Main Street Corridor:
Evaluation of Effects of Roadway Modifications

This study evaluates Main Street from Depot Avenue to N 8th Avenue before and after reconstruction to determine the impacts of the project on the transportation system considering roadway capacity, traffic volumes including multimodal activity, traffic speeds, travel time, and safety. In addition, staff identified changes to the surrounding land uses and land values along the corridor.

Project Summary:

Main Street from Depot Avenue to N 8th Avenue was reconstructed in 2009/2011 from a 4-lane with center turn lane configuration to a 2-lane with center turn lane, on-street parking, bicycle lanes, and wider sidewalks with bulb-outs at intersections. Bus bays were added where feasible to accommodate transit vehicles. The traffic signals along the corridor were upgraded to current traffic management standards, and a few traffic signals were removed. The intersection at N 1st Avenue was reconfigured as one-way into Main Street at both the eastbound and westbound approaches. In addition, underground utilities were replaced. The roadway was under construction from September 2009 to June 2011. The second phase of the project implementation is funded and under development, and includes lighting improvements, streetscaping, evaluation of additional midblock crossing locations, and the construction of a roundabout at the intersection of Depot Avenue to further complement the 'complete street' configuration. *Figure 1* depicts the project location. *Figure 2* illustrates the roadway configuration before and after reconstruction.

Figure 1: Project Location

Figure 2: Main Street Corridor - Before and After

Note: Sample cross-section south of S 5th Ave. Left: 2008; Right: 2012

Project Impacts:

City staff collected data before and after the project implementation to evaluate the effectiveness of the project and to determine impacts to the transportation network and adjacent land uses. The findings are categorized and summarized in the following sections. In general, when comparing before and after conditions:

- Traffic volumes along the corridor have decreased without significant dispersion to adjacent corridors. This change however cannot be solely attributed to the project as a downward trend in traffic volumes is observed countywide;
- No changes were observed on the roadway level of service;
- Travel time to traverse the corridor from Depot Avenue to N 8th Avenue increased by an average of 29 seconds;
- Travel speeds decreased by an average of 2 miles per hour;
- The number and severity of crashes have decreased;
- Bicycle volume increased significantly along Main Street; and,
- Several properties along the corridor were improved post construction of the project.

Traffic Volumes

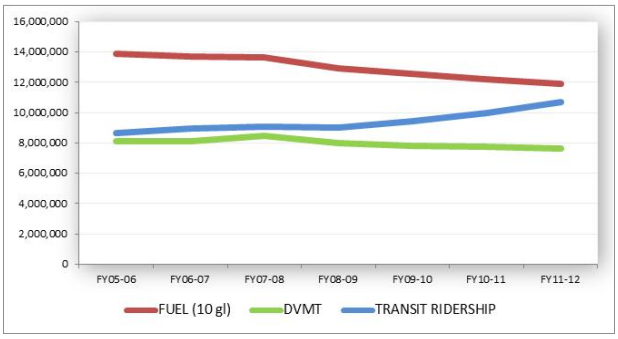
The traffic volumes along Main Street have decreased on average by 21% post-reconstruction comparing 2008 to 2012 traffic volumes. As shown in *Table 1*, there was no negative impact to adjacent roadways in the area. The gridded roadway network in the downtown and other major north/south corridors in the vicinity have absorbed the traffic demand and no significant increase is noted at any particular segment. In addition to the roadway modifications other factors may also have contributed to the reduction in traffic such as the overall downward trend in traffic volumes observed in Alachua County. During the period between 2005 and 2012 there was a 4.2% decrease in the number of daily vehicle-miles travelled (DVMT) countywide[1] while the population increased by 3.8%. The decrease in DVMT may represent a shift to other modes such as transit which saw an increase in ridership during the same period, and may be indicative of behavior adjustments induced by other environmental factors such as increases in fuel costs and changes in local policies and land use patterns that promote mixed use development and shorter trips that can be accomplished by modes other than automobile. *Figure 3* depicts the observed trends in travel and fuel consumption from FY05 to FY12 (FY12 DVMT value reflects draft report received via e-mail from the Florida Department of Transportation and is currently not posted online; fuel data was obtained from the Florida Department of Revenue[2]).

