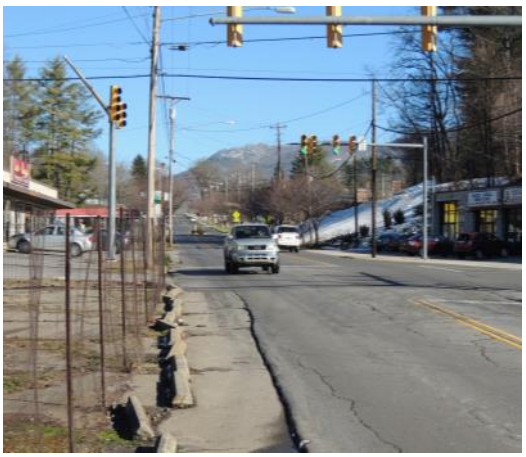
North Main Street
Complete Streets Study

Prepared for:

Town of Waynesville

JMTE Project 0146

Located in Waynesville, North Carolina



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Acknowledgments

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1. Introduction

Waynesville's North Main Street Complete Streets Study represents the efforts conducted in 2013 to define design concepts for the intersection of North Main Street and Walnut Street east of downtown Waynesville. Past citywide and countywide planning efforts indicated this area as both a gateway for the Town of Waynesville and a vital link in the pedestrian and bicycle network, for both Waynesville and Haywood County residents and visitors. Project research and due diligence has revealed that many local citizens and Town officials consider this a critical "missing link" in the Waynesville sidewalk system.

The intersection of North Main Street and Walnut Street in Waynesville is the subject of this Complete Streets study, which evaluated various design options to fill sidewalk gaps, provide for bicycle facilities and address future vehicular traffic needs.

To develop the recommendations contained in this study, the Town of Waynesville obtained a grant from the French Broad River Metropolitan Planning Organization (FBRMPO) and identified a team of engineering and planning consultants to carry out the grant on behalf of the Town. The North Main Street Complete Streets Study is the first step in realizing improvements at the intersection of North Main Street and Walnut Street that will accommodate transportation needs for motorists, pedestrians and bicyclists for many years to come.

The adoption of this study by the Town of Waynesville will be followed by more detailed design and environmental analysis that lead to land acquisition to accommodate the final design and construction of the project. Funding for these steps will likely come through partnerships that include the Town of Waynesville, FBRMPO and the North Carolina Department of Transportation (NCDOT). Other partners could include area developers, land owners,
Haywood County, and other state or local agencies.

Background

The nature of transportation in large cities and small towns is undergoing a transformation in the United States. Communities are seeking more balance in consideration of the many users of the transportation system to create a safer transportation network, provide transportation options, enhance livability and promote economic development. This philosophy is known as the Complete Streets concept.

There exists a strong history of support from Complete Streets investments along North Main Street (US 23 Business) among the many stakeholders and agencies that have a role to play in funding, constructing and maintaining the street. The Town of Waynesville's past planning and policy efforts, in combination with plans led by Haywood County, the French Broad River Metropolitan Planning Organization (FBRMPO), and the North Carolina Department of Transportation, clearly point to the need for robust multi-modal investments along the North Main Street corridor.

The plan and policy synthesis section further discusses and summarizes the many plans and strategies these agencies and stakeholders have adopted.

It forms the basis for continued study and design of the corridor, as well as, helps identify how these agencies should support pursuits by the Town of Waynesville to re-build North Main Street to safely accommodate all modes of transportation —for both recreational and commuting purposes.

The Town of Waynesville pursued funding for this study, in part, to identify options that would complete the sidewalk network near the North Main Street and Walnut Street intersection.

A key part of the Complete Streets philosophy is improving roadway user safety while accommodating multi-modal transportation simultaneously. The reported vehicular crash history for this intersection for the past 10 years is low. This study is not an operational or driver safety project. As stated above and based on previous planning and policy efforts, this intersection was chosen because the need of multi-modal accommodations is clearly present.

Project Goals and Objectives

- To develop a project that encompasses the Complete Streets philosophy
- To develop a project that will lead to economic development
- To develop a project that will foster community development
- To develop a project that can be expanded and connected to other activities, transportation systems, and community resources
- To develop a project that will serve the transportation needs of Waynesville
- To develop a project that will operate efficiently, effectively, and safely for all roadway users

Recommended Alternative

The consultant team for the North Main Street Complete Streets study was tasked with taking a long-range view of growth and development in and around the intersection to develop a design alternative that met the goals and objectives listed above.

Based on these goals and objectives, a major realignment option for North Main Street and Walnut Street (Exhibit 1-1) is recommended to construct new pedestrian and bicycle facilities and create a realigned intersection that allows for a future direct connection to Vance Street that could be constructed if property north of Walnut Street redevelops.

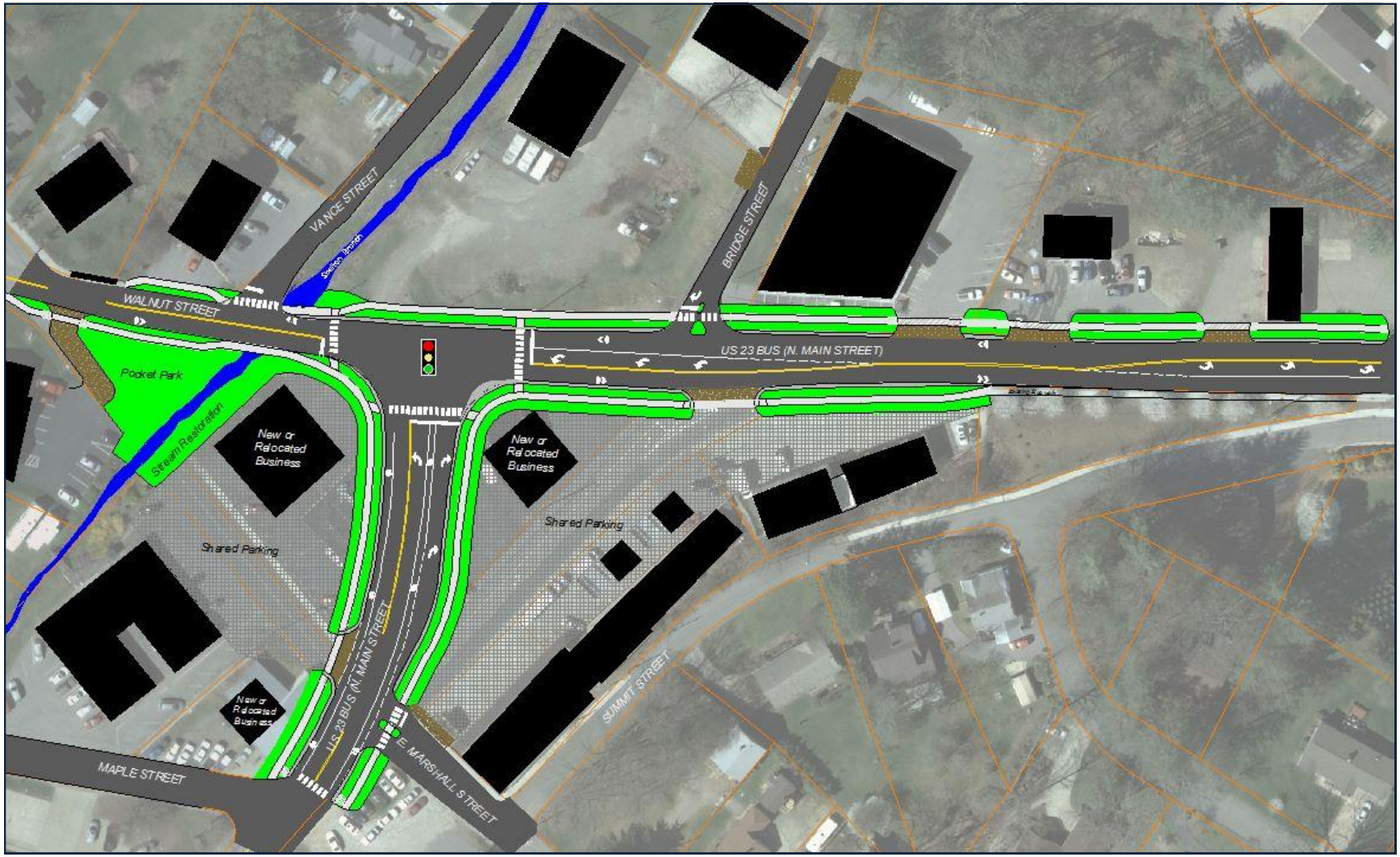
This recommended alternative requires the full acquisition of two businesses located south of Walnut Street and represents a notable cost and impact to the project in order to fulfill the goals and objectives.

The summary of the breadth and depth of analysis undertaken to develop this recommendation is contained in *Chapter 6*.

Exhibit 1-1

Recommended Alternative: Major Realignment

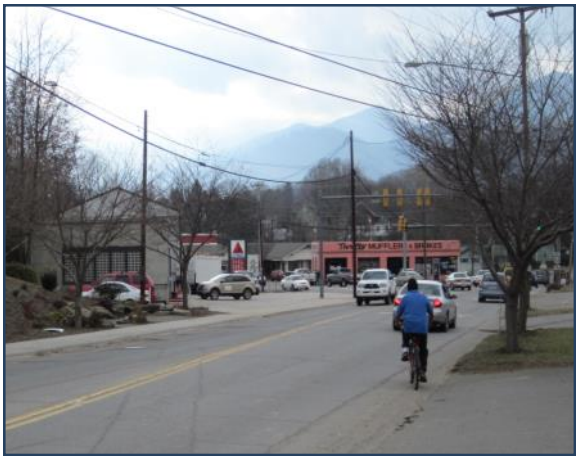
The major realignment alternative is the recommended approach to addressing various long-term transportation, land use and economic development needs east of downtown Waynesville. The recommended realignment shown below has notable impacts to properties, which is typical for an urban environment. The impact to the two businesses south of Walnut Street is significant, requiring relocation. The long-term vision to create a more direct and safe multi-modal connection to the recreational facilities north of the intersection along Vance Street was a major consideration in recommending this alignment.



2. What are Complete Streets?

A key concept in complete streets implementation is that if the needs and safety of pedestrians and bicyclists are accommodated first and as a priority in project design, then the needs of motorists can also be accommodated. The opposite is not true.

This is evident on many streets throughout the United States and Western North Carolina where the needs of pedestrians and bicyclists were evaluated long after the needs of motorists were accommodated, which has limited the ability of communities to achieve multi-modal transportation goals.



A variety of users pass through the North Main Street and Walnut Street intersection every day. Accommodating these users requires careful thought about how all users of all ages and abilities can be safely accounted for in project design.

Just because a street has sidewalks and bicycle facilities does not mean it is "complete." There are several other factors that go into implementing Complete Streets design practices that ultimately lead to a street becoming and staying complete in a manner that accommodates all users of all ages and abilities at all times.

Further, pedestrians and bicyclists are more flexible in terms of where they go and how they achieve that than motorized vehicles.

To properly implement Complete Streets, this flexibility should not only be accommodated, but encouraged in some situations.

The Complete Streets philosophy can be described as the following:

Complete Streets safely accommodate all transportation modes and all users of all ages and abilities, at all times, in both the transportation and land use realms of the built environment.

From this description the following details are important to consider:

- **All transportation modes:** This includes travel by car, on foot, by bike, on a motorcycle and by truck. On urban streets, the mobility and safety needs of these modes are accommodated and promoted.
- **All users:** These are the people who use the modes--motorists, pedestrians, and bicyclists—safely and in balanced consideration of one another as they use the street.
- **All ages and abilities:** This relates to the many different user needs. A child or senior citizen has different needs as a pedestrian than an adult. A bicyclist who rides 50 miles every weekend has different needs than a parent taking their child to the park or greenway with a bike and chariot.
- **At all times:** This is an overlooked element of many Complete Streets policies. The temporal elements of the Complete Streets definition implies that the needs of all users, especially those most dependent on non-motorized modes or those sensitive to minor changes in travel patterns, shall be accommodated during construction and maintenance activities as well as in signal timing.

- **In both the transportation and land use realms of the built environment:** The need to accommodate all users' safety in the transportation realm is evident in the term "Complete Street." Maximizing the investment in complete streets and ensuring increased usage by non-motorized travelers comes from the land use realm. If the streets are considered walkable and bikeable, then the adjacent land uses should also be designed similarly. A pedestrian or bicyclist should be able to easily and safely access the front door of local businesses and their neighborhood, and have a place to park their bicycle at their destination.

These cyclists are taking a rest along the greenway near Vance Street. Linking pedestrians and bicyclists to destinations such as parks and greenways is a key consideration when thinking about Complete Streets.

Design Resources

There is no one single source for best practices related to Complete Streets design. NCDOT has published Complete Streets Design Guidelines that provides recommendations on how to consider the needs of pedestrian and bicyclists along streets. The Manual on Uniform Traffic Control Devices (MUTCD) provides standards that address many intersection issues related to Complete Streets implementation. The Institute for Transportation Engineers (ITE) has developed special guidance on creating walkable communities. The American Association of State Highway Transportation Officials (AASHTO) has several publications, most notably *A Policy on Geometric Design of Highways and Streets* its new *Guide for the Development of Bicycle Facilities*, a *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, and a document called *Achieving Flexibility in Highway Design*, which notes several areas for flexibility from typical one-size-fits-all approaches to Complete Streets and context-sensitive solutions.

