

Cottrell, Scott

To: Bradley.Arnold@sumtercountyfl.gov
Subject: FDOT Safety Projects - CR 466 at Belvedere Blvd, Buena Vista Blvd, and Morse Blvd
Attachments: 18000 CR 466 at Belvedere Blvd Final.pdf; 18000 CR 466 at Buena Vista Blvd final.pdf; 18000 CR 466 at Morse Blvd Revised Final.pdf

Bradley,

Per our discussions, and after my own review of the proposed projects, here are my recommendations for the proposed FDOT funded (FHWA Safety funds) safety improvements along C466 at three locations (see attached):

1. C466 @ Belvedere.
2. C466 @ Buena Vista Blvd.
3. C466 @ Morse Blvd.

Belvedere: The proposed scope at Belvedere is very straight forward and produces the greatest return on investment, that is the Benefit/cost ratio is over 17:1. That is a very high ratio, and can reap great benefits for low cost. It will reduce the rear end collisions on the east-west axis; of the 18 crashes at this intersection during the 3 year study period, 7 are correctable by the recommended scope. As recommended by Ron Grant, I have requested of FDOT that the turn lane on C466 be increased in length to allow more cars to queue. FDOT told me we could make that change during design. As part of this project, we can also review the striping along Belvedere just south of intersection as it goes past the school entrance. PWD has received complaints about this. I strongly recommend this project proceed thru FDOT's safety program for design in FY14 and construction in FY15.

Buena Vista: The proposed scope at Buena Vista is both a north bound left turn (NBLT) lane on Buena Vista onto C466 (the Buena Vista turn lanes backs up into the thru lane when the snowbirds arrive). The scope also includes shifting the turn lanes on C466; the east bound lanes 5' to the north and the west bound turn lane 5' to the south, to reduce the off set of the opposing turn lanes thereby improving visibility of approaching traffic for the turning cars. Of the 20 crashes at this intersection in the 3 year study period, 4 could be corrected by this shift. The scope also include U-turn bays. The benefit/cost ratio of this project is only 1.7: 1, which is the lowest of the 3 intersections. We can: a) proceed thru FDOT's safety program with the scope as stated, or b) request FDOT adjust the scope to delete the U-turn bays as unnecessary, during design adjust the shift of the east-west turn lanes to reduce impact (but not eliminate) to the aesthetics of the intersection, and keep the NBLT lane in; or c) request FDOT to put this intersection on hold for now, but proceed with the NBLT lane on Buena Vista via the Pavement Management Program in FY13. I recommend option b), as we can adjust the scope to a degree during design. As a minimum we need to move forward with the NBLT lane on Buena Vista, whether or not the FDOT Safety project proceeds.

Morse Blvd: The proposed scope at Morse consists of shifting the east and west bound turn lanes on C466 to the north and south by 5" respectively and adding U-turn bays. Of the 21 crashes at this intersection, 5 could be corrected by the turn lane shifts. With a benefit cost ratio of 2.6: 1, this project has merit. We can either: a) proceed thru FDOT's safety program with the scope as stated, or b) request FDOT adjust the scope to delete the turn bays as unnecessary, and during the design phase, adjust the shift of the east-west turn lanes to reduce, but not eliminate, impact to the aesthetics of the intersection, or c) request FDOT put this intersection on hold for now. I recommend option b), as we can adjust the scope to a degree during design.

Per our discussions and your direction to me last week, on Friday 14 September, I told the FDOT District 5 Safety Manager to place the Buena Vista and Morse Safety projects on hold, but proceed with the Belvedere Safety improvements.

I understand your current guidance is to proceed only with the NBLT lane on Buena Vista funded by the Pavement Management Program and tell FDOT to place all three safety projects on hold. We are proceeding that way.

Sincerely,

Scott B. Cottrell, PE
Director, Public Works
Sumter County
352-569-6700

Composite Study

8-HR TMC

Qualitative Assessment

Collision Analysis

Benefit Cost Analysis

CR 466 at CR 101/Belvedere Boulevard

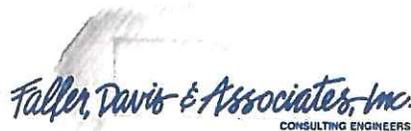
STUDY 6C/6E
SUMTER COUNTY

Districtwide Community Traffic Safety Program C-8T80
Financial Project No. 237995-1-32-09
Letter of Authorization No. 6C/6E
FDA No. 01038206C, 01038206E

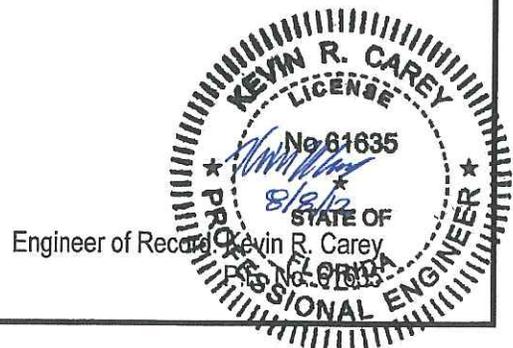
Prepared For:



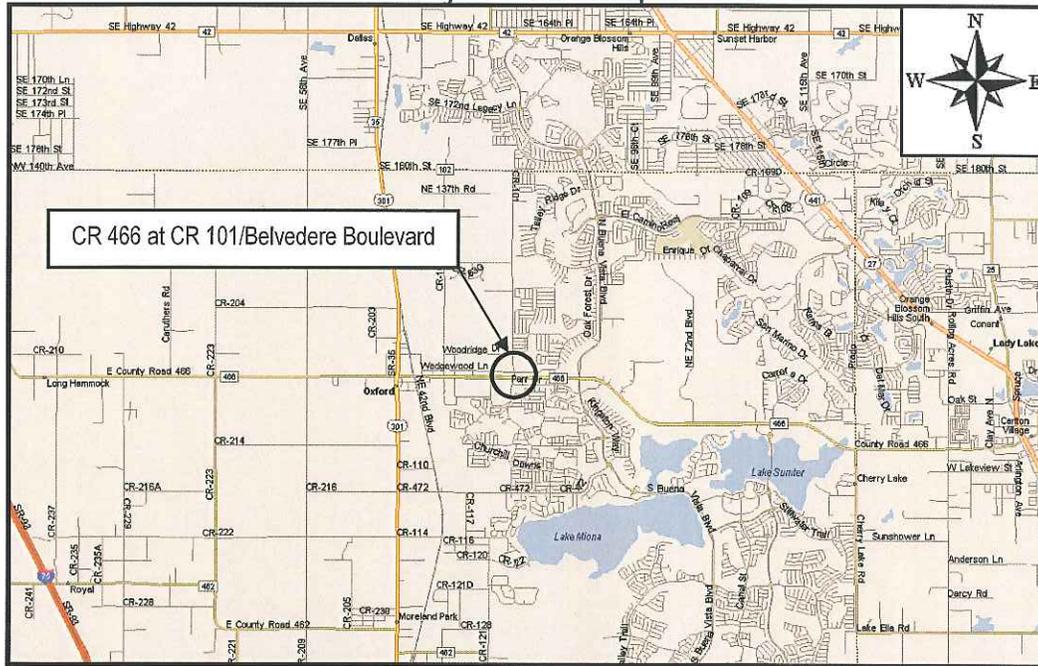
Prepared By:



Maitland, Florida
August 2012



Project Location Map



Summary of Existing Conditions

Feature	Description
Main Street	<ul style="list-style-type: none"> • CR 466
Side Street	<ul style="list-style-type: none"> • CR 101/Belvedere Boulevard
Area Location	<ul style="list-style-type: none"> • The intersection is located in The Villages, 1.3 miles east of US 301 and 5.9 miles west of US 27/US 441.
Surrounding Development	<ul style="list-style-type: none"> • Commercial and residential
Land Uses at Intersection	<ul style="list-style-type: none"> • Northeast-Field • Northwest-CVS Pharmacy • Southwest-Retention pond • Southeast-Field
Traffic Control	<ul style="list-style-type: none"> • Traffic signal with protected-permissive left turn phases for all directions
Adjacent Signalized Intersections	<ul style="list-style-type: none"> • Southern Trace/Tall Trees Lane 0.4 miles east • Tatonka Terrace 0.5 miles west
CR 466	<ul style="list-style-type: none"> • <u>Cross Section</u>-Five lane divided roadway with a grassed median, and a closed drainage system • <u>Posted Speed Limit</u>-45 mph • <u>Function</u>-Urban collector • <u>Connectivity</u>-US 27/US 441 to the east and US 301 to the west • <u>East Approach Lanes</u>-Two through lanes, a shared through/right turn lane, and a left turn lane • <u>West Approach Lanes</u>-Two through lanes, a left turn lane, and a right turn lane
CR 101 Belvedere Boulevard	<ul style="list-style-type: none"> • <u>Cross Section</u>-The north approach is a four lane divided roadway, with a closed drainage system; the south approach is a three lane undivided roadway with a closed drainage system. • <u>Posted Speed Limit</u>-30 mph • <u>Function</u>-Urban-local roadway • <u>Connectivity</u>-CR 102 to the north and Buena Vista Boulevard to the south • <u>North Approach Lanes</u>-One through lane, one left turn lane, and one right turn lane • <u>South Approach Lanes</u>-One through lane, one left turn lane, and one right turn lane
Other Distinct Features	<ul style="list-style-type: none"> • 20 MPH school zone with flashing beacon west of the intersection • Golf cart tunnel runs parallel to Belvedere Boulevard

QUALITATIVE ASSESSMENT

The intersection of CR 466 and CR 101/Belvedere Boulevard was observed by a registered professional engineer during the midday (11:00 AM to 12:00 PM) and afternoon (2:00 to 3:00 PM) peak periods to assess existing operating conditions and to determine what, if any, improvements are needed.

Request: The Department requested a review of the intersection to determine if any safety and/or operational improvements are needed.

Operations: Operations include the efficiency of operation and interaction of motor vehicles, pedestrians, and bicycles at the intersection. Following are the observations relating to these factors:

- In the midday peak period (11:00 AM to 12:00 PM), traffic is moderate with platooned groups of vehicles approaching the intersection from both directions. There were 716 eastbound and 916 westbound vehicles per hour (vph) approaching the intersection. Side street traffic volumes are lower with 456 northbound and 396 southbound vph during this period.
- In the afternoon peak period (2:00 to 3:00 PM), traffic is heavy with 739 eastbound vph and 1,030 westbound vph approaching the intersection on CR 466. Side street traffic volumes in the afternoon peak period are higher than the traffic volumes in the midday period with 469 northbound vph and 448 southbound vph approaching the intersection.
- There is minimal pedestrian and bicycle activity at the intersection.
- There are shopping plazas located on the northeast and northwest quadrants. The Villages High School is located on the southwest quadrant. A large number of vehicles were observed to generate from these locations.
- During the review period, the traffic signal operated in non-coordinated mode. The signal operated efficiently with no observed phase failures during the midday or afternoon peak periods with one exception.
 - The Villages High School dismissed students during the afternoon peak period. The northbound left turn phase failed on several cycles. This condition lasted approximately 20 minutes.
- Drivers approaching from the north, south, and east have a clear line of sight to the traffic signal. The sight distance approaching from the west is limited due to the sag vertical curve at the intersection. From a view point 3.5 feet above the ground, approximately 600 feet west of the intersection with no vehicles ahead of the observation location, the signal heads are visible. But, if there is traffic ahead of the observer, the view to the signal heads is obstructed.

Safety: Vehicle, pedestrian, and bicycle safety at the intersection are assessed through review of crash reports, identification of significant crash trends, then correlation to field conditions. Following are the observations relating to the safety of the intersection.

- Crash reports were provided for CR 466 at CR 101/Belvedere Boulevard by the Department for the 37 month period ending December 31, 2010. Eighteen crashes were reported, which included eleven rear end crashes, two sideswipe crashes, two right turn crashes, an angle crash, a backed into crash, and an overturned crash. These crashes resulted in 11 injuries, no fatalities, and an estimated \$65,530 in property damage. Eight-nine percent of the crashes occurred on a dry roadway surface and eight-three percent occurred in daylight lighting conditions.
- All of the rear end collisions involved eastbound or westbound vehicles. All of the collisions were the result of careless driving.
 - A trend of rear end collisions occurred in the inside eastbound through lane approaching the signal. Due to the length of the turn lane and the heavy traffic volumes during the midday and afternoon peak periods, these collisions may be the result of the eastbound left turn queue backing up into the inside through lane.
- One sideswipe collision occurred between westbound vehicles when a driver in the center through lane changed lanes and collided with a vehicle in the outside through lane.
- One right turn collision occurred when a northbound right turning vehicle violated the right of way of a southbound left turning vehicle and collided in the inside through lane on CR 466.
- One right turn collision occurred when a southbound right turning vehicle violated the right of way of a westbound through vehicle.
- The angle collision occurred when a northbound vehicle violated the right of way of an eastbound vehicle.
- A crash occurred when a vehicle in the westbound left turn lane backed into another vehicle.
- The overturned collision occurred when a westbound vehicle made a U-turn into the path of an eastbound vehicle. The eastbound vehicle, a motorcycle, overturned while trying to avoid crashing into the rear of the U-turning vehicle.

Maintenance: In addition to observing operational and safety conditions, correctible maintenance items are also identified during the field review. Following is a summary of maintenance items observed along the corridor:

- The intersection signing and pavement markings are in good condition and properly applied.

Based on field observations, collision history, and engineering judgment, the following improvements are recommended:

- The eastbound left turn lane should be extended to alleviate the trend of eastbound rear end collisions that are occurring in the inside through lane. The scope of this improvement is as follows:
 1. Relocate decorative street light in the median.
 2. Replace landscaping as necessary.
 3. Modify existing irrigation as necessary.
 4. Replace sod as needed.
 5. No right-of-way impacts are anticipated.
- Signal ahead warning signs should be installed.
- Sumter County should consider providing additional split time to the side street to reduce the observed phase failures during school dismissal.

