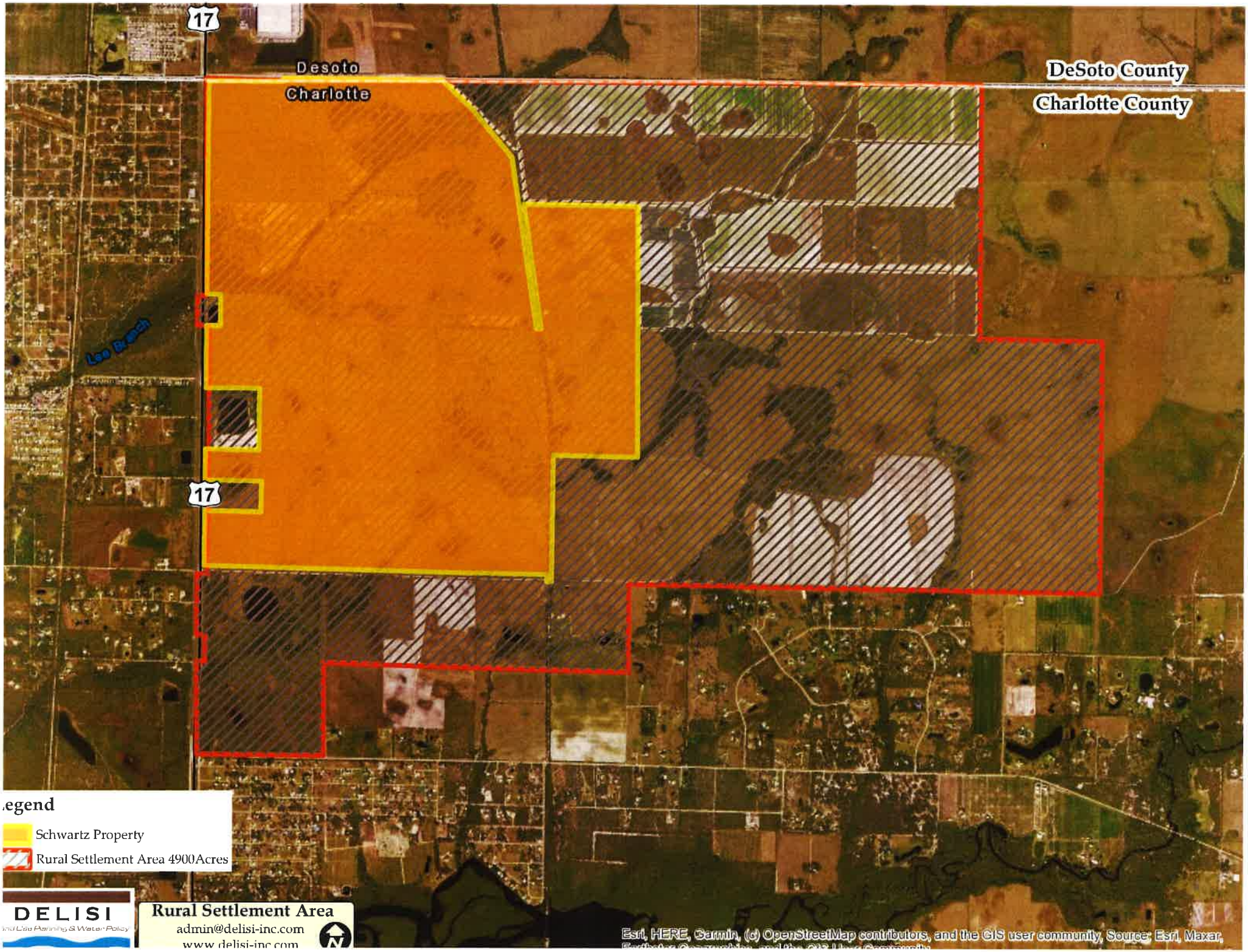
EXISTING/FUTURE TRAFFIC
The roadway link Level of Service analysis will be based on the long-term impacts (year 2045) using the latest D1RPM Travel Model (FSUTMS). The Level of Service Thresholds for County maintained roadways will be derived from the Charlotte County Roadway Level of Service Data Spreadsheet. The Level of Service Thresholds for State maintained roadways will be derived from the FDOT's latest Generalized Peak Hour Two-Way Service Volumes tables.

Analysis scenarios will be as follows:

- Future Background Traffic (2045 Year Traffic Conditions)
- Future Background Traffic + Project Traffic (2045 Year Traffic Conditions)

The projected 2045 year background traffic volumes will be obtained from the latest D1RPM Travel Model (FSUTMS). No intersection or turn lane analysis will be prepared at this time.

Attachments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TABLES 1A & 2A

2045 LOS ANALYSIS

TABLE 1A
LEVEL OF SERVICE THRESHOLDS
2045 LONG RANGE TRANSPORTATION ANALYSIS - US 17 CPA

TOTAL PM PEAK HOUR PROJECT TRAFFIC = 7,482 VPH IN= 4,356 OUT= 3,126

		2045 E + C NETWORK LANES		SERVICE VOLUMES					PERCENT	TWO-WAY	% PROJ
				LOS A	LOS B	LOS C	LOS D	LOS E	PROJECT	PROJECT	TRAFFIC
ROADWAY	ROADWAY SEGMENT	# Lanes	Roadway Designation	VOLUME	VOLUME	VOLUME	VOLUME	VOLUME	TRAFFIC	TRAFFIC	of LOS Standard
US 17	N. of CR 760 (DeSoto County)	4LD	Arterial	0	3,040	4,350	5,290	6,070	14%	1,047	24.1%
	N. of CR 761 (DeSoto County)	4LD	Arterial	0	3,040	4,350	5,290	6,070	18%	1,347	31.0%
	N. of Site	4LD	Arterial	0	3,040	4,350	5,290	6,070	38%	2,843	65.4%
	S. of Site	4LD	Arterial	0	3,040	4,350	5,290	6,070	56%	4,190	96.3%
	S. of Washington Loop Rd	4LD	Arterial	0	0	3,245	3,528	3,528	48%	3,591	101.8%
	W. of Bermont Rd (CR 74)	6LD [1]	Arterial	0	0	4,290	4,870	4,870	38%	2,843	58.4%
	W. of Piper Rd	6LD	Arterial	0	0	4,290	4,870	4,870	35%	2,619	53.8%
	W. of I-75	6LD	Arterial	0	0	4,505	5,114	5,114	17%	1,272	24.9%
US 17 (Marion Ave)	E. of US 41	3LN	Arterial - WB One Way	0	0	2,652	3,372	3,588	8%	599	17.8%
US 17 (Olympia Ave)	E. of US 41	3LN	Arterial - EB One Way	0	0	2,652	3,372	3,588	8%	599	17.8%
Bermont Rd (CR 74)	E. of US 17	2LU	Collector	0	0	1,760	2,020	2,020	1%	75	3.7%
Piper Rd	S. of US 17	4LD	Arterial	0	0	2,760	3,290	3,290	2%	150	4.5%
Florida St	S. of US 17	2LU	Collector	0	0	1,760	2,020	2,020	1%	75	3.7%
	N. of US 17	2LU	Collector	0	0	1,760	2,020	2,020	1%	75	3.7%
Cooper St	S. of US 17	2LU	Collector	0	0	1,760	2,020	2,020	5%	374	18.5%
	S. of Charlotte Ave	2LU	Collector	0	0	1,760	2,020	2,020	2%	150	7.4%
	S. of Carmalita St	2LU	Collector	0	0	1,760	2,020	2,020	1%	75	3.7%
	N. of Taylor Rd	2LU	Collector	0	0	1,760	2,020	2,020	1%	75	3.7%
Carmalita St	W. of Cooper St	2LU	Collector	0	0	1,760	2,020	2,020	1%	75	3.7%
US 41 NB Bridge	N. of Downtown Punta Gorda	2LN	Bridge - NB One Way	0	0	1,548	2,280	2,556	3%	224	9.8%
US 41 SB Bridge	N. of Downtown Punta Gorda	2LN	Bridge - SB One Way	0	0	1,548	2,280	2,556	3%	224	9.8%
US 41 (Tamiami Trial)	S. of Taylor Rd	4LD	Arterial	0	0	3,245	3,528	3,528	2%	150	4.2%
I-75	N. of US 17	6LF	Freeway	0	6,490	8,910	11,050	11,560	4%	299	2.7%
	S. of US 17	6LF	Freeway	0	6,490	8,910	11,050	11,560	15%	1,122	10.2%

[ ] - Denotes the LOS Standard for each roadway segment

* Level of Service Thresholds for Charlotte County roadways were taken from the Charlotte County Roadway Level of Service Data Spreadsheet.
* Level of Service Thresholds for State mantained roadways were taken from FDOT's Generalized Service Volume Tables consistent with FDOT's D1 LOS report.
1. Long range transportation plan shows widening improvement.

TABLE 2A
2045 ROADWAY LINK LEVEL OF SERVICE CALCULATIONS
US 17 CPA - 4,900 ACRES

TOTAL PM PEAK HOUR PROJECT TRAFFIC = 7,482 VPH IN= 4,356 OUT= 3,126

ROADWAY	ROADWAY SEGMENT	2045 FSUTMS AADT 2-WAY VOLUME [1]	K-100 FACTOR	2045 BACKGROUND PK HR PK SEASON 2-WAY VOLUME [2]	LOS	PROJECT TRAFFIC DIST.	PK DIR PM PROJ TRAFFIC	2045 BACKGROUND PLUS PROJ PK HR PK SEASON 2-WAY VOLUME	LOS
US 17	N. of CR 760 (DeSoto County)	19,163	0.091	1,744	B	8%	599	2,343	B
	N. of CR 761 (DeSoto County)	16,331	0.091	1,486	B	11%	823	2,309	B
	N. of Site	12,612	0.091	1,148	B	35%	2,619	3,767	C
	S. of Site	13,627	0.091	1,240	B	66%	4,938	6,178	F
	S. of Washington Loop Rd	18,119	0.091	1,649	C	60%	4,489	6,138	F
	W. of Bermont Rd (CR 74)	12,943	0.091	1,178	C	48%	3,591	4,769	D
	W. of Piper Rd	14,772	0.091	1,344	C	45%	3,367	4,711	D
	W. of I-75	10,121	0.091	921	C	23%	1,721	2,642	C
US 17 (Marion Ave)	E. of US 41	9,937	0.091	904	C	11%	823	1,727	C
US 17 (Olympia Ave)	E. of US 41	9,024	0.091	821	C	11%	823	1,644	C
Bermont Rd (CR 74)	E. of US 17	3,452	0.091	314	C	1%	75	389	C
Piper Rd	S. of US 17	5,665	0.091	516	C	2%	150	666	C
Florida St	S. of US 17	1,544	0.091	141	C	1%	75	216	C
	N. of US 17	1,787	0.091	163	C	1%	75	238	C
Cooper St	S. of US 17	4,687	0.091	427	C	8%	599	1,026	C
	S. of Charlotte Ave	2,289	0.091	208	C	3%	224	432	C
	S. of Carmalita St	2,412	0.091	219	C	2%	150	369	C
	N. of Taylor Rd	4,352	0.091	396	C	1%	75	471	C
Carmalita St	W. of Cooper St	4,419	0.091	402	C	1%	75	477	C
US 41 NB Bridge	N. of Downtown Punta Gorda	31,931	0.091	2,906	F	4%	299	3,205	F
US 41 SB Bridge	N. of Downtown Punta Gorda	30,857	0.091	2,808	F	3%	224	3,032	F
US 41 (Tamiami Trial)	S. of Taylor Rd	24,447	0.091	2,225	C	4%	299	2,524	C
I-75	N. of US 17	39,916	0.091	3,632	B	5%	374	4,006	B
	S. of US 17	41,656	0.091	3,791	B	10%	748	4,539	B

1 The 2045 AADT Two-Way Volume was obtained from the adopted 2045 FSUTMS model.

2 The 2045 Peak Hour Peak Season Two-Way Traffic Volume was calculated by multiplying the 2045 AADT by the K-100 factor.

* The K-100 factor was obtained from the Charlotte County Roadway Level of Service Data table.

CHARLOTTE COUNTY
ROADWAY LEVEL OF SERVICE
DATA REPORT

CHARLOTTE COUNTY: 2023 ROADWAY LEVEL OF SERVICE DATA

VV SNO	Roadway	Station	From	To	Context Class	Lanes	2023 AADT	Sugg. Gr. Rate	Level of Service Calculations[1]									
									K100	100th Hr Vol.	Level of Service Limits (Pk. Hr. Two-way Vol.)				Level of Service		Percent (%) Capacity Used
											B	C	D	E	Adopted	Current	
1	Acline Road	167	U.S. 41	Taylor Rd.	C3R	2-Lane	1,744	5.00%	0.091	159	*	1760	2020	*	D	C	8%
2	Acline Road	191	Burnt Store Rd.	U.S. 41	C3R	2-Lane	1,588	5.00%	0.091	145	*	1760	2020	*	D	C	7%
3	Airport Road	249	Cooper St.	Taylor Rd.	C3R	2-Lane	5,577	5.00%	0.091	507	*	1760	2020	*	D	C	25%
4	Airport Road	169	Taylor Rd	I-75	C3R	2-Lane	5,874	5.00%	0.091	535	*	1760	2020	*	D	C	26%
5	Airport Road	168	I-75	Golf Course Blvd.	C3C	2-Lane	4,327	5.00%	0.091	394	*	1380	1950	*	D	C	20%
6	Appleton Blvd	211	San Cruz Waterway	C.R. 771	C3R	2-Lane	3,175	5.00%	0.091	289	*	1760	2020	*	D	C	14%
7	Aqui Esta Drive	170	Bal Harbor Blvd.	U.S. 41	C3R	2-Lane	8,419	5.00%	0.091	766	*	1760	2020	*	D	C	38%
8	Atwater Street	25	Peachland Blvd.	Veterans Blvd.	C3R	2-Lane	3,368	4.00%	0.091	306	*	1760	2020	*	D	C	15%
9	Bayshore Road	27	Sibley Bay St.	Edgewater Dr.	C3C	2-Lane	2,199	5.00%	0.091	200	*	1380	1950	*	D	C	10%
10	Bayshore Road	312	Edgewater Dr.	U.S. 41	C3R	2-Lane	2,845	2.00%	0.091	259	*	1760	2020	*	D	C	13%
11	Beach Road	118	Gulf Blvd.	S.R. 776	C3R	2-Lane	8,896	5.00%	0.091	810	*	1760	2020	*	D	C	40%
12	Beacon Drive	234	Westchester Blvd.	Elmira Blvd.	C3R	2-Lane	3,218	3.00%	0.091	293	*	1760	2020	*	D	C	14%
13	Beacon Drive	235	Elmira Blvd.	Olean Blvd.	C3R	2-Lane	3,181	3.00%	0.091	289	*	1760	2020	*	D	C	14%
14	Beacon Drive	220	Olean Blvd.	Midway Blvd.	C3R	2-Lane	3,361	5.00%	0.091	306	*	1760	2020	*	D	C	15%
15	Beaver Lane	222	Hancock Ave.	Westchester Blvd.	C3R	2-Lane	4,679	5.00%	0.091	426	*	1760	2020	*	D	C	21%
16	Biscayne Drive	1	Cornelius Blvd.	Chancellor Blvd.	C3R	2-Lane	3,238	5.00%	0.091	295	*	1760	2020	*	D	C	15%
17	Biscayne Drive	3	SR-776	Cornelius Blvd.	C3R	2-Lane	2,640	5.00%	0.091	240	*	1760	2020	*	D	C	12%
18	Boca Grande Causeway	162	Boca Grande Causeway	C.R. 775	C3C	2-Lane	7,869	3.00%	0.091	716	*	1380	1950	*	D	C	37%
19	Burnt Store Road	187	Lee County line	Zemel Rd.	C3R	4-Lane	15,081	7.00%	0.091	1,372	*	3090	3360	*	D	C	41%
20	Burnt Store Road	186	Zemel Rd.	Acline Rd.	C3R	4-Lane	18,344	7.00%	0.091	1,669	*	3090	3360	*	D	C	50%
21	Burnt Store Road	171	Acline Rd.	U.S. 41	C3R	4-Lane	20,409	6.00%	0.091	1,857	*	3090	3360	*	D	C	55%
22	Cape Haze Drive	161	Amberjack Cove Waterway	C.R. 775	C3R	2-Lane	3,608	2.00%	0.091	328	*	1760	2020	*	D	C	16%
23	Capricorn Blvd	224	Rampart Blvd.	Sandhill Blvd.	C3R	2-Lane	4,739	2.00%	0.091	431	*	1760	2020	*	D	C	21%
24	Carmalita Street	190	BMX Track	U.S. 41	C3R	2-Lane	2,912	5.00%	0.091	265	*	1760	2020	*	D	C	13%
25	Carmalita Street	311	Florida St.	BMX Track	C3R	2-Lane	1,598	3.00%	0.091	145	*	1760	2020	*	D	C	7%
26	Chamberlain Blvd	2	Cornelius Blvd.	US 41	C3R	2-Lane	2,804	5.00%	0.091	255	*	1760	2020	*	D	C	13%
27	Chancellor Blvd	123	Campbell St.	Apollo Waterway	C3R	2-Lane	3,631	5.00%	0.091	330	*	1760	2020	*	D	C	16%
28	Chancellor Blvd	124	Apollo Waterway	US-41	C3R	2-Lane	4,404	5.00%	0.091	401	*	1760	2020	*	D	C	20%
29	Cochran Blvd	15	Education Way	Collingswood Blvd.	C3R	2-Lane	8,253	2.00%	0.091	751	*	1760	2020	*	D	C	37%
30	Cochran Blvd	96	Pellam Blvd.	Education Way	C3R	2-Lane	12,465	2.00%	0.091	1,134	*	1760	2020	*	D	C	56%
31	Cochran Blvd	94	Lakeview Blvd.	Pellam Blvd.	C3C	2-Lane	15,492	2.00%	0.091	1,410	*	1380	1950	*	D	D	72%
32	Cochran Blvd	95	U.S. 41	Lakeview Blvd.	C3C	4-Lane	14,257	2.00%	0.091	1,297	*	2760	3290	*	D	C	39%
33	Cochran Blvd	259	U.S. 41 S.	Veteran's Blvd.	C3C	4-Lane	19,286	2.00%	0.091	1,755	*	2760	3290	*	D	C	53%
34	Collingswood Blvd	4	Toledo Blade Blvd.	S.R. 776	C3R	2-Lane	3,813	4.00%	0.091	347	*	1760	2020	*	D	C	17%
35	Collingswood Blvd	5	Wintergarden Ave.	Toldeo Blade Blvd.	C3R	2-Lane	6,770	5.00%	0.091	616	*	1760	2020	*	D	C	30%
36	Collingswood Blvd	31	Edgewater Dr.	Wintergarden Ave.	C3R	2-Lane	4,554	5.00%	0.091	414	*	1760	2020	*	D	C	21%
37	Collingswood Blvd	32	O'Hara Dr.	Edgewater Dr.	C3R	2-Lane	3,570	3.00%	0.091	325	*	1760	2020	*	D	C	16%
38	Conway Blvd	33	U.S. 41	Olean Blvd	C3R	2-Lane	4,841	5.00%	0.091	441	*	1760	2020	*	D	C	22%
39	Conway Blvd	246	Olean Blvd	Midway Blvd	C3R	2-Lane	4,020	5.00%	0.091	366	*	1760	2020	*	D	C	18%
40	Cooper Street	250	U.S. 41	Airport Rd.	C3C	2-Lane	4,260	4.00%	0.091	388	*	1380	1950	*	D	C	20%
41	Cooper Street	151	Airport Rd.	Taylor Rd.	C3R	2-Lane	3,655	3.00%	0.091	333	*	1760	2020	*	D	C	16%
42	Cooper Street	152	Carmalita St.	U.S. 17 N	C3R	2-Lane	5,892	4.00%	0.091	536	*	1760	2020	*	D	C	27%