Purpose & Need for Complete Streets

The effort to identify complete streets solutions at North Main Street and Walnut Street followed analysis techniques similar to what NCDOT applies for project development, including an evaluation of natural and human-environment features within the project area. This process requires what is known as a *"Purpose and Need Statement"* that is vetted publicly and is a major factor behind the design alternative that is selected.

As a starting point for further evaluation and as an outcome of this study, the following Purpose and Need statement was drafted:

Improvements at the intersection of North Main Street and Walnut Street in Waynesville are needed to fulfill the Town's goals and objectives for creating a gateway to downtown Waynesville. These transportation improvements will improve safety, accommodate multi-modal users, and promote economic development. The Complete Streets implementation will also improve the health of area residents by

providing and encouraging pedestrian and bicycle linkages to downtown, the Waynesville Greenway, the Waynesville Recreation Center, the Waynesville Skate Park, and nearby family parks and playgrounds.

The North Main Street Study and the "Purpose and Need Statement" are initial steps intended to be incorporated within the final environmental process. Many of the methods employed throughout the study can be utilized as the Town of Waynesville and NCDOT move forward with the project.

Waynesville's Context for Complete Streets

In many communities, land use, transportation and economic development policies are still catching up to the modern realization that appropriate accommodations for pedestrians and bicyclists are essential as described above in defining Complete Streets. The North Main Street Complete Streets Study sought to identify the needs in the project area for pedestrians and bicyclists as well as motorists.

The Town of Waynesville has a well-established track record of identifying and evaluating transportation needs along the Town's street that are intended to safely accommodate both motorized and non-motorized modes of transportation. The Waynesville Land Development Plan, the Waynesville Pedestrian Plan, the Haywood County Comprehensive Plan, and the studies of South Main Street and the Russ Avenue Corridor all note the need to prioritize the movement of pedestrians and bicyclists through and around Town in balance with the movement of motorized vehicles.

Waynesville has also adopted many policies that support land use and related design patterns that safely accommodate access for pedestrians and bicyclists.

A summary of past planning and policy efforts by the Town of Waynesville, Haywood County and the North Carolina Department of Transportation is contained in Chapter 3.

3. Plan & Policy Synthesis

Town of Waynesville Plans and Policies

Waynesville's planning and policy actions have indicated the town, its leaders and its residents desire a quality of life that strikes a balance between growing the local economy and protecting and enhancing the Town's identity. Waynesville is a destination community for employment within Haywood County, for visitors who flock to the region year-round, a place for retirees, and for residents who support local businesses. Waynesville has a track record of planning that reinforces this vision for the community.

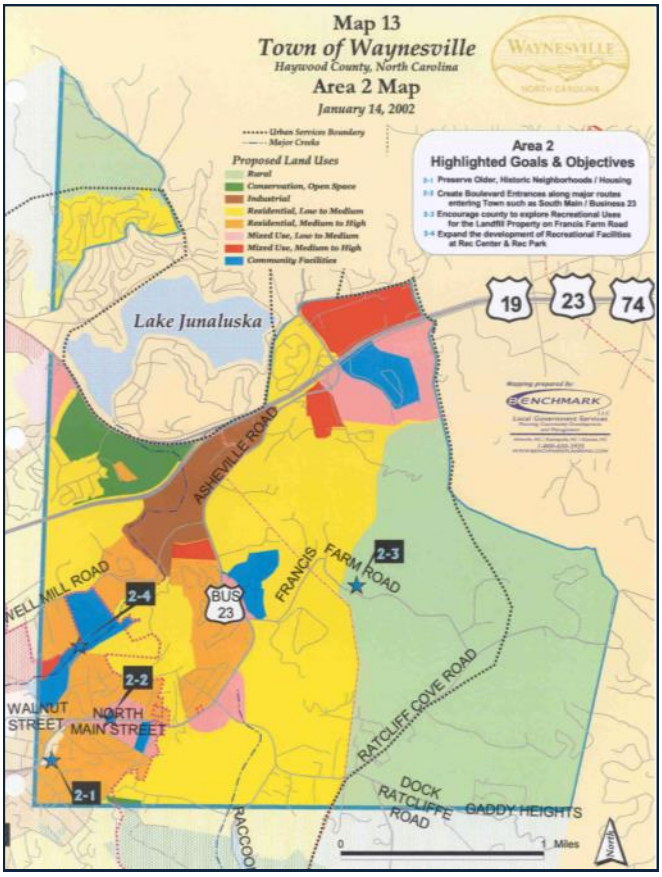
2020 Land Development Plan (2002). Waynesville's Land Development Plan (LDP) is the comprehensive land use plan to guide the Town through the year 2020. Since its adoption in 2002, the strategic planning for Waynesville growth has been influenced by the implementation actions identified in the LDP. The LDP addresses many subject areas—land use, economic development, environment, transportation and demographics.

The LDP established Waynesville's vision as:

> ***"Preserving its heritage and inviting the future through quality planning for living today and tomorrow…We will achieve this through planning mixed-used development, aesthetic infrastructure design for economic prosperity, health community and family life…Waynesville will be regarded as the model town for the twenty-first century."***

Elements of the LDP pertinent to the North Main Street Complete Streets study and reflective of this vision are summarized below.

Exhibit 3-1: Land Development Plan Area 2 Map



Waynesville's Land Development Plan identifies several improvements to fulfill the Town's vision. North Main Street (denoted as item 2-4 above) is shown as a "boulevard treatment" in the vicinity of the Walnut Street intersection.

- **Alternative Transportation Modes:** Local circulation could be served by a public transportation system… augmented by a bicycle/pedestrian pathway and sidewalk system.
- **Recreation:** A centerpiece is the multi-purpose recreation facility at the Town's Vance Street Park. The Town has also developed a greenway trail system plan which will utilize Richland Creek and other pathways to connect local attractions. The greenway trail system will not only provide an excellent amenity of walking trails but will also provide well-defined, safe and accessible pathways furnishing alternative means of transportation to area residents.
- **Land Use Goal:** Promote the orderly growth, development and enhanced land values of the Town by preserving and improving Waynesville's existing neighborhoods, creating more attractive commercial centers, maintaining a strong downtown area, taking steps to reduce urban sprawl and protecting the natural beauty of the community.

- **Transportation Goal:** Create a safe, efficient and environmentally sensitive multi-modal transportation system throughout the Waynesville community.
- Create boulevard entrances into downtown to improve the appearance of Waynesville's gateways and provide traffic calming on Russ Avenue, South Main Street and North Main Street.
- Explore the use of various traffic calming techniques for use on public roads.
- Develop alternative transportation opportunities providing Waynesville residents and visitors with choice, mobility, convenience and safety; Coordinate the planning for all modes of transportation utilized within the Waynesville planning area.
- Include bicycle and pedestrian paths in the design of all major road improvements unless deemed not feasible; Establish bicycle routes throughout the community with special attention given to destination points such as schools, churches, recreation sites and governmental facilities; Provide better marking, lighting and identification of crosswalks throughout the community.
- Connect Junaluska Elementary School with the Recreation Center via pedestrian /bicycle path.
- A sidewalk/bicycle lane loop should be developed along North Main Street, Francis Farm Road, and Ratcliff Cove Road.

Land Development Standards (2011). The Land Development Standards (LDS) document is intended to guide new development in the Town and sets forth the requirements placed upon property owners and developers as land is subdivided or redeveloped. The LDS require developers adjacent to public streets such as North Main Street to construct sidewalks—minimum of 5-feet wide—and

Exhibit 3-2: Land Development Standards Commercial Street Cross Section

6.6.2.C Commercial Street Main streets are intended to provide access to neighborhoods and high density residential and commercial areas.	**1.** Right-of-Way Width	60 - 80 ft (Curb & Gutter)
	2. Lane Widths	10-12 ft
	3. Median Width	n/a
	4. Design Speed	20-25 mph
	5. Traffic Lanes	2 lanes
	6. Parking Lanes	Both sides @ 8 feet marked (Or One side only as appropriate)
	7. Curb Radius	15-25 ft (See Section 6.7.6)
	8. Walkway Type	12 ft sidewalk both sides (16 ft required for outdoor seating areas) (dimensions are measured from back of curb to the outside edge of sidewalk)
	9. Planter Type	Tree wells or 6 ft continuous planting strip (included in walkway type dimension)
	10. Pedestrian Facilities	Intersection bulb outs (Required) & Mid-block crosswalks
	11. Curb Type	Vertical curb & gutter
	12. Landscape Type	1 per 40 ft of street frontage (See also 8.5.1)
	13. Bicycle Facilities	5 ft Bike Lane (See also 6.9.3) or 6 ft w/on-street parking

Waynesville's Land Development Standards identify typical street cross sections to be pursued as the Town grows. The North Main Street Complete Streets study used this cross section, as well as others, to formulate recommendations for intersection.

"accessways" should be provided from the property to abutting greenways or open space. Right-of-way is also required to be dedicated in accordance with adopted transportation plans.

A major reference in the LDS related to North Main Street is to the Thoroughfare Plan (Comprehensive Transportation Plan), which has standing within North Carolina General Statutes related to a Town's ability to regulate and require improvements along public streets in accordance with the Thoroughfare Plan. The LDS also references like improvements for any other "similarly adopted specific design plan."

The LDS contains other references specific to street design, including requirements and guidance on appropriate applications for sidewalks, bicycle lanes, intersections, on-street parking and drainage systems. The LDS also references shared lane marking for bicyclists as well as situations where the 5-foot minimum sidewalk width is increased due to topography, lack of a buffer between the sidewalk and the curb, and the sidewalk abutting an existing building.

Exhibit 3-3: Pedestrian Plan Activity Generators

The 2010 Comprehensive Pedestrian Plan identifies several activity generators throughout the town, including those shown in the illustration above (from the Pedestrian Plan).

Waynesville Comprehensive Pedestrian Plan (2010). The Pedestrian Plan reinforces many of the tenets of the Land Development Plan and Land Development Standards and strengthens several design and program elements related to increasing pedestrian usage throughout Waynesville. Specifically, the Pedestrian Plan recommends filling sidewalk gaps on North Main Street between West Marshall Street and Bridge Street.

The vision of the Waynesville Comprehensive Pedestrian Plan is:

> ***"The town of Waynesville is a safe and healthy place to live, work, learn and play. Our town is a community where walking is a major travel mode and where the town's development patterns and interconnected pedestrian circulation network:***
>
> - ◊ ***Provide pedestrians convenient, safe and enjoyable access and mobility throughout the developed portions of the town.***
> - ◊ ***Link the town's neighborhoods by providing a 'seamless system', which helps to maintain a vibrant and sustainable lifestyle."***

Goals and objectives related to North Main Street are:

- Increase and enhance the safety of pedestrians in the town of Waynesville;
  - ◊ Change the perception that roads are for cars only, particularly on low volume, low speed facilities.
  - ◊ Create facilities that provide separation from travel lanes.
  - ◊ Provide well-marked crosswalks with signal actuation where appropriate.
  - ◊ Promote appropriate vehicular speed through the design of pedestrian facilities.

- Adopt policies that promote connectivity, coordination and continuity of pedestrian facilities throughout the town of Waynesville; and
- Enhance personal and environmental health in the town of Waynesville.
  - ◊ Promoting walking to the children in the town.
  - ◊ Encourage residents of the town to "be active."

Other features and projects contained within the Pedestrian Plan influence recommendations on North Main Street:

- As areas near the CBD redevelop, the Town should promote mixed use and pedestrian-oriented development for these areas, with a focus on providing pedestrian connections to the CBD and surrounding areas.
- Complete sidewalk construction, especially the missing links, along the "backbone" of the pedestrian system: including Main Street (US Business 23) …for the entire length within the Town's planning jurisdiction.
- Extend sidewalk along Broadview Road from east of North Main Street to East Street.
- Connect missing sidewalk along Hazel Street between Cherry Street and North Main Street.

Other Studies: Two additional plans relate to the North Main Street Complete Streets Study in that they set the tone for evaluation of Waynesville's gateways corridors and establish the need for incorporation of complete streets themes.

- **Russ Avenue Corridor Study (2010):** The Russ Avenue corridor study evaluated multi-modal transportation needs along this section of US 276 entering Waynesville. The study included recommendations on improved traffic flow and intersection improvements, frontage roads, landscaped medians, improved pedestrian facilities, and the addition of bicycle lanes. Once implemented, the recommended improvements in the Russ Avenue Corridor Study have the potential to impact North Main Street as increased traffic volumes and multi-modal usage will be linked via Marshall Street and Walnut Street.
- **South Main Street Corridor Plan (2012):** This study incorporated the needs to connect neighborhoods and businesses along South Main Street to the downtown area and nearby neighborhoods, including the Hazelwood community. The Plan incorporated the themes of NCDOT's Complete Streets efforts, integrated land use considerations with transportation needs, made recommendations for streetscape improvements, and assessed traffic impacts in the area.

