

Bicycle/Pedestrian Feasibility Study

City of DeBary – Dirksen Drive Trail



FINAL

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Volusia County MPO



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INTRODUCTION

The proposed bicycle/pedestrian trail will serve as a connector from US Highway 17-92 sidewalk system to Volusia County's Gemini Springs Park located on the south side of Dirksen Drive. This project will also become a local segment of Volusia County's Spring-to-Spring Trail. At the time of this report, no sidewalks exist on either side of Dirksen Drive. Bicyclists and pedestrians currently have to use the roadway to access Gemini Springs Park from US 17-92. The sidewalk system within a one-half mile radius of the proposed trail is fragmented and neighborhoods and retail sites are generally not well connected. The proposed connection in this feasibility report will provide a safe access route to Gemini Springs Park and the Lake Monroe Trail and Park from US 17-92. The study area along Dirksen Drive is approximately one-quarter mile in length.

PROJECT PURPOSE AND SCOPE

The purpose of this study is to evaluate the feasibility of a proposed multi-use trail on the south side of Dirksen Drive from US 17-92 to the western-most lot for the Gemini Springs and Lake Monroe Park trail system in the City of DeBary, Florida. The project location is illustrated in Figure-1. Portions of the developing Spring to Spring Trail are currently not connected, specifically the segment between US 17-92 and Gemini Springs. A cost estimate is provided as part of this study for Volusia County MPO's budgeting and planning purposes. Two field visits were conducted for data collection, preliminary concept development, and corridor evaluation.

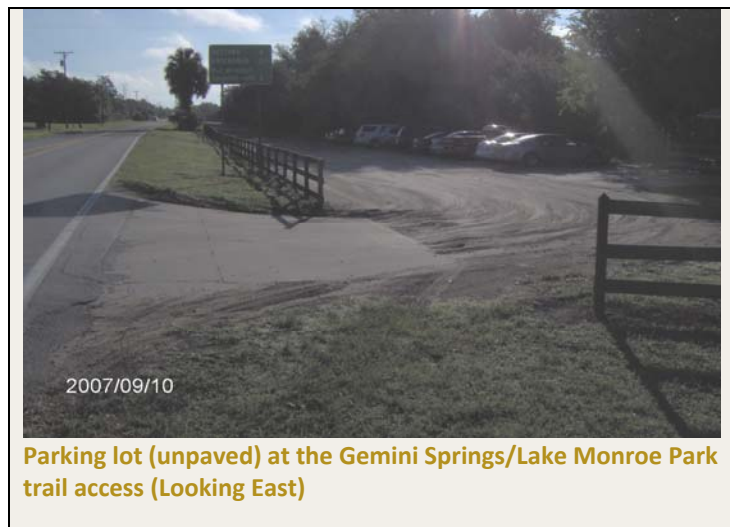
The analysis conducted was essential to develop a preliminary feasibility assessment. It is recognized that a preliminary engineering study is recommended prior to the final determination of the ability to permit and construct this trail. Our research and investigations have indicated that the trail concept is feasible as portrayed in this document.

The final graphics include notes, diagram and callouts identifying the proposed trail conceptual alignment, roadway right-of-way, and other general characteristics. Considerations for the trail include conformance with the requirements of the Americans with Disabilities Act (ADA), appropriate signage and pavement marking along the roadway and trail, and connection concepts at US 17-92 and at the existing Gemini Springs/Lake Monroe Park Trail.

PHYSICAL INVENTORY AND ASSESSMENT OF EXISTING CONDITIONS

The project is located within the City of DeBary, Florida. The study area is bounded by US 17-92 to the west and Gemini Springs Park to the east. The location of the project is on the edge of an urbanized well-developed area of DeBary that was developed prior to the implementation of growth management regulations. An initial field review was conducted on July 6th and a follow-up field review was conducted on September 10th to analyze the existing conditions, record measurements and examine the roadway, sidewalks, the existing trail system, and the site of the proposed Town Center development project. The reviews included walking the proposed corridor, measuring the existing trail and sidewalk system widths, and evaluating the connection points on either end of the proposed trail. The corridor was photographed by RS&H associates to begin the development of an image library that was used to document existing physical features and to support the development of the trail concept plan. Geographical Information Systems (GIS) maps were used in the field to document distances measured in the field using a distance measuring wheel.

