

Consensus Building for Roundabouts in Windermere, Florida

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Credits:

Canin Associates, Inc.: Lead Consultant
Responsible for project management, urban planning,
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HDR Engineering, Inc.: Responsible for all traffic engineering and civil
engineering design of roads

PEC, Inc.: Responsible for survey and utility design

Abstract

The Town of Windermere, Florida, a small community west of Orlando, is nearly an island nestled amongst the Butler Chain of Lakes. Windermere's two-lane Main Street, which passes through its town center, provides one of the few north-south roadway connections in western Orange County. With rapid growth in the western portion of the County, Main Street had seen a continual increase in traffic volumes and congestion that threatened the core of this tranquil community. All-way stop control at two primary intersections had led to extensive traffic backups with peak hour queues exceeding a mile in some instances, and many frustrated motorists diverting from the primary roads to cut through local neighborhood streets.

To help preserve its town center, enhance the sense of place, and provide relief to the congestion and cut-through traffic, the Town selected the team of Canin Associates and HDR Engineering, Inc. to develop a Town Center Master Plan. To ensure the ultimate plan would enjoy broad support, the Consultant engaged the townspeople in a visioning and community consensus building process which incorporated a series of workshops, public meetings, and exercises such as a visual preference survey. One of the early concepts developed to help manage traffic and provide aesthetic enhancements was the conversion of the all-way stop intersections to roundabouts. Consensus building was a difficult process because at the outset of the project, roughly half of the townspeople were opposed to *any* change within the town center. Nor were roundabouts an easy sell, because there were few good local examples in the Orlando area to point to. Further, many of the townspeople had bad experiences in the past with some form of circular intersections (though most were *not* modern roundabouts), and were initially biased against roundabouts. Much time was spent in workshops and public meetings explaining what a modern roundabout is and how it operates. Many townspeople began to gain confidence in the concept of roundabouts after seeing photo examples, traffic simulations comparing different traffic control options, and even a video of a large fire truck easily navigating a similar roundabout in another city.

Ultimately, the town agreed upon and approved a plan that included a two-lane brick street surface with parallel parking and single lane concrete roundabouts at the two primary town center intersections. The Main Street Plan has since been implemented, and the transformation has been even more successful than the Town had hoped. Traffic queuing and cut-through traffic has been dramatically reduced because traffic flows much more easily through the town center. However, despite better traffic flow, the speed of traffic has been kept at appropriate levels due to the design employed. Further, the street design has helped to enhance the sense of place within the town center. The success of the ultimate product can be tied directly to the success of the public process and identifying and approving an attractive and efficient corridor concept.

Introduction

The Town of Windermere, Florida is a small community located in western Orange County, west of Orlando, and situated among the pristine Butler Chain of Lakes. The Town, with a population of only about 2,500 residents, has two primary two-lane roadways that pass through the Town's center, Main Street running north-south and Sixth Avenue running east-west, as shown in Figure 1. Both