Haywood County Plans

Haywood County has conducted two studies that included some consideration of direct or indirect impacts along North Main Street related to non-motorized transportation.

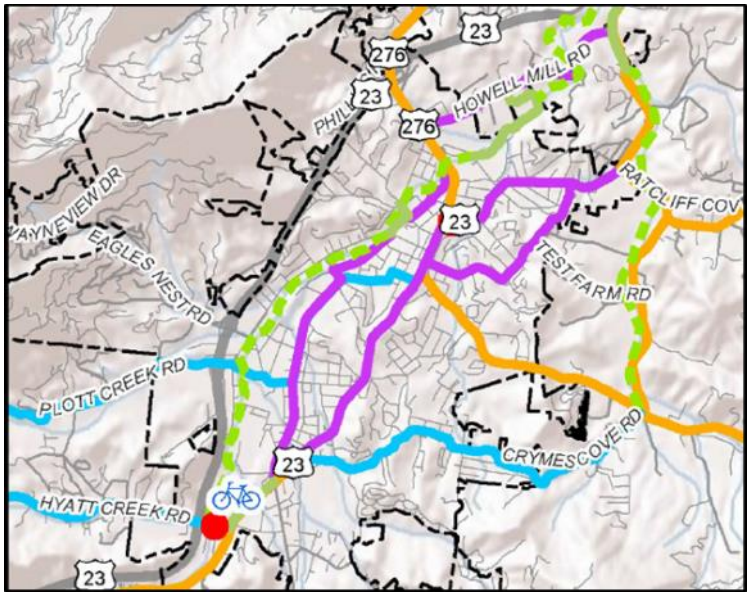
Haywood County Comprehensive Bicycle Plan (2011). The Comprehensive Bicycle Plan included evaluation of projects, programs and policies for all of

Haywood County's towns as well as rural areas. The Bicycle Plan includes general classifications for bicycle facility types that fit the context of the area. It also includes parameters for installation of certain bicycle facilities, including shared lane markings and bicycle lanes through intersections.

North Main Street is indicated in the plan for an "urban shared lane" facility, meaning that current conditions, based on road width and right-of-way, indicate that a shared lane marking is most practical along the route. North Main Street at Walnut Street was identified as one of the Plan's "hot spots," meaning that participants in the Bicycle Plan indicated this area as one of concern for safety due to traffic volumes, topography and use by bicyclists.

Haywood County Recreation Master Plan (2007). The Recreation Plan recommendations state that "any future roadway construction project in the County should include provisions to accommodate pedestrian and bicycle travel." It notes these connections should link future parks and recreation facilities as well as greenways. For greenways, the Recreation Plan recommends a countywide network of them, noting that 80% of respondents to the Plan's survey expressed support for such a system. The nearby greenway along Richland Creek in Waynesville is a backbone of this potential system and its linkages to neighborhoods and businesses along North Main Street.

Exhibit 3-4: Bicycle Plan Routes in & around Waynesville



The Haywood County Comprehensive Bicycle Plan identified North Main Street as a key east-west bicycle route and recommended an urban shared lane marking treatment for the corridor given existing constraints related to street width and right-of-way.

NC Department of Transportation Support for Complete Streets

In 2009, NCDOT adopted a Complete Streets policy to reflect growing demand and interest among communities to see the agency prioritize and invest in pedestrian and bicyclist facilities. The agency's Complete Streets policy acknowledges that "transportation, quality of life, and economic development are all undeniably connected through well-planned, well-designed, and context-sensitive transportation solutions." The policy states NCDOT is committed to "providing an efficient multi-modal transportation network" for the needs of "motorists, transit users, bicyclists and pedestrians of all ages and abilities." The policy notes that it compels NCDOT's professionals to "consider and incorporate multi-modal alternatives in the design and improvement of all appropriate transportation projects within a growth area of a town or city unless exceptional circumstances exist."

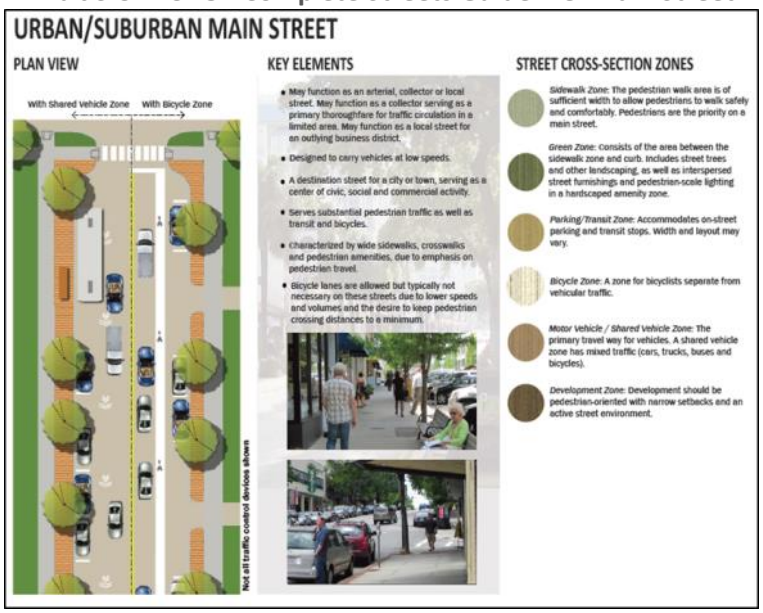
NCDOT Transportation-Public Health Policy (2012). The necessity for NCDOT to invest in future Complete Street improvements along North Main Street is also supported in the agency's Public Health Policy adopted in 2012.

The policy provides greater support to NCDOT's mission statement, which references public health outcomes of NCDOT investments:

NCDOT ***"may have opportunities to support positive health outcomes by considering public health implications in our decision-making across all transportation modes, programs, policies, projects, and services, and through all stages of the life of a transportation project from planning to project development, construction, operations and maintenance.***

- ***A multi-modal transportation system to provide access to and options for customers of all abilities and capabilities***
- ***The safety of all users and all modes of transportation***
- ***The potential for the transportation system to support human health."***

Exhibit 3-5: NCDOT Complete Streets Guideline: Main Street



NCDOT's Complete Streets Guidelines and Policy Framework identified cross-sections for various applications of the agency's Complete Streets Policy. The Urban/Suburban Main Street concept shown above has many similarities to North Main Street in Waynesville.

French Broad River Metropolitan Planning Organization / Land of Sky Regional Council

The French Broad River Metropolitan Planning Organization (FBRMPO) is the federally-designated regional transportation planning agency responsible for overseeing long-range transportation planning for the urbanized that includes Waynesville.

2035 Long-Range Transportation Plan (2010). FBRMPO's Long-Range Transportation Plan (LRTP) includes multi-modal considerations for the transportation system in the metropolitan area in Western North Carolina that includes Waynesville. The vision of the LRTP supports a safe and efficient transportation system that includes integration of roadway, transit, freight, pedestrian and bicycle networks. Projects that are funded via NCDOT or other federal sources must be consistent with the vision and broad project descriptions contained in the LRTP.

The LRTP contains several state and federal policies oriented toward directing transportation investments to Complete Streets projects. The LRTP includes future project funding set-asides that may be useful for North Main Street improvements.

Blue Ridge Bicycle Plan (2013 - *draft*). While the Haywood County Comprehensive Bicycle Plan includes more specific recommendations for the bicycle system in Waynesville, the Blue Ridge Bicycle Plan is establishing more distinct corridor priorities for Haywood County and the region that can be used for more direct funding pursuits via NCDOT.

The Plan is being conducting concurrently with *WalkBikeNC*—the statewide bicycle and pedestrian plan for North Carolina. *WalkBikeNC* includes an evaluation of state bicycle routes, including State Bike Route 2, which currently follows the Blue Ridge Parkway through Haywood County. A preliminary recommendation in *WalkBikeNC* involved re-routing of State Bike Route 2 to move it off of the Parkway to follow other local routes, including North Main Street through Waynesville.

The Blue Ridge Bicycle Plan is still in its draft stages and will be adopted in summer 2013. North Main Street is included in the draft plan list of Bicycle Corridors, noting the need to evaluate the inclusion of bicycle lanes along the route from Church Street to East Street (identified as Haywood corridor "E" in the draft plan).

Summary

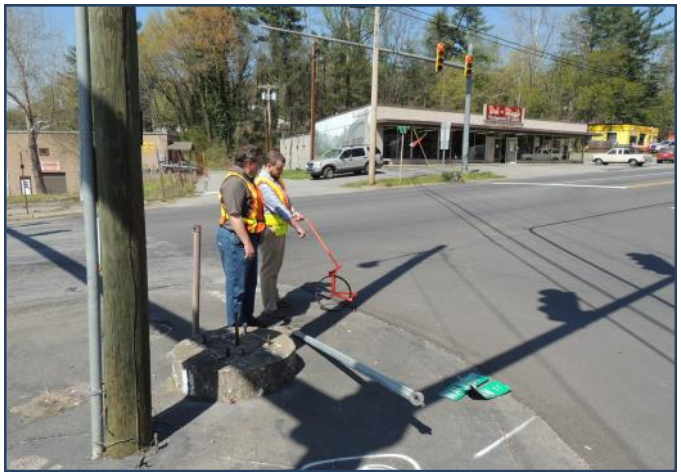
The planning efforts outlined in this section represent the established track record in Waynesville, the region and the state for pursuing increased investment in complete streets along corridors such as North Main Street. This is just a summary of those efforts; the plan and policy documents contain design standards and recommendations that will be used to refine the design parameters for the North Main Street Complete Street study. They will also be instrumental in helping Waynesville identify funding partners for implementation of the study's findings.

4. Data Collection

As part of the project's initial steps existing roadway user data, traffic signal operation, and traffic conditions were collected. In order to ascertain what Complete Street applications may be most appropriate, this data was analyzed to determine current and projected operational and safety elements.

In order to depict what the roadway volumes for this intersection and peripheral intersections within the study area will look like in the future, current roadway volumes needed to be collected. Multiple intersections were counted by our team to obtain existing vehicular, pedestrian, and bicycle volumes. Existing roadway user data was collected at the following intersections:

- Walnut Street @ North Main Street (US 23 Business)
- East Marshall Street @ North Main Street
- Vance Street @ Walnut Street
- West Marshall Street @ Walnut Street



Members of the consultant team for North Main Street conducted various in-the-field data collection and observation efforts, including measuring existing dimensions and counting motorized and non-motorized users to help identify and determine needs.

These intersections were determined to be key locations in order to obtain a complete design. When connecting these intersections, they form a triangle within the roadway network with approaches connecting at angles other than 90 degrees. This occurrence was part of the decision to include these intersections within the overall redesign of the intersection of North Main Street at Walnut Street.

A day-long 12-hour turning movement count was first conducted at the intersection of Walnut Street @ North Main Street in order to establish the AM and PM peak periods for the project analysis.

Weekday peak hour data was collected for all roadway users (combined) at the remaining intersections. The existing turning movement count data and figures can be found in the *Appendix B*.

In addition to the combined user data, focused peak period weekend data was collected for bicyclists and pedestrians at all the intersections. The following characteristics were observed regarding the pedestrian and bicyclist trips:

- The Citgo station / convenience store is the primary destination for pedestrians within the study area as a majority of trips that originated within and outside the study area were bound for this location;
- Due to the lack of marked crosswalks, many pedestrians crossed at unmarked crosswalk locations;
- There is a significant movement of pedestrians from the interior "triangle" of the intersections to the Citgo Station. This appeared to be generated by employees and customers of the two businesses located within the "triangle."

Additional environmental, operational, and geographical data was also gathered using: base maps, field observation, vehicle crash history, STIP projections, reports, past studies, and solicited client input.

5. Public Input

In addition to data collection, there were two public input sessions conducted to gather information and feedback about the North Main Street and Walnut Street Intersection. In all, more than 40 members of the public, local property and business owners, elected officials, and town staff attended the two input sessions. Each was held at Waynesville's Town Hall.

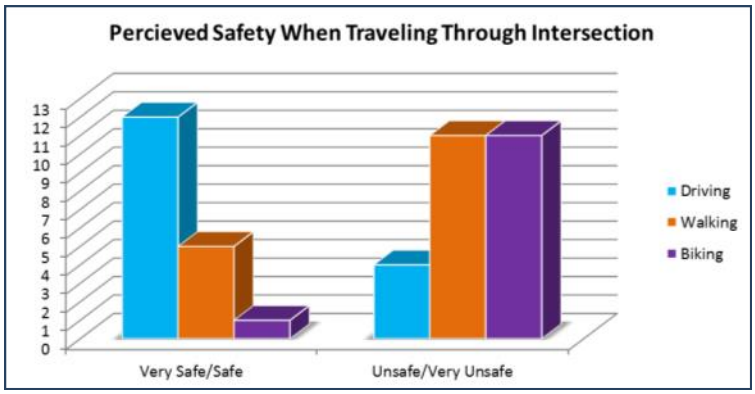
Public Input Session #1

During the initial proposal stage our team immediately agreed that a public input session for members of the community, especially stakeholders and business/property owners, needed to be an integral part of the process. An initial public input session was conducted May 2, 2013 to gather preliminary comments.

This meeting was crucial to understanding the desires of those most affected by any potential changes to occur at the North Main Street and Walnut Street intersection and peripheral study intersections.

