



# **Maggie Valley Pedestrian Safety Action Plan**





## A Call to Action

Throughout 2015 and into 2016, the Town of Maggie Valley has been developing a Master Plan for a Town Center. While that effort is on hold pending a broader view of plan elements, one outgrowth of the Master Plan development is recognition of the need for better pedestrian and bicyclist facilities, especially regarding safety.

US 19, Soco Road, can be challenging to cross as a pedestrian or ride on as a cyclist. This Pedestrian Safety Action Plan identifies some treatments and locations where safety improvements can be made throughout the Town.

## Maggie Valley is becoming more attractive to pedestrians and bicyclists.

Maggie Valley's many attractions, shops, lodgings and several residential areas can be made safely accessible for walkers and bicyclists. Paramount to accomplishing this is slowing traffic down to the speed limit, providing safe crossings of Soco Road, and providing safe places along Soco Road for walkers and bicyclists to travel.



Long-standing attractions such as the Stompin' Ground dance hall provide entertainment showcasing mountain culture in music and dance. Guests can get there by walking.

Relatively new Frankie's Italian Trattoria on US 19 is sidewalk accessible, although a long walk from downtown.



## Existing Conditions for Pedestrians

Maggie Valley is a long and narrow town defined by US Highway 19 that traverses the valley. A community concern is the effect the highway speeds have on, among other things, pedestrian and bicyclist safety. According to the NCDOT's crash data map, there were no bicycle or pedestrian crashes involving motor vehicles from 2007 to 2013 within the town limits. There were three pedestrian crashes and one bicyclist crash within close proximity of the Town during that time, and none were fatal.

From Fie Top Road at Ghost Town to the eastern city limits at the intersection of US 276, Soco Road is uniformly 64 feet wide between the faces of the curb. An "average" pedestrian walking at 3.5 to 4 feet per second requires 16 to 18 seconds to walk across the road; a time in which a vehicle driving the speed limit will travel almost one thousand feet. It is not reasonable to expect a pedestrian to feel safe crossing under such circumstances, especially with so much traffic driving faster than the speed limit.





Only **1/3** of crosswalks in Maggie Valley have pedestrian refuge islands



A refuge island gives a pedestrian a protected place to cross the highway part way, needing smaller gaps in time to safely cross - in effect, a five-lane road becomes two two-lane road. For example, pedestrian refuges on Soco Road reduce the distance gap needed by pedestrians from nearly 1,000 feet to a little over 400 feet.

While pedestrians have the right-of-way in marked and unmarked crosswalks, many pedestrians choose not to assert that right for a variety of reasons, including not trusting that the vehicle will yield, not wanting to inconvenience motorists, or just wanting to reduce stress by crossing when there is no oncoming traffic.

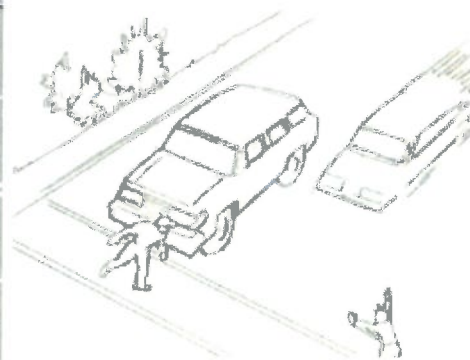
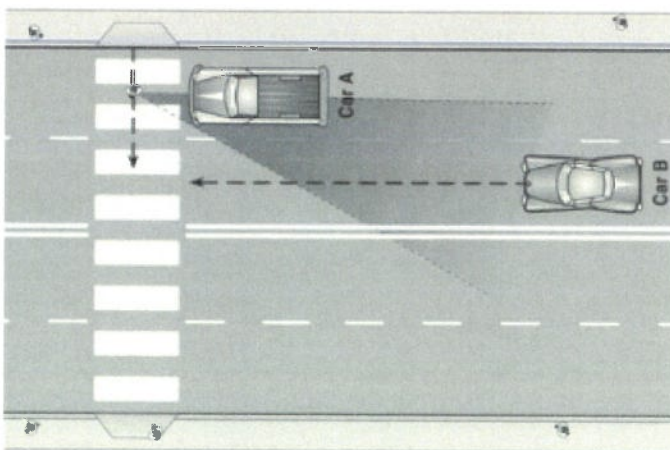


This existing crosswalk near Town Hall has “shark’s teeth” lines indicated traffic “YIELD.” This line should be located at least 30 and no more than 50 feet from the crosswalk.



All of the existing crosswalks in Maggie Valley have the risk of the “multiple threat” crash. This occurs when a vehicle slows or stops too close to a crosswalk when yielding to a pedestrian, blocking the view of the pedestrian and the driver in the next lane from seeing each other. This is the reason that YIELD lines need to be 30 or more feet from the crosswalk. Further protection is provided by adding an official sign, shown below, adjacent to the YIELD line.

One vehicle stops for a pedestrian on a multi-lane road, but the motorist in the next lane does not, resulting in a crash.



## Engineering treatments for Pedestrian Safety

This plan identifies several engineering treatments to help improve pedestrian safety in Maggie Valley:

- Typical sections where long gateway islands can be built to create a sense of place, calm traffic, provide pedestrian refuges, and provide a place for landscaping;
- Locations where additional pedestrian refuge islands can be built with little or no interference to driveway accesses;
- Examples and recommendations for the use of Rectangular Rapid Flash Beacons (RRFBs), and
- How bicycle lanes can be provided.

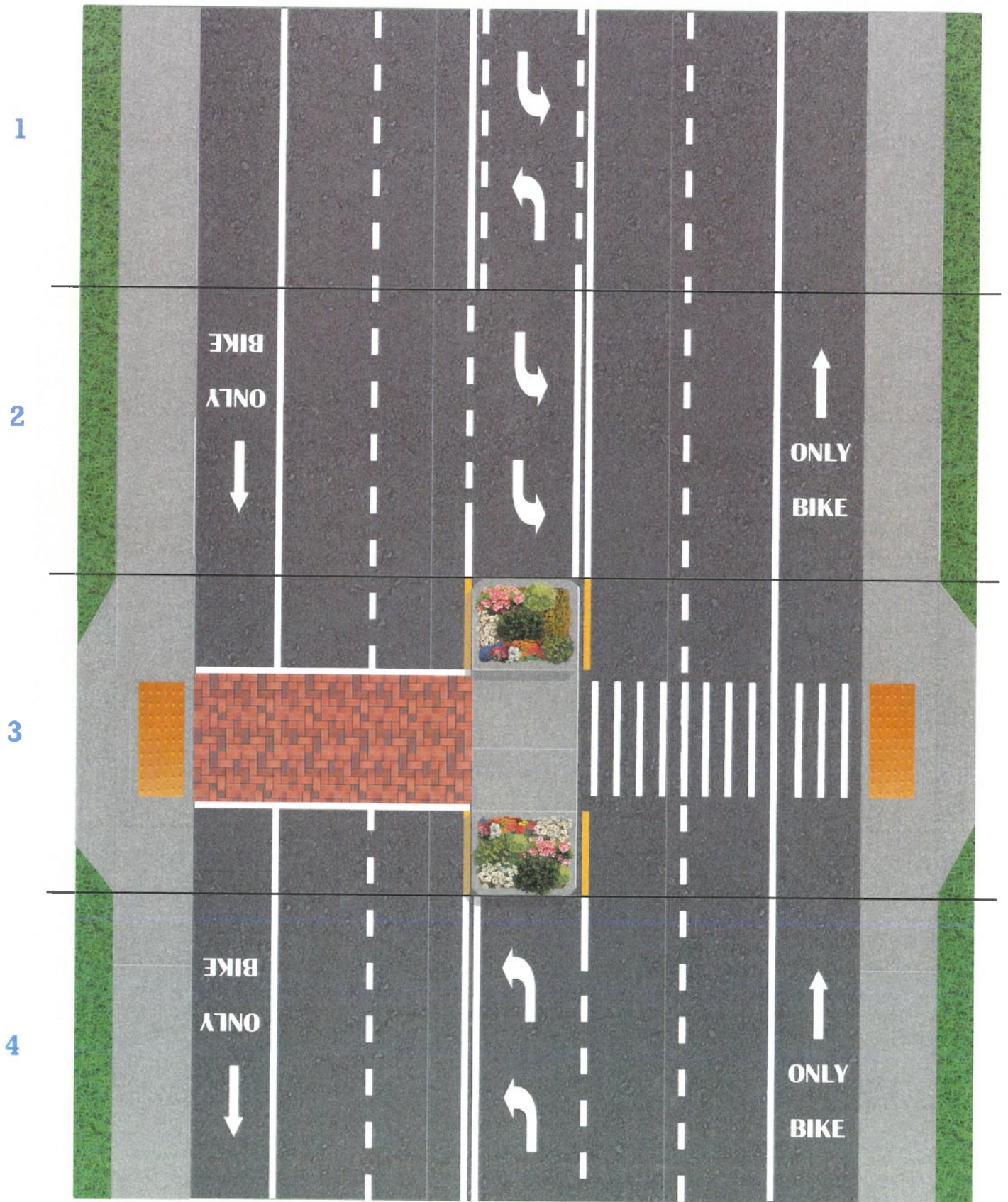
*Examples of shading structures for benches are also shown.*