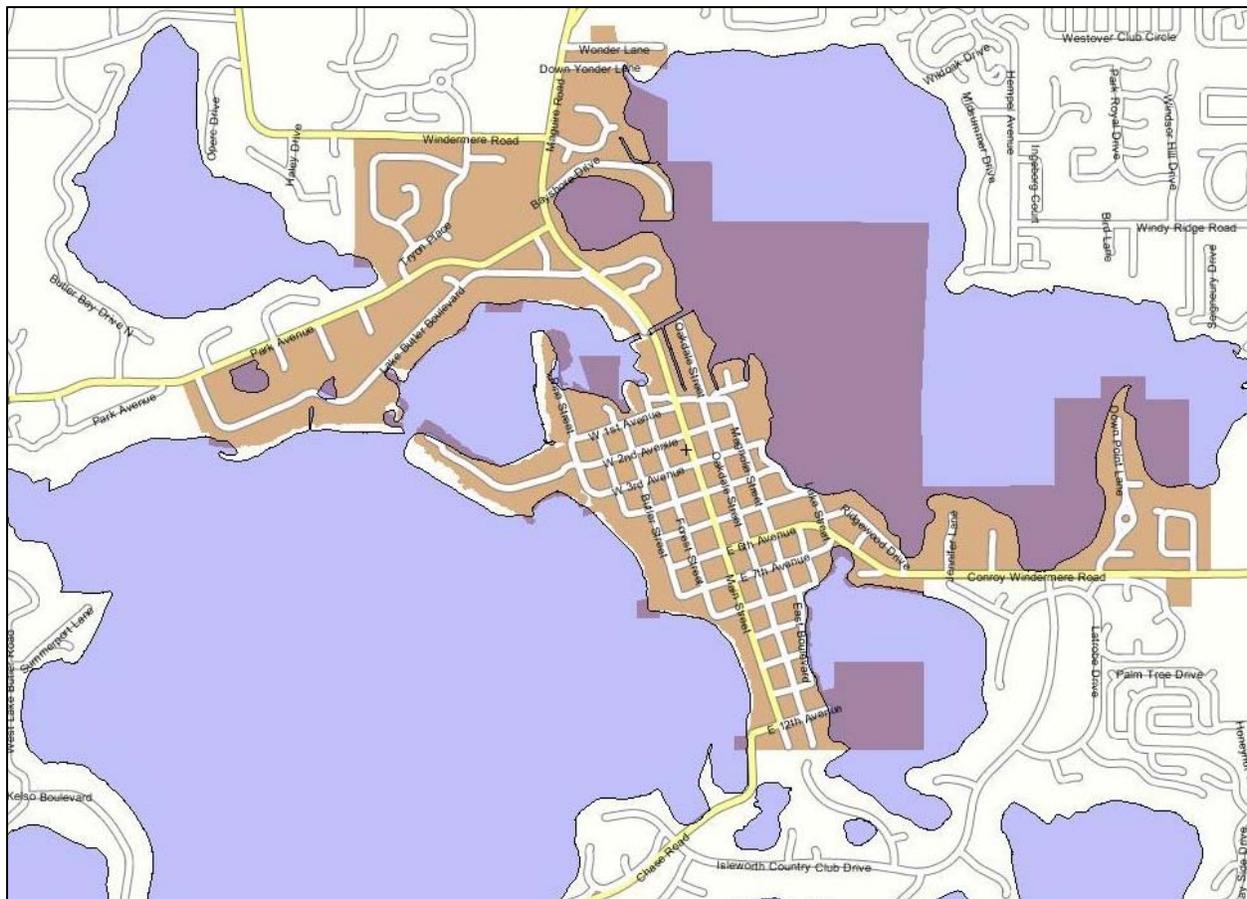
Windermere's neighborhood streets are unpaved



Main Street had the feel of a "country highway"

roadways had the feel of "country highways" and although posted speeds in the Town Center were no greater than 30 mph, if not for the all-way stop controlled intersections within the Town Center would likely have seen excessive vehicle speeds. The Town's local streets are on a grid system but consist mostly of unpaved dirt roads, which the Town desired to maintain as unpaved to help preserve the character of the community.

Figure 1 – Town of Windermere Street Network



An important issue in Windermere was the increasing regional pressure on Main Street and Sixth Avenue; these roadways serve as important regional routes providing two of the few through connections in western Orange County due to the geography of the area lakes. A spike in new growth in recent years in areas near the Town had placed even more burden on these two roadways to carry a heavier traffic load, including a significant volume of trucks. Further, the traffic volumes were anticipated to continue to build, as Orange County and surrounding cities had approved 39 residential developments totaling more than 24,000 homes.

Congestion through the Town had increased dramatically, with significant delays at the two primary intersections along Main Street at Fifth and Sixth Avenues, which were both all-way stop controlled. In some cases, queues at the core of the Town Center extended as much as one mile during peak periods. This also led to another problem – motorists frustrated by the traffic backups frequently would use the neighborhood dirt streets to cut through the Town to avoid the two primary intersections. Needless to say, the townspeople grew very frustrated at the traffic conditions on both the main roadways as well as the neighborhood roads. However, there was general agreement that the Town did not want to widen their main roads to four lanes. In fact, the Town had taken ownership of Main Street and Sixth Avenue from Orange County in 1999 to help ensure the roads would not be widened, allowing the Town to maintain its small town character.



All-way stop control in the Town Center resulted in extensive peak hour queuing

To complicate the through traffic issue, a developer bought up a considerable amount of property with the Town Center, including a historic church, and the townspeople were skeptical of his intentions. The developer intended to construct a new retail center in an area that included only a handful of small businesses and the Town Hall. However, many residents, particularly older residents, opposed any change in the Town Center, and were fearful of the additional traffic any new development would generate.

