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ROUNDABOUT CONCEPT DESIGN STUDY

PREPARED FOR THE CITY OF PALMETTO

NOVEMBER 07, 2011

Jensen Beach, FL

Moore Design

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ROUNDABOUT CONCEPT DESIGN STUDY

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Source Material:

Insurance Institute for Highway Safety, Highway Loss Data Institute 1996-2011
National Roundabout Conference, Kansas City, 2008
Florida Roundabout Guide, Florida Department of Transportation
Liberty Mutual Insurance Company
U.S. Department of Transportation, Federal Highway Administration

Roundabout Concept Design Study

Prepared for:

City of Palmetto Community Redevelopment Agency

by

Moore 2 Design, LLC

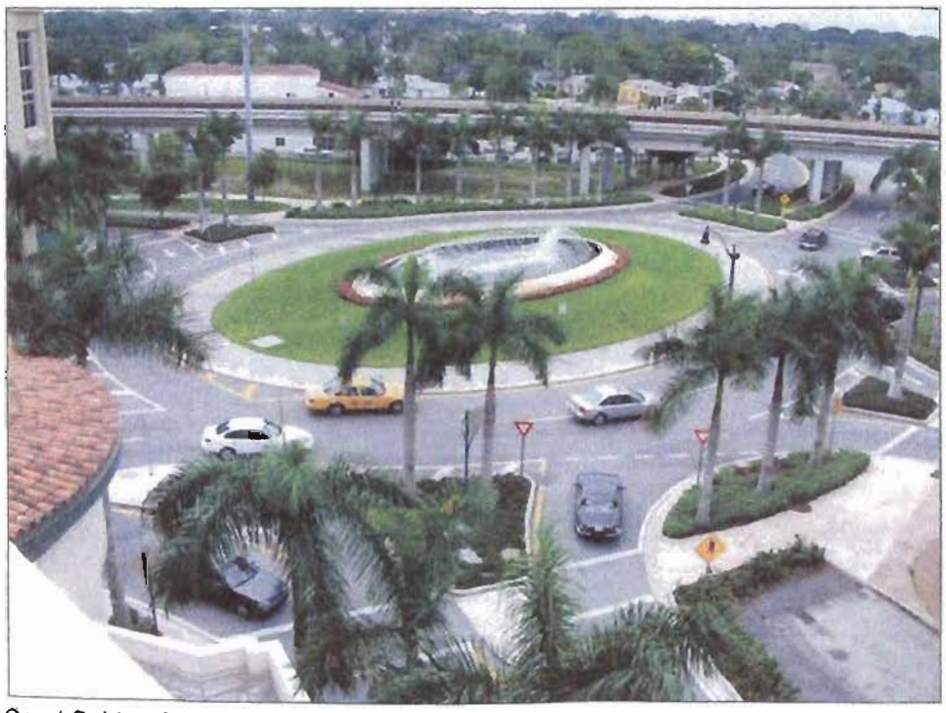
November 07, 2011

1. What is a roundabout?

The modern roundabout is a circular intersection with design features that promote safe and efficient traffic flow.

At roundabouts vehicles travel counterclockwise around a raised center island, with entering traffic yielding the right-of-way to circulating traffic. In urban settings, entering vehicles negotiate a curve sharp enough to slow speeds to about 15-20 mph; in rural settings, entering vehicles may be held to somewhat higher speeds (30-35 mph). Within the roundabout and as vehicles exit, slow speeds are maintained by the deflection of traffic around the center island and the relatively tight radius of the roundabout and exit lanes.

Slow speeds aid in the smooth movement of vehicles into, around, and out of a roundabout. Drivers approaching a roundabout must reduce their speeds, look for potential conflicts with vehicles already in the circle, and be prepared to stop for pedestrians and bicyclists. Once in the roundabout, drivers proceed to the appropriate exit, following the guidance provided by traffic signs and pavement markings.