The field review started from the parking lot of Gemini Spring Park and ended at US 17-92. This is the first signalized intersection west of the project limits. US 17-92 is a north-south four lane Urban Principal Arterial, with a posted speed of 50 mph. The 2006 Annual



Parking lot (unpaved) at the Gemini Springs/Lake Monroe Park trail access (Looking East)

Average Daily Traffic on US 17-92 from Plantation Road to Dirksen Drive is 22,500 (LOS B) and from Dirksen Drive to Ft. Florida Road is 23,000 (LOS B). The existing paired sidewalk along US 17-92 is 6 feet wide and is located adjacent to the curb.

Dirksen Drive is a two-lane facility with a posted speed of 45 mph, functionally classified as an Urban Collector. There exists a non-mountable curb along the eastbound travel lane from US 17-92 eastward to approximately 100 feet west of the unpaved entrance to the trail parking lot. The 2006 Annual Average Daily Traffic on Dirksen Drive from US 17-92 to Palm Road is 8,110 (LOS D). Table-3 lists the 2006 Volusia County Traffic Counts and LOS Standards.

The existing Gemini Springs and Lake Monroe Park trail width is 12 feet. At the intersection of these two trails is a loop/cul-de-sac that is approximately 8-feet in width. The Lake Monroe Park Trail currently terminates just to the west of this loop. A gated access point at this trail terminus provides secured access for maintenance of the trail system.



Adjacent to and just west of this gate is a second gate that provides access to the currently vacant property that is the site for the proposed Town Center development project. An unpaved driveway accessing Dirksen Drive provides access to both of these gates.

A primary issue with the trail is the proposed development of the DeBary Town Center. The 67-acre property in the southeast quadrant of the US 17-92 and Dirksen Drive intersection will tentatively support multi-family, neighborhood retail and other commercial/retail land uses.

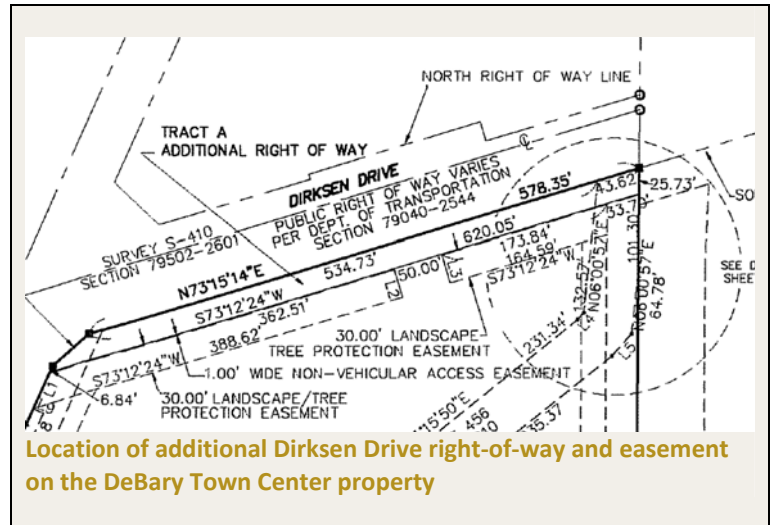


Gated access points to Lake Monroe Park Trail and to the proposed Town Center property

The master site plan (Figure 2) denotes four access points along US 17-92, and potentially one access point on Dirksen Drive.

This access point would be provide direct access to the proposed neighborhood commercial center and is conceptually located at the existing driveway apron which is directly across the driveway to the convenience store located on the north side of Dirksen Drive. The proposed trail would cross this access point.

In April 2007, the property owner granted to the City of DeBary an exclusive easement and right-of-way of approximately 25 feet for purposes of a sidewalk. This easement effectively increases the half right-of-way on the south side of Dirksen Drive to approximately 55 feet in width. Based on information from the property owner's survey, approximately 35 feet of right-of-way will exist for location of the proposed trail between the back of the existing roadway curbing to the new right-of-way line. Within this 35-foot envelope, a southbound right turn lane is anticipated to be located as part of the development of the proposed neighborhood retail center.



Volusia County Utilities was contacted to obtain information on underground utilities.