The project team discovered some common concerns throughout the public input session. Many believed that sidewalk connectivity was of utmost importance in order to provide a safe atmosphere for pedestrians traversing this intersection. In addition, the desire for bicyclist accommodations was mentioned by multiple attendees. Several attendees felt the design of the intersection was confusing.

Exhibit 5-1: Public Input on Safety along North Main Street



The Haywood County Comprehensive Bicycle Plan identified North Main Street as a key east-west bicycle route and recommended an urban shared lane marking treatment for the corridor given existing constraints related to street width and right-of-way.

It should also be noted that a few of the public meeting attendees felt that a "*do nothing"* option was an acceptable alternative for evaluation. This was due to feelings that there were not substantial traffic flow or congestion issues at the intersection. Those most in favor of doing nothing were people with property and/or business interests in the immediate project area.

In order to quantify the public's comments, a questionnaire was created and the results from this questionnaire are shown in *Exhibit 5-1.* As can be seen in the figure, many people felt attempting to walk or bike through this intersection was unsafe. It should be noted the sample size is relatively small but still gives insight to the impetus behind redesigning this intersection to meet "Complete Streets".

The data and comments developed from the public input session provided valuable insight that helped the team during the decision making process involving the alternative intersection designs.

Public Input Session #2

After the project team narrowed down the recommended options to the Minor Realignment and the Major Realignment, a second public input session was conducted. This public meeting was conducted on July 16, 2013. The intent of

this public meeting was for the public, especially stakeholders and business/ property owners, to make comments as to which design option they would like to see implemented. The no-build option was also presented. There were multiple comments that applauded the design recommendations being presented. Some of the comments commended the addition of pedestrian and bike facilities for both alternatives.

Property and business owners discuss project alternatives with the consultant team. Those whose property is most likely to be impacted expressed support for a "do nothing" option because of this potential impact. Others expressed support for a long-term vision to make improvements and provide a direct link to Vance Street.

With regard to the Major Realignment option (as recommended in this study), many attendees realized the long-term vision to link North Main Street in a more direct alignment with Vance Street given the concentration of public recreational facilities along Vance Street and the planned improvements along Howell Mill Road.

Much like the first public meeting, some attendees felt the *"do nothing"* option was the only acceptable recommendation, primarily due to their property or business interests in the immediate project area. There were a few similar comments regarding potential structure removals due to the proposed roadway footprint. The team distributed right of way acquisition information, as provided by NCDOT, to interested individuals to help them gain an understanding of what could occur if a realignment option was pursued that impacted their property or business.

Overall, the majority of the public and the Town officials present at the public meeting agreed that future generations must be considered when selecting a design recommendation.

Although this project will require additional right of way and altered land use, concerned attendees were encouraged to understand the long-term vision and utility of these improvements. Many attendees expressed their excitement for the potential Vance Street realignment and the increased connectivity to the Waynesville Recreational facilities.

6. Analysis Approach & Methodology

In order to determine what Complete Street applications may be most appropriate, this data was analyzed to determine current level of service (LOS), vehicle queue length, vehicle delay, crash patterns, impact of the nearby connectors, parking facilities and business locations. These findings represent the base line or existing data.

A design year of 2035 was chosen as a base year for which the new volumes would represent. This year was chosen because the NCDOT Transportation Improvement Project for Howell Mill Road, within a half mile vicinity of the study area, uses the same design year. Similarly, a comparable growth factor was used for the North Main Street Complete Streets Study that was used for the Howell Mill Road improvement project. This was done in order to maintain consistency with growth patterns for the surrounding roadway network.

Addressing Complete Streets needs was the primary focus of the analysis to identify options for North Main Street. However, influences such as the creek, need for stream restoration and bridge constraints near Vance Street impacted how options were defined and evaluated.

Once the design year data was obtained, the project team used specialized traffic engineering software to analyze the proposed design options. From these options, the team was able to determine, based on traffic approach volumes, adequate intersection geometry such as: lane widths, storage lane lengths, signal phasing, and signal timing.

The analysis was conducted for each design option in order to determine network operation based on intersection geometry and signal phasing / timing. Initially, multiple scenarios were considered as potential design recommendations. The initially considered design options included:

- **No-Build/Do Nothing.**
- **Minor Realignment:** Realign North Main Street to create a T-Intersection at Walnut Street.
- **Major Realignment:** Realign North Main Street to create a T-Intersection at Walnut Street, including a potential Vance Street Realignment to create Conventional Intersection.
- **Roundabout:** Combining the current intersections of North Main Street & Walnut Street and Walnut Street & Vance Street into a roundabout.
- **Multiple T's:** Create a T intersection at Vance Street & Walnut Street, North Main Street & Walnut Street, and Marshall Street & Walnut Street .
- **Walnut T:** Realign Walnut Street to create a T-Intersection at North Main Street.

Each option was analyzed using *Synchro,* a traffic engineering software that allows the user to model intersections and roadway networks to determine levels of service (LOS) for motorized traffic. The analysis is based on thresholds specified in the *Highway Capacity Manual* (HCM) published by the Transportation Research Board. Synchro provides motorized vehicle analysis of capacity, vehicle delay, volume to capacity ratio (v/c), queue lengths, traffic signal timing,

and vehicle flow rate. Existing and horizon conditions were analyzed for percent queue free, LOS, and v/c ratio. Some pedestrian and bicyclist elements can be evaluated with *Synchro.*

The HCM defines capacity as "the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point during a given time period under prevailing roadway, traffic, and control conditions".

LOS is a term used to represent different driving conditions, primarily with respect to traffic congestion. It is defined as a "qualitative measure describing operational and perceptional conditions within a traffic stream". LOS "A" represents free flow traffic conditions with no congestion. LOS "F" represents severely impacted traffic flow due to vehicle congestion. LOS is generally determined by the total "Control Delay" experienced by drivers. Control delay is vehicle delay that is ultimately caused by the traffic control device. This includes deceleration delay, queue move-up time delay, stopped delay, and acceleration delay. (*Exhibit 6-1)*

Usually, at a signalized intersection LOS "D" is considered the lowest acceptable LOS. However, it is not unusual for a side street or private driveway at an un-signalized intersection to experience LOS "F" during a peak hour. The analysis for un-signalized intersections can project very high delays on the side street, thus it is recommended to use LOS measurements as a comparative tool rather than a design tool. The volume to capacity ratio can also be an indication of

Exhibit 6-1: Highway Capacity Manual Level of Service & Delay Thresholds

Un-signalized Intersection		Signalized Intersection	
Level of Service	Average Control Delay Per Vehicle (Seconds)	Level of Service	Average Control Delay Per Vehicle (Seconds)
A	0-10	A	0-10
B	10-15	B	10-20
C	15-25	C	20-35
D	25-35	D	35-55
E	35-50	E	55-80
F	> 50	F	> 80

Exhibit 6-2: Highway Capacity Manual Volume to Capacity Ratio and % of Free Flow Speed Thresholds

Level of Service	V/C Ratio	Percent of Free Flow Speed (Peak Hour)
A	0.50 and Below	90% or greater
B	0.60 to 0.69	70% to 90%
C	0.70 to 0.79	50%
D	0.80 to 0.89	40%
E	0.90 to 0.99	33%
F	1.00 and Above	25% or less

roadway LOS. *(Exhibit 6-2)*

It can be seen as the v/c ratio approaches 1.0, the point where volume equals capacity, the LOS deteriorates dramatically.

The 95th Queue is defined to be the vehicle queue (back-up) that has only a 5% probability of being exceeded during the analysis period. At un-signalized intersections, p0 is the probability of a queue free state.

Exhibit 6-3 includes level of service analysis for the existing intersection based on current peak hour traffic conditions. The intersection is operating within acceptable thresholds for level of service. Additional analysis for a "no build / do nothing" scenario were evaluated for the year 2035. This evaluation indicated the intersection would still operate within acceptable thresholds without a major change to the intersection's configuration. Level of service analysis does not completely account for the operational impacts to the intersections stemming from its existing configuration that includes skewed angles on approaches.

Exhibits 6-4 (below) and *6-5 (*next page*)* illustrate 2035 analysis for a two-phase implementation of the recommended Major Realignment. Phase One would include realigning North Main Street to create "T" intersection while allowing for a future Phase Two (potentially triggered by redevelopment of property north of the intersection) that would create a four-way intersection with the

Exhibit 6-3: Existing Intersection—Analysis of AM/MD/PM Peak Hour Traffic Conditions

Approach	AM Peak Hour		MD Peak Hour		PM Peak Hour	
	95th Queue Length (Feet)	LOS and Delay (sec)	95th Queue Length (Feet)	LOS and Delay (sec)	95th Queue Length (Feet)	LOS and Delay (sec)
Eastbound	124	B 18.6	258	C 24.4	234	C 25.5
WB Left Turn	136	C 22.5	135	C 25.1	157	C 26.7
WB Thru & Right	128	A 7.5	128	A 8.1	144	A 8.1
NB Thru & Left	9	C 21.6	13	C 21.6	12	C 21.8
NB Right	68	A 10.0	97	B 10.8	111	B 10.4
Southbound	4	C 28.1	3	C 30.6	4	C 30.4

Exhibit 6-4: Major Realignment, "T" - Analysis of Horizon Year (2035) AM/MD/PM Peak Hour Traffic Conditions

Approach	AM Peak Hour		MD Peak Hour		PM Peak Hour	
	95th Queue Length (Feet)	LOS and Delay (sec)	95th Queue Length (Feet)	LOS and Delay (sec)	95th Queue Length (Feet)	LOS and Delay (sec)
Eastbound	121	B 13.7	233	B 16.7	225	B 16.7
WB Left Turn	102	B 12.6	125	B 16.2	142	B 15.5
WB Thru	48	A 3.2	56	A 3.1	41	A 2.7
NB Left Turn	24	B 14.4	53	B 18.0	29	B 17.9
NB Right Turn	19	A 4.5	31	A 6.8	32	A 6.7

Exhibit 6-5: Major Realignment, 4-Way - Analysis of Horizon Year (2035) AM/MD/PM Peak Hour Traffic Conditions

Approach	AM Peak Hour		MD Peak Hour		PM Peak Hour	
	95th Queue Length (Feet)	LOS and Delay (sec)	95th Queue Length (Feet)	LOS and Delay (sec)	95th Queue Length (Feet)	LOS and Delay (sec)
Eastbound	127	B 14.0	252	B 17.2	181	B 16.7
WB Left Turn	105	B 12.6	131	B 16.8	123	B 15.4
WB Thru & Right	52	A 3.2	64	A 3.3	43	A 2.9
NB Thru & Left	31	B 14.9	67	B 18.8	31	B 16.1
NB Right Turn	19	A 4.6	31	A 7.0	28	A 6.1
Southbound	29	B 14.6	38	B 17.7	35	B 16.0

Vance Street connection.

Pedestrian & Bicyclist Quality of Service

An analysis was also conducted on existing and future Quality of Service (QOS) measures for pedestrian and bicyclist traffic through the North Main Street and Walnut intersection. The analysis, which is also based on Highway Capacity Manual formulas, was generated using LOSPlan software and data obtained through the motorized traffic analysis. Exhibit 6-6 illustrates the results of this analysis for existing conditions as well as the major and minor realignment options.

In general, the quality of service for non-motorized transportation through the intersection will be greatly improved (from QOS D to QOS B) in the major realignment scenario due to completion of the sidewalk system and inclusion of bicycle lanes.

The completion of the sidewalk system in the Minor Realignment scenario will also improve conditions for pedestrians. However, separation from traffic due to the lack of a bicycle lane does not achieve the same QOS gains as the Major Realignment.

For bicyclists, the Major Realignment improves conditions from a current QOS of D to B due to inclusion of the bicycle lanes on North Main Street. In the Minor Realignment scenario, bicyclists must still use the full lane and, in combination

Exhibit 6-6: Quality of Service Analysis for Non-Motorized Transportation at North Main Street and Walnut Street

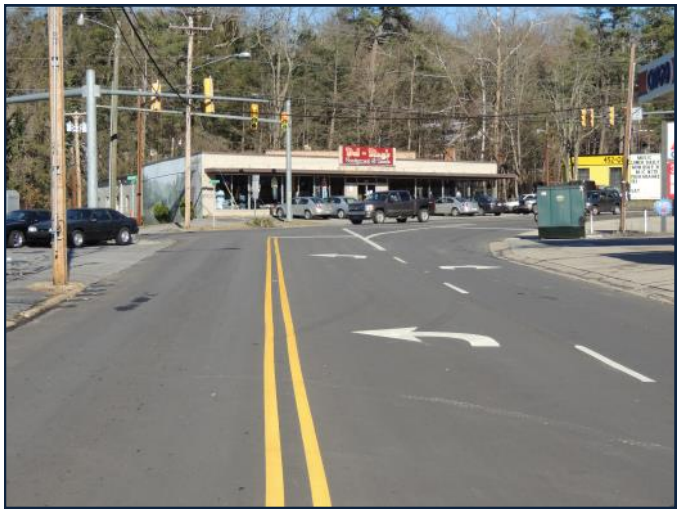
User	Current Conditions QOS (Score*)	Major Realignment QOS in 2035 (Score*)	Minor Realignment QOS (Score*)
Pedestrians	D (3.87)	B (2.45)	C (3.07)
Bicyclists	D (3.59)	B (2.68)	D (4.05)

* Numerical score is based on a range of 0.00 (excellent) to 6.5 (poor).