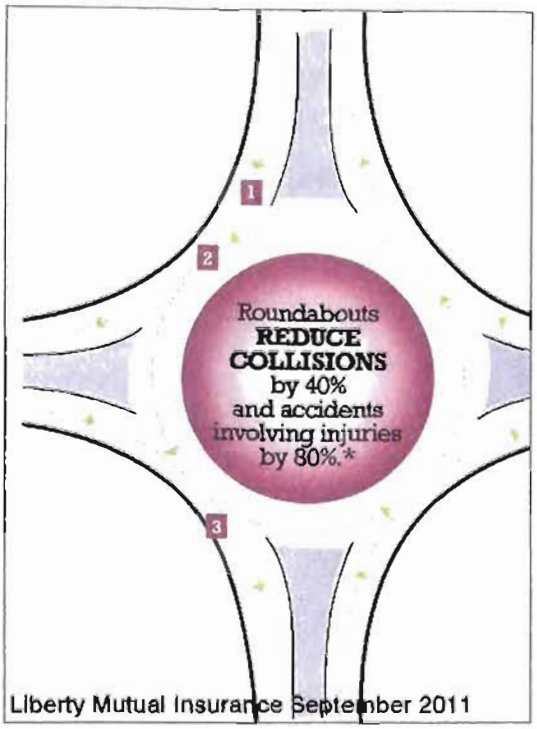


Coral Gables, FL

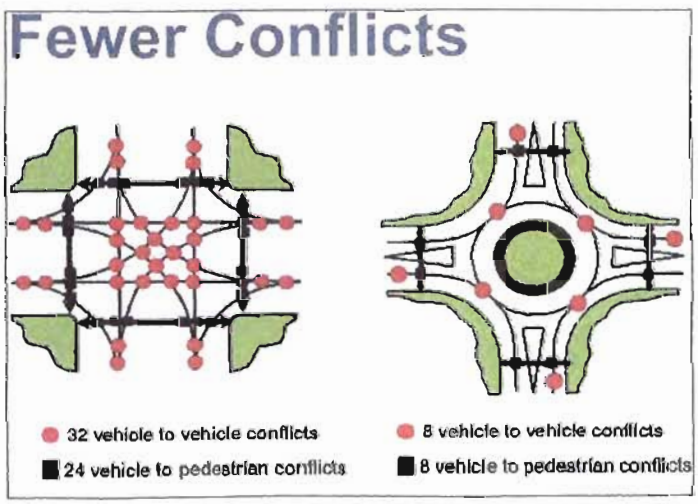
2. Roundabout Features

2-a. Safety

Several features of roundabouts promote safety. At traditional intersections with stop signs or traffic signals, some of the most common types of accidents are right-angle, left-turn, and head-on collisions. These types of collisions can be severe because vehicles may be traveling through the intersection at high speeds. With roundabouts, these types of potentially serious crashes essentially are eliminated because vehicles travel in the same direction. Installing roundabouts in place of traffic signals can also reduce the likelihood of rear-end accidents and their severity by removing the incentive for drivers to speed up as they approach green lights and by reducing abrupt stops at red lights. The vehicle-to-vehicle conflicts that occur at roundabouts generally involve a vehicle merging into the circular roadway, with both vehicles traveling at low speeds — generally less than 20 mph in urban areas and less than 30-35 mph in rural areas.



A 2001 Institute study* of 23 intersections in the United States reported that converting intersections from traffic signals or stop signs to roundabouts reduced injury accidents by 80 percent and all crashes by 40 percent. Similar results were reported by Eisenman et al : a 75 percent decrease in injury accidents and a 37 percent decrease in total accidents at 35 intersections that were converted from traffic signals to roundabouts. A study of 17 higher speed rural intersections (40 mph and higher speed limits) found that the average injury crash rate per million entering vehicles was reduced by 84 percent and fatal crashes were eliminated when the intersections were converted to roundabouts. Studies of intersections in Europe and Australia that were converted to roundabouts have reported 41-61 percent reductions in injury crashes and 45-75 percent reductions in severe injury crashes.