The following information was obtained:

- 12" water line located approximately 100 feet south of Dirksen runs from US 17-92 eastward for 500 feet, where it crosses Dirksen Drive and serves the existing convenience store on the north side of Dirksen
- 12" water line from Buena Vista Street crossing Dirksen approximately 1800 feet east of US 17-92, running approximately 500 feet westward on the south side of Dirksen
- An 8" sanitary sewer line runs along the north side of Dirksen from US 17-92 to the existing convenience store
- A 4" force main line crosses Dirksen from the north (approximately 200 feet east of the convenience store) and runs eastward along the south side of Dirksen for approximately 950 feet to a lift station.

The Town Center Master Plan displays a utility easement running through the property from US 17-92 (approximately 400 feet south of Dirksen Drive) running northeasterly to Dirksen Drive (at the northeast corner of the property). This recorded easement (Volusia County O.R.B. 205, pg. 456 and O.R.B. 224, pg. 610) is seen in Figure 2.

A review of the soil conditions was assessed through the preparation of a soil map (Figure-4) from GIS data from Volusia County and St. Johns River Water Management District (SJRWMD). The soil map illustrates that the soils in the study area consist of Paola Fine Sand with 0 to 8 percent slope, Immokalee Sand, and Daytona Fine Sand with 0 to 5 percent slope. Soil types in the study area have high infiltration rates and are classified as well drained to excessively drained sands and gravel. Topography information from the County's GIS data indicates relatively level terrain with elevations from 30 to 35 feet.

TRAIL CONCEPT PLAN

The proposed trail would be located adjacent to and south of Dirksen Drive, connecting the existing sidewalk on the east side of US 17-92 to the unpaved parking lot for the Gemini Springs and Lake Monroe Park trails. The multiuse paved trail has a proposed width of 12 feet with a two-foot tie into existing grade on each side, resulting in a 16-foot wide corridor. This proposed 12 foot paved trail will match the existing trail widths for the Gemini Springs and Lake Monroe park trails. A typical section of a 12 foot wide trail is shown in Figure 3. Figure 5 provides a concept map of the proposed trail.

To improve the visibility of the trail and its users, the trail should be situated in a linear configuration parallel to Dirksen Drive. Connection to the existing US 17-92 sidewalk should occur just north of the existing traffic signal mast arm for the northbound approach. The trail connection to the existing trail system should occur at the northwestern-most point of the existing loop. While there is a stub-out of the Lake Monroe Park Trail to the west of this loop, a connection at this point would create two potential conflicts for trail users. First, there would be a potential conflict between persons coming off the loop and accessing the existing Lake Monroe Park Trail and persons traveling on the new proposed trail segment. A merge situation would be created that may result in a collision incident between trail users. Second, and potentially more significant is the existing driveway access to Dirksen Drive for trail maintenance vehicles and vehicles accessing the Town Center vacant property. The Florida Department of Transportation's *Bicycle Facilities Planning and Design Handbook* notes that the distance between a trail and a parallel roadway has a pronounced effect on the operations and safety of the trail, including driver recognition of the trail, and the trail user's recognition of turning motor vehicles. Locating the trail crossing of the existing maintenance driveway to the north, and linking it to the north portion of the existing loop, will provide better visibility and recognition between a driver and a trail user.

To accomplish this, we recommend that the existing loop section be re-designed to accommodate the continuation of the existing 12-foot wide trail from the east. The proposed trail would be an extension of the north portion of the loop, which will require widening from the existing 8 feet width to 12 feet. The south portion of the loop is recommended to be widened to 12-feet to provide continuity of the Gemini Springs Trail to Lake Monroe Park Trail connection.

A primary issue with the proposed trail connection to US 17-92 is coordination with the proposed Town Center development. The Master Site Plan's potential access point from Dirksen Drive onto Tract B, which is proposed to be developed as a neighborhood retail shopping center, would introduce a vehicular crossing of the trail. Appropriate signage and pavement markings on Dirksen Drive, as well as signage and markings on the trail, will be required. As previously discussed, the trail location within the right-of-way should maximize visibility and recognition between drivers and trail users.

This trail poses no foreseeable impacts to significant wetlands, wildlife habitat, natural communities, or to the built environment. The Town Center Master Plan and associated development order specifies a 30-foot landscape easement between the Dirksen Drive right-of-way and the development of any buildings or paved parking areas. The trail would be located north of this easement, within the Dirksen Drive right-of-way. Any landscaping plan as part of the site plan approval process for the Town Center should ensure that appropriate sight visibility is maintained at any driveway crossings of the trail.