Contact: Ravi Kamarajugadda - Ravi.Kamarajugadda@charlottecountyfl.gov or (941) 575-3668

CHARLOTTE COUNTY: 2023 ROADWAY LEVEL OF SERVICE DATA

VV SNO	Roadway	Station	From	To	Context Class	Lanes	2023 AADT	Sugg. Gr. Rate	Level of Service Calculations[1]									
									K100	100th Hr Vol.	Level of Service Limits (Pk. Hr. Two-way Vol.)				Level of Service		Percent (%) Capacity Used
											B	C	D	E	Adopted	Current	
43	Cornelius Blvd	6	SR-776	Biscayne Dr.	C3R	2-Lane	5,706	5.00%	0.091	519	*	1760	2020	*	D	C	26%
44	Cornelius Blvd	263	Biscayne Dr.	U.S. 41	C3R	2-Lane	6,045	5.00%	0.091	550	*	1760	2020	*	D	C	27%
45	CR 771	158	Rotonda Blvd E	KeyStone Blvd	C3R	2-Lane	12,753	5.00%	0.091	1,161	*	1760	2020	*	D	C	57%
46	CR 771	157	Rotonda Blvd E	Ingram Blvd	C3C	4-Lane	16,750	5.00%	0.091	1,524	*	2760	3290	*	D	C	46%
47	CR 771	155	Ingram Blvd	Marathon Blvd	C3C	4-Lane	25,043	5.00%	0.091	2,279	*	2760	3290	*	D	C	69%
48	CR 771	159	Marathon Blvd	SR 776	C3C	4-Lane	19,407	5.00%	0.091	1,766	*	2760	3290	*	D	C	54%
49	CR 775	163	C.R. 771	Boca Grande Causeway	C3R	2-Lane	8,748	3.00%	0.091	796	*	1760	2020	*	D	C	39%
50	CR 775	164	Boca Grande Causeway	Gaspar Dr.	C3R	2-Lane	6,843	3.00%	0.091	623	*	1760	2020	*	D	C	31%
51	CR 775	165	Gaspar Dr.	Cape Haze Dr.	C3R	2-Lane	8,476	3.00%	0.091	771	*	1760	2020	*	D	C	38%
52	CR 775	166	Cape Haze Dr.	Esther St.	C3R	2-Lane	8,972	3.00%	0.091	816	*	1760	2020	*	D	C	40%
53	CR 775	141	Esther St.	Rotonda Blvd. W	C3R	2-Lane	9,914	3.00%	0.091	902	*	1760	2020	*	D	C	45%
54	CR 775	140	Rotonda Blvd. W	Short St.	C3C	4-Lane	14,514	3.00%	0.091	1,321	*	2760	3290	*	D	C	40%
55	CR 775	128	Short St.	San Casa Dr.	C3C	4-Lane	12,456	3.00%	0.091	1,133	*	2760	3290	*	D	C	34%
56	CR 775	125	Mississippi Ave.	Ainger Creek	C3C	4-Lane	14,690	3.00%	0.091	1,337	*	2760	3290	*	D	C	41%
57	CR 775	126	Ainger Creek	S.R. 776	C3C	4-Lane	15,702	3.00%	0.091	1,429	*	2760	3290	*	D	C	43%
58	CR74/Bermont Road	111	U.S. 17	Happy Hollow Rd	C3R	2-Lane	9,986	5.00%	0.091	909	*	1760	2020	*	D	C	45%
59	CR74/Bermont Road	360	Happy Hollow Rd	SR 31	C2	2-Lane	6,207	5.00%	0.091	565	440	780	1330	2710	D	C	42%
60	CR74/Bermont Road	361	SR 31	County Line	C2	2-Lane	3,952	5.00%	0.091	360	440	780	1330	2710	D	C	27%
61	Cranberry Blvd	217	U.S. 41	Hillsborough Blvd.	C3R	2-Lane	11,042	5.00%	0.091	1,005	*	1760	2020	*	D	C	50%
62	David Blvd	210	Lafitte Waterway	Willmington Blvd.	C3R	2-Lane	3,683	3.00%	0.091	335	*	1760	2020	*	D	C	17%
63	Deep Creek Blvd	225	Rio De Janeiro Ave.	Sandhill Blvd.	C3R	2-Lane	7,179	3.00%	0.091	653	*	1760	2020	*	D	C	32%
64	Deep Creek Blvd	264	Rio De Janiero Ave.	Seasons Dr.	C3R	2-Lane	2,828	4.00%	0.091	257	*	1760	2020	*	D	C	13%
65	Easy Street	29	U.S. 41	Olean Blvd.	C3C	2-Lane	2,116	2.00%	0.091	193	*	1380	1950	*	D	C	10%
66	Easy Street	30	Olean Blvd.	Gibralter Dr.	C3R	2-Lane	2,237	4.00%	0.091	204	*	1760	2020	*	D	C	10%
67	Edgewater Drive	7	Flamingo Blvd.	Pellam Blvd.	C3R	2-Lane	5,567	5.00%	0.091	507	*	1760	2020	*	D	C	25%
68	Edgewater Drive	40	Pellam Blvd.	Midway Blvd.	C3R	2-Lane	9,337	5.00%	0.091	850	*	1760	2020	*	D	C	42%
69	Edgewater Drive	39	Midway Blvd.	Lakeview Blvd.	C3R	4-Lane	10,324	5.00%	0.091	940	*	3090	3360	*	D	C	28%
70	Edgewater Drive	38	Lakeview Blvd.	W Tarpon Blvd.	C3R	4-Lane	11,903	5.00%	0.091	1,083	*	3090	3360	*	D	C	32%
71	Edgewater Drive	41	W Tarpon Blvd.	Port Charlotte Blvd.	C3R	4-Lane	11,852	5.00%	0.091	1,079	*	3090	3360	*	D	C	32%
72	Edgewater Drive	37	Port Charlotte Blvd	Harbor Blvd.	C3R	4-Lane	12,430	5.00%	0.091	1,131	*	3090	3360	*	D	C	34%
73	Edgewater Drive	36	Harbor Blvd	Cousley Dr.	C3R	4-Lane	12,640	5.00%	0.091	1,150	*	3090	3360	*	D	C	34%
74	Edgewater Drive	34	Cousley Dr.	Gardner Dr.	C3R	4-Lane	12,831	5.00%	0.091	1,168	*	3090	3360	*	D	C	35%
75	Edgewater Drive	35	Gardner Dr.	U.S. 41	C3R	4-Lane	13,295	5.00%	0.091	1,210	*	3090	3360	*	D	C	36%
76	Education Way	88	Toledo Blade Blvd.	Murdock Circle	C3R	2-Lane	5,554	5.00%	0.091	505	*	1760	2020	*	D	C	25%
77	Elkcam Blvd	43	U.S. 41	Midway Blvd.	C3R	2-Lane	2,682	3.00%	0.091	244	*	1760	2020	*	D	C	12%
78	Elmira Blvd	90	Conway Blvd.	Beacon Dr.	C3R	2-Lane	3,504	2.00%	0.091	319	*	1760	2020	*	D	C	16%
79	Elmira Blvd	91	Beacon Dr.	Kings Highway	C3R	2-Lane	2,525	2.00%	0.091	230	*	1760	2020	*	D	C	11%
80	Flamingo Blvd	8	Edgewater Dr.	Christopher Waterway	C3R	2-Lane	5,748	5.00%	0.091	523	*	1760	2020	*	D	C	26%
81	Flamingo Blvd	9	Christopher Waterway	SR-776	C3R	2-Lane	5,932	5.00%	0.091	540	*	1760	2020	*	D	C	27%
82	Florida Street	172	Carmalita St.	La Villa Rd.	C3R	2-Lane	1,189	5.00%	0.091	108	*	1760	2020	*	D	C	5%
83	Forrest Nelson Blvd	82	U.S. 41	Peachland Blvd.	C3C	2-Lane	6,307	5.00%	0.091	574	*	1380	1950	*	D	C	29%
84	Gillot Blvd	10	Bluestone St.	S.R. 776	C3R	2-Lane	4,147	3.00%	0.091	377	*	1760	2020	*	D	C	19%

CHARLOTTE COUNTY: 2023 ROADWAY LEVEL OF SERVICE DATA

VV SNO	Roadway	Station	From	To	Context Class	Lanes	2023 AADT	Sugg. Gr. Rate	Level of Service Calculations[1]								
									K100	100th Hr Vol.	Level of Service Limits (Pk. Hr. Two-way Vol.)				Level of Service		Percent (%) Capacity Used
											B	C	D	E	Adopted	Current	
127	Marion Avenue	178	Marlympia Way	Florida St.	C3C	2-Lane	2,099	2.00%	0.091	191	*	1380	1950	*	D	C	10%
128	Melbourne Street	61	Harper Ave.	Harborview Rd.	C3R	2-Lane	2,461	5.00%	0.091	224	*	1760	2020	*	D	C	11%
129	Midway Blvd	63	O'Hara Dr.	Edgewater Dr.	C3R	2-Lane	4,994	3.00%	0.091	454	*	1760	2020	*	D	C	22%
130	Midway Blvd	62	Edgewater Dr.	Riviera Ln.	C3R	2-Lane	4,382	3.00%	0.091	399	*	1760	2020	*	D	C	20%
131	Midway Blvd	69	Riviera Ln.	Lakeview Blvd.	C3R	2-Lane	5,632	3.00%	0.091	513	*	1760	2020	*	D	C	25%
132	Midway Blvd	68	Lakeview Blvd.	U.S. 41	C3R	4-Lane	10,367	3.00%	0.091	943	*	3090	3360	*	D	C	28%
133	Midway Blvd	64	U.S. 41	Elkcam Blvd.	C3R	4-Lane	15,443	5.00%	0.091	1,405	*	3090	3360	*	D	C	42%
134	Midway Blvd	66	Elkcam Blvd.	Harbor Blvd.	C3R	4-Lane	15,534	5.00%	0.091	1,414	*	3090	3360	*	D	C	42%
135	Midway Blvd	65	Harbor Blvd	Orlando Blvd.	C3R	4-Lane	17,950	5.00%	0.091	1,633	*	3090	3360	*	D	C	49%
136	Midway Blvd	67	Orlando Blvd.	Inverness St.	C3R	4-Lane	16,787	5.00%	0.091	1,528	*	3090	3360	*	D	C	45%
137	Midway Blvd	70	Invenness St.	Kings Highway	C3R	4-Lane	15,978	2.00%	0.091	1,454	*	3090	3360	*	D	C	43%
138	Murdock Circle	83	Education Way	U.S. 41	C3C	4-Lane	9,584	3.00%	0.091	872	*	2760	3290	*	D	C	27%
139	Murdock Circle	87	U.S. 41	Veterans Blvd.	C3C	4-Lane	12,047	2.00%	0.091	1,096	*	2760	3290	*	D	C	33%
140	N Jones Loop Road	174	E of Piper Rd	0	C3R	2-Lane	3,141	3.00%	0.091	286	*	1760	2020	*	D	C	14%
141	N. Beach Road	119	Sarasota Co. Line	Gulf Blvd.	C3R	2-Lane	1,514	3.00%	0.091	138	*	1760	2020	*	D	C	7%
142	O'Hara Drive	243	Collingswood Blvd.	Midway Blvd.	C3R	2-Lane	2,200	2.00%	0.091	200	*	1760	2020	*	D	C	10%
143	Olean Blvd	73	U.S. 41	Easy St.	C3C	4-Lane	6,155	2.00%	0.091	560	*	2760	3290	*	D	C	17%
144	Olean Blvd	72	Easy St.	Conway Blvd.	C3R	2-Lane	5,567	3.00%	0.091	507	*	1760	2020	*	D	C	25%
145	Olean Blvd	71	Conway Blvd.	Beacon Dr.	C3R	2-Lane	5,384	3.00%	0.091	490	*	1760	2020	*	D	C	24%
146	Olean Blvd	74	Beacon Dr.	Kings Highway	C3R	2-Lane	4,463	3.00%	0.091	406	*	1760	2020	*	D	C	20%
147	Orlando Blvd	75	Midway Blvd.	Quasar Blvd.	C3R	2-Lane	2,400	3.00%	0.091	218	*	1760	2020	*	D	C	11%
148	Paulson Drive	229	U.S. 41	Prineville St.	C3C	2-Lane	5,158	3.00%	0.091	469	*	1380	1950	*	D	C	24%
149	Peachland Blvd	265	CochranBlvd. (a.k.a.Toledo Blade)	Forrest Nelson Blvd.	C3R	2-Lane	8,129	5.00%	0.091	740	*	1760	2020	*	D	C	37%
150	Peachland Blvd	77	Forrest Nelson Blvd.	Atwater St.	C3R	2-Lane	9,623	4.00%	0.091	876	*	1760	2020	*	D	C	43%
151	Peachland Blvd	79	Atwater St.	Harbor Blvd.	C3R	2-Lane	9,151	5.00%	0.091	833	*	1760	2020	*	D	C	41%
152	Peachland Blvd	78	Harbor Blvd.	Beacon Dr.	C3R	2-Lane	8,836	5.00%	0.091	804	*	1760	2020	*	D	C	40%
153	Peachland Blvd	80	Beacon Dr.	Loveland Blvd.	C3R	2-Lane	11,026	5.00%	0.091	1,003	*	1760	2020	*	D	C	50%
154	Pellam Blvd	240	Wintergarden Ave.	CochranBlvd.	C3R	2-Lane	5,125	2.00%	0.091	466	*	1760	2020	*	D	C	23%
155	Pellam Blvd	241	Edgewater Dr.	Wintergarden Ave.	C3R	2-Lane	2,902	5.00%	0.091	264	*	1760	2020	*	D	C	13%
156	Pine Street	131	Sarasota Co. Line	Second St.	C3R	4-Lane	8,030	3.00%	0.091	731	*	3090	3360	*	D	C	22%
157	Pine Street	132	Second St.	S.R. 776	C3C	4-Lane	10,980	5.00%	0.091	999	*	2760	3290	*	D	C	30%
158	Piper Road	175	Jones Loop Rd.	Golf Course Blvd.	C3C	4-Lane	10,534	5.00%	0.091	959	*	2760	3290	*	D	C	29%
159	Port Charlotte Blvd	101	Sunrise Waterway	Edgewater Dr.	C3R	2-Lane	2,385	5.00%	0.091	217	*	1760	2020	*	D	C	11%
160	Prineville Street	230	Paulson Dr.	Hillsborough Blvd.	C3C	2-Lane	5,718	4.00%	0.091	520	*	1380	1950	*	D	C	27%
161	Quesada Avenue	81	Cochran Boulevard (a.k.a.Toledo Blade)	Forrest Nelson Blvd.	C3R	2-Lane	10,579	4.00%	0.091	963	*	1760	2020	*	D	C	48%
162	Quesada Avenue	84	Forrest Nelson Blvd.	Hinton St.	C3R	2-Lane	8,544	3.00%	0.091	778	*	1760	2020	*	D	C	38%
163	Quesada Avenue	85	Hinton St.	Harbor Blvd.	C3R	2-Lane	5,731	3.00%	0.091	521	*	1760	2020	*	D	C	26%
164	Rampart Blvd	192	Kings Highway	I-75	C3R	2-Lane	14,596	3.00%	0.091	1,328	*	1760	2020	*	D	C	66%
165	Rio De Janeiro Avenue	106	Harborview Rd.	Rampart Blvd.	C3R	2-Lane	7,171	3.00%	0.091	653	*	1760	2020	*	D	C	32%
166	Rio De Janeiro Avenue	107	Rampart Blvd.	Sandhill Blvd.	C3R	2-Lane	5,236	3.00%	0.091	476	*	1760	2020	*	D	C	24%
167	Rio Villa Drive	176	Deltona Dr.	U.S. 41	C3R	2-Lane	2,287	3.00%	0.091	208	*	1760	2020	*	D	C	10%
168	Rotonda Blvd E	154	Boundary Blvd.	C.R. 771	C3R	2-Lane	4,609	3.00%	0.091	419	*	1760	2020	*	D	C	21%