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In addition, the entire town is nearly surrounded by the Butler chain of lakes, which have been designated by the state as Outstanding Florida Waters due to the clarity and quality of the water. Special rules that limit stormwater discharge options are imposed by the South Florida Water Management District for all projects and improvements in this area. These rules require extensive treatment of stormwater runoff prior to discharge.

Due to these issues, there was a general sense of mistrust amongst the townspeople, with a fear of change, and many divisive issues. Approximately half of all Town residents were opposed to any changes in the Town, while the other half (typically younger residents) were in favor of some appropriate changes. The Town enjoys powerful political leadership, but employs very little staff. Much responsibility to help set direction for the Town's decisions was placed on the Town's numerous citizen committees. Unfortunately, there had not been clear direction on the traffic and Town Center issues from the various committees. Eventually, the Town decided it needed the

help of a consultant and selected the Team of Canin Associates as lead planner with HDR Engineering, Inc. providing engineering support to develop a master plan to preserve and enhance the sense of place within the Town Center and make recommendations to provide relief from the congestion and cut-through traffic. A primary goal of the Team at the outset of the project was to use a public visioning process designed to fully engage the townspeople, identify all the major issues, gather input and ideas, build consensus, and inspire a collective ownership of the master plan that would be developed.

The Public Process

To engage the townspeople, the Team scheduled a series of workshops, public meetings, and various exercises designed to gain valuable input from all sectors of the Town. By the end of the process, approximately 30 meetings were held with the public to help build consensus on the plan.

Initial Issues and Opinions Questionnaire

At the outset of the project, the Team needed a more solid understanding of what the most important issues were. Therefore the first task undertaken was the development of an 81-item questionnaire that was sent to every residence and property owner in the Town. The survey was well received with a 25% response rate, and the results helped to frame the key issues. These included downtown congestion, pedestrian mobility, and cut-through traffic resulting from the downtown congestion. In fact, the frustration over the cut-through traffic had led the Town to pass an ordinance making it illegal to cut through the neighborhood streets, with signs warning motorists the dirt streets were for “Local Traffic Only” and threatening a fine of \$200 between 7 – 9 AM, and 3 – 6 PM. The survey also helped identify issues about which there was disagreement among the respondents, including the extent and type of downtown development that should be allowed.



Signs warning of fines for cut-through traffic on local streets

Traffic Analysis

Figure 2 shows the daily traffic volumes in Windermere in 2002 at the start of the project, which ranged from approximately 9,000 to 11,000 within the Town Center on Main Street, to 16,000 on Sixth Avenue. This data along with peak hour turning movement counts provided the basis for the Team to complete a traffic analysis of the primary Town Center intersections, which included evaluation of the existing and alternative traffic control at both the existing and projected future traffic levels.

The existing all-way stop controlled intersections and alternative signal control were evaluated using the procedures from the Highway Capacity Manual (HCM) and its supporting Highway Capacity Software (HCS). Roundabout control was evaluated using SIDRA, which employs the Australian roundabout analysis methodology. The results of the analysis showed that the roundabouts would exhibit superior performance in terms of average vehicle delay compared to the other intersection control options for the projected traffic conditions through 2025. Ultimately, the traffic simulation software

VISSIM was used to construct 2-D and 3-D simulations of the downtown intersections with all-way stop control and roundabout control in order to show the townspeople the difference in operations and delay.

Public Workshop and Community Value Survey

Early in the process, a public workshop was held to discuss the project and administer a visual preference survey. At this workshop, the Team discussed the results of the traffic study and showed that the root of the traffic problem was the intersections, and not the roadways. The team provided numerous examples of different typical sections for the corridors, discussed their pros and cons, and asked participants whether they were appropriate for the Main Street and Sixth Avenue. From this survey, the corridor options receiving the most votes were a 20-foot wide roadway with curb and gutter, and a two-lane section with median. The participants were also asked to rate the appropriateness of alternative traffic control devices. The results of this portion of the survey showed the Townspeople favored brick streets with roundabouts at some intersections, midblock pedestrian crossings, and all-way stop control. There was generally a negative reaction to traffic signals, speed humps, and on-street parking. The Team generally agreed with the Town's priorities with the exception of on-street parking, which was deemed appropriate in select areas having an adjacent retail component.