7. Refining Options for North Main

This chapter summarizes the six initial alternatives that were evaluated as part of this study. As stated earlier, the analysis was conducted for each design option in order to determine network operation.

- **No-build / Do Nothing**
- **Minor Realignment:** Realign North Main Street to create a T-Intersection at Walnut Street
- **Major Realignment:** Realign North Main Street to create a T-Intersection at Walnut Street – including a potential Vance Street Realignment to create a Conventional Intersection.
- **Roundabout:** Combining the current intersections of North Main Street @ Walnut Street and Walnut Street & Vance Street into a roundabout intersection.
- **Multiple T's:** Create a T intersection at Vance Street & Walnut Street, North Main Street & Walnut Street, and Marshall Street & Walnut Street.
- **Walnut T:** Realign Walnut Street to create a T-Intersection at North Main Street.



The northbound approach of North Main Street at Walnut Street is the main focus of evaluating intersection realignment options. Several alternatives were evaluated related to reconfiguring motor vehicle lanes to create 90-degree angles, reduce crossing distance for pedestrians and provide a safer environment for bicyclists and other users at the

No-Build / Do Nothing

A "no-build" alternative is typically viewed as an alternative due to federal funding requirements to evaluate what happens if nothing were done at the subject intersection. In this evaluation, a no-build alternative was evaluated, meaning no reconfiguration occur at the intersection. The subject intersection has documented geometric challenges and conflicts within adjacent land uses related to driveway access and parking. If a no-build alternative was selected, it is still possible to fill gaps in the pedestrian system and heighten the awareness of bicyclists through the intersection. This alternative is not recommended based on the purpose and need of the project.

Pedestrian Accommodations: There are gaps in the sidewalk system within much of the study area as past project investments constructed sidewalks up to the intersection but did not attempt to retrofit existing properties with sidewalks. Current "open" driveway cuts within the study area also detract from the pedestrian experience and create conflict points. If a no-build alternative were selected in terms of not altering the configuration of the intersection, filling the gaps in the pedestrian facilities is still recommended. Separate projects and negotiations would need to occur with property owners to reduce driveway conflict points.

Bicyclist Accommodations: There are no existing bicycle facilities within the project study area. A no-build alternative would not alter the curb-to-curb section of the intersection, thus prohibiting the installation of bicycle lanes. If a no-build alternative were selected, bicyclists can still be accommodated on existing travel lanes, which would be shared use. Shared lane markings combined

with signage along the route are recommended in a no-build scenario.

Motorist Accommodations: The current intersection geometry consists of a 4-way intersection. The westbound N. Main Street approach consists of two lanes – a left turn lane and a through/right lane. Although the left turn movement for vehicles continuing on N. Main Street is significant, the heaviest movement on this approach is the through movement onto Walnut Street. The eastbound Walnut Street consists of a single lane allowing all movements. The right turn movement on this approach and the corresponding northbound left turn create an unconventional acute angle. The southbound Bridge Street approach also consists of a single lane allowing all movements. Bridge Street is a short dead end street that serves much lower traffic volumes than the other approaches. The northbound approach consists of two lanes – a channelized right turn lane and a through/left lane. The heaviest movement on this approach is the right turn for traffic continuing on N. Main Street.

A no build or do nothing alternative at the intersection is related to what could occur with regard to the configuration of the intersection for motorized vehicles. Gaps in the pedestrian system would still be addressed to complete sidewalk linkages if this alternative was preferred.

Current intersection geometry and lane configurations can be seen in *Exhibit 7-1.*

As can be seen in the Synchro software reports (*Appendix C*), the overall operation of the current intersection alignments are adequate and within acceptable standards as set forth by the HCM and NCDOT. No approach currently operates at a LOS of less than 'C'. The horizon analysis is similar with no approach operation at a LOS of less than 'C'. Anticipated horizon year (2035) turning movement count data for this alternative can be seen in the *Appendix B*.

Environmental Considerations: The existing culverts and proximity of impervious surfaces to Shelton Branch has degraded the quality of the stream. There currently are no buffers along the edges of the creek to reduce sedimentation and pollutants entering the creek from nearby paving and roof tops. The no-build option does not address any of these concerns.

Properties Impacted: Other than possible negotiations with property owners for sidewalk installation and access modifications, the no-build option does not impact any properties.

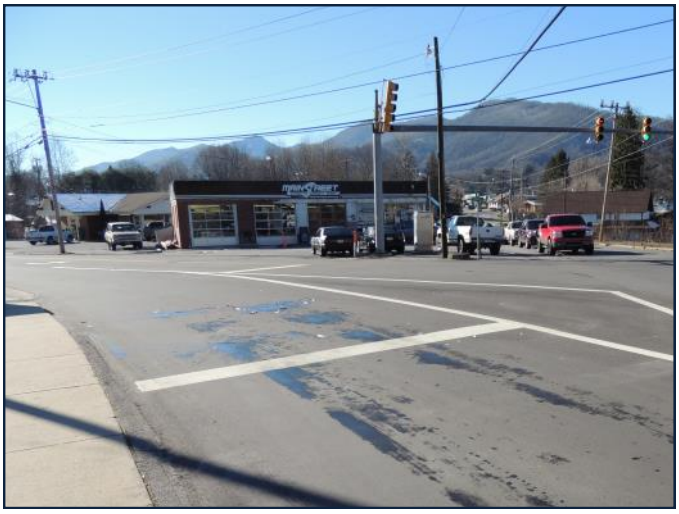
Exhibit 7-1

Current Intersection Geometry & Lane Configurations

The current alignment is a remnant of past design and development decisions in the project vicinity that did not prepare the Town of Waynesville for various multi-modal transportation needs. The approach angle of North Main Street at Walnut Street creates visibility issues for motorists, pedestrians and bicyclists. There are no notable traffic volume concerns with the existing intersection. The intersection is lacking a completed side-walk network and has no on-street bicycle facilities.

Minor Realignment

This alternative would maintain a three-way intersection at North Main Street and Walnut Street but reconfigure the intersection westward to create a more conventional T-intersection (*Exhibit 7-2)*. This will eliminate the geometric challenges associated with the existing alignment. This alternative should be considered as a recommended option based on the purpose and need of the project.



The Minor Realignment alternative would address the northbound right turn approach (shown in the foreground above) to create a 90-degree intersection. The major property impact would be to the auto repair shop (shown in the background above).

Pedestrian Accommodations: The creation of a conventional three-way intersection would increase pedestrian accommodations and safety when compared to the existing intersection by adding facilities and creating a more conventional configuration at the intersection, thus reducing pedestrian crossing distance. This option does not provide ideal pedestrian and bicycle connectivity to Vance Street and nearby recreation facilities.

Bicyclist Accommodations: Shared bicycle lanes would be added along the south leg of the intersection (North Main Street) to facilitate movement from downtown Waynesville and nearby neighborhoods to the project area. Bicyclists traveling to recreation facilities along Vance Street would need to make a left turn at the intersection to reach Vance Street along a route without bicycle facilities. Due to constraints beyond the project limits, bicycle lanes are not recommended in this alternative.

Motorist Accommodations. This option consists of a conventional three-way intersection with a 90 degree approach angle. The unnatural angle for the northbound left turn/eastbound right turn movement is eliminated. Because of the improved intersection alignment with this option, it is anticipated that a minimal number of drivers may alter their travel patterns. However, this number is expected to be small and will not be significant in overall intersection operation. This option also increases the likelihood of allowing a northbound right turn on red. The proposed configurations are shown in *Exhibit 7-2*.

As can be seen in the Synchro software reports (*Appendix C*) the overall operation of this option at the horizon year is adequate and within acceptable standards as set forth by the HCM and NCDOT. The horizon analysis is similar with no approach operation at a LOS of less than 'C'. Anticipated horizon year (2035) turning movement count data for this alternative can be seen in the *Appendix B*.

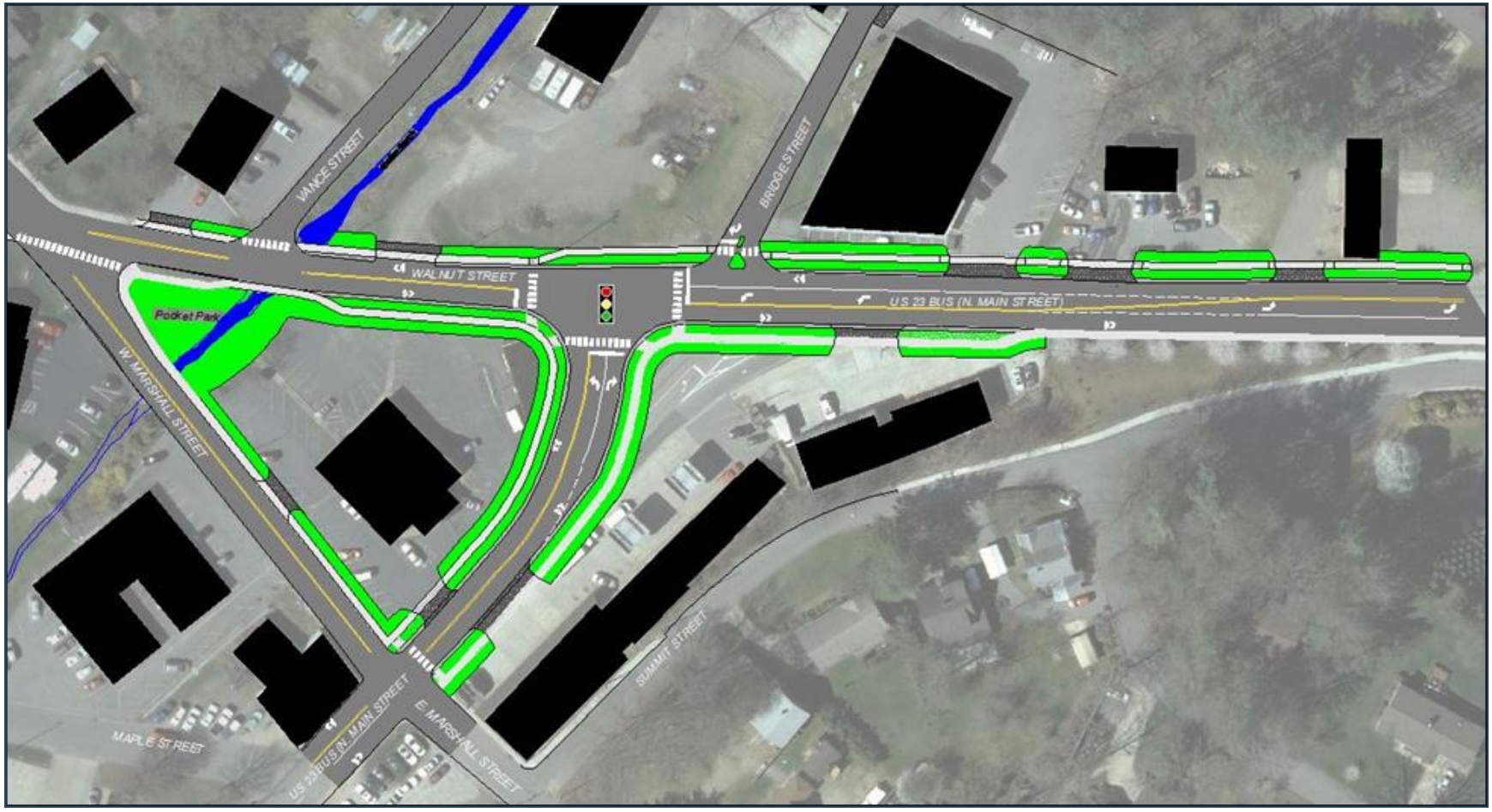
Environmental Considerations. Similar to the no-build option, the existing culverts and proximity of impervious surfaces to Shelton Branch has degraded the quality of the stream. There currently are no buffers along the edges of the creek to reduce sedimentation and pollutants entering the creek from nearby paving and roof tops. This option does not address any of these concerns.

Properties Impacted. Property impacts would be heaviest in the triangular parcel in the southwest quadrant of the intersection. Additionally, property Impacts may be possible during negotiations with property owners for sidewalk installation and access modifications.

Exhibit 7-2

Minor Realignment

The Minor Realignment alternative would address many long-term transportation, land use and economic development needs east of downtown Waynesville but would not allow for a future connection to Vance Street, thus limiting more direct access for all users wishing to reach the Recreation Center, Howell Mill Road and other facilities. The Minor Realignment option corrects existing geometric design issues related to visibility at the intersection and would complete the sidewalk network. To minimize property impacts, no dedicated on-street bicycle facilities are included. Shared lane markings are recommended in lieu of bicycle lanes.