## Gateway Islands and Crossings

The following Typical Sections represent elements that can be pieced together to create a variety of elements in median island treatments on Soco Road.

1. An undivided five lane section with two-way left turn lane and bicycle lanes. The NC-DOT has previously said they would allow dimensions of 4' – 11' – 10' – 10' – 10' – 11' – 4' for this cross-section (see *Figure 1 on page 6*).
2. The location of pedestrian refuge islands can be made more acceptable to business interests by placing them between busier driveways where the left turns are made “head-to-head” or “tail-to-tail”. This example shows the head of a left turn lane ending at a refuge island (see *Figure 1 on page 6*).
3. This section shows a typical refuge island with a choice of two marking styles: the “continental” white bars similar to those currently in use, and a stamped brick treatment between two parallel white lines. The white lines are required to make the crosswalk compliant with the MUTCD (see *Figure 1 on page 6*).
4. The other side of an island as shown in 2 above, the left turn lane is terminated heading into the refuge island (see *Figure 1 on page 6*).

Figure 1





## Gateway Islands and Crossings (Cont'd)

- 5.** This and other sections with tapered islands can be used to encourage driving at the speed limit. These tapers create apparent “chicanes” – appearing to narrow the road without really doing so, and causing a lateral shift while driving that is only comfortable up to the speed limit. The taper length is designed to match the speed limit: for 35 mph the length would be 225 feet and for 45 mph the length would be 495 feet. Longer distances would encourage speeding and shorter distances would fail to accommodate the desired speed, so the distances must be precise (*see Figure 2 on page 8*).
- 6.** This is another tapered island treatment but with a pedestrian crossing. Note how these two used together (5 and 6) create a separated and protected bicycle lane for several hundred feet (*see Figure 2 on page 8*).
- 7.** This section is intended for use where a longer median can be provided without undue interference with the needs of left-turning traffic. It could be used as a gateway feature entering the Town and preparatory to a tapered section (*see Figure 2 on page 8*).
- 8.** Another tapered treatment like 5 above, used in advance of a continuous section (number 7) (*see Figure 2 on page 8*).
- 9.** This section is intended for use where it might be desirable to continue an island on the curb side of the road at a location like a pocket park. A pedestrian crossing cannot be placed in this section due to the undivided four lane width. Further, left turns by traffic should be prohibited by the use of a curb with delineators on the centerline since following through traffic would not expect a left turn movement from a vehicle in front of them (*see Figure 2 on page 8*).
- 10.** Use of a tapered island to begin an undivided four-lane section (*see Figure 3 on page 9*).
- 11.** Use of a center landscaped median to begin a gateway or in this case a tapered island (*see Figure 3 on page 9*).
- 12.** The standard typical proposed for all of Soco Road that does not have islands – an undivided five-lane road with outside bicycle lanes (*see Figure 3 on page 9*).

Since the presence of a pedestrian refuge islands reduces the crossing distance from 64 to 28 feet (it will become 23 feet if our recommended bicycle lanes are implemented), it is our recommendation that all crossings have refuge islands. This will result in the removal of some crossings and relocation of others. NCDOT guidance is that crossings should be no closer than 400 feet apart.

Pedestrian refuge medians and high visibility crosswalks increase pedestrian safety, and bicycle lanes help identify the presence of cyclists. Bicycle lanes will fit on the existing highway, and those lanes also create a buffer between the existing sidewalk and motor vehicle traffic, increasing pedestrian safety and comfort.