BENEFIT COST ANALYSIS

A benefit cost analysis was performed to determine if modifications are justified based on objective criteria compared to other roadway corridors within the state. The Highway Safety Improvement Program Manual outlines that for an improvement to be justified, the following must be met: 1) The benefit cost ratio shall be greater than 1.0; 2) The improvement should address a hazardous road location/feature or correct a safety problem. The improvements recommended within this report will correct a safety problem.

Improvement

Extend the eastbound left turn lane and install signal ahead warning signs.

A cost estimate was developed; the estimated construction cost is \$89,775.74, and the estimated design cost is \$26,932.72, resulting in a grand total of \$116,708.46. A weighted crash reduction factor of 46% was calculated and used in the analysis based on a crash reduction factor of 28% for the extension of the eastbound left turn lane and a 25% reduction factor for the installation of the signal ahead warning signs (Update of Florida Crash Reduction Factors and Counter Measures to Improve the Development of District Safety Improvement Projects, April, 2005). The resultant benefit cost ratio was calculated to be 17.2 to 1. A detailed cost estimate is provided in the appendix.

A conceptual improvement diagram was created and is provided in the appendix.

Based on a benefit cost ratio of 17.2, extending the eastbound left turn lane and installing signal ahead warning signs is justified.

North Approach Photographs



Looking south into the intersection along CR 101



Looking north from the intersection along CR 101

South Approach Photographs



Looking north into the intersection along Belvedere Boulevard



Looking south from the intersection along Belvedere Boulevard

East Approach Photographs



Looking west into the intersection along CR 466



Looking east from the intersection along CR 466

West Approach Photographs



Looking east into the intersection along CR 466



Looking west from the intersection along CR 466

COLLISION DATA

Section: N/A
 Intersecting Street: CR 101/Belvedere Boulevard
 Source Data: Hard Copy Crash Reports
 Study Period: From 1/1/2008 to 12/31/2010 37 Months

Route: CR 466
 County: Sumter
 City: The Villages

No.	Long or Short Form	Date	Day	Time	DOB	Age	Alcohol / Drugs	Lighting Condition	Roadway Surface	Weather	Fatal	Injury	Most Severe Injury	Harmful Event	Property Damage	Vision Obstructed	Contributing Cause
1	S	4/9/2008	Wednesday	17:10	2/24/1927	81	None	Daylight	Dry	Clear	0	0	None	Right Turn	\$1,000	None	Careless Driving
2	L	5/2/2008	Friday	16:48	2/18/1934	74	None	Daylight	Dry	Clear	0	2	None- Incapacitating	Rear End	\$10,000	None	Careless Driving
3	L	7/15/2008	Tuesday	6:51	11/30/1979	29	None	Dawn	Dry	Cloudy	0	1	Possible	Rear End	\$400	None	Careless Driving
4	S	8/8/2008	Friday	12:13	Unknown	Unknown	None	Daylight	Dry	Clear	0	0	None	Right Turn	\$3,200	None	Improper Lane Change
5	S	10/17/2008	Friday	14:30	12/26/1975	33	None	Daylight	Dry	Clear	0	0	None	Backed Into	\$550	Load on Vehicle	Improper Backing
6	S	10/28/2008	Tuesday	14:49	5/20/1991	17	None	Daylight	Unknown	Unknown	0	0	None	Rear End	\$0	None	Careless Driving
7	S	11/12/2008	Wednesday	7:38	2/16/1992	17	None	Dark (No SL)	Dry	Cloudy	0	0	None	Rear End	\$1,300	None	Careless Driving
8	S	11/17/2008	Monday	15:02	7/18/1972	36	None	Daylight	Dry	Clear	0	0	None	Rear End	\$6,000	None	Careless Driving
9	S	3/6/2009	Friday	17:34	9/6/1931	78	None	Daylight	Unknown	Unknown	0	0	None	Sideswipe	\$1,000	None	Careless Driving
10	S	4/23/2009	Thursday	16:57	5/11/1944	65	None	Daylight	Dry	Clear	0	0	None	Sideswipe	\$1,650	None	FTYRW
11	S	6/16/2009	Tuesday	15:00	12/13/1987	22	None	Daylight	Dry	Clear	0	0	None	Rear End	\$2,000	None	Careless Driving
12	L	7/7/2009	Tuesday	10:18	9/13/1966	43	None	Daylight	Dry	Cloudy	0	0	None	Rear End	\$4,000	None	Careless Driving
13	S	7/24/2009	Friday	7:41	10/12/1988	21	None	Daylight	Dry	Clear	0	0	None	Rear End	\$3,000	Glare	Careless Driving
14	L	10/30/2009	Friday	7:58	6/30/1960	49	None	Daylight	Dry	Cloudy	0	2	Possible	Rear End	\$4,000	None	Careless Driving
15	L	12/1/2009	Friday	16:15	8/4/1936	73	None	Dusk	Dry	Cloudy	0	3	None- Incapacitating	Rear End	\$12,000	None	Careless Driving
16	L	2/25/2010	Thursday	7:20	Unknown	Unknown	Undetermined	Daylight	Dry	Clear	0	0	None	Rear End	\$800	None	Careless Driving
17	L	4/10/2010	Saturday	18:05	2/3/1929	81	None	Daylight	Dry	Cloudy	0	1	None- Incapacitating	Overturned	\$650	None	Improper Turn Driver Distraction
18	L	6/2/2010	Wednesday	16:29	3/31/1971	39	Alcohol	Daylight	Dry	Clear	0	2	None- Incapacitating	Angle	\$14,000	None	

COLLISION DATA

Section: N/A
 Intersecting Street: CR 101/Belvedere Boulevard
 Source Data: Hard Copy Crash Reports
 Study Period: From 1/1/2008 to 12/31/2010 37 Months

Route: CR 466
 County: Sumter
 City: The Villages

Crash Statistics			Injury Severity (Number of Crashes)									Lighting			Roadway Condition		
Total Number of Crashes	Total Number of Long Form Crashes	Total Property Damage	Total Number of Fatalities	Total Number of Fatal Crashes	Total Number of Injuries	Total Number of Injury Crashes	None	Possible	Non-Incapacitating	Incapacitating	Fatal	Daylight	Dark (SL)	Dark (No SL)	Wet	Dry	Unknown
18	8	\$65,550	0	0	11	6	12	2	4	0	0	16	0	2	0	16	2
100%	44%	N/A	N/A	0%	N/A	33%	67%	11%	22%	0%	0%	89%	0%	11%	0%	89%	11%
Rear End	Head On	Angle	Left Turn	Right Turn	Sideswipe	Backed Into	Parked Car	Collision with MV Other Road	Pedestrian	Bike	Bike (Bike Lane)	Moped	Train	Animal	Hit Sign/Sign Post	Hit Utility Pole	Hit Guardrail
11	0	1	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0
61%	0%	6%	0%	11%	11%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Hit Fence	Hit Concrete Barrier Wall	Bridge/Pier/Abutment	Hit Tree/Shrub	Hit Const. Barricade/Sign/Brdg/Pier/Abut	Traffic Gate	Crash Attenuator	Fixed Object Above Road	Other Fixed Object	Moveable Object	Ran Into Ditch/Culvert	Ran Off Road Into Water	Overturned	Occupant Fell From Vehicle	Trac/Trailer Jackknifed	Fire	Explosion	All Other
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%	0%	0%	0%	0%	0%
No Improper Driving	Careless Driving	FTYRW	Improper Backing	Improper Lane Change	Improper Turn	Followed Too Closely	Disregarded Traffic Signal	Exceed Safe Speed Limit	Disregarded Stop Sign	Failed to Maintain Equipment /	Improper Passing	Drove Left of Center	Exceeded Stated Safe Speed Limit	Obstructing Traffic	Driver Distraction	All Other	Alcohol/Drugs Under Influence
0	13	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	1
0%	72%	6%	6%	6%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%	0%	6%



THIS IS A PRELIMINARY LAYOUT TO ILLUSTRATE THE CONCEPT. FINAL LANE WIDTHS, TURN LANE LENGTHS, AND R/W INFORMATION TO BE DETERMINED AS PART OF DESIGN.

<ul style="list-style-type: none"> CONTROLLER CABINET TRAFFIC SIGNAL POLE SIGNAL HEAD SIGN 	<ul style="list-style-type: none"> DELINEATOR POWER POLE LIGHT POLE HYDRANT 	<ul style="list-style-type: none"> DITCH BOTTOM INLET MANHOLE MITERED END SECTION DRAINAGE INLET 	<ul style="list-style-type: none"> GUARDRAIL FENCE TREE/SHRUB BUILDING 	<p><i>Fallen Davis & Associates, Inc.</i></p>	<p>CONCEPTUAL IMPROVEMENT DIAGRAM DISTRICTWIDE COMMUNITY TRAFFIC SAFETY PROGRAM</p>	<p>PAGE NO. 15</p>
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APPENDIX

TURNING MOVEMENT COUNT
 NORTH STREET: CR 101
 SOUTH STREET: Belvedere Boulevard
 CR 466 at CR 101/Belvedere Boulevard
 ALL VEHICLES

DATE: 5/8/2012
 EAST STREET: CR 466
 WEST STREET: CR 466
 TIME: 7-9 AM, 11AM-1 PM, 2-6 PM
 BY: FDA

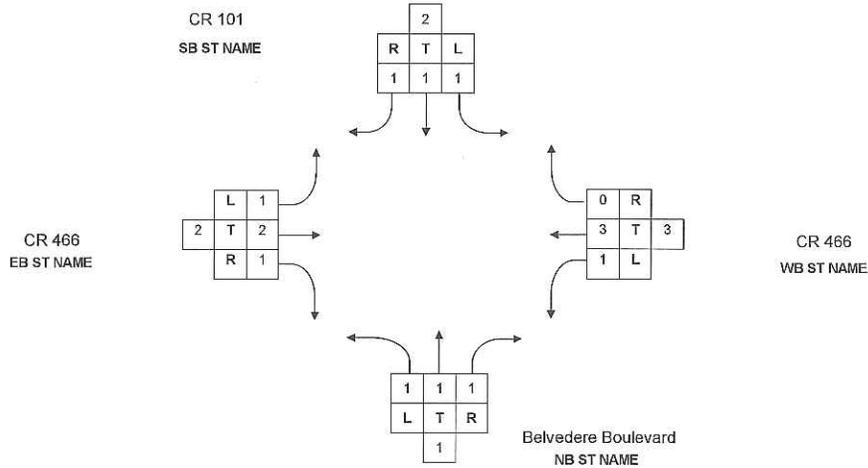
START TIME	NORTHBOUND					SOUTHBOUND					NS TOTAL	EASTBOUND					WESTBOUND					EW TOTAL	GRAND TOTAL
	LEFT	THRU	RIGHT	U-TURN	TOTAL	LEFT	THRU	RIGHT	U-TURN	TOTAL		LEFT	THRU	RIGHT	U-TURN	TOTAL	LEFT	THRU	RIGHT	U-TURN	TOTAL		
7:00	21	13	21	0	55	9	13	20	0	42	97	22	132	16	0	170	34	151	10	3	198	368	465
7:15	27	24	31	0	82	27	36	14	0	77	159	30	146	25	0	201	79	216	14	1	310	511	670
7:30	25	26	36	0	87	39	45	8	0	92	179	48	217	18	0	283	44	180	21	1	226	509	688
7:45	23	18	17	1	59	30	16	10	0	56	115	39	213	26	3	281	19	110	31	1	161	442	557
Total	96	81	105	1	283	105	110	52	0	267	560	139	708	85	3	935	175	637	76	6	895	1,830	2,380
8:00	20	18	17	0	55	36	13	5	0	54	109	21	129	20	0	170	14	91	29	3	137	307	416
8:15	17	20	18	0	55	29	18	18	0	63	118	16	129	6	0	151	16	84	22	3	125	275	394
8:30	21	25	19	0	65	18	18	13	0	47	112	16	115	18	1	150	14	93	30	4	141	291	403
8:45	21	21	19	0	61	28	17	16	0	61	122	12	93	14	1	120	18	115	27	3	164	284	406
Total	79	84	73	0	236	111	64	50	0	225	461	65	466	58	2	591	63	383	108	13	567	1,158	1,619
11:00	46	35	30	0	111	48	36	25	0	109	220	22	116	35	1	174	34	166	30	4	234	408	528
11:15	45	46	29	1	121	45	38	16	0	99	220	26	133	40	2	201	31	165	33	3	232	433	653
11:30	35	48	25	0	108	34	37	19	0	90	198	19	114	24	1	158	32	158	41	5	236	394	592
11:45	54	39	23	0	116	51	31	16	0	98	214	28	128	28	1	183	34	148	30	2	214	397	611
Total	180	168	107	1	456	178	142	76	0	396	852	95	491	125	5	716	131	637	134	14	916	1,632	2,484
12:00	35	32	22	0	89	47	34	13	0	94	183	32	99	39	0	170	31	166	41	6	244	414	597
12:15	34	38	15	0	87	51	40	18	0	109	196	38	113	25	4	180	47	170	32	9	258	438	634
12:30	41	27	31	0	99	62	34	13	0	109	208	21	114	25	4	164	36	162	30	5	233	397	605
12:45	44	34	20	0	98	52	31	19	0	102	200	29	115	33	1	178	39	153	35	8	235	413	613
Total	154	131	88	0	373	212	139	63	0	414	787	120	441	122	9	692	153	651	138	28	970	1,662	2,449
14:00	35	20	20	0	75	49	38	11	0	98	173	16	114	25	1	156	29	191	34	0	254	410	563
14:15	42	28	19	0	89	52	32	17	0	101	190	20	116	27	0	163	33	194	39	2	268	431	621
14:30	48	54	40	0	142	52	43	26	0	121	263	27	150	32	0	209	37	180	34	4	255	464	727
14:45	58	54	51	0	163	58	60	10	0	128	291	35	138	36	2	211	45	165	40	3	253	464	755
Total	183	156	130	0	469	211	173	64	0	448	917	98	518	120	3	739	144	730	147	9	1,030	1,769	2,686
15:00	61	39	30	0	130	56	42	31	0	129	259	32	174	33	2	241	32	175	42	8	257	498	757
15:15	44	32	31	0	107	52	58	20	0	130	237	30	147	40	2	219	40	138	32	5	215	434	671
15:30	28	30	16	0	74	49	48	17	0	114	188	27	134	34	2	197	21	200	46	3	270	467	656
15:45	33	33	25	0	91	45	48	9	0	102	193	25	129	26	1	181	38	150	27	3	228	409	602
Total	166	134	102	0	402	202	196	77	0	475	877	114	584	133	7	838	131	673	147	19	970	1,808	2,685
16:00	47	32	18	0	97	55	43	18	0	114	211	17	144	25	0	186	30	180	32	3	225	411	622
16:15	38	31	10	0	79	40	36	13	0	89	188	37	133	35	1	206	23	178	33	2	236	442	610
16:30	30	28	21	0	79	44	37	19	0	100	179	28	102	21	1	152	35	218	42	1	296	448	627
16:45	27	28	17	0	72	49	44	26	0	119	191	25	123	24	4	176	14	172	22	0	208	384	575
Total	142	119	86	0	327	188	160	74	0	422	749	107	502	105	6	720	102	728	129	6	965	1,685	2,434
17:00	36	17	17	0	70	58	30	22	0	110	180	17	131	22	0	170	21	245	17	3	286	456	636
17:15	37	20	13	0	70	45	30	12	0	87	157	27	142	24	2	195	27	225	26	2	280	475	632
17:30	39	16	13	0	68	48	26	17	0	91	159	30	118	23	2	173	20	160	19	1	200	373	532
17:45	31	18	13	0	62	36	24	14	1	75	137	17	125	22	2	166	18	152	19	3	192	358	495
Total	143	71	56	0	270	187	110	65	1	363	633	91	516	91	6	704	86	782	81	9	958	1,662	2,295