[1] Source: Florida Department of Transportation, online at: http://www.dot.state.fl.us/planning/statistics/mileage-rpts/public.shtm
[2] Online at http://dor.myflorida.com/dor/taxes/fuel/

Table 1: Traffic Volume Trends

STREET	2005	2006	2007	2008	2009	2010	2011	2012
N MAIN ST	21,000	18,100	20,500	17,200	17,800	17,600	13,200	13,100
S MAIN ST	18,200	15,800	16,400	14,400	13,900	13,700	13,500	11,300
NW 6TH ST	9,522			8,942			7,969	
SW 6TH ST	6,804			6,074			8,495	
NW 3RD ST			490					559
NE 7TH ST		1,188			874			
SE 7TH ST		1,983			1,773			1,595
NE 9TH ST	5,965			6,086				5,421
SE 9TH ST		3,701			2,138			2,384
NE 8TH AV	10,425			11,469			10,349	
NW 8TH AV	17,700	17,500	18,600	16,300	16,300	16,500		
E UNIVERSITY AV	27,000	21,000	21,000	22,500	21,000	21,000	19,700	18,600
W UNIVERSITY AV	28,000	25,000	22,500	23,000	21,500	22,000	21,000	19,900
SW DEPOT AV		5,293			3,080		4,803	
SE DEPOT AV		7,173					4,018	
SW 13TH ST	48,000	34,500	35,000	34,500	33,000	35,000	35,000	33,000
NW 13TH ST	34,000	29,000	29,500	29,500	28,500	27,500	28,000	28,000
SE 11TH ST	21,000	19,500	18,150	19,050	19,000	19,500	20,350	18,850

Figure 3: Transportation Trends in Alachua County (FY05-FY12)



Level of Service

Based on the Metropolitan Transportation Planning Organization (MTPO) Multimodal Level of Service (LOS) Reports for years 2008 and 2012[3], there was no significant change in the level of service along Main Street before and after the reconstruction. As indicated in *Table 2* Main Street operates at or below the adopted LOS. The MTPO report considers Williston Road as the segment boundary for the portion south of University Avenue; this segment includes a 4-lane portion resulting in a higher maximum service volume, however when considering only the 2-lane portion between Depot Avenue and University Avenue with maximum service volume of 15,960 vehicles per day the segment operates at the adopted LOS D at 76% of available capacity.

[3] Available online at http://www.ncfrpc.org/mtpo/publications

Table 2: Level of Service Impacts

Segment	Year	Adopted LOS	Maximum Service Volume	Operating at % Capacity	Annual Average Daily Traffic	Operating LOS
Williston Rd to University Ave	2008	D	31,065	43%	13,500	C
	2012	D	31,540	39%	12,200	C
University Ave to N 8th Ave	2008	D	21,675	81%	17,600	D
	2012	D	15,960	87%	13,900	D

Source: MTPO Multimodal Level of Service Report (Y2008 and Y2012)

Travel Time & Travel Speed

Travel time and speed data for the 'before' period was recorded in October 2001. The 'after' data was recorded in April 2013. The study consisted of 5 runs in both northbound and southbound directions for the extent of the project (from Depot Avenue to N 8th Avenue) during four periods of the day. *Table 3* summarizes the findings. As shown in *Table 3*, on average there was an increase of 29 seconds in the travel time and a 2.1 mph decrease in the travel speeds when comparing before and after conditions. The highest impact is observed in the northbound direction particularly during midday when the travel time increase reached up to 105 seconds. The calculated standard deviation of the after period is 64 seconds, compared to 29 seconds before reconstruction, indicating that the travel time under the new roadway configuration is significantly more sensitive to fluctuations in traffic patterns caused by the presence of heavy vehicles as well as conflicts with high turn movements and pedestrian crossings, which may contribute to extension of queues and result in additional delays. The traffic signal timing at the intersection of Main Street and University Avenue is currently under evaluation to determine what changes can be implemented to address the delays observed.