Figure 2

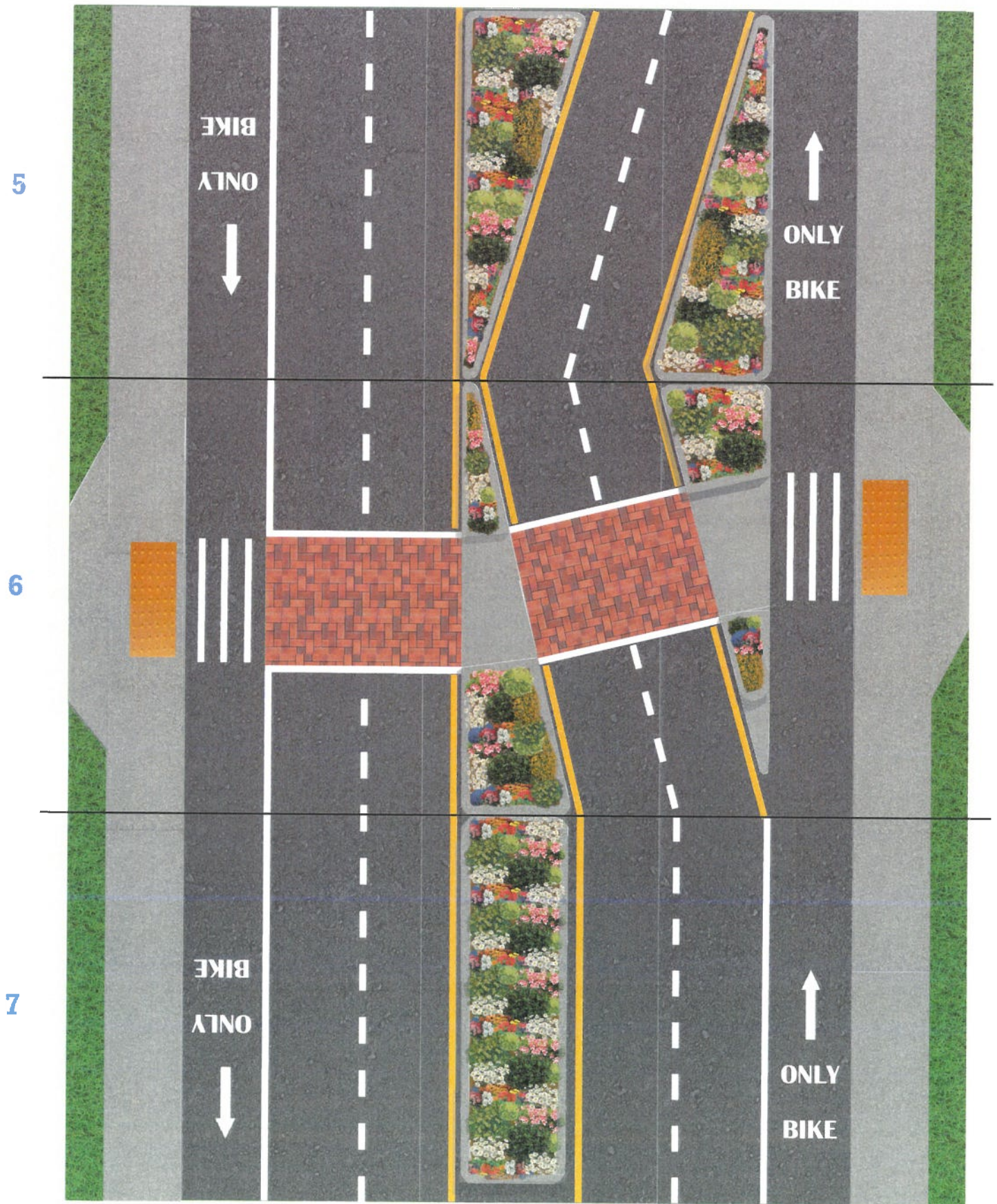
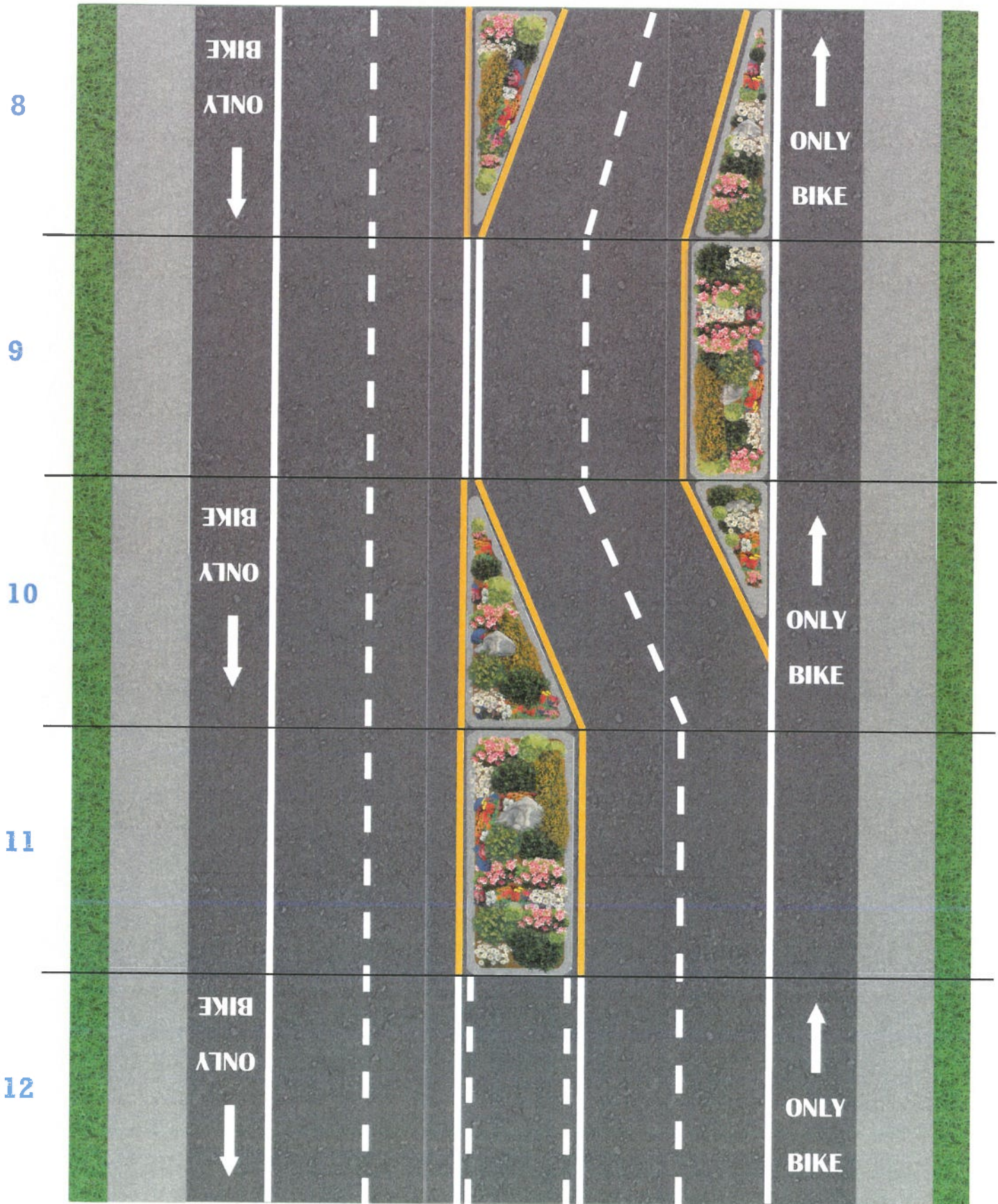


Figure 3



## Treatment suggestions for Maggie Valley

A 270' landscaped island between Woodfern Drive and Moody Farm Road, with pedestrian refuges at both ends (and possible tactile/visible treatments within the crosswalk, like red brick).



A 300' island from Fie Top to Tube World  
(Optional 230' island from Tube World to Murphy-Garland Parish Hall)



## Before



At the Evans Cove Road and Lewis Lane intersection with Soco Road, install a 160' diameter two-lane roundabout to slow traffic and provide better pedestrian crossing, without restricting any turning movements.

(This would require at least fifty additional feet behind the existing curb lines).