FLORIDA DEPARTMENT OF TRANSPORTATION

SUMMARY OF VEHICLE MOVEMENTS

SECTION N/A CITY The Villages COUNTY Sumter
 STATE ROUTE CR 466 INTERSECTING ROUTE CR 101/Belvedere Boulevard
 OBSERVER FDA DATE 5/8/2012 MILEPOST N/A
 WEATHER Fair ROAD CONDITION Good
 REMARKS

FORM COMPLETED BY GP DATE 07/31/12



TIME	NORTHBOUND					SOUTHBOUND					TOTAL	EASTBOUND					WESTBOUND					TOTAL		
	BEGIN/END	L	T	R	U	TOT	L	T	R	U		TOT	N/S	L	T	R	U	TOT	L	T	R		U	TOT
4 - 5																								
5 - 6																								
6 - 7																								
7 - 8		96	81	105	1	283	105	110	52	0	267	550	139	708	85	3	935	176	637	76	6	895	1,830	
8 - 9		79	84	73	0	236	111	64	50	0	225	461	65	466	58	2	591	63	383	108	13	567	1,158	
9 - 10																								
10 - 11																								
11 - 12		180	168	107	1	456	178	142	76	0	396	852	95	491	125	5	716	131	637	134	14	916	1,632	
12 - 1		154	131	88	0	373	212	139	63	0	414	787	120	441	122	9	692	153	651	138	28	970	1,662	
1 - 2																								
2 - 3		183	156	130	0	469	211	173	64	0	448	917	98	518	120	3	739	144	730	147	9	1,030	1,769	
3 - 4		166	134	102	0	402	202	196	77	0	475	877	114	584	133	7	838	131	673	147	19	970	1,808	
4 - 5		142	119	66	0	327	188	160	74	0	422	749	107	502	105	6	720	102	728	129	6	965	1,685	
5 - 6		143	71	56	0	270	187	110	65	1	363	633	91	516	91	6	704	86	782	81	9	958	1,662	
6 - 7																								
7 - 8																								
8 - 9																								
9 - 10																								
10 - 11																								
11 - 12																								
TOTAL		1,143	944	727	2	2,816	1,394	1,094	521	1	3,010	5,826	829	4,226	839	41	5,935	986	5,221	960	104	7,271	13,206	

Percentage	40%	34%	26%	0%		47%	36%	17%	0%			14%	71%	14%	1%		14%	72%	13%	1%			
Maximum	183	168	130	1		212	196	77	1			139	708	133	9		176	782	147	28			
Minimum	79	71	56	0		105	64	50	0			65	441	58	2		63	383	76	6			

Composite Study

8-HR TMC

Qualitative Assessment

Collision Analysis

Benefit Cost Analysis

CR 466 at Buena Vista Boulevard

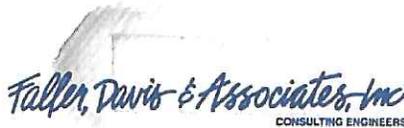
STUDY 6C/6E
SUMTER COUNTY

Districtwide Community Traffic Safety Program C-8T80
Financial Project No. 237995-1-32-09
Letter of Authorization No. 6C/6E
FDA No. 01038206C, 01038206E

Prepared For:



Prepared By:

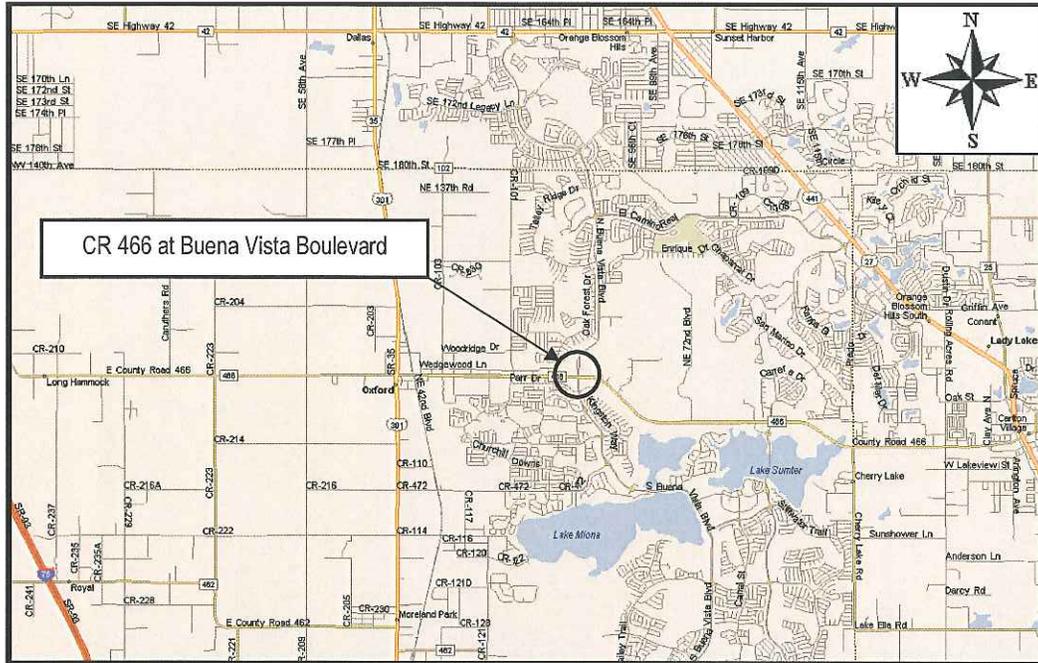


Maitland, Florida
August 2012



Engineer of Record, Kevin R. Carey

Project Location Map



Summary of Existing Conditions

Feature	Description
Main Street	<ul style="list-style-type: none"> CR 466
Side Streets	<ul style="list-style-type: none"> Buena Vista Boulevard
Area Location	<ul style="list-style-type: none"> The intersection is located in The Villages, 2.0 miles east of US 301 and 5.20 miles west of US 27/US 441.
Surrounding Development	<ul style="list-style-type: none"> The area is a mix of light commercial and residential uses in the vicinity of the intersection.
Land Uses at Intersection	<ul style="list-style-type: none"> Northeast-Golf course Northwest-Golf course Southwest-Field Southeast-Laurel Manor Plaza
Traffic Control	<ul style="list-style-type: none"> Traffic signal with protected-permissive left turn phases for all directions There are no pedestrian features provided at the intersection.
Adjacent Signalized Intersections	<ul style="list-style-type: none"> Southern Trace/Saddlebrook Lane 0.5 miles to the north Tall Trees Lane (roundabout) 0.4 miles to the south Morse Boulevard 2.3 miles to the east Southern Trace/Tall Trees Lane 0.3 miles to the west
CR 466	<ul style="list-style-type: none"> <u>Cross Section</u>-Four lane divided roadway with a grassed median and a closed drainage system <u>Posted Speed Limit</u>-45 mph <u>Function</u>-Urban Collector <u>Connectivity</u>-US 27/US 441 to the east and US 301 to the west <u>East Approach Lanes</u>-Two through lanes, a left turn lane, and a right turn lane <u>West Approach Lanes</u>-Two through lanes, a left turn lane, and a right turn lane
Buena Vista Boulevard	<ul style="list-style-type: none"> <u>Cross Section</u>-Four lane divided roadway with a grassed median and a closed drainage system <u>Posted Speed Limit</u>-35 mph <u>Function</u>-Local roadway <u>Connectivity</u>-CR 42 to the north and SR 44 to the south <u>North Approach Lanes</u>-Two through lanes, one left turn lane, and one right turn lane <u>South Approach Lanes</u>-Two through lanes and one left turn lane
Other Distinct Features	<ul style="list-style-type: none"> None

QUALITATIVE ASSESSMENT

The intersection of CR 466 and Buena Vista Boulevard was observed by a registered professional engineer during the midday (11:00 AM to 12:00 PM) and afternoon (2:30 to 3:30 PM) peak periods to assess existing operating conditions and to determine what, if any, improvements are needed.

Request: The Department requested a review of the intersection to determine if any safety and/or operational improvements are needed.

Operations: Operations include the efficiency of operation and interaction of motor vehicles, pedestrians, and bicycles at the intersection. Following are the observations relating to these factors:

- In the midday peak period, traffic is moderate with platooned groups of vehicles approaching the intersection from the west. Traffic approaching from the east is dispersed as the nearest signal is 2.3 miles to the east. There were 906 eastbound and 870 westbound vehicles per hour (vph) approaching the intersection. Side street traffic volumes are lower with an average of 661 northbound and 654 southbound vph during this period.
- There is minimal pedestrian and bicycle activity at the intersection.
- In the afternoon peak period, traffic volumes are heavy with 1,033 eastbound and 942 westbound vph approaching the intersection on CR 466. Side street traffic volumes in the afternoon peak period are lighter than the midday traffic volumes with 580 vph northbound and 533 vph southbound.
- During both review periods, gaps were available in mainline traffic for permissive left turning vehicles.
- During the review periods, the traffic signal operated in non-coordinated mode. The signal operates using SOP 10 with eastbound and westbound right turn overlap phases. The signal operated efficiently with the exception of a few observed phase failures during the midday and afternoon peak periods.
- It was observed that northbound and southbound “No U-turn” signs are not provided on the north and south approaches as would be expected with eastbound and westbound right turn overlap phases. Northbound and southbound U-turns were not observed at the intersection during the peak periods. No conflicts were observed between northbound and southbound U-turn movements and eastbound and westbound right turn overlap movements.
- The mainline left turn lanes are negatively offset from one another, which limits the sight distance when the lanes are occupied by vehicles.
- During both review periods several instances of the following were observed:
 - The eastbound and westbound protected left turn phase serviced most vehicles in the queue. The first vehicle in the unserved queue, for both mainline left turn lanes, would remain at the stop bar instead of pulling forward to obtain a line of sight. Due to the opposing left turning vehicles, sight distance is limited and gaps in opposing mainline traffic are not apparent to left turning drivers. On several cycles, the first and second cars remaining in the queue were able to clear the intersection during the yellow clearance phase. This resulted in a few vehicles not being serviced during the cycle.
 - Without opposing left turning vehicles, left turning drivers were able to turn during the permissive phase with minimal delay.

- During the midday review period, the northbound left turn movement exceeded the available storage capacity on several occasions. There were no observed conflicts, and all of the vehicles were serviced every cycle.

Safety: Vehicle, pedestrian, and bicycle safety at the intersection are assessed through review of crash reports, identification of significant crash trends, then correlation to field conditions. Following are the observations relating to the safety of the intersection.

- Crash reports were provided for CR 466 at Buena Vista Boulevard by the Department for the 37 month period ending December 31, 2010. Twenty crashes were reported, which included eleven rear end crashes, five left turn crashes, three sideswipe crashes, and one angle crash. These crashes resulted in 13 injuries, no fatalities, and an estimated \$106,600 in property damage. Approximately 85 percent of the crashes occurred on a dry roadway surface in daylight lighting conditions.
- Five of the rear end collisions involved eastbound or westbound vehicles. Three of the rear end collisions involved northbound vehicles, and two rear end collisions involved southbound crashes. All of these collisions were the result of either careless driving or following too closely. One northbound collision was potentially related to the northbound left turn lane exceeding capacity as it occurred at the beginning of the left turn lane.
- Four of the five left turn collisions involved eastbound left turning vehicles versus westbound through vehicles. Eight injuries resulted from these crashes; three injuries were incapacitating. The remaining left turn collision involved a westbound left turning vehicle and an eastbound through vehicle. No injuries were reported from the collision. These crashes are potentially related to the sight distance issue noted earlier in the report.
- One of the sideswipe collisions involved southbound vehicles on Buena Vista Boulevard, north of CR 466. A vehicle in the inside lane changed lanes and struck a vehicle in the outside lane. No injuries were reported in the collision.
- Another sideswipe collision also involved southbound vehicles on Buena Vista Boulevard on the north side of CR 466. The first vehicle was a marked Sumter County patrol car escorting a funeral procession through the intersection to travel westbound on CR 466. The second vehicle was stopped at the traffic signal and was making a right turn. A motorcycle unit was located in the center of the intersection and was directing traffic for the funeral procession. Both vehicles involved in the collision assumed the officer was waving them to proceed with their right turn movements. The patrol car struck the right turning vehicle on the driver's side. There were no injuries as a result of this collision.
- The remaining sideswipe collision occurred when an eastbound vehicle in the inside through lane changed lanes into the left turn lane and collided with another vehicle.
- The angle collision occurred when a northbound left turning vehicle disregarded the red signal indication and collided with an eastbound vehicle. Two non-incapacitating injuries resulted from the collision.