FDOT GENERALIZED SERVICE VOLUME TABLES

Limited Access

Freeway Generalized Service Volume Tables

(Core Urbanized)

Peak Hour Directional

	B	C	D	E
2 Lane	2,400	3,170	3,970	4,150
3 Lane	3,390	4,600	5,810	6,130
4 Lane	4,340	6,060	7,700	8,170
5 Lane	5,480	7,450	9,680	10,390
6 Lane	6,630	9,220	11,520	12,760

Peak Hour Two-Way

	B	C	D	E
4 Lane	4,360	5,760	7,220	7,550
6 Lane	6,160	8,360	10,560	11,150
8 Lane	7,890	11,020	14,000	14,850
10 Lane	9,960	13,550	17,600	18,890
12 Lane	12,050	16,760	20,950	23,200

AADT

	B	C	D	E
4 Lane	51,300	67,800	84,900	88,800
6 Lane	72,500	98,400	124,200	131,200
8 Lane	92,800	129,600	164,700	174,700
10 Lane	117,200	159,400	207,100	222,200
12 Lane	141,800	197,200	246,500	272,900

(Urbanized)

	B	C	D	E
2 Lane	2,500	3,300	4,070	4,240
3 Lane	3,570	4,900	6,080	6,360
4 Lane	4,720	6,500	8,090	8,490
5 Lane	5,790	8,020	10,020	10,610

	B	C	D	E
4 Lane	4,550	6,000	7,400	7,710
6 Lane	6,490	8,910	11,050	11,560
8 Lane	8,580	11,820	14,710	15,440
10 Lane	10,530	14,580	18,220	19,290

	B	C	D	E
4 Lane	50,600	66,700	82,200	85,700
6 Lane	72,100	99,000	122,800	128,400
8 Lane	95,300	131,300	163,400	171,600
10 Lane	117,000	162,000	202,400	214,300

(Transitioning)

	B	C	D	E
2 Lane	2,430	3,180	3,790	3,910
3 Lane	3,520	4,670	5,610	5,870
4 Lane	4,630	6,170	7,440	7,830
5 Lane	5,690	7,640	9,220	9,800

	B	C	D	E
4 Lane	4,420	5,780	6,890	7,110
6 Lane	6,400	8,490	10,200	10,670
8 Lane	8,420	11,220	13,530	14,240
10 Lane	10,350	13,890	16,760	17,820

	B	C	D	E
4 Lane	45,100	59,000	70,300	72,600
6 Lane	65,300	86,600	104,100	108,900
8 Lane	85,900	114,500	138,100	145,300
10 Lane	105,600	141,700	171,000	181,800

(Rural)

	B	C	D	E
2 Lane	2,010	2,770	3,270	3,650
3 Lane	2,820	3,990	4,770	5,470
4 Lane	3,630	5,220	6,260	7,300

	B	C	D	E
4 Lane	3,650	5,040	5,950	6,640
6 Lane	5,130	7,250	8,670	9,950
8 Lane	6,600	9,490	11,380	13,270

	B	C	D	E
4 Lane	34,800	48,000	56,700	63,200
6 Lane	48,900	69,000	82,600	94,800
8 Lane	62,900	90,400	108,400	126,400

Adjustment Factors

Auxiliary Lanes Present in Analysis Direction Adjustment: +1,000
Ramp Metering Present Adjustment: Multiply by 1.05

Auxiliary Lanes Present in Analysis Direction Adjustment: +1,800
Ramp Metering Present Adjustment: Multiply by 1.05

Auxiliary Lanes Present in Analysis Direction Adjustment: +20,000
Ramp Metering Present Adjustment: Multiply by 1.05

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C2T, C4, C5, & C6

Motor Vehicle Arterial Generalized Service Volume Tables

(C2T-Rural Town)

Peak Hour Directional

	B	C	D	E
1 Lane	*	720	940	**
2 Lane	*	1,140	1,640	**
3 Lane	*	2,120	2,510	**

Peak Hour Two-Way

	B	C	D	E
2 Lane	*	1,310	1,710	**
4 Lane	*	2,070	2,980	**
6 Lane	*	3,850	4,560	**

AADT

	B	C	D	E
2 Lane	*	13,800	18,000	**
4 Lane	*	21,800	31,400	**
6 Lane	*	40,500	48,000	**

(C4-Urban General)

	B	C	D	E
1 Lane	*	*	870	1,190
2 Lane	*	1,210	1,790	2,020
3 Lane	*	2,210	2,810	2,990
4 Lane	*	2,590	3,310	3,510

	B	C	D	E
2 Lane	*	*	1,580	2,160
4 Lane	*	2,200	3,250	3,670
6 Lane	*	4,020	5,110	5,440
8 Lane	*	4,710	6,020	6,380

	B	C	D	E
2 Lane	*	*	17,600	24,000
4 Lane	*	24,400	36,100	40,800
6 Lane	*	44,700	56,800	60,400
8 Lane	*	52,300	66,900	70,900

(C5-Urban Center)

	B	C	D	E
1 Lane	*	*	690	1,080
2 Lane	*	1,290	1,900	2,130
3 Lane	*	1,410	2,670	3,110
4 Lane	*	2,910	3,560	3,640

	B	C	D	E
2 Lane	*	*	1,250	1,960
4 Lane	*	2,350	3,450	3,870
6 Lane	*	2,560	4,850	5,650
8 Lane	*	5,290	6,470	6,620

	B	C	D	E
2 Lane	*	*	13,900	21,800
4 Lane	*	26,100	38,300	43,000
6 Lane	*	28,400	53,900	62,800
8 Lane	*	58,800	71,900	73,600

(C6-Urban Core)

	B	C	D	E
1 Lane	*	***	790	1,030
2 Lane	*	***	1,490	1,920
3 Lane	*	***	2,730	2,940
4 Lane	*	***	3,250	3,490

	B	C	D	E
2 Lane	*	***	1,440	1,870
4 Lane	*	***	2,710	3,490
6 Lane	*	***	4,960	5,350
8 Lane	*	***	5,910	6,350

	B	C	D	E
2 Lane	*	***	16,000	20,800
4 Lane	*	***	30,100	38,800
6 Lane	*	***	55,100	59,400
8 Lane	*	***	65,700	70,600

Adjustment Factors

The peak hour directional service volumes should be adjust by multiplying by 1.2 for one-way facilities
The AADT service volumes should be adjusted by multiplying 0.6 for one way facilities 2 Lane Divided Roadway with an Exclusive Left Turn Lane(s): Multiply by 1.05
2 lane Undivided Roadway with No Exclusive Left Turn Lane(s): Multiply by 0.80

Exclusive right turn lane(s): Multiply by 1.05
Multilane Undivided Roadway with an Exclusive Left Turn Lane(s): Multiply by 0.95
Multilane Roadway with No Exclusive Left Turn Lane(s): Multiply by 0.75
Non-State Signalized Roadway: Multiply by 0.90

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* Cannot be achieved using table input value defaults.
** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached.

C3C & C3R

Motor Vehicle Arterial Generalized Service Volume Tables

(C3C-Suburban Commercial)

Peak Hour Directional

	B	C	D	E
1 Lane	*	760	1,070	**
2 Lane	*	1,520	1,810	**
3 Lane	*	2,360	2,680	**
4 Lane	*	3,170	3,180	**

Peak Hour Two-Way

	B	C	D	E
2 Lane	*	1,380	1,950	**
4 Lane	*	2,760	3,290	**
6 Lane	*	4,290	4,870	**
8 Lane	*	5,760	5,780	**

AADT

	B	C	D	E
2 Lane	*	15,300	21,700	**
4 Lane	*	30,700	36,600	**
6 Lane	*	47,700	54,100	**
8 Lane	*	64,000	64,200	**

(C3R-Suburban Residential)

	B	C	D	E
1 Lane	*	970	1,110	**
2 Lane	*	1,700	1,850	**
3 Lane	*	2,620	2,730	**

	B	C	D	E
2 Lane	*	1,760	2,020	**
4 Lane	*	3,090	3,360	**
6 Lane	*	4,760	4,960	**

	B	C	D	E
2 Lane	*	19,600	22,400	**
4 Lane	*	34,300	37,300	**
6 Lane	*	52,900	55,100	**

Adjustment Factors

The peak hour directional service volumes should be adjust by multiplying by 1.2 for one-way facilities
The AADT service volumes should be adjusted by multiplying 0.6 for one way facilities 2 Lane Divided Roadway with an Exclusive Left Turn Lane(s): Multiply by 1.05
2 lane Undivided Roadway with No Exclusive Left Turn Lane(s): Multiply by 0.80

Exclusive right turn lane(s): Multiply by 1.05
Multilane Undivided Roadway with an Exclusive Left Turn Lane(s): Multiply by 0.95
Multilane Roadway with No Exclusive Left Turn Lane(s): Multiply by 0.75
Non-State Signalized Roadway: Multiply by 0.90

This table does not constitute a standard and should be used only for general planning applications. The table should not be used for corridor or intersection design, where more refined techniques exist.
* Cannot be achieved using table input value defaults.
** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached.

C1 & C2

Motor Vehicle Highway Generalized Service Volume Tables

(C1-Natural & C2-Rural)

Peak Hour Directional

	B	C	D	E
1 Lane	240	430	730	1,490
2 Lane	1,670	2,390	2,910	3,340
3 Lane	2,510	3,570	4,370	5,010

Peak Hour Two-Way

	B	C	D	E
2 Lane	440	780	1,330	2,710
4 Lane	3,040	4,350	5,290	6,070
6 Lane	4,560	6,490	7,950	9,110

AADT

	B	C	D	E
2 Lane	4,600	8,200	14,000	28,500
4 Lane	32,000	45,800	55,700	63,900
6 Lane	48,000	68,300	83,700	95,900

Adjustment Factors

2 Lane Divided Roadway with Exclusive Left Turn Adjustment: Multiply by 1.05
Multilane Undivided Highway with Exclusive Left Turn Adjustment: Multiply by 0.95
Multilane Undivided Highway without Exclusive Left Turn Adjustment:: Multiply by 0.75

This table does not constitute a standard and should be used only for general planning applications. The table should not be used for corridor or intersection design, where more refined techniques exist.

FDOT DISTRICT ONE LOS REPORT

Section No.	State Road No.	Local Road Name	From	From M.P.	To	To M.P.	Section Length	SIS	Existing Context Class	Future Context Class	Functional Classification	Posted Speed	Area Type	Facility Type	FDOT LOS Std.	County LOS Std.	City LOS Std.	Year 2022								Deficiency Determination
																		Divided/ UnDivided	One/Two Way	Left Turn Bays	Right Turn Bays	Thru Lanes	Peak Hour Two-Way			
																							Capacity	Volume	LOS	
04020000	US 17	SR 35/US 17	Charlotte County Line	0.000	CR 761 (Madison Ave)	2.257	2.257	SIS	C2	C2	Principal Arterial-other	60	RUA	H	C	C		D	2W	WL	WR	4	4,350	1,007	B	
04020000	US 17	SR 35/US 17	CR 761 (Madison Ave)	2.257	0.4 Miles S. of Collins St	3.860	1.603	SIS	C2	C2	Principal Arterial-other	60	RUA	H	C	C		D	2W	WL	WR	4	4,350	1,140	B	
04020000	US 17	SR 35/US 17	0.4 Miles S. of Collins St	3.860	Hull Ave	7.067	3.207	SIS	C2	C2	Principal Arterial-other	60	RUA	H	C	C		D	2W	WL	OR	4	4,350	1,140	B	
04020000	US 17	SR 35/US 17	CR 761 (Madison Ave)	2.257	Hull Ave	7.067	4.810	SIS	C2	C2	Principal Arterial-other	60	RUA	H	C	C		D	2W	WL	WR	4	4,350	1,140	B	
04020000	US 17	SR 35/US 17	Hull Ave	7.067	CR 760 A (McCaskill St)	9.579	2.512	SIS	C2	C2	Principal Arterial-other	60	RUA	H	C	C		D	2W	WL	OR	4	4,350	1,159	B	
04020000	US 17	SR 35/US 17/BREVARD AVE	CR 760 A (McCaskill St)	9.579	Hibiscus Dr	13.480	3.901	SIS	C2	C2	Principal Arterial-other	50	TA	H	C	C	C	D	2W	WL	OR	4	4,350	1,269	B	
04020000	US 17	BREVARD AVE	Hibiscus Dr	13.480	Palmetto St	14.021	0.541	SIS	C3C	C2T	Principal Arterial-other	40	TA	H	C	C	C	D	2W	WL	OR	4	2,760	1,503	C	
04020000	US 17	SR 35/US 17/BREVARD AVE	CR 760 A (McCaskill St)	9.579	Palmetto St	14.021	4.442	SIS	C2	C2	Principal Arterial-other	50	TA	H	C	C	C	D	2W	WL	OR	4	4,350	1,297	B	
04020000	US 17	BREVARD AVE	Palmetto St	14.021	SR 70/Magnolia St	14.315	0.294	SIS	C3C	C2T	Principal Arterial-other	35	TA	A	C	C	C	U	1W	OL	OR	2	1,824	855	C	
04020000	US 17	BREVARD AVE	SR 70/Magnolia St	14.315	SR 70/Hickory St	14.470	0.155	SIS	C2T	C2T	Principal Arterial-other	35	TA	A	C	C	C	U	1W	OL	OR	2	1,368	801	C	
04020000	US 17	BREVARD AVE	SR 70/Hickory St	14.470	SR 35/DeSoto Ave	15.780	1.310	SIS	C2T	C2T	Principal Arterial-other	35	TA	A	C	C	C	U	1W	OL	OR	2	1,368	810	C	
04020000	US 17	BREVARD AVE	Palmetto St	14.021	SR 35/DeSoto Ave	15.780	1.759	SIS	C2T	C2T	Principal Arterial-other	35	TA	A	C	C	C	U	1W	OL	OR	2	1,368	817	C	
04020000	US 17	BREVARD AVE	SR 35/DeSoto Ave	15.780	Livingston St	16.693	0.913	SIS	C2	C2	Principal Arterial-other	45	TA	A	C	C	C	D	2W	WL	OR	4	4,350	1,107	B	
04020101	US 17 SB	N DESOTO AVE	SR 35/N. of Fiveash St	0.000	Fiveash St	0.195	0.195	SIS	C3C	C3C	Principal Arterial-other	45	TA	A	C	C	C	U	1W	WL	OR	2	1,824	738	C	
04020101	US 17 SB	N DESOTO AVE	Fiveash St	0.195	South of Cypress St	1.204	1.009	SIS	C3C	C3C	Principal Arterial-other	35	TA	A	C	C	C	U	1W	OL	OR	3	2,832	738	C	
04020101	US 17 SB	N DESOTO AVE	South of Cypress St	1.204	SR 70/Hickory St	1.273	0.069	SIS	C3C	C3C	Principal Arterial-other	35	TA	A	C	C	C	U	1W	OL	OR	3	2,832	738	C	
04020101	US 17 SB	N DESOTO AVE	SR 70/Hickory St	1.273	Oak St	1.354	0.081	SIS	C2T	C2T	Principal Arterial-other	35	TA	A	C	C	C	U	1W	OL	OR	3	983	873	C	
04020101	US 17 SB	N DESOTO AVE	Oak St	1.354	SR 70/Magnolia St	1.430	0.076	SIS	C2T	C2T	Principal Arterial-other	35	TA	A	C	C	C	U	1W	OL	OR	3	983	873	C	
04020101	US 17 SB	N DESOTO AVE	SR 70/Magnolia St	1.430	SR 35/S. of Palmetto St	1.736	0.306	SIS	C2T	C2T	Principal Arterial-other	35	TA	A	C	C	C	U	1W	WL	WR	2	1,436	747	C	
04020101	US 17 SB	N DESOTO AVE	SR 35 (N. of Fiveash St)	0.000	SR 35/S. of Palmetto St	1.736	1.736	SIS	C3C	C3C	Principal Arterial-other	35	TA	A	C	C	C	U	1W	WL	WR	3	2,974	752	C	
04020102	US 17	BREVARD AVENUE	Livingston St	0.000	CR 660/McKay St	1.085	1.085	SIS	C2	C2	Principal Arterial-other	55	TA	H	C	C		D	2W	WL	OR	4	4,350	982	B	
04020102	US 17	BREVARD AVENUE	CR 660 (McKay St)	1.085	N. of NE Cubitis Ave	4.709	3.624	SIS	C2	C2	Principal Arterial-other	65	TA	H	C	C		D	2W	WL	OR	4	4,350	1,359	B	
04020102	US 17	BREVARD AVENUE	N. of NE Cubitis Ave	4.709	South of Tennesse St	6.627	1.918	SIS	C2	C2	Principal Arterial-other	65	RDA	H	C	C		D	2W	WL	OR	4	4,350	1,359	B	
04020102	US 17	BREVARD AVENUE	South of Tennesse St	6.627	North of Tennesse St	6.868	0.241	SIS	C2	C2	Principal Arterial-other	60	RDA	H	C	C		D	2W	WL	OR	4	4,350	1,359	B	
04020102	US 17	BREVARD AVENUE	North of Tennesse St	6.868	DeSoto/Hardee County Line	6.971	0.103	SIS	C2	C2	Principal Arterial-other	60	RDA	H	C	C		D	2W	OL	OR	4	4,350	1,359	B	
04020102	US 17	BREVARD AVENUE	N. of NE Cubitis Ave	4.709	DeSoto/Hardee County Line	6.971	2.262	SIS	C2	C2	Principal Arterial-other	65	RDA	H	C	C		D	2W	WL	OR	4	4,350	1,359	B	
04040000	SR 70	SR 70	Manatee County Line	0.000	Pine Level St	8.447	8.447	SIS	C2	C2	Principal Arterial-other	60	RUA	H	C	C		U	2W	OL	OR	2	780	493	C	
04040000	SR 70	SR 70	Pine Level St	8.447	CR 661 A/Bunker Ave	10.161	1.714	SIS	C2	C2	Principal Arterial-other	60	RUA	H	C	C		U	2W	OL	OR	2	780	551	C	