## After

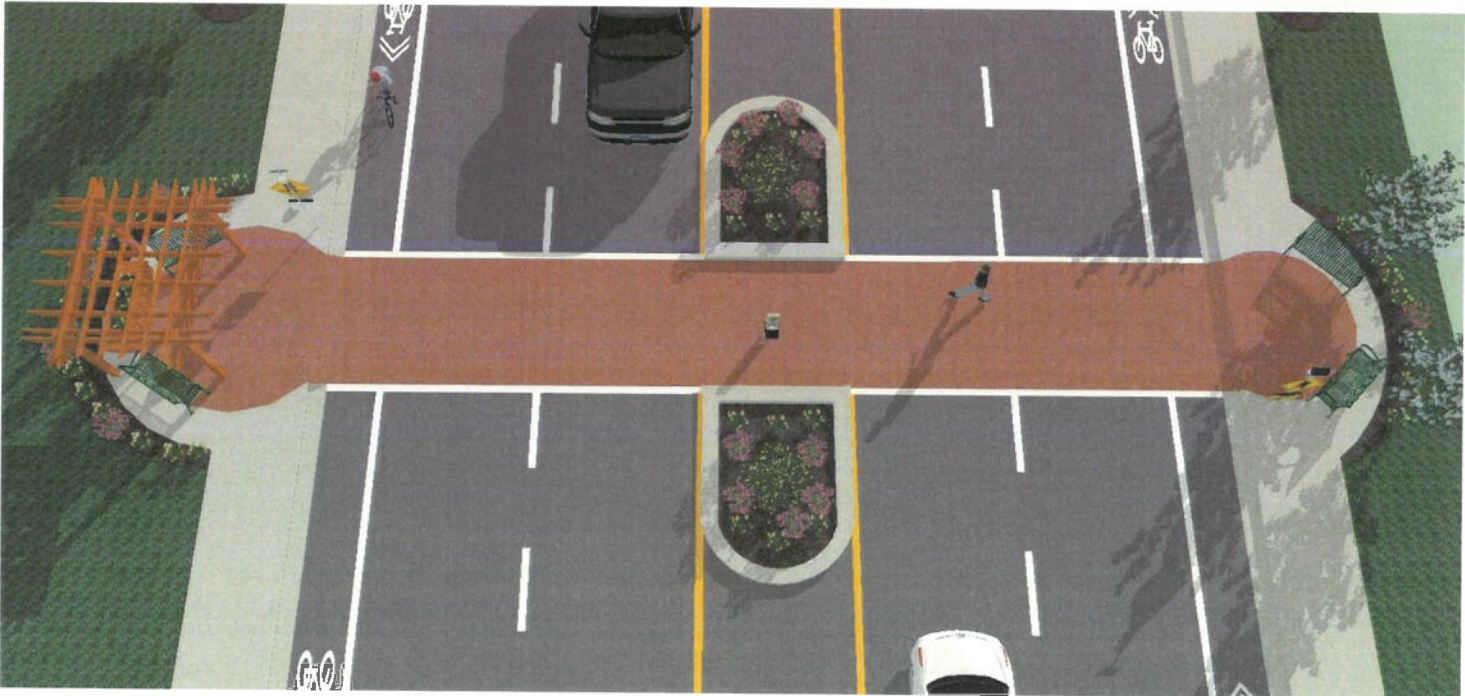


Efforts to enhance pedestrian crosswalks with aesthetic design treatments like red brick pavers and other beautification possibilities help increase awareness through visibility, along with standard safety signs and signalization.

These images (and those on page 14) represent a total roadway width of 77' (6' sidewalks, 1.5' curb and gutter, 4' bicycle lanes, 11' travel lanes, and a 10' turning lane), within the current NCDOT right-of-way.



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## Solar Powered Pedestrian Actuated Crosswalk Signage



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The outer “bulb” areas can range in size, but the smallest version (without pergola) would require an area of approximately 8' x 20'.

## Sample Concept of Beautification Possibilities



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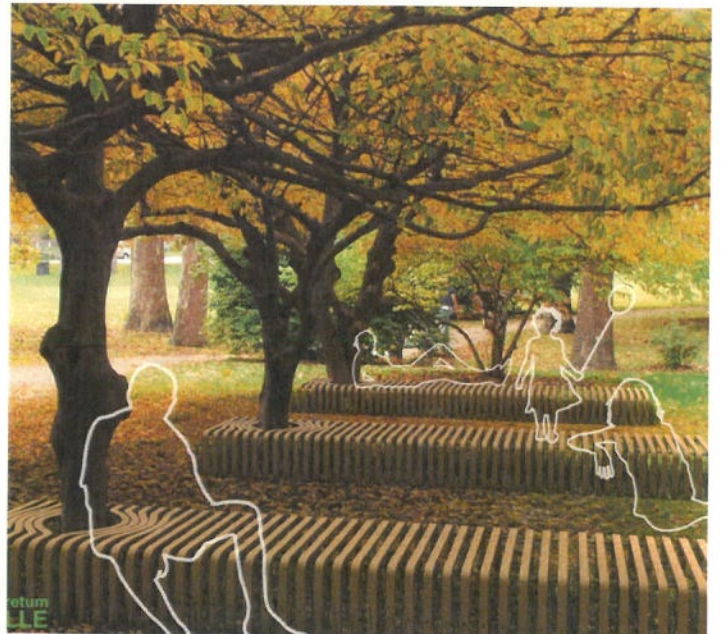


## Additional Examples of Beautification Possibilities

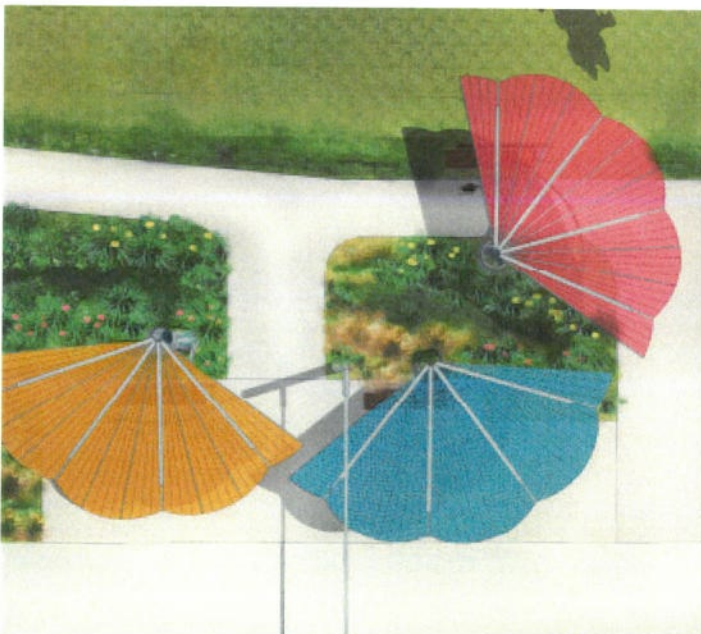


The image to the left is an example of a shade structure for benches on the Columbus-Phenix City Riverwalk along the Chattahoochee River in Georgia/Alabama.

The images below demonstrate the diversity of methods to create comfortable pedestrian amenities to accommodate crosswalk features in Maggie Valley.



© 2010 Gaspard Graulich



© 2012 Norris Design



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## Rectangular Rapid Flash Beacons (RRFBs)

Rectangular Rapid Flash Beacons (RRFBs) have become a national treatment for difficult pedestrian crossings, especially locations with a history of pedestrians being struck by motor vehicles. They are used when a decision is made not to use a full traffic signal with “Walk” and “Don’t Walk” control for pedestrians and red/yellow/green for motor vehicles.



The RRFB is also considered a less strict control treatment than a HAWK signal. A HAWK (High-Intensity Activated Crosswalk) is more precisely identified by the MUTCD as a Pedestrian Hybrid Beacon (PHB) and uses a steady red signal to require traffic to stop, then moves to a flashing red that requires a stop followed by permission to proceed when clear.

An RRFB relies on motorists obeying the “Yield to Pedestrians in crosswalk” traffic law while the HAWK relies on the more commonly obeyed law to stop for a steady or flashing red signal. Both treatments provide quicker service to both the pedestrian and motorist than a full traffic control signal does.

If a crosswalk is deemed critically important, and a refuge island absolutely cannot be provided, a rectangular rapid flash beacon (RRFB) should be considered for that crosswalk. “Yield” pavement marking lines thirty feet in advance of the crosswalk should absolutely be used in this case. Some people think the signs, flashers and associated hardware and possible overhead wiring make these types of signals unattractive. Because of resistance, expense, and aesthetics, and because no physical protection is actually provided with either a HAWK or an RRFB, every effort should be used to rely on physical design rather than motorist compliance to provide pedestrian safety.



## Rectangular Rapid Flash Beacons (RRFBs)



RRFB on an undivided five-lane US highway, similar to Maggie Valley. This location is in Cherokee, Jackson County, NC, and has a 45 mph speed limit. This location has a pedestrian refuge island in the center lane, allowing for an additional sign and flasher on the both left side approaches. Note that no marked buffer has been added to this end of the refuge island. The neighboring driveways are ideally suited for a head-to-head termination of the left turn lanes. Also note that the center island is “mountable”, meaning that traffic can easily ride over the island, affording less protection for any pedestrian waiting in the island.