Maintenance: In addition to observing operational and safety conditions, correctible maintenance items are also identified during the field review. Following is a summary of maintenance items observed along the corridor:

- The signing and pavement markings and signalization equipment are in good condition with one exception:
 - The northbound yellow indications are dim, and consideration should be given to replacement.

Based on field observations, collision history, and engineering judgment, the following improvements are recommended:

- Provide positive offset left turn lanes to increase line of sight to opposing traffic and reduce left turn crashes at the intersection. The scope of this improvement is as follows:
 1. Shift the eastbound left turn lane five feet to the north and the westbound left turn lane five feet to the south.
 2. Remove the existing landscaped medians and construct four foot wide concrete traffic separators. The roadway crown for the left turn lanes will need to be shifted five feet north for the eastbound left turn lane and five feet south for the westbound left turn lane by providing an asphalt overbuild area. An alternative to shifting the crown would be to provide drainage slots in the concrete traffic separator.
 3. Construct U-turn bays on the northwest and southeast corners to facilitate U-turn movements of passenger vehicles. This will require installation of manholes, drainage inlets, and storm sewer pipes.
 4. Replace the eastbound and westbound mast arm signal supports and provide 4-section left turn heads.
 5. Remove the existing median lighting and install decorative street lighting along the outside edges of the road.
 6. Consider extending the northbound left turn lane to increase queue storage and prevent queued vehicles from extending out into the through lanes.
 7. Replace landscaping as necessary.
 8. Modify existing irrigation as necessary.
 9. No right-of-way impacts are anticipated.
- Sumter County should consider signalization or signing changes that reduce the potential for conflicts between northbound/southbound U-turn movements and eastbound/westbound right turn overlap movements such as restricting northbound/southbound U-turn movements.

BENEFIT COST ANALYSIS

A benefit cost analysis was performed to determine if modifications are justified based on objective criteria compared to other roadway corridors within the state. The Highway Safety Improvement Program Manual outlines that for an improvement to be justified, the following must be met: 1) The benefit cost ratio shall be greater than 1.0; 2) The improvement should address a hazardous road location/feature or correct a safety problem. The improvements recommended within this report will correct a safety problem.

Improvement

Provide positive offset mainline left turn lanes to reduce the incidence of left turn collisions and extend the northbound left turn lane to reduce the observed queuing.

A cost estimate was developed; the estimated construction cost is \$463,229.54, and the estimated design cost is \$83,381.32, resulting in a grand total of \$546,610.86. A crash reduction factor of 37% was applied to the construction of positive offset left turn lanes (Desktop reference for crash reduction factors report No. FHWA-SA-08-011). There were no long form crashes considered correctable by extending the northbound left turn lane. As such, a crash reduction factor for this improvement was not used in the analysis. Although there were no correctable long form crashes, extending the northbound left turn lane will reduce the observed queuing and the potential for rear end crashes associated with vehicles entering the left turn lane. The resultant benefit cost ratio was calculated to be 1.7 to 1.

A conceptual improvement diagram and a detailed cost estimate are provided in the appendix.

Based on a benefit cost ratio of 1.7, providing offset mainline left turn lanes and extending the northbound left turn lane are justified.

North Approach Photographs



Looking south into the intersection along Buena Vista Boulevard



Looking north from the intersection along Buena Vista Boulevard

South Approach Photographs



Looking north into the intersection along Buena Vista Boulevard



Looking south from the intersection along Buena Vista Boulevard

East Approach Photographs



Looking west into the intersection along CR 466



Looking east from the intersection along CR 466

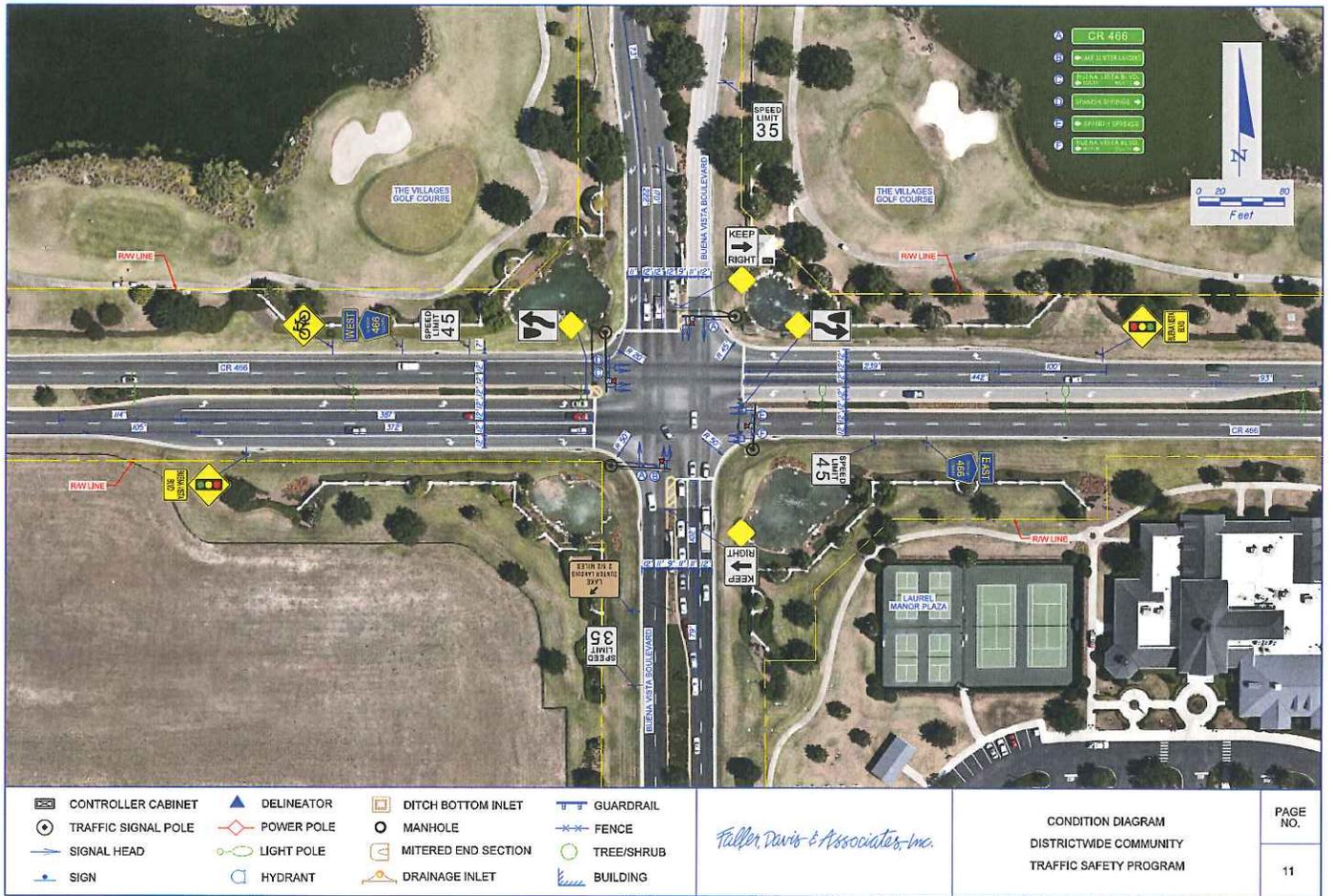
West Approach Photographs



Looking east into the intersection along CR 466



Looking west from the intersection along CR 466



	CONTROLLER CABINET		DELINEATOR		DITCH BOTTOM INLET		GUARDRAIL
	TRAFFIC SIGNAL POLE		POWER POLE		MANHOLE		FENCE
	SIGNAL HEAD		LIGHT POLE		MITERED END SECTION		TREE/SHRUB
	SIGN		HYDRANT		DRAINAGE INLET		BUILDING

Fallen Davis & Associates, Inc.

CONDITION DIAGRAM
DISTRICTWIDE COMMUNITY
TRAFFIC SAFETY PROGRAM

HW:RWD 8/7/2022 4:59:58 PM 2:\1302.00\1302\1302\HW:RWD\HW:RWD.dwg CR 466 CR 466 at Buena Vista Blvd/CR 466 Area Condition-DistWIDE.dwg



SYMBOLS:	
	REAR END
	SIDE SWIPE
	RIGHT ANGLE
	BACKED INTO
	RIGHT TURN
	COLLISION WIPED
	OUT OF CONTROL
	LEFT TURN
	HEAD ON
	OVERTURNED VEHICLE
	COLLISION WITH BIKE
	HIT MOVEABLE OBJECT
	HIT SIGN
	HIT TREE
	HIT OTHER FIXED OBJECTS
	HIT ANIMAL
	RAN INTO DITCH/DRIVEWAY
	RAN OFF ROAD INTO WATER
	TRACTOR/TRAILER JACKKNIFED
	HIT GUARDRAIL
	HIT BARRIER WALL
	HIT BRIDGE/PIER/ABUTMENT/RAIL
	HIT FENCE
	HIT UTILITY POLE

COLLISION DIAGRAM DISTRICTWIDE COMMUNITY TRAFFIC SAFETY PROGRAM		PAGE NO. 12
<i>Fallon Davis & Associates, Inc.</i>		

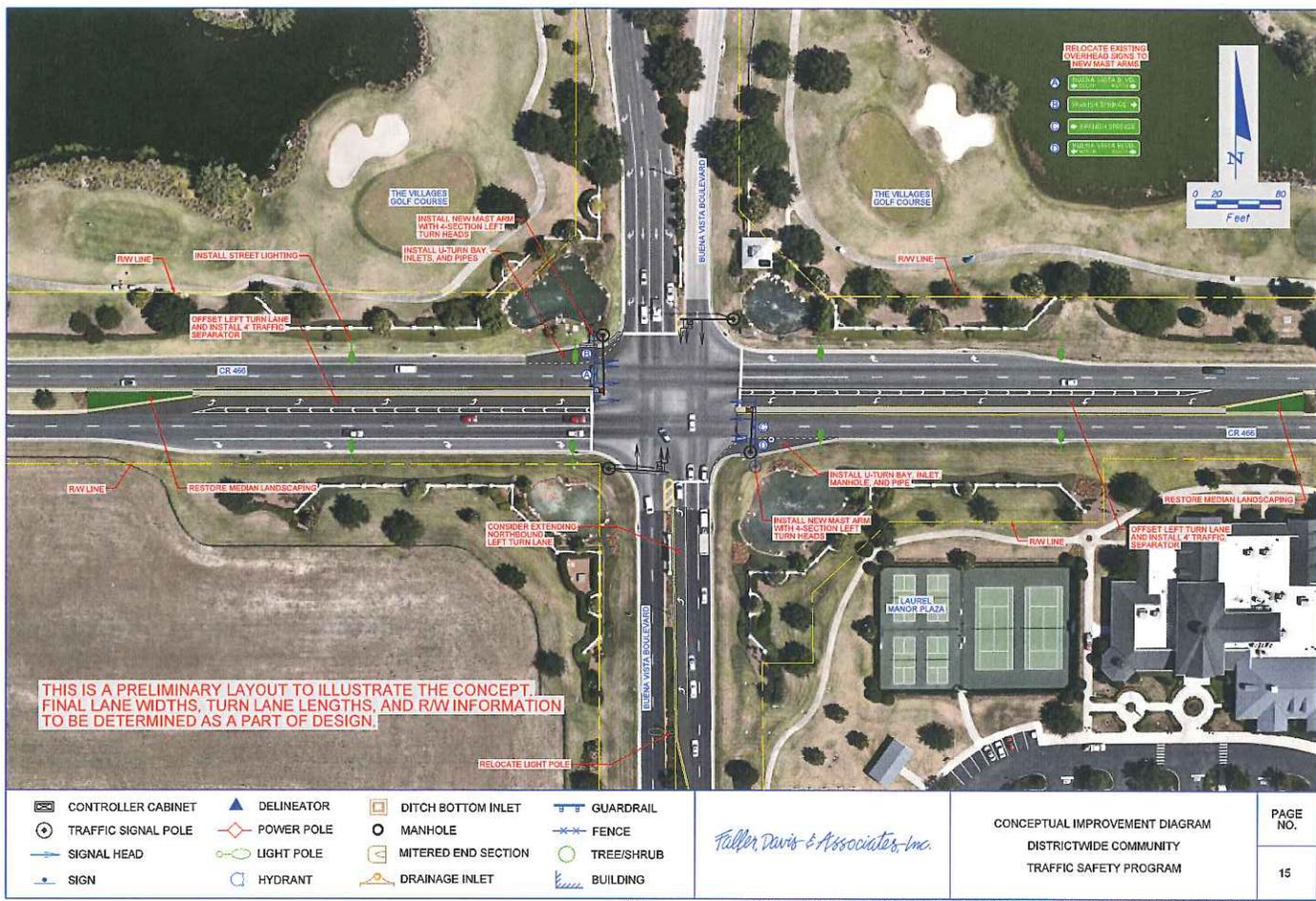
Miscellaneous 11/20/2022 2:07:38 PM 2/1/2022 10:58:11 AM 2009/01/01 486-CH 486 of Buena Vista Blvd/CR406 Area Collision-Collision-Collision.dgn