Section No.	State Road No.	Local Road Name	From	From M.P.	To	To M.P.	Section Length	SIS	Existing Context Class	Future Context Class	Functional Classification	Posted Speed	Area Type	Facility Type	FDOT LOS Std.	County LOS Std.	City LOS Std.	Year 2022								Deficiency Determination
																		Divided/ UnDivided	One/Two Way	Left Turn Bays	Right Turn Bays	Thru Lanes	Peak Hour Two-Way Capacity	Peak Hour Two-Way Volume	Peak Hour Two-Way LOS	
01040000	US 17	OLYMPIA AVE	US 41 (Cross St)	0.000	SR 35/US 17 (Marion Ave)	1.532	1.532	-	C4	C4	Principal Arterial-other	35	UA	A	D	D	D	U	1W	WL	0R	3	3,372	938	C	
01040000	US 17	DUNCAN RD	SR 35/US 17 (Marion Ave)	1.532	I - 75	2.275	0.743	-	C3C	C3C	Principal Arterial-other	55	UA	A	D	D		D	2W	WL	WR	6	5,114	1,854	C	
01040000	US 17	DUNCAN RD	I - 75	2.275	Copeley Ave	2.558	0.283	SIS	C3C	C3C	Principal Arterial-other	55	UA	A	D	D		D	2W	WL	0R	6	4,870	1,854	C	
01040000	US 17	DUNCAN RD	Copeley Ave	2.558	CR 74 (Bermont Rd)	3.436	0.878	SIS	C3C	C3C	Principal Arterial-other	55	UA	A	D	D		D	2W	WL	WR	4	3,454	2,385	C	
01040000	US 17	DUNCAN RD	CR 74 (Bermont Rd)	3.436	CR 764 (Washington Loop Rd)	6.425	2.989	SIS	C3R	C3R	Principal Arterial-other	55	UA	H	D	D		D	2W	WL	WR	4	3,528	1,494	C	
01040101	US 17	MARION AV/SR35/US17W	SR 35/US 17	0.000	US 41 (Cross St)	1.668	1.668	-	C4	C4	Principal Arterial-other	35	UA	A	D	D	D	U	1W	0L	WR	3	3,541	1,050	C	
01040201	US 17	US 17/SR 35	CR 764 (Washington Loop Rd)	0.000	CR 764 (Washington Loop Rd)	1.673	1.673	SIS	C2	C2	Principal Arterial-other	55	UA	H	D	D		D	2W	WL	WR	4	5,290	1,323	B	
01040201	US 17	US 17/SR 35	CR 764 (Washington Loop Rd)	1.673	DeSoto County Line	4.425	2.752	SIS	C2	C2	Principal Arterial-other	60	TA	H	C	D		D	2W	WL	WR	4	4,350	1,169	B	
01050000	SR 776	MCCALL RD/SR 776	Pine St (CR 775)	2.237	Gulfstream Blvd	4.484	2.247	-	C3C	C3C	Minor Arterial	45	UA	A	D	D		D	2W	WL	WR	4	3,454	2,349	D	
01050000	SR 776	MCCALL RD/SR 776	Gulfstream Blvd	4.484	Sea Mist Dr	7.268	2.784	-	C3C	C3C	Minor Arterial	55	UA	A	D	D		D	2W	WL	0R	4	3,290	2,561	C	
01050000	SR 776	MCCALL RD/SR 776	Sea Mist Dr	7.268	CR 771 (Gasparilla Rd)	9.403	2.135	-	C3C	C3C	Minor Arterial	55	UA	A	D	D		D	2W	WL	WR	4	3,454	2,403	C	
01050000	SR 776	JOBEAN RD/MCCALL RD/SR 776	CR 771 (Gasparilla Rd)	9.403	Cornelius Blvd	14.018	4.615	-	C3R	C3C	Minor Arterial	55	UA	A	D	D		D	2W	WL	WR	4	3,528	3,002	C	
01050000	SR 776	EL JOBEAN RD	Cornelius Blvd	14.018	Toledo Blade Blvd	16.449	2.431	-	C3C	C3C	Minor Arterial	55	UA	A	D	D		D	2W	WL	0R	4	3,290	3,150	D	Near Capacity
01050000	SR 776	EL JOBEAN RD	Toledo Blade Blvd	16.449	US 41	17.549	1.100	-	C3C	C3C	Minor Arterial	50	UA	A	D	D		D	2W	WL	WR	4	3,454	2,565	C	
01060000	SR 776	S MCCALL RD/SR 776	CR 775 (Pine St)	9.230	Sarasota County Line	10.385	1.155	-	C3C	C3C	Minor Arterial	45	UA	A	D	D		D	2W	WL	WR	4	3,454	2,624	C	
01075000	I-75	SR 93/I-75	Lee County Line	0.000	CR 762 (Tuckers Grade)	8.543	8.543	SIS	LA	LA	Principal Arterial-Interstate	70	RDA	F	C			D	2W		0A	6	7,250	5,408	C	
01075000	I-75	SR 93/I-75	CR 762 (Tuckers Grade)	8.543	N Jones Loop Rd	11.812	3.269	SIS	LA	LA	Principal Arterial-Interstate	70	TA	F	C			D	2W		0A	6	8,430	6,248	B	
01075000	I-75	SR 93/I-75	N Jones Loop Rd	11.812	US 17	15.100	3.288	SIS	LA	LA	Principal Arterial-Interstate	70	UA	F	D			D	2W		0A	6	11,050	7,457	C	
01075000	I-75	SR 93/I-75	US 17	15.100	CR 776 (Harbor View Rd)	17.912	2.812	SIS	LA	LA	Principal Arterial-Interstate	70	UA	F	D			D	2W		0A	6	11,050	7,380	C	
01075000	I-75	SR 93/I-75	CR 776 (Harbor View Rd)	17.912	CR 769 (Kings Highway)	21.089	3.177	SIS	LA	LA	Principal Arterial-Interstate	70	UA	F	D			D	2W		0A	6	11,050	6,750	C	
01075000	I-75	SR 93/I-75	CR 769 (Kings Highway)	21.089	Sarasota County Line	22.008	0.919	SIS	LA	LA	Principal Arterial-Interstate	70	UA	F	D			D	2W		0A	6	11,050	5,175	B	
01000002		Piper Road	N Jones Loop Road	0.000	Airport Rd	1.450	1.450	SC	C3C	C3C	Minor Arterial	45	UA	A	D	D		D	2W	WL	WR	4	3,454	684	C	
01511000		N Jones Loop Road	I-75	5.066	Piper Rd	5.430	0.364	SC	C3C	C3C	Minor Arterial	45	TA	H	C			D	2W	WL	WR	4	2,858	295	C	

Section No.	State Road No.	Local Road Name	From	From M.P.	To	To M.P.	Section Length	SIS	Existing Context Class	Future Context Class	Functional Classification	Posted Speed	Area Type	Facility Type	FDOT LOS Std.	County LOS Std.	City LOS Std.	Year 2022								Deficiency Determination
																		Divided/ UnDivided	One/Two Way	Left Turn Bays	Right Turn Bays	Thru Lanes	Peak Hour Two-Way Capacity	Peak Hour Two-Way Volume	Peak Hour Two-Way LOS	
01010000	US 41	TAMIAMI TRAIL	Lee County Line	0.000	Zemel Rd	2.339	2.339	-	C2	C2	Principal Arterial-other	65	RDA	H	C	D		D	2W	WL	WR	4	4,350	2,280	B	
01010000	US 41	TAMIAMI TRAIL	Zemel Rd	2.339	Morningside Drive	5.562	3.223	-	C2	C2	Principal Arterial-other	65	RDA	H	C	D		D	2W	WL	WR	4	4,350	2,025	B	
01010000	US 41	TAMIAMI TRAIL	Morningside Drive	5.562	Tuckers Grade Blvd	7.013	1.451	-	C3C	C3C	Principal Arterial-other	60	UA	H	D	D		D	2W	WL	WR	4	3,454	2,025	C	
01010000	US 41	TAMIAMI TRAIL	Tuckers Grade Blvd	7.013	CR 765A/Taylor Rd	8.583	1.570	-	C3C	C3R	Principal Arterial-other	60	UA	H	D	D		D	2W	WL	WR	4	3,454	2,025	C	
01010000	US 41	TAMIAMI TRAIL	CR 765A/Taylor Rd	8.583	CR 765/Burnt Store Rd	10.184	1.601	-	C3R	C3R	Principal Arterial-other	50	UA	A	D	D	D	D	2W	WL	WR	4	3,528	1,431	C	
01010000	US 41	TAMIAMI TRAIL	CR 765/Burnt Store Rd	10.184	US 41/Cross St	13.270	3.086	-	C3R	C3R	Principal Arterial-other	40	UA	A	D	D	D	D	2W	WL	WR	4	3,528	3,004	C	
01010000	US 41	TAMIAMI TRAIL	US 41/Cross St	13.270	Melbourne St	15.295	2.025	-	C3C	C3C	Principal Arterial-other	45	UA	H	D	D	D	U	1W	WL	WR	2	2,281	2,219	D	Near Capacity
01010000	US 41	TAMIAMI TRAIL	Melbourne St	15.295	CR 776/Harbor View Rd	16.314	1.019	-	C3C	C3C	Principal Arterial-other	45	UA	A	D	D		D	2W	WL	WR	6	5,114	4,005	C	
01010000	US 41	TAMIAMI TRAIL	CR 776/Harbor View Rd	16.314	Harbor Blvd	18.177	1.863	-	C3C	C3C	Principal Arterial-other	45	UA	A	D	D		D	2W	WL	WR	6	5,114	4,005	C	
01010000	US 41	TAMIAMI TRAIL	Harbor Blvd	18.177	Forest Nelson Blvd	20.221	2.044	-	C3C	C3C	Principal Arterial-other	45	UA	A	D	D		D	2W	WL	WR	6	5,114	4,383	C	
01010000	US 41	TAMIAMI TRAIL	Forest Nelson Blvd	20.221	Murdock Circle	21.548	1.327	-	C3C	C3C	Principal Arterial-other	45	UA	A	D	D		D	2W	WL	WR	6	5,114	4,789	D	Near Capacity
01010000	US 41	TAMIAMI TRAIL	Murdock Circle	21.548	Toledo Blade Blvd	23.081	1.533	-	C3C	C3C	Principal Arterial-other	45	UA	A	D	D		D	2W	WL	WR	6	5,114	3,288	C	
01010000	US 41	TAMIAMI TRAIL	Toledo Blade Blvd	23.081	Sarasota County Line	25.946	2.865	-	C3C	C3C	Principal Arterial-other	55	UA	A	D	D		D	2W	WL	WR	6	5,114	2,790	C	
01010101	US 41	CROSS ST US 41 SB	US 41 (Tamiami Trail)	0.000	Olympia Ave	1.617	1.617	-	C3C	C3C	Principal Arterial-other	45	UA	H	D	D		U	1W	0L	WR	2	2,281	2,430	F	Over Capacity
01010101	US 41	CROSS ST US 41 SB	Olympia Ave	1.617	US 41 (Tamiami Trail)	2.042	0.425	-	C3C	C3C	Principal Arterial-other	35	UA	A	D	D	D	U	1W	WL	0R	3	3,216	1,575	C	
01030000	SR 31	SR 31	Lee County Line	0.000	Cypress Pkwy	0.390	0.390	SIS	C2	C2	Minor Arterial	60	TA	H	C			U	2W	0L	WR	2	780	1,216	D	Over Capacity
01030000	SR 31	SR 31	Cypress Pkwy	0.390	Lake Babcock Dr	1.140	0.750	SIS	C2	C2	Minor Arterial	60	TA	H	C			D	2W	WL	WR	2	819	1,216	D	Over Capacity
01030000	SR 31	SR 31	Lake Babcock Dr	1.140	Cook Brown Rd	2.003	0.863	SIS	C2	C2	Minor Arterial	60	TA	H	C			D	2W	WL	WR	2	819	1,216	D	Over Capacity
01030000	SR 31	SR 31	Cook Brown Rd	2.003	CR 74	12.126	10.117	SIS	C2	C2	Minor Arterial	60	RDA	H	C			U	2W	WL	WR	2	780	684	C	
01030000	SR 31	SR 31	CR 74	12.126	DeSoto County Line	18.397	6.271	SIS	C2	C2	Minor Arterial	60	RDA	H	C			U	2W	0L	WR	2	780	570	C	

CHARLOTTE COUNTY-PUNTA GORDA 2045 COST FEASIBLE PLAN

Table 8-6: Roadway Cost Feasible Projects List ($ Millions Future Year of Expenditure)