A consideration for the future implementation of this trail, and the subsequent phases of the Spring-to-Spring Trail on the west side of US 17-92 will be the design of the trail crossing at US 17-92. The intersection currently has delineated pedestrian crossings for the west, north, and east legs of the intersection, but no marked crossing for the south

leg. If the Spring-to-Spring Trail will be configured to use the existing pedestrian crossings at US 17-92 and Dirksen Drive, then no additional crossings will be required. If, however, the proposed trail will cross at the south side of this intersection, appropriate signage, pavement markings, and design features should be implemented to ensure a safe and ADA compliant pedestrian crossing.

The concept for the feasibility study presented in this report is based on the existing conditions for Dirksen Drive. The development of the DeBary Town Center may require modifications to the lane configuration and access management along Dirksen Drive. These modifications may require refinements to the trail concept plan, including modifications or additions to the signage and pavement markings. The City and Volusia County should coordinate with the Town Center developer through the site plan approval process to ensure that the County's design standards for multiuse trails are addressed.

FINANCIAL FEASIBILITY

Table 1 provides a preliminary cost estimate for the design and construction of the proposed multiuse trail along Dirksen Drive. This cost estimate is to be considered an opinion of probable cost based solely on the results of this feasibility study. The item number and unit of measure are based on the Florida Department of Transportation (FDOT) Basis of Estimate Manual. The unit prices are based on the average costs for each pay item as provided by FDOT, and have been adjusted based on recent bid tabulations for trail projects. This adjustment provides a more factual basis for the preliminary cost estimate for similar projects in Central Florida. The cost estimate does not include right-of-way, utility relocation, or permitting fees that may be associated with the final design phase. As the trail is proposed to be located within the existing right-of-way, these potential costs should be minimized. As shown in Table 1, the total preliminary cost estimate for the design and construction of the trail as represented in this feasibility study is \$84,983. To adjust for potential future increases in the project's cost estimate, an annual inflationary factor may be applied. Prices have been stabilizing recently from their peak levels associated with the construction activity and materials price trends exhibited in 2006. The Florida Department of Transportation provides annual inflation factors for roadway construction costs which may be used as a guideline for this trail project. The 2007 cost estimate provided herein may be adjusted by the FDOT inflationary factors for the next three years as follows:

2008 Annual Factor of 7.0%, 2008 Cost Estimate = \$90,932

2009 Annual Factor of 4.5%, 2009 cost Estimate = \$95,024

2010 Annual Factor of 4.0%, 2010 Cost Estimate = \$98,825.

In response to comments from Volusia County, an alternate cost estimate has been prepared to reflect a 12-foot wide concrete trail. This opinion of probable cost assumes that the northern portion of the existing trail loop will be removed and the proposed

concrete trail will be constructed. The concrete segment will tie into the existing trail to Gemini Springs just east of the existing trail loop. As shown in Table 2, the total preliminary cost estimate for the design and construction of the concrete trail is \$124,086. The 2008 through 2010 inflation-adjusted cost estimates are \$132,772, \$138,747, and \$144,297, respectively.

The multiuse trail along Dirksen Drive may be planned, designed and constructed using a variety of funding strategies. The property owner of the DeBary Town Center site has provided an easement and additional right-of-way for the location of this trail, which reduces the potential right-of-way acquisition costs. There exist a number of State, Federal, and private funding sources available to implement this project. The following potential funding sources may be applicable to this multiuse trail project:

- FHWA/FDOT Transportation Enhancement Program – State and Federal funds to support multi-modal transportation projects
- ECHO Grants – The Volusia County ECHO (Environment, Cultural, Historic, and Outdoor Recreation) grants in aid program
- Volusia County MPO XU Funds – Federal transportation funds in urban areas which may be used in highway, transit or bicycle/pedestrian projects,
- Recreational Trails Program – Administered by the FDEP, these grants provide matching funds for the construction of trails and trail user education,
- Private-Public Partnerships – Strategies exist for partnerships between and among various organizations and locals or state agencies to provide contributions in-kind or other matching funding sources toward projects that enhance the community.