COLLISION DATA

Section: County Roadway
 Intersecting Street: Buena Vista Boulevard
 Source Data: Hard Copy Crash Reports
 Study Period: From 1/1/2008 to 12/31/2010 37 Months

Route: CR 466
 County: Sumter
 City: The Villages

No.	Long or Short Form	Date	Day	Time	DOB	Age	Alcohol / Drugs	Lighting Condition	Roadway Surface	Weather	Fatal	Injury	Most Severe Injury	Harmful Event	Property Damage	Vision Obstructed	Contributing Cause
1	S	1/11/2008	Friday	13:26	2/10/1935	73	None	Daylight	Dry	Clear	0	0	None	Rear End	\$5,000	None	Careless Driving
2	S	1/23/2008	Friday	14:06	2/4/1986	22	None	Daylight	Dry	Clear	0	0	None	Rear End	\$600	None	Followed Too Closely
3	S	2/21/2008	Thursday	8:54	6/20/1981	27	None	Daylight	Wet	Rain	0	0	None	Rear End	\$13,000	None	Careless Driving
4	S	3/6/2008	Thursday	11:57	10/13/1937	70	None	Daylight	Dry	Clear	0	0	None	Sideswipe	\$2,000	None	Careless Driving
5	L	7/12/2008	Saturday	8:00	3/25/1970	38	None	Daylight	Dry	Cloudy	0	2	Non-Incapacitating	Angle	\$4,000	None	Careless Driving Disregarded Traffic Signal
6	S	8/22/2008	Friday	14:51	2/18/1940	69	None	Daylight	Wet	Rain	0	0	None	Left Turn	\$15,000	Inclement Weather	Improper Turn
7	S	10/24/2008	Friday	7:44	8/31/1983	25	None	Daylight	Wet	Rain	0	0	None	Rear End	\$200	None	Careless Driving
8	S	12/9/2008	Tuesday	17:51	7/2/1963	45	None	Dusk	Dry	Clear	0	0	None	Rear End	\$3,500	None	Careless Driving
9	L	12/27/2008	Saturday	20:58	1/23/1931	78	None	Dark (SL)	Dry	Clear	0	1	Non-Incapacitating	Left Turn	\$11,000	None	Improper Turn
10	S	1/8/2009	Friday	14:36	11/7/1972	36	None	Daylight	Dry	Clear	0	0	None	Rear End	\$1,500	None	Careless Driving
11	S	8/28/2009	Friday	12:36	6/28/1956	53	None	Daylight	Dry	Clear	0	0	None	Rear End	\$200	None	Followed Too Closely
12	S	10/6/2009	Tuesday	17:17	12/7/1982	27	None	Daylight	Dry	Clear	0	0	None	Rear End	\$350	None	Careless Driving
13	L	10/22/2009	Thursday	15:56	5/13/1950	59	None	Daylight	Dry	Clear	0	0	None	Left Turn	\$1,500	None	Improper Turn
14	L	11/17/2009	Tuesday	14:34	12/30/1975	34	None	Daylight	Dry	Clear	0	1	Possible Non-Incapacitating	Rear End	\$2,000	None	Careless Driving
15	L	3/18/2010	Thursday	11:24	8/28/1930	80	None	Daylight	Dry	Cloudy	0	1	Incapacitating	Rear End	\$11,000	None	Careless Driving No Improper Driving
16	S	3/23/2010	Tuesday	13:15	4/14/1977	33	None	Daylight	Dry	Clear	0	0	None	Sideswipe	\$3,400	None	Careless Driving
17	L	5/13/2010	Thursday	20:54	12/6/1940	69	None	Dark (SL)	Dry	Clear	0	5	Incapacitating	Left Turn	\$17,000	None	Improper Turn
18	S	6/29/2010	Tuesday	12:20	6/21/1921	89	None	Daylight	Dry	Clear	0	0	None	Sideswipe	\$2,000	None	Careless Driving
19	L	10/14/2010	Thursday	8:00	8/18/1986	24	None	Daylight	Dry	Clear	0	2	Incapacitating Non-Incapacitating	Left Turn	\$13,000	None	Careless Driving Followed Too Closely
20	L	10/21/2010	Thursday	8:45	8/5/1970	40	None	Daylight	Dry	Clear	0	1	Incapacitating Non-Incapacitating	Rear End	\$350	None	Careless Driving Followed Too Closely



	CONTROLLER CABINET		DELINEATOR		DITCH BOTTOM INLET		GUARDRAIL
	TRAFFIC SIGNAL POLE		POWER POLE		MANHOLE		FENCE
	SIGNAL HEAD		LIGHT POLE		MITERED END SECTION		TREE/SHRUB
	SIGN		HYDRANT		DRAINAGE INLET		BUILDING

Fallon Davis & Associates, Inc.

CONCEPTUAL IMPROVEMENT DIAGRAM
 DISTRICTWIDE COMMUNITY
 TRAFFIC SAFETY PROGRAM

8/15/2016 8:50:02 AM 2:332.00 00 CTSP 8209 Hwy 81rpt 616C CR 490 CR 490 at Buena Vista Blvd/CR 490 area Condition-Conceptual.dgn

APPENDIX

TURNING MOVEMENT COUNT
 NORTH STREET: Buena Vista Boulevard
 SOUTH STREET: Buena Vista Boulevard
 CR 466 at Buena Vista Boulevard
 ALL VEHICLES

DATE: 5/9/2012
 EAST STREET: CR 466
 WEST STREET: CR 466
 TIME: 7-9 AM, 11AM-1 PM, 2-6 PM
 BY: FDA

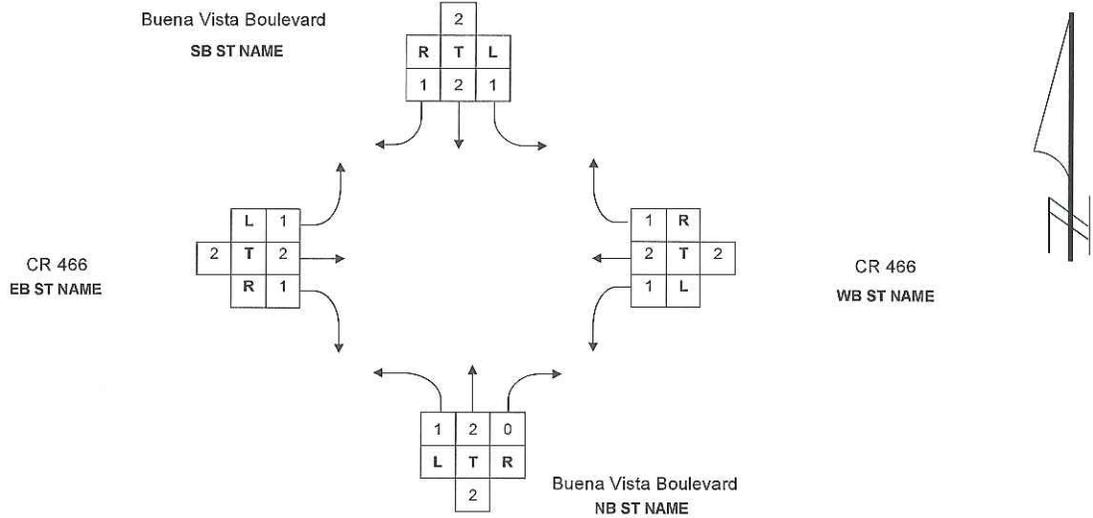
START TIME	NORTHBOUND					SOUTHBOUND					NS TOTAL	EASTBOUND					WESTBOUND					EW TOTAL	GRAND TOTAL
	LEFT	THRU	RIGHT	U-TURN	TOTAL	LEFT	THRU	RIGHT	U-TURN	TOTAL		LEFT	THRU	RIGHT	U-TURN	TOTAL	LEFT	THRU	RIGHT	U-TURN	TOTAL		
7:00	19	24	8	0	51	14	19	50	0	83	134	40	84	26	0	150	1	155	6	0	162	312	446
7:15	23	22	9	0	54	15	38	53	0	104	158	51	119	46	0	216	13	229	10	0	252	488	628
7:30	28	47	10	0	85	30	42	27	0	99	184	68	212	40	0	320	11	196	13	0	220	540	724
7:45	32	44	13	0	89	32	53	27	0	112	201	67	184	62	0	313	9	107	22	0	138	451	652
Total	102	137	40	0	279	91	150	157	0	398	677	226	599	174	0	999	34	687	51	0	772	1,771	2,448
8:00	38	44	16	0	100	39	28	36	0	103	203	51	111	31	0	193	12	93	14	0	119	312	515
8:15	40	58	32	0	130	26	48	31	0	105	235	47	115	40	1	203	18	102	25	0	145	348	583
8:30	46	59	17	0	124	39	67	39	0	145	289	50	118	45	0	213	20	86	22	0	128	341	610
8:45	50	50	15	1	116	37	57	36	1	131	247	41	133	33	0	207	19	117	26	0	162	369	616
Total	176	211	82	1	470	141	200	142	1	484	954	189	477	149	1	816	69	398	87	0	554	1,370	2,324
11:00	67	66	27	1	161	33	79	58	0	170	331	61	116	49	0	226	31	153	31	0	215	441	772
11:15	73	85	27	2	187	41	78	46	1	166	353	81	104	38	0	223	34	178	36	0	248	471	824
11:30	58	69	21	0	146	43	58	47	1	149	285	29	148	40	1	218	32	149	24	0	205	423	718
11:45	73	62	32	0	167	34	70	65	0	169	336	43	142	53	1	239	28	141	33	0	202	441	777
Total	269	282	107	3	661	151	285	216	2	654	1,315	214	510	180	2	908	125	621	124	0	870	1,776	3,091
12:00	78	68	22	0	168	29	51	35	0	115	283	36	149	84	1	270	17	149	24	1	191	461	744
12:15	63	69	27	0	159	17	47	56	4	124	283	37	119	52	0	208	22	155	31	0	208	416	899
12:30	63	71	29	0	163	42	67	49	0	158	321	53	155	54	0	282	30	158	35	0	223	485	906
12:45	66	49	31	0	146	27	81	43	0	151	297	37	126	60	0	223	26	146	34	0	206	429	726
Total	270	257	109	0	636	115	246	183	4	548	1,184	163	549	250	1	963	95	608	124	1	828	1,791	2,975
14:00	54	44	16	0	114	30	58	47	0	135	249	48	131	48	1	226	35	169	24	0	228	454	703
14:15	59	40	15	0	114	25	62	56	1	144	258	49	136	33	0	218	23	185	31	0	239	457	715
14:30	70	72	26	0	168	31	61	57	1	150	318	68	126	51	0	245	30	191	37	0	258	503	821
14:45	64	63	26	0	153	36	50	45	0	131	284	62	171	46	1	280	34	169	26	0	229	509	793
Total	247	219	83	0	549	122	231	205	2	560	1,109	225	564	178	2	969	122	714	118	0	954	1,923	3,032
15:00	59	57	19	1	136	39	59	46	0	144	280	75	152	44	0	271	31	157	24	0	212	483	763
15:15	48	49	26	0	123	18	47	42	1	108	231	60	134	42	1	237	20	191	31	1	243	480	711
15:30	70	56	21	0	147	36	55	50	0	141	288	37	119	54	0	210	37	183	22	0	222	432	720
15:45	71	55	17	0	143	23	43	47	0	113	256	44	148	39	0	231	19	143	31	1	194	425	681
Total	248	217	83	1	549	116	204	185	1	596	1,055	216	553	179	1	949	107	654	108	2	871	1,820	2,875
16:00	45	52	18	0	115	14	65	48	0	127	242	46	139	37	0	222	27	166	37	1	231	453	695
16:15	53	47	24	0	124	20	58	58	1	137	261	37	128	55	0	218	32	130	27	1	190	408	669
16:30	42	52	20	0	114	25	51	52	0	128	242	38	158	45	0	237	19	172	29	0	220	457	699
16:45	61	44	16	0	121	21	46	52	0	119	240	29	116	47	0	192	19	125	25	0	169	361	601
Total	201	193	78	0	474	80	220	210	1	511	985	148	537	184	0	869	97	593	118	2	810	1,679	2,664
17:00	56	64	12	0	132	20	48	39	0	107	239	34	159	42	0	235	26	172	29	0	227	462	701
17:15	65	39	21	0	125	13	40	63	0	116	241	31	165	37	0	233	28	157	39	0	224	457	698
17:30	52	55	14	0	121	31	50	42	0	123	244	38	137	36	1	212	15	143	31	0	189	401	645
17:45	47	66	19	0	132	14	50	45	0	109	241	33	117	38	0	188	20	107	23	0	150	338	579
Total	220	224	66	0	510	78	186	189	0	455	965	136	578	153	1	868	89	578	122	0	790	1,658	2,623

FLORIDA DEPARTMENT OF TRANSPORTATION

SUMMARY OF VEHICLE MOVEMENTS

SECTION N/A CITY The Villages COUNTY Sumter
 STATE ROUTE CR 466 INTERSECTING ROUTE Buena Vista Boulevard
 OBSERVER FDA DATE 5/9/2012 MILEPOST N/A
 WEATHER Fair ROAD CONDITION Good
 REMARKS