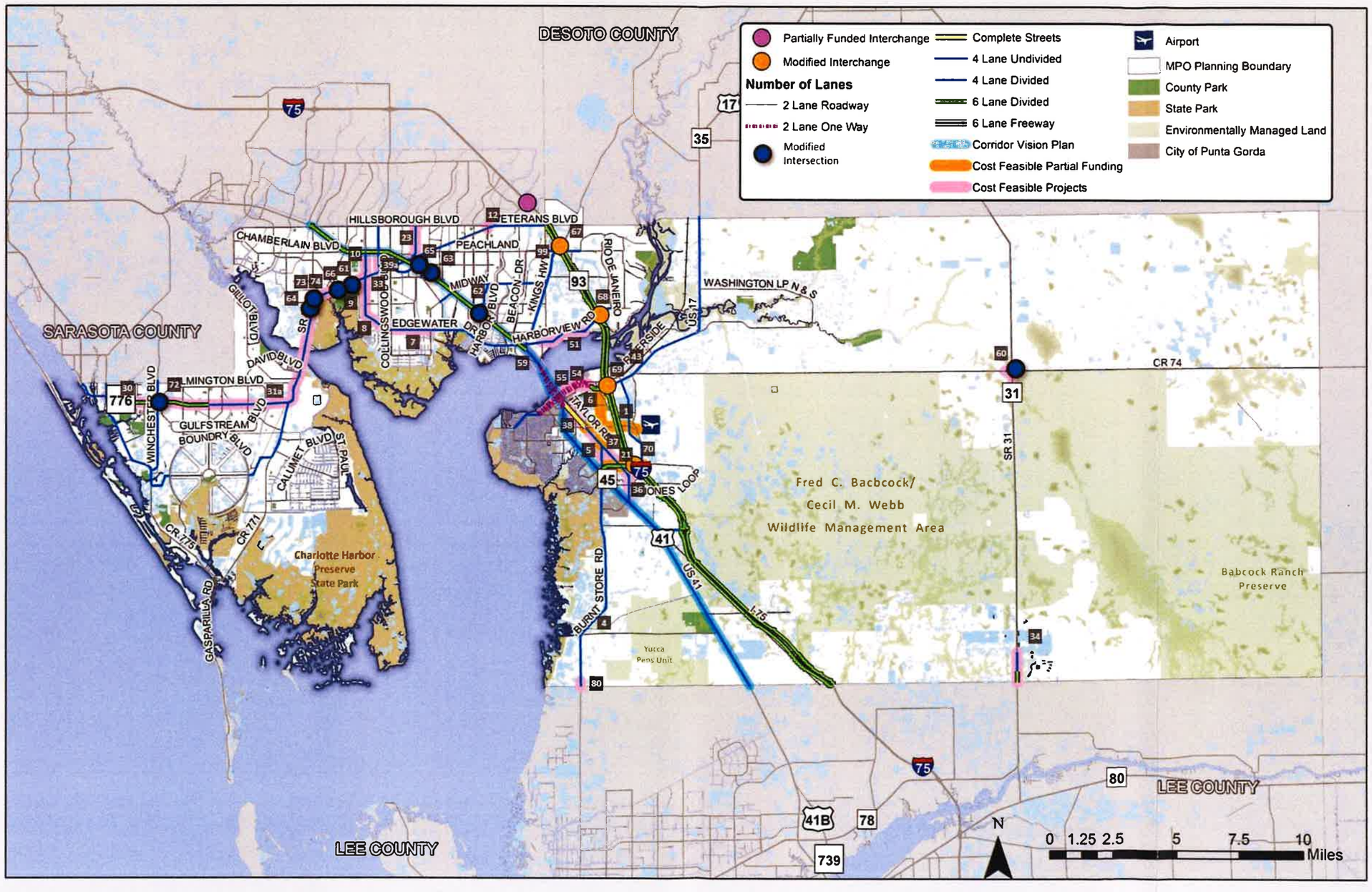
Map ID	Facility	From	To	Existing Lanes	Project Description	LRTP Funding Source	2021 – 2025 (YOE)			2026-2030 (YOE)			2031-2035 (YOE)			2036-2045 (YOE)		
							PD&E / PE	ROW	CST	PD&E / PE	ROW	CST	PD&E / PE	ROW	CST	PD&E / PE	ROW	CST
1	Airport Road	Taylor Rd	Piper Road	2	Widen 2 to 4 lanes	*Local*							$5.80	$7.43				
4	Burnt Store Rd	Zemel Rd	Scham Rd	2	Widen 2 to 4 lanes	*TIP*												
5	Burnt Store Rd	N Jones Loop	Taylor Rd	2	Widen 2 to 4 lanes	*Local*										$2.75	$2.45	$21.30
6	Burnt Store Rd Extension	Taylor Rd	Florida St @ US 17	0	New 4-lane	*Local*										$12.53		
7	Edgewater Dr (Phase 3)	Midway Blvd	Collingswood Blvd	2	Widen 2 to 4 lanes	*TRIP / Local*						$31.40						
8	Edgewater Dr (Phase 4)	Collingswood Blvd	Samantha Ave	0	Roadway realignment and new bridge	*Local*	$2.10		$23.00									
9	Edgewater Dr / Flamingo (Phase 5)	Collingswood Blvd	SR 776	2	Widen 2 to 4 lanes	*Local*	$1.00					$25.12						
10	Flamingo Blvd	SR 776	US 41	2	Widen 2 to 4 lanes	*Local*							$3.21	$5.33	$17.92			
12	Hillsborough Blvd / Raintree Blvd	Veterans Blvd		0	New 2-lane	*Local*							$0.45	$1.40	$2.53			
21	N Jones Loop	Burnt Store Rd	Piper Road	4	Widen 4 to 6 lanes	*State*	$1.22						$4.48				$5.27	
23	Prineville Dr	Paulson Dr	Hillsborough Blvd	2	Widen 2 to 4 lanes	*TRIP / Local*										$9.07	$15.64	$52.59
30	SR 776	CR 775	Spinnaker Blvd	4	Widen 4 to 6 lanes	*State*	$2.00			$6.49	$6.13				$57.38			
31a	SR 776 Future Corridor Study	Pine Street / Placida Rd	US 41		Future Corridor Study	*State*				$6.48	$20.28		$2.57				$9.98	$67.38
	(Funding for up to 8 intersection locations) Potential Candidate Intersections: Sunnybrook Blvd, Oceanspray Blvd, David Blvd, Coliseum Blvd, San Casa Dr, Winchester Blvd, Hollis Ave, Biscayne Dr.)																	
34	SR 31	Lee County Line Cypress Parkway	Cypress Parkway Lake Babcock Dr.	2	Widen 2 to 6 lanes Widen 2 to 4 lanes	*Developer*				$2.56	$7.18	$28.99						
36	Taylor Rd	US 41	Jones Loop Rd	2	Widen 2 to 4 lanes	*Local*							$5.37	$8.90	$29.93			
37	Taylor Rd	N Jones Loop Rd	Airport Rd	2	Widen 2 to 4 lanes	*Local*										$7.42	$12.80	$43.03
38	Taylor Rd	Airport Rd	US 41	2	Complete Streets	*Local*										$3.22	$4.23	$18.66
39a	Toledo Blade Blvd (CR 39)	SR 776	Whitney Avenue	2	Widen 2 to 4 lanes	*Developer*						$7.62						
43	US 17	Copley Ave	CR 74	4	Widen 4 to 6 lanes	*SIS*							$1.05			$2.00		
51	Harbor View Road	Melbourne St	I-75	2	Widen 2 to 4 lanes	*Federal / Local*	$4.02	$9.79				$31.60						
54 / 55	Marion Avenue / Olympia Avenue	US 41	Marlympia Way	3	Lane Repurposing - resurface and striping	*State*	$0.29			$1.42		$9.32						
59	US 41 Corridor Vision Plan			4/6	Corridor & Safety Improvements	*State*				$5.95		$6.28						$18.55
60	SR 31	@ CR 74		2	Roundabout	*State*		$0.64				$0.89						
61	SR 776	@ Flamingo Blvd		4	Intersection - turn lanes	*TIP*			$1.46									
62	US 41	@ Easy Street		4	Intersection - turn lanes	*State*										$1.09		$8.44
63	US 41	@ Forrest Nelson		4	Intersection - turn lanes	*State*										$1.09		$8.44
64	SR 776	@ Jacobs St		4	Intersection - turn lanes	*State*										$1.09		$8.44

Map ID	Facility	From	To	Existing Lanes	Project Description	LRTP Funding Source	2021 – 2025 (YOE)			2026-2030 (YOE)			2031-2035 (YOE)			2036-2045 (YOE)		
							PD&E / PE	ROW	CST	PD&E / PE	ROW	CST	PD&E / PE	ROW	CST	PD&E / PE	ROW	CST
65	US 41	@ Carousel Plaza		4	Intersection - turn lanes	*State*										$1.09		$8.44
66	**SR 776**	**@ Charlotte Sports Park**		**4**	**Intersection - turn lanes**	***State***	**$0.15**					**$1.27**						
67	I-75	at CR 769/Kings Hwy			Interchange Modifications	*SIS*							$6.50					
68	**I-75**	**at CR 776/Harbor View**			**Interchange Modifications**	***SIS***							**$6.50**					
69	I-75	at US 17/SR35			Interchange Modifications	*SIS*							$7.50					
70	**I-75**	**at North Jones Loop Rd**			**Interchange Modifications**	***SIS***							**$6.50**					
71	ITS Master Plan Implementation					*State / Federal / Local*						$3.14	$7.07		$3.54			$16.00
72	**SR 776**	**@ Gulfstream Blvd / Wilmington Blvd**		**4**	**Intersection - turn lanes**	***State***				**$0.81**		**$5.71**						
73	SR 776	@ Biscayne Blvd		4	Intersection - turn lanes	*State*				$0.81		$5.71						
74	**SR 776**	**@ Cornelius**		**4**	**Intersection - turn lanes**	***State***							**$0.96**	**$7.17**	**$7.17**			
80	Burnt Store Road	Vincent Avenue	Wallaby Lane	2	Widen 2 to 4 Lanes	*Federal*							$0.56	$0.27	$3.11			
99	**Kings Hwy / Peachland / Veterans**				**Intersection Modification**	***Local***				**$5.95**								
						Subtotal:	*$10.78*	*$10.43*	*$24.46*	*$30.47*	*$33.59*	*$157.05*	*$58.52*	*$30.5*	*$128.58*	*$41.35*	*$50.37*	*$271.27*
						Total:	**$840.37**											

Notes:

- PD&E/PE are product support phases for Project Development & Environment phase and Preliminary Engineering phase
- ROW is Right-of-Way costs associated with land acquisition
- CST is the Construction cost for completing the identified project
- Existing Funding is included in the MPO's 2020/2021 – 2024/2025 Transportation Improvement Program.

Figure 8-1: Roadway Cost Feasible Projects



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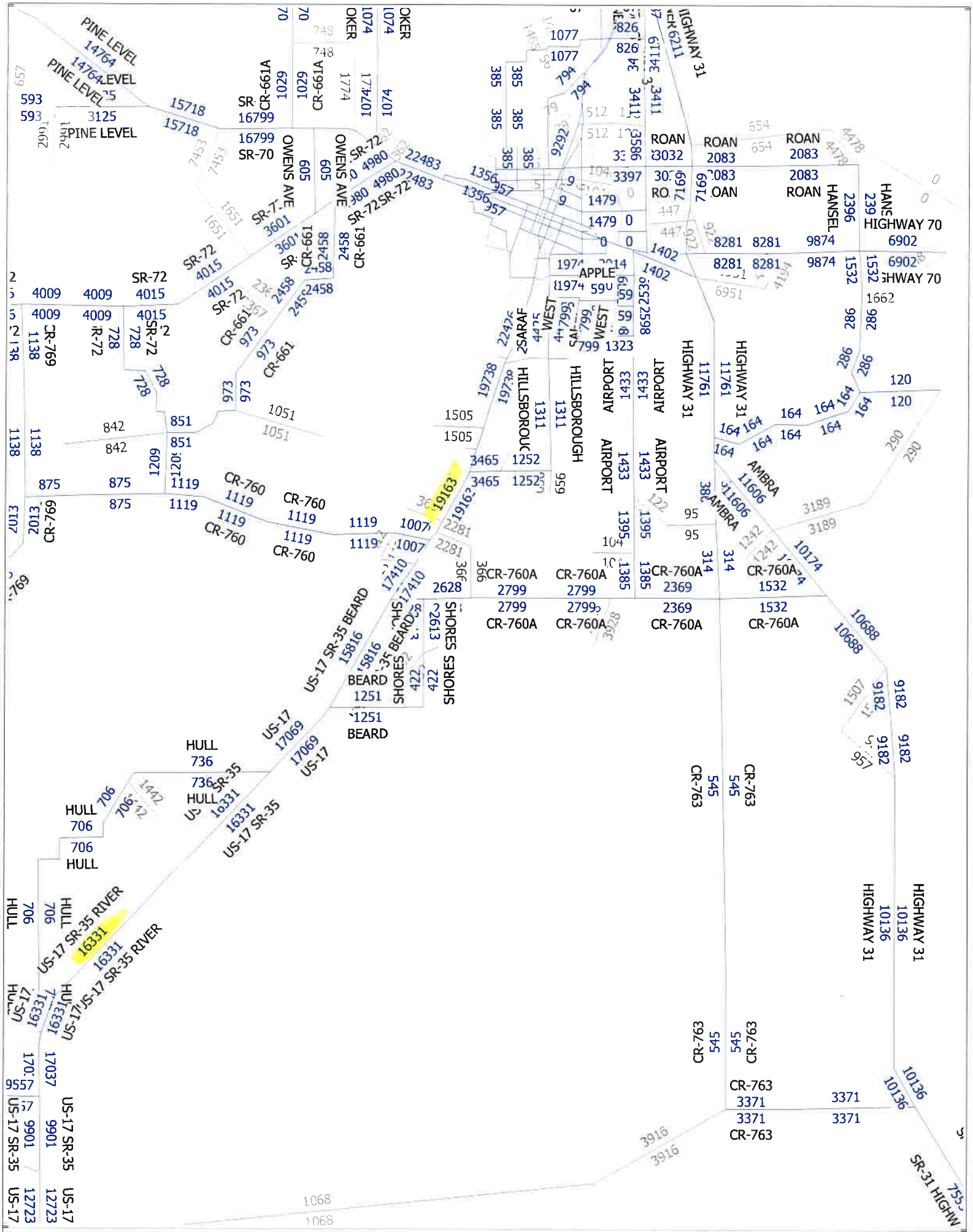
NETWORK VOLUMES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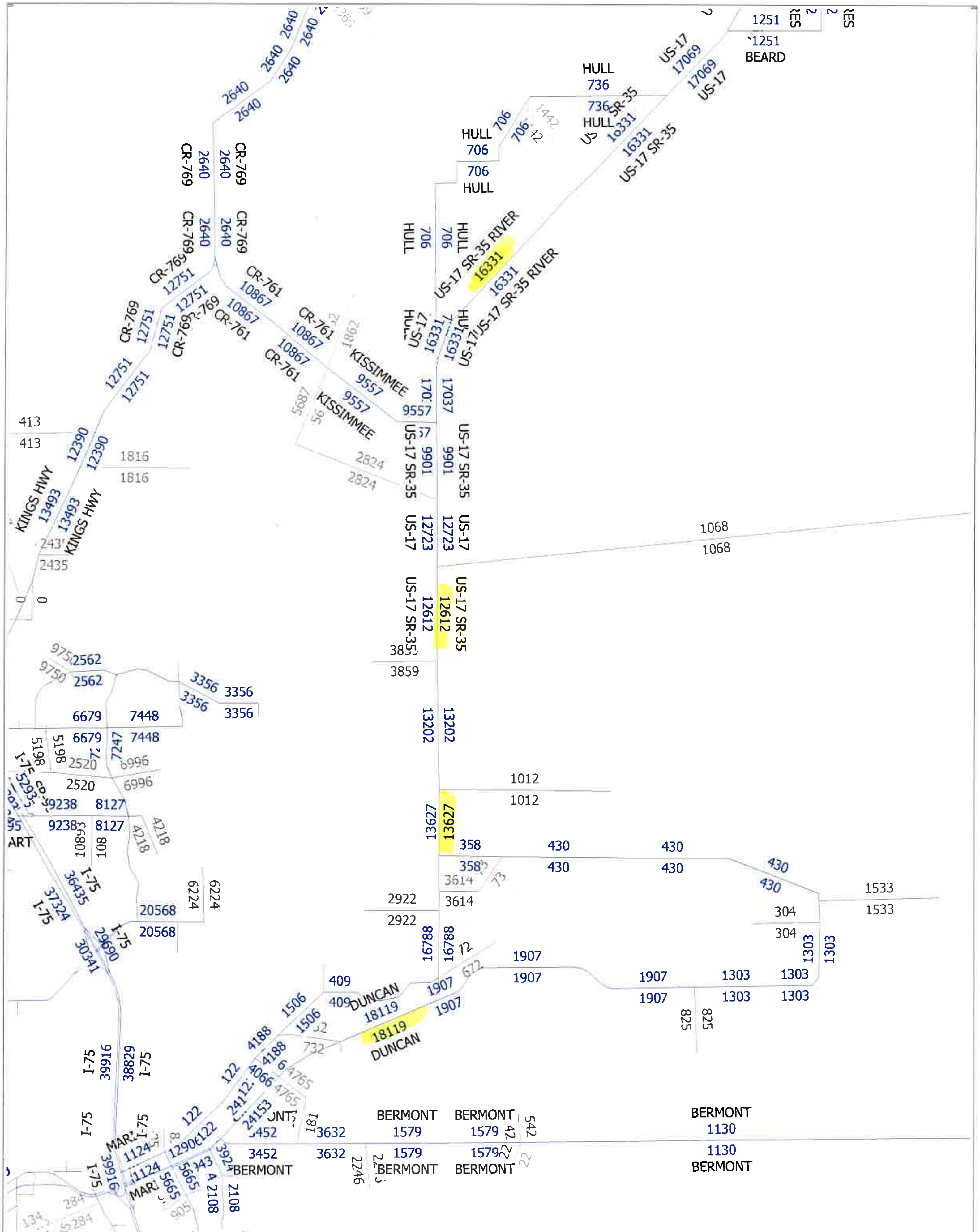