Major Realignment

This alternative would correct the existing geometric issues at the intersection while also potentially tying North Main Street to Vance Street via a conventional intersection (*Exhibit 7-3*). The Vance Street connection is not officially recommended as part of this project but could easily be accomplished as a future project. The direct route to Vance Street would create a more complete connection to the recreation facilities and neighborhoods while addressing turning radii at the existing Vance Street intersection. This option is still viable even without the potential Vance Street realignment. Part of this option includes the closure and removal of Marshall Street between Walnut Street and North Main Street. This alternative should be considered as a recommended option based on the purpose and need of the project.

The Major Realignment alternative would bisect the triangular shaped set of parcels and have major impacts to the restaurant and auto repair shop. The Major Realignment is the only option that allows for a future Vance Street connection to help facilitate direct multi-modal access to the recreational facilities.

Pedestrian Accommodations. The creation of a conventional intersection would create more predictability for pedestrians than the current configuration and reduce pedestrian crossing distance at North Main Street and Walnut Street (when compared to current conditions). The addition of sidewalks throughout the project study area is included along with crosswalks and other features at the intersection. A more direct route to Vance Street would accommodate pedestrian trips to recreational facilities and also correct existing facility gaps at Vance Street and along a portion of Vance Street.

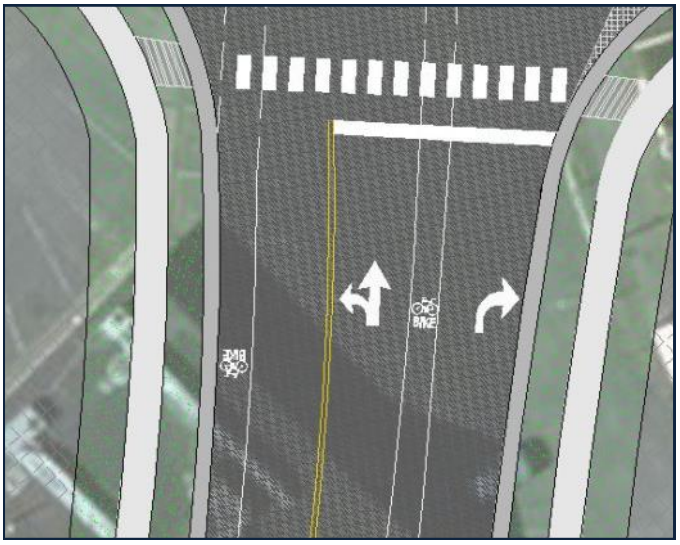
Bicyclist Accommodations. In this alternative, bicycle lanes would be added along the south and north approaches of the intersection (North Main Street and Vance Street) to facilitate movement from downtown Waynesville and nearby neighborhoods to the Vance Street recreation facilities. Due to constraints beyond the project limits bicycle lanes along the east and west approaches are not recommended as part of this alternative.

Motorist Accommodations. This option consists of a conventional intersection with a 90 degree approach angle. The unnatural angle for the northbound left turn / eastbound right turn movement is eliminated. Because of the improved intersection alignment and Marshall Street closure, it is anticipated that some drivers will alter their travel patterns. This option will also increase the likelihood of a northbound right turn on red allowance. The proposed lane configurations for this option can be seen in *Exhibit 7-3*.

As can be seen in the Synchro software reports (*Appendix C*) the overall operation of this option at the horizon year is adequate and within acceptable standards as set forth by the HCM and NCDOT. Intersection operation is improved with this configuration as no approach operates at a LOS of less than 'B' during the horizon year. Anticipated horizon year (2035) turning movement count data for this alternative can be seen in the *Appendix B*.

Environmental Considerations. This option would eliminate one crossing over Shelton Branch, and allow for establishment of a vegetated buffer along both sides of the creek. The buffer will reduce pollutants running into the creek, and will reduce runoff velocities entering the creek. If the potential Vance Street alignment is pursued, an additional culvert will need to be installed to accommodate the Shelton Branch crossing.

Properties Impacted: This alternative would require the most property acquisition. Property impacts would be heaviest in the triangular parcel in the southwest quadrant of the intersection. Additionally, property impacts may be possible during negotiations with property owners for sidewalk installation and access modifications.



A more detailed image of North Main Street at Walnut illustrates how the Major Realignment will allow space for bicycle lanes that connect to Vance Street and the recreational facilities. It also allows for wider sidewalk buffers and planting strips between the sidewalk and building setbacks or parking areas.

Roundabout

The consultant team evaluated a roundabout at the intersection based on feedback from attendees at the public meeting. The team felt a roundabout may be a way to accommodate traffic flows without a signal along the corridor. After evaluation, it was determined that a roundabout was not feasible due to the impact on adjacent properties, the proximity of the culvert over Shelton Branch, and the sheer scale of the roundabout and its impacted area.

Pedestrian Accommodations. Pedestrian facilities would be constructed with a roundabout to fill existing gaps in the sidewalk network. Special design considerations are required at roundabouts to facilitate safe pedestrian movement through the intersection. Pedestrians would have to cross only one-lane of traffic at a time and only two lanes on each leg of the intersection. They would not be constrained by signal timing, thus creating more fluid pedestrian travel.

Bicyclist Accommodations. A roundabout requires dual consideration of bicyclists to navigate the intersection. Bicycle lanes or shared lanes may terminate into the roundabout creating a potential navigational hazard. However, roundabouts are generally considered safer for bicyclists due to slower operating speeds of vehicles approaching and traveling through this type of intersection.

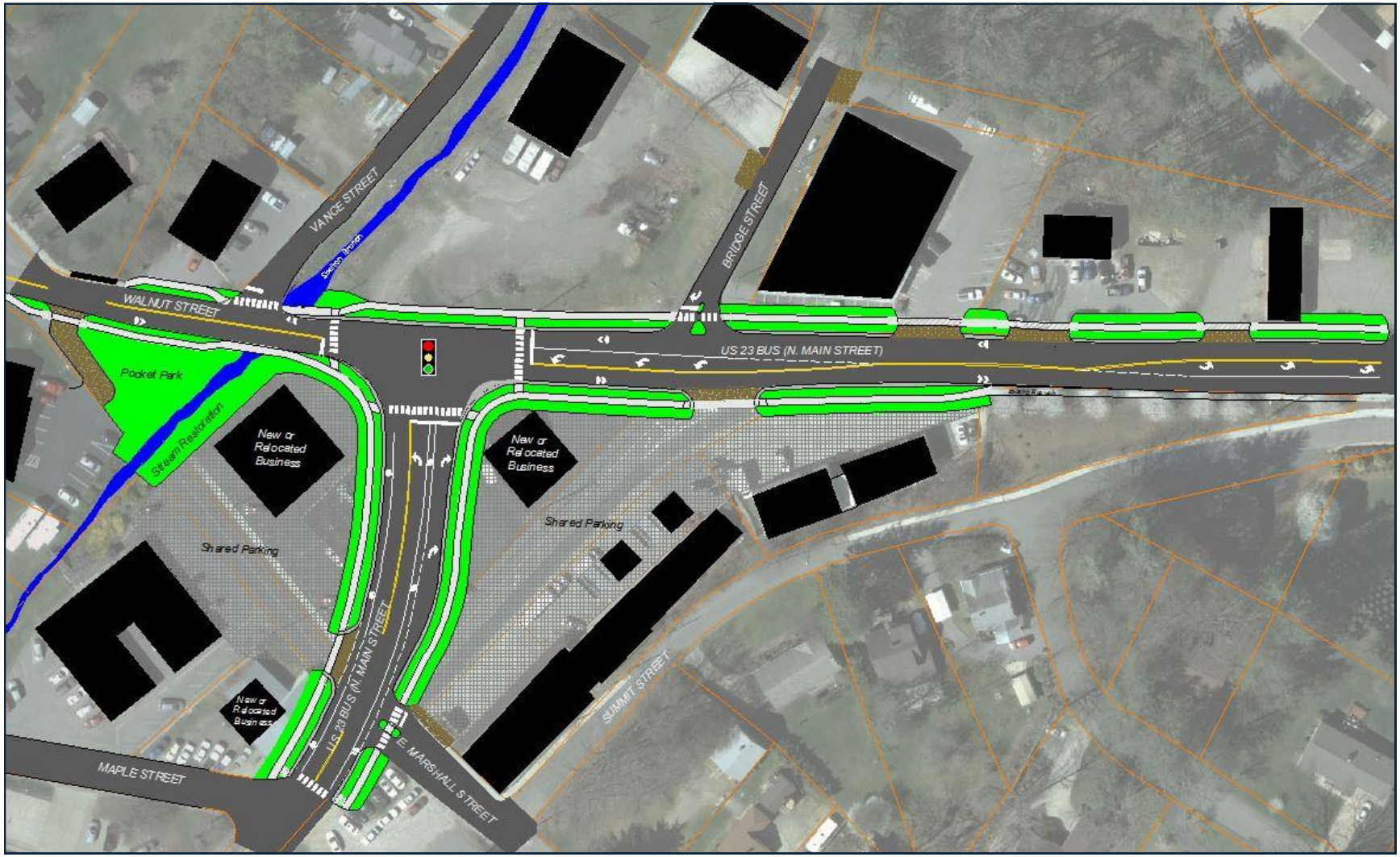
Motorist Accommodations. As a whole, roundabouts can operate as much as 60 percent more efficient than a traffic signal and reduce collisions significantly, virtually eliminating head on crash potential. However, due to the early identification of the constraints described above, this option was dismissed as a viable alternative and was not further analyzed for motorist accommodations.

Environmental Considerations. While this option would eliminate one crossing over Shelton Branch, it would require a longer culvert where Walnut Street crosses over Shelton Branch, and a new culvert where Vance street crosses over Shelton Branch. The total impact to the creek would actually increase with this option.

Exhibit 7-3

Recommended Alternative: Major Realignment

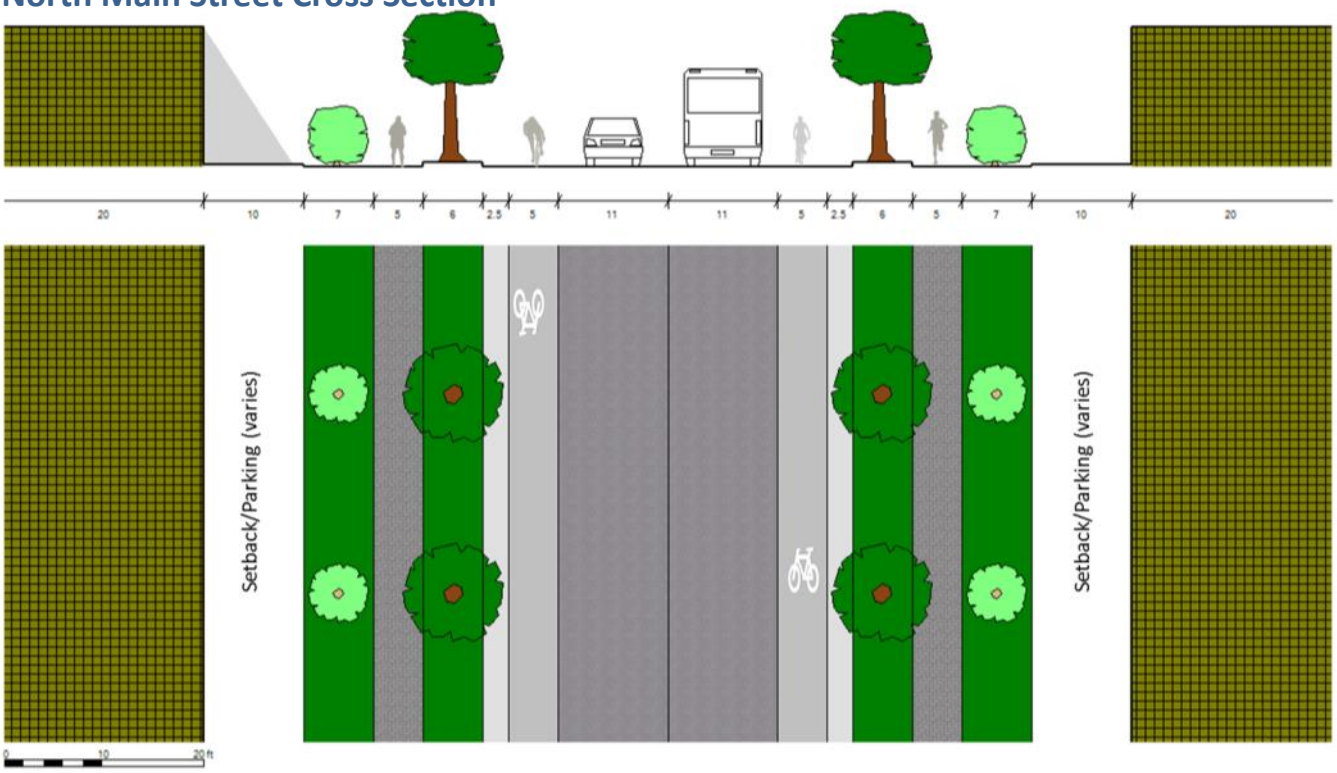
The major realignment alternative is the recommended approach to addressing various long-term transportation, land use and economic development needs east of downtown Waynesville. The recommended realignment shown below has notable impacts to properties, which is typical for an urban environment. The impact to the two businesses south of Walnut Street is significant, requiring relocation. The long-term vision to create a more direct and safe multi-modal connection to the recreational facilities north of the intersection along Vance Street was a major consideration in recommending this alignment.