FORM COMPLETED BY GP DATE 07/31/12



TIME	NORTHBOUND					SOUTHBOUND					TOTAL	EASTBOUND					WESTBOUND					TOTAL		
	BEGIN/END	L	T	R	U	TOT	L	T	R	U		TOT	N/S	L	T	R	U	TOT	L	T	R		U	TOT
4 - 5																								
5 - 6																								
6 - 7																								
7 - 8	102	137	40	0	279	91	150	157	0	398	677	226	599	174	0	999	34	687	51	0	772	1,771		
8 - 9	176	211	82	1	470	141	200	142	1	484	954	189	477	149	1	816	69	398	87	0	554	1,370		
9 - 10																								
10 - 11																								
11 - 12	269	282	107	3	661	151	285	216	2	654	1,315	214	510	180	2	906	125	621	124	0	870	1,776		
12 - 1	270	257	109	0	636	115	246	183	4	548	1,184	163	549	250	1	963	95	608	124	1	828	1,791		
1 - 2																								
2 - 3	247	219	83	0	549	122	231	205	2	560	1,109	225	564	178	2	969	122	714	118	0	954	1,923		
3 - 4	248	217	83	1	549	116	204	185	1	506	1,055	216	553	179	1	949	107	654	108	2	871	1,820		
4 - 5	201	195	78	0	474	80	220	210	1	511	985	148	537	184	0	869	97	593	118	2	810	1,679		
5 - 6	220	224	66	0	510	78	188	189	0	455	965	136	578	153	1	868	89	579	122	0	790	1,658		
6 - 7																								
7 - 8																								
8 - 9																								
9 - 10																								
10 - 11																								
11 - 12																								
TOTAL	1,733	1,742	648	5	4,128	894	1,724	1,487	11	4,116	8,244	1,517	4,367	1,447	8	7,339	738	4,854	852	5	6,449	13,788		

Percentage	42%	42%	16%	0%		22%	42%	36%	0%			21%	60%	20%	0%		11%	75%	13%	0%		
Maximum	270	282	109	3		151	285	216	4			226	599	250	2		125	714	124	2		
Minimum	102	137	40	0		78	150	142	0			136	477	149	0		34	398	51	0		

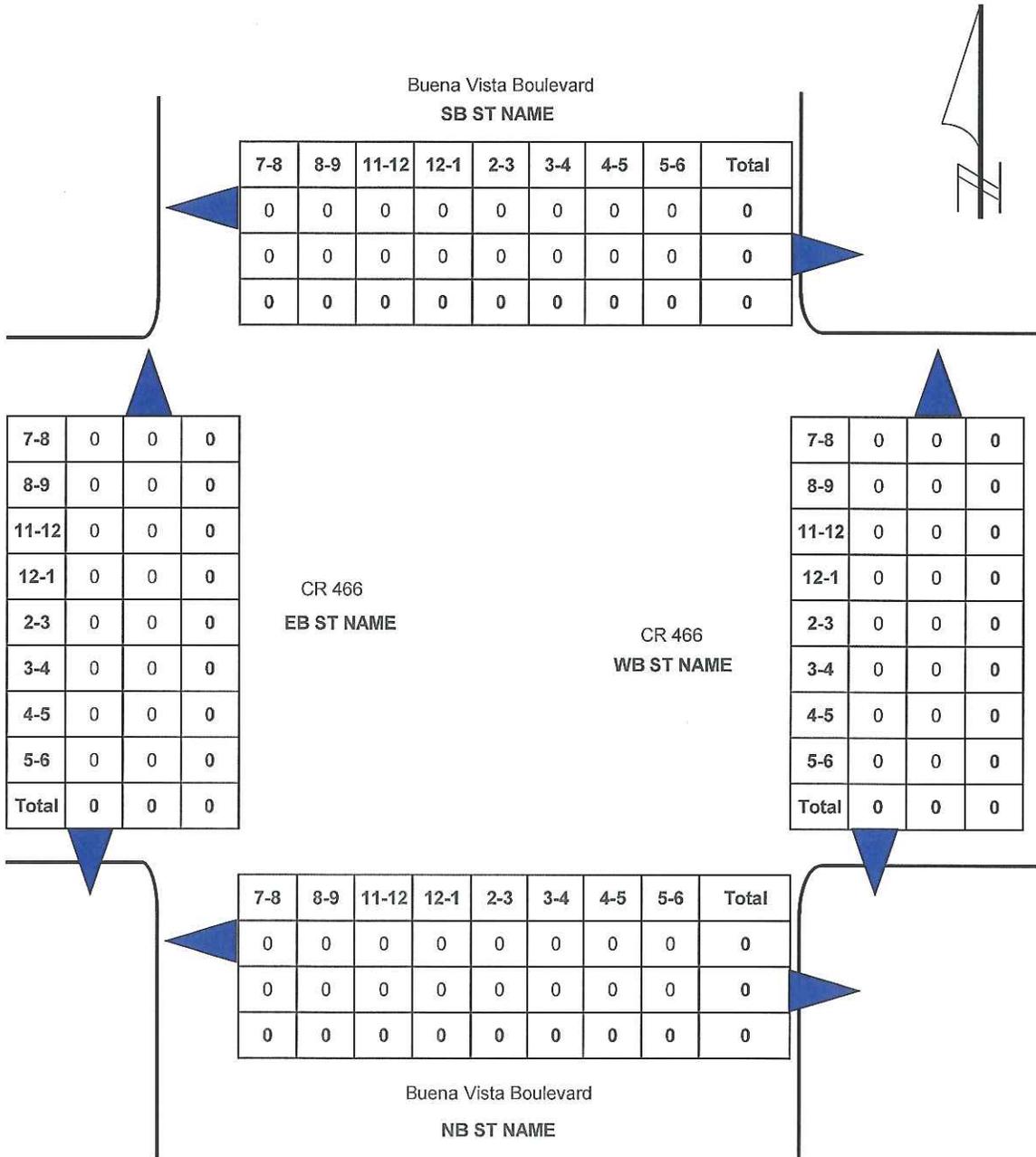
FLORIDA DEPARTMENT OF TRANSPORTATION

PEDESTRIAN MOVEMENT SUMMARY

SECTION N/A CITY The Villages COUNTY Sumter
 STATE ROUTE CR 466 INTERSECTING ROUTE Buena Vista Boulevard
 OBSERVER FDA DATE 5/9/2012 MILEPOST N/A

REMARKS

FORM COMPLETED BY GP DATE 07/31/12



Composite Study

8-HR TMC

Qualitative Assessment

Collision Analysis

Benefit Cost Analysis

CR 466 at Morse Boulevard

STUDY 6C/6E
SUMTER COUNTY

Districtwide Community Traffic Safety Program C-8T80

Financial Project No. 237995-1-32-09

Letter of Authorization No. 6C/6E

FDA No. 01038206C, 01038206E

Prepared For:



Prepared By:

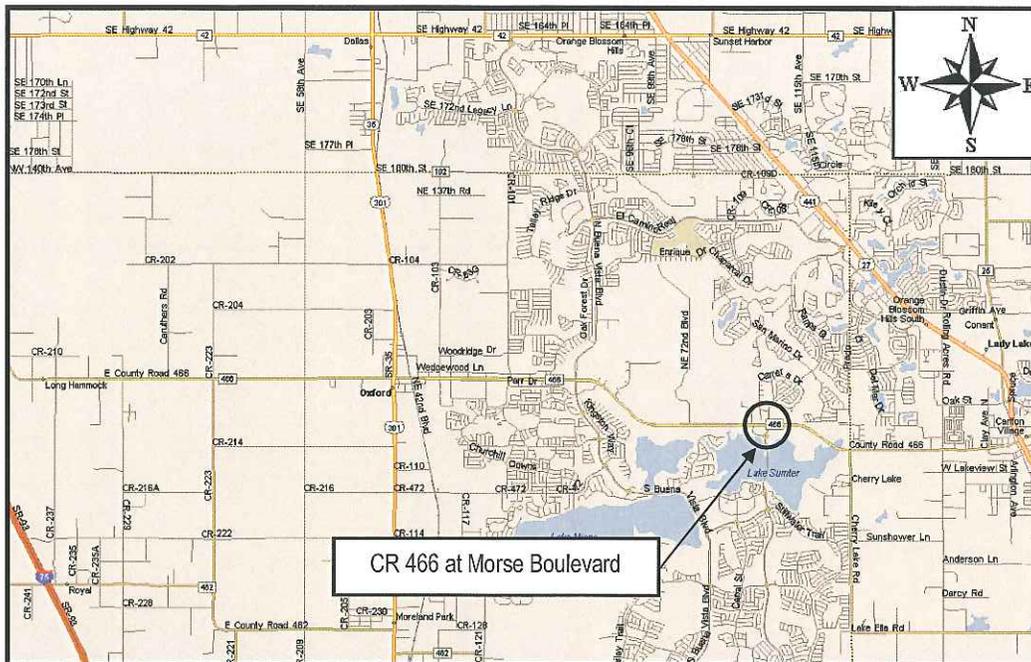
Faller, Davis & Associates, Inc.
CONSULTING ENGINEERS

Maitland, Florida
August 2012



Engineer of Record Kevin R. Carey
No. 61835

Project Location Map



Summary of Existing Conditions

Feature	Description
Main Street	<ul style="list-style-type: none"> CR 466
Side Streets	<ul style="list-style-type: none"> Morse Boulevard
Area Location	<ul style="list-style-type: none"> The intersection is located in The Villages, 4.3 miles east of US 301 and 2.3 miles west of US 27/US 441.
Surrounding Development	<ul style="list-style-type: none"> The area is a mix of light commercial and residential uses in the vicinity of the intersection
Land Uses at Intersection	<ul style="list-style-type: none"> Northeast-Church Northwest-Golf course Southwest-Retention pond Southeast-Retention pond
Traffic Control	<ul style="list-style-type: none"> Traffic signal with protected-permissive left turn phases for all directions There are no pedestrian features provided at the intersection.
Adjacent Signalized Intersections	<ul style="list-style-type: none"> Mariposa Way (roundabout) 0.13 miles to the south Rolling Acres Road 2.0 miles to the east Buena Vista Boulevard 2.3 miles to the west
CR 466	<ul style="list-style-type: none"> <u>Cross Section</u>-Four lane divided roadway with a grassed median and a closed drainage system <u>Posted Speed Limit</u>-45 mph <u>Function</u>-Urban Collector <u>Connectivity</u>- US 27 to the east and US 301 to the west <u>East Approach Lanes</u>-Two through lanes and a left turn lane <u>West Approach Lanes</u>-Two through lanes, a left turn lane, and a right turn lane
Morse Boulevard	<ul style="list-style-type: none"> <u>Cross Section</u>-Four lane divided roadway with a grassed median and a closed drainage system <u>Posted Speed Limit</u>-20 mph <u>Function</u>-Local roadway <u>Connectivity</u>-US 27 to the north and Miller Boulevard to the south <u>North Approach Lanes</u>-Two through lanes, one left turn lane, and one right turn lane <u>South Approach Lanes</u>-Two through lanes, one left turn lane, and one right turn lane
Other Distinct Features	<ul style="list-style-type: none"> Significant horizontal curve south of the intersection

QUALITATIVE ASSESSMENT

The intersection of CR 466 and Morse Boulevard was observed by a registered professional engineer during the midday (12:00 to 1:00 PM) and afternoon (2:30 to 3:30 PM) peak periods to assess existing operating conditions and to determine what, if any, improvements are needed.

Request: The Department requested a review of the intersection to determine if any safety and/or operational improvements are needed.

Operations: Operations include the efficiency of operation and interaction of motor vehicles, pedestrians, and bicycles at the intersection. Following are the observations relating to these factors:

- In the midday peak period (12:00 to 1:00 PM), traffic is moderate with dispersed vehicles approaching the intersection from both directions. There were 755 eastbound and 930 westbound vehicles per hour (vph) approaching the intersection. Side street traffic volumes are moderate with 954 northbound and 647 southbound vph during this period.
- There is minimal pedestrian and bicycle activity at the intersection.
- In the afternoon peak period (2:30 to 3:30 PM), traffic volumes are moderate with 944 eastbound and 998 westbound vph approaching the intersection on CR 466. Side street traffic volumes are moderate with 963 northbound vph and 618 southbound vph approaching the intersection.
- During both review periods, gaps were available in mainline traffic for permissive left turning vehicles.
- The mainline left turn lanes are negatively offset from one another, which limits the sight distance when the lanes are occupied by vehicles.
- During the review periods, the traffic signal operated in non-coordinated mode. The signal operates using SOP 10. The signal operated efficiently with no observed phase failures during the midday or afternoon peak periods with one exception: westbound left turn phase failures were observed.
- During both review periods several instances of the following were observed:
 - The eastbound and westbound protected left turn phase serviced most vehicles in the queue. The first vehicle in the unserved queue, for both mainline left turn lanes, would remain at the stop bar instead of pulling forward to obtain a better line of sight. Due to the opposing left turning vehicles, sight distance is limited and gaps in opposing mainline traffic are not apparent to left turning drivers. On several cycles, the first and second cars in the remaining queue were able to clear the intersection during the yellow clearance phase. This resulted in a few vehicles not being serviced during the cycle.
 - Without opposing left turning vehicles, left turning drivers were able to turn during the permissive phase with minimum delay.

- The westbound five-section signal head is rotated away from westbound left turning traffic and towards westbound through traffic. The left turn arrow indication is difficult to see from the stop line. The lead driver was observed to wait in the left turn lane for approximately five to ten seconds before a trailing driver sounded their horn that the protected phase was operational. When the lead driver did not start their turn at the beginning of the protected phase, several vehicles were not serviced by the protected phase, and only a couple vehicles were able to clear on the permissive phase.
- The westbound left turn movement is heavy with an average of 331 vph using a single left turn lane. On several occasions the queue was observed to extend back to the end of the turn lane taper.
- The existing westbound left turn lane at Morse Boulevard and the existing eastbound left turn lane into the Fairway Christian Center, east of Morse Boulevard, have been constructed back to back with no available space for extending either turn lane.

Safety: Vehicle, pedestrian, and bicycle safety at the intersection are assessed through review of crash reports, identification of significant crash trends, then correlation to field conditions. Following are the observations relating to the safety of the intersection.