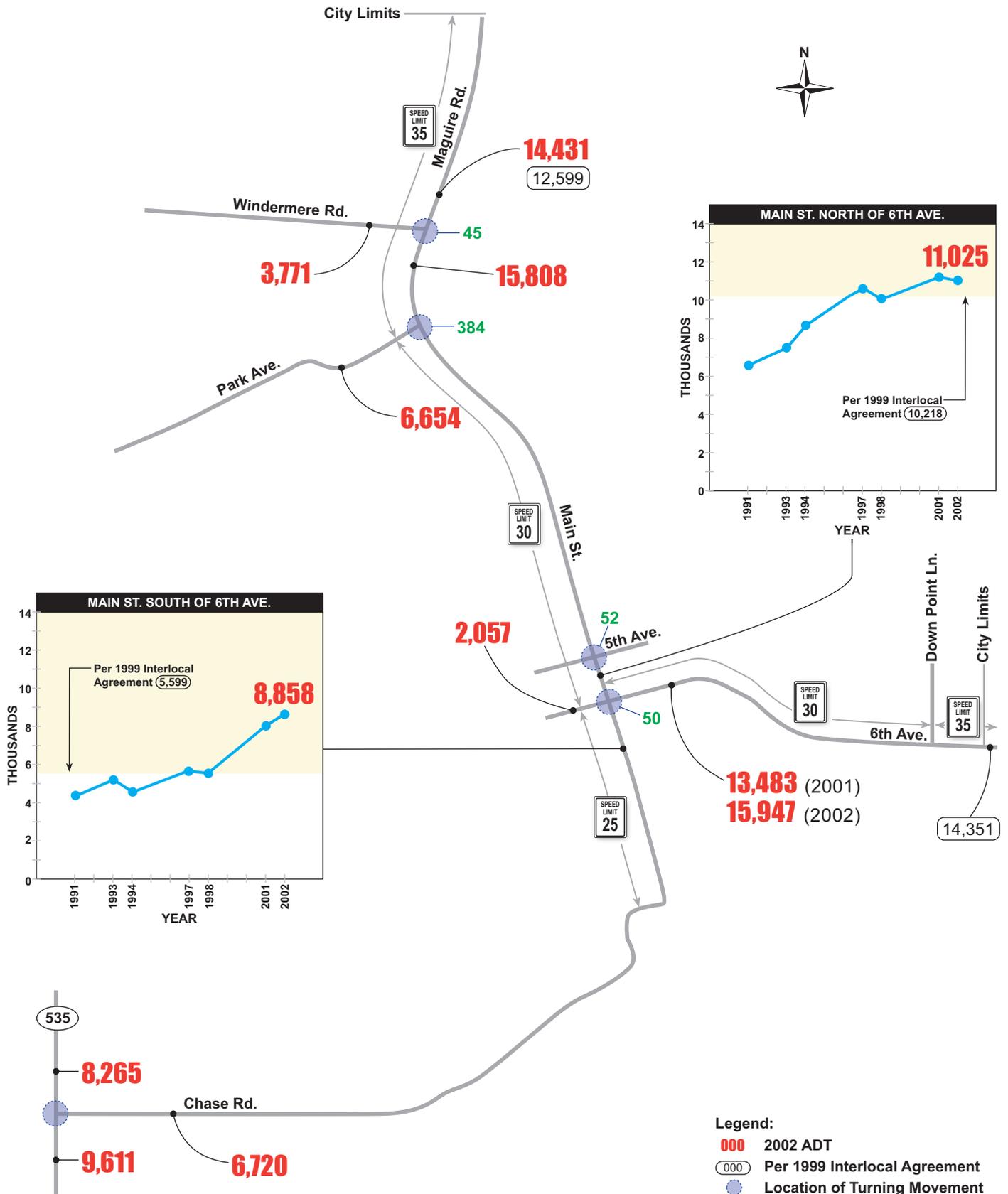
Design Charrette

Following the initial public meeting, the Team held a charrette that drew more than 100 attendees. At this meeting, the Team divided the participants into 10 working groups, each of which then designed their optimal solutions for the Town Center. A key outcome of this exercise was that 7 of the 10 groups had very similar solutions proposed, including brick street sections with roundabouts on Main Street at Fifth and Sixth Avenues. This provided clear direction for the Team in the development of a preferred alternative for the Town.