## Rectangular Rapid Flash Beacons (RRFBs)



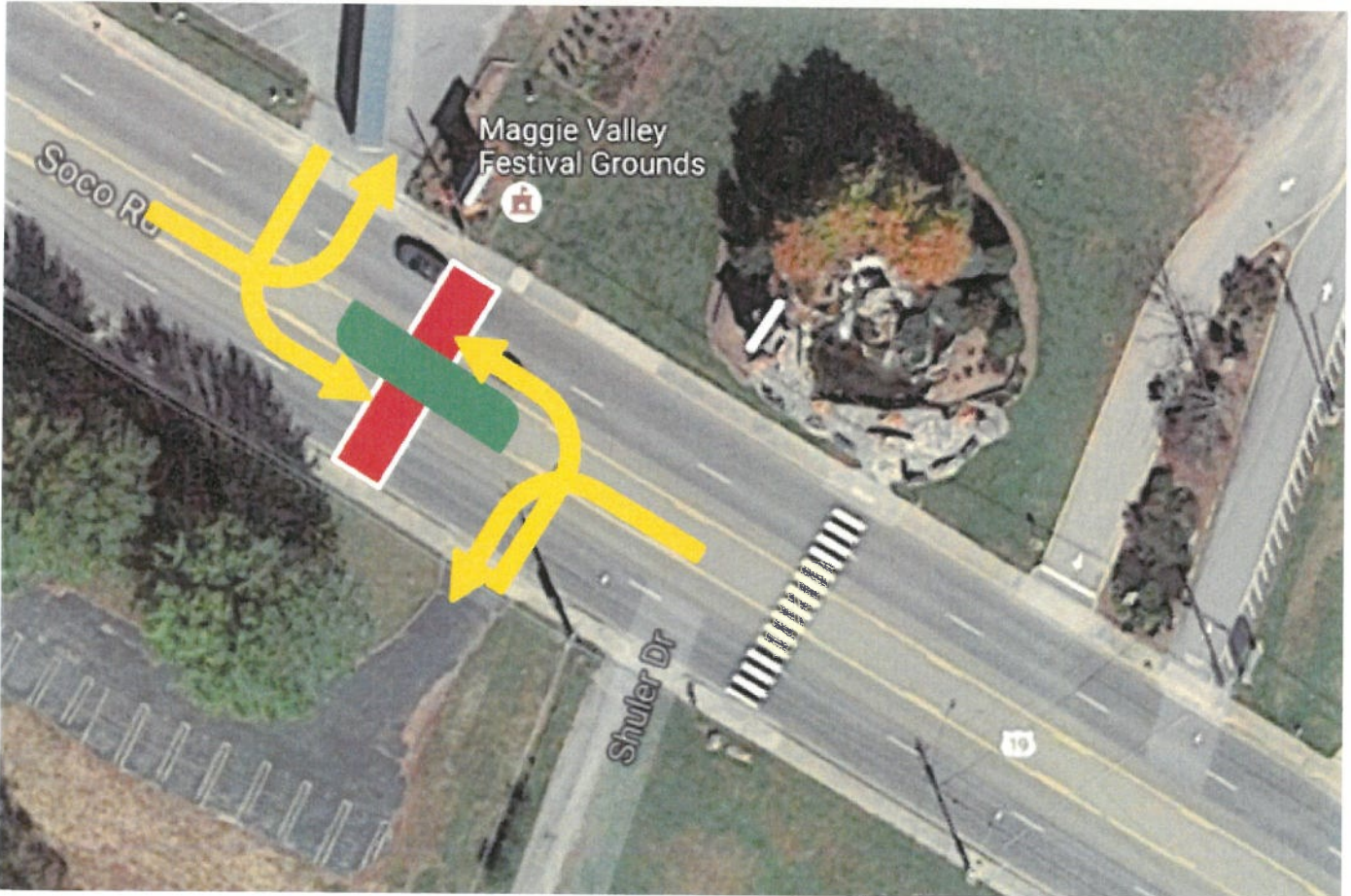
RRFB with push-button activation, midblock refuge, and “continental” style high visibility markings (already damaged). Location: US 441 near Cherokee, NC, Jackson County.



Same RRFB location, showing crossing path. All three poles have push buttons to activate the flashers, which are solar powered. The RRFBs for this location cost about \$22,000; adding the refuge island and markings makes this about a \$30,000 project.

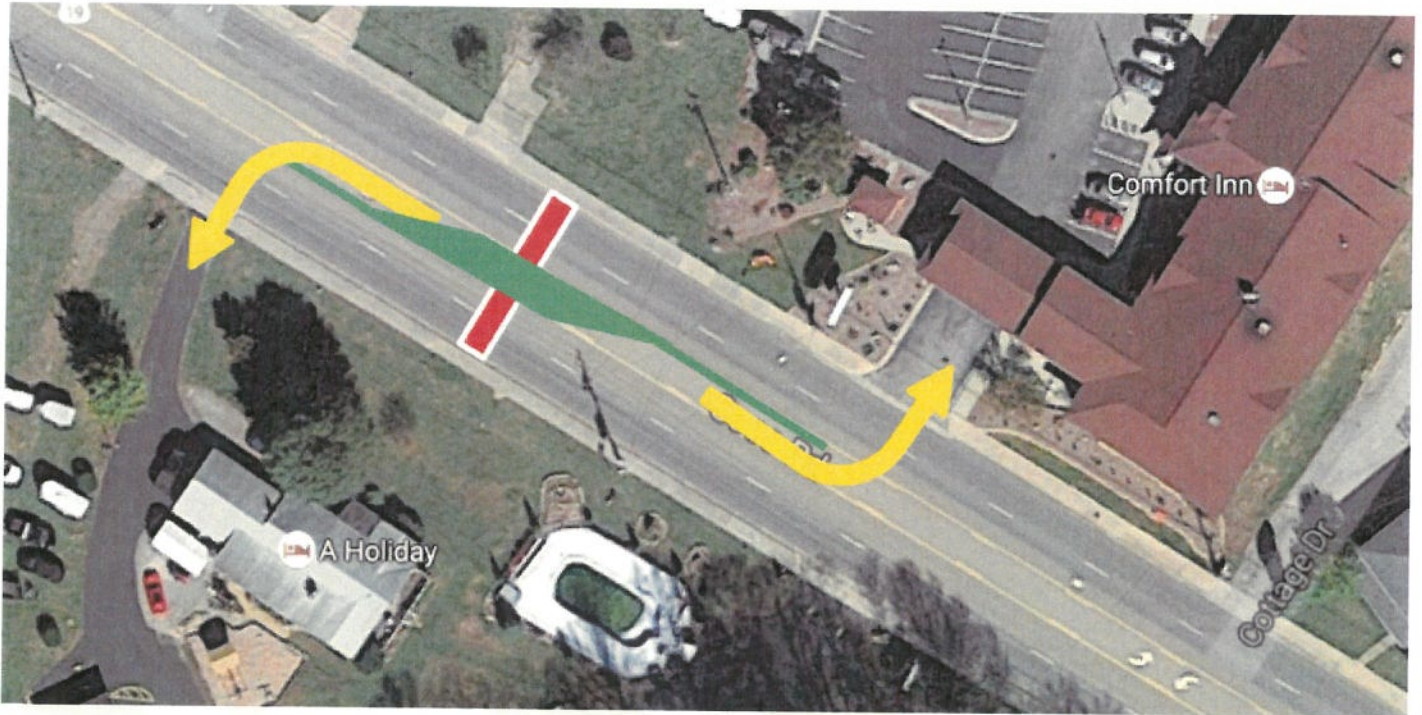
## Locating Pedestrian Refuge Islands

The ideal location for a pedestrian refuge island to best accommodate the needs of traffic turning movements is where the left turns are either “head-to-head” or “tail-to-tail”, with space in between without a need for left turns.