- Crash reports were provided for CR 466 at Morse Boulevard by the Department for the 37 month period ending December 31, 2010. Twenty-one crashes were reported, which included ten rear end crashes, seven left turn crashes, two angle crashes, and two right turn crashes. These crashes resulted in seven injuries, no fatalities, and an estimated \$79,250 in property damage. Approximately 95 percent of the crashes occurred on a dry roadway surface in daylight lighting conditions.
- Six of the rear end collisions involved eastbound or westbound vehicles. Two of the rear end collisions involved southbound vehicles, and the remaining rear end collisions involved northbound vehicles. All of these collisions were the result of either careless driving, driver distraction, or following too closely.
- The collision history at the intersection indicates a trend of mainline left turn crashes. Four of the six left turn collisions involved eastbound left turning vehicles versus westbound through vehicles. Two injuries resulted from these crashes; one of the instances was a non-incapacitating injury, and the other was an incapacitating injury. Two left turn collisions involved westbound left turning vehicles versus eastbound through vehicles. No injuries resulted from these three crashes.
- One of the angle collisions occurred when a northbound vehicle violated the right of way of a westbound vehicle, resulting in one non-incapacitating injury. The other angle collision occurred when a southbound left turning vehicle disregarded the traffic signal and collided with an eastbound vehicle. There was one incapacitating injury as a result of this collision.
- Both right turn collisions occurred when southbound left turning vehicles and northbound right turning vehicles turned into the eastbound inside through lane. No injuries were reported from these collisions.

Maintenance: In addition to observing operational and safety conditions, correctible maintenance items are also identified during the field review. Following is a summary of maintenance items observed along the corridor:

- The signing and pavement markings and signalization equipment are in good condition with one exception:
 - The westbound five section signal head should be rotated towards westbound traffic to make the indications more apparent to left turning drivers.

Based on field observations, collision history, and engineering judgment, the following improvements are recommended:

- Provide positive offset left turn lanes to increase line of sight to opposing traffic and reduce left turn crashes at the intersection. This scope of this improvement is as follows:
 1. Shift the eastbound left turn lane five feet to the north and the westbound left turn lane five feet to the south.
 2. Remove the existing landscaped medians and construct four foot wide concrete traffic separators. The roadway crown for the left turn lanes will need to be shifted five feet north for the eastbound left turn lane and five feet south for the westbound left turn lane by providing an asphalt overbuild area. An alternative to shifting the crown would be to provide drainage slots in the concrete traffic separator.
 3. Construct U-turn bays on the northwest and southeast corners to facilitate U-turn movements of passenger vehicles. This will require installation of manholes, drainage inlets, and storm sewer pipes.
 4. Replace the eastbound and westbound mast arm signal supports and provide 4-section left turn heads.
 5. Remove the existing street lighting from the median and install decorative street lighting along the outside edges of the road.
 6. Replace landscaping as necessary.
 7. Modify existing irrigation as necessary.
 8. No right-of-way impacts are anticipated.

BENEFIT COST ANALYSIS

A benefit cost analysis was performed to determine if modifications are justified based on objective criteria compared to other roadway corridors within the state. The Highway Safety Improvement Program Manual outlines that for an improvement to be justified, the following must be met: 1) The benefit cost ratio shall be greater than 1.0; 2) The improvement should address a hazardous road location/feature or correct a safety problem. The improvements recommended within this report will correct a safety problem.

Improvement

Provide positive offset mainline left turn lanes to reduce the incidence of left turn collisions.

A cost estimate was developed; the estimated construction cost is \$364,400.18, and the estimated design cost is \$72,880.04, resulting in a grand total of \$437,280.22. A crash reduction factor of 37% was applied to the construction of positive offset left turn lanes (Desktop reference for crash reduction factors report No. FHWA-SA-08-011). The resultant benefit cost ratio was calculated to be 2.6 to 1.

A conceptual diagram and detailed cost estimate is provided in the appendix.

Based on a benefit cost ratio of 2.6, providing offset mainline left turn lanes is justified.

North Approach Photographs



Looking south into the intersection along Morse Boulevard



Looking north from the intersection along Morse Boulevard

South Approach Photographs



Looking north into the intersection along Morse Boulevard



Looking south from the intersection along Morse Boulevard

East Approach Photographs



Looking west into the intersection along CR 466



Looking east from the intersection along CR 466

West Approach Photographs



Looking east into the intersection along CR 466



Looking west from the intersection along CR 466



SYMBOLS:		RIGHT TURN		HEAD ON		HIT SIGN		HIT ANIMAL		HIT BARRIER WALL	
CRASH NUMBER	YEAR	REAR END	COLLISION W/PEDEST.	OVERTURNED VEHICLE	HIT TREE	HIT PARKED CAR	RAN INTO DITCH/OVERT	RAN OFF ROAD INTO WATER	TRACTOR/TRAILER JACKKNUFED	HIT BRIDGE/PENY/ABUTMENT/RAIL	HIT UTILITY POLE
HIT SEVERE INJURY	HIT SEVERE INJURY	SIDE SWIPE	OUT OF CONTROL	COLLISION W/BIKE	HIT OTHER FIXED OBJECTS	HIT OTHER FIXED OBJECTS	TRUCK/TRAILER JACKKNUFED	TRACTOR/TRAILER JACKKNUFED	HIT FENCE	HIT FENCE	
IMPOSSIBLE INJURY	IMPOSSIBLE INJURY	RIGHT ANGLE	LEFT TURN	HIT MOVABLE OBJECT							
NON-CAPACITATING	NON-CAPACITATING	BACKED INTO									
SWIFTLY	SWIFTLY										

COLLISION DIAGRAM
 DISTRICTWIDE COMMUNITY
 TRAFFIC SAFETY PROGRAM
Faller Davis & Associates, Inc.
 PAGE NO. 12

COLLISION DATA

Section: County Roadway
 Intersecting Street: Morse Boulevard
 Source Data: Hard Copy Crash Reports
 Study Period: From 1/1/2008 to 12/31/2010 37 Months

Route: CR 466
 County: Sumner
 City: The Villages

No.	Long or Short Form	Date	Day	Time	DOB	Age	Alcohol / Drugs	Lighting Condition	Roadway Surface	Weather	Fatal	Injury	Most Severe Injury	Harmful Event	Property Damage	Vision Obstructed	Contributing Cause
1	L	5/27/2008	Tuesday	10:34	7/6/1970	38	None	Daylight	Dry	Cloudy	0	2	Non-Incapacitating	Rear End	\$2,500	None	Careless Driving
2	L	6/25/2008	Wednesday	14:35	10/21/1965	43	None	Daylight	Dry	Cloudy	0	1	Possible	Rear End	\$150	None	Careless Driving
3	S	9/11/2008	Thursday	11:23	9/14/1978	30	None	Daylight	Dry	Cloudy	0	0	None	Rear End	\$8,000	None	Driver Distraction
4	L	11/27/2008	Thursday	10:49	1/1/1930	79	None	Daylight	Dry	Clear	0	1	Non-Incapacitating	Angle	\$13,000	None	Disregarded Traffic Signal
5	S	2/17/2009	Tuesday	16:10	8/13/1987	22	None	Daylight	Dry	Clear	0	0	None	Rear End	\$2,000	None	Careless Driving
6	L	3/11/2009	Wednesday	12:18	1/4/1929	80	None	Daylight	Dry	Clear	0	0	None	Left Turn	\$10,000	None	FTYRW
7	S	5/15/2009	Friday	7:46	3/29/1968	41	None	Daylight	Dry	Clear	0	0	None	Rear End	\$300	None	Careless Driving
8	L	6/15/2009	Monday	8:30	2/9/1927	82	None	Daylight	Dry	Clear	0	1	Non-Incapacitating	Left Turn	\$6,000	None	Improper Lane Change
9	S	7/1/2009	Wednesday	14:48	6/23/1922	87	None	Daylight	Dry	Cloudy	0	0	None	Rear End	\$600	None	Followed Too Closely
10	S	8/3/2009	Monday	7:33	4/2/1926	83	None	Daylight	Dry	Clear	0	0	None	Rear End	\$2,000	None	Careless Driving
11	S	8/5/2009	Wednesday	10:03	7/3/1947	62	None	Daylight	Dry	Cloudy	0	0	None	Rear End	\$700	None	Careless Driving
12	S	10/13/2009	Tuesday	17:46	9/16/1926	83	None	Daylight	Dry	Clear	0	0	None	Left Turn	\$1,000	None	Careless Driving
13	S	10/13/2009	Tuesday	12:05	1/22/1930	80	None	Daylight	Dry	Clear	0	0	None	Right Turn	\$500	None	Improper Turn
14	S	12/7/2009	Monday	7:35	10/19/1959	50	None	Daylight	Wet	Cloudy	0	0	None	Rear End	\$0	None	Careless Driving
15	S	12/17/2009	Thursday	11:58	6/19/1921	89	None	Daylight	Dry	Cloudy	0	0	None	Right Turn	\$2,500	None	Careless Driving
16	L	2/26/2010	Friday	9:50	7/25/1926	84	None	Daylight	Dry	Clear	0	0	None	Left Turn	\$3,000	None	FTYRW
17	L	3/4/2010	Thursday	20:30	5/20/1982	28	None	Dark (SL)	Dry	Clear	0	0	None	Left Turn	\$4,000	None	FTYRW
18	S	3/29/2010	Monday	17:50	6/7/1992	18	None	Daylight	Dry	Clear	0	0	None	Rear End	\$2,500	None	Careless Driving
19	L	6/25/2010	Friday	14:38	7/20/1973	37	None	Daylight	Dry	Clear	0	0	None	Left Turn	\$4,500	None	Disregarded Traffic Signal
20	L	7/7/2010	Wednesday	12:11	3/11/1962	48	None	Daylight	Dry	Cloudy	0	1	Incapacitating	Angle	\$6,000	None	Disregarded Traffic Signal
21	L	9/7/2010	Tuesday	13:16	4/2/1926	84	None	Daylight	Dry	Cloudy	0	1	Incapacitating	Left Turn	\$12,000	None	FTYRW

COLLISION DATA

Section: County Roadway
 Intersecting Street: Morse Boulevard
 Source Data: Hard Copy Crash Reports
 Study Period: From 1/1/2008 to 12/31/2010 37 Months

Route: CR 466
 County: Sumter
 City: The Villages

Crash Statistics		Injury Severity (Number of Crashes)										Lighting			Roadway Condition		
Total Number of Crashes	Total Number of Long Form Crashes	Total Property Damage	Total Number of Fatalities	Total Number of Fatal Crashes	Total Number of Injuries	Total Number of Injury Crashes	None	Possible	Non-Incapacitating	Incapacitating	Fatal	Daylight	Dark (SL)	Dark (No SL)	Wet	Dry	Unknown
21	10	\$79,250	0	0	7	6	15	1	3	2	0	20	1	0	1	20	0
100%	48%	N/A	N/A	0%	N/A	28%	71%	5%	14%	10%	0%	95%	5%	0%	5%	95%	0%
Rear End	Head On	Angle	Left Turn	Right Turn	Sideswipe	Backed Into	Parked Car	Collision with MV Other Road	Pedestrian	Bike	Bike (Bike Lane)	Moped	Train	Animal	Hit Sign/Sign Post	Hit Utility Pole	Hit Guardrail
10	0	2	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0
48%	0%	10%	33%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Hit Fence	Hit Concrete Barrier Wall	Bridge/Pier/Abutment	Hit Tree/Shrub	Hit Const Barricad/Sign/BrdgPier/Abutt	Traffic Gate	Crash Attenuator	Fixed Object Above Road	Other Fixed Object	Moveable Object	Ran Into Ditch/Culvert	Ran Off Road Into Water	Overturned	Occupant Fell From Vehicle	Trac/Trailer Jackknifed	Fire	Explosion	All Other
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
No Improper Driving	Careless Driving	FTYRW	Improper Backing	Improper Lane Change	Improper Turn	Followed Too Closely	Disregarded Traffic Signal	Exceed Safe Speed Limit	Disregarded Stop Sign	Failed to Maintain Equipment /	Improper Passing	Drove Left of Center	Exceeded Stated Safe Speed Limit	Obstructing Traffic	Improper Load	All Other	Alcohol/Drugs Under Influence
0	10	4	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0
0%	48%	19%	0%	5%	5%	5%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

APPENDIX

TURNING MOVEMENT COUNT
 NORTH STREET: Morse Boulevard
 SOUTH STREET: Morse Boulevard
 CR 466 at Morse Boulevard
 ALL VEHICLES