Residents design their Town Center corridor solutions

Town of Windermere Traffic Data



Legend:

- 000** 2002 ADT
- 000** Per 1999 Interlocal Agreement
- Location of Turning Movement Counts
- 000** Pedestrians Crossing Roadway

Traffic Counts are weekday average for October 3, 4, 7, 8, 9, 2002.
Transportation Research Board

Remaining Skepticism of Roundabouts

Despite the favorable reception of brick streets with roundabouts as a traffic calming option, there was still a significant amount of skepticism about roundabouts. This skepticism could be tied to three primary issues:

1. Unfamiliarity with roundabouts (did not understand how they work)
2. Previous bad experience with “roundabouts”
3. Concern over their operation in Windermere

Unfortunately, the first issue was largely the result of the lack of quality local examples of roundabouts in the Orlando area. Although the greater Orlando area does have a number of circular intersections, most of which are neighborhood traffic circles, many of them do not have all the characteristics of modern roundabouts. For example, several have stop control on entry.



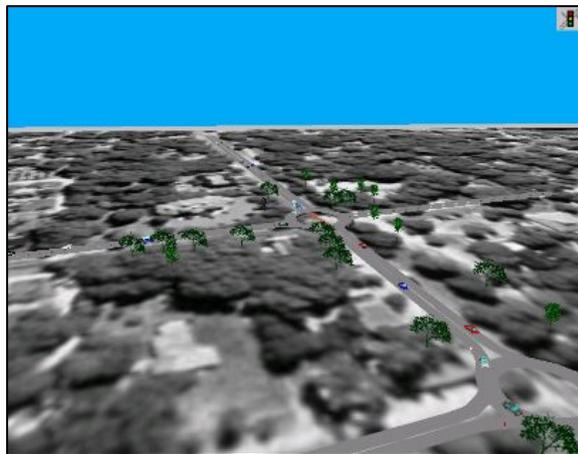
A typical neighborhood traffic circle in Orlando

In discussing the second issue with Windermere residents, it was discovered that the typical bad experience with a roundabout happened at a circular intersections (mostly in the northeast portion of the U.S.) which were actually either rotaries or large and perhaps poorly designed multilane circular intersections. There were no reported bad experiences with single lane modern roundabouts.

The third issue related to specific questions regarding how a roundabout would operate in Windermere. These included whether the roundabouts would create gaps in traffic to allow traffic from side streets downstream of the roundabout to enter the roadway, or whether a roundabout could accommodate large emergency vehicles.

To help address the roundabout specific issues, the Team held a public meeting and participated at a Rotary Club breakfast, each of which included three components, as follows:

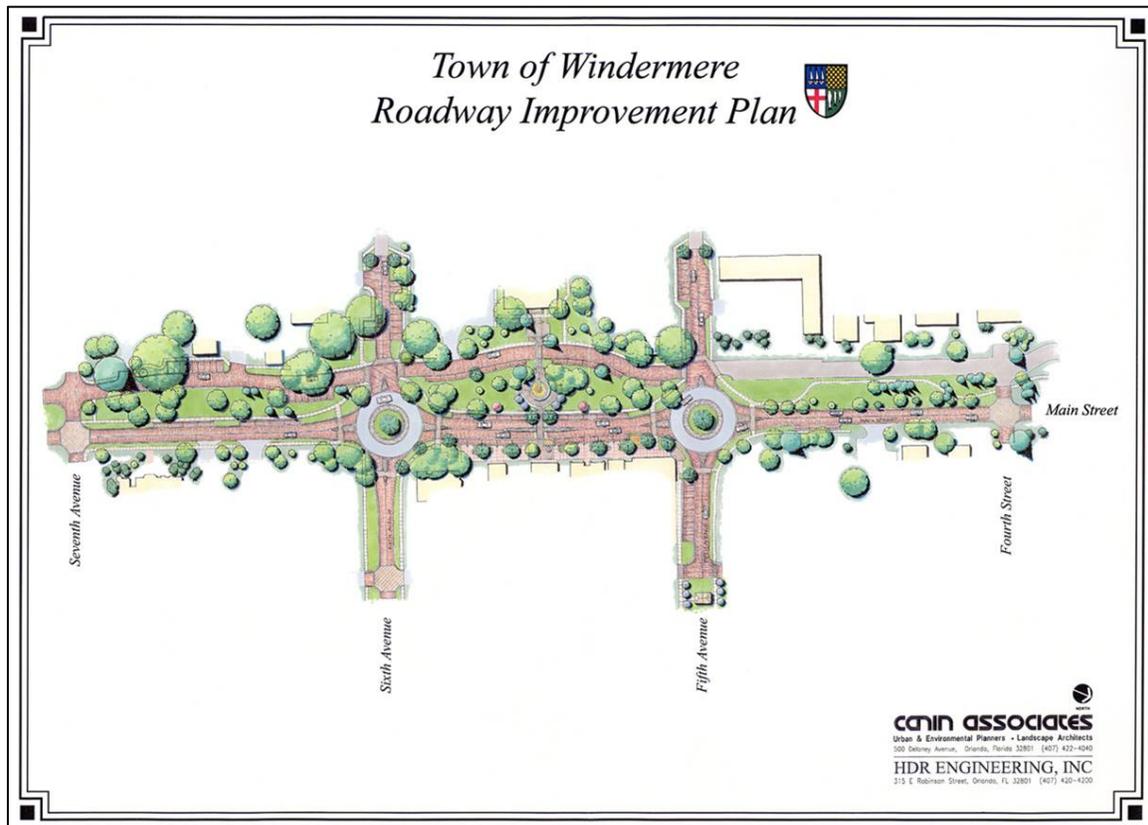
1. A photo-heavy presentation about modern roundabouts, including what they are, what they aren't, their features and characteristics, situations in which they are a good traffic control choice, and situations where they might not be the best traffic control choice.
2. VISSIM simulations comparing the operations of all-way stop control versus roundabouts.
3. A short video clip from the City of Clearwater, Florida (courtesy of Ken Sides) which showed a City Fire Department ladder truck easily and successfully negotiating a modern single lane