Table 3: Travel Time and Speed

PERIOD	TRAVEL TIME (Before / After) [SEC]				TRAVEL SPEED (Before / After) [MPH]			
	SOUTHBOUND	NORTHBOUND	TOTAL AVG	Difference	SOUTHBOUND	NORTHBOUND	TOTAL AVG	Difference
7:45 AM	206 / 225	192 / 245	199 / 235		17.9 / 16.4	19.3 / 15.1	18.6 / 15.8	
11:30 AM	234 / 205	186 / 291	210 / 248		15.8 / 18.0	19.9 / 12.7	17.9 / 15.4	
1:00 PM	207 / 213	205 / 280	206 / 247		17.9 / 17.4	18.0 / 13.2	18.0 / 15.3	
4:45 PM	196 / 220	257 / 234	227 / 227		18.9 / 16.8	14.4 / 15.8	16.7 / 16.3	
			210 / 239	29 sec			17.8 / 15.7	2.1 mph

Crashes

The combined Alachua County/City of Gainesville crash database was used to evaluate the incidence of crashes before and after the road reconstruction. The evaluation considered the 'before' period of January 1, 2008 to June 3, 2009; and the 'after' period of January 1, 2012 to June 3, 2013. Crashes that occurred during construction or during the period of adjustment immediately following it were not considered. As demonstrated in *Table 4*, the number and severity of crashes was significantly reduced post-construction. There was a reduction of 69% in the overall incidence of crashes post-construction, and a decrease of 81% in the number of crashes resulting in injuries. The overall cost associated with property damages decreased by 73%. When comparing the before and after study periods, the corridor crash rate[4] dropped from 6.82 to 2.69 per million vehicles indicating a significant improvement in corridor safety after the project implementation. The results are consistent with findings of other studies where significant reductions in the number and severity of crashes were observed. The Federal Highway Administration lists this type of roadway reconfiguration as a proven safety countermeasure to reduce crashes and increase operational benefits for all system users[5].

Table 4: Summary of Before and After Crashes

	BEFORE	AFTER
Number of Crashes	59	18
Crash Type		
Rear End	21	9
Angle	19	3
Sideswipe	3	3
Pedestrian	3	0
Bicycle	2	1
Other	11	2
Severity		
Fatalities	0	0
Incapacitating	3	1
Non-Incapacitating	18	3
Property Damage Only	38	14
Total Estimated Damage	$154,043	$41,350
Crash Rate	6.82	2.69

Multimodal Use

Bicycle and pedestrian volume counts were obtained for the AM and PM peaks in 2004 (between January and March) and in 2013 (April) at 4 intersections along Main Street at: S 4th Avenue; S 2nd Avenue; S 1st Avenue and N 2nd Avenue. *Table 5* provides a summary of the before and after observations. The added bicycle lanes and reduced travel speeds contributed to the creation of a multimodal complete street that is more attractive to cycling. Bicycle volumes along the corridor increased significantly post construction with over 75% of the bicycle movement using the on-street bike

[4] Calculated based on methodology outlined in the Highway Safety Manual, AASHTO, 2010

[5] Federal Highway Administration, online at: http://safety.fhwa.dot.gov/provencountermeasures/fhwa_sa_12_013.htm

lanes. Observations show a decrease in pedestrian activity during the morning peak and an increase in the afternoon peak along the corridor. Other factors may have influenced the fluctuation in pedestrian movements such as the relocation of the RTS transfer station, changes in employment centers and business operating hours.

Eastbound/westbound cross movement of bicycle and pedestrians from the intersecting streets evaluated increased post-construction.