Funding through the Transportation Enhancement Program requires that multiuse trail facilities meet or exceed standards for the safe accommodation of non-motorized users.

These facilities must meet the most recently approved planning and design requirements of the following:

1. American Association of State Highway Transportation Officials (AASHTO),
2. FDOT: Florida Bicycle Facilities Planning and Design Handbook,
3. FDOT: Pedestrian Facilities Planning and Design Handbook,
4. Americans with Disabilities Act Architectural Guidelines, and
5. Manual on Uniform Traffic Control Devices (MUTCD)

Figure-1: Location Map

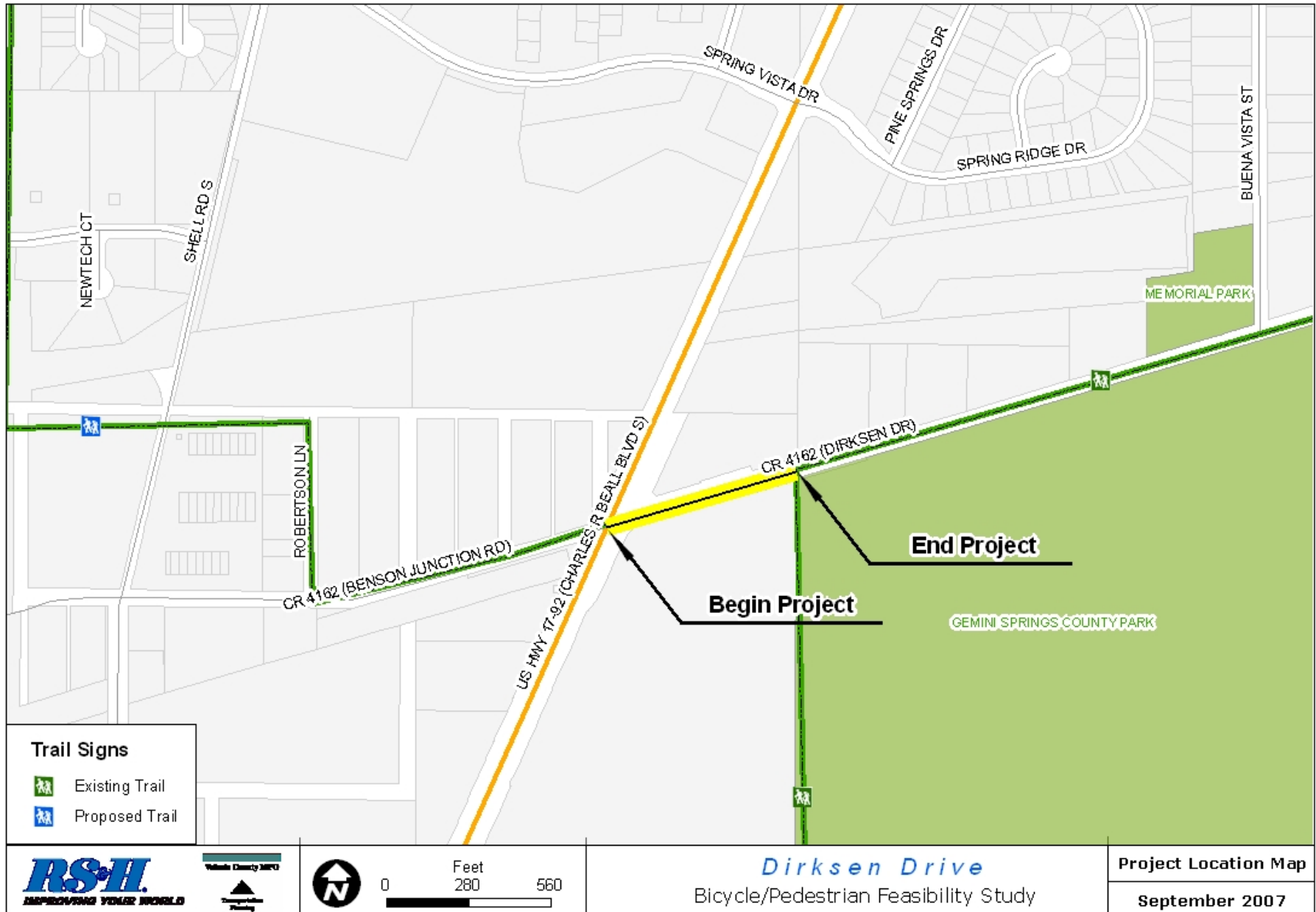


Table-3: Volusia County Historical Counts & LOS Standards

Volusia County Historical Counts & LOS Standards_2															
Road Name	Limits (From - To)	2005 AADT	2006 AADT	Phase 1 E+C (2025) AADT	Phase 2 Adopted 2025 AADT	2005 Daily VMT	2006 Daily VMT	2005 K ₁₀₀ Factor	2006 Peak Hour Volume	2006 Vol. Co. Allowable LOS	2006 LOS Capacity	2005 VIC Ratio	2006 VIC Ratio	2005 LOS	2006 LOS
Courtland Blvd.	Howland Blvd. to Post Court	6,530	6,570	1,859	3,214	3,265	3,285	0.0977	642	E	10,080	0.648	0.662	D	D
Courtland Blvd.	Post Court to India Blvd.	6,370	6,400	1,859	3,214	4,459	4,480	0.0977	625	E	10,080	0.632	0.635	D	D
Courtland Blvd.	India Blvd. to Maltby Dr.	6,280	6,230	1,889	3,784	1,884	1,889	0.0977	609	E	10,080	0.623	0.618	D	D
Courtland Blvd.	Maltby Dr. to Ft Smith Blvd.	6,440	6,410	1,889	3,784	2,576	2,564	0.0977	626	E	10,080	0.639	0.636	D	D
Courtland Blvd.	Ft Smith Blvd. to Larchmont Dr.	6,120	6,020	2,903	2,648	6,120	6,020	0.0977	588	E	10,080	0.607	0.597	D	D
Courtland Blvd.	Larchmont Dr. to Doyle Rd.	6,040	6,040	2,903	2,648	4,832	4,832	0.0977	590	E	10,080	0.599	0.599	D	D
Courtland Blvd.	Doyle Rd. to Staten Dr.	2,050	2,000	3,062	3,110	820	800	0.0977	165	E	10,080	0.203	0.198	C	C