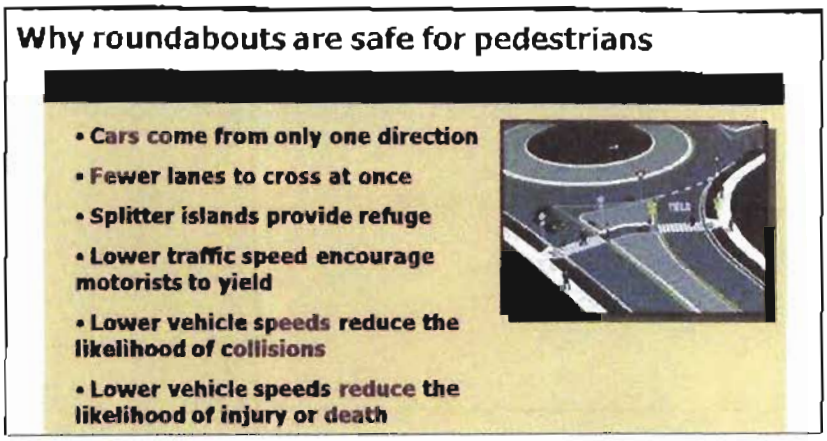


*Insurance Institute for Highway Safety, Highway Loss Data Institute 1996-2011

2-b. Pedestrians

Roundabouts generally are safer for pedestrians than traditional intersections. In a roundabout, pedestrians walk on sidewalks around the perimeter of the circular roadway. If they need to cross the roadway, they cross only one direction of traffic at a time. In addition, crossing distances are relatively short, and traffic speeds are lower than at traditional intersections.

Studies in Europe indicate that, on average, converting conventional intersections to roundabouts can reduce pedestrian accidents by about 75 percent. Single-lane roundabouts, in particular, have been reported to involve substantially lower pedestrian accident rates than comparable intersections with traffic signals.