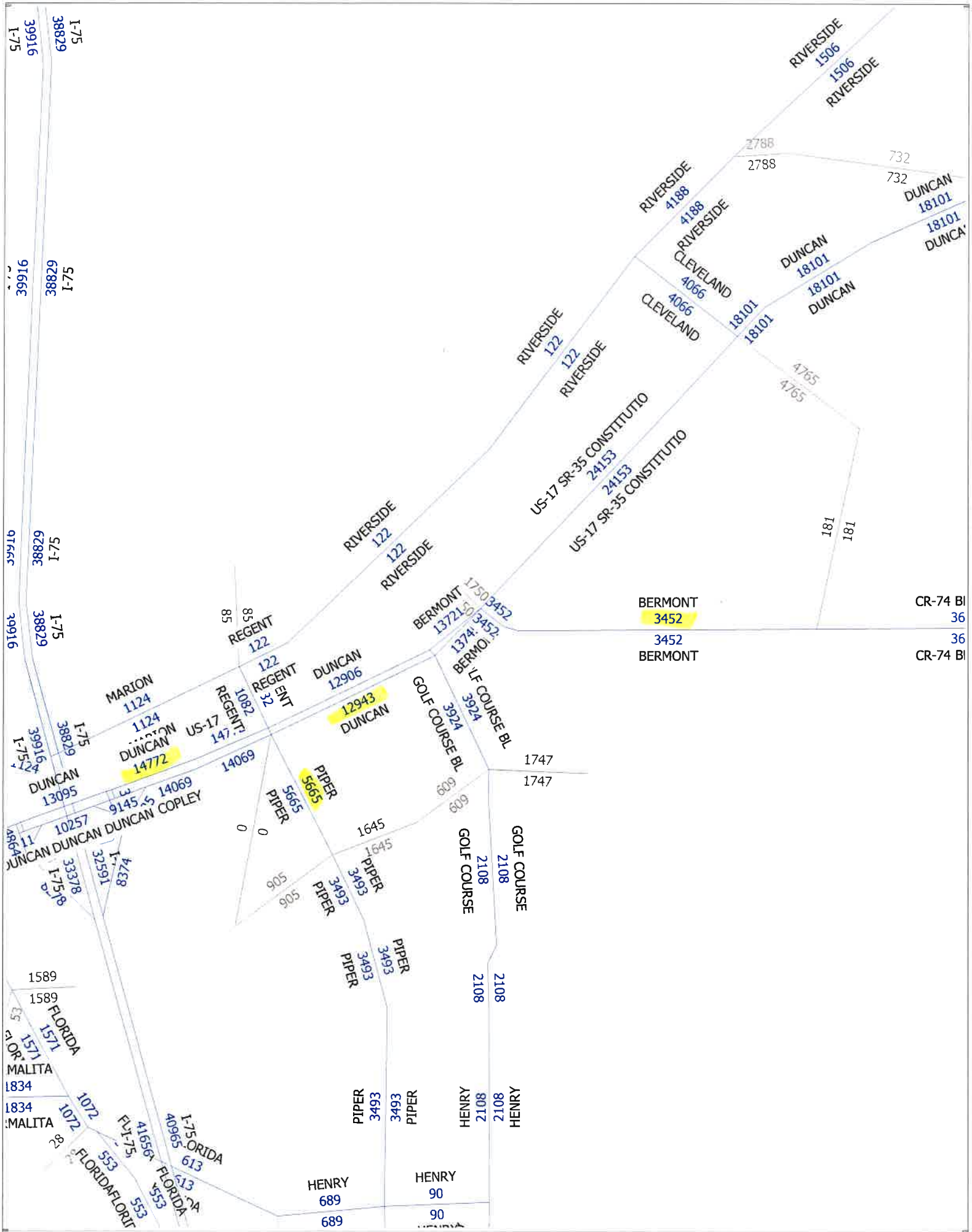

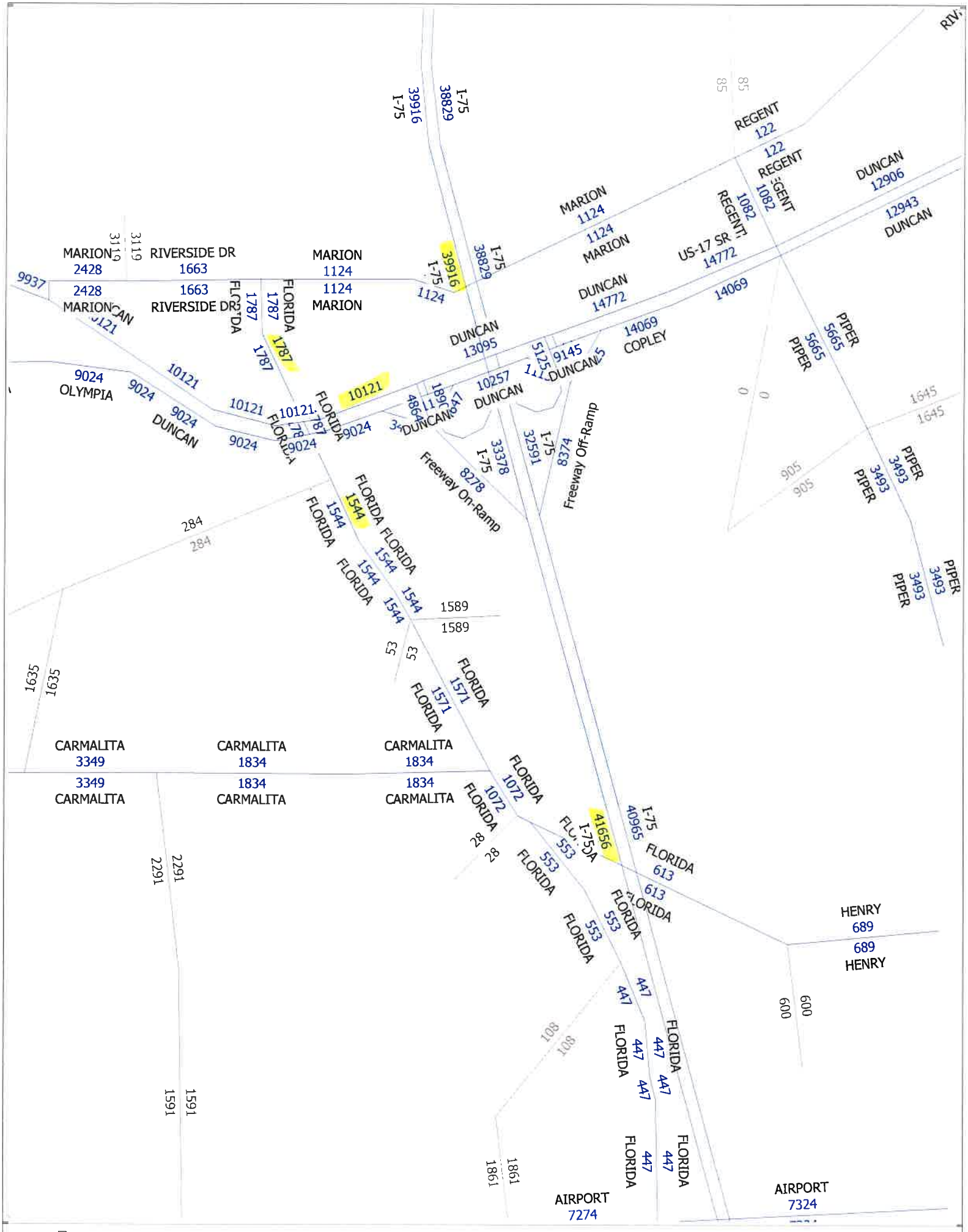

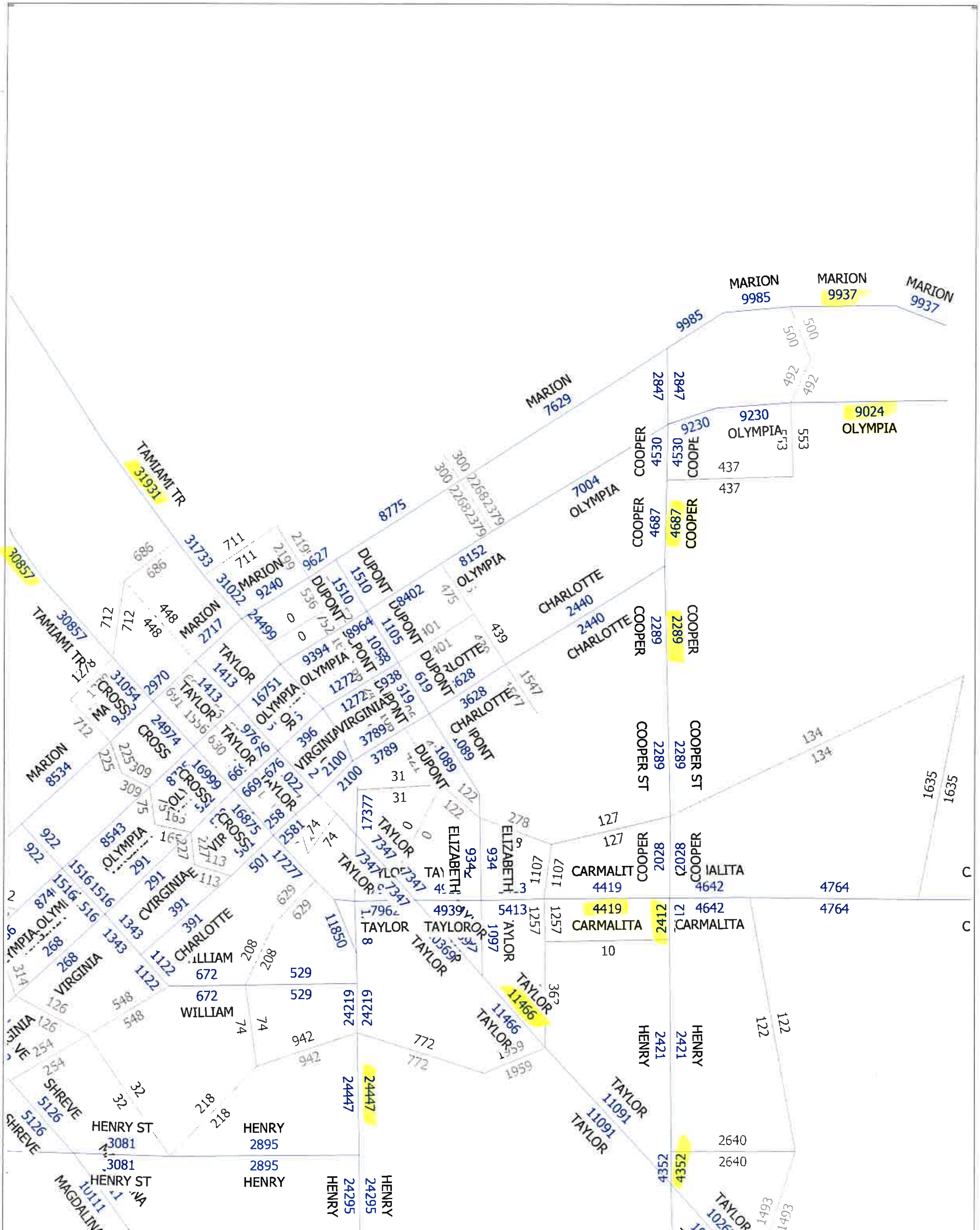
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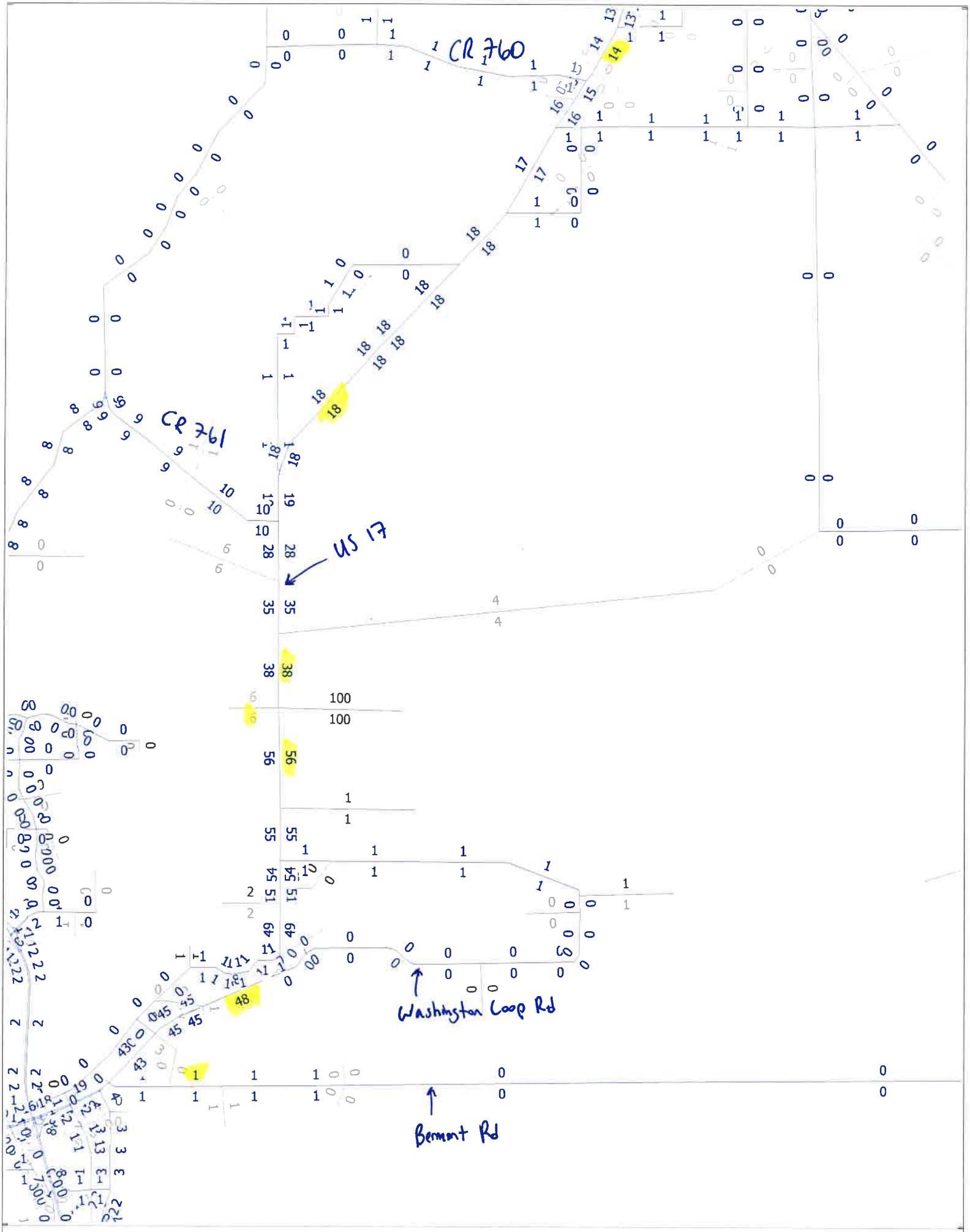
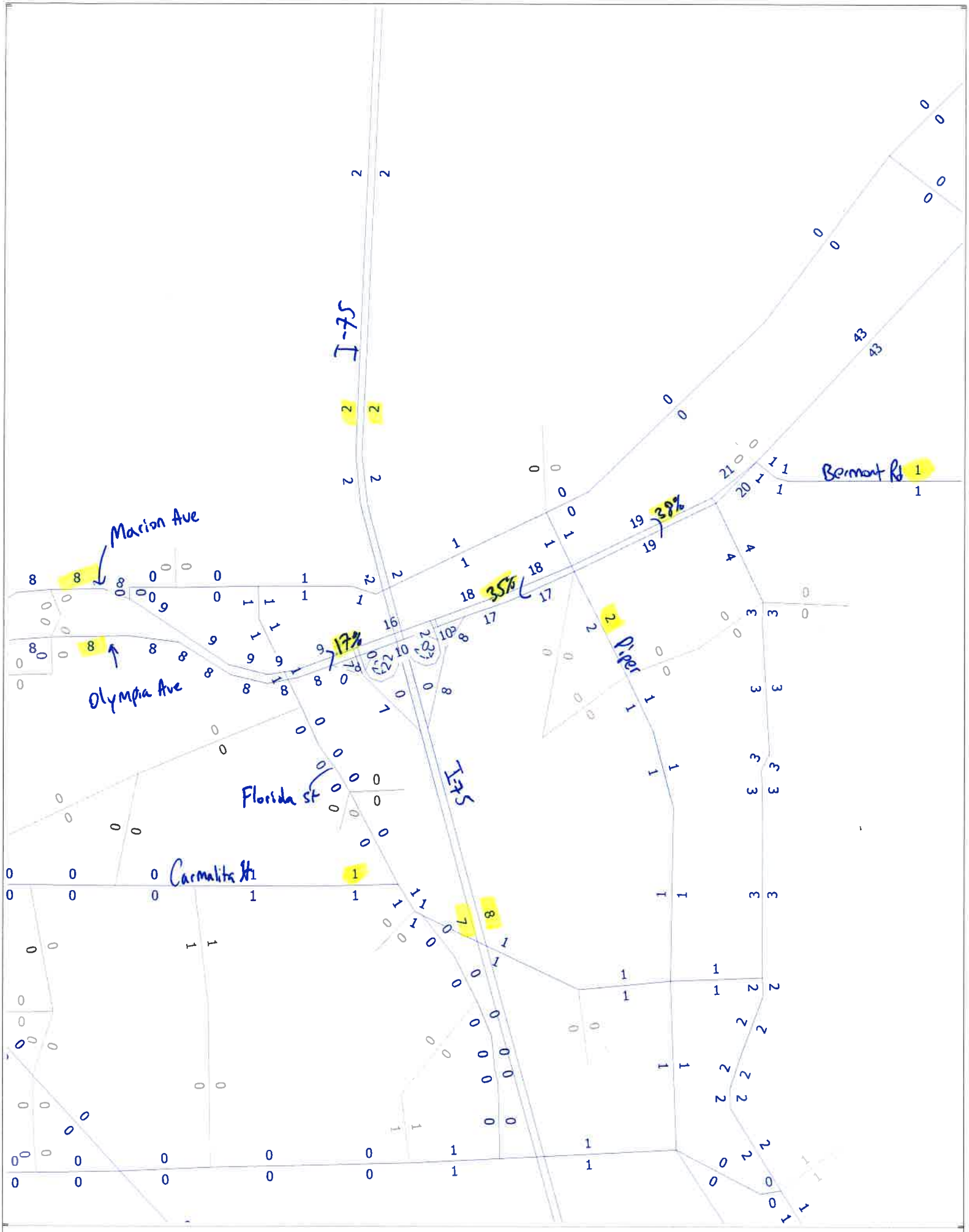
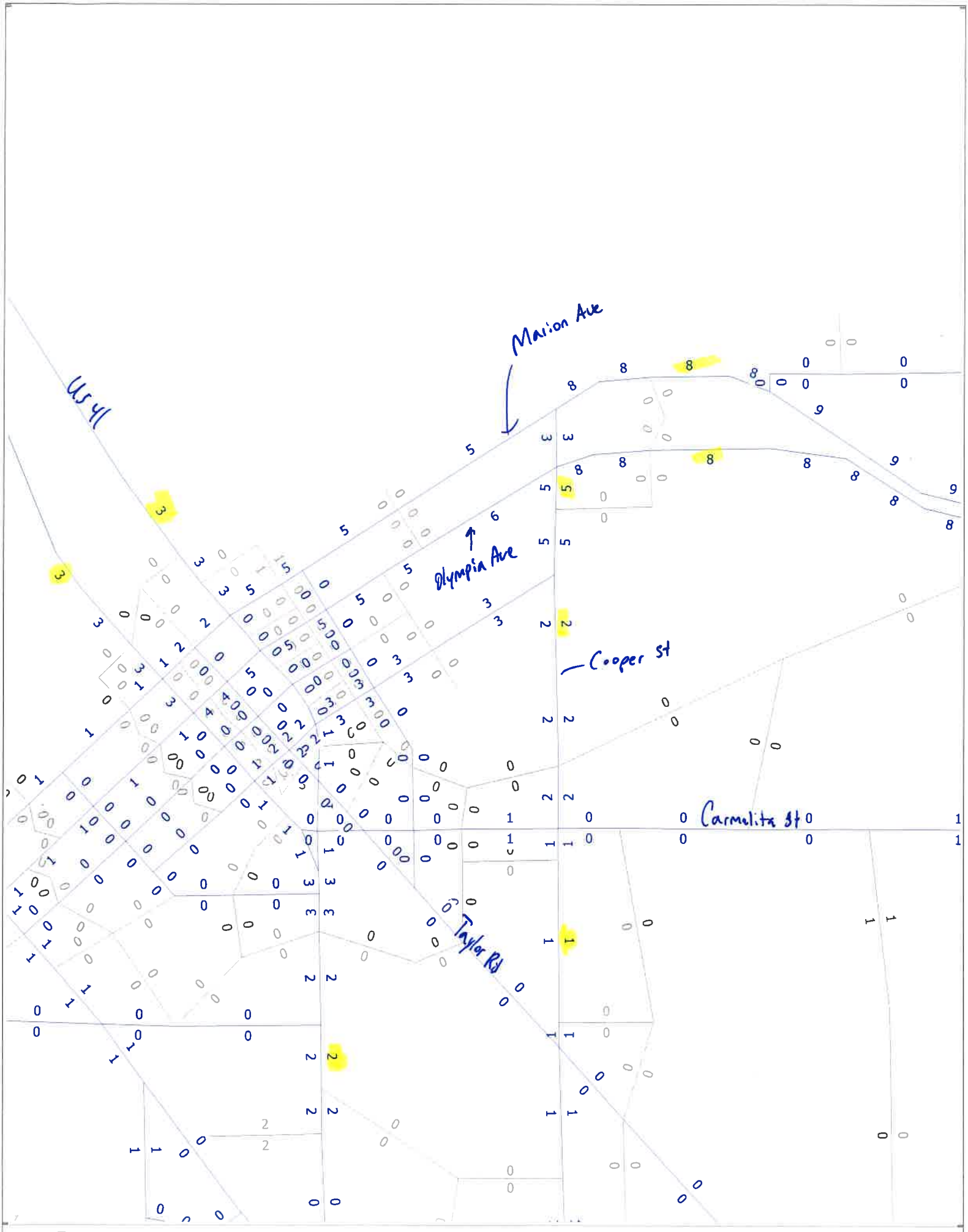
MAGDALINA