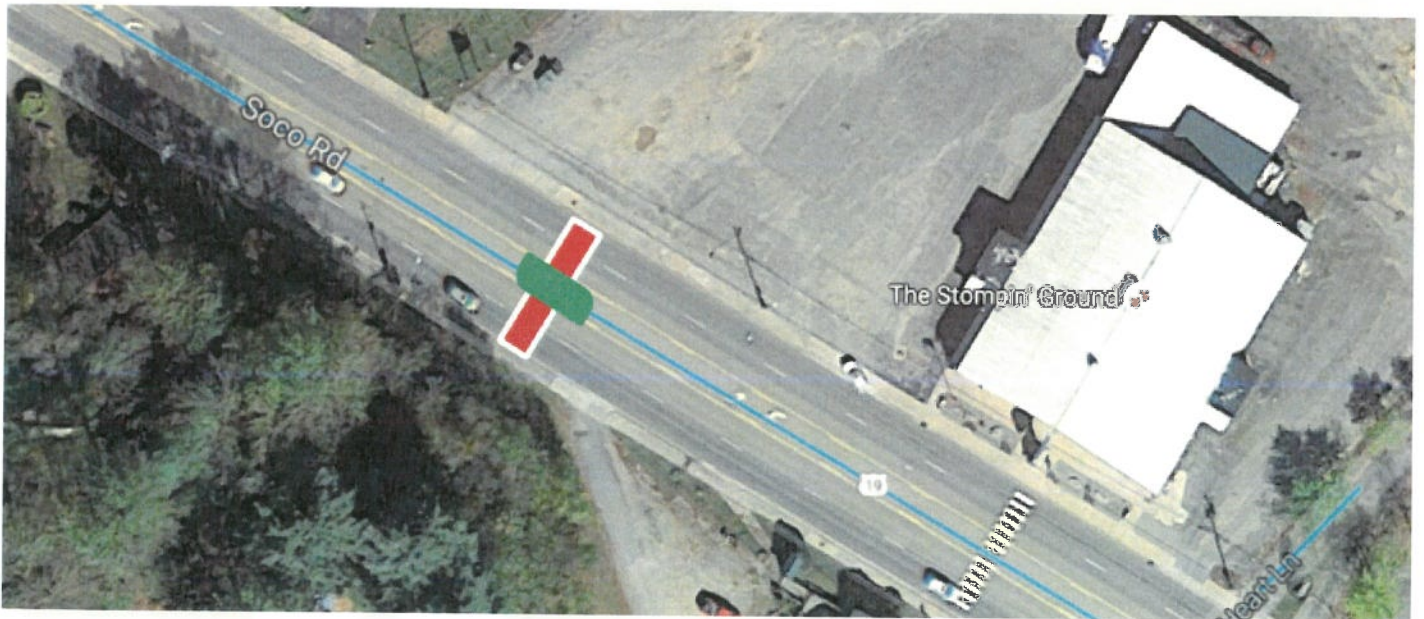


3391 Soco Road – No traffic turning conflicts at this refuge island opportunity at Festival Grounds; relocate crossing to here. This is an example of a “head-to-head” treatment. The two-way left turn markings would be changed to exclusive one-way in the direction shown.

## Locating Pedestrian Refuge Islands

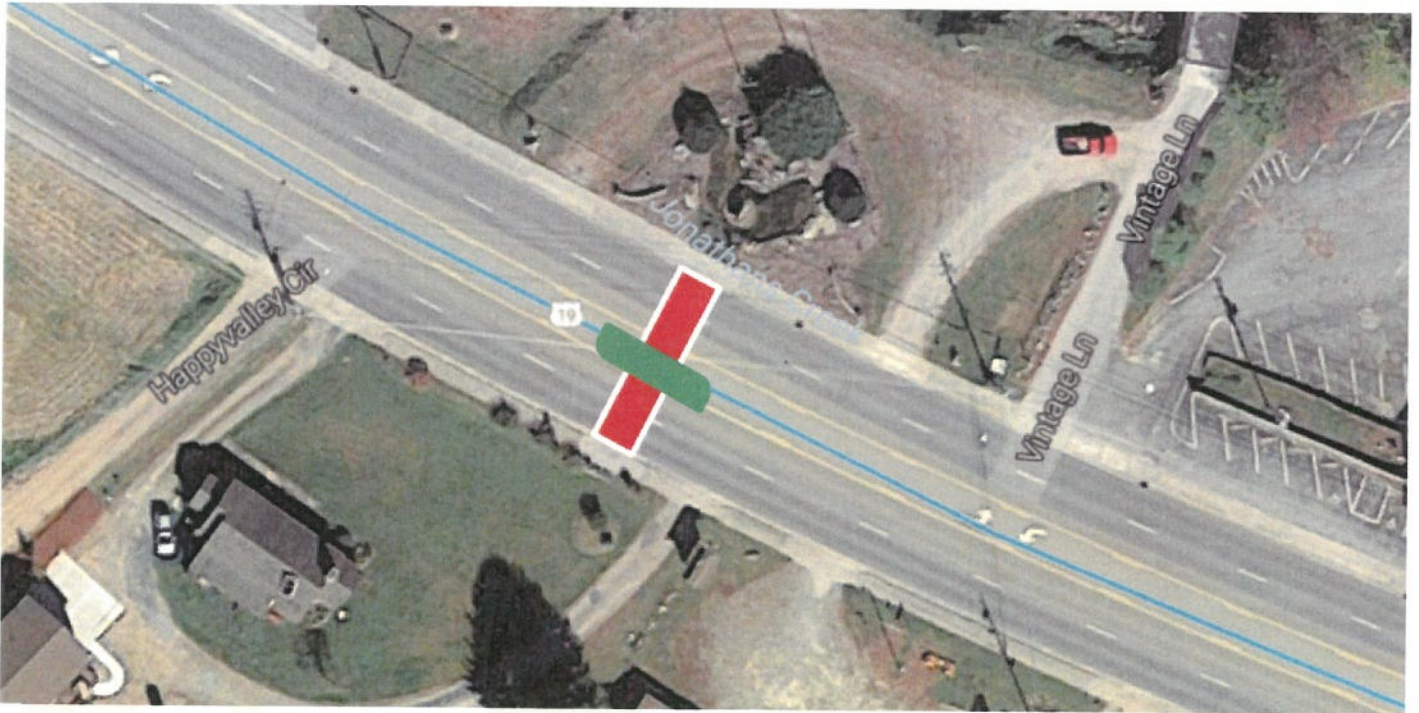


A Holiday and Comfort Inn - Room exists for a refuge island between two left turn locations. Here the left turn lanes are positioned “tail-to-tail”.