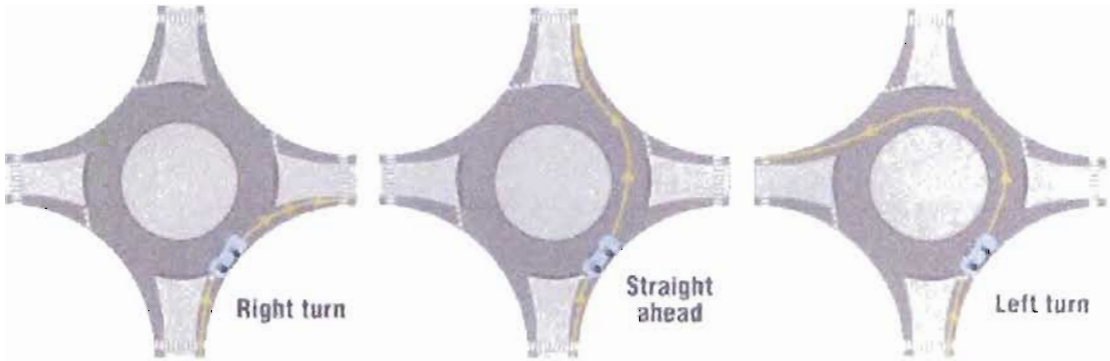


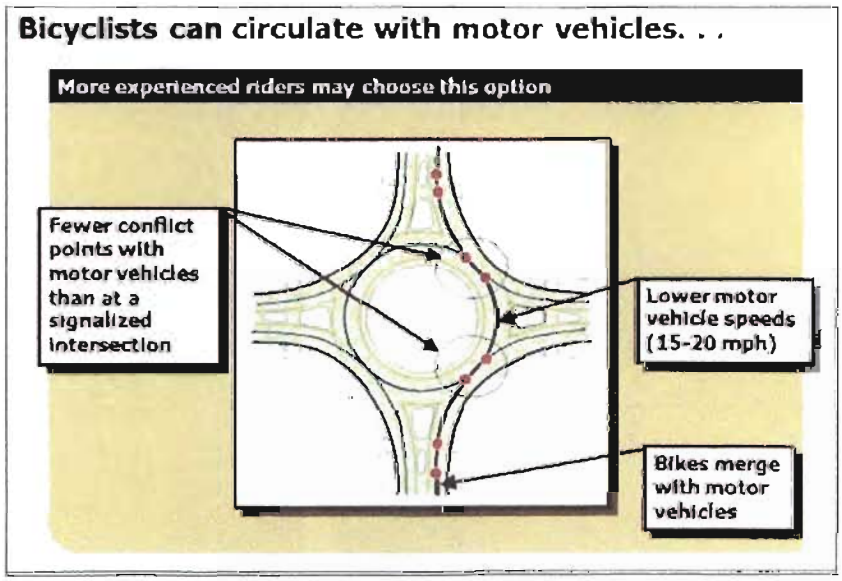
Bradenton Beach, FL

2-c. Traffic flow

Several studies conducted by the Institute and others have reported significant improvements in traffic flow following conversion of traditional intersections to roundabouts. A study of three intersections in Kansas, Maryland, and Nevada, where roundabouts replaced stop signs, found that vehicle delays were reduced 13-23 percent and the proportion of vehicles that stopped was reduced 14-37 percent. A study of three locations in New Hampshire, New York, and Washington, where roundabouts replaced traffic signals or stop signs, found an 89 percent average reduction in vehicle delays and a 56 percent average reduction in vehicle stops. A study of 11 intersections in Kansas found a 65 percent average reduction in delays and a 52 percent average reduction in vehicle stops after roundabouts were installed.

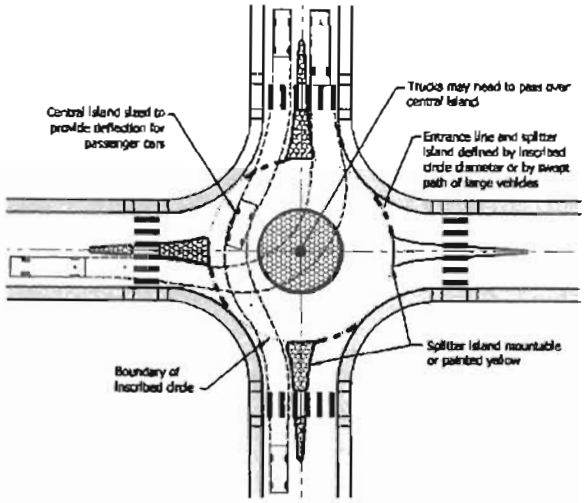
A 2005 Institute study documented missed opportunities to improve traffic flow and safety at 10 urban intersections suitable for roundabouts where either traffic signals were installed or major modifications were made to intersections with signals. It was estimated that the use of roundabouts instead of traffic signals at these 10 intersections would have reduced vehicle delays by 62-74 percent. This is equivalent to approximately 325,000 fewer hours of vehicle delay on an annual basis.





2-d. Larger vehicles

To accommodate vehicles with large turning radii such as trucks, buses, and tractor-trailers, roundabouts provide an area between the circulatory roadway and the central island, known as a truck apron, over which the rear wheels of these vehicles can safely track. The truck apron generally is paved with materials like brick or cobblestone that have a different texture than the roadway to discourage smaller vehicles from using it.



2-e. Older drivers

Roundabouts eliminate many of the driving scenarios that can be challenging for older drivers. Relative to other age groups, senior drivers are over-involved in accidents occurring at intersections. In 2008, 37 percent of drivers 70 and older in fatal accidents were involved in multiple-vehicle intersection accidents, compared with 22 percent among drivers younger than 70.

Older drivers' intersection accidents often are due to their failure to yield the right-of-way. Particular problems for older drivers at traditional intersections include left turns and entering busy thoroughfares from cross streets. Roundabouts eliminate these situations entirely.

A 2007 study in six communities where roundabouts replaced traditional intersections found that about two-thirds of drivers 65 and older supported the roundabouts.

Coral Springs, FL

2-f. Driver Preference

Drivers may be skeptical, or even opposed, to roundabouts when they are proposed. However, opinions quickly change when drivers become familiar with them. A 2002 Institute study in three communities where single-lane roundabouts replaced stop sign-controlled intersections found 31 percent of drivers supported the roundabouts before construction compared with 63 percent shortly after. Another study surveyed drivers in three additional communities where single-lane roundabouts replaced stop signs or traffic signals. Overall, 36 percent of drivers supported the roundabouts before construction compared with 50 percent shortly after. Follow-up surveys conducted in these six communities after roundabouts had been in place for more than one year found the level of public support increased to about 70 percent on average.

Five Points, Sarasota, FL

Clearwater, FL

3. Long Term Benefits:

Because roundabouts improve the efficiency of traffic flow, they also reduce vehicle emissions and fuel consumption.