Table 5: Summary of Bicycle and Pedestrian Movement

		BIKE			PEDESTRIAN		
		Before	After	Difference	Before	After	Difference
MAIN STREET (north/south)	AM Peak	41	80	95%	144	93	-35%
	PM Peak	92	227	147%	213	240	13%
CROSS STREETS (east/west)	AM Peak	49	92	88%	124	151	22%
	PM Peak	125	169	35%	229	367	60%

Note: Volumes reflect the 2-hour total between 7:00 - 9:00 am for the AM peak, and 4:00 - 6:00 pm for the PM peak

Portions of the Main Street corridor are currently served by 3 RTS transit routes, depicted in *Table 6*. Routes operate on a 30- to 60-minute headway, with service hours between 6:00 am and 11:00 pm, serving 164 passengers daily (total passenger boarding and alighting along the project boundaries). Since the construction of the Rosa Parks Downtown Transfer Station in 2007 and the closing of Bethel Station downtown, the number of routes traversing the Main Street corridor has decreased significantly from 10 transit routes in 2001 to the current 3 routes.

Table 6: RTS Transit Routes along Main Street

Route	Segment Served	Weekday Span of Service	Weekday Headway (minutes)	Daily Ridership
6	Depot Ave to NW 1st Ave	6:03 AM - 7:58 PM	60	37
15	University Ave to NW 8th Ave	6:03 AM - 10:58 PM	30, 60	103
	NW 8th Ave to NW 16th Ave			498
27	Depot Ave to NW 1st Ave	8:33 AM - 6:05 AM	60	24

Impact to Adjacent Land Uses and Property Values

There are mixed land uses for the properties fronting Main Street including entertainment, retail, manufacturing, restaurant, government and offices. In general, there have not been major changes in

land use along Main Street since 2002. The most significant change was the construction of the Alachua County Criminal Justice Center in the 200 block of S Main Street, which precedes the Main Street reconstruction.

Property values along Main Street have generally increased significantly since 2002. Previous studies of total land value (property plus improvements) showed mixed outcomes between 1990 and 2002, with most properties seeing an increase or decrease of less than 49%. Since 2002, however, the value of many properties along Main Street has risen more than 100% (as a result of market conditions and a potential positive impact from the project).

While staff was unable to determine a specific correlation between the reconstruction of Main Street and the observed increase in land values, it is noted in the literature that changes to corridors that calm traffic, provide additional parking and improve multimodal access tend to have a positive impact in surrounding businesses and land values[6]. Improvements to livability from the addition of features such as sidewalks and bike lanes, parking, lower speeds and other infrastructure-related additions like brick pavers and lighting, can also create a pleasing aesthetic that can enhance the marketability of an area and stimulate redevelopment, including increases in land values. In addition, reduced travel speeds increase visibility and recognition of surrounding destinations leading to a potential increase in business activity[7]. Some case studies indicated an increase in growth sales of commercial establishments post-implementation of similar projects[8].

Since 2010, 18 properties have been permitted for a remodel, even despite nationwide economic challenges. As a further indicator of economic activity, zoning compliance permits (which are required to establish a new business) slowed briefly during construction but are on pace to return to preconstruction levels. From 2004-2010, an average of 11 permits were issued per year. In January and February of 2013 alone, 6 permits were issued. Figures 4, 5 and 6 illustrate the changes over time by parcel.

Conclusions:

The results of the reconstruction of Main Street between Depot Avenue and N 8th Avenue are consistent with results of other similar projects. The lane changes and addition of bicycle and parking lanes significantly improved safety conditions, calmed traffic and increased multimodal usability. Overall, the project had positive impacts in the livability of the surrounding area with some improvements noted in redevelopment activity adjacent to the corridor. Negative impacts were noted to the travel time particularly in the northbound direction during midday; staff is currently working to adjust the traffic signal timing at the critical intersection of Main Street and University Avenue to reduce delays to the extent possible and will continue to monitor the impacts.