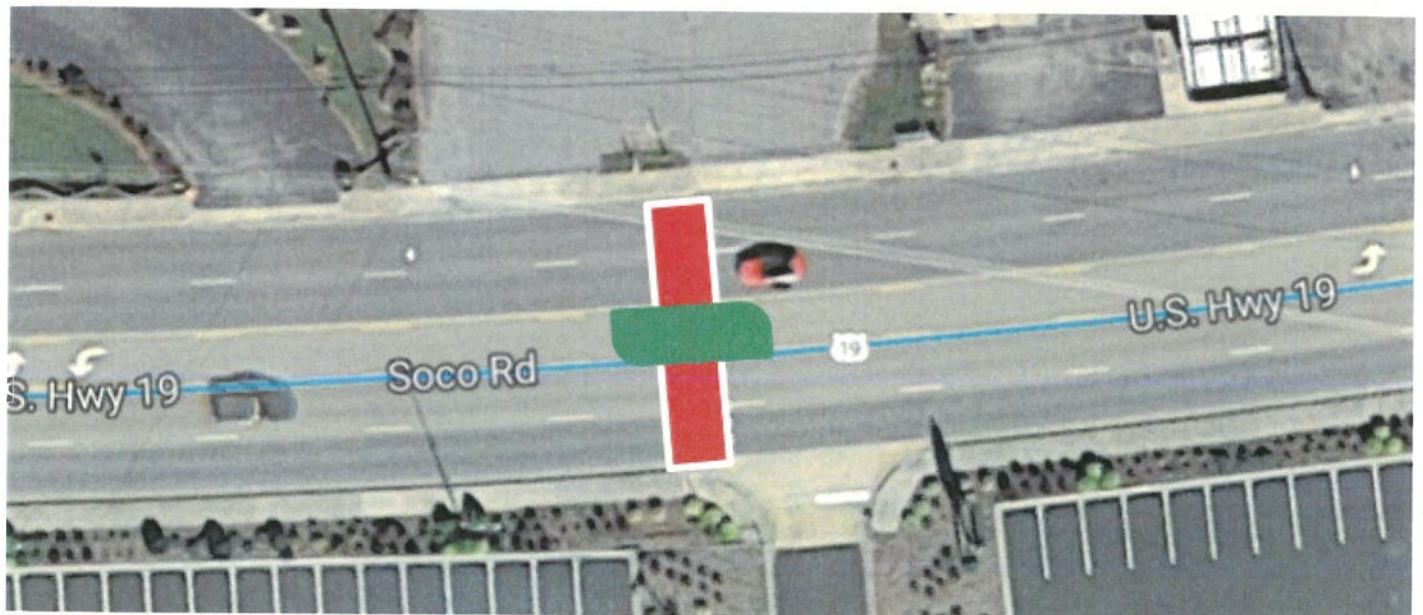


3155 Soco Road, west of Stompin' Grounds - Relocate crossing and protect it with a refuge island. While some left turn movements may be blocked, other accesses to these businesses exist.

## Locating Pedestrian Refuge Islands



2986 Soco Road - Upgrade existing crosswalk.



2674 Soco Road - Upgrade existing crosswalk.

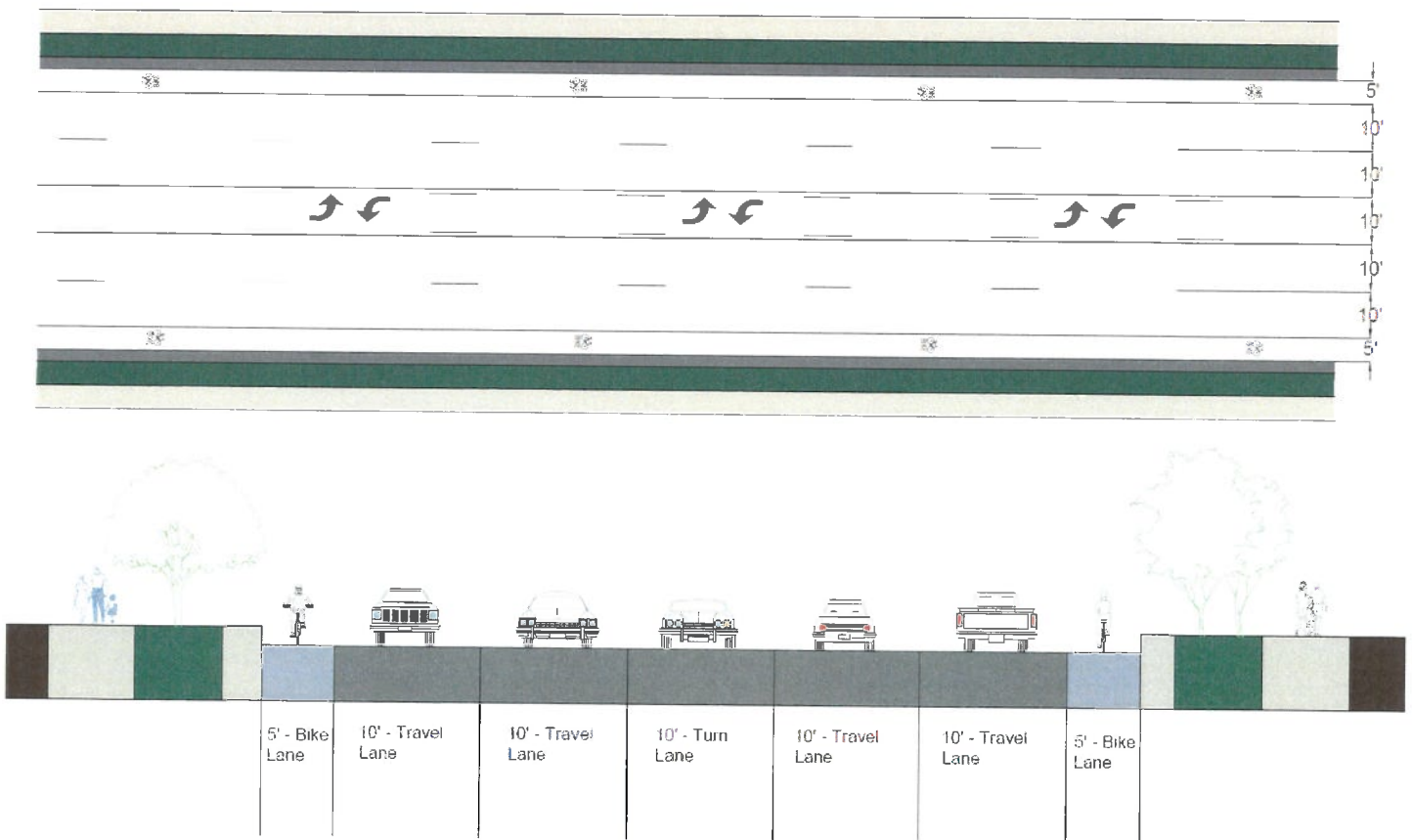
## Adding Bicycle Lanes to US 19

Restripe existing pavement for five 10' lanes with 5' bike lanes, possibly buffered. This is recommended for implementation from the two-lane highway west of Fie Top Road to the traffic signal at US 276.

Discussions with NCDOT indicate that they will only approve a cross section with eleven-foot wide outside lanes, so this recommendation would become:

4' bike lane - 11' travel lane - 10' travel lane - 10' turn lane - 10' travel lane - 11' travel lane - 4' bike lane.

A minimum four-foot-wide bike lane is acceptable when motor vehicle speeds do not exceed 35 mph. The section of US 19 east of the Town Center, from Dogwood Drive to US 276, has a posted speed limit of 45 mph and should have a minimum five-foot-wide bike lane. Requiring an 11' outside travel lane will take away the possibility of a protected bike lane or a five-foot bike lane.





## Appendix - Recommendations from the DRAFT Town Center Master Plan

### Other Safety Recommendations (Long-Term)

- **Detached Sidewalks Along US 19:** Through requirements on new development and/ or incremental investments by the Town, Maggie Valley should consider creating a minimum buffer of five-feet between the sidewalk and back of curb along US 19. This separation from vehicular traffic greatly increases the feeling of security for those who walk along the route.
- **Upgrade Crossings of US 19:** Crossing a five-lane road will always be intimidating to pedestrians. Crosswalk compliance by motorists along US 19 was lacking during observations made by the consultant team during this plan. Maggie Valley can work with NCDOT and business owners to evaluate opportunities to upgrade existing pedestrian crossings of US 19. New technologies such as Rectangular Rapid Flashing Beacons (RRFBs) can be considered to add to existing crossings. Pedestrians can push a button that activates flashing lights to raise the awareness of their presence to motorists. Other treatments are available and can be explored.