Courtland Blvd.	Staten Dr. to Enterprise-Osteen Rd.	1,090	1,080	3,062	3,110	545	540	0.0977	106	E	10,080	0.108	0.107	C	C
Cowart Rd.	Bunnell Rd to Little Brown Church Rd.	370	390	1,379	-	759	800	0.0977	38	C	6,880	0.054	0.057	A	A
Cow Creek Rd.	SR 442 to Volco Rd.	840	970	1,365	1,362	2,940	3,395	0.0977	95	C	6,880	0.122	0.141	A	A
Daugharty Rd. (N. End)	SR 11 to Fernview Rd.	430	520	2,074	1,945	323	390	0.0977	51	C	6,880	0.063	0.076	A	A
Daugharty Rd.	Fernview Rd. to Marsh Rd.	870	600	2,074	1,945	134	120	0.0977	59	C	6,880	0.097	0.087	A	A
Daugharty Rd.	Marsh Rd. to Grissom Rd.	510	320	202	214	204	128	0.0977	31	C	6,880	0.074	0.047	A	A
Daugharty Rd. (S. End)	Grissom Rd. to SR 11	650	620	202	214	260	248	0.0977	61	C	6,880	0.094	0.090	A	A
Deltona Blvd.	Normandy Blvd. to Gaynor Ct.	16,130	-	10,749	13,791	2,420	-	0.0977	-	E	25,200	0.640	-	D	D
Deltona Blvd.	Gaynor Ct. to Abbeyville St.	16,330	-	10,749	13,791	9,798	-	0.0977	-	E	25,200	0.648	-	D	D
Deltona Blvd.	Abbeyville St. to Balsam St.	15,680	-	10,749	13,791	7,840	-	0.0977	-	E	25,200	0.622	-	D	D
Deltona Blvd.	Balsam St. to Enterprise Rd.	18,980	-	10,749	13,791	9,490	-	0.0977	-	E	25,200	0.753	-	D	D
Deltona Blvd.	Enterprise Rd. to Hummingbird St.	13,550	-	8,856	8,966	4,743	-	0.0977	-	E	10,080	1.344	-	F	F
Deltona Blvd.	Hummingbird St. to DeBary Ave.	12,740	-	8,856	8,966	6,370	-	0.0977	-	E	10,080	1.264	-	F	F
Demotte Ave.	Peninsula Dr. to Atlantic Ave.	2,820	2,270	-	-	564	454	0.0977	222	E	10,080	0.280	0.225	C	C
Derbyshire Rd.	Flomich St. to LPGA Blvd.	8,420	8,320	7,930	7,764	6,315	6,240	0.0977	813	E	10,080	0.835	0.825	E	E
Derbyshire Rd.	LPGA Blvd. to 6th St.	7,230	6,810	4,073	5,254	5,423	5,108	0.0977	665	E	10,080	0.717	0.676	D	D
Derbyshire Rd.	6th St. to Mason Ave./SR 430	6,290	5,940	4,073	5,254	4,403	4,158	0.0977	580	E	10,080	0.624	0.589	D	D