[6] *"Going on a Road Diet",* Federal Highway Administration, 2011; online at: http://www.fhwa.dot.gov/publications/publicroads/11septoct/05.cfm
[7] Manual for Uniform Traffic Control Devices, FHWA, 2003
[8] *"Road Diet Handbook: Setting Trends for Livable Streets",* September 2006

Figure 4: Land Use Changes (2002 – 2012)

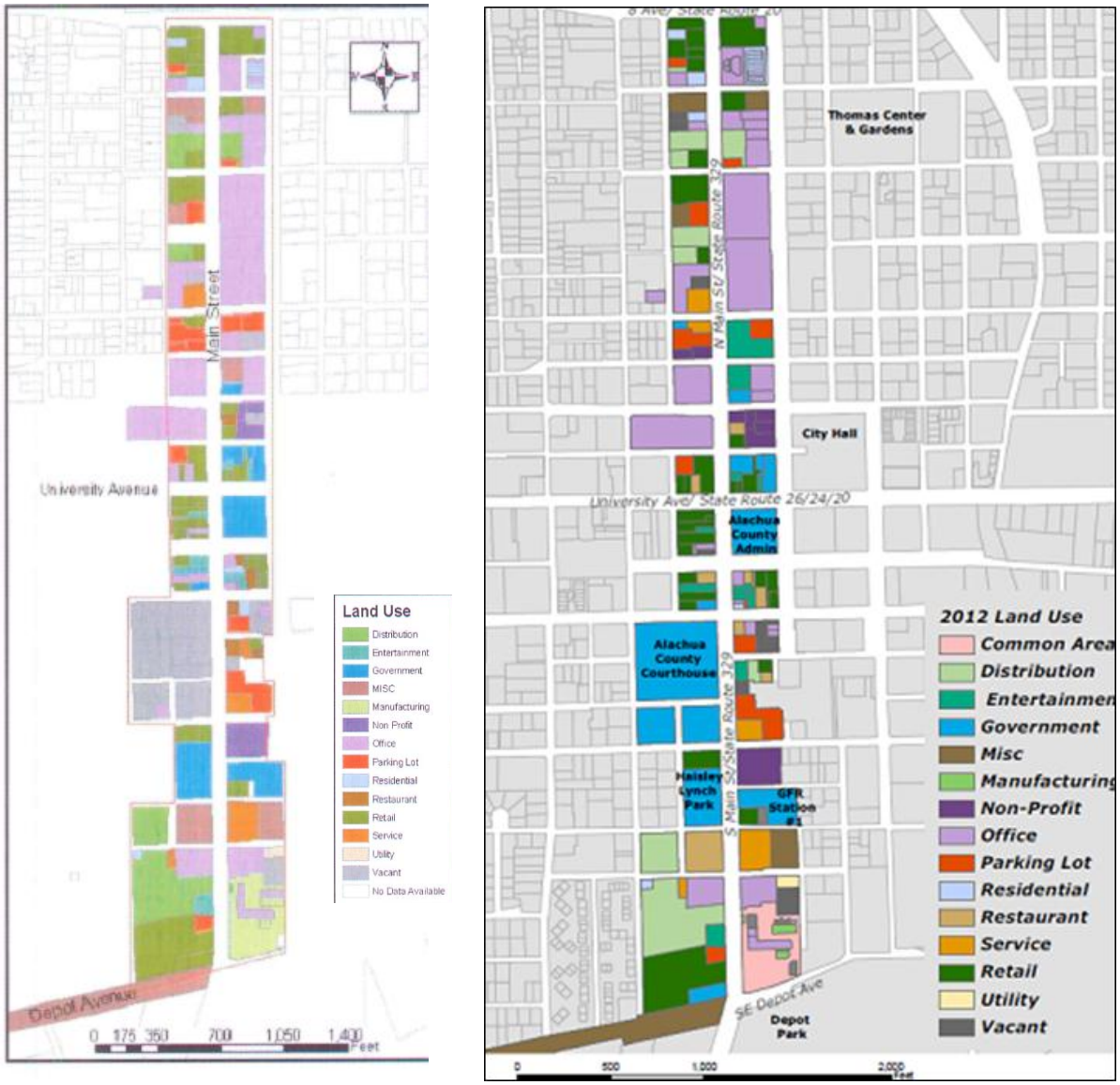


Figure 5: Permitted Remodel (2009-2012)