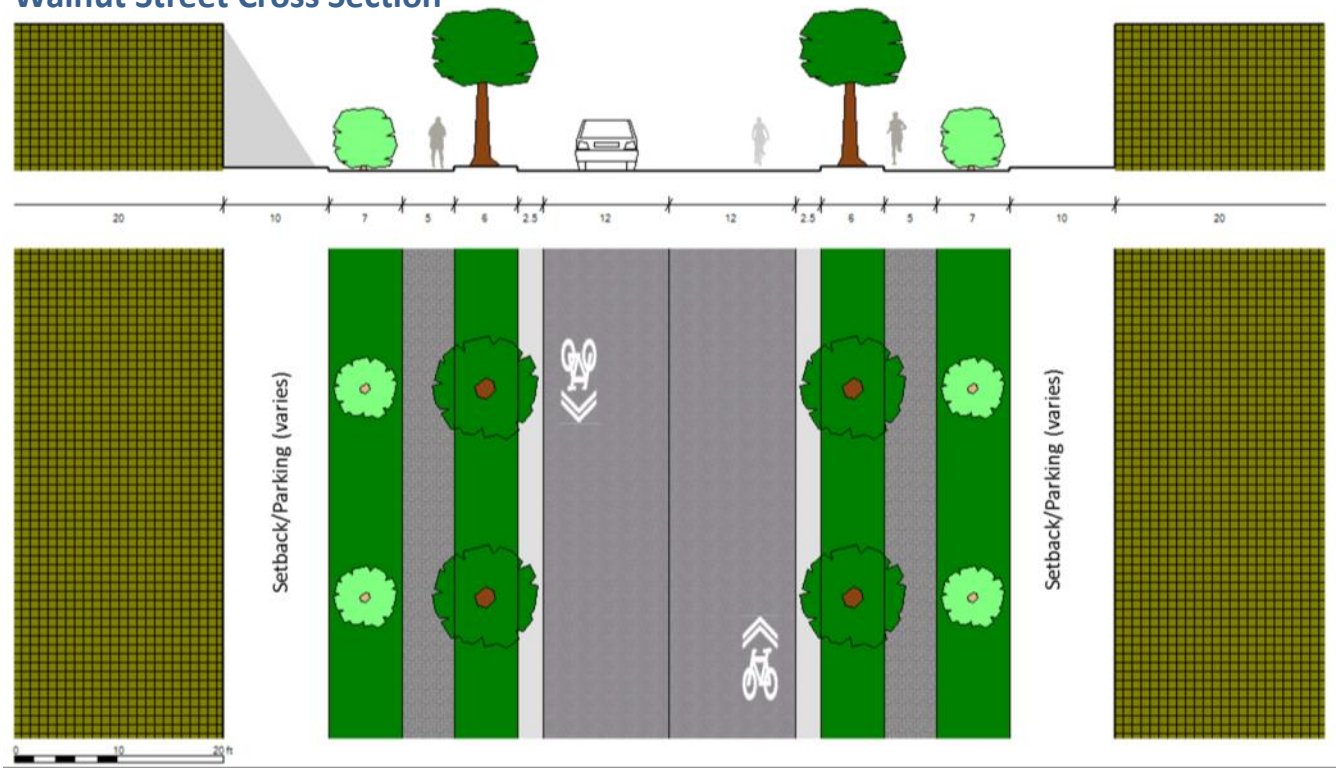
Cross Sections

Below are conceptual street cross section dimensions for the Major Realignment alternative.

North Main Street Cross Section



Walnut Street Cross Section



Other Options

The consultant team also evaluated two additional alternatives. Initial consideration was given to realigning Walnut Street into N. Main Street as a "T" intersection. However, the traffic count data indicated the primary overall movement through the intersection was the eastbound and westbound approaches from N. Main Street to Walnut Street and vice versa. As a result, this option was dismissed as a viable alternative and was not further considered.

The team also considered creating several "T" type intersections at: Vance Street & Walnut Street, North Main Street & Walnut Street, and Marshall Street & Walnut Street. Early evaluation indicated possible operational concerns with this option. Due to the proximity of these newly formed intersections, there would be an overlap in their area of influence, creating potential safety challenging for turning vehicles. As a result, this option was dismissed as a viable alternative and was not further considered.

Refinement of Alternatives & Recommendation

The team's recommendation is the Major Realignment option. This option was selected based on the data analysis, public input, and future planning opportunities.

Key factors in this recommendation include:

- The Major Realignment provides the most options for future facilities in the intersection vicinity as well as on streets in the area, particularly Vance Street.
- It allows for the most comprehensive inclusion of non-motorized facilities (e.g. bicycle lanes and sidewalks with buffers) to achieve Complete Streets goals.
- It allows for a future Vance Street alignment to directly link multi-modal users and nearby residents to existing and planned recreational facilities to the north.
- No approach operates at less than "LOS B" for this alternative, which ensures adequate function beyond the horizon year of the project analysis.
- 100 foot storage lanes, adequate for turn lanes, can be accommodated.
- Signal phasing / timing can be improved compared to current conditions (impacts would be analyzed during project design).

While there are many positive aspects of this recommended alternative, it is impossible to avoid potentially negative impacts on any alternative. The major realignment recommendation is based on what the consultant team feels is the best-fit alternative to address current needs and allow Waynesville to fulfill its vision for a more interconnected and multimodal transportation system. Property impacts are always difficult for those businesses and property owners who are directly affected. Through early involvement during design and making appropriate accommodations, the effects on those impacted should be minimized to the greatest extent possible.

8. Activity Connection Plan

In addition to the design efforts at the intersection of North Main Street and Walnut Street, an *Activity Connection Plan*® (ACP) was conducted to identify "off-site" pedestrian and bicycling improvements that are also important in achieving Complete Streets goals and maximizing return on investment.

The ACP is a planning model and process that takes full advantage of the most likely street network movements by both pedestrian and bicyclists: Recreational trips that promote physical activity and can improve individual and community health. 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.

The focus area for the Waynesville area ACP is centered on the project intersection located east of downtown Waynesville and expanding outward a distance suitable for both walking and biking. All told, eight recreational sites are located inside a 1.5 mile radius. The sites include regional parks, smaller community

Exhibit 8-1: Overview
An overview of the Waynesville ACP focus area (below) shows the eight sites included for assessment. The sites range in both size and uses. Some of the activity sites are officially designated as recreational places while others are unofficial such as Lake Junaluska Elementary School and Pigeon Community Center. Worth noting is the absence of recreational sites south of the project intersection. Terrain, community resources, and opportunities may be obstacles for such sites but worth further consideration in the future.

parks, schools, running tracks, baseball fields and basketball courts.

As described, the ACP model looks at where potential users of recreational sites are located and more specifically, the likely routes used to access them. In Waynesville, several regional highways span the community linking several neighborhoods or sectors. The ACP model only focuses on the street or street segments with the highest probability for use to focus resources in a manner that streamlines project focus locations to maximize use sooner than later.

Over time and as the suggested improvements are made, the community should see increased rates of walking and biking. Assuming the community continues with improvements beyond the ACP, users should start to feel more comfortable with the idea of walking to a grocery store or bicycling to a job site. However, getting trepid users more confident in their skills for more utilitarian trip making is a principal objective of the ACP concept.

Exhibit 8-2: Notable Routes and Destinations that can promote active transportation

Determining which routes should be of utmost priority for bicycle and pedestrian infrastructure includes a series of analysis steps. 1. Does the street access the site directly? 2. Does the street reach into an adjoining population pocket? 3. Is the route the most direct of the routes accessing the site? 4. Where is the logical terminus for improvements? After determining the routes most suitable to answer the questions posed, the below map shows those to be further explored throughout the balance of the report.

Waynesville Recreation Park

Bicycle parking (left) and fix-it stations (right) can add both practical use and aesthetic value. The need for more bicycle parking was identified in the Haywood County Comprehensive Bicycle Plan.

Exhibit 8-3: Activity Connection Plan Recommendations for Access to the Waynesville Recreation Park

Street	Issue	Infrastructure Improvement	Non-Infrastructure Improvement
Marshall/ Main	Crossing	Install crosswalks linking neighborhood to park	
Marshall/ Walnut	Crossing	Install crosswalks linking neighborhood to park	
Marshall/ Walnut	Signage	Install wayfinding signage on Walnut indicating the presence of the Recreation Park	Seek to install park promotional signage such as banners or community art
Marshall	Bike Facilities	Paint shared land markings on Marshall between North Main Street and railroad tracks	
Park Entrance	Driveway Conflict	Stripe pedestrian walk space across park driveways	
Park Site	Bike Parking	Install bike racks throughout park site. Install a fix-it station for bikes, strollers and other users who need to make quick repairs.	Standard parking or decorative, monumental bike parking.
Vance/ Walnut	Pathway Extension	Seek to extend pathway from driveway/ street terminus to Walnut	
Vance/ Pathway	Pathway Gap	Fill gap between driveway path and existing pathway section	
Vance/ Parkview	Crossing	Construct pedestrian crossing and crosswalk from neighborhood to park site and pathway	
Parkview	User Space	Paint shared land markings from Vance to Keller	

Vance Street Park & Recreation Center

Lining Vance Street with a series of banners similar to the above would indicate to visitors, potential residents and current residents the presence of a unique community asset and promotion of health and recreation as an attribute of quality of life.

Exhibit 8-4: Activity Connection Plan Recommendations for Access to Vance Street Park

Street	Issue	Infrastructure Improvement	Non-Infrastructure Improvement
Vance	User Space	Install shared lane markings due to width restrictions, long term seek bike lanes or sidepath	
Vance	Signage	Install wayfinding signage on Vance indicating the presence of the park and fitness facility	Seek to install park promotional signage such as banners or community art, make Vance a recreational corridor
Park Site	Bike Parking	Install bike racks throughout park site	Standard parking or decorative, monumental bike parking
Vance/Howell Mill	Pathway Extension	Complete the pathway to Howell Mill Road	
Vance Trail	Rock Barrier	Replace large boulder in pathway with obelisk or bollard	Ideal location for community recreation map kiosk and bulletin board
Site	Promotion		Ideal location for fun run and fundraising for park improvements

Waynesville Lodge Baseball Field

Use of outdoor gyms continues to increase as facilities have improved in terms of variety, universal design, materials and minimum maintenance. Adding such facilities at sports fields allows others to use the site.

Exhibit 8-4: Activity Connection Plan Recommendations for Lodge Baseball Field

Street	Issue	Infrastructure Improvement	Non-Infrastructure Improvement
Dellwood/ Love	Crossings	Install crosswalk across Love Lane	
Dellwood/ Love	Turn Radius	Install curb extension on SW corner to minimize crossing distance and slow turning vehicles	
Dellwood	Sidewalk Obstructions	Remove utility poles on east side of roadway	
Dellwood	Signage	Install wayfinding signage indicating fields	
Dellwood/ Field	Pedestrian Access	Formalize driveway into park pathway around perimeter of park site	Organized run/walk events for fundraising, awareness, can include the park trail
Dellwood/ Field	Sidewalk Gap	Fill sidewalk gap on the eastside of roadway	
Henry Street	User Area	Wrap sidewalk around from on parking stalls identical to Pigeon Community Center and Central Elementary School	
Henry/Field Access	Usable Space	Consider reconfiguring space between Henry and the outfield fences of both fields	Space could be a skate or BMX park, outdoor gym area

9. Cost Analysis

A planning level cost estimate was conducted on the recommended Major Realignment option. Exhibit 9-1 contains an estimate based on the approximate scope of the project with consideration of pavement, structures, right-of-way acquisition and other related construction and site preparation elements. The total estimate is $3.2 million, which includes an estimated $1.16 million in right-of-way acquisition. The estimated cost for design of the project is $460,000.

The Town of Waynesville may use these estimates for project requests to NCDOT and FBRMPO. They are estimated in 2013 dollars based on recent bids on similar materials. If funds are pursued in future years, these costs will need to be escalated based on prevailing rates of increased costs.