A 3-D traffic simulation was used to show residents how the pair of roundabouts would operate

roundabout without even having to use the roundabout's truck apron. The video included a sound byte from a Fire Department representative stating that their ladder trucks had no problems getting through the roundabout.

Although there were some roundabout naysayers up until the point that the project was completed and open to traffic, these measures seemed to address the majority of the hesitancy towards the single lane roundabout concepts proposed and served to help ensure the approval of the preferred alternative concept by the Town Council.



The preferred roadway improvement plan submitted to the Town by the Consultant Team included brick streets and a pair of single lane roundabouts

Other Keys to Building Consensus

Another key factor in building consensus amongst the townspeople of Windermere was the powerful political leadership enjoyed by the Town. Among the key players was Fred Pryor, an architect who served on the Town Council and was in charge of long range planning. Fred managed the contract with the Consultant Team and was a key player in facilitating much of the discussion regarding the project at the various forums. Although not a staunch advocate of the plan in its early stages, Fred saw the momentum beginning to build as opinions began to align and the project evolved. With his background in architecture, he knew how to get projects completed; he championed the project and played an instrumental role in getting the plan adopted by the Town Council, along with the supporting changes needed in the Town's Comprehensive Plan and Land Development Code.

There were many other people who served as strong resources during the course of the project and many key players from the community were involved. One of these was Don Greer, a developer who understood how to get projects built. He volunteered his time to manage the construction phase of the project.

Another key to the project was the assembling of a well balanced consultant team with creative thinkers. The well rounded team included planners, landscape architects, public involvement specialists, traffic engineers, and roadway and drainage designers, who worked collaboratively to develop the concept plan and ensure that it would work operationally and was constructible. Although roundabouts have proven highly successful in many parts of the world, it took creative thinking and perhaps a leap of faith to recommend a type of traffic control that just had not gained popularity locally. The team had to have confidence in this solution at the time it was proposed and have examples that would show the townspeople this would work in their community.

Project Epilogue – How the Problems Were Solved

The Master Plan developed by Canin Associates included modifications to the Town's Comprehensive Plan and the adoption of a Planned Unit Development (PUD) ordinance to manage growth in the Town Center.

Subsequently, to the adoption of the Master Plan, Canin Associates was hired as the lead consultant to manage the detailed engineering design and collaborated with HDR and PEC to develop the final construction plans and oversee the project implementation.

The plan developed by the Consultant Team was approved by the Town Council and went forward as the largest public works project in the history of the Town with a \$3.3 million construction budget. The end product that was designed and constructed included single lane concrete roundabouts (with 102-foot and 109-foot inscribed circle diameters) at Fifth and Sixth Avenues and a brick street surface extending on Main Street from Seventh Avenue north to Fourth Avenue including limited on-street parking on both sides of the street, concrete curbing and concrete sidewalks, a raised midblock pedestrian crossing, and multi-use trail running parallel to Main Street. Additionally, Fifth and Sixth Avenues were constructed with brick for about a block on each side of Main Street, and the old dirt road in front of the Town Hall was also brick paved.