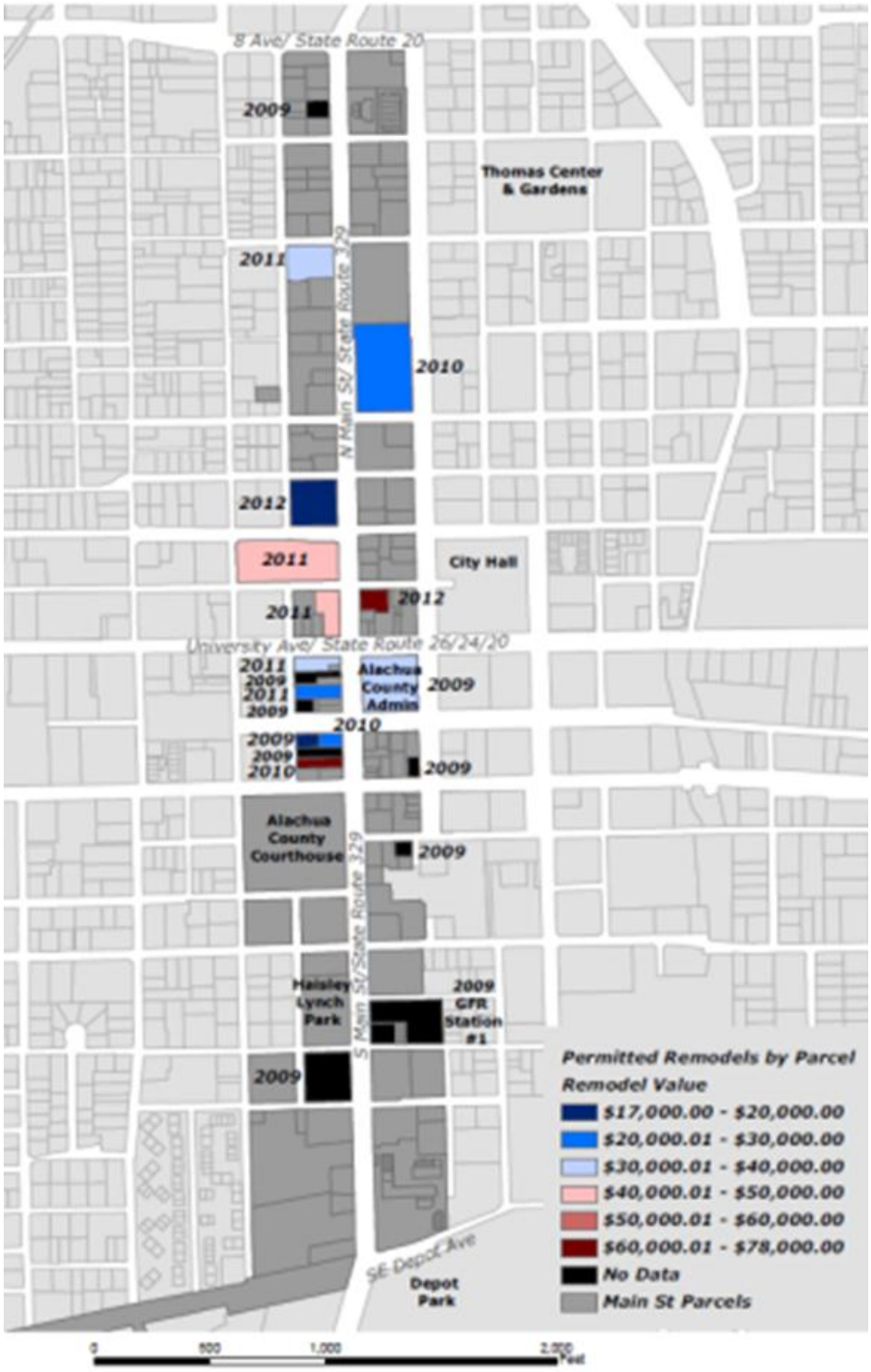


Figure 6: Zoning Compliance Permits (2004-2013)