FSUTMS DISTRICT ONE MODEL
PROJECT TRIP DISTRIBUTION







ITE PASS-BY RATE

Vehicle Pass-By Rates by Land Use

Source: ITE *Trip Generation Manual*, 11th Edition

Land Use Code	820								
Land Use	Shopping Center (> 150k)								
Setting	General Urban/Suburban								
Time Period	Weekday PM Peak Period								
# Data Sites	8 Sites with GLA between 150 and 300k				16 Sites with GLA between 300 and 900k				
Average Pass-By Rate	29% for Sites with GLA between 150 and 300k				19% for Sites with GLA between 300 and 900k				
	Pass-By Characteristics for Individual Sites								
GLA (000)	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips			Adj Street Peak Hour Volume	Source
					Primary (%)	Diverted (%)	Total (%)		
213	Florida	1990	312	28	31	41	72	—	33
225	Illinois	1994	264	35	32	33	65	1970	24
227.9	Kentucky	1993	—	34	35	31	66	—	34
235	Kentucky	1993	211	35	29	36	65	2593	2
255	Iowa	1994	222	23	38	39	77	3706	24
256	Connecticut	1994	208	27	51	22	73	3422	24
293	Illinois	1994	282	24	70	6	76	4606	13
294	Pennsylvania	1994	213	24	48	18	76	4055	24
350	Massachusetts	1994	224	18	45	37	82	2112	24
361	Virginia	1994	315	17	54	29	83	2034	24
375	North Carolina	1994	214	29	48	23	71	2053	24
413	Texas	1994	228	28	51	21	72	589	24
418	Maryland	1994	281	20	50	30	80	5610	24
450	California	1994	321	23	49	28	77	2787	24
476	Washington	1994	234	25	53	22	75	3427	24
488	Texas	1994	257	12	75	13	88	1094	13
560	Virginia	1994	437	19	49	32	81	3051	24
581	Colorado	1994	296	18	53	29	82	2939	24
598	Colorado	1994	205	17	55	28	83	3840	24
633	Texas	1994	257	10	64	26	90	—	24
667	Illinois	1994	200	16	53	31	84	2770	24
738	New Jersey	1994	283	13	75	12	87	8059	24
800	California	1994	205	21	51	28	79	7474	24
808	California	1994	240	13	73	14	87	4035	24

INTERNAL CAPTURE WORKSHEETS

PERMITTED SCENARIO

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:		**Organization:**	
Project Location:		**Performed By:**	
Scenario Description:		**Date:**	
Analysis Year:		**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	820	500k	Sq. Ft.	1,798	863	935
Restaurant				0		
Cinema/Entertainment				0		
Residential		6,000	Units	4,664	2,938	1,726
Hotel				0		
All Other Land Uses[2]	130	1 mil	Sq. Ft.	340	75	265
				6,802	3,876	2,926

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	243	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	86	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	6,802	3,876	2,926
Internal Capture Percentage	10%	8%	11%
External Vehicle-Trips[5]	6,144	3,547	2,597
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	10%	26%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	8%	5%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	0
Analysis Period:	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	863	863	1.00	935	935
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	2938	2938	1.00	1726	1726
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	19		271	37	243	47
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	69	725	362	0		52
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		69	0	0	118	0
Retail	0		0	0	1351	0
Restaurant	0	432		0	470	0
Cinema/Entertainment	0	35	0		118	0
Residential	0	86	0	0		0
Hotel	0	17	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	86	777	863	777	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	243	2695	2938	2695	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	75	75	75	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	243	692	935	692	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	86	1640	1726	1640	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	265	265	265	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Commercial

INTERNAL CAPTURE WORKSHEETS

PROPOSED SCENARIO

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:		**Organization:**	
Project Location:		**Performed By:**	
Scenario Description:	Proposed	**Date:**	
Analysis Year:		**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	820	500k	Sq. Ft.	1,798	863	935
Restaurant				0		
Cinema/Entertainment				0		
Residential		8,000	Units	6,112	3,850	2,262
Hotel				0		
All Other Land Uses[2]	130	1.5 mil	Sq. Ft.	510	112	398
				8,420	4,825	3,595

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	243	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	86	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	8,420	4,825	3,595
Internal Capture Percentage	8%	7%	9%
External Vehicle-Trips[5]	7,762	4,496	3,266
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	10%	26%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	6%	4%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	0
Analysis Period:	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	863	863	1.00	935	935
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	3850	3850	1.00	2262	2262
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	19		271	37	243	47
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	90	950	475	0		68
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		69	0	0	154	0
Retail	0		0	0	1771	0
Restaurant	0	432		0	616	0
Cinema/Entertainment	0	35	0		154	0
Residential	0	86	0	0		0
Hotel	0	17	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	86	777	863	777	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	243	3607	3850	3607	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	112	112	112	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	243	692	935	692	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	86	2176	2262	2176	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	398	398	398	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

TRIP GENERATION EQUATIONS

Single-Family Detached Housing
(210)

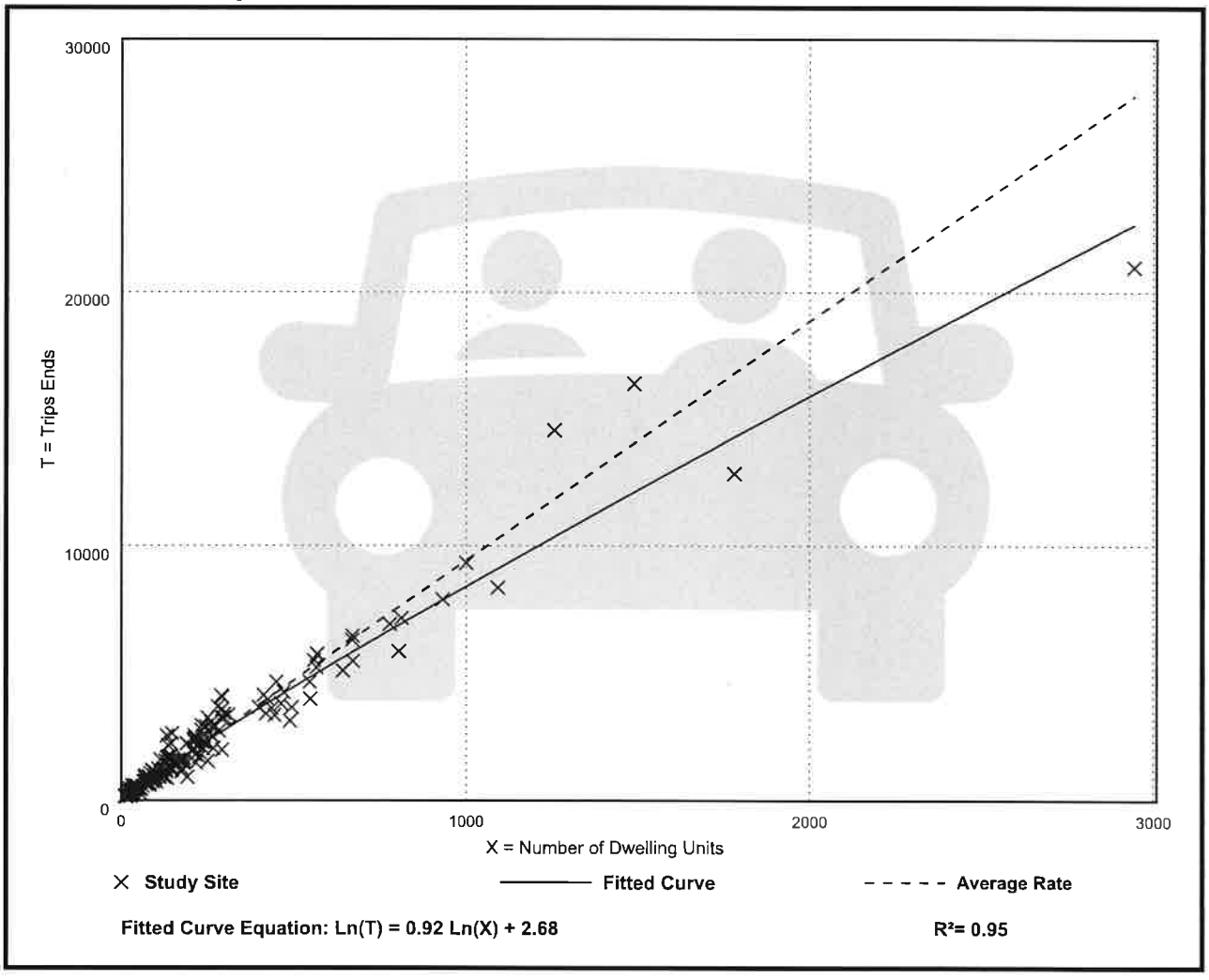
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.92 Ln(X) + 2.68

R^2= 0.95

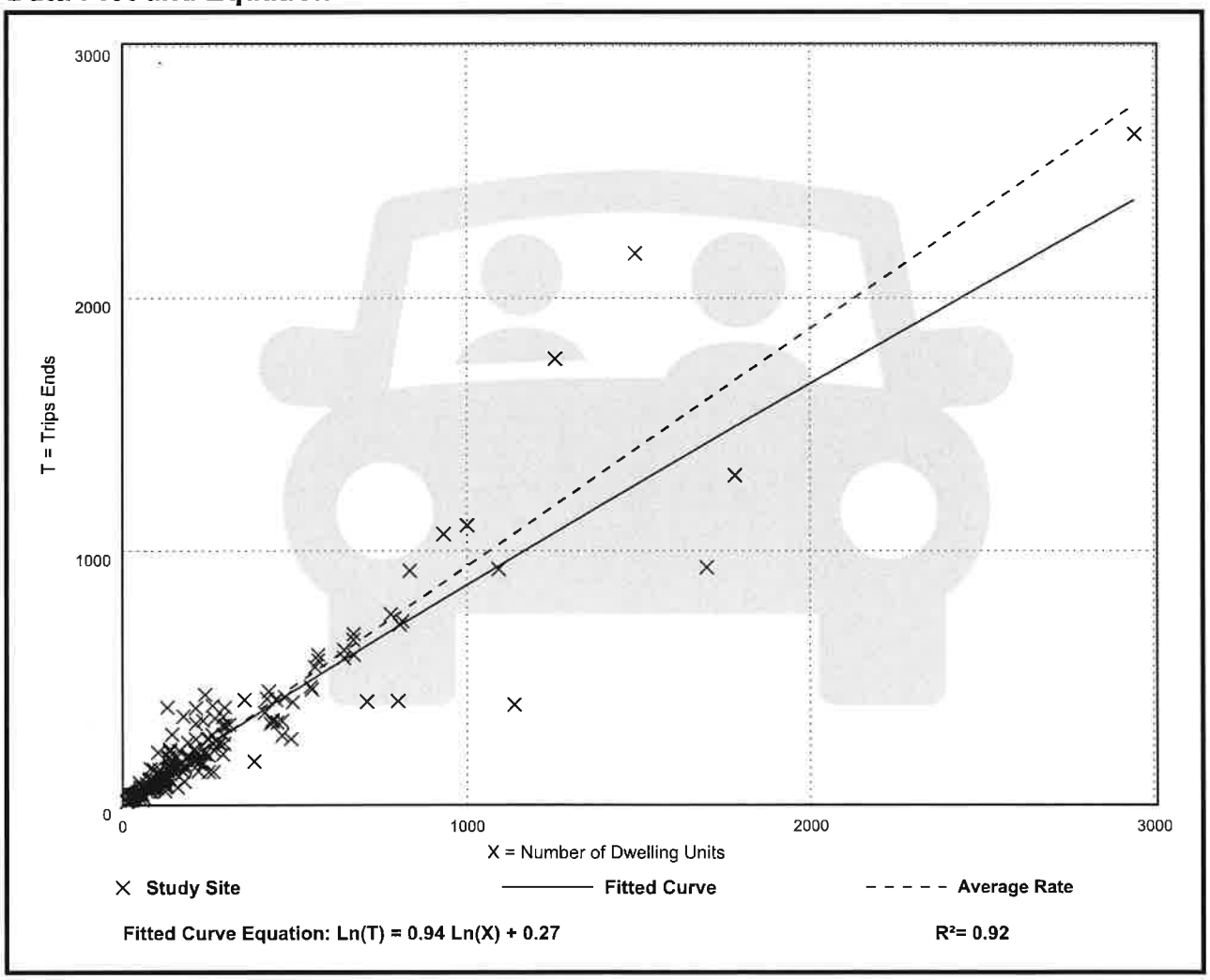
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 208
Avg. Num. of Dwelling Units: 248
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.94 Ln(X) + 0.27

R^2= 0.92

Industrial Park
(130)

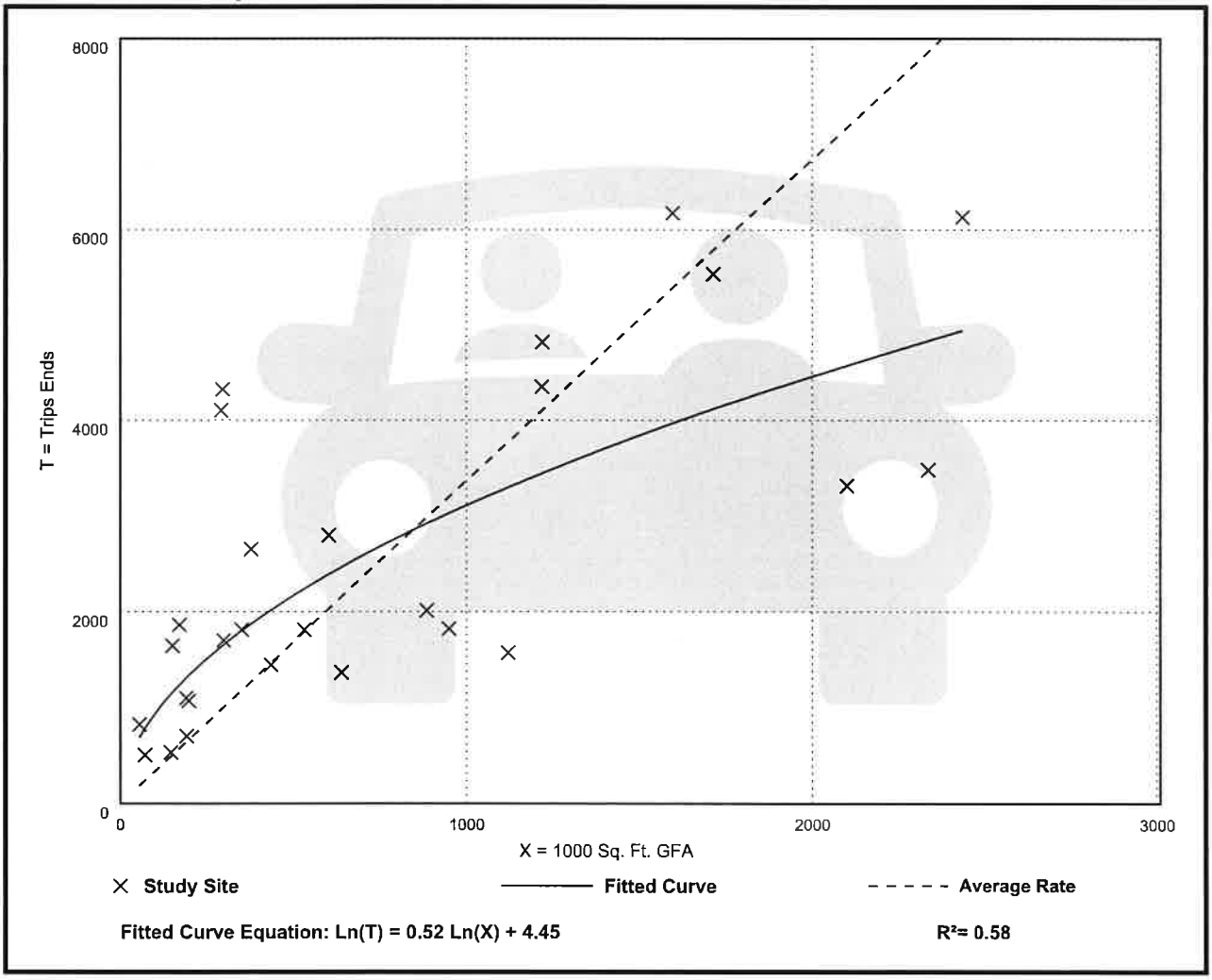
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 27
Avg. 1000 Sq. Ft. GFA: 762
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.37	1.41 - 14.98	2.60