The single lane roundabout at Main Street and Sixth Avenue after completion

Innovative designs for the roundabouts were planned to accommodate large trucks as well as autos. Because of the truck component, the pavement was designed with 12 inches of crushed concrete over a compacted base, overlaid by a sand cushion and the brick paver surface. The less trafficked side streets were brick over compacted stabilized



The raised midblock pedestrian crossing located between the two roundabouts

sand. Concrete was used for the circulating roadways at each roundabout due to the heavier loadings at the intersections themselves.

Initial designs for the underground stormwater retention/detention system were too costly for the project budget. The subsurface soil below the project consisted of a minimum of 21 feet of sand above the seasonal high water table. This unique soil structure and extensive discussion by HDR with representatives of the South Florida Water Management District, including a seminar presentation by Storm Tech representatives sponsored by HDR, convinced the Water

Management District engineers to allow soil percolation during the actual storm event. Previously the District had allowed percolation, but only after the storm duration period had ended. Ultimately, the existing ditch drainage system was replaced with a completely underground system featuring Storm Tech components, ADS pipe and Nyoplast structures with cast frames and grates. This innovative approach allowed downsizing of the system to about half of what would have been necessary to comply with the previous requirement, addressed environmental issues associated with potential runoff into the area lakes, and allowed the project to move forward. Another benefit of this type of drainage was that the entire system could be located beneath paved areas of the side streets, freeing up land in front of the historic City Hall for redevelopment as a park.



The Town of Windermere held a street party to celebrate the opening of their improved Main Street with its brick street and pair of roundabouts

Since its opening in November 2005, the project has been very successful at addressing the issues identified in the public process and has exceeded the expectations of the Town. First, the roundabouts relieved congestion by replacing the existing pair of all-way stop controlled intersections in the Town Center and reducing vehicle delay, the number of stops, and queuing. The roundabouts allowed traffic in the Town Center to keep moving and flow much more efficiently, but at low speeds appropriate to the pedestrian environment desired in the Town Center. The low vehicle speeds along with the pedestrian elements included in the project such as sidewalks, a midblock crossing, and multi-use trail along with the streetscape enhanced the Town Center's sense of place and made it easier and safer to make walking trips in the Town Center. Finally,

because delay and queuing were reduced significantly, the cut-through traffic that had been pervasive within the adjacent neighborhoods, all but disappeared. Essentially, there was no longer a reason for motorists to cut through the neighborhood streets when they could easily travel through the Town Center on the primary roadways with little delay.

Since their opening, the roundabouts have been successful in dispelling nearly all remaining opposition. According to Windermere's Town Manager, many of those most vocally opposed to the roundabouts have commented on how great they work. Traffic has not diminished, but has been managed much better. Additionally, there have only been a couple of minor crashes reported at the roundabouts since they opened nearly three years ago. The Town of Windermere has had such a positive experience with the roundabouts that they are currently preparing to build their third roundabout, at a location north of the Town Center on Main Street adjacent to the local elementary school.

Conclusions

The keys to building consensus in the Town of Windermere that allowed successful implementation of two roundabouts in the Town Center included the following:

- Assembling a well balanced creative thinking team, that included all facets of urban planning and design, and had the confidence to recommend "outside of the box" solutions.
- Using a public visioning process designed to fully engage the townspeople, identify all issues, gather input and ideas, build consensus, and inspire a collective ownership of the master plan. Important elements of the process included the issues and opinions questionnaire and a design charrette.
- Adoption of a new Comprehensive Plan PUD ordinance and continuity of a single lead consultant throughout the process.
- Providing examples of successful roundabouts elsewhere. Although there were few good local examples in the Orlando area, numerous photos of roundabouts from other communities in Florida and across the country were used to help sell the roundabout concept.
- Incorporating traffic simulation provided the townspeople another visual tool so they could easily see how a roundabout would operate compared to other traffic control alternatives.
- Showing a video of fire department ladder truck successfully negotiating a similar single lane roundabout provided further evidence of the ease of their use by emergency vehicles.
- Incorporating the goal of creating a sense of place and improving pedestrian and bicycle movement in conjunction with a traffic solution helped illustrate the payoff beyond traffic efficiency and bring together a broad coalition in support of the project.
- Having strong political leadership, great local resource people, and a true project champion – each proved vital in gaining project approval despite the initially divisive issues.