In one study, installing a roundabout in place of an intersection with signals reduced carbon monoxide emissions by 29 percent and nitrous oxide emissions by 21 percent. In another study, replacing traffic signals and stop signs with roundabouts reduced carbon monoxide emissions by 32 percent, nitrous oxide emissions by 34 percent, carbon dioxide emissions by 37 percent, and hydrocarbon emissions by 42 percent.

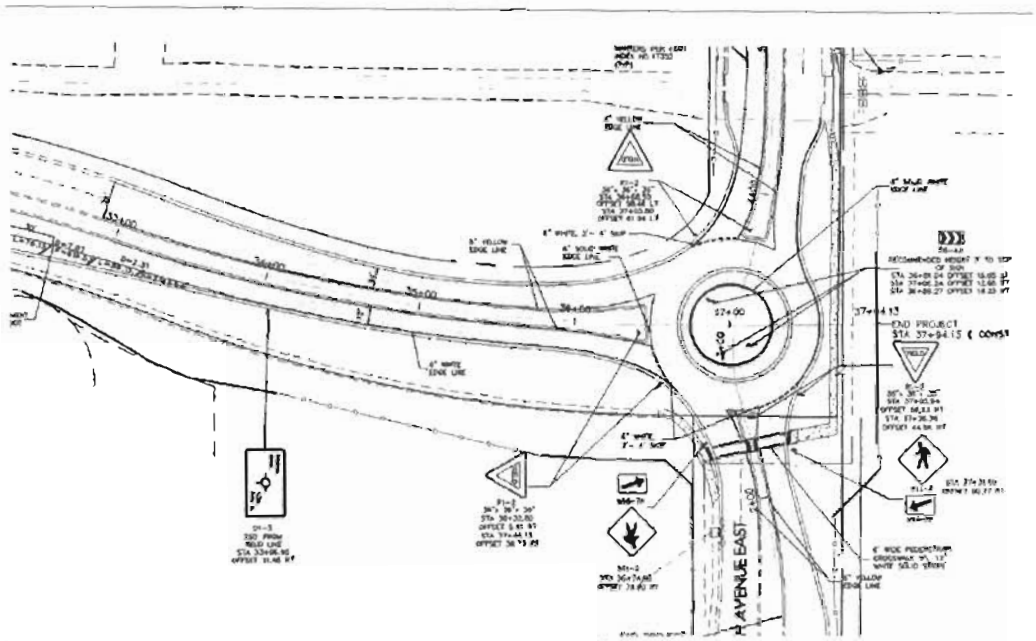
Constructing roundabouts in place of traffic signals can reduce fuel consumption by about 30 percent. At 10 intersections studied in Virginia, this amounted to more than 200,000 gallons of fuel per year.

While the initial construction cost of a roundabout varies site by site, its maintenance is cheaper than for intersections with signals. Roundabouts also can enhance aesthetics by providing landscaping opportunities.

Clearwater, FL

4. Long Term Costs

Basic signalized intersections cost an average of $3,000 per year for electricity, maintenance of loops, controller, signal heads, timing plans, etc. In addition, signal heads and controllers have to be replaced and completely rebuilt on a regular basis. Larger signalized intersections are more expensive to maintain. The only maintenance costs for a roundabout are for landscaping and occasional sign replacement.