Dirksen/DeBary/Doyle	US 17/92 to Palm Rd.	7,750	8,110	15,513	15,513	13,563	14,193	0.0977	792	E	12,480	0.621	0.650	D	D
Dirksen/DeBary/Doyle	WB I-4 Ramps to EB I-4 Ramps	21,200	21,670	15,513	15,513	4,240	4,334	0.0977	2,117	E	32,900	0.644	0.659	C	D
Dirksen/DeBary/Doyle	I-4 to Deltona Blvd.	29,800	31,030	40,392	40,392	2,980	3,103	0.0977	3,032	E	32,900	0.906	0.943	D	D
Dirksen/DeBary/Doyle	Deltona Blvd. to Enterprise St.	20,040	20,900	28,688	28,688	13,026	13,585	0.0977	2,042	D	14,600	1.285	1.432	F	F
Dirksen/DeBary/Doyle	Enterprise St. to Main St.	19,650	20,070	32,571	32,571	2,948	3,011	0.0977	1,961	D	14,600	1.260	1.375	F	F
Dirksen/DeBary/Doyle	Main St. to Broadway St.	21,220	22,000	31,206	31,206	8,488	8,800	0.0977	2,149	D	14,600	1.380	1.507	F	F
Dirksen/DeBary/Doyle	Broadway St. to Providence Blvd.	21,940	22,160	31,206	31,206	8,776	8,884	0.0977	2,185	D	14,600	1.406	1.518	F	F
Dirksen/DeBary/Doyle	Providence Blvd. to Garfield Rd.	13,910	12,340	10,728	10,728	16,892	14,808	0.0977	1,206	E	12,480	1.115	0.989	F	F
Dirksen/DeBary/Doyle	Garfield Rd. to Saxon Blvd.	10,260	10,030	10,728	10,728	15,390	15,045	0.0977	980	E	12,480	0.822	0.804	D	D
Dirksen/DeBary/Doyle	Saxon Blvd. to Sheryl Dr.	9,380	9,170	10,068	10,068	16,760	16,340	0.0977	896	E	12,480	0.752	0.735	D	D
Dirksen/DeBary/Doyle	Sheryl Dr. to Courtland Blvd.	8,280	8,290	10,068	10,068	4,554	4,560	0.0977	810	E	12,480	0.663	0.664	D	D
Dirksen/DeBary/Doyle	Courtland Blvd. to Bull Run Ave.	5,770	5,730	3,180	3,180	4,039	4,011	0.0977	560	E	12,480	0.462	0.459	C	C
Dirksen/DeBary/Doyle	Bull Run Ave. to SR 415	5,840	5,850	3,180	3,180	4,672	4,680	0.0977	572	E	12,480	0.468	0.469	C	C
US 17/92	Plantation Rd. to Dirksen Dr.	21,000	22,500	29,788	29,788	14,700	15,750	0.0977	2,198	D	35,700	0.588	0.630	B	B
US 17/92	Dirksen Dr. to Ft. Florida Rd.	21,500	23,000	45,290	45,290	20,425	21,850	0.0977	2,247	D	35,700	0.602	0.644	B	B