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.52 Ln(X) + 4.45

R^2= 0.58

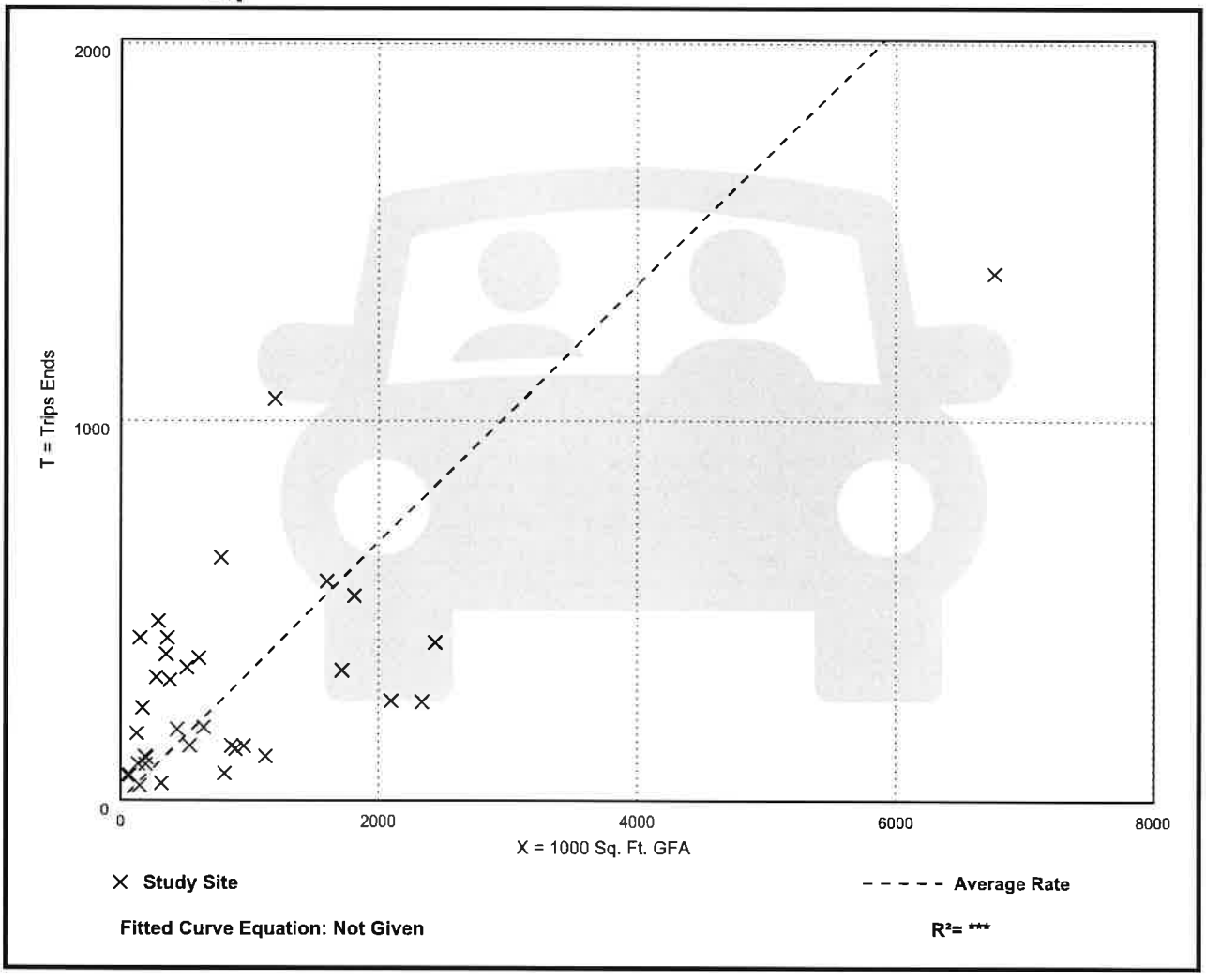
Industrial Park
(130)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 35
Avg. 1000 Sq. Ft. GFA: 899
Directional Distribution: 22% entering, 78% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.34	0.09 - 2.85	0.36

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= ***

Shopping Center (>150k)
(820)

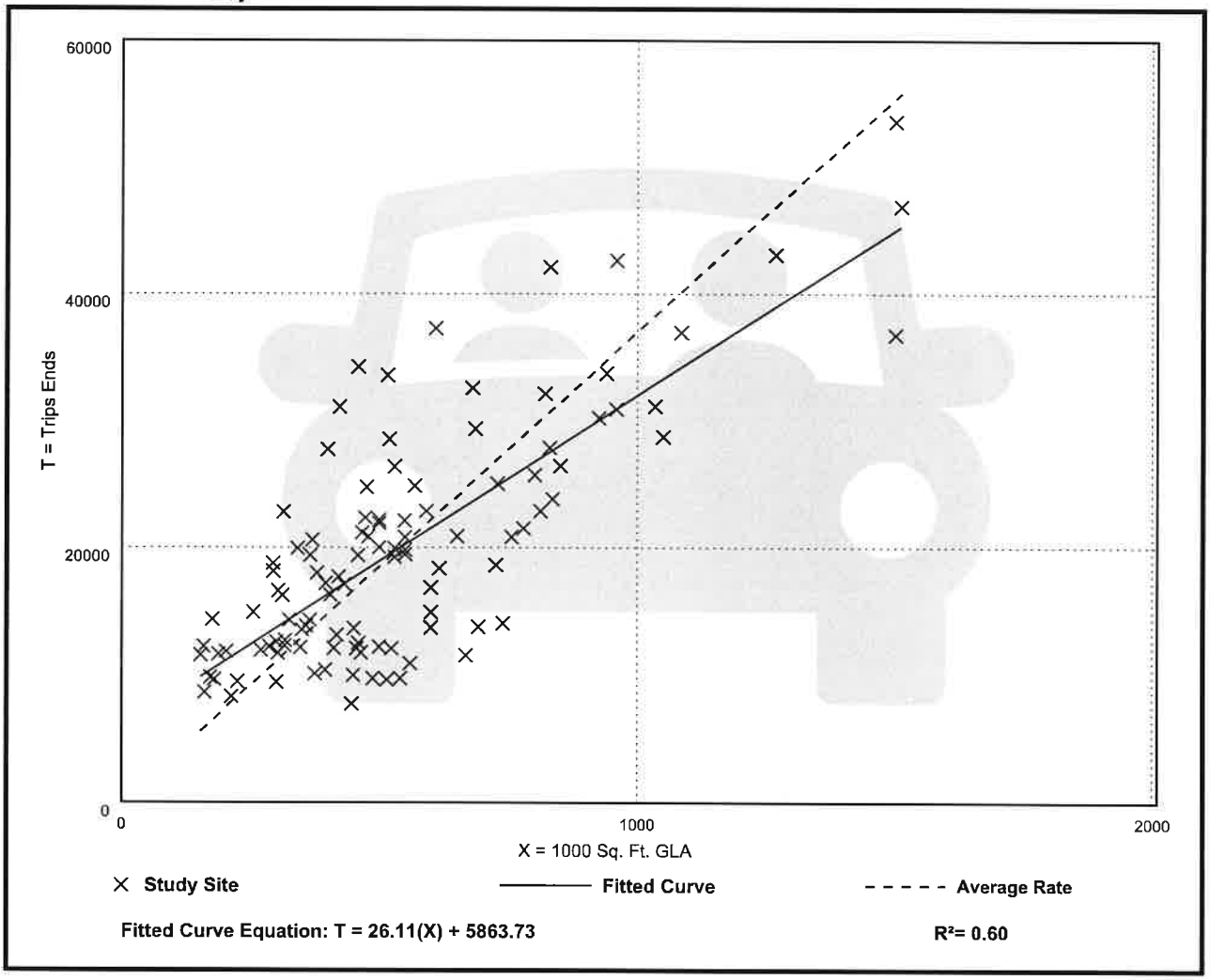
Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 108
Avg. 1000 Sq. Ft. GLA: 538
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
37.01	17.27 - 81.53	12.79

Data Plot and Equation



Fitted Curve Equation: T = 26.11(X) + 5863.73

R^2= 0.60

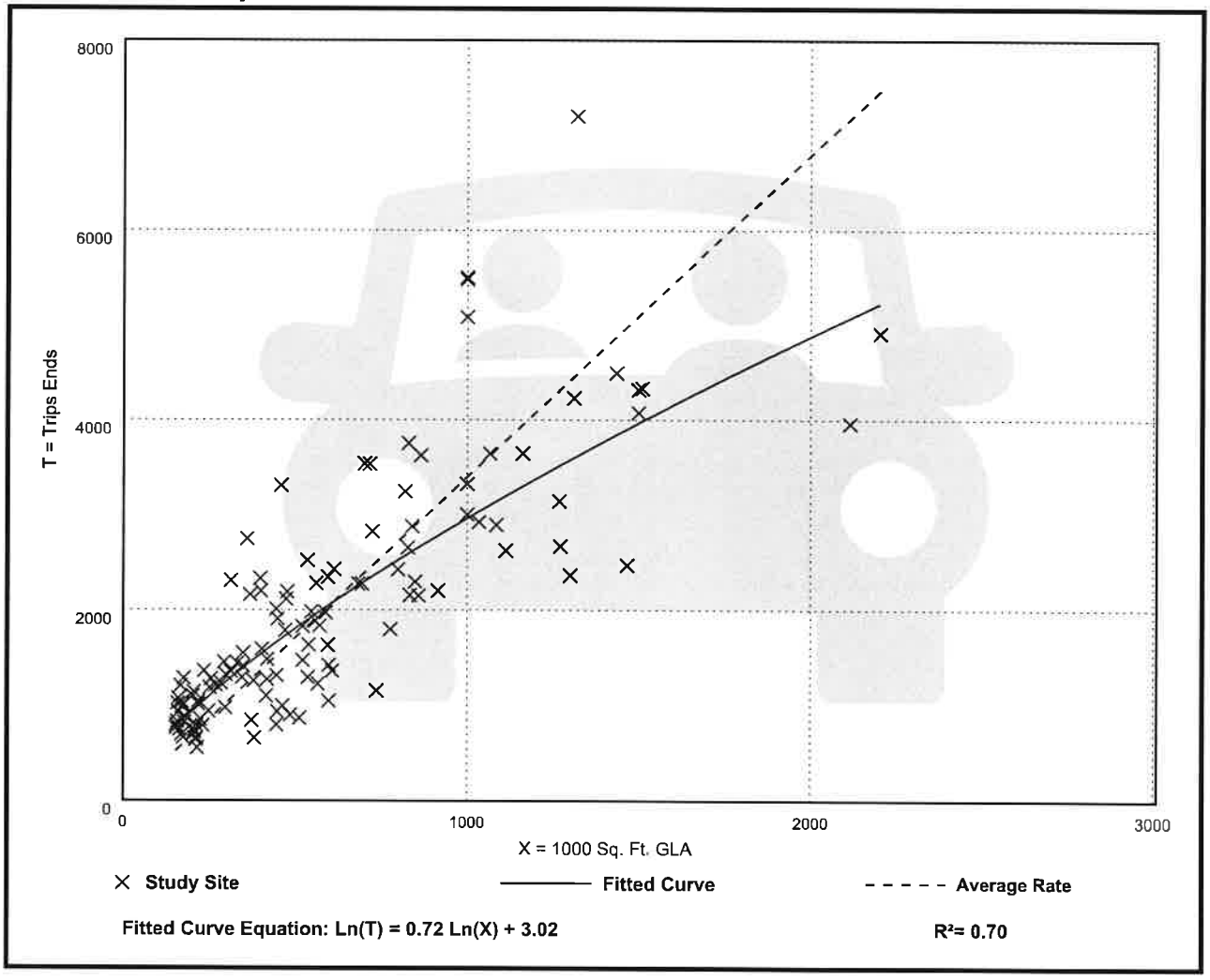
Shopping Center (>150k)
(820)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 126
Avg. 1000 Sq. Ft. GLA: 581
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
3.40	1.57 - 7.58	1.26

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.72 Ln(X) + 3.02

R^2= 0.70

Derek P. Rooney | Derek.Rooney@gray-robinson.com | **D** 239.254.8455
1404 Dean Street, Suite 300, Fort Myers, Florida 33901 | **T** 239.340.7979 | **F** 239.321.5334

September 10, 2024

BY HAND DELIVERY

Jie Shao
Principal Planner
Charlotte County Board of County Commissioners

Re: U.S. 17 - Utility Availability

Dear Ms. Shao:

In support of the proposed plan amendment for Pulte Home Company, LLC, ("Pulte") I have prepared this statement as to the status and availability of water and wastewater services to serve existing and proposed development within the urban service areas of the U.S. 17 Corridor Planning Area. As you are aware the region was previously certificated by the Florida Public Service Commission to Sun River Utilities, Inc. Sun River has since become insolvent and been placed into receivership with Central State Water Resources ("CSWR"). CSWR currently operates a small utility facility serving less than 100 users west of U.S. 17 and is currently working with property owners to identify both new sources and utility facility siting as well as abandoning the current facility and serving the region as a distribution and collection entity.

Pulte has identified the existing Peace River Manasota Regional Water Authority transmission line which runs parallel to U.S. 17 DeSoto County as the primary water source and in working with DeSoto County to tap into their allocation on the DeSoto County side of CSWR's service area. The terms of that connection are currently being negotiated between Pulte, CSWR, and DeSoto County under a bulk-service agreement. Pulte has also been keeping Charlotte County Utilities ("CCU") and County Administration aware of this process in case an interlocal agreement or other cross-jurisdictional services need to be memorialized.

With respect to wastewater, Pulte is working with CCU on preliminary water modeling with respect to a potential subterranean force main line under the Peace River from the East Port plant to CSWR's current facility. While CCU has indicated there is sufficient capacity to serve the entire U.S. 17 Corridor, the modeling will determine if additional improvements are needed to serve the Pulte project. Pulte and CSWR will working to jointly fund the force main improvements and be presenting a utility development agreement to the Charlotte County Board of County Commissioners for their approval.

To summarize, both DeSoto and Charlotte counties have identified sufficient capacity to serve the U.S. Corridor, Pulte will be working with CSWR to formalize its bulk distribution and collection agreements to provide service to Pulte's project which are expected before the end of the calendar year.

Sincerely,

/s/Derek P. Rooney

CSWR-FLORIDA
Utility Operating Company
A CSWR Managed Utility

September 10, 2024

Attn: Pulte Home Company, LLC

RE: Schwartz Parcel Development, North Charlotte, FL

Please accept this letter as conditional approval for CSWR-Florida Utility Operating Company (CSWR-FL) to provide water and wastewater service for the development located on the Schwartz parcel within the CSWR-FL's North Charlotte service area and verification of future water and sewer capacity for the proposed development.

CSWR-FL will require approval of the final sealed and signed plans prior to the start of construction. Additional contribution, construction, inspection and tapping requirements will be detailed in a separate Utility Service Agreement (USA).

It is important to note that this conditional approval is contingent upon CSWR-FL's final approval of final sealed and signed plans.

If you have any questions, please contact me at your convenience.

Sincerely,

Ben Sanders
Business Development

BOARD OF COUNTY COMMISSIONERS
DESOTO COUNY
Utilities Department
2170 NE Roan Street
Arcadia, Florida 34266
Phone: (863) 491-7500 Fax: 491-7506

July 11, 2025

Attn: Mr. Ben Sanders
Business Development
Central States Water Resources

RE: CSWR-FL North Charlotte Service Area Wholesale Water
Highway 17 Corridor Development
DeSoto and Charlotte County, FL

Mr. Sanders,

Please accept this letter as preliminary verification that DeSoto County (the "County") Utilities has the capacity to provide wholesale water to CSWR-FL's for use in CSWR-FL's North Charlotte service area, however, the County's willingness to serve is subject to the DeSoto County Board of County Commissioners (the "Board") approval. The County has the current capacity to provide an initial amount of .816 million gallons per day to CSWR-FL with plans to increase capacity in the future, at the cost of CSWR-FL, to service continued development up to 2 million gallons per day.

As a condition to providing the aforementioned wholesale water to CSWR-FL, the County will require that CSWR-FL design, permit, and construct, and to thereafter transfer to DeSoto County ownership and control, of water facilities designed, permitted and/or constructed by CSWR-FL outside of CSWR-FL's service area that lie within the jurisdictional boundaries of the County. The County will further require approval of construction plans related to the water interconnect between CSWR-FL and DeSoto County. Additional rate, capacity charge, contribution, construction, inspection and tapping requirements will be detailed in a separate Utility Service Agreement. Moreover, the County will require that CSWR-FL enter into a cooperative funding agreement with the County for the purpose of ensuring that CSWR-FL provide the necessary funding for the County to develop a bulk rate, and for the County to contract for management, operations, and legal services for the provision of implementation and review of the aforementioned plan required by CSWR-FL's request for wholesale water.

It is important to note that this letter shall serve only to verify the County's capacity to serve; however, ultimate approval of willingness to serve is contingent upon a determination by the Board, and the satisfaction of the aforementioned conditions.

If you have any questions, please contact me at your convenience.

Sincerely,

Greg Harris

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