Exhibit 9-1: Cost Estimate for Major Realignment Option (2013 dollars)

ITEM	QUANTITY	UNITS	UNIT COST	EXTENSION
Mobilization	1	EA	$ 10,000.00	$ 10,000.00
Mill Existing Paving	6500	SY	$ 2.00	$ 13,000.00
Demolish Existing Paving	6000	SY	$ 10.00	$ 60,000.00
Demolish Existing Concrete	500	SY	$ 10.00	$ 5,000.00
Relocate Power Pole / Lines	12	EA	$ 5,000.00	$ 60,000.00
Demolish Existing Buildings	7000	SF	$ 20.00	$ 140,000.00
Remove Existing Culvert / Headwalls	1	EA	$ 10,000.00	$ 10,000.00
Clearing and Grubbing	1	AC	$ 1,500.00	$ 1,500.00
Erosion Control	2	AC	$ 10,000.00	$ 20,000.00
Mass Grading	3000	CY	$ 5.00	$ 15,000.00
Fine Grading	1	EA	$ 25,000.00	$ 25,000.00
Tack Coat over Existing Asphalt	6500	SY	$ 2.00	$ 13,000.00
2" Overlay over Existing Asphalt	6500	SY	$ 12.00	$ 78,000.00
New 10"/2.25"/2.5" Asphalt Section	1600	SY	$ 42.00	$ 67,200.00
New Sidewalk	400	SY	$ 45.00	$ 18,000.00
Striping / Turn Arrows Bike Lane Markings	1	EA	$ 14,500.00	$ 14,500.00
New Concrete Drive Aprons	100	SY	$ 55.00	$ 5,500.00
30" Curb and Gutter	1800	LF	$ 25.00	$ 45,000.00
New Guardrail	120	LF	$ 50.00	$ 6,000.00
New Storm Piping	2000	LF	$ 40.00	$ 80,000.00
New Catch Basins	13	EA	$ 2,000.00	$ 26,000.00
New Storm Outlets & Riprap	2	EA	$ 2,500.00	$ 5,000.00
Creek Restoration	150	LF	$ 30.00	$ 4,500.00
Seeding / Straw	1	AC	$ 2,000.00	$ 2,000.00
Traffic Signal	1	EA	$ 250,000.00	$ 250,000.00
Clifford Gould LLC property acquisition / relocation	1	EA	$ 990,000.00	$ 990,000.00
Leatherwood, Judy poperty acquisition / relocation	1	EA	$ 166,000.00	$ 166,000.00
Sidewalk and Buffer easement acquisistion	1	EA	$ 150,000.00	$ 150,000.00

Note: These estimates are not based on engineering drawings, and are estimates only. Unit prices are based on bids from recent projects of similar scope.

Subtotal (Rounded)	$2,280,000.00
Contigency (20%)	*$ 460,000.00*
Engineering / Project Management (20%)	*$ 460,000.00*
TOTAL	**$ 3,200,000.00**

10. Summary & Next Steps

The completion of this study is a critical first step in the Town of Waynesville realizing a vision for North Main Street to be an enhanced gateway to the Town. Once the study in complete, the Town will need to pursue other action steps to fully implement its findings and position the project for funding through the French Broad River Metropolitan Planning Organization (FBRMPO) and North Carolina Department of Transportation (NCDOT). This section summarizes the next steps for implementation to be pursued by the Town of Waynesville and its many partners throughout Haywood County and the region.

Adoption of the study by the Town of Waynesville Board indicates support for the project and allows for a series of implementation actions to be set in motion. Pursuing partners and exploring various funding options for elements such as stream restoration and overall project funding are Next Steps beyond endorsement of the study.

Adopt the Study

The Town of Waynesville should adopt the North Main Street Complete Streets Study via resolution by the Town Board to indicate support for the study's findings and showcase to the public a commitment to pursue its implementation. It is also advised that the findings be presented to the Technical Coordinating Committee and Technical Advisory Committee of FBRMPO. Area partners such as a NCDOT's Division 14 office, Haywood County and its Commissioners, and BicycleHaywoodNC should receive copies of the study.

Request Prioritization for FBRMPO's TIP

NCDOT is in the throes of revamping the methods by which it prioritizes and funds transportation investments. These changes were brought about by legislative action through the North Carolina General Assembly in 2013. Through the summer and fall of 2013, FBRMPO will undertake a process to identify its own method for prioritizing projects within the region for consideration for inclusion in updates of the Transportation Improvement Program. The Town of Waynesville needs to determine where the North Main Street Complete Streets improvements lie in terms of priority with other recommendations from previous studies such as the South Main Street Study and Russ Avenue Corridor Study. FBRMPO is able to provide feedback as to which improvements from these studies fit into the new funding tiers in NCDOT's programs as different funding mechanisms may apply.

Depending on funding and Town priorities, Waynesville could pursue full-scale design of the project prior to construction funding being programmed to position the Town for implementation in the event that special funding programs or grant opportunities emerge.

Ensure Land Use Policies reflect Study findings

Waynesville's Land Development Plan as well as its zoning ordinance and related policies include many elements that will help the Town continue to achieve a walkable and bikeable urban environment. It is possible that some findings of the North Main Street Complete Streets Study, perhaps in combination with other corridor studies, may necessitate a reconsideration of some of these policies. If so, the Town of Waynesville should pursue an update of these policies to reflect study findings to ensure new land development in the project footprint and vicinity supports Complete Streets tenets.

Just as upgrades were made to accommodate pedestrians more safely along Asheville Highway, the Town and its partners should pursue similar facility upgrades along streets that link the North Main Street and Walnut Street intersection to recreational facilities, shopping areas and neighborhoods.

Monitor Land Development

It is likely that land use will change, properties will redevelop and new land uses emerge in the project vicinity before project improvements are implemented at the intersection of North Main Street and Walnut Street. The Town of Waynesville should monitor property transactions and development proposals in the project area in order to ensure the preferred alignment is not compromised before implementation is pursued. The Town may seek opportunistic purchase of property to safeguard against re-development placing buildings or other structures in the footprint of the preferred alignment.

Pursue other Complete Streets Investments Beyond the Project

The Activity Connection Plan® effort was intended to identify the importance of making linkages between places that can promote physical activity through the direct investments envisioned at North Main Street and Walnut Street. Additionally, there are "off-site" investments that should be considered as either separate projects or as an aligned request for Transportation Alternatives funds through the FBRMPO. Crosswalks are desired at some nearby intersections near the North Main Street / Walnut Street intersection. These may be accommodated through requests to NCDOT Division 14 along state-managed routes on through the Town's resources on town-managed routes. Pedestrian facilities in the form of a side path or sidewalks are recommended along Vance Street to connect to the various recreation facilities. These may be requested through the MPO or other sources, as well as constructed through Town resources.

Identify partners

To maximize the Town of Waynesville's investment in the North Main Street and Walnut Street intersection, various education, encouragement and enforcement programs should be pursued. These can and should include efforts by various partnering agencies and organizations that are well-suited to provide such programming support. Partners such as Haywood County Schools, Haywood County, BicycleHaywoodNC, Healthy Haywood, and law enforcement can all play a role

in identifying funding sources and managing programs to promote more pedestrian and bicycle travel and less motorized travel, as well as safer travel for all modes.

Measure Performance

It may be many years before the North Main Street Complete Streets Study recommendations are fully realized. In the meantime, the Study should not be viewed as a static document. Transportation demand will change, as will land use. The vision for increased investment in the Town's recreation facilities will create additional demand through the project study area across all modes. As the Town works toward implementation, it is recommended that activity in and around the study area be tracked on a regular basis. Knowing how the characteristics of transportation and land use change around the project area can help further inform the full design and construction effort as well as make a continuing case for funding of the project. It can also help bolster the priority of the project through FBRMPO and NCDOT efforts.

Some performance measures that can be analyzed for changes over time include:

- Vehicular traffic counts
- Vehicular delay
- Accident rates
- Pedestrian counts
- Bicyclist counts
- Number of building permits issued within ½-mile of the project

Until the project enters the design phase, the Town, its partners and other agencies should regularly monitor activities near the intersection, including number of users and changes in land use. This will help inform specific design decisions and where assumptions made in this study may need to be revisited during design due to changing conditions.

Beyond the Pavement

The North Main Streets Complete Streets study was tasked with defining features of the transportation system within a defined project limit, but as noted above with land use, it is imperative that the Town of Waynesville and its partners also continued to pursue and enact policies and programs to support Complete Streets beyond this. Outside the project limits, other investments in sidewalks, greenways, bicycle lanes, crosswalks and wayfinding should also be considered as funding is pursued for intersection improvements, as identified in the *Activity Connection Plan*.

Beyond land use policy, maximizing investment in Complete Streets and increasing usage is also dependent upon various programs in the area that encourage active modes of transportation. Groups such as Haywood County Schools developing a Safe Routes to Schools program; BicycleHaywoodNC educating and encouraging safe bicycle riding skills; Town Police and Haywood County Sheriff conducting safety campaigns and stings; and various efforts by the Town's Parks and Recreation Department to promote the Recreation Center and Greenway are all vital in promoting increased physical activity through active transportation.

Other Complete Streets Considerations

Curb Ramp and Landing Design

Curb ramps are where the sidewalk meets the street and are critical to facilitate safe movement from pedestrians to and from the sidewalk system. The function of curb ramps is to provide safe passage onto a sidewalk for non-motorized roadway users, especially those challenged by a curb step such as parents with strollers, joggers, older adults, or children.

The practice of curb ramp construction in North Carolina has been in place since passage of ADA and subsequent design guidelines. Implementation has been slow to conform to standards. As standards have changed, many previously constructed facilities have not been upgraded and do not meet current standards ADA.

NCDOT recently modified its standards and now provides other options for curb ramp design, based on conditions, to meet ADA standards. The Town of Waynesville may be using standards prior to those recently adopted by NCDOT. The new standards can be found through NCDOT's website.

Additional information on curb ramps can be obtained through the United States Access Board's Public Right-of-Way Accessibility Guidelines (ADAAG) and ITE.

Bicycle Facilities & User Types

Not all bicyclists have common needs as they are the most diverse type of user along a street. A recreational cyclist who travels long distances is comfortable operating in many different conditions, but they are not the norm and definitely not the type of bicyclist that should be viewed as the "design vehicle" when considering Complete Streets implementation. In the same manner that a truck or delivery vehicle is considered the "design vehicle" for motorized vehicle design parameters in street design, it is important to recognize its equivalent in the bicycling realm—the bicycle with a chariot.

A chariot is a trailer attached to a bicycle that is used primarily to haul a child or children behind a bicycle. This is the type of bicycle that is very likely to journey to parks, recreation facilities and greenways from their home. While AASHTO standards indicate a minimum width for bicycle lanes as 4-feet, this width is barely wide enough to accommodate a bicyclist with a chariot. Just as engineers rarely recommend a 9-foot vehicular travel lane (the AASHTO minimum for urban streets), the 4-foot bicycle lane should be seen as the minimum only in the most constrained situations. It does not allow for appropriate shy distance for the widest bicycle design vehicle.

Maintenance & Operations

The importance of recognizing that Complete Streets should accommodate all users of all abilities at all times, as noted in the Introduction to this study, is key to understanding what should drive decisions to accommodate pedestrians and bicyclists during maintenance and operation activities along streets.

Surface Conditions. Surface conditions along walking or bicycling routes can greatly detract from the willingness and ability of pedestrians and bicyclists to use facilities intended for their transport. Just as a community would not allow a

downed tree to block vehicular travel lanes, such conditions should not be allowed to persist along sidewalks and in bicycle lanes. The removal of debris, trimming of trees and shrubs and clearing of debris is crucial. While resources for clearing of such debris may be limited, municipalities can often times find neighborhood groups, non-profits and other organizations to assist in the clearing of debris and other temporary obstructions from the pedestrian way or bicycle route.

Waynesville is subject to heavy snowfall during winter. In most instances, property owners clear the sidewalks. The Town should be careful not to plow snow onto sidewalks or obstruct bicycle lanes for long periods of time after snowfall.

Signal Timing. While signs, utility poles or the absence of sidewalks are seen as physical barriers to Complete Street users, particularly pedestrians, the timing of traffic signals are a type of traffic operations application that can also have a barrier effect. Signals should be timed to balance the needs of vehicular traffic along a route while being cognizant of the effect that signal timing has on pedestrians.

MUTCD contains guidance on signal timing to allow for older adults or persons with disabilities to cross a street. The information contained in MUTCD addresses only crossing time, which is critical to consider so that pedestrians are not still in the street when the lights turn green.

The time a pedestrian must wait to cross an intersection is also important. As traffic engineering practices has evolved under a philosophy that motorists should typically only have to wait through one signal cycle, the result at some intersections has been instituting a longer wait time for pedestrians. Cycle lengths should be minimized to accommodate both pedestrian and motorist needs with some consideration given for time of day conditions. However, peak period vehicular travel periods should not dictate signal timing as this is often times also the peak time for pedestrian traffic.

As land use and travel conditions change around an intersection, NCDOT and municipalities should evaluate signal timing to maximize safety for all modes while not having a deleterious effect on pedestrians.

Wayfinding

Wayfinding is an important element of the built environment that promotes safe use of facilities along the best-suited routes for pedestrians and bicyclists. As noted earlier in this chapter, the flexibility of pedestrians and bicyclists means they do not need to be subjected to the same route decisions that are prescribed for motorists. Installation of a system wayfinding signage helps identify suitable routes for pedestrians and bicyclists to reach their destinations. Wayfinding is also a valuable feature in communities where there are high volumes of visitors/ tourists.

A pedestrian and bicyclist wayfinding system can easily be integrated into other wayfinding efforts. Bicyclists can use streets, sidewalks, greenways, and bicycle lanes. Pedestrians can use sidewalks and greenways. Key destinations should be identified on wayfinding signs with an understanding of the destinations best suited for non-motorized modes.

Concluding Remarks

This study was developed through a public planning process involving a broad range of people, including land owners, municipal officials, residents and professionals. The content within provides the foundation needed to support the "Complete Streets" initiative desired by the Town of Waynesville. It is anticipated that with funding pursuit, community support and creative complete street design, this project will become a reality and will serve the Waynesville community for many years to come.

Appendix A

Raw Count Data

Appendix B

Turning Movement Counts

Appendix C

Capacity Analysis