### Other Pedestrian Enhancements for Maggie Valley

- **Pedestrian Wayfinding:** Either through signage or brochures, Maggie Valley can promote the relatively short walking distances between destinations, businesses and lodging. Increasing the presence of pedestrians throughout the town creates greater awareness and puts “eyes on the street.” This can help overcome a sense that walking along US 19 is unsafe.
- **Maggie Valley Festival Grounds:** Consider a greenway or walking path on the periphery of the Festival Grounds in combination with an off-street pedestrian linkage to the site from properties to the east and west. The setting is perfect to promote it as a recreational site. Outparcels or underutilized areas around the grounds could be considered for playgrounds or other physical activity upgrades to create more of park setting that utilizes the property year-round and by people of all ages and abilities.
- **Long-Range Vision for a Greenway:** Maggie Valley can consider a long-range vision and plan for a greenway along Jonathan Creek or other routes. Greenways are becoming as much of an economic development and promotional tool for communities as sewer and water lines, transportation access and public parks. Getting a greenway spanning the length of Maggie Valley is not an easy undertaking. The Town may consider working with a conservation organization or a land trust to start negotiating easements along streams and sewer easements (if possible) to patch together a future greenway network. Given the many constraints, the greenway vision should not restrict a future path to a stream-side location; rather all potential routing options should be considered.

## Appendix - Recommendations from the DRAFT Town Center Master Plan

### Sidewalks

A successful Town needs sidewalks, yet design and implementation can be challenging, especially the allocation of adequate funds. The item to note from Maggie Valley's subdivision ordinance is the lack of standards requiring developers to share in the burden of sidewalk construction. Many towns require developers to plan for and install sidewalks in conjunction with their development project. Valdese, NC (population 4,471) and Black Mountain, NC (population 8,080) are two small western NC towns with a sidewalk construction policy included in their subdivision ordinance.

It is recommended that Maggie Valley implement a developer sidewalk construction policy. If the Town chooses to implement a policy, it should either adopt it in accordance with a sidewalk master plan that identifies priority corridors or it should clarify key connections needed throughout the Town.

### Administrative and Policy Action Items to Implement the Town Center Master Plan

- Seek conceptual plan approval by letter from the NCDOT for the roadway elements in the plan, final approval subject to submission of pavement marking plans.\*
- Adopt a policy governing business use of the public sidewalks such that it is encouraged without hindering pedestrian movement.

*\*When funding has been identified, request permission from NCDOT to implement the pavement marking plan for lane narrowing and bicycle lane installation. This will involve applying for an encroachment agreement, completion of a detailed capacity analysis and either construction by Town personnel or by contract. If funded by the NCDOT's Division of Bicycle and Pedestrian Transportation, contracting is required. Cost savings and appearance would be improved by implementing these changes with the next resurfacing project on US 19, but based on the existing pavement condition that is not likely before 2027. Alternatively, restriping prior to resurfacing gives residents the opportunity to try the markings in a trial period.*

# Appendix - Recommendations from the DRAFT Town Center Master Plan

## Implementation Costs Summary for Pedestrian Safety Infrastructure Components

Construction costs are preceded by the costs of planning, design, permitting, engineering, utility and real estate/right-of-way. Construction estimates should include these costs as well as anticipated costs for construction administration, field inspection, and unknown (contingency) costs.

The costs given here were previously determined as part of the Town Center Master Plan effort. They are at the planning level, meaning that they are broad estimates. Detailed construction cost estimates require engineering plans and specifications.

The marking of bike lanes would create a safety buffer between through traffic and the existing sidewalk's pedestrians of about 6.5 feet in width.



Infrastructure Projects for Pedestrian and Bicycle Safety Plan	
Restripe US 19 in the 35 mph zone for narrower lanes to add bicycle lanes. This would extend from the two-lane west of Fie Top Road to just east of Summit Lane, a distance of about three (3) miles.	\$300,000
Option: Restripe US 19 in the 35 mph and 45 mph zone for narrower travel lanes to add bicycle lanes. This would extend from the two-lane west of Fie Top Road to the intersection of US 276.	\$425,000

## Appendix - Recommendations from the DRAFT Town Center Master Plan

### Activity Connection Plan

The town would be well-served by addressing other area needs that reflect common functions within a town center. One of the economic advantages found in traditional Main Street settings is a network of facilities that promote activity via modes other than the automobile. Maggie Valley should aspire to provide a “park once” experience for visitors just stopping by, and a way for hotel guests and residents to access the Town Center via walking and biking so it preserves parking capacity for other visitors. An Activity Connection Plan or ACP was conducted to identify likely “off-site” pedestrian and bicycling improvements that are also important in achieving Complete Streets and Town Center goals. The ACP evaluates access beyond just the presence of sidewalks, bike lanes and greenways to identify projects, programs and policies that will help Maggie Valley take full advantage of Town Center investments. Recreational trips should not be overlooked as they promote physical activity, can improve individual and community health and serve as an economic driver for the Town.



By first identifying a community’s most desirable recreation sites, then determining where users of such sites are being generated, we can improve accessibility, safety and use by determining the short and mid-term infrastructure needs for the likely corridors used most by participants in active transportation. In addition to roadway infrastructure identification, non-infrastructure improvements are also crucial elements of the ACP model. Promotional activities, appropriate signage, use of community events and city policies are areas that can also help to improve access, safety, and overall return on investment all while getting more people to participate in active transportation now while continuing to foster an environment of even greater participation in the future.

Further, investments in walking, bicycling and greenway facilities is now shown to create more jobs per million dollars spent than traditional transportation investments. Maggie Valley can use research findings like this to help in working with NCDOT and businesses to understand that a more balanced approach to transportation investments offers a greater return on those investments.

## Appendix - Recommendations from the DRAFT Town Center Master Plan

### Pedestrian Permeability, Tourism, and Active Lifestyles

Maggie Valley seeks to increase the number of establishments that are attractive to bicyclists and pedestrians. People seek more active lifestyles, and the Town wants to prepare for more attractions that don't require residents and visitors to get in their cars.

An important social feature here is pedestrian permeability with the existing and new retail businesses that surround the Town Center's public areas. Pedestrian permeability is the trait that people can walk between places in the center without facing obstacles such as fences, a lack of sidewalks to front doors, or out of the way paths. A plaza should connect seamlessly with both public and private sidewalk and building entrances to make the connections more attractive in all directions. Benches should be placed both for the solitude of enjoying the park and for sitting and visiting with other guests. Town policies and ordinances need to allow and encourage outdoor restaurant dining, even if partially in the public space.

The following images show potential social gathering places and attractions that will increase the number of people walking and biking in Maggie Valley.



(A) and (B) Veteran's Park with splash pad (Lula, GA)

(C) Splash pad at Wesleys' Playground (Franklin, NC)



## Appendix - Recommendations from the DRAFT Town Center Master Plan



- (D) Veteran's Memorial with flag poles and artillery, American Legion (Valdese, NC)
- (E) Open Air Skylight Pavillion with ice skating rink (Reston, VA)
- (F) Brick plaza and wall, annual and perennial flower bed w/ dedication plaque (Lula, GA)
- (G) The Foothills Farmer's Market Pavillion (Shelby, NC)

## Conclusion

Whatever course the Town decides to take, bicyclist and pedestrian safety are of paramount importance. Maggie Valley should pursue funding for a broad bicycle and pedestrian safety project that will have the added benefit of making the Town a more attractive and safe place for those citizens and visitors who enjoy walking and biking.