DATE: 5/10/2012
 EAST STREET: CR 466
 WEST STREET: CR 466
 TIME: 7-9 AM, 11AM-1 PM, 2-6 PM
 BY: FDA

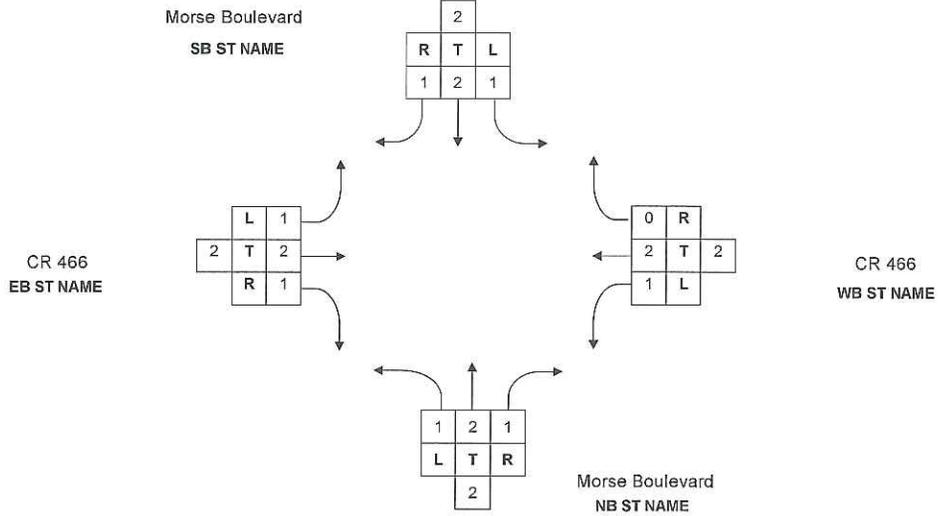
START TIME	NORTHBOUND					SOUTHBOUND					NS TOTAL	EASTBOUND					WESTBOUND					EW TOTAL	GRAND TOTAL
	LEFT	THRU	RIGHT	U-TURN	TOTAL	LEFT	THRU	RIGHT	U-TURN	TOTAL		LEFT	THRU	RIGHT	U-TURN	TOTAL	LEFT	THRU	RIGHT	U-TURN	TOTAL		
7:00	16	24	16	0	56	12	31	13	0	56	112	17	60	19	0	96	26	165	0	191	287	399	
7:15	21	44	21	0	86	11	30	16	0	59	145	26	100	19	0	145	27	204	6	237	382	527	
7:30	23	76	31	1	130	8	43	24	0	75	205	43	139	24	0	206	36	136	6	177	363	568	
7:45	25	86	43	0	154	11	44	26	0	81	235	30	153	26	0	209	63	104	7	174	383	618	
Total	85	229	111	1	426	42	148	81	0	271	697	116	452	88	0	656	152	608	19	0	779	1,436	2,132
8:00	35	82	37	0	154	11	37	27	0	75	229	27	95	20	1	143	53	76	5	134	277	506	
8:15	30	85	52	0	167	9	45	25	0	79	246	14	91	25	1	131	53	97	11	161	292	536	
8:30	33	95	72	0	200	13	55	43	0	111	311	32	127	19	1	179	66	102	6	173	352	663	
8:45	34	115	71	0	220	15	64	29	0	108	328	34	111	28	0	173	64	94	10	166	341	669	
Total	132	377	232	0	741	48	201	124	0	373	1,114	107	424	92	3	626	236	369	31	0	636	1,282	2,376
11:00	30	124	86	0	240	8	74	37	1	120	380	42	111	32	4	189	69	88	7	1	165	354	714
11:15	63	82	91	0	236	15	121	42	0	178	414	44	126	37	0	207	79	137	8	0	224	431	845
11:30	30	111	101	0	242	15	79	43	0	137	379	46	120	34	1	201	85	121	8	0	214	415	794
11:45	37	129	94	0	260	16	80	47	0	143	403	41	121	46	1	209	86	122	12	0	220	429	852
Total	160	446	372	0	978	54	354	169	1	578	1,558	173	478	149	6	806	319	468	35	1	823	1,629	3,185
12:00	46	106	83	0	235	17	95	47	0	159	394	49	122	30	3	204	93	131	10	0	234	438	832
12:15	43	94	90	0	227	12	105	38	0	155	382	36	104	38	3	181	89	109	11	0	209	390	772
12:30	45	97	111	0	253	20	97	47	0	164	417	42	113	33	1	189	117	105	13	0	235	424	841
12:45	41	108	90	0	239	17	102	50	0	169	408	37	104	38	2	191	108	134	10	0	252	433	841
Total	175	495	374	0	954	66	399	182	0	647	1,601	164	443	139	9	755	407	479	44	0	930	1,685	3,286
14:00	48	105	94	0	247	20	85	46	0	151	398	40	139	29	0	208	92	144	14	0	250	458	856
14:15	62	101	83	0	246	20	105	39	0	164	410	29	120	31	1	181	93	112	15	1	221	402	812
14:30	81	116	92	0	289	8	113	42	0	165	452	30	137	28	1	194	107	133	20	0	260	454	905
14:45	49	74	80	0	203	13	93	51	0	157	380	53	183	24	0	260	131	134	23	0	288	548	908
Total	240	396	349	0	985	61	396	178	0	635	1,620	152	579	110	2	843	423	523	72	1	1,019	1,882	3,482
15:00	36	108	78	0	222	12	105	37	0	154	376	44	158	36	1	239	92	117	14	0	223	462	836
15:15	81	88	100	0	249	15	81	48	0	144	393	52	185	29	5	251	89	128	10	0	227	478	871
15:30	61	82	113	0	256	20	76	51	0	147	403	34	111	33	2	180	114	162	15	0	291	471	874
15:45	57	86	73	0	216	9	110	29	0	148	364	37	100	45	4	186	116	126	16	0	259	444	808
Total	215	364	364	0	943	56	372	165	0	593	1,536	167	534	143	12	856	411	533	55	0	999	1,855	3,391
16:00	47	83	80	0	210	13	87	41	1	142	352	38	121	39	1	199	93	118	36	1	248	447	799
16:15	35	58	73	0	164	13	103	43	0	159	323	37	121	37	0	195	87	129	11	0	227	422	745
16:30	38	61	72	0	171	12	108	41	0	161	332	22	141	34	1	198	111	131	11	0	253	451	783
16:45	41	55	61	1	158	9	80	36	0	125	283	28	106	24	2	160	105	127	15	0	247	407	690
Total	161	255	286	1	703	47	378	161	1	587	1,290	125	489	134	4	752	398	505	73	1	975	1,727	3,017
17:00	64	81	100	0	245	10	99	44	0	153	396	28	161	26	1	216	94	156	14	0	264	480	878
17:15	52	62	76	0	190	14	59	37	0	110	300	29	131	19	0	179	83	142	9	0	214	393	693
17:30	44	67	61	0	172	12	73	42	0	127	299	33	138	21	1	191	69	131	9	0	209	400	699
17:45	35	71	71	0	177	10	76	31	0	117	294	35	149	25	0	209	74	117	13	1	205	414	708
Total	195	281	308	0	784	46	307	154	0	507	1,291	125	577	91	2	795	300	546	45	1	892	1,687	2,978

FLORIDA DEPARTMENT OF TRANSPORTATION

SUMMARY OF VEHICLE MOVEMENTS

SECTION County Road CITY The Villages COUNTY Sumter
 STATE ROUTE CR 466 INTERSECTING ROUTE Morse Boulevard
 OBSERVER FDA DATE 5/10/2012 MILEPOST N/A
 WEATHER Fair ROAD CONDITION Good
 REMARKS

FORM COMPLETED BY GP DATE 07/31/12



TIME	NORTHBOUND					SOUTHBOUND					TOTAL	EASTBOUND					WESTBOUND					TOTAL		
	BEGIN/END	L	T	R	U	TOT	L	T	R	U		TOT	N/S	L	T	R	U	TOT	L	T	R		U	TOT
4 - 5																								
5 - 6																								
6 - 7																								
7 - 8		85	229	111	1	426	42	148	81	0	271	697	116	452	88	0	656	152	608	19	0	779	1,435	
8 - 9		132	377	232	0	741	48	201	124	0	373	1,114	107	424	92	3	626	236	369	31	0	636	1,262	
9 - 10																								
10 - 11																								
11 - 12		160	446	372	0	978	54	354	169	1	578	1,556	173	478	149	6	806	319	468	35	1	823	1,629	
12 - 1		175	405	374	0	954	66	399	182	0	647	1,601	164	443	139	9	755	407	479	44	0	930	1,685	
1 - 2																								
2 - 3		240	396	349	0	985	61	396	178	0	635	1,620	152	579	110	2	843	423	523	72	1	1,019	1,862	
3 - 4		215	364	364	0	943	56	372	165	0	593	1,536	167	534	143	12	856	411	533	55	0	999	1,855	
4 - 5		161	255	286	1	703	47	378	161	1	587	1,290	125	489	134	4	752	396	505	73	1	975	1,727	
5 - 6		195	281	308	0	784	46	307	154	0	507	1,291	125	577	91	2	795	300	546	45	1	892	1,687	
6 - 7																								
7 - 8																								
8 - 9																								
9 - 10																								
10 - 11																								
11 - 12																								
TOTAL		1,363	2,753	2,396	2	6,514	420	2,555	1,214	2	4,191	10,705	1,129	3,976	946	38	6,089	2,644	4,031	374	4	7,053	13,142	

Percentage	21%	42%	37%	0%		10%	61%	29%	0%			19%	65%	16%	1%		37%	57%	5%	0%			
Maximum	240	446	374	1		66	399	182	1			173	579	149	12		423	608	73	1			
Minimum	85	229	111	0		42	148	81	0			107	424	88	0		152	369	19	0			

FDOT Cost Estimate

Study Type	Safety Study
County	Sumter
Study Road	CR 466 at Morse Blvd

Pay Item	Description	Unit	Quantity	Unit Price	Total Cost
101-1	Mobilization (10% Construction Materials)	LS	1.00	\$26,560.77	\$26,560.77
107-1	Litter Removal and Disposal	AC	0.10	\$12.80	\$1.28
107-2	Mowing	AC	0.10	\$23.19	\$2.32
110-1-1	Clearing and Grubbing	LS/AC	1.00	\$8,380.62	\$8,380.62
110-4	Concrete Pavement Removal	SY	484	\$12.57	\$6,083.88
120-1	Regular Excavation	CY	545	\$3.77	\$2,054.65
120-6	Embankment	CY	50	\$3.33	\$166.25
285-709	Optional Base, Base Group 9	SY	1,346	\$13.15	\$17,699.90
327-70-06	Milling Existing Asphalt Pavement (1.5" Average Depth)	SY	1,024	\$1.76	\$1,802.24
334-1-13	Superpave Asphaltic Concrete (C)	TN	114	\$83.53	\$9,522.42
337-7-33	Asphaltic Concrete Friction Course (FC 12.5) (1.5")	TN	136.0	\$101.29	\$13,775.44
425-1-361	Inlet Type P-6	EA	1	\$3,024.79	\$3,024.79
425-2-63	Manholes, P-8, Partial	EA	1	\$3,395.62	\$3,395.62
425-6	Valve Box - Adjust	EA	4	\$413.37	\$1,653.48
430-175-136	Pipe Culvert Optional Material (CD) (Round) (36")	LF	10	\$69.55	\$7,024.05
520-1-7	Concrete Curb and Gutter Type E	LF	304	\$11.35	\$3,450.40
520-1-10	Concrete Curb and Gutter Type F	LF	247	\$12.62	\$3,117.14
520-5-21	Traffic Separator Type II 4'	LF	701	\$38.05	\$26,673.05
570-1-2	Performance Turf, Sod	SY	498	\$1.66	\$824.19
580-1-1	Landscape Complete	LS	1	\$5,000.00	\$5,000.00
590-70	Irrigation (Rework)	LS	1	\$2,000.00	\$2,000.00
630-1-12	Conduit (underground)	LF	100	\$3.97	\$397.00
632-7-1	Signal Cable	PI	1	\$2,741.51	\$2,741.51
635-1-11	Pull and Junction Boxes	EA	2	\$294.22	\$588.44
649-31-304	Mast Arm Assembly (WS 110, 70.5')	EA	2	\$23,557.00	\$47,114.00
650-1-311	Traffic Signal Head (F&I) (3-section)	EA	4	\$707.45	\$2,829.78
650-1-411	Traffic Signal Head (F&I) (4-section)	EA	2	\$868.15	\$1,736.29
663-74-15	Vehicle Detector Assembly (Video)	EA	2	\$5,738.46	\$11,476.91
690-10	Traffic Signal Head Assembly Removal	EA	4	\$30.80	\$123.18
690-34-2	Pole Removal Deep (Bolt On Attachment)	EA	2	\$1,832.59	\$3,665.18
690-90	Remove Conduit and Cabling	PI	1	\$264.74	\$264.74
690-100	Signal Equipment, Miscellaneous Remove	PI	1	\$463.42	\$463.42
700-20-40	Single Post Sign (Relocate)	AS	2	\$102.10	\$204.20
700-48-48	Sign Panel (Relocate)	EA	4	\$151.43	\$605.72
711-11-122	Thermoplastic Pavement Markings (8" White)	LF	1288	\$1.09	\$1,403.92
711-11-124	Thermoplastic Pavement Markings (18" White)	LF	219	\$2.63	\$575.97
711-11-125	Thermoplastic Pavement Markings (24" White)	LF	32	\$3.86	\$123.52
711-11-151	Thermoplastic Pavement Markings (6" White 2'-4' Skip)	LF	84	\$0.94	\$78.96
711-11-170	Thermoplastic Pavement Marking Arrow	EA	7	\$55.74	\$390.18
711-11-211	Thermoplastic Pavement Markings (6" Yellow)	NM	0.321	\$4,058.32	\$1,302.72
715-1-12	Lighting - Conductors (No. 8 to No. 6)	LF	5304	\$1.23	\$6,523.92
715-1-60	Lighting - Conductors (Remove and Dispose)	LF	2652	\$0.23	\$609.96
715-2-11	Lighting Conduit (Underground)	LF	1768	\$3.12	\$5,516.16
715-14-11	Lighting Pull Box (Roadside - Moulded)	EA	8	\$375.95	\$3,007.60
715-14-51	Lighting Pull Box (Remove) (Roadside - Moulded)	EA	4	\$218.15	\$872.60
715-500-1	Pole Cable Distribution System	EA	8	\$458.11	\$3,664.88
715-511-145	Light Pole Complete (Special Design)	EA	8	\$6,564.94	\$52,519.52
715-550	Light Pole Complete (Special Design) (Remove)	EA	4	\$288.92	\$1,155.68
					Subtotal
					\$292,168.44
					Contingency (10% Subtotal)
					\$29,216.84
					Maintenance of Traffic (10% Subtotal)
					\$29,216.84
					Erosion Control (5% Subtotal)
					\$14,608.42
					Construction Total
					\$365,210.55
					PECEI (20% Construction Total)
					\$73,042.11
					Design Total
					\$73,042.11