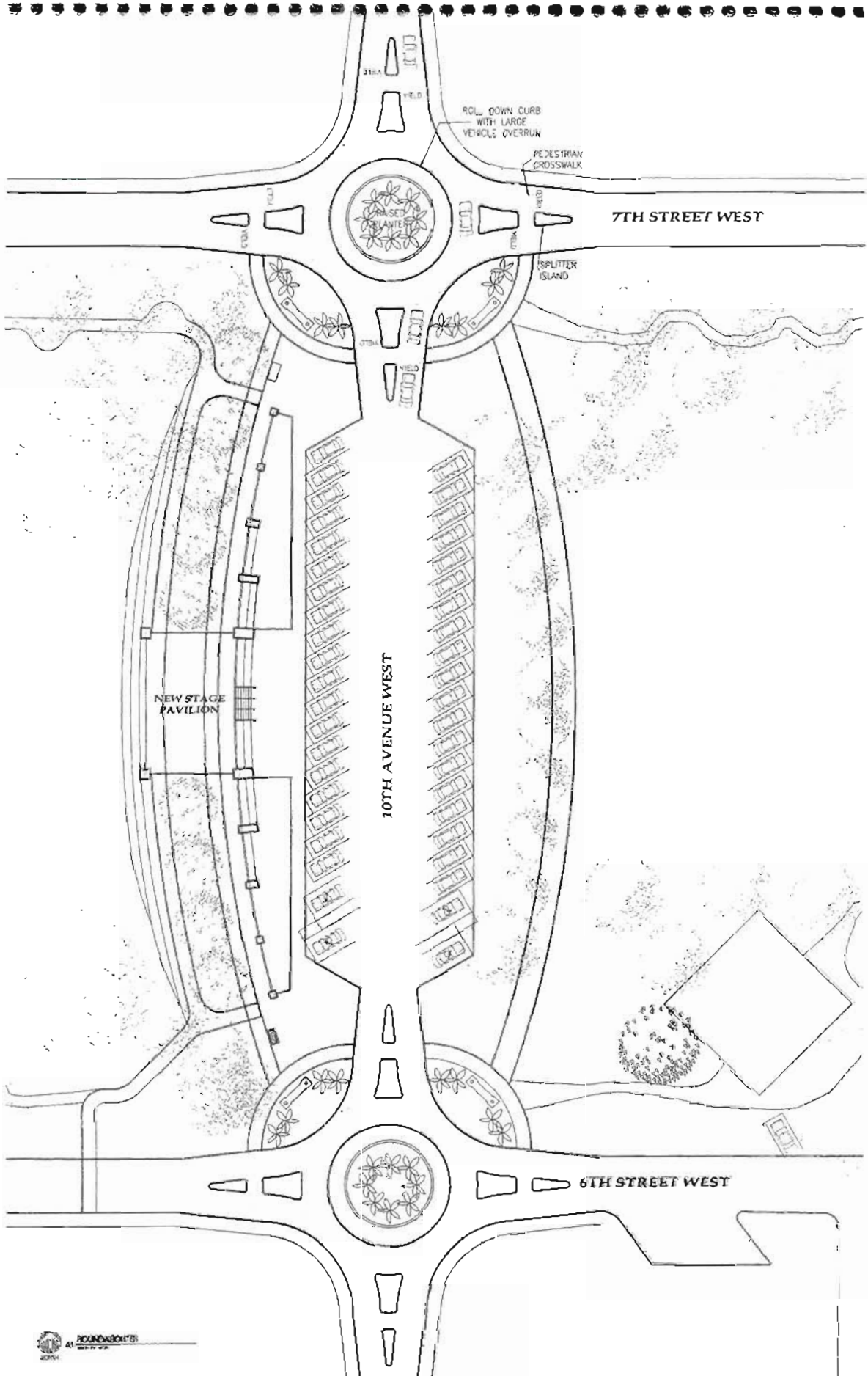
The first roundabout for Palmetto is currently under construction on Haben Boulevard.

5. Executive Summary

The City of Palmetto should consider roundabouts for future intersection improvements for the following reasons:

1. It's the safest intersection
2. Higher capacity with lower delay
3. Good for all modes of traffic
   a. Cars
   b. Trucks
   c. Bikes
   d. Pedestrians
4. Design flexibility
   a. Can accommodate existing property geometry, uses and rights of way
5. Sustainability
   a. Lower long-term costs than a signalized intersection
   b. Environmental impacts
      i. Can incorporate Low Impact Design
         a. Pervious pavers
         b. Stormwater filtering
      ii. Reduce the amount of energy consumed (no signalization)
      iii. Reduce the amount of natural resources to construct
      iv. Reduce vehicle emissions due to shorter idle and wait times

The attached conceptual design for 10th Avenue at 6th and 7th Streets indicate how future roundabouts can tie into the Sutton and Lamb Park Master Plan.



PRELIMINARY NOT FOR CONSTRUCTION

ROUNDABOUTS 10TH AVE AND 6TH AND 7TH STREETS	SUTTON AND LAMB PARKS	Moore 2 Design
SHEET NO. R-1	PROJECT NO. 1:101	DATE 05/12/11
	PALMETTO, FL	

NO.	DATE	REVISION DESCRIPTION
1	11.06.11	ISSUE DATE