Source: <http://volusia.org/traffic/2006%20Traffic%20Counts.pdf>

Figure-4: Soil and Contour Map

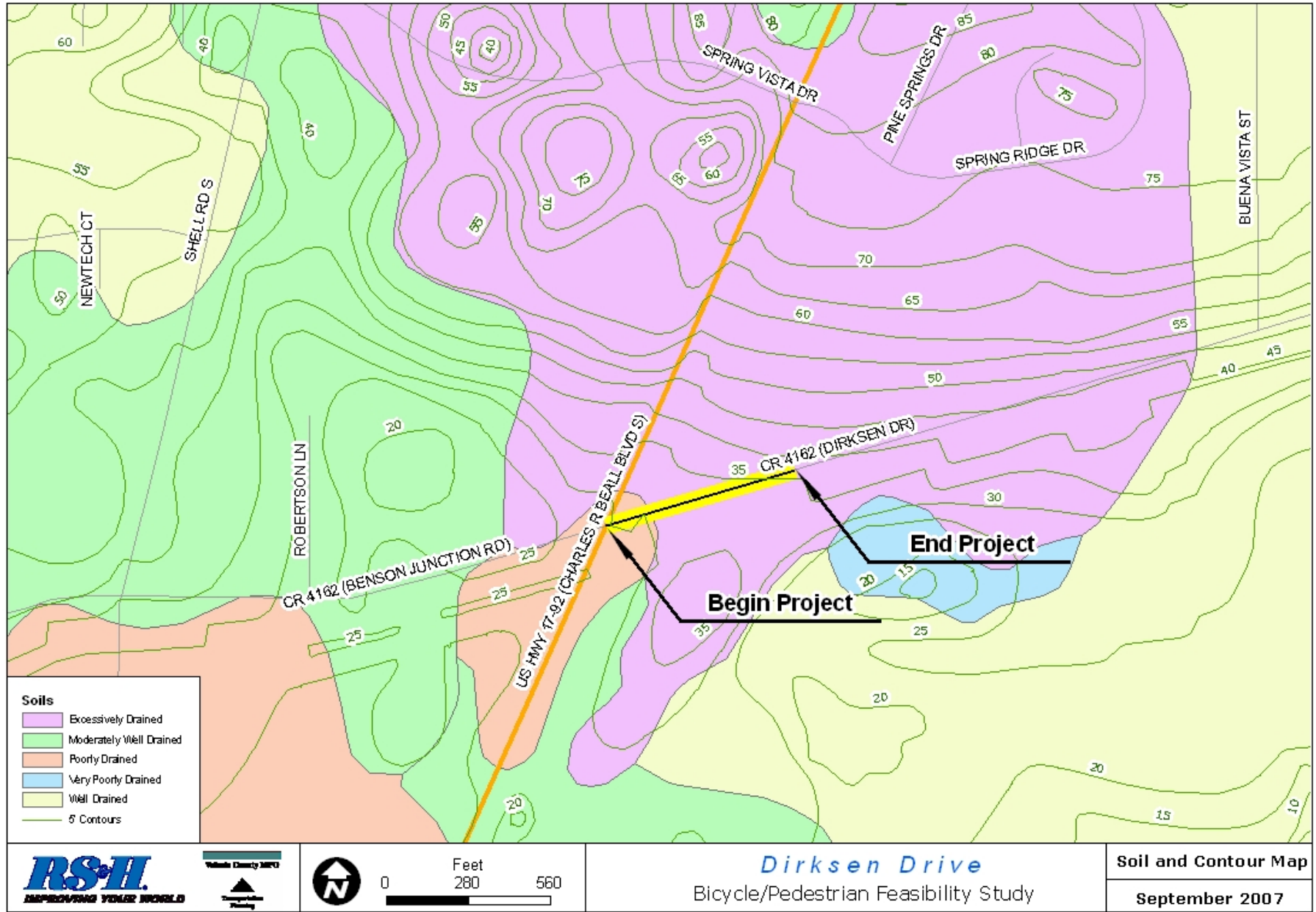


Figure-5: Concept Map



REFERENCES

In conducting this feasibility study we contacted the following agencies, companies, and websites:

DeBary City Hall: 386-688-2040

Volusia County Utilities: 386-943-7027

Volusia County GIS services: <http://volusia.org/gis/>

2006 Volusia County Traffic Counts: <http://volusia.org/traffic/2006%20Traffic%20Counts.pdf>

DeBary Town Center: <http://www.debarytowncenter.com>

CPH Engineers: 386-736-4142

Allen & Company: 